Wednesday 17 September

Parallel session A

Health services research

001 THE IMPACT OF GOVERNMENT-SET TIME TARGETS ON PATIENT CARE AND OUTCOMES: A RETROSPECTIVE ANALYSIS OF ROUTINE DATA

[1]J Freeman, [1,2]S Mason, [2]S Croft, [2]C Yap, [2]S Cross. [1]School of Health and Related Research, University of Sheffield, Sheffield, UK; [2]Emergency Department, Sheffield Teaching Hospitals Trust, Sheffield, UK

Background: Recent government initiatives within the NHS have seen care becoming increasingly target driven. In 2000, the NHS announced a target of 4 h between arrival and discharge or admission for patients in the emergency department (ED); a target of 90% seen within 4 h was set for March 2004 and 98% for January 2005. However, the impact of targets (positive and negative), and particularly those that are based on a time-frame, have not been extensively studied and concerns have been raised about the unintended consequences for patients that might arise from stringent time-related targets. These include the possibility of clinicians making rushed decisions without complete information, resulting in missed diagnoses, unnecessary hospitalisations or revisits to the ED for the same problem, and most recently, of patients queuing in ambulances before admission to the ED.
Objective: To evaluate the effect of the 4-h target on patient care and outcomes.
Design: Retrospective analysis of hospital records data.
Setting: Large urban ED in the north of England.
Participants: Anonymised patient-level data from 560 000 new patient episodes between April 2000 and February 2006.
Main Outcome Measures: Time spent in the ED, mortality, admission rate, one-day hospitalisations, repeat visits to the ED and investigations performed for periods before, during and after the 4-h target.
Methods: Interrupted time-series analysis was used to examine changes in patient outcomes during the study period.
Results: Median time to see a clinician fell from before the target was introduced to after it was established (53 to 37 minutes, $p < 0.001$). Median total ED time also fell (119 to 93 minutess, $p < 0.001$). Overall, the mean number of investigations per patient rose (1.10 to 1.29, $p < 0.001$), as did the proportion of patients being admitted (15.4% to 16.9%, $p < 0.001$). However, there was a decrease in the proportion of patients who did not wait (5.7% to 3.6%, $p < 0.001$). There was no change in ED mortality ($p = 0.45$).
Conclusions: The introduction of time targets into the emergency care setting has been associated with changes in patient care within the ED. Overall, patients are seen more quickly, spend less time in the ED, are more likely to be admitted to hospital and more likely to have an investigation during their stay. Although this may be true for the majority of patients, further work is needed to see whether these changes benefit all patient groups.

002 CRITICAL REFLECTIONS ON THE RISE OF QUALITATIVE RESEARCH IN HEALTH SERVICES RESEARCH

[1]C Pope, [2]N Mays. [1]School of Nursing and Midwifery, University of Southampton, Southampton, UK; [2]Health Services Research Unit, London School of Hygiene and Tropical Medicine, London, UK

In September 1991, at the 35th Society for Social Medicine Annual meeting (coincidentally also in Southampton) we presented a paper entitled "Opening the black box: the future of HSR". With some trepidation, we delivered our thoughts about the place of qualitative research in health services research (HSR) using a Socratic dialogue—between a fictitious director of a health services research unit and a more junior sociologist. We sought to stimulate debate about the dominance of the experimental method and to suggest that qualitative methods had much to offer HSR and should be taken more seriously.

In the intervening years qualitative research methods have become mainstream in HSR and some areas of medical research. Qualitative research is often incorporated into randomised controlled trials to inform trial design, to evaluate process and to explore whether interventions are acceptable and feasible. Major UK funding programmes, including the National Institute for Health Research and the Medical Research Council, have encouraged and supported qualitative and mixed (combined qualitative and quantitative) method studies. Clinical and HSR journals have become more willing to publish qualitative studies, sometimes allowing greater word limits for this text-based research. They have also helped develop clearer guidance for peer review to ensure that qualitative research is judged appropriately. More recently, alongside the systematic review and meta-analysis of quantitative research evidence, we have begun to explore ways of integrating and synthesising the findings of qualitative research using methods such as narrative synthesis and meta-ethnography.

It would appear that the fictitious "Pandora" (the sociologist in our dialogue) has won her argument: qualitative research is established and accepted in HSR. However, like her namesake in Greek myth, she is not quite sure this is the outcome she anticipated. Our paper picks up where we left off 17 years ago, to evaluate, critically, how far qualitative research has come in HSR. We ask some searching questions about whether we are utilising its full potential to inform and improve health service organisation and the delivery of care. In particular, we take a hard look at the quality of qualitative research, the dominance of interviews, the limits to thematic analysis, the rise of "mixed up" methods and the challenges for qualitative synthesis.

003 TRENDS AND INEQUALITIES IN CORONARY REVASCULARISATION FOLLOWING THE INTRODUCTION OF THE NATIONAL SERVICE FRAMEWORK

DG Cook, IM Carey, S DeWilde, PH Whincup. Division of Community Health Sciences, St George's, University of London, London, UK

Background: During the 1990s there were marked inequities in coronary revascularisation rates by age, region and social deprivation. Although overall coronary revascularisation rates have risen following National Service Framework investment, whether inequities have been reduced remains unknown.
Aim: To assess trends in coronary revascularisation rates in the United Kingdom by age, sex, socioeconomic position and area between 1995 and 2005.
Design: Observational study of a large computerised database of primary care records.
Setting: 188 practices contributing to the DIN–LINK database.
Subjects: Fully registered patients 30 years and older—597 020 in 1995, 871 017 in 2005.
Main Outcome: First coronary revascularisation in a given year—544 in 1995, 1375 in 2005. Odds ratios (OR) were adjusted for age, sex, practice (fitted as a random effect) and for clinical need (presence and severity of existing coronary heart disease and diabetes).
Key Exposures: Age, region defined as the south, midlands (including Wales) and north (including Scotland) and socioeconomic

status based on the A classification of residential neighbourhoods (ACORN) score.

Results: Revascularisation rates rose from 0.91/1000 in 1995 to 1.58/1000 in 2005. Rates were lower in older subjects throughout, but the age differential steadily declined; the OR for 70–79 versus 60–69 year olds rose from 0.49 (95% CI 0.39 to 0.62) in 1995 to 0.73 (95% CI 0.63 to 0.83) in 2005. In contrast sex, social and geographical differences remained constant between 1995 and 2005. Men were more likely to have a coronary revascularisation than women; in 1995 OR 2.12 (95% CI 1.67 to 2.68); in 2005 OR 2.19 (95% CI 1.92 to 2.50). The most socially deprived group had lower revascularisation rates when compared with the least deprived group both in 1995 (OR 0.71; 95% CI 0.53 to 0.96) and in 2005 (OR 0.73; 95% CI 0.60 to 0.90). After adjusting for social differences, the north and the midlands had lower rates compared with the south both in 1995 (north OR 0.74; 95% CI 0.56 to 0.98), midlands OR 0.63 (95% CI 0.49 to 0.82) and in 2005 (north OR 0.71; 95% CI 0.58 to 0.86), midlands OR 0.90 (95% CI 0.73 to 1.11). These patterns were apparent both for emergency and elective revascularisations.

Conclusions: After adjustment for clinical need, coronary revascularisation rates showed persistent age and gender-related, regional and social inequities. These differences were stable over the past decade and unaffected by the government injection of cash into revascularisation services and the steady rise in revascularisation rates.

Methods I

004 REPRESENTING TRAJECTORIES OF SOCIAL LOCATION OVER THE LIFECOURSE: A CHALLENGE AND A PROPOSED SOLUTION

[1]J Walker, [2]R Mitchell, [1]S Platt, [3]D Blane. [1]*Research Unit in Health, Behaviour and Change, The University of Edinburgh, Edinburgh, UK;* [2]*Section of Public Health and Health Policy, The University of Glasgow, Glasgow, UK;* [3]*Division of Epidemiology, Public Health and Primary Care, Imperial College, London, UK*

Background: The near-ubiquity of social inequalities in health has long been recognised and extensively investigated. However, many studies in this field have been based on data that represent the individual's socioeconomic status at a single point in time (eg, adulthood) or at a small number of widely spaced discrete time points (eg, childhood, early adulthood and late adulthood). Such "sparse" sampling may mask changes or fluctuations in subjects' social position that occur between sampling points, potentially leading to the associations between a person's true social location over time and health being incorrectly estimated.

Objectives: To illustrate the diversity and complexity of individuals' trajectories of social location over the age range 15–60 years. To propose a method for reducing the diverse range of observed trajectories into a smaller number of higher-level patterns, thus facilitating the investigation of associations between social location and health status in later life.

Design: Retrospective longitudinal study.

Setting: United Kingdom.

Population: Men and women aged 63–78 years.

Results: Among the 294 individuals studied, a total of 216 unique trajectories were identified when the subject's social location at each individual year in the age range 15–60 years was defined as either manual, non-manual, unemployed or engaged in Armed Forces service. When sampling was restricted to every fifth year in the age range 15–60 years (10 datum points), a total of 122 unique trajectories of time-related social position was observed. Reducing the state space (by combining the manual and Armed Forces states) resulted in a small reduction in the number of trajectories identified. A data reduction process based on optimal matching (to derive statistical distances between trajectories) followed by cluster analysis (to identify natural groupings in the trajectories) was

developed. Application of this process reduced the 122 unique 5-year trajectories to 13 clusters. However, interpretation of the resulting cluster scheme was problematic.

Conclusions: Life-time trajectories of social position, when examined at the single or 5-year level, exhibit considerable diversity and variety. Such detailed variation may not be accurately captured in studies that consider a person's social status only at a small number of discrete time points. Current interest in life-course explanations of health inequalities may demand more detailed representations of subjects' life-time social position than have generally been used hitherto. Further research is required into techniques for reducing large sets of unique social trajectories into more compact higher-level schemes, to permit effective analysis.

005 LATENT CLASS REGRESSION ANALYSIS OF COLORECTAL CANCER DATA

[1]WJ Harrison, [1]A Downing, [1]MS Gilthorpe, [1,2]D Forman, [1]RM West. [1]*Centre for Epidemiology and Biostatistics, University of Leeds, Leeds, UK;* [2]*Northern and Yorkshire Cancer Registry and Information Service, St James' University Hospital, Leeds, UK*

Objective: We aim to use latent class analysis (LCA) to explore the relationship between mortality from colorectal cancer and various risk factors (area deprivation, sex, age at diagnosis).

Data and Methods: We use a dataset of patients in a large UK regional population diagnosed with colorectal cancer between 1991 and 2004. Two-year survival (alive/dead) is taken as the outcome for ease of comparison with other studies. Survival and the impact of associated risk factors may vary according to both place of diagnosis (hospital) and stage at diagnosis. As patients are clustered by diagnostic centres that are not strictly a random sample, standard multilevel modelling may be inappropriate. By employing LCA at the hospital level we effectively generate a "semi-parametric" multilevel model. Standard regression models may give rise to biased results when model covariates (such as stage) are measured with error or have missing values, or when covariates (such as stage) lie on the causal path, due to the reversal paradox. To attempt to minimise these biases, we use stage as a class predictor only. The resultant patient classes will have a graduated survival analogous to those observed for different stages of disease. We may then examine how survival varies across hospital classes. LCA models were explored comparing log-likelihood statistics and misclassification rates.

Results: Three subject classes and two hospital classes were chosen to provide a balance between misclassification error and parsimony. The subject classes identified one group as the poor survivors, corresponding to late stage diagnosis. Of the two other classes, one had good survivors and the other very good survivors. The risk profiles by sex differed across the classes, as did age at diagnosis. The deprivation profiles did not differ across the classes and it can be seen that for both classes, as deprivation increases, the odds of survival decrease.

Conclusions: The latent group structure was informative: the model suggests that there is a typology of patients and a typology of hospitals. By allocation of patients to hospital types that match their profile there might be opportunity to optimise patient care. This analytical strategy has considerable prognostic utility to inform health service providers of disparities within patient care.

006 COMPOSITIONAL AND CONTEXTUAL EFFECTS OF EARLY LIFE ON ADULT HEALTH: FINDINGS FROM THE ABERDEEN CHILDREN OF THE 1950S STUDY

R Dundas, AH Leyland, S Macintyre. *MRC Social and Public Health Sciences Unit, Glasgow, UK*

Objective: To examine the effect of individual and neighbourhood childhood factors on adult health.

Design: Multilevel cross-classified historical cohort study.

Setting: Aberdeen, United Kingdom.

Participants: 6640 respondents (81% of eligible sample) to a follow-up questionnaire (3144 men, 3496 women; mean age at follow-up 47 years) born in 1950–6 and resident in Aberdeen in 1962.

Main Outcome Measure: Poor self-reported health.

Methods: Neighbourhood was defined as enumeration district in the 1961 Census. Cross-classified multilevel modelling was used to account for the effect of neighbourhood of residence and primary school attended on adult self-reported health. Model A (composition) examined individual childhood risk factors: age, sex, parents owning home and overcrowding. Model B (context) examined neighbourhood variables: percentage of home owners in neighbourhood and percentage of homes in neighbourhood with own amenities (hot and cold water, bathroom and WC) in 1961. Model C (combined) examined the combined individual and neighbourhood effect on adult self-rated health.

Results: There was little variation across neighbourhoods in the proportion of adults reporting poor self-rated health; intraclass correlation coefficient (ICC) is 0.007. Higher ICC were found for individual childhood factors: parents owning home (0.369) and overcrowding (0.077). Both childhood individual and neighbourhood lack of home ownership were associated with poor adult self-reported health: model A (composition), odds ratio (OR) for individuals whose parents owned their home 0.65 (95% CI 0.53 to 0.79); model B (context), for a 10% increase in the proportion of households that were owner occupied the OR of reporting poor self-rated health in adults was 0.91 (95% CI 0.89 to 0.94). When both individual and neighbourhood characteristics were combined (model C), the effect of individual home ownership on poor self-rated health became non-significant (OR 0.80; 95% CI 0.63 to 1.03) but the effect of neighbourhood, although attenuated, remained significant: for a 10% increase in the proportion of households that were owner occupied in a neighbourhood the OR of reporting poor self-rated health in adults was 0.95 (95% CI 0.90 to 0.99). Paternal social class was significantly associated with adult self-rated health (p<0.001) and attenuated the effect of the individual factors but the effect of neighbourhood amenities remained significant (p = 0.03).

Conclusions: Both childhood individual and neighbourhood factors affected adult health, but the effect of some individual factors disappeared when neighbourhood factors were taken into account. It would seem that both context and composition in early life are important for adult health.

Assault and self-harm

007 **THE SOCIAL PATTERNING OF DEATH DUE TO ASSAULT IN SCOTLAND: POPULATION-BASED STUDY**

AH Leyland, R Dundas. *MRC Social and Public Health Sciences Unit, Glasgow, UK*

Background: Death due to assault has been increasing in Scotland, with the mortality rate for men increasing by 83% between 1981 and 2001.

Objective: To examine the extent to which death due to assault is socially patterned.

Setting: Scotland, population 5.1 million.

Main Outcome Measures: Deaths due to assault (International Classification of Diseases (ICD) version 9 E960–969; ICD10 X85–Y09, Y87.1).

Methods: Analysis of death records 1981–2005 (including age, sex, social class and area of residence), census data (providing populations), Carstairs scores and Scottish index of multiple deprivation (area-based deprivation measures). Mortality rates were standardised to the European standard population. Inequalities, overall and cause-specific, are assessed using the slope index of inequality.

Results: The sharp increase in mortality due to assault was most pronounced at ages 15–44 years and was steeper among assaults involving the use of knives and other sharp weapons. By 2005 assault accounted for 3–5% of all male deaths at these ages; approximately two-thirds of these deaths were caused by knives. In 2001, among men aged 20–39 years the mortality rate due to assault in routine occupations (29% of this population) was 11 times that in managerial and professional occupations (17% of the population); at ages 40–59 years the rate was nine times as high. In routine occupations the male mortality rate at ages 20–59 years (13 per 100 000) was approximately equivalent to the mortality rate due to colorectal cancer (15 per 100 000) and half the mortality rate due to cerebrovascular disease (26 per 100 000). Men under 65 years living in the most deprived 20% of areas had a mortality rate due to assault (11 per 100 000) nearly 40 times that of those living in the least deprived 20%. By 2001 assault accounted for 11% of the total inequalities in male mortality at ages 15–19 years, 17% at ages 20–24 years and 4–6% at ages 25–44 years.

Conclusions: Mortality due to assault shows a strong social patterning, both by individual occupational status and possibly more so by the deprivation level of the area of residence. The low overall mortality rates from assault mask the extent of the problem among particular groups in which rates are comparable to those from "mainstream" causes of death. Despite contributing few deaths in total, assault is a major contributor to inequalities in deaths among young men.

008 **DELIBERATE SELF-HARM AND SUICIDE: GENDER-SPECIFIC TRENDS IN EIGHT EUROPEAN REGIONS**

[1]E Arensman, [2]T Fitzgerald, [3]T Bjerke, [4]J Cooper, [1]P Corcoran, [5]D De Leo, [6]O Grad, [7]K Hawton, [8]H Hjelmeland, [4]N Kapur, [2]I Perry, [9]E Salander-Renberg, [10]K Van Heeringen. *[1]National Suicide Research Foundation, Cork, Ireland; [2]Department of Epidemiology and Public Health, University College Cork, Cork, Ireland; [3]Lillehammer College, Lillehammer, Norway; [4]Department of Psychiatry, University of Manchester, Manchester, UK; [5]Departmemt of Psychiatry, Griffith University, Brisbane, Australia; [6]University Psychiatric Hospital and Medical School, University of Ljubljana, Ljubljana, Slovenia; [7]Department of Psychiatry, University of Oxford, Oxford, UK; [8]Norwegian University of Science and Technology, Trondheim and Norwegian Institute of Public Health, Oslo, Norway; [9]Department of Psychiatry, Umea University, Umea, Sweden; [10]Department of Psychiatry, Gent University, Gent, Belgium*

Objective: The Network for International Collaboration on Evidence in Suicide Prevention (NICE–SP) has conducted an international comparative study to examine time trends in deliberate self harm (DSH) and suicide in eight different European regions and how rates of DSH at the regional level and national suicide rates co-vary in each region.

Design: Prospective study. Across the regions, the monitoring period ranged from 6 (1998–2003) to 14 years (1989–2003). Standard registration forms were used to collect information on demographic variables and self-harm characteristics.

Setting: Eight regions in six European countries.

Participants: Patients aged 15 years and over presenting to general hospitals following DSH in defined catchment areas. Data on suicides were obtained from national statistics offices in the individual countries.

Results: The international database comprised over 44 000 DSH episodes. Trends in DSH rates over time varied considerably across the different European regions and by gender. Based on rolling averages, DSH rates per 100 000 for women were consistently higher than for men, with the highest rates in Manchester (580.9), Oxford (416.0) and Gent (305.7), and the lowest rates in Sor-Trondelag (148.4), Umea (128.6) and Ljubljana (71.9). The two Irish regions showed intermediate DSH rates, with 266.2 in Limerick and

216.5 per 100 000 in Cork. With the exception of Ljubljana, similar trends over time were found for female and male DSH rates. Based on average annual DSH rates at the regional level and average annual suicide rates at the national level, a similar ranking was found for female and male DSH rates across the European regions. Looking across countries, a significant correlation (Spearman's rank correlation) was found between the rate of change in suicide rates nationally and DSH rates over time for men (r = 0.71, p<0.05).

Conclusions: Although DSH rates vary considerably between European countries, regional DSH rates and national suicide rates follow similar trends over time in both men and women. An increase in DSH may thus be accompanied by an increase in suicide, in particular among men. Based on the study outcomes, it is recommended that prevention programmes target both forms of suicidal behaviour.

009 | THE IMPACT OF RESTRICTED AVAILABILITY OF PARACETAMOL AND DISTALGESIC ON INTENTIONAL DRUG OVERDOSE PRESENTATIONS TO HOSPITAL IN IRELAND

[1]P Corcoran, [1]JE Lutomski, [1]E Arensman, [2]IJ Perry. [1]*National Suicide Research Foundation, College Road, Cork, Ireland;* [2]*Department of Epidemiology and Public Health, University College, Cork, Ireland*

Background: Intentional drug overdose is the most common method of deliberate self-harm that presents to hospital emergency departments. In October 2001, Irish legislation was enacted to restrict the availability of paracetamol in pharmacies and general retail outlets. The restrictions have gradually been implemented and enforced since that time. In January 2006, distalgesic, a prescription analgesic compound of paracetamol and dextropropoxyphene, was withdrawn from the Irish market.

Objectives: To examine the incidence and pattern of intentional drug overdose presentations to Irish hospitals and assess the impact of the legislation that restricted the availability of paracetamol and the withdrawal of distalgesic from the Irish market.

Methods: As part of the Irish National Registry of Deliberate Self-Harm, data were collected on intentional drug overdose presentations to Ireland's hospital emergency departments over the period 2002–7. The drug name and number of tablets involved in the overdose act were recorded. Data relating to the availability of paracetamol-containing drugs through pharmacy and retail outlets in Ireland were also obtained.

Results: Intentional drug overdose accounted for approximately 75% of the 10 500 deliberate self-harm presentations to hospital emergency departments each year. Whereas minor tranquillisers were the most common type of drug taken (~40%), each year paracetamol-only and paracetamol-compound drugs were involved in approximately 20% and 10% of overdose acts, respectively. The proportion of drug overdose presentations involving paracetamol in some form did not decrease significantly after the enactment of the legislation. In contrast, the withdrawal of distalgesic resulted in a sharp decrease in its involvement in overdose acts, from approximately 400 cases annually in 2002–5 to 40 in 2007. In general, more tablets were taken in overdose acts involving paracetamol. However, there was some evidence that the number of tablets in such acts decreased in parallel with the gradual enforcement of the legislation restricting the availability of paracetamol.

Conclusions: The withdrawal of distalgesic from the Irish market has, as one would have expected, greatly reduced the frequency of its use in intentional drug overdose acts presenting to hospital. The legislation restricting the availability of paracetamol has had a limited effect. Consideration should be given to restricting the availability of minor tranquillisers.

The environment and health

010 | CHANGES IN ENVIRONMENTAL TOBACCO SMOKE EXPOSURE OVER A 20-YEAR PERIOD: CROSS-SECTIONAL AND LONGITUDINAL ANALYSES

[1]BJ Jefferis, [1]AG Thomson, [1]LT Lennon, [2]C Feyerabend, [2]M Diog, [2]L McMeekin, [1]SG Wannamethee, [3]DG Cook, [3]PH Whincup. [1]*British Regional Heart Study, UCL Department Primary Care and Population Sciences, Royal Free and University College Medical School, London, UK;* [2]*ABS Laboratories, London, UK;* [3]*Division of Community Health Sciences, St George's, University of London, London, UK*

Objective: To examine long-term changes in environmental tobacco smoke (ETS) exposure in British men over a 20-year period (1980–2000), using serum cotinine (a stable metabolite of nicotine that is an accurate marker of tobacco exposure).

Design: Prospective cohort of men: British Regional Heart Study.

Setting: General practices in 24 towns in England, Wales and Scotland.

Participants: Non-smokers, including 2125 studied at baseline (Q1: 1978–80), 3046 studied 20 years later (Q20: 1998–2000) and 1208 studied at both times. Men were coded as non-smokers using reported smoking history and cotinine (<15 ng/ml) at both surveys.

Outcome Measures: ETS exposure assessed through serum cotinine measurement.

Results: In cross-sectional analysis, the geometric mean cotinine level declined from 1.36 ng/ml (95% CI 1.31 to 1.42) at Q1 to 0.19 ng/ml (95% CI 0.18 to 0.19) at Q20. The prevalence of cotinine levels below the level of detection rose from 0.002% at Q1 to 27.8% at Q20. Manual social class and northern region of residence were associated with higher mean cotinine levels both at Q1 and Q20; older age was associated with lower cotinine exposure at Q20 only. Spouse smoking and exposure to cigarette smoke in the home were associated with elevated cotinine levels at Q20. Among 1208 persistent non-smokers, cotinine fell by −1.47 ng/ml (95% CI −1.57 to −1.37), a decline of 86%. Absolute falls in cotinine were greater among men in manual occupational groups, in the midlands and Scotland compared with southern England, although the percentage decline in cotinine was very similar in all groups.

Conclusion: Marked declines in passive tobacco exposure occurred between 1980 and 2000, even before the legislative ban on smoking in public places. By 2000, although most non-smokers still had detectable serum cotinine levels, most had cotinine levels below those associated with health risks. Men with the highest ETS exposure were living with a spouse who smoked, or outside southern England, of younger age and in manual occupations. These groups should be the focus of preventive health efforts.

011 | BEST AVAILABLE EVIDENCE ON HOUSING IMPROVEMENT AND HEALTH: A SYSTEMATIC REVIEW

[1]H Thomson, [1]S Thomas, [2]E Sellstrom, [3]M Petticrew. [1]*MRC Social and Public Health Sciences Unit, Glasgow, UK;* [2]*Department of Health Sciences, MidSweden University, Ostersund, Sweden;* [3]*London School of Hygiene and Tropical Medicine, London, UK*

Background: In 2001 a systematic review identified 18 studies that had assessed the health impacts of housing improvement. Since then completion of a number of quasi-experimental housing studies indicate that the quality and quantity of available evidence is increasing and it is now timely to re-examine the strength of research evidence in this field.

Aim: To review the best available evidence from intervention studies that can shed light on whether or not housing improvements can lead to health improvements.

Methods: A systematic review of housing intervention studies. Thirty-four scientific and "grey" literature databases were searched (1872–2007) and experts were contacted to identify relevant

studies. Studies were assessed independently by two reviewers for risk of bias to identify those with the least risk of bias as best available evidence.

Results: Forty-three studies were identified. Twenty-one studies had "minimal" or "some" sources of bias and were synthesised narratively reflecting study quality. Sixteen of these studies were completed since the 2001 review. Improvements in general, respiratory, and mental health were reported following warmth and energy efficiency improvements. These impacts were particularly marked in two randomised controlled trials set in New Zealand, whereas impacts in eight UK studies were less apparent. Warmth improvements were associated with increased usable space, increased privacy and improved social relationships; absences from work or school due to illness were also reduced. Some small improvements in general and mental health were reported following housing-led neighbourhood renewal (n = 7 studies). There is little evidence of deterioration in health status following housing improvement.

Discussion: The quality and quantity of evidence for healthy housing investment has increased substantially since 2001. Warmth and energy efficiency interventions that target vulnerable individuals living in poor housing are most likely to lead to health improvements. The health impacts of programmes that target areas rather than individual household need are less clear. Immediate health impacts following housing improvement are difficult to detect, but improved housing conditions may have important socioeconomic impacts that may consequently facilitate better health in the long term.

---

012 | **THE AFTERSHOCK OF DE-INDUSTRIALISATION: TRENDS IN MORTALITY IN SCOTLAND AND OTHER PARTS OF POST-INDUSTRIAL EUROPE**

[1]D Walsh, [2]M Taulbut, [3]P Hanlon. [1]Glasgow Centre for Population Health, Glasgow, UK; [2]NHS Health Scotland, Glasgow, UK; [3]Department of Public Health and Health Policy, University of Glasgow, Glasgow, UK

Background: Post-industrial decline (and its many associated factors) is frequently cited as one of the major underlying reasons behind the poor health profile of Scotland and, especially, the west of Scotland. This begs the question of how have other post-industrial areas in Europe fared in respect of recent health trends?

Objectives: To identify regions in Europe that are comparable to Scotland (and especially the west of Scotland) on the basis of a similar history of industrialisation and subsequent de-industrialisation. As a first stage in the project, to analyse long-term trends in mortality for a range of causes.

Methods: Regions were identified through consultation with experts in the fields of European history and public health, backed up by analysis of trends in European industrial employment data. Mortality and population data were requested from regional statistical agencies, from which comparable mortality rates and other related statistics were calculated. Additional analyses of potentially influential factors (eg, socioeconomic measures, severity of de-industrialisation) were also undertaken.

Results: Twenty regions were identified, 13 in mainland Europe (within Germany, France, Belgium, The Netherlands, Poland, Czech Republic) and seven within the United Kingdom. Data were obtained for all but one of the regions, and in most cases for a 20–25-year period. Interesting patterns emerged from comparisons of different causes of death, especially among younger male and middle-aged female populations. Generally, mortality rates appear to be improving at a faster rate in the European regions compared with Scotland (and particularly the west of Scotland), even in areas that appear comparatively worse in terms of socioeconomic characteristics.

Conclusions: Health in comparable post-industrial regions appears to be improving faster than in Scotland and, especially, the west of Scotland. Contrasting trends for specific causes of death (eg, alcohol-related, suicide) are of concern and may point to valuable lessons that could be learned from elsewhere in Europe. It is hoped that the project's next stages of data collation/analysis will help explain these trends further. In the meantime a valuable dataset has been created that will be of interest to those in the many post-industrial regions of Europe.

Older people I

013 | **THE INFLUENCE OF CHRONIC KIDNEY DISEASE ON HIP FRACTURE-RELATED MORTALITY IN OLDER PEOPLE**

[1]A Mylne, [1]D Nitsch, [2]P Roderick, [1]L Smeeth, [3]R Hubbard, [1]A Fletcher. [1]Department of Epidemiology, London School of Hygiene and Tropical Medicine, London, UK; [2]Public Health Sciences and Medical Statistics, University of Southampton, Southampton, UK; [3]Department of Clinical Epidemiology, University of Nottingham, Nottingham, UK

Background: Severe chronic kidney disease (CKD) is associated with mineral disorders that can result in pathological bone structure and an increased risk of falling from co-morbidity and therapy. The clinical significance is unclear especially in older people who not only have a high prevalence of osteoporosis and a high incident hip fractures rate but also a high prevalence of CKD.

Objective: To examine whether CKD at older ages is associated with hip fracture-related mortality.

Methods: Cohort study of people aged 75 years and over participating in a cluster randomised trial of health and social assessment of older people in the community between 1994 and 1998 in the United Kingdom. There were 13 177 (87%) participants in 53 general practices who had serum creatinine measured in local laboratories at baseline. CKD was assessed by the estimated glomerular filtration rate (eGFR) in ml/min per 1.73 m^2, derived using the modification of diet in renal disease formula. Analyses are based on deaths up to the end of November 2005 for any reported hip fracture based on International Classification of Diseases codes on the death certificate sent to the Office for National Statistics. We used propensity scores to adjust appropriately for all potential confounders (relating to both falls risk and bone structure) in Cox regression models.

Results: There were 84 hip fracture-related deaths over 84 117 person-years of follow-up, a median follow-up of 7.3 years (interquartile range 3.8 to 8.8). Compared with an eGFR greater than 60 ml/min per 1.73 m^2, the age and sex-adjusted hazard ratios for hip fracture-related mortality for eGFR 45–59 and less than 45 ml/min per 1.73 m^2 were 1.06 (95% CI 0.71 to 1.58) and 1.97 (1.12 to 3.50), respectively. The fully adjusted hazard ratio using propensity scores for participants with an eGFR less than 45 ml/min per 1.73 m^2 compared with those with an eGFR of 45 ml/min per 1.73 m^2 or greater was 1.81 (1.11 to 2.94).

Conclusions: Among older people, an eGFR of less than 45 ml/min per 1.73 m^2 (stage 3b–5 CKD on international classification) is independently associated with a nearly twofold increase in hip fracture-related mortality. The extent to which this is due to a higher incidence of hip fracture or of case-fatality or both requires further study.

---

014 | **ASSOCIATION BETWEEN GRIP STRENGTH AND CARDIOVASCULAR DRUG USE IN OLDER PEOPLE: FINDINGS FROM THE HERTFORDSHIRE COHORT STUDY**

[1]TA Ashfield, [2]HE Syddall, [2]HJ Martin, [2]EM Dennison, [2]C Cooper, [1,2]A Aihie Sayer. [1]Academic Geriatric Medicine, University of Southampton, Southampton, UK; [2]MRC Epidemiology Resource Centre, University of Southampton, Southampton, UK

Background: Lower grip strength in older people is associated with major adverse health consequences and there is interest in identifying modifiable influences. Cardiovascular drugs are

commonly prescribed in later life but their effect on muscle strength is not known.

Objective: To determine whether grip strength in older people is associated with the use of cardiovascular drugs.

Design/Participants: Cross-sectional study of 1572 men and 1415 women aged 59–73 years, resident in Hertfordshire, UK, who completed a home interview and attended a clinic. Exposure and outcome variable: the use of individual cardiovascular drugs was recorded at interview and grip strength was measured at clinic.

Results: 45% of participants were taking at least one cardiovascular system drug and after adjustment for age, height, history of stroke, presence of ischaemic heart disease, diabetes and hypertension there were decreases in grip strength of 2.02 kg in men (b 95% CI 0.32 to 3.72, p = 0.02) and 3.36 kg in women (95% CI 1.55 to 5.18, p<0.01) taking nitrate drugs and 2.35 kg in men (95% CI 0.04 to 4.67, p = 0.05) and 1.75 kg in women (95% CI 0.28 to 3.22, p = 0.02) taking furosemide. Using similar adjustment, women taking calcium antagonists (b 1.06 kg, 95% CI 0.03 to 2.10, p = 0.04) and fibrate drugs (b 3.25 kg, 95% CI 0.36 to 6.15, p = 0.03) also had impaired grip strength. Nitrate drugs in both men and women and fibrate drugs in women remained associated with impaired grip strength after further adjustment for physical activity (walking speed). Statins, which are known to have potential adverse effects on skeletal muscle, did not have any significant associations with grip strength in either sex.

Conclusions: Nitrates, furosemide, calcium antagonists and fibrates are associated with reduced grip strength. This may be partly explained by co-morbidity, but the literature indicates that nitrates and fibrates may have direct effects on skeletal muscle. These findings have potential implications for the health and function of older people treated with these drugs, but experimental and longitudinal studies are needed to investigate further possible causal relationships.

---

015 | **THE SOCIOECONOMIC STATUS OF OLDER PEOPLE: IS HOUSE VALUE A USEFUL INDICATOR?**

S Connolly, D O'Reilly, M Rosato. *Department of Epidemiology and Public Heath, Queen's University Belfast, Belfast, Northern Ireland, UK*

Objectives: There has been relatively little research into inequalities in health in older populations. This may be partly explained by the difficulty in identifying appropriate indicators of socioeconomic status in older people. Traditional indicators such as car access, education, housing tenure and social class all suffer from particular problems when applied to older populations. A possible alternative indicator of socioeconomic status for older populations is the value of their house, which is in keeping with the lifecourse approach and should reflect, to some extent, cumulative wealth. This paper addresses the question of whether house value is a useful indicator of socioeconomic status in people aged over 65 years by examining whether it predicts subsequent mortality.

Design: Longitudinal study of people aged 65 years and over.

Subjects: 164 889 people aged 65 years and over, enumerated in the Northern Ireland 2001 Census and not living in communal establishments.

Main Outcome Measure: 34 413 deaths between 2001 and 2006 were analysed by capital value of residence of property while controlling for other demographic, health, socioeconomic and area characteristics.

Results: Capital value of residence was highly correlated with other indicators of socioeconomic status, such as car access and health (limiting long-term illness and general health). Combining information on house value and tenure confirmed that all owner-occupiers, regardless of house value, had a lower likelihood of death in the follow-up period than social renters. In a model adjusted for sociodemographic, socioeconomic and health status there was a

moderate reduction in mortality risk with increasing house value for those aged between 65 and 74 years; however, the gradients for the over 75s were less apparent.

Conclusions: This analysis suggests that house value does not significantly contribute to the current limited range of socioeconomic indicators in older populations. Given that most people now die over the age of 75 years more work is needed to identify appropriate indicators of socioeconomic status in older people.

Thursday 18 September

Parallel session B

Cardiovascular disease: risk factors

016 | **MULTIPLE RISK FACTOR INTERVENTION FOR CARDIOVASCULAR DISEASE: UNCERTAINTY REMAINS**

[1]KJ Ward, [1]FC Taylor, [2]A Beswick, [2]M Burke, [2]G Davey Smith, [1]S Ebrahim. [1]*Non-communicable Disease Epidemiology Unit, London School of Hygiene and Tropical Medicine, London, UK;* [2]*Department of Social Medicine, University of Bristol, Bristol, UK*

Background: It is widely believed that multiple risk factor intervention using counselling and educational methods is efficacious, cost-effective and should be expanded. Programmes in many countries use such methods as part of their strategy to reduce mortality and morbidity due to coronary heart disease (CHD). Randomised controlled trials of multiple risk factor interventions have been conducted and require systematic review.

Objectives: To assess the effects of multiple risk factor intervention for reducing CHD mortality, morbidity and cardiovascular risk factors in adults without clinical evidence of established cardiovascular disease.

Methods: An earlier Cochrane systematic review was updated by searching the Cochrane Central Register of Controlled Trials, MEDLINE and EMBASE to 2006. Randomised trials using counselling and/or education to modify more than one cardiovascular risk factor in adults from general populations, occupational groups, or high-risk groups were included. Trials of less than 6 months' duration were excluded. Data were extracted by two reviewers independently. Investigators were contacted to obtain missing information.

Results: A total of 55 trials (over 60 000 subjects) was found, of which 14 reported clinical event data. In the 14 trials with clinical event outcomes, the pooled relative risk for CHD mortality was 0.93 (95% CI 0.87 to 1.00, p = 0.06, I^2 = 43%). Non-fatal cardiovascular events showed considerable heterogeneity of effect and were only reported for half the studies reporting fatal events. Net changes in systolic and diastolic blood pressure and blood cholesterol were (weighted mean differences) −2.71 mm Hg (95% CI −3.49 to −1.93 mm Hg), −2.13 mm Hg (95% CI −2.67 to −1.58 mm Hg) and −0.24 mmol/l (95% CI −0.32 to −0.16 mmol/l), respectively. Odds of reduction in smoking prevalence was 9% (95% CI 1% to 17%). Marked statistical heterogeneity was found between the studies with respect to cardiovascular risk factor outcomes and was largely due to greater effects in trials of hypertensive participants.

Conclusions: Contrary to expectations, multiple risk factor interventions had little or no impact on the risk of CHD mortality but did appear to reduce risk factors. Explanations for this paradox are that these small risk factor changes were not maintained long term or that the small falls in risk factors may have been caused by biases in some of the studies. The methods of attempting behaviour change in the general population are limited and do not appear to be effective. Different approaches to behaviour change are needed and should be tested empirically before being widely promoted.

017 A RANDOMISED CONTROLLED TRIAL TO EVALUATE THE IMPACT OF EARLY HEALTH EDUCATION AND RISK FACTOR ADVICE FOR PATIENTS WITH UNSTABLE ANGINA

[1]K Roche, [1]J Goodfellow, [1]C Jones, [2]R West. [1]*Princess of Wales Hospital, Bridgend, UK;* [2]*Wales Heart Research Institute, Cardiff, UK*

Background: There is little information on the role of early health education and the support of patients with unstable angina. Cardiac rehabilitation is established throughout the United Kingdom for patients following myocardial infarction or cardiac surgery. Patients with unstable angina may be referred to cardiac rehabilitation, often several weeks after discharge. As unstable angina patients face a high initial risk of mortality or further cardiovascular events they could benefit from earlier advice, education and support. We have undertaken a randomised controlled trial to identify behavioural and health-related quality of life (HRQoL) consequences of early nurse-led health education and support for patients with a diagnosis of unstable angina.

Methods: This trial compared early health education with usual care in 200 patients with a working diagnosis of unstable angina in one district general hospital. Patients were invited to enter the trial if they had not undertaken a cardiac rehabilitation programme in the previous 6 months and were not immediately referred for revascularisation. Intervention involved two health education sessions, one as an inpatient and one within 2 weeks of discharge, focussing on coronary risk factor knowledge. Structured interviews were used to evaluate independently whether intervention improved knowledge of heart disease (modified York scale) 6 weeks after diagnosis and risk factor behaviour and HRQoL (MacNew) status after 6 months.

Results: Baseline measures of HRQoL, knowledge and understanding of unstable angina and modifiable risk factors were comparable in the education and control groups, as were treatment in hospital and medication on discharge. Following diagnosis, knowledge of coronary heart disease increased but at 6 weeks there was no difference between intervention and control groups: 25 (10) (mean, standard deviation) and 27 (10) (York score), respectively. At 6 months, smoking prevalence also reduced in the education group, 24% before and 14% after, and in the control group, 34% before and 16% after. Global HRQoL improved both in the educational group, 3.2 (0.8) before and 5.5 (1.1) after, and in the control group, 3.1 (0.8) before and 5.1 (1.1) after. There was little overall difference between intervention and control groups, demonstrating no significant effect of the educational intervention.

Conclusion: With "usual care" patients demonstrate significant beneficial changes in some aspects of risk-related behaviour and some improvements in HRQoL. Early, brief but intensive health education sessions for patients with unstable angina appear to have little additional impact on knowledge of coronary disease or HRQoL.

018 PRIMARY PREVENTION INTERVENTIONS TO REDUCE CARDIOVASCULAR DISEASE RISK: A REVIEW OF REVIEWS

[1]D Whiting, [1]J Critchley, [1]N Unwin, [2]S Capewell, the MRC IMPACT steering group. [1]*ARCHEPI Research Programme, Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK;* [2]*Division of Public Health, University of Liverpool, Liverpool, UK*

Background: The major risk factors for cardiovascular disease (CVD) are now well established, with smoking, hypercholesterolaemia, hypertension, obesity, diabetes, and physical inactivity accounting for approximately 90% of variation in risk. We evaluated the evidence for primary prevention interventions to reduce these risk factors (interventions both within and outside health services).

Review Methods: Reviews and meta-analyses were sought using the Cochrane Library, Campbell Collaboration and Medline. Three researchers independently screened references and studies were included if they: (1) included change in risk factors or CVD outcomes; (2) included largely those who did not already have CVD and (3) were systematic reviews. Information from the reviews was summarised to include scope of review, magnitude of effects, evidence quality.

Results: The evidence varied in amount and quality. Smoking: 42 reviews. Good evidence and large effect sizes for various interventions, settings and approaches. Example: nicotine replacement therapy: odds ratios for smoking cessation 1.77, 95% CI 1.66 to 1.88. Lipids: 11 reviews. Limited evidence that reduced/modified dietary fat prevented CVD and lowered CVD mortality. Better evidence that lipid-lowering therapy reduced CVD events. Example: Omega 3 fatty acids: no effect on lipid levels or CVD events. Hypertension: 24 reviews. Pharmacotherapy: good evidence with effect sizes of reduced CVD morbidity and mortality in the elderly. Long-term modest salt reduction reduced blood pressure in people with normal and raised blood pressure (mean reduction in systolic blood pressure: -5.06 mm Hg (95% CI -5.81 to -4.31). Obesity: 21 reviews. Good evidence in short term with effect measures for some diets, exercise, psychological, behavioural and pharmacological interventions for weight loss. Example: exercise for overweight; higher intensity exercise resulted in greater reduction in fasting serum glucose (weighted mean difference -0.3 mmol/l; 95% CI -0.5 to -0.2). Diabetes: 30 reviews. Evidence and effect sizes found for exercise and group-based training for self-management. Also good evidence for reduction in CVD outcomes from intensive glycaemic control. Example: regular participation in physical activity of moderate intensity reduced the risk of type 2 diabetes (relative risk 0.69, 95% CI 0.58 to 0.83). Physical inactivity: 13 reviews. Limited evidence for most types of interventions; effect sizes small, results inconsistent and rarely sustained over time. Little quantitative pooling of results was feasible.

Conclusions: There is some good evidence to guide policy-based risk factor reduction to prevent CVD. However, there are still many gaps, particularly for physical activity and non-Europid populations.

019 IS BODY MASS BEFORE MIDDLE AGE RELATED TO CORONARY HEART DISEASE RISK IN LATER LIFE? A SYSTEMATIC REVIEW AND META-ANALYSIS OF PROSPECTIVE OBSERVATIONAL STUDIES

[1]CG Owen, [1]PH Whincup, [1]L Orfei, [1]Q Chou, [1]AK Wathern, [1]SJ Kaye, [2]JG Eriksson, [3]C Osmond, [1]DG Cook. [1]*St George's, University of London, London, UK;* [2]*National Public Health Institute and University of Helsinki, Helsinki, Finland;* [3]*University of Southampton, Southampton General Hospital, Southampton, UK*

Objective: Obesity from early life is becoming more common. However, the implications for coronary heart disease (CHD) risk in later life are uncertain. We therefore aimed to review the relationship of body mass index (BMI) before 30 years of age to CHD risk in later life.

Design: Systematic review of published prospective studies relating BMI in childhood and early adulthood (2–30 years) to later CHD risk using Medline (1950 onwards), Embase (1980 onwards) and Web of Science (1970 onwards) databases (to November 2007).

Participants: Fourteen studies (496 004 participants, 22 533 CHD events) relating early BMI to later CHD outcome were identified.

Main Outcome Measures: Relative risks (RR) of CHD associated with a 1 standard deviation (SD) increase in BMI were extracted and pooled using random-effect models.

Results: BMI in early childhood (2–5 years, two studies) was inversely related to CHD risk (RR 0.90, 95% CI 0.79 to 1.03). Conversely, BMI in later childhood (7–18 years, eight studies) and BMI in early adult life (19–30 years, four studies) were both positively related to later CHD risk (RR 1.13, 95% CI 1.04 to 1.23; RR 1.17, 95% CI 1.03 to 1.33, respectively). Results were unaffected

by adjustment for cardiovascular risk factors. Gender and year of birth had little effect on the association.

Conclusions: BMI is positively related to CHD risk from approximately 7 years of age; the association is of similar strength to that observed with adult BMI. Long-term control of BMI from the first decade of life may be important for the prevention of CHD.

Lifecourse epidemiology I

020 **EARLY DETERMINANTS OF VISUAL OUTCOME IN BRITISH CHILDREN AND ADOLESCENTS**

[1]AR Rudnicka, [1]CG Owen, [2]M Richards, [3]MEJ Wadsworth, [1]DP Strachan. [1]St George's, University of London, London, UK; [2]MRC Unit for Lifelong Health and Ageing and MRC National Survey of Health and Development, Royal Free and University College Medical School, London, UK; [3]Department of Epidemiology and Public Health, Royal Free Hospital, London, UK

Objective: It has been suggested that early life exposures, such as birth weight, breast feeding and socioeconomic position, programme childhood myopia. We examined the relationship of reduced unaided vision (indicative of myopia) in childhood and adolescence with early sociodemographic factors and nutrition.
Design: Three British cohort studies recruited babies born in 1946, 1958 and 1970. Level of parental education, maternal age, birth weight, gender, birth order, social class and infant feeding status were ascertained either at birth or by parental questionnaire in early childhood.
Participants: Analyses were restricted to those with complete data (n = 3510, 10 633 and 9076 for 1946, 1958 and 1970 cohorts, respectively).
Main Outcome Measures: Odds ratios (OR) for unaided vision of 6/12 or worse at ages 10–11 years and 15–16 years were adjusted for all factors. Because of homogeneous effects across cohorts, results were pooled using fixed-effects meta-analyses.
Results: The prevalence of reduced vision ranged from 4.4% to 6.5% at 10–11 years, 9.4% to 11.4% at 16 years, with marginally higher levels in later cohorts. In childhood poor vision was positively associated with higher parental education (OR 1.48 versus lower education, 95% CI 1.23 to 1.79), maternal age (OR 1.10 per 5-year increase, 1.04 to 1.17). Inverse associations were observed with birth weight (OR 0.85 per 1 kg rise, 0.76 to 0.95) and number of older siblings (OR 0.89 per older sib, 0.83 to 0.94). Similar directions and magnitudes of effect were observed in adolescence, except the association with birth weight was null. Despite declines in breast feeding across successive cohorts (65%, 43% and 22% breast fed for more than 1 month, respectively), no associations were found with infant feeding at either age.
Conclusions: Consistent associations of reduced vision with parental education, maternal age and birth order suggest that environmental factors are important for visual development and myopia in early life.

021 **COGNITIVE FUNCTION ACROSS LIFE AND MID-LIFE PHYSICAL PERFORMANCE: FINDINGS FROM A BRITISH BIRTH COHORT STUDY**

[1]R Cooper, [1]R Hardy, [2]J Guralnik, [1]M Richards, [1]D Kuh. [1]MRC Unit for Lifelong Health and Ageing, Department of Epidemiology and Public Health, Royal Free and University College Medical School, London, UK; [2]Laboratory of Epidemiology, Demography, and Biometry, National Institute on Aging, Bethesda, Maryland, USA

Background: Independence and quality of life in later adulthood depend on the maintenance of cognitive and physical performance. There are reasons to expect associations between cognitive and physical performance and their rate of change with age. Most fundamental of these reasons is that both motor and cognitive systems are likely to be influenced by processes, developmental and degenerative, which influence central nervous system function.
Objectives: To examine whether measures of cognitive performance recorded across life were related to physical performance at age 53 years after adjustment for current body size, physical activity levels, health status and occupational class.
Design: Prospective birth cohort study.
Participants: Men and women from the MRC National Survey of Health and Development, followed up since birth in 1946 until age 53 years (N = 2135).
Main Outcome Measures: Chair rise time, standing balance time and grip strength measured at age 53 years by nurses during home visits.
Results: Higher scores on all childhood and adult cognitive tests, and slower declines in verbal memory and search speed between ages 43 and 53 years, were associated with better standing balance and performance in chair rising. Whereas balance time was more strongly associated with the measures of cognitive ability that show less age-associated change over time (ie, scores on tests of general cognitive ability in childhood and adulthood), chair rising was most strongly associated with the cognitive tests that show more age-associated decline (ie, verbal memory and search speed). The associations between cognitive performance and grip strength were inconsistent and weak.
Conclusions: The differential patterns of association found are consistent with the different neural systems underlying these physical performance tasks. Our findings suggest that initial developmental differences as well as shared aging processes may underlie associations found between cognitive and physical performance.

022 **PATTERNS IN TROUBLE SLEEPING AMONG WOMEN AT MID-LIFE: RESULTS FROM A BRITISH PROSPECTIVE COHORT STUDY**

[1,2]SE Tom, [2]D Kuh, [1]JM Guralink, [2]G Mishra. [1]Laboratory of Epidemiology, Demography and Biometry, National Institute on Aging, Bethesda, Maryland, USA; [2]MRC Unit for Lifelong Health and Ageing, Royal Free and University College Medical School, London, UK

Background: Whereas it has been established that there is a high prevalence of trouble sleeping among women at mid-life, less is known about changes in trouble sleeping over time in this age group.
Objectives: To describe the dynamics of trouble sleeping among women at mid-life in relation to the life course socioeconomic environment and health-related risk factors at age 43 years.
Design: A nationally representative birth cohort study.
Setting: England, Scotland, Wales.
Study Members: 893 women followed up since birth in 1946 and annually between ages 48 and 54 years.
Main Outcome Measures: Duration of trouble sleeping, duration per episode of trouble sleeping, and average number of episodes of trouble sleeping per woman experiencing at least one episode between ages 48 and 54 years.
Results: Multistate life table analysis showed that women spent an average of 2.6 years with trouble sleeping, and the average length of a continuous episode of trouble sleeping was 2.3 years. Among women who reported at least one episode, the average number of episodes was 1.3. At age 43 years, the number of physical conditions, anxiety and depression symptoms, use of prescription medication, and current or past trouble sleeping were related to increased total and per episode duration of trouble sleeping over the 7-year study interval. Differences associated with these risk factors ranged from 1.2–1.8 years for duration over the study interval to 0.5–0.9 years per episode. There was no association between the average number of episodes per woman reporting at least one episode and these health-related risk factors at age 43 years. Life

course social environment measures and health behaviours at age 43 years were not related to any of the three outcomes.

Conclusions: These results underscore the need to understand the relationships between risk factors and trouble sleeping at mid-life from a longitudinal perspective. Future research should use other methodological approaches to explore multivariate and time-dependent relationships between the dynamics of trouble sleeping at mid-life and these risk factors.

023 COGNITIVE ABILITY IN EARLY ADULTHOOD AND RISK OF FIVE SPECIFIC PSYCHIATRIC DISORDERS IN MID-LIFE: THE VIETNAM EXPERIENCE STUDY

[1,2]CR Gale, [2]IJ Deary, [3]SH Boyle, [3]J Barefoot, [4]LH Mortensen, [2,5]GD Batty. [1]MRC Epidemiology Resource Centre, University of Southampton, Southampton, UK; [2]MRC Centre for Cognitive Ageing and Cognitive Epidemiology, Department of Psychology, University of Edinburgh, Edinburgh, UK; [3]Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, USA; [4]Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark; [5]MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK

Objective: To examine the relation between pre-morbid cognitive ability in early adulthood and the risk of major depression, generalised anxiety, post-traumatic stress disorder (PTSD), alcohol and drug abuse or dependence and co-morbid forms of these conditions in mid-life.

Design: Prospective cohort study in which cognitive ability was measured on enlistment into military service at a mean age of 20.4 years and psychiatric disorder was assessed by structured diagnostic interview at a mean age of 38.3 years.

Setting: United States.

Participants: 3258 male veterans, participants in the Vietnam Experience Study.

Main Outcome Measures: Major depression, generalised anxiety, PTSD, alcohol or drug abuse or dependence, since enlistment and currently, diagnosed according to the American Psychiatric Association's Diagnostic and Statistical Manual, edition 3.

Results: Lower cognitive ability was associated with an increased risk of depression, generalised anxiety, alcohol abuse/dependence and PTSD and some patterns of co-morbidity. For a standard deviation decrease in cognitive ability, unadjusted odds ratios (95% CI) for having these disorders currently were: 1.32 (1.12 to 1.56) for depression, 1.43 (1.27 to 1.64) for generalised anxiety, 1.20 (1.08 to 1.35) for alcohol abuse/dependence, 1.39 (1.18 to 1.67) for PTSD, 2.50 (1.41 to 4.55) for PTSD plus generalised anxiety, 2.17 (1.47 to 2.43) for PTSD plus generalised anxiety plus depression and 2.77 (1.12 to 6.66) for having all four disorders. Most associations remained after adjustment for confounders.

Conclusions: Lower cognitive ability is a risk factor for several forms of psychopathology, including some forms of co-morbidity. Understanding the mechanisms whereby ability is linked to individual patterns of psychopathology may inform intervention.

Health behaviours: alcohol and drugs

024 ALCOHOL-RELATED MORTALITY IN ENGLAND AND WALES: HOW DO DEATH RATES VARY BY OCCUPATION?

A Baker, C Griffiths, C Rooney, E Romeri. Office for National Statistics, London, UK

Objectives: To examine recent patterns in alcohol-related deaths by occupation and consider whether historical trends have persisted.

Population: Men and women aged 20–64 years in England and Wales.

Outcome Measures: Directly age-standardised rates, standardised and proportional mortality ratios.

Results: People who work with alcohol, particularly bar staff and publicans, had very high levels of alcohol-related mortality in 2001–5, a finding regularly reported since the first analysis by the Registrar General of mortality by occupation and cause of death, published in 1895. Alcohol-related mortality has increased considerably in recent years, with male rates doubling in England and Wales between 1991 and 2006, from eight to 16 deaths per 100 000 population. Rates for male bar staff and publicans increased from 42 to 65 deaths per 100 000 between 1991–5 and 2001–5. Similar increases were not seen in all occupations, however. Male medical practitioners, traditionally found to have high levels of alcohol-related mortality, had rates that declined between 1979–84 and 2001–5, from 10.6 to 5.9 deaths per 100 000 population. In 2001–5, low levels of alcohol-related mortality were found for men who worked as farmers and drivers. An analysis for women, not traditionally considered by occupation, found that employment appeared to have a protective effect against alcohol-related mortality. High levels were found for women who worked as bar staff and publicans and low levels for women who worked with children.

Conclusions: Those with access to alcohol at work were found to have the highest levels of alcohol-related mortality in 2001–5, confirming earlier evidence of the risks of the social pressure to drink at work, which do not appear to have diminished over time. The decrease in alcohol-related mortality for medical practitioners may reflect the changing ethnic mix of doctors, but may also demonstrate a cultural change within the medical profession. Trends in mortality rates for male doctors are indicative of a change in behaviour, perhaps similar to the situation with smoking in which, once the hazards were recognised, doctors gave up earlier than the general population.

025 BRITISH MEDICAL ASSOCIATION-ENDORSED GUIDELINES FOR "SENSIBLE" ALCOHOL CONSUMPTION: IS EXCEEDING THEM ACTUALLY DETRIMENTAL TO HEALTH AND SOCIAL CIRCUMSTANCES? EVIDENCE FROM A POPULATION-BASED COHORT STUDY

[1]GD Batty, [1]H Lewars, [1]C Emslie, [2]CR Gale, [1]K Hunt. [1]MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK; [2]MRC Epidemiology Resource Centre, University of Southampton, Southampton General Hospital, Southampton, UK

Objective: Although released two decades ago, the British Medical Association-endorsed guidelines for "sensible" alcohol consumption remain controversial. We examined the health and social impact of drinking in excess of current weekly (>21 units in men; >14 units in women) and daily (>4 units in men; >3 units in women) recommendations. This is a particularly important public health question because over half of the adult population of England report drinking in excess of the new daily guidelines.

Design: Prospective cohort study in which typical alcohol consumption was measured using a 7-day recall grid at baseline survey and study participants were followed up passively (mortality ascertainment) and actively (re-survey for health and social outcomes) for up to 18 years.

Setting: West of Scotland.

Participants: 1551 participants (847 women) aged approximately 55 years at baseline survey in 1988.

Main Outcome Measures: All-cause and coronary heart disease mortality; responses to nurse-administered enquiries regarding minor psychiatric morbidity, self-perceived health, hypertension, accidents, obesity and financial difficulties.

Results: A markedly higher proportion of men than women exceeded both the weekly (24.5% versus 3.4%) and daily (50.4% versus 18.5%) guidelines. Surpassing guidelines for sensible alcohol intake was associated with an increased risk of selected health and social outcomes, including coronary heart disease (daily guidelines), minor psychiatric illness (daily guidelines), hypertension (daily guidelines), accidents (weekly guidelines) and financial problems (weekly and daily guidelines). The daily guidelines thus seem better able to predict adverse health and social outcomes than weekly

guidelines. These effects did not appear to differ between men and women and remained after adjustment for a range of covariates.

Conclusions: Given that exceeding the guidelines for sensible drinking is common, particularly in men, these findings of an increased risk of unfavourable health and social outcomes in people who do so are of public health importance.

026 HOW DO DRUG MISUSERS OUTSIDE DRUG TREATMENT DIFFER FROM THOSE RECEIVING TREATMENT? AN EPIDEMIOLOGICAL NEEDS ASSESSMENT

[1]R Holland, [1]J Broadbent, [1]V Maskrey, [2]I Cameron, [2]J Flowers. [1]School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK; [2]Eastern Region Public Health Observatory, Institute of Public Health, Cambridge, UK

Aims: To investigate problem drug users outside drug treatment and compare with those known to drug treatment services.

Background: Capture–recapture studies have identified that a large proportion (>75%) of problem drug users are outside treatment at any time. Although many access treatment intermittently, some rarely or never do. Little is known about those consistently outside services. We compared characteristics (age, sex, drug use) of those in contact with health or criminal justice but who have not been in structured treatment (unknown to the national drug treatment monitoring system; NDTMS) with those known to treatment services.

Methods: Three years of anonymised data (1 April 2004 to 31 March 2007) on drug users collected from: mortality data, police, probation, arrest referral and hospital episodes statistics (2 years data), were matched to Norfolk NDTMS episodes (3 years of data). Datasets were matched to NDTMS using initials, sex, date of birth; except hospital episodes statistics data, which were matched using sex, date of birth and postcode.

Setting: Norfolk

Results: A total of 16 010 records was analysed. The proportion of individuals in each dataset known to treatment services (NDTMS) ranged from 22% to 55% (worst for police). These proportions were increased by extending to use all NDTMS data (not solely 3 years) and restricting to those with clearly specified drug use. Even when the proportion known to treatment services was highest (arrest referral), few were in current treatment (5%). Only 33% of drug-related hospital admissions were known to treatment services, increasing to 55% when restricted to opiate/crack/cocaine admissions. The match between treatment and drug-related deaths was also low (38%). For police, probation and arrest referral those outside treatment were younger (median 2–4 years, p<0.01), and were less likely to use class A drugs (p<0.001) than those known to treatment; the difference in drug use was also found for hospital admissions (p<0.001).

Conclusions: Problem drug users identified in NDTMS and other datasets (criminal justice and health) appear more commonly to use class A drugs compared with those unknown to NDTMS, implying drug services are targeting more severe users. However, over 40% of those with severe use (eg, a hospital admission for opiate/crack use) have been outside treatment for at least 3 years. For criminal justice, those outside drug treatment are younger and predominantly use class B/C drugs. Whether this group has unmet treatment needs or progresses to more severe use is unknown. These findings are limited by possible errors in matching or movement of individuals outside Norfolk.

027 "ESCAPING FROM PRISON": FEMALE STUDENTS' SUBSTANCE USE AND THE SCHOOL ENVIRONMENT

A Fletcher, C Bonell. Department of Public Health and Policy, London School of Hygiene and Tropical Medicine, London, UK

Background: Determinants of alcohol and drug-related harm include school disengagement, poor teacher–student relationships, truancy and exclusion.

Aim: To explore how school experiences, especially school disengagement, may act as a structural factor shaping young people's perceptions and actions in relation to alcohol and drugs.

Methods: Qualitative data were collected through semistructured interviews and observations at two case-study schools in London. Fifteen students aged 14–15 years were interviewed at each school, once in autumn 2006 and once again in summer 2007. Five teachers at each school were also interviewed.

Study Results: Young people actively identify themselves at school in groups by adopting or rejecting "risky" health behaviours, and this relates to their place in the school "pecking order" and sociodemographic characteristics. Female students who did not "fit" into the school culture and were persistently monitored and punished described their school as a "prison". Unlike the "school stars" and the "sporty girls", these students were disconnected from key markers of status and progress during secondary school. Smoking cannabis provided these students an opportunity to escape the stress and humiliation of school, "have a laugh" and gain some respect by looking less like a child and more like an adult. Smoking cannabis also offered them a passive, more "mellow" form of resistance at school and an excuse for not doing well academically. These students also had low expectations for the future and reported that they had few incentives not to misuse alcohol and experiment with other drugs such as cocaine and "pills" when they were available.

Conclusions: The school environment contributes to the shaping of young people's identities, expectations, social networks and health behaviours, including in relation to drug use and related harm. This study highlights the potential of the school environment for future structural intervention in harm reduction.

Maternal and child health

028 DO WOMEN CHANGE THEIR HEALTH BEHAVIOURS IN PREGNANCY? FINDINGS FROM THE SOUTHAMPTON WOMEN'S SURVEY

SR Crozier, SM Robinson, KM Godfrey, C Cooper, HM Inskip, the Southampton Women's Survey Study Group. MRC Epidemiology Resource Centre, Southampton General Hospital, Southampton, UK

Objective: To describe the changes in smoking, alcohol use, fruit and vegetable consumption and caffeine consumption from before pregnancy to during pregnancy.

Design: The Southampton Women's Survey, a longitudinal population-based cohort study of non-pregnant women aged 20–34 years living in the city of Southampton. The women were characterised in terms of their diet, body composition, physical activity and social circumstances when they were not pregnant and in early and late pregnancy.

Setting: Southampton, UK.

Participants: 1490 women who delivered between 1998 and 2003 and who had information before pregnancy and at 11 and 34 weeks' gestation.

Main Outcome Measures: At each time point a trained research nurse ascertained smoking status and assessed food and drink consumption using a food frequency questionnaire. We derived the proportions of women who complied with recommendations not to smoke, to eat five portions of fruit and vegetables per day and to drink no more than four units of alcohol per week and 300 mg of caffeine per day.

Results: Women smoked less and drank less alcohol and caffeinated drinks in pregnancy than before pregnancy, but there was little change in fruit and vegetable intake. Before pregnancy 27% of women smoked, 54% drank more than four units of alcohol per week, 47% ate fewer than five portions of fruit and vegetables per day, and 39% drank more than 300 mg caffeine in drinks per

day. In early pregnancy 15% of women smoked, 10% drank more than four units of alcohol per week, 46% ate fewer than five portions of fruit and vegetables per day, and 16% drank more than 300 mg caffeine in drinks per day. Younger women and those with fewer educational qualifications were less likely to comply with public health recommendations. 81% of women in early pregnancy complied with at least three of the recommendations.

Conclusions: Previous studies about health behaviours before pregnancy have collected data retrospectively, whereas in the Southampton Women's Survey information before pregnancy was collected at the time when the women were not pregnant and thus was not subject to recall bias. We have found encouraging evidence of changed health behaviours in pregnancy. The lowest rates of compliance in pregnancy were for the recommendation to eat at least five portions of fruit and vegetables per day. Our results indicate that young women and those with few educational qualifications may particularly benefit from targeted health initiatives.

029 OCCUPATIONAL PREDICTORS OF PREGNANCY OUTCOMES IN WORKING WOMEN IN THE LIFEWAYS COHORT

[1,2]I Niedhammer, [1] DO'Mahony, [3]S Daly, [4]J Morrison, [1]C Kelleher, the Lifeways study group. [1]University College Dublin School of Public Health, Dublin, Ireland; [2]INSERM, France; [3]Coombe Women's Hospital, Dublin, Ireland; [4]National University of Galway, Ireland

Objectives: Occupational factors may be considered as a dimension of social and material life conditions and may play a substantial role in pregnancy outcomes. The objectives were to examine the associations between various occupational factors and low birth weight and preterm delivery in a prospective cohort of Irish working women.

Population and Methods: The Lifeways cohort included a sample of 1124 pregnant women, and 676 of them delivered a single baby and were working at their first prenatal care visit. The two pregnancy outcomes were low birth weight ($\leqslant 3000$ g) and preterm delivery (<37 gestation weeks). Occupational factors included 11 factors describing job and working conditions: occupational group, work contract, working hours, shift work, physical demands, job satisfaction, job stress, etc. Associations between occupational factors and pregnancy outcomes were studied using the χ^2 test. Logistic regression analysis was used to adjust for classic risk factors: parity, complications during pregnancy, planned pregnancy, maternal age, body mass index, smoking, alcohol consumption, region, marital status and education.

Results: The prevalences of low birth weight and preterm delivery were 15.42% and 8.38% among Lifeways working women. Bivariate analysis displayed one significant association between working 40 h or more a week and low birth weight ($p<0.01$). In logistic regression analysis, trends were observed between working with a temporary contract and being unsatisfied with job, and preterm delivery ($p<0.10$), and between working 40 h or more a week and shift work and low birth weight ($p<0.15$). The study of a cumulative index showed that being exposed to at least two of these four occupational factors significantly increased the risk of preterm delivery (odds ratio (OR) 3.59, 95% CI 1.39 to 9.24) and low birth weight (OR 2.48, 95% CI 1.22 to 5.06). Age above 35 years (OR 2.85, 95% CI 1.04 to 7.86), complications during pregnancy (OR 2.22, 95% CI 1.24 to 3.98), smoking (OR 3.89, 95% CI 2.00 to 7.55) and high alcohol consumption (OR 2.77, 95% CI 1.13 to 6.80) increased the risk of low birth weight. Nulliparity (OR 2.63, 95% CI 1.12 to 6.18) and complications during pregnancy (OR 2.85, 95% CI 1.29 to 6.30) were found to predict preterm delivery.

Conclusions: Our findings reinforce classic risk factors and underline the potential impact of occupational factors on pregnancy outcomes. This is one of the very few prospective studies on pregnancy outcomes that include working conditions.

030 WOMEN'S DECISION-MAKING ABOUT PAIN RELIEF IN LABOUR

[1]J Lally, [1]M Murtagh, [1]R Thomson, [2]S MacPhail. [1]Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK; [2]Newcastle-upon-Tyne NHS Foundation Trust, Newcastle-upon-Tyne, UK

Introduction: This study examines the views and expectations of women and professionals about their experience of pain relief in labour and their information needs to support decision-making. It addresses what decisions are made, how and when they are made, and how we can support women to make appropriate decisions. The findings will support the development of risk communication tools and decision aid(s) to support evidence-based choice.

Background: Wennberg has argued that unexplained variations in the face of uncertainty should support greater involvement of patients in decision-making; this allows patients to make better informed decisions by presenting clinical evidence and the likely effects of alternative interventions. However, decision aids to support women making decisions about pain relief in labour are of limited availability, although there are many examples of information leaflets. The National Institute of Health and Clinical Excellence guidelines identify an urgent need for research into support needs for pregnant women in making informed decisions.

Method: A systematic literature review explored women's expectations and experiences of pain, methods of pain relief and decision-making in the field of obstetrics. Interviews and focus groups were conducted with professionals involved in the care of pregnant women and pregnant women at various stages of pregnancy.

Results: The literature review revealed major gaps between women's expectations and experience in four key areas: the level and type of pain, access to pain relief, the level of participation in decision-making and control during labour. Professionals in the focus groups suggested that women are not well prepared for the pain of labour, with a subsequent gap between expectations and experience. Many professionals also believed that women no longer need to feel pain, given the methods of relief available. Finally professionals felt that, whereas women have control of decisions, their choices are often professionally guided. Interviews with pregnant women have identified key themes such as positive and negative attitudes to pain and its relief in labour, points during labour when decisions need to be made, their information needs, and barriers to information and to accessing preferred pain relief.

Conclusion: The findings from this study will support the subsequent development of appropriate risk communication and decision aid(s) to support evidence-based choice in pain relief in labour

031 TOO FAT TO PUSH? OBESITY AS A RISK FACTOR FOR CAESAREAN DELIVERY IN NULLIPAROUS WOMEN: SYSTEMATIC REVIEW AND META-ANALYSIS OF COHORT STUDIES

[1,2]S Bhattacharya, [1]L Aucott, [1]A Poobalan, [1]T Gurung. [1]Department of Public Health, University of Aberdeen, Aberdeen, Scotland, UK; [2]Department of Obstetrics and Gynaecology, University of Aberdeen, Aberdeen, Scotland, UK

Background: The prevalence of obesity has been increasing globally as have the rates of caesarean deliveries. This paper attempts to assess the association between the two phenomena.

Objective: To quantify the association between increasing maternal pre-pregnancy body mass index (BMI) and caesarean delivery rates.

Design: Systematic review and meta-analysis of published cohort studies.

Data Sources: Three electronic bibliographic databases, MEDLINE, EMBASE, CINAHL were searched systematically from 1996 to May 2007. MeSH terms and key words for "pregnancy", "obesity", "overweight", "body mass index" and "caesarean section" were combined with the Cochrane Collaboration strategy for identifying

primary studies. Reference lists of all articles were checked to identify other relevant studies. There were no language restrictions. **Review Methods:** Using methodology developed by the NHS Centre for Reviews and Dissemination, all references were scanned to identify relevant citations. Full text versions obtained were assessed by two reviewers for inclusion according to criteria agreed a priori. Data were extracted using a previously developed and piloted form. All the studies included were assessed for methodological quality using an adaptation of the Newcastle–Ottawa Scale for cohort and case–control studies. The rate of caesarean section in each BMI category was calculated for each study included and the pooled crude odds ratios for caesarean delivery computed using either fixed or random effects models as appropriate.

Results: The search identified 841 citations of which 53 papers were considered relevant based on the title and abstract. Finally, 11 papers were considered eligible for inclusion in the review and meta-analysis. Although all the papers were cohort studies only three were prospective in nature. Compared with women with normal BMI (20–25 kg/m^2), the crude pooled odds ratios (95% CI) of caesarean section in overweight (BMI 25–30 kg/m^2), and obese (BMI >30 kg/m^2) women were 1.53 (1.48 to 1.58), 2.26 (2.04 to 2.51) and 3.38 (2.49 to 4.57), respectively. The pooled odds of having an emergency caesarean section were 1.64 (95% CI 1.55 to 1.73) in overweight and 2.23 (2.07 to 2.42) in obese women.

Conclusion: The risk of caesarean delivery is increased by 50% in overweight women and almost two and a half times in obese women compared with women with normal BMI.

Qualitative research

032 | PATIENT EXPERIENCES OF CONTINUITY OF CARE IN DIFFERENT CHRONIC ILLNESSES

[1]L Cowie, [1]M Morgan, [2]P White, [1]M Gulliford. [1]*Division of Health and Social Care Research, King's College London, London, UK;* [2]*Department of General Practice, King's College London, London, UK*

Background: Improving the patient experience of chronic illness care and increasing patients' capacity for self-care, are important themes in health services policy. The concept of continuity is concerned with patients' experiences of receiving consistent and coordinated care, responding to their changing needs, over time. Previous studies of continuity have focussed on specific conditions, but many patients have more than one chronic condition—multimorbidity. We aimed to determine whether patients' experiences of continuity of care for different chronic illnesses can be analysed using a common conceptual framework.

Methods: A qualitative study was implemented including subjects with diabetes mellitus, stroke, arthritis, coronary heart disease, asthma, chronic obstructive pulmonary disease, hypertension and hypercholesterolaemia. In-depth semistructured interviews were held with 35 patients, recruited from seven general practices in south east London. Interviews were transcribed verbatim and coded using qualitative data analysis software. Analysis focussed on experienced continuity using a multidimensional model following Freeman and colleagues. The relevance of different dimensions was considered for different points on the healthcare pathway.

Results: Patients were recruited by index condition, but many patients reported several different chronic conditions. The main themes from the analysis were found to be broadly consistent for patients with different conditions. The qualitative data demonstrated a high level of importance attached to longitudinal and relational continuity irrespective of condition or structure of care management. Relational continuity emerged as an expectation in the primary care settings but only as desirable in other contexts. Team and cross-boundary continuity were valued by patients with more than one chronic condition, or when care of a single condition was shared between more than one significant professional or location. The value

of other dimensions can be associated with certain condition characteristics. Flexible continuity, for example, is more pertinent for those patients in whom the condition is unstable or undermanaged.

Conclusions: A common conceptual model of continuity may be applied across patients with different chronic illnesses, or across different illnesses in the same patient. The significance and experience of continuity depends on the model of care received.

033 | THE FINANCIAL COST AND ECONOMIC IMPACT OF CANCER ON PATIENTS AND THEIR FAMILIES: A QUALITATIVE STUDY

[1]A Timmons, [1]A Ó Ceilleachair, [2]C Finn, [2]A Staines, [1]H Comber, [1]L Sharp. [1]*National Cancer Registry, Dublin, Ireland;* [2]*Dublin City University, Dublin, Ireland*

Objectives: The financial consequences and wider economic impact of cancer for patients and their families are poorly understood, but are likely to be multifaceted and complex. Most of the previous studies have considered only single dimensions, such as impact on work/employment or time and travel implications. Some studies have been methodologically weak. Others have relied on administrative data sources rather than collecting data directly from patients. We aimed to collect detailed, in-depth information on the nature and consequences of cancer-related costs for patients and their families.

Methods: Qualitative semistructured face-to-face interviews were conducted. Interviews were tape-recorded, transcribed verbatim and analysed using a content analysis approach. The study took place in Ireland, which has a mixed public–private healthcare system. Interviews were conducted in patient's homes and oncology outpatient clinics of collaborating hospitals across the country. 17 patients with colorectal (plus eight family members), 12 with breast, five with prostate and four with lung cancer, from nine hospitals, were ascertained through cancer nurses and oncology social workers and subsequently interviewed.

Results: Several key themes emerged. The direct financial outlays associated with a cancer diagnosis included treatment-related travel and parking expenses; increased utility bills and costs of new clothing. Cancer adversely impacted on patients' ability to work and the resultant loss of income caused difficulties for the family. Also notable was the opportunity cost of a cancer diagnosis for carers/family members, in terms of extended leave to help their relative, especially around the period of initial diagnosis and surgery. Difficulties in accessing medical cards and disability payments were experienced. Participants made several practical recommendations to help minimise financial hardship and improve services for future cancer patients and their families.

Conclusions: Cancer can entail significant economic and financial consequences for some patients and their families. Treatment-related travel costs, household expenses, problems in accessing health and welfare entitlements and the burden on the wider family are all areas that health and social services, and patient support groups, could seek to target to ameliorate the experience of cancer for patients and their families. Qualitative research provides rich, detailed data and is an informative and valuable first step in the development of valid instruments to quantify the economic impact of cancer on patients and their families.

034 | THE ACCEPTABILITY OF COGNITIVE BEHAVIOURAL THERAPY SOFTWARE FOR THE TREATMENT OF DEPRESSION IN PEOPLE WITH MULTIPLE SCLEROSIS

[1]CL Cooper, [1]D Hind, [1]A O'Cathain, [1]GD Parry, [2]CL Isaac, [3]A Rose, [4]B Sharrack. [1]*School of Health and Related Research, University of Sheffield, Sheffield, UK;* [2]*Department of Psychology, University of Sheffield, Sheffield, UK;* [3]*Walton Centre for Neurology and Neurosurgery NHS Trust, Liverpool, UK;* [4]*Department of Neurology, Sheffield Teaching Hospitals NHS Trust, Sheffield, UK*

Background: People with chronic physical conditions are at elevated risk of depression, which can worsen their associated

health outcomes. The NHS has an acknowledged shortage of cognitive behavioural therapy (CBT) practitioners and recommends CBT software for people with mild and moderate depression. However, the applicability of generic CBT software for the treatment of depression in people with chronic physical conditions is unclear.

Objective: An assessment of the acceptability and appropriateness of computerised CBT for the treatment of depression in people with multiple sclerosis (MS).

Design: A qualitative study, based on in-depth interviews and evaluation sheets and using framework analysis.

Participants: We recruited people with relapsing remitting (n = 13) or secondary progressive (n = 4) MS, with self-reported mild or moderate depression (14 to 28 on the Beck Depression Inventory), but who had not received psychotherapeutic intervention within the past year. The level of disability ranged from fully ambulatory to wheelchair-restricted (1.5 to 7.0 on the Expanded Standard Disability Status Scale) and nine participants experienced visual disturbances. The study psychologist diagnosed nine participants as experiencing major depressive disorder, using the Mini-International Neuropsychiatric Interview.

Setting: Participants used one of two CBT software packages for either eight (Beating the Blues) or five (MoodGym) weekly sessions, at home or in a clinical research facility.

Results: Nearly all participants identified at least one CBT technique that they found useful. At the same time, nearly all found both CBT software packages inappropriate for people with MS. Those using MoodGym found it wordy and felt they were being encouraged to do activities of which they were no longer physically capable as an answer to their depression; they also felt it was aimed at teenagers rather than adults. People using Beating the Blues could see the value of the theoretical approaches and techniques but had problems applying it to their experiences of living with MS, which included (variably), irritability, unpredictability, fear and different types of loss. Users of both software packages found it difficult to answer the depression symptom inventories honestly or consistently because they believed that they should not be scoring symptoms that they felt were caused by their MS rather than depression.

Conclusions: CBT techniques have the potential to support people coping with MS. However, for many users, CBT software packages need to be more explicit about the applicability of techniques to people with MS. Physically ill users of CBT software need guidance on how to answer depression symptom inventories.

---

035 **THEM AND US: ENGAGING CLINICIANS, MANAGERS AND COMMISSIONERS IN INTERVENTIONS FOR CHANGE IN HOSPITAL SERVICE PROVISION: QUALITATIVE FINDINGS FROM THE NATIONAL COPD RESOURCES AND OUTCOMES PROJECT**

[1]C Rivas, [1]SJC Taylor, [2]S Abbott, [3]A Clarke, [1]C Griffith, [4]CM Roberts. [1]Centre for Health Sciences, Barts and The London School of Medicine and Dentistry, London, UK; [2]City Community and Health Sciences, Incorporating St Bartholomew School of Nursing and Midwifery, City University, London, UK; [3]Health Sciences Research Institute, Warwick Medical School, Warwick, UK; [4]The Royal College of Physicians, London, UK

Objective: To undertake a qualitative evaluation of reciprocal peer review with feedback and action plans, identifying barriers to and facilitators of change in service provision, focussing on the involvement, contributions and significance of different peer reviewing team members.

Design: Non-participant observation of peer review visits and semistructured interviews with purposively sampled participants of the National COPD Resources and Outcomes Project (NCROP), a prospective controlled trial comparing mailed feedback from the national chronic obstructive pulmonary disease (COPD) audit (control sites) versus mailed feedback and reciprocal peer review visits with feedback and action plans (intervention sites). Peer

reviewing teams were meant to include clinicians, a hospital manager, services commissioner and patient representative.

Setting: The national NCROP study involving respiratory departments in 54 intervention and 46 control hospitals in the United Kingdom.

Data Sources: Field notes from non-participant observations of eight peer review visits with 43 audiotaped interviews (14 face-to-face with members of observed teams, telephone conversations with lead clinicians from 18 more intervention and 11 control sites).

Analysis: Thematic analysis, using framework methodology, informed by the McKinsey 7S model of change management.

Main Findings: Many teams failed to engage managers, commissioners and patient representatives in the intervention and this often reflected normal working relationships (horizontally cohesive communication between clinicians with poor vertical communication). Clinicians perceived the absence of managers and commissioners from all or part of the visits as problematical for the intervention. However, some service improvement was achievable at some sites without their presence. The perceived significance of the visits as a tool for change was variable. Typologies of effective and ineffective teams emerged from both control and intervention site data, with some teams better able than others to work within or around financial constraints and other organisational change to improve service delivery.

Conclusion: We believe this is the only large qualitative study of the experience of peer review as a way of improving health service provision. Peer review is perceived by participants as a wasteful or soft strategy for achieving change in the NHS even when accompanied by feedback and action plans. It led to some degree of change in almost all intervention sites but had variable significance: it does not necessarily require the engagement of a multidisciplinary team to be effective but may only achieve major changes when a culture for change and good vertical as well as horizontal relationships exists. Teams can achieve change if they work with increased bureaucracy rather than feeling defeated by it. Managers and commissioners need to break down clinicians' "them and us" perceptions and attitudes.

Parallel session C

Cardiovascular disease and diabetes: trends

036 **TRENDS AND INEQUALITIES IN SHORT AND LONG-TERM ACUTE MYOCARDIAL INFARCTION CASE-FATALITY RATES IN SCOTLAND, 1988–2004**

CA Davies, AH Leyland. *MRC Social and Public Health Sciences Unit, Glasgow, UK*

Background: Ischaemic heart disease is the leading cause of death in Scotland and the mortality rate is among the highest in western Europe. Incidence and mortality rates have been falling over recent years; however, socioeconomic inequalities still exist. We explore the patterning of case-fatality following acute myocardial infarction (AMI).

Objectives: Examine trends and inequalities in case-fatality after a first AMI event from 1988 to 2004.

Design: Linked hospital discharges and death records for all AMI events from 1981 to 2004 for those aged 30+ years. Short-term case-fatality was divided into CF0: death on day of first AMI; CF1: death in 2–28 days following AMI. Long-term case-fatality (CF2) was defined as death in 29–365 days. Area deprivation (DEPCAT) was assessed using Carstairs scores.

Setting: Scotland, population 5.1 million.

Main Outcome Measures: Directly age standardised rates and odds ratios (OR) of case-fatality by age, sex, year of first AMI event and deprivation using multilevel logistic regression modelling.

Results: Between 1988 and 2004, 178 781 of the 372 349 patients with a first AMI died on the day of event, 34 198 died 2–28 days and 17 971 died 29–365 days later. Age standardised CF0 at 30–64 years decreased from 39% in 1988 to 32% in 2004 in men and from 38% to 27% in women. CF1 and CF2 also showed substantial decreases. Socioeconomic inequalities in CF0 for men aged 45–74 years were diminishing by 2003–4. Odds of CF1 were higher in women, with stronger gender gradients in the younger and more affluent; OR for women compared with men aged 30–44 years were 8.2 (95% CI 1.3 to 51.1) in DEPCAT1 (most affluent) and 1.3 (0.5 to 3.1) in DEPCAT7 (most deprived). The odds of CF2 decreased over time at most ages. Gender gradients were strongest in the older and more affluent; OR for women aged 75+ years in DEPCAT1 relative to men was 1.3 (1.1 to 1.6). Socioeconomic inequalities were seen for men; OR at ages 45–59 years in DEPCAT7, compared with DEPCAT1, was 1.8 (1.1 to 3.0).

Conclusions: A high proportion of AMI incidents in Scotland result in death on the day of the event but treatment advances and reductions in first AMI severity have led to improvements in short-term case-fatality. However, gender and socioeconomic inequalities suggest these improvements are not uniform across all population groups. There were also inequities in long-term AMI case-fatality; significant decreases over time were not seen in younger ages and socioeconomic gradients were highest in middle-aged men, suggesting differences in the effectiveness of secondary prevention of AMI.

037 HIGH-RISK VERSUS ROSE POPULATION APPROACHES TO PREVENTION: MODELLING THE DECLINE IN CORONARY HEART DISEASE DEATHS IN THE UNITED STATES 1980–2000

[1]F Young, [1]JA Critchley, [2]E Ford, [3]M O'Flaherty, [3]S Capewell. [1]*Institute of Health and Society, Advancing Research in Chronic Disease Epidemiology (ARCHEPI) programme, University of Newcastle-upon-Tyne, Newcastle-upon-Tyne, UK; [2]Division of Adult and Community Health, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; [3]Division of Public Health, University of Liverpool, Liverpool, UK*

Objective: US coronary heart disease (CHD) mortality rates have halved since 1980. Current health initiatives favour risk factor reduction in CHD patients (secondary prevention). Might population-based primary prevention (risk factor reduction in apparently healthy subjects) produce more powerful mortality reductions?

Design-setting and Participants: The previously validated IMPACT model was used to synthesise data for the US population (280 million) describing: (1) CHD patient numbers; (2) uptake and effectiveness of specific treatments; (3) trends in major cardiovascular risk factors in populations and in patient groups; and (4) the mortality benefits of these specific risk factor changes in the apparently healthy populace and in CHD patients. Risk factor trend data for major CHD risk factors were estimated from the NHANES II survey (1976–80) and a combination of the continuous NHANES surveys (1999–2002).

Results: Between 1980 and 2000, CHD mortality rates fell by 47%, resulting in 341 745 fewer deaths in 2000 compared with 1978. Overall, absolute smoking prevalence declined by 11.7% between 1980 and 2000. This resulted in approximately 39 925 fewer deaths (minimum estimate 34 955, maximum estimate 52 435): approximately 25% in known CHD patients and the remainder in apparently healthy people. Population total cholesterol levels fell by 0.34 mmol/l, resulting in some 111 095 fewer deaths (minimum estimate 70 355, maximum estimate 155 835): approximately 82 830 fewer deaths reflected dietary changes (in seemingly healthy individuals), plus approximately 28 745 fewer deaths were attributable to statin treatment (12 165 in CHD patients, 16 580 in individuals without recognised CHD). Mean population systolic blood pressure fell overall by 5.1 mm Hg between 1980 and 2000, resulting in approximately 92 645 fewer deaths (minimum estimate 61 015, maximum estimate 128 905): approximately 68 800 fewer deaths attributable to secular falls in blood pressure (again in apparently healthy people) plus approximately 23 845 fewer deaths attributable to hypertensive treatments in individuals without recognised CHD. Approximately 240 000 fewer deaths were thus attributable to reductions in the three major risk factors in the population. An optimal high-risk approach, medicating 80% of the apparently healthy populace with elevated blood pressure or cholesterol would have prevented or postponed approximately 32 900 and 83 900 deaths, respectively.

Conclusions: Approximately 60% of the recent large falls in CHD deaths are attributable to reductions in smoking, cholesterol and blood pressure in the whole US population. However, behavioural risk factor reductions (population-based primary prevention) achieved substantially larger reductions than medicating those with high risk. Future CHD policies should prioritise population-wide tobacco control and healthier diets.

038 TRENDS IN SURVIVAL FOLLOWING ACUTE MYOCARDIAL INFARCTION IN THE UNITED KINGDOM: RELATION TO CHANGES IN PRESCRIBING OF EVIDENCE-BASED MEDICATION IN PRIMARY CARE

[1]S Hardoon, [2]P Whincup, [1]I Petersen, [1]A Islam, [3]S Capewell, [1]R Morris. [1]*Division of Population Health, UCL, London, UK; [2]Division of Community Health Sciences, St George's, University of London, London, UK; [3]Division of Public Health, University of Liverpool, Liverpool, UK*

Background: Mortality following myocardial infarction (MI) has fallen in recent years in the United Kingdom. Few studies have investigated the contribution to this decline of improvements in prescribing of evidence-based medication.

Objective: To examine the contribution of changes in prescribing of evidence-based medication to MI patients to trends in 3-year survival following a first MI.

Design: Longitudinal study.

Setting: 218 general practices contributing to the Health Improvement Network; a representative UK-wide primary care database.

Participants: 6586 men and 3766 women who had a first MI between 1991 and 2002, who were aged 35 years or over at the time of their MI and who survived at least 3 months after their MI.

Methods: First-MI patients were followed up for 3 years for mortality. Medication use in the 3 months following the MI was determined from prescription data. Changes over time in post-MI mortality rates and in the odds of receiving different medications were estimated from Poisson and logistic regression, respectively. The trend estimates were combined with trial evidence on medication effectiveness to assess the contribution of each medication to the trend in mortality.

Results: Between 1991 and 2002, adjusting for age and gender, the 3-year post-MI mortality rate among patients who had survived 3 months fell by 32.3% (95% CI 20 to 43), from a baseline rate of 81 deaths per 1000 person-years in 1991. Meanwhile, prescribing in the first 3 months following an MI increased significantly: lipid-lowering drugs increased from 3% of patients receiving treatment in 1991 to 79% in 2002; odds ratio (OR) per annum increase in calendar time: 1.79 (1.75 to 1.83), beta-blockers increased from 26% to 68%; OR 1.23 (1.21 to 1.24), ACE inhibitors from 11% to 71%; OR 1.28 (1.26 to 1.30) and anti-platelet drugs from 46% to 86%; OR 1.20 (1.18 to 1.22). The increase in prescribing of lipid-lowering drugs in isolation could statistically explain approximately 45% of the decline in post-MI mortality. Similarly, beta-blockers explain approximately 28%, ACE inhibitors explain approximately 21%, and anti-platelet drugs explain approximately 14% of the decline.

Conclusions: Much of the decline in the mortality rate for first MI patients may be attributed to considerable increases in primary care prescribing of evidence-based medications to these patients. This highlights the value of secondary prevention measures for reducing coronary heart disease mortality.

039 | **RECENT LEVELLING OF CORONARY HEART DISEASE MORTALITY TRENDS IN SCOTLAND 1986–2006: MAJOR DIFFERENCES BY AGE AND DEPRIVATION**

[1]J Bishop, [1]T McLaughlin, [2]M O'Flaherty, [1]A Redpath, [1]J Chalmers, [2]S Capewell. [1]iSD Scotland, Edinburgh, UK; [2]Division of Public Health, University of Liverpool, Liverpool, UK

Objective: Scotland has one of the highest rates of coronary heart disease (CHD) mortality in western Europe. Halving premature death rates by 2010 is a Scottish government target. However, worrying increases in obesity and diabetes among young adults raise concerns about their subsequent CHD mortality rates. We recently reported a flattening in CHD mortality rates among younger adults in the United Staates and in England and Wales. This study now examines trends in age-specific CHD mortality rates in Scotland and also explores the effects of deprivation.

Methods: Death registration data were used to calculate age-specific CHD mortality rates from 1986 to 2006. Annual percentage changes (APC) in the rates were examined using Joinpoint analysis. Socioeconomic deprivation effects were analysed using SIMD 2006.

Results: CHD age-standardised mortality rates showed an increasing downwards trend overall. In men (and women) there was a −29% (−26%) change between 1986 and 1996 and a −45% (−41%) change between 1996 and 2006. Mortality rates show a general downwards trend for groups aged 55–64, 65–74, 75–84 and 85 years plus. However, there was a clear decrease in the APC in men and women under 55 years. APC for men aged 35–54 years show recent, significant flattening: −6.28% between 1986 and 2003, then −0.55% between 2003 and 2006. Furthermore, a small increase in young men in 2005–6 could not be excluded. Likewise in women aged 35–54 years, APC was −9.02% from 1989 to 1995 slowing to −4.94% from 1995 to 2006. Sixfold socioeconomic differentials were seen between CHD mortality rates in the most deprived and most affluent quintiles aged 35–44 years. These differentials decreased with greater age but equalised only above 85 years. Age-standardised mortality rates across all deprivation quintiles decreased over the time period, but with no narrowing of the relative inequality gap. Crucially, CHD mortality rates in men aged 35–54 years in the two most deprived quintiles decreased between 1996 and 2004 (APC −5.62%) but then increased between 2004 and 2006 (APC +6.4%).

Conclusions: Unfavourable trends are occurring in CHD mortality rates in younger age groups in Scotland, much as in England and the United States. These trends probably reflect adverse trends in cardiovascular risk factors rather than decreases in treatment. The recent, upward mortality trend in deprived men is particularly concerning and has major policy implications. CHD prevention in younger people in deprived groups should be prioritised.

040 | **EVIDENCE OF AN ACCELERATING INCREASE IN PREVALENCE OF DIAGNOSED TYPE 2 DIABETES IN BRITISH MEN 1978–2005: PROSPECTIVE COHORT STUDY**

[1]MC Thomas, [1]SL Hardoon, [1]AO Papacosta, [1]RW Morris, [1]SG Wannamethee, [2]A Sloggett, [3]PH Whincup. [1]Research Department of Primary Care and Population Health, University College London, London, UK; [2]Centre for Population Studies, London School of Hygiene and Tropical Medicine, London, UK; [3]Division of Community Health Sciences, St George's, University of London, London, UK

Objectives: To estimate the secular increase in the prevalence of diagnosed type 2 diabetes in British men between 1978 and 2005.

Design: Prospective cohort study (the British Regional Heart Study) with seven sequential questionnaire surveys between 1978 and 2005.

Participants: A representative cohort of 7735 British men aged 40–59 years at entry in 1978–80 selected from general practices in 24 British towns.

Main Outcome Measures: Recall of a doctor diagnosis of diabetes, recorded at each time point. Logistic regression models with generalised estimating equations were fitted to provide age-adjusted estimates of the calendar year increases in odds of type 2 diabetes, both overall and for consecutive periods, each of approximately 5 years.

Results: The crude prevalence of type 2 diabetes increased from 1.2% in 1978–80 to 12.1% in 2005. The age-adjusted average annual increase in type 2 diabetes prevalence for the 27-year study period was 7.0% (95% CI 5.4% to 8.6%). However, the annual rate of increase increased over time, from 4.3% (95% CI 0.4% to 8.2%) between 1979 and 1984 to 11.8% (95% CI 8.4% to 15.4%) between 2003 and 2005; $p_{trend} = 0.01$. The highest annual increases occurred among subjects with higher mean body mass index levels and in towns in Scotland.

Conclusions: The prevalence of type 2 diabetes has risen substantially in Britain during the past three decades and the recent rate of increase has been almost three times greater than that in the early 1980s. Effective primary prevention strategies to reduce the prevalence of type 2 diabetes, particularly by reducing the extent of overweight and obesity, are urgently needed.

Lifecourse epidemiology II

041 | **BIRTH WEIGHT AND RISK OF TYPE 2 DIABETES: A QUANTITATIVE SYSTEMATIC REVIEW OF PUBLISHED EVIDENCE**

[1]PH Whincup, [1]S Kaye, [1]CG Owen, [2]R Huxley, [1]DG Cook, the EARLYREAD collaboration. [1]Division of Community Health Sciences, St George's, University of London, London, UK; [2]The George Institute for International Health, University of Sydney, Sydney, Australia

Background: A large number of reports have examined the association between low birth weight and an increased risk of type 2 diabetes, but the consistency, strength and independence of the association has not been formally examined.

Aim: To review published evidence relating birth weight and type 2 diabetes (T2DM) in adult populations.

Study Design: Systematic review and meta-analysis of published studies relating birth weight and T2DM in adults.

Subjects: Data were available for 31 of 32 relevant studies (6443 cases of T2DM, 153 919 individuals, 32 populations).

Outcome Measures: Relative risk of T2DM associated with a 1 kg increase in birth weight. When possible, the effects of adjustment (body mass index, social class) and exclusion (macrosomia, maternal diabetes) were examined.

Results: There was considerable heterogeneity between studies ($I^2 = 65\%$, 95% CI 50% to 76%, $p \leqslant 0.001$), largely resulting from positive birth weight–T2DM associations in three populations of young adults, two of native north Americans with high prevalences of gestational diabetes and one study of young adult Canadians. The remaining studies showed little heterogeneity ($I^2 = 17\%$, 95% CI 0% to 48%, p = 0.21) and a graded inverse association between birth weight and T2DM (pooled age and sex-adjusted relative risk 0.76, 95% CI 0.71 to 0.81 per kg). Among these studies, the association was strengthened appreciably both by adjustment for body mass index and by the exclusion of macrosomic infants but was unaffected by social class adjustment. The proportional reduction in T2DM incidence predicted from a SD increase in birth weight (~500 g increase in birth weight) was 13% (95% CI 11% to 15%), increasing to 17% (95% CI 13% to 20%) after the exclusion of macrosomic infants.

Conclusions: In most populations studied, lower birth weight was independently related to an increased risk of T2DM. This may reflect an important underlying causal association, although the potential impact of feasible increases in birth weight on T2DM risk

appears likely to be modest. The rising prevalence of gestational diabetes occurring in many populations could alter the relationship between birth weight and T2DM in the next generation.

---

042 | **FACTORS INFLUENCING HEIGHT AND WEIGHT AT 10–14 YEARS IN UK CHILDREN WITH CONGENITAL HEART DEFECTS**

[1]RL Knowles, [2]C Bull, [3]C Wren, [1]C Dezateux. [1]UCL Institute of Child Health, London, UK; [2]Great Ormond St Hospital NHS Trust, London, UK; [3]Freeman Hospital, Newcastle-upon-Tyne, UK

Introduction: Congenital heart defects (CHD) affect 6–8 children per 1000 live births, of whom 80% now survive into adulthood. Findings from short-term follow-up studies suggest that preschool children with CHD are smaller and lighter than their unaffected peers, particularly if cyanosed. Growth and size are important markers of physical health in childhood, yet the factors influencing height and weight in children surviving with CHD beyond 10 years of age remain unclear.

Objectives: To investigate the influence of preoperative, individual and social factors on growth at age 10–14 years for children with CHD in a prospectively defined UK-wide cohort.

Methods: We calculated z-scores for height and weight (British 1990 growth reference) and body mass index (BMI) using measurements recorded at their most recent hospital visit for 470 children (268 boys) aged over 10 years, participating in a UK-wide prospective cohort of children born between 1992 and 1995 and diagnosed with serious CHD (excluding isolated ductus arteriosus) in the first year of life. Preterm (<37 weeks gestation) children and those with extracardiac abnormalities/syndromes were excluded. The association of preoperative factors in the first year of life, sex, presence of cyanosis (clinical observation or oxygen saturation <90%) after one year of age and social factors (Index of Multiple Deprivation score for current postcode) with height and weight z-scores and BMI (categorised as overweight, obese or neither using International Obesity Task Force standards) was explored using multivariable regression (Stata SE 9.2).

Results: Mean age at hospital visit was 11.1 years (range 10.0–13.3). 16% of children were overweight and 6% were obese. Median (interquartile range) z-scores for height and weight were −0.27 (−1.06 to 0.43) and −0.05 (−0.83 to 0.86) and, for BMI, 17 (16 to 20). After adjustment for all other factors, mean (95% CI) weight and height z-scores were significantly lower in children for whom cyanosis was recorded after the first year of age: 0.95 (1.5 to 0.36) and 0.89 (1.57 to 0.20) respectively.

Conclusion: Cyanosis after one year of age independently predicted lower weight and height at 10–14 years of age. Over one-fifth of children with CHD were overweight or obese by this age, which may have important implications for their longer-term cardiovascular health.

---

043 | **A REVIEW OF "NATURAL EXPERIMENT" STUDIES EXPLORING THE DEVELOPMENTAL ORIGINS OF HEALTH AND DISEASE**

[1]RF Head, [2]MS Gilthorpe, [1]GTH Ellison. [1]Faculty of Health and Social Care Sciences, St George's, University of London, London, UK; [2]Biostatistics Unit, Centre for Epidemiology and Biostatistics, University of Leeds, Leeds, UK

Objective: To assess the contribution made to the literature examining the developmental origins of health and disease by studies of two "natural experiments", the Dutch famine and the Leningrad siege.

Design: Synthesis and critical review.

Data Sources: A systematic search of the Medline database was undertaken to retrieve articles published between June 1945 and July 2007. Corresponding authors of all the articles identified were also contacted and asked whether they knew of any other published papers or unpublished reports that should be included.

Review Methods: Studies were included if they contained a statistical analysis of a relationship between exposure to either of the "natural experiments" and a health outcome in adulthood, defined as 18 years of age or older. Studies were excluded if they examined reproductive or other developmental outcomes such as fertility, age at menarche or age at menopause, or if they examined mental health or behavioural outcomes. Review articles that did not present any new results were also excluded.

Results: 25 studies, published between 1976 and 2007, met the inclusion criteria. Ten corresponding authors were identified and a further eight studies were identified through this method. The total of 33 included studies comprised 29 studies of the Dutch famine and four studies of the Leningrad siege. The most replicated significant relationships found among the selected studies were between exposure to the famine/siege and cardiovascular disease (four studies), breast cancer (three studies), obesity (three studies) and glucose tolerance (three studies) in later life. Exposures in both prenatal and postnatal life appeared to be linked to later health outcomes. There were a number of potential pitfalls with the selected studies, such as the choice of exposure measure, various types of selection bias, adjustment for confounders, multiple testing and publication bias. When a quality score was devised to isolate the highest-quality studies, it was found that the breast cancer and cardiovascular disease studies had been replicated in more than one high-quality study, but that the relationships with obesity and blood glucose had not been demonstrated in any of the studies considered to be of high quality.

Conclusions: Studies of "natural experiments" have many advantages in clarifying relationships between undernutrition in early life and later health outcomes, but they also suffer from a number of pitfalls that must be addressed, or at least acknowledged, so that such studies can make a meaningful contribution to the developmental origins of health and disease hypothesis.

---

044 | **TEST THE TOTAL, DIRECT AND INDIRECT EFFECTS OF BIRTH SIZE, CATCH-UP GROWTH AND CURRENT BODY SIZE IN LIFECOURSE EPIDEMIOLOGY**

[1,2]Y-K Tu, [1]MS Gilthorpe. [1]Biostatistics Unit, Centre for Epidemiology and Biostatistics, University of Leeds, Leeds, UK; [2]Leeds Dental Institute, University of Leeds, Leeds, UK

Introduction: Many studies found inverse associations between birth size and chronic adult diseases—the fetal origins of adult diseases. Recently, a modified version of the fetal origins hypothesis claimed that catch-up growth might have a stronger impact on health in later life than birth size. As growth is a continuing process in lifecourse, the challenge is therefore to tease out the impact of body size in different critical phases of lifecourse. The aim of this presentation is to use latent growth models to test the effects of body sizes during the lifecourse on health outcomes.

Materials and Methods: Longitudinal data from a cohort of 2007 young adults (1067 males and 940 females) recruited in the Philippines during 1983–4 were used for statistical analysis. Body mass index (BMI) was used as the measure for body size, and the outcomes were systolic blood pressure (SBP) and diastolic blood pressure (DBP) measured in 2002. Latent growth modelling, an application of structural equation modelling, was used to test the impact of BMI at birth, change in BMI during growth, and current BMI on SBP and DBP.

Results: For females, BMI at birth had negative total effects on SBP (−3.81) and DBP (−0.03). Change in BMI during growth had positive total effects on SBP (0.92) and DBP (0.46). Current BMI had positive effects on SBP (0.99) and DBP (0.52). BMI at birth had stronger negative direct effects on SBP (−4.798) and DBP (−0.604). The change in BMI during growth had weaker negative direct

effects on SBP (−0.07) and DBP (−0.11). For males, BMI at birth had negative total effects on SBP (−0.58) but positive effects on DBP (0.42). Change in BMI during growth had positive total effects on SBP (1.36) and DBP (0.93). Current BMI had positive effects on SBP (1.67) and DBP (0.9). BMI at birth had negative direct effects on SBP (−2.25) and DBP (−0.48). The change in BMI during growth had weak negative direct effects on SBP (−0.31) but positive direct effects on DBP (0.03).

Conclusion: These new statistical models estimate the effects of body size at different phases of the lifecourse simultaneously, and therefore misinterpretation can be avoided. The results showed that current BMI had a larger positive effect on SBP and DBP, whereas BMI at birth had negative direct and total effects. Change in BMI during growth had weak direct effects, indicating its impact was mainly mediated by current BMI.

---

045 | **CHILD-TO-ADULT BODY MASS INDEX AND HEIGHT TRAJECTORIES: A COMPARISON OF TWO BRITISH BIRTH COHORTS**

[1]L Li, [2]R Hardy, [2]D Kuh, [1]R Lo Conte, [1]C Power. [1]Centre for Paediatric Epidemiology and Biostatistics, UCL Institute of Child Health, London, UK; [2]MRC National Survey of Health and Development, UCL, London, UK

Background: Obesity continues to increase worldwide. The development of body mass index (BMI) trajectories may have changed across recent generations experiencing the obesity epidemic at different life stages. Other components of physical development may also have changed over time. These trends may impact on adult chronic disease risks. This study compared child-to-adult growth and BMI trajectories across two generations.
Design: Two British birth cohorts, born in 1946 and 1958, approximately 5300 and 17 000 subjects, followed up to 53 years and to 45 years, respectively.
Measures: Birth weight was extracted from birth records for the 1946 cohort and measured for the 1958 cohort. Height and weight were measured or self-reported at multiple ages throughout child-to-adulthood. Trunk length (sitting height), waist and hip circumferences were measured at 43 and 53 years for the 1946 cohort and at 45 years for the 1958 cohort. Overweight and obesity were defined as BMI (weight/height^2) greater than 25 and 30 kg/m^2, respectively, in adulthood and using age and sex-specific International Obesity Task Force in childhood.
Analysis: Mean birth weight, height, weight and BMI at each age from childhood (centred at 7, 11, 15.5 years) to adulthood, adult leg and trunk length, and waist and hip circumferences were calculated for each cohort. BMI trajectories were estimated using piecewise linear models for repeated BMI measures (at 7, 11, 15, 20, 26, 36, 43 and 53 years for the 1946 cohort, at 7, 11, 16, 23, 33 and 45 years for the 1958 cohort) corresponding to a BMI trajectory for "childhood" and one for "adulthood".
Results: Individuals born in 1958 were not heavier at birth than the 1946 cohort, but were taller in childhood by approximately 1 cm on average, grew faster thereafter and were 3–4 cm taller by adolescence. The 1958 cohort achieved adult height earlier, were taller by 1 cm, an increase that was entirely due to their longer leg length. BMI trajectories diverged from early adulthood, with a faster rate of BMI gain in the 1958 cohort than the 1946 cohort, although mean BMI at 7 years and rate of childhood gain had not shown an increase. By mid-adulthood the 1958 cohort had on average a greater BMI (1–2 kg/m^2), larger waist (7–8 cm) and hip (5 cm) circumferences and a higher prevalence of obesity (25.1% versus 10.8% in men and 23.7% versus 14.8% in women).
Conclusions: Changes in height and adiposity over a relatively short period of 12 years suggest the likelihood of opposing trends of influences on later disease risk in these populations.

Psychosocial health

046 | **SUBJECTIVE WELLBEING OF 13 AND 15-YEAR-OLD BOYS AND GIRLS IN SCOTLAND AND THE HEALTH PROMOTING SCHOOL**

KA Levin, C Currie. *Child and Adolescent Health Research Unit, University of Edinburgh, Edinburgh, UK*

Background: The emotional wellbeing of children and adolescents is a priority area for the Scottish Executive. Previous research has shown that the subjective wellbeing of schoolchildren in Scotland has improved since 1994. The Scottish Executive set a target in 2003 that every school should be a health promoting school (HPS) by 2007, with an overall emphasis on creating an ethos of "care, respect, participation, responsibility and fairness for all".
Objective: The aim of this study is to calculate the school effects of subjective wellbeing for boys and girls and examine the impact of HPS status on wellbeing.
Methods: Data from the 2006 Health Behaviour in School-Aged Children survey were modelled using multilevel binomial modelling for boys and girls, with six subjective wellbeing outcomes, adjusting for age, year, family affluence, family structure, mother–child relations, father–child relations and peer relations. School-level variance was examined. HPS status was then added to the models as an explanatory variable.
Results: Among boys, family structure, family affluence, paternal absence and communication with parents are associated with lower levels of subjective wellbeing. There are, however, no school effects for any measure of subjective wellbeing. Among girls, family affluence, parental absence, communication with mother, father and best friend are all associated with lower levels of subjective wellbeing. In addition, school effects were found for measures of life satisfaction, happiness, multiple health complaints, helplessness and feeling left out. After adjusting for individual factors, for girls, the odds of "never feeling left out" in a HPS are 1.94 (95% CI 1.30 to 2.89) those of being in a school with no HPS status. The odds of "never feeling helpless" in a HPS are 1.62 (95% CI 1.18 to 2.21) those of a school with no HPS status. However, the odds of excellent perceived health are lower for girls in a HPS (odds ratio 0.67; 0.28 to 0.99). HPS status does not explain the school effects of happiness and life satisfaction.
Conclusion: Subjective wellbeing is known to be lower among girls than boys. After adjustment for individual factors, HPS status is associated with lower rates of helplessness and feeling left out among girls, but poorer perceived health. This suggests that while achieving an atmosphere of inclusion in schools, the HPS may also have increased awareness of health among girls, but may not have had much influence on life satisfaction and happiness.

---

047 | **HANS SEYLE, "THE FATHER OF STRESS" AND TOBACCO INDUSTRY FUNDING OF RESEARCH INTO STRESS AND HEALTH**

M Pettigrew. *London School of Hygiene and Tropical Medicine, London, UK*

Background: The concept of "stress" has achieved something of a renaissance in the field of public health in recent years; for example it has been suggested as an important contributor to the development of health inequalities. The concept of stress owes much to the work of Hans Selye (1907–82), who is widely accepted to have created the modern concept and successfully promoted it to other scientific and non-scientific fields. One of Selye's major allies in promoting the issue of stress and illness has not previously been discussed: the tobacco industry, which made extensive use of his research, provided significant funding to him and others working in the field for many years and controlled the reporting of that research, using it strategically in product defence and litigation. This study investigated tobacco industry funding of research on

stress, and in particular Selye's role as a tobacco industry consultant.

Methods: Extensive searches of archives of tobacco industry documents, carried out between April 2005 and December 2007.

Results: Selye received extensive tobacco industry funding over many decades, and this research was used extensively in three ways: (1) in litigation to defend the industry's interests; (2) in general industry PR materials and (3) to argue against a causal role for smoking in heart disease and lung cancer. As an example of the latter, tobacco industry representatives regularly attended and reported back from health and epidemiological conferences, including a meeting organised by the Society for Social Medicine, after which an industry consultant reported back to industry colleagues on how he managed to introduce stress as a topic for discussion, specifically in the context of the multifactorial aetiology of coronary heart disease.

Discussion: Selye and his research on stress are regularly cited in the public health literature, but the relationship between Selye's work and tobacco industry funding is rarely or never acknowledged. This relationship may need to be taken into account when discussing the role of stress in the creation of health inequalities. Other examples of the value of "stress" (as well as other research on the social determinants of health) to the tobacco industry will be presented.

048 | THE IMPORTANCE OF INCOME TO THE "MIDLIFE CRISIS": FINDINGS FROM A CROSS-SECTION OF 88 000 ADULTS

[1]IA Lang, [2]DJ Llewellyn, [1]D Melzer. [1]*Epidemiology and Public Health Group, Peninsula Medical School, Exeter, UK;* [2]*Institute of Public Health, University of Cambridge, Cambridge, UK*

Background: Psychological distress rises in prevalence in midlife and declines in later life. This "midlife crisis" has been presented as a universal phenomenon but we hypothesised that income plays a critical role in the relationship between age and psychological distress.

Methods: The Health Survey for England is a nationally representative annual survey that includes subjective and measured indicators of psychological distress. Data from years 1997 to 2005 were pooled (n = 88 083). GHQ-12 scores, reported mental illness and receipt of relevant medication were assessed in relation to household income and age. Analyses were adjusted for age, sex, ethnicity, smoking, social class, education and health problems.

Results: Outcomes showed the reported prevalence rise in psychological distress with age, peaking in middle age and declining subsequently. In analyses conducted separately by income categories this pattern was found only in low income groups. Income-related inequalities were greatest in midlife: for example, in men aged 45–54 years the odds ratio of receiving psychiatric medication in the lowest income group compared with the highest was 7.50 (95% CI 4.24 to 13.27), and in women aged 45–54 years the odds ratio of reporting mental illness was 10.25 (95% CI 6.16 to 17.05). The prevalence of psychological distress was higher in women but showed the same overall relationship with income and age.

Conclusions: Increased psychological distress in middle age—the "midlife crisis"—is found only in those in low income households. Policy-makers and analysts concerned with population mental health must take into account differences related to both age and socioeconomic status.

049 | DISTRESS FROM SOCIAL RELATIONS AND ANGINA PECTORIS: A 6-YEAR FOLLOW-UP STUDY OF MIDDLE-AGED DANISH MEN AND WOMEN

R Lund, U Christensen. *Department of Social Medicine, Institute of Public Health, University of Copenhagen, Copenhagen, Denmark*

Background: Social support (eg, emotional and instrumental support) has in numerous studies been shown to protect against coronary heart disease (CHD) especially among men. Furthermore, lack of social support is considered an independent risk factor for CHD. However, the effects of distressing social relations on CHD are less well described. The aim of the present study was to analyse the association between excessive demands or worries and conflicts caused by close social relations and incident angina pectoris among men and women.

Methods: The analyses were based on the Danish Longitudinal Study of Work, Unemployment and Health. The study included a random sample of 40 and 50-year-old Danish men and women at the baseline survey in 2000, N = 7588. Of these, 4170 participated in the follow-up survey in 2006, had full records on the included variables and were free of heart disease at baseline. Indices of distressing social relations were constructed including questions on excessive demands/worries and conflicts caused by kin and non-kin, respectively. Angina pectoris was assessed by the Rose angina questionnaire.

Results: High score on the index of distress from family (partner, children and other family) at baseline was associated with a significantly increased risk of angina in 2006 after adjustment for age, gender, living with a partner (yes/no), smoking (never, ex-smoker, smoker) and socioeconomic status at baseline, odds ratio (OR) 1.43 (95% CI 1.07 to 1.91). The harmful effect of distress from family was exclusively due to excessive demands or worries. Likewise, a high score on the index of distress from non-kin (friends, colleagues, neighbours) was associated with an increased risk of angina 6 years later, adjusted OR 1.29 (95% CI 0.99 to 1.69). This association was also solely due to the detrimental effect of excessive demands or worries, adjusted OR 1.37 (95% CI 1.09 to 1.72). A high score on the indices of conflicts with kin and non-kin, respectively, did not show any association with a later risk of angina pectoris. There was no interaction between age, gender, living with partner or not, smoking, or socioeconomic status and distress from any source.

Conclusion: Distress caused by social relations seems to be an important risk factor for incident angina pectoris among both women and men. For both men and women excessive demands and worries were more important as risk factors than conflicts caused by social relations.

050 | PSYCHOSOCIAL FACTORS RELATED TO CARDIOVASCULAR DISEASE RISK IN UK SOUTH ASIAN MEN AND WOMEN

[1]ED Williams, [1]A Steptoe, [2]JS Kooner. [1]*University College London, London, UK;* [2]*Imperial College London, London, UK*

Objective: To compare the psychosocial experience of south Asians (people originating from the Indian subcontinent) living in the United Kingdom with UK whites, and to measure the contribution of psychosocial adversity towards the excess risk of coronary heart disease (CHD) observed in UK south Asians. In addition, this study aimed to validate psychosocial scales in south Asians, using differential item functioning statistical tests.

Design: Cross-sectional design.

Setting: West London, United Kingdom.

Participants: 1130 apparently healthy UK south Asian and 818 European white men and women, aged 35–75 years, were randomly selected from a larger cardiovascular risk prevention study (the LOLIPOP Study).

Methods: Psychosocial data were collected in questionnaire form (translations available in English and Punjabi). CHD markers (coronary artery calcium, carotid intima-media thickness) and potential biological and behavioural mediators were also measured.

Results: Analyses showed that south Asians experienced greater financial strain, residential crowding, family conflict, social deprivation and racial discrimination than white Europeans. They had larger social networks, but reported lower social support, higher negative support, greater depression and hostility. The south Asian group also had elevated waist/hip ratios, higher rates of the metabolic syndrome

and diabetes and was less physically active. Subgroup analyses indicated significant psychosocial, behavioural and biological heterogeneity between the south Asian religious groups. Validation analyses using differential item functioning demonstrated significant item bias on some of the scales but the ethnic group differences remained after removal of the invalid items.

Conclusions: In comparison with UK whites, UK south Asians showed a significantly higher CHD risk profile in psychosocial and biological factors, which was largely independent of socioeconomic status. Validation was provided for the use of psychosocial questionnaires in this UK south Asian sample. These findings are concordant with the hypothesis that psychosocial disadvantage contributes to a heightened propensity to CHD in UK south Asians and must be acknowledged when clinicians and researchers address this issue.

Child and family health

051 A SYSTEMATIC REVIEW OF FINANCIAL BENEFITS FOR CHILD HEALTH AND WELLBEING IN LOW INCOME OR SOCIALLY DISADVANTAGED FAMILIES IN DEVELOPED WORLD COUNTRIES

[1]PJ Lucas, [2]K McIntosh, [3]M Petticrew, [4]HM Roberts, [2]A Shiell. [1]School for Policy Studies, University of Bristol, Bristol, UK; [2]Department of Community Health Sciences, University of Calgary, Calgary, Canada; [3]The Public and Environmental Health Research Unit (PEHRU), London School of Hygiene and Tropical Medicine, London, UK; [4]Social Science Research Unit, Institute of Education, London, UK

Objective: To conduct a systematic review of the evidence from randomised controlled trials that additional monies provided to poor or disadvantaged families may benefit children by reducing relative poverty and thereby improving children's health, wellbeing and educational attainment.

Data Sources: ASSIA, Embase, Econlit, ERIC, CENTRAL, CINAHL, Index to Theses, Medline, PsycINFO, SIGLE and MDRC, SSRN and SRDC online libraries.

Study Selection: Studies selected provided money to relatively poor families, which included a child under the age of 18 years or a pregnant woman, measured outcomes related to child health or wellbeing and were conducted in a high income country.

Included Studies: Nine trials including more than 25 000 participants were included in the review. Seven USA-based and one Canadian study assessed the impact of welfare reform programmes on families. All studies placed conditions on receipt of additional monies, usually taking up employment, three studies included an unconditional trial arm.

Results: Total household income increases were modest, despite generous predictions. Studies were heterogeneous, limiting opportunities for meta-analysis. Direction of effect varied across studies; no consistent effect was observed on child health, mental health, school achievement or emotional state. Non-significant effects favouring the intervention group were seen for child cognitive development (three studies, pooled odds ratio (OR) not estimable), and a non-significant effect favouring controls in rates of teenage pregnancy or parenthood (three studies, OR 1.12; 0.82 to 1.52). One study found significantly higher rates of substantiated cases of child neglect in 2/3 observed years.

Conclusions: Some studies cited here have been included in previous reviews of the impact of welfare reform on child health and development (eg, Waldfogel 2007), and have been cited in support of work-based welfare reform for families (Freud 2007). However, they have not previously been included in a systematic review, combined with studies with similar aims and methods and subject to transparent and systematic data extraction and appraisal. Whereas these studies were generally of high methodological quality, child outcomes are often of lower quality (relying on parental report), and may be subject to reporting bias (partial

reporting). On the basis of the evidence reviewed here we cannot state unequivocally whether conditional financial benefits are effective at improving child health or wellbeing. We note particular concerns by some authors that sanctions and conditions (such as working hours) placed on families may increase family stress. We conclude that the evidence supporting welfare to work programmes for improved child outcomes is less conclusive than some have previously argued.

052 OPERATIONALISING FAMILY: EXAMPLES FROM THE MILLENNIUM COHORT STUDY

L Panico. Department of Epidemiology and Public Health, UCL, London, UK

Background: Children from certain family backgrounds, particularly those living with single parents, appear to do less well in various educational, emotional and mental health outcomes, although we know less about physical health. These studies often define family in a one-dimensional manner, limited to the resident parents and/or their marital status. They largely ignore theoretical frameworks available in other disciplines, such as sociology, when defining family and considering potential pathways.

Objectives: This paper critically examines the current quantitative definition and measurement of family in social sciences, focusing on child health. It seeks to operationalise theoretical frameworks developed by sociologists on defining and describing family and shows how these concepts can be applied quantitatively.

Methods: Longitudinal data from the Millennium Cohort Study (MCS) will be used. The study collected information for 18 553 children born in 2000–1 at approximately 9 months, 3½ and 5 years of age. At sweep 1, 59.1% of households contained two married parents (n = 10 921), 23.7% two non-married parents (n = 4375) and 17.2% a single parent (n = 3190). MCS has a rich dataset on household composition, socioeconomic characteristics, family relationships and child health. The relationships between family structure, household characteristics, non-kin networks and family processes and their impact on child health, will be tested. We will look at birth weight, asthma and physical growth.

Results: We show that single parents have wider kin and non-kin networks outside their household (for example, 51.1% of single parents saw their own parents daily versus 37.6% in two-parent households). Family structure is a predictor of child health: children born to single parents are 150 g lighter at birth than those born to married parents (p<0.001) and were twice as likely to have had asthma by age 3 years (p<0.001). However, these results hide important variations. For example, if we just consider poor households (<£10 400 per year), there are no differences in birth weight across family structures. Looking beyond the household, living with the child's grandparent, being in touch with the child's father and seeing friends regularly diminished child health differences between two and one-parent households. Data from sweep 3 (age 5 years), due to be archived shortly, will also be analysed.

Conclusion: Quantitative researchers can and should adopt a less restrictive definition of family. A quantitative analytical framework is proposed, which incorporates household structure and characteristics, non-household networks and family processes. We show that this framework can be used even in secondary data analysis.

053 SOCIAL INFLUENCES ON PHYSICAL ACTIVITY PARTICIPATION AMONG SCOTTISH SCHOOL CHILDREN: A LONGITUDINAL STUDY

J Kirby, J Inchley. Child and Adolescent Health Research Unit (CAHRU), Moray House School of Education, University of Edinburgh, Edinburgh, UK

Objectives: To investigate the influence of social factors on physical activity participation among Scottish schoolchildren across the primary–secondary school transition and early secondary years.

Design: Five-year prospective cohort study; data collected annually by self-report questionnaire.

Setting: Eight Scottish secondary schools.

Participants: Approximately 1500 Scottish schoolchildren.

Main Outcome Measures: Peer, paternal and maternal support, peer socialising and parental licence in relation to physical activity participation; according to age, gender and socioeconomic status.

Results: Gender differences in social support to be physically active were less common in primary school and the early secondary years, but by the fourth year of secondary school, boys reported higher levels of peer, paternal and maternal support than girls. For example, 67.4% of boys, but only 39.2% of girls reported high peer support in their fourth secondary school year. Peer and maternal support decreased among both genders over the years, but decreased paternal support was only evident in girls, with only 35.5% reporting high paternal support by their fourth secondary school year. High social support was associated with high activity levels in boys, with high peer support associated with increased activity across all years and parental support having a direct association among older boys. High peer support was associated with high activity levels in girls across the later secondary school years, but there was no relationship between parental support and physical activity. Peer socialising was associated with increased activity in boys (57.3% of fourth year boys were highly active), but this was not apparent in girls as they became older. A significant association was found between independent play and physical activity in primary school and the early secondary years, suggesting that parental restrictions on outdoor play may influence overall participation in early adolescence. Overall, pupils from high affluent families reported higher levels of parental support for being active than those from low affluent families and high levels of support were most likely to be sustained over time among those from high affluent families.

Conclusions: Social factors have an important influence on pupils' decisions to be physically active. Furthermore, significant age, gender and socioeconomic effects are apparent as children progress from primary to secondary school and through the secondary school years. These findings highlight the need for specific interventions that address young people's physical activity behaviour within a social context.

---

054 LONE PARENTHOOD, MATERIAL DEPRIVATION AND CHILD EMOTIONAL DEVELOPMENT IN THE MILLENNIUM COHORT STUDY

A McMunn, Y Kelly, M Bartley. *Department of Epidemiology and Public Health, UCL, London, UK*

Objective: To examine whether the children of lone parents fare worse than children in two-parent families in terms of emotional and behavioural development at age 3 years and, if so, whether this is explained by material deprivation.

Design: Prospective cohort study.

Setting: The Millennium Birth Cohort Study (MCS): a large, representative sample of children born in the United Kingdom in 2000–2 and their families.

Participants: 13 945 children who participated in the MCS interview at waves 1 (9 months) and 2 (3 years).

Main Outcome Measure: The Strengths and Difficulties Questionnaire, a widely used instrument for assessing psychological morbidity in children.

Results: Of those children who were in lone parent families at 9 months, 34.6% had some emotional or behavioural difficulties by age 3 years compared with 23.5% of children who lived in two parent families. The equivalent proportions for major emotional and behavioural difficulties were 5.5% of children in lone parent families and 2.2% of children in two parent families. Children who had lived in a lone parent family were significantly more likely to have emotional and behavioural difficulties at age 3 years compared with children who lived with two parents, regardless of whether they lived in a lone parent family at 9 months, 3 years or both ages and this was true for both boys and girls. The increased risk for children in lone parent families was attenuated somewhat by the inclusion of material circumstances. The odds ratio for any difficulty among children living in a lone parent family at any age was reduced from 1.72 (95% CI 1.58 to 1.88) when adjusted for sex only to 1.44 (1.25 to 1.65) when further adjusted for occupational class and household income. The inclusion of work status only attenuated the increased likelihood of difficulties in lone parent families marginally.

Conclusions: The increased risk of emotional and behavioural problems among children in lone parent families was partly, but not entirely, explained by the material circumstances of the family. Further analysis will include a wider range of measures of material living conditions and will examine emotional and behavioural difficulties at age 5 years.

---

055 ASSISTED REPRODUCTIVE TECHNIQUES AND THE RISK OF HAVING A CHILD WITH CONGENITAL ANOMALIES

AD Mohangoo, SE Buitendijk. *Department of Reproduction and Perinatology, TNO Quality of Life, Netherlands Organisation for Applied Scientific Research, Leiden, The Netherlands*

Background: The percentage of children born after assisted reproductive techniques will continue to increase due to demographic changes such as maternal age and new developments in assisted reproductive techniques.

Objectives: To determine the risk of having a child with one or more congenital anomalies for intrauterine insemination (IUI), ovulation induction (OI) and in-vitro fertilisation/intracytoplasmatic sperm injection (IVF/ICSI) conceived children.

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 one or more congenital anomalies and the risk of (specific) congenital anomalies in different organ systems adjusted for maternal characteristics (age, ethnicity and parity), expressed in odds ratios (OR).

Results: Compared with naturally conceived children, the overall OR for the risk of anomalies was 1.2 (p<0.05), 1.3 (p<0.001) and 1.4 (p<0.001), for IUI, OI and IVF/ICSI, respectively. For IVF/ICSI the risk of anomalies was elevated in all but one organ system; the exception was the respiratory system. For OI the risk was elevated for anomalies of the central nervous system, the skin and abdominal wall and for chromosomal and syndromal anomalies. An increased risk of hernia umbilicalis and hernia inguinalis was observed in OI conceived children (OR, respectively, 7.4 and 3.1; p<0.001), and for single umbilical artery, tetralogy of Fallot, lung hypoplasia, hernia inguinalis and focomely/amely in IVF/ICSI conceived children (OR, respectively, 1.7, 4.8, 3.0, 4.0 and 4.4; p<0.001). No elevated risk of specific congenital anomalies and congenital anomalies at the organ system level was observed for IUI conceived children.

Conclusions: Assisted reproductive techniques are associated with an overall small increased risk of having a child with one or more congenital anomalies. IVF/ICSI and OI conceived children have an increased risk of specific congenital anomalies and for congenital anomalies at the organ system level.

Primary care

056 PATIENT–PHYSICIAN INTERACTION AND THE PRODUCTION OF HEALTH INEQUALITIES IN A FRENCH MULTIDISCIPLINARY STUDY: AN ORIGINAL METHODOLOGY AND PRELIMINARY FINDINGS FROM THE INTERMEDE PROJECT

[1]M Kelly-Irving, [2]A Afrite, [3]J Pascal, [2]C Cases, [3]P Lombrail, [1]T Lang, the INTERMEDE group. [1]INSERM Unit 558, Toulouse, France; [2]IRDES, Paris, France; [3]Public Health Department, Nantes, France

Introduction: The health system participates in maintaining social inequalities in health. Sociological research suggests that the way in which physicians socially classify their patients influences their behaviour and consequently the secondary care that patients are likely to receive. The aim of the INTERMEDE project is to specify the nature of the patient–physician interaction and its consequences for the generation of health inequalities.

Methods: Two complimentary approaches were used. First, a qualitative phase took place whereby 215 consultations were observed using 11 GPs in three regions of France (Pays de Loire, Midi-Pyrénées, Ile-de-France) of which 50 were followed up for interviews with the patient and the physician. Second, a quantitative phase was carried out among 30 GPs and their patients in which three questionnaires were used: a patient questionnaire before and after the consultation (nature and content of consultation) and a follow-up 2 weeks later, a physician questionnaire post-consultation (mirroring the questions asked in the patient questionnaire) and finally a physician questionnaire on his/her practices and values.

Results: Overall, 30 physicians and 640 patients were included in the quantitative phase and 84% of the patients were subsequently followed up. Both qualitative and quantitative phases identify inter and intra-physician variability as a potential source of health inequalities. Preliminary qualitative findings underline the importance of a social, cultural, gendered or temporal proximity between patient and physician and the physician's anticipation of patient behaviours. Early quantitative analyses show that the patient and physician often gave different reasons for the consultation. Patients referred to having a chronic disease only two-thirds of the time compared with their GP. A high degree of discordance was observed between physicians and patients for mental health and health promotion outcomes.

Conclusions: Initial results are positive as to the feasibility of such an original multidisciplinary approach. The study identifies and explores disharmonies observed between patients and physicians during GP consultations and the role of inter and intra-physician variability in generating health inequalities. The findings will specify which aspects of the interactions and expectations during consultation are associated with patients and GPs' characteristics that could contribute to the production of social inequalities in health.

057 THE EFFECT OF FINANCIAL INCENTIVES ON INEQUALITIES IN THE QUALITY OF PRIMARY CARE

C Fullwood, T Doran, D Reeves. National Primary Care Research and Development Centre, University of Manchester, Manchester, UK

Objective: To determine whether socioeconomic inequalities in the quality of primary care in England have diminished under a pay-for-performance scheme.

Design: Analysis of activity data extracted from general practices' clinical computing systems; data from the UK Census, the 2004 Index of Deprivation, and on characteristics of individual practices. Practices were grouped into quintiles on the basis of area deprivation in their locality. We examined overall levels of achievement for 48 clinical activity indicators during the first 3 years of the quality and outcomes framework (QOF) scheme (2004–5 to 2006–7) and their association with area deprivation.

Setting: The QOF scheme remunerates general practices in the United Kingdom on the basis of their performance against a set of quality indicators covering clinical care for several chronic diseases, including coronary heart disease, diabetes and asthma.

Participants: 7637 general practices in England.

Main Outcome Measures: (1) Practice-reported achievement (the proportion of eligible patients for whom the quality indicators were achieved). (2) Exception reporting rates (the proportion of patients excluded from target calculations by practices for reasons including informed dissent and extreme frailty).

Results: (1) Median reported achievement was 85.1% in year 1, 89.3% in year 2 and 90.8% in year 3. In year 1, progressively lower levels of achievement were associated with higher levels of area deprivation: ranging from median 86.8% achievement for quintile 1 (least deprived) to 82.8% for quintile 5 (most deprived). Between years 1 and 3, the gap in median achievement between quintiles 1 and 5 narrowed from 4.0% to 0.8%. On regression modelling, greater increases in practice achievement were associated with lower levels of achievement in year 1 and not with area deprivation. (2) Exception reporting rates were generally low and changed little over time. Higher exception reporting rates were, however, weakly associated with higher levels of area deprivation: ranging from 7.21% for quintile 1 to 7.59% for quintile 5 in year 3.

Conclusions: There has been a reduction in variation in quality of care for incentivised activities at the practice level during the first 3 years of the QOF scheme. Gains in quality were inversely related to initial levels of achievement but were unrelated to area deprivation, suggesting that the scheme is highly equitable. The QOF has the potential to make a substantial contribution to the reduction of health inequalities, but its impact on unincentivised activities needs to be assessed.

058 ATTITUDES AND KNOWLEDGE OF GPS TOWARDS HUMAN PAPILLOMAVIRUS INFECTION, TESTING AND VACCINATION: RESULTS FROM A NATIONAL SURVEY IN IRELAND

J Murphy, L Sharp, A-E Carsin. National Cancer Registry, Cork, Ireland on behalf of the Irish Cervical Screening Research Consortium (CERVIVA)

Objective: To determine GPs' attitudes and knowledge of human papillomavirus (HPV) infection, HPV testing and HPV vaccination in Ireland.

Design: A national survey of GPs in Ireland. A questionnaire was mailed to a random sample of 1995 GPs, stratified by sex and area during March–July 2007. The questionnaire included 13 factual questions on HPV infection and questions on HPV testing and vaccination attitudes and practices.

Setting: Ireland.

Participants: 1995 GPs in Ireland, 878 GPs responded (response rate 44%).

Main Outcome Measures: Determination of GPs attitudes and knowledge of HPV. GPs have a key role to play in advising women about all aspects of HPV, including prevention of infection.

Results: 16% of GPs answered 11 or more of 13 HPV infection questions correctly; 56% answered 8–10; 23% answered 5–7 and 4% answered 4 or fewer correctly. 42% favoured HPV tests being used routinely as an adjunct to smears. Almost 70% felt "positive" or "very positive" about HPV vaccination. One-third thought vaccination would give lifelong cervical cancer protection. 10% knew vaccination could provide protection against other cancers. More GPs would be willing to vaccinate sexually active (71%) than sexually naive (62%) girls under 16 years. This was also the case for GPs willing to vaccinate women aged 16–26 years, with 79% willing to vaccinate sexually active and 63% willing to vaccinate sexually naive women. 53% of GPs would vaccinate sexually active women

over 26 years. Few GPs (5–7%) had administered HPV tests or vaccinations. Infection knowledge was related to willingness to administer vaccines.

Conclusion: Although support for HPV vaccination is high, this study highlights gaps in GPs' knowledge about vaccine efficacy, vaccine-appropriate groups and HPV infection.

059 USE OF PROSTATE-SPECIFIC ANTIGEN BY MALE GPS AND FACTORS INFLUENCING THIS PRACTICE: A NATIONAL SURVEY

FJ Drummond, A-E Carsin, L Sharp, H Comber. *National Cancer Registry, Cork, Ireland*

Objective: Screening for prostate cancer is controversial and the increase in prostate cancer incidence is attributed to the widespread use of prostate-specific antigen (PSA) testing. The majority of PSA testing occurs in general practice. The aim of this study was to evaluate the prevalence of PSA testing among male GPs and to investigate factors associated with the self-reported use of PSA by male GPs.

Methods: A national survey was posted to all male GPs in the Republic of Ireland (n = 2219). A multivariate logistic regression model was constructed to identify factors significantly associated with whether male GPs would themselves have a PSA test.

Results: The response rate was 53%. Of the respondents, 89% reported that they would have a PSA test. In the multivariate logistic model, GPs who would have a PSA test themselves were significantly more likely to be older (>50 years), to work in solo practices, and less likely to have worked in the United Kingdom; these GPs were significantly more likely to overestimate the positive predictive value of PSA and digital rectal examination and were significantly less knowledgeable regarding prostate cancer risk factors than GPs who would not have a PSA test. These GPs were almost four times more likely to have had an asymptomatic man diagnosed with prostate cancer through PSA testing than GPs who would not themselves have a PSA test. The PSA testing behaviour of GPs who would not have a PSA test differed from those who would have a test; they were significantly less likely to test asymptomatic men (odds ratio (OR) 0.12, 95% CI 0.08 to 0.18), perform occupational health tests, arrange appointments for PSA testing, or frequently to test men with unrelated complaints, lower urinary trait symptoms, or a family history of prostate cancer and were significantly more likely to perform a digital rectal examination. GPs who would not have a PSA test strongly believed that men should only be PSA tested when prostate symptoms develop (OR 26.02, 95% CI 11.78 to 57.48).

Conclusions: Despite uncertainty concerning the value of PSA testing, the majority of male GPs would have a PSA test themselves and this positive attitude towards PSA testing influenced their practice. GPs who would not have a PSA test were more knowledgeable about the efficacy of PSA and prostate cancer risk factors and were significantly less likely to PSA test men in their practice, arguing that dissemination of evidence-based information could effect change in the PSA testing practice of GPs.

060 EXCLUDING INDIVIDUAL PATIENTS FROM PAY-FOR-PERFORMANCE TARGETS: AN ANALYSIS OF EXCEPTION REPORTING IN THE UK'S QUALITY AND OUTCOMES FRAMEWORK

T Doran, C Fullwood, M Roland. *National Primary Care Research and Development Centre, University of Manchester, Manchester, UK*

Objective: To determine whether patient characteristics are associated with rates of exception reporting by general practices under the UK's pay-for-performance scheme and whether practices have exploited the provision to exclude patients for financial gain.

Design: Analysis of activity data extracted from general practices' clinical computing systems, data from the UK Census and the 2004 Index of Deprivation and data on characteristics of individual practices.

Setting: The Quality and Outcomes Framework (QOF) remunerates general practices on the basis of their performance against a set of quality indicators covering clinical care for several chronic diseases, including coronary heart disease, diabetes and asthma. Practices can exclude patients from the quality calculations for reasons including extreme frailty, intolerance of treatment and informed dissent. This provision, called "exception reporting", is intended to safeguard patients against inappropriate treatment. Exception reporting may, however, allow physicians to game the system to their financial advantage by excluding patients for whom the targets had been missed rather than for a genuine clinical reason.

Participants: 8105 general practices in England in 2005–6.

Main Outcome Measures: Patterns of exception reporting for 65 clinical activities and the association of exception reporting rates with practice and patient characteristics.

Results: Practices excluded a median 5.3% of patients from the quality calculations (interquartile range 4.0–6.9%, minimum 0.0%, maximum 28.3%). Practices were most likely to exclude patients from indicators relating to giving treatments and achieving target levels of intermediate outcomes, and were least likely to exclude them from indicators relating to routine checks and measurements and to offers of treatment. There was no correlation between exception reporting rates and the number of points (and hence remuneration) available for individual indicators (Spearman's R = 0.06). Practices that did not receive maximum payments in the previous year tended to have marginally higher exception reporting rates than practices that did. Higher exception reporting rates were also associated with practices situated in more densely populated areas, with fewer patients over the age of 64 years and with larger practice populations. However, practice and patient characteristics explained only 2.7% of the variance in exception reporting.

Conclusions: Exception reporting safeguards patients against inappropriate treatment and ameliorates perverse incentives to refuse care to "difficult" patients. The system does not appear to have been widely abused in England, but the possibility of low-level gaming reinforces the need for effective systems to monitor for inappropriate exclusions.

Friday 19 September

Parallel session D

Cancer

061 THE DIAGNOSIS OF PROSTATE CANCER IN BLACK MEN AND WHITE MEN RESIDENT IN ENGLAND: THE PROCESS COHORT STUDY

[1]C Metcalfe, [1]S Evans, [2]R Persad, [1]Y Ben-Shlomo, the PROCESS investigators. [1]*Department of Social Medicine, Bristol University, Bristol, UK;* [2]*Department of Urology, United Bristol Healthcare Trust, Bristol, UK*

Background and Objectives: We have previously shown that black men residing in England have three times the incidence of diagnosed prostate cancer when compared with their white counterparts. We examine whether access to diagnostic services underlies this association.

Design: Population-based retrospective cohort study.

Setting and Population: Black men and white men, diagnosed with prostate cancer in the late 1990s, and residing in four districts within Bristol or London. Cases were ascertained using multiple sources including pathology databases, hospital discharge diagnosis files and prostate-specific antigen (PSA) records greater than 10 ng/ml.

Ascertainment of Race: When possible, men were asked to complete the 2001 census questions on ethnicity. Otherwise this information was obtained from the man's wife, hospital records, or death certificates.

Main Outcome Measures: Men were asked to complete a questionnaire (obtained for 811 men), and further information was obtained from hospital medical records (obtained for 1467 men). These sources provided information on knowledge of prostate cancer, delays in seeking medical attention, referral pathway, symptoms at presentation and initial investigations.

Results: Black men and white men were comparable in their knowledge of prostate cancer, in the delays reported before presentation, and in the referral route followed before diagnosis. Black men were diagnosed an average of 5 years younger compared with white men. At the time of diagnosis black men had similar urinary symptom frequency (approximately 65% in each group), PSA levels (approximately 25% of both groups having a level below 10 ng/ml), tumour grades and tumour stages compared with white men. However, when black men were compared with white men diagnosed at a comparable age, there was evidence of higher PSA levels (p<0.001) and other signs of more advanced disease in black men.

Conclusions: Black men in England appear to be diagnosed with prostate cancer at a similar stage of the disease, but at a younger average age. This may be because black men start to develop the disease at a younger age, putting these men at higher risk of seeing the disease develop in their lifetimes.

---

062 ACCESS TO PALLIATIVE CARE FOR UPPER GASTROINTESTINAL CANCER PATIENTS: A SURVEY OF FIVE CANCER NETWORKS

[1]D Bailey, [2]C Wood, [3]M Goodman, the South West Cancer Intelligence Service (SWCIS) Upper GI Tumour Panel. [1]*Cancer Intelligence Service, South West Public Health Observatory, Bristol, UK;* [2]*Salisbury District Hospital, Salisbury, UK;* [3]*Royal Bournemouth Hospital, Bournemouth, UK*

Objective: To determine the effectiveness of the different models of palliative care for upper gastrointestinal cancer patients across five cancer networks, population 7.2 million. To determine if resources are available and if patients with palliative care needs are supported throughout their illness. To determine how often patients are admitted to hospital as an emergency when they could have been better managed by palliative care or other care in the community.

Method: A questionnaire was agreed by a multidisciplinary panel of 14 upper gastrointestinal tumour clinicians, with representation from the five cancer networks. Upper gastrointestinal lead clinicians in 26 hospital trusts were asked to complete the questionnaire collaboratively at their multidisciplinary team (MDT).

Results: 22/26 (85%) trusts responded. 20/22 trusts (91%) had palliative care representation at their MDT, attendance ranging from 5% to 100% with a palliative care doctor attending in only 15% of cases. 19/22 (86%) trusts had adequate resources for urgent stents, and 86% felt there were sufficient resources to support palliative care patients throughout their illness. 82% stated the model of palliative care provision worked well in their locality, although outside of hours support was variable. Only 41% of MDT had a dietician attending. 8/20 (40%) trusts said patients were fairly often admitted as an emergency for pain control, nausea, dysphagia and blood transfusions when they could have been better managed in the community.

Conclusion: Although overall specialist palliative care representation at MDT was good at 91%, there was wide variation in attendance and concerns over lack of resources. Recommendations include increasing resources for dietetic support, for palliative care staff when attendance at MDT is low and in three trusts to increase the capacity for urgent stenting. Suggestions for improving services included more hospice beds, an out-of-hours service at weekends and bank holidays, mobile palliative care urgent assessment teams and facilities for day-case transfusions at hospices. There is a clear need for closer working between secondary care and local palliative care services. This requires better data collection of palliative care activity, both in primary and secondary care, to enable the burden on services to be quantified and understood. This would allow improvement of services in terms of out-of-hours support, community management of palliative care and variations between different providers.

---

063 IS SMOKING STATUS AT TIME OF DIAGNOSIS AN INDEPENDENT PROGNOSTIC FACTOR FOR SURVIVAL FROM CANCER? A POPULATION-BASED STUDY

A-E Carsin, L Sharp. *National Cancer Registry, Ireland*

Background: A few studies have suggested smoking at the time of diagnosis may be associated with poorer outcomes, but most of these have been small and/or based on selected clinical series. The extent to which the relationship might be due to socioeconomic status is not clear.

Objective: We investigated whether smoking status at diagnosis was associated with survival for individuals diagnosed with one of 10 common cancers—breast, colorectal, lung, prostate, stomach, head and neck, bladder and ovarian cancers, malignant melanoma and non-Hodgkin's lymphoma (NHL).

Methods: Invasive cancers diagnosed from 1999 to 2003 and registered with the National Cancer Registry, Ireland, were included. Cases were categorised according to the deprivation category of their area of residence. Cases were followed up to 31 December 2005 or to death, whichever occurred first. Only cancer-specific mortality was considered. Cox proportional hazards models were used to compare risk of death in non-smokers versus current smokers. The analysis was done for all cases and repeated after stratifying by treatment (surgery, chemotherapy, radiotherapy). First, hazard ratios (HR) were adjusted for age, sex, stage, marital status and then further adjusted for deprivation.

Results: The numbers of patients included were: breast 9815; colorectal 8650; prostate 8435; lung 7649; NHL 2215; melanoma 2183; stomach 2117; bladder 2069; head and neck 1808; ovary 1710. Overall, the risk of dying from cancer was higher for smokers than non-smokers for all cancers apart from stomach. This was statistically significant for lung (adjusted HR 1.15; 95% CI 1.09 to 1.21), prostate (adjusted HR 1.39; 95% CI 1.24 to 1.57) and head and neck cancer (adjusted HR 1.48; 95% CI 1.25 to 1.75). Smoking was significantly associated with poorer survival at one year for breast, colorectal, lung, prostate and head and neck cancer and melanoma. For melanoma, the effect was stronger in patients who had had surgery (adjusted HR 1.54; 95% CI 1.02 to 2.34). For ovarian cancer, it was stronger in patients who had not had surgery (adjusted HR 1.37; 95% CI 1.01 to 1.85). The association was stronger among patients who had not had radiotherapy for cancers of the breast, lung, prostate, head and neck and for NHL. All association persisted after adjustment for deprivation.

Conclusion: These results suggest that smoking at diagnosis increases the risk of dying from several types of cancer. This association was evident after adjusting for socioeconomic status. Possible, and plausible, explanations include the impact of smoking on immune competence or inflammatory response, effects of smoking on metabolism of chemotherapy drugs and smoking-induced susceptibility to genetic damage.

---

064 DECLINING DEATH RATES FOR PROSTATE CANCER AND TRENDS OF INCIDENCE AND TREATMENT IN ENGLAND AND WALES (1975–2004): IS THERE A LINK?

[1]S Hussain, [1]D Gunnell, [1]J Donovan, [1]C Trotter, [2]J Verne, [2]S McPhail, [3]P Stephens, [1]R Martin. [1]*Department of Social Medicine, Bristol, UK;* [2]*South West Public Health Observatory, Bristol, UK;* [3]*Intercontinental Medical Statistics (IMS) Health, London, UK*

Introduction: Prostate cancer is the second commonest cause of cancer deaths among men. A decline in the mortality rate of

prostate cancer was reported in the United Kingdom in the early 1990s. This study examined the trends of incidence and treatment of prostate cancer in order to assist the interpretation of the mortality trends of this disease.

Methods: Joint point regression was applied to the secular trends in mortality and incidence (source Office of National Statistics), radical prostatectomy and orchidectomy (Hospital Episodes Statistics database) and androgen suppression drugs (source Intercontinental Medical Statistics).

Results: Prostate cancer mortality has declined from 1992 (95% CI 1990 to 1994). Men aged 55–74 years show a greater reduction (2.75% reduction per year; 95% CI 2.33% to 3.18%) than those aged above 75 years (0.71%; 0.26% to 1.15%). The death rates for those under 55 years has remained at low levels from 1975 to 2004. The decline in mortality in prostate cancer in the age group of 55–74 years occurred at a time when the incidence of prostate cancer in England and Wales has increased in all age groups (<55; 55–74; 75+ years). The age-specific trends in incidence have shown the highest (sixfold) increase in those under 55 years of age between 1975 (3.07 per 100 000) and 2004 (18.30 per 100 000). The use of radical prostatectomy has increased from 89 operations in 1991 to 2788 operations in 2004 among men aged 55–74 years. The prescriptions of androgen suppression have also increased from 33 000 prescriptions in 1987 to 470 000 prescriptions in 2004.

Conclusions: The decrease in prostate cancer mortality is greatest among men aged 55–74 years. Whereas the increased availability of prostate-specific antigen testing in the latter part of the 1990s, increased detection of localised/early stage disease and its radical treatment, explains the increasing trends in incidence of prostate cancer, the same explanation cannot be extended to the early decline (1992) in mortality because it predates the substantial use of prostate-specific antigen testing in England and Wales. The recent trends of mortality, however, can be better explained by a combination of increased diagnosis and increased radical treatment for localised cancer or low volume locally advanced disease among the younger age groups. Medical androgen suppression therapy may also partly explain the trends.

Methods II

065 PUBLICLY FUNDED RANDOMISED TRIALS: HOW MANY PROVE A DIFFERENCE?

J Raftery, L Grigore. *Wessex Institute for Health R&D, University of Southampton, Southampton, UK*

Aims: For published randomised controlled trials (RCT) commissioned by the United Kingdom's two main funders, the Medical Research Council (MRC) and the NHS Health Technology Assessment Programme (HTAP), to estimate the proportion (total, by funder) that show the expected difference between treatments.

Data/Methods: Identification of RCT from the publicly available Current Controlled Trials database (http://www.controlled-trials. com), due to have completed between 1996 and 2005. Data extraction from published reports of results.

Results: Of the 150 (91 MRC, 59 HTAP) eligible published trials, three were designed as non-inferiority, the rest tested hypotheses to do with the superiority of particular technologies. 17 (25%) trials had either placebo or no-treatment controls (23% MRC, 7% HTAP). 97 of the 147 eligible superiority trials (67%) reported no difference in primary outcome (67% MRC, 68% HTAP).

Discussion: Two-thirds of the trials designed to test hypotheses of superiority failed to show a statistically significant difference in a primary outcome. This proportion did not vary by funder. The scope for showing difference was limited by 83% of trials having active controls. As failure to show superiority cannot be interpreted

as non-inferiority, the value of these results for policy is questionable. Demonstration of non-inferiority would have greater policy relevance for some comparisons, but might require larger trials.

Conclusions: Within current designs, larger trials are required. When appropriate, scope should be included to switch from superiority to non-inferiority designs. The alternative decision analytical approach, which would design trials on the basis of value of information, also deserves consideration.

066 SHOULD WE USE RELATIVE RISKS OR ODDS RATIOS IN CLUSTER RANDOMISED TRIALS WITH BINARY OUTCOMES THAT HAVE HIGH PROPORTIONS?

MJ Campbell. *Medical Statistics Group, Health Services Research, ScHARR University of Sheffield, Sheffield, UK*

Introduction: It is well known in cluster randomised trials with a binary outcome and a logistic link that the population averaged and cluster-specific models estimate different population parameters (Neuhaus and Jewell, *Biometrika* 1993). However, it is less well appreciated that for a log link, the population parameters are the same (Campbell *et al*, *Stat Med* 2007) and a log link leads to a relative risk. This suggests that for a prospective cluster randomised trial the relative risk is easier to interpret. Commonly the odds ratio and the relative risk have similar values and are interpreted similarly. However, when the incidence of events is high they can differ quite markedly and it is unclear which is the better parameter.

Methods: We estimate the relative risk through either the use of generalised estimating equations or through a random effects model, which are the population averaged and cluster-specific methods, respectively. Although a cluster-specific model for a clinical trial has no realisation, the model can be relatively easily fitted using either Gaussian quadrature or Bayesian methods (MCMC).

Results: We explore these issues in a cluster randomised trial, the Paramedic Practitioner Older People's Support Trial (Mason *et al*, *BMJ* 2007). This investigated whether paramedic practitioners who assessed and treated patients in the community could reduce emergency admissions to hospital. In that trial the admission rate was high and the use of a logistic model was potentially misleading. A relative risk was a better summary measure and gave a different interpretation to some of the data. However, in this case the intraclass correlation coefficient (ICC) was low and so fitting was not a problem. For simulated data with a high ICC, there were no problems fitting a logistic model, but there were convergence problems with a log-linear model. We conclude that notwithstanding the attractions of a log-linear model leading to a relative risk, in general with high incidence and a high ICC a logistic model is the best option.

067 ESTIMATING HOW MANY PEOPLE ARE INFECTED WITH HEPATITIS C VIRUS IN ENGLAND AND WALES: AN EVIDENCE SYNTHESIS APPROACH

[1]M Hickman, [2]D De Angelis, [2]M Sweeting, [1]T Ades. *[1]Social Medicine and Community Based Medicine, University of Bristol, Bristol, UK; [2]MRC Biostatistics Department, University of Cambridge, Cambridge, UK*

Background: Estimates of the number hepatitis C virus (HCV) cases in England and Wales vary considerably—with one research group estimating 280 000 and another 466 000 to 900 000, neither providing much justification for their estimate. Injecting drug users (IDU) are the main risk group and the number of current and ex-IDU the main driver to the number of HCV infections. However, there is no single representative data source that can tell us how many IDU or how many HCV infections there are in the population. Instead, we have partial information and a mixture of data sources.

Methods: We adopted a multiparameter evidence synthesis of information on the size of the groups at risk of HCV (IDU, ex-IDU and non-IDU) and the risk-specific anti-HCV prevalence. The England and Wales population was further subdivided into sex, region (London, north west England, rest of England and Wales) and age (15–29, 30–44, 45–59 years). We used data from multiple HCV seroprevalence studies conducted in different populations, which with additional data on the composition of each study in terms of the risk groups gave us risk group-specific estimates of HCV prevalence. Information on current IDU was derived from capture–recapture studies and population surveys. We developed a method of estimating the number and proportion on ex-IDU based on estimating injecting duration and time since last injection from a sample of ex-IDU. We simultaneously estimated the size of at-risk groups and prevalence of HCV through the use of Bayesian Markov chain Monte Carlo techniques.

Findings: Overall we estimated that there were 171 000 anti-HCV cases in England and Wales (95% CI 115 000 to 276 000); with 40% among current IDU and 45% among ex-IDU and 15% exposed through other routes. In addition, we estimated that there were 190 000 (137 000 to 265 000) IDU and 399 000 (177 000 to 906 000) ex-IDU yielding estimates of prevalence in adults aged 15–59 years of 0.6% (0.43 to 0.83) and 1.2% (0.55 to 2.83), respectively. We broke the IDU population into current and ex and dependent non-dependent/recreational use and estimated that these ratios were approximately 1 : 2 and 2 : 1, respectively.

Implications: These estimates of the number of HCV cases in England and Wales were substantially lower than previous estimates—although still representing a significant public health burden. The largest uncertainty lies in the estimates and information on the number of ex-IDU. In addition, in the absence of other information we had to assume that one data source on the number of IDU was unbiased. The modelling framework provides an opportunity to incorporate new information and improve the estimates and improve the evidence base for policy-makers.

---

068 | THE STATISTICAL PITFALLS OF PARTIALLY RANDOMISED PATIENT PREFERENCE TRIALS

[1]I Gemmell, [2]G Dunn. [1]National Primary Care Research and Development Centre, University of Manchester, Manchester, UK; [2]Biostatistics Unit, University of Manchester, Manchester, UK

Background: The partial patient preference design has been suggested as a method of estimating treatment outcome in studies of interventions when both patients and clinicians are aware of treatment allocation. The patient preference trial (PPT) design allocates those who do not express a treatment preference to groups at random but allows those who express a preference to receive the treatment of their choice. It has been suggested that the design can improve the external and internal validity of trials.

Aim: To illustrate the impact that an unmeasured confounder could have on the results and conclusions drawn from a partial patient preference trial.

Method: Using computer simulation we generated 4000 observations ("patients") that reflected the distribution of the Beck Depression Index (DBI) in trials of treatment for depression. Half of these observations were randomly assigned to a randomised controlled trial (RCT) design and half were assigned to a PPT design. In the RCT, "patients" were evenly split between treatment and control groups, whereas in the PPT, to reflect patient choice, 85% of patients were allocated to the experimental treatment and 15% to the control. We created a treatment effect that was equivalent to a 1 unit decrease in BDI and a confounder effect that was equivalent to a 1 unit increase in BDI. The (unmeasured) confounder was evenly split between treatment and control groups in the RCT; in the PPT 24% of patients who received the treatment had the confounder and 77% of patients who received the control had the confounder. The simulation was repeated 4000 times to estimate the frequency with which the presence of an unmeasured confounder could lead to biased results when using the PPT design.

Results: The null hypothesis of no difference between treatment groups was rejected in 81% of trials using the RCT design and in 88% of trials using the PPT design. The average treatment effect was correctly estimated as 1 BDI (se 0.35) in the RCT and incorrectly estimated as 1.5 BDI (se 0.49) in the PPT. Analysis of the PPT adjusted for the confounder correctly estimated the treatment effect as 1 BDI (se 0.54); however, the large standard error associated with the estimate meant that the null hypothesis was rejected in only 46% of PPT trials.

Conclusions: Partial patient preference designs are not recommended as a method of establishing an unbiased estimate of treatment effect because they are subject to biases introduced by unmeasured confounders.

Diet and health

069 | WHY DO SOME WOMEN OF LOWER EDUCATIONAL ATTAINMENT EAT POORER QUALITY DIETS THAN OTHERS?

W Lawrence, M Barker, S Crozier, the Food Choice Group, University of Southampton. MRC Epidemiology Resource Centre, University of Southampton, Southampton General Hospital, Southampton, UK

Objective: Focus groups carried out in Southampton suggested that some women of lower educational attainment have a poorer diet than others. Thematic analysis indicated this might be because some women felt they lacked control over the food choices they made for themselves and their families, had less support for making healthier choices, had some ambiguous views on the long-term benefits of healthy eating and were less interested in the processes of food provision (shopping, preparation, cooking and eating). The present study aimed to confirm that there were differences in quality of diet within a group of women with lower educational attainment and to try and account for these differences. We assessed quality of diet and investigated the relationship between this and psychosocial factors in a sample of women with lower educational attainment.

Design: Structured interviews on women's diet and a range of demographic, environmental and psychosocial factors.

Setting: 19 children's centres and baby clinics in Southampton.

Participants: 212 women of lower educational attainment (up to GCSE), median age 26 years.

Main Outcome Measure: Quality of diet assessed by 20-item food frequency questionnaire.

Results: Principal components analysis was used to calculate a single diet score for each woman. Women with high scores had diets that were in line with recommendations from the UK Department of Health and other agencies. This pattern was therefore termed a "prudent" dietary pattern. There was considerable variation in quality of diet in this group of women. A multiple linear regression model was fitted with outcome (prudent diet score) and predictors expressed as z-scores. Those who had the poorest diets were less positive about the potential benefits of eating healthily ($\beta = 0.29$; p<0.001), less interested in food shopping, preparation and consumption ($\beta = 0.18$; p = 0.005), felt less in control of their lives ($\beta = 0.17$; p = 0.009) and reported less social support for eating healthily ($\beta = 0.15$; p = 0.02). This model explained 25% of the variation in prudent diet scores. These associations were independent of age, number of children in the home, dress size (body mass index proxy) and working status. None of the latter was associated with prudent diet scores in these 212 women.

Conclusion: These findings suggest that an intervention package to improve the diets of disadvantaged women in Southampton needs to increase the women's perceived control, raise their involvement in food, improve levels of support for healthy eating and heighten their awareness of the benefits of eating a healthier diet.

070 THE WHOLE SCHOOL APPROACH TO HEALTHY EATING: A MULTILEVEL ANALYSIS OF PUPIL DIET BEHAVIOUR

NP Townsend. *Cardiff Institute of Society, Health and Ethics, Cardiff University, Cardiff, UK*

The aim of this research was to assess the relationship between a whole school approach to nutrition and the self-reported diets of pupils. Individual and school-level effects on two measures of diet choice, one for unhealthy foods and one for fruit and vegetables, were estimated using multilevel modelling. The data are from the Welsh Health Behaviour in School-aged Children study and involve data from 70 schools in which pupils (N = 7300) were surveyed using anonymous questionnaires completed in the school and teachers (N = 292) were surveyed using postal questionnaires. Although differences between schools in pupil diet behaviour were found to originate mainly from differences in pupil characteristics, variation between schools remained when controlling for individual effects. A wide range of school approaches to the promotion of healthy eating were taken into account, although only a few of them were found to influence the diet choices pupils made. When looking at the whole school approach to nutrition, using a variable measuring the extent to which schools have a whole school approach in place, it was found that this did have a significant effect on pupil self-reported diets, even when controlling for individual effects. The findings demonstrate the need for greater study into a whole school approach to nutrition and the individual approaches that it incorporates.

071 SOCIOECONOMIC DIFFERENCES IN THE NUTRITIONAL CONTENT OF FOOD AND DRINKS ADVERTISED IN POPULAR UK WEEKLY MAGAZINES

J Adams, A Hodgson, M White. *Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK*

Background: Socioeconomic differences in social norms may contribute to inequalities in diet and body weight. The media helps shape social norms through advertisements. Little is known about what foods are advertised in UK print media.
Objectives: To describe the types and nutritional content of food and drinks advertised in popular UK weekly magazines by the socioeconomic profile of readers.
Design: Four consecutive issues of UK weekly magazines with a readership over 500 000 were purchased in November 2007. All food advertisements were categorised into seven food groups based on the Balance of Good Health, with additional categories for alcoholic beverages and diet soft drinks. Data on the nutritional content of advertised foods were obtained from packaging, manufacturers' websites and standard food tables.
Measures: We calculated the percentage of energy from macronutrients, saturated fat and sugars and fibre and sodium density for foods advertised. The socioeconomic profile of each magazine was characterised as the ratio of the proportion of C2DE individuals who read the magazine to the proportion of ABC1 individuals who read the magazine. Magazines were divided into more affluent, middle and more deprived tertiles based on this ratio. Differences in the distribution of food categories across socioeconomic tertiles and correlation between nutrient content and socioeconomic ratio were investigated at the advertisement level.
Results: Four issues of 29 publications contained 2841 pages and 432 advertisements for 101 products. Food advertisements were less common in the middle, compared with the more affluent and deprived tertiles (χ^2 = 17.82, p<0.001). The most common category of food advertised overall, and in each tertile, was sugary and fatty foods (34.0%). Starchy foods were advertised more often in the more deprived (χ^2 = 7.36, p = 0.025) and alcoholic beverages in the more affluent (χ^2 = 16.85, p<0.001) tertile. Greater socioeconomic ratio (greater proportion of C2DE readers) was associated with a higher percentage of energy from protein (τb = 0.11, p = 0.002), saturated fat (τb = 0.08, p = 0.029), carbohydrate (τb = 0.13, p<0.001), and

sugars (τb = 0.18, p<0.001), higher fibre (τb = 0.08, p = 0.015) and sodium density (τb = 0.13, p<0.001) and lower percentage of energy from alcohol (τb = −0.20, p<0.001).
Conclusions: Food advertisements are common in popular magazines. Sugary and fatty foods accounted for more than a third of foods advertised. There were differences in the type and nutritional content of foods advertised according to the socioeconomic profile of readers. These reflect known dietary variations. This pattern of advertising may represent a barrier to reducing inequalities in diet and body weight.

072 EDUCATIONAL ATTAINMENT, PERCEIVED CONTROL AND THE QUALITY OF WOMEN'S DIETS

M Barker, W Lawrence, S Crozier, the Food Choice Group, University of Southampton. *MRC Epidemiology Resource Centre, University of Southampton, Southampton General Hospital, Southampton, UK*

Objective: Data from the Southampton Women's Survey have established that women of lower educational attainment have poorer quality diets than women of higher educational attainment. This relationship is strong and graded such that for every increase in level of educational qualifications, there is an increase in the likelihood that a woman will have a better quality diet. This is not wholly explained by socioeconomic status. Focus groups carried out in Southampton suggest that women of lower educational attainment may have a poorer diet because they feel they lack control over the food choices they make for themselves and their families. We set out to investigate the relationship between educational attainment, perceived control and quality of diet in a cross-section of Southampton's women.
Design: Structured interviews covering women's diet, educational attainment and perceived control.
Setting: 19 children's centres and baby clinics in Southampton.
Participants: 378 women, median age 28 years.
Main Outcome Measures: Quality of diet assessed by 20-item food frequency questionnaire and perceived control assessed by a standard general control questionnaire.
Results: In this group, women of lower educational attainment had poorer quality diets (r = 0.42; p<0.001) and felt less in control of their lives (r = 0.33; p<0.001) than women of higher educational attainment. Those who felt less in control of their lives also had poorer quality diets (r = 0.31; p<0.001). In a regression model both educational attainment and perceived control had independent effects on quality of diet (p<0.001 for both).
Conclusion: Women of lower educational attainment perceive themselves to have less control over their lives than women of higher educational attainment, and this perceived lack of control is reflected in their diets being of poorer quality. However, our data suggest that although they are linked, educational attainment and perceived control have independent effects on quality of diet. We are currently exploring other psychological and behavioural differences between women of lower and higher educational attainment that might help explain differences in the quality of their diet.

Healthcare evaluation

073 BARRIERS TO UPTAKE OF EYE CARE SERVICES FOR CHILDREN IN BANGLADESH

[1]M Muhit, [2]N Odedra, [3]S Hartley, [1]C Gilbert. [1]*International Centre for Eye Health, London School of Hygiene and Tropical Medicine, London, UK;* [2]*Department of Optometry, Leicester, UK;* [3]*University of East Anglia, Norwich, UK*

Background: In a previous study, we found that more than a third of childhood blindness in Bangladesh is treatable, but the vast majority of blind children never attend eye hospital.

Objective: To identify factors that influence the use of eye health services by parents with children who are severely visually impaired or blind in Bangladesh.

Design: Qualitative study using semi-structured in-depth interview of individual and focus group discussions (FGD).

Setting: This study was conducted in rural Bangladesh. Interviews and FGD were conducted in naturalistic settings including residence of blind children, school premises or in an appropriate space in the villages.

Participants: 38 children, aged 10–15 years, with blindness or visual impairment, participated in 20 interviews and two FGD. 37 interviews and one FGD were conducted with parents or the primary carer of a blind child. Five other FGD were conducted with parents who did not have any blind child. 19 interviews and seven FGD were conducted with various types of service providers including doctors, traditional healers, school teachers and rehabilitation workers.

Main Outcome Measures: Barriers to accessing children's eye health services.

Results: Barriers identified in this study fell into seven main categories: (1) poverty and lack of financial ability to cover the direct and indirect cost of surgery, travel, food and accommodation for the child and parents when going to the city—where paediatric eye services are located; (2) lack of time and accompanying person to visit hospital; (3) long distance to hospital; (4) fear of eye surgery in young children, including fear of surgery itself but also fear of death from anaesthesia and fear of causing further damage to the eye; (5) various beliefs "children who are born blind can not be treated to restore sight", "supernatural cure for blindness" and "children need to grow older before they are eligible for surgery"; (6) lack of information about eye care services for children and (7) greater acceptance and high preference of the parents for non-surgical cure, particularly from traditional healers, religious healers and untrained "village doctors".

Conclusions: Many of the factors influencing access to eye care services for children operate at the community level. Community development, raising awareness, health education and making information available at the community level, societal support towards early detection, referral and cost of surgical care for blind children is essential to overcome the identified barriers and linking blind children and their parents with eye hospitals.

| 074 | **EFFECTIVENESS OF ANTIRETROVIRALS IN A SOUTH AFRICAN PROVINCIAL PROGRAMME: COHORT STUDY** |

[1]LR Fairall, [2]MO Bachmann, [3]G Louwagie, [4]C Van Vuuren, [3]P Chikobvu, [4]D Steyn, [5]GH Staniland, [5]V Timmerman, [5]M Msimanga, [5]CJ Seebregts, [6]A Boulle, [4]R Nhiwatiwa, [7]ED Bateman, [8]MF Zwarenstein, [9]RD Chapman. [1]*Knowledge Translation Unit, University of Cape Town Lung Institute, University of Cape Town, Cape Town, South Africa; [2]School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK; [3]Department of Community Health, Faculty of Health Sciences, University of the Free State, Bloemfontein, South Africa; [4]Department of Internal Medicine, Division of Infectious Diseases, University of the Free State, Bloemfontein, South Africa; [5]Biomedical Informatics Research Division, Medical Research Council, Cape Town, South Africa; [6]Infectious Disease Epidemiology Unit, School of Public Health and Family Medicine, University of Cape Town, Cape Town, South Africa; [7]Department of Medicine, University of Cape Town, Cape Town, South Africa; [8]Li Ka Shing Knowledge Institute, St Michaels Hospital, Department of Health Policy, Management and Evaluation, University of Toronto, Toronto, Canada; [9]Free State Department of Health, Bloemfontein, South Africa*

Background: It is not ethically possible to compare highly active triple antiretroviral treatment (HAART) for HIV/AIDS with no treatment in randomised trials. But observational studies of treatment effectiveness are prone to selection bias, rarely compare those receiving antiretroviral treatment with similar patients not receiving antiretroviral treatment and underestimate mortality unless patients are actively followed up.

Methods: In this cohort study we followed 14 267 patients enrolled in the Free State public sector antiretroviral treatment programme for up to 20 months after enrolment. 3619 patients received HAART for up to 19 (median 6, interquartile range 3–9) months. Patients' clinical data were linked with the national mortality register. Marginal structural regression models adjusted for baseline and time-varying covariates.

Results: HAART was associated with lower mortality (hazard ratio (HR) 0.14; 95% CI 0.11 to 0.18) and tuberculosis (HR 0.61; 95% CI 0.46 to 0.81) after adjusting for age, sex, tuberculosis at baseline, previous antiretroviral drugs, CD4 cell count, weight, co-trimoxazole treatment, clinic and district. Co-trimoxazole was associated with lower mortality (HR 0.37; 0.32 to 0.42). Each month of HAART was associated with a 15 cells/μl (15–16) increase in CD4 lymphocyte count and a 603 g (548–658) increase in body weight. However, of 4570 patients followed for over a year, 53% died and 87% of patients who died had not received HAART.

Conclusions: HAART provided through these South African government health services appears as effective as in high income countries. Delays starting HAART contributed to high mortality. Faster expansion and timely commencement of HAART are needed.

| 075 | **MISSED OPPORTUNITIES FOR REFERRAL IN CHRONIC LIVER DISEASE** |

[1]J Parkes, [1]M Smith, [2]A Young, [3]W Rosenberg, [1]P Roderick. [1]*Public Health Sciences and Medical Statistics, University of Southampton, Southampton, UK; [2]National Coordinating Centre for Health Technology Assessment, University of Southampton, Southampton, UK; [3]Institute of Hepatology, University College London, London, UK*

Background: Little is known of the epidemiology of referral patterns in chronic liver disease (CLD) in the United Kingdom, particularly the stage of disease initially presenting to hepatologists and whether there was an opportunity for earlier referral. Earlier detection of CLD could potentially improve clinical outcomes by offering opportunities for motivation for lifestyle change and for surveillance for oesophageal varices and hepatocellular cancer.

Objectives: To recruit a cohort of patients newly referred to hepatology services with CLD. To ascertain by clinical record review if there had been a missed opportunity for hepatology referral (previous contact with health services at which CLD or risk factors were reported).

Methods: New cases of CLD referred to hepatology at one centre over a 6-month period were ascertained by "hot pursuit" whereby each of the two weekly hepatology outpatient clinics were visited and hepatology wards on at least a thrice weekly basis. Cases presenting for the first time with cirrhosis or its complications whether previously known to hepatologists or not were ascertained. Patients were excluded if they were already known to hepatologists. Clinical records were searched for previous contact with healthcare to evaluate whether there had been any opportunities missed for earlier referral to hepatology. This included retrospective assessment of all blood tests performed.

Results: 118 patients were included, median age 49 years (19–82), 61% male. Most had alcoholic liver disease (ALD) (27% overall), 52% (n = 61) had a biopsy that allowed the severity of disease to be assessed. In patients with ALD presentation to hepatology is later in the disease process than other aetiologies. Overall, 20% of all new cases presented to hepatology with cirrhosis. 38/118 (32%) had previous contact with health services more than 18 months before hepatology referral, when risk factors for liver disease and/or abnormal tests were noted, of which most had ALD (42% ALD, 29% chronic hepatitis C, 16% non-alcoholic fatty liver disease). 31% of patients presented with moderate to severe fibrosis/cirrhosis, with 45% having had previous contact with health services.

Conclusion: Almost one third of new patients referred to hepatology had a missed opportunity for referral, 45% of this group presented with significant liver disease and may have benefited from earlier referral.

| 076 | ECONOMIC EVALUATION OF A PALLIATIVE CARE INTERVENTION FOR PEOPLE SEVERELY AFFECTED BY MULTIPLE SCLEROSIS: A RANDOMISED PHASE II TRIAL |

[1]IJ Higginson, [2]P McCrone, [1]S Hart, [1]R Burman, [3]E Silber, [1]P Edmonds. [1]Department of Palliative Care, Policy and Rehabilitation, King's College London, London, UK; [2]Institute of Psychiatry, King's College London, London, UK; [3]Department of Neurology, King's College Hospital, London, UK

Objective: To determine and estimate the cost-effectiveness of a new palliative care and neurology service for patients severely affected by multiple sclerosis (MS) and their caregivers.
Design: Delayed intervention (wait-list, randomised controlled trial) phase II MRC framework.
Setting: South London.
Participants: Patients severely affected by MS deemed by MS nurses, neurologists or other staff to have palliative care needs (unresolved symptoms, psychosocial concerns, end of life issues, progressive illness or complex needs).
Intervention: Multiprofessional palliative care team assessment and follow-up visit or call with recommended changes in treatments and services. The intervention group was offered the team immediately; the control group continued best standard care and then offered the team after a 3-month delay.
Data Collection: Face-to-face interviews using trained interviewers and validated questions at baseline and 6 and 12 weeks.
Main Costs and Outcome Measures: Self-reported use of services and time spent caring by families/friends using a standard questionnaire at 12 weeks, before the control group receiving the intervention. Self-reported caregiver burden and palliative care outcomes and key symptoms using the Zarit Burden Inventory (12-item version) and the Palliative Care Outcome Scale.
Results: 52 patients were recruited, consented to take part in the trial; 26 were randomly assigned to the intervention (I), 26 to the control (standard care) group (C): 25 fast track and 21 control patients completed the trial. Groups were similar at baseline. The mean age was 53 years and there was a high level of disability, mean Expanded Disability Status Scale score, mean 7.7 (median 8, SD 1.0) in both groups. At 12 weeks there were few differences in patient outcomes but caregiver burden was 4.47 points (total possible points are 48) lower (95% CI 1.05 to 7.89) in the fast track compared with the standard group. Mean service costs, including inpatient care and informal care, over the 0–12-week follow-up, were £1789 lower for the fast track group (bootstrapped 95% CI £5224 to £1902). There was also a trend towards lower community costs in the fast track group, and no differences in costs to informal caregivers.
Conclusions: Preliminary results from this phase II study provide sufficient evidence for further research into models of palliative care for people with MS with phase II and phase III studies, particularly in terms of their effects on caregivers and costs.

Health policy

| 077 | ESTIMATING THE CARDIOVASCULAR MORTALITY BURDEN ATTRIBUTABLE TO THE EUROPEAN COMMON AGRICULTURAL POLICY ON DIETARY SATURATED FATS |

[1]F Lloyd-Williams, [1]M O'Flaherty, [2]M Mwatsama, [2]C Birt, [2]R Ireland, [1]S Capewell. [1]Division of Public Health, University of Liverpool, Liverpool, UK; [2]Heart of Mersey, Liverpool, UK

Objective: To estimate the burden of cardiovascular disease within 15 European Union countries (before the 2004 enlargement), as a result of excess dietary saturated fats attributable to the Common Agricultural Policy (CAP).
Methods: A spreadsheet model was developed to synthesise data on population, diet, cholesterol levels and mortality rates. A conservative estimate of a reduction in saturated fat consumption of just 2.2 g was chosen, representing 1% of daily energy intake. The fall in serum cholesterol concentration was then calculated, assuming that this 1% reduction in saturated fat consumption was replaced with 0.5% monounsaturated and 0.5% polyunsaturated fats. The resulting reduction in cardiovascular and stroke deaths was then estimated. We conducted a probabilistic sensitivity analysis by performing a Monte Carlo simulation allowing the parameters based on the Clarke equation and Law meta-analysis to vary stochastically.
Findings: Reducing saturated fat consumption by 1% and increasing monounsaturated and polyunsaturated fat by 0.5% each would lower blood cholesterol levels by approximately 0.06 mmol/l, resulting in 9822 fewer coronary heart disease deaths (minimum estimate 1265, maximum estimate 11 050) and 3024 fewer stroke deaths (minimum estimate 790, maximum estimate 3794) each year. Of this total, 4388 (minimum estimate 578, maximum estimate 4939) were heart disease premature deaths (under 75 years) and 607 (minimum estimate 471, maximum estimate 906) were stroke premature deaths. The burden was greatest in France, Germany, Italy, Spain and the United Kingdom.
Conclusion: The cardiovascular disease burden attributable to CAP appears substantial. Furthermore, these calculations were conservative estimates and the true mortality burden may be higher. The analysis contributes to the current wider debate concerning the relationship between CAP, health and chronic disease across Europe, together with recent international developments and commitments to reduce chronic diseases. The reported mortality estimates should be considered in relation to the current CAP and any future reforms.

| 078 | OPENING THE BLACK BOX: A STUDY OF THE PROCESS OF NICE GUIDELINE IMPLEMENTATION |

DI Spyridonidis, MW Calnan. School of Social Policy, Sociology and Social Research, University of Kent, UK

Objective: To identify how local healthcare providers and organisations respond to nationally agreed clinical guidelines (National Institute of Health and Clinical Excellence (NICE) clinical guideline on Obesity and Chronic Heart Failure). This will involve the examination of the nature of the process by which clinical guidelines are implemented, how they are introduced, received and used by front-line providers, assessing their impact on clinical practice in different clinical settings and identifying features that account for their success or failure in their context.
Design: Qualitative study using case studies. The process was tracked retrospectively and prospectively beginning when the guidelines were introduced into primary care and hospital settings and followed up at different phases of the process. The snowballing sampling technique was used to identify key informants (Primary Care Trust (PCT) managers and clinicians) involved in the implementation process for informal face-to-face interviews. Analysis was facilitated by thematic analysis and constant comparison and was complemented by the construction of case studies from individual narratives.
Setting: One PCT in the south west of England.
Participants: 13 respondents, including 10 senior and middle PCT managers and three GPs.
Main Outcome Measures: Characteristics of the implementation process, factors influencing the decision-making process, successful outcomes of NICE guidelines.
Results: Early results support that the implementation process might be characterised as strategic and staged to begin with, but becomes "messy" as it moves from the planning phase to adoption in every day practice. A similar type of process was evident for both the guidelines even though they were markedly different in terms of

scope. Whereas national priorities determine the context for implementation in primary care, GPs have a substantial degree of autonomy and the developments taking place in practice suggest that the adoption of NICE guidelines is a form of negotiation rather than a top-down process. GPs and managers have different and often competing values and interests and different levels of influence, which result in inevitable tensions and sometimes conflict.

Conclusions: The implementation process of nationally agreed clinical guidelines is influenced by the interactions and interconnections of individuals with different professions, values and level of influence who work in different contexts and are subject to various complex forces.

---

079 **FACTORS ASSOCIATED WITH FEMALE GENITAL MUTILATION IN BURKINA FASO: POLICY IMPLICATIONS**

[1]B Karmaker, [2]N-B Kandala, [1]A Clarke. [1]*Health Sciences Research Institute, University of Warwick, Warwick, UK;* [2]*Clinical Sciences Research Institute, Warwick Medical School, University of Warwick, Warwick, UK*

Introduction: Female genital mutilation (FGM) usually undertaken between the ages of one and 9 years is widely practised throughout Africa and by migrants from African countries in other parts of the world. Laws prohibit it in almost every country. FGM can cause immediate complications (pain, bleeding and infection) and delayed complications (sexual and obstetric problems). Several factors have been associated with an increased likelihood of FGM although it is suggested that the practice may be reducing.

Methods: We investigated social, demographic and economic factors associated with the incidence of FGM in Burkina Faso using the Demographic Health Survey (DHS) 2003. DHS is a nationally representative cross-sectional survey (multistage stratified random sampling of households) of women of reproductive age (15–49 years). Associations between potential risk factors and the prevalence of FGM were explored using χ^2 and t-tests. Logistic regression modelling was used to investigate social, demographic and economic risk factors associated with FGM.

Main Outcome Measures: Whether a woman had had FGM, and if she had daughters any had had FGM or if she intended them to have FGM.

Results: Data were available on 12 477 women. Response rates by region were at least 90%. Women interviewed were representative of the underlying populations of the different regions of Burkina Faso. 9267 (74.3%) of all the women interviewed had had FGM. 7550 women had daughters, of whom 2216 (29%) had a daughter with FGM and 334 (6.2%) said that they intended that their daughter should have it. Univariate analysis showed that age, religion, wealth, ethnicity, literacy, years of education, household affluence, region and who in the household had responsibility for healthcare decisions were all significantly related to the three outcomes. (p<0.01) Multivariable logistic regression showed that younger age (odds ratio (OR) relative to 40–49 years; 15–19 years; 0.44 (0.38 to 0.52); 20–29 years; 0.78 (0.68 to 0.90)); religion (OR relative to Muslim; Christian; 0.45 (0.40 to 0.49); traditional 0.52 (0.45 to 0.59)); ethnicity and region remained significant, whereas wealth, household affluence, literacy and education were no longer significant once these other factors were taken into account.

Conclusions and Policy Implications: Factors associated with FGM are varied and complex. Younger women and those from specific groups and religions are less likely to have had FGM. Policies should capitalise on secular trends. Religious leaders should be involved in continuing programmes of action. Paradoxically, making the practice illegal may have hampered reporting as well as some remedial measures.

---

080 **THE LONG-TERM IMPACT OF THE NATIONAL SERVICE FRAMEWORK FOR CORONARY HEART DISEASE**

[1]K Cooper, [1]E Bishop, [2]M O'Flaherty, [1]D Turner, [1]J Raftery, the Impact Working Group. [1]*Wessex Institute for Health Research and Development, University of Southampton, Southampton, UK;* [2]*Division of Public Health, University of Liverpool, Liverpool, UK*

Introduction: The National Service Framework set targets for the NHS to improve the prevention, diagnosis and treatment of coronary heart disease (CHD). To evaluate the long-term impact of the National Service Framework on the future cost and effectiveness of CHD treatment, we modelled the effect of increased treatment uptake, between 1999 and 2005, over patient lifetimes.

Methods: The Southampton CHD treatment model was used to model the lifetime costs and consequences of a UK population with CHD. The model is a multi-intervention, population-based Markov model. Patients move between health states according to transition probabilities, broken down by age and sex. It calculates their life expectancy and lifetime costs, including their estimated quality of life. The model started with a hypothetical cohort of CHD patients and followed them for their lifetime. The model was run using CHD treatment uptake data from a range of sources for 1999, compared with the most recent data available (2005).

Results: For most interventions, treatment uptakes increased between 1999 and 2005. The increase in treatment uptake results in large increases in both the cost and patient life expectancy. For the population of England and Wales, the increased uptake will result in 17 100 fewer CHD deaths per year, patient life-years will increase on average by 160 700 each year, and costs by £535 million each year. The increased treatment uptake had an incremental cost effectiveness ratio of £3970/quality-adjusted life-year gained. The intervention that will cause the greatest increase in costs and decrease in mortality is statins.

Conclusion: Between 1999 and 2005, CHD treatment increased and this will lead to a reduction in CHD deaths and an increase in costs for these treatments. The cost effectiveness of these treatments is likely to be well below the National Institute for Health and Clinical Excellence threshold of £30 000/quality-adjusted life-year.

Parallel session E

Inequalities

081 **INEQUALITIES IN ALCOHOL-RELATED MORTALITY IN ENGLAND AND WALES**

[1]SE Erskine, [2]R Maheswaran. [1]*University of Sheffield Medical School, Sheffield, UK;* [2]*Section of Public Health, ScHARR, University of Sheffield, Sheffield, UK*

Background: Alcohol-related mortality is a serious problem in England and Wales. Alcohol-related mortality rates are increasing faster than in many other European countries. Such deaths are potentially preventable through education and regulation.

Objective: To identify subgroups of the population who are most at risk of dying from alcohol-related disease. This may help public health interventions to be targeted more effectively.

Design: Ecological study of mortality data for electoral wards, men and women, England and Wales 1999–2003.

Methods: Mortality data for standard table wards were used to explore the association between alcohol-related mortality and socioeconomic deprivation by age and sex. The Carstairs index was used as an area based measure of deprivation. It is a standardised combination of four 2001 Census variables at ward level (male unemployment, overcrowding, residents in social class

IV or V, no car access). Differences between urban and rural areas were also investigated. The Office for National Statistics definition of alcohol-related mortality was used. Deaths from liver cirrhosis accounted for 85% of the deaths. Other causes of death included in the definition were alcoholic gastritis, alcohol-induced chronic pancreatitis, alcohol poisoning, alcoholic neuropathies and alcoholic cardiomyopathy.

Results: Large inequalities were found between wards; those experiencing greater levels of deprivation had a higher risk of dying from an alcohol-related cause. Rate ratios of mortality rates adjusted for age and urban–rural status for the most compared with the least deprived quintiles of the population of England and Wales were: men all ages, 3.39 (95% CI 3.10 to 3.71); women, 2.36 (2.16 to 2.57). The association varied with age. The greatest inequalities were among those aged 25–44 years: men, 4.73 (4.00 to 5.59); women, 4.24 (3.50 to 5.13). Those in urban areas also experienced higher alcohol-related mortality relative to rural areas after adjustment for age and deprivation: men, 1.35 (1.20 to 1.52); women, 1.12 (1.01 to 1.25).

Conclusions: Large inequalities in alcohol-related mortality exist between subgroups of the population in England and Wales. These should be considered when designing alcohol-related public health policies.

082 ARE INEQUALITIES IN OVERWEIGHT, OBESITY AND HIGH WAIST–HIP RATIO AMONG ENGLISH ADULTS WIDENING?

E Stamp, D Howel, T Chadwick, A Adamson, M White. *Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK*

Background: Understanding the social patterning of obesity is important for developing effective interventions. Socioeconomic inequalities in measures of excess body weight have been reported, but it is unclear how these patterns are changing over time.

Objectives: To investigate the social patterning of overweight, obesity and high waist–hip ratio (WHR) among adults in England between 1991 and 2004.

Methods: Analyses used annual Health Survey for England data from 1991 to 2004. Logistic regression was used to model the relationship between obesity (body mass index $\geqslant30$ kg/m^2), overweight (body mass index $\geqslant25$ kg/m^2), high WHR ($\geqslant0.95$ in men, $\geqslant0.85$ in women) and explanatory variables including age, gender and socioeconomic position, categorised by occupational social class and educational attainment.

Results: The prevalence of obesity in English adults rose from 15% in 1991 to 24% in 2004. There were similar increases in the prevalence of overweight and high WHR over this time period. The increases in obesity and overweight over time were proportionately greater in men than women, although women had higher levels of obesity overall. In all survey years, the prevalence of all outcomes increased with age up to 60–74 years. The prevalence of obesity and overweight increased more rapidly with age in men than in women. The prevalence of obesity, overweight and high WHR was higher among adults in the manual social class compared with adults in the non-manual social class and among adults who had left school aged 16 years or younger compared with those who left after 16 years. For example, the odds ratio for obese men in manual occupations was 1.2 (95% CI 1.15 to 1.25) and for women 1.6 (95% CI 1.58 to 1.70). These associations were statistically significant, except for that between occupation and being overweight in men. Adding interaction terms between year and either measure of socioeconomic position showed little evidence of a socioeconomic widening gap over time for either men or women for any outcome.

Conclusions: The prevalence of obesity has increased steadily, presenting major challenges for public health. However, there is little evidence that the gap between higher and lower socio-economic groups has altered since the early 1990s.

083 THE ROLE OF MID-RANGE SLEEP DURATION IN SOCIOECONOMIC INEQUALITIES IN SELF-REPORTED HEALTH: EVIDENCE FROM THE 2005 UK TIME-USE SURVEY

J Adams. *Institute of Health and Society, Newcastle University, Newcastle-upon-Tyne, UK*

Background: It has been hypothesised that total sleep duration mediates the relationship between socioeconomic position (SEP) and health; sleep restriction has a disruptive effect on the endocrine and immune systems and less affluent individuals may have less opportunity for sleep. This hypothesis is not supported by current evidence, perhaps because the relationship between sleep duration and health is now thought to be U-shaped, rather than monotonic. Morbidity and mortality are lowest at 7–8 h sleep per day (''mid-range'' sleep). The role of mid-range sleep in socioeconomic inequalities in health is not known.

Objectives: To explore the role of mid-range sleep in the relationship between SEP and self-reported health.

Design: Data were abstracted from the 2005 UK Time-Use Survey—part of the Omnibus Survey, a monthly survey of adults in Great Britain. In February, June, September and November 2005 the Omnibus Survey included an interviewer administrated time-use module asking respondents to recall what they were doing, in 10-minute slots, over a 24-h period.

Participants: The Omnibus Survey draws a random probability sample of private addresses from the postcode address file each month and a random individual aged 16 years or over from each household is selected for interview. Analyses were restricted to individuals aged over 25 years (n = 4530).

Measures: Total sleep duration was calculated from the number of 10-minute slots in which respondents reported sleeping, intending to sleep or trying to sleep. Mid-range sleep was defined as 6.5–8.5 h. SEP was measured using the National Statistics Socio-economic Classification (NS-SeC) collapsed into three groups. Self-reported health was categorised as very bad/bad, fair, good or very good.

Results: There was a positive association between NS-SeC and self-reported health (linear regression coefficient (95% CI) 0.21 (0.17 to 0.25)). More affluent individuals were more likely to report mid-range sleep (odds ratio (95% CI) 1.22 (1.13 to 1.32)). Mid-range sleep was positively associated with self-reported health (linear regression coefficient (95% CI) 0.09 (0.02 to 0.16)). Controlling for the proportion of individuals who reported mid-range sleep did not attenuate the relationship between NS-SeC and self-reported health.

Conclusions: There was no evidence that mid-range sleep played a role in socioeconomic inequalities in health. These data were self-report and cross-sectional. The measure of sleep duration used can not distinguish between time in bed and actual sleep duration. These findings should be confirmed using physiological measures of sleep duration and longitudinal data.

Methods III

084 THEORY-ORIENTATED SYSTEMATIC REVIEWS OF COMPLEX HEALTHCARE INTERVENTIONS: ILLUSTRATED BY AN EXAMPLE OF SMOKING RELAPSE PREVENTION

FJ Song. *School of Allied Health Professions and School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK*

Background: In complex healthcare interventions, links between different components and their relative functions may have not been clearly specified. Consequently, it is often difficult to define the inclusion/exclusion criteria and to categorise included studies appropriately in systematic reviews of complex healthcare interventions. In this paper, a case study is used to show the usefulness of theory-orientated systematic reviews of complex interventions.

Methods: Theories underlying complex interventions investigated in trials included in a systematic review of smoking relapse prevention were assessed and data were re-analysed according to theories of relapse prevention interventions.

Findings: The original systematic review of 42 trials did not explicitly consider underlying theories and concluded that the evidence did not support the use of skills training or other specific interventions to avoid smoking relapse. Several theories regarding relapse prevention can be identified from trials, although the descriptions were not always clear and were sometimes missing. The identified theories are then used to guide the systematic review in terms of the categorisation of studies, the selection of mediator and moderator factors and the interpretation of findings. For example, many interventions (in 36 trials) were based on the cognitive-behavioural relapse prevention model by Marlatt and Gordon (1985). Features of this model imply that interventions based on this theory may be effective only in people who are highly motivated. This is confirmed by the results of subgroup analyses; smoking abstinence odds ratio (OR) 1.05 (95% CI 0.97 to 1.13) using data from all 36 trials of skill training and OR 1.27 (95% CI 1.08 to 1.49) using data from seven trials that included quitters in volunteers. Findings from qualitative studies were also used to help the interpretation of the results.

Conclusion: A theory-orientated approach is required for systematic reviews of complex healthcare interventions.

---

085 **PARENTAL PERCEPTIONS OF HUMAN PAPILLOMAVIRUS VACCINATION: EXAMINING THE BASES OF RESISTANCE USING INNOVATIVE REVIEWING METHODS**

G Greene, M Davies. *AWARD, Department of Primary Care and Public Health, Heath Park, Cardiff, UK*

Background: Human papillomavirus (HPV) is the most common sexually transmitted infection and is an essential cause of cervical cancer. A school-based vaccination programme will start in the United Kingdom targeting 12–13-year-old girls from September 2008. Uptake of novel vaccines is low and resistance to vaccination increasing. This project seeks to understand social and mass media that may influence parental resistance.

Objectives: To examine the degree to which anti-vaccination beliefs can be generalised across vaccination contexts. To identify the main components of opposition to HPV vaccination in popular print and electronic media. To assess the degree of similarity of difference between anti-vaccination arguments and mass media coverage of HPV.

Design: A systematic review of health and social science papers containing vaccination arguments screened by and included by two independent reviewers. Toulmin's model of argument was used to break down arguments to component parts and to synthesise them according to themes arising. A framework analysis was used to compare changes or consistency in the arguments over time and vaccine context. A content analysis of a range of national (UK) newspapers, regional newspapers and web-based media was undertaken. A coding frame was developed by two researchers and occurrences of key concepts logged in qualitative analysis software. Themes were developed by examining the relationships between concepts and the contexts in which they emerged.

Main Outcome Measures: Differences or similarities in anti-vaccination arguments across time and vaccine contexts. Differences or similarities between any anti-vaccination arguments and themes arising from popular media surveyed

Results: The systematic review identified 345 potential papers of which 281 were excluded and 43 retrieved. Anti-vaccination beliefs formed a spectrum ranging from pragmatic concerns with safety, political concerns with public health "control" and spiritual and "alternative" beliefs. The nature of the anti-vaccination argument

appears similar over time and across vaccine contexts. Nonetheless, anti-vaccination in the United Kingdom does not appear to be an organised movement as it has been when compulsory vaccination was introduced. Analysis of popular media is ongoing. Initial results suggest that opposition to HPV does not primarily reflect anti-vaccination beliefs. Popular media coverage of HPV vaccination is dominated by a "moral panic" concerning the effects of vaccinating against a sexually transmitted infection on the subsequent behaviours of young women.

Conclusion: The range of beliefs and popular media influences described here provide the basis for targeting groups for primary research on anti-vaccination beliefs in the context of HPV vaccination.

---

086 **PSYCHOEDUCATIONAL SMOKING CESSATION INTERVENTIONS FOR PATIENTS WITH CORONARY HEART DISEASE: META-ANALYSIS AND DISCUSSION OF METHODOLOGICAL ISSUES**

[1]M Huttunen-Lenz, [2]F Poland, [1]F Song. [1]*School of Allied Health Professions and School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK;* [2]*School of Allied Health Professions, University of East Anglia, Norwich, UK*

Introduction: Available evidence suggests that psychoeducational interventions can be effective in increasing smoking cessation and reducing mortality, but there is considerable uncertainty about what makes a smoking cessation intervention effective. Evaluation of overall intervention effectiveness is complicated by diversity of available study characteristics and difficulty to define what a psychoeducational intervention is. The present meta-analysis is a part of a systematic review of psychoeducational cardiac rehabilitation interventions and evaluates the effectiveness of psychoeducational secondary preventive smoking cessation only interventions for coronary heart disease patients.

Methods: The Cochrane Controlled Trials Register, PsycINFO, MedLine, CINAHL, and Dissertations and Abstracts International databases were searched. One person using predefined data sheets for numerical and non-numerical data carried out data extraction in duplicate. Relative risk (RR) was used to calculate combined intervention effectiveness. Post-hoc subgroup analyses were performed to investigate unexplained heterogeneity with emphasis on the effect of theory inclusion in intervention planning.

Results: Twelve randomised controlled studies were included in the meta-analysis, three with reservations. Primary outcome measures were point prevalent smoking cessation, continuous smoking cessation and all-causes mortality. Overall, results indicated that higher rates of point prevalent (RR 1.56; 95% CI 1.18 to 2.07) and continuous (RR 1.59; 95% CI 1.10 to 2.28) smoking cessation were associated with smoking cessation interventions. Analyses showed high levels of unexplained variation between the included studies for point prevalent ($I^2 = 82.3\%$) and continuous ($I^2 = 82.4\%$) smoking cessation. A lower rate of total mortality (RR 0.44; 95% CI 0.24 to 0.79) was associated with smoking cessation interventions. Sensitivity analyses indicated that the only outcome significantly affected by study exclusion was total mortality (RR 0.56; 95% CI 0.28 to 1.11). Unplanned post-hoc subgroup analyses for effects of theory inclusion, follow-up length and intervention intensity were conducted. Subgroup analysis results were similar for both point prevalent and continuous smoking cessation outcomes. Use of a theoretical model in intervention design, follow-up between 6 and 12 months, and interventions that tailored their intensity to participant needs, were associated with best outcomes.

Conclusions: The meta-analysis results indicated that psychoeducational smoking cessation interventions can be effective in increasing smoking cessation rates and reducing total mortality. Results also indicated that using a theory to guide intervention planning with flexible resource use may improve intervention effectiveness. However, due to the diversity of study characteristics,

the present analysis offers limited gains for understanding the features of an effective intervention.

Ethnicity and health

087 ETHNIC DENSITY EFFECTS ON MATERNAL AND CHILD HEALTH

[1]KE Pickett, [1]RJ Shaw, [1]K Atkin, [2]K Kiernan, [3]RG Wilkinson. [1]Department of Health Sciences, University of York, York, UK; [2]Department of Social Policy and Social Work, University of York, York, UK; [3]Division of Epidemiology and Public Health, University of Nottingham, Nottingham, UK

Objectives: Studies, mostly of mental health, suggest that members of ethnic minority groups might be healthier when they live in areas with a high concentration of people from their own ethnic group, in spite of higher levels of material deprivation typically found within such areas. We investigated the effects on maternal and child health of area-level same-ethnic density, independent of area deprivation and individual socioeconomic status, in five ethnic minority groups at two geographical scales.
Design: Cross-sectional analysis within the Millennium Cohort Study.
Setting: England.
Participants: Mothers in five ethnic minority groups (black African n = 367, Bangladeshi n = 369, black Caribbean n = 252, Indian n = 462 and Pakistani n = 868) and their 9-month-old infants.
Main Outcome Measures: Low birth weight, preterm delivery, breastfeeding, maternal depression, self-rated health and limiting long-standing illness.
Results: Compared with those who live in areas with less than 5% of people from the same ethnic minority population, Indian mothers living in areas with more than 50% same-ethnic density were more likely to have breastfed their infant (odds ratio (OR) 2.91; p-value 0.02), whereas Pakistani mothers at the same high ethnic density were less likely to breastfeed than their counterparts at low density (OR 0.38; p-value 0.02). Indian and Pakistani mothers were significantly less likely to report ever being depressed in areas with high same-ethnic density. There was a protective effect of ethnic density for limiting long-term illness among Bangladeshi mothers at 5–30% density (OR 0.16; p-value <0.01) and Pakistani mothers at all higher densities, eg, OR 0.30; p = 0.03 at density greater than 50%. Ethnic density was unrelated to infant outcomes and maternal self-rated health, and unrelated to any outcomes in black African and black Caribbean mothers and infants, possibly because no families in these groups lived at higher levels of same-ethnic density. Results were similar whether we examined smaller (lower super output areas, mean population 1500) or larger (medium super output areas, mean population 7200) residential areas.
Conclusions: Among ethnic minority mothers and infants in England the relationship of ethnic density to health varies by ethnicity and outcome. Our results suggest that for some outcomes, in some ethnic groups, the psychosocial advantages of shared culture, social networks and social capital may override the adverse effects of material deprivation.

088 THE CULTURAL CONTEXT OF CHILD HEALTH INEQUALITIES: PATTERNS OF IMMUNISATION AND BREASTFEEDING BY ETHNICITY IN MANCHESTER, UK

D Baker, A Garrow, C Shiels. Centre for Public Health Research, Salford University, Salford, UK

Objectives: To examine inequalities in uptake of immunisation and in breastfeeding initiation by ethnic group and area level of deprivation.

Design: Analysis of longitudinal (2002–7) routinely collected data held on a child health database.
Setting: Manchester, United Kingdom.
Participants: 31 521 children who were born in Manchester between 2002 and 2007 and had been allocated a code for ethnicity in the child health database.
Main Outcome Measures: Breast feeding initiation; uptake of triple vaccine (diphtheria, pertussis and tetanus) at 16 weeks; uptake of the measles, mumps and rubella vaccine (MMR) by the age of 2 years.
Results: Black or black British women had the highest rates of breast feeding initiation (83.7%) and members of south Asian ethnic groups had the highest uptake of the triple and MMR vaccines (Indian, 94.4%, 95.6%; Pakistani, 95.1%, 95.2%; Bangladeshi, 96.3%, 94.9%). White women had the lowest percentage of breast feeding initiation (43%) and uptake of triple (92.3%) and MMR vaccines (87.6%). Women who belonged to black and ethnic minority groups were consistently and significantly more likely to have their children immunised and to initiate breast feeding when compared with white women. Within the white ethnic group, lower breast feeding initiation, and lower uptake of triple and MMR vaccines were all significantly associated with living in a deprived area. There was no association between these measures and deprivation within the black or south Asian ethnic groups.
Discussion: These findings demonstrate that, in a city with an ethnically diverse population, predictors of poorer child health such as not breast feeding or immunising a child, are most consistently and commonly located within white, disadvantaged communities. An explanation that draws on cultural and social influences on behaviour appears more salient in this context for explaining inequalities between ethnic groups, rather than one that is based on underlying differences in material circumstances. The importance of the findings of this study for policy lie in its implications for the measurement of child health outcomes in multiethnic, deprived areas and the delivery of appropriate healthcare to those most in need. In this context there are lessons to be learnt from members of black and minority ethnic communities who appear to maximise their children's opportunities for good health despite living in deprived circumstances.

089 INFORMATION ON ETHNIC MINORITIES AND DEMOGRAPHIC DATA FROM ASTHMA CLINICAL TRIALS DOES NOT REACH THE PUBLIC DOMAIN: EVIDENCE FROM A SYSTEMATIC REVIEW AND IMPLICATIONS FOR TACKLING HEALTH DISPARITIES

G Frampton, J Shepherd. Southampton Health Technology Assessments Centre (SHTAC), School of Medicine, University of Southampton, Southampton, UK

Background: Debates over the meaning of "race" and "ethnicity" and the strategic need to resolve health disparities have prompted extensive recommendations for reporting and analysing demographic information in clinical trials. We conducted a systematic review to determine the extent to which race/ethnicity and related variables are reported in publications from randomised controlled trials of asthma interventions.
Methods: Randomised controlled trials of inhaled corticosteroids and long-acting beta2-agonists in asthmatic subjects were identified by systematically searching 12 electronic bibliographic databases. We identified peer-reviewed papers reporting 87 relevant trials published during 1985 to 2006, from which we extracted data on patients' race/ethnicity, ancestry, socioeconomic variables and geographical attributes.
Results: The proportion of the papers that reported the race/ethnicity of their participants was lower than would be expected by chance and has recently declined. None of the papers included race/ethnicity in statistical analyses or reported socioeconomic variables, ancestry, or genetic data for their participants and few discussed the

generality of their findings. The frequency of reporting race/ethnicity differed between the United States and the United Kingdom, but 23 of 87 papers did not identify countries. Despite extensive recommendations, guidance from health agencies on analysing and reporting demographic data in clinical trials still appears inconsistent, requiring harmonisation.

Conclusion: Recommendations for reporting and analysing socio-economic and demographic data have had limited influence on peer-reviewed papers that report clinical trials of asthma interventions. Improved access to demographic and socioeconomic data from clinical trials is needed to support the health agencies' strategic objective of reducing disparities in asthma severity and treatment. Improved publication of demographic data from clinical trials would also assist evidence-based clinical decisions involving minority populations and the development of pharmacogenetic approaches for asthma management.

Occupation and health

090 SHIFT WORK AND RISK OF CARDIOVASCULAR DISEASE: NEW EVIDENCE FROM THE 1958 BRITISH BIRTH COHORT

C Thomas, C Power. *MRC Centre for Epidemiology of Child Health, UCL Institute of Child Health, University College London, London, UK*

Objectives: To establish whether different types of shift work are associated with risk factors for cardiovascular disease (CVD) in mid-life and associations are mediated through health behaviours.

Design: Prospective cohort.

Setting: England, Scotland and Wales.

Participants: 7834 men and women in the 1958 British birth cohort with biomedical data at 45 years and who were employed at age 42 years.

Main Outcome Measures: Body mass index, waist circumference, blood pressure, triglycerides, total and high-density lipoprotein cholesterol, glycosylated haemoglobin (HbA1c), fibrinogen, C-reactive protein (CRP).

Results: Shift work was associated with several risk factors for CVD. Among men, body mass index increased with increasing frequency of each type of shift work (nights, early mornings, evenings, weekends). The strongest association was seen for early morning work (04:00–07:00 hours) with an average increase of 1 kg/m^2 from men not working shifts to those working one or more mornings per week. Among men, increases in the levels of waist circumference, triglycerides, HbA1c, CRP and fibrinogen were found for early morning workers; waist circumference and CRP increased for night workers (22:00–04:00 hours), and high-density lipoprotein cholesterol decreased with increasing frequency of night or early morning work. Several associations seen for men were not found for women, eg, early morning work was not associated with HbA1c, CRP or fibrinogen. Adjustment for health behaviours (diet, smoking, physical activity, alcohol consumption) did not explain the associations.

Conclusions: Shift work in the early morning and at night is associated with increased risk factors for CVD, especially among men. Associations do not appear to be due to differences in health behaviours.

091 RESILIENCE TO UNEMPLOYMENT'S EFFECTS ON HEALTH

[1]RJ Shaw, [2]A Sacker, [3]M Bartley. [1]*Department of Health Sciences, University of York, York, UK;* [2]*Institute for Social and Economic Research, University of Essex, Colchester, UK;* [3]*Department of Epidemiology and Public Health, UCL, London, UK*

Objective: Unemployment is a stressful condition that may have a detrimental impact on health. This study tests if the impact of unemployment on health can be reduced by the presence of

resources in the domains of physical vitality, cognitive ability, psychological capacity, human, social and financial capital and work attitudes.

Design: Prospective cohort study. Resilience is operationalised by testing for interaction effects between resources measured between birth and age 23 years and unemployment between the ages of 24 and 41 years.

Setting and Participants: 4177 men in the National Child Development Study with near-complete work histories between the ages of 24 and 41 years.

Main Outcome: Health assessed using self-rated health, limiting longstanding illness, the Malaise Index and the General Health Questionnaire (GHQ).

Results: Housing tenure at age 23 years, an indicator of financial capital, consistently indicated resilience. For those who were living in rented or shared accommodation at age 23 years, unemployment was significantly associated with poorer health for all outcomes. However, home ownership significantly modified the effects of unemployment on self-rated health (p<0.05) and Malaise index (p<0.001) and approached significance for limiting longstanding illness (p = 0.10) and GHQ (p = 0.11), resulting in there being no association between unemployment and health for home owners. Evidence for other resources was mixed. For one indicator of human capital, occupational social class, there was a significant interaction that indicated resilience to the effects of unemployment on GHQ caseness (p = 0.03), and another suggestion of an interaction for limiting illness (p = 0.06). The other indicators of resources only suggested resilience to at most one health outcome. Absence of psychological distress at age 23 years indicated resilience to unemployment's effects on self-rated health (p = 0.04). Religious attendance, a measure of social capital, indicated resilience to unemployment's effects on limiting longstanding illness (p = 0.02). Growth rate at age 7 years, measuring physical vitality, indicated resilience to unemployment's effects on malaise (p = 0.02). Resilience to a high GHQ score was conferred by good health (p = 0.01) and high job satisfaction (p = 0.02) at age 23 years.

Conclusions: The clearest protection against poor health following unemployment was security of circumstances indicated by house ownership. Internal resources may provide resilience but the evidence was less consistent.

092 CONTEXTUAL FACTORS AND SOCIAL CONSEQUENCES OF INCIDENT DISEASE

U Christensen, M Kriegbaum, CO Hougaard, OS Mortensen, F Diderichsen. *Department of Public Health, Section of Social Medicine, University of Copenhagen, Copenhagen, Denmark*

Background: Large geographical variations in the incidence of disability benefits have been reported, but it is unclear to what extent that is confounded by variations in disability rates and disease pattern in the population and whether local variations in rehabilitation and health insurance practice modify the employment effect of disease. We have studied the risk of labour market exclusion following incident hospitalisation for ischaemic heart disease (IHD) and whether this risk may be modified by contextual factors at the municipal level.

Methods: A cohort design on a 10% random sample of the whole Danish population including individuals aged 43–60 years (n = 516 454 person-years including 840 cases of IHD). The independent variable was incident hospitalisation for IHD and outcome variable was defined as job loss 2 years after the event. Regional-level data included all the 275 Danish municipalities in 1996.

Results: There was a strong association between incident IHD and labour market exclusion 2 years later, odds ratio 2.8 (95% CI 2.4 to 3.4). Men had less risk of being excluded than women and immigrant status, low educational attainment and co-morbidity

were significantly associated with job loss. However, the individual relative risk of exclusion following incident IHD was not modified substantially when neither the fixed effects of the regional-level variables nor the random intercept effect of municipality was included in the analyses.

Conclusion: The geographical variation in incidence of labour market exclusion following incident disease is not primarily an effect of differential social consequences across municipal variations in labour market and socioeconomic conditions.

Older people II

093 CHRONIC KIDNEY DISEASE AND MORTALITY RISK IN OLDER PEOPLE IN THE COMMUNITY

[1]P Roderick, [2]D Nitsch, [2]R Atkins, [2]L Smeeth, [3]R Hubbard, [2]A Fletcher. [1]*Public Health Sciences and Medical Statistics, University of Southampton, Southampton, UK;* [2]*Department of Epidemiology, London School of Hygiene and Tropical Medicine, London, UK;* [3]*Department of Clinical Epidemiology, University of Nottingham, Nottingham, UK*

Background: Chronic kidney disease (CKD) is common in older people and is likely to be detected because of high rates of routine blood testing, but the significance of CKD is less clear in older people. **Objective:** To examine whether CKD at older ages (aged 75+ years) is independently associated with an increased risk of all-cause and cardiovascular mortality.

Methods: Cohort study of people aged 75 years and over participating in a cluster randomised trial of health and social assessment of older people in the community between 1994 and 1998 in the United Kingdom. There were 13 177 (87%) participants in 53 general practices who had serum creatinine measured in local laboratories at baseline. CKD was assessed by the estimated glomerular filtration rate (eGFR) measured in ml/min per 1.73 m^2 derived from the modification of diet in renal disease formula. All patients were registered with the Office for National Statistics. Analyses are based on deaths up to the end of November 2005 for any death and for International Classification of Diseases codes indicating cardiovascular disease as the underlying cause. Cox regression models were used to assess the effects of eGFR on mortality risk with adjustment for confounders (eg, sociodemographic, cardiovascular risk, co-morbidity), and for pathophysiological consequences of CKD such as a low haemoglobin.

Results: After median follow-up of 7.3 years (interquartile range 3.8–8.8) 7633 (58%) had died, 42% from cardiovascular causes. In the first 2 years of follow-up compared with eGFR greater than 60 ml/min per 1.73 m^2, the fully adjusted hazard ratios for all-cause mortality for baseline CKD in bands 45–59, 30–44, less than 30 ml/min per 1.73 m^2 were in men 1.13 (0.93 to 1.37), 1.69 (1.26 to 2.28) and 3.87 (2.78 to 5.88) and in women 1.14 (0.93 to 1.40), 1.33 (1.06 to 1.68) and 2.44 (1.68 to 3.56), respectively. The hazard ratios were greater in men and for cardiovascular mortality (in those without previous CVD), and were lower for mortality after 2 years although of the same pattern.

Conclusions: CKD is of independent prognostic significance in older people, which is most apparent once eGFR is less than 45 ml/min per 1.73 m^2 (stage 3b–5 CKD on international classification).

094 WHAT FACTORS ARE ASSOCIATED WITH PHYSICAL ACTIVITY IN OLDER PEOPLE, ASSESSED OBJECTIVELY BY ACCELEROMETRY?

[1,3]T Harris, [1]C Owen, [2]C Victor, [3]R Adams, [1]D Cook. [1]*Division of Community Health Sciences, St George's, University of London, London, UK;* [2]*School of Health and Social Care, Reading University, Reading, UK;* [3]*Sonning Common Health Centre, Reading, UK*

Objectives: To assess physical activity (PA) levels measured objectively using accelerometers in community-dwelling older people and to examine the associations with physical health, disability, anthropometric measures and psychological and social factors.

Design: Cross-sectional survey. Participants completed a questionnaire assessing health, disability, psychological and social factors and PA levels, underwent anthropometric assessment and wore an accelerometer (Actigraph) for 7 days.

Setting: Single general practice (primary care centre) Oxfordshire, UK

Participants: 560 community-dwelling older people aged over 65 years, registered with the practice were randomly selected and invited to take part. 43% (238/560) participated.

Main Outcome Measures: Average daily accelerometer step-counts and time spent in different PA levels. Associations between step-counts and other factors were examined using linear regression.

Results: Average daily step-count was 6443 (95% CI 6032 to 6853). Men achieved 754 (84 to 1424) more steps daily than women. Step-count declined steadily with age. Independent predictors of average daily step-count were: age; general health; disability; diabetes; body mass index; exercise self-efficacy and perceived exercise control. Activities associated independently with higher step-counts included number of long walks and dog-walking. Only 2.5% (6/238) of participants achieved the recommended 150 minutes weekly of at least moderate intensity activity in bouts of 10 minutes or more, 62% (147/238) achieved none.

Conclusions: This is the first population-based sample of older people with objective PA and anthropometric measures. PA levels in older people are well below recommended levels, emphasising the need to increase PA levels in this age group, particularly in those who are overweight/obese or have diabetes. The independent effects of exercise self-efficacy and exercise control on PA levels highlights their role as potential mediators for intervention studies.

095 A RELIABLE MEASURE OF FRAILTY FOR A COMMUNITY-DWELLING OLDER POPULATION

[1]S Kamaruzzaman, [2]GB Ploubidis, [1]S Ebrahim. [1]*Non-Communicable Disease Unit, London School of Hygiene and Tropical Medicine;* [2]*Center for Population Aging, London School of Hygiene and Tropical Medicine, London, UK*

Background: Frailty in older adults remains undefined despite efforts to quantify this construct. The numerous existing measures are affected by which definition they are based on. Although these measures of frailty provide useful associations with adverse outcomes, the majority are unable to provide adequate evidence to inform policy. In light of the lack of consensus on its definition and the absence of a standardised assessment tool, we are challenged to decide whether an operational measure of frailty is indeed feasible.

Aim: To derive a model-based measurement of frailty as well as examine its internal reliability for use in a community-dwelling elderly population.

Method: We employed the British Women's Heart and Health Study (BWHHS) cohort of 4286 women aged 60–79 years from 23 towns in Britain. Frailty was represented by 42 indicators. These were extracted and recoded into binary categorical variables. Explanatory factor analysis (EFA) using the Mplus software appropriate for binary data was conducted as a means of reducing the data from a wide range of frailty attributes to a smaller number of dimensions or factors. The resulting model of EFA was subjected to confirmatory factor analysis and was confirmed by the data.

Results: We found that five factors or dimensions were needed to explain the association between frailty indicators. These factors were found to represent frailty in the following dimensions/factors: physical ability, cardiovascular disease, physiological measures and respiratory symptoms/disease and visual impairment. The confirmatory factor analysis restricted the model further by fitting the

EFA-driven structure to the observed data. We will present one of two possible models that best represents frailty in this population of older women.

Conclusions: The results are in line with the growing agreement that frailty is a multidimensional concept, represented by a wide range of attributes, especially those that are not directly observed. A multidimensional measure of frailty is represented here by the use of factor analysis. This measure will be used to predict overall survival in the BWHHS and this is to be further replicated in the MRC trial for older people assessment. This statistical method may help provide valid and reliable answers to the ultimate question of whether frailty is indeed a useful measure in predicting adverse outcomes in older populations.

Plenary session

096 WORK/LIFE BALANCE: DOES MATERNAL EMPLOYMENT INFLUENCE CHILDREN'S HEALTH BEHAVIOURS?

SS Hawkins, TJ Cole, C Law, the Millennium Cohort Study Child Health Group. *Centre for Paediatric Epidemiology and Biostatistics, UCL Institute of Child Health, London, UK*

Background: Maternal employment is associated with an increased risk of overweight (including obesity) in young children, particularly when mothers work long hours. However, little is known about how maternal employment may influence the determinants of obesity in children.
Objectives: To examine the relationships between paid maternal employment and indicators of children's physical inactivity/activity and dietary patterns at age 5 years.
Design, Participants and Setting: 12 576 singleton children from the UK Millennium Cohort Study, born between 2000 and 2002. Information was collected by interview on maternal employment and children's health behaviours at age 5 years. Maternal employment histories were constructed based on employment from the child's birth to age 5 years.
Main Outcome Measures: Physical inactivity: television/computer use; physical activity: weekly exercise, transport to school; diet: daily fruit and breakfast consumption, food (crisps or sweets, fruit/vegetables) and sweetened beverage consumption between meals.
Results: Among all mothers, 30% had never been employed since the birth of the child, 35% worked 1–20 h (PT) and 34% worked 20+ h per week (FT). Overall, 61% of 5-year-old children use the television/computer 2+ h daily, 48% are driven to school, 54% eat three plus portions of fruit daily, and 22% primarily eat crisps or sweets, 45% fruit/vegetables and 41% primarily drink sweetened beverages between meals. All relationships presented are after adjustment for sociodemographic characteristics, including household income, maternal education and ethnicity and maternal body size when the children were age 5 years. Compared with children whose mothers had never been employed, children whose mothers worked FT were more likely to use the television/computer 2+ h daily (adjusted odds ratio 1.32; 95% CI 1.17 to 1.50) (compared with 0–2 h), be driven to school (1.47, 1.29 to 1.68) (compared with walk/cycle), or primarily eat crisps or sweets (1.23, 1.07 to 1.40) (compared with other snacks) or drink sweetened beverages (1.13, 0.99 to 1.30) between meals. Children whose mothers worked FT were also less likely to eat three plus portions of fruit daily (0.79, 0.69 to 0.90) (compared with 0–2) or primarily eat fruit/vegetables between meals (0.83, 0.73 to 0.94) (compared with other snacks). Differences in health behaviours between children whose mothers were not employed and those who worked PT were also evident for television/computer use, transport to school and sweetened drink consumption. After adjustment there were no differences by maternal employment status in children's weekly exercise or breakfast consumption.
Conclusions: Full and part-time employment appears to be a barrier to mothers in providing their children with healthy foods

and opportunities for physical activity. Further analyses will examine how flexible or atypical employment patterns may influence these relationships.

097 ETHNIC DIFFERENCES IN LEVELS OF PHYSICAL ACTIVITY AMONG BRITISH PRIMARY SCHOOL CHILDREN IN THE CHILD HEART HEALTH STUDY IN ENGLAND (CHASE)

[1]CG Owen, [1]CM Nightingale, [1]AR Rudnicka, [2]U Ekelund, [1]DG Cook, [1]PH Whincup. [1]*Division of Community Health Sciences, St George's, University of London, London, UK;* [2]*Medical Research Council Epidemiology Unit, Cambridge, UK*

Objective: To examine differences in objectively measured physical activity in 9–10-year-old British children of south Asian, black African-Caribbean, and white European origin.
Design: Cross-sectional study of children in 79 state primary schools in London, Birmingham and Leicester carried out between January 2006 and February 2007.
Participants: 2089 children who wore activity monitors (ActiGraph GT1M) during waking hours for at least 600 minutes of registered time on at least one day.
Main Outcome Measures: Ethnic differences in markers of overall activity (mean daily counts, steps and counts per minute of registered time; CPM), adjusted for age, gender, day of the week, month and day order of recording. Multilevel modelling allowed for repeated measures within individual and clustering within school.
Results: In white Europeans, mean daily counts, CPM and steps were 406 549, 514 and 10 615, respectively; mean registered time was 798 minutes. Compared with white Europeans, south Asians recorded 22 788 (95% CI 8751 to 36 825) fewer counts, 48 fewer CPM (95% CI 30 to 65) and 699 fewer steps (95% CI 229 to 1627), despite having 35 minutes (95% CI 22 to 47) more registered time per day. In similar analyses, black African-Caribbeans recorded 21 588 more daily counts (95% CI 9040 to 34 136) but wore the monitor for on average 37 minutes longer (95% CI 25 to 48); CPM and number of steps were similar to whites. In all ethnic groups, girls recorded less activity than boys, with 82 251 fewer counts (95% CI 73 047 to 91 415), 95 fewer CPM (95% CI 83 to 106) and 2031 fewer steps (95% CI 1401 to 2659). Similar differences in recommended levels of moderate activity were observed throughout.
Conclusions: This study provides the first objective evidence that British south Asian children have lower activity levels compared with European whites and African-Caribbeans. These differences may contribute to the emergence of ethnic differences in markers of cardiovascular and diabetes risk in childhood.

098 EUROPEAN LIVER FIBROSIS PANEL OF SERUM MARKERS CAN PREDICT SERIOUS FIBROSIS ON BIOPSY AND CLINICAL OUTCOME IN PATIENTS WITH MIXED AETIOLOGY CHRONIC LIVER DISEASE

[1]J Parkes, [1]P Roderick, [1]S Harris, [2]C Gough, [1]M Wheatley, [3]G Alexander, [4]J Collier, [5]C Day, [6]M Lombard, [7]D Mutimer, [8]J Ramage, [5]A Burt, [9]G Dusheiko, [10]E Sampson, [11]R Cross, G Aithal, [13]M Mayo, [14]M Peters, [12]W Irving, [12]S Ryder, [15]M Manos, [16]W Rosenberg. [1]*Public Health Sciences and Medical Statistics, University of Southampton, Southampton, UK;* [2]*Wellcome Clinical Research Facility, Southampton, UK;* [3]*Department of Hepatology, Addenbrookes Hospital, Cambridge, UK;* [4]*Department of Gastroenterology, John Radcliffe Hospital, Oxford, UK;* [5]*Department of Hepatology, Freeman Hospital, Newcastle-upon-Tyne, UK;* [6]*Department of Gastroenterology, Royal Liverpool and Broadgreen Hospital, Liverpool, UK;* [7]*Department of Hepatology, Queen Elizabeth Hospital, Birmingham, UK;* [8]*Department of Gastroenterology, North Hampshire Hospital, Basingstoke, UK;* [9]*Department of Hepatology, Royal Free Hospital, London, UK;* [10]*Siemens Diagnostics, Tarrytown, New York, USA;* [11]*iQur Ltd, Southampton, UK;* [12]*Queens Medical Centre, Nottingham, UK;* [13]*University of Dallas, Dallas, Texas, USA;* [14]*University of California, San Francisco, California, USA;* [15]*Permanente Group, Oakland, California, USA;* [16]*Institute of Hepatology, University College London, London, UK*

Introduction: Chronic liver disease (CLD) is the fifth cause of death in middle-age. Major risk factors are harmful drinking,

obesity and injecting drug use, the prevalence of which have risen over the past 20 years, leading to predictions of an increase in CLD in the coming decades. Liver fibrosis is asymptomatic until the end stages of disease, making early diagnosis and prognosis problematical. Clinicians use fibrosis in a liver biopsy to predict clinical outcomes, which has limitations of patient hazard and interpretation. The enhanced liver fibrosis (ELF) serum marker panel, a non-invasive means of diagnosing liver fibrosis with high diagnostic accuracy in a single large study, could be used to identify people who have serious liver disease, potentially directly predict clinical outcomes in such patients, and investigate CLD epidemiology in the general population. Two studies were conducted to evaluate ELF performance in the identification of liver fibrosis in independent populations and investigate ELF performance in predicting clinical outcomes in patients recruited to the original ELF study 1998–2000.

Methods: External validation was conducted in seven cohorts of CLD patients evaluating ELF in diagnosing fibrosis on biopsy. Patients with mixed aetiology CLD at seven English centres were followed up for clinical outcomes by the examination of clinical data. Mortality was ascertained from national sources. Morbidity in non-attenders at a recruiting centre was ascertained by questionnaires to GPs. The primary outcome measure was liver-related morbidity/liver-related death.

Results: ELF predicted serious fibrosis on biopsy in seven cohorts (total n = 825) with median area under the curve of 0.86 (0.83–0.93). 498 patients were followed up (median of 7.7 years) median age 43 years (19–75). Ascertainment of clinical status was possible in 93% of patients. There were 67 liver outcomes (44 deaths). Unadjusted analyses by Kaplan–Meier plots showed that baseline ELF score divided into four groups can predict liver outcomes, with those people having the highest ELF scores being significantly more likely to have clinical outcomes than those in the middle groups. Cox proportional hazards model showed fully adjusted hazard ratios of more than 100 (ELF score 12.52–16.67), 25 (10.426–12.51) and 7 (8.34–10.425) when comparing the highest score groups with the lowest. A unit change in ELF is associated with a doubling of the risk of liver-related outcome.

Conclusions: ELF can accurately predict serious liver fibrosis and clinical outcomes in patients with CLD and is likely to be useful in identifying patients at high risk of serious fibrosis and future clinical outcomes.