Abstracts

Plenary sessions

EXPLAINING THE DECLINE IN CORONARY HEART DISEASE MORTALITY IN THE US BETWEEN 1980 AND 2000

E. Ford[1], U. Ajani[1], J. Croft[1], D. Labarthe[1], J. A. Critchley[2], S. Capewell[2]. *[1]Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion 4770, Buford Highway Mailstop K-66, Atlanta, GA 30341, USA; [2]Division of Public Health, Quadrangle, University of Liverpool, Liverpool L69 3G, UK*

Background: Between 1980 and 2000, age adjusted coronary heart disease (CHD) mortality rates in the US fell by over 40%. Our study aimed to examine how much of this fall could be attributed to medical and surgical treatments, and how much to changes in cardiovascular risk factors.

Methods: We applied the previously validated, cell based IMPACT CHD mortality model to the USA population of 281 million. This model synthesises data on:

- numbers of patients with various forms of CHD
- the proportion receiving specific treatments
- the effectiveness of these treatments (survival benefit over a minimum of one year)
- population trends in major risk factors
- the corresponding changes in mortality.

The main data sources were published trials and meta-analyses, official statistics, clinical audits, and NHANES surveys.

Results: Between 1980 and 2000, CHD mortality rates in the US fell by 45% in men and by 41% in women aged 25–84 years. This resulted in 274 275 fewer deaths in 2000. Approximately 48% of this fall was attributed to treatments in individuals (including 13% heart failure treatments, 11% secondary prevention therapies, 7% initial treatments of acute myocardial infarction, and 7% from revascularisation procedures). Approximately 50% of the mortality fall was attributable to changes in population risk factors: *reductions* in cholesterol (20%), smoking (22%), and blood pressure (30%), substantially offset by *increases* in diabetes (−9%) and obesity (−4%). Improvements in physical activity were modest and poorly quantified. The mortality fall attributable to other, unmeasured factors appeared minimal (<2%), representing a model fit of 97.5% The proportional contributions of specific treatments and risk factor changes to the overall mortality decrease remained relatively consistent in sensitivity analyses.

Conclusions: Approximately half the substantial fall in CHD mortality rates in the US population between 1980 and 2000 was attributable to reductions in major risk factors, mainly smoking, cholesterol, and blood pressure. Worrying adverse trends were seen in obesity and diabetes. Almost half the mortality fall was attributable to therapies in the community and in hospital. This emphasises the importance of a comprehensive CHD strategy which promotes primary prevention, particularly a healthier diet and tobacco control, and which maximises the population coverage of effective treatments, especially medications for secondary prevention and heart failure.

WILLINGNESS OF YOUNG MEN AND WOMEN TO BE TESTED FOR *CHLAMYDIA TRACHOMATIS* IN NON-MEDICAL SETTINGS

K. Lorimer[1], M. E. Reid[1], G. Hart[2]. *[1]Public Health & Health Policy, University of Glasgow, Glasgow G12 8RZ, UK; [2]MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow G12 8RZ, UK*

Objectives: *Chlamydia trachomatis* is the most prevalent sexually transmitted infection (STI) in the UK. Prevalence is highest among those aged <25 years. Traditional efforts to screen and treat this largely asymptomatic infection have primarily focused on women, with no screening for men outwith sexual health clinics. However, screening and treating men, apart from reducing the total burden of disease, also serves as a primary prevention strategy for women. There is a lack of data on how best to involve men in screening, although recently ''innovative approaches'' to target men have been advocated in the government's White paper *Choosing health*. This paper explores the willingness of young men and women to be tested for chlamydia in a range of non-medical settings.

Design: A mixed method study with a survey conducted in each of three settings with all participants to assess knowledge of and attitudes towards screening for chlamydia in non-medical situations. All participants were offered opportunistic testing for chlamydia, by urine sample. Semistructured depth interviews were conducted with 10% of participants to explore further young people's views on sexual health.

Participants: 253 young women and men aged between 16 and 24 years.

Setting: Three non-medical locations in Glasgow:

- Education—a large further education college
- Health and fitness—three local authority leisure centres
- Workplace—two call centres (data collection for workplace is ongoing).

Results: 98% of age eligible users approached participated in education and health and fitness settings (n = 120 and n = 133, respectively). In each setting, young men were as likely as women to accept the offer of a chlamydia test. Uptake of testing was highest in the health and fitness setting (60% uptake for both women and men compared with 20% in education setting). Disease prevalence was 5.1% (4.5% in men; 11.7% in women). Interview data suggest young men's willingness to be tested for chlamydia in non-medical settings is due to convenience and raised awareness of the largely asymptomatic nature of chlamydia infection from the health promotion aspect of the study.

Conclusions: This study shows that young men are willing to be tested for chlamydia in non-medical settings. There appears to be an association between increased knowledge of chlamydia and willingness to be tested. Increasing opportunities for the take-up of screening in non-medical settings could have a significant impact on the incidence and prevalence of this easily treated STI, and reduce the future burden of unwanted reproductive health sequelae.

SOCIOECONOMIC STATUS AND CAESAREAN SECTIONS IN SCOTLAND

L. Fairley, A. H. Leyland. *MRC Social and Public Health Sciences Unit, University of Glasgow, 4 Lilybank Gardens, Glasgow G12 8RZ, UK*

Background: Caesarean section rates have risen over the past 20 years in the UK. Recent work suggested the odds of having an elective caesarean section are lowest in the most deprived areas of England compared with the most affluent, but that study used area deprivation as a marker of socioeconomic status rather than individual social class.

Aims: To examine whether individual social class, area deprivation, or both are related to caesarean sections in Scotland and to investigate how this has changed over time.

Data: Routine maternity discharge data from live singleton births in Scottish hospitals from three time periods were used; 1980–81 (n = 133 555), 1990–91 (n = 128 933), and 1999–2000 (n = 102 285). The address from each record was assigned to a quintile of deprivation based on the Carstairs score from the relevant census. The records were linked to birth registrations to obtain the occupational social class of the father. Multilevel logistic regression was used to account for the correlations of outcomes within postcode sectors and health boards. At each time emergency and elective caesareans were analysed separately. The relative index of inequality (RII) was used to assess social class inequalities. All models were adjusted for maternal age, maternal height, parity, gestational age, and marital status.

Results: The rate of emergency caesareans rose from 6.3% in 1980–81 to 11.9% in 1999–2000, while the rate of elective caesareans also rose from 3.6% to 5.5%. Social class was associated with emergency caesareans in 1980–81 (RII = 1.14; 95% CI 1.04 to 1.25) and 1990–91 (RII = 1.13; 95% CI 1.03 to 1.23) but not 1999–2000 (RII = 1.02; 95% CI 0.93 to 1.12). In 1980–81 and 1990–91 women from the most deprived areas were also more likely to have an emergency section than those in most affluent areas (OR = 1.12, 1.01 to 1.24 and OR = 1.13, 1.03 to 1.24, respectively). There was no association between either social class or deprivation and elective caesarean in 1980–81 and 1990–91. In 1999–2000 women at the bottom of the social class hierarchy were 13% less likely to have an elective caesarean than women at the top (RII = 0.87, (0.76 to 1.00)) and additionally women from the most

deprived quintile had decreased odds of having an elective caesarean (OR = 0.86, 0.75 to 0.99). Further stratification by previous sections showed different patterns of association for both emergency and elective caesareans. For all models there was substantial unexplained variation between health boards.

Conclusions: Both individual social class and area deprivation are independently associated with caesarean sections in Scotland. Inequalities have disappeared for emergency sections whilst appearing for elective sections.

Parallel session A

Cancer

RECENT TRENDS IN BREAST CANCER SURVIVAL IN NORTH CHESHIRE

G. Bracegirdle[1], D. Baker[2]. [1]*National Primary Care Research and Development Centre, The University of Manchester, Williamson Building, Oxford Road, Manchester, UK;* [2]*Institute of Public Health Research and Policy, University of Salford, Humphrey Booth House, Salford, UK*

Objective: To examine the association between breast cancer and deprivation in two areas of northwest England.

Design: Longitudinal data from 1990 to 2002 of incidence and mortality from breast cancer were constructed from cancer registry and public health mortality datasets. The DETR index of multiple deprivation was used to determine ward based deprivation scores.

Setting (a) Two areas in the northwest of England: Halton (more deprived area) and Warrington (more affluent area); and (b) wards were aggregated into three deprivation groups—affluent, neither, deprived—across the two areas.

Participants: Women who have been diagnosed with breast cancer from 1990 to 2002.

Main Outcome Measure: One and five year survival rates.

Results: There was an increase of approximately 10% in one year survival from 1990–99; the largest increase was seen in the oldest age group (75+) with a 24% increase in one year survival. Overall there was a 25% increase in five year survival from 39% in 1990 to 64% in 1997, again the oldest age group had the largest increase from 7% to 41% surviving at least five years. Grade 1 cancers show the greatest increase in the five year survival rate from 56% in 1990 to 90% in 1997. Kaplan-Meier survival curves show no significant difference in survival times by area or deprivation groups. Cox regressions showed that the variables of significance in relation to survival were age and diagnosis year, type of cancer, mode of presentation and size, grade, and stage of cancer.

Conclusion: The results indicate that area of residence and deprivation group do not have a large impact on survival from breast cancer. It appears that the variables of greatest consequence are the cancer variables such as grade, size, stage, and mode of presentation, which show significant differences between individuals in relation to survival and were not in this study associated with deprivation.

CHILDHOOD LEUKAEMIAS AND CNS TUMOURS: CORRELATION OF INTERNATIONAL INCIDENCE RATES

S. J. Hepworth, R. G. Feltbower, P. A. Mckinney. *Paediatric Epidemiology Group, Centre for Epidemiology and Biostatistics, University of Leeds, UK*

Background: An increasing number of studies have linked the occurrence of childhood cancer with infectious origins. For example, childhood leukaemia has a strong infectious aetiology and recent evidence has emerged suggesting infections may be linked to other cancers such as central nervous system (CNS) tumours. If both diagnostic groups are associated with infections, one might expect their respective incidence rates to be correlated.

Aims: We aimed to investigate the correlation between international incidence rates of childhood leukaemia and CNS tumours focusing on sub-types that are hypothesised to have an infectious aetiology and to determine if any correlation found can be explained by national demographic factors.

Methods: An ecological analysis was carried out using data from 29 countries covered fully or in part by population based cancer registries. World standardised incidence rates for leukaemia, CNS tumours, and their subtypes for children aged 0–14 years and routinely available demographic indicators such as gross domestic product, life expectancy, and infant mortality were obtained. Pearson's correlation coefficient was calculated to quantify any associations.

Results: A non-significant positive correlation was found between the rates of all leukaemias and all CNS tumours ($r = 0.25$, $p = 0.20$), when examining subtypes a highly significant positive correlation was found between rates of acute lymphoblastic leukaemias (ALL) and astrocytoma ($r = 0.56$, $p = 0.002$), both of these subtypes have been previously linked to an environmental cause. When considering wealth related factors the incidence rate of all CNS tumours was positively associated with GDP per capita ($r = 0.70$, $p < 0.001$) whereas for all leukaemias it was not statistically significant ($r = 0.34$, $p = 0.08$).

Conclusions: National incidence rates of childhood leukaemias and astrocytomas are highly correlated and further investigation is needed to try and determine whether they share a common, underlying infectious or environmental cause. Childhood CNS tumour incidence rates were positively correlated with GDP per capita, some of this correlation may be explained by differences in the availability of modern diagnostic tools to identify brain tumours.

TRENDS IN THE INCIDENCE OF CUTANEOUS MALIGNANT MELANOMA IN THE NORTHERN AND YORKSHIRE REGION OF ENGLAND, 1998–2002

A. Downing[1,2], D. Forman[2,3]. [1]*Cancer Medicine Research Division, CRUK Clinical Centre, Leeds, UK;* [2]*Centre for Epidemiology & Biostatistics, University of Leeds, UK;* [3]*Northern and Yorkshire Cancer Registry and Information Service, Arthington House, Cookridge Hospital, Leeds LS16 6QB, UK*

Background: Cutaneous malignant melanoma dramatically increased in incidence in the UK from the 1970s to the 1990s. Recent reports from Australia and Northern Europe suggest similar increases in these countries have slowed, especially in the younger age groups, reflecting an impact of educational strategies to reduce detrimental sunlight exposure. This study aims to investigate the incidence of malignant melanoma in the Northern and Yorkshire region between 1998 and 2002 to look for changes overall and in relation to stage at diagnosis that may indicate similar effects in England.

Data and Methods: All patients newly diagnosed with in situ or invasive cutaneous malignant melanoma between 1998 and 2002 were identified from the Northern and Yorkshire Cancer Registry and Information Service database (4816 cases: 1152 in situ and 3664 invasive) and an extract obtained. The data were analysed to look at prognostic factors, such as age, sex, body site, and stage (Breslow thickness).

Results: The age standardised rate of melanoma increased from 11.4 per 100 000 in 1998 to 15.2 in 2002. The rise was greater in females (12.1 to 16.9 per 100 000) than in males (10.7 to 13.5 per 100 000). Rates remained highest in the over 75s (43.6 and 46.6 per 100 000 in 2002 in males and females, respectively). However, the greatest increase was seen in females aged 15–44, rising from 8.9 per 100 000 in 1998 to 14.3 in 2002. The most common site in females was the lower limb and in males it was the trunk, this being observed in all years. For invasive melanoma, the rate increased from 8.3 per 100 000 in 1998 to 11.8 in 2002, while for in situ tumours the rate increased from 3.1 to 3.3. The age standardised rate of thin tumours (<1.5 mm) increased from 4.9 per 100 000 in 1998 to 7.7 in 2002. Intermediate tumours (1.5–4.0 mm) increased from 1.8 to 2.3 per 100 000 and thick tumours (>4.0 mm) from 0.9 to 1.0 per 100 000.

Conclusions: The overall incidence of melanoma has continued to rise sharply in the Northern and Yorkshire region. However, the main increase has been in early stage thin tumours, possibly indicating a trend towards earlier diagnosis. Rates increased most in young females, the group most likely to present early with less advanced tumours. Further work is underway to extend these observations to 2003 and investigate the extent to which they can be explained by the opening of melanoma screening centres in some areas.

RISK OF RELAPSE AND ASSOCIATED PROGNOSTIC FACTORS IN LONG TERM SURVIVORS OF CHILDHOOD CANCER IN YORKSHIRE, UK

R. G. Feltbower[1], I. J. Lewis[2], S. E. Kinsey[2], S. Picton[2], M. Richards[2], A. W. Glaser[2], P. A. Mckinney[1]. [1]*Paediatric Epidemiology Group, Centre for Epidemiology and Biostatistics, University of Leeds, Leeds LS2 9LN, UK;* [2]*Paediatric Oncology & Haematology, Leeds Teaching Hospitals NHS Trust, Leeds LS9 7TF, UK*

Aims: Despite the improvement in survival from childhood cancer over the past 30 years, few studies have addressed the impact from relapsed

disease following treatment. We aimed firstly to examine the likelihood of relapse across different haematological diagnostic groups and secondly to describe the association between certain prognostic factors and risk of relapse.

Methods: Children (0–1 years) with leukaemia and lymphoma were ascertained from a population based register covering the former Yorkshire Region Health Authority and diagnosed from 1974–2001. Patients were divided into the following subtypes: acute lymphoblastic leukaemia (ALL), acute myeloid leukaemia (AML), Hodgkin's disease (HD), and non-Hodgkin lymphoma (NHL). Children were actively followed up every two years and any relapse episode recorded; cross checks with national clinical trial databases were performed to optimise ascertainment rates of relapse. Logistic regression was used to test for the association between relapse (yes/no) and age, sex, period of diagnosis, deprivation, ethnic group (Asian or not), and entry into a clinical trial.

Results: 1129 children were identified of whom 320 (28%) relapsed at least once. Those with leukaemia were more likely to relapse (32%) than children with lymphoma (19%). Subgroup analysis revealed that the proportion relapsing ranged from 33% and 30% for ALL and AML, to 15% and 22% for HD and NHL, respectively. Females were less likely to relapse than males for all cancers except HD, although this difference was only significant for ALL (odds ratio 0.68; 95% CI 0.47 to 0.99). Children with leukaemia and NHL were significantly less likely to relapse if diagnosed during the 1980s and 1990s compared with the 1970s; no significant differences in patterns of relapse over time were seen for HD. Older children aged 5–14 year olds were more likely to relapse than 0–4 year olds overall. Relapse was significantly less likely to occur for patients diagnosed with leukaemia from more deprived areas (p trend = 0.037), although this was most marked for AML (p trend = 0.004). No association was observed with deprivation for lymphomas. Entry onto a trial significantly reduced the risk of relapse for all diagnostic groups apart from NHL. No significant differences in relapse were evident by ethnic group.

Conclusion: Despite the increased likelihood of relapse for leukaemia over other haematological cancers, the overall risk has fallen significantly over time and through entry into a clinical trial. The observation that children from more affluent areas with leukaemia, especially AML, were more likely than others to relapse warrants further investigation.

ADHERENCE TO TAMOXIFEN AND RECURRENCE OF AND MORTALITY FROM BREAST CANCER

C. McCowan[1], T. P. Fahey[1], P. T. Donnan[1], A. M. Thompson[2], J. A. Dewar[2], M. Crilly[3]. *[1]Division of Community Health Sciences, University of Dundee, Dundee, UK; [2]Department of Surgery and Molecular Oncology, Ninewells Hospital and Medical School, Dundee, UK; [3]Department of Public Health, University of Aberdeen, Aberdeen, UK*

Objective: To investigate whether women in the community prescribed tamoxifen as an adjuvant therapy for breast cancer are adherent to their medication and subsequently whether adherence influences survival and recurrence rates.

Design: Cohort study using a record linkage database.

Subjects and Setting: All women hospitalised for breast cancer for the first time, registered with the Cancer Registry or receiving tamoxifen between 1993 and 2002 in Tayside, Scotland, UK.

Methods: The study population was identified from the dispensed prescribing, hospital admissions, and Cancer Registry databases. Any other records relating to the identified population were also extracted from the prescribing and admissions database along with records of death from the General Registrars Office and Carstairs score and index of deprivation from the Health Board datasets. All records were anonymised and passed to the research team for linkage and analysis. Duration of tamoxifen therapy was calculated from the first and last encashed prescriptions, while adherence was calculated as the coverage provided by those prescriptions divided by the duration. Comorbidity used the Charlson index calculated from hospital admission records supplemented by additional prescribing information.

Main Outcome Measures: Percentage of population using tamoxifen, and the percentage with poor adherence. Survival analysis investigated the effect of adherence and duration of therapy on recurrence of breast cancer and all cause mortality. Covariates used were age, social deprivation, comorbidity, and staging of disease at presentation.

Results: 3669 patients were included in the study, 2594 (71%) used tamoxifen on a regular basis. There were 653 (25%) tamoxifen users classed as having poor adherence of less than 80% of recommended dose. Tamoxifen users had hazard ratios of 0.626 (95% CI 0.540 to 0.725) and 0.425 (0.376 to 0.481) compared with non-users for recurrence of breast cancer and all cause mortality. For every additional 10% of adherence a patient decreased their hazard of recurrence and all cause mortality by 0.962 (0.928 to 0.998) and 0.957 (0.926 to 0.988) respectively while every extra year of tamoxifen therapy reduced the hazard by 0.756 (0.730 to 0.782) and 0.647 (0.624 to 0.670) after adjusting for other covariates.

Conclusions: Tamoxifen can reduce the recurrence of breast cancer and also improve survival. Tamoxifen use for $\geqslant 5$ years is more beneficial than shorter periods of time. Approximately one quarter of patients have poor adherence which may have negative effects on outcomes.

Lifecourse I

SOCIOECONOMIC LIFECOURSE INFLUENCES ON WOMEN'S SMOKING BEHAVIOUR IN EARLY ADULTHOOD

H. Graham[1], B. Francis[2], H. Inskip[3], J. Harman[2], and the SWS study team[3]. *[1]Institute for Health Research, Lancaster University, Lancaster, UK; [2]Centre for Applied Statistics, Lancaster University, Lancaster, UK; [3]Southampton Women's Survey, MRC Epidemiology Resource Centre, Southampton General Hospital, Southampton, UK*

Background: There is evidence that socioeconomic circumstances across life influence the risk of adult smoking, with the socioeconomic lifecourse conceptualised as the trajectory running from parental socioeconomic position (SEP), through education, to own occupation/SEP. However, women's socioeconomic circumstances are also influenced by their domestic trajectories and, particularly, by early/deferred entry into motherhood and partnership status.

Aim: To incorporate women's domestic trajectories into an analysis of the socioeconomic lifecourse influences on their smoking status in early adulthood.

Methods: Women aged 25–34 years were identified from the contemporary and representative Southampton Women's Survey (n = 8437). Self-reported data provided measures of smoking status, socioeconomic and parenthood histories, and partnership status. Logistic regression was used to predict current smoking ($\geqslant$1 cigarette per day) and, for women who had ever smoked, to predict quitting, in models which included childhood SEP, education, adult SEP, parenthood trajectories, partnership status, and age.

Results: 29% were current smokers and 36% of ever smokers were ex-smokers. Parenthood histories and partnership status contributed significantly to smoking risk. For women who became mothers in their teenage years, the odds of smoking were higher (OR 1.7, 95% CI 1.4 to 2.1) and the odds of quitting were lower (OR 0.8, 95% CI 0.6 to 1.0) than for childless women. Women who became mothers at/after age 25 were less likely to smoke and more likely to quit than either of these groups. For both outcomes, the inclusion of domestic trajectories only slightly modified the effects of childhood SEP, current SEP and education, with the latter remaining a particularly powerful predictor. The odds of smoking for women leaving full time education at or before16 were 3.4 (95% CI 2.7 to 4.1) times higher than for women staying in education beyond age 21; their odds of quitting were more than halved, (OR 0.4, 95% CI 0.3 to 0.5). Women living without a partner were more likely to smoke than cohabiting women (OR 1.2, 95% CI 1.0 to 1.4), particularly if they were lone parents; also they were less likely to quit smoking (OR 0.6, 95% CI 0.5 to 0.8).

Conclusions: Both the conventionally measured socioeconomic lifecourse and the domestic lifecourse contributed separately to the risk of smoking and, for smokers, to the odds of quitting. This suggests that women's domestic careers constitute an important pathway of influence on their smoking behaviour in early adulthood. Our study underlines the need for a broader concept of the socioeconomic lifecourse to inform research and policy on this key dimension of women's health behaviour.

LIFECOURSE INFLUENCE OF RESIDENTIAL AREA ON MORTALITY

O. Naess[1], B. Claussen[1], G. Davey Smith[2], A. Leyland[3]. *[1]Institute of General Practice and Community Medicine, Oslo, Norway; [2]Department of Social Medicine, University of Bristol, Bristol, UK; [3]MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK*

Background: Studies relating area of residence with mortality has a long history in public health research. Most studies are cross sectional or with short follow up. It is a problem that few studies have looked at area effects through individuals' lifecourse. Unlike for situations in which

population health is determined by infectious diseases with a short induction time, most chronic diseases in high income countries probably develop over many years. It is thus likely that if there is a genuine effect of area of residence on mortality risk, one would expect that this effect could be demonstrated longitudinally.

Objective: In this study we wanted to follow the residential history of a cohort and investigate the relative importance of the area they lived in at different time points through their lifecourse.

Subjects and methods: Data were obtained by linking the censuses from 1960, 1970, 1980, and 1990 with the death register. Deaths were from 1990–98. The study population was based on all male inhabitants living in Oslo in 1990 aged 30–69 years who had lived in Oslo through the period 1960–90 (49 736 with complete data). Area definition was based on area codes in 1960 (electoral wards). Similar area coding was given to areas at the other time points so that number of areas at any time was 68. A cross classified multilevel logistic regression model was run. That enabled us to partition and estimate area level variance at each time point.

Results: The overall finding appears to be that in the youngest age group (30–39 years), area of residence close to the time of death is most important. In this age group, where men lived in 1990 explained 50% of the total variation in mortality. For the other time points in the same age group this was 16% in 1980, 13% in 1970, and 22% in 1960. In the oldest age group these proportions were similar at all time points, ranging from 12% in 1960 to 26% in 1990.

Conclusion: Results from this study suggest that area of residence through the lifecourse is an important determinant of health inequalities and that this association is not explained by health related selective migration prior to death.

MILK INTAKE IN CHILDHOOD PROGRAMMES IGF-I LEVELS IN ADULTHOOD: 65 YEAR FOLLOW UP OF THE BOYD ORR COHORT

R. M. Martin[1], J. Holly[2], N. Middleton[1], G. Davey Smith[1], D. Gunnell[1]. *[1]Department of Social Medicine & [2]Department of Surgery, University of Bristol, Bristol, UK*

Background: Raised insulin-like growth factor-I (IGF-I) levels are associated with increased cancer risk. Nutrition plays an important role in regulating IGF-I, with cross sectional studies in both child and adulthood showing positive associations of energy, protein, and milk intake with IGF. It is possible that adulthood IGF-I levels are ''programmed'' by early nutrition and such programming could account for observed associations of childhood diet and height with cancer. In a randomised milk supplementation intervention in early life, supplementation was inversely associated with IGF-I levels in young adulthood, but the evidence linking childhood diet with the IGF axis in later life is limited. We investigated the relation of diet in childhood with IGF levels in adulthood.

Design: Historical cohort based on a 65 year follow up in 2002–03 of 728 (679 with complete data) participants in the Carnegie (Boyd Orr) survey of diet and health in pre-war Britain, 1937–39.

Outcome Measures: IGF-I and IGF binding protein-3 (IGFBP-3). Regression coefficients are the change in IGF levels per 1 standard deviation increase childhood levels of nutrient and food intake with adjustment for age, sex, energy (using the residual method), social class in childhood, factors in adulthood (smoking, alcohol, exercise, BMI), and adjustment of IGF-I for IGFBP-3 and vice versa.

Results: There was little evidence that energy intake in childhood was associated with IGF-I (regression coefficient: 0.93; 95% CI −1.83 to 3.70) or IGFBP-3 (1.77; −71.45 to 74.98) levels in late adulthood. There was evidence that intake of milk and milk products in childhood was inversely associated with IGF-I (−2.54; −5.12 to 0.05; p = 0.05), even after further adjustment for dairy product intake in adulthood (−3.28; −6.57 to 0.01; p=0.05). IGF-I levels in adulthood were also positively associated with intake of vegetables in childhood (3.60; 0.90 to 6.30; p=0.009). IGF-I levels were not associated with childhood intake of protein, carbohydrates, fat, saturated fat, polyunsaturated fat, animal fat, vegetable fat, meat, or fruit.

Conclusions: These results support an emerging literature suggesting that milk intake in childhood may programme the IGF axis in later life. This study and others suggest the hypothesis that increased milk intake in childhood causes a long term resetting of the pituitary, resulting in lower IGF-I levels in later life. The positive association of childhood vegetable intake with adult IGF-I was unexpected, and requires replication. Knowledge of childhood dietary influences on the IGF axis could have potentially important implications for primary cancer prevention interventions started in early life.

THE ACCUMULATIVE EFFECTS OF SOCIAL CLASS ON INFLAMMATORY MARKERS: EVIDENCE FROM 1958 BRITISH BIRTH COHORT

F. Tabassum[1], M. Kumari[1], C. Power[2]. *[1]Department of Epidemiology and Public Health, UCL, London, UK; [2]Centre for Paediatric Health and Biostatistics, Institute of Child Health, London, UK*

Background: To investigate the effects of accumulation of advantage and disadvantage, assessed by social class throughout the lifecourse, on inflammatory cardiovascular risk factors.

Design: The 1958 birth cohort is a longitudinal study of people living in Britain who were born in one week in March 1958. Since then there have been six waves of follow up. Using father's and own occupation, categorised using the Registrar's general classification collapsed into four groups, social class was determined at three stages of respondents' lives: at birth, social class in 1981, and mid-life social class at 42 years. A cumulative indicator score of social class (CIS) was calculated which ranged from values of 0 (always in social class I&II) to 9 (always in class IV&V).

Subjects: 8795 men and women were included in the analyses.

Main Outcome Measures: The inflammatory markers, C-reactive protein (CRP), fibrinogen (FIB), and von Willebrand Factor (vWF) were examined at age 44/45 years. The relation between inflammatory markers and CIS was explored using analysis of variance and linear regression models.

Results: A graded relation was observed between the accumulative impact of social class over the lifecourse and the inflammatory markers CRP and FIB. For example, women with a CIS of 9 had higher levels of CRP (beta coefficient 2.39, 95% CI 1.66 to 3.42) compared with women with a CIS of 0 and men with a CIS of 9 had higher levels of FIB (1.06, 95% CI 0.10 to 1.13) compared with men with a CIS of 0. The relation between vWF and CIS was not linear. When stratified by social class in mid-life, the effects of cumulative social class on inflammatory markers were found to hold, although they did not remain linear. For example, following stratification by social class at 42 years, highest social class in mid-life and low social class at birth or at 23 years was associated with increased levels of CRP (1.58 mg/l higher in men with CIS of 6 compared with the average CRP in men with CIS of 0) and FIB (1.06 g/l higher in women with CIS of 5 compared with the average FIB in women with CIS of 0).

Conclusions: There is an accumulative impact of socioeconomic factors on CRP and fibrinogen over the lifecourse. Hence, considering the socioeconomic position at only one point in time cannot capture completely lifecourse effects on inflammatory cardiovascular risk factors.

CHILDHOOD ADIPOSITY IS ASSOCIATED WITH INSULIN-LIKE GROWTH FACTOR IN ADULTHOOD

I. Bray, R. M. Martin, J. Holly, N. Middleton, G. Davey-Smith, D. Gunnell. *Department of Social Medicine, University of Bristol, Canynge Hall, Whiteladies Road, Bristol BS8 2PR, UK*

Objective: Leg length in childhood and insulin-like growth factor (IGF)-I levels in adulthood are both positively associated with the later development of cancer, but inversely associated with coronary heart disease (CHD) risk. We examined the relation between anthropometry in childhood and IGF levels in adulthood to investigate whether associations of leg length with future cancer and CHD risk may be mediated by the IGF axis.

Design: Historical cohort based on the Carnegie (Boyd Orr) Survey of Diet and Health in Pre-War Britain, 1937–39. Childhood anthropometric measurements (height, leg length, and weight) were taken on 2997 children in England and Scotland between the ages of 2 and 14 years. Adulthood IGF measurements, taken in 2002–03, were available for 429 of these subjects.

Main Outcome Measures: IGF-I, IGF binding protein (BP)-3, the molar ratio of these variables, and IGFBP-2. Regression coefficients are the change in IGF levels per 1 standard deviation increase in the childhood anthropometry variables with adjustment for age, sex, clinic versus postal blood sample, social class in childhood and adulthood, lifestyle factors (smoking, alcohol, exercise), and BMI in adulthood.

Results: We found that BMI in childhood was inversely associated with IGFBP-3 in adulthood (regression coefficient: −91.05; 95% CI −189.48 to 7.39) and that trunk length was positively associated with IGFBP-3 in adulthood (87.28; −8.08 to 182.64). There was weaker evidence of similar associations between IGF-I and childhood BMI (−3.47; −7.56 to 0.62) and trunk length (3.28; −0.81 to 7.38). There was no evidence of an association between either height or leg length in childhood and adulthood IGF-I but trunk length was weakly positively associated with IGF-I (3.28; −0.81 to 7.38). We found strong evidence of a positive

association between childhood BMI and IGFBP-2 (7.5%; 2.8% to 12.3%) and some evidence of a positive association between height and IGFBP-2 (3.6%; −0.6% to 8.0%). There was also no evidence of a relation between any of the anthropometric variables considered and the molar ratio IGF-I/IGFBP-3.

Conclusion: The data suggest that BMI and trunk length in childhood are associated with IGF levels in adulthood indicating that childhood adiposity may have a long term influence on the IGF axis. These results do not support the hypothesis that the associations of leg length in childhood with cancer and CHD in adulthood are mediated by IGF-I or IGFBP-3. The unexpected associations between childhood anthropometry and IGFBP-2 could indicate that height and BMI in childhood are linked with insulin resistance in later life.

Access, utilisation, and inequalities I

IS THE HEALTH OF THE LONG TERM UNEMPLOYED BETTER OR WORSE IN HIGH UNEMPLOYMENT AREAS?

M. Whitehead[1], F. Drever[1], T. Doran[2]. [1]*Department of Public Health, University of Liverpool, Liverpool, UK;* [2]*National Primary Care Research and Development Centre, University of Manchester, Manchester, UK*

Objective: To compare the self-rated general health of the long term unemployed between regions of Great Britain.

Design and Setting: Cross sectional study using data from the 2001 census and claimant count statistics in Great Britain.

Participants: Adults aged between 25 and 64 in Great Britain and enumerated in the 2001 Census (n = 25.6 million).

Main Outcomes: European age standardised rates of self-rated general health, by sex, social class, long term unemployment, and region.

Results: Although the East, South East, and South West regions of England generally had low rates of poor self-rated health, the long term unemployed in these regions fared badly in health terms (for example: male rates of poor self-rated health of 126, 176, and 191/1000 respectively, compared with 119/1000 for Great Britain as a whole). Conversely, in the North East and North West regions of England, Scotland, and Wales—areas of high unemployment and generally poor health—the long term unemployed fared relatively well in health terms. For example, long term unemployed women in Scotland and the North East had statistically significant lower rates of poor self-rated health than women in routine occupations in these regions (RR for Scotland = 0.86 (95% CI 0.79 to 0.94); RR for North East = 0.84 (CI 0.73 to 0.96)).

Conclusion: In some circumstances, the health of the long term unemployed was better in high unemployment regions and, conversely, worse where the local labour market was traditionally stronger. This points to the need to take more account of the geographic and socioeconomic context in which long term unemployment is experienced.

EMPLOYMENT AFTER HOSPITALISATION FOR A CHRONIC ILLNESS IN SWEDEN: VARIATIONS BY GENDER, SOCIAL CLASS, AND DIAGNOSIS

P. Holland[1], I. Möller[2], B. Burström[2], M. Whitehead[1]. [1]*Division of Public Health, University of Liverpool, Liverpool, UK;* [2]*Division of Social Medicine, Karolinska Institutet, Stockholm, Sweden*

Background: Reducing inequalities in health is increasingly a priority of national public health strategies. Although research has shown that adverse social circumstances create inequalities in health, little is known about the impact of chronic illness on socioeconomic circumstances. Ill health itself may lead to poverty and other health risks, leading to more severe illness and disability for poorer groups, exacerbating existing social inequalities in health.

Objectives: To establish (1) how employment rates are affected by the diagnosis of a chronic illness; (2) whether the likelihood of leaving the labour market varies by gender and social group; and (3) whether certain chronic illnesses are more damaging to livelihoods than others.

Design: Secondary analysis of longitudinal hospital inpatient data, linked to information on employment status and social class from the Longitudinal Population Register on Education, Income and Work in Sweden, for the period 1994–2001.

Subjects: All men and women of working age, resident in Stockholm County and admitted to hospital in 1996 with ischaemic heart disease (IHD) (n = 1290), a musculoskeletal disorder (n = 2185), a neurosis (n = 1700), or a psychosis (n = 733). The general population of the County were the reference group.

Outcome Measures: Annual age standardised employment rates and odds of leaving the labour market between hospitalisation and 2001, by diagnosis and socioeconomic group.

Results: Between 1996–2001, employment rates increased among the general population of Stockholm, yet declined annually among people diagnosed with a chronic illness. Women and manual workers with chronic illness had lower employment rates than their male and non-manual peers. People diagnosed with a mental illness were more disadvantaged in employment terms than those diagnosed with IHD or a musculoskeletal condition, especially manual workers. Among those initially employed at baseline, people with a chronic illness left the labour market at a greater rate compared with the general population. By 2001, the adjusted odds of leaving the labour market were 3.4 (95% CI 2.9 to 3.9) for people diagnosed with a musculoskeletal disorder, 4.0 (95% CI 3.2 to 4.8) for people with IHD, 4.3 (95% CI 3.5 to 5.4) for people with a neurosis, and 7.1 (95% CI 5.1 to 9.9) for people with a psychosis.

Conclusions: People diagnosed with a chronic illness, especially women and manual workers, are vulnerable to losing their employment. Manual workers with a mental illness carried the highest risk of being out of the labour market. Welfare policies must focus on protecting the employment of people with mental illnesses and other chronic conditions, especially those employed in manual occupations.

PREDICTORS OF POOR MENTAL HEALTH AT AREA LEVEL IN IRELAND: A MULTILEVEL ANALYSIS OF DEPRIVATION AND SOCIAL CAPITAL INDICATORS

N. Fitz-Simon[1], F. Shiely[1], D. Corradino[1], S. Friel[2], C. Kelleher[1]. [1]*Department of Public Health Medicine and Epidemiology, University College, Dublin, Ireland,* [2]*Centre for Health Promotion Studies, National University of Ireland, Galway, Ireland*

Objective: To examine the variability in self-reported mental health problems at area level in Ireland and to assess the relative influence, if any, of sociodemographic and social capital indicators.

Design: Multilevel cross sectional analysis of the 2002 National Survey of Lifestyle Attitudes and Nutrition (SLAN).

Setting: 328 district electoral divisions (DEDs) across the Republic of Ireland.

Participants: 5992 adults over 18 years selected at random within DEDs from the electoral register were asked to complete a standardised previously validated postal questionnaire.

Main Outcome Measures: Self-reported mental ill health in the previous month.

Results: 25% of respondents reported problems with mental health in the previous month. There was significant variability in the risk of reporting problems with mental health at DED level (variance 0.123, SE 0.034). Controlling for individual level social and demographic variables, which all had a significant effect on the risk of reporting poor mental health (age, sex, income level, education, means tested general medical services eligibility, employment status, level of social support, membership of clubs and organisations, smoking status, and interactions between these variables) did not affect the variability at DED level (variance 0.131, SE 0.050). People living in rural areas were less likely to report mental illness and were more likely to report high levels of trust, which independently reduced the risk of reporting poor mental health. Inclusion of individual level trust, and the DED level variable indicating urban or rural location, significantly reduced the variability at DED level (variance 0.046, SE 0.043). The cross level interaction between DED location and trust was not significant, indicating their effects are additive.

Conclusions: Although there is area level variation in self-reported mental ill health not accounted for by individual level characteristics, this is largely explained by differences in urban and rural areas and patterns of trust in particular appear to be related to location. These findings provide further support for previous evidence that indicators of social capital may reflect well preserved community networks and support but are not necessarily related to material or social disadvantage. These findings have relevance for the international debate on the directionality of the relation between social capital and disadvantage.

THE RELATION BETWEEN LIMITING LONG TERM ILLNESS AND MORTALITY IN ENGLAND AND WALES: A 12 YEAR FOLLOW UP STUDY OF THE ONS LONGITUDINAL STUDY

M. Rosato, D. O'Reilly. *Department of Epidemiology and Public Health, Queens University Belfast, Belfast, UK*

Objectives: A question on limiting long term illness (LLTI) was included in the UK 1991 census and it has been extensively used to assess need and in the construction of resource allocation formulae. However, questions remain about the subjectivity of the responses. In this analysis we address the relation between LLTI and all-cause mortality and their relation over time; the relation between LLTI and selected cause-specific mortality over time; and finally, how these relations are modified by inclusion of demographic factors such as age, sex, ethnicity, and region of residence, socioeconomic circumstances (SES) both at an individual and area level.

Design: Longitudinal analysis: a 12 year follow up study of the Office for National Statistics Longitudinal Study (ONS-LS) 1991 cohort.

Subjects: 424 531 members of the ONS-LS enumerated at the 1991 census, aged 16 and over.

Main Outcome Measure: Mortality between 1991 and 2002

Results: Cross sectional analysis of the cohort at 1991 confirms the SES gradients in LLTI reported elsewhere, though levels in deprived areas were still high even after controlling for household deprivation levels. Even after adjustment for other factors, LLTI levels were significantly higher in Wales than in other parts of the UK.

There were 65 157 deaths in the 12 years of follow up. After adjustment for demographic and socioeconomic factors, men reporting an LLTI at the 1991 census showed a threefold mortality risk in the four years following the census (3.00, 95% CI 2.80 to 3.22). For women over the same period the risk was higher (3.68, 95% CI 3.33 to 4.11). In both men and women the excess risk associated with LLTI attenuated in later time periods, and the hazards ratios for the 12 year follow up were 1.99 (95% CI 1.92 to 2.07) and 2.18 (95% CI 2.06 to 2.30) respectively. LLTI was closely associated with respiratory and cardiac mortality and less so with mortality from external causes: for females the respective hazard ratios were 2.40 (CI 2.12 to 2.72), 3.36 (CI 2.87 to 3.93), and 2.15 (CI 1.47 to 3.15). Male results showed similar patterns. Significant interactions between age and LLTI were found suggesting that the relationship between LLTI and mortality was attenuated with age group. A similar relation was found with deprivation levels, at both household and area level, and also among people living in Wales.

Conclusions: These data would suggest that significant care should to be taken when using LLTI to assess need or to allocate resources.

SOCIODEMOGRAPHIC DIFFERENCES IN THE PROVISION OF HEALTHCARE SERVICES IN INDIVIDUALS WITH KNEE PAIN

V. J. Cavendish[1], J. Sandhu[2], P. Juni[4], S. Williams[3], I. D. Learmonth[1], P. Dieppe[3]. [1]*Academic Orthopaedic Unit, Southmead Hospital, Bristol, UK;* [2]*Department of Social Medicine, University of Bristol, Bristol, UK;* [3]*MRC HSRC Canynge Hall, Whiteladies Road, Bristol, UK;* [4]*Department of Social and Preventative Medicine, University of Berne, Switzerland*

Background: Arthritis is a frequent cause of knee pain, often resulting in locomotor disability in older age. Although there have been major advances in clinical management to reduce pain and disability, if conservative therapy fails then total knee replacement (TKR) surgery has shown itself to be an effective and accepted treatment. However, little is known about the provision of healthcare services available to individuals with knee pain. The aim of this study was to investigate healthcare provision by individuals with self-reported knee pain.

Methods: The Somerset and Avon Survey of Health (SASH) is a cross sectional study of a stratified random sample of 28 080 individuals aged 35 and over, from 40 general practices in the South West, UK. The presence of knee pain was determined using a postal administered screening questionnaire. Participants were asked about their use of services over the past 12 months. Logistic regression was used to calculate the odds ratios (OR) for the association between socio-demographic variables (age, sex, ethnicity, and deprivation) and measures of healthcare provision.

Results: Among the 22 732 responders, 3247 participants reported knee pain. After controlling for age, males were significantly less likely to be receiving prescribed medications (OR 0.76, 95% CI 0.65 to 0.89, $p<0.001$). Using Townsend Deprivation score those in the highest quintile (most deprived) received more prescribed medication (OR 1.61, 95% CI 1.26 to 2.05, $p_{trend}<0.001$) and were less likely to have previously received a TKR (OR 0.27, 95% CI 0.09 to 0.78, $p_{trend}=0.006$). There were no sociodemographic differences with regards to referrals to a hospital consultant, or subsequently being placed on a consultant waiting list for TKR surgery.

Conclusions: The provision of healthcare services for individuals with knee pain differs by sex and deprivation. These differences were evident at the level of primary and secondary care. Variations in service provision result in disparate access to services for patients and costs to the National Health Service. An evidence based management pathway for patients with knee pain is vital to ensure equity in service provision.

Qualitative research and mixed methods

A MIXED METHODS APPROACH TO EXPLORING HEALTHCARE USE FOR KNEE PAIN AND DISABILITY IN OLDER ADULTS

C. Jinks[1], K. Jordan[1], B. N. Ong[1], P. Croft[1]. [1]*Primary Care Sciences Research Centre, Keele University, Staffordshire, UK*

Objective: To investigate healthcare use for knee pain and reasons for help seeking behaviour.

Design: Cross sectional survey (n = 6073) followed by in-depth qualitative interviews (n = 22).

Setting: Three general practices in North Staffordshire, UK.

Participants: Men and women aged 50+ registered at the practices.

Main Outcome Measures: GP consultation for knee pain in the previous twelve months and use of drugs, aids, or home remedies within the last two weeks for knee pain.

Results: 75% responded to the survey and 50% reported knee pain in the last 12 months. Half of those with knee pain reported this as severe. A third of those with knee pain reported consulting their GP in the last 12 months. However, 53% of the severe group had not consulted their GP. In the previous two weeks, 63% of those with knee pain had used drugs, 59% had used aids (for example, canes, sprays, bandages) and 49% had used home remedies. The most common drugs were paracetamol, co-proxamol and ibuprofen. In terms of home remedies, one in three respondents had used cod liver oil and 14% used glucosamine. Other home remedies (for example, copper bracelets and magnets) were less commonly used. One in seven had used no healthcare in the past two weeks including 5% of those with severe knee pain. Use of home remedies (particularly cod liver oil and glucosamine) was less associated with severity than drug or aids use. Recent use of drugs and aids were associated with GP consultation independently of severity (both $p<0.001$) but use of home remedies was not.

In-depth interviews revealed the influences on people's healthcare decisions. Barriers to health care use included (1) cultural issues (for example, stoicism and expectations of ageing), (2) previous negative personal or family experience with GPs or health care, (3) operational difficulties like obtaining appointments. Factors facilitating consultation included family persuasion and changes in health status. Respondents talked about a wider range of self-care including Tens machines, olive oil, warm towels, gels, knee stockings, straps, and anti-inflammatory tablets. Respondents made adaptations to their everyday activities and made comparisons with others.

Conclusion: Knee pain is a public health priority due to its contribution to disability. Some self-care is occurring but, for a variety of reasons, older adults are reluctant to use primary care services for this problem. There may be missed opportunities for treating knee pain and disability in this group and for initiating preventative programmes.

HEALTH VISITORS AND THE PARENT/CHILD RELATIONSHIP: A FOCUS GROUP STUDY

P. Wilson[1], R. Barbour[2], C. Graham[3], M. Lynch[3], H. Minnis[4], C. Puckering[4]. [1]*General Practice and Primary Care, University of Glasgow, Glasgow, UK;* [2]*Nursing and Midwifery, University of Dundee, Dundee, UK;* [3]*South East Glasgow LHCC, Glasgow, UK;* [4]*Psychological Medicine, University of Glasgow, Glasgow, UK*

Objective: There is strong evidence supporting the view that cognitive processes and social functioning in later life are shaped in early childhood. Health visitors, with ongoing supportive contact with virtually all mothers and young children in the UK, are thus uniquely well placed to identify difficulties in the parent/child relationship. Indeed, recent policy developments emphasise their potential role in supporting the parent/infant relationship. This comes about, however, against a background where relatively little is known about health visitor practice. This qualitative study aims to address this omission through exploring *how* health visitors identify and manage problems in the parent/child relationship.

Design: Focus group study. Transcripts were coded using Atlas Ti software, and analysed using the constant comparative method.

Participants: Health visitors sampled purposively to include those working in both affluent and deprived areas. Further groups have been convened to take preliminary findings into account and to allow comparison between health visitors with varying levels of experience.

Results: The health visitors highlighted as a concern lack of theoretical training relevant to an understanding of the parent/child relationship, although they expressed a strong desire for such knowledge. Although health visitors referred to a professional apprenticeship with both formal and informal peer support, there was considerable variation in practice with extensive reliance on lay knowledge of parenting and being parented. Whereas some health visitors adopted an active approach to direct observation of parent/child dyads, others relied more on consideration of contextual data about the family or asked direct questions. These different types of approach were particularly evident in discussions about the identification of potential child abuse. Engagement with families having problems was often difficult and a variety of strategies was used, with marked differences between approaches adopted by participants working in deprived and affluent areas.

Conclusion: There are significant variations in the way health visitors conceptualise and work with the relationship between parents and young children. The findings from this study make explicit the tacit knowledge upon which health visitors rely and have the potential to inform a more structured approach to education of health visitors in order adequately to prepare them for this demanding aspect of their work.

FREE TEXT COMMENTARIES IN EPIDEMIOLOGICAL SURVEYS: IGNORE OR INCLUDE?

B. N. Ong[1], K. M. Dunn[1], P. R. Croft[1]. [1]*Primary Care Sciences Research Centre, Keele University, Keele, Staffordshire ST5 5BG, UK*

Objective: To assess the content and contribution of free text commentaries to the analysis of an epidemiological study on low back pain.

Design: This was a mixed method study comprising an epidemiological cohort study and qualitative interviews on low back pain. Questionnaires at baseline and follow up contained the modified Roland-Morris Disability Questionnaire, the Short Form-36, the Chronic Pain Grade, and the Hospital Anxiety and Depression Scale. Free text comments were invited using an open ended question at the end of the 12 month follow up questionnaire. This asked participants to describe, in their own words, how their back pain had been over the previous 12 months.

Setting: Five general practices in Staffordshire, UK.

Participants: Consecutive low back pain primary care consulters aged 30–59 years.

Results: 466 people completed the 12 month follow up questionnaire. 80% of respondents (n = 375) used the free text option and provided a wealth of material that varied in length and content, and contained both positive and negative descriptions of health status. Emerging themes included pain in parts of the body other than the lower back, and the impact of back pain on physical ability and work, psychological wellbeing, and social activities. Differences were highlighted in the epidemiological findings between people giving particular responses to the free text option. For example, people mentioning the impact of their back pain in the free text comments were more likely to have high levels of disability than those not mentioning this (odds ratio 3.6).

Conclusions: In many questionnaire based studies, unsolicited comments from responders tend to be ignored. Rather than analysing ad hoc commentaries throughout survey questionnaires we explicitly invited respondents to add their thoughts in an unstructured format. The free text material allowed comparisons of information from different sources and offered valuable insights that strengthened the findings of the study as a whole by contextualising and elaborating responses, and providing more detailed understanding of the subject.

TEENAGE PARENTHOOD AND SOCIAL EXCLUSION: A MULTI-METHOD STUDY

M. Wiggins[1], A. Oakley[1], M. Sawtell[1], H. Austerberry[1], F. Clemens[2], D. Elbourne[2]. [1]*Social Science Research Unit, Institute of Education, University of London, London, UK;* [2]*London School of Hygiene and Tropical Medicine, London, UK*

Objective: The study sought to understand using a novel methodological approach the relation between teenage parenthood and social exclusion. It explored: why some women have children while in their teens and others do not; how these women experience teenage parenthood; and what distinguishes those parents and children who have positive outcomes, in terms of social inclusion and good health, from those who do less well.

Design: Mixed method longitudinal study. Secondary analysis was carried out on two existing data sets: the Social Support and Pregnancy Outcome study (conducted 1986–94), and the Social Support and Family Health study (1999–2001). Additional follow up data from both samples were collected through postal questionnaires and in-depth interviews, including some with men who were previously teenage fathers, and children whose parents were teenagers when they were born. Focus group discussions were held with teenage parents. The study integrated analysis of the different types of data to develop a comprehensive picture of how giving birth as a teenager may constitute a ''risk factor'' for social exclusion.

Setting: Stoke, Derby, London, Kent, and Reading.

Participants: 258 current or previous teenager mothers; 969 non-teenage mothers; 13 teenage fathers; and 19 children of teenage mothers.

Results: A major finding was that dislike of school has a strong independent effect on the risk of teenage pregnancy. The data also show that violence in school and domestic settings is an important risk factor. The key factors that characterised the lives of those previous teenage mothers who had done well were: support from family; having a positive partner relationship; developing a career or having employment they liked; and the passage of time since the birth.

Conclusions: Most studies of teenage pregnancy use either a ''qualitative'' or a ''quantitative'' approach. Using different methods, both qualitative and quantitative, in sequence throughout our study allowed the outcomes from one method to inform the content of the next, and made it possible for us to collect a pool of multidimensional data. This is a framework that extends the more restricted focus of much previous research in this area to reflect the multifaceted nature of the social phenomenon of teenage pregnancy.

DEVELOPING GUIDANCE ON THE CONDUCT OF NARRATIVE SYNTHESIS IN SYSTEMATIC REVIEWS

J. Popay[1], H. Roberts[2], A. Sowden[3], M. Petticrew[4], N. Britten[5], L. Arai[2], K. Roen[1], M. Rodgers[3]. [1]*Institute of Health Sciences, Lancaster University;* [2]*Child Health Research & Policy Unit, City University;* [3]*NHS CRD, York University;* [4]*MRC Social & Public Health Sciences Unit, Glasgow University;* [5]*Peninsula Medical School, University of Exeter, UK*

Background: The use of meta-analytic or other statistical techniques is sometimes not appropriate when synthesising data in systematic reviews. In these cases, a narrative approach to synthesis is recommended. In general, a narrative approach to synthesis can be employed: (1) in addition to undertaking a statistical meta-analysis; (2) instead of a statistical meta-analysis because the experimental or quasi-experimental studies included are too heterogeneous; or (3) where the review questions dictate the inclusion of a wide range of different designs, producing qualitative and/or quantitative findings for which no other specialist approach to synthesis is appropriate.

However, unlike meta-analysis, narrative synthesis does not rest on an authoritative body of knowledge on the rigour and reliability of techniques developed over the years. Researchers often do what they consider to be a ''narrative synthesis'' when they do not have knowledge of, or expertise in, formal synthesis techniques. Given this, the aim of this ESRC funded work was to develop guidance on the conduct of narrative synthesis.

Method: An extensive search produced a total of 69 studies which were selected to inform our guidance. We identified a range of approaches to narrative synthesis and explored how data had been synthesised in a number of systematic reviews.

Results: We identified a number of different tools and techniques used to synthesise data. These ranged from simple textual descriptions, through the tabulation of findings to the development of more complicated models—such as conceptual mapping—which facilitate the exploration of relations between study findings. The tools and techniques were then incorporated into draft guidance on the conduct of systematic narrative synthesis and this was sent for review to a panel of international experts in evidence synthesis. We present the results of an exploratory application of this guidance to a narrative synthesis of the findings from multiple studies on the implementation of domestic smoke alarms.

Methods I

FACTORS IMPACTING ON PATIENT PARTICIPATION TO A RANDOMISED CONTROLLED TRIAL

S. Mcleer, V. Entwistle, M. Campbell. *Health Services Research Unit, University of Aberdeen, UK*

Background: Randomised controlled trials (RCTs) are important for evaluating the effectiveness of treatments in health care, but trialists often find it difficult to recruit and retain participants. Research into recruitment has largely focused on clinicians' and researchers' perspectives. Relatively little is known about patients' experiences.

Results: We used qualitative methods to explore patients' perspectives on trial recruitment and participation. We carried out non-participation observations of trial recruitment consultations and in-depth interviews with patients invited to participate in a UK multicentre RCT comparing medication and surgery for gastro-oesophageal reflux disease (GORD). Purposive sampling was used to include patients with a range of characteristics from two recruitment centres.

Results: This abstract focuses on initial interviews with patients about their experiences up to the stage of treatment allocation. A range of factors influenced patients' decisions about attending the recruitment consultations and participating in the trial. Individuals' circumstances were clearly significant. For example, some people had been treated solely by a GP, and saw the recruitment consultation and participation in the trial as an opportunity to see a specialist and find out more information about their GORD. The eligibility criteria for this RCT meant that patients were already receiving one of the interventions (medication) being compared in the trial. Willingness to participate in the trial was influenced by their experiences with medication. Some of those who declined to be randomised did so because their symptoms were well controlled and so they preferred to continue with their medication.

Conclusions: A desire to help others was evident, however the concept of self-benefit also emerged as an important theme. For example, some people thought that by participating in the trial they would receive better care. Others saw randomisation to the surgical arm of the trial as an opportunity to potentially be ''cured''. Some of those patients who agreed to be randomised nonetheless expressed preferences for one or the other treatments in the interviews before they were told of their allocation. This does have potential implications for their responses to the interventions they received.

ADDING ETHNICITY CODES TO ROUTINE HEALTH DATA BY RECORD LINKAGE TO CENSUS RECORDS: SURMOUNTING THE CONFIDENTIALITY CHALLENGE

J. Chalmers[1,2], C. Povey[2], R. Bhopal[1], C. M. Fischbacher[1,2], M. Steiner[1], J. Jamieson[2,3], D. Knowles[2], P. Scrimgeour[4]. [1]*Public Health Sciences, University of Edinburgh, Edinburgh, UK;* [2]*Information Services, NHS National Services Scotland, Edinburgh, UK;* [3]*National Resource Centre for Ethnic Minorities, NHS Health Scotland, Glasgow, UK;* [4]*General Register Office for Scotland, Edinburgh, UK*

Introduction: The Race Relations (Amendment) Act 2000 and NHS policy require health services to publish data showing they are promoting racial equality and reducing ethnic inequalities. However, routine data sources in Scotland rarely include a patient's ethnicity. One approach is to use record linkage techniques, but this was only considered acceptable if the process could be done without including individual identity in the linked database at any point. This paper describes our solution.

Methods: The health data are maintained by the Information Services Division of NHS National Services Scotland (ISD), and the census data are maintained by the General Register Office for Scotland (GROS).

A copy of the Community Health Index (CHI) dataset (the Scottish equivalent to the English NHS number) was used. This contains the demographic data and CHI number for every individual registered with a General Practitioner or in receipt of screening services. A one way encryption algorithm was used to convert the CHI number into a code in a way that ensured it would be virtually impossible to reverse the process.

A data extract with relevant personal identifiers and a census form number was taken from GROS's census file, the census number was encrypted, and the file was linked to the encrypted CHI dataset with the same personal identifiers using probability matching. The personal identifiers were then stripped off. A further extract containing ethnic code and an encrypted census number was joined to the first file using the encrypted census number, which was then discarded leaving the ethnicity code and the encrypted CHI number. The relevant hospital and death datasets were then linked via the CHI number and the CHI number encrypted, after which the personal identifiers were discarded. The file with the census ethnic code and the file derived from the hospital/death records were linked using the encrypted CHI number on both files.

Results: Overall, 94% of the 4.9 million census records were matched to a CHI record with an estimated false positive rate of less than 0.1%. The majority of matching failures are thought to be caused by poor transcription of names from the census form, and variations between the census data and NHS records for items such as date of birth and the detailed spelling of names.

Discussion: The technique described meets ethical, professional, and legal concerns about the linkage of census and health data and is transferable outside Scotland.

CARBOXYHAEMOGLOBIN LEVEL, SMOKING HABIT, AND MORTALITY IN 25 YEARS IN THE RENFREW/PAISLEY PROSPECTIVE COHORT STUDY

C. Hart[1], G. Davey Smith[2], D. Hole[1], V. Hawthorne[3]. [1]*Public Health & Health Policy, University of Glasgow, Glasgow, UK;* [2]*Department of Social Medicine, University of Bristol, Bristol, UK;* [3]*Department of Epidemiology, University of Michigan, Ann Arbor, USA*

Objectives: To investigate how carboxyhaemoglobin level was related to smoking habit and to assess whether carboxyhaemoglobin level was related to mortality.

Design: Prospective cohort study.

Setting: Residents of the towns of Renfrew and Paisley in Scotland.

Participants: The whole Renfrew/Paisley study, conducted between 1972 and 1976, consisted of 7048 men and 8354 women aged 45–64 years. This study was based on 3372 men and 4192 women who were screened after the measurement of carboxyhaemoglobin level was introduced about half way through the study.

Main Outcome Measures: Deaths from coronary heart disease (CHD), stroke, chronic obstructive pulmonary disease (COPD), lung cancer, and all causes in 25 years after screening.

Results: Carboxyhaemoglobin level was related to self-reported smoking and was higher in participants who reported inhaling compared with those who reported not inhaling, for each smoking category. Participants with lower carboxyhaemoglobin levels had better lung function. There were positive relations between carboxyhaemoglobin level and all causes of mortality analysed (relative rate associated with 1 SD (2.93) increase in carboxyhaemoglobin for all causes, CHD, stroke, COPD, and lung cancer were 1.26 (1.19 to 1.34), 1.19 (1.13 to 1.26), 1.19 (1.13 to 1.26), 1.64 (1.47 to 1.84), and 1.69(1.60 to 1.79) respectively). Adjustment for self-reported cigarette smoking attenuated the associations but they remained relatively strong.

Conclusions: The self-reported smoking data were validated by the objective measure of carboxyhaemoglobin level. As carboxyhaemoglobin level remained associated with mortality after adjusting for smoking, carboxyhaemoglobin seems to capture more of the ''risk'' associated with smoking tobacco than self-reported tobacco consumption alone. Analysing mortality by self-reported cigarette smoking will underestimate the strength of association between smoking and mortality.

THE COST EFFECTIVENESS OF DIAGNOSTIC ALGORITHMS FOR DEEP VEIN THROMBOSIS

F. C. Sampson[1], S. W. Goodacre[1], M. D. Stevenson[1], A. Wailoo[1], A. J. Sutton[2]. [1]*ScHARR, University of Sheffield, 30 Regent Street, Sheffield S1 4DA, UK;* [2]*Department of Health Sciences, University of Leicester, 22–28 Princess Road West, Leicester LE1 6TP, UK*

Introduction: Deep vein thrombosis (DVT) has an annual incidence of around 1 per 1000. DVT can lead to potentially fatal pulmonary embolus and long term complications such as post-thrombotic syndrome. Anticoagulant treatment reduces the risk of adverse outcomes but carries a small risk of haemorrhage. As around 15% of patients who present to the emergency department with clinical suspicion of DVT are diagnosed with DVT, accurate and cost effective diagnosis is essential. Diagnostic strategies use combinations of cheap, simple, but less accurate tests such as clinical risk scores and D-dimer blood tests to select patients for further testing with more expensive, accurate modalities. The optimal diagnostic strategy for DVT remains unclear. We therefore aimed to estimate the diagnostic accuracy and cost effectiveness of algorithms used to test patients with clinically suspected DVT.

Methods: Algorithms were identified by postal survey of emergency departments and literature review. The accuracy of each constituent diagnostic test was estimated by systematic review and meta-analyses. A decision-analytic model was then used to estimate the overall accuracy of each algorithm and the outcomes of testing and treatment, valued as

quality adjusted life years (QALYs). The net benefit of using each algorithm was estimated using cost utility analysis, assuming thresholds of willingness to pay of £20,000 and £30,000 per QALY.

Results: The most cost effective algorithms used D-dimer to discharge low risk patients. If we are willing to pay up to £20,000 per QALY the most cost effective and practical strategy is to discharge patients with a low or intermediate clinical risk score and negative D-dimer, ultrasound for those with a high score or positive D-dimer, and repeat ultrasound for those with positive D-dimer and high clinical risk score, but negative initial scan. If we are willing to pay £30,000 per QALY the optimal strategy would also offer repeat ultrasound for all patients with a negative initial scan.

An alternative strategy using plethysmography alongside ultrasound, with venography for discordant cases, appears to be very cost effective, but depends upon assumptions of test independence being met and ability to provide plethysmography at relatively low cost.

Conclusions: Diagnostic algorithms based on combinations of clinical risk scores, D-dimer, and ultrasound are among the most cost effective. Further diagnostic testing for patients with a low clinical risk score and negative D-dimer is unlikely to represent a cost effective use of resources. Cost effectiveness of repeat ultrasound depends upon our threshold for willingness to pay for health gain. The role of plethysmography needs further evaluation.

THE MULTIPLE SCLEROSIS RISK-SHARING SCHEME: AN INNOVATIVE APPROACH TO ASSESSING COST EFFECTIVENESS

C. Cooper[1], M. Pickin[1], T. Chater[1], M. Boggild[2], J. Palace[3], J. Nichol[1] on behalf of the RSS Monitoring Study Consortium. *[1]University of Sheffield, Sheffield, UK; [2]University of Liverpool, Liverpool, UK; [3]University of Oxford, Oxford, UK*

Background: Prescribing of disease modifying therapies (DMTs)—beta interferon and glatiramer acetate—for multiple sclerosis (MS) has been controversial because of their high cost. ''Postcode prescribing'' and high profile court cases were followed by an appraisal by The National Institute for Health and Clinical Excellence (NICE). NICE concluded that these treatments did not represent a cost effective use of NHS resources, and recommended that a way be found to allow cost effective NHS prescribing of DMTs. The resulting ''MS Risk-sharing Scheme'' allows prescribing of DMTs at a reduced price. Uniquely, agreements exist for further price adjustments conditional upon observed disease progression in the study cohort.

Objectives: The scheme will assess the cost effectiveness of DMTs in MS over 10 years to inform price adjustment ensuring that the cost per QALY is less than a predetermined cost per QALY limit.

Design: Cohort study.

Setting: 68 UK hospitals.

Participants: 5000 MS patients.

Outcome measures: Disability progression measured using the Expanded Disability Status Scale (EDSS) and cost effectiveness assessed as cost per QALY.

Results: 5000 patients (73% female, 27% male) have been recruited to the study from 68 MS centres across the UK and have been reviewed annually. Data on disease progression at three years are available for those recruited early in the study. Data on participant demographics, type of MS, and disease progression will be presented.

Discussion: Lessons learned from the first three years of the scheme will be presented. The methodological, practical, and political implications of the scheme will be discussed, along with implications for the use of this model in other disease areas where cost effectiveness of therapies is controversial and where the price of intervention may be linked to monitoring of real world cohorts. We will also discuss the value of this approach in assessing whether benefits shown in randomised controlled trials are maintained over the longer term in cohorts of all patients eligible for an intervention.

Parallel session B

Older people

IMPACT OF LONG TERM WARFARIN ON THE QUALITY OF LIFE OF ELDERLY PEOPLE WITH ATRIAL FIBRILLATION

A. Blance[1], R. M. West[1], A. K. Das[2], P. D. Willcoxson[2], O. J. Corrado[2]. *[1]Biostatistics Unit, Centre for Epidemiology & Biostatistics, University of Leeds, Leeds, UK; [2]Department of Geriatric Medicine, Leeds General Infirmary, Leeds, UK*

Background: Warfarin reduces the risk of stroke substantially in older patients with atrial fibrillation (AF) and might be very commonly prescribed. However, only 20–30% of the eligible patients are on this treatment. One of the reasons for underuse is presumed to be poor quality of life. We seek whether duration of warfarin treatment affects quality of life among the elderly.

Methodology: Community warfarin clinics were sampled for patients aged at least 75 years. Patients completed the SF12v2 questionnaire and a researcher checked for risk factors of stroke: cardiac failure (C), hypertension (H), age ⩾75 years (A), diabetes mellitus (D), and stroke (S). Scoring ($CHADS_2$) was from 0 to 6 (one point for each risk factor except for stroke, for which two points are scored)—all patients had a $CHADS_2$ score of at least 1 since all were over 75 years. Linear regression was used to model two measures of quality of life—the physical component scores (PCS) and mental component scores (MCS) from the SF12v2 questionnaire—in order to determine the effect on these of duration of warfarin treatment whilst adjusting for confounding factors.

Results: A total of 330 questionnaires were completed for which PCS and MCS were calculated. A further 15 questionnaires were only partially completed, and these were excluded from the analyses as the PCS and MCS calculations were not possible. It was noted, however, that the excluded patients had similar completed characteristics to those analysed. A linear regression model was fitted for each dependent variable (PCS/MCS). Age, sex, duration on warfarin, $CHADS_2$, and stroke status were explored as covariates. After fitting all covariates separately and combined, covariates were dropped from the model if consistently non-significant. Overall, models had poor explanatory power ($r^2 = 0.14$ and $r^2 = 0.07$ respectively for PCS and MCS). $CHADS_2$ in the final PCS model and age in the final MCS model were the only significant covariates remaining. In particular, duration on warfarin had no significant influence over either quality of life measure.

Conclusion: Duration on warfarin treatment did not significantly affect quality of life. Physical quality of life, measured by PCS, was affected by disease burden ($CHADS_2$). Mental quality of life, as measured by MCS, worsened with age. In view of these findings, physicians may be reassured that long term warfarin use does not appear to reduce quality of life among older patients.

DEVELOPING ATTRIBUTES FOR A GENERIC QUALITY OF LIFE MEASURE FOR OLDER PEOPLE: IS IT PREFERENCES OR CAPABILITIES THAT ARE IMPORTANT?

J. Coast[1], I. Grewal[2], J. Lewis[2], T. Flynn[1], J. Brown[3], J. Bond[4]. *[1]University of Bristol, [2]National Centre for Social Research, [3]Eli Lilly & Company Ltd, [4]University of Newcastle, UK*

Objectives: Current UK policy with respect to the provision of health and social care for older people suggests that greater integration is required. Economists' attempts to assist resource allocation decisions, however, tend to be very health focused, with the use of health related quality of life measures. This paper reports an attempt to determine attributes for a new index clearly focusing on quality of life (for older people) rather than health or other influences on quality of life.

Design: In-depth interviews with transcripts analysed using constant comparative methods and key themes identified with the assistance of the framework approach.

Participants: 40 informants aged 65 years and over purposively selected to include the range of personal characteristics (sex, age, health status, household composition, and most recent occupation).

Setting: Three geographical locations covering the north and south of the UK.

Main Outcome Measures: Interviews were conducted to find out informants' views about what is important to them in terms of quality of life. Initial discussions with informants tended to concentrate upon factors influencing quality of life such as activities, relationships, health, wealth, and surroundings. Further probing and analysis was aimed at identifying conceptual attributes of quality of life.

Results: Five conceptual attributes emerged from the data: attachment, role, enjoyment, security, and control. The data also suggested that the quality of informants' lives was limited by the loss of ability to pursue these attributes. So, for example, it is not poor health in itself that reduces quality of life, but the influence of that poor health upon each informant's ability to, for example, be independent that is important.

Conclusions: In interpreting the findings, Amartya Sen's work on functioning and capability seems to be particularly pertinent. Using this work, it is possible to interpret the five conceptual attributes as a set of functionings important for older people in the UK in the 21st century, but noting that it is the capacity to achieve these functionings that appears to be of greatest importance to individuals. This suggests that quality of life

measurement in this group should focus on capability rather than preference based utility.

DIET AND LIFESTYLE FACTORS ASSOCIATED WITH URINARY INCONTINENCE IN OLDER WOMEN: A PROSPECTIVE COHORT STUDY

C. W. McGrother, H. M. Dallosso, R. Matthews, M. M. K. Donaldson. *Department of Health Sciences, University of Leicester, Leicester, UK*

Aim: Little is known about primary causes of urinary incontinence. This study aims to identify dietary and non-dietary lifestyle factors associated with the onset of clinically significant urinary storage syndromes: overactive bladder (OAB) and stress incontinence (SUI).

Methods: A random sample of 20 244 women aged 40 years and over, living at home and registered with a GP in Leicestershire or Rutland, was sent a postal questionnaire on urinary symptoms and lifestyle (response rate 65%). Responders were asked to complete the EPIC 130 item validated food frequency questionnaire (response rate 65%). Follow up data on urinary symptoms were collected by postal questionnaire one year later (response rate 91%).*

Outcome Measures: OAB was defined as one or both of the symptoms of urge leakage (''a strong desire to pass urine that results in leakage of urine before reaching the toilet'') and urgency (''a strength of urgency on feeling the need to pass urine that is typically very strong or overwhelming''). SUI was defined as the symptom of stress incontinence (''leakage on coughing, laughing or exercise several times a month or more''). These questions were developed for the study and conform to International Continence Society recommendations. Logistic regression was used to examine associations between diet/other lifestyle factors and incident cases of OAB and SUI.

Results: Prevalences at baseline were: OAB 16.3%; SUI 17.3%. At the year 1 follow up incidence rates were: OAB 9.2% (492 cases); SUI 8.3% (421 cases). There was little evidence of non-response bias in the reporting of urinary symptoms at baseline and no difference in the dropout rate between baseline OAB cases and non-cases at follow up. In the multivariate model there were reduced risks for OAB with high consumption of vegetables ($p=0.02$), bread ($p=0.001$), and chicken ($p=0.005$); plus increased risks with high consumption of fizzy drinks ($p=0.03$), smoking ($p=0.04$), and obesity ($p=0.05$). For SUI there were reduced risks with high consumption of bread ($p=0.02$); plus increased risks with high consumption of fizzy drinks ($p=0.03$) and obesity ($p=0.002$). Adjustment for socioeconomic status had minimal effect.

Conclusions: This prospective study provides evidence that some aspects of diet and lifestyle may be independent risk factors in the causation of urinary incontinence in older women living at home. Further evaluation of lifestyle associations with bladder dysfunction and comorbidities within the neuromuscular and circulatory systems is planned, using graphical modelling.†

*MRC funding.
†BUPA Foundation funding.

THE PSYCHOSOCIAL VERSUS MATERIAL HYPOTHESIS TO EXPLAIN OBSERVED INEQUALITY IN DISABILITY AMONG OLDER ADULTS: DATA FROM THE WEST OF SCOTLAND TWENTY-07 STUDY

J. Adamson[1], K. Hunt[2], S. Ebrahim[3]. [1]*Department of Health Sciences, University of York, York, UK;* [2]*MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK;* [3]*Department of Social Medicine, University of Bristol, Bristol, UK*

Objectives: One explanation posed for socioeconomic inequalities in health is the ''psychosocial hypothesis'', which suggests that inequalities are a consequence of the direct or indirect effects of stress stemming from socioeconomic hierarchies. An alternative view considers that it is tangible material conditions (including, food, housing, access to amenities, etc) which explain health inequalities. This study considers the relative explanatory power of the psychosocial and material hypotheses in observed inequalities in disability among older people.

Methods: Analysis was based on 723 respondents aged 63 years from the West of Scotland Twenty-07 study. The main outcome measure was overall disability using an adapted form of the questionnaire developed by OPCS surveys of disability. This questionnaire provides an overall score of severity of disability, measured across several domains, including locomotion, dexterity, reaching and stretching, sensory impairment, and continence. Respondents were grouped comparing the highest scoring tertial with the lowest and mid-tertial combined. Socioeconomic position across the lifecourse was measured in two different ways. An index of perceived financial hardship was based on respondents' reports of their financial position across four decades of adult life. An index of material conditions was calculated from data on possession of several indicators of material wealth (for example, ownership of television, washing machine) during the same time periods. The relation between the two measures of socioeconomic position and disability were examined using logistic regression.

Results: Both the index of perceived financial hardship (OR 1.28, 95% CI 1.10 to 1.48); and index of material conditions (OR 1.27 95% CI 1.11 to 1.45) showed similarly sized associations with reported disability. However, when these associations were adjusted for sex, morbidity, and lifestyle factors, the index of material conditions became the strongest predictor of disability. For each decade spent in material deprivation there was a 20% increased risk of reporting in the highest tertial of overall disability score (OR 1.19, 95% CI 1.02 to 1.37), and those who had experienced material deprivation across all four decades were over three times more likely (OR 3.36, 95% CI 1.50 to 7.52) to report greater disability.

Discussion: Onset of disability in early old age does appear to be socially patterned across both measures of socioeconomic position. However, this relation was stronger for the index of material conditions. Material conditions across four decades remained an independent risk factor for disability after adjustment for sex, morbidity, and lifestyle factors. The data do not provide strong support for the psychosocial hypothesis of health inequalities.

Lifecourse II

ASSOCIATION OF BIRTHWEIGHT AND RENAL FUNCTION: POPULATION BASED STUDY

D. G. Fogarty[1], P. Mccarron[1], L. Murray[1], G. Savage[1], A. P. Maxwell[1], F. Kee[1]. [1]*Centre for Clinical and Population Science, Queen's University of Belfast, Belfast BT12 6BJ, UK*

Background: The association between birthweight and chronic kidney disease (CKD), has been examined in a small number of select populations—often those with established kidney dysfunction.

Objective: To investigate the association between birthweight and renal function in early adulthood in a population based setting.

Design, Setting, and Participants: Data were extracted from two linked population based databases: the Child Health System containing data on 444 168 births in N Ireland from 1971–86 and all renal tests ordered in N Ireland in 2001/2. There were 62 123 individuals (mean age 23.2 years) born 1971–86 with a birthweight $\geq$1500 g on whom serum creatinine was measured.

Results: Estimated glomerular filtration rate (eGFR) was computed using serum creatinine, and sex. Mean (standard deviation) eGFR was 97.9 (SD 20.2) ml/min in females and 87.4 (SD 24.5) ml/min in males. After controlling for gestational age, age at testing, and socioeconomic status, eGFR increased by 0.71 (95% CI 0.25 to 1.18) ml/min for every 1 kg decrease in birthweight in females and by 0.62 (95% CI 0.04 to 1.20) ml/min in males. After categorising individuals with eGFR of $<$60 ml/min as having CKD, neither sex showed an association between birthweight and risk of CKD. In a subgroup of 833 individuals who had GFR measured directly by creatinine clearance, associations were larger and in the opposite direction: in females for a 1 kg fall in birthweight, GFR declined by 4.99 (95% CI $-$3.9 to 13.92) ml/min, while in males the same birthweight change was accompanied by a 11.59 (95% CI 0.27 to 23.45) ml/min decline. There was no association between risk of CKD in females (RR per 1kg fall in birthweight = 1.07 (95% CI 0.7 to 1.7), while the same birthweight fall in males resulted in a doubling of risk for CKD, RR = 1.96 (95% CI 1.1 to 6.6).

Conclusions: This large population based study reveals modest associations between birthweight and renal function in the section of the population with substantially normal eGFR. However, in those investigated for renal disease there GFR was positively associated with birthweight in males. The findings suggest that fetal development plays a role in determining renal function even in early adulthood, particularly in those who are set to develop early kidney disease.

MEASURED AND RECALLED EARLY ADULT WEIGHT: THE EFFECT OF MISCLASSIFICATION ON ASSOCIATIONS BETWEEN BMI AND CANCER

M. Jeffreys[1], K. Huang[1], B. Galobardes[2], P. Mccarron[3], S. Kinra[2], G. Davey Smith[2]. [1]*Centre for Public Health Research, Massey University, Wellington,*

NZ, [2]Department of Social Medicine, University of Bristol, UK, [3]Department of Epidemiology and Public Health, Queen's University, Belfast, UK

Background: There is substantial interest in early life weight and its association with cancer, but most studies have to rely on recalled weight due to practical constraints.

Objective: To estimate the effect of weight misclassification due to recall error on associations between weight in early adulthood and cancer prevalence.

Design: Historical cohort study, with contemporaneously measured as well as recalled weight at age 20.

Participants: A total of 2629 men and 1217 women who attended the University of Glasgow Student Health Service (1948–68), were traced through the NHS Central Register (1998) and responded to a postal questionnaire (2001–02). Height and weight were measured at university (mean age 20 years). At a mean age of 64 years, participants recalled their university weight.

Main Outcome Measures: Self-reported cancer prevalence.

Results: The mean difference in weight (recalled minus true) was 3.3 kg (95% CI 3.0 to 3.4) in men and 0.03 kg (95% CI −0.2 to 0.3) in women.

A Bland-Altman plot showed that the 95% limits of agreement between the two methods lay between −13.9 and 7.4 in men and −9.0 and 8.9 in women. In both sexes, the odds ratios per 1 kg higher weight for cancer prevalence, adjusted for age and height, were similar for measured and recalled weight (0.97 (95%CI 0.94 to 1.00) *v* 0.96 (95%CI 0.92 to 1.00) in men and 0.97 (95%CI 0.93 to 1.01) *v* 0.98 (95%CI 0.94 to 1.02) in women). Associations based on the two weight estimates were also similar for lung and colorectal cancers. Using recalled weight slightly overestimated the associations between early adult weight and breast and prostate cancers.

Conclusion: Women may be more accurate at recalling past weight than men. Using recalled weight in retrospective studies is unlikely to significantly distort associations between early adult weight and cancer, based on data from former university students. These data cannot necessarily be extrapolated to other populations, or to outcomes that are recognised by the public as closely related to weight, such as diabetes.

LIFECOURSE SOCIOECONOMIC POSITION AND SMOKING STATUS: THE INFLUENCE OF CONTEXT

A. H. Leyland[1], R. Dundas[1], S. Macintyre[1], D. A. Leon[2]. *[1]MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK; [2]Epidemiology Unit, London School of Hygiene and Tropical Medicine, UK*

Background: Socioeconomic status at different stages of the lifecourse has been shown to be independently associated with mortality and health behaviours.

Aim: To assess the effect of socioeconomic status in childhood on adult smoking controlling for adult socioeconomic position.

Design: Historical cohort study; Aberdeen Children of the 50s Study

Participants: 7127 respondents (63% of eligible sample) born in 1950–55 who attended one of 45 mainstream primary schools in Aberdeen in 1962 and responded to a postal questionnaire in 2001.

Main Outcome Measure: Self-report of ever having smoked (available for 7109 respondents).

Methods: Multilevel logistic regression was used to assess the influence of paternal social class (SC) at birth and adult SC on smoking status, controlling for the primary school attended. In addition a contextual measure of the social mix within the school was created from the data set—the proportion of children in each school whose father was in social classes I and II—and the significance of this was assessed.

Results: 52% of respondents had ever smoked. After adjustment for the sex of the respondent and age at the time of interview, SC in childhood and as an adult were independently associated with adult smoking. A joint analysis suggested a stronger relation with adult SC relative to SCI&II (OR SCIII = 1.42, 95% CI 1.28 to 1.58; SCIV&V = 2.16, 95% CI 1.87 to 2.50) than with paternal SC (SCIII = 1.07, 95% CI 0.91 to 1.25; SCIV&V = 1.38, 95% CI 1.16 to 1.64) although both were significant ($p<0.001$ for both). The variance between schools was small (0.012) relative to its standard error (0.008) and suggested just 0.4% of the variability in smoking was attributable to primary school. None of the schools was associated with a risk of smoking significantly higher or lower than average. However, the school context proved to be significant. 10% of children were at schools where 1.4% or fewer children had fathers in SCI&II, while 10% were at schools where 39.4% or more of the children had fathers in SCI&II. The odds of smoking among children at the former school were significantly higher than those at the latter after adjustment for adult and paternal SC (OR 1.23, 95% CI 1.07 to 1.42). Following adjustment for the school context, the effect of paternal SC was substantially attenuated.

Conclusions: The naïve analysis suggests an association between parental social class and adult smoking, controlling for adult social class, which may be misleading. There is evidence that this relation is partly due to the contextual effect of primary school or its correlates.

IS HYSTERECTOMY ASSOCIATED WITH LONG TERM RISK OF DEATH? EVIDENCE FROM THE ROYAL COLLEGE OF GENERAL PRACTITIONERS' ORAL CONTRACEPTION STUDY

L. Iversen, P. C. Hannaford, A. M. Elliott, A. J. Lee. *Clinical Department of General Practice & Primary Care, University of Aberdeen, Aberdeen, UK*

Objectives: To investigate the long term risk of death from any cause, from cardiovascular disease, and cancer in women who had or had not had hysterectomy.

Design: A nested cohort study.

Setting: The Royal College of General Practitioners' Oral Contraception Study.

Participants: The Oral Contraception Study began in 1968 aiming to study the health effects of oral contraceptives. Over a 14 month period, 1400 general practitioners recruited 23 000 women who were using oral contraceptives and a similar number of age matched women who had never done so. The average age of the participants at recruitment was 29 years. We conducted a nested cohort study of 7410 women constructed from the Oral Contraception Study. Women who had a hysterectomy (n = 3705) during the study, and were flagged at the National Health Service Central Registries (for notification of cancers and deaths), were compared with women who did not have the operation (n = 3705) and were flagged.

Main Outcome Measures: All-cause, cardiovascular, and cancer mortality.

Results: By the end of follow up, 623 (8.4%) of women had died. Young women who had a hysterectomy experienced an adjusted hazard ratio of 0.82 (95% CI 0.65 to 1.03) for all-cause mortality compared with young women who did not have a hysterectomy. Among older women for all-cause mortality the adjusted hazard ratio was 0.94 (95% CI 0.75 to 1.18). Hysterectomy was not associated with a statistically significantly adjusted hazard ratio of cardiovascular death among women who were young, 0.85 (95% CI 0.54 to 1.33) or older, 0.80 (95% CI 0.52 to 1.23) at the time of operation. The effect of hysterectomy on cancer mortality was different depending on the age of the women at the time of surgery. Women who were younger were less likely to die from cancer than similarly aged women who did not have a hysterectomy, adjusted hazard ratio 0.81 (95% CI 0.55 to 1.19). Women who were older when they had hysterectomy had the same risk of death from cancer as similarly aged women who did not have the operation, adjusted hazard ratio 1.02 (95% CI 0.69 to 1.49).

Conclusions: For this nested cohort of women our results are reassuring but they ignore other non-fatal implications of hysterectomy. These findings should not be used to argue that hysterectomy be used as a public health measure to reduce women's risk of death later in life. The absence of increased medium to long term mortality risk should be used to reassure women who have had the operation.

Access, utilisation, and inequalities II

ARE PERFORMANCE INDICATORS AN ADEQUATE AND APPROPRIATE MEASURE OF ACCESS TO HEALTH CARE?

N. Drey[1], A. Macfarlane[1], A. Pollock[2], S. Godden[2]. *[1]Department of Midwifery, City University, London; [2]Public Health Policy Unit, University College London*

Background: Creating fair and equitable access to health care, particularly for marginalised groups has a high profile in Government policy. To monitor this there are many performance indicators, targets and standards, most recently those expounded in *Assessment for Improvement* (Healthcare Commission, Nov 2004). The adequacy and appropriateness of these indicators were assessed as part of a study that examined the extent to which access health care can be measured and monitored by routine data.

Methods: We identified performance indicators, targets, and standards relating to health care in England (since 1990) through a web based search of the Department of Health and Treasury Homepages

and consultation with experts and reference to official publications. Adapting a pre-existing framework for access to health care, based on measures of need, opportunity, utilisation, and outcome, we examined these *indicators* to determine to if they were sufficient to measure and monitor access to health care by the population as a whole and by specific marginalised groups.

Results: Numbers of indicators have multiplied over the period. The 12 umbrella targets set as part of the 2002 Treasury Spending Review cascaded into 148 individual targets for the last Star Rating (2004). Recently the Healthcare Commission has added compliance standards as part of *Assessment for Improvement*, potentially increasing the number of indicators even further. Outcome measures address access only in terms of waiting times and expressions of choice. Little could be said about the opportunity to use health services generally, nothing for marginalised groups. Targets based on utilisation measures were most frequently used (for example, waiting times).

Discussion: Performance indicators, targets, and standards for access to health care are inadequate for monitoring access. The lack of an overall rationale and architecture for the new standards means the picture they will paint is likely to be confusing. The current definition of access is very consumer driven: the speed with which an individual is seen and increasingly what choice the individual has. The wider notion of access is missed, especially with respect to the barriers to accessing health care by excluded and marginalised groups. The new standards are unlikely to remedy this, as the indicators of access are not developed further. Many of the data used in the new standards are not in the public domain, making external analysis and critique difficult. An independent organisation to scrutinise the whole process of performance management in the NHS is needed.

PERSON, PLACE, AND TIME: A MULTILEVEL ANALYSIS OF THE EFFECT OF INDIVIDUAL SOCIOECONOMIC CHARACTERISTICS AND AREA OF RESIDENCE ON ADULT MALE MORTALITY 1995–2001

C. White[1], R. Wiggins[2], D. Blane[3], A. Whitworth[1], M. Glickman[1]. [1]*Office for National Statistics, London,* [2]*City University, London,* [3]*Imperial College, London, UK*

Aim: To compare the influence on adult male mortality in 1995–2001 of socioeconomic characteristics of the individual, measured at three censuses 1971–91, and their area of residence in 1991.

Sample: 49 951 males in the ONS Longitudinal Study who were aged 46 or over, and resident in private households, in 1991. The LS contains linked census data from 1971 to 2001 and vital events data for a 1% representative sample of the population of England and Wales.

Outcome Measure: Deaths of sample members in the period 1995–2001.

Methods: Multilevel logistic regression was carried out in MLWin. An initial individual level model based on characteristics at each census separately was extended first to include derived longitudinal variables, and then developed into a two level model including area characteristics.

Results: The strongest predictors of mortality were Social Class in 1971, housing tenure in 1991, and unemployment at any census. Social and housing tenure mobility between 1971 and 1991 also had significant effects. Neighbourhood deprivation (indicated by the Carstairs deprivation quintile of ward of residence in 1991) and residence in the South East were also important, while district level variation was not significant after the inclusion of these in the model.

Conclusions: Individual level social factors are the main determinants of adult male mortality. There is also evidence that different measures have greater impact on mortality risk at different points in the lifecourse. The addition of indicators that capture individual changes in states longitudinally increases the explanatory value of the model above simple associations over time. These findings have important consequences for our understanding of premature mortality among men.

SOCIOECONOMIC DIFFERENCES IN HEALTHCARE SPENDING IN THE LAST YEAR OF LIFE IN STOCKHOLM COUNTY: AN ANALYSIS OF LINKED DATA

B. Hanratty[1], B. Burström[2], M. Whitehead[1]. [1]*Division of Public Health, University of Liverpool, UK;* [2]*Department of Public Health Sciences, Division of Social Medicine, Karolinska Institute, Stockholm, Sweden*

Background: Healthcare spending at the end of life accounts for a substantial proportion of most health service budgets. Proximity to death and age at death are important influences on costs. Differing levels of morbidity and access to health care across social groups mean that socioeconomic status is also associated with variation in costs. Many countries attempt to take account of the greater health needs among poorer groups when allocating resources, but there are few empirical data to inform these estimates. This study aims to investigate the association between individual socioeconomic status and healthcare expenditure in the last year of life.

Methods: Data were extracted from the linked healthcare and welfare registers, for all deaths among Stockholm county residents in 2002 (total population 1.8 million). These provided, at individual level, state expenditure on inpatient, outpatient, primary, and private care in the last year of life and sociodemographic variables. Household net disposable income was obtained from the national income register for the year 1998, equivalised, and divided into quintiles to provide a measure of socioeconomic position. Linear regression analyses were used to investigate the influence of individual sociodemographic characteristics and healthcare utilisation on expenditure.

Findings: Data were available for 14 458 of the 16 617 adult deaths in 2002. Total age standardised spend increased by a factor of almost two across income quintiles from least to most affluent groups. Spending decreased with increasing age over 65 years in all income quintiles. Similar trends were seen in spending by medical specialty, including primary and private care. Income quintile was significantly associated with total health spending in multivariate analysis, adjusting for age, sex, healthcare use, major diagnostic groups, and other sociodemographic variables. In subgroup analyses of 3573 cases admitted with ischaemic heart disease, and 4759 with a cancer admission in the last year of life, only age and health service use were significantly associated with expenditure.

Conclusions: People with higher incomes were more costly for the health service to treat in their last year of life compared to less affluent decedents, even accounting for differing levels of health care use. Although social patterning of disease may account for some of the difference in expenditure, these findings suggest significant inequality, and possibly inequity, in healthcare spending at the end of life. This merits attention in countries with welfare systems that are less well established than that of Sweden.

This study was funded by the Medical Research Council.

PERSISTENCE OF SUBSTANTIAL INEQUALITIES IN MORTALITY BY COUNTRY OF BIRTH IN ENGLAND AND WALES 2001–2003

S. Wild[1], C. Fischbacher[2], A. Brock[3], C. Griffiths[3], R. Bhopal[1]. [1]*Public Health Sciences, University of Edinburgh, Edinburgh, UK;* [2]*Information Services (ISD), NHS National Services Scotland, UK;* [3]*Office for National Statistics, London, UK*

Objective: To compare mortality from major causes of death for England and Wales by country of birth and for residents of Scotland and Ireland with that of the whole population of England and Wales.

Design: Cross sectional study of mortality for people aged 20 years and over using population data from the 2001 Census and mortality data for 2001–2003. Death rates for England and Wales as a whole were used as the standard for indirect standardisation. Age specific SMRs for age categories of 20–44 years, 45–59 years, 60–69 years, and ⩾70 years were examined in addition to the broader age group of ⩾20 years.

Setting: England and Wales, Scotland, and Ireland.

Main Outcome Measures: Standardised mortality ratios (SMRs) for major causes of death

Results: All-cause mortality (indicated by SMR (95% CI)) for people aged 20 years and over was higher than the England and Wales average for people born in East Africa (men 105 (95% CI 101 to 111), women 108 (95% CI 102 to114)), Ireland (men 128 (95% CI 126 to 129), women 113 (95% CI 111 to115)), Scotland (men 113 (95% CI 111 to 115), women 109 (108–111)) and West Africa (men 117 (95% CI 111 to 124), women 121 (95% CI 112 to 130)). SMRs for ischaemic heart disease (International Classification of Diseases, tenth revision (ICD–10) codes I20–I25) were highest among people born in Bangladesh (men 175 (95% CI 158 to 193), women 167 (95% CI 136 to 204)), India (men 131 (95% CI 126 to 137), women 149 (95% CI 142 to 157)) and Pakistan (men 162 (95% CI 152 to 172), women 174 (95% CI 159 to 192)), and lowest among people born in West Africa (men 61 (95% CI 51 to 73), women 81 (95% CI 62 to 103)) and the West Indies (men 73 (95% CI 68 to 78), women 96 (95% CI 88 to105)). Women born in West Africa had an increased SMR for breast cancer (132 (95% CI 105 to 163)). Migrants to England and Wales born in Ireland had higher all-cause mortality than residents of Ireland but migrants to England and Wales born in Scotland had lower mortality than residents of Scotland.

Conclusions: Patterns of mortality by country of birth observed in previous analyses generally persist in this analysis even among the oldest age group (≥70 years of age). Further inequalities in mortality by country of birth (for example, higher mortality from ischaemic heart disease among men born in the Middle East (SMR (95% CI) 115 (106 to 125)) or Eastern Europe (SMR (95% CI) 111 (106 to 116)) have also been demonstrated.

Healthcare follow up studies

CHRONIC PAIN AND QUALITY OF LIFE FOUR YEARS AFTER GASTROINTESTINAL SURGERY

J. Bruce[1], M. Turner[2], Z. H. Krukowski[2]. [1]*Department of Public Health, University of Aberdeen, UK;* [2]*Department of Surgery, University of Aberdeen, UK*

Background: Chronic post-surgical pain (CPSP) is a known consequence of mastectomy and hernia surgery, which can impact on postoperative quality of life. Few studies have assessed chronic pain and quality of life after gastrointestinal surgery.

Objectives: To assess chronic pain, quality of life, and wound infection at four years in patients undergoing gastrointestinal surgery for cancer and other conditions.

Design: Prospective cohort study of patients undergoing gastrointestinal surgery in 1999 with follow up of survivors at four years postoperatively.

Setting: Regional centre in Northeast Scotland.

Participants: All consecutive adult patients (n = 435) undergoing gastrointestinal anastomosis surgery between 1 January 1999 and 31 December 1999.

Main Outcome Measures: Chronic pain, quality of life, and wound infection at four years postoperatively. Chronic pain and quality of life were assessed using the McGill Pain Questionnaire and EORTC core questionnaire. Risk factors for the development of chronic pain were assessed; multiple linear regression was undertaken to assess quality of life in patients reporting chronic pain.

Results: The mortality rate was 135/435 (31%) at four years. A total of 202 of 275 (73%) patients eligible for follow up responded to the survey. Forty patients (20%) reported chronic pain after surgery. Pain was predominantly neuropathic in nature with ''stabbing'' being the most frequent descriptor. Women were at higher risk (OR 2.7 95% CI 1.2 to 6.1) and younger age at surgery (≤65 *v* >65 years; OR 3.0 95% CI 1.3 to 7.1) was associated with chronic pain. Women had lower EORTC scores than men for functioning scales and significantly poorer symptom scores for fatigue, nausea, pain, and diarrhoea. Younger patients reported their physical condition had caused them considerable financial difficulties. Mean quality of life scores were significantly lower in patients reporting CPSP adjusted for age and sex. Overall, patients undergoing surgery for cancer in 1999 reported better quality of life compared with those having surgery for non-malignant conditions.

Conclusions: The prevalence of chronic pain after gastrointestinal surgery was low compared with other surgical procedures but was associated with poorer quality of life, particularly in women and younger age groups. Quality of life at four years was significantly higher in patients surviving gastrointestinal cancer surgery compared with those with non-malignant conditions.

MANAGEMENT OF ACUTE CORONARY SYNDROME IN DIABETIC PATIENTS: FINDINGS FROM THE NATIONAL AUDIT PROJECT

C. F. M. Weston[1], R. R. West[2], J. S. Birkhead[3], and MINAP Steering Group. [1]*Singleton Hospital, Swansea, UK;* [2]*University of Wales College of Medicine, Cardiff, UK;* [3]*Northampton General Hospital, UK*

Background: Individuals with type 2 diabetes mellitus are at greater risk of myocardial infarction (MI) and subsequent heart failure, reinfarction, and death than those without diabetes. Differences in presenting symptoms, diagnostic uncertainly, or differences in management may contribute. Recent guidelines for management of these patients should lead to improved outcomes. The present study compares management of diabetic with non-diabetic patients.

Method: The Myocardial Infarction National Audit Project (MINAP) collects data on all MI, or increasingly acute coronary syndrome (ACS), patients in England and Wales. All acute general hospitals collaborate. Key data fields are completed in over 90% of records and sample records are validated annually. There were 295 000 records available for analysis. For this comparison patients were classified as diabetic on basis of prior diagnosis by referring general practitioner, patient, or accompanying relative and not on new diagnosis by glucose measurement following admission. Comparisons were made in management between diabetic and non-diabetic patients.

Results: Diabetic histories were recorded in 24 983 (17.2%) men and 15 200 (18.2%) women. The intervals between onset of symptoms and call for help were longer for diabetic than for non-diabetic patients; median 103 *v* 86 minutes. Intervals between call and admission to hospital were the same; 45 minutes. Intervals between admission and reperfusion were longer; 40 *v* 34 minutes. Fewer diabetics were reperfused; 67.5% *v* 72.6% of ST elevation MI, although similar proportions were revascularised, 8.4% *v* 8.5%. In hospital mortality was higher; 13.2% *v* 11.0%, and this difference remained significant after adjustment for age, sex, and diagnostic classification. Time trends 2000 to 2004 show significant improvements in early management and possibly small improvements in case fatality. Record linkage, available shortly in MINAP, will facilitate further analysis of outcome over the longer term.

Conclusion: Analysis of a large dataset confirmed differences between diabetic and non-diabetic patients in admission, management, and outcome. Time trend analysis, allowing monitoring of effects of guidelines, showed some improvement in care of these patients.

RE-ADMISSION AND RETURN TO THEATRE AS INDICATORS OF QUALITY OF SURGICAL CARE: A CASE STUDY FROM NATIONAL PROSPECTIVE TONSILLECTOMY AUDIT

J. Lewsey[1,2], L. Copley[1], D. Lowe[1], J. Browne[1,2], D. Cromwell[1,2], J. van der Meulen[1,2]. [1]*Clinical Effectiveness Unit, The Royal College of Surgeons of England, London, UK;* [2]*Health Services Research Unit, London School of Hygiene and Tropical Medicine, London, UK*

Introduction: The value of re-admissions as measures of outcome following healthcare provision has often been debated in the past 40 years. The advantage of using re-admissions as outcome indicators is that they can be derived from routinely collected data, while a disadvantage is that they may reflect both policy and ''real'' outcome. In clinical settings, re-admissions where patients return to theatre could be considered as a ''harder'' measure of outcome than re-admissions which do not involve patients returning to theatre. It can be hypothesised, therefore, that variation between clinical care providers in the latter outcome would be greater than variation between clinical care providers in the former outcome. This hypothesis is investigated using data from the National Prospective Tonsillectomy Audit (NPTA). This audit was carried out between July 2003 and October 2004.

Objective: To measure the variation between NHS hospitals in proportions of patients being: (a) re-admitted to hospital following tonsillectomy (but not returning to theatre) within 28 days, and (b) re-admitted to hospital following tonsillectomy (and returning to theatre) within 28 days.

Methods: Multilevel logistic regression was used to model the two binary outcomes accounting for the clustering of patients within hospitals, and to estimate the between-hospital variance. Age and sex of patient, tonsillectomy technique, grade of operating surgeon, and primary indication for surgery were used for risk adjustment.

Results: A total of 33 583 consenting patients underwent tonsillectomy in 144 NHS hospitals. Overall, 608 patients (1.8%) were re-admitted to hospital but not returned to theatre and 651 patients (1.9%) were re-admitted and returned to theatre. After risk adjustment, the variance (in log odds of outcome) between hospitals was statistically significant from zero for both outcomes. The variance between hospitals in log odds of re-admission (no return to theatre) was over 40% greater than the variance between hospitals in log odds of re-admission (with return to theatre). This difference was also statistically significant.

Discussion: The results of this study support the hypothesis that variation between clinical care providers in re-admissions is greater than variation between clinical care providers in ''harder'' outcomes, such as return to theatre. Furthermore, these results suggest that considering procedural activity within re-admission may help to distinguish those re-admissions due to poor clinical outcome and those as a consequence of hospital policy.

WHAT HAPPENS TO OLDER PEOPLE WHO ARE LEFT AT HOME FOLLOWING A 999 CALL?

E. Knowles[1], S. Mason[1,2], B. Colwell[1]. [1]*Medical Care Research Unit, University of Sheffield, UK;* [2]*Department of Emergency Medicine, Sheffield Teaching Hospitals Trust, Sheffield, UK*

Background: In 2003–2004, 37.3% of emergency calls to the ambulance service nationally did not result in an emergency patient journey. Previous research has shown that older people who fall form a significant proportion of this non-conveyance rate. Recently, the Department of Health has issued guidance that services will no longer be expected to provide an emergency response to category C (non-urgent) calls. They have advised local health communities to decide for themselves how best to manage patients not requiring transport. This may include alternative responses from other healthcare providers.

This study aimed to identify what happens to older people who are left at home following a 999 call.

Methods: Patients calling 999 between the hours of 0800–2000 (September 03–October 04) who were over 60 years and reporting a minor injury or illness but not subsequently conveyed to hospital were eligible for recruitment into this study. Consenting patients were asked to complete questionnaires at 3 and 28 days following their minor episode to document satisfaction with care received, subsequent use of health services, and health outcomes. In addition, ambulance service records and hospital IT systems were reviewed to document subsequent calls or attendances in 28 days following the incident.

Results: 318 eligible patients were recruited into the study. The female: male ratio was 1.9:1.0, and ages ranged from 60–102 years (mean age 83 years). 89% of patients lived in their own home and 79% presented to the service following a fall. Most patients were not conveyed to hospital because no injuries were identified (52%), or they were advised to contact an alternative service such as primary care or NHS Direct (32%). After 28 days, 51% of responders had contacted another healthcare provider in relation to the original episode. Almost a quarter of patients requested an ambulance in the 28 days following their original episode (23%).

Conclusions: It is clear from this study that although hospital attendance may not have been required, further use of health services took place in relation to the incident. This has resource implications for health services, and clinical implications for patients. There are no recommendations and very little evidence to guide ambulance services on how they assess and manage patients who are not conveyed to hospital. This situation presents significant clinical risk to services and exposes patients to decisions made without the appropriate clinical knowledge and skills.

Maternal and child health

THE IMPACT OF MATERNAL EMPLOYMENT ON BREASTFEEDING DURATION: FINDINGS FROM THE MILLENNIUM COHORT STUDY

L. J. Griffiths, S. S. Hawkins, C. Law, A. R. Tate, C. Dezateux, and the Millennium Cohort Study child health group. *Centre for Paediatric Epidemiology and Biostatistics, Institute of Child Health, London, UK*

Background: Although the World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, an increasing number of women are returning to work soon after child birth, making this difficult to achieve.

Objectives: To examine the relation between maternal employment status and breastfeeding duration.

Design, Participants, and Setting: British/Irish White mothers of 14 868 children, born between September 2000 and January 2002, in England, Scotland, Wales, and Northern Ireland, participating in the Millennium Cohort Study. Maternal report, when the Cohort child was 9 months old, of infant feeding history and current employment status.

Main Outcome Measure: Breastfeeding, wholly or partially, for at least six months.

Results: For all UK countries, 4.9% of mothers were on leave, 35.8% were not employed, 3.7% were self-employed, 33.8% were in part time employment, and 11.8% were in full time employment. Seventy per cent (11 938) of all mothers initiated breastfeeding and, of those, 33% (3851) continued for at least six months. Only 1% (208) breastfed exclusively for this time period. After adjustment for potential confounders (maternal socioeconomic status, highest academic qualification, UK country, lone parenthood status, maternal age, and parity), mothers on leave, not employed, self-employed, and employed part time were more likely to have breastfed for at least six months compared to mothers in full time employment (rate ratios 1.80 (95% CI 1.54 to 2.11), 1.65 (95% CI 1.48 to 1.84), 1.52 (95% CI 1.29 to 1.79), and 1.26 (95% CI 1.12 to 1.41), respectively).

Conclusions: Although the WHO and UK government recommend breastfeeding until at least six months, our data suggest that very few mothers do so, with even less breastfeeding exclusively. Mothers in full and part time employment are less likely to breastfeed for six months, than mothers on leave, not working, or self-employed. Recent UK policies to encourage breastfeeding in the workplace, not implemented before Millennium Cohort births, may positively impact on breastfeeding practices. Further analyses will examine day care, maternity leave, and employment factors—such as reasons for returning to work and flexible working arrangements provided by employers.

INFLUENCE OF PARITY ON FETAL MORTALITY IN PROLONGED PREGNANCY

L. Hilder[1], S. Sairam[2], B. Thilaganathan[2]. [1]*Perinatal Health Research, Department of Midwifery, City University, London, UK;* [2]*Fetal Medicine Unit, Academic Department of Obstetrics and Gynaecology, St George's Hospital Medical School, London, UK*

Background: In England an estimated 50 000 inductions of labour at or beyond 41 weeks' gestation are conducted on the basis of a national recommendation endorsed by both the National Institute for Health and Clinical Excellence and the Royal College of Obstetricians and Gynaecologists. However, the published evidence on the effect of parity on stillbirth in prolonged pregnancy is limited, and has produced conflicting data. The aim of this study is to evaluate the influence of parity on fetal mortality in prolonged pregnancies.

Patients and Methods: Retrospective analysis of 145 695 singleton births with known parity and no malformation noted at birth to residents in the former North East Thames Region, UK. The parity and gestation specific stillbirth risks and relative risks per 1000 ongoing pregnancies were calculated in relation to parity between 37 and 45 weeks.

Results: Before 41 weeks the stillbirth risk rose gradually but did not differ by parity. By 41 weeks there was a substantial increase in the stillbirth risk in nulliparous women but not in parous women. The pattern of rise is such that the stillbirth risk is 2.9 times higher (95% CI 1.06 to 8.19) in nulliparous women at 42+ weeks' gestation.

Conclusion: Being parous appears to have a protective effect on fetal mortality in prolonged pregnancy. These findings question the need for routine induction of labour at 41 weeks in parous women.

AN EVALUATION OF THE EFFECTS OF CASELOAD MIDWIFERY: A RETROSPECTIVE ANALYSIS OF ROUTINE DATA

J. Freeman[1], J. Munro[2], P. Dorling[2], T. Oxley[2]. [1]*Medical Statistics Group, ScHARR, University of Sheffield, Sheffield, UK;* [2]*Jessop Wing, Royal Hallamshire Hospital, Sheffield, UK*

Objectives: To investigate the effects of caseload midwifery on outcomes of labour and rates of breastfeeding in a non-selective population based sample.

Design: Retrospective analysis of hospital records data.

Setting: Large maternity hospital in North of England.

Participants: 618 women who had caseload midwifery care in pregnancy and the postnatal period compared with 14 619 controls receiving standard midwifery care in Sheffield, from June 2002 to December 2004.

Main Outcome Measures: Mode of delivery, home birth rate, epidural rate, rate of breastfeeding on discharge.

Results: Of 6000 women delivering in Sheffield annually approximately 4% are managed through the One-to-One (121) (caseload) midwifery scheme, a care scheme based at six general practices in the west and north of the city. Each midwife has a defined caseload of women, providing continuity of care and carer throughout the antenatal, intrapartum, and postnatal periods. There were significantly lower rates of epidural (41.5% for standard care, 27.3% for 121 care; $p<0.001$) and emergency caesarean section (14.7% for standard care, 10.5 for 121 care; $p<0.01$), and a much higher rate of normal delivery (without ventouse or forceps) (61.7% for standard care, 72.3% for 121 care; $p<0.001$). More women on the 121 scheme gave birth at home (2.2% for standard care, 11.9% for 121 care; $p<0.001$) and more were breastfeeding on discharge (57.7% for standard care, 76.1% for 121 care; $p<0.001$). There was no evidence of a difference in the elective caesarean section rates (8.4% for standard care, 6.5% for 121 care).

Conclusions: In an unselected group of women in a large northern industrial city, caseload midwifery is associated with lower epidural rates and emergency caesarean section, higher rates of normal unassisted delivery and significantly higher rates of breastfeeding on discharge. The lack of any evidence of a difference in elective caesarean section rates indicates that the case mix was similar for both standard care and 121 care. Thus caseload midwifery care offers real benefits for women during labour, with an increased likelihood of uncomplicated labour for the majority.

HOW EFFECTIVELY DO YOUNG WOMEN PREPARE FOR PREGNANCY?

H. M. Inskip, S. R. Crozier, S. E. Borland, S. M. Robinson, K. M. Godfrey, and the Southampton Women's Survey study team. *MRC Epidemiology Resource Centre, University of Southampton, Southampton SO16 6YD, UK*

Objective: To examine the extent to which women prepare for pregnancy by following general health messages.

Design: The data were collected within the Southampton Women's Survey, a prospective study of non-pregnant women of peak child bearing age. The interviews, conducted in the women's homes, included detailed measurements of their health and lifestyle.

Setting: Southampton, UK.

Participants: 6083 women aged 20–34 years resident in the city of Southampton and interviewed between April 1998 and June 2000. The sample was representative of the British population in terms of ethnicity, and had a similar range of Townsend index scores (a measure of deprivation). We compared 102 women who conceived within three months of interview with those who did not. We also considered the 78 women who conceived within three months of interview and had anticipated trying for a baby within the next year.

Main Outcome Measures: Women were asked whether they currently smoked and were taking folic acid supplements, and if so the amount. Information was also collected about units of alcohol consumed and whether the woman had taken strenuous exercise in the previous three months. Diet was assessed using a food frequency questionnaire. Principal component analysis was used to summarise women's eating patterns, and the first component was employed as a measure of healthy eating.

Results: No differences were seen in whether the woman had taken strenuous exercise or the measure of healthy eating between women who conceived within three months, and those who did not. 28% of those who conceived smoked, compared with 34% of the others ($p=0.28$). Of the 78 women who anticipated trying for a baby, 26% smoked. Women who conceived were more likely to be taking $\geqslant$400 μg/day folic acid supplements (12% *v* 2%); amongst the 78 who anticipated trying for a baby the figure was 14%. Women who conceived within three months were less likely to report never drinking alcohol (4% *v* 11%); however, among alcohol drinkers, those who conceived drank more moderately ($p=0.008$).

Conclusion: Women who conceived were only marginally more likely than others to follow general health guidelines, and only 12% of them were taking the recommended level of folic acid supplements. 76% of the 102 women who had anticipated trying for a baby within a year had conceived within three months, but nevertheless these women had not adopted general health guidelines.

Parallel session C

Cardiovascular health

WHAT IS THE CASE FOR CASE MANAGEMENT? EVIDENCE FROM TWO SYSTEMATIC REVIEWS OF DISEASE MANAGEMENT IN CHRONIC HEART FAILURE AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

S. J. C. Taylor, B. Candy, M. Underwood, C. J. Griffiths, on behalf the COPD Nursing Review Group and the Cochrane Review No 9924 Group. *Centre for General Practice and Primary Care, Barts and the London, Queen Mary's School of Medicine and Dentistry, London, UK*

Background: Case management and ''disease specific care management'' underpin the Department of Health's plans to improve the management of long term conditions and reduce unscheduled hospital care. Both chronic heart failure (CHF) and chronic obstructive pulmonary disease (COPD) are commonly associated with unplanned hospital admission. What is the evidence that case management can improve patient outcomes and reduce acute care resource use in CHF or COPD? We present the results of two recent systematic reviews (SRs).

Aims: To assess the effectiveness of case management for CHF or COPD with regard to patient outcomes (including survival and quality of life, QOL) and health service use.

Methods: Study selection criteria: randomised controlled trials (RCTs) comparing disease management interventions specifically directed at patients with established CHF, or COPD, to usual care. In each review we searched 11 electronic databases, including CENTRAL, MEDLINE, EMBASE, CINAHL, AMED, and the Science Citation Index (CHF search January 1966–June 2003, no language restrictions, being updated for SSM conference; COPD search January 1980–January 2005, English and Dutch) and contacted experts in the field. Citations were screened and data were extracted by two reviewers working independently. Study quality was assessed using published criteria.

Results: CHF SR. We identified 11 RCTs describing case management; only one was of high quality. Overall there was little evidence of any benefit from case management in CHF. No association between case management and reduced all cause mortality was detected (odds ratio, OR, 0.86, 95% CI 0.67 to 1.10, $p=0.23$), although there was evidence of possible benefit when analysis was limited to better quality studies (OR 0.68, 95% CI 0.46 to 0.98, $p=0.04$). There was some weak evidence that case management may be associated with fewer admissions for heart failure.

COPD SR. We identified nine RCTs, all had potential methodological flaws. Meta-analysis of the interventions failed to detect any influence on mortality at 9–12 months follow up (OR 0.91, 95% CI 0.59 to 1.39). There was some evidence that the interventions did not improve patients' QOL nor improve their psychological wellbeing, disability, or pulmonary function. Only one study reported a reduction in hospital admissions. In both reviews we identified several outcomes where little or no evidence was available.

Conclusions: To date there is little available evidence from robust RCTs to suggest that case management or disease specific care management improve patient outcomes and reduce hospital resource use among patients with COPD and CHF.

DOES AREA OF RESIDENCE INDEPENDENTLY INFLUENCE LIKELIHOOD OF CORONARY HEART DISEASE IN OLDER BRITISH MEN?

R. W. Morris[1], S. G. Wannamethee[1], L. T. Lennon[1], M. C. Thomas[1], P. H. Whincup[2]. [1]*Department of Primary Care & Population Sciences, Royal Free & University College Medical School;* [2]*St George's Hospital Medical School, London, UK*

Objective: To examine whether deprivation scores for areas in which older British men live predict their future risk of coronary heart disease (CHD) independently of their individual social status profiles.

Design: Prospective population based study.

Setting: A socially and geographically representative sample of men born between 1918 and 1939, recruited in the late 1970s from 24 British towns.

Subjects: 5049 men without documented evidence of previous major CHD, who responded to a questionnaire in 1992 when aged 52–73 years, and for whom complete data on individual and electoral ward based measures of social status were available.

Main Outcomes: Incidence of major CHD and death over 9.75 years.

Results: 472 new major CHD events (1.08%pa), and 1021 deaths (2.28%pa) occurred. When men were divided into fifths according to increasing deprivation (Carstairs electoral ward score), CHD incidences (%pa) were 0.92, 0.89, 0.99, 1.33, and 1.29. When modelling trends, rate ratios for men in the top fifth compared with the bottom fifth were 1.55 (95% CI 1.19 to 2.00) for CHD and 1.72 (95% CI 1.38 to 2.14) for death. However these rate ratios reduced to 1.22 (95% CI 0.92 to 1.61) for CHD and 1.09 (95% CI 0.84 to 1.43) for death when effects of individual social status measures (car ownership, housing, longest held occupation, marital status, and social networks) were accounted for. By contrast, effects of individual measures were strongly related to both outcomes: incidence rate ratios among men with no car compared with men owning two cars were 1.58 (95% CI 1.14 to 2.18) for CHD, and 2.22 (95% CI 1.76 to 2.80) for death, even after adjustment for other individual and area based measures.

Conclusion: There was little evidence of an independent relation of area deprivation with CHD incidence, or with death, once individual measures of social status had been adjusted for. Individual rather than contextual measures of deprivation may be more relevant for policy makers concerned with social inequalities in CHD for older men.

COMPLICATIONS FOLLOWING DIAGNOSTIC CARDIAC CATHETERISATION: RESULTS OF A CONFIDENTIAL ENQUIRY INTO CARDIAC CATHETER COMPLICATIONS

R. West[1], G. Ellis[2], N. Brooks[3], on behalf of the Joint Audit Committee of the British Cardiac Society and Royal College of Physicians of London. [1]*Wales Heart Research Institute, University of Wales College of Medicine, Cardiff, UK;* [2]*Royal Glamorgan Hospital, Llantrisant, UK;* [3]*Wythenshawe Hospital, Manchester, UK*

Objectives: To estimate the frequency and nature of complications in patients undergoing diagnostic cardiac catheterisation in catheter laboratories in England and Wales.

Methods: All centres undertaking diagnostic cardiac catheterisation, in England and Wales during 10 years 1990–99, were invited to participate in the study. Each centre reported numbers of procedures performed each month and details of complications and deaths, as they occurred. Complication and death rates were calculated for the main diagnostic procedures and for each participating hospital and time trends in complications were examined.

Results: Forty one cardiac centres contributed and reported 211 645 diagnostic procedures in adults and 7582 paediatric procedures. The majority (89%) of diagnostic catheter studies in adults were left heart studies with coronary arteriography. The overall complication rate for adult procedures was 7.4, with 0.7 deaths per 1000. The complication rate for paediatric procedures was similar but mortality rather higher; 7.1 and 1.4 per 1000 respectively. Complication rates varied between centres but with no significant association with caseload. Death rates were higher in low volume centres. The most common complications were arrhythmias (36%) but ischaemic complications accounted for more deaths (42%). Time trends across the decade showed both complication and mortality rates decreasing; from 9.5 to 4.5 and from 1.4 to 0.4 per 1000 respectively.

Conclusion: Complication rates of diagnostic catheterisation are low but neither negligible nor irreducible. Although voluntary audit of cardiac catheter complications is useful there is clear need for a more formal reporting system in all cardiac catheter laboratories.

AGE PERIOD COHORT ANALYSIS OF TRENDS IN CARDIOVASCULAR RISK FACTORS IN VORARLBERG HEALTH MONITORING AND PROMOTION PROGRAMME 1985–2002

H. Ulmer[1], C. C. Kelleher[2], N. Pfaffenberger[1], G. Diem[3], H. Concin[3]. *[1]Department of Medical Statistics, Informatics and Health Economics, Innsbruck Medical University, Austria; [2]Department of Public Health Medicine and Epidemiology, University College Dublin, Ireland; [3]Arbeitskreis fur Vorsorge und Sozialmedizin, Bregenz, Austria*

Background: The extent to which variations in cardiovascular disease relate to clinical intervention or secular declines in risk factors merits increasing attention but few datasets are powerful enough and with sufficient follow up to assess this question.

Objectives: To evaluate secular or birth cohort related trends in cardiovascular risk factors, body mass index (BMI), total cholesterol, systemic blood pressure, glucose, and smoking pattern between 1985 and 2002.

Design: Prospective cohort follow up and linkage study.

Participants and Setting: First visit measurements in over 167 000 adult men and women (mean age 42 (SD 15) years) screened for cardiovascular risk factors as part of a standardised primary care assessment in Vorarlberg province of Austria.

Methodology: Data were categorised in five year bands according to year of birth (ranging from 1900–1984) and chronological age (from 20–84 years). Risk factor levels at 10th, 50th, and 90th percentiles were estimated for each band.

Results: BMI showed a small but systematic increase over time in both men and women in all age groups and percentiles; for instance 50th percentile value at age 45–49 years was 25.70 for men born between 1940–44 and 26.20 for those born between 1950–54. For women the comparable values were 24.24 compared with 25.81. Total serum cholesterol was trending downwards at all ages in men and women, 50th percentile value at age 45–49 was 230 mg/dl for men born between 1940–44 and 226 mg/dl for those born between 1950–54. For women the comparable values were 217 mg/dl and 212 mg/dl respectively. Plasma glucose level also increased consistently, 50th percentile value for males 45–49 years was 86 mg/dl, rising to 95 mg/dl and for females 85 mg/dl rising to 90 mg/dl. There was no alteration in systemic blood pressure values. Smoking rates deceased over time in males aged 25–44 years and those over 60 years but were comparable in middle aged groups. In women, rates fell over time only in 25–34 year olds.

Conclusions: This very large primary care based dataset confirms secular changes in risk factor patterns unrelated to subsequent treatment and provides support for the view that population level trends are contributing significantly to the variations in coronary heart disease rates seen to date. The contrast to the findings in blood pressure trends seen in other recent studies may be explained by methodological considerations including digit preference or may reflect a real halt in previously beneficial trends, given the rising overweight and obesity patterns.

SECULAR TRENDS IN HEART RATE IN YOUNG ADULTS FROM 1949–2004: ANALYSES OF CROSS SECTIONAL STUDIES

P. McCarron[1], A. Black[1], C. Cardwell[1], G. Davey Smith[2], L. Murray[1]. *[1]Centre for Clinical and Population Sciences, Queen's University Belfast, UK; [2]Department of Social Medicine, University of Bristol, Bristol, UK*

Background: Increased heart rate in early adulthood is a predictor of later cardiovascular risk. Heart rate may therefore have potential for monitoring and predicting cardiovascular health, and, in addition, is straightforward to measure. However, to date, secular changes in heart rate have not been reported.

Objective: To investigate secular trends in resting heart rate in young adults.

Design, Setting, and Participants: A series of cross sectional samples of first year undergraduates (5562) aged 16–24 years who attended Queen's University Belfast from 1949–2004, and underwent health checks at the university health centre.

Main Outcome Measure: Resting heart rate.

Results: Crude aggregate data for 1949–59 showed a decline in heart rate in males and females over this time. Using data from 1975 onwards, both unadjusted and fully adjusted analyses—controlling for age, BMI, height, smoking, and physical activity—provided strong evidence of a U-shaped association between heart rate and year of entry to university in both sexes ($p<0.001$): heart rate initially declined and then increased from the mid-1980s to 2004. Using all available data demonstrated that in male students heart rate declined from a high of 78.4 beats per minute (bpm) in 1949–54 to 68.9 in the early 1980s, thereafter rising to 74.1 bpm in 2001–04. For females, the corresponding heart rates were 78.9, 68.5, and 77.0 bpm. Physical activity levels in both sexes dropped from 1975–2004 ($p<0.01$).

Conclusions: The decline in heart rate in young adults occurring as least 50 years ago and continuing until the 1980s is consistent with other favourable findings on cardiovascular health in this age group, and with the long term declines in cardiovascular mortality. The more recent surge in heart rate, which could not be accounted for by decreasing physical activity, and widely reported increases in overweight in young individuals prompts concern that recent long term cardiovascular health gains may be reversed. Measurement of heart rate in population health surveys would provide a simple tool to assist in monitoring cardiovascular health.

Policy, implementation, and evaluation I

THE EFFECT OF THE LEGISLATIVE BAN ON SMOKING AND SMOKING RATES AMONG BAR WORKERS

B. Mullally[1], B. Greiner[1], I. Perry[1], S. Allwright[2]. *[1]Department of Epidemiology and Public Health, University College Cork, Ireland; [2]Department of Public Health and Primary Care, Trinity College Centre for Health Sciences, Adelaide & Meath Hospital incorporating the National Children's Hospital Tallaght, Dublin 24, Ireland*

Background: Bar worker health has gained a lot of attention in Ireland due to the ban on smoking in workplaces including bars. It is expected that the smoking ban had a positive effect on the smoking behaviour of Irish bar workers. There is concern about the widening gap in mortality and morbidity between the managerial and professional social classes, and those with lower levels of education. As bar workers are a heterogeneous group comprising of owners, managers, part and full time staff (including students), social class and educational status can vary widely. Although the overall number of smokers from 1999–2003 (SLAN, 2003) has decreased, this is not occurring at the same rate for males and females across all sectors in society or for all age groups.

Objectives: To determine the prevalence of smoking among bar workers in Cork City. To examine the influence of social class, education, sex, and age on smoking behaviour in Irish bar workers. To determine if the legislative ban has had an effect on smoking behaviour and the role of social class, education, sex, and age.

Method: A follow up study on bar workers (random, n = 129) and catering staff (control) from Cork City was conducted before (January–March 2004) and one year after (January–March 2005) the implementation of Europe's first legislative ban on work place smoking. The study is part of a larger national study on bar workers' health, including participants from Cork, Dublin, Galway, and N Ireland. Data obtained

included a questionnaire, a salivary sample (cotinine), and respiratory health (FEV1 and PEF) measurements.

Results: Prevalence of smoking among Cork bar workers was 54.3% (baseline). Female bar workers had a much higher prevalence of smoking than male bar workers overall and males were more likely to be ''heavy smokers'' or to have ''never smoked'' than females. Results from the post-ban survey which is currently ongoing will also be reported.

Conclusions: These results clarify some of the topical issues around differential effects of workplace health protection measures on health related behaviour with emphasis on social class and education.

PERCEIVED IMPACT OF THE EUROPEAN CLINICAL TRIALS DIRECTIVE ON UK PUBLICLY FUNDED TRIALS

S. Meredith[1], B. Farrell[1], R. Moser[2], M. Stead[2]. [1]*MRC Clinical Trials Unit, London, UK;* [2]*National Cancer Research Network Coordinating Centre, Leeds, UK*

Background: The Medicines for Human Use (Clinical Trials) Regulations 2004, which transposed the European Clinical Trials Directive (2001/20/EC) into UK law, came into force on 1 May 2004. The regulations apply to all clinical trials of medicines, whether licensed or unlicensed, commercial, or non-commercial.

Aim: To assess the impact of the new regulations on publicly funded trials of medicines six months after their implementation.

Method: A questionnaire (and three reminders) was sent by email to: the UK Trial Managers Network (managers of all trials funded by the Medical Research Council, Health Technology Assessment Programme and the Arthritis Research Campaign); trial managers and coordinators in the National Cancer Research Network; members of the UK Clinical Trials Forum (an informal network of academic trialists). To avoid duplication, recipients were asked to respond per trial in collaboration with their colleagues. Those working on trials of medicines open on 1 May 2004 (''ongoing'') or due to open subsequently (''new'') were asked whether they had experienced difficulties that they attributed to the regulations in specified areas, and if so to describe the problem and indicate whether it had been resolved.

Results: Information was received for 110 clinical trials of medicines—74 ongoing and 36 new (denominators are unknown). Problems attributed to the regulations were reported in 61 (82%) ongoing and 27 (75%) new trials. The distribution by type of problem was very similar in ongoing and new trials, therefore these have been combined. The most common areas of difficulty reported were: (1) arrangement of sponsorship (66 trials, 60%), with the problem unresolved at the time the questionnaire was completed in 32 (29%); (2) trust approval, agreements and contracts (50, 45%), unresolved in 16 (15%); (3) insurance/indemnity issues (47, 43%), unresolved in 12 (11%); (4) MHRA related issues, mainly administrative delays (45, 41%), unresolved in 16 (15%); (5) ethics committee issues, mainly transitional problems, (34, 31%), unresolved in five (5%). Six trials were suspended and in four new sites could not be opened.

Conclusions: It is probable that groups experiencing problems are overrepresented among our respondents, therefore the absolute numbers may be more informative than the proportions. We found a high rate of problems attributed to the regulations; although many of these were transitional, sponsorship of publicly funded trials in particular remains an issue. Practical solutions must be found if research on medicines in the public interest is not to be impeded.

DO NATIONAL URBAN REGENERATION PROGRAMMES IMPACT ON HEALTH AND THE SOCIOECONOMIC DETERMINANTS OF HEALTH? A SYSTEMATIC REVIEW OF UK REGENERATION PROGRAMMES (1980–2004)

H. Thomson[1], R. Atkinson[2], Mark. Petticrew[1], Ade. Kearns[2]. [1]*MRC Social & Public Health Sciences Unit, 4 Lilybank Gardens, Glasgow, G12 8RZ, UK;* [2]*Department of Urban Studies, University of Glasgow, UK*

Background: In the UK area regeneration programmes which tackle socioeconomic determinants of health are an explicit part of a national strategy to improve health and reduce health inequalities. Previous evaluations of the health and socioeconomic impacts of national regeneration programmes may contain evidence of the potential for these policies to contribute to a public health strategy, but these data have not been systematically reviewed.

Aim: To synthesise data on the impact on health and key socioeconomic determinants of health (employment status, income, housing quality, and educational qualifications) reported in evaluations of national UK regeneration programmes.

Methods: A systematic review of all national level evaluation documents reporting impacts of national regeneration programmes in the UK (1980–2004). Seven electronic bibliographic databases were searched and national experts were contacted to identify evaluation documents.

Results: Ten evaluations reported impacts on health or socioeconomic determinants of health. 4/10 evaluations used prospective surveys to assess health and socioeconomic impacts of regeneration activities on local residents; 6/10 evaluations relied exclusively on routine data to report impacts. Three evaluations reported health impacts; mortality rates fell in two evaluations while self-reported health deteriorated in the third evaluation. Most socioeconomic outcomes assessed demonstrated an overall improvement following regeneration investment; however, the effect size was often similar to national trends over the same time period. In addition, the range of effects across case study areas often included negative effects, pointing to the possibility of harmful effects following regeneration investment.

Conclusions: The potential for large scale regeneration investment to impact on health inequalities through tackling deprivation remains unknown owing to the lack of impact evaluations carried out and methodological problems. Although routine area based data can demonstrate area level impacts, they are unable to shed light on the distribution of impacts among the target population or small neighbourhoods.

Large scale investment to reduce socioeconomic deprivation may be an important strategy to improve health and reduce health inequalities, but there is still a need to assess the health and socioeconomic impacts of these initiatives on target groups. Assessments of these impacts could be used to inform the development of future investment, and to help prevent detrimental effects on already disadvantaged communities.

WAS SID THE SLUG WORTH £4 MILLION? A POPULATION PERSPECTIVE OR POLICY BASED EVIDENCE

R. A. Harrison[1,2], R. Edwards[2]. [1]*Bolton Primary Care Trust;* [2]*Evidence for Population Health Unit, University of Manchester, UK*

Background: In 2004, the Food Standards Agency launched its salt reduction campaign at an initial cost of £4 million. Yet a comprehensive systematic review (Hooper *et al*, 2004 Cochrane Collaboration), found no support for advising individuals to reduce their intake of salt and information is lacking on the prevalence of high salt users, their health, and lifestyle characteristics. We examined this using population data, to inform the priority for investing in Sid the Slug.

Methods: Information on salt intake, lifestyles, and health were obtained through an extensive population survey. Participants were asked ''Has salt generally been added to your food during cooking? and ''At the table do you generally add salt to food?''. The survey was sent to a 5% sample of adults, in the boroughs of Wigan and Bolton, northwest England. Systematic sampling identified 21 923 participants from the GP/FHSA register, of whom 15 465 (70%) returned usable questionnaires in June 2001. Analysis was performed in SPSS with multiple regression (in Stata) presented later.

Results: Of survey responders, 55% (8479/15 465) were women, mean age was 49 years (18–102 years) and 95.5% (14 691) White. Two thirds (61.0%) usually had food with added salt during cooking; a third (36.6%) usually added salt at the table and overall one quarter (26.6%) usually had food with salt added during cooking and went on to add more salt at the table. Salt use was higher in men than women, increased with older age in men but decreased with age in women. High salt use was greater among those having poor compared with excellent general health (31.3% *v* 24.1%); those in the top and the bottom quintiles of Townsend deprivation; those finding it very difficult to manage financially compared with living comfortably (33.8% *v* 25.0%); the unemployed (but previously worked) versus employed (35.0% *v* 27.1%) and those not seeing a dentist within two years (32.2% *v* 25.3%). It was much higher among smokers (35.9% *v* 20.9%); those drinking alcohol at least almost everyday compared with once or twice a week (35.4% *v* 26.4%); those not eating ''five-a-day'' (28.4% *v* 18.7%); those with a poor total diet score (36.0% *v* 15.5%).

Conclusions: Regular addition of salt to foods by individuals was associated with social deprivation, poorer health status, and undesirable health related behaviours, particularly smoking. Most salt consumed is through natural or processed foods and evidence from systematic review finds no clear benefits to health from advising individuals to reduce salt intake. £4 million on Sid the Slug is unlikely to benefit the population's health.

EVIDENCE BASED RECOMMENDATIONS ARE NOT ''SMART'' ENOUGH FOR IMPLEMENTATION: THE CASE OF OBESITY

W. C. S. Smith, L. S. Aucott, A. S. Poobalan, S. Memon. *Departments of Public Health and Child Health, Institute of Applied Health Sciences, University of Aberdeen, Foresterhill, Aberdeen AB25 2ZD, UK*

Background: There is considerable expertise in the process of identifying, critically appraising, and synthesising evidence to develop guidelines and recommendations for policy and practice. However there is increasing documentation on the failure of these recommendations to be implemented. The recommendations while based on evidence may not be formulated in a way that readily leads to implementation. This paper analyses the recent recommendations on obesity in terms of an implementation framework as an example.

Objectives: To assess the UK national recommendations for the treatment and prevention of obesity in terms of an implementation framework.

Design: Review of published recommendations on obesity since 2000.

Main Outcome Measures: The capacity of recommendations on obesity to be implemented in terms of a framework that includes feasibility, costing, funding, cost effectiveness, ownership, time-scale, effective size, beneficiaries, monitoring, health systems, and legislation.

Results: Most recommendations on obesity while demonstrating their basis in evidence fail to meet the implementation standards. The recommendations tend to be vague and non-specific, unclear in who is responsible for implementation and monitoring, and no timescale is indicated for their implementation. There is little attempt to assess the size of effect and who would benefit. The costs of implementing the recommendations are not estimated, nor who would fund their implementation and the implications of failure of implementation. Fiscal, legal, and operational implications are rarely addressed. Long lists of recommendations are often presented with no prioritisation. There are some notable exemptions to the general pattern emanating from more operational or locally based groups.

Conclusions: Public health has developed skills in appraising evidence and formulating recommendations based on this evidence. However these recommendations are not automatically implemented. Different skills are required to translate these recommendations into actions to improve health and prevent disease. Public health clearly needs to develop the implementation skills to a level comparable with the ability to synthesise evidence.

Lifestyle and health behaviour I

HEALTH SEEKING BEHAVIOUR IN GLASGOW TUBERCULOSIS PATIENTS

A. Hopkins[1], J. Mcmenamin[1], M. E. Reid[2]. [1]*Health Protection Scotland, Glasgow, UK;* [2]*Public Health and Health Policy, Division of Community Based Sciences, University of Glasgow, UK*

Objective: To describe the health seeking behaviour of patients with primary tuberculosis infection.

Design: A qualitative study using semistructured, face-to-face interviews with individuals diagnosed with, and treated for, tuberculosis.

Participants: Candidates with a genetically indistinguishable strain of tuberculosis, suggestive of recently transmitted infection, were invited to participate in this study. Patients (23) or suitable next of kin (5) participated in 28 interviews.

Main Outcome Measures: Symptom recognition and interpretation, decision making for health seeking, putative reasons for delay in receipt of diagnosis, personal and community attitudes towards individuals with tuberculosis.

Results: Medical assistance was sought when persistent or worsening symptoms interfered with daily activities, and occasionally when family or friends intervened or provided encouragement to seek medical care. Patients without readily identifiable risk factors, such as homelessness or alcohol misuse, reported they were diagnosed after multiple visits to their GPs. Some indicated they had initially been diagnosed with a benign condition. Despite completing prescribed treatments for these ailments, patients reported their health failed to improve, and they had insisted on further tests to determine the cause of their illness. Patients were surprised when diagnosed with TB, as they thought it was a disease of the past, and virtually unheard of nowadays. Others felt relieved they had been diagnosed with a treatable disease. Patients experienced feelings of guilt and shame, as a diagnosis of tuberculosis required the involvement of family and friends in screening events, and patients also felt they had unknowingly put those individuals at risk of infection. Many often felt stigmatised by their diagnosis because of its association with a poor socioeconomic status. Patients, particularly women, reported an unwillingness to disclose their diagnosis to community members for fear of social isolation.

Conclusions: Both patients and health professionals contributed to a delay in receiving prompt treatment for tuberculosis. This delay prolongs the period in which patients pose an infection risk to other susceptible individuals. Patients also indicated that the stigma of the disease created problems for them. These factors may hinder contact tracing for secondary cases of tuberculosis in the future.

RELATION BETWEEN YOUNG PEOPLE'S USE OF ALCOHOL, CANNABIS, OR TOBACCO AND RISKY SEXUAL BEHAVIOUR

A. Parkes, D. Wight, M. Henderson, G. Hart. *MRC Social and Public Health Sciences Unit, University of Glasgow, 4 Lilybank Gardens, Glasgow G12 8RZ, UK*

Objectives: To examine links between substance use and risky sexual behaviour, and to explore the extent to which event specific use of alcohol/drugs may account for these.

During 1996–1999, 5854 teenagers provided self-complete questionnaire responses at age 13/14 and 15/16 years on substance use and sexual behaviour, as part of an RCT of a school based sex education programme (SHARE) in 25 schools in Lothian and Tayside, Scotland.

Main Measures: At age 13/14 and 15/16 years: regular drinking, use of cannabis and tobacco. Age 15/16: pregnancy, STI consultation, age of sexual debut, number of sexual partners, 12 month condom use score. Contraceptive use and whether drunk/stoned at first sexual intercourse (FS), most recent sexual intercourse (RS), and first intercourse with most recent partner (FSMRP).

Methods: Multivariate regression modelling, allowing for clustering by school.

Results: In separate models, age 13/14 regular drinking and smoking each predicted age 15/16 reports of less than 100% use of condoms during the preceding 12 month period (OR drinking 1.47, 95% CI 1.20 to 1.81; smoking 1.86, 95% CI 1.37 to 2.51). Drinking, smoking, and cannabis use each predicted four or more sexual partners by age 15/16, adjusting for age of sexual debut (OR drinking 2.62, 95% CI 2.02 to 3.40; smoking 2.22 95% CI 1.67 to 2.95; cannabis 2.35, 95% CI 1.34 to 4.11).

In separate models, regular drinking and smoking at age 13/14 each predicted increased likelihood of pregnancy by age 15/16 (OR drinking 2.04, 95% CI 1.43 to 2.91; smoking 1.90, 95% CI 1.05 to 3.43). Regular smoking predicted STI consultation by age 15/16 (2.07, 95% CI 1.33 to 3.24).

Regular use of any two or more substances was associated with increased sexual risk for all outcomes, compared to use of only one substance. Condom use is explored in more detail to investigate how the links between regular substance use and contraceptive behaviour may be accounted for by use of substances at intercourse, social environment, and beliefs/attitudes.

Discussion: The results will help to inform educational, counselling, and health services for adolescent substance users, in relation to both the effects of using drink or drugs before intercourse and users' more general predisposition to sexual risk taking.

PARENTS TALKING ABOUT THE MMR VACCINE: ANALYSIS OF AN INTERNET DISCUSSION FORUM

Z. C. Skea[1], V. A. Entwistle[1], I. S. Watt[2], E. M. Russell[1]. [1]*University of Aberdeen, UK;* [2]*University of York, UK*

Background: The possibility of a link between the measles, mumps, and rubella vaccine (MMR) and inflammatory bowel disease and autism in children has received several periods of intense media attention since the concern was first raised in 1998.

Methods: As part of a project investigating communication about MMR in different arenas, we analysed the content of discussion ''threads'' on http://www.mumsnet.com—a website designed with an online discussion forum for parents that has searchable, publicly accessible archives.

We analysed two discussion ''threads'' which ran from August 2000–February 2002 and from January–March 2003. Combined, the two discussions involved 132 participants who posted a total of 617 messages. Safety issues relating to the MMR vaccine were discussed

often (190 postings) and at length. 78 postings made reference to scientific literature; and 69 messages made reference to popular media articles.

Results: Some participants had decided for and some against having their children vaccinated with MMR. People who did not think there was sufficient evidence to link the MMR vaccine to autism tended to refer to the available scientific evidence in their messages, and to perceive their understanding as rational, based on facts, and unemotional. They emphasised that there was no proof of a link and often commented that any risk from the vaccine is greatly outweighed by the potential risks of contracting measles, mumps, or rubella.

In contrast, people who remained suspicious that the vaccine might be implicated in causing autism drew on other sources of evidence, including emotive personal testimonies from parents whose children had allegedly suffered vaccine damage and the established fact that no vaccine is 100% safe. They tended to emphasise that there was no proof that there was not a link between the vaccine and autism.

Conclusions: Using an Internet discussion forum to investigate public opinions is a relatively innovative form of data collection. It raises a number of ethical and methodological issues. We will conclude with a brief discussion of these and consideration of how these discussion forums compare with more traditional interviews and focus groups.

DOES THE INTERNET LEAD TO RISKIER SEX AMONG GAY MEN?

J. Elford[1], G. Bolding[1], M. Davis[1], L. Sherr[2], G. Hart[3]. [1]*City University London, Institute of Health Sciences, St Bartholomew School of Nursing & Midwifery;* [2]*Royal Free & University College Medical School, London;* [3]*MRC Social & Public Health Sciences Unit, Glasgow, UK*

Objective: Among gay men, an association has emerged between seeking—and meeting—sexual partners through the Internet and high risk sexual behaviour. This association raises a number of, as yet, unanswered questions concerning the Internet and risk for HIV and sexually transmitted infection (STI). The objective of this study was to examine whether the excess risk for HIV and STI seen among gay men who look for sex through the Internet occurs with men they meet online (through the Internet) rather than offline (in bars, clubs, etc).

Methods: In 2002–2003, 4225 London gay men were recruited for the study. The sample comprised: (1) HIV positive gay men attending an outpatients treatment clinic (n = 528, response rate 66%); (2) gay men seeking an HIV test (404, 72%); (3) gay men using gyms (2002, n = 921; 2003, n = 543; 60%), and (4) gay men using Internet chatrooms and profiles (2002, n = 1250; 2003, n = 579; response rate unknown). All men completed a self-administered, anonymous questionnaire. High risk sexual behaviour was defined as unprotected anal intercourse (UAI) with a partner of unknown or discordant HIV status. This presents a risk for HIV transmission.

Results: Half the men in the clinics and gyms had used the Internet to look for sex. Men who looked for sex through the Internet were more likely to report high risk sexual behaviour than other men (for example, HIV negative men, testing clinic 24.6% *v* 12.4%; adjusted odds ratio 2.0, 95% CI 1.1 to 2.3; $p<0.05$). However, they were just as likely to meet their high risk UAI partners *offline* as *online* (for example, HIV negative men, Internet sample; met online only 9.7%, offline only 11.1%; Wilcoxon Z, $p = 0.7$).

Some HIV positive men reported UAI with casual partners who were also HIV positive. These men were more likely meet, and disclose their HIV status, online rather than offline. (for example, clinic sample: met online only 9.9%, met offline only 3.8%, Wilcoxon Z $p<0.01$).

Conclusion: In relation to HIV transmission, sex with online partners was no more risky than sex with offline partners. There was no evidence that the Internet per se led to HIV risk among gay men. However, HIV positive men met casual UAI partners of the same HIV status through the Internet. Although this does not present a risk of HIV transmission to an uninfected person it does present a risk of STI and cross infection for positive men themselves.

DRUG USE OVER THE YOUTH/ADULT TRANSITION

H. Sweeting, P. West. *MRC Social & Public Health Sciences Unit, 4 Lilybank Gardens Glasgow, G12 8RZ, UK*

Background: Knowledge of drug use among young people after school leaving is limited.

Objectives: To describe patterns of drug use from ages 15 to 30 among a community based cohort, examine associations with smoking and drinking, and identify sociodemographic correlates.

Design: Longitudinal study of a cohort aged 15 when first interviewed in 1987.

Setting: West of Scotland.

Participants: First interviews were completed by 1009 young people. 908 were re-interviewed at age 18, 675 at 23, and 578 at 30; 499 completed every interview.

Main Outcome Measures: Similar drugs lists were included at each age. Individual drugs were categorised as CNS depressant, stimulant, ''rave'', and ''hard'' (barbiturates, temazepam, tranquillisers, heroin, methadone, temgesic, cocaine, crack, morphine, opium). At ages 18, 23, and 30, participants were asked about frequency of use in the past year.

Results: 10% reported any experience of drugs at age 15. Use of any drugs in the last year was reported by 24%, 35% and 22% at ages 18, 23, and 30 respectively. While last year rates of cannabis only also peaked at 23, those of ''hard'' drugs rose steadily from 2% at age 18 to 8% at 30. There was considerable fluctuation in and out of drug use over the youth/adult transition. The predictors of cannabis only at 30 differed from those of ''hard'' drugs, the former associated with early smoking and drugs other than cannabis, the latter with current smoking and early use of cannabis and other drugs. A gradient in respect of parental class for any drugs at 15 had disappeared by 18, reversed by 23, and disappeared again by 30. Use of cannabis only showed no class patterning at 15, 18, or 30, but a reverse gradient at 23; the gradient in ''hard'' drugs at 18 had disappeared by 23. High levels of drug use were found among those in education at this age.

Conclusions: Uptake of drugs is not confined to the immediate school period. Rather than following a set pattern, pathways through drug use are complex. Different drugs show different patterns of association with other substances. New users around age 20 remove the earlier association between drugs and disadvantage.

Mental health

IS ENHANCED PRIMARY CARE FOR DEPRESSION COST EFFECTIVE? A SYSTEMATIC REVIEW OF HIGH QUALITY ECONOMIC EVALUATIONS

S. M. Gilbody[1], P. M. Whitty[2], P. Bower[3]. [1]*University of York;* [2]*University of Newcastle;* [3]*University of Manchester, UK*

Background: Depression is common in primary care settings, yet is often missed or suboptimally managed. Guidelines have been proposed as a means of improving the quality of primary care for depression and a series of NICE guidelines have recently been released. Guidelines are likely to have little impact unless there is a coherent plan for their implementation. A number of enhanced organisational and educational strategies have been proposed to improve the management of depression in primary care. Decision makers are likely to need to know whether these interventions are cost effective in routine primary care settings. However, the cost effectiveness of guideline implementation and quality improvement strategies are rarely considered, and we decided to apply a rigorous systematic review methodology to this area of practice and policy.

Methods: We sought high quality full economic evaluations (cost effectiveness and cost utility analyses) conducted alongside randomised controlled trials of enhanced primary care for depression. We searched a broad range of clinical and economic databases from inception to 2004. The quality of economic evaluations was judged against accepted criteria and a narrative overview of key design features and results was undertaken. All data were extracted blindly by two independent reviewers. Cost and consequence were standardised to UK pounds and incremental cost effectiveness ratios were visually summarised using a permutation matrix.

Main Outcomes Measures: Depression outcomes; patient utility and incremental cost effectiveness ratios.

Results: From 4593 references, our searches identified 11 full economic evaluations (4757 patients with depression). A near uniform finding was that the interventions improved outcomes and were associated with greater costs. When considering primary care depression treatment costs alone, ICER estimates ranged from £7 ($13) to £13 ($24) per depression free day. When measuring quality adjusted life years (QALYs), estimates ranged from £8269 ($15,463) per QALY for a nurse delivered case management approach, to £19,483 ($36,434) per

QALY for a complex intervention to enhance medication management. Educational interventions and passive guideline dissemination strategies alone were associated with increased cost and no clinical benefit.

Conclusions: Improved outcomes through depression management programmes can be expected, but are associated with increased cost and will require investment. Decision makers will find this evidence synthesis useful in planning care and in setting priorities, and in implementing national guidelines. These data have not previously been synthesised in any systematic way.

SECULAR TRENDS IN MENTAL HEALTH IN STUDENTS: ANALYSES OF CROSS SECTIONAL SURVEYS

A. Black, L. Murray, M. Donnelly, P. Mccarron. *Centre for Clinical and Population Sciences, Queen's University Belfast, UK*

Background: A recent report from the Royal College of Psychiatrists has suggested that mental health problems are more common now in students than in the past, and that the number of students presenting to student counselling services and the severity of their mental health problems is increasing. However, there is a lack of empirical evidence and, to date there have been no reports on the long term time trends in the mental health of university students in the UK.

Objective: To investigate secular trends and recent patterns in the mental health of young adults.

Design, Setting, and Participants: A series of cross sectional cohorts of first year undergraduate students (4033) aged 16–24 years who attended Queen's University Belfast between 1975 and 1992 and completed the Cornell Medical Index (CMI) as part of a routine health check. A random sample of first year undergraduates (206) was selected from the 2004 intake. In addition to the CMI, the 2004 cohort completed the SF-36 and General Health Questionnaire (GHQ-28) in order to investigate the current validity of the CMI.

Main Outcome: Mental health as measured by the psychological component of the CMI.

Results: Concurrent validity of the CMI was supported by the strong correlations ($p<0.001$) found between the CMI psychological component and SF-36 mental health scale ($r=-0.67$) and mental health summary measure ($r=0.63$) and the GHQ-28 ($r=0.58$). Preliminary analysis indicate that the mean mental health score on the CMI did not vary between 1975 and 1992 ($p=0.52$ in males and $p=0.27$ in females). A cut-off score of $\geqslant 10$ on the CMI psychological component was used to indicate a ''case''. Case prevalence (and range) between 1975 and 1992 was 5.7% (2.5% to 8.7%) and 13.9% (9.9% to 18.0%) in males and females respectively. However, by 2004, the proportion of cases had more than doubled to 12.2% in males and 31.5% in females ($p<0.001$ in both sexes). The proportion of cases was consistently higher in females compared to males from 1975 to 2004.

Conclusion: These preliminary results suggest that the mental health of young university students has declined recently after a period of relative stability. The reasons for the rise in mental health problems of young adults require further exploration. Further detailed analysis is also necessary to investigate if trends occurred in specific psychological constructs (including depression and anxiety) and to determine the current prevalence of these disorders.

A QUALITATIVE STUDY OF THE REASONS WHY MENTALLY DISTRESSED YOUNG ADULTS TEND NOT TO SEEK HELP

L. Biddle[1], J. Donovan[1], D. Sharp[2], D. Gunnell[1]. *[1]Department of Social Medicine, University of Bristol; [2]Division of Primary Care, University of Bristol, UK*

Objective: Psychiatric morbidity surveys indicate that young adults are less likely to seek help for mental disorder than other adults. This study sought to understand the reasons why they might not seek help.

Design: Semistructured qualitative interviews.

Participants: Males and females aged 16–24 years screening as cases with probable mental disorder (GHQ-12) or describing past episodes of mental disorder ($n=23$) and sampled purposively according to help seeking behaviour.

Setting: Bristol and surrounding areas.

Results: Help seeking emerged as a dynamic process contingent upon young adults' concepts of mental distress and the wider social meanings attributed to this and seeking help. Interviewees understood distress according to a polarised framework of ''normal'' and ''real'' distress. ''Real'' distress was an extreme, stigmatised category of severe distress separated from ''normal'' distress by a firm threshold. Need for help was located with ''real'' distress only. Illness behaviour was a process of negotiating a position within this framework. Belief that crossing the threshold would initiate an irreversible status passage involving stigma and undesirable treatments and the desire to disassociate from this created a cycle of avoidance. This cycle was often perpetuated by the lay group and involved using strategies to normalise distress even when this persisted or worsened. Episodes of severe depression became encompassed within the category ''normal'' as the threshold for ''real'' distress and hence help was shifted to further extremes. As help seeking was inextricably linked to ''real'' distress, it was seen as a pivotal act that would move an individual across the threshold and therefore ''make'' distress ''worse'' rather than offering cure. Not seeking help was central to the avoidance of ''real'' distress and maintaining normality.

Conclusion: Mentally distressed young adults' illness behaviour is characterised by avoidance and denial. The threshold for help seeking is shifted repeatedly towards the point of crisis. Existing models of help seeking tend to be deterministic and static. They describe linear pathways to help and account for non-help seeking in terms of ''barriers'' to care, which although easily translated to targets for policy intervention, are superficial representations of complex issues. This study suggests an alternative model highlighting the need for interventions that reconstruct the social meanings of mental disorder and ''help''.

PSYCHOSOCIAL FACTORS ASSOCIATED WITH REPEATED DELIBERATE SELF HARM IN ADOLESCENTS

E. Arensman[1], C. Sullivan[2], P. Corcoran, R. Farrow[1], H. Keeley[3], I. J. Perry[4]. *[1]National Suicide Research Foundation, Cork, Ireland; [2]Inspire Foundation, Rozelle NSW, Australia; [3]Health Services Executive, Western Region, Ireland; [4]Department of Epidemiology and Public Health, University College Cork, Cork, Ireland*

Objectives: To determine the psychosocial factors associated with repeated deliberate self harm (DSH) in adolescents aged 15 to 17.

Methods: A cross sectional survey was carried out using an anonymous, internationally validated self-report questionnaire. Thirty nine schools involving 3830 students in the Southern Health Board area in Ireland were surveyed as part of the Child and Adolescent Self-Harm in Europe (CASE) study between January 2003 and March 2004. DSH was defined on the basis of standard criteria agreed by the steering group for the international multicentre CASE study, with application of the criteria by three independent raters (Cohen's Kappa = 0.77).

Results: A lifetime history of DSH was reported by 333 (9.1%) of the adolescents surveyed. Self cutting (66.0%) and overdose (35.2%) were the most common DSH methods. Only 11.3% of adolescents had ever presented to hospital after harming themselves. Deliberate self-harm was more common among females (18.5%, 95% CI 15.2% to 21.8%) than males (6.2%, 95% CI 3.9% to 8.4%). Of those teenagers who had harmed themselves, nearly half (45.9%) had done so more than once. Repeated deliberate self harm was more common in those with high levels of depressive symptoms (OR = 2.27, 95% CI 1.01 to 5.09). Knowing of friends who had engaged in deliberate self harm was significantly associated with repetition (OR = 1.96, 95% CI 1.14 to 3.35). No differences between repeaters and non-repeaters were found with regard to anxiety, impulsivity, self esteem, and suicidal behaviour by family members.

Conclusions: Repeated DSH is a common problem among adolescents in Ireland. The survey provides evidence for the effect of imitative behaviour on repeated DSH in teenagers. Given that only a minority of self harming adolescents come to the attention of healthcare services, the findings from the study underline the need for broadly based mental health promotion initiatives targeting issues of relevance to adolescents.

NEGOTIATING THE MANAGEMENT OF DEPRESSION: A REFLECTION ON DOCTORS' AND WOMEN'S ACCOUNTS OF THE MANAGEMENT OF DEPRESSION IN RELATION TO HABERMAS'S THEORY OF COMMUNICATIVE ACTION

M. Maxwell. *School of Clinical Sciences and Community Health, General Practice Section, University of Edinburgh, UK*

Introduction: Despite UK general practitioners being responsible for helping people to manage most emotional distress and the majority of psychiatric problems, very little is known about how they do this in their everyday practice. In addition, there has been relatively little research on the patient's perspective of depression and its management in primary care. One of the current debates within medical sociology surrounding

the doctor/patient relationship is the extent to which the medical encounter reflects or is shaped by macro-level social structures. Of relevance in the context of depression is the charge that medical professionals offer biomedical or technical solutions for inherently social problems or the problems of everyday life.

Aim: To explore doctors' and women's experiences of the management of depression in primary care and to consider the findings in relation to the ''medicalisation thesis''.

Methods: Using qualitative interviews, 37 women and 20 general practitioners were interviewed at the start of the study and 30 women and 19 general practitioners were revisited approximately 9–12 months later to review the process of care. Interviews were recorded and transcribed and analysis was conducted using the constant comparison method, a systematic tool for developing and refining theoretical categories and their properties.

Findings: The women did not passively accept their general practitioner's explanation and advice but evaluated this in relation to their own range of experiential, biographical, and common sense knowledge surrounding health, illness, emotions, depression, antidepressant medications, and medication use in general. They continually evaluated ''formal medical knowledge'' and care in relation to their own understandings and as new knowledge (experiential and common sense knowledge) emerged. General practitioners recognised that patients brought their own understandings to the consultation and their management involved eliciting patient beliefs and addressing the moral dilemmas that some of these beliefs created for the women. General practitioners had to negotiate care by addressing patients' concerns and sometimes acted strategically in order to persuade, or coerce, patients to accept their advice and treatment.

Discussion: These findings are discussed in relation to the ''medicalisation'' thesis through reflecting on Habermas's theory of Communicative Action and the relation between ''system'' and ''lifeworld''. It considers whether GPs could be said to use ''distorted communication'' in their speech acts and whether (taken together with the women's accounts) this could be considered as evidence of ''system rationalisation'' or macro-level influences operating within the management of depression.

Methods II

ASSOCIATION BETWEEN SYMPTOM REPORTING AND SUBSEQUENT MORTALITY

A. Elliott[1], K. Hunt[2,3], P. Hannaford[1], B. Smith[1], S. Wyke[3]. *[1]Department of General Practice and Primary Care, University of Aberdeen, UK; [2]MRC Social and Public Health Sciences Unit, University of Glasgow, UK; [3]Department of Nursing and Midwifery, University of Stirling, UK*

Background: Self-assessed health is consistently related to subsequent mortality, but reporting of minor symptoms in relation to mortality has not been investigated (although this might offer general practitioners a pragmatic way of identifying patients whose health requires closer scrutiny).

Objective: To assess the relation between individuals' burden of minor symptoms and subsequent mortality.

Methods: 858 men and women aged around 58 years were interviewed by nurses in 1990/01 as part of the West of Scotland Twenty-07 Study. Measures of morbidity included different indicators of the presence and impact (''had in last month'', ''had in last month and tend to have'', ''caused limitation to activity in last month'', ''had in last month and consulted GP in last month'') of a checklist of symptoms, in addition to chronic longstanding illness, and self-assessed health. All respondents are flagged at the NHS Central Registries. Odds ratios for mortality (up to 31 December 2004) were calculated for different indicators of symptom burden, with and without adjustment for socioeconomic status, smoking, longstanding illness, and self-assessed health.

Results: Mortality was elevated for three indicators of symptom burden (unadjusted OR (95% CI) for six or more symptoms ''in last month and tend to have'' 2.97 (1.57 to 5.59); six or more symptoms ''in last month resulting in limitation to activity'' 3.66 (1.86 to 7.22); six or more symptoms ''in last month and consulted GP for symptoms'' 2.42 (1.26 to 4.68). Significant associations with mortality remained for the first two indicators of symptom burden in analyses adjusting for sex, socioeconomic status (occupational social class, housing tenure, deprivation category, car ownership, income group), smoking, and the presence of any longstanding illness (OR = 2.08, 95% CI 1.03 to 4.21 and 2.10, 1.01 to 4.39 respectively). No significant associations were seen when adjustment was made for self-assessed health.

Conclusion: A heavy burden of minor symptoms in late mid-life predicts subsequent mortality even after adjustment for socioeconomic status, smoking, and longstanding illness. Understanding more about the patterns of symptom reporting may provide further insight into the relation between global measures of self-assessed health and mortality.

SELF-REPORTED GENERAL HEALTH AND SUBSEQUENT MORTALITY

L. A. Gray, A. H. Leyland. *Medical Research Council Social and Public Health Sciences Unit, University of Glasgow, UK*

Background: Self-assessed health is used to gauge wellbeing and reliably predicts subsequent morbidity and mortality status in some populations.

Aim: To investigate the relation between self-reported general health and mortality in Scotland, adjusting for a history of coronary heart disease (CHD).

Design: Data from the Scottish Health Survey 1995 for consenting participants aged 16–64 years were linked to death records. Information on self-reported general health (''very good'', ''good'', ''fair'', ''bad'', or ''very bad'') and demographics including socioeconomic circumstance was available from the survey and previous ill health details were obtained through linkage to hospital discharges. Multilevel logistic regression analyses were performed to assess associations of self-reported general health and subsequent death, unadjusted and adjusted for age, sex, Carstairs index of deprivation, economic activity, educational qualification attainment, and prior CHD, accounting for the hierarchy of individual, area, and Health Board.

Results: Of the 7363 respondents, 243 (3.3%) died within six years. Median age was 39 years; 38 years for those alive at the end of follow up and 57 years for those who died. In total, 3304 (44.9%) were male; 44.5% of those alive and 57.2% for those dead. Altogether, 2270 (30.8%) were in social class I or II (31.1% alive, 23.5% dead), 4586 (62.3%) were economically active (63.4% alive, 29.2% dead), and 5386 (73.1%) had some educational qualification (74.0% alive, 49.0% dead). Overall, 7245 (98.4%) had no previous CHD (98.7% alive, 88.5% dead). Of all respondents, for 5572 (75.7%) self-reported general health was ''very good'' or ''good''; 5475 (76.9%) of those alive and 97 (39.9%) of the dead. Univariably, compared with ''very good'' or ''good'' health, those reporting ''fair'' or worse health had a fivefold increase in risk of death: odds ratio (OR = 5.01, 95% confidence interval 3.85 to 6.51). Multivariably, ''fair'' or worse health was associated with more than doubled risk (OR = 2.22; 1.70 to 3.09); OR for a one year increase in age was 1.08 (1.07 to 1.10); 0.57 (0.44 to 0.77) for being female; 1.03 (0.99 to 1.08) for a unit increase in Carstairs index; 1.38 (1.41 to 2.68) for being economically inactive; 1.10 (0.96 to 1.70) for no qualification and 2.33 (1.46 to 3.85) for history of CHD. The association between self-reported health and death did not differ by previous CHD status (p = 0.468).

Conclusion: The association of self-reported general health with mortality in Scotland is attenuated by age, sex, socioeconomic circumstance, and previous ill health but nevertheless remains as strong a predictor as prior CHD hospitalisation.

ESTIMATING TYPE 2 DIABETES RISK: DOES THE CAMBRIDGE RISK SCORE PERFORM ANY BETTER THAN BODY MASS INDEX?

C. Thomas, E. Hyppönen, C. Power. *Centre for Paediatric Epidemiology and Biostatistics, Institute of Child Health, UCL, London, UK*

Objectives: The Cambridge Risk Score was developed as a tool to screen for patients at increased risk of type 2 diabetes. It is constructed from information on sex, age, body mass index (BMI), first degree relative with diabetes, treatment with anti-hypertensive or steroid medication, and smoking status. The objective of the study was to determine whether the score was any better than BMI, the strongest component of the score, to predict HbA1c in a population at mid-life.

Design: Cross sectional analysis.

Setting: 1958 British Birth Cohort.

Participants: 7452 cohort members without known diabetes who participated in a survey of biomedical risk factors and disease outcomes at age 44–45 years.

Main Outcome Measures: Elevated HbA1c levels using three thresholds to define undiagnosed diabetes (≥7%), hyperglycaemia (6–6.99%), and minor disturbances in glucose metabolism (5.5–5.99%).

Results: 0.9% (95% CI 0.7 to 1.1) of the sample had undiagnosed diabetes, 2.2% (1.9 to 2.6) had hyperglycaemia and 16.8% (15.9 to 17.7) had HbA1c between 5.5 and 5.9%. Receiver operator curve (ROC) analyses found that the score was able to detect individuals with HbA1c ⩾7% (area under the curve 0.84, 0.79 to 0.89) and HbA1c ⩾6% (0.76, 0.73 to 0.79) with reasonable accuracy, but performed poorly when tested using the lower threshold of 5.5% (0.65, 0.63 to 0.66). The optimal cut-off value of the score determined from the ROC analysis was able to detect individuals with HbA1c ⩾7% with 76.9% sensitivity (95% CI 64.8 to 86.5) and 77.8% specificity (76.9 to 78.8). However, the performance of BMI alone was as good as the score against each HbA1c threshold. The optimal cut-off value to identify individuals at risk of having HbA1c levels ⩾7% was 30 kg/m^2 (the WHO definition for obesity) and had a sensitivity of 78.5% (66.5 to 87.7) and specificity 73.9% (72.8 to 74.9). Using the cut-off values determined from these analyses, the Cambridge Risk Score and BMI indicated that 22.3% and 23.7% of individuals, respectively, were at increased risk of developing type 2 diabetes.

Conclusions: The prevalence of hyperglycaemia or undiagnosed diabetes was relatively low at age 44–45 years. However, analyses using the Cambridge Risk Score and BMI indicated that approximately 20% of the sample was at increased risk of developing type 2 diabetes. In this relatively young population, the Cambridge Risk Score did not provide any additional advantage to the identification of diabetes risk than BMI on its own.

COMPOSITION OR CONTEXT? A MULTILEVEL ANALYSIS OF SOCIAL CAPITAL AND MATERNAL MENTAL HEALTH IN PERU

M. De Silva[1], S. Huttly[1], T. Harpham[2], for the Young Lives Project Team. *[1]London School of Hygiene and Tropical Medicine; [2]London South Bank University, UK*

Rationale: Mental disorders account for 12% of the global burden of disease with women and the poor disproportionately affected. Social capital may explain some of the geographical variation in mental disorders and be used to develop effective community based interventions. There is substantial disagreement about whether social capital should be measured at the individual or community level resulting in two conflicting streams of research. This paper proposes a combined theory which takes a holistic view of social capital as the ''value'' of social relationships at any level. This allows the two streams not only to co-exist but to complement each other as the effect of ecological social capital cannot be estimated without measuring individual social capital.

Objective: To explore the relative importance of individual and ecological (community) level social capital in the prediction of maternal common mental disorders (CMD) in Peru.

Design: Multilevel analysis of cross sectional data from Young Lives: an international study of childhood poverty (http://www.younglives.org.uk).

Setting: 82 communities across Peru.

Participants: 1659 mothers of children aged between 6 and 18 months.

Main Outcome Measure: Maternal common mental disorders (CMD) measured using the SRQ20.

Main Exposures: Individual and ecological level social capital. Four dimensions of social capital were measured; membership of community organisations, citizenship activities, support from groups and community members, and cognitive social capital. Individual responses to the social capital questions were aggregated to the community level to provide measures of ecological social capital.

Analysis Framework: A wide range of confounders were included within a conceptual framework, including community level factors such as deprivation and economic inequality, and individual level factors including demographics and socioeconomic status.

Results: Preliminary findings emphasise the relative importance of individual (compositional) as opposed to community (contextual) factors in the prediction of CMD. In particular, individual level cognitive social capital (perceptions that relationships in the community are trusting, harmonious etc) are highly protective of mental health. This research raises the question ''who pays to build social capital?'', as results show a trade off between costs to the individual and benefits to the community of participating in structural social capital.

USE OF LONGITUDINAL LATENT CLASS ANALYSIS TO DESCRIBE THE PATHWAY OF LOW BACK PAIN

K. Jordan, K. M. Dunn, P. Croft. *Primary Care Sciences Research Centre, Keele University, Keele, Staffs ST5 5BG, UK*

Background: Latent class analysis is a method of clustering subjects together based on their similarity on measured variables. It is commonly applied to cross sectional data; for example, grouping subjects into disease subtypes based on symptoms and test results. A less common application is grouping subjects based on repeated measurements of the same variable: longitudinal latent class analysis (LLCA). LLCA may be useful in modelling the course of disease. We have used the example of low back pain to investigate whether LLCA can identify distinctive pathways in the symptom over time.

Objective: The objective was to establish whether LLCA is an effective method of modelling the course of pain. Specifically, to determine whether LLCA could identify distinct pathways of back pain by grouping primary care back pain consulters according to their subsequent pain levels over six months.

Methods: Participants were consecutive primary care patients with back pain who completed a baseline questionnaire and then monthly questionnaires for twelve months. Using a self-reported pain intensity score, monthly back pain levels of none, mild, or high were derived. At the first stage, LLCA was applied to 188 subjects who had pain intensity scores for all six months after baseline. At the second stage, another 154 subjects who had pain scores for at least four but not all of the six months were added to the analysis.

Results: LLCA on the 188 subjects revealed four distinct pathways of back pain. Analysis of all 342 subjects yielded the same pathways. These pathways were recovering (30%), persistent mild (36%), fluctuating (13%), and severe chronic (21%). A subgroup of the recovering group who recovered immediately after baseline and a subgroup of the fluctuating group who showed a more progressive pattern of pain intensity were also suggested from the analysis. Comparison with 7–12 month pain intensity and disability scores suggested distinctiveness of these pathways over a longer period than six months.

Conclusions: LLCA appears to be a useful method to identify and summarise the course of low back pain over time. This fills a gap in research into common symptoms where classification on the basis of, for example, underlying pathology has not proven to be helpful in clinical practice or epidemiological studies. LLCA may also be of use in describing the course of other common symptoms with poorly defined natural histories, such as fatigue and headache, which are often characterised simply as acute or chronic.

Parallel session D

Health services research

INTEGRATED OUT-OF-HOURS CARE ARRANGEMENTS IN ENGLAND: OBSERVATIONAL STUDY OF PROGRESS TOWARDS SINGLE CALL ACCESS VIA NHS DIRECT AND IMPACT ON THE WIDER HEALTH SYSTEM

V. Lattimer[1], J. Turnbull[1], S. George[2], A. Burgess[1], H. Surridge[1], K. Gerard[2], J. Lathlean[1], H. Smith[3]. *[1]Health Services Research Group, School of Nursing and Midwifery, University of Southampton; [2]Health Care Research Unit, University of Southampton, [3]Brighton and Sussex Medical School, University of Brighton, UK*

Objectives: To assess the extent of service integration achieved within general practice cooperatives and NHS Direct sites participating in the Department of Health's national ''Exemplar Programme'' for single call access to out-of-hours care via NHS Direct. To assess the impact of integrated out-of-hours care arrangements upon general practice cooperatives and the wider health system (use of emergency departments, 999 ambulance services, and minor injuries units).

Design: Observational before and after study of demand, activity, and trends in the use of other health services.

Setting: Thirty four English general practice cooperatives with NHS Direct partners (''exemplars'') of which four acted as ''case exemplars''. Also 10 control cooperatives for comparison.

Main Outcome Measures: Extent of integration achieved (defined as the proportion of hours and the proportion of general practice patients covered by integrated arrangements), patterns of general practice cooperative demand and activity and trends in use of the wider health system in the first year.

Results: Of 31 distinct exemplars 21 (68%) integrated all out-of-hours call management by March 2004. Nine (29%) established single call access for all patients. In the only case exemplar where direct comparison was possible, cooperative nurse telephone triage before integration completed a higher proportion of calls with telephone advice

than did NHS Direct afterwards (39% *v* 30%; p<0.0001). The proportion of calls completed by NHS Direct telephone advice at other sites was lower. There is evidence for transfer of demand from case exemplars to 999 ambulance services. A downturn in overall demand for care seen in two case exemplars was also seen in control sites.

Conclusion: The new model of out-of-hours care was implemented in a variety of settings across England by new partnerships between general practice cooperatives and NHS Direct. Single call access was not widely implemented and most patients needed to make at least two telephone calls to contact the service. In the first year, integration may have produced some reduction in total demand, but this may have been accompanied by shifts from one part of the local health system to another. NHS Direct demonstrated capability in handling calls but may not currently have sufficient capacity to support national implementation.

HOSPITAL CHARACTERISTICS AND EMERGENCY DEPARTMENT RETURN VISITS

J. McCusker[1], R. Ionescu-Ittu[1], A. Ciampi[1], A. Vadeboncoeur[2], D. Roberge[3], D. Larouche[2], J. Verdon[1], R. Pineault[2]. [1]*McGill University;* [2]*University of Montreal;* [3]*University of Sherbrooke, Quebec, Canada*

Objectives: Better quality and continuity of care of older patients at an emergency department (ED) visit are hypothesised to reduce the rate of return visits. The study objectives were: (1) to describe between-hospital differences in the time to the first return visit among patients aged 66+ in the province of Quebec who were discharged home following an initial visit in 2001; (2) to identify hospital characteristics associated with return visits, after adjustment for patient characteristics.

Design: Multilevel (hospital and patient) study linking five provincial databases: three linked at the individual level (physician billings, medication prescriptions, and hospital discharges), and two linked at the hospital level (registry of ED stretcher visits, survey of ED geriatric services). In order to take into account the multilevel structure of the data, the Cox model with frailty was used. This led to the definition of a ''frailty index'' for each hospital, which describes the relative hazard of first return visit for that hospital compared with the baseline (overall) hazard, while adjusting for hospital level and/or patient level covariates.

Participants: We included all general acute care adult hospitals in the province with at least 100 eligible patients who visited an ED during 2001 (n=80, one hospital excluded). The study population (n=169 481) comprised individuals aged 66+ with an initial ED visit (no ED visit during the previous 30 days) in 2001. Excluded were those resident in long term care or admitted to hospital at the initial visit.

Main Outcome Measure: A return visit was defined as a subsequent visit either to the same or another ED.

Results: After adjustment for patient level covariates (including age, sex, material and social deprivation, prior health services use, diagnosis at initial visit, comorbidity) the following hospital level variables were significantly associated (p<0.05) with a longer time to first return ED visit: larger ED size, medium or high average ED crowding, urban location outside Montreal, presence of an inpatient acute care geriatric unit, presence of a social worker in the ED, and a higher ratio of hospital outpatient clinic visits to return ED visits during the 30 days after the initial ED visit.

Conclusions: This population based study found that hospital characteristics indicating geographic location, size, and geriatric services are independently associated with return ED visits in older patients. These results support the hypothesis that hospital resources favourable to better quality and continuity of geriatric care may reduce return ED visits.

NIGHT DISCHARGE FROM INTENSIVE CARE UNITS: HAVE THINGS CHANGED?

K. Rowan[1], D. A. Harrison[1], S. Harvey[1], C. Welch[1], H. Wunsch[2], A. Hutchings[3]. [1]*Intensive Care National Audit & Research Centre, London;* [2]*Department of Anesthesiology, Columbia Presbyterian Medical Center, New York;* [3]*London School of Hygiene & Tropical Medicine, London*

Background: In the late 1990s, we reported that discharge at night from intensive care units (ICUs) had increased in the UK. Night discharges were more likely to be reported as premature and discharge at night was associated with increased, case mix adjusted hospital mortality. Night (premature) discharge was thought to reflect pressure for ICU beds. In late 2000, £149.5 million per year, over two years, was invested into ICUs in the NHS predominantly to increase bed capacity.

Aim: To investigate the effect of increased investment/bed capacity on night (premature) discharge from ICU over time.

Design: Cohort study.

Setting: 171 adult, general ICUs in England, Wales, and Northern Ireland.

Population: Survivors from ICU admitted between 1995 and 2004.

Analysis: Night was defined as discharge between 00:00 and 04:59. Outcome was ultimate hospital mortality. Crude and case mix adjusted hospital mortality for discharges at night were compared with discharges during the day and modelled over time.

Results: Bed capacity significantly increased over time (median beds per unit +0.25 per year 95% CI 0.14 to 0.36). A total of 254 770 admissions (79.1%) survived the ICU. Over time, the odds of being discharged from ICU to a high dependency unit (HDU) significantly increased (OR=1.18 per year, 95% CI 1.17 to 1.18), and to the ward significantly decreased (OR 0.92 per year, 95% CI 0.91 to 0.93).

Restricting the analysis to those discharged from ICU direct to a ward in the same hospital (n=179 124, 70.3%), overall severity of case mix (measured by median APACHE II probability of hospital mortality) was 14.1% and increased over time (median 13.0 to 14.2%). The percentage of night discharges was 2.5% and the odds of being discharged at night increased over time (OR=1.06 per year, 95% CI 1.04 to 1.07). Crude hospital mortality was 10.2%, significantly higher for night discharges (13.2%) compared with day (10.1%). After adjustment for case mix, hospital mortality for discharge at night remained significantly higher compared with during the day (OR=1.30, 95% CI 1.19 to 1.42) and this effect had not changed over time (OR 1.00 per year, 95% CI 0.94 to 1.06).

Conclusions: Increased investment was reflected in increased bed capacity and increased use of HDUs. Despite this, discharge at night from ICU direct to a ward in the same hospital is still common and remains a quality of care issue.

INTEGRATED OUT-OF-HOURS CARE: THE CHALLENGES OF PARTNERSHIP WORKING AND THE POTENTIAL SOLUTIONS

A. Burgess[1], S. Maslin-Prothero[1], J. Lathlean[1], H. Smith[3], J. Turnbull[1], S. George[2], K. Gerard[2], V. Lattimer[1]. [1]*Health Services Research Group, School of Nursing and Midwifery, University of Southampton, UK;* [2]*Health Care Research Unit, School of Medicine, University of Southampton, UK;* [3]*Brighton and Sussex Medical School, UK*

Objective: To investigate the views and experiences of staff involved in establishing new integrated out-of-hours care arrangements, to learn from these experiences and inform further extension of integrated arrangements across England.

Design: Qualitative interview study.

Setting: Following an independent review of out-of-hours care in England (Department of Health, 2000) an ''Exemplar Programme'', consisting of 34 ''exemplars'', was established to enable out-of-hours providers and NHS Direct to gain experience of developing integrated services. An independent evaluation of the Exemplar Programme was commissioned to examine the impact of the proposed new model of care on patients and the wider health system activity, but also to investigate the experiences of organisations that were working together to deliver the new model of care. The evaluation consisted of several interconnecting studies, of which this is one.

Participants: Purposive sample of 93 staff working within or associated with four of the 34 exemplars (referred to as ''case exemplars''). Interviewees included a broad cross section of staff from frontline staff (health information advisers, nurses, and general practitioners) to senior management (medical directors, general managers) to external informants (PCT representatives, ambulance, and A&E staff).

Key Themes: Experiences of planning for integration and working in a developing partnership, perceptions about the impact on patients, and thoughts about future priorities.

Results: Semistructured interviews were conducted with ninety of the 93 individuals selected for interview (96.8%). Two of the four case exemplars experienced substantial difficulties in achieving full integration and in developing the partnership relationships necessary for successful implementation of the new model of care. The effort required to develop partnerships between GP cooperatives and NHS Direct appeared to have been underestimated at the outset. Integrations led by a team (rather than by an individual) appeared to work well, although individual leaders appeared to make exceptional personal efforts to generate success, and those with a ''foot in both camps''—that is, a role in each organisation—were in a good position to lead, but often bore considerable stress in the endeavour. Participants emphasised the importance of good communication, establishing good working relationships and trust, and of investing time in getting to know their partner organisations.

Conclusions: Although there were examples of partnerships that had worked effectively, there were more examples of difficulties in establishing relationships and trust at every level; between partner organisation and clinicians. The findings of this study provide learning outcomes for organisations that are planning integrated out-of-hours services.

Policy, implementation, and evaluation II

THE INVERSE EVIDENCE LAW IN TOBACCO CONTROL: FINDINGS FROM A SYSTEMATIC REVIEW OF REVIEWS

C. Main[1], L. Mather[1], D. Ogilvie[2], M. Petticrew[2], A. Sowden[1], S. Thomas[2], M. Whitehead[3], M. Egan[2]. [1]*Centre for Reviews and Dissemination, University of York, UK;* [2]*MRC Social and Public Health Sciences Unit, University of Glasgow, UK;* [3]*Department of Public Health, University of Liverpool, UK*

Background: Health policies in many countries aim to reduce smoking and smoking related health inequalities. Possible interventions range from micro-level therapies for individual patients, such as nicotine replacement, to legal and fiscal controls on the availability or use of tobacco. However, there is increasing concern that evidence about the effects of such interventions may not be equally available across this spectrum. The so-called ''inverse evidence law'' (Nutbeam, 2003) suggests that interventions to tackle the more upstream determinants of health may have the least robust evidence base, and we hypothesise that evidence about tobacco control interventions may exemplify this ''law''.

Aim: To map the distribution, by type of intervention, of currently available evidence in systematic reviews and meta-analyses of the effects of interventions to control tobacco use.

Methods: We have conducted a systematic review of reviews of the effects of tobacco control interventions, published at any time and in any place or language, identified through comprehensive searching of electronic and other sources.

Results: 183 systematic reviews and meta-analyses met our inclusion criteria. Over half (n = 96) evaluated micro-level interventions, mostly delivered in healthcare settings and focusing on smoking cessation rather than prevention. The remainder (n = 87) assessed interventions applied above micro level, of which most (n = 58) were health promotion initiatives targeted on workplaces, schools or communities. Only a small minority of reviews (n = 29) addressed the effects of macro-level policies to control access to, or use of, tobacco; these were largely concerned with specific settings.

Conclusions: We have comprehensively mapped the evidence currently available from systematic reviews and meta-analyses to inform policy decisions about how to reduce smoking in populations. Our findings exemplify the inverse evidence law whereby we may know least about the effects of interventions with the potential to have the greatest impact on the health of the largest number of people. The effects of upstream measures such as restricting overall tobacco supply, tax policy, or enforcement of smoking prohibitions and restrictions remain largely uncharted at the level of systematic review. The evidence that has been identified on population level interventions will be summarised and discussed.

IMPACTS OF A THEORETICALLY BASED, TEACHER DELIVERED SEX EDUCATION PROGRAMME (*SHARE*) ON NHS REGISTERED CONCEPTIONS AND TERMINATIONS UP TO FIVE YEARS POST INTERVENTION: AN RCT IN SCOTLAND

M. Henderson[1], D. Wight[1], G. Raab[2], G. Hart[1]. [1]*Medical Research Council Social & Public Health Sciences Unit, Glasgow, UK;* [2]*Napier University, Edinburgh, UK*

Objectives: Despite widespread support for school sex education, there are very few large scale, long term trials of its effects on behaviour, and hardly any that use service based, rather than self-reported, outcomes. This paper presents the final outcomes from a randomised controlled trial (RCT) of a theoretically based, teacher delivered sex education programme for 13–15 year olds in Scotland. The *SHARE* programme (20 session pack and five day teacher training course) was developed and carefully piloted over two years. Interim outcomes at six months post intervention, average age 16.1 years, showed no impact on behaviour, but at this age only 1/3 of the sample reported sexual intercourse and there was 32% attrition. This paper describes the impact of the intervention on conceptions and terminations up to age 20, 4.5 years post intervention, as recorded by the NHS. The outcomes are not subject to reporting bias or attrition.

Design: Twenty five schools in eastern Scotland were assigned by a balanced randomisation either to deliver *SHARE* or to continue with their existing sex education. All third year pupils in two successive years were invited to participate in the study (n = 8430). Participants were followed up at six months (n = 5854) and 2.5 years (n = 2864) post-intervention with self-complete questionnaires. The Information and Statistics Division of the NHS provided SMR1 and SMR2 conception, miscarriage and termination data up to the age of 20 in aggregated form for all females in the sample (n = 4196).

Results: At baseline predictors of sexual experience (parenting and socioeconomic) were balanced between the arms of the trial. The achieved sample was representative of all Scottish 14 year olds in terms of social class and family composition (1991 Census). By age 20, 22% of young women had conceived, 58% of all their conceptions (1205 conceptions to 922 women) resulting in a live birth/miscarriage, and 42% a termination. Conceptions rose from 23:1000 at age 15 to 70:1000 at age 19, while the proportion of all conceptions terminated fell from 50% at 15 to 39% at 19. These data are currently being analysed by arm of the trial and by school in order to conduct both ''intention-to-treat'' and ''on-treatment'' analyses.

Conclusions: These analyses will allow us to report (at conference) on the effect of the *SHARE* programme on conceptions and terminations at 4.5 years post-intervention. The findings will be discussed in terms of the efficacy of the programme, the extent and quality of its delivery, and possible limitations in evaluation design.

NATIONAL PATIENT SURVEY OF STROKE CARE IN ENGLAND

E. Howell, R. Reeves. *Picker Institute Europe, King's Mead House, Oxpens Road, Oxford, UK*

Objectives: To evaluate stroke services in England based on patients' experiences of hospital and post-discharge care. The survey aimed to identify areas for improvement and provide an indication of the adherence to standards outlined in the National Service Framework for Older People.

Methods: An advisory group of stroke care experts assisted with the development of the questionnaire, which was tested at length with stroke patients and carers. One third of acute NHS trusts in England (51) were randomly selected for participation in the survey that was carried out between October–December 2004. Questionnaires were sent to all patients admitted between April and June 2004 who had a primary stroke diagnosis. Up to two reminder letters were sent to non-responders. If the patient was unable to complete the questionnaire as a result of aphasia or confusion the carer could respond on the patient's behalf, and this was recorded in the questionnaire. Opportunity was also given for respondents to comment in their own words on their experiences of stroke care.

Results: Questionnaires were sent to 2786 patients and completed questionnaires were received from 1713 (adjusted response rate 65%). Respondents were positive about the overall care and treatment they received for their stroke. However, respondents reported getting insufficient help with speech and communication difficulties (50%), emotional problems (61%), and mobility (39%). Not enough information was given to patients about medication side effects (62%), diet (43%), and exercise (33%). Patients who stayed on a specialist stroke unit reported more positive experiences of their stroke care than those who had stayed on another type of ward.

Conclusion: This survey demonstrates the value of using a validated survey instrument to measure patients' experiences of stroke services. It revealed areas where the quality of care for stroke patients requires improvement to meet the standards outlined in the National Service Framework for Older People. Such patient surveys should routinely form part of the assessment of stroke services.

AN RCT TO EVALUATE THE HEALTH EFFECTS OF WELFARE ADVICE IN PRIMARY CARE: RESULTS OF A PILOT STUDY

M. White[1], J. Mackintosh[1], D. Howel[1], S. Moffatt[1], A. Sandell[1], M. Deverill[1], T. Chadwick[1], R. Bell[2], N. Whitton[2]. [1]*School of Population and Health Sciences, University of Newcastle upon Tyne;* [2]*Welfare Rights, Social Services, Newcastle City Council*

Background: Many welfare benefits are unclaimed, particularly by older people. Targeting welfare advice has been proposed as a way to reduce health inequalities.

Objective: To assess the feasibility and acceptability of a community randomised controlled trial (RCT) of welfare advice.

Setting: Four general practice populations in Newcastle upon Tyne, 2002–04.

Design: RCT with outcome measurements at baseline, 6, 12, and 24 months. The intervention was delivered to the control group six months after the intervention group.

Intervention: Welfare advice consultations and active assistance with benefit claims, tailored to individual household needs and delivered in participants' own homes.

Participants: A sample of 71 men and 55 women aged 60–93 years who volunteered to participate.

Main Outcome Measures: Changes in measures of physical health (SF36 physical scale, symptoms inventory), psychological health (Hospital Anxiety and Depression Scales, SF36 mental health scale, social interaction, self-esteem, personal mastery, life events), health related behaviour (diet, physical activity, smoking, alcohol consumption), socioeconomic status (disposable income, financial vulnerability, standard of living index).

Results: 126 of 400 randomly selected people aged over 60 consented to participate and were randomised; of these 120 were followed up at six months, 117 at 12 months, and 109 at 24 months. Intervention and control groups were well balanced on all measures at baseline. 60% of participants received an award (44% financial, 32% non-financial). Median time from welfare assessment to receipt of benefits was 99 days (interquartile range (IQR) 47–154); 26% did not receive their benefits within six months. Median weekly benefit gained was £55 (IQR 19–77). The intervention group reported lower financial vulnerability score at six months compared with the control group (mean change −1.5 *v* 0.1; mean difference −1.6 (95% CI for difference −2.6 to −0.7)), but there were no other differences between groups in any outcome measures at 6, 12, or 24 months. In explanatory analyses, there were significant changes in dietary factors, sleep quality, social interaction, and standard of living index among intervention group participants between six and 12 months. There were no changes in outcomes associated specifically with financial or material gains in either group, compared with those receiving no awards.

Conclusions: A community RCT of welfare advice proved both feasible and acceptable to participants and professionals. Length of follow up and intervention free period among the control group would need to be extended in a full scale RCT. More sensitive measures of psychosocial outcomes should be adopted for a future study.

Lifestyle and health behaviour II

COGNITION AND RISK OF ALL-CAUSE MORTALITY: AN EXPLORATION IN THE HEALTH AND LIFESTYLE SURVEY OF ADULTS AGED 18 YEARS AND OVER

B. A. Shipley[1], G. Der[2], M. Taylor[1], I. J. Deary[1]. [1]*Department of Psychology, University of Edinburgh, Edinburgh, UK;* [2]*MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK*

Introduction: Among both older and younger adults cognitive status and the amount of cognitive decline in old age has been associated with mortality. Furthermore, there is evidence to suggest that the association between cognition in old age and mortality remains even after demographic and health variables have been controlled for. One mechanism proposed for this association is that psychometric intelligence may assess bodily integrity by indexing speed of information processing. This study provides new information about the role of reaction time (a sensitive and culture reduced measure of speed of information processing) means, and their variabilities, in the risk of all-cause mortality. Social and demographic risk factors will also be taken into account.

Methods: Participants were from the Health and Lifestyle Survey, a national survey of adults in England, Scotland, and Wales. In 1985 data on lifestyle factors, socioeconomic status, health, and cognition were collected for 9003 individuals. All-cause mortality over 19 years of follow up was investigated in relation to performance on a short term verbal declarative memory test, a test of visual spatial reasoning, and simple and choice reaction time.

Results: Slower and more variable simple (RT mean HR = 1.09, 95% CI 1.04 to 1.13: RT variability HR = 1.09, 95% CI 1.05 to 1.14), and choice (RT mean HR = 1.18, 95% CI 1.13 to 1.24: RT variability HR = 1.08, 95% CI 1.04 to 1.12) reaction times were significantly related to increased risk of all-cause mortality over 19 years of follow up after controlling for age and sex. The effect was slightly attenuated after further adjustment for social class, education, smoking, alcohol, physical activity, forced expiratory volume, blood pressure, and body mass index (simple RT mean HR = 1.03; 95% CI 0.99 to 1.08, simple RT variability HR = 1.03; 95% CI 0.99 to 1.08) (choice RT mean HR = 1.08, 95% CI 1.03 to 1.14: choice RT variability HR = 1.04, 95% CI 0.99 to 1.09). A novel finding was the existence of an effect of reaction time on mortality in young adults. Poorer memory ability was also significantly related to an increased risk of death independent of reaction time (HR = 0.94, 95% CI 0.91 to 0.97).

Conclusions: Slower and more variable reaction time was related to higher morality risk in younger as well as older participants. Higher memory ability was also associated with a decreased risk of death. The lack of attenuation of the cognition-mortality association by socio-demographic, health behaviour, and physical health factors suggests that part of the effect is related to the organism's efficiency of processing information. Furthermore, having shown this in not only older adults but among the young also, the present results suggests that reaction time is not merely an indicator of age-related physiological deteriorations.

DOES IQ EXPLAIN SOCIOECONOMIC INEQUALITIES IN HEALTH? EVIDENCE FROM THE WEST OF SCOTLAND

G. D. Batty[1,2], G. Der[1], S. Macintyre[1], I. Deary[2]. [1]*MRC Social & Public Health Sciences Unit, University of Glasgow, Glasgow, UK;* [2]*Department of Psychology, University of Edinburgh, Edinburgh, UK*

Objective: To test the hypothesis advanced by Gottfredson (*J Pers Soc Psychol* 2004;**86**:174–99) that intelligence is ''… epidemiologists' elusive ''fundamental cause'' of social class inequalities in health'' (p 174).

Design: Cross sectional and prospective cohort study.

Setting: West of Scotland (Twenty-07 study).

Participants: 1347 participants (739 women) aged 56 in 1987.

Main Outcome Measures: Total and coronary heart disease (CHD) mortality were assessed prospectively. Respiratory function, self-reported minor psychiatric morbidity, long term illness, and self-perceived health were assessed cross-sectionally.

Results: In sex adjusted analyses, indices of socioeconomic position (own and paternal social class, education, income, and area deprivation) were associated with each health outcome, such that the greatest risk of ill health and mortality was evident in the most disadvantaged groups. On adjusting for IQ (measured using the Alice Heim 4 test), there was a marked attenuation in risk for poor mental health (attenuation in risk across socioeconomic indicators: 15 to 58%), long term illness (25 to 53%), and poor self-perceived health (41 to 56%). These attenuating effects were more pronounced for the ''hard'' health endpoints of low respiratory function (44 to 66%), CHD mortality (31 to 111%) and total mortality (45 to 131%). For example, the increased risk of total mortality in the most disadvantaged occupational group relative to the least (1.70 (1.17 to 2.47)) was eliminated when IQ was added to the statistical model (0.96 (0.63 to 1.46)). On controlling separately for reaction time (RT), an indicator of information processing efficiency that may be the foundation of IQ, a similar but weaker patterning of attenuation was evident.

Conclusions: In the present study, differences in IQ and RT across socioeconomic groups explained some or all of the socioeconomic gradients in health, depending on the indicator of socioeconomic position, cognition, and health under consideration. Thus, some support for Gottfredson's hypothesis was found. These findings require replication in other datasets.

PSYCHOLOGICAL WELLBEING AND FAMILY TYPE AMONG BLACK CARIBBEAN AND BLACK AFRICAN ADOLESCENTS IN THE DASH STUDY

M. Maynard[1], S. Harding[1], H. Minnis[2]. [1]*Medical Research Council Social and Public Health Sciences Unit, Glasgow, UK;* [2]*Section of Psychological Medicine, University of Glasgow, UK*

Objective: To examine adolescent psychological wellbeing, and the influence of family type and social deprivation, in a study with sufficient sample size to analyse separately diverse groups of Black African origin.

Design: The DASH (Determinants of Adolescent Social wellbeing and Health) study includes 6613 11–13 year olds in 51 schools in London. This analysis is based on the 25-item Strengths and Difficulties Questionnaire (SDQ) completed by 1224 White UK, 926 Black Caribbean, 297 Mixed Black Caribbean and White, 609 Nigerians & Ghanaians, and 464 other Black African children. The SDQ measures total difficulties score (TDS) and its component subscales (emotional symptoms, conduct problems, hyperactivity, peer problems), and pro-social behaviour. Higher scores reflect more difficulties except for

pro-social behaviour. Mean scores in each ethnic group were adjusted for age, family type, and deprivation, stratified by sex.

Results: Distributions of the social factors varied between ethnic groups. For example 40% of the Black Caribbean and Mixed children are from single parent families compared to 25% of White UK and Nigerian/Ghanaian and 30% of other Africans. Age adjusted mean TDS for White UK boys was 11.45 (95% CI 11.06 to 11.84), with similar scores for Black Caribbean and Mixed boys. Nigerian/Ghanaian boys reported lower mean TDS compared to White boys (age adjusted regression coefficient −2.09 (95% CI −2.83 to −1.35) p<0.001). A similar but weaker finding was observed for other African boys (−1.17 (95% CI −1.92 to −0.42) p=0.002). Age adjusted mean TDS for White UK girls was 11.65 (95% CI 11.22 to 12.08), with a similar score for Black Caribbean girls, and non-significantly lower scores for the other ethnic groups. Family type was significantly associated with TDS particularly for White girls. On adjustment for family type, scores were further decreased for ethnic minority boys and girls compared with Whites, with the lower TDS for other African girls compared to White girls becoming significant (−0.96 (95% CI −1.77 to −0.14) p=0.02). Inclusion of tertiles of deprivation in fully adjusted models did not materially alter these findings. Lower TDS for Nigerian/Ghanaian boys and Other African boys and girls was explained by lower emotional symptoms and hyperactivity scores. Pro-social behaviour scores were significantly higher for Nigerian/Ghanaian boys compared to other boys, and lower for Black Caribbean and Mixed girls in relation to other girls.

Conclusions: These findings indicate Black African boys have better self-reported psychological wellbeing than Black Caribbeans and Whites. Family type is an important independent correlate of psychological wellbeing for all groups but operates differently for Africans.

PERSONALITY AND ALL-CAUSE MORTALITY: RESULTS FROM THE EDINBURGH ARTERY STUDY COHORT

M. Taylor[1], M. Whiteman[1], G. Fowkes[2], A. Lee[3], I. Deary[1]. [1]*Department of Psychology, University of Edinburgh, UK;* [2]*Wolfson Unit for Prevention of Peripheral Vascular Diseases, Public Health Sciences, University of Edinburgh, UK;* [3]*Department of General Practice and Primary Care, Foresterhill Health Centre, Aberdeen, UK*

Background: The extent to which personality traits may affect all-cause mortality risk has not been well established. This study examines the influence of personality traits and social factors on all-cause mortality over 7.5 years.

Design and Population: The Edinburgh Artery Study (EAS) has followed up 1592 men and women (aged 55–74 years) for cardiovascular disease mortality and all-cause mortality since 1987–98. The NEO-FFI personality questionnaire which measures neuroticism, extraversion, agreeableness, openness, and conscientiousness was administered in 1995–96 to 1035 surviving participants. During 7.5 years of prospective follow up (from 1996–2003), 137 men (27.5%) and 101 women (18.8%) died. In men, the age adjusted relative rate of all-cause mortality was 0.73 (95% CI 0.56 to 0.95) for a 1 standard deviation increase in conscientiousness scores.

Results: The association between conscientiousness and mortality remained (RR 0.70; 95% CI 0.52 to 0.95) after additional adjustment for social class, smoking, body mass index, systolic blood pressure. Openness was significantly associated with all-cause mortality over 7.5 years in men but not in women. The association between openness and all-cause mortality was attenuated and non-significant after controlling for traditional risk factors. A well fitting structural equation model in men showed that age, conscientiousness, and blood pressure were direct predictors of all-cause mortality in men. The link between conscientiousness and mortality was not mediated by health behaviours such as smoking.

Conclusion: Conscientiousness may be protective against all-cause mortality in a general population sample of older men, accounting for approximately 2–3% of the variance.

Child health

PATTERNS OF INFANT MILK FEEDING AND INFANT ANTHROPOMETRY AT 6 MONTHS OF AGE

L. D. Marriott[1], S. R. Crozier[1], S. E. Borland[1], C. M. Law[2], K. M. Godfrey[1], H. M. Inskip[1], W. T. Lawrence[1], S. M. Robinson[1], SWS Study Group[1]. [1]*MRC Epidemiology Resource Centre, University of Southampton, UK;* [2] *Institute of Child Health, London, UK*

Objective: To examine the relation between patterns of milk feeding in infancy and weight, length and head circumference at 6 months of age.

Design: Southampton Women's Survey (SWS) is a population based study of non-pregnant women aged between 20–34 years, resident in Southampton. The offspring of women who become pregnant are followed up in infancy and childhood. Infants are visited at home at 6 months ± 2 weeks. An infant milk feeding history is completed and the infants are measured.

Population: 1645 singleton births to SWS mothers between 1999–2003.

Outcome Measures: Weight, supine length, and head (occipitofrontal) circumference were measured using Seca infant scales, Holtain infantometer, and anthropometric tapes, respectively. Measurements were standardised to 6.0 months of age using the UK 1990 Growth Reference and converted to standard deviation scores (SDS).

Results: We identified three milk feeding groups; 500 (30%) infants were still receiving breast milk at 6 months, 857 (52%) infants had been breastfed for less than 6 months (median duration 6.3 weeks, interquartile range 2.0–15.0 weeks), and 288 (18%) infants had never received breast milk. Infants who were still breastfed at 6 months were lighter, mean weight (SDS (95% CI) −0.14 (−0.24 to −0.04) compared with 0.15 (0.08 to 0.22) in infants breastfed for less than 6 months (p<0.0001), and 0.17 (0.04 to 0.30) in infants who were never breast fed (p=0.0002). Mean supine length showed a similar pattern of association as weight with milk feeding group. Infants who were still breastfed at 6 months had a mean length (SDS (95% CI)) of 0.04 (−0.06 to 0.13) compared with 0.18 (0.11 to 0.25) in infants breastfed for less than 6 months (p=0.02) and 0.20 (0.07 to 0.32) in infants who were never breastfed (p=0.04). Infants who were breastfed for less than 6 months had a significantly larger mean head circumference (SDS (95% CI)) −0.04 (−0.11 to 0.03) compared with −0.22 (−0.32 to −0.13) in infants who were still being breastfed at 6 months (p=0.002). The never breastfed infants had an intermediate mean head circumference −0.15 (−0.27 to −0.02). There were no sex differences in the relation between milk feeding pattern and anthropometry.

Conclusion: In contemporary UK infants, the pattern of milk feeding in the first six months of life is related to growth.

Funding: Medical Research Council, University of Southampton, Dunhill Medical Trust, Food Standards Agency.

PUBLIC HEALTH INTERVENTIONS TO PREVENT EARLY CHILDHOOD CARIES: A SYSTEMATIC REVIEW

A. Poobalan[1], M. Brazelli[2], L. Aucott[3], W. C. S. Smith[3], P. J. Helms[1]. [1]*Department of Child Health, University of Aberdeen;* [2]*Health Services Research Unit, University of Aberdeen;* [3]*Department of Public Health, University of Aberdeen*

Objectives: To assess the effects of public health interventions for the prevention of dental caries in children under five years of age.

Design: Systematic review.

Data Sources: Cochrane Central Register of Controlled Trials, Medline, Embase and Cinahl.

Main Outcomes Measures: Incidence of caries, status of caries, tooth loss, percentage of caries free teeth, rate of restorations, and pain/discomfort episodes in children.

Inclusion Criteria: Randomised controlled trials of single or multi-component interventions compared with standard care or no intervention. The target population for interventions included children up to five years of age as well as parents, teachers, health visitors, and other healthcare professionals.

Results: Forty two randomised controlled trials met the inclusion criteria. Most of the interventions consisted of health education, systemic fluorides, and topical fluorides. Few studies investigated sealants, and applications of chlorhexidine and iodine. Health education had a positive outcome provided the intervention included personal contact and home visits whereas information leaflets sent by post showed no benefits. Hands on games and puppet shows had more impact than verbal instructions for young children. Reduced sugar intake in nursery diets helped prevent caries in children irrespective of their sugar intake at home. Systemic fluorides were effective compared with placebo or no treatment. Among the topical fluorides only fluoride toothpastes showed consistent benefits although one study showed effectiveness with topical application of a fluoride solution. Direct application of antimicrobial agents such as chlorhexidine and iodine showed positive results. Fissure sealants proved to be effective, although their success was related to their retention rate. In terms of delivery, dental health education delivered by trained general nurses appeared to be as effective as dental health education delivered by dental hygienists and dental health professionals.

Conclusions: Existing evidence suggests that systemic fluorides, sealants, and topical application of antimicrobial agents along with health education by personal contact are effective in prevention of dental caries in children under five.

DO BABIES GAIN WEIGHT FASTER THAN THEY DID 10 YEARS AGO?

A. Tate, C. Dezateux, T. Cole, the Millennium Cohort Study Child Health Group. *Centre for Paediatric Epidemiology and Biostatistics, Institute of Child Health, London, UK*

Introduction: The reported trend in obesity among young children is a cause of great concern. There is evidence that children as young as two years of age are fatter now than they were 10 years ago, but it is not yet known at what age this change occurs. The Millennium Cohort Study (MCS) provided the opportunity to investigate weight gain from birth to nine months in a large group of babies of different ethnicities.

Participants: We investigated the weight gain of 9483 term MCS infants in England and Wales born in 2000–01 who had been weighed at birth and at 8–10 months. We compared the (maternally reported) weights with those reported at similar ages for 11 718 (predominately white) children from the Avon Longitudinal Study of Parents and Children (ALSPAC) born in 1991–92 (Blair *et al*, 2004). The 1990 Growth Reference was used to calculate z scores for conditional weight gain.

Results: Birth weight, weight at 9 months and weight gain z score (mean (SD)) for the MCS white babies (n = 8183) were 3.45 (0.49), 9.01 (1.14), and 0.18 (1.17). The weights and weight gain were remarkably similar to those for ALSPAC. There were no significant regional differences for either weight or weight gain. Marked differences were seen between the MCS ethnic groups, with Pakistani, Bangladeshi, and Indian infants (n = 938) significantly lighter than their white counterparts at birth (3.14 (0.51)) and 9 months (8.43 (1.19)), and growing more slowly (−0.26 (1.36)). Black infants (n = 362) were also significantly lighter than white infants at birth (3.33 [0.56]) but by nine months were heavier (9.22 (1.36)) and faster growing (0.47 (1.34)).

Conclusions: White infants do not appear to be gaining weight any faster between birth and nine months than they did 10 years ago. This supports recent evidence from a Plymouth study that the trend to increased weight gain starts after this age. Our findings also suggest that weight gain in infancy differs by ethnic group. Further analyses of this cohort will examine the relation of ethnic differences in weight gain in infancy to infant feeding practices, and to weight gain in the preschool years.

ARE CHILDREN WITH ASTHMA MORE LIKELY TO LIVE NEAR MAIN ROADS? A CASE CONTROL STUDY

Y. M. Chang[1], A. Clarke[1], R. Bornschein[2], L. Levin[2], M. Lierl[3], R. Buncher[2]. [1]*Public Health & Policy Research Unit, Centre for General Practice & Primary Care, Queen Mary University of London, UK;* [2]*Department of Environmental Health, University of Cincinnati medical Centre, OH, USA;* [3]*Division of Allergy and Immunology, Cincinnati Children's Hospital Medical Centre, OH, USA*

Background: Asthma is one of the commonest causes for admission to hospital in children. Over the past two decades, while urban sprawl and air pollution have become concerns globally, hospital admissions for asthma have risen by more than 50% for children under the age of 15 years. Although air pollutants and allergens have been suggested as contributing to this rise, the magnitude of the effect is uncertain. In this study, the association between the main source of ambient air pollutants in Cincinnati, that is, major traffic corridors (MTC), and childhood hospital attendance for asthma were examined using logistic modelling, with spatial analysis in the use of GIS.

Objective: To investigate whether those receiving medical service from a children's hospital for asthma are more likely to live near a MTC than those paediatric patients of that hospital for gastrointestinal (GI) disorders or convulsions.

Design: Case control design using hospital data.

Setting: Cincinnati Children's Hospital Medical Centre (CCHMC), Ohio, USA.

Participants: Cases were defined as children living in four counties in the Cincinnati Area and who were admitted to or visited CCHMC between April 1996 and October 1997 and who had a principal diagnosis of asthma. Controls lived in the same four counties and were the patients of the same hospital in the same time period but had a principal diagnosis of convulsions or GI disease. There were 6323 children in the case (asthmatic) group and 8479 children in the control group. Children in each group were divided into four subgroups depending on the distance of their home from MTC (<0.25, 0.25 to <0.5, 0.5 to <0.75, and 0.75 to <1 miles).

Results: No difference was found in the geospatial pattern of the residential distribution in four asthmatic subgroups as compared to four control subgroups. The odds for children with asthma living within 0.25 mile from the major traffic corridors was 1.05 (95% CI 0.93 to 1.18) compared with those admitted for the other conditions.

Conclusions: In this study, residential proximity to major traffic corridors did not appear to be associated with an increased likelihood of attendance at a children's hospital for asthma, but race does.

Genetic and environmental epidemiology

DIETARY ZINC INTAKE AND PRIMARY ADULT BRAIN TUMOUR RISK

S. Nayee[1], K. Muir[1], J. Lui[1], P. Dimitropoulou[1], L. Demetriou[1], M. Van Tongeren[2], S. J. Hepworth[3], P. A. Mckinney[3]. [1]*Department of Epidemiology and Public Health, University of Nottingham, UK;* [2]*Centre for Occupational and Environmental Health, University of Manchester, UK;* [3]*Centre for Epidemiology and Biostatistics, University of Leeds, UK*

Aim: The aetiology and mechanisms behind brain tumour development remain unclear. The purpose of the UK Adult Brain Tumour Study, a population based case control study, was to collect data on a range of potential risk factors including diet. Zinc acts as a co-factor of antioxidant enzymes to protect against oxygen free radicals produced during oxidative stress. We aimed to test the hypothesis that consuming a greater amount of dietary zinc would lead to a reduced brain tumour risk.

Methods: A total of 1012 cases (glioma n = 600; meningioma n = 254, acoustic neuroma n = 135, other n = 25) and controls 1103 (matched on age, sex, and general practice) were recruited from Trent, West Midlands, West Yorkshire, and Central Scotland over a three year period (2001–2004). After a face to face interview each participant was left a food frequency questionnaire (FFQ) on dietary intake to complete and return by post to the study centre. The FFQ was based on the EPIC study and gathered data on dietary items including questions on vitamin and mineral supplement use. A total of 761 interviewed cases (75%) and 871 controls (79%) returned the FFQ. The dietary nutrient intake for each subject was extracted from the FFQ data using software developed and validated by the EPIC study. Analysis was carried out using logistic regression with adjustment for possible confounders.

Results: After adjustment for the season FFQ returned, which may affect dietary intake, and multivitamin use, zinc intake appeared to show a statistically significant protective association for all tumours together (OR for highest quartile of intake = 0.79, p trend = 0.32).

Conclusions: Increased zinc intake appears to be associated with reduced brain tumour risk. These preliminary findings are consistent with the hypothesis under test which has biological plausibility. Further investigation by tumour subtype will identify whether this finding is a general or subtype specific association. Zinc is an essential element for a fully functioning immune system and speculation might invoke the involvement of immune pathways as one potential mechanism by which zinc protects against brain tumour development.

FETAL GENOTYPE CONTRIBUTES TO DIFFERENCES IN BIRTH WEIGHT BETWEEN INDIANS AND EUROPEANS IN THE UK: EVIDENCE FROM TWO STUDIES OF BIRTH OUTCOME IN ETHNICALLY MIXED UNIONS.

G. A. Ronalds[1], P. J. Steer[2], D. A. Leon[1]. [1]*Department of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London, UK;* [2]*Academic Department of Obstetrics and Gynaecology, Imperial College Faculty of Medicine at Chelsea and Westminster Hospital, London, UK*

Objectives: In the UK Indian women have babies that are lighter on average than babies born to women of white European ancestry. The reasons for this are not clear. In particular, the contribution of genetic influences is unknown. We compared births to ''mixed unions'' (babies with one Indian and one European parent) to babies with either two European or two Indian parents. This let us explore the effect of father's ethnicity—and hence the influence of fetal genetics—on the ethnic difference in birth weight.

Design: Cross sectional surveys in two datasets.

Setting and Participants: Individuals with Indian and/or white European parents. 125 782 individuals (born 1975–2000) were from the Office for National Statistics Longitudinal Study (LS), a representative sample of the population of England and Wales. 6264 were delivered at a London hospital (1998–2004).

Main Outcome Measure: Birth weight.

Results: On average, babies with a European father were heavier at birth than babies with an Indian father, even when adjusted for socioeconomic position and a range of maternal factors. The paternal effect was very similar in the two datasets. It was found whether the mother was Indian (adjusted birth weight differences in LS data: 249 g (95% CI 143 to 354); in hospital data: 236 g (95% CI 62 to 411)) or European (LS data: 117 g (95% CI 26 to 207); hospital data: 83 g (95% CI 40 to 206)).

Conclusions: These data suggest that the difference in birth weight between Indians and Europeans born in the UK is partly attributable to fetal genetics. Our findings imply that birth weight will remain lower in Indians than in Europeans, regardless of convergence in environment and lifestyle.

GENE–ENVIRONMENT INTERACTION BETWEEN IRON INTAKE AND HFE GENOTYPE IN HAEMOCHROMATOSIS: RESULTS FROM THE UK WOMEN'S COHORT STUDY

J. E. Cade[1], D. C. Greenwood[2], J. A. Moreton[1], V. J. Burley[1], B. A. Bratley[1], J. A. Randerson-Moor[3], K. Kukalizch[3], D. Thompson[4], M. Worwood[5], D. T. Bishop[3]. *[1]Nutrition Epidemiology Group, [2]Biostatistics Unit, [3]Genetic Epidemiology Group, Centre for Epidemiology & Biostatistics, University of Leeds, UK; [4]Department of Clinical Biochemistry and Immunology, Leeds General Infirmary, UK; [5]University of Wales College of Medicine, Cardiff, UK*

Background: High levels of iron storage may predispose individuals to a number of chronic diseases including heart disease, diabetes, liver disease, and some cancers. Recent genetic research has identified the C282Y mutation in the HFE gene to be most commonly associated with iron overload (haemochromatosis). Approximately 3–400 000 people in the UK may be homozygous for C282Y and at risk of iron overload, though clinical penetrance of homozygosity now appears to be lower than earlier estimates. About 15% of the population are heterozygous and usually asymptomatic.

Methods: Cheek cell samples were requested from 15 000 participants in the UK Women's Cohort Study. Blood was requested from the potential C282Y homozygotes and heterozygotes identified by cheek cells to confirm genotyping. A further sample of 3000 women was asked for blood samples alone. Serum ferritin concentrations, used as a measure of iron storage, were obtained on 2531 of these women. Dietary intake of haem iron from meat and other related intakes were estimated from a 218-item food frequency questionnaire.

Results: HFE genotypes were consistent with Hardy-Weinberg equilibrium and phase analysis confirmed the two variants to be segregating on distinct haplotypes. Iron storage was strongly related to genotype and haem iron intake. The mean serum ferritin concentration for C282Y homozygotes (n=31) was 131 μg/l (95% CI 83 to 204), 55 μg/l (95% CI 52 to 58) for heterozygotes (n=726) and 44 μg/l (95% CI 43 to 46) for wild types (n=1774). Before adjusting for potential confounders, serum ferritin was 2.9 times higher (99% CI 2.2 to 3.9) in C282Y homozygotes than wild types, and heterozygotes had slightly higher concentrations than wild types (ratio: 1.2, 95% CI 1.2 to 1.3). After adjustment for potential confounders, these results remained similar, and a substantial gene/environment interaction was observed between C282Y genotype and haem iron intake. The effect of the haem iron intake was 2.0 times greater (95% CI 1.2 to 3.2, p=0.006) for C282Y homozygotes than wild type. For heterozygotes there was no such interaction (ratio: 1.0, 95% CI 0.9 to 1.1, p=0.6) as compared with the wild type.

Discussion: Implications for public health are that known homozygotes should limit intake of red meat, though this should not replace the standard treatment of regular phlebotomy. For the larger group of heterozygotes, no interaction was observed, and this group need not alter their diet on the basis of this study. Our conclusions will inform the ongoing debate on screening for haemochromatosis.

Funded by the Foods Standards Agency (csa5404) and the World Cancer Research Fund.

A 24 YEAR COHORT STUDY OF MORTALITY IN SLATE WORKERS IN NORTH WALES

M. J. Campbell[1], N. G. Hodges[2], H. F. Thomas[3], A. Paul[4], J. G. Williams[5]. *[1]Medical Statistics Group, University of Sheffield, Institute of Primary Care, Northern General Hospital, Sheffield S5 7AU, UK; [2]Consultant Physician, North West Wales Trust, Bangor North Wales, UK; [3]GP General Practitioner, 6 College Road, Eastbourne, UK; [4]Specialist Registrar (Public Health Medicine) Welsh Assembly Government, Cathays Cardiff, UK; [5]Consultant Physician, Halton General Hospital, Runcorn, UK*

Design: A cohort study, with a contemporaneous control group (quasi-experimental study).

Methods: A cross sectional study of slate workers was carried out in 1975 by the MRC Pneumoconiosis Unit. All 726 slate workers and 529 age matched controls were followed up until the end of 1998. The date and cause of death in those who had died were identified from the Office of National Statistics.

Results: The average age of the exposed subjects was 49.0 years as compared to 48.3 for the controls in 1975. The slate workers had 55.9% current smokers as opposed to 53.9% for the controls. We found a clear excess death rate amongst slate workers compared with controls, having adjusted for age and smoking habit. This was largely restricted to those aged under 75 at the time of the survey (hazard ratio for all cause deaths 1.24, 95% CI 1.04 to 1.47, p=0.015). The excess was mainly due to respiratory disease and pneumoconiosis. The hazard ratio for respiratory deaths relative to controls was 1.85 (95% CI 1.21 to 2.82).

Discussion: This study has a strong design because it has contemporaneous controls who matched the slate workers at the start of the follow up for age and smoking habit, and who came from the same area and background. We concluded that it is likely that the excess deaths in the exposed group was due to exposure to slate dust.

Plenary sessions

APPLICATION OF CONTINUOUS MONITORING METHODS TO HIP PROSTHESES

S. Hardoon[1], J. Lewsey[1,2], J. Van Der Meulen[1,2]. *[1]Clinical Effectiveness Unit, The Royal College of Surgeons of England, London, UK; [2]Health Services Research Unit, London School of Hygiene & Tropical Medicine, London, UK*

Background: There are many different brands of cups and stems used in hip replacement procedures. For example, in 2003 there were over 350 different combinations of these components in use in England and Wales. It is unclear which combination performs best, and indeed whether all meet NICE benchmark standards.

Objective: To explore the application of continuous monitoring methods in evaluating hip prosthesis performance immediately after their introduction into clinical practice. We have investigated how these methods could have been used to monitor the performance of the 3M Capital Hip System, and given early warning of the poor performance of this implant.

Methods: The SPRT (Sequential Probability Ratio Test), the RSPRT (Resetting SPRT), and the CUSUM (CUmulative SUM) continuous monitoring methods were considered, each employed assuming three different statistical distributions for the outcome (revision of the implant):

- Bernoulli—to look at the risk of revision at a fixed time after implantation
- Poisson—to look at the rate of revision, taking into account person-time
- Weibull—adaptation of the Poisson approach to allow for varying rate with time from implant

The methods were applied retrospectively on a dataset of the 3M Capital Hip System. This prosthesis was introduced in 1990 and identified as performing unsatisfactorily eight years later (Department of Health Hazard Notice), by which point over 4600 prostheses had been implanted.

Results: Alerts to the poor performance of this hip would have been given by all the monitoring methods at least four years before the Hazard Notice. The Weibull methods alerted earliest (April 1993), followed by the Poisson (October 1993), and the Bernoulli (November 1994). If implantation had stopped at the time of the Weibull alert, over 3300 implants using this faulty hip system could have been prevented. Of these 3300 implants, over 400 (13%) were later revised—revisions that could have been avoided.

Conclusions: The continuous monitoring methods could have given strong evidence of the poor performance of the 3M hip system at an early stage, which indicates that they can be valuable tools in monitoring hip (and knee) implants. The recently initiated National Joint Registry provides an opportunity for centralised continuous monitoring of all joint replacements. This would allow the introduction of new prosthesis

innovations into clinical practice with an assurance that poor performance would be identified quickly.

PUTTING SUICIDE ON THE MAP: THE GEOGRAPHY OF DESPAIR IN ENGLAND AND WALES

N. Middleton, J. Sterne, D. Gunnell. *Department of Social Medicine, University of Bristol, Canynge Hall, Whiteladies Road, Bristol BS8 2PR, UK*

Background: Geographical studies of suicide in Britain have: (1) focused on relatively large areas—heterogeneous in terms of the socioeconomic characteristics of the communities that comprise them, (2) have not investigated whether the geography of suicide varies across the different age groups—as recent changes in its age patterning might suggest, and (3) have favoured simple regression approaches that treat geographical areas as independent.

Aims: Two aspects of the geography of suicide were investigated: (a) the magnitude and spatial patterning of its geographical variation and (b) the extent to which socioeconomic characteristics of areas explain the observed patterns in England and Wales, 1988–94. Analyses were based on constituencies (n = 569) and wards (n = 9265)—a finer geographical scale than previously used nationally.

Methods: Random effects regression models (that is, negative Binomial and Bayesian hierarchical models) were used to derive and map age and sex specific ''smoothed'' area estimates of rate ratios by incorporating evidence of heterogeneity and spatial autocorrelation into their estimation. Furthermore, any unexplained variation was assessed in a series of maps of residual rate ratios after controlling for the effect of a range of 1991 census derived socioeconomic characteristics of these areas.

Results: There was strong evidence of heterogeneity (that is, greater variability than expected by chance alone) and spatial clustering (that is, neighbouring areas tend to have similar levels of suicide). Although the geography of suicide differed across age/sex groups, two main patterns emerged: clusters of high rates in (a) remote and coastal parts of the country and (b) central parts of cities (with low rates in their periphery). Area characteristics accounted for 50%–75% of the observed geographic variation. Possible indicators of levels of social fragmentation in an area, such as single person households and unmarried population, appeared particularly important. However, up to twofold differences in rates remained unexplained—residual variation also clustered.

Conclusions: Suicide is an important contributor to area health inequalities—understanding the geography of suicide is vital in informing appropriate area based reduction strategies. Although, nationally, indicators of social fragmentation are particularly important, associations with other factors such as unemployment and long term illness appear to be particular to some regions. Further research should seek to identify such factors as well as clarify the extent to which the observed area differences reflect the high risk demographic composition of such areas or true area influences on the mental health and suicide risk of their populations.

INCREASING INEQUALITIES IN HEALTH: IS IT AN ARTEFACT CAUSED BY THE SELECTIVE MOVEMENT OF PEOPLE?

S. Connolly, D. O'Reilly, M. Rosato. *Department of Epidemiology and Public Health, Queens University Belfast, UK*

Objectives: The current method of assessing whether inequalities in health within populations may be changing is to compare the health status of areas, or groups of areas, over time. However this methodology may be seriously flawed as it ignores the movement of people between areas. Previous research has shown such movement to be selective with a net loss of the more affluent and healthier residents from deprived areas towards the more affluent areas.

This paper addresses the question of whether selective migration has contributed to the observed increasing socioeconomic gradients in mortality in England and Wales between 1991 and 2001.

Design: Longitudinal study of migrants.

Subjects: 524 561 residents of England and Wales aged less than 75 enumerated in the 1991 census and 417 864 residents enumerated in both the 1991 and 2001 censuses (ONS Longitudinal Study)

Main Outcome Measure: 4215 deaths in 1991–92 and 2830 deaths in 2001–02 were analysed by quintile of deprivation of the deceased at the time of death. Deaths in 2001–02 were similarly analysed using quintile of deprivation of residence in 1991.

Results: The Longitudinal Study confirmed a mortality gradient by socioeconomic status with a nearly 50% excess (all-cause mortality, 0–74) for those in the most deprived compared with those in the least deprived quintile at the 1991 census. Between 1991 and 2001, 30% of the population changed quintile and there was a net movement from deprived and towards more affluent areas. By 2001 the excess mortality in the most deprived quintile had increased to 68%, although when migration is accounted for, this excess falls to 64%.

Conclusions: This study of individuals confirms the increasing polarisation in patterns of ill health across the country over the last decade. However, the selective movement of people between areas can account for some of this observed increase. Although work needs to be done to determine the other causes of the increasing inequalities, selective migration does have a part to play and caution should be exercised when using ecological studies to measure the change in health inequalities between areas over time.