Abstracts

Parallel session A

Population health I

[001] WEALTH AND HEALTH IN EUROPE AND THE USA: A COMPARATIVE ANALYSIS

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Background and Objectives: There are enormous variations across countries in wealth and wealth inequality, but it is not known whether these translate into variations in the distribution of health. This study examines the association between wealth and health across Europe and the USA.

Data and Methods: Data comprised nationally representative samples of men and women aged 50–74 who participated in the 2004 cross-sectional Survey of Health, Ageing and Retirement in Europe (n = 21,569), the English Longitudinal Study of Ageing (n = 6880), and the United States Health and Retirement survey (n = 13,667). Measures of health, wealth and demographics were directly comparable across countries. Outcomes comprised physical health (measured by IADL limitations), mental health, cardiovascular disease, stroke, hypertension, diabetes, cancer, lung disease and functional limitations with instrumental activities of daily living (IADL), adjusted for health behaviour risk factors and depression. Analyses were conducted using logistic regression, entering interaction terms to allow estimates of the effect of wealth to differ according to country or region, and adjusting for confounders and potential mediators.

Results: Despite their lower wealth, European adults had better health than their US counterparts, particularly at the bottom of the wealth distribution. The health gap between the upper and bottom wealth tertiles was generally smaller in Continental Europe than in the English or US population. Odds ratios (OR) for cardiovascular disease were 1.09 (95% CI 1.02 to 1.16) in Continental Europe, 1.02 (95% CI 1.02 to 1.15) in England and 1.36 (95% CI 1.72 to 2.25) in the USA. Corresponding ORs for reporting >1 IADL limitations were 1.98 (95% CI 1.72 to 2.28) in Continental Europe, 3.32 (95% CI 2.68 to 4.11) in England, and 2.70 (95% CI 2.29 to 3.19) in the USA. The association between absolute wealth and health was significantly smaller in Continental Europe, and was curvilinear at higher levels of wealth in all countries. Associations were independent from income and education, and were attenuated but remained significant after adjustment for risk factors.

Conclusion: European adults are generally less wealthy but exhibit better overall health and smaller wealth inequalities in health than their US counterparts. Variations may reflect the impact of more egalitarian wealth distribution and healthcare care policies in some European countries than in the USA.

[002] COMPARISONS OF HEALTH DETERMINANTS IN REGIONAL AREAS IN EUROPE

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Background: Relative to Western Europe, the Glasgow area has high morbidity and mortality, which may be attributable to elevated rates of negative health-related behaviours, such as smoking and alcohol consumption. Overall, Glasgow is more deprived than other regions.

Objective: To investigate whether differences in health determinants between adults in Greater Glasgow and those in selected urban areas elsewhere in Europe can be explained by socioeconomic factors.

Design: Data on age, sex, area, smoking, body mass index, alcohol consumption, physical activity, and socioeconomic factors: educational qualifications and marital status were available from the Scottish Health Survey 2003 (Greater Glasgow [n = 1267]); Health Survey for England 2004, 2003 and 2002 (Greater Manchester [n = 1587], Tyne & Wear / Northumberland [n = 1072], Merseyside/Cheshire [n = 1512]); Northern Ireland 2001, Health and Wellbeing Survey 2001; Eastern Norway Survey for Scania (Malmö [n = 4053], Helsingborg [n = 2565], Lund [n = 4533] in Sweden) 2004; and Spanish Health National Survey 2001 (Madrid [n = 1998], Barcelona [n = 1538], Valencia [n = 871], Seville [n = 495], and Malaga [n = 329]). Logistic regression analyses compared health determinants in Greater Glasgow to those in other regions by sex, unadjusted and adjusted for age and socioeconomic factors.

Results: Compared with Greater Glasgow, significantly lower rates of smoking in Greater Manchester (OR 0.67; 95% CI 0.45 to 0.99), Merseyside/Cheshire (OR 0.57; 0.38 to 0.86), Malmö (OR 0.61; 0.49 to 0.77), Helsingborg (OR 0.52; 0.41 to 0.67) and Lund (OR 0.38; 0.29 to 0.48); obesity in Eastern Northern Ireland (OR 0.56; 0.40 to 0.77), Malmö (OR 0.40; 0.30 to 0.54), Helsingborg (OR 0.43; 0.32 to 0.58), Lund (OR 0.32; 0.24 to 0.43), Madrid (OR 0.43; 0.31 to 0.59), Barcelona (OR 0.39; 0.28 to 0.55), Valencia (OR 0.49; 0.33 to 0.72) and Malaga (OR 0.49; 0.28 to 0.84); excess weekly alcohol consumption (OR 0.70; 0.53 to 0.92) and physical activity (OR 0.51; 0.39 to 0.68) in Eastern Northern Ireland among men, and smoking in Greater Manchester (OR 0.67; 0.49 to 0.91), Merseyside/Cheshire (OR 0.62; 0.44 to 0.87), Malmö (OR 0.62; 0.51 to 0.75), Helsingborg (OR 0.61; 0.50 to 0.76), Lund (OR 0.39; 0.32 to 0.48), Barcelona (OR 0.71; 0.57 to 0.90) and Malaga (OR = 0.49; 0.33 to 0.74); and obesity in Eastern Northern Ireland (OR 0.72; 0.55 to 0.94), Malmö (OR 0.45; 0.35 to 0.58), Helsingborg (OR 0.40; 0.30 to 0.52), Lund (OR 0.36; 0.28 to 0.47), Madrid (OR 0.47; 0.36 to 0.62), Barcelona (OR 0.41; 0.30 to 0.56), and Valencia (OR 0.45; 0.31 to 0.64); excess weekly alcohol consumption (OR 0.72; 0.53 to 0.97); and physical activity (OR 0.72; 0.56 to 0.93) in Eastern Northern Ireland among women were not explained by survey year, age group or socioeconomic factors. Significantly higher rates of smoking among men in Madrid (OR 1.52; 1.20 to 1.93), Barcelona (OR 1.57; 1.23 to 2.01), Valencia (OR 1.61; 1.22 to 2.13), and Malaga (OR 1.50; 1.03 to 2.19) and among women in Eastern Northern Ireland (OR 1.57; 1.26 to 1.95) remained after adjustment. Significantly lower rates of obesity in Seville (OR 0.62; 0.41 to 0.94) and physical activity in Greater Manchester (OR 0.68; 0.47 to 0.98) among women emerged on adjustment.

Conclusion: Negative health-related behaviours were often, but not universally, elevated in Greater Glasgow compared with other urban areas in Europe, supporting the existence of a ‘Glasgow effect’. Disparities could not be explained by differences in education and marital status although these are unlikely to entirely represent socioeconomic profiles.

[003] FEMUR FRACTURES IN EUROPE: MYTHS AND TRUTHS ABOUT GEOGRAPHIC DIFFERENCES (A REVIEW STUDY)

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Objectives: The objective of this study was to identify the geographical pattern of incidence rates, for men and women, of osteoporotic femur fractures in European Countries.

Methods: The information was selected from articles published in scientific journals, according to the following parameters: studies conducted in European Countries, based on hospital admissions, of individuals (aged >50 years) with femur fractures caused by low energy impact, and diagnosis code ICD9CM (International Disease Codes, 9th revision, clinical modification) 820–820.9. To be included, the studies should have the incidence rates for men and women available from any period between 1995 and 2005 and published in English, French, German, Spanish, Portuguese or Italian languages.

Results: Thirty studies from 20 different countries were selected. Fracture increase with age and are higher in women than in men in all the studies. Mean age of fractures was 70.5 and 79.6 year old for men and women respectively, ranking from 59.3 in Serbia Montenegro to 80.7 in Spain, for men and 72.6 in Serbia Montenegro to 82.5 in Sweden. For men the higher rates were observed for Lithuania, Norway and Sweden; for women, in Iceland, Norway and Sweden. The lower rates observed in men and women were in Russia and Greece.

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Conclusions: No continuous increase of the incidence rates, from south to north Europe, as it is described in the literature, was observed. There is no significant difference between the quartiles, in both genders, from UK to Greece. Mediterranean countries, such as Portugal, Spain or Italy are in the second quartile, while Norway, Sweden and Iceland are in the fourth quartile. Limitations of the study are: few studies from east European countries, and some studies referred to regional data, while others to national data.

Maternal and child health

SMOKING DURING PREGNANCY AND LOW BIRTHWEIGHT OUTCOMES IN MASSACHUSETTS FROM 1989 TO 2004: AN EPIDEMIOLOGICAL STUDY

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Background: The state of Massachusetts introduced a comprehensive tobacco control programme (MTCP) in January 1993. Tobacco smoke is a serious health hazard, particularly for pregnant women. Low birthweight (LBW) is a common consequence of smoking. Smoking during pregnancy is associated with increased risk of preterm birth and LBW. Studies conducted in Massachusetts in 1989 and 2004 in Massachusetts that could be attributed to reductions in smoking prevalence during pregnancy. Since the exposure (smoking during pregnancy) of interest occurs earlier than the outcome (LBW) in our study, any association observed between smoking and LBW is most likely to be causal.

Methods: We calculated population-attributable risk (PAR), using the conventional formula in addition to the effect measure, which is relative risk (RR) in this study. Because the database used (Massachusetts Community Health Information Profile) captures almost all the pregnant women including their smoking status across the state, and also links the birth files with the death files, this database is a valuable resource for calculating the overall smoking prevalence among pregnant women, as well as infant mortality rates (IMR). Multiple births and pregnancies with unknown smoking status were excluded from the analysis. LBW was classified into three groups (0–1499 g, 1500–2499 g and ≥2500 g).

Results: Approximately 91,000 and 78,250 live-births occurred in 1989 and 2004, respectively. Almost 22% of mothers smoked during pregnancy in 1989, reducing to 7.4% in 2004 (66% decline), and the youngest mothers (15–24-year-olds) smoked the greatest. IMR among smoking mothers declined from 11.6/1000 live-births in 1989 to 4.2/1000 live-births in 2004 (37% decline). The very LBW babies (mothers declined from 11.6/1000 live-births in 1989 to 5.7 in 2004 (50% decline), while IMR in non-smoking mothers decreased from 6.7 in 1989 to 2.1/1000 live-births in 2004 (97% decline). The very LBW babies among smokers showed an annual decline of 8.4% (95% CI: 9.1 to 7.7). In the 15-year study period, the RR of LBW among smokers decreased from 2.0 to 1.71 (a 29% overall decline). Consequently, PAR decreased from 18% to 5% over the 15-year period contributing to almost 300 fewer LBW babies between 1989 and 2004.

Conclusions: Approximately 300 fewer LBW babies were born between 1989 and 2004 in Massachusetts that could be attributed to reductions in smoking prevalence during pregnancy. In general, IMRs in Massachusetts are 19.8/1000 live-births in 1989 and 7.4/1000 live-births in 2004 (66% decline), and the youngest mothers (15–24-year-olds) smoked the greatest. IMR among smoking mothers decreased from 11.6/1000 live-births in 1989 to 4.2/1000 live-births in 2004 (37% decline). The very LBW babies (mothers declined from 11.6/1000 live-births in 1989 to 5.7 in 2004 (50% decline), while IMR in non-smoking mothers decreased from 6.7 in 1989 to 2.1/1000 live-births in 2004 (97% decline). The very LBW babies among smokers showed an annual decline of 8.4% (95% CI: 9.1 to 7.7). In the 15-year study period, the RR of LBW among smokers decreased from 2.0 to 1.71 (a 29% overall decline). Consequently, PAR decreased from 18% to 5% over the 15-year period contributing to almost 300 fewer LBW babies between 1989 and 2004.

Conclusions: The increased risk of SGA observed among infertile couples persists in adjusted models suggesting that the increased risk is not accounted for by differences in maternal age and BMI at pregnancy. Infertility treatment is associated with increased risk of SGA and perinatal outcomes. Singletons born after infertility treatment have an increased risk of being small-for-gestational-age (SGA) and dying in the perinatal period. Part of the increased risk may be related to the underlying infertility. The increased risk of SGA and perinatal mortality as a function of time to pregnancy and infertility treatment. Singleton and twin births (treated and untreated) have increased risk of both outcomes among infertile couples (treated and untreated), but the odds ratios (ORs) of perinatal death among infertile couples were attenuated after adjustment for maternal age and body mass index (1.32, 95% CI 0.95 to 1.84 in untreated and 1.26, 95% CI 0.86 to 1.85 in treated couples). The elevated risk of SGA among infertile couples persisted after adjustment for maternal age, parity and smoking (OR 1.24, 95% CI 1.10 to 1.40 among untreated, and OR 1.40, 95% CI 1.23 to 1.60 among treated). The risk of SGA increased with TTP, and a longer TTP was associated with a small reduction in birth weight across the whole distribution.

Conclusion: The increased risk of SGA observed among infertile couples with or without infertility treatment suggests that infertility may be a marker of risk for intrauterine growth restriction. Treatment per se seems to have little effect on fetal growth.

Older people

THE QUALITY OF HEALTH CARE RECEIVED BY OLDER PEOPLE IN ENGLAND

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Objectives: To measure the extent to which people aged over 50 years received a broad range of effective healthcare interventions, for common
Design and Setting: Cohort study. Interviewers collected data using face-to-face interviews in participants’ homes as part of The English Longitudinal Study of Ageing (ELSA).

Participants: 8688 people completed an interview. Participants were representative of the older population of England.

Interventions: Participants were asked questions about their health status, then whether they had received the healthcare specified by 32 indicators of quality of care in 14 conditions, plus 7 questions about patient-centred care. Quality indicators were originally developed at RAND in the USA to measure basic healthcare for older adults, and were then adapted for use in England.

Main Outcome Measures: The percentage of eligible quality indicators achieved for each quality indicator, and also aggregated by condition, domain of care, and overall across all conditions.

Results: 62.5% (95% CI 61.2 to 63.1) of quality indicators were achieved overall. Quality varied greatly by condition, and the percentage of indicators achieved for each condition, in order of quality from highest to lowest was: urinary incontinence 100 (92.0 to 100), ischaemic heart disease 82.6 (79.0 to 85.8), poor hearing 79.1 (77.1 to 80.9), pain 78.0 (72.5 to 82.8), diabetes 71.6 (74.3 to 77.8), smoking 74.1 (71.6 to 76.4), hypertension 72.5 (68.6 to 76.1), stroke 65.4 (53.8 to 75.8), depression 63.6 (57.5 to 69.4), patient-centred care 58.6 (57.5 to 59.7), poor vision 57.1 (53.0 to 61.1), osteoporosis 52.8 (49.8 to 55.8), incontinence 51.3 (48.6 to 54.1), falls 43.7 (37.8 to 49.6), osteoarthritis 20.6 (17.4 to 24.1) and skin conditions 23.0 (21.7 to 24.4) indicated by the domain of care to which they referred, and the percentage of indicators achieved was 79.8 (77.6 to 81.9) for the screening and prevention domain, 64.0 (63.0 to 65.1) for treatment and follow-up, and 60.3 (58.3 to 62.3) for diagnosis.

Conclusions: Over one third of the population of England aged over 50 years are not receiving basic recommended care for common conditions. This lack of care has serious implications for the health of the public. Quality of care is substantially worse for some conditions than others, and initiatives to improve the quality of healthcare received by older adults are needed.
Results: There were 746 people with no lesion, 118 with oesophagitis, and 106 with peptic ulcer or gastroduodenal erosions. Reflux symptoms alone were found to significantly raise the risk of oesophagitis (OR 3.73, 95% CI 2.10 to 6.62) but not for peptic ulcer or gastroduodenal erosions (1.52, 0.79 to 2.91). Dyspeptic symptoms with reflux symptoms were associated with an increased risk for both peptic ulcer or gastroduodenal erosions (reflux non predominant symptom: 2.08, 1.06 to 4.10; reflux predominant 1.91, 1.11 to 3.36) and oesophagitis (2.27, 1.09–4.71; 3.78, 2.22 to 6.43). Dyspeptic symptoms alone were not associated with an increased risk of either peptic ulcer or gastroduodenal erosions or oesophagitis (1.31, 0.83–2.74; 1.69, 0.91 to 3.12).

Conclusions: This study compared the prevalence of lesions in the oesophagus, stomach, and duodenum between people with and without symptoms in the general population. These results, along lifestyle and demographic factors and Helicobacter pylori infection were related to decision-making in the management of uninvestigated patients with upper gastrointestinal symptoms. These findings suggest that a new, more appropriate, definition of dyspepsia might be warranted.

011 SMOKING AND GASTRIC CANCER: SYSTEMATIC REVIEW AND META-ANALYSIS OF COHORT STUDIES

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Objective: To review systematically and summarise quantitatively the evidence from cohort studies addressing the association between smoking and gastric cancer, updating a previous meta-analysis published in 1997.

Design: Systematic review and meta-analysis.

Data Sources: PubMed [ (smoke OR smoking OR nicotine OR tobacco OR lifestyle OR lifestyles OR cigarette OR diet OR alcohol) AND (gastric cancer OR stomach cancer OR cardia cancer)] and reference lists hand searching.

Study Selection: Published cohort and nested case-control studies addressing the association between smoking and gastric cancer. Papers published in English were reviewed and only studies evaluating cigarette smoking were included. Preference was given to the longest follow-ups when results from the same study were published more than once.

Data Extraction: Conducted by at least two reviewers and discrepancies resolved by consensus. When sex-specific estimates were available they were considered separately as if obtained from different studies.

Data Analysis: Combined risk estimates and 95% confidence intervals were computed with STATA version 9.2, using a random effects model. Heterogeneity was quantified using the I2 statistic, and stratified analysis according to study characteristics was performed.

Results: Twenty seven studies (23 cohort and 4 nested case-control analyses) were included in the systematic review and meta-analysis. The mean/median/midpoint of the difference between first and last years of follow-up was 9 years, ranging from 2–25 years. Two year studies provided risk estimates adjusted for age and 12 for socioeconomic status (education, occupation and type of health insurance). When considering never smokers as the reference category, the combined RR estimates were 1.55 (95% CI 1.42 to 1.68; I2 = 50.3%; 29 estimates from 22 studies) for current smokers (9.7% CI 1.39 to 1.81; I2 = 42.5%; 23 estimates from 20 studies) for the highest category of consumption when more than two categories were available, and 1.32 (95% CI 1.20 to 1.44; I2 = 24.0%; 27 estimates from 21 studies) for ex-smokers. The summary RR estimates for current vs. never smokers was 1.67 (95% CI 1.45 to 1.93; I2 = 56.7%; 15 studies) when only men were evaluated, 1.29 (95% CI 1.12 to 1.49; I2 = 16.5%; 35 studies) when considering the estimates for women, and 1.53 (95% CI 1.40 to 1.67; I2 = 8%; 6 studies) when data were presented for males and females combined.

Conclusion: Cigarette consumption (current smokers vs never smokers) was associated with a significantly increased risk of gastric cancer. When results from the same study were published more than once. The summary RR estimates for current vs. never smokers was 1.67 (95% CI 1.45 to 1.93; I2 = 57.6%; 15 studies) when data were presented for males and 1.29 (95% CI 1.12 to 1.49; I2 = 16.5%; 35 studies) when considering the estimates for women, and 1.53 (95% CI 1.40 to 1.67; I2 = 8%; 6 studies) when data were presented for males and females combined.

012 APPENDECTOMY, SMOKING AND INFLAMMATORY BOWEL DISEASE: A CASE CONTROL STUDY

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Aim: To examine the association between appendectomy and smoking and the subsequent risk of developing ulcerative colitis or Crohn’s disease.

Methods: A case/control study was carried out in Cork University Hospital. The cases (n = 250) having a diagnosis of either Crohn’s disease (CD) or ulcerative colitis (UC) and ~50 years were recruited consecutively from the weekly inflammatory bowel disease clinic. The controls (n = 249) were recruited consecutively from the general outpatients department and were age and gender matched with a five year range. Data were obtained on history of appendectomy, smoking status and a wide range of markers for early childhood hygiene. Blood samples for genetic analyses are also available. Cases and controls were matched by age at recruitment. We evaluated smoking status at time of diagnosis and appendectomy one year prior to diagnosis. For the control group the age of diagnosis for the matched case was used.

Results: The age at diagnosis was similar for CD and UC cases, median (lower, upper quartile) = 22 (18, 26) and 24 (17, 29) respectively. Among those who had an appendectomy the age at which this occurred was 18 (12, 25). Based on a conditional logistic regression, smoking was significantly associated with a reduced risk of UC; OR 0.44 (95% CI 0.22 to 0.89). However, appendectomy was not significantly associated with UC; OR 0.60 (95% CI 0.14 to 2.51). Neither factor was significantly associated with CD; OR 0.98 (95% CI 0.50 to 1.90) and 1.25 (0.41 to 3.83) respectively.

Conclusion: The results for UC with regard to smoking and appendectomy are consistent with earlier research but the lack of association between CD smoking and appendectomy differs from previous work. However, additional analyses adjusted for markers of early childhood hygiene and stratified by genetic markers will clarify the aetiological and clinical significance of these findings.

Diet and health

013 DIETARY INTAKE OF VITAMIN K AND RISK OF PROSTATE CANCER IN EPIC-HEIDELBERG

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Background: Anticarcinogenic activities of the synthetic K-vitamin mena- dione (K3), as well as of phylloquinone (K1) and menaquinone (K2), the vitamins naturally occurring in the human diet, have been observed in various cancer cell lines, including prostate cancer cells. The mechanisms by which phylloquinone and menaquinone may exert cancer-preventive effects include the induction of the proto-oncogenes c-myc and c-fos, which are associated with apoptosis. Epidemiological studies linking dietary intake of vitamin K with the development of cancer have been rarely conducted.

Objective: To examine the association between dietary vitamin K intake and the risk of incident prostate cancer.

Design: Prospective cohort study.

Setting: Heidelberg, Germany.

Participants: 11 319 male subjects, aged 40–64 years, enrolled between 1994 and 1998 for EPIC-Heidelberg. Habitual dietary intake was assessed using a validated food frequency questionnaire. Dietary intake of phylloquinone and menaquinone was estimated using HPLC-based food content data.

Main Outcome Measure: The relative risk (RR) of total and advanced (Gleason sum score >7, TNM staging score of T3/T4, N1–N3 or M1, PSA at diagnosis >20 ng/ml or prostate cancer as underlying cause of death) prostate cancer in relation to quartiles of phylloquinone and menaquinone intake was modelled using Cox proportional hazards regression; crude (stratified for age) results and results adjusted for potential confounders are presented.

Results: During the mean follow-up time of 8.6 years, 268 incident including 108 advanced prostate cancer cases occurred. Median intakes (interquartile range) of phylloquinone and menaquinone in the cohort were 93.6 (70.9–123.5) and 34.7 (25.7–45.7) µg/day, respectively. Dietary intake of menaquinone was inversely associated with prostate cancer risk. The crude RR (95% CI) for prostate cancer was 0.73 (0.51–1.04, p trend = 0.09) comparing the highest versus lowest quartile of menaquinone intake; after multivariate adjustment the risk estimate was 0.64 (0.41–1.00, p trend = 0.06). The association was stronger for advanced prostate cancer; RR = 0.36 (0.17–0.78), p trend = 0.01). Phylloquinone intake was not associated with prostate cancer; adjusted RR (highest vs lowest quartile of phylloquinone intake) was 1.03 (0.79–1.33).

Conclusions: Our findings suggest a protective effect of menaquinone intake on the risk of prostate cancer while no significant association was observed for phylloquinone. This fits with experimental data showing much stronger anti-tumour activity for menaquinone as compared to phylloquinone. Since this is one of the first prospective investigations on the
**Dietary patterns and gastric cancer in a Portuguese urban population**

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**Objective**: To quantify the association between different dietary patterns and the gastric cancer risk in a Portuguese population.

**Design**: Case-control study.

**Setting**: Cases were selected in two major hospitals from Porto, Portugal, and controls were selected among city dwellers.

**Participants**: Incident gastric cancer cases were identified in the surgery departments of two major hospitals. Population controls were recruited by random digit dialling using households as the sampling frame, followed by simple random sampling to select one eligible person among permanent residents in each household. Trained interviewers inquired participants using a structured questionnaire including sociodemographic and lifestyle characteristics. A validated food frequency questionnaire (FFQ) was used to evaluate food intake in the previous year. Data from 388 histologically confirmed cases and 1053 controls were analysed.

**Main Outcome Measures**: Cluster analysis, with standardised data, was used to identify dietary patterns. The 82 FFO items were previously combined into 24 groups. To determine the number of clusters, hierarchical cluster analysis was performed with squared Euclidean distances used in the proximities matrix and Ward’s method used as clustering method. The Calinski and Harabasz pseudo-F stopping rule index and the Duda and Hart Je(2)/Je(1) index were used jointly to select the number of clusters for each dietary pattern.

**Results**: Three dietary patterns were identified with the following characteristics: (I) highest consumptions of fruit and dairy products, and the lowest consumptions of grains and alcoholic beverages; (II) highest consumptions of vegetable soup, legumes and grains; (III) the highest in fast-foods/fried snacks, coffee, fish, red meat, white meat, codfish, eggs and alcoholic beverages. Vegetable consumption was similar across the three patterns. Individuals in pattern I were more likely to be female (66.0%). Median age was higher for subjects in pattern II (69 years) and lower for those in pattern III (58 years). Compared to the dietary pattern I, pattern II was associated with a higher risk of gastric cancer (OR 3.29, 95% CI 1.75 to 6.20). No statistically significant association was found between patterns I and III (OR 1.05, 95% CI 0.77 to 1.42).

**Conclusions**: A dietary pattern characterised by high consumption of soup (usually a salted food consumed in large amounts), legumes and grains is associated with an increased risk of gastric cancer.

**Lifestyle: smoking cessation**

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**Objective**: To investigate the factors that influence the food choices made by mothers of young children living in areas of high deprivation.

**Design**: Interview with 156 households. The study was conducted in high-deprivation areas of Porto, Portugal. Questionnaires were sent with covering letters from GPs and identified current smokers, offering help with quitting smoking. General practices were randomised to intervention or control groups; smokers in the intervention practices were recruited and were asked to complete the questionnaire. Questionnaires were sent with covering letters from GPs and identified current smokers, offering help with quitting smoking. General practices were randomised to intervention or control groups; smokers in the intervention practices were recruited and were asked to complete the questionnaire.

**Results**: Three dietary patterns were identified with the following characteristics: (I) highest consumptions of fruit and dairy products, and the lowest consumptions of grains and alcoholic beverages; (II) highest consumptions of vegetable soup, legumes and grains; (III) the highest in fast-foods/fried snacks, coffee, fish, red meat, white meat, codfish, eggs and alcoholic beverages. Vegetable consumption was similar across the three patterns. Individuals in pattern I were more likely to be female (66.0%). Median age was higher for subjects in pattern II (69 years) and lower for those in pattern III (58 years). Compared to the dietary pattern I, pattern II was associated with a higher risk of gastric cancer (OR 3.29, 95% CI 1.75 to 6.20). No statistically significant association was found between patterns I and III (OR 1.05, 95% CI 0.77 to 1.42).

**Conclusions**: A dietary pattern characterised by high consumption of soup (usually a salted food consumed in large amounts), legumes and grains is associated with an increased risk of gastric cancer.

**Primary care smoking cessation intervention conducted in a sample of Spanish smokers: predictors of smoking cessation**

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**Background**: There is a large body of research on the effectiveness of specific interventions addressed to people who want to stop smoking. However, there are no studies including large samples of individuals that...
tested the complete range of interventions recommended nowadays for helping people to give up smoking, especially interventions including motivational interviewing of those not interested in cessation in the upcoming weeks.

**Objective:** To evaluate the effectiveness in primary care centres of a stepped smoking cessation intervention based on transtheoretical model of change.

**Design:** Randomised clinical trial. Unit of randomisation: basic care unit (family physician and nurse who care for the same group of patients). Intention to treat analysis.

**Setting:** Eighty two primary care centres.

**Participants:** 2830 current smokers (age 14–85 years) seeking assistance for any reason at primary care centres (1482 and 1348 subjects assigned to intervention group and control group, respectively).

**Intervention:** Six-month implementation of recommendations of a Clinical Practice Guideline. Control: usual care.

**Measurement:** Abstinence rate (point prevalence) one year after the inclusion of subjects in the study. Demographic variables, characteristics of tobacco use and motivation to quit variables were investigated as predictors of smoking cessation, collected through a structured questionnaire designed for this purpose.

**Results:** Abstinence rate one year after the inclusion of subjects was 22.6% (24.8% in the intervention group vs 20.2% in the control group). The multiple logistic regression model showed that the factors predicting smoking cessation were age (OR 1.01, 95% CI 1.00 to 1.02), belonging to intervention group (OR 1.32, 95% CI 1.03 to 1.70), motivation to quit (Richmond test) (OR 1.10, 95% CI 1.04 to 1.17) and readiness to quit smoking (OR 1.08, 95% CI 1.03 to 1.13). Contrarily, high nicotine dependence (Fagerström test) (OR 0.87, 95% CI 0.83 to 0.92) and having a partner who smokes (OR 0.75, 95% CI 0.58 to 0.97) lowered the probability of stopping.

**Conclusions:** The study shows that primary health care is a suitable context for an intervention against tobacco through the use of stepped interventions. Low nicotine dependence, high motivation, readiness to change, age and not having a partner who smokes are good predictors of success.

**018** THE IMPACT OF THE SMOKING BAN IN IRELAND: MODELLING HOSPITAL ADMISSIONS FOR ACUTE MYOCARDIAL INFARCTIONS

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**Objective:** To determine whether the legislation on smoking in public places which came into effect on 29 March 2004 led to a reduction in hospital admissions.

**Design:** An ecological study by means of a time series analysis of the admissions as recorded by HIPE (Hospital InPatient Enquiry), the registration system used by 95% of the Irish Hospitals.

**Setting:** Republic of Ireland.

**Participants:** All patients admitted to a hospital from 1999–2004.

**Main Outcome Measures:** Numbers of weekly admissions for acute myocardial infarctions (AMI).

**Results:** ARIMA models were fitted in which the legislation was included in the model as an intervention variable. AMI fell with 13.4 admisions per week, after a delay of 8 weeks, in the first six months after the introduction of the smoking legislation.

**Conclusions:** Taking into account the limitations of ecological studies, our results suggest that the observed decline in hospital admissions for AMI in the six-month period following the smoking legislation might be due to the reduction in environmental tobacco smoke (ETS) in the working environment. Controlling passive smoking by means of legislation may have important short-term effects on health.

**Methods I**

**019** SUB-STUDIES NESTED IN A LARGER COHORT: A COMPARISON OF THE NESTED CASE-CONTROL AND CASE-COHORT DESIGNS


**Objective:** To compare two designs for sub-studies nested within a larger cohort study, when laboratory analyses are necessary to obtain covariate measurements, with the aim of making most efficient use of the biological material.

**Background and Motivation:** It is common for biological material to be collected in large scale cohorts. Studies making use of this biological material are normally nested within the cohort, maximising the use of the material and minimising the costs of performing the sample analyses. Two main methods used by investigators to design such studies are the nested case-control design and the case-cohort design. Greater statistical efficiency can be achieved from a case-cohort study relative to a comparable nested case-control study, and the former may be advantageous as the subcohort can be used to monitor the study. However, if the laboratory measurement method is susceptible to effects due to samples being processed in batches then the nested case-control design is preferred to ensure unbiased relative risk estimates.

**Methods:** Simulations are used to model laboratory “batch” effects within comparable nested case-control and case-cohort sampling schemes, using both prospective and retrospective case-cohort studies. Batch effects considered include time drifts of the assay, and variations due to differences in laboratory analyses and conditions. Relative risks from simulated nested case-control and case-cohort studies are estimated using partial and pseudo-likelihoods respectively and compared.

**Results:** In a nested case-control study the samples from individuals in the same case-control set are analysed in the same batch, eliminating any batch effect. In a case-cohort study each sampled risk set comprises individuals whose samples were subject to different batch effects. Non-time-dependent batch effects which increase the variation in measurements result in a consistently biased relative risk estimate in a case-cohort study. This bias increases as the between-batch variation increases relative to the total variation among the measurements, although it is small for a range of realistic circumstances. Batch effects due to time-drifts result in systematic bias in relative risk estimates, which decreases as the size of the subcohort increases. These effects are illustrated in a study of the association between breast cancer and serum oestriadiol.

**Conclusions:** Laboratory derived measurements which are subject to “batch” effects can result in biased relative risk estimates in a case-cohort study. However, for a range of typical scenarios the magnitude of the bias is not severe and the efficiency gain of the case-cohort design over the nested case-control design remains.

**020** IMPROVING PSYCHOMETRIC PROPERTIES OF A SCALE MEASURING INPATIENT SATISFACTION WITH CARE BY REDUCING CEILING EFFECT

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**Objective:** To solve two problems of an already validated scale measuring inpatient opinion on care: (1) a high non-response rate for some items due to the “not applicable” response option and (2) a skewed score distribution with high ceiling effect.

**Method:** EQS-H scale comprised 26 items and two subscales of 13 items each, “quality of medical information” (MI) and “relationships with staff and daily routine” (RS). Three studies were conducted: (1) a mono-centre study (n = 552, response rate (RR) 83.4%, self-completion the day before discharge) to confirm psychometric properties of the new version; (2) a mono-centre study (n = 1246, RR 77.9%, self-completion the day before discharge) to confirm psychometric properties of the new version; (3) a multicentre national study (n = 886, RR 41.7%, self-completion the day before discharge) to confirm psychometric properties of the new version.

**Results:** Six items having a non-response rate >20% were deleted, increasing rates of exhaustive responses to all items from 15% to 48%. Factorial analysis supported the evidence for removing four more items to ensure good internal validity and reliability of the new version and explained 43% of the variance. Cronbach’s α were 0.80 (MI) and 0.81 (RS). Study 2 confirmed the results obtained. The new response format produced a normalisation of the 2 scores with a large decrease in ceiling effect (7.6% for MI subscale and 6.1% for RS). Properties of the final version were excellent: the two subscales (8 items each) explained 66% of the variance in PCA, Cronbach’s α were 0.92 (MI) and 0.93 (RS). The 16-item EQS-H overall score was associated with several adjustment variables in a general multivariate linear model (gender, age, health status, satisfaction with life). Structural Equation Modelling confirmed the existence of latent factors (MI and RS) but the best characteristics were obtained with a hierarchical model including the two latent factors and a global satisfaction latent factor, bringing the 16 items together.
Conclusions: The new version of EQS-H had better psychometric properties than the previous one. Rates of missing values were lower, and score distributions in England and Wales were normalised. Dimensions explored focused on quality of MI delivered and on RS, are not limited to the French healthcare system, and further scale validation in other countries and cultures is required, since it would facilitate cross-cultural studies of healthcare services’ quality. English, Spanish and Italian versions of the scale are already available.

**HEALTH, URBAN TRANSFORMATION AND THE “GoWell” STUDY: EVALUATING COMPLEX SOCIAL CHANGE IN THE CONTEXT OF GLASGOW’S URBAN REGENERATION PROGRAMME**

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Objective: Researchers and policy-makers have called for evaluative evidence of interventions affecting social determinants of health and health inequalities. Evaluations of such interventions are often expensive, difficult to design and implement, and hence remain something of a rarity. The “GoWell” study aims to evaluate the effects of macro- and micro-level urban transformation in Glasgow during a decade of massive investment in neighbourhood regeneration. This presentation will summarise early findings and discuss the challenges involved in conducting complex evaluations on this topic.

Design: GoWell is a 10-year prospective study with comparison areas. It involves both longitudinal and repeat-cross-sectional surveys of residents’ health and well-being (n = 7,000), and a qualitative study of stake-holders (n = 100) that explores socio-environmental pathways to health, theories of change and community empowerment. Additional components of the study also measure changes to physical environments, services and neighbour-hood amenities.

Setting: Over the next decade, Glasgow will undergo a £multi-billion investment programme involving housing improvement, demolitions and “new-builds”, as well as community sustainability initiatives across the city. GoWell compares 14 neighbourhoods undergoing different types of regeneration and evaluates routine data at both neighbourhood and city-wide level.

Results: Our baseline survey (summer 2006) has highlighted the poor health, low expectations and low senses of self- and collective-efficacy amongst a sizable minority of residents in neighbourhoods earmarked for regeneration. Initial summary findings include reports of high levels of social isolation (particularly in neighbourhoods dominated by multi-stores, where only 45% of residents reported daily contact with anyone); resistance to healthy lifestyle messages (40% of smokers intend never to quit); high health service use (across a range of measures); low self- and collective-efficacy (29% of participants think they can influence decisions affecting their neighbourhood), and qualitative evidence suggests that residents have little influence over the regeneration process. Compared to ‘white Scottish’ residents, Glasgow’s growing asylum-seeker population reports higher levels of neighbourhood satisfaction and better health across a range of measures.

Discussion: In a city characterised by high concentrations of ill-health and deprivation, many Glasgow residents remain disenfranchised from their community, from regeneration processes and from key public health messages. GoWell will provide policy-relevant evidence on whether different types of regeneration can have positive (or adverse) impacts on health and well-being in these communities, through either behavioural, psychosocial or physical pathways. As such, GoWell provides a case study in the methodological challenges associated with complex evaluations of “natural experiments” affecting social determinants of health.

**AVOIDABLE MORTALITY IN ITALY**

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Background: The study of avoidable mortality is important for public health, given that it can provide indications for prevention interventions. A cause of death is defined as "avoidable" if there exist forms of prevention capable of reducing the number of deaths, particularly among non-elderly persons. Avoidable mortality is classified into three categories, according to the type of intervention: (1) mortality avoidable through primary prevention: reducing the incidence of the disease or event (eg, prevention of lung cancer through anti-smoking campaigns); (2) avoidable through secondary prevention: early detection and treatment (eg, prevention of cancer of the uterine cervix through screening); and (3) that avoidable through improved treatment and medical care (eg, severe heart disease amenable to timely interventions).

Materials and Methods: We analysed the official mortality data collected by the Italian National Institute of Statistics (ISTAT) for 2002 (the most recent data available). We calculated the Years of Potential Life Lost (YPLL) for persons between the ages of 5 and 64 years who died before reaching the life expectancy: 77 years for men and 83 years for women. We calculated the standardised rates of YPLL by gender and for each of Italy’s 21 Regions.

Results: Avoidable causes of death were responsible for 22.8% of the YPLL among men and 12.3% among women. Among both men and women, the causes of death avoidable through primary prevention had the greatest impact, especially among men (75% of the YPLL among men, compared to 50% among women). Among women, the causes avoidable through secondary prevention were responsible for 31.4% of YPLL, compared to only 2.3% among men, probably because most of these deaths were caused by breast or cervix cancer. The causes avoidable through improved treatment and medical care were responsible for a similar percentage of YPLL when comparing the two genders (22.5% for men and 19.2% for women). In northern Regions, the causes avoidable through primary prevention had the greatest impact, whereas in southern Regions the causes avoidable through improved treatment and medical care were most important; in central Regions, there was an intermediate situation.

Conclusions: Mortality avoidable through primary prevention continues to contribute to YPLL in Italy. Detailed analyses at the national level can provide useful indications to decision-makers for promoting prevention strategies for reducing the impact of avoidable diseases.
A8 SSM and IEA abstracts

024 INCOME DYNAMICS AND PREMATURE ADULT MORTALITY IN CANADA

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Objectives: While there is a large body of research on the health consequences of involuntary job loss, there is relatively little research on the association of income drops, or income dynamics more generally, and health outcomes. Income declines following job loss or other abrupt changes to family economic circumstances may have direct impacts on the health of individuals. We conceive of the dynamics of family disposable income as both a series of life events and as a chronic exposure, and explore dose-response relationships around income changes for premature all-cause mortality. Confounding by family breakdown, family deaths, job loss, and retirement, and health selection bias are accounted for in the analysis. Effect modification by sex, family type, and income level are explored.

Design: The Longitudinal Administrative Databank (LAD) is a 20% random sample of Canadian personal income tax filers, linking income tax records at the individual level for 6.2 million individuals for the years 1992–2004, with Census families reconstructed. It is an open cohort and is representative of the Canadian population cross-sectionally and longitudinally. Measures of annual family disposable income were used to estimate income dynamics over time between the ages of 45 and 59, and were analysed as time-varying covariates in survival models, lagged to reflect assumptions regarding induction periods.

Setting: Adult population, aged between 45 and 59 at the time of income measurement.

Participants: Canadian personal income tax filers.

Main Outcome Measures: Premature (aged 51–77) all-cause mortality as reported on tax returns for the deceased.

Results: Early results indicate that effects of income and income dynamics on mortality risk are present in this Canadian sample, but more moderate than was observed previously in the USA. Patterns seen in the Panel Study of Income Dynamics in the USA, where it appeared that income dynamics primarily affected the survival of those with mid-range incomes, are not present in the Canadian data.

Conclusions: Income dynamics is a theoretically challenging exposure construct, and how it is conceived has a significant bearing on how one would analyse associations with health outcomes. Further research with cause-specific mortality and intermediate health outcomes is recommended. Future research would be of greatest policy value if comparison of patterns observed in Canada to other jurisdictions included measures of the coverage and generosity of income security programmes.

025 POPULATION ATTRIBUTABLE RISKS FOR POOR OUTCOME IN PRIMARY CARE LOW BACK PAIN

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Background: Back pain is common in the general population, with one-month prevalence around 30%, and is therefore a significant public health problem. Many people recover quickly, but approximately a quarter of sufferers (6–9% of the population) will consult a GP for their problem within a one-year period, and a high proportion have persistent problems. Providing information on the risk of persistence is therefore important in this group, but few studies have identified a representative sample or included a wide range of risk factors, and none have calculated population attributable risks (PARs).

Objective: To determine the risk factors for a poor outcome at one-year, and the proportion of back pain sufferers with a poor outcome that can be attributed to measurable risk factors.

Design and Setting: Prospective inception cohort study in five general practices in Staffordshire, UK.

Participants: Consecutive back pain consultants aged 30–59 years (n = 389).

Results: Baseline risk factors covering demographics, episode duration, symptom severity, pain widespreadness, affect and cognitions, and self-reported health were assessed for their importance. In unadjusted analyses, 12 baseline risk factors were significantly associated with having highly disabling and severely limiting pain at follow-up. After adjustment for potential confounders, 7 baseline factors remained significant associations: the strongest risks were for unemployment (relative risk (RR) 4.15; 95% CI 2.03 to 8.51) and high pain intensity (RR 4.13; 95% CI 1.73 to 9.88). Adjusted PARs were calculated from the adjusted RRs, with 95% CIs calculated using bootstrapping techniques. The highest PARs were for high pain intensity (86%; 95% CI 42 to 84%) and unemployment (64%; 95% CI 47 to 76%), indicating that in over 60% of back pain consultants with a poor outcome, outcome is statistically attributable to these baseline factors, regardless of the presence of the other risk factors. Poor self-rated health, high disability, upper body pain and pain bothersomeness all also had high PARs over 40%.

Conclusions: We have demonstrated that a range of factors significantly increase the risk of a poor outcome in back pain consultants, and that these high risks in combination with high prevalence of the risk factors in this population leads to very high PARs, even after adjustment. In public health, calculation of PARs is one method of identifying potential targets for intervention, and given that consultants with back pain in primary care represent a significant proportion of all sufferers, this is therefore a sensible arena for public health secondary prevention of persistent back pain.

026 PREVALENCE OF PREMENSTRUAL SYNDROME AND THE INFLUENCE OF CONTRACEPTIVE USE AND LIFESTYLE FACTORS ON THIS CONDITION

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Objective: To determine the prevalence of premenstrual syndrome in healthy young women, and assess the effects of contraceptive use and lifestyle factors on this condition.

Design: Cross-sectional survey.

Setting: Within the Southampton Women’s Survey (SWS), a cohort study of women recruited through general practices from the general population, who were interviewed when not pregnant and followed through subsequent pregnancy.

Population: 973 women aged 20–34 years (53% of the 1841 women invited to participate).

Methods: Women who provided a blood sample as part of the SWS recruitment interview were asked to complete a prospective six-week menstrual symptom diary. Two clinicians assessed the diaries independently according to a pre-specified protocol and identified women suffering from significant premenstrual symptoms. Disagreements were resolved in discussion with a third researcher. Prevalence of premenstrual syndrome was assessed and related to contraceptive use and lifestyle factors using binary regression to obtain prevalence ratio risks.

Main Outcome Measures: Premenstrual syndrome (PMS), diagnosed as (a) a cyclical pattern of symptoms occurring in the days leading up to menstruation that resolved completely or greatly improved by the end of menstruation, (b) an interval of ≥7 days before symptoms recur, and (c) ≥5 symptoms scored as mild or moderate or ≥2 symptoms scored as severe, with each symptom following the pattern described above. In women with no discernable menstrual cycle or erratic bleeding, diaries were examined for any evidence of cyclical symptoms.

Results: Using these pre-specified criteria, 24% of the women were considered to have PMS (95% CI 21 to 27%). If all those who failed to complete the diary had had free of PMS then the prevalence would have been 12%. Women were less likely to be diagnosed with premenstrual syndrome if they currently used hormonal contraceptives (prevalence ratio 0.60, 95% CI 0.47 to 0.76), especially progestogen-only methods. Strikingly, premenstrual syndrome was not diagnosed in any of the 34 women using injectable progestogens (prevalence ratio 0.0, one-sided upper) 97.5% confidence point 0.1). After adjustment for contraceptive use, premenstrual syndrome was more likely to be diagnosed in women reporting a high level of stress in their lives and in those with a lower level of educational attainment.

Conclusions: Premenstrual syndrome is common in young women, with nearly a quarter suffering a range of symptoms on a monthly basis. Injectable progestogens, or other progestogen-only contraceptives appear to alleviate this condition and may provide an effective therapy.

027 WOMEN’S PERCEPTIONS OF MATERNITY CARE

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Objective: To investigate women’s perceptions of the quality of their care during pregnancy and childbirth.

www.jech.com
**Setting:** England.

**Participants:** Women aged 16 years and over, excluding those whose infants had died before data collection.

**Design:** A random sample of 4800 women was identified by the Office for National Statistics, using live birth registrations for births in one week in March 2006. The sampling was stratified on the basis of births in different geographical areas (Government Office Regions). No subgroups were over-sampled. Check of infant deaths were made before mailing and women whose baby had died were excluded.

**Method:** Questionnaires with structured attitudinal question formats were mailed three months after the birth. Women were able to respond in a variable way to statements about the care provided, indicating agreement or disagreement, whether the statement applied only to some staff, and in some instances about midwifery and medical staff separately.

**Main Outcome Measures:** Women’s perceptions of midwifery and medical staff during pregnancy, labour and birth and the postnatal period.

**Results:** The usable response rate was 63%. 13% of respondents were from black and minority ethnic groups. Differences in perceptions occurred with pregnancy, labour and birth and postnatal care and with parity. Women’s views were largely positive, though some were critical about interpersonal aspects of care. During pregnancy, more than one in 10 women felt they received care from one or more midwives or doctors who did not talk to them in a way they could understand (13% and 14% respectively) and similar proportions felt they were not treated with respect (14% and 11%). Perceptions about labour and birth were generally similar, though more women were positive about care at this time. Women were more critical about the midwifery care, with one in five reporting that 20% or more members of staff did not communicate with them effectively and 22% that one or more members of staff did not treat them with respect. Women who had previously given birth, who had shorter labours and shorter postnatal stays were more positive in the views expressed.

**Conclusions:** The type of question format used allowed women describe the contrasts in care that many experienced, including their interactions with different staff groups. The findings confirm the view that experiencing effective communication and feeling respected appear to be markers for quality of care from a women’s perspective.

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**028 RISK FACTORS FOR CONGENITAL ANOMALIES**

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**Objectives:** To determine the relation between several potential risk factors and the risk of having a child with one or more congenital anomalies.

**Design:** Retrospective cohort study.

**Setting:** The Netherlands Perinatal Registry, 1997–2004.

**Participants:** 1 594 380 newborns registered in the Netherlands Perinatal Registry.

**Main Outcome Measures:** The overall risk of having a child with a congenital anomaly and the risk of anomalies in different organ systems, expressed in odds ratios. Population attributable risks were calculated to express the impact of the risk factors on a population based level.

**Results:** All studied potential risk factors, maternal age, parity, ethnicity, pre-existing maternal diabetes, maternal epilepsy, history of abortions, IVF/ICSI pregnancy, other assisted reproduction techniques, gender and plurality were significantly related to the risk of having a child with a congenital anomaly. The strongest relation was found for pre-existing maternal diabetes and maternal epilepsy (adjusted OR 2.0 95% CI 1.8 to 2.3 and adjusted OR 2.1 95% CI 1.7 to 2.6, respectively). For maternal diabetes the risk of anomalies was especially elevated in the cardiovascular organ system and for maternal epilepsy in the central nervous system. High maternal age, IVF/ICSI pregnancy, male gender and plurality were also strongly related to the risk of having a child with an anomaly. The population attributable risks calculated for all risk factors were especially high for male gender, primiparous women, high maternal age and non-Western ethnicity (PAR respectively 18.4, 5.0, 2.5 and 1.7). The PAR for maternal diabetes, for epilepsy and for IVF/ICSI is very small as the prevalence of these risk factors in the general population is very low. In total 30% of the registered anomalies could be ascribed to the studied risk factors.

**Conclusions:** Strategies for primary prevention of congenital anomalies should focus on (partly) different risk factors depending on the approach used. For a high-risk group approach existing maternal morbidity such as diabetes and epilepsy are important factors. For a public health approach, however, factors such as high maternal age, primiparity and ethnicity are more important to focus on, for example in preconception counselling.

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**029 MATERNAL AGE SPECIFIC RISK OF NON-CHROMOSOMAL ANOMALIES**

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**Objectives:** The increased risk of chromosomal anomalies associated with older mothers is well documented. We assess the risk of non-chromosomal anomalies in older mothers (35+ years) and younger mothers (<20 years) in Europe 1990–2004.

**Design and Setting:** Prevalence study in 25 regions of Europe covered by population-based EUROCAT registries, 1990–2004, covering a total of 4.8 million births. The EUROCAT database contains standardised comparable data on malformations obtained from a collaborative network of European registries set up initially to get out epidemiological surveillance of congenital anomalies throughout Europe.

**Participants:** All registered cases of non-chromosomal anomaly that were liveborn, fetal deaths at 20 weeks gestation or more or terminations of pregnancy following prenatal diagnosis of a congenital malformation.

**Main Outcome Measures:** Prevalence of non-chromosomal anomalies (total cases divided by total births) by 5-year maternal age groups.

**Results:** In the years 1990–2004, 25 regional registries in 15 European countries identified a total of 111,899 cases of non-chromosomal anomalies with maternal age known, giving a prevalence rate of 23 per 1000 births. The proportion of young mothers (<20 years) increased from 3% in 1990–4 to 3% in 2000–4, while the proportion of older mothers (35+) increased from 14% in 1990–4 to 19% in 2000–4. The prevalence of all non-chromosomal anomalies was 27 per 1000 births in younger mothers (<20 years) and 23 per 1000 births in older mothers (35+) years. The relative risk of all non-chromosomal anomalies for younger mothers (<20 years) was 1.13 (95% CI 1.10 to 1.17) and 0.97 (95% CI 0.96 to 0.99) for older mothers (35+ years) compared to the baseline (25–29 years). In 2000–4 the prevalence of non-chromosomal anomalies in younger mothers was 26 per 1000 births and 23 per 1000 births in older mothers. Results differed for individual anomalies.

**Conclusions:** Generally, young maternal age is a stronger risk factor for a wider range of non-chromosomal congenital anomalies than older maternal age. The increasing average age of mothers at childbirth in Europe is not causing an increase in prevalence of non-chromosomal congenital anomalies, as overall risk does not rise with older maternal age. However, teenage mothers are at greater risk of congenital anomalies, and this needs further investigation.

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**030 PHYSICAL EXERCISE AND THE RISK OF PRETERM BIRTH: A STUDY WITHIN THE DANISH NATIONAL BIRTH COHORT**

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**Objective:** According to antenatal guidelines in many countries, women should be physically active during pregnancy, although empirical evidence to support this recommendation concerning fetal health is still sparse. The aim of the study was to examine the relation between physical exercise during pregnancy and the risk of preterm birth.

**Material and Methods:** Self-reported data on physical exercise were collected twice during pregnancy for 89,196 women recruited to the Danish National Birth Cohort between 1996 and 2002. Outcome data stem from the National Discharge Registry in Denmark. Hazard ratios (HR) for preterm birth were calculated by use of Cox regression analysis.

**Results:** Among singleton pregnancies one third of the participants did engage in physical exercise during pregnancy and 4.9% gave birth preterm. Physical exercise was associated with a reduced risk of preterm birth compared with no exercise (HR 0.82, 95% CI 0.76 to 0.88) but no dose-response relation was seen. The association was not affected by the type of exercise. The results did not indicate any time-dependent effects of exercise on extreme, very, and moderate preterm birth.

**Conclusions:** This study showed a reduced risk of preterm birth among women who engaged in exercise during pregnancy compared with women who reported no exercise. These results indicate a slightly protective effect of exercise or that pregnancies ending in preterm deliveries follow an early onset of symptoms that may interfere with the capacity to be physically active.
A10 SSM and IEA abstracts

031 THE SEROPREVALENCE OF RUBELLA IN PREGNANT WOMEN IN NORTH THAMES
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Background: Maternal rubella infection early in pregnancy can cause severe and multiple congenital anomalies in the infant. Since the introduction of vaccination, the number of children born with congenital rubella has declined in the UK, and only 12 UK-born children were reported to the national surveillance programme between 1999 and 2006. Most of these were infants born to mothers who were recent immigrants and infected in their country of origin, or soon after arrival in the UK. London, with a large immigrant population and consistently low measles, mumps and rubella (MMR) vaccination uptake, is at particular risk of rubella outbreaks.

Objectives: To estimate the proportion of pregnant women who are rubella IgG antibody seronegative by maternal country of birth, maternal age and Primary Care Trust of residence at delivery.

Design: Cross-sectional seroprevalence study of approximately 18 000 residual newborn dried blood spots randomly sampled from newborn screening samples collected in 2004.

Setting: North Thames (North London, Bedfordshire, Hertfordshire and Essex), England

Methods: Rubella IgG enzyme-linked immunosorbent assay to measure maternally acquired antibody for a maternal antibody concentration. Finite mixture models were constructed and used to estimate the proportion of seronegative pregnant women. Rubella seroprevalence was examined using logistic regression in STATA.

Results: 12 814 samples have been tested thus far. 3.1% (95% CI 2.8% to 3.4%) were seronegative to rubella. Women born in Sub-Saharan Africa and South Asia were more likely than UK-born women to be seronegative, controlling for maternal age: adjusted odds ratio (AOR) (95% CI) 4.9 (3.3 to 7.4) and 4.9 (3.4 to 7.2) respectively. Relative to those aged 30–34 years, women aged <20 were more likely to be seronegative: AOR 2.5 (1.5 to 4.1).

Conclusion: These preliminary findings suggest that young mothers and those born abroad are at increased risk of rubella infection. Immunisation strategies targeted at newly arrived women migrants might reduce the prevalence of rubella susceptibility in women of child bearing age. An increase in the uptake of vaccine among children in London is also required to prevent transmission of rubella infection to pregnant women.

032 DO COMPLEX INTERVENTIONS HELP OLDER PEOPLE TO LIVE AT HOME? A SYSTEMATIC REVIEW
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Background: In older age, decline in physical function may lead to loss of independence, the need for hospital and nursing home care, and premature death. The importance of preventive strategies based around identification and treatment of diverse risk factors is recognised by older people, health professionals and policy makers. Strategies take the form of complex interventions: combinations of interdisciplinary teamwork targeting health and social problems.

Objectives: To evaluate community-based complex interventions to preserve physical function and independence in older people.

Methods: We used Cochrane systematic review methods to identify randomised controlled trials fulfilling the inclusion criteria: mean age 65+ years; living at home or preparing for hospital discharge to home; community-based multifactorial intervention; and follow-up at least 6 months. Articles were identified from computerised databases and citation searches. Outcomes studied were: not living at home, death, nursing home and hospital admissions, falls, and physical function. Summary relative risks and standardised mean differences were calculated using fixed effects meta-analysis and potential sources of heterogeneity investigated.

Results: Eighty nine trials including nearly 100 000 people fulfilled inclusion criteria. While most trials were conducted in the USA and UK, many other countries were represented. The overall relative risk of not living at home was 0.95 (95% CI 0.93 to 0.97) reflecting a mean of 2.2% more people living at home per year in the intervention group (number needed to treat 45). This was explained by reduced nursing home admissions, relative risk 0.87 (95% CI 0.83 to 0.90) rather than death, relative risk 1.00 (95% CI 0.97 to 1.02). Hospital admissions were lower in the intervention group, relative risk 0.93 (95% CI 0.90 to 0.97) and 0.90 (95% CI 0.86 to 0.94) respectively. Physical function at follow up was better in the intervention group, standardised mean difference −0.09 (95% CI −0.14 to −0.05). With the exception of reduced nursing home admissions, there was no evidence for greater effectiveness in less healthy groups. There was no suggestion that higher intensity interventions were more effective.

Conclusions: The need to evaluate complex models of care in older people is recognised internationally. Review of trials suggests that complex interventions can help older people to carry on living at home, largely through preventing the need for nursing home admission, and reduce hospital admissions and falls. As benefits were seen with a broad range of intervention intensities in different older populations, determining the cost-effectiveness of specific interventions is a high priority to inform implementation of care.

033 PREDICTORS OF THE ONSET AND PERSISTENCE OF PARTICIPATION RESTRICTION IN COMMUNITY-DWELLING OLDER ADULTS
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Background: In older populations, increasing rates of chronic diseases and impairments may lead to activity limitation but may not necessarily restrict participation in aspects of life such as looking after dependants, work or socialising. Our study aimed to examine which individual and environmental factors were linked with the onset and persistence of perceived participation restriction in community-dwelling older adults.

Methods: Prospective population-based observational cohort of adults aged 50 years and over using self-completed questionnaires. Analysis was performed on participants (n = 3709) who completed all items of the Keele Assessment of Participation at both baseline and three-year follow-up. Multi-level logistic regression was used to assess the baseline predictors of (a) onset and (b) persistence of any participation restriction (restriction in one aspect of life or more) at three years. Factors examined were at the individual level (age, gender, specific health conditions and impairments common in older adults, socio-economic and personal factors) and the area-level Index of Multiple Deprivation covering domains of income, employment, education, health and disability, housing and services, crime and the living environment.

Results: A high level of activity limitation (OR 2.7; 95% CI 1.6 to 2.4) was the main independent predictor of onset of participation restriction at three years. Modest associations were also apparent for comorbidity, obesity and adequacy of income. The main predictors of persistence of participation restriction were depression (3.3; 1.9 to 5.9) and age 80 and over (2.9; 1.5 to 5.7). Activity limitation, cognitive impairment, occupational class and adequacy of income were also significantly related to persistence. Of the seven area-level domains, only living in an area with high levels of crime deprivation (1.3; 0.9 to 1.9) was associated with the onset of participation restriction. High education deprivation (1.4; 0.8 to 2.5) and high environment deprivation (1.2; 0.8 to 1.9) were associated with the persistence of participation restriction although these associations were not statistically significant.

Conclusions: The onset and persistence of participation restriction were associated with a range of potential health and social targets in older adults. The socially disadvantaged and the oldest old were more susceptible to the onset and persistence of perceived participation restriction. Clinical approaches aimed at managing activity limitation and health conditions and impairments (such as depression and obesity) may prevent and reduce participation restriction in older adults. Area level environmental factors did not appear to be linked with the onset or persistence of participation restriction but power to demonstrate these limits was limited.

034 SOCIAL ENGAGEMENT AND THE RISK OF CARDIOVASCULAR DISEASE MORTALITY: RESULTS OF A PROSPECTIVE POPULATION-BASED STUDY OF OLDER MEN
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Objective: Although social relationships appear to be related to health status, their association with cardiovascular disease (CVD) is less clear. Although some studies have suggested that weak social relations increase

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CVD risk, few have taken into account the potential confounding effects of behavioural factors (smoking, physical activity, body weight and alcohol consumption) and the influence of co-morbidity and disability. We examined the prospective relation of social engagement with CVD mortality taking account of behavioural factors, socioeconomic conditions and the presence of comorbidity and disability.

**Design:** Prospective study of a socioeconomically and geographically representative cohort.

**Setting:** 24 British towns.

**Participants:** 5925 men, aged 52–74 years, followed-up from 1992 to 2006.

**Methods:** Social engagement was measured as a score from 0–9 based on questions reflecting the structure of relationships including frequency and extent of engagement. The score was categorised into four groups: 0–3, 4–6, 7–8 and 9. Hazard ratios for CVD mortality according to these categories were computed and the effect adjusted for age, comorbidity, and behavioural and socioeconomic factors.

**Results:** Subjects with higher social engagement scores had lower levels of smoking, heavy drinking, obesity and physical inactivity (all p for trend < 0.005). The hazard for CVD mortality decreased with increasing social engagement score – hazard ratio (HR) for those with the highest social engagement scores of 8–9 was 0.42 (95% CI 0.32 to 0.53) compared to those with the lowest scores of 0–3 (p for trend <0.0001). Further adjustment for behavioural factors (smoking, alcohol, physical activity and body weight), disability, comorbidity and socioeconomic factors reduced the strength of this association though a significant trend remained (p for trend 0.0004). The hazard ratio for CVD mortality according to these categories was HR 0.59 (95% CI 0.53 to 0.65) for those with the highest social engagement scores of 8–9 and HR 0.90 (95% CI 0.82 to 0.99) for those with the lowest social engagement scores of 0–3. However, a significant trend remained (p for trend = 0.0004) – HR 0.70 (95% CI 0.53 to 0.93) for highest vs lowest social engagement score. This association between increasing social engagement score appeared to be present both in men with and without CVD at baseline. Although the association appeared somewhat stronger in patients with pre-existing CVD (HR 0.59 for highest vs lowest social engagement scores) than in those without (HR 0.79), there was no evidence of an interaction between social engagement and CVD (p = 0.98).

**Conclusion:** In our study of older men, social engagement appeared to have a modest protective effect on CVD mortality independent of behavioural factors, socioeconomic conditions, disease and disability.

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**036 DECREASED MUSCLE MASS AND INCREASED CENTRAL ADIPOSITY ARE INDEPENDENTLY RELATED TO MORTALITY IN OLDER MEN**

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**Background:** Although visceral fat deposition increases with age, muscle mass is reduced. These changes have opposite effects on body weight; BMI is therefore an increasingly poor marker of adiposity with increasing age. Studying the influence of age-related changes in body composition on mortality therefore requires the use of more specific body composition measures.

**Aims:** We have examined the relationship between a wide range of indices of body composition including BMI and more specific markers of adiposity (waist circumference (WC), waist-to-hip ratio (WHR), fat mass) and markers of muscle mass (mid arm muscle circumference, fat free mass) and all cause mortality in men aged 60–79 years.

**Methods:** Prospective study of 4107 men aged 60–79 years with no diagnosis of heart failure, and followed up for an average of 6 years during which there were 713 deaths.

**Results:** Underweight men (BMI <18.5) had a mortality rate three times higher than any other BMI group. After exclusion of these men, increased adiposity (BMI, WC and WHR) showed little relation with mortality after adjustment for lifestyle characteristics. Muscle mass (indicated by mid-arm muscle circumference (MAMC)) was significantly and inversely associated with mortality (adjusted relative risk for the 4 quartiles were 1.00, 0.79, 0.71 and 0.71 (p=0.0003 for trend)). Men with low MAMC (lowest quartile) had the highest mortality irrespective of adiposity. After adjustment for MAMC, obesity markers, particularly high WC (>102 cm) and WHR (top quartile) were associated with increased mortality. The relationship between BMI and mortality appeared to be dependent on muscle mass, obesity being positively associated with increased mortality only in those with above median MAMC. Measuring both MAMC and WC most effectively predicted mortality. Men with low WC (<102 cm) and above median muscle mass showed the lowest mortality risk. Men with WC >102 cm and below median muscle mass showed significantly increased mortality (adjusted RR 1.39, 95% CI 1.08 to 1.77) and this increased to 1.66 95% CI (1.08 to 2.56) in those with WC >102 and below median MAMC.

**Conclusion:** The findings suggest that both decreased muscle mass (denoted by low mid-arm muscle circumference) and increased visceral fat (denoted by high waist circumference) are independently associated with increased mortality in older men. Although BMI should be used in the first instance to identify underweight men, our findings suggest that the use of both waist circumference and MAMC provide simple measures of body composition to assess mortality risk in older men.

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**037 25-HYDROXYVITAMIN D AND RISK OF POSTMENOPAUSAL BREAST CANCER**

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**Introduction:** A variety of studies suggest that vitamin D may reduce the risk of breast cancer. Most of these studies assessed the effects of dietary intake only, although sun exposure is an important source of vitamin D. Therefore, measurement of vitamin D metabolites provides a better indication of the overall vitamin D status. Serum concentration of 25-hydroxyvitamin D (25(OH)D) was suggested as medium-term biomarker of vitamin D supply.

**Objective:** To assess the association of 25(OH)D serum concentrations with the risk of breast cancer in postmenopausal women.

**Design:** We used a large population-based case-control study in Germany, which recruited incident breast cancer patients aged 50–74 between 2002 and 2005 and population-based controls matched according to year of birth. Information on sociodemographic and anthropometric data, lifestyle habits, hormone use and other breast cancer risk factors were collected by...
Objective: To explore the relationships between recognised breast cancer risk factors and two novel measures of breast density volume.

Design: Cross sectional study nested within a prospective cohort.


Main Outcome Measures: Volumetric breast density was estimated from media-lateral oblique mammograms taken at the first screening visit for each woman. We used a fully automated computer programme (Standard Mammogram Form, SMF, Version 2.2) applied to digitised film-screen mammograms. This measured the proportion of the breast volume composed of dense (non-fat) tissue (SMF%) and the absolute volume of this tissue (SMF volume in cm³).

Results: The median age at first breast screening was 54.1 years (range 40.0 to 71.5). The median SMF volume was 70.25 cm³ (interquartile range: 51.0 to 103.0). Mean SMF% was 26.3%, standard deviation 8.0% (range 12.7% to 58.8%). Age-adjusted logistic regression models showed a mixed pattern of associations between volumetric breast density and breast cancer risk factors. There was a positive relationship between age at last menstrual period and SMF%, odds ratio per year later: 1.05 (95% CI 1.01 to 1.08, p = 0.004). Number of pregnancies was inversely related to SMF%, odds ratio per extra kg/m² 0.83 (0.79 to 0.88) respectively, p < 0.001. BMI measured at university (median age 19) and in 2001 (median age 62) was positively related to SMF volume, odds ratio per extra kg/m² 1.21 (1.15 to 1.28) and 1.17 (1.09 to 1.26) respectively, and inversely related to SMF%, odds ratio per extra kg/m² 0.83 (0.79 to 0.88) and 0.82 (0.76 to 0.88) respectively, p < 0.001.

Conclusions: SMF% and absolute SMF volume are related to several, but not all, breast cancer risk factors. In particular, the positive relationship between BMI and SMF volume suggests that the volume of dense breast tissue is likely to be a useful marker in breast cancer epidemiology.
Methods: We conducted this study in the counties of North Jutland and Aarhus, Denmark, with a total population of 1.15 million women from January 1991 through December 2002. We used county hospital discharge registries to identify breast cancer cases, and pharmacy registries for prescription history. Controls, matched to cases on birth year and county of residence, were selected from the Danish Civil Registration system, and sampled by incidence density sampling. We excluded exposure data in the year before index date to allow for a preclinical latency period. Exposure history was included from the time the individual entered the study databases were established—1989 in North Jutland and 1996 in Aarhus. We used conditional logistic regression to compute crude and adjusted odds ratios and 95% confidence intervals as a measure of relative risk of breast cancer according to sCox-2 inhibitors and other NSAIDs use. We examined the association of NSAIDs and sCox-2 inhibitors with breast cancer risk using odds ratios (OR) and 95% confidence intervals (CI) for low, medium, and high intensity of use. We controlled for age, smoking, alcohol consumption, use of hormone therapy, and other relevant variables. We included a frailty component in the model to account for the correlation of the exposure histories within the same household.

Results: We included 7237 cases and 71 208 population-based controls. Median age at the study population was 62.7 years; over 57% were aged <65 years at index date. More cases than controls had ever used HRT (32.2% vs 28.8%). Compared to never/rare users, low and high intensity use of sCox-2 inhibitors were positively associated with breast cancer risk (OR low intensity: 1.04, 95% CI 0.97 to 1.13, OR medium intensity: 1.78, respectively). There was no significant association of other NSAIDs (OR low intensity: 1.20, 95% CI 0.94 to 1.52 and OR medium intensity: 1.35, 95% CI 1.03 to 1.78) with breast cancer risk. Use of sCox-2 inhibitors were positively associated with breast cancer risk (32.2% vs 28.8%). Compared to never/rare users, low and high intensity of use.

Conclusion: There was a significant association of sCox-2 inhibitors with breast cancer risk, but no significant association of other NSAIDs. The association was stronger with increased intensity of use.

Genetics and health

GENES AND SMOKING INTERACT ON THE RISK OF AGE-RELATED MACULOPATHY: THE MUENSTEN AGEING AND RETINA STUDY

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Background: Age-related macular degeneration (AMD) is the most common cause of irreversible visual impairment and legal blindness among older people in the Western world. Although the genetic determinants of age-related maculopathy (ARM) and AMD have been extensively studied in recent epidemiological and clinical investigations, the complex interplay between genetic and environmental factors in determining the onset and progression of the disease remains insufficiently understood.

Objectives: We investigated whether single nucleotide polymorphisms (SNPs) within two previously identified AMD risk genes on different chromosomes (Complement factor H (dbSNP ID:rs1061170) and LOC387715 (dbSNP ID:rs10490924)) were related to prevalent ARM (n = 449) and AMD (n = 288) in the baseline examination of the Muenster Ageing and Retina Study cohort (MARS, total n = 920). Particular interest was dedicated to effect modification between SNPs and/or by smoking. We also specifically searched for differences relating to the two phenotypic manifestations of geographic atrophy (GA) and choroidal neovascularisation (CNV).

Results: We observed that the CFH risk allele frequency in controls (34%) and the LOC (25%) genetic variants were common and independently associated with an increased risk of ARM (OR 5.6 and 2.0, respectively, p < 0.001, homozygous vs non-carrier) and AMD (OR 6.9 and 8.5, respectively, p < 0.001). Both SNPs were more strongly associated with CNV (homozygotes OR 6.6 and 11.0) than GA (OR 4.9 and 4.1, respectively). Compared to individuals carrying none of the two risk alleles, those homozygous for both risk variants showed a massively higher risk of AMD (OR 69.9; synergy index SI: 8.7). Of 34 individuals homozygous for both risk alleles, only one had no maculopathy. Furthermore, smoking amplified the effect of each of the genetic risk variant, especially for CNV (OR 15.4 and 20.8, respectively, for homozygotes).

Conclusion: There is indication of a very strong genetic determination of ARM and AMD, we observed strong biological interaction between two common genetic risk variants in different chromosomal loci, and it appears that smoking substantially accentuates the genetic risk of AMD, especially for CNV. The public health impact of these findings needs consideration.
**ROLE OF PARENTAL LINEAGES IN MONOZYGOTIC AND DIZYGOTIC TWINSING IN ITALY**

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**Objective:** It is widely accepted that twinning, especially of dizygotic pairs, is a familial trait. Different transmission patterns for dizygotic (DZ) twinning have been proposed, and the role of both parental lineages for monozygotic (MZ) and DZ twin births is controversial.

**Design:** Since most studies simply compare twinning prevalence among relatives of MZ and DZ twins, we adopted a case-control approach to estimate the relative risk of being MZ or DZ twin given that a parent or a grandparent is a twin.

**Participants and Setting:** Participants in this study were all members of the Mercurio Project that enrolled consecutive singleton and twin births in 40 Italian hospitals during 1993–5. Twins were recontacted 10 years later by the Italian Twin Registry to better ascertain their zygosity. Data on twin parents and grandparents were collected three months after birth for 552 spontaneously conceived twin pairs (229 MZ, 323 DZ), and 1162 singletons.

**Main Outcome Measures:** Odds ratio (OR) of being a twin given that at least one parent or grandparent is a twin.

**Results:** Twin prevalence is not significantly different between twins’ and singletons’ parents. Instead, the odds ratio of being a twin given that at least one grandparent is a twin is 1.6 (95% CI 1.1 to 2.3). This OR rises to 1.9 (95% CI 1.2 to 3.0) if at least one maternal grandparent is a twin, but is not significant for paternal side. When looking at the ORs by zygosity, having one maternal or paternal twin grandparent confers a higher risk of DZ twinning (OR 1.8, 95% CI 1.0 to 3.1 and OR 1.7, 95% CI 1.0 to 3.1). For MZ twins only maternal side confers a significant higher risk (OR 2.1, 95% CI 1.2 to 3.8) and in particular the signal come from maternal grandmother (OR 2.7, 95% CI 1.3 to 5.6).

**Conclusion:** In our sample MZ twinning seems to be transmitted by maternal grandmother, while both lineages contribute to DZ twinning.

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**Lifestyle: smoking and health**

**VALUE-ADDED EDUCATION AND SMOKING UPTAKE IN SCHOOLS: A COHORT STUDY**

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**Objective:** To show that schools achieving higher examination pass and lower truancy rates than expected given their pupil populations (value-added schools) are associated with a lower incidence of smoking among pupils (13–14 years).

**Methods:** Value-added scores for schools were derived from the standardised residuals of two regression equations that separately predicted the proportion of pupils passing high school diplomas and the proportion of half-days lost to truancy from the socio-economic and ethnic profile of pupils. The residuals were inversely correlated, so that schools with higher than expected examination pass rates had lower than expected truancy rates and a principal component score indexed value-added education. The risk of regular smoking at one and two year follow-up was examined in relation to the value-added score in a cohort of 8352 UK pupils in 52 schools. Random effects logistic regression was used to adjust for baseline smoking status and other adolescent smoking risk factors.

**Results:** Many schools providing value-added education served disadvantaged communities and consequently had low examination pass rates and high truancy, but these rates were better than expected given their pupil populations. Adjusted for smoking uptake risk factors, the odds ratio (95% CI) for regular smoking for a one standard deviation increase in the value-added measure was 0.85 (0.73 to 0.99) at one year and 0.80 (0.71 to 0.91) at two year follow-up. Baseline smoking status did not moderate this.

**Conclusion:** Schools providing value-added education are associated with lower incidence of smoking. Understanding the precise mechanisms could be of great public health significance.
Results: Smoking prevalence has declined slightly in both men and women from 1993 to 2003 (from 60% to 49% in men, and 5% to 3.2% in women); this has occurred in all age groups, throughout urban and rural areas. However, the proportion of heavy smokers among current smokers has more than doubled in only five years (from 25% in 1998 to over 52% in 2003), and the age at starting to smoke has fallen slightly (by about three years). Few current smokers report recent attempts to quit and most (62%) report having given up. Evidence of alcohol quitting: the most common reason given for quitting is ill-health (41%), but few smokers report receiving any doctor advice to quit. In poorer rural areas, the direct costs of cigarettes resulted in reductions in expenditure on education among smoking households, compared with non-smoking households.

Discussion: Although there have been some recent successes in reducing overall smoking prevalence, further efforts are urgently needed, particularly in rural areas. Smoking may have considerable opportunity costs, affecting future generations in China.

**049 RISK PERCEPTION OF SMOKING IN THE GENERAL POPULATION: CHANGES FROM 1999 TO 2006**


**Background:** Smoking is the leading cause of death in many developed countries. It is estimated that in Ireland more than 6000 people die of smoking-related diseases each year, this is 10 times more than the number killed each year in road traffic accidents. Research conducted in 1999 showed that the general Irish population were aware of the dangers of smoking at large but clearly underestimated the importance of smoking relative to other external causes of death. It is likely that with the extensive public discussions on the harmful effects of smoking the population became more aware of smoking as the major risk factor for premature death over the past few years.

**Objectives:** To investigate changes in perceived risk of premature death due to smoking from 1999 to 2006 in the general population and general practitioners.

**Methods:** This study involved two cross-sectional telephone surveys of representative samples of 1000 Irish adults in 1999 and 2006 respectively, and follow-up telephone surveys with a random sample of general practitioners. The original ‘expert’ sample of general practitioners (n=171, 85% response rate) were interviewed in 1999; a repeat survey was completed in 2006 (n=131, 77% response rate). Participants were asked to identify the main cause of death before age 70 in Ireland from a list of seven causes: smoking, road traffic accidents, accidents at work, AIDS, homicide, illicit drugs and alcohol misuse and estimate the absolute number of premature death among 1000 20-year-old lifelong smokers.

**Results:** In 2006 43.2% of the general population sample correctly identified smoking as the most important cause of premature death followed by road traffic accidents (39%). Women, and the youngest and the oldest age groups were significantly more likely to underestimate the relevance of smoking to traffic accidents (39%). Women, and the youngest and the oldest age groups were significantly more likely to underestimate the relevance of smoking relative to other external causes of death. It is likely that with the extensive public discussions on the harmful effects of smoking the population became more aware of smoking as the major risk factor for premature death over the past few years.

**Discussion:** Although the health effects of smoking in men are well established, there have been few large studies examining the health effects of smoking in women.

**Objectives:** To investigate the association between smoking and the risk of a number of health outcomes, including cancer incidence and mortality from other causes.

**Design:** Prospective cohort study.

**Participants and Setting:** A cohort of 1.3 million women aged 56 years on average, recruited from breast screening clinics in 1996–2001 in England and Scotland. Women were followed prospectively for incident cancer and death through NHS cancer registration and death records.

**Main Outcome Measures:** Relative risks of incident cancer and all cause mortality for current versus never smokers, adjusting for age, body-mass index (BMI), region and deprivation index.

**Results:** At recruitment, 51% of the women were lifelong non-smokers and 21% were current smokers. On average, current smokers reported smoking from the age of 19 years and smoked 15 cigarettes per day. During an average follow-up of 6.2 years for cancer incidence and 7.9 years for mortality from any cause, 54,162 incident cancers were diagnosed and 41,174 deaths occurred. The relative risks of developing cancer for current versus never-smokers varied substantially by cancer site. The relative risk of mortality from any cause for current versus never smokers is 2.84 (95% CI 2.77 to 2.91) in this cohort of women, which is higher than that reported for men in other studies. In particular, current smokers in this cohort are at a substantially increased risk of mortality from lung cancer, chronic obstructive pulmonary disease and coronary heart disease compared to women who have never smoked.

**Conclusions:** In this large cohort of women, current smokers are at a significantly increased risk of developing cancer and also of mortality from cancer and other causes. The relative risk for all cause mortality suggests that two out of three deaths in female smokers are due to smoking in this study.

**050 THE ROLE OF PEER INFLUENCE AND PEER SELECTION IN ADULT SMOKEING**

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**Background:** Smoking in adolescence is strongly associated with friends’ smoking behaviour. However, longitudinal analyses have found that this relationship is not straightforward. It is unclear whether the school year group, friendship group, best friend or boy/girlfriend have the greatest influence, and there is inconsistent evidence of the relative importance of peer influence (direct effect of others on an individual) and peer selection (friendships dependent on behaviour).

**Objectives:** To ascertain: if the smoking behaviour of best friends and/or the wider friendship group is associated with future smoking behaviour (peer influence); if change in smoking behaviour is associated with changes in smoking behaviour of best friends and/or the wider friendship group (peer selection).

**Methods:** ASSIST involved almost 11 000 12–13-year-old students in 59 schools. Four waves of data (including own smoking behaviour, smoking behaviour of best friend, girlfriend/boyfriend, wider friendship group, family and co-residents, and socioeconomic status) were collected (baseline=T1, post-intervention=T2–T4). Logistic regression was used to estimate the effect of peer influence and selection on the likelihood of weekly smoking at T2. Unvariable and multivariable models were separated variables representing peer influence and selection before their combined effects were estimated. All models controlled for T1 smoking behaviour. A final model controlled for respondents’ sex, household smoking, and SES.

**Results:** Peer-influence variables were significant (p<0.001) in unvariable models but best friends’ smoking and year-group smoking prevalence were not significant when all peer-influence variables were included. After controlling for peer selection, peer-influence variables were not significant. Peer-selection variables were significant (p<0.001) in unvariable and multivariable models. Change to having smoking friends significantly increased the risk of smoking. There was no comparable protective effect of change to having non-smoking friends. Students reporting no change in the behaviour of best friends who smoked, or in a wider friendship group which included smokers, had the highest risk of smoking at T2.

**Conclusions:** Peer selection of the wider friendship group, rather than of best friends or boy/girlfriends, was more strongly associated with smoking uptake than peer influence. This suggests that interventions which focus on resisting peer pressure to adopt risk behaviours such as smoking may be based on a naïve understanding of the relationship between adolescent socialisation, peer effects and behaviour.
A16 SSM and IEA abstracts

Design: Two population-based, nationally representative, cross-sectional surveys.

Setting: England.

Participants: 21 089 parents of children aged 5–16 were approached to participate in the British Child and Adolescent Mental Health Surveys of 1999 and 2004. With parental consent, a child’s teacher (n = 15 816) and the child themselves if aged 11–16 (n = 7346) were also approached to participate. Postcode was used to assign an Indices of Multiple Deprivation (IMD) score.

Main Outcome Measure: Participation in the survey (as a proportion of all those approached to take part).

Results: 75% parents who were approached participated and, for those parents who participated, 77% of teachers and 90% of children aged 11–16 took part. Parents, teachers and children were all substantially less likely to participate in more deprived areas, a trend which could be seen across the whole range. The response rate in the most deprived vs the least deprived IMD quartile was 70% vs 79% in parents, 71% vs 81% in teachers and 85% vs 92% in children. Multiple logistic regression models entering the IMD subdomains simultaneously suggested that different domains might be more important in predicting non-response in different informants.

Conclusion: Parental response rates were substantially lower in more deprived neighbourhoods. Furthermore, even among those parents who did participate, deprivation was a powerful predictor of non-participation for both their children and their children’s teachers. Designs of this sort, which approach some informants only after obtaining consent from others, may therefore result in a multiplication of deprivation-related response biases, operating at two distinct points in the recruitment process. This is of particular concern for studies involving children, which often adopt just such a strategy, but is also relevant to some adult designs. More generally, these findings suggest that in England greater deprivation predicts lower response rates in multiple types of respondent. This may lead to the underestimation of the prevalence of deprivation-related health outcomes. These findings also provide a hint that different forms of deprivation may be more relevant for different informants.

053 THE IMPACT OF SPARSE DATA AT THE HOUSEHOLD LEVEL IN MULTILEVEL MODELLING

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Background: Multilevel models are invaluable in area-level research for investigating the impact of context on health outcomes. The choice of which contexts to include in an analysis is not straightforward. Frequently datasets are collected which include sparse levels of data and published studies of household-level effects on mental health often contain many single response households. This results in the household level being sparse. The effect of this sparsity on the validity of results from a multilevel model has not been investigated to date. Similarly the ramifications of excluding such levels are unknown. Despite this uncertainty, recently published papers investigating common mental disorders have suggested that households constitute an important contextual unit to include in the model.

Objective: To determine the impacts of including and excluding a sparse household level in a multilevel analysis.

Design: Simple three-level datasets were simulated with known variance structure in order to imitate individuals nested within households nested within areas. The relative importance of the household level, the sample size and the level of sparseness were all varied in order to assess the impact of each of these factors on multilevel modelling. Household responses were modelled by a Poisson distribution. An outcome measure was simulated based on the variance structure, as well as an individual-level predictor of this outcome. The outcome was fitted as a normal response, as well as being dichotomised for logistic analysis.

Methods: Multilevel modelling using the R programming language.

Results: Variance component estimates for three-level null models were unbiased for most levels of sparseness, however, extreme sparseness conditions (average number of respondents per household <1.5) the variability of the household and individual level variance components increased. Excluding the household level resulted in the majority of that level’s variance being attributed to the individual level. Area level variance components were overestimated only when the sample size was small (n = 1000) and the excluded level’s variance contribution was large (~50%). Fixed effect coefficient estimation was unaffected as was the standard error on those coefficients.

Conclusion: The impact of including a sparse household level in multilevel analysis is complicated and depends on the level of sparseness present. The total sample size and the relative magnitude of the variance contribution from the sparse level. Sparseness can reduce variance component estimation precision and so caution should be exercised in interpreting these models.

054 BEYOND KAPPA: THE USE OF MULTIFACETED RASCH ANALYSIS AND MULTILEVEL MODELLING TO INVESTIGATE OBSERVER EFFECTS

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Introduction: It is common in health research to undertake calibration exercises. When the scale concerned is categorical, this usually involves the use of Cohen’s Kappa. Although well-documented, problems concerning Kappa are still not widely appreciated. The confidence intervals associated with Kappa are usually very wide. This lack of robustness can lead to calibration exercises drawing spurious conclusions. Kappa values close to one are rarely achieved and research that subsequently ignores the observer effect may lead to erroneous conclusions being drawn. This paper considers two alternative approaches (1) multifaceted Rasch modelling and (2) multilevel modelling.

Methods: The carious status of each surface, around each tooth, was recorded for 26 subjects by 26 observers, using a 10-point ordinal scale. RUMM2020 software was used to fit a multifaceted Rasch model. A 2-level model with observer at level-1 and surface at level-2 was fitted using MLwiN software, such that random variation at level-1 is a measure of the observer effects.

Results: Pairwise Kappa agreement ranged from 0.41 to 0.80, indicating that agreement was modest and variable. Agreement was not sufficient to ignore observer effects. Multifaceted Rasch analysis revealed several interesting features. In ranking the items in level of difficulty, not all disagreements lay at the difficult end of the spectrum. Observers diverged across the centre of the scale, where the majority of the observations happened to lie. Multilevel modelling was successful in explicitly incorporating the observer effects in the model. Observer effects were substantial.

Conclusions: The dataset analysed is typical of calibration exercises and research involving more than one observer. This work demonstrates the necessity of adopting alternative approaches to Kappa as: (1) observer effects may not always be ignored, as this can potentially lead to erroneous conclusions being drawn; and (2) costly calibration exercises may not always be necessary.

055 IDENTIFYING COMPLEX CAUSAL PATHWAYS WITH ARTIFICIAL NEURAL NETWORKS: A SIMULATION STUDY

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Background: The investigation of genetic factors is gaining importance in epidemiology. Most relevant from a public health perspective are complex diseases that are characterised by complex pathways involving gene–gene- and gene–environment-interactions. The identification of such pathways in case-control studies requires sophisticated statistical methods that are still in their infancy. Due to their ability in describing complex non-linear association structures, artificial neural networks might represent a suitable means for modelling complex causal pathways. To investigate the potential of artificial neural networks, we currently conduct several simulation studies.

Methods and Results: The results from two simulation studies will be presented. The first one investigated whether the artificial neural network was able to detect the mode of inheritance. For coding single genotypes, different coding schemes were used. The results were compared with those of logistic regression models. It showed that in contrast to the logistic regression model, the artificial neural network was able to capture the underlying mode of inheritance irrespective of the applied coding scheme for the genotype. The second simulation study investigated the ability of artificial neural networks for capturing gene–gene-interaction. For generating the data, several biological relevance was used again, the results were compared with those logistic regression models with and without interaction terms. The artificial neural network succeeded in modelling the different scenarios. This strength was also emphasised by the poor performance of the logistic regression model in some of the investigated situations.

Conclusion: The results of the simulation studies showed the high potential of artificial neural networks for modelling the complex interplay of genetic factors in etiology. This promising approach will be further pursued using simulation data and real world data.
SSM and IEA abstracts

056 HOW REAL IS INTENTION-TO-TREAT ANALYSIS IN PHARMACOEPIDEMIOLOGICAL SAFETY STUDIES? WE CAN DO BETTER

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Introduction: Although cohort studies which are based on intention-to-treat (ITT) approach are a simple design with data which are simpler to analyse and results easier to interpret, such studies also intrinsically assume that any time-varying treatment effect that exits can be adequately estimated by a fixed-effect component. However, such an assumption may not reflect real-life drug use. Reflection of real-life clinical practice is a major strength of epidemiological safety studies. The failure to properly reflect reality may result in the underestimation of time varying treatment effect and irreproducible conclusions due to exposure misclassification. In effect, the use of nested case-control design is a concession that ITT in cohort design may not be adequate. But the nested design also has its own sources of bias, including confounding by indication. We illustrate the viability of the case-crossover and case-in-time designs as alternatives by replicating a previously reported study that was based on the two designs.

Methods: A retrospective cohort of asthma patients aged 5–54 at first diagnosis in the UK General Practice Research Database was used to assess the safety of short-acting β2-agonists (SABA) on the risk of fatal or near fatal asthma attack in 1987–2006. The case-crossover design involved only patients who experienced the event and additionally, the case-in-time design also involved matched control patients in a nested case-control design who were event-free but were similar to their matched cases on age, gender and duration of asthma based on sampling from the corresponding risks sets. In both designs, we defined two periods of one year duration on each patient. The current period was the year before the event and a reference period as the year before the current. Thus patients had two years of assessment on SABA use between asthma diagnosis and the event. In the case-time control version, each qualified control subject of the nested case-control design was used twice, once for the current and also for the reference periods.

Results: We compared those who used more than 12 scripts in a one-year period with those who used less, we obtained hazard ratios of 2.73 (95% CI 2.07 to 3.59), 1.67 (0.95 to 2.92) and 0.79 (0.50 to 1.22) in the nested period with those who used less, we obtained hazard ratios of 2.07 to 3.59), 1.67 (0.95 to 2.92) and 0.79 (0.50 to 1.22) in the nested period with those who used less.

Conclusion: Both the case-crossover and case-in-time designs gave results similar to those previously reported and those from the nested case control also confirmed the bias of confounding by disease severity.

Parallel session C

Lifecourse 1

057 POOR MIDLIFE PHYSICAL FUNCTION AMONG UNMARRIED AND CHILDLESS MEN: EVIDENCE FROM THE 1946 BRITISH BIRTH COHORT

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Background: Marital and parental role characteristics are important factors in both men and women’s health. Most studies to date have either focused on disease specific outcomes or summary measures of self-reported health rather than using functional tests of performance.

Objective: To investigate the extent to which marital and parental role characteristics are associated with midlife physical function.

Design: Prospective birth cohort study.

Setting: England, Scotland and Wales.

Participants: 1353 men and 1411 women followed up since their birth in 1946.

Main Outcome Measure: Handgrip strength, timed chair rising, and standing balance tests at age 53 years were used to calculate an aggregate physical performance score (men 1.42 (SD 0.42, range 0–2.81); women 1.30 (SD 0.37, range 0–2.59).

Results: The mean physical performance score was 1.42 (SD 0.42) for men and 1.30 (SD 0.37) for women. By age 53 years, 11% of men and 8% of women had married but remained childless; 6% of men and 4% of women had never married. Never married (1.15; 95% CI 1.06 to 1.24) and childless married men (1.36; 95% CI 1.30 to 1.42) had significantly poorer physical performance score than married men with children (1.46; 95% CI 1.43 to 1.48). These relationships remained after adjustment for adult social class, own educational attainment and body mass index at 53 years (β −0.18, 95% CI −0.27 to −0.09 for never married and β−0.09, 95% CI −0.16 to −0.03 for childless married, compared with married men with children). Of those men who had never married 28% were classified as having long-term health problems compared to 5% in both those married men and married men with children. There were no marked differences among women.

Conclusion: In this representative middle-aged population, unmarried and childless men faced greater risk of poor midlife physical function, even after adjustment for confounders. These findings suggest that for men, marriage and parenthood protect against functional decline in midlife. Alternatively, physical performance may be a marker of poorer health in earlier life, which affects the chance of marriage and parenthood.

058 SMOKING HISTORY AND COGNITIVE FUNCTION IN LATE MIDE-LIFE

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Objectives: To examine the association between smoking history and cognitive function in middle-aged men and women, and explore the underestimation of this association due to loss to follow-up among smokers, through death and non-participation.

Design: Prospective cohort study (Whitehall II study) of 10,308 participants aged 35–55 years at baseline (phase 1: 1985–8). Smoking history was assessed in phases 1, 2, 3, 4, and 5 (1985–9), 3 (1991–3) and 5 (1997–9). Smoking status was categorised as: ‘current smoker at Phase 5’, ‘recent ex-smoker’ (stopped smoking between Phases 1 and 5), ‘long-term ex-smoker’ (those who stopped before Phase 1) and ‘never smoker’. Cognitive functioning (memory test, AH 41, Mill-Hill, phonemic and semantic fluency) was tested at phases 5 and 7 (2002–4).

Participants: At Phase 5, data were available for 5346 respondents (72% men, 28% women) free of stroke. Study of cognitive change between Phases 5 and 7 was possible for 4630 participants.

Main Outcome Measures: Being in the worst quintile of cognitive function or cognitive decline.

Results: Smokers at Phase 1 had a higher risk of death (HR 2.00; 95% CI 1.58 to 2.52 in men, and HR 2.46; 95% CI 1.80 to 3.37 in women) and non-participation (OR 1.32; 95% CI 1.16 to 1.51 in men, OR 1.69; 95% CI 1.41 to 2.02 in women). In age-adjusted analyses, male smokers had a higher risk of poor cognition on all measures. In fully adjusted models, this risk remained for memory (OR 1.41; 95% CI 1.08 to 1.84). Male ‘current’ (OR 1.46; 95% CI 1.13 to 1.89) and ‘recent ex-smokers’ (OR 1.62; 95% CI 1.23 to 2.13) also had a higher risk of decline in the AH-41 score. In both genders, ‘long-term ex-smokers’ were less likely to have deficits in vocabulary and verbal fluency (−30% of reduction of risk). Post hoc analysis showed that giving up smoking in early midlife is accompanied by amelioration of other health behaviours.

Objectives: To examine the association between smoking history and cognitive function in men and women, and explore the underestimation of this association due to loss to follow-up among smokers, through death and non-participation.

Results: Smokers at Phase 1 had a higher risk of death (HR 2.00; 95% CI 1.58 to 2.52 in men, and HR 2.46; 95% CI 1.80 to 3.37 in women) and non-participation (OR 1.32; 95% CI 1.16 to 1.51 in men, OR 1.69; 95% CI 1.41 to 2.02 in women). In age-adjusted analyses, male smokers had a higher risk of poor cognition on all measures. In fully adjusted models, this risk remained for memory (OR 1.41; 95% CI 1.08 to 1.84). Male ‘current’ (OR 1.46; 95% CI 1.13 to 1.89) and ‘recent ex-smokers’ (OR 1.62; 95% CI 1.23 to 2.13) also had a higher risk of decline in the AH-41 score. In both genders, ‘long-term ex-smokers’ were less likely to have deficits in vocabulary and verbal fluency (−30% of reduction of risk). Post hoc analysis showed that giving up smoking in early midlife is accompanied by amelioration of other health behaviours.

Objectives: To examine the association between hysterection and subsequent psychological health among women.

Results: Hysterectomy impacts detrimentally on subsequent psychological health (−30% of reduction of risk). Post hoc analysis showed that giving up smoking in early midlife is accompanied by amelioration of other health behaviours.

Objectives: To test the association between hysterection and subsequent psychological health; to examine whether this association varies by characteristics of hysterection; to investigate whether the association is...
independent of pre-hysterectomy psychological health and other potential confounders.

**Design:** Prospective cohort study.

**Setting:** England, Scotland and Wales.

**Participants:** Women from the MRC National Survey of Health and Development, followed up since birth in March 1946 until age 53 years with data on hysterectomy status (N = 1790)

**Main Outcome Measure:** General Health Questionnaire (GHQ)-28 scores of age 53 years.

**Results:** There was no significant association between hysterectomy status and GHQ-28 score at age 53 years when grouping all hysterectomies together (difference in mean log(GHQ-28 score) 0.09 (95% CI 0.04 to 0.21)). However, this masked significant variation in effect by characteristics of hysterectomy. Most notably, compared with women who had undergone abdominal hysterectomy or oophorectomy, women who had undergone vaginal hysterectomy for cancer had GHQ-28 scores at age 53 years which were 49% higher (95% CI 4% to 95%), and women who had undergone a hysterectomy before age 40 years had GHQ-28 scores 35% higher (95% CI 14% to 57%). These associations were not fully explained by prior psychological state or vulnerability, lifetime socioeconomic position, weight at age 26 years, smoking status or hormone replacement therapy use.

**Conclusions:** The poor psychological health of women who had undergone hysterectomy for cancer suggests that these women may require greater levels of support than they currently receive. While it is not possible from these analyses alone to identify whether there is an age or period effect operating which explains the association between young age at hysterectomy and poor subsequent psychological health, that a significant association has been found reignites the debate about whether there is an association between hysterectomy and psychological health and suggests that women who undergo the procedure at young ages could be at risk of poor psychological health in the long term.

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**060**

**LONG-TERM EFFECTS OF ADVERSE CHILDHOOD EXPERIENCES: INFLUENCES ON BODY SIZE AND GLUCOSE HOMEOSTASIS**

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**Objectives:** Recent evidence suggests that abusive or neglectful childhood experiences are associated with adult health outcomes including obesity, cardiovascular disease and diabetes. The aim of this paper is to investigate the influences of childhood adversities (abuse, neglect, parental mental health or drug/alcohol problems, parental separation/divorce, parental involvement or support) on life-course body size and glucose homeostasis in adulthood.

**Design:** Birth cohort study.

**Setting:** England, Scotland and Wales.

**Participants:** 9377 members of the 1958 British birth cohort attending a biomedical survey at 45 years.

**Main Outcome Measures:** Standard deviation scores (SDS) for body mass index (BMI) at 7, 11, 16, 23, 33 and 45 years. Percentage change (100 x final minus initial) in percentage haemoglobin (HbA1c) at 45 years.

**Results:** Three patterns of growth were identified for participants who experienced childhood adversities compared to those who did not: (1) lower SDS for BMI throughout childhood and adulthood was associated with having a neglected physical appearance at 7 or 11 years or having a parent with a mental health problem; (2) lower BMI in childhood and a greater BMI in adulthood was a common pattern for those reporting different types of abuse, particularly physical abuse; and (3) a greater BMI in adulthood only was found for a lack of parental support in childhood as assessed, for example, by few outings and little parental interest in the child's education or low aspirations for the child. Despite the finding of a greater BMI at 45 years for several adversities, relationships with HbA1c were weak. Most associations were explained by socioeconomic indicators except for a peak upbringing (0.57%, 95% CI 0.12 to 1.01), little maternal (0.43, 0.72–2.15) or paternal interest in education for women (0.83, 0.20 to 1.45) and for poor socio-emotional adjustment in childhood (0.83, 0.19 to 1.46). Additional adjustment for adiposity, smoking and alcohol consumption further attenuated associations, and a borderline association remained only for paternal interest in education.

**Conclusions:** Different patterns of growth were associated with different forms of childhood adversity, resulting in greater adult adiposity for some but not all experiences. Adversity in childhood was weakly associated with increased HbA1c in mid-adulthood, reflecting associations with socioeconomic circumstances, later adiposity and health behaviours. Given the relatively young age of the cohort, and associations with childhood adversity for obesity, smoking and alcohol consumption, stronger effects on glucose metabolism may not be apparent until later in life.

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**061**

**ETHNIC VARIATIONS IN GESTATIONAL AGE AND WEIGHT AT BIRTH IN ENGLAND AND WALES**

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**Background:** Ethnic differences in gestational age at birth and birthweight have been reported in relatively small local studies in the UK and elsewhere. Neither gestational age of live births, nor ethnic group, are collected at birth registration in England and Wales which gives rise to important gaps in the routine data on births. A new data source has been identified which is able to fill these gaps for births in England and Wales.

**Objective:** To investigate the variation in gestational age and birthweight across ethnic groups in England and Wales.

**Design:** Analysis of linked birth registration and NHS Numbers for Babies Service (NN4B) records.

**Setting:** England and Wales.

**Population:** All singleton live births in 2005 (~627 000), classified to “ethnic category (baby)” (using 2001 Census groupings) as requested on the NN4B record.

**Main Outcome Measures:** Gestational age distribution, mean gestational age, preterm rate (% <37 weeks), very preterm rate (% <28 weeks), birthweight distribution, mean birthweight, low birthweight rate (% <2500 g).

**Results:** An ethnic group is recorded for 89.0% of live singletons and gestational age at birth for 99.2%. Two thirds of live singletons are recorded as White British. The preterm birth rate is higher in the Black Caribbean group (9.7%) than in White, Asian, or the Black African, groups (ranging between 5.5% and 7.0%). It is lower in the Bangladeshi than the Indian or Pakistani groups. Very preterm birth rates vary by a factor of three across ethnic groups. The low birthweight rate is 5.6% in the White British group compared to around 10% in the Pakistani, Bangladeshi, Indian and Black Caribbean groups. Results will also be presented on the other measures. The contribution to the findings of different age patterns of childbearing across ethnic groups will be explored.

**Conclusions:** The differences shown between ethnic groups in gestational age and birthweight are large and justify more detailed investigation. These findings, not previously available for England and Wales as a whole, have important implications for policy and clinical practice. Further work is needed validating the ethnic group information. The NN4B is a powerful new data source whose importance in extending information on births in England and Wales will increase further with linkage to birth and death registration data.

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**062**

**GESTATIONAL AGE-SPECIFIC RISKS OF SURVIVAL AND MAJOR DEVELOPMENTAL IMPAIRMENTS**

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**Background:** The reduction in infant mortality rates in recent decades has led to greater emphasis on the fate of survivors, particularly those born extremely preterm. In addition to information about the chances of survival, it is now increasingly important for both parents and clinicians to have information about the probability of newborns surviving with impairments which may pose significant life challenges. However, mortality rates by gestational age (GA) are not available from ONS and data about major impairments are scarce.

**Objective:** To investigate the relationship between gestational age at delivery, survival to age one year and subsequent risk of cerebral palsy, visual impairment and hearing loss.

**Design:** Linkage of data from the 4Child database with data from the Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) for births 1993–5.

**Setting:** Four counties in south east England.

**Main Outcome Measures:** Survival at age one year, survival with or without cerebral palsy or sensory impairment.

**Results:** Births at <24 weeks had a mortality rate of 96% by age one year. Mortality rates fell sharply with increasing GA, with rates of 55% at 24–27 weeks and 18% at 28–31 weeks. Generally, as birthweight increased within each GA group, mortality rates fell. In the 36–39 week group mortality rate increased for those with birthweights in excess of 4000 g, however numbers were small and this was not statistically significant. Twelve infant survivors born at <24 weeks had none of the three major impairments. At 24–27 weeks, 28–31 weeks, 32–35 weeks, 36–39 weeks and 40–45 weeks, infant survivors had cerebral palsy rates

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CANCER STUDY

063 INFANT FEEDING AND GROWTH DURING THE FIRST YEAR OF LIFE: THE SOUTHAMPTON WOMEN’S SURVEY

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Background: Current guidelines recommend that infants are exclusively breastfed for the first 6 months, with particular solid foods being gradually introduced from 6 months.

Objective: To compare growth of infants whose feeding most closely followed current guidelines with growth of infants with other feeding practices.

Methods: The Southampton Women’s Survey is a prospective cohort study of women aged 20–34 years and their babies. At 6 and 12 months infants’ weight, length and skinfold thickness were measured, their milk feeding recorded, and diets assessed using food frequency questionnaires. Dietary patterns of infants and twins were derived using principal components analysis. The main outcomes were conditional growth in weight, length and skinfold thickness from 0–6 and 6–12 months.

Results: Infants who breastfed from 0–6 months gained weight, length and adiposity from 0–6 months more slowly and were smaller in size at 6 months than infants who were formula-fed, independent of age at introduction of solids and maternal factors: compared with infants who breastfed from 0–6 months, infants who were formula-fed gained 0.21 standard deviation scores (SDS) in weight (95% CI 0.00 to 0.42), 0.43 SDS in length (95% CI 0.07 to 0.45) and 0.36 SDS (95% CI 0.07 to 0.45) in skinfold thickness. Conversely, infants whose diets had the highest frequencies of breads and processed foods gained weight less rapidly from 6–12 months than other infants, independent of milk feeding, age at introduction of solids and maternal factors: compared with infants in the lowest quartile, infants in the highest ‘infant guidelines’ score quartile gained 0.24 SDS (95% CI 0.06 to 0.43) in weight and 0.32 SDS (95% CI 0.19 to 0.45) in skinfold thickness. Conversely, infants whose diets had the highest frequencies of breads and processed foods gained weight less rapidly from 6–12 months than other infants.

Conclusions: Variations in infant feeding are related to patterns of infant growth. Infants whose feeding conformed most closely to current guidelines had slower weight and length gain from 0–6 months, were smaller at 6 months of age, and had more rapid weight and skinfold thickness gain from 6–12 months, than other infants. The extent to which these patterns of growth influence the current or later health of infants needs to be assessed.

064 ALLERGY AND RISK OF CHILDHOOD LEUKAEMIA: RESULTS FROM THE UNITED KINGDOM CHILDHOOD CANCER STUDY

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Objective: To determine the extent of preceding history of allergy on risk of childhood leukaemia using contemporaneously-collected primary care data.

Design: National population-based case-control study.

Setting: UK

Participants: 839 children diagnosed with leukaemia aged 14 or younger; 1337 controls randomly selected from primary care population registers and individually-matched to participating cases by age, sex and region

Main Outcome Measures: Associations of childhood leukaemias with clinically-diagnosed eczema, asthma and hay fever, estimated with unconditional logistic regression. Accuracy of 1843 parental reports of allergy history using a measure of sensitivity, overall agreement between interviews and records using the kappa (κ) statistic and a comparison of rates of agreement between sets of proxy interviewers.

Results: More than a third of subjects had at least one allergy diagnosed prior to leukaemia diagnosis (cases) or pseudodiagnosis (controls). For both total acute lymphoblastic leukaemia (ALL) and common-ALL/precursor B-cell ALL (c-ALL), a history of eczema was associated with a 30% significant reduction in risk: the odds ratios (OR) and 95% confidence intervals (CI) were 0.70 (0.51 to 0.97) and 0.68 (0.48 to 0.98), respectively. Similar associations were observed for hay fever (OR 0.47; 95% CI 0.26 to 0.85 and OR 0.62; 95% CI 0.33 to 1.16 for ALL and c-ALL, respectively). No such patterns were seen either for asthma and ALL, or for any allergy and acute myeloid leukaemia. Asthma was reported with high accuracy, but eczema history was frequently under-reported by mothers. Agreement between interview and contemporaneous clinical diagnoses was only moderate for both cases and controls and risk estimates for allergy histories were less pronounced if based on medical record data.

Conclusions: Our finding of a reciprocal relationship between allergy and ALL in children is compatible with the hypothesis that a dysregulated immune response is a critical determinant of childhood ALL. A comparative analysis of primary care records with parent’s recall of allergy confirmed the unreliability of parental report at interview.

065 RECENT TRENDS IN THE INCIDENCE RATE OF TYPE 1 DIABETES IN CHILDHOOD IN GERMANY

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Background and Aims: A large population at risk and a sufficiently long observation period are important preconditions for valid estimation of Type 1 diabetes incidence in childhood and its temporal trends. Aim of the present study was to estimate incidence and time trends of Type 1 diabetes in children 0–14 years of age in the large risk population of the German federal state North-Rhine-Westphalia (NRW) during 1996–2003.

Materials and Methods: During the study period the average risk population was 2.9 million children comprising about one quarter of all children in the age group 0–14 years in Germany. The North Rhine-Westphalian diabetes register ascertains newly diagnosed cases of type 1 diabetes by means of three data sources: the prospective hospital-based active surveillance system ESPED, annual inquiries among practices, and the computer-based documentation system DPV founded for quality control and scientific research in paediatric diabetes care. Completeness of ascertainment was estimated by the capture-recapture-method using log-linear modelling. Point and interval estimates (95% CI) of incidence rates (per 100 000 person-years) were based on Poisson distribution. Age-and sex-standardised rates were estimated by the direct method using equal weights. Poisson regression analysis was applied to assess time trends.

Results: During 1996–2003 a total of 4261 newly diagnosed diabetic children aged 0–14 years (2227 boys, 2034 girls) were registered. Ascertainment was estimated to be 96.8% (95% CI 96.4% to 97.2%) complete. The overall age- and sex-standardised incidence rate was 18.1 (17.6 to 18.7). The age-standardised incidence among boys (18.5, 17.7 to 19.3) was slightly higher than among girls (17.8, 17.0 to 18.5, p = 0.188). Age-specific estimates for age groups 0–4, 5–9, and 10–14 years were 12.5 (11.7 to 12.4), 19.8 (18.8 to 20.8), and 22.0 (21.0 to 23.1), respectively (p<0.001). The average annual incidence increase was estimated as 3.9% (2.5% to 5.3%). While there was no significant difference in incidence trend among boys and girls (annual increase: 4.3% vs 3.4%, p = 0.526) the incidence trend varied significantly between age-groups (p = 0.012), with the steepest increase in youngest children. Annual increases for the age groups 0–4, 5–9, and 10–14 years were 7.7%, 3.8% and 2.1%, respectively.

Conclusions: These data confirm that incidence of type 1 diabetes in childhood is steadily increasing in Germany. Based on the observed incidence rate, there are annually about 2500 children newly diagnosed
with type 1 diabetes in Germany which underlines the public health importance of childhood diabetes care. Further research is needed to identify causes of the continuous rise of diabetes incidence.

**066 DIABETES AND THE RISK OF CANCER IN THE MILLION WOMEN STUDY**

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**Background:** Diabetes has been associated with cancer at various sites, but prospective studies have been limited in size or have lacked a non-diabetic comparison group.

**Objectives:** We used data from the largest ever prospective study of cancer in women to examine the risk of cancer in the presence of diabetes.

**Participants:** 1.3 million women aged on average 56 years were recruited between 1996 and 2001 through the NHS breast screening programme, and followed prospectively over median 6.6 years for incident cancer through the Office for National Statistics.

**Outcome Measures:** Relative risk (RR) of incident cancer in women with versus without self-reported diabetes, allowing for age, smoking status, body-mass index (BMI), region and deprivation index.

**Preliminary Results:** Diabetes was reported by 33 000 women (2.7%) at recruitment. Out of 56 000 (non-melanoma) incident cancers, 1855 (3.3%) were in women with diabetes. The RR for incident cancer in women with vs. women without diabetes was 1.2 (95% CI 1.1 to 1.2). Women with diabetes were at a significantly greater risk of pancreatic (RR 1.6, 95% CI 1.1 to 2.1), renal (RR 2.0, 95% CI 1.4 to 2.6), endometrial (RR 1.4, 95% CI 1.2 to 1.7), and oesophageal (RR 1.7, 95% CI 1.2 to 2.5) cancers than women without diabetes.

**Conclusions:** This large prospective study confirms that women with diabetes are at increased risk of several cancers, even after allowing for BMI.

**067 GEOGRAPHICAL AND SOCIOECONOMIC DETERMINANTS OF TYPE 1 DIABETES INCIDENCE IN SWEDEN**

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**Objective:** It is today widely assumed that socioeconomic factors at the area level as well as at the individual level influence the risk of type 1 diabetes (T1D). However, compared with other disorders such as, for example, cardiovascular diseases, there are only a small number of studies investigating the association between socioeconomic factors and the risk of T1D. In this paper we present preliminary results from a larger project aimed at developing the social, educational and health-related aspects of the T1D prevention efforts.

**Participants:** Using the Swedish Medical Birth Registry together with the National Mortality and Hospital Discharge Registers, all newborns between 1987 and 1993 (n = 815 599) were prospectively followed for development of T1D until the age of 11. Geographic information was determined by geocoding residence of mothers at time of birth. Individual socioeconomic information was obtained by linking socioeconomic data from 1990 Swedish Census as well as from 1987 to 1993 the National Income and Asset Register.

**Methods:** We apply a three level logistic regression model with individual nested within municipalities (n = 290) nested within counties (n = 25). Geographical variation between these areas in the incidence of T1D was expressed as median odds ratios (MOR). Socioeconomic factors and other individual characteristics were later added to the model as fixed effects to determine how socioeconomic factors were associated with incidence of T1D and how much of the variance between areas was due to differences in individual composition of the areas.

**Results:** In a model simultaneously taking into account between-municipality and between-county variations, a slight variation in incidence of childhood T1D was observed between municipalities (MOR 1.16, 95% CI 1.09 to 1.24) but almost no variation was found between counties (MOR 1.06, 95% CI 1.01 to 1.12). Being on social allowance (OR 0.83, 95% CI 0.71 to 0.96) and higher household income (one quintile increase) (OR 1.05 95% CI 1.02 to 1.08) as well as year of birth, gestational age adjusted birth weight, maternal diabetes status, and country of birth were associated with incidence of T1D. However, these compositional factors did not explain the variation between municipalities.

**Conclusion:** High socioeconomic position of the household seems to increase the risk of the child developing diabetes before age 11. However, the individual factors studied explained the small variation between areas. Further investigation will examine contextual variables at the municipality level and examine spatial distribution of children developing T1D.

**068 EVALUATION OF A COMPLEX INTERVENTION: A CLUSTER RANDOMISED CONTROLLED TRIAL OF ENHANCED DIABETES CARE — THE UNITED KINGDOM ASIAN DIABETES STUDY**

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**Introduction:** Intensive management in type 2 diabetes can improve clinical outcomes, but delivering healthcare to achieve targets remains a challenge for healthcare professionals. Within a complex interventions framework and following a pilot study, we investigated the effectiveness of a culturally sensitive enhanced care package designed to improve cardiovascular risk factors in patients of South Asian ethnicity with type 2 diabetes.

**Methods:** In Coventry and Birmingham, UK, 21 practices were randomised to either intervention (protected practice nurse time, link worker sessions and diabetes specialist nurse support) or standard, care groups. Treatment protocols, including detailed prescribing algorithms for control of diabetes, blood pressure and lipids were provided for both groups. Outcome measures were blood pressure, total cholesterol, HbA1c and proportions of patients achieving internationally recommended and Quality and Outcomes Framework (QOF) targets after one year. Analyses used multiple linear and mixed regression models to estimate intervention effects allowing for confounding factors and cluster randomisation.

**Results:** 1494 consenting patients of South Asian ethnicity with type 2 diabetes were included in analyses. Baseline differences between intervention and control groups were significant for systolic and diastolic BP, gender and diabetes duration. After one year, significant decreases in systolic blood pressure (4 mmHg), diastolic blood pressure (2 mmHg), total cholesterol (0.3 mmol/l) and proportions of patients achieving blood pressure and total cholesterol targets were achieved for the whole study group. With adjustment for confounding factors, the intervention group achieved significantly lower systolic (−2.1 mmHg (−3.7 to −0.4), p = 0.013) and diastolic (−1.4 mmHg (−2.4 to −0.4), p = 0.004) blood pressures. After adjustment for clustering, only diastolic blood pressure remained significant. There were no significant differences between groups for total cholesterol or HbA1c. In the sub-group of patients with blood pressure >145/85 mmHg at baseline, the intervention group achieved significantly greater reductions in systolic (−4.7, −8.2 to −1.1, p = 0.012) and diastolic (−2.3, −4.6 to −0.1, p = 0.041) blood pressures after adjustment for confounding factors and clustering.

**Discussion:** Although improvements in blood pressure and cholesterol were achieved, limited effects of the intervention were observed. There were no significant improvements in glycaemic control, despite the QOF initiative plus our intervention. In high risk groups, there was some evidence of added benefits from our culturally sensitive initiative. Innovative measures to motivate patients and evidence-based clinical targets may be needed to maximise healthcare outcomes in patients of South Asian ethnicity.

**Cancer**

**069 PERSONAL HISTORY OF ENDOMETRIOSIS AND RISK OF CUTANEOUS MELANOMA IN A LARGE PROSPECTIVE COHORT OF FRENCH WOMEN**

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**Background:** Some studies have suggested an association between cutaneous melanoma and endometriosis, but the available evidence is weak and the effect of other benign gynaecological diseases on the risk of melanoma is unknown.

**Objective:** To investigate the potential effect of a personal history of endometriosis and some other benign gynaecological diseases on the risk of cutaneous malignant melanoma in women.

**Design:** The French E3N prospective cohort study.

**Setting:** France.
Results: During 12 years of follow-up, 363 cutaneous melanoma cases were ascertained. After adjustment for phototype factors, body mass index, and hormonal factors, women with a personal history of endometriosis were significantly more at risk of melanoma than women who never had endometriosis (RR 1.62, 95% CI 1.15 to 2.29). There was also a significant positive association between melanoma and a personal history of fibroma, as compared to women with no such history (RR 1.33, 95% CI 1.06 to 1.67). A history of ovarian cyst, uterine polyp, breast adenoma/fibro-adenoma, or breast fibrocystic disease was not significantly associated with risk.

Conclusion: These data provide the strongest evidence to date of a positive association between a history of endometriosis and the risk of melanoma. In addition to suggesting a hormonal hypothesis, these results may reflect that endometriosis and melanoma share common genetic features. Because endometriosis appears as a risk indicator for cutaneous melanoma, gynaecologists may alert patients with endometriosis of their higher susceptibility to the disease and guide them towards melanoma prevention. The association between a history of fibroma and melanoma has not been previously described and needs to be confirmed in future studies.

Background: An increasing incidence of thyroid cancer has been reported in many countries over the last few decades. Much of this increase may be due to improved ascertainment, but there may be other contributing factors. The thyroid gland is highly susceptible to radiation carcinogenesis. Dental radiography, which is a common source of radiation exposure in the general population, is often overlooked as a source of radiation to the gland and may be associated with the risk of thyroid nodules and thyroid cancer. An increased risk of thyroid cancer has been reported in dentists, dental assistants, and diagnostic x-ray workers. Exposure to dental x-rays has also been associated with an increased risk of meningiomas, tumours of salivary and parathyroid glands, and low birth weight in infants. There is current controversy over the possible thyroid carcinogenic effects of low doses of radiation such as those due to dental radiography.

Objective: To evaluate the potential relationship between exposure to dental x-rays and risk of thyroid cancer.

Design: Population based case-control study.

Setting: National Cancer Registry, Kuwait Cancer Control Centre, Kuwait (population 2.8 million).

Participants: 313 patients with thyroid cancer; 313 control subjects individually matched to each thyroid cancer patient for age, gender, nationality, and district of residence. Information on dental x-rays and other relevant exposures was collected through a personal interview with the cases and controls, and the data were recorded in a structured questionnaire. Multivariate logistic regression models were used for case-control comparisons.

Main outcome measures: Risk of thyroid cancer associated with exposure to dental x-rays.

Results: There was an approximately twofold significantly increased risk of thyroid cancer in individuals who were exposed to dental x-rays (OR 2.1; 95% CI 1.4 to 3.1) (p = 0.001). There was also a significant dose-response relationship which showed an increasing trend in risk with increasing number of dental x-rays (p = 0.001). This relationship remained after controlling for sociodemographic factors (gender, nationality, level of education), number of live births, or age at diagnosis.

Conclusions: These data support the hypothesis that exposure to dental x-rays is associated with an increased risk of thyroid cancer with a significant dose-response relationship.
factors were associated with treatment receipt. Our observations suggest that receipt of treatment for prostate cancer may improve survival.

**Obesity and health**

**073 EFFECT OF OVERWEIGHT AND OBESITY ON HOSPITAL ADMISSIONS FOR GALLBLADDER DISEASE**

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**Objectives:** To examine the effect of body mass index (BMI) on the risk of hospital admission and the length of hospital stay for gallbladder disease in middle-aged women in the UK.

**Design:** Prospective population-based cohort study.

**Setting and Participants:** 1.3 million women aged 56 years old on average, recruited from breast screening clinics from 1996–2001 in England and Scotland and followed-up through NHS hospital admission record databases for a total of 8.0 million person-years.

**Main Outcome Measures:** Hospital admissions for cholecystitis, cholecystectomy and average length of hospital stay.

**Results:** A total of 25,612 women had at least one hospital admission for cholecystitis, cholecystectomy or a cholecystectomy during follow-up. The relative risk of hospital admission increased with increasing BMI (p < 0.0001 for linear trend). Compared to women with a BMI of < 22.5 kg/m², obese women had an adjusted relative risk of hospital admission for gallbladder disease of 2.40 (95% CI 2.34 to 2.56). It is an estimate that among middle-aged women in the UK, overweight and obesity contributes to 43% of hospital admissions for gallbladder disease. The effect of BMI on the number of hospital admissions and the length of hospital stay for gallbladder disease will also be examined, taking into account other factors including smoking, socioeconomic status and pre-existing illnesses.

**Conclusions:** Increased BMI makes a major contribution to hospital admissions for gallbladder disease.

**074 HOW MUCH HEAVIER ARE WE? SECULAR CHILDHOOD OBESITY TRENDS IN THE REPUBLIC OF IRELAND**

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**Background:** During the 1990s the Republic of Ireland experienced high annual rates of economic growth, which reversed decades of economic under-performance and transformed the country from one of the poorest to one of the most affluent countries in Europe. Economic development is a critical determinant of health and the effects of economic growth on childhood growth and development have been documented in many countries worldwide.

**Objective:** We have examined trends in height, weight and body mass index in representative samples of Irish children examined in 1946–8 and 2002.

**Subjects:** Heights and weights of children between the ages of 4–14 years in the Republic of Ireland were recorded in 1948 (n = 14,835) and 2002 (n = 17,518) as part of the Irish Nutrition Survey (1948) and the North South Survey of Children’s Oral Health (2002).

**Results:** Comparison of data from 1948 and 2002 show that children were taller and heavier in 2002 and that the increase in weight was disproportionate to the increase in height. On average, 14-year-old boys and girls were 23.1 cm and 15.6 cm taller respectively in 2002. More dramatic increases are seen in the weights of these children. The average weight of 14-year-old boys in 2002 is 65% greater than that of 1948, (37.0 kg and 60.9 kg respectively), while that of girls also increased substantially from 30.5 kg in 1948 to 58.7 kg in 2002. Mean BMI for 14-year-old boys and girls show similar increases from 17 kg/m² and 18 kg/m² respectively in 1948 to 21 kg/m² and 22 kg/m² in 2002.

**Conclusion:** The findings are of interest, given the relatively unique historical pattern of economic development in Ireland in the 20th century (in a European context), prolonged stagnation followed by a rapid catch-up phase of high economic growth. The data provide stark and compelling evidence for the increasing obesity epidemic in Irish children in tandem with the “Celtic Tiger”.

**075 SNACKING BETWEEN MEALS IN RELATION TO WEIGHT GAIN AND OBESITY IN A PROSPECTIVE MEDITERRANEAN COHORT: THE SUN STUDY**

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**Background:** Although snacking between meals has been traditionally considered a possible risk factor for obesity, longitudinal data on the long-term relationship between snacking and weight gain are limited.

**Objective:** To evaluate prospectively the relationship between snacking between meals and weight gain, and the incidence of overweight/obesity.

**Setting:** Free-living Mediterranean cohort (the SUN study).

**Participants:** 8752 university graduates from a Spanish dynamic cohort (mean age of 38 years, 60% women) followed up for an average of 28 months through mailed questionnaires.

**Main Outcome Measures:** The main exposure was snacking between meals. We defined two outcomes: weight gain (gaining > 5 kg during follow-up) and incidence of overweight/obesity (achieving BMI > 25 kg/m² during follow-up). Self-reported weight and BMI were previously validated in a subsample of the cohort.

**Results:** Among the first 100.7% of the population overweight/obesity and weight gain > 5 kg during follow-up. After adjusting for age, sex, smoking, leisure-time physical activity, and total fibre intake, snacking between meals was associated with a significantly higher risk of weight gain. The odds ratio (OR) was 1.18 (95% CI 1.02 to 1.36). After excluding prevalent cases of overweight/obesity at baseline, we found 500 incident cases of overweight/obesity among 6314 participants. Snacking was associated with a significantly higher risk of incident overweight/obesity (adjusted OR 1.26, 95% CI 1.03 to 1.54).

**Conclusions:** These results provide evidence to support a role for snacking between meals as one of the risk factors explaining the current obesity epidemic in Mediterranean countries.

**076 MEASURING PHYSICAL ACTIVITY IN EPIDEMIOLOGICAL STUDIES AMONG CHILDREN: POTENTIAL PROBLEMS OF ACCELEROMETER MEASUREMENTS**

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**Objective:** Overweight and obesity are the most common nutritional disorders in industrialised countries, and their prevalence continues to rise. Physical Activity (PA) is one major determinant of body composition. Accelerometers have been reported to provide valid objective measures among adults. However, studies among children rarely report positive findings. To assess the day-to-day variability of accelerometers in preschoolers.

**Design:** Cross-sectional study.

**Setting:** Compulsory school entry health examination, Munich, Southern Germany.

**Participants:** 205 children aged 5.00 to 6.99 years.

**Main Outcome Measures:** Counts of uni-axial accelerometers (Actigraph AM 7164–2.2) from instruments placed on elastic belts as provided by the manufacturer were measured under free-living conditions. The measurements were carried out on five consecutive days including one weekend from the time of getting up in the morning until bedtime. Any time the instruments were taken off during the day—for example, for swimming or bathing—was noted in daily logs by the parents. Additionally, parents were asked to estimate the time the child cycled each day in order to adjust for invalid counts during cycling.

**Results:** The sample consisted of 51% boys and 49% girls. The majority of children were between the ages of 5 and 7 years (82%). Thirteen children were excluded because of refusal to participate. If refusal to carry the accelerometer (n = 9) or loss of the instrument (n = 4) leaving accelerometer data of n = 192 children. Boys showed on average 135 counts more per minute compared to girls with mean values of 899 for boys and 764 for girls (p < 0.01). Intra-individual correlation of actigraphy data between single days of examination was low with Pearson correlation coefficients between r = 0.31 and r = 0.51 adjusted for weekday or weekend day, respectively. Furthermore, child’s body mass index and accelerometer measures were not related to each other (Pearson’s
correlation coefficient $r = -0.06$). In a subsequent study individuals wore two accelerometers at the same time. Analyses showed higher measures (>50% counts/minute; $p<0.01$) for instruments placed in front of the umbilicus compared to instruments placed at the right hip.

**Conclusion:** Comparison of activity counts on different days revealed an additional interindividual variability in activity levels. Our data indicate an interindividual variability in accelerometer measures among preschoolers under free-living conditions. Uni-axial accelerometers placed on elastic belts might measure physical activity better than low precision accelerometers under free-living conditions, possibly due to variable placement of instruments. Such measurement errors have to be considered in studies on physical activity measured by accelerometry and obesity among preschoolers.

**Lifestyle: alcohol consumption and health**

**Hazardous alcohol drinking and premature mortality in Russia: The Izhevsk family case-control study of men aged 25–54 years, 2003–2005**

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**Background:** Life expectancy among Russian men is extremely low. In 2004 it was 59 years, and largely driven by very high mortality at working ages. The reasons for this and for the huge fluctuations in mortality seen since the mid-1980s are poorly understood. The Izhevsk Family case-control study has investigated the contribution of alcohol and, hazardous drinking in particular, to male mortality in a typical Russian city in the Urals.

**Methods:** Interviews were obtained with proxy informants for 62% (1750/2893) of all deaths among male residents of the city aged 25–54 years over 24 months from October 2003. Interviews with proxy informants of live controls were obtained for 57% (1750/3078) of control households approached. Information was obtained on frequency of consumption and usual amount of beer, wine and spirits consumed, frequency of consumption of non-beverage alcohol (manufactured ethanol-based liquids not intended to be drunk, known as surrogates) and markers of problem drinking including frequent hangovers and extended periods of excessive drunkenness.

**Results:** Over half (51%) of the cases were classed as problem drinkers or drank surrogates, compared to 13% of controls. The mortality odds ratio (OR) for these hazardous drinkers, relative to men who either abstained or were non-problematic beverage drinkers was 6.0 (95% CI 5.0 to 7.3) adjusted for smoking and education. The odds ratio for drinking non-surrogates in the past year (yes/no) was 9.2 (7.2 to 11.7) adjusted for age. Adjustment for volume of ethanol consumed from beverages, education and smoking attenuated the OR to 7.0 (5.5 to 9.0). The magnitude of the association of surrogate drinking with mortality varied considerably by cause of death. The observed pattern is very similar to the variation by cause in the proportional mortality increases observed in Russia among men aged 25–54 between 1991 and 1994. We estimate that 43% of deaths among men aged 25–54 years in Izhevsk are attributable to patterns of hazardous drinking and especially to surrogate consumption.

**Conclusions:** Hazardous alcohol consumption is strongly related to mortality among working age men in a typical Russian city and may account for almost half of all deaths in this group. Our study is the first to identify surrogate consumption as a particularly important component of hazardous drinking in Russia. Moreover, our analyses provide indirect support for the contention that this type of drinking behaviour may be related to the sharp fluctuations seen in Russian mortality in the early 1990s.

**The effect of the reduction in the price of alcohol on socioeconomic differences in alcohol-related mortality: A natural experiment based on register data**

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**Background:** In 2004 there was a drastic reduction in the price of alcohol in Finland due to a reduction in alcohol taxes and travellers’ duty free allowances from the EU were abolished. The authors examined to what extent this affected alcohol-related mortality in different age and socioeconomic status groups.

**Methods:** For this register-based follow-up study of all over 15-year-old Finnish men and women, independent variables of the participants were extracted from employment statistics of Statistics Finland for the end of 2000 and 2003, and mortality follow-up was for the years 2001–3 and 2004–5 respectively. Alcohol-related causes were defined on the basis of both the underlying and contributory causes of death. Poisson regression models including different socioeconomic variables and calendar period interaction were fitted.

**Results:** Alcohol-related mortality increased among men by 16% and among women by 31% after the reduction in the price of alcohol. 82% of the deaths and increase were due to chronic causes. The increase was the largest among men aged 55–59 years and women aged 50–54 years. Among those aged 30–59 years, alcohol-related mortality increased most in the socioeconomic groups where the premature mortality rates were already the highest: men and women who were unemployed or pensioners. It is noteworthy that those employed have not suffered from the increased alcohol-related mortality thus far. Largest increases and differences in increase were observed for chronic rather than acute alcohol related causes. Differences in change in alcohol-related mortality by income were partially accounted for by differences in main activity.

**Conclusions:** The mortality impact of the reduction in the price of alcohol was, in the first two years after the changes, confined to subpopulations which already had the highest mortality rates.

**The impact of binge drinking on sickness absence**

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**Objective:** Sickness absence is influenced by several different factors. We aimed to examine the impact of binge drinking on sickness absence and to analyse whether this impact could be explained by socioeconomic position, physical and mental strain at work and health status.

**Design:** Baseline questionnaire survey (2000–2) linked with the employer’s registers on sickness absence with three years’ follow-up.

**Setting:** Staff of the City of Helsinki, Finland.

**Participants:** 5328 female and 1442 male employees of the City of Helsinki, aged 40–60 years.

**Main Outcome Measures:** Short (self-certified, 1–3 days) and long (medically confirmed, 4+ days) spells of sickness absence.

**Results:** Binge drinking was strongly associated with both short sickness absence spells among women (RR 1.70, 95% CI 1.36 to 2.13) and men (1.62 (1.19 to 2.19) and with long sickness absence spells among women (1.55 (1.16 to 2.08), Adjusting for occupational social class and working conditions had no effects on the association. Adjusting for several diseases (such as angina, diabetes and hypertension) only slightly attenuated the associations. However, the associations remained statistically significant.

**Conclusions:** Binge drinking increased the risk of having sickness absence information on alcohol, tobacco and other lifestyle variables from families of the deceased. Complete proxy information was obtained from 48 572 deceased adults (31 512 men and 17 060 women). A control group
comprising 5719 deaths was made up from a group of diseases known not to be related to alcohol or tobacco.

Main Outcome Measures: Relative risk for mortality from all causes and from specific causes.

Results: Among controls, approximately half of the men and 90% of the women were reported to be non-drinkers or light drinkers (average of one drink a day). Fairly heavy alcohol consumption (average of a bottle of vodka every few days) was very rare in the control group and one in 100 drivers was a heavy cannabis user, and very heavy alcohol consumption (average of one bottle of vodka a day) was reported for approximately one in six men and one in 30 women. Specific causes of death that were increased for very heavy alcohol consumption among men included respiratory tuberculosis (RR = 3.3), cancers of the head and neck (RR = 2.2), and liver cirrhosis (RR = 5.9). Acute myocardial infarction was not increased although other acute ischaemic heart disease was increased (RR = 2.3). External causes of death were strongly associated with very heavy alcohol consumption (RR = 5.2) including transport accidents (RR = 2.3), suicide (RR = 6.2) and assault (RR = 5.9). Although very heavy alcohol consumption was rare among women, RRs of mortality tended to be greater, being 4.2 for respiratory tuberculosis, 5.8 for other acute IHD and 11.6 for external causes. All the above RRs were significant at p<0.0001.

Conclusions: If these deaths are largely or wholly causal then, among male very heavy drinkers, this level of alcohol consumption was responsible for approximately 42% of deaths due to medical causes and 81% of deaths due to external causes. Among female very heavy drinkers, approximately 58% of deaths due to medical causes and 91% of deaths due to external causes were due to very heavy alcohol consumption.

Methods III

081 A COMPARISON OF METHODS FOR ASSESSING THE RISK OF CAUSING A ROAD CRASH WHEN DRIVING UNDER THE INFLUENCE OF CANNABIS OR ALCOHOL

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Background: The prevention of road crash deaths and injuries requires the knowledge of crash risks associated with hazardous behaviours such as driving under the influence of cannabis or alcohol. When designing a case-control study for assessing such risks, setting up a relevant control group is hard to achieve due to difficulties in determining a representative sample of the road population and the driver’s reluctance to report their level of consumption without compulsory test. Both responsibility analysis and quasi-induced exposure method can be used to get round this difficulty. No research has compared these approaches which are both relevant for investigating the role of cannabis and alcohol.

Objective: To evaluate the disparities between results assessed in the quasi-induced exposure method and those assessed with the responsibility analysis.

Participants: 10 748 drivers with known blood cannabis and alcohol concentrations, who were involved in fatal crashes in France between October 2001 and September 2003.

Design: Population based case-control studies set up using the quasi-induced exposure method and the responsibility analysis.

Main Outcomes Measures: The cases were those considered at fault in their crash and the controls those determined not at fault. Alcohol and cannabis consumption were measured with blood and urine tests immediately after the crash.

Results: An increase in the risk of causing a crash was found when driving under the influence of cannabis or alcohol. The risk assessed for cannabis was similar in all case-control studies. Due to disparities in sample size and in the type of crash studied, the alcohol dose-effect response was found to be larger with the quasi-induced exposure method than with the responsibility analysis, especially for drivers involved in single vehicle crashes. The assessment of the alcohol and cannabis interaction could only be estimated in the responsibility analysis and it showed that the risk associated with joint consumption was only the multiplication of the risks of causing a crash related to the consumption of either.

Conclusions: The quasi-induced exposure method makes it possible to focus on road safety issues that are particular to drivers prone to single- or two-vehicle crashes. The responsibility analysis is relevant for issues requiring an assessment of risk for the whole driver population. Therefore, the latter approach provides a unique attributable risk that is valuable in improving public health issues related to cannabis and alcohol on the road.

082 DOES POPULATION MIXING MEASURE INFECTIOUS EXPOSURE AT THE COMMUNITY LEVEL?


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Background: There is growing evidence that some chronic diseases, including asthma, leukaemia, brain tumours and autoimmune diseases may be associated with exposure to infections. Infections may act through a direct mechanism with specific infections precipitating disease, or through a process such as the “hygiene hypothesis”, in which a lack of exposure to infections in early childhood fails to correctly prime the immune system thereby increasing future risk of secondary disease. Measuring the range and dose of infection an individual is exposed to at a specific time period is difficult, even more so, when common infections are of interest. A series of studies have used population mixing, a term used to describe a process by which contact between people is promoted by their spatial movement, as a proxy for the level of infectious disease circulating in a community.

Objectives: A real measures of population mixing and community characteristics were compared with routine hospital data on infections to develop a valid and reproducible infectious disease proxy for future epidemiological studies.

Design: Ecological study using 2001 census derived migration and census derived measures of population mixing and Hospital Episode Statistics (HES) data aggregated across small geographical areas.

Setting: Two Government Office Regions (West Midlands and the East, England) and Scotland.

Main Outcome Measures: Census derived measures of population mixing.

Results: A commuting-based distance measure showed a strong significant negative association with hospital admissions that was consistent across infection group, age groups and regions; areas with a higher median distance travelled by commuters leaving the area having a lower rate of hospital admissions for infections. Deprivation and population density demonstrated positive association with hospital admissions in a number of infection groups. Population potential (relative accessibility) explained the most variation in infectious admissions in Scotland, showing a non-linear relationship.

Conclusions: Providing hospital admissions are a good marker of common infections—the results suggest distance commuted may be the most reliable measure of population mixing for demonstrating an association with infections circulating in a community. Deprivation and population density are also good proxies for the level of infectious disease. Areas that exhibit high levels of population mixing do not necessarily possess raised rates of hospital admissions for infectious disease.

083 KRISTIAN FEYER ANDVORD’S STUDIES ON THE EPIDEMIOLOGY OF TUBERCULOSIS AND THE ORIGIN OF GENERATION COHORT ANALYSIS IN NORWAY

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Background: Generation cohort analysis has played an important role in epidemiology as a means to describe the experience of disease rates in people born in successive calendar years. This approach provides important clues about the natural history of specific diseases at the individual level as well as the evolution of disease at population level. Kristian Feyer Andvord suggested that primary infection mainly takes place in childhood and that falling mortality rates at the time of observation was a reflection of exposure early in life. Wade Hamilton Frost later in 1939 published a similar idea citing Andvord, and introduced the concept of “cohort”. This seminal paper by Frost is widely known in epidemiology as it marks the birth of a concept vital to the discipline’s self identification. Less attention has been paid to Andvord. We wanted to follow the origin of this method in the work of Andvord and the causal inferences he made in the period he acted within.

Methods: We went through all his 24 scientific articles and essays published in the period 1889–1935. To get reach of additional literature on Andvord and generation cohort analysis, we did a literature search using the following key words: “cohort”, “cohort analysis”, “generation”, “Andvord”, “Frost” and “tuberculosis”.

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Results: In contrast to many other countries, tuberculosis mortality in Norway did not start to decline until 1900. In 1930 Andvord was able to describe tuberculosis mortality for successive birth cohorts. He spent 40 years of his adult working life, from 1895 to 1935, on the quest to identify the age dependent susceptibility of the disease by means of comparing first geographic pattern and later birth cohorts. This period coincided with major changes in the scientific conceptions of tuberculosis and diseases in general, such as the political and ideological notions of prevention, which was also reflected in the causal inferences made by Andvord as he moved from miasmatic to genetic explanations for the decline of mortality. He was reluctant to put any emphasis on improved social living conditions.

Conclusions: Although Andvord developed a powerful tool in epidemiology when he described tuberculosis mortality in a period of great changes, he was influenced by political and ideological models of disease.

**084 WHY MY DISEASE IS IMPORTANT: METRICS OF DISEASE OCCURRENCE USED IN THE INTRODUCTORY SECTIONS OF PAPERS IN THREE LEADING GENERAL MEDICAL JOURNALS IN 1993 AND 2003**

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Objectives: It is the consequences of events rather than the events themselves that reflect their social importance. “Event-based” measures of disease occurrence, which are typically optimal for scientific investigation, do not explicitly take into account the consequences of the events. They therefore do not appear to be optimal for expressing claims about the importance of a disease of interest. Time-based measures of “disease burden” (such as the Disability Adjusted Life-Year (DALY) which was first introduced in the 1990s) were developed with the aim of better capturing the social significance of health losses from disease onset. Here, we have analysed metrics used in claims about disease importance and investigated differences in trends between the years 1993 and 2003.

Design: Textual examination of papers retrieved from Medline.

Data Sources and Methods: 1126 papers published in the New England Journal of Medicine, the Lancet and the Journal of the American Medical Association during the first halves of 1993 and 2003 were selected on the basis of keywords found in a pilot study to be associated with claims about disease importance. 132 of these articles in 1993 and 248 in 2003 included claims about disease importance in their introductory sections and characteristics of these claims were abstracted.

Results: Of the quotes identified in the papers and articles examined the majority used counts, prevalence or incidence measurements to express the importance of the disease of interest. Some also used risk estimates and economic terms, such as cost of treatment, to describe the impact of the disease. There was no difference in the frequency of reporting these measures between those published in 1993 and 2003. Very few articles referred to metrics that weighted events by the expected consequent loss of healthy life—such as years of life lost, DALYs and/or QALYs. Conclusions: Time-based metrics appear to have made little headway. Claims about the relative importance of diseases continue to be over-weightingly expressed in terms of counts (of deaths and disease onsets) and comparable risk measures. Such “event-based” metrics do not usually convey to readers sufficient information on which to make a judgment about the relative social importance of a given disease.

**085 LOW APGAR SCORES AT BIRTH AND LONG-TERM COGNITIVE OUTCOMES**


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Background: Infants in a poor condition at birth (as measured by a low Apgar score) who then develop encephalopathy are at increased risk of cerebral palsy and learning difficulties, with the duration of the low Apgar score correlating with the risk of these conditions. However, around 5% of infants have transiently low Apgar scores without developing encephalopathy, and the long-term outcome of these infants is unknown.

Objectives: To investigate the association of brief (0–5 min) and prolonged (>5 min) low Apgar scores (<7) in non-encephalopathic infants with educational achievement at age 15–16 and intelligence quotients (IQ) in adulthood.

Design: Nationwide and population-based record-linkage cohort study of 176,524 males. Data from the Medical Birth Register were linked to Population and Housing Censuses, conscription medical records (IQ), and School Registers (summary school grade). Infants were classified depending on the time for their Apgar score to reach 7 or above. Infants born before 37 weeks and those with encephalopathy were excluded.


Main Outcome Measure: IQ score at 18 years of age.

Results: Infants with brief (OR 1.14 (1.03–1.27)) or prolonged (OR 1.35 (1.07–1.69)) low Apgar scores were more likely to have a low IQ score. The longer it took an infant to achieve a normal Apgar score the greater their risk of having a low IQ score at age 18 years (p = 0.003). There was no association between brief (OR 0.96 (0.87 to 1.06)) or prolonged (OR 1.01 (0.81 to 1.26)) low Apgar scores and a low summary school grade at age 15–16, or evidence for a trend in the risk of a low school grade (p = 0.61).

Conclusions: Infants in poor condition at birth with no encephalopathy have increased risk of poor functioning in cognitive tests in later life. While lower IQ scores were found even in infants with only briefly low Apgar scores there was no impact on a broader measure of educational achievement (school grade).

**086 FISH INTAKES IN PREGNANCY AND CHILD NEURODEVELOPMENT AT AGE 4 YEARS: RESULTS FROM A LONGITUDINAL SPANISH COHORT**

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Objectives: To assess associations between maternal fish consumption in pregnancy and cognitive development at age 4 years in a population with high intakes.

Setting: Menorca, Spain.

Participants: 459 full-term children born in 1997–8 to mothers recruited from prenatal clinics in the second trimester of pregnancy (95% response rate). 86% were administered developmental tests by trained psychologists at 4 years.

Main Outcome Measures: Associations between maternal fish consumption and scores on the Spanish version of the McCarthy Scales of Children’s abilities using multivariate linear regression.

Results: Fish intake during the second trimester of pregnancy, 49.4% up to once/week, 46.7% 1 to 2 times/week, 9.9% 2–3 times/week, and 5.1% >3 times/week. In multivariate models, fish consumption was not associated with development in children breastfed ≥6 months. However, in children breastfed <6 months, intakes of 2–3 times/week were associated with significantly higher standardised general cognitive (10.1 (SD 3.2)), perceptual-performance (10.1 (SD 3.1)), memory (9.7 (SD 3.3)) and verbal (8.8 (SD 3.3)) scores. Children whose mothers had intakes >3 times/week (256–453 g) had similar test scores as those of mothers with low intakes. Children fish intakes at age 4 years were not associated with test performance.

Conclusions: Consistent with previous studies, moderately high fish intakes in pregnancy were positively related to child cognitive development in subjects breastfed <6 months. There was no association between maternal fish intakes and cognitive development among children breastfed >6 months, who had higher mean scores. Breast milk is a key postnatal source of n-3 fatty acids essential for brain membranes, for which fish is the main dietary source. Although numbers were small, results suggest that high fish intakes, exceeding recommended limits to reduce neurotoxin exposure, may not enhance development in some settings.

**087 THE RELATIONSHIP BETWEEN PERIODONTAL DISEASE AND PRETERM LOW BIRTHWEIGHT**

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Background: There is no consensus about the possible influence of periodontal disease on preterm low birthweight.

Setting: Population based study of 176,524 full-term children born in 1997–8 to mothers recruited from prenatal clinics in the second trimester of pregnancy (95% response rate). 86% were administered developmental tests by trained psychologists at 4 years.

Main Outcome Measures: Associations between maternal fish consumption in pregnancy and cognitive development at age 4 years in a population with high intakes.

Results: Infants with brief (OR 1.14 (1.03–1.27)) or prolonged (OR 1.35 (1.07–1.69)) low Apgar scores were more likely to have a low IQ score. The longer it took an infant to achieve a normal Apgar score the greater their risk of having a low IQ score at age 18 years (p = 0.003). There was no association between brief (OR 0.96 (0.87 to 1.06)) or prolonged (OR 1.01 (0.81 to 1.26)) low Apgar scores and a low summary school grade at age 15–16, or evidence for a trend in the risk of a low school grade (p = 0.61).

Conclusions: Infants in poor condition at birth with no encephalopathy have increased risk of poor functioning in cognitive tests in later life. While lower IQ scores were found even in infants with only briefly low Apgar scores there was no impact on a broader measure of educational achievement (school grade).

Results: Fish intake during the second trimester of pregnancy, 49.4% up to once/week, 32.9% >1 to 2 times/week, 12.7% 2–3 times/week, and 5.1% >3 times/week. In multivariate models, fish consumption was not associated with development in children breastfed ≥6 months. However, in children breastfed <6 months, intakes of 2–3 times/week were associated with significantly higher standardised general cognitive (10.1 (SD 3.2)), perceptual-performance (10.1 (SD 3.1)), memory (9.7 (SD 3.3)) and verbal (8.8 (SD 3.3)) scores. Children whose mothers had intakes >3 times/week (256–453 g) had similar test scores as those of mothers with low intakes. Children fish intakes at age 4 years were not associated with test performance.

Conclusions: Consistent with previous studies, moderately high fish intakes in pregnancy were positively related to child cognitive development in subjects breastfed <6 months. There was no association between maternal fish intakes and cognitive development among children breastfed ≥6 months, who had higher mean scores. Breast milk is a key postnatal source of n-3 fatty acids essential for brain membranes, for which fish is the main dietary source. Although numbers were small, results suggest that high fish intakes, exceeding recommended limits to reduce neurotoxin exposure, may not enhance development in some settings.

Parallel session D

Lifecourse II
**Objective:** To investigate relationship of clinical parameters of periodontal disease with preterm low birthweight babies.

**Methods:** A case-control study with 542 post-partum women aged over 30 years of age was conducted. Four groups of cases were compared with non-preterm and non-low birthweight controls (n = 393): low birthweight (n = 96), preterm (n = 110), preterm and low birthweight (n = 63) and preterm and/or low birthweight (n = 143). Periodontal clinical parameters of dental plaque, bleeding on probing, periodontal pocket depth and clinical attachment level were recorded by through full mouth examination. Covariates included socio-demographic and anthropometric characteristics, housing conditions, maternal harmful habits, physical activities, violence during pregnancy, psychosocial factors, satisfaction with pregnancy, obstetric history, prenatal care and diseases during pregnancy.

**Results:** Periodontal disease levels were significantly higher in controls than cases. The extent of periodontal disease did not increase risk for preterm low birthweight using 13 different measures of periodontal disease. Frequency of periodontal sites with periodontal pocket depth > 4 mm in women having low birthweight, preterm, and preterm and/or low birthweight was lower than controls.

**Conclusion:** In a large sample of women aged 30 years or over, periodontal disease was not more severe in those with preterm low birthweight babies.

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**088 MATERNAL SIZE IN PREGNANCY AND BODY COMPOSITION IN CHILDREN**

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**Background:** Evidence suggests that babies’ fat mass at birth is greater if their mothers were themselves fatter during pregnancy, but it is unclear whether this association persists into childhood.

**Objective:** To examine the relation between maternal size in pregnancy, early growth and body composition in children.

**Design:** Prospective cohort study.

**Setting:** Southampton, UK.

**Participants:** 216 9-year-old children whose mothers had participated in a study of nutrition during pregnancy.

**Main Outcome Measures:** Fat mass and lean mass measured by dual-energy x-ray absorptiometry, and adjusted for height (“fat mass index” and “lean mass index”).

**Results:** Fat mass index at age 9 years was greater in children whose mothers had a larger mid-upper arm circumference in late pregnancy or a higher pre-pregnant body mass index. For one standard deviation (SD) increase in maternal mid-upper arm circumference in late pregnancy, fat mass index rose by 0.26 (95% CI 0.06 to 0.46) SD in boys and by 0.44 (95% CI 0.31 to 0.57) SD in girls. For one SD increase in maternal pre-pregnancy BMI, fat mass index rose by 0.20 (95% CI 0.07 to 0.33) SD in boys and by 0.42 (95% CI 0.29 to 0.56) SD in girls. Other independent predictors of greater fat mass were smoking in pregnancy (in boys) and shorter duration of breastfeeding (in girls). Lean mass index was greater in children who had weighed more at birth.

**Conclusions:** Mothers who had a higher body mass index before pregnancy and a larger mid-upper arm circumference during pregnancy tend to have children with greater adiposity at age 9 years.

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**089 BIRTHWEIGHT AND RISK OF CHILDHOOD LEUKAEMIA: RESULTS FROM THE UNITED KINGDOM CHILDHOOD CANCER STUDY**

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**Objective:** To determine whether there is an association between birthweight and risk of developing childhood leukaemia using birth certificate data obtained from the Office for National Statistics.

**Design:** National population-based case-control study.

**Setting:** UK.

**Participants:** 1514 children (0–14 years old) newly diagnosed with leukaemia (1991–6), of which 1280 had acute lymphoblastic leukaemia (ALL) and 231 had acute myeloid leukaemia (AML). Two controls per case, individually-matched to cases on date-of-birth, sex and region of residence (n = 2997), were randomly selected from primary care population registers of the six cohort centres.

**Main Outcome Measures:** Associations for total leukaemia, and separately for ALL and AML, with five categories of birthweight (<2500, 2500–2999, 3000–3499, 3500–3999 and >4000 g) were estimated using unconditional logistic regression adjusting for age, sex and region of residence.

**Results:** Preliminary analyses showed that compared to the baseline category (3000–3499 g), there was no association between low birthweight and childhood leukaemia (<2500 g, OR 0.87; 95% CI 0.65 to 1.15), but there was an increased risk for babies weighing 4000 g or more (OR 1.30; 95% CI 1.05 to 1.60). Stratification by sex revealed no association for boys (OR 1.12 95% CI 0.86 to 1.46), but an increased risk for girls (OR 1.80; 95% CI 1.26 to 2.56). Similar results were observed for ALL alone, but no birthweight differences between AML cases and controls were observed.

**Conclusions:** We are confident that these findings reflect a real association between low birthweight and childhood leukaemia. The data are not subject to recall bias, as they were recorded at birth registration. These findings support the hypothesis that high birthweight is a risk factor for childhood leukaemia, and provide further evidence that the development of childhood leukaemia maybe initiated in utero. Few studies have investigated the difference in risk between boys and girls, and we plan to examine this association further.

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**090 DEPRIVATION IS ASSOCIATED WITH HIGHER PREVALENCE OF CARDIOVASCULAR DISEASE AMONG PEOPLE WITH DIABETES INDEPENDENTLY OF CURRENT RISK FACTOR LEVELS**

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**Objective:** To investigate whether prevalence of cardiovascular complications of diabetes are associated with deprivation.

**Design:** Cross-sectional study using an area-based measure to define quintiles of deprivation.

**Setting and Subjects:** 52 280 people with diabetes on a population-based register in southern Scotland of whom 15707 were in the most deprived quintile and 7882 were in the most affluent quintiles of the Scottish population.

**Main Outcome Measures:** Hospital records of diagnoses of ischaemic heart disease, stroke or peripheral vascular disease

**Results:** Age/sex adjusted prevalence of diabetes was 3.5% and 2.3% in the most and least deprived quintiles respectively. People with diabetes in the most compared to the least deprived quintile were younger (61.8 vs 62.6 years, p=0.0001), more likely to be current smokers (32% vs 13%, p=0.0001), more likely to have type 2 than type 1 diabetes (89% vs 83%, p=0.0001), more likely to be current smokers (32% vs 13%, p=0.0001) had shorter mean duration of diabetes (6.8 years vs 8.6 years, p=0.0001), higher mean body mass index (BMI 31.0 vs 29.2 kg/m², p=0.0001), lower mean systolic blood pressure (134 vs 137 mmHg, p=0.0001), lower mean cholesterol (4.37 vs 4.54 mmol/l) and higher HbA1c (7.8 vs 7.6%, p=0.0001) The proportion of people that had any mention on hospital discharge records within the last five years was higher in the most deprived quintile than the least deprived quintile for ischaemic heart disease (14% vs 10%, p=0.0001), stroke (4.7% vs 3.5%, p=0.0001), peripheral vascular disease (2.6% vs 1.4%, p=0.0001) or any vascular disease (18% vs 13%, p=0.0001). Even after adjusting for potential confounding factors (as given above) in multivariable logistic regression the odds ratio (95% CI) for a hospital admission for any vascular disease within the last five years for the most deprived compared to the least deprived quintile was 1.51 (1.39 to 1.63). The most marked effect of deprivation for hospital admissions within the last five years was for peripheral vascular disease (odds ratio [95% CI] for the least deprived compared to the least deprived quintile 2.08 [1.69 to 2.55]).

**Conclusions:** History of hospital admission with all major cardiovascular complications of diabetes is more common among deprived than affluent populations and these relationships persist after adjusting for current risk factor levels. The findings suggest that deprivation may act as a marker of lifelong exposure to risk factors such as smoking. Addressing current risk factor levels alone is unlikely to reduce inequalities in cardiovascular complications of diabetes by deprivation.
Background and Objectives: Studies have suggested that health inequalities decline with age. This study examines whether socioeconomic gradients in the incidence of illness decline with age, and, if so, whether this decline is explained by differential mortality.

Design: Wealth inequalities in deterioration of health and mortality over a two-decade period are examined using the first two waves of the English Longitudinal Study of Ageing (ELSA), a large, longitudinal panel study of English people aged 50+.

Participants: Participants in the first two waves of ELSA who were disease free at wave 1 (n = 6371 for self-reported health, n = 6911 for activities of daily living, n = 7262 for ischaemic heart disease).

Main Outcome Measures: Three health outcomes are assessed: self-reported fair or poor health; reporting difficulty with one or more activity of daily living (ADLs); and ischaemic heart disease (IHD), measured as self-reported diagnosed or symptomatic angina or myocardial infarction. General mortality was used for self-reported health and disability, and cardiovascular mortality was used in relation to IHD.

Results: A stronger wealth gradient in the proportion of new cases reporting poor health was seen up to age 75, with a weakening in the wealth gradient thereafter. The addition of mortality strengthened the gradient for people aged 80 and over with the overall odds ratio for trend in this age group increasing from 1.12 (9.07 to 1.31) before the inclusion of mortality to 1.22 (1.08 to 1.38) after. An inverse wealth gradient in the incidence of ADL of all age groups, and in the inclusion of fatalities did not change the strength of this relationship for any age group. The inverse wealth gradient in incidence of IHD declined with age so that from the age of 60 there was no significant gradient in new cases of IHD. The inclusion of circulatory-related deaths with new cases of IHD increased the odds for the trend in wealth substantially for the two oldest age groups as well as for those aged 60–64, with the odds ratio now significant in the 70–74 and 80+ age groups, as well as for participants in their fifties.

Conclusions: The relationship between wealth and onset of illness declined with age for self-reported health and heart disease. Selectivity mortality attenuated the decline of health inequalities somewhat in the oldest age groups, as well as for participants in their fifties.

Objective: Socioeconomic differences in stroke incidence by subtype and gender in Rome, 2001–4

Participants: All 35–84 years old Rome residents who suffered from a first acute ischaemic (ICD-9-CM = 434, 436, n = 7734) or haemorrhagic stroke (ICD-9-CM = 430–431, n = 2625) in 2001–4. We linked hospital discharge abstracts and vital-status data.

Main Outcome Measures: Age-standardised rates of total incidence, out-of-hospital deaths, and hospitalisations were the outcome measures. SEP (low vs not low) was based on the five-level small area index (I least well-off, V most well-off). Poisson regression yielded age-adjusted rate ratios (RR) and 95% CI.

Results: First ischaemic stroke events in the study period were 7734 (6% out-of-hospital deaths, 94% hospitalised). Population incidence rates: 48.8/100 000 men, 29.9/100 000 women. The incidence of first ischaemic acute stroke, out-of-hospital deaths, and hospitalisations were statistically significantly higher in men, and were higher in each successively disadvantaged group (SEP V vs SEP I: RR 1.67, 1.82, respectively), while no evidence of association was found between SEP and out-of-hospital deaths. First haemorrhagic stroke events were 2625 (8% out-of-hospital deaths, 92% hospitalisations). Population incidence rates: 17.9/100 000 men, 11.0/100 000 women. Among men low SEP was associated with higher incidence, out-of-hospital deaths, and hospitalisations (SEP V vs SEP I: RR = 1.49, 1.27, 1.52, respectively). Among women, the effects were slightly weaker (SEP V vs SEP I: RR = 1.32 for incidence, and 1.40 for hospitalisations), while no effect was evident on out-of-hospital deaths.

Conclusions: Stroke incidence strongly differs between socioeconomic groups. While the higher risk of fatal out-of-hospital events among disadvantaged people may be related to greater disease severity, different access to high quality acute care services cannot be excluded as a potential mechanism.

Background: Ischaemic heart disease (IHD) is a leading cause of death in Scotland, and the Scottish IHD mortality rate is amongst the highest in Western Europe. Incidence and mortality have fallen over recent years; however, geographic variations and socioeconomic inequalities in IHD incidence and mortality still exist.

Objective: To examine the changes in socioeconomic and geographic inequalities in incidence of acute myocardial infarction (AMI) in Scotland between 1990–2 and 2000–2.

Inequalities in cancer incidence: different social indicators show different impact

Objective: (1) To compare the social gradient in cancer incidence in Turin (Italy) using different socioeconomic indicators (educational level, occupation, material circumstances); (2) to assess whether social indicators are independently related to cancer incidence after controlling for the others.

Methods: Individual record-linkage between the Turin Longitudinal Study and the Piedmont Cancer Registry provided data on cancer incidence for 30–85 years old residents in Turin in the period 1985–99. We chose the cancer sites with good evidence of social inequalities in the literature: liver, lung, stomach and UADT cancers in men; cervix, stomach, breast and lung, in women. Educational level, in general, is the socioeconomic indicator which shows a greater independent association with cancer incidence. These results suggest that unfavorable social circumstances early in the life course may have greater influence on cancer risk.
Vascular diseases I

095 ASSOCIATION OF C-REACTIVE PROTEIN AND HEART RATE VARIABILITY IN AN ELDERLY GENERAL POPULATION

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Background: Reduced heart rate variability (HRV) and inflammatory markers are both associated with an increased mortality, morbidity and a worse outcome of cardiovascular diseases (CVD). Whether they are on a common causal pathway is unclear. To date, only few studies examined the association of HRV and inflammatory markers, and none of these used short-term HRV measures. However, recent observations suggest that standardised short-term recordings of heart rate dynamics may better reflect abnormalities in the intrinsic autonomic regulatory system and the associated risk of mortality than long-term HRV measures.

Objective: The aim of the study was to investigate the association of time- and frequency-domain parameters of HRV with high-sensitivity C-reactive protein (CRP) as an inflammatory marker in an elderly general German population.

Methods: This analysis is based on data of 1779 participants (45–83 years) of the baseline investigation of the CARLA Study. Standard deviation of normal to normal intervals (SDNN), high-frequency power (HF), low-frequency power (LF) and LF/HF ratio were computed from stationary 5-min segments of highly standardised 20-min resting ECGs recorded under controlled conditions. Linear regression modelling was used to analyse the association of CRP with HRV, adjusted for age, CVD status, diabetes mellitus, smoking status, blood pressure, medical treatment, tobacco use, education and physical activity.

Results: We found weak inverse age-adjusted associations between CRP level and SDNN, LF and LF/HF ratio in men, but not in women. After multivariate adjustment only the inverse association of LF/HF ratio with CRP was statistically significant in both sexes. The multivariate adjusted means (95% CI) of the CRP-quartiles were 1.0 (1.0–1.0), 1.1 (1.0–1.2), 1.4 (1.3–1.5) and 1.7 (1.5–1.9), 1.5 (1.3–1.6) and 1.3 (1.2–1.5) for men, and 1.2 (1.0–1.3), 1.1 (0.9–1.2), 1.0 (0.9–1.1) and 0.9 (0.8–1.0) for women. To examine effect modification by health status, we repeated the analyses separately for subjects with and without apparent CVD or diabetes mellitus. Only the inverse association of CRP with LF/HF ratio remained stable and statistically significant in the subgroup analyses.

Discussion/Conclusion: A reduced HRV is weakly associated with the inflammatory marker CRP. In our analysis, especially the LF/HF ratio correlated with CRP, suggesting a possible pathophysiological link between inflammatory activity and shift in the frequency spectrum toward higher frequency components. Lower parasympathetic and higher sympathetic tone may have caused this HRV change. Whether an altered HRV and an altered CRP are causally related or whether both are caused by an independent unknown factor remains to be explored in a follow-up investigation.
Results: CRP, fibrinogen and total/HDL-C were positively associated, and albumin was inversely associated, with vascular mortality both in men with and without prior disease. In all men, after adjustment for age and other vascular risk factors except lipids, lnCRP was more strongly associated with vascular mortality than was total/HDL-C (hazard ratio, HR 1.92 per 2 SD; [95% CI 1.62 to 2.28] vs 1.30 (1.13 to 1.50)). Albumin also displayed a strong relationship (HR 0.51 (0.42 to 0.62)), as did fibrinogen (HR 1.50 (1.26 to 1.79)). After additional adjustment for lnCRP and albumin, the strong effects of inflammation, both lnCRP (HR 1.60 (1.29 to 1.97)) and albumin (HR 0.61 (0.49 to 0.75)) were still strongly associated with vascular mortality, but fibrinogen was not (HR 1.01 (0.82 to 1.24)). 2 SD higher lnCRP and albumin levels were also associated with an approximate doubling and halving of non-vascular mortality, respectively. The probability of surviving from age 70 to age 80 with or without elevated CRP>3 mg/l was 77% vs 89%, respectively, in men without and with prior disease; and 58% vs 72% in men with prior disease.

Conclusions: Biomarkers of inflammation were strongly associated with both vascular and non-vascular mortality in old age and the associations with vascular mortality were stronger than those with blood lipids.

Health services research

Objective: To assess IHD mortality associations with plasma levels of total cholesterol, LDL-cholesterol (LDL-C), HDL-cholesterol (HDL-C), apolipoprotein B (Apo B), and apolipoprotein A1 (Apo A1), when measured in older men (aged 66 to 96 years).

Design: Prospective study.

Setting: Seven-year follow-up of a cohort of 5344 men (mean age 77 years), including 74% without diagnosed cardiovascular disease (CVD) or stroke.

Participants: Re-survey of surviving participants in 1970 Whitehall study of London Civil servants.

Main Outcome Measure: Hazard ratios (HR) for IHD deaths (n=447) were estimated for a 2 standard deviation difference in usual plasma lipids with or without stratification for prior diagnosis of CVD.

Results: IHD mortality was not significantly associated with total cholesterol in all men (HR 1.03), but a significant positive association in men without CVD and a slight, non-significant inverse association in men with without CVD was observed (HR 1.47 vs 0.84). The patterns were similar for LDL-C (HR 1.50 vs 0.98) and Apo B (HR 1.68 vs 0.93). IHD risks were inversely associated with HDL and with Apo A1 in men with and without CVD. IHD risks were strongly associated with total/HDL-C (HR 1.57) and Apo B/Apo A1 (HR 1.54), and remained strongly related at all ages.

Conclusion: Blood lipids other than total cholesterol were associated with IHD in older men. Differences in lipids that are achievable by statins were associated with about one-third lower risk of IHD, irrespective of age.
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**Background:** As PSA screening for prostate cancer is not recommended in the UK, the Prostate Cancer Risk Management Programme (PCRMP) was introduced to provide balanced information to men regarding the advantages and disadvantages of PSA testing. Traditionally, as PSA increases with age, age-specific reference ranges for PSA have been used to recommend further investigation. As interim guidance, the PCRMP have recommended the use of new (and lower) age-specific PSA cut-off values for referral. The PSA threshold at which biopsy is recommended will dictate the number of biopsies required to be performed and ultimately the burden of prostate referrals on the NHS. We assessed and compared the role of traditional age-specific PSA values, the PCRMP cut-off values, and a single cut-off of 4.0 ng/ml in a population based cohort.

**Methods:** PSA results from all men in Northern Ireland are maintained on a confidential electronic database by the Northern Ireland Cancer Registry (NICR). These data are linked to the NICR database of incident cancers occurring within the region. Men who had their first PSA test between 1 January 1994 and 31 December 2000 were included. These men were followed for a diagnosis of prostate cancer until 31 December, 2003.

**Results:** 96 304 men were included, with 3530 (3.7%) diagnosed with prostate cancer; 18 008 men aged 60 years and over had an initial PSA >4 ng/ml. Of these men, 2734 were diagnosed with prostate cancer. When the PCRMP guideline thresholds were applied, 15 740 had a PSA greater than their age-specific values of whom 2678 were diagnosed with cancer. Using the traditional cut-points, 12 673 had a PSA greater than their age-specific value and 2575 cancers were diagnosed. In men aged less than 60 years, using the PCRMP guidelines, twice as many men were above the age-specific thresholds compared to a cut-point of 4 ng/ml (3869 vs 1951). Using a PSA cut-off of 4 ng/ml, 294 men were diagnosed with cancer. The lower PCRMP cut-points predicted 326 prostate cancers. Using the traditional age-specific values, 2714 men exceeded the threshold and 316 cancers were predicted.

**Conclusions:** Lowering the PSA cut-off values would result in a substantially greater number of men referred for biopsy but this would yield relatively few extra prostate cancers. When establishing workable and practical guidelines it is important to consider the potential increased burden of biopsy referrals on the NHS and to balance the need to detect clinically significant prostate cancers with reducing unnecessary prostate biopsies.

**102 BIAS IN NON-RANDOMISED EVALUATIONS OF SERVICE DEVELOPMENTS: A CASE STUDY FROM THE INTRODUCTION OF CRITICAL CARE OUTREACH SERVICES**

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**Background:** In 2002, critical care outreach services (CCOS) were introduced despite no evidence for their effectiveness. In 2004, the NHS SPBO R&D Programme commissioned an evaluation of CCOS and, by this time, a randomised controlled trial was infeasible so a mixed-methods approach, including a non-randomised matched cohort analysis, was undertaken.

**Methods:** During a one-year period, 52 hospitals collected prospective data on all CCOS visits and these were linked to the same patients in the Case Mix Programme Database of ICU admissions. Patients visited by the CCOS post-discharge from ICU (cases) were matched 1:1 with controls from three pools: [1] patients discharged from the same ICU during the study period but without a CCOS visit; [2] patients discharged from the same ICU but prior to the introduction of CCOS; [3] patients discharged from an ICU in a hospital with no CCOS. Matching was based on patient characteristics at ICU admission.

**Results:** 6150 cases were identified. From match [1], CCOS post-discharge was not associated with differences in hospital mortality (risk ratio 1.08, 95% CI 0.94 to 1.25) or post-discharge hospital stay (mean difference +0.5 days, −0.5 to +1.6) and was associated with significantly increased cost per patient (mean difference £2868, £2245 to £3132). In contrast, for match [2], CCOS post-discharge was associated with decreased hospital mortality (0.88, 0.77 to 1.00, and 0.89, 0.81 to 0.99) and shorter hospital stay (−3.3 days, −4.4 to −2.1, and −2.9 days, −3.8 to −2.0), which offset the cost of CCOS (£322, −825 to £180, and −£277, −£623 to £68).

**Discussion:** Non-randomised comparisons suffer from different types and different degrees of bias. Matched analyses attempt to reduce bias by identifying a control population similar to the cases in every respect except treatment. Success depends on the ability to match on all factors relating to the treatment decision. We anticipated that selection bias would be stronger in match [1], as an active decision was made not to visit controls post-discharge. However in matches (2) and (3), CCOS visits were unavailable but additional historic (2) and quality of care (3) biases may exist. In three matched comparisons, if one match is deemed, a priori, to be subject to a greater degree of bias and the other two matches give consistent results, does this aid or hinder interpretation?

**103 PATTERNS OF CARE FOR COLORECTAL CANCER IN IRELAND: FACTORS PREDICTING RECEIPT OF TREATMENT AND MORTALITY IN A LARGE, POPULATION-BASED SERIES**

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**Objective:** To investigate the factors predicting receipt of treatment and mortality amongst colorectal cancer (CRC) patients in Ireland.

**Design:** A population-based study of incident CRC, followed-up from diagnosis to death or 31 December 2004. Factors associated with treatment receipt within one year of diagnosis, overall and separately by stage, were investigated using logistic regression. Factors associated with all-cause mortality were investigated using Cox proportional hazards methods.

**Setting:** Republic of Ireland.

**Subjects:** 15 249 individuals with primary colorectal cancer (ICD-10 C18.0–C20.0), diagnosed 1994–2002, and registered with the National Cancer Registry.

**Main Outcome Measures:** Proportions receiving any surgery, any chemotherapy or any radiotherapy; odds ratios; hazard ratios.

**Results:** Overall 78% of patients underwent cancer-directed surgery (79% of colon; 76% of rectal cancers), 31% had chemotherapy, (similar for colon and rectal tumours) and 13% radiotherapy (4% of colon and 28% of rectal). More than 96% of tumours staged I, II or III had surgery. In total 2526 patients (17%) received no-cancer directed treatment; almost all of them stage IV (45%) or unstaged tumours (50%). Over time, the proportions receiving chemotherapy increases significantly for all stages as did the proportion having radiotherapy for rectal cancer. Older, unmarried patients, with stage IV or unknown disease were significantly (p<0.05) less likely to receive cancer-directed surgery. Women with stage I CRC were significantly less likely to receive chemotherapy than men with same stage (p=0.03) and women with rectal cancer were less likely to have radiotherapy (p=0.003). Five-year survival was 72%, 60%, 44%, 7% and 42% for stage I, II, III, IV and unstaged tumours, respectively. Male, older and not married patients had a significantly higher risk of death. Stage III and IV CRC was associated with an increased mortality.

**Conclusions:** In this population-based setting, use of adjuvant cancer-directed therapy increased significantly over time. Patient-related factors predicted the likelihood of treatment and mortality. If such disparities were addressed, this might bring about improvements in terms of survival and mortality rates for CRC.

**104 THE COST-EFFECTIVENESS OF HOME-BASED POPULATION SCREENING FOR CHLAMYDIA TRACHOMATIS IN THE UK: ECONOMIC EVALUATION OF THE CHLAMYDIA SCREENING STUDIES (CLASS) PROJECT**

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**Background:** Chlamydia trachomatis is the commonest reported sexually transmissible infection in developed countries. Most published economic evaluations suggest screening for chlamydia is cost-effective but the validity of this conclusion is in doubt. We have shown, in a systematic review, that most studies used the wrong modelling approach and some unrealistic
Work and health

SOCIOECONOMIC POSITION AND LOW BACK PAIN, THE ROLE OF BIOMECHANICAL STRAINS AND PSYCHOSOCIAL WORK FACTORS

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Objective: To analyse the contribution of biomechanical strains and psychosocial work factors to occupational class disparities for low back pain (LB) in the GAZEL cohort.

Methods: The study population comprised 1487 men from the GAZEL-LBP sub-project, who had also completed a questionnaire in 1997 on psychosocial work factors assessed by the job strain model, and a questionnaire which included a French version of the Nordic questionnaire for assessment of LB in 2001. All those subjects had also completed in 1996 a questionnaire on past occupational exposures which included the number of years of exposure in the past, for three biomechanical strains specific for LB (manual material handling, bending/twisting, driving). The associations between LB lasting more than 30 days in the 12 months of 2000, and social position in the company in 1989 (four categories according to the French classification) were analysed using a Cox model. First, relative risks for the social position were computed, professionals being the reference group. The contribution of biomechanical strains and psychosocial factors to these relative risks was then estimated by comparing relative risks adjusted and non-adjusted for these factors.

Results: Prevalence of LB lasting more than 30 days was 14% in the whole population. The proportion of the relative risk for blue-collar workers compared to professionals which could be associated with biomechanical strains was higher than 70%; the corresponding figure for psychosocial work factors was 11%. For clerks, the figures were 45% for biomechanical strains and 11% for psychosocial work factors. Additional analyses for a further larger sample (including also those with missing data for psychosocial factors, mainly because they were retired in 1997) were conducted in order to validate the results on the role of biomechanical strains in a slightly different population.

Discussion/Conclusion: In this population, exposure to biomechanical strains seems to have an important role in occupational class disparities. The role of physical risk factors might have been underestimated in previous studies, due to a lack of precision in exposure assessment or a lack of precision for the health outcome.

106 “A HARD DAY’S NIGHT”? THE EFFECTS OF COMPRESSED WORK WEEK INTERVENTIONS ON THE HEALTH AND WORK-LIFE BALANCE OF SHIFT WORKERS: A SYSTEMATIC REVIEW

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Background: The workplace is increasingly being recognised by policymakers as an important intervention point at which health can be improved and health inequalities reduced. There is a largely untapped literature which describes the (often negative) effects of shift work on health and wellbeing. Shift work may therefore be an important, but largely overlooked determinant of health and wellbeing for many workers.

Methods: Systematic review. Following QUORUM guidelines we searched electronic databases, websites and bibliographies for published or unpublished experimental and quasi-experimental studies that evaluated the effects of Compressed Work Week interventions on the health and work-life balance of shift workers. We contacted study authors to validate the results on the role of biomechanical strains in a slightly different population.

Results: Forty studies were found. Compressed Work Week interventions did not always improve the health of shift workers, but they were seldom detrimental. However, the interventions generally improved work-life balance. There were few effects on organisational outcomes. No studies reported on the effects of the interventions on socioeconomic inequalities in health.

Conclusion: This systematic review suggests that the Compressed Work Week is a considerably important intervention for the health of shift workers, and it appears to do so with little or no adverse effects on health or organisational outcomes. This should be taken into consideration by those policymakers and practitioners charged with creating healthier workplaces. However, further research is needed into the effects of such interventions on socioeconomic inequalities in health.

107 OCCUPATIONAL EXPOSURE TO PESTICIDES AND RISK OF TESTICULAR CANCER

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Objective: To investigate the association between occupational pesticide exposure and the risk of testicular cancer.

Design: Population-based national multicentre case-control study.

Setting: Germany

Participants: Incident cases were reported through an active reporting system of clinical and pathological departments in the study regions (cities of Bremen, Essen, Hamburg and the Saarland). 269 (99 non-seminoma; 170 seminoma) of 353 eligible cases of confirmed testicular cancer were interviewed. 797 matched by five-year age group and study centre were selected from residential registries.

Outcome Measure: Odds ratios and 95% confidence intervals.

Statistical Analysis: Conditional logistic regression adjusted for cryptorchidism.
Results: Low prevalences of pesticide exposure were reported in both groups (cases: 5.20%; controls: 4.14%). The adjusted odds ratio for ever use of pesticides and rural residence remained high (OR = 2.21; 95% CI 1.31 to 3.71) after adjustment for other potential risk factors. However, the association with rural residence did not change after adjustment for exposure to pesticides. Conclusion: This study provides further evidence of an association between rural residence and pesticide exposure. However, the results suggest that the association may be explained by other factors such as socioeconomic status and cultural practices. Further research is needed to explore these potential mechanisms.
Analyses: Cross-sectional analyses using OLS linear models, controlling for gender and social class. Longitudinal analyses via Structural Equation models using simultaneously fitted and lagged models to determine causal direction.

Results: At age 11, personal income exhibits a curvilinear relationship with self-esteem and depression together with a positive linear relationship with ASB, the latter corroborated by teachers’ reports. At age 13 and 15, income is positively related to both self-esteem and ASB and (slightly) to improved mood. The relationship between income and ASB is confirmed in an analysis of contact symptoms, and is not attributable to theft. SEM analyses suggest that self-esteem predicts income rather than the reverse, though the effect is small, and that conversely income predicts improved mood over the same period. Analyses of income and ASB reveal evidence of reciprocal effects in the earlier period (11–13) together with an effect of ASB on income between 13 and 15. All these effects are much larger than those between income and self-esteem and depression.

Conclusions: With the exception of a small positive effect of personal income on mood, there is little evidence in these results that higher personal income bestows better health in youth. Most of the evidence is consistent with reverse causation; that higher incomes are secured both by young people with higher self-esteem and those who engage in antisocial behaviour. There is also some support for the anti-consumerist view that personal income and antisocial behaviour are inextricably linked.

112 IMPACT OF HEALTH-RELATED STIGMA AMONG PEOPLE WITH MENTAL DISORDERS: RESULTS OF THE ESEMED PROJECT

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Objectives: To assess the relationship between health-related stigma and sociodemographic factors, as well as its impact on quality of life, social and life activities limitation, among people with mental disorders and significant disability.

Design: Analysis of data from a cross-sectional face to face household interview survey.

Setting: Representative samples of the adult population of six European countries: Belgium, France, Germany, Italy, The Netherlands and Spain.

Participants: 21 425 respondents provided data between 2001 and 2003.

Main Outcome Measures: Health-related stigma was assessed through two questions regarding emotional reactions (embarrassment) and discrimination experiences, and was endorsed if the respondent declared at least “a little” in both items.

Results: 815 respondents had a 12-month mental disorder and significant disability. Among those, 14.7% (95% CI 10.8 to 19.7) declared stigma. Stigma was higher among individuals with lower education and those married or cohabiting. Stigma was positively and significantly associated with low education (having studied < 12 years vs ≥12 years, OR 2.84), having been previously married or cohabiting (married or cohabiting with someone, OR 0.57); unemployment (vs working, OR 5.13) and not working due to disability (vs working, OR 3.97). The multivariate analysis showed that stigma had a significant effect over the SF-12 physical component summary score (PCS) (β = –4.65; p < 0.05) while the impact on the SF-12 mental component summary score (MCS) (β = –3.7) did not reach statistical significance. Stigma was also associated to a higher proportion of limitation in life activities (14.62; p < 0.05) and of social limitation (28.09; p < 0.001).

Conclusion: In Europe, around one in seven individuals with mental disorder and significant disability experienced health-related stigma. Stigma, which is more frequent among people with less education, married and unemployed or laid off due to disability, is associated with worse physical quality of life and more life activities and social limitation. Routinely exploring stigma in the assessment of individuals with mental disorders is recommended.

113 PSYCHIATRIC PATIENTS ARE LESS LIKELY TO DEVELOP CANCER THAN TO DIE OF IT: RESULTS OF AN EPIDEMIOLOGICAL STUDY FROM NOVA SCOTIA

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Objectives: There are conflicting data on the risk of cancer in psychiatric patients, possibly due to the use of different methodologies and outcomes such as incidence or mortality. Mortality is not an ideal risk marker as it affected by both susceptibility to developing the disorder, and subsequent survival. We investigated the association between mental illness and cancer incidence, first admission rates, and mortality across an entire jurisdiction (Nova Scotia) using a standard methodology.

Method: A population-based record-linkage study of all patients in contact in contact with primary care or specialist mental health services for a psychiatric problem from 1995–2001. We used the Public Health Agency of Canada’s case definition for surveillance of psychiatric disorder. Records were linked with cancer registrations and death records. We used the inception cohort method to calculate standardised incidence, first admission and mortality rate ratios, and proportional hazards or logistic regression to control for other confounders.

Setting/Participants: Patients attending primary care and specialist mental health services (n = 247 344) including impatient, outpatient and community settings in both private and public sectors in Nova Scotia (population = 1 million).

Main Outcome Measures: Standardised incidence, first admission and mortality rate ratios [RR] relative to the rate in the general population.

Results: 4690 people had cancers diagnosed after their first contact with mental health services. There were 2486 carcinoma deaths. Cancer mortality was 72% higher in males (95% CI 63 to 82%) and 59% higher in females (95% CI 49 to 69%) with a similar pattern for first admissions. Cancer incidence for psychiatric patients was significantly lower than in both males (RR 1.21 (95% CI 1.18 to 1.24)) and females (RR 1.31 (95% CI 0.80 to 0.91)). The incidence RR varied from 1.88 for brain cancer (males 95% CI 1.65 to 2.15) to 0.91 for melanoma in females (95% CI 0.33 to 0.45). Incidence of colorectal (for males), prostate, bladder and ovarian cancer was no higher than for the general population. After adjusting for demographic factors and comorbidity (Charlon-Deyo index), there was a 28% excess mortality in psychiatric patients. Patients of lower income and from rural areas also had significantly higher mortality.

Conclusion: People with mental illness in Nova Scotia have a higher cancer case fatality rate, rather than increased incidence for several cancer sites. It is unlikely that lifestyle explains this finding as incidence should better reflect the increased mortality rate. Other possibilities include delays in detection or initial presentation, with more advanced staging at presentation, and difficulties in communication or accessing health care (for example, inaccess in access to specialised procedures or surgery).

114 INEQUALITIES IN MENTAL WELL-BEING OF 11–15 YEAR-OLD BOYS AND GIRLS IN SCOTLAND, 1994–2006

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Background: The mental well-being of children and adolescents is a priority area for the Scottish Executive, as it tackles socioeconomic inequalities in health. Previous research has shown that emotional and mental health problems are predictors of externalising behaviour and general well-being in later life. Promoting young people’s health therefore has long-term benefits to individuals and society as a whole.

Objective: The aim of this study is to describe changes in mental well-being amongst adolescents living in Scotland between 1994 and 2006, to investigate socioeconomic inequalities in mental well-being and changes in inequalities over time.

Methods: Data from the 1994, 1998, 2002 and 2006 Health Behaviour in School-Aged Children survey were modelled using Multilevel Binomial modelling for boys and girls, adjusting for age, year and deprivation using the Family Affluence Scale.

Results: For measures of confidence, happiness, multiple health complaints (MHC), helplessness, feeling left out and perception of looks, positive mental well-being is higher among boys than girls, and among younger than older adolescents. Adjusting for age, the odds of “feeling very happy” in 2006 among boys is 1.70 (95% CI 1.49 to 1.94) and among girls 1.75 (1.50 to 2.03) that of 1994. Similarly, there is a significant increase in confidence among girls, and a significant decrease in MHC, helplessness, and feeling left out. For boys, significant reductions are seen in MHC helplessness and feeling left out. Among boys and girls, a biologic inequalities in happiness, MHC and perception of looks are evident. Inequalities in confidence and helplessness also exist among girls. Between 1998 and 2006 socioeconomic inequalities in MHC and happiness increased for boys, and inequalities in happiness, MHC and perception of looks increased for girls so that, for example, the odds of happiness among girls with high FAS relative to low in 1998 to 2006 were 1.46 (1.11 to 1.91) those of high FAS relative to low in 1998. Inequalities in all other indicators do not change significantly over time.
Conclusions: Indicators of adolescent mental well-being in Scotland appear to be improving over time. However, gender and age differences in mental well-being persist, as do socioeconomic inequalities. Inequalities are likely to widen for some indicators suggesting that a targeted approach is required in addressing the mental health of young people in Scotland.

Qualitative and mixed methods

EXPLORING RESPONSIBILITY FOR HEALTH IN FAMILIES: ANALYSING SOCIAL RELATIONSHIPS THROUGH A FOCUS GROUP STUDY

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Background: Against a backdrop of policy rhetoric emphasising parental responsibility for child health it is important to explore the opportunities and constraints facing parents in undertaking these responsibilities. Focus group methods have the potential of providing a dynamic understanding of how responsibility is shaped by social contexts and social relationships by encouraging people to construct their meaning of health through interactions with others.

Objectives: To explore how concepts of responsibility for health in families are shaped by social relationships, using focus groups as a means of accessing social interactions.

Design: Twelve focus groups were conducted with naturally occurring groups in Wales. A semi-structured schedule, newspaper headline prompts and a prioritisation task were used to guide the discussion. Transcriptions were analysed using a grounded theory approach and main themes identified and validated by a second researcher. Areas of consent and disagreement within groups were identified and key areas of similarity and difference between socioeconomic groups identified.

Participants: Participants (n=101) included a range of age groups and family backgrounds, with 57% female. A broad range of socioeconomic backgrounds were represented, 27% of participants lived in the top 10% most deprived wards in Wales and 23% in the 50% least deprived wards.

Results: The data highlighted a common expectation that family members could positively influence health behaviours and parents presented their experiences of trying to provide positive role models within the home. As discussions developed it became clear that parents faced many challenges in meeting these responsibilities and they explained these difficulties within a dynamic context of social and economic change. Family relationships were also interwoven with other social relationships. Community relationships provided a supportive framework for health improvement but tensions within and between communities also worked to undermine these support structures. In terms of relationships between individuals and the state, there were significant differences based on socioeconomic background with variations in levels of reliance on the state and coupled with different attitudes to public health information.

Conclusions: Examining social relationships provides an important additional dimension to understanding how responsibility for health is constructed and focus groups provide an insight into the ways in which social relationships are interwoven in the fabric of everyday life. These findings have implications for public health interventions and adds to the case for moving away from individual-behaviour-based approaches towards more collective approaches which acknowledge the inter-relations between different social relationships and what this means to different groups.

WHAT DO PEOPLE VALUE WHEN PROVIDING UNPAID CARE? DETERMINING ATTRIBUTES FOR A DISCRETE CHOICE EXPERIMENT

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Background: The impact healthcare interventions have on unpaid carers can be extremely important but is rarely considered in economic evaluations. In view of this, a preference-based instrument has been developed to capture this impact. This has been designed from first principles, to include non-health items (attributes) that influence a person’s well-being when providing unpaid care. A discrete choice experiment (DCE) will be used to test the instrument and determine valuations for different caring profiles.

Objective: Determine attributes and levels for a DCE to quantify preferences for different caring profiles.

Design: Meta-ethnographic studies of qualitative studies followed by semi-structured interviews with carers.

Meta-ethnography: Forty four qualitative studies were reviewed for the meta-ethnography. These were excluded. Meta-ethnography with interview follow-up offers a new route for developing attributes for a DCE. It is likely that applying the method of grounded theory when the researcher is unfamiliar with the topic area, but a body of qualitative literature on the topic exists. This work qualitatively revealed a number of factors that are important to carers when they provide unpaid care, that are traditionally neglected in economic evaluations.

PATIENTS’ UNDERSTANDING OF THE SURVIVAL BENEFITS OF PALLIATIVE CHEMOTHERAPY: FINDINGS FROM ASPECTS (A STUDY OF PATIENTS’ EXPERIENCES OF TREATMENTS)

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Objective: Every year in the UK many thousands of patients are told they have inoperable cancer and are offered palliative chemotherapy treatment. Survival benefit is often a main outcome measure (along with disease progression, quality of life, and toxicity) in clinical research. It is also an important concern to patients. The evidence suggests that, in cases of advanced cancer, survival benefits are modest (often measured in weeks or months, rather than years). In this paper we consider whether patients have a clear understanding of the survival benefits of palliative chemotherapy when making decisions about treatment.

Design and Setting: ASPECTS (A Study of Patients’ Experiences of TreatmentS) is a qualitative, longitudinal study examining patients’ and carers’ views and experiences of palliative chemotherapy. Fieldwork was undertaken at Bristol Haematology and Oncology Centre (BHOC), Weston General Hospital, and in patients’ homes.

Participants: Patients with three relatively common cancers: pancreatic (15), non-small cell lung cancer (15) and colorectal cancer (15). These disease sites were chosen because they have differing life expectancies, and differing survival benefits are associated with the respective palliative chemotherapy treatment.

Methods: A cohort of 45 patients was studied before they saw an oncologist, at the consultation where palliative chemotherapy was discussed, and on through palliative chemotherapy treatment. Interviews and consultations were digitally recorded and anonymised to protect confidentiality. All recordings were fully transcribed and coded using Atlas.Ti software. Common themes and concepts were identified. Further analysis employed the constant comparison method of grounded theory in which the textual data were scrutinised for differences and similarities within themes.

Results: Clinicians informed patients that the intent of palliative chemotherapy was not curative but that the treatment had three main benefits: ‘improved quality of life’, ‘relief of symptoms’ and ‘prolonging life’. Patients were given detailed information about the treatment regimen, and potential side effects. However, survival benefits of the treatment were often not discussed. The majority of patients accepted palliative chemotherapy. Those who rejected chemotherapy, or were considered unsuitable for the treatment, were more likely to receive information about survival benefits than those who accepted the treatment.

Conclusion: Despite the importance placed on survival benefit as an outcome measure in clinical research about palliative chemotherapy,
survival benefits (including the lack of survival benefit associated with some chemotherapy) is often not included in the discussions about treatment options between clinicians and patients. Patients often accept palliative chemotherapy without a clear understanding of the survival benefits.

EXPLAINING VARIATIONS IN PATIENT SATISFACTION WITH REHABILITATION PLANNING AND GOAL SETTING: A MIXED METHOD APPROACH

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Objective: To explain satisfaction with rehabilitation planning and goal setting in German patients attending inpatient medical rehabilitation that was found to be more than 0.5 standard deviations lower compared to other satisfaction domains (doctors, nurses, psychologists, services, therapies).

Design: Two-phased mixed method approach. (1) Quantitative analysis of patient satisfaction data from the quality assurance programme of inpatient rehabilitation of the German statutory pension insurance. Two clinics rated above average and two clinics rated below average in satisfaction with rehabilitation planning and goals were identified after case-mix adjustment. (2) Qualitative interviews, blinded to ranking, with patients from the selected clinics.

Setting: Medical rehabilitation clinics in Germany, somatic indications (quantitative phase) and in Northern Germany, cardiovascular and musculoskeletal disorders (qualitative phase).

Participants: Quantitative phase: n = 142 327 patients in k = 548 rehabilitation clinics; qualitative phase: n = 40 patients in k = 4 rehabilitation clinics.

Analysis: Quantitative phase: multilevel linear regression analysis to model the relation between predictors (patient characteristics, process variables, outcome ratings, health status after rehabilitation, different aspects of patient satisfaction) and satisfaction with rehabilitation planning and goals (dependent variable). Qualitative phase: identification of categories within transcribed patient interviews that distinguish between clinics rated above or below average by thematic coding approach.

Results: Quantitative phase: while patient characteristics were only of marginal importance, behavioural recommendations given by the clinic with regard to home tasks, job as well as leisure activities (process variables) accounted for a substantial amount of variance (21.7%) of satisfaction with rehabilitation planning and goals. Of the reported outcomes only change in psychological distress accounted for 2.2% variance. Health status after rehabilitation did not show independent associations. Satisfaction with doctors, satisfaction with housing, and with their rehabilitation in general accounted for additional 21.1% variance. Qualitative phase: no substantial differences between clinics were found with regard to rehabilitation planning and explicit goal setting. Clinics rated above or below average differed in terms of perceived continuity of care (medical contact person, knowledge about patient’s status, perception of changes in the patient, stringent therapeutic regime), doctors’ concern for the patient (appreciation of patient, trust in doctor), and organisational characteristics (for example, perception of high work load of staff, schedule disruptions).

Conclusion: The mixed method approach yielded converging and complementing results. Higher levels of satisfaction with rehabilitation planning and goal setting might be accomplished by focussing treatment on areas relevant for patients’ daily life, on continuity of care, on a respectful doctor-patient relationship, and on organisational prerequisites.

AN EXPLORATORY STUDY OF ANTIDEPRESSANT PRESCRIBING IN SCOTLAND: THE GP PERSPECTIVE

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Objective: This study aimed to explore the reasons for the increase and variation in prescribing of antidepressants in Scotland.

Design: In-depth qualitative interviews.

Setting: General Practises across Scotland.

Participants: Sixty three general practitioners in 30 practices.

Results: General practitioners offer a range of explanations for the rise in antidepressant prescribing in Scotland. Interestingly, an increase in the incidence of depression was rarely among the reasons given. Instead, a number of linked factors including the success of campaigns, such as the Defeat Depression Campaign, to raise awareness of depression coupled with a willingness to present on the part of patients were suggested. GPs also tended to recognise a trend towards a higher overall index of suspicion in communities, for example, the identification of postnatal depression or depressive illness among those who require chronic disease management. This had resulted in a cultural shift towards acceptance of antidepressant medication by both patients and GPs. The perceived safety of SSRI medication provides GPs with an option of managing depression in primary care that is relatively risk-free. Many GPs questioned the appropriateness of prescribing at current levels, and talked about the medicalisation of unhappiness, which is exacerbated by social deprivation and the breakdown of traditional social structures. In spite of this, the decision to prescribe is a considered one, and arriving at a diagnosis of depression is patient-centred and symptom-driven. Nevertheless, GPs feel compelled ‘to do something’ and alternatives to prescribing are seen to be scarce and poorly resourced. Increased availability of alternatives such as ‘talking therapies’ may reduce prescribing but many GPs would use these in addition to prescribing. Variations in prescribing are the result of individual GP personality and experience.

Conclusions: GPs perceive themselves to be surrounded by social change, which has demanded a solution to mild/moderate depressive illness in primary care. This solution has been medical. Consequently, GPs find themselves operating in a policy climate that aims to reduce the prescribing of antidepressants, without any indication of the ‘correct’ level of prescribing. On a macro level, GPs recognise that some inappropriate prescribing exists, yet at an individual level, prescribing decisions are measured.

Parallel session E

Life course III

CUSTOMISED BIRTHWEIGHT NORMS FOR EARLY DETECTION OF RISK FACTORS OF METABOLIC SYNDROME IN ADULT LIFE

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Background: Studies have found that customised norms improve the identification of fetal growth restriction (FGR) among newborns; however this approach has yet to be applied to studying the relationship between FGR and risk of adult chronic disease.

Aims: To explore the association between growth restriction and insulin resistance using customised versus standard norms of birthweight in a young adult population.

Material: 1.43 of 215 Polish men aged 24–29 years examined in 2000–4, whose mothers participated in a follow-up study during pregnancy in Warsaw’s Wola district in 1974–7. From the original cohort of 1912 babies (including 945 boys) exclusions were: those born from pregnancies with uncertain gestational age or with late first visit and not being involved in laboratory testing in 2000–4.

Methods: Standard norms for fetal growth restriction (FGR) were taken from population growth charts. Customised norms were computed by applying Hadlock’s formula to Gardosi’s model of optimal birthweight at 40 weeks. The HOMA-IR index was used to index insulin resistance. The linear regression model on log-transformed HOMA-IR index was applied and adjusted for current body mass index.

Results: 6.3% of the sample was classified as growth restricted using standard norms versus 11.9% using customised norms. Both definitions of FGR were significantly associated with higher HOMA-IR (customised: 2.56 for FGR and 1.80 for non-FGR and standard 2.74 for FGR and 1.83 for non-FGR). The combination of both norms identified a subgroup with relatively high HOMA-IR index among those classified as non-FGR using standard norms, but identified as growth restricted using with customised norms. The adjusted mean HOMA-IR index for babies classified as non-FGR by both standards was 1.80 (95% CI 1.66 to 1.96), 2.39 (95% CI 1.72 to 3.30) for standard non-FGR but customized FGR, and 2.73 (95% CI 2.01 to 3.71) for those classified as FGR using both norms (p<0.001).

Conclusions: Using customised fetal growth restriction indices could help in detecting groups at risk of metabolic syndrome in adult life and should be explored in future research.

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121 PRENATAL STRESS EXPOSURE TO BEREAVEMENT AND RISK OF EPILEPSY: DEVELOPMENTAL ORIGINS OF EPILEPSY?

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Objectives: By examining the association between the exposure to bereavement during prenatal period and the risk of epilepsy later in life, we aim to test the hypothesis that there are developmental origins of epilepsy from exposure to stress in fetal life in a large longitudinal study.

Design: Retrospective cohort study with up to 35 years of follow-up.

Setting: The data linkage of four national registers in Denmark.

Participants: All 2.3 million persons born in Denmark from 1970 to 2004.

Main Outcome Measures: Hospitalisation due to epilepsy from 1970 to 2004; outpatients due to epilepsy from 1995 to 2004.

Results: After the data linkage, a total of 43,384 persons were included into exposed group, whose mothers experienced bereavement from one year before conception to the date of birth of these children. A total of 2,316,255 children were in unexposed group. The mean follow-up time is 15 years. There were 206 epilepsy cases among the exposed children (2.24%) and 37,798 cases in the unexposed group (1.60%), yielding a relative risk of 1.69 (95% CI 1.57 to 1.83) after adjusting for mother’s age, education, residence.

Conclusion: We observed an increased risk of epilepsy in the offspring of mothers who had been exposed to loss of a child during the pregnancy period. Our data support the hypothesis that bereavement might cause patho-physiological changes in pregnant mothers, which could subsequently affect the brain development of the fetus. Epilepsy might have developmental origins from stressful life events in fetal life.

122 CHILDHOOD RESIDENTIAL STABILITY AND HEALTH IN ADOLESCENCE: FINDINGS FROM THE WEST OF SCOTLAND TWENTY-07 STUDY

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Background: Moving can be a major life event for children as well as adults. Previous research has shown that residential mobility has a negative effect on educational attainment and can lead to health problems and poor health behaviours. Residential stability in childhood may help children to develop and maintain social networks. These strong social networks, known to offer protective health benefits, may carry over into adolescence and later on into adulthood.

Objective: To investigate the relationship between childhood residential stability and health outcomes and behaviours in adolescents.

Data and Methods: Analysis of the youngest cohort (born in the 1970s) of the Twenty-07 Study. Data were available on 513 respondents, sampled from 62 postcode sectors in Clydebank, aged around 15 at baseline in 1987/8. Residential stability was derived from the number of addresses at which the respondent had lived between birth and interview and was categorised as no moves (stable), 1–2 moves (moderately mobile) or 3–4 moves (frequently mobile). Multiple regression models were used to assess the relationship between residential stability and a number of health outcomes. Analyses were controlled for age, sex, housing tenure, family stability, area deprivation (Carstairs) and social class of head of household.

Main Outcome Measures: BMI, waist:hip ratio, longstanding illness and smoking status.

Results: Twenty four per cent of adolescents had never moved. 61% had moved 1–2 times and 15% had moved 3–4 times. Mobility differed in terms of all socio-demographic characteristics except age and sex. There was no change in mean BMI or waist:hip ratio as the number of moves increased. Reports of a longstanding illness in adolescence were not significantly related to the number of moves made in childhood (OR 1.07 (0.66 to 1.73) for those who moved 1–2 times relative to those who had never moved, OR 1.37 (0.75 to 2.49) for those who moved 3–4 times); although odds were elevated for increased moves. Those who moved 1–2 times had elevated odds of smoking at 15 (OR 1.14 (0.82 to 1.60)) while those who had moved 3–4 times had significantly greater odds (OR 1.65 (1.07 to 2.55)) compared to those who had lived at the same address since birth.

Conclusions: Increased mobility during childhood is independently associated with adverse health status by the age of 15. This appeared to be true for self-reported longstanding illness and smoking status, although the only significant result in this sample is for smoking status. Directly measured adolescent health variables do not appear to be associated with childhood mobility.

123 EARLY MOTHERHOOD AND CARDIOVASCULAR DISEASE: BIOLOGY OR LIFESTYLE? AN INVESTIGATION OF AGE AT PARENTHOOD AND CARDIOVASCULAR DISEASE RISK FACTORS AT AGE 53 YEARS IN MEN AND WOMEN

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Background: Detrimental changes to the coronary heart disease (CHD) risk profile occur during pregnancy. If such changes were permanent, early motherhood would be a risk factor for CHD. Alternatively, any association with age at first birth may reflect social differences in age at starting a family or lifestyle factors associated with child rearing. One way of exploring these hypotheses is to consider associations in men and women.

Objectives: To examine the association between parental age at the birth of first child and CHD risk factors at age 53 years and to assess whether the relationships are stronger in women than men.

Design: Birth cohort study.

Setting: England, Scotland and Wales.

Subjects: 2538 men and women from the MRC National Survey of Health and Development, followed up since their birth in 1946, who reported having at least one biological child.

Outcomes: Body mass index (BMI), waist:hip ratio, systolic and diastolic blood pressure (SBP, DBP), total, LDL and HDL cholesterol and glycated haemoglobin at 53 years.

Methods: Self-reported records of births collected throughout adult life were used to define age at birth of first child (categorised as <20; 20–25; 25–30; >30 years). Regression models were used to investigate the association of age at birth of first child with all outcomes.

Results: There were significant associations between age at first child and all risk factors, except total and LDL cholesterol. Poorer mean risk factor levels were observed with decreasing age at parenthood. The associations were generally stronger in men than women, but did not differ significantly (all p values for test of sex interaction >0.2). The mean difference (95% CI) in BMI between those who had been teenage mothers compared with those who became mothers after age 30 was 1.3 kg/m² (0.1 to 2.5). For men, the difference was 1.1 kg/m² (0.2 to 2.1). SBP was 4.5 mmHg (0.2 to 8.8) higher in teenage mothers and 5.4 mmHg (0.6 to 10.2) in teenage fathers than in the oldest parental age group. Similarly, the differences for glycated haemoglobin were 2.2% (~0.3 to 4.7) for women and 3.7% (1.1 to 6.2) for men. The associations were not explained by family size. All associations, except those with blood pressure, were largely explained by potential predictors of age at parenthood or by adult behavioural and social factors.

Conclusions: These findings, being the same in men and women, suggest that factors associated with early childrearing have detrimental long-term impacts on health. Family based interventions targeted at young parents may reduce CHD risk.

124 ETHNIC DIFFERENCES IN CHILDHOOD COGNITIVE DEVELOPMENT: FINDINGS FROM THE MILLENIUM COHORT STUDY

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Background: Preschool children with unfavourable cognitive and/or socio-emotional skills are less likely to do well in a range of educational, health and socioeconomic outcomes compared with their better-off counterparts throughout life. Ethnic inequalities in child and adult health have been widely documented; however, it is unclear how cognitive development during early childhood varies across ethnic groups in the UK.

Objectives: This paper seeks to determine whether cognitive development differs across ethnic groups and whether observed patterns can be explained by socioeconomic, cultural and home environment factors.
Methods: Data from the second sweep of the UK Millennium Cohort Study on 12,624 White, 415 Indian, 719 Pakistani, 271 Bangladesh, 354 Black Caribbean, 325 Black African children were analysed. Home visits including parental interviews and cognitive skills tests were conducted when the cohort member was aged approximately 3.5 years. Cognitive development was assessed by testing children on naming vocabulary, colours, shapes, sizes, numbers and letters. We examined the effect of explanatory factors, including household income, occupational class, parental education, household language, whether the child understood a story in English, maternal migration status, and a range of home environment factors (whether the household was noisy, whether the child was distracted during testing, etc) on cognitive test scores. Using the White group as the reference category, ethnic differences in cognitive tests are given per 1000.

Results: Children from non-White ethnic minority groups had significantly lower cognitive test scores compared to White children. On vocabulary tests, the z scores for the difference between ethnic minority and White children were: Indian −0.60, Pakistani −1.15, Bangladeshi −1.31, Black Caribbean −0.34 and Black African −0.69. On identifying colours, shapes, letters and numbers, z score differences between ethnic minority and White children were: Indian −0.15, Pakistani −0.90, Bangladeshi −1.18, Black Caribbean −0.32 and Black African −0.47. Up to 70% of these differences were accounted for by socioeconomic and cultural factors, though the extent of this varied according to ethnic group. For example, most of the Black Caribbean disadvantage was explained by socioeconomic factors, while the Pakistani and Bangladeshi disadvantage was explained by both socioeconomic and cultural markers.

Conclusion: Differences exist in cognitive tests scores across ethnic groups during early childhood. Explanations for these differences were not homogeneous across groups. These results have important implications for future educational performance and the life chances linked to this, such as disadvantage and ill health. Our paper highlights different needs across different ethnic groups.

125 ETHNIC DIFFERENCES IN DIABETES AND CARDIOVASCULAR RISK FACTORS ORIGINATE IN EARLY LIFE: PRELIMINARY RESULTS OF THE CHILD HEART AND HEALTH STUDY IN ENGLAND (CHASE)

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Background: Compared with white Europeans, British South Asian adults have greatly increased risks of type 2 diabetes associated with insulin resistance, hyperglycemia and central obesity. British African-Caribbean adults have less marked increases in type 2 diabetes, associated with lower total and LDL cholesterol and higher triglycerides. Coronary heart disease rates are high in the former group, low in the latter.

Objective: To examine whether similar patterns of ethnic differences in adiposity and metabolic factors are apparent in British children in the first decade of life.

Design: Cross-sectional survey of children (CHASE Study) recruited from a sample of 200 Primary schools in London, Birmingham and Leicester, with standardised measurements of anthropometry, blood pressure and fasting blood sampling. Ethnicity was defined by parental self-definition.

Biochemical analyses were conducted blind to ethnic group status.

Participants: 1257 South Asian, 1307 African-Caribbean and 1393 White European children aged 9–10 years (response rates 69% for physical measurements, 61% for blood measurements).

Results: In age-adjusted analyses, compared with white Europeans, South Asian children had higher mean truncal thickness while African-Caribbean children had a higher mean BMI. South Asian children had higher mean glycosylated haemoglobin (HbA1c) and triglyceride levels, with lower mean HDL-cholesterol levels. African-Caribbean children had a less marked elevation of mean HbA1c levels, higher mean HDL-cholesterol and lower mean triglyceride concentrations. Mean total and LDL-cholesterol and blood pressure levels did not differ appreciably between ethnic groups. The ethnic differences in HbA1c, triglyceride and HDL-cholesterol levels were unaffected by adjustment for measures of adiposity.

Conclusions: Ethnic differences in adiposity and metabolic factors are established by the end of the first decade of life. Important determinants of ethnic differences in adult disease appear to be operating early in life and may offer scope for early prevention.

126 INTERGENERATIONAL TRANSMISSION OF ETHNIC INEQUALITIES IN GENERAL HEALTH

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Background: Previous research strongly suggests that ethnic groups are more likely to suffer a poorer health profile compared to the overall population. Trends have emerged to suggest that social factors such as socioeconomic status and health behaviours are not fixed across generations and have a role to play in these inequalities in health.

Objectives: This project aimed to establish the degree to which ethnic inequalities in health are transmitted from the first to second generation, and to determine the extent that intergenerational changes in socioeconomic status and health behavioural factors might explain any variation that exists.

Methods: Data from the 1999 and 2004 Health Surveys for England which had ethnic boosts to their samples assessed the prevalence of fair/poor general health, raised glycosylated haemoglobin blood levels and diagnosed hypertension across first (n = 4492) and second (n = 5729) generations of seven ethnic minority populations (Black Caribbean, Black African, Indian, Pakistani, Bangladeshi, Chinese and Irish). A White population was selected as reference (n = 28 576). The risk of poor health outcome was estimated by applying logistic regression models and stepwise inclusion of socioeconomic and behavioural factors standardised for age and sex.

Conclusion: Differences across ethnic groups using logistic regression adjusted for age and sex.

Results: The second generation groups reported slightly poorer general health than the first migrant generation, although this was not statistically significant. This generational worsening in health was less consistent for elevated glycosylated haemoglobin and diagnosed hypertension where the direction of change tended to vary by ethnic group. Rates of reported ill health across all outcomes increased in the second generation after adjustment for socioeconomic position, whereas health behaviour had no effect. The Bangladeshi population showed significant intergenerational improvement in general health relative to the White reference, after adjustment for age and sex, showing a reduction in the odds ratio (95% CI) from 2.75 (2.13 to 3.56) for the first generation to 1.58 (1.17 to 2.13) in the second generation.

Conclusion: Cross-generational differences in health are likely to be mediated by changes in socioeconomic circumstances. It remains unclear as to what degree such social mobility is mediated by post-migration class reassignment and whether these trends in mobility and subsequent positive effects on health will persist across future generations.

127 MORTALITY FROM LIVER CIRRHOSIS AND HEPATOCELLULAR CANCER BY COUNTRY OF BIRTH IN ENGLAND AND WALES

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Objectives: The rates of liver cirrhosis and hepatocellular cancer (HCC) have been increasing in the UK and the rest of the world. Contributing aetologies include alcohol intake, hepatitis B and C and non-alcoholic fatty liver disease. There is a paucity of data examining the racial and ethnic epidemiological burden of these conditions, of which country of birth can be a proxy. We sought to compare mortality in England and Wales from liver cirrhosis and hepatocellular cancer (HCC) by country of birth.


Main Outcome Measures: Standardised mortality ratios (SMRs) for liver cirrhosis and HCC.

Results: Deaths included 13 982 alcoholic liver disease, 10 461 other liver diseases and 9261 hepatocellular cancer respectively. Mortality rates for HCC were particularly high for men born in Bangladesh (SMR 523; 95% CI 449 to 592), while liver cirrhosis was statistically significantly higher than the national average for men born in Ireland (SMR 241; 95% CI 219 to 265), Scotland (198; 180 to 210) and India (149; 128 to 174), and for women born in Ireland (218; 190 to 250) and Scotland (192; 165 to 223). Mortality from other liver diseases was similarly increased in men from Ireland (SMR 194; 95% CI 170 to 221), India (188; 158 to 214) and Scotland (147; 127 to 171) as well as women from Ireland (160; 137 to 187) and Scotland (138; 115 to 165). Alcoholic liver disease mortality was lower for men and women born in Bangladesh (male
Introduction: Health inequalities refer to a broad range of differences in both health experience and health status between demographic groups, regions and countries. Targets and mechanisms to reduce health inequalities now feature in Irish health policy in Quality and Fairness - A Health System for You. Cardiovascular disease remains a leading cause of death and disability in Ireland, which is addressed in the national cardiovascular strategy ''Building Healthier Hearts''.

Aim: To examine the pattern of coronary heart disease (CHD) morbidity, mortality and treatment among gender and geographical regions in Ireland.

Methods: Data on cardiovascular morbidity and mortality were obtained using the Public Health Information System (PHIS), Hospital In-patient Enquiry (HIPE), and CSO Vital Statistics. All data were age-standardised (direct method).

Results: There has been a significant decline in CHD mortality (males 24.6% and females 23.0% from 1994–8 to 1999–2003). However, differences in 1999–2003 five-year CHD mortality between former health board (HB) regions are evident, with the Eastern Regional Health Authority (ERHA) having the lowest CHD mortality for men (SDR per 100,000 population = 204 (95% CI 198 to 209) and women (SDR = 100 (97 to 103)) and the Midlands HB having the lowest mortality for women (SDR = 237 (223 to 250)) and Southern HB having highest mortality for women (SDR = 116 (111 to 120). CHD hospitalisation in 2004 was highest in the South Eastern, Midland, North Eastern and North Western HBs for men and women, and lowest in Southern HB. There was a significant 2.45-fold difference in CHD hospitalisations between men and women. Uptake of cardiovascular interventions in 2004 varied widely across regions with the ERHA having the highest rates of percutaneous coronary intervention (PCI) for men and women and highest rates of coronary artery bypass grafting (CABG) for women. The Southern, South Eastern, and Mid-Western HBs had the lowest rates of PCI, and the Western and North Western the lowest rates of CABG. There was a significant 3.0-fold higher rate of PCI and 4.8-fold higher rate of CABG between men and women, and this inequality remained stable over time (overall male:female odds ratio of revascularisation in 2004 vs 1998, OR 1.06 (0.95 to 1.19)).

Conclusions: There have been significant improvements in CHD morbidity and interventions over time. Further work on reducing inequalities between regions and gender would improve health outcomes for all in the future.

### Vascular diseases II

**128 CARDIOVASCULAR DISEASE IN IRELAND: ARE THERE REGIONAL AND GENDER DIFFERENCES?**

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**Conclusion:** There are a number of statistically significant differences for liver cirrhosis and HCC mortality rates by country of birth. This would suggest that there are high-risk ethnic and racial groups for liver-related mortality. These data indicate there are major inequalities that demand clinical attention, education and research, as well as urgent public health action.

**Results:**

- Non-fatal acute myocardial infarction cases among young men, whereas the lack of regular leisure-time physical activity practice had a higher impact among the older.
- An increase of educational levels and sustained reduction of waist-to-hip ratios, involving changes on dietary and physical activity patterns, are indirectly demanded for men of all ages.

**Background:** It is hypothesised that low antioxidant enzymes activity is associated with an increased risk of cardiovascular disease. Studies of antioxidant enzymes and coronary heart disease (CHD) have yielded conflicting results.

**Objective:** To perform a meta-analysis of the association of glutathione peroxidase, superoxide dismutase and catalase activity with CHD endpoints in all inclusion studies.

**Methods:** We searched MEDLINE and the Cochrane Library from 1966 through February 2007. Relative risk (RR) estimates were pooled using an inverse-variance weighted random-effects model. We assessed publication bias by using the funnel plots. Sensitivity analysis assessed the relative influence of each study by omitting one study.

**Results:** Thirty seven case-control studies and two prospective studies are included. The pooled relative risks for CHD were 0.54 (95% CI 0.40 to 0.72); p for heterogeneity < 0.001; I² = 91.9%; 53% (95% CI 0.39 to 0.73; p for heterogeneity < 0.001; I² = 92.1%); and 0.43 (0.21 to 0.89 p for heterogeneity I² = 94.4%) for each 1-standard deviation increase in glutathione peroxidase, superoxide dismutase, and catalase activity, respectively. The funnel plots did not suggest the presence of publication or related bias. Sensitivity analysis indicated that all of the studies include in the pooled estimates seemed to contribute equally to the estimate.

**Conclusion:** Glutathione peroxidase, superoxide dismutase, and catalase activity were inversely associated with the risk of CHD in observational studies. Few prospective studies have addressed the cardiovascular effectiveness of antioxidant enzymes activity. More evidence from prospective studies is needed before to establish the fact that a low antioxidant enzyme activity is a CHD risk factor.

**Background:** Research results on the association between job stressors and hypertension is not conclusive prompting suggestions of using more objective stressor measures. This cross-sectional study uses work characteristics data obtained by worksite observations and by self-report. The
yeast infection was associated with a higher risk of epilepsy but only in children born preterm (IRR 2.63, 95% CI 1.45 to 4.76). We found no association between clinically manifest genital herpes, herpes labialis, genital warts, and the risk of epilepsy.

**Conclusions:** Exposure to maternal infections was associated with a higher risk of epilepsy. Our findings have implications for public health if they reflect causal associations since early surveillance and treatment may prevent adverse neurodevelopmental outcomes.

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**133 INCIDENCE OF AND FACTORS RELATED TO ACUTE HEPATITIS B IN BARCELONA, 1995–2005**

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**Objective:** To analyse trends in acute hepatitis B virus (HBV) infection incidence, to characterise the distribution between genders, age groups, country of origin, and groups at risk of infection in Barcelona during 1995–2005.

**Design:** Acute HBV cases are reported by physicians to the active surveillance system of the Public Health Agency of Barcelona. Incident cases of acute HBV infection were defined by positive serology for HbsAg and anti-Hbc IgM, or seroconversion to anti-Hbc detected during epidemiological surveillance in patients with compatible illness. Standardised annual incidence rates of acute HBV were computed using the Barcelona population in 2005. Incidence rate ratios (IRR) of every year against the mean of the whole period (1995–2005) were computed in a parametric Poisson regression stratified by country of origin. Data on most probable route of transmission in individuals older than 19 years were collected. For analysis purposes, data were aggregated in three different periods of time 1995–9, 1999–2002 and 2003–5.

**Setting:** Population of Barcelona.

**Main Outcome Measures:** Standardised annual incidence rates by age and sex and annual IRR of acute HBV infection.

**Results:** Between 1 January 1995 and 31 December 2005, 576 acute HBV cases were reported. Mean age was 39 (SD 14) years for men and 42 (SD 19) for women. Men have more than threefold the risk of women through the 10 years. The highest standardised incidence risk was observed in 2005 for both men and women: 9.41 and 2.50 per 100,000, respectively.

An interaction was found between the country of origin and the diagnostic year. IRR was significantly higher than the mean of the whole 11-year period in 1997 (2.00 [95% CI 1.54–2.60]) and in 1998 (2.36 [95% CI 1.84–3.01]) and significantly lower in 2001 (0.64 [95% CI 0.42–0.97]) and 2005 (0.34 [95% CI 0.20–0.54]) for native people. However, IRR followed an increasing trend in foreign people being significantly higher in 2005 (3.81 [95% CI 2.38–6.07]). The number of cases attributed to injecting drug use has decreased significantly (35.7%–17.1%–8.0%, P<0.001). In contrast, a significant increasing trend was observed in men who have sex with men (4.0%–13.0%–25.3%, P<0.001), and in those who reported more than one heterosexual partner (5.6%–10.1%–17.3%, P<0.001).

**Conclusions:** HBV incidence has decreased among native people in the period 1995–2005, however an increasing trend has been observed since 2001 for foreign people. An increase in the number of cases attributed to sexual contact has been observed together with a decrease in the number of those attributed to injecting drug use.

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**132 PRENATAL EXPOSURE TO MATERNAL INFECTIONS AND RISK OF EPILEPSY**

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**Background:** New evidence indicates that prenatal exposure to maternal infections increase the risk of cerebral palsy, mental retardation, and schizophrenia. Aetiology of childhood epilepsy is still unclear and may origin in prenatal life.

**Methods:** We identified 90 619 singletons born between September 1997 and June 2003 from the Danish National Birth Cohort (DNBC) and followed them from the 29th day after birth to 31 December 2005. Maternal infection (cystitis, pyelonephritis, diarrhoea, cough, vaginal yeast infection, genital herpes, venereal warts, and herpes labialis) were reported by their mothers in computer-assisted telephone interviews. We considered cases of epilepsy those with a diagnosis recorded in the Danish National Hospital Register as inpatients and outpatients. We estimated the incidence rate ratios (IRR) of epilepsy through Cox regression.

**Results:** Compared with unexposed children, the relative risk of epilepsy was higher for those exposed in prenatal life to maternal cystitis (IRR 1.44, 95% CI 1.17 to 1.77), pyelonephritis (IRR 2.12, 95% CI 1.00 to 4.48), and diarrhoea (IRR 1.23, 95% CI 1.03 to 1.47). The longer the duration of diarrhoea, the higher the relative risk of epilepsy with an IRR of 1.50 (95% CI 1.07 to 2.09) for diarrhoea lasting four days or more. Coughs, lasting more than one week, were associated with an increased risk of epilepsy, in the first year of life with an IRR of 1.54 (95% CI 1.09 to 2.17). Vaginal
The environment and health

PM$_{2.5}$ AS INDICATOR OF THE AIR POLLUTION INFLUENCE OVER DAILY HOSPITAL ADMISSIONS IN MADRID, SPAIN (2001–2005)

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Background: The last report of WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide of 2005 assessed about the use of PM$_{2.5}$ guideline value is preferred instead of the PM$_{10}$ values. The aim of this paper is to analyse if concentrations of PM$_{2.5}$ are the best indicator of the air pollution quality and quantify its influences over daily hospital admissions.

Methods: As dependent variable has been used the daily number of emergency hospital admissions to the Hospital General Universitario Gregorio Marañón since 2001 to 2005. The causes analysed were all causes (ICD-9: 1–799), respiratory (ICD-9: 460–519) and circulatory causes (ICD-9: 390–459), traumatisms and births were excluded. The independent variables were daily records of PM$_{2.5}$, PM$_{10}$, NO$_x$, SO$_2$ and O$_3$ mean concentrations in Madrid. Seasonalities and trend were used as control variables, also, flu epidemics, noise and pollen concentration were used. Poisson Regression Models were performed to calculate the relative risk (RR) and the attributable risk (AR).

Results: PM$_{2.5}$ concentrations were the one primary pollutant that resulted statically significant in the models. The function relationship with hospital admissions was linear and without threshold. The RR for an increase of 25 µg/m$^3$ in PM$_{2.5}$ concentrations was 1.07 (95% CI 1.05 to 1.09) for all causes; for circulatory causes was 1.08 (95% CI 1.03 1.13) and for respiratory causes was 1.07 (95% CI 1.02 to 1.11). The ARs were 6.7%, 7.5% and 6.3% respectively. These values were significantly higher than the results obtained for PM$_{10}$ concentrations.

Conclusions: PM$_{2.5}$ concentrations were the one primary pollutant that showed statically association with hospital admissions in Madrid during the period studied. The RR obtained shows the need to implement the measurements to reduce the concentrations of PM$_{2.5}$ in Madrid.


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Objective: To assess the impact of a change in transport policy on the peak expiratory flow and respiratory symptoms of children.

Results: Compared to many major cities, traffic levels in Oxford were relatively low pre-OTS. Despite these low levels, adjusted regression analyses showed significant improvements in PEF and wheeze post-OTS (PEF: beta = 5.71 l/min, [95% CI 3.23 to 8.18]; wheeze: OR 0.80, [95% CI 0.69 to 0.92]). Improvements in PEF were found to be greater among children living near roads where traffic decreased post-OTS compared to those living where there had been an increase. The association was limited to children currently receiving treatment for asthma and to those in SEC III-V.

Conclusions: These findings suggest that city-wide interventions can lead to improvements to children’s respiratory health. The benefits of these interventions may be most relevant to children already experiencing respiratory problems or come from less affluent socioeconomic backgrounds.
Background: The increasing number of wind turbines has led to a concern with possible adverse effects on people that are exposed to the noise. There is a need to estimate the prevalence of annoyance due to wind turbine noise, identify moderating factors and describe possible health effects.

Method: Two cross-sectional studies were carried out within 12 geographical areas in Sweden that differed with regard to terrain and degree of urbanisation (suburban vs rural), but that all comprised wind turbines of nominal power 600 kW or larger. Subjective responses were obtained by a questionnaire, which purpose was masked (response rate: 60%; n=1095). Doses of wind turbine noise were calculated as A-weighted sound pressure levels (SPLs) outside the dwellings of each respondent (range 25–45 dBA).

Results: A dose-response relationship was found both for perception of the noise (OR 1.4; 95% CI 1.3 to 1.43) and for noise annoyance (OR 1.2; 95% CI 1.1 to 1.39). The risk for annoyance was enhanced among respondents that could see at least one turbine from their dwelling and among those living in rural areas. Sound characteristics related to the amplitude modulation of the sound ("beating") were appraised as the most annoying (swishing, whistling and pulsating/throbbing). Being negative towards the visual impact of the wind turbines on the landscape scenery was strongly associated with annoyance (OR 2.5; 95% CI 3.3 to 7.09). Estimated for SPL, self-reported health impairment was not directly correlated to SPL. Decreased well-being (being strained/stressed, irritable, unusually tired and feeling pain in neck, back or shoulders) was associated with noise annoyance (OR 1.2; 95% CI 1.0 to 1.6; adjusted for SPL). Indications of possible hindrance in psycho-physiological restoration were observed.

Conclusions: Wind turbines are placed in areas with low levels of background noise and the sound comprises an amplitude modulation which makes the noise easy to perceive and also annoying. Wind turbines are furthermore prominent objects, with a rotational movement that attracts the eye. Multimodal sensory effects or negative aesthetic response could enhance the risk for noise annoyance. No direct health effects could be linked to wind turbine noise. However, the exposure could possibly lead to stress-related symptoms due to prolonged physiological arousal and hindrance of restoration.

Background: The evidence for neighbourhood effects on health is mixed, partly because sample sizes from neighbourhoods are often small and because both the health outcome and the measurement of neighbourhood characteristics are based on responses to the same survey. We investigated the relationship between self-rated health and an objective measure of neighbourhood quality in a unique analysis of census records.

Methods: The REAT score; tertile 1 has the best environment and tertile 3 the worst. A linked to the census records. Areas were divided into tertiles based on the Index of Multiple Deprivation. The quality of the built environment in a unique analysis of census records. The increasing number of wind turbines has led to a concern with possible adverse effects on people that are exposed to the noise. There is a need to estimate the prevalence of annoyance due to wind turbine noise, identify moderating factors and describe possible health effects.

Results: A dose-response relationship was found both for perception of the noise (OR 1.4; 95% CI 1.3 to 1.43) and for noise annoyance (OR 1.2; 95% CI 1.1 to 1.39). The risk for annoyance was enhanced among respondents that could see at least one turbine from their dwelling and among those living in rural areas. Sound characteristics related to the amplitude modulation of the sound ("beating") were appraised as the most annoying (swishing, whistling and pulsating/throbbing). Being negative towards the visual impact of the wind turbines on the landscape scenery was strongly associated with annoyance (OR 2.5; 95% CI 3.3 to 7.09). Estimated for SPL, self-reported health impairment was not directly correlated to SPL. Decreased well-being (being strained/stressed, irritable, unusually tired and feeling pain in neck, back or shoulders) was associated with noise annoyance (OR 1.2; 95% CI 1.0 to 1.6; adjusted for SPL). Indications of possible hindrance in psycho-physiological restoration were observed.

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We know the risk of overdose is increased following release from prison, and that methadone maintenance can be protective, but lack evidence for other modalities and risk of overdose immediately following treatment. The VeDette Study is a prospective cohort of 10,454 heroin users recruited in Italy (1998–2002) which can evaluate the impact of a range of treatments (methadone maintenance, detox and psychosocial) on overdose mortality.

Methods: VeDette cohort followed up heroin users for 10,208 person-years in treatment and 2914 person-years out of treatment. We compared overdose mortality for heroin users in and out of treatment using (age and sex) standardised overall mortality ratios (SMR) and hazard ratios (HR), and compared scenario of one month treatment and one month after treatment versus two months no treatment.

Findings: There were 41 overdose deaths, 10 during treatment and 31 out of treatment, giving annual mortality rates of 0.1% and 1.1% and SMR of 3.9 (95% CI 2.8 to 5.4) and 21.4 (16.7 to 27.4) compared to general population respectively. Retention in the range of treatments was protective against overdose mortality (HR 0.09, 95% CI 0.04 to 0.19) independent of treatment type and potential confounders. The month immediately after treatment was the greatest risk for fatal overdose with a mortality rate of 2.3% and HR of 26.6 (95% CI 11.6 to 61.1). After one month the mortality rate was approximately 0.8%. Most of the overdose deaths following detoxification had completed treatment, whereas most of the overdose deaths following methadone maintenance dropped out of treatment. We estimate excess mortality risk of short-term therapies (lasting less than one month) to be 8 per 10,000 or 1 in 1,250 events.

Implications: Treatment for heroin dependence reduces overdose mortality risk. Overdose risk in the period immediately following treatment may be comparable to the risk following prison release. Long-term effectiveness of short-term therapies has been questioned. The study provides evidence that they also may also maybe clinically dangerous. Large scale observational follow-up studies are required in UK and other countries to corroborate and test the findings. Detoxification services should be reviewed, following our conceptualisation of the finding that risk of overdose is higher among treatment completers.

### Psychosocial health

#### Determinants of Subjective Social Position among Retired Men and Women in the Gazel Cohort

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Context: Recent studies have used a subjective measure of social position—subjective because it refers to the perception that an individual has of his/her place in the social hierarchy. In particular, it has been observed that subjective social position (SSP) was essentially determined by occupation, education, household income, satisfaction with standard of living, and controlling for financial security during the last 10 years.

Objective: To examine socioeconomic and health-related factors as determinants of SSP in a population of retired men and women.

Methods: Data used were based on the GAZEL cohort composed by 20,624 volunteers, employed at the French Electricity and Gas company and annually followed up since 1989. 9095 retired men and women aged 50–65 years in 2004 were included for this analysis. SSP was measured using a ladder at 10 levels on which individuals must themselves represent the place they think to have in the social hierarchy. Three categories of determinants were analysed: (1) current socioeconomic factors (occupational grade before retirement, spouse’s occupational situation, household income, household wealth, feeling of financial security, marital status); (2) past socioeconomic factors (occupational grade at entry to the company, educational level, father’s occupational grade, number of financial difficulties in childhood, height); (3) health-related factors (mental health (CESD), number of pathologies). Univariate and multivariate analysis (linear regression) had been used to study relationships between SSP and determinants (by using R² or “percentage of explained variance”).

Results: The univariate part indicated that all determinants analysed were significantly associated with SSP. Determinants explaining the greatest percentage of variance were: occupational grade before retirement (21.9%) and household income (19.4%), followed by educational level (13.7%), occupational grade at entry (13.6%), household wealth (12.7%) and feeling of financial security (11.1%). The global model including all socioeconomic and health-related factors led to 33.7% of explained variance in the ladder. All determinants, except marital status and

#### Risk of Opiate Overdose Death During and Following Specialist Drug Treatment: Results from Vedette Study and Implications for Short-Term Therapies

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Background: Government targets to reduce drug related overdose deaths by 20% in UK from 1999 to 2005 have not been met. The reduction was less than 1%. Specialist drug treatment is critical to overdose prevention.
number of pathologies, remained significantly associated with SSP. Resulted also showed that the six strongest predictors of SSP were in decreasing order: occupational grade before retirement, feeling of financial security, household income, household wealth, occupational grade at entry to the company, number of financial difficulties in childhood. Conclusion: Our study showed that people use mainly current and past socioeconomic criteria to assign themselves SSP.

145 DOES FAMILY PROCESS EXPLAIN FAVOURABLE PSYCHOLOGICAL WELL-BEING SCORES IN ADOLESCENTS FROM MINORITY ETHNIC GROUPS IN THE MRC DASH STUDY?

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Background: Minority ethnic groups in the DASH study have better psychological well-being (measured by Goodman’s strengths and difficulties questionnaire (SDQ)), compared to their White counterparts despite some groups having significantly poorer socioeconomic status (SES). Objectives: To examine (a) the association between family process (how families function) and psychological well-being, taking into account family type and SES, among adolescents from a range of ethnic groups and (b) whether family process accounts for differences in psychological well-being between ethnic groups.

Design: The DASH (Determinants of Adolescent Social well-being and Health) study includes 6632 pupils in 51 London schools. This analysis uses baseline data collected at age 11–13 in 2003. Adolescent psychological well-being is based on the total difficulties score (TDS) obtained from the self-reported 25-item SDQ. Higher scores reflect more difficulties. Family process is based on frequency of time spent in six activities with family: “watch TV”, “play indoor games”, “eat a meal”, “go for a walk”, “visit friends or relatives”, “go other places”. The sample includes 1224 White UK, 926 Black Caribbean, 1073 Black African, 494 Indian and 621 Pakistani/Bangladeshi pupils who completed the SDQ and questions on family type, family process and SES.

Results: Distributions of family activities varied between ethnic groups. For example South Asian participants were more likely, and those of Black Caribbean or African origin less likely, to eat a meal as a family compared to Whites. In multivariate analyses based on the whole sample, all six activity variables were significant correlates of TDS, independent of family type and SES. The largest effect size was for eating a meal together (<weekly compared to everyday occurrence was associated with a significant increase in TDS (regression coefficient 1.65, 95% CI 1.20 to 2.08)). In models stratified by ethnicity family activity-TDS associations varied across groups. For example, eating a meal together (<weekly was associated with higher TDS for all groups except the Black Caribbean. For Black Caribbean only, weekly compared to daily visiting friends and going other places were associated with lower TDS. Adjusting for differences in family activity frequency did not explain the lower TDS in minority groups compared to Whites.

Conclusion: There was ethnic patterning in the frequency and impact of family activities but this did not account for the protective effect of minority ethnicity on self-reported psychological well-being.

146 SOCIOECONOMIC INEQUALITIES IN HEALTH: THE CONTRIBUTION OF PHYSICAL AND PSYCHOSOCIAL WORKING CONDITIONS

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Objectives: To examine physical and psychosocial working conditions as explanations for socioeconomic inequalities in health related functioning (SF-36, PCS).


Setting: City of Helsinki, Finland.

Participants: Municipal employees of the City of Helsinki, aged 40–60 years (n=8627; 7168 women and 1792 men, response rate 67%)

Main Outcome Measures: SF-36, Physical Component Summary (PCS).

Results: There was a clear occupational social class gradient in health-related functioning: poor physical functioning was much more prevalent in the lowest class as compared with the highest class both among women (OR 3.11; 95% CI 2.09 to 4.62) and men (OR 2.42; 95% CI 1.49 to 3.95). Heavy physical workload explained 44% of women’s and half of men’s, overexposure to harmful chemicals and different work environment related exposures explained 11% of women’s and 64% of men’s occupational class gradient in functioning. However, physical working conditions showed bidirectional effects: when computer aided work was taken into account, the class gap widened by 37% for women and by 33% for men.

Conclusions: Working conditions, especially physical working conditions explain a large part of socioeconomic inequalities in SF-36 physical functioning. The bidirectional effects of working conditions on the gradient are also a notable finding. This study shows that in particular physical working conditions should be taken into account in health inequality research since they are likely to explain health inequalities markedly more than psychosocial working conditions.

147 WELL-BEING AND SOCIAL PRODUCTIVE ACTIVITIES IN THE YEARS BEFORE STATE PENSION AGE: RESULTS FROM THE ENGLISH LONGITUDINAL STUDY OF AGEING

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Objective: To explore the association between engagement in social productive activities, such as caring for someone, volunteering and membership in organisations and well-being (measured by quality of life and life satisfaction) for a pre-retirement population, and the extent to which these relationships vary according to rewards from these activities.


Design: Cross-sectional.

Participants: 3247 participants in the years leading up to State Pension Age (aged 52–64 for men or 59 for women) from the English Longitudinal Study of Ageing.

Measures: Main outcomes variables are CASP19 to measure quality of life (range 6–57) and SWLS for Life Satisfaction (range 5–35). The quality of life was measured in terms of experiencing social recognition for the effort spent into the activity. The variables were coded as “No activity”, “Feeling rewarded”, “Not feeling rewarded” for caring and volunteering respectively.

Results: Descriptive analyses showed that volunteering and being active members of an organisation were associated with better quality of life and life satisfaction in both sexes. Among women caring (compared to not caring) was associated with lower quality of life. Multivariate results showed that caring without perceived reward (compared to not caring) was associated with reduced quality of life among men (β = 2.66, 95% CI 4.90 to 0.41) and women (β = 5.21, 95% CI 7.59 to 3.84) and lower life satisfaction among women only (β = 1.28, 95% CI 1.28 to 2.66). Perceived reward in volunteering (compared to not volunteering) was associated with increased quality of life and life satisfaction for women (β = 2.07, 95% CI 0.64 to 3.50 and 1.32, 95% CI 0.18 to 2.46 respectively) and increased quality of life score only for men (2.76, 95% CI 1.51 to 4.02). Active members of an organisation had higher scores of quality of life (men and women) and life satisfaction (men only) compared with others.

Conclusions: Engagement in socially productive activities is related with greater quality of life and life satisfaction. In addition, the quality of the activity—in terms of perceived reward—is also important.