Society for Social Medicine and the International Epidemiological Association European Group

Abstracts of oral presentations

SSM Selected papers

1 WHAT DO THE PUBLIC THINK ABOUT THE USE OF THEIR HEALTH INFORMATION? PATIENT ELECTRONIC RECORD: INFORMATION AND CONSENT—THE PERIC PROJECT

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3921 adults randomly selected from across Great Britain were interviewed. Subjects were asked to assess a selection of 10 out of 200 vignettes. Each vignette contained four elements: a category of individual; access to some or all of the health record; specified purpose; and level of patient identifier. Subjects were asked to say how happy they would be to allow access to their health record in the circumstances described.

The public were generally happy to provide access to health information. For almost a third of vignettes, subjects said that they would be very happy to allow access to their health information. 9.1% of subjects said that they would be very happy to allow access within all of the vignettes that they were asked to assess. There was however, a significant minority of responses (11.6%) to vignettes where subjects said that they would be very unhappy to allow access. In addition 2.1% of individuals said that they were very unhappy with all of the vignettes presented to them. Individuals from higher social groups, older people and males were more likely to be happy with access to their health information. The individual requesting information was the most important factor determining permission to access health information. Subjects were happier to release anonymised rather than personally identifiable data. Content of the information to be released did not seem to be that important, even when the health record contained sensitive information. With the exception of teaching students, the use of the information wasn't an important determinant of consent.

Despite a level of support for use of health information in most circumstances, this doesn't mean that patients don't want to be asked for consent, nor that the views of the small minority can be ignored. The ethical and policy implications of these findings will be discussed.

2 THE IMPACT OF SMOKING ON DURATION OF CHRONIC DISEASE UNTIL DEATH

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Background: It is well documented that smokers have increased mortality and morbidity. However, little is known about the possible impact of smoking on duration of chronic disease until death.
Objective: To present a new statistical method for estimating median survival time and median disease-free survival time, based on data from a prospective study, and to use this method to analyse the impact of smoking on disease duration until death.
Methods: The method is relevant for prospective studies where at least 25% - but less than 50% - of the patients have died during the study period. Further, at least 40% of the subjects must be diseased or dead at the end of the observation period. The core idea of the new statistical method is to use mortality data from official statistics to prolong a survival curve until the time of 50% survival, and to use linear extrapolation for prolonging a disease-free survival curve accordingly. Median survival time and median disease-free survival time may then be estimated from these extrapolated curves.
The method is used on data from a prospective study of 2014 initiallyt healthy, middleaged men followed for 23 years on mortality, and 21 years on the endpoint "first hospitalisation due to a chronic disease".
Results: Both the smokers (n=882) and the nonsmokers were on average 50 years old at start of the study, and 572 of the participants died during the 23 years observation period (28.4%). After 21 years of follow-up 993 of the men were either diseased or dead (49.2%). When applying the new method on data from this study, the estimated median time until death was 24.5 years for smokers, and 30.7 years for nonsmokers. Further, the estimated median time until first chronic disease or death was 17.0 years among smokers, and 27.0 years among nonsmokers. Thus the estimated "median" duration of chronic disease until death was 10.0 years for smokers, and 6.2 years for nonsmokers.
Conclusion: Our analyses indicates that among healthy 50 years old men, the expected number of years with a chronic disease during the remaining liftetime is about 10 years for smokers, and about 6 years for nonsmokers.

3 MODELS OF ALCOHOL CONSUMPTION AND MORTALITY FOR MEN AND WOMEN AT DIFFERENT AGES

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The relationship between all-cause mortality and alcohol consumption is typically U-shaped due to the excess risk of ischaemic heart disease in non-drinkers and positive associations between alcohol consumption and other causes of death. The shape and location of this U-curve depend on age and sex, since drinking prevalences and mortality are age- and sex-specific. From a review of the international epidemiological literature, we extracted models of the association between alcohol consumption and alcohol-related causes of death. We combined these models with age- and sex-specific data from England and Wales on drinking prevalence at various levels, and the distributions of causes of death, to estimate for England and Wales the all-cause risk of death in terms of alcohol consumption, age and sex. Causes of death considered were: cancers of lip, oral cavity and pharynx, oesophagus, colon, rectum, liver, larynx, and breast; essential hypertension, ischaemic and haemorrhagic stroke, liver cirrhosis, non-cirrhotic chronic liver disease, chronic pancreatitis, ischaemic heart disease and injuries.

We found that all-cause mortality increases with alcohol consumption in women aged under 55 and men aged under 35, but that the relationship is U-shaped above these ages. The level at which the lowest risk occurs increases with age to 3 units/week and 8 units/week respectively in women and men aged over 65. The level at which risk is increased by 5% above the minimum age- and sex-specific risk increases with age from 8 units/week in women aged 20, to 17 units per week in women aged 70; and from 5 units/week in men aged 20, to 30 units/week in men aged 70.

In conclusion, we show that substantially increased risks of all-cause mortality can occur in people drinking within the Royal Colleges' recommended limits of 21 units/week in men and 14 units/week in women, especially in younger people.

4 THE EPIDEMIOLOGY OF AN OUTBREAK OF SURGERY. RECENT TRENDS IN THE USE OF RADICAL PROSTATECTOMY IN ENGLAND

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Background and objective: The optimum management of localised prostate cancer is unclear, with no evidence from randomised controlled trials comparing the treatment options: surgery, radiotherapy or monitoring ('watchful waiting'). We have used routine data to examine patterns of utilisation of one of these treatments, radical prostatectomy, in NHS hospitals.
Methods: Numbers of radical prostatectomies performed in English NHS hospitals were obtained from the Hospital Episode Statistics database for 1991–1997. Directly age-standardised operation rates were calculated for NHS regions and ward deprivation quintiles. The relative risk of admission for radical prostatectomy was calculated by ward deprivation quintile.
Findings: There was a 14-fold increase in surgery, and a five-fold increase in the number of Trusts undertaking surgery, over the study period. By 1997 under half of all operations occurred in Trusts where surgeons operated more than once a month. Rates of surgery were greatest in the South East and Northern and Yorkshire NHS regions. In NHS regions outside London risk of surgery in an NHS hospital was significantly greater for men living in affluent areas (RR=1.6, 95% confidence interval 1.3 to 1.9, P_{TREND}<0.001), in London this trend was reversed (RR=0.2, 95% confidence interval 0.1 to 0.6, P_{TREND}<0.001).
Interpretation: In the absence of evidence of effectiveness, use of radical prostatectomy has increased dramatically in England in recent years. This increase in surgery, and local variations in its development, probably reflects a combination of access to PSA testing, particularly through the private sector, and urologists' preferences. By 1997 most operations were still being performed in 'low-volume' hospitals, which may have implications for quality of care and subsequent outcome. Rational development of care for men with early prostate cancer should be informed ideally by a randomised trial of treatment options, or, at a minimum, by the routine collection of outcome data.

5 ETHNIC DIFFERENCES IN INSULIN RESISTANCE BETWEEN EUROPEANS AND SOUTH ASIANS HAVE THEIR ORIGINS EARLY IN LIFE

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Background: Insulin resistance and type II diabetes among British adults of South Asian origin may contribute to their excess mortality from coronary heart disease. We have examined whether insulin levels and other cardiovascular risk factors differ between British children of South Asian and European origin.
Methods: We carried out a school-based survey including 231 South Asian and 3415 European 8–11 year-old children (response rate 75%). Height, weight and blood pressure were measured in all children; waist-hip ratio, blood lipids, glucose and insulin were measured among 10–11 year olds (74 South Asian and 1287 European).
Results: European children had a higher mean ponderal index (mean difference 0.40 kg/m3, 95%CI 0.10 to 0.70 kg/m³), although South Asian children had a higher mean waist circumference (mean difference 1.4 cm, 95%CI 0.4 to 2.4 cm) and higher mean diastolic blood pressure and pulse rate (mean differences 1.3 mmHg, 95%CI 0.2 to 2.4 mmHg; 3.3 min⁻¹, 95%CI 1.5 to 5.1 min⁻¹). South Asian children had markedly higher insulin levels, both fasting (proportional difference 68%, 95%CI 29% to 119%) and post-load (proportional difference 40%, 95% CI 11% to 77%). Mean triglyceride and fibrinogen levels were also higher among South Asians although plasma glucose, total, LDL and HDL cholesterol did not differ markedly between the groups. The relationships of both ponderal index and waist circumference to insulin level were markedly stronger among children of South Asian origin compared with Europeans. Adjustment for childhood factors (waist circumference and pulse rate) and for

birthweight attenuated but did not abolish the European-South Asian differences in insulin level.
Conclusion: South Asian-European differences in insulin resistance have their origins early in life; cardiovascular disease prevention in British South Asians may need to begin in childhood or earlier.

6 SEX MATTERS: SECULAR TRENDS IN SEX DIFFERENCES IN CORONARY HEART DISEASE MORTALITY

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Background: The reason for the sex difference in coronary heart disease (CHD) mortality though widely assumed to be due to the protective effect of oestrogen in women, remains enigmatic.
Methods: National and international data were used to describe secular trends in sex differences in CHD and other cause specific mortality for England and Wales between 1921 and 1998 and for other industrialised countries between 1947 and 1997.
Findings: The twentieth century epidemic of CHD only affected men in most industrialised countries. In England and Wales, where this could be examined in detail, death rates in men increased in the late 1940s but remained stable in women. These trends result in an increase in the sex ratio for CHD mortality from a constant value of 1.5 between 1921 and 1949 to a peak of 3.5 in 1972. There was no compensatory increase in death rates from other causes to which women with CHD could plausibly have been misdiagnosed. If the sex ratio had remained at 1.5 and rates in women as they were for the whole time period 1.2 million fewer deaths from CHD in men would have occurred over the last century. Whilst sex ratios for CHD mortality show a clear period effect those for lung cancer show a cohort effect. Mortality from stroke over the period decreased in both sexes with the sex ratio remaining constant. Secular trends in the sex ratio of CHD mortality are strongly correlated with trends in total mean per-capita fat consumption (correlation coefficient 0.9, 95% confidence interval 0.8–0.9, p < 0.01), moderately correlated with total mean per-capita alcohol consumption (0.5, 0.3–0.7, p < 0.01) and weakly correlated with the sex ratio in the proportion of smokers (0.3, 0.0–0.6, p = 0.06) after allowing for lagged effects.
Conclusion: These trends cannot be explained solely by oestrogen and suggest that sex differences in CHD are largely driven by environmental factors. Whatever is responsible for the difference clearly has important public health implications.

Cardiovascular disease I

7 IS THE PREVALENCE OF CORONARY HEART DISEASE FALLING IN BRITISH MEN?

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Objective: To assess whether long-term trends over time in acute major coronary heart disease (CHD) event rates have influenced the burden of prevalent CHD in British men.
Methods: Trends were examined using data from the British Regional Heart Study, a longitudinal cohort study of 7735 men, aged 40–59 years at entry (1978–80), and selected from 24 British towns. The prevalences of current angina symptoms and history of diagnosed CHD were ascertained by questionnaire on four occasions: 1978–80, 1983–85, 1992 and 1996. New major CHD events (fatal and non-fatal) were ascertained throughout the study using NHS central registers and general practice record reviews. Age-specific and age-adjusted trends in CHD prevalence were compared with trends in major CHD event rates. Generalized estimating equations were used to obtain overall estimates of trend that allowed for association between repeated observations from individual subjects.
Results: From 1978–1996 there was a clear decline in the prevalence of current angina symptoms: the age-adjusted annual percentage change in odds (95% CI) was -1.8% (-2.8, -0.8). However, there was

no evidence of a trend in the prevalence of history of diagnosed CHD (annual change in odds: +0.1% (-1.0, +1.2)). Over the same period, the CHD mortality rate fell substantially (annual change (95% CI): -4.1% (-6.5, -1.6)); rates of non-fatal myocardial infarction, all major CHD events, and first major CHD event fell by -1.7% (-3.9, +0.5), -2.5% (-4.1, -0.8) and -2.4% (-4.3, -0.5) respectively.

Conclusions: These results suggest that middle-aged British men are less likely to experience symptoms of angina than in previous decades, but are just as likely to have a history of diagnosed CHD. Despite falling rates of new major events and falling symptom prevalence, the need for secondary prevention among middle-aged men with established CHD remains as great as ever.

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8 DOES STRESS CAUSE HEART DISEASE? CASE-CONTROL STUDY OF THE ASSOCIATION BETWEEN THE MAJOR HORMONAL STRESS AXES AND THE METABOLIC SYNDROME

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Background: We have previously shown strong inverse social gradients in coronary disease (CHD) incidence and prevalence of the metabolic syndrome. The metabolic syndrome gradient is little altered by adjusting for current reported health behaviours. One possibility is that the metabolic syndrome, a precursor of CHD, may in part be the product of altered neurohormonal activity due to chronic stress.

Study objective: To examine associations between metabolic syndrome caseness and functioning of hypothalamic-pituitary-adrenal (HPA) and sympathetic-adrenal (SA) axes.

Design: Nested case-control study within the Whitehall II study, with double-blind sample collection.

Participants: Cases (n=30) were defined according to current measurements of glucose tolerance, serum lipids, central obesity and blood pressure. Controls were a random sample of 153 men (mean age 51.6 years). All participants were Caucasian.

Results: HPA axis Salivary cortisol, collected on two consecutive working days at 1630h and 2200h, showed a tendency to be higher in those reporting recent hassles (Day 2 afternoon hassles yes vs. no, mean (95%CI): 3.1(2.7–3.5) vs. 2.7(2.4–3.0) nmol/l p=0.09), but was similar in metabolic syndrome cases compared to controls. Total urinary cortisol metabolites, from a 24h collection, were higher in cases than controls (8.9(6.6–12.0) vs. 6.3(5.2–7.7) mg/day p=0.01). SA axis Sympathetic and parasympathetic activity was obtained from a 5-minute electrocardiogram and urinary catecholamine metabolites. Normetanephrine output was correlated with cardiac autonomic function indexed by heart rate variability (HRV, SD of N-N intervals) (r=-0.25, p<0.001). Heart rate was higher among cases versus controls (72.3(67–78) vs. 64.6(60–69) b/min p<0.0001). Low HRV, shown elsewhere to be a coronary risk marker, was associated with metabolic syndrome (42.5(36–49) vs. 32.3(24–40) p=0.004). 24h urinary metanephrine and normetanephrine output was respectively similar and higher in cases vs. controls.

Conclusions: Our findings link neurohormonal function to the metabolic syndrome, a cluster of CHD risk factors specifically associated with lower socioeconomic position. This is evidence that stress pathways may be important in causation, and may add to the explanation of the inverse social gradient in CHD. Alternatively, the metabolic syndrome may be the cause rather than the result of altered neurohormonal activity.

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9 A NATIONAL SURVEY OF SUDDEN ARRHYTHMIC DEATH SYNDROME (SADS)

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Background: A national survey of Sudden Arrhythmic Death Syndrome (SADS)—unexplained sudden cardiac deaths with normal cardiac pathology and negative toxicology—was undertaken to describe the demographic, medical and family characteristics of these victims.

Method: SADS cases were identified through 117 (96%) HM Coroners in England over a 12 month period. Inclusion criteria were (1) 4–64 years old; (2) no cardiac history; (3) last seen alive within 12 hours of death; (4) coroners post mortem required; (5) no cause identified by a cardiac pathologist; (6) negative toxicology. For confirmed SADS cases the deceased's GP was approached for permission to contact the closest surviving relatives who were then interviewed.

Results: 56 SADS cases identified, 35 (63%) male, mean age 32 (range 7–64) years. 39 cased had informant interviews. Of the SADS cases greater or equal than 16 years, 33% current smokers, 28% regular drinkers and 39% overweight or obese. About one fifth of all SADS cases had reported cardiac symptoms ante-mortem. 8 (19%) had drugs prescribed within 48 hours of death and 15 (36%) had drugs prescribed in the previous 12 months. 2 (6%) were recreational drug users. 3 (7%) reported cardiac symptoms, 1 as upper respiratory tract infection and 5 (13%) had dental infections or treatment in the 48 hours prior to death. 10 (18%) had a history of sudden death in the family and cot death in 2 families.

Conclusions: About 4.1% of all sudden cardiac deaths are unexplained and this sis the firth national survey to characterise the socio-demographic, medical and family characteristics of these victims. Three quarters of these deaths remain completely unexplained.

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10 Q-T DISPERSION AS A RISK FACTOR FOR CARDIAC DEATH

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Introduction: QTc dispersion reflects variation in the QT interval across a 12 lead ECG corrected for heart rate. In recent years QTc dispersion has emerged as a potentially important predictor of sudden cardiac death. However, current evidence linking QTc dispersion to cardiac mortality is largely based on small clinical studies.

Objective: To study the relationship between QT dispersion in a standard 12 lead ECG, corrected for heart rate (QTc) and the risk of cardiac death.

Methods: A nested case-control study based on 8 years follow-up of 2,512 men, aged 45 to 59 years, from the Caerphilly cohort study. We obtained ECG's from all 218 men who died from coronary heart disease during follow-up (cases) and 218 controls, matched for age and sex. QTc interval was measured on baseline ECG's by 4 trained observers using digitalised calipers.

Results: Data are presented on 420 patients with ECG suitable for analysis, 205 cases and 215 controls. QTc dispersion in milliseconds (ms) was positively skewed in cases and controls. Median QTc dispersion was significantly higher in cases (47 ms) than in controls (51msec), p= 0.03. In univariate analysis, risk of cardiac death was increased in each quartile of QTc interval relative to the first (odds ratios, 1.0, 1.3, 1.1, 2.0, p for trend = 0.01). In logistic regression analysis, adjusted for age, smoking, hypertension, history of myocardial infarction and ECG Minnesota code, we observed a significantly increased risk in the upper quartile of the QTc distribution relative to the other 3 quartiles combined (adjusted OR = 1.65 (95% CI 1.0–2.7)

Conclusion: The data suggest that QTc is an independent predictor of cardiac death. The association is non-linear with increased risk largely confined to the upper quartile of the distribution.

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11 CLUSTER RANDOMISED CONTROLLED TRIAL TO COMPARE THREE METHODS OF PROMOTING SECONDARY PREVENTION OF CORONARY HEART DISEASE IN PRIMARY CARE

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Objective: To assess the effectiveness of three different methods of promoting secondary prevention of coronary heart disease in primary care.

Design: Pragmatic, unblinded, cluster randomised controlled trial.

Subjects: 21 general practices received intervention; outcome measured in 1906 patients aged 55–75 years with established coronary heart disease.

Interventions: Audit of notes with summary feedback to primary health care team (audit group); assistance with setting up a disease register and systematic recall of patients to general practitioner (GP

recall group); assistance with setting up a disease register and systematic recall of patients to a nurse led clinic (nurse recall group).

Main outcome measures: At 18 months' follow up: adequate assessment (defined) of 3 risk factors (blood pressure, cholesterol, and smoking status); prescribing of hypotensive agents, lipid lowering drugs, and antiplatelet drugs; blood pressure, serum cholesterol level, and plasma cotinine levels.

Results: Adequate assessment of all 3 risk factors was much more common in the nurse and GP recall groups (85%, 76%) than the audit group (52%). The advantage in the nurse recall compared with the audit group was 33% (95% confidence interval 19% to 46%); in the GP recall group compared with the audit group 23% (10% to 36%), and in the nurse recall group compared with the GP recall group 9% (3% to 22%). However, these differences in assessment were not reflected in clinical outcomes. Mean blood pressure (148/80, 147/81, 148/81 mm Hg), total cholesterol (5.4, 5.5, 5.5 mmol/l), and cotinine levels (% probable smokers 17%, 16%, 19%) varied little between the nurse recall, GP recall, and audit groups respectively, as did prescribing of hypotensive and lipid lowering agents. Prescribing of antiplatelet drugs was higher in the nurse recall group (85%) than the GP recall or audit groups (80%, 74%). After adjustment for baseline levels, the advantage in the nurse recall group compared with the audit group was 10% (3% to 17%), in the nurse recall group compared with the GP recall group 8% (1% to 15%) and in the GP recall group compared with the audit group 2% (6% to 10%).

Conclusions: Setting up a register and recall system improved patient assessment at 18 months' follow up but was not consistently better than audit alone in improving treatment or risk factor levels. Understanding the reasons for this is the key next step in improving the quality of care of patients with coronary heart disease.

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12 **ETHNIC DIFFERENCES IN THE INVASIVE MANAGEMENT OF CORONARY DISEASE: ARE THEY UNFAIR? PROSPECTIVE FINDINGS FROM THE ACRE STUDY**

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Objectives: To compare revascularisation rates in south Asian and white patients undergoing coronary angiography in relation to the appropriateness of revascularisation and clinical outcome. Design: prospective cohort study with two and a half years follow up; appropriateness of revascularisation was rated by a nine member expert panel. Setting: Tertiary cardiac centre in the City and east London with referrals from five contiguous health authorities

Participants: Consecutive patients (502 south Asian, 2974 white) undergoing coronary angiography in the ACRE (Appropriateness of Coronary Revascularisation) study. There were no exclusion criteria.

Main outcome measures: coronary revascularisation, non-fatal myocardial infarction and mortality.

Results: Among patients who were appropriate for revascularisation, South Asians compared with whites had lower age adjusted rates of coronary angioplasty (hazard ratio 0.69, 95% confidence interval 0.5 to 1.0) and coronary artery bypass grafting (hazard ratio 0.74, 95% confidence interval 0.6–0.9). These differences were not abolished by adjustment for socio-economic status and persisted among patients for whom cardiologists had recommended revascularisation.There were no differences in mortality (hazard ratio 1.05, 95% confidence interval 0.7–1.6) nor rate of non-fatal myocardial infarction (hazard ratio 1.07, 95% confidence interval 0.8–1.5) between south Asians and whites who had coronary artery disease.

Conclusions: South Asian patients in whom revascularisation was rated appropriate were less likely to undergo subsequent angioplasty or coronary artery bypass grafting than comparable white patients. There were no differences in outcomes.

Health services I

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13 **TOP RATED BRITISH BUSINESS RESEARCH: HEALTH SERVICE RESEARCHERS LOOK IN**

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Aims: Health based research covers not only treatment given to individual patients but also issues relating to health service organisation. Business schools have an established history of conducting research into organisational issues and it is therefore logical for health service researchers to look towards business research in seeking lessons in methodology.

Methodology: The study describes the research methodology used in the three business/management schools in Britain given top ratings for research by the Higher Education Funding Council: London Business School, Lancaster University and UMIST at Manchester University. We obtained a total of 187 articles from these institution's publication lists. Articles were classified as empirical or non-empirical. Non-empirical work includes all that of a purely theoretical or discursive nature, and that using simulated data. Empirical studies were defined as those using secondary or primary data in an attempt either to examine a particular case or to inform more general knowledge or theory. Such studies were further classified according to whether they were reviews, purely descriptive, provided an evaluation of a management tool, or evaluated a potentially useful management intervention. Evaluative articles were then classified according to their design.

Results: Preliminary results indicate that approximately half of the articles were of a theoretical nature. The remaining studies contained at least one type of empirical analysis, and of these only around one tenth could be classified as evaluative of a management intervention. In terms of study design, it was apparent that only a very small number of studies used an experimental or analytical design such as a randomised trial, case control study, or cohort study.

Conclusions: Whilst not dismissing the relevance and value of studies of a theoretical nature, it is argued that business/management researchers are failing to capitalise on the opportunities provided by such work to conduct research of an evaluative nature.

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14 **THE CONTRIBUTION OF MEDICAL CARE TO CHANGING LIFE EXPECTANCY IN GERMANY AND POLAND**

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This paper assesses the impact of medical care on mortality changes in east Germany and Poland before and after the political transition, with west Germany included for comparison. Building upon Rutstein's concept of unnecessary untimely deaths, we calculated the contribution of conditions considered amenable to medical care or health policy to changing temporary life expectancy from birth to age 75 for the periods 1980/83 to 1988 and 1991/92 to 1996/97.

Temporary life expectancy improved between 1980 and 1997, with west Germany doing best in the 1980s, adding 1.6 years in men and 1.0 in women (east Germany: 0.7 in both sexes; Poland: 0.2 in men, 0.3 in women). In the 1990s, gains were largest in men in Poland and east Germany, at 1.5 and 1.4 years, and only 0.6 years in west Germany (women: 0.7, 0.9 and 0.3 years, respectively). In the 1980s, in east Germany, 50–60% of the improvement was attributable to conditions amenable to medical care. A net positive effect observed in Poland was counterbalanced by worsening ischaemic heart disease mortality.

In the former communist entities, improvements attributable to medical care in the 1980s were due, largely, to declining infant mortality. In the 1990s, they also benefited adults. A persisting east-west gap in Germany was due, largely, to higher mortality from amenable conditions in the east with causes amenable to health policy contributing about half and medical care 16% (men) to 24% (women) to the differential in 1997.

The findings indicate that medical care has made a significant contribution to improvements in population health over the last two decades, but has differed over time and between countries. There remains potential for further progress in Poland and the former GDR to narrow the health gap with the west.

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15 **THE PARADOX OF COMPRESSED MORBIDITY: RISING INDIVIDUAL HEALTH AND LONGEVITY ADVERSELY AFFECT POPULATION HEALTH INDICES**

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It is widely accepted that medical and social progress has resulted in longer life and greater health, compressing morbidity into a shorter

proportion of an increasing life span. This paper presents a range of morbidity data, mortality rates and economic indicators to argue that whilst this may be true for individuals, population morbidity indices are deteriorating. We have traded longer individual life for worsening population health through mechanisms that extend life expectancy of individuals with chronic illness by a greater proportion than healthy individuals.

Death is distinctly biased against weaker individuals. High rates of mortality selectively diminish genetic and phenotypic diversity in the population, increasingly so with advancing age. Conversely, low death rates diminish the selective disadvantage of individuals inherently susceptible to disease, preserving genetic and phenotypic variations and their associated ill health.

These factors operate at both ends of the lifecycle. Congenital disorders and chromosomal abnormalities limit life expectancy far less than in previous decades. Post-diagnostic survival in both non-fatal and fatal neurological disorders and cancers has significantly improved. For instance, the life expectancy of infants with Down's syndrome has increased by forty years since 1960, that of people diagnosed with multiple sclerosis by eleven years and that of the entire population by only four years. There has been a tenfold increase in the prevalence of Down's syndrome and a fifty percent increase in the prevalence of multiple sclerosis consequent upon reduced mortality from these conditions and from respiratory and urinary tract infections associated with them.

Mortality is increasingly transposed from accidental to biological, from exogenous to endogenous and from tractable to intractable causes. Increased rates of endogenous disease (e.g. neurological disease and cancers) are a consequence of increased life expectancy and a major explanatory factor for increasing rates of endogenous disease.

16 RURAL/URBAN DIFFERENCES IN THE ASSOCIATION BETWEEN TOWNSEND DEPRIVATION AND HOSPITAL UTILISATION: THE END OF A 'RURAL' MYTH?

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Background: Associations between inequalities in healthcare utilisation and socioeconomic deprivation, as measured by deprivation indices such as the Townsend index, are well established. However, it is argued that the Townsend index is insensitive to rural/urban differences due to the inclusion of car-ownership, as people in rural areas make car-ownership a higher priority.
Objective: To examine ways in which the Townsend index and its constituent components differ in their association with hospital utilisation across the rural/urban spectrum.
Setting: A diverse rural/urban environment: the West Midlands region of the NHS (population 5.3 million).
Data: Hospital Episode Statistics (1994/5–1998/9); socio-demographic data from the 1991 census.
Methods: Retrospective multilevel multivariate modelling, comparing three ward-level utilisation measures (standardised episode-, admission-, and bed-rates) and four rural/urban characteristics (population density, population potential, electoral ward area and perimeter).
Results: Townsend exhibited a non-linear relationship with all utilisation measures, despite its components generally exhibiting a linear relationship. When each deprivation model was attenuated by rural/urban characteristics, Townsend was only significantly affected for bed-rates and this was consistent when including and excluding the effects of rural/urban characteristics on each utilisation measure directly. Car-ownership was unperturbed by rural/urban characteristics for all three utilisation measures, whereas homeownership and overcrowding showed significant perturbations.
Conclusions: It is demonstrated that the behaviour of a composite index can be very different from that of its components, revealing how a deprivation index may encapsulate a different meaning to its constituent parts. Two of the four Townsend components yielded considerable perturbation in their relationship to healthcare utilisation across the rural/urban spectrum, whilst the composite index did not. Contrary to anecdotal opinion, car-ownership was stable across different rural/urban areas in relation to healthcare utilisation. The supposition that car-ownership is a poor proxy for deprivation due to rural/urban differences is not founded and appears to be a 'rural' myth.

17 PICKER IN-PATIENT SURVEY: PATIENT EXPERIENCES AND PATIENT SATISFACTION WITH AN EPISODE OF CARE

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Objective: To determine what aspects of health care provision are most likely to influence satisfaction with care, and, secondly, to explore the extent to which satisfaction is a meaningful indicator of patient experience of health care services.
Design: Postal survey of a sample of patients who underwent a period of in-patient care. Patients were asked to evaluate their experience of this episode of care overall, and to complete the Picker Inpatient Survey questionnaire, which asks patients to report on aspects of their experience of care.
Sample: Patients, aged 18 and over, presenting at five hospitals, within one NHS Trust, in Scotland. Questionnaires were mailed to patients' homes within one month of discharge. Two reminders were sent to non-responders. 3592 questionnaires were mailed to people of which 2249 (65%) questionnaires were returned.
Results: Almost 90% respondents indicated they were satisfied with their period of in-patient care. Age and overall self assessed health were only weakly associated with satisfaction. A multiple linear regression indicated that the major determinants of patient satisfaction were Physical Comfort, Emotional Support and Respect for Patient Preferences. However, many patients who indicated that they were satisfied with their health care also indicated problems with their in-patient care as measured on the Picker Inpatient Survey. Indeed, 55% of respondents who indicated their in-patient episode was 'excellent' also indicated problems on 10% or more of the issues measured on the Picker questionnaire.
Discussion: The evidence presented here would suggest that patient satisfaction scores present a limited and optimistic picture. Detailed questions about specific aspects of patients' experiences are likely to be more useful to monitor performance of various hospital departments and wards and could point to ways in which health care delivery could be improved.

18 FORECASTING A PATIENTS WAIT FOR SURGERY: ARE WAITING TIME STATISTICS ACCURATE ENOUGH?

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Background: Governments worldwide have created web-based waiting list information services to inform doctors and patients about current waiting times for elective surgery at local public hospitals. By so doing, it is envisaged that more referrals will be directed to surgeons without excessive waiting times, thereby improving access to services. Yet, there have been no published evaluations of the statistics= accuracy. Therefore, a study was designed to investigate how accurately the waiting time of patients added to a waiting list can be predicted by commonly disseminated statistics.
Methods: Data were collected at a public hospital in Sydney, Australia, on elective surgery activity and waiting list behaviour from July 1995 to June 1998. The data covered 46 surgeons in 10 surgical specialties. Ten types of waiting time statistics were produced for each month, and were used to forecast the waiting time of someone joining the waiting list during the subsequent month. Accuracy was evaluated using various measures including mean square error, and the proportion of patients whose wait exceeded the forecast by 90 days. The theoretical maximum level of accuracy was also calculated.
Results: The accuracy of the tested statistics varied greatly, being affected more by the behaviour of a surgeon=s waiting list than by how the statistics were derived. Overall, statistics based on the mean rather than the median, and surgeon rather than speciality level data, were more accurate. Nonetheless, for 19 surgeons, the best forecast function still underestimated waiting times by 90 days or more for over 25% of listed patients. When the theoretical optimal forecast function was used, seven surgeons had 20% or more of listed patients wait 90 days longer than the forecast wait. This suggests that waiting time information services should be used with caution, and not used to actively shop around.

Methodology I

19 EXPERIENCES WITH CLUSTER RANDOMISED TRIALS IN COMPLEX INTERVENTIONS

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It is now more than 20 years since Cornfield[1] described at a meeting of the International Epidemiological Association the correct analysis of trials in which clusters (or groups) of individuals are randomised, rather than individuals. Thanks largely to the work of Donner they are now becoming more popular in the analysis of interventions designed to change the behaviour of health professionals. One of the main reasons for the use of cluster randomised trials is fear of contamination of patients on active and control group. Another is the supposed inability of a health professional to change interventions between patients. However cluster randomised trials have a number of serious problems. One of the main ones is lack of comparability between the intervention arm and control arm. Patients recruited to the intervention arm may differ simply because the health professionals have been trained in a different way, and so may recruit differently. When the outcome is an event, then if the intervention works it is likely that the ICC will differ between the two arms of the trial, which makes the analysis more complicated. There are also ethical problems, such as the level of consent that one can obtain from patients. This paper will argue that some of the fears that lead to the use of cluster randomised trials are exaggerated, and that individually randomised trials are of feasible, and are easier to analyse and interpret and have greater power. Contamination is often not such a threat as might be supposed. Switching treatments can be monitored by an external observer. A more balanced appraisal of the uses and problems of cluster randomised trials is due.

1 Cornfield, J (1978). Randomization by group: a formal analysis. American Journal of Epidemiology 1978; 108, 100–102

20 ANALYSIS OF PATIENT SPECIFIC COST DATA FROM CLUSTER RANDOMISED TRIALS: A CASE STUDY FROM IMPLEMENTATION RESEARCH

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Introduction: This study explored the effectiveness and efficiency of a guideline based, open-access urological investigation service (URGE). To evaluate the efficiency of the service, two considerations influenced the statistical analysis, namely, the cluster randomised trial design and the skewed distribution of patient specific cost data. Hence, appropriate statistical methods were required to incorporate between cluster variation in the analysis whilst ensuring that arithmetic means were compared (since total costs are important to policy makers). The statistical analysis of patient specific cost data, collected within a cluster randomised trial framework, is explored.
Methods: Patient specific costs were computed by multiplying resource use by unit costs. Costs incurred by the NHS whilst the patient was managed in secondary care were included. To account for the clustered design, a cluster level analysis and random intercept model for individual patient data were undertaken. To account for the non-normal distribution of costs, confidence intervals for the intervention effect were constructed using non-parametric bootstrapping.
Results: 314 patients were referred with prostatism from 50 practices. Analysis at cluster level indicated the intervention led to a cost saving of £53.40 (95% confidence interval (CI): Normal 5.0 to 101.7; Bootstrap CI −3.8 to 106.5). The random intercept model of individual patient costs also indicated that the intervention led to a cost saving of £53.40 (95%CI: Normal 2.8, 103.9; Bootstrap −4.6 to +97.7).
Discussion: The choice of analysis technique did not affect point estimates in this example due to absence of between cluster variation. Reliance on tests and CIs constructed under normality would have resulted in incorrect conclusions. Analyses at cluster level are restrictive, they do not easily adjust for patient covariates, nor do they incorporate within practice variability. Individual patient level analyses adjust for both patient and practice characteristics but techniques may be less robust to departures from normality.

21 A METHODOLOGIC PERSPECTIVE ON BALANCED AND RANDOM ALLOCATION IN CLINICAL TRIALS

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Objective: A basic issue in randomised controlled trials (RCTs) is whether we can safely assume comparability between groups at base-line with respect to all potentially important prognostic factors. While in large-scale trials simple randomisation will do, balancing allocation methods are employed in small trials.
Questions are: a. when should balancing be considered; b. which allocation method performs best; c. how does balance depend on the number of categories for a prognostic variable (e.g. many centres in a multicentre trial); d. what type of analysis should be used in case of balanced allocation.
Methods: Simulation studies were performed (1000 replications) varying the number of subjects (20–400), the method of balancing (four options), the number of categories per prognostic factor (2–8) and type of analysis (simple vs. multivariate). Choices were made with reference to a real life situation, i.e. a trial on the effect of grommets in children with otitis media with effusion.
Results: Simulation showed that: a. a balancing allocation method is superior to randomisation, especially when the number of subjects is 100 or less; b. from the four methods tested, the variance method performs best; c. balance is only mildly affected by the number of prognostic factors and number of categories; d. multivariate analysis does add to validity and precision.
Conclusion: Investigators should always consider balanced allocation in case of small trials.

22 IMPACT OF PLACEBO AND BLINDING ON THE FEASIBILITY OF CLINICAL TRIALS

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Placebos and blinding are used to minimize the bias in the observation and recording of outcomes and bias due to outcomes resulting from beliefs and behaviour of the participants. The use of placebo and blinding may influence the trial process.
Purpose: In a 5-year primary prevention trial with postmenopausal hormone therapy (PHT) in Estonia, we studied the impact of placebo and blinding (blind arm) as compared to drug therapy or no treatment (non-blind arm) on numbers recruited and reasons for droping out during the recruitment.
Methods: Women who were eligible and willing to participate in the PHT trial based on the data they gave in a questionnaire survey, were randomised into the blind and non-blind arms. Recruitment and dropout rates are based on record keeping during the trial process. Reasons for not coming to the clinical examination are based on a special anonymous survey to a sample of women who did not attend (n = 7.90, 37% responded).
Results: Of the first 4279 invited women, 28% in the blind arm and 35% in the non-blind arm started the trial (p<0.001). Most women in both arms (63% and 56% respectively) dropped out by not attending clinical or ultrasound examinations. The rest were excluded after being found ineligible in the examinations (8% and 6%) or after loosing interest after the clinical examination (1% and 2%). The most common reasons for not wanting to join the trial were change of mind, worsened health, and various practical and financial issues preventing visits to the clinicians.
Conclusions: Blinding and placebo decreased women's interest in participating in a long-term preventive trial.

23 A COMPARISON OF METHODS FOR ASSIGNING CONFIDENCE INTERVALS TO THE INTRACLASS CORRELATION COEFFICIENT: APPLICATION TO CLUSTER RANDOMISED TRIALS

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Study Objective: The fear of crime may be an important explanatory mechanism underlying social and geographical inequalities in health. A

number of studies have shown that major health inequalities exist between different areas within the UK. However, there has been some debate about the mechanisms underlying area differences in health. It has been hypothesised that area differences in health may be partly explained by differences in social capital. The fear of crime in the local neighbourhood may be an indicator of social capital, as to some extent, it measures the breakdown in community trust and networks.

Design: This study examines cross sectional data from the 1996 British Crime Survey Health was measured by the respondent's self rating of general perceived health. Social capital was operationalised by using a measure of the fear of crime in the local area or neighbourhood. Multilevel logistic regression models were used to examine area differences in health.

Setting and Participants: A population representative sample survey of adults in England and Wales (N=16,090).

Main results: The fear of crime was found to be associated with self-rated health even after adjusting for health behaviours and a number of individual and household level socio-economic factors. Area differences in self-rated health were reduced to non-significance after health behaviours, socio-economic factors and the fear of crime were adjusted for in the regression model.

Conclusion: There is some evidence that fear of crime is associated with health and it may have an important role in explaining area differences in health.

24 | RE-CONCEPTUALISING AND GENERALISING THE ABSOLUTE RISK DIFFERENCE: A UNIFICATION OF EFFECT SIZES, ODDS RATIOS AND NUMBER-NEEDED-TO-TREAT

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Quantification of treatment efficacy from RCTs is a topical subject. Particularly, the rise of interest in meta-analyses has highlighted the problem of comparing trials with different numerical expressions of treatment efficacy.

One statistic commonly used for Gaussian distributed outcomes is the Effect Size (ES), the difference in group means divided by a within-group standard deviation. Two statistics commonly used to express between group differences with respect to dichotomous outcomes are the Odds Ratio (OR) and the 'Number-Needed-to-Treat' (NNT), the inverse of the absolute risk difference, which is rising in popularity due to its simplicity and ease of interpretation. These statistics have the weakness of being applicable only to certain data types and therefore cannot be universally applied, making the comparison of trials and formal meta-analyses problematic.

One statistic that has been suggested as a useful quantification of treatment effect in the two group (control and intervention) context is the A statistic. If X and Y are the values of an outcome (higher values more preferable) for randomly selected individuals from the control and intervention groups respectively, then $A = Pr(X<Y)$, i.e. the probability that the intervention individual has an outcome preferable to that of the control individual.

For a binary outcome it can be shown that $Pr(X<Y)—Pr(Y>X)$ is equivalent to the absolute risk difference (the inverse of NNT) and $Pr(X<Y) / Pr(Y<X)$ is the equivalent of the OR.

These statistics can be generalised to ordinal and continuous outcomes with no distributional assumptions. Thus, the NNT and OR statistics can be generalised to all data types with analogous interpretations. In the case of a Gaussian outcome, the generalised NNT is a function of the ES. Therefore, by conceptualising the absolute risk difference and the OR in this fashion a simple and universal approach to expressing group differences is obtained.

Mental health

25 | WHY ARE THERE SOCIAL GRADIENTS IN CHILD MENTAL HEALTH?

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Objective: to propose an explanatory model of social gradients in child mental health

Background: social gradients in child mental health has been noted in the UK, Australia and Canada. Preventive and policy initiatives, such as Sure Start, focus on the most disadvantaged. Observational research tends to be driven by the need to find 'modifiable' risk and protective factors which could be used to influence the mental health of individual children. The finely graded relationship of adverse mental health outcomes in childhood cannot be explained by single risk or protective factors neither can interventions aimed at the extreme end of the gradient hope to significantly reduce the burden of child mental health in the child population. A model based on a lifecourse perspective and reflecting the interrelationship and complexity of risk and protective factors is necessary to adequately explain, and inform interventions aimed at modifying, the social gradient in child mental health.

An explanatory model: observational studies have indicated that a range of risk and protective factors correlate with child mental health. Many of these show a social gradient in the same direction as child mental health. Some of these factors are temporally closely related to mental health outcomes but others exert their effects over extended periods of time and across generations. Risk and protective factors are also likely to be additive, cumulative, and possibly multiplicative in their effects on mental health. A model based on the additive, cumulative, and multiplicative effects of risk and protective factors acting over time and across generations and rooted in social and environmental circumstances provides a plausible explanation for the fine social grading of child mental health across populations. Potential uses of this model in research and policy initiatives will be discussed.

26 | NEUROTIC DISORDERS (ND) IN SANTIAGO, CHILE: PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES

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We estimated the prevalence of ND and sociodemographic correlates among 3,870 randomly selected adults living in private households in the Greater Santiago, Chile (n=3,237,286). ND were measured using a structured clinical interview (CIS-R) administered by lay interviewers. A questionnaire covering diverse social, demographic, and economic factors was administered too. Prevalence estimates and confidence intervals were calculated after adjusting for sampling weights, stratification and clustering. Associations between ND and sociodemographic factors were estimated using odd ratios and their 95% confidence intervals using logistic regression.

Response rate was 90%. The one-week prevalence of individuals scoring above 12 points in the CIS-R was 25% (95% C.I.22.8–27.3). The one-week prevalence of at least one ICD-10 ND diagnosis was 13% (95% C.I11.6–14.5). ND were significantly more prevalent among women and individuals aged 25 to 39. Separated and 'lone parents' had statistically significant (p<0.05) associations with a higher prevalence of ND, after adjustment for other variables. Poorer educational levels and a recent income drop showed significant associations with ND. Unemployment was significantly associated with ND but only for men. Per capita income level were not associated with ND after adjustment for other sociodemographic variables. Increased levels of social support were associted with lower prevalence rates of ND but only among females.

Most research from developed and less developed countries has found that women, previously married, and those people belonging to the most socially disadvantaged groups (education, income, and social class) have higher prevalence of ND. However there are differences in the socioeconomic variables that are associated with ND in different countries. Eduaction seems to be closely associated to ND in many less developed countries but not in richer nations. There are no clear explanations for these differences but it is important to be aware there might cultural differences in the measurement of social class gradients.

27 | SUICIDE SEASONALITIES DEPEND ON SUICIDE METHODS—A REAPPRAISAL

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Background: Suicide seasonality is an ubiquitous phenomenon—perceived and debated already by scholars of the 19th century. In

general, suicide frequencies peak in spring and early summer, whereas they depict a low in autumn and winter months. In differentiating analyses, suicide seasonalities appear to be related particularly to violent suicide methods. We investigated the divergences of suicide seasonalities by suicide methods using Swiss mortality data.

Data and methods: The suicide data were extracted from the Swiss cause of death statistics courtesy of the Federal Statistical Office in Neuchatel. The data entered in the analyses cover the period 1969–1994. In this period 37,518 suicides (ICD-8 codes 950–959) were registered in the mortality statistics. The data were analysed by the Edwards' method which examines unimodal sinusoidal patterns in aggregated monthly data and by spectral analysis with disaggregated monthly data.

Results: While overall Swiss suicide data 1969–94 depict the expected pattern with a peak in May and June, analyses by suicide methods show that there is no common pattern. Suicide seasonalities are absent or rather weak in some violent as well as non-violent methods (firearms, cutting, crashing, poisoning). Even if clearly present (hanging, drowning, jumping from high place, unspecified/other), the seasonalities show distinct patterns and cycles. Besides sinusoidal patterns the suicide seasonalities include also pulse-like patterns: in overall data as well as in most method-specific data the December frequencies fall more than 10% below the neighbouring months. The decrease of the frequencies culminates until Chrismas / New Year and then returns to avarage levels.

Conclusions: To summarize, the seasonality of the overall Swiss suicide frequencies is but a compound seasonality. It largely depends on specific suicide methods and different cyclical dynamics instead of being a universal fact, and there is no sound base to believe in a single social or biological causal mechanism.

28 VARIATION IN IRISH SUICIDE RATES BY CALENDAR MONTH AND DAY OF THE WEEK

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Significant variation in the number of suicides by calendar month and day of the week has been reported for many countries dating back as far as the nineteenth century. An excess of suicides has been consistently associated with the months of late spring and with Monday. Little has been published on the temporal variation of Irish suicides.

The aim of this study was to examine the variation in Irish suicide rates by month and by day of the week between 1990 and 1998 adjusting for the effects of age, gender and year.

Suicide and population data were obtained from the Irish Central Statistics Office. Age-standardised and age-specific suicide rates were calculated with confidence intervals. The effects of month and day allowing for age, gender and year were assessed using Poisson regression analysis.

Over the study period, there was significant variation in suicide rates by age for men and women. Furthermore, annual rates increased for the young of both genders. An excess of young male and female suicides was associated with late spring/ early summer. The effect of day of the week on suicide rates was more striking for men than women. Young men, in particular, exhibited an excess of suicides on Monday.

Suicide rates in Ireland are affected by calendar month and day of the week in a manner consistent with the internationally established pattern of an excess of suicides in late spring/ early summer and on Monday. The effects are more noticeable among the young and in particular, among young men.

29 SMALL-AREA VARIATION IN SUICIDE RATES IN ENGLAND AND WALES, 1991–1993.

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Background: Previous analyses of geographic variation in suicide in Britain have focussed on relatively large geographic areas and/or examined associations in all age groups combined.
Setting: The electoral wards of England and Wales, 1991–1993.
Methods: Poisson regression was used to examine ecological associations between an area's age- and sex-specific suicide mortality and its levels of single and aggregate measures of socio-economic deprivation and social fragmentation.

Results: Indicators of social fragmentation (i.e. living alone, unmarried/divorced) were most consistently associated with suicide risk in both univariable and multivariable models. For example, across quartiles of wards ranked according to increasing proportion of people living alone, relative risks of suicide in males aged 15–44 were: 1.00, 1.08 (1.00~1.17), 1.17 (1.09~1.27) and 1.48 (1.38~1.59). Similarly in females aged 15–44, these were: 1.00, 1.19 (1.00~1.41), 1.33 (1.13~1.56), 1.82 (1.56~2.11). Ecological associations were generally weaker in the older age-groups. For example, in the quartile of wards with the highest proportions of divorced people, the rate of suicide was 62% (50%~75%) higher than the rate in the lowest quartile in males aged 15–44, 30% (18%~44%) higher in males aged 45–64 and 2% (-10%~17%) higher in males aged 65+. Similarly in females these differences were 50% (29%~75%), 36% (16%~60%) and 14% (-3%~35%) respectively.

Summary: This research demonstrates the importance of examining ecological associations with suicide risk separately in different age/sex groups. Wards characterised by high levels of social fragmentation have higher rates of suicide, particularly in younger people. In the context of the government's intention to reduce area health inequalities by area-based targeting, mental health promotion should focus on these areas.

30 MASCULINITIES AND DEATHS DUE TO SUICIDE AND ACCIDENTS AMONG YOUNG MEN IN LIVERPOOL

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Objective: To examine the life histories of 24 Liverpool men aged 15–39 who died of an accident or suicide during 1995; and in particular, to identify how masculinities and self destructive behaviours contributed to the deaths of these young men.
Methods: Methods included psychological autopsy incorporating interviews with relatives and friends of the deceased. In addition Coroner's notes, GP records and hospital records were examined. An analytic inductive approach was applied in the analysis using Connell's theory of masculinities.
Results: Self imposed risks and self destructiveness were major factors in most of these deaths and suicides and accidents differed only in terms of the amount of responsibility acknowledged by an individual for their self destruction. Three groups were identified; underclass males who exhibited protest masculinity; those men who perceived themselves as failing in the most fundamental areas of complicit hegemony such as the workplace and relationships with women; and a small third group where there was no destructive pathway leading to death.
Conclusion: The model of hegemonic masculinity is extremely destructive to the health of marginalised males. Despite the fact that there may be many different types of masculinities as suggested by Connell (1995), the possible constructions of masculinity available to this group are limited. Marginalised males in particular may need to take large risks in order to demonstrate their own mastery and competence over the environment. Effective health promotion strategies for this group need to be based on an understanding of the motivation behind self-destructive behaviour.

Ethics and communication

31 INFORMED CONSENT: WHAT CAN IT MEAN IN RURAL GAMBIA?

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Introduction: Researchers carry considerable responsibility for the ethical conduct of their research at all times, but particularly so where study subjects are poorly educated and have little access to good quality healthcare. The basic requirements for informed consent are the provision of sufficient information, absence of coercion and competence to consent. The interpretation of these requirements may not always be straightforward.

Methods: A study of reproductive morbidity in women aged 15–54 in was conducted in rural Gambia in 1999. The nature and rationale of the study was explained and willingness to participate sought from village leaders, the whole village and individually. The 1348 women who agreed to participate (72% of those eligible) were interviewed by a female fieldworker, examined by a gynaecologist (including a speculum examination) and gave blood and urine samples. One year after the main study semi-structured interviews were conducted in a sub-sample of 45 participants stratified by age and ethnic group. The aim was to examine perceptions of the study.

Results: There was poor appreciation that the purpose of the investigations was research rather than the provision of healthcare. The physical examination had left a strong impression on most participants, but the majority had not been unhappy with the experience. While many women appreciated that they were tested for health problems, few understood exactly what they had been tested for. Only a few women regretted participating, and 58% said clearly that they would participate again in a similar survey. The major perceived benefit was the treatment given, mentioned by almost all participants.

Discussion: This raises questions about the understanding of explanations of studies during consent procedures and hence how much information is 'sufficient' to satisfy ethical requirements. The extent to which desire for treatment influences the decision to participate needs further research.

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32 DO DIFFERENT NURSES GIVE DIFFERENT ADVICE IN NHS DIRECT?

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Background: NHS Direct, the national 24 hour telephone advice line staffed by nurses, provides advice to callers about managing their health problems. Nurses use computerised decision support software to direct callers to self-care, GP immediately or later, or A&E urgently or as an emergency via 999. Nurses have a variety of backgrounds, mainly accident and emergency and practice nursing, and varied lengths of clinical experience. At the time of the study, three types of software were used.

Objectives: To determine whether different nurses offer different advice. To understand the influences that lead nurses to provide particular types of advice.

Methods: Routine data on calls triaged in April 2000, and information about the length and type of clinical experience of nurses taking those calls, were obtained from 11 NHS Direct sites. These data were analysed using log linear modelling in GLIM with adjustments for case-mix. Face-to-face semi-structured interviews were undertaken with 24 NHS Direct nurses with different clinical experience and were analysed using framework analysis in WinMax.

Results: Nurses with less than ten years clinical experience were less likely to dispose callers to self care than those with more than 20 years experience (36% versus 41%), as were nurses with a hospital rather than community background (38% versus 42%). These differences were small compared with differences between software (31% versus 36% versus 44%). Nurses felt that the software was an essential support to their clinical decision-making but that the nurse was an active partner in the process drawing on their clinical experience and that of their colleagues, their "gut reactions", and their perceptions of callers' anxieties and expectations.

Conclusions: The advice given by NHS Direct nurses may be influenced by the length and nature of their experience. It appears that any effect is small compared with the influence of the software.

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33 UNEQUAL ACCESS TO INFORMATION ABOUT TREATMENT OPTIONS FOR PROSTATE CANCER: A QUALITATIVE STUDY

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Introduction: There is growing concern that only some groups of people have access to the Internet, and that inequality in access to information about health care may increase. There is no consensus on the best treatment for prostate cancer. This paper explores men's perceptions of factors affecting their choice of treatment.

Method: Fifty-two relatively unstructured interviews were conducted with men living in the UK; in 50 cancer had been confirmed. This purposive sample was obtained through GPs, urologists, support groups and charities. Interviews were video-recorded or audio-taped, and analysed using NUD*IST.

Findings: Men's experiences varied greatly. A few men, particularly those from socially deprived backgrounds, had evidently received little information and had little influence over the decision making process. However, some said they preferred to be guided by their doctors. Other men sought information from their consultants, charities, support groups, friends, other patients, and particularly the Internet. Access to information did not always ease decision making: some men felt pressured by their family, support group or doctor to chose one treatment rather than another, and new treatments, such as brachytherapy or cryosurgery were not easily available to everyone.

Conclusion: As more medical information becomes accessible to the public through the Internet, inequalities in awareness about treatment options are likely to widen. Ways of communicating information about a broad range of treatments are needed, that do not further disadvantage those without access to the Internet.

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34 IDENTIFYING PROSTATE CANCER IN THE COMMUNITY: DIFFICULTIES IN COMMUNICATING THE IMPLICATIONS OF PSA TESTING

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Asymptomatic prostate cancer can be detected following a Prostate Specific Antigen (PSA) blood test with biopsy for those with raised PSA results. Population screening for prostate cancer is not currently available because treatments for localised disease carry risks and have uncertain benefits. A change in NHS policy will shortly remove restrictions on PSA testing if men consent to receive information about the implications of testing.

Methods: As part of a feasibility study for a randomised trial of treatment for localised prostate cancer (ProtecT Study), men aged 50–69 were informed about prostate cancer and treatments and invited to have a PSA test. Semi-structured interviews elicited men's reasons for consenting to PSA testing and study participation, and responses to information about treatments and outcomes. Interviews were audio-taped and transcribed verbatim. The constant comparative method was used to identify salient themes.

Results: 21 men were interviewed, 5 before and 16 after receiving a raised PSA result. Participants were mostly aware that there was uncertainty surrounding treatment for localised prostate cancer. Advantages of 'catching it early' were commonly presented as a reason for PSA testing. PSA testing was compared with routine cervical and breast cancer screening and an involvement in 'preventative medicine' commonly endorsed. There was a general expectation that test results would be negative and thus give reassurance, and participants tended to avoid consideration of treatments until an abnormal result was received.

Conclusion: New NHS policy to inform men about the implications of PSA testing may be thwarted by the existence of a 'catching cancer early enables treatment' discourse allied with an expectation of negative results and high levels of compliance with prevention services. Serious questions are raised about whether it is possible to engage potential recipients in the consideration of the implications of PSA testing.

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35 INCORPORATING THE VIEWS AND NEEDS OF THE TARGET GROUP IN THE DEVELOPMENT OF A LARGE SCALE EPIDEMIOLOGICAL COMMUNITY HEALTH SURVEY

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As a social scientist (L.S.E.) who is a member of the Society for Social Medicine and also a founder member of the Australasian Epidemiological Association I am concerned to ensure that the research we conduct is relevant to the target group and that the consumers' views and needs are represented in the development of our survey instruments. In 1999, the International Year of Older Persons, the NSW Health Department and NSW Ageing and Disability Department funded the development of a questionnaire survey to monitor the health and well-being of older people living in the community. The

emphasis was on health outcomes which are important to older people themselves and which have reasonable prospects for improvement, prevention and cost-effective health and aged care services. I was a consultant designing the questionnaire, responsible to a Steering Committee on which older persons' consumer groups were represented and encouraged to provide input to the questionnaire's direction and content. In particular, they were concerned to identify positive aspects of healthy ageing. The questionnaire focussed on health and well-being rather than illness, and also collected information on life style, employment, social activities and the contributions older people make through voluntary work and caring for others. In addition, the older persons' representatives stated the importance of including questions to identify the hopes and fears of older people. This required the use of open-ended questions in an otherwise highly structured computer assisted telephone interview (CATI). The telephone survey of randomly selected households was conducted in 1999/2000 with 500 people over 65 years interviewed in each of the 17 health areas (N=8,500). Interviews were carried out by trained interviewers in five languages (English, Arabic, Chinese, Greek and Italian). The findings will provide base line information which will inform health policy planning and which is meaningful to the target group.

36 | WRITING TO PATIENTS: A RANDOMISED CONTROLLED TRIAL

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Background: Efforts to improve doctor-patient communications have included the use of written materials to supplement the verbal information provided to patients in the medical consultation. Providing patients with a detailed letter summarising their outpatient consultation has been highlighted in recent studies to be of potential value to patients.
Objective: To evaluate the feasibility, acceptability and effectiveness of a summary letter from a consultant to new outpatients attending a haematology outpatient clinic in a general hospital setting.
Design: A randomised controlled trial involving 131 consecutive referrals to haematology outpatients, of whom 70 were randomised to receive a letter summarising the consultation, with a copy to their GP and 61 controls who received a note thanking them for attending the clinic with a standard letter to their GP. Intervention patients and controls are assessed for recall, compliance and satisfaction using a standardised structured interview. Referring GP/consultant's opinions of the use of summary letters are also sought.
Results: Data are currently available on (i) satisfaction with the summary letter from 50 intervention patients who have returned for their second visit to outpatients and (ii) feasibility of letter in terms of impact on consultant time (data based on 62 letters) 92% of the intervention group were 'very pleased' or 'pleased' to receive a written summary of their consultation and 90% considered the letter as 'very useful' or 'useful'. 60% indicated that they understood all of the summary letter, 35% understood 'most but not all' and 5% understood 'very little'. Strongly positive views on the summary letter were expressed by patients during interview, reflecting high satisfaction rates. The average time taken to dictate the patient summary letter was 6.8 minutes, range 3 to 15 minutes.
Conclusions: Letters from consultants to patients summarising key elements from the clinical encounter are feasible and enhance quality of care.

Reproduction

37 | PRELIMINARY RESULTS FROM THE NATIONAL WOMEN'S HEALTH STUDY - A POPULATION-BASED SURVEY OF MISCARRIAGE AND INFERTILITY IN THE UK

N. Maconochie, P. Doyle, S. Prior. *London School of Hygiene & Tropical Medicine.*

Despite improvements in obstetric care in the UK over the past fifty years, it is estimated that around one in five pregnancies will end in miscarriage (fetal death before 24 weeks). The personal and public health impact of pregnancy loss is a neglected area in medical research and strategies of prevention remain outside mainstream medical services. Although several large studies have been conducted elsewhere, relatively little epidemiological work in this area has been conducted in the UK. Between one third and one half of fetuses miscarried are thought to have a chromosomal anomaly (probably even more earlier in gestation), but relatively little epidemiological work has been conducted to investigate possible causes of loss where no fetal abnormality is present. Moreover, there is currently no unbiased population-based prevalence estimate of fetal loss which can be used as a reference for other UK-based epidemiological studies.

An increasing number of couples are also seeking help for problems achieving a pregnancy, but again although it is estimated that between 3 to 5% of couples experience such problems, few population-based prevalence studies have been conducted in the UK, particularly where fertility problems have been treated solely by the general practitioner using ovarian stimulation.

The National Women's Health Study is a large population-based postal survey investigating the reproductive health of 50,000 women aged 18 to 45 randomly selected from the electoral registers of England, Wales and Scotland. As well as enabling us to obtain population-based prevalence estimates of miscarriage and infertility, this survey has been designed to investigate the role of biological, lifestyle and behavioural factors including previous history of infertility or miscarriage, smoking, coffee and alcohol consumption, diet, vitamin intake, air travel, occupation and stress levels during pregnancy on risk of miscarriage. We shall describe the methods and present preliminary results from this survey.

38 | SURVIVAL ANALYSIS OF FERTILITY FOLLOWING ECTOPIC PREGNANCY

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Objective: (i) to evaluate the reproductive outcome after ectopic pregnancy (ii) to assess the contribution of risk factors to future fertility.
Methods: The study population is based on a register of ectopic pregnancies established in an urban area around Lille, in North France. 328 women treated between April 1994 and March 1997, who had not been using an IUCD at the time of the ectopic pregnancy, and were trying to become pregnant, were included. A prospective follow-up was conducted by telephone interviews every 6 months and then every year. The main outcome measures were cumulative pregnancy rates, calculated with Kaplan-Meier estimators. Log-rank tests and Cox regression were performed to evaluate risk factors of fertility after ectopic pregnancy.
Results: 215 (65.5%) women became pregnant after a mean time of 5 months. 182 (84.7%) pregnancies were intrauterine, 22 (10.2%) were recurrent ectopic pregnancies, and for 11 (5.1%) it was too early to define implantation. The 1 year cumulative intrauterine pregnancy rate was 56%, and reached 67% after 2 years. After adjusting factors associated with fertility with a Cox regression, 3 factors significantly lowered reproductive performances : age > 35 years (OR 0.53 95%CI [0.27, 1.53]), anterior tubal damage (OR 0.46 95%CI [0.22, 0.96]), and previous history of infertility (OR 0.69 95%CI [0.47, 1.01]).
Conclusion: More than half the women treated for ectopic pregnancy obtained spontaneously a normally progressive pregnancy after 1 year. Fertility depends more on previous characteristics of the patients than on characteristics of EP itself or treatment thereof.

39 | BIRTH CHARACTERISTICS OF OFFSPRING AND PARENTAL DIABETES

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Background: Several studies have shown inverse associations between birth weight and the risk of diabetes in adulthood. Diabetes and low birthweight may share common risk factors, e.g. genetic polymorphisms that generate associations between the two.

Methods: A dataset was created by a record-linkage between the Swedish Medical Birth Register and the Cause of Death Register. Birth data on all children born in Sweden 1973–1980 were linked with their parents' death records. The dataset contained 573,437 mothers (106 diabetes deaths) and 563,008 fathers (334 diabetes deaths). Hazards ratios (with 95% CI) for parental deaths per SD increase in birth weight (SD=0.54kg) were estimated using proportional hazards regression models.

Main results: After adjustment for gestational age, birthweight of offspring was negatively related to diabetic mortality among mothers, HR=0.48 (0.42 to 0.54), and fathers, HR=0.89 (0.80 to 0.98). Early premature delivery was strongly related to diabetes mortality among mothers, HR=4.12 (2.49 to 6.81), but not fathers, HR=0.70 (0.39 to 1.25). Adjustment for educational level left the findings unchanged. Diabetic mothers tend to have higher birthweight babies than non-diabetic mothers, which should lead to an association in the opposite direction.

Conclusions: A polymorphism associated with both low birthweight and diabetes might generate the observed association, although the fetal environment of pre-diabetic or diabetic mothers including treatments could result in fetal growth retardation and premature delivery. The evidence for common polymorphisms for low birthweight and diabetes risk among fathers is stronger, since paternal diabetes will clearly not directly influence fetal growth.

40 PRE-CONCEPTUAL EXPOSURE TO IONISING RADIATION AND PREGNANCY OUTCOME

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Despite concern about possible genetic effects of exposure to low-level ionising radiation the epidemiological evidence is sparse and conflicting. This is particularly true for male exposure, reflecting the difficulty in obtaining suitable data for analysis. The Nuclear Industry Family Study, funded by the Department of Health and the Health and Safety Executive, was set-up in response to these concerns. A large-scale survey of men and women occupationally exposed to ionising radiation, it aimed to assess whether their offspring were at increased risk of adverse outcome. The cohort consisted of men and women who worked (or used to work) at nuclear establishments throughout the UK. Postal questionnaires were used to collect information on reproduction, including details of all pregnancies and their outcome. The final response rate was 82% for men and 88% for women. We present here the results relating to fetal death and congenital malformation.

Men reported a total of 23,676 pregnancies, and the women 3,585, conceived after first employment in the industry. The risks of miscarriage, stillbirth or congenital malformation were not related to whether the father had been monitored before conception, or to the actual dose received before conception. Among pregnancies reported by women the risk of early miscarriage (<13 weeks gestation) was higher if the mother had been monitored before conception, but there was no trend with dose. The risk of stillbirth was also higher if the mother had been monitored before conception, but this finding was based on only 29 stillbirths. The risk of any major malformation, or specific groups of malformations, was not related to maternal monitoring, or dose received, before conception.

41 WHERE NOT TO BE GIVE BIRTH IN THE 1860'S: AN EARLY EXAMPLE OF EUROPEAN COLLABORATION

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Florence Nightingale, a nineteenth century pioneer in the use of statistics in hospital planning and administration, corresponded with contemporaries in England and in other parts of Europe to compare the mortality rates of hospitals, including those providing maternity services. In the eighteenth and nineteenth centuries, it was usual to give birth at home but a small proportion of women in major cities gave birth in 'lying-in institutions'. Unfortunately, maternal mortality among women who delivered in these institutions was high compared with that of the general population.

England was slower than many other European countries in setting up such institutions and in 1862, the Nightingale Fund arranged for a maternity ward to be established in the newly built King's College Hospital in London for the specific purpose of training midwives.

This was closed in 1867, after a succession of deaths from puerperal fever. In investigating the reasons for its high mortality, Florence Nightingale collected data from lying-in institutions and workhouses in Britain and Ireland and compared these with mortality rates for institutions in other European countries. Armand Husson, director of the Assistance Public which ran hospitals in Paris, including lying-in hospitals with high mortality rates, had commissioned a French doctor, Leon le Fort, to tour Europe and collect comparative data in the mid 1860s.

Florence Nightingale's correspondence with contemporaries in England and abroad, together with comments in her books and those of Leon Le Fort and Armand Husson show that there was considerable international communication between them by letter, telegraph and in person. All commented on the poor quality and incompleteness of the data available and the fact that statistics were not collected in a uniform way, making it difficult to compare the maternal mortality rates of lying-in institutions and populations in Europe.

42 TERMINATION OF PREGNANCY—ATTITUDES AND BEHAVIOUR OF WOMEN IN A TRADITIONAL SOCIETY

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Traditional societies offered western medical services are often faced with difficult choices especially in the area of reproduction. As Israeli citizens, Bedouins, a Moslem traditional minority, are offered prenatal care including diagnosis of congenital anomalies in the fetus, which may lead to a need to decide about pregnancy termination. The Bedouins are at high risk for congenital anomalies and hereditary diseases due to prevalent consanguinity and to extended childbearing age. The present paper combines qualitative and quantitative methods and looks at attitudes toward pregnancy termination and at the actual behavior of Bedouin women who are faced with an unfavorable diagnosis. Semi-structured interviews were conducted with 88 women. Interviews were analyzed using qualitative methodology. Data from the only hospital serving the Bedouins were examined to assess the ratio of terminations/births in pregnancies with congenital anomalies. Women were asked about attitudes toward termination, whom they would have consulted, and the reasons for their decision. While divided on the question of termination, the common theme was that any decision should be based on reliable medical opinion "several consistent opinions" and/or on "opinions from physicians in the West Bank". Advice from religious authorities and extended family members is sought by women who do and among those who don't approve termination. The reasons given for approving termination are both mother and child related : to spare the child's from suffering and the mother from feeling helpless, as well as to avoid the heavy burden on the mother and the family. Opposing termination is based on the opinion that doctors are sometimes wrong, as well as on religious reasons. In the years 96–98 there were 16,834 births to Bedouin women and 61 terminations due to diagnosed congenital anomalies (3.6 per 1000 births), as compared to Jews 119 terminations and 17,039 births (7.0 per 1000).

Inequalities

43 COMPARING CHANGES OF SOCIAL INEQUALITIES IN HEALTH IN THE NORDIC COUNTRIES

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We examined how inequalities in health by employment status and educational attainment in four Nordic countries, Denmark, Finland, Norway and Sweden over the time from the mid 1980s to mid 1990s.

During this period Finland and Sweden underwent a deep economic recession whereas Denmark and Norway showed a relatively stable development. We ask, whether similar or dissimilar trends in health inequalities can be found between the Nordic countries. The data derived from comparable interview surveys carried out in 1986/87 and 1994/95 in the four Nordic countries. Limiting long-standing illness and perceived health, were analysed by age, gender, employment status and educational attainment.

In each country the prevalence of ill health remained broadly similar. Finns had the poorest health, but the gap between countries narrowed. Among men there was a universal tendency of narrowing inequalities for both health indicators and b y employment status as well as educational attainment. Nevertheless, health inequalities remained clear and consistent. An exception was negligible inequalities in limiting long-standing illness between Finnish employed and unemployed men. Among women inequalities for both health indicators remained broadly stable in all countries. The only suggestion of widening inequalities concerned Swedish women's health inequalities by educational attainment.

Despite the economic recession and a large increase in unemployment in Finland and Sweden health inequalities tended to narrow among Nordic men and remained stable among Nordic women from the mid 1980s to mid 1990s. The welfare state arrangements are likely to have contributed to the buffering against the pressures towards widening health inequalities over the study period.

44 DETERMINANTS OF AND INEQUALITIES IN SELF-PERCEIVED HEALTH IN UKRAINE

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Background: Ukraine is the second most populous of the former Soviet Republics and since transition it's economy has fared even more poorly than Russia. Although the impact of the collapse of the former Soviet Union on health in Russia has been investigated, little is known of its impact in other post-Soviet republics.
Method: A national cross-sectional study was undertaken in Ukraine in March 2000. 1600 interviews were completed (72% response rate) with a representative sample of Ukrainian adults. We investigated socioeconomic and psychosocial determinants of self-perceived health, which has been shown to be a valid and reliable measure of overall health and predictive of mortality. Odds ratios of less than good physical health were calculated using logistic regression.
Results: 25% of men and 43% of women rated their health as poor or very poor. This is worse than levels seen in Russia and considerably worse than rates in western Europe. Women are at increased risk of poor self-rated health compared with men (OR 3.58, 2.50–5.14) as are women living in villages compared with those in cities (OR 3.24, 1.30–8.07). Socioeconomic factors including poor material situation (OR 1.64, 1.01–2.67), and psychosocial factors including low control over life (OR 1.89, 1.15–3.11) were identified as independent health determinants. Control over life was found to account for the negative impact of low social position on health. Good family relations protected against poor health.
Conclusions: Marked gender, geographical and socioeconomic inequalities in health were documented. The findings suggest that a decrease in control, arising from an increasingly uncertain political and economic environment, a reduction in material wealth and the stress of change may all have contributed to the decline in life expectancy seen with transition.

45 HEALTH INEQUALITIES IN NEW ZEALAND: QUANTIFYING THE INTER-ETHNIC GAPS

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British and other European colonists began organised settlement of New Zealand from the 1840s. The existing Maori population was disadvantaged in many ways and inequalities in health access and outcomes are evident today even within socioeconomic groups. This talk explores three inter-ethnic gaps B in the distribution of socioeconomic deprivation, in levels of mortality, and in gradients of mortality across ordered disadvantage categories.

Numerator data are taken from the 1995–7 national mortality database. The 1996 national Census provides denominator data. Disadvantage is measured by the national census-based small area index of deprivation, NZDep96, which incorporates nine markers of

deprivation. It excludes information on ethnic affiliation, which is considered a risk factor for deprivation, not a direct marker of it.

Maori are over-represented in areas with higher levels of deprivation. Potentially avoidable (and overall) mortality rates increase with increasing deprivation across age groups, in both sexes, and in both Maori and European groups. In general, Maori have a higher mortality than Europeans and a steeper gradient in the relationship between mortality and deprivation. Using mortality from all causes to quantify the overall extent of ethnic B rather than socioeconomic B disadvantage, the most extreme situation occurs within the most deprived decile, where Maori men have a life expectancy at birth 8.2 years less than European men. The difference for women is a full decade. While this may indicate that the benefits of the health system are distributed unevenly, partly due to differential access, social circumstances other than medical treatment, such as life-course disadvantage, may contribute to the higher rates of mortality among Maori. Attempts to address health inequalities should be monitored by life-expectancy data as well as group and disease-specific statistics on mortality, hospitalisations, and primary care.

46 ARE INEQUALITIES IN HEIGHT UNDERESTIMATED BY ADULT SOCIAL POSITION? THE ROLE OF ARTEFACT AND HEIGHT-RELATED SELECTION.

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Background: Height is an important health index, with increased risk of mortality among shorter adults. Social inequalities in height foreshadow subsequent inequalities in mortality, and hence there is interest in determining the causes of height inequalities.
Objective: To determine the role of artefact and height-related selection in the development of social differences in adult height.
Design: Birth cohort study.
Setting; England, Scotland and Wales.
Participants: All born 3rd–9th March, 1958.
Main outcome measures: Height measured at age 33. Social class, at age 7, based on father's occupation, and at age 33, on the subject's own occupation.
Results: Social gradients in adult height were found with class at age 7 and adult class. The difference in mean height between extreme groups was greater for class of origin than for adult class, with differences of 2.2cm vs 1.6cm respectively for men; 2.2 vs 1.7cm for women. This narrowing of social inequalities in height was due to height-related social mobility: those moving into a higher class were taller on average than the class they left, but shorter than the class they joined. To illustrate, men moving into class I&II were taller (177.2cm) than men remaining in class IIIm (176.1cm), but shorter than men with class I&II origins (178.3cm). The narrowing of class differences occurs mainly through a decrease in mean height in classes I&II, whereas average height in classes IV&V was similar irrespective of whether it was for class of origin or adult class. This suggests that changes in social structure, represented by the general trend of upward mobility, have acted to diminish inequalities in adult height.
Conclusions: The combination of artefact and height-related selection acts to constrain inequalities in height and may lead to an underestimation of the role of childhood socio-economic factors in the development of inequalities in adult disease.

47 INEQUALITIES IN HEALTH—DO PATIENTS FROM MINORITY ETHNIC GROUPS REPORT MORE PROBLEMS WITH THEIR TREATMENT FOR HEART DISEASE THAN WHITE PATIENTS

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Objective: To compare the experiences of patients from minority ethnic groups and white patients receiving hospital treatment for heart disease.
Methodology: A questionnaire mailed to all patients discharged from 196 NHS Trusts in England from June to September 1998 with a diagnosis of ischaemic heart disease or having an operational procedure (angiogram, angioplasty, CABG). A sample of 113,000 patients, with 84,300 responding (74% response rate). Patients were asked to report on their experiences (what happened) rather than to rate their satisfaction.

Results: On many questions in the National Survey of NHS Patients - Heart Disease 1999, patients from minority ethnic groups reported significantly more problems with their care than white patients. This applied across all dimensions of care from admission/access to discharge. Regarding access, for example, patients from minority ethnic groups were more likely to report having to wait more than 30 minutes for assessment in A&E (25% compared to 9% for white patients), more likely to have had their admission cancelled (20% v 12%) and were more likely to have to wait for a bed once admitted (40% v 27%). Such patients were also on average younger, more likely to have had a procedure or operation and more likely to live in London—all groups which, on average, tend to report more problems with their care. Nevertheless, the differences persisted after adjusting for various demographic variables.

Discussion: Differences between the experiences of white patients and those from minority ethnic groups do not appear to be explained by other demographic factors. This may suggest differences in the way patients from minority ethnic groups access care and receive treatment. Possible explanations for such differences will be discussed.

48 INCOME INEQUALITY, INDIVIDUAL INCOME AND MORTALITY

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Objective: To analyse the association between an area based measure of income inequality and individual mortality from all-causes and major causes of death after control for individual household income and other established risk factors.
Design: A mixed level prospective cohort study with follow up of mortality.
Setting: Pooled data from two population studies conducted in Copenhagen.
Subjects: 13 710 women and 12 018 men followed for a mean of 15.3 years.
Main outcome measure: Relation between income inequality in local areas of residence and individual all-cause as well as cause-specific mortality at follow up was examined with Cox proportional hazard analysis.
Results: 3460 women and 4107 men died during follow up. Mortality rates were highest in the parishes with highest inequality in income. Parish income inequality showed a significant negative association with subsequent mortality from cancer in women (Hazard Ratio (HR) least versus most inequal quartile: 1.62(95%CI: 1.32–2.00) and men (HR least versus most inequal quartile: 1.46(95%CI: 1.15–1.90)) after adjustment for mean household income in the area, individual income, family composition at area and individual level, smoking, exercise, alcohol drinking and body mass index. In men, the association was significant for lung cancer mortality (HR least versus most inequal quartile:1.97(95%CI:1.44–2.69)). There were no associations between area income inequality and mortality from all-causes, vascular disease or other causes after adjustment for other individual risk factors. Individual income was inversely related with mortality from all-causes, vascular diseases and other causes whereas no associations was seen for mortality from neoplastic diseases. There was no evidence for an interaction between area income inequality and individual income with regard to mortality.
Conclusion: Positive associations between income inequality and mortality may reflect confounding from other risk factors. The relation may differ for specific causes of death.

Cardiovascular disease II

49 THE PREVALENCE OF CHRONIC PAIN FOLLOWING CARDIAC SURGERY

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Introduction: Recent studies have reported up to 30% of patients report persistent pain following mastectomy and hernia repair. No large scale studies have investigated the epidemiology of chronic pain following cardiac surgery. The aim of this study was (1) to estimate the frequency of chronic pain following cardiac surgery and (2) to determine the characteristics of chronic chest and leg pain following cardiac surgery.
Methods: A cross-sectional survey was undertaken on a cohort of 1348 consecutive patients who underwent open heart surgery via central chest wound (median sternotomy) at Aberdeen Royal Infirmary NHS Trust between January 1996 and May 2000. Chronic pain was defined using the standard definition of pain longer than 3 months. Ethical permission was granted for the study. The questionnaire comprised of standard demographic questions, SF-36, sections from the Rose Angina and McGill Pain Questionnaires.
Results: A total of 1195 (89%) questionnaires were returned, 1080 (80%) of which were completed. The mean age of respondents was 65 years (SD 9.8), 73% were male, and median time since surgery was 27 months (range 4–56 months). The cumulative prevalence of chronic pain after cardiac surgery was 41% (n=442 patients) over a 4½ year period. Of the chronic pain group: 138 (31%) reported chest pain only; 86 (19%) reported leg pain only; and the remainder reported both (n=212; 49%). Patients reporting chronic pain were more likely to be younger (p<0.001) and to be overweight (BMI >25; p=0.04) than patients without chronic pain. Quality of life was significantly lower for all eight domains in patients reporting chronic pain.
Conclusion: Cardiac surgery is a common elective surgical procedure yet to date, no large scale study has explored the prevalence and impact of chronic postoperative pain. This survey found that 41% of patients suffered chest or leg pain beyond expected normal healing time, higher than previously reported.

50 SEX-SPECIFIC EARLY MIDLIFE PROCESSES OR EFFECT OF MENOPAUSE? A DESCRIPTIVE ANALYSIS OF DATA ON RISK FACTORS OF CARDIOVASCULAR DISEASE FROM THE MONICA-PROJECT AUGSBURG

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The evidence for an effect of menopause on risk factors of cardiovascular disease (CVD) from cross-sectional and longitudinal studies remains controversial. In order to examine the possibility of sex-specific accelerations of unfavourable changes in female risk profiles from the early fifth decade on, instead of after menopause, we analysed data from women and men in the MONICA-project Augsburg, Germany, in 1984–1995. Fourteen parameters of body size, blood pressure, serum lipids and hemostasis were measured in three representative population based samples, including a total of 5642 women not using hormones and 5899 men, between age 25 and 64. Cigarette smoking, alcohol consumption and regular exercise were assessed as covariates. The parameters were graphed by gender and 5-year age groups, and stratified by covariates. Because patterns across the age groups were similar in the three surveys, the data were pooled. A consistent unfavourable acceleration from age group 45–49 to 50–54 exclusively in women, that would be compatible with a menopause effect, was seen for serum triglycerides. Plasma viscosity showed accelerations either from age group 40–44 to 45–49 or from 45–49 to 50–54, depending on the covariate stratum. Body mass index, other serum lipids (HDL, LDL, total cholesterol), fibrinogen and blood pressure showed sex-specific unfavourable accelerations in women as early as from age group 40–44 to 45–49, consistently across the strata. Measures of body composition did not show any acceleration exclusively in women at any age step. Based on this descriptive approach, an effect of menopause can be assumed for serum triglycerides, and possibly plasma viscosity. Most other CVD risk factors in women showed unfavourable sex-specific accelerations already from the early fifth decade on. In conclusion, a shift of the focus from menopause to sex-specific early midlife processes when studying the mechanisms of cardiovascular aging seems to be promising.

51 TRENDS AND SOCIAL FACTORS IN BLOOD PRESSURE CONTROL IN SCOTTISH MONICA SURVEYS 1986–1995: THE RULE OF HALVES REVISITED

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Objective: To investigate trends in the patterns of detection, treatment and control of hypertension and to examine the influence of social factors on blood pressure control.
Design: Four Scottish MONICA cross-sectional surveys in 1986, 1989, 1992 and 1995.
Setting: North Glasgow, Scotland.
Subjects and methods: People aged 25–64 were recruited randomly from general practice lists with a stratification of sex and 10-year bands. 1262 participated in the 1st survey, 1397 in the 2nd, 1516 in the 3rd and 1836 in the 4th.
Main outcome measures: Prevalence of hypertensive status and odds ratios of hypertension undetected, untreated, and treated but uncontrolled.
Results: According to the cut points of blood pressure ⩾160/95 mmHg, favourable trends in the patterns of detection, treatment and control of hypertension were observed: for hypertension undetected 56.3%, 44.6%, 32.0% and 38.2% across 4 surveys, while for treated controlled 15.2%, 26.4%, 32.0% and 32.8% respectively. These trends remained using the cut points of blood pressure ⩾140/90 mmHg or systolic blood pressure ⩾105 mmHg. The multivariate analysis showed that poor control of hypertension was not related to social deprivation, but significantly related to male gender, younger age, higher educational level, employment status, body mass index, smoking and alcohol drinking. Poor control diminished over time.
Conclusions: In Scotland the management of hypertension has improved and the so-called "rule of halves" may be no longer valid. The patterns of control of blood pressure is not affected by socioeconomic status, but people at a high risk of poor control of hypertension should be targeted.

52 | FACTORS INFLUENCING SHORT TERM AND LONG TERM SURVIVAL IN 24,175 PATIENTS WITH A FIRST ADMISSION FOR ANGINA: SCOTLAND 1986–1995

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Background: Angina is the commonest cause of admission for coronary heart disease in the United Kingdom. There is a conflicting literature regarding the prognosis of angina, with almost no recent population-based data from unselected UK patients.
Methods: Using the Scottish Record Linkage System, we identified all first admissions for angina (ICD9 code 411–413) between 1986 and 1995 in Scotland (population 5.1 million). Patients with any prior admission for heart disease were excluded. Events following discharge, and survival to ten years were examined using multi-variate logistic regression to adjust for age, sex, deprivation, comorbidity and year of admission.
Results: Between 1986–1995, 24,175 individual patients had a first admission for angina (52 % male, 48% female). Annual admission rates increased by over 50% between 1986 and 1995. Overall crude case-fatality at 1 month, 1, 5 and 10 years was 1%, 7%, 22%, and 38%, respectively. Adjusted case-fatality doubled for each decade of increasing age, increased significantly with a range of comorbidities. Significant improvement in case-fatality between 1986 and 1995 was seen in women but not men. By December 1997, one third of the 24,175 patients had undergone subsequent hospital admission (25% for angina, 13% angiography, 10% for chest pain, 7% AMI, 6% heart failure, 7% CABG surgery and 3% for angioplasty). Case-fatality was significantly increased following any subsequent admission for acute myocardial infarction or heart failure. Conversely, case-fatality was lower following any subsequent admission for chest pain, CABG surgery, angiography, or angioplasty.
Conclusions: Short term and long term case-fatality following a first admission for angina is substantial, and is further increased by age and comorbidity. In spite of the increasing use of evidence-based therapies, age-adjusted case-fatality did not improve in men between 1986 and 1995. This merits further research.

53 | SURVIVAL IN 56,938 PATIENTS WITH A FIRST EMERGENCY ADMISSION FOR CHEST PAIN: SCOTLAND 1986–1995

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Background: Chest pain accounts for over half a million emergency medical admissions every year in the United Kingdom. Admission reflects concerns regarding the possibility of unstable angina or non-Q wave myocardial infarction. However, the majority of patients prove not to have unstable coronary heart disease (CHD). Information regarding subsequent prognosis in such patients is sparse and conflicting.
Methods: We therefore used the Scottish Record Linkage System to review short term and long term prognosis in all individuals with a first emergency admission for chest pain (ICD9 code 786.5) between 1986 and 1995 in Scotland (population 5.1 million). Patients with past or current heart disease were excluded. Survival to ten years was examined using multivariate logistic regression to adjust for age, sex, comorbidity, deprivation and year of admission.
Results: Between 1986 and 1995, 56,938 individual patients were admitted as an emergency with a first diagnosis of chest pain, with no prior admissions for any form of heart disease. Annual admission rates doubled during this period. There were 30,964 men and 25,974 women (54.4%, 45.6%). Over half (53%) were aged under 55 years, with only 11% aged over 75. Over 90% of patients had NO prior admissions, and their 1, 5 and 10 year case-fatality rates were 4%, 12% and 21% respectively. Adjusted case fatality rates approximately doubled for every decade of increasing age, and were significantly higher with any prior admission. In the most deprived quintile compared with the most affluent; admission rates were twofold higher and case-fatality at 1 and 5 years was increased by 1.29 and 1.49 respectively in men (1.26 & 1.39 in women).
Conclusions: Although coronary heart disease incidence is falling, first admissions with chest pain doubled between 1986 and 1995. The prognosis appears relatively benign, less so in patients with comorbidity, deprivation or increasing age.

54 | MAXIMISING LIFE-YEARS GAINED FROM CHD MORTALITY REDUCTION IN SCOTLAND: PREVENTION OR TREATMENT?

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Objective: To estimate the years of life gained in Scotland between 1975 and 1994 attributable to: cardiology treatments, and b) population reductions in major coronary heart disease (CHD) risk factors.
Methods: We used a previously validated cell-based mortality model combining published effectiveness data with available information (by sex and age group) on: uptake of all CHD treatments; risk factor trends in the Scottish population (5.1 million); median survival in specific CHD patient groups; median survival for those without heart disease (Registrar General's Life Tables, adjusted for 'competing causes of death'). Category-specific life-years-gained (LYGs) were calculated as the product of deaths prevented or postponed in 1994 multiplied by life expectancy. Sensitivity analyses were then conducted.
Results: Compared with the 1975 base-year, there were 5980 fewer CHD deaths in 1994. These represented approximately 46,720 life-years-gained (maximum estimate 59,957, minimum 31,670). Medical and surgical treatments for patients with CHD gained approximately 11,608 life-years (maximum estimate 14,155, minimum 9,488). The largest contributions came from pharmacological secondary prevention among post-infarct and post-surgery patients, hypertension treatments, and CABG surgery. Medical angina treatments, heart failure therapies, and initial treatments for acute myocardial infarction had a smaller impact. Population reductions in major cardiovascular risk factors (smoking, cholesterol and blood pressure) together accounted for some 35,112 LYG (maximum estimate 45,803, minimum 22,182). Reductions in smoking accounted for over 40% of this total.
Discussion: In Scotland in 1994, specific cardiological treatments postponed hundreds of deaths and correspondingly gained many thousands of life-years. However, approximately three times as many life-years were gained by falls in smoking and rather modest reductions in other cardiovascular risk factors. These findings may be cautiously generalisable elsewhere in the UK.

Health services II

55 THE EFFECT OF SURGEON WORKLOAD ON SURVIVAL FROM BREAST CANCER

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Objectives: To determine the variation in surgeon workload over time and to assess the impact of a high workload on survival.
Methods: This was a retrospective population-based study, using Northern and Yorkshire Cancer Registry and Information Service data. Univariate analyses. Multivariate survival comparisons were made by Cox's proportional hazards regression.
Subjects: 16 092 female breast cancer patients diagnosed and treated with surgery in the Yorkshire region between 1986 and 1994.
Results: During the study period, surgeons with a low mean annual workload of less than 10 managed 6% of patients, surgeons with a workload of 10–29 treated 26%, 30–49 33%, while 35% were managed by surgeons with the highest workload of more than 50. Over the study period, there was a trend to increasing numbers of patients being treated by surgeons with higher workloads. During 1986–88, surgeons managing 50 or more patients per year treated 26% of cases. By 1992–94, this had increased to 42%. The overall 5-year survival was 62%. Patients treated by the higher workload surgeons had significantly better survival. Survival 5 years from diagnosis was 58% in the lowest consultant workload category compared to 67% in the highest workload category. The relative risk of death was significantly lower for those patients treated by surgeons with the highest workload. Compared to a baseline of 1.00 for patients treated by surgeons with the lowest workload, relative risk reduced to 0.86 (0.78–0.95) after adjusting for case mix (age, disease extent, socio-economic profile and time period) and treatment.
Conclusion: The findings confirm earlier evidence that management by high workload surgeons improves overall survival from breast cancer.

56 THE INFLUENCE OF WORKLOAD ON OUTCOMES IN OESOPHAGO-GASTRIC CANCER

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Objective: Variations in the outcomes of a number of cancers have been suggested to relate to both the specialisation and the workload of treating clinicians and hospitals. This study aimed to examine this relationship and to determine if clinician or hospital workload affects outcomes in patients with oesophageal and gastric cancer.
Methods: A retrospective study of population–based data collected by the Northern and Yorkshire Cancer Registry and Information Service between 1986 and 1994 was undertaken. Outcome measures included histopathological confirmation and treatment rates, 30-day postoperative mortality and overall survival with a median follow-up period of five years.
Results: A total of 9313 oesophago-gastric cancer patients were included in the analysis. The relative risk of death was shown to be lower in oesophago-gastric cancer patients treated by high workload consultants than by low workload consultants. For example, following casemix adjustment and compared to a baseline of 1.00 for patients treated by the lowest workload consultants, the relative risk of death for oesophageal patients was reduced to 0.85 (0.76–0.96). In gastric cancer patients the relative risk was 0.92 (0.84–1.00). There was also a trend towards better survival in high volume hospitals. Similarly, post-operative mortality was generally lowest in patients treated by high workload consultants and hospitals whilst histopathological confirmation and treatment rates were both greater in the higher volume groups. Although, diminished the majority of these trends remained following adjustment for casemix.
Conclusions: The evidence suggests that concentrating surgical management to centres with high workload surgeons and specialist supportive teams will reduce post-operative mortality and improve overall survival in patients with oesophageal and gastric cancer.

57 TRENDS OF SICK LEAVE IN CHRONICALLY ILL PATIENTS TREATED WITH COMPLEMENTARY ALTERNATIVE MEDICINE—RESULTS OF AN OUTCOME STUDY

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Effects of an array of Complementary Alternative Medicine interventions on chronic diseases are investigated using predefined health indicators. The ongoing outcome study, including about 1000 volunteers, is sponsored by 22 German company health insurances.

We analyze observed trends in sick leave, matched by covariables like age, gender, diagnosis and health improvement. Sick leave data of 358 patients at work were sampled over a period of 5 years retrospectively and 5 years prospectively. We test trends in a subcohort (n=163) with nonmissing sick leave data in the observation period ranging 3 years before and after inclusion. Nonparametric tests (Friedman test, Wilcoxon/Wilcox rank sum test, repeated measures multivariate analysis of variance, based on ranks) are used. The cumulative sick leave incidence (CSLI: proportion of patients with any sick leave per year) serves as indicator in the study group. Secular trends are controlled for by standardization regarding calendar year, age and gender, based on the working population of german company health insurances.

Sickness absence days per year increase from 21 (95%CI 16–27) to 30 (95%CI 24–36) days within 5 years prior to inclusion, decrease afterwards from 28 (95%CI 21–35) in the first to 21 (CI 14–28) in the second year of treatment and sustain at this level in the following 2 years. Furthermore, the csli is almost constant between 59% and 65% in the retrospective period, but decreases significantly during and after treatment down to 52% (95%CI 44%-59%). the detailed analysis shows that these effects exceed regression-to-the-mean.

For the first time a profound analysis of complementary alternative medicine effects on sickness absence over a longlasting observation period can be presented. There is surprisingly clear evidence that the intervention reduces sick leave in chronically ill patients. These observations are corroborated by data on the selfreported improvement of the patients' health status.

58 COST-EFFECTIVENESS OF MANAGEMENT STRATEGIES FOR PATIENTS WITH ACUTE, UNDIFFERENTIATED CHEST PAIN

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Background: Patients presenting to hospital with acute chest pain, undiagnosed by electrocardiograph and clinical assessment, have a low, but important, risk of significant myocardial ischaemia. Strategies for detecting ischaemia in this situation have received little formal evaluation and vary from low cost, poor effectiveness (discharging all home) to high cost, high effectiveness (admission and intensive investigation). This study aimed to compare the relative cost-effectiveness of potential diagnostic strategies.
Methods: Decision analysis modelling was used to determine the incremental cost per life saved for each of five strategies, compared to the next most effective alternative, or a baseline strategy of discharging all patients home without further testing.
Results: The incremental cost per life saved increased with the complexity of each diagnostic strategy, relative to the next most effective. Cardiac enzyme testing alone cost £92,352 per life saved compared to discharge without testing. Adding 2–6 hours of observation and repeat enzyme testing cost an extra £99,277 per life saved. Adding exercise testing to this strategy cost £163,755 per life saved. A strategy of overnight admission, enzyme and exercise testing was markedly more expensive with a marginal cost of £707,066 per life saved, while a strategy consisting of overnight admission without exercise testing was subject to extended dominance. Sensitivity analysis revealed that the results were sensitive to variation in the cost providing each strategy.
Conclusion: Strategies consisting of 2–6 hours observation and repeat enzyme testing, either with or without exercise testing, incur similar costs per life saved to presently funded interventions for coronary heart disease, while strategies requiring hospital admission may be considered to be prohibitively poor value for money. Empirical validation of the true costs and effects of these strategies is essential prior to widespread implementation.

59 THE INFLUENCE OF ABSOLUTE RISK, PATIENT PREFERENCES AND COSTS ON THE DECISION TO TREAT HYPERTENSION: A MARKOV DECISION ANALYSIS

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Background: Hypertension guidelines recommend a treatment threshold of $\geq 10\%$ over five years. This has been criticised as arbitrary and it ignores patients' preferences and treatment costs. The aim of this study was to evaluate cost-effectiveness by using Markov decision analysis.

Method: A Markov decision model was constructed to incorporate lifetime risk of morbidity and mortality associated with having hypertension. Age and sex-specific risk profiles were created using the Framingham risk equation for low and high risk patients based on data from the Health Survey for England. Utilities were measured directly using the standard gamble method. Cost data for antihypertensive therapy, hospital costs for stroke and MI, and ongoing costs for severe stroke were inflated by 3% annually. The models compared life-expectancy and cost-effectiveness for treatment strategies at different levels of risk.

Results: Treatment was more effective than no treatment in all categories of age, risk and sex, but cost more. In terms of life expectancy, marginal effectiveness of treatment ranged from 0.1 years in low risk 60 year old males to 3.1 years in high risk 30 year old females. Cost per additional QALY gained by treatment: (1) ranged from £1126 to £8250; (2) was lower for men than women; (3) was lower for high risk individuals; (4) was lower in middle age among low risk individuals; (5) decreased with age among high risk individuals.

Conclusion: Our results show that a treatment recommendation of 10% for 5-year risk oversimplifies the likely costs and benefits over a patient's lifetime. In absolute terms, young, high risk men gain most life years from treatment and elderly, low risk females gain least. However in terms of cost per QALY, it is most cost-effective to treat the high risk elderly.

60 THE 'INTEGRATION' OF PUBLIC INVOLVEMENT IN THE NHS: A CONSENSUS POLICY DISGUISING MULTIPLE UNDERSTANDINGS AND DIVERSE PRACTICE

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Objectives: Patient and public involvement is an attractive policy for governments to promote, but remains remarkably difficult to realise in practice. This study describes the differences in interpretation within primary care groups (PCGs) and trusts (PCTs) of the policy to 'integrate' patient and public involvement into the work of NHS organisations; and to assess the forms of local implementation.

Background: In Patient and public involvement in the NHS (Department of Health, 1999), the government promoted an integrated approach to the issue: 'NHS and health organisations should strategically and systematically build patient and public involvement into the way they operate'. The policy gave little indication of what this meant in practice. PCGs and PCTs have been pursuing local interpretations since April 1999.

Methods: Six case studies of London PCGs were followed for 14 months employing qualitative interviews with key stakeholders and observation of meetings. Analysis focussed on the meanings attached to 'integration' and the specific organisational responses.

Results: 'Integration' was understood in diverse ways: instituting lay voices in formal decision-making processes; creating standing mechanisms; ensuring regular consideration of the impact of PCG decisions on patients/public; promoting open organisational culture; and addressing the potential for public involvement in all policy-making. These encompass approaches which focus on visible mechanisms (the first two) and approaches which focus on moderating existing organisational behaviour (the latter three). In practice, the former approaches suffered from powerlessness and a failure to connect with the processes of change in the PCGs. The latter approaches were less marginalising but were only effective if there was strong executive commitment.

Conclusion: There is no consensus about what the 'integration' of patient and public involvement into the NHS actually means. In practice, implementation can create organisational satisfaction that the

policy is being addressed when the mechanisms do little more than legitimate professional decision-making.

Methodology II

61 HEALTH RESEARCH WARNING: IGNORING MISSING DATA CAN SERIOUSLY BIAS YOUR ESTIMATES

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Objectives: To demonstrate the serious bias resulting from ignoring missing data values or using naïve imputation methods, and the advantages of using multiple imputation (MI) in an epidemiological study of alcohol consumption. To illustrate a practical method of implementing MI, and its use in epidemiological analysis.

Design: Birth cohort study.

Setting: England, Scotland and Wales.

Subjects: Men and women in the MRC National Survey of Health and Development, a national cohort study of 5362 births in 1946, of whom 3262 were interviewed in 1989 at the age of 43.

Outcome measures: Alcohol consumption is derived from a seven day diet diary. Measures of excessive consumption are drinking in excess of 3U(f) or 4U(m), and of double this recommended limit, 6U(f) or 8U(m), on any day of the week.

Methods: Only 2002 (61%) of the 3262 study members interviewed in 1989 completed the diet diary. Using this complete data MCAR, MAR and MNAR mechanisms of missingness were simulated (100 times), and the resulting incomplete data dealt with by listwise deletion (LD), mean value replacement and MI. Multiple imputed data sets were generated using SOLAS™, based on regression models using covariates gender, reported weekly consumption, smoking, CAGE score, systolic blood pressure, day of the week and consumption on recorded days. The model was applied to the 3262 study members.

Results: Listwise deletion and group mean imputation produced progressively greater biased estimates with departure from MCAR, whereas those using MI were unbiased even when the missingness of the data was related to the amount people drank (MNAR). For example, under this model, average estimates of the proportion of men drinking over twice the daily recommended limits, known to be 38.0%, were 25.3% for LD, compared with 38.8% for MI. Further, MI is more efficient than LD since it uses the information contained in incomplete records. Since standard errors are biased this is demonstrated using Mean Square Errors, which were 107 and 1.5 respectively for LD and MI. Using the same MI method on the full data produces estimates of 42.5% (95% CI 39.4 to 45.6).

Conclusion: Missing data poses a problem for epidemiological studies in which the reason for missing data is not known and in which it is unlikely to be missing at random. Multiple Imputation provides insurance against bias in even when the data is not missing at random. Once the MI has been implemented standard complete data methods can be used to analyse the multiple data sets

62 ESTIMATION OF CASE UNDERASCERTAINMENT IN A UK-BASED PREVALENCE STUDY OF PROGRESSIVE SUPRANUCLEAR PALSY (PSP)

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Objective: To determine the prevalence of progressive supranuclear palsy (PSP), a form of atypical parkinsonism, in the United Kingdom by means of a three-tiered study utilising different methods in order to compare underascertainment at each level.

Methods: Cases were identified throughout the UK (population 59.2 million) largely by means of passive referral mechanisms involving neurologists. Cases were actively identified in the Northern region

(population 2.7 million) using a multiple-source case ascertainment technique involving a wide variety of specialists. Finally, in Newcastle upon Tyne (population 260 000) patients with PSP were actively identified from a primary care-based review and personal examination.

Results: 577 clinically confirmed cases of PSP were identified in the national study, 80 in the regional study and 17 in the community study. The standardised prevalence rates for each level were 1.0 per 100,000 (0.9 to 1.1), 3.1 per 100,000 (2.4 to 3.8) and 5.0 per 100 000 (CI 2.5–7.5) respectively. Systematic differences were also observed using the different ascertainment methods. Cases in the national study were more likely to be males and have a younger age at onset. Underdiagnosis was a problem as 41% of cases in the community were not previously diagnosed as having PSP.

Conclusions: Our point prevalence for PSP is the highest yet recorded and suggests the disease is more common than previously considered. Misdiagnosis is common. A twenty-fold variation in disease prevalence estimates was found depending on the method used for case ascertainment. The study confirms the importance of active and detailed case ascertainment in ensuring reliable and unbiased prevalence estimates in rare diseases such as PSP.

63 CONTROL OR OVERCONTROL OF POTENTIAL CONFOUNDERS IN MULTIVARIATE ANALYSIS; THE EXAMPLE OF SOCIAL CLASS

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Background: Controlling for confounders in the analysis of observational data is central to epidemiological study and a decision to control or not to control for a factor has significant implications on inference regarding nature and direction of association. Controlling for (potential) confounders in analysis has parallels with matching in case control studies, on factors known/shown to be casually associated. While matching in case control studies is often conservative, the availability of powerful computers and statistical packages facilitates adjustment for many factors in analysis.

Social class is an important epidemiological 'marker', which shows strong associations with many diseases. Social class may be a proxy for occupational hazards, environmental factors and / or lifestyle habits but social class is not a direct measure of exposure per se.

Observation: The present paper examines the effect of adjustment for social class in associations with heart disease mortality. Well-designed studies and statistical overviews show markers for chronic infection to be significantly associated before and after adjustment for recognised risk factors (for example OR = 1.7, CI 1.3–2.2) but not after adjustment for social class (1.2). Such adjustment for a 'potential confounder', by removing social class, may conceal one possible mechanism, by which social class affects mortality. Since known risk factors (smoking, drinking, environment etc) do not explain all association between social class and heart disease, some mechanisms remain unknown and adjustment, when investigating a new candidate risk factor, may be 'throwing the baby out with the bath water'

Conclusion: Multivariate analysis should be employed with caution and results reported both with and without adjustments, particularly for potential confounders not demonstrated to be causal.

64 EPIDEMIOLOGICAL APPROACHES TO THE INVESTIGATION OF LANDFILL; SMALL AREA STATISTICS AND A TIME TO PREGNANCY SURVEY

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In 1997, using statistics based on electoral wards, we found that the women living near the Nant-y-Gwyddon landfill site were at increased risk of giving birth to a child with a congenital abnormality, but that this risk was increased even before the site accepted waste. Obtaining evidence of harm from landfill emissions, or proving safety, is difficult because of lack of information on exposures and the low absolute numbers of congenital abnormalities occurring in the surrounding communities. Two follow up studies were therefore undertaken.

The first study was undertaken to see if the results of the original study could be replicated near other sites licensed to accept similar substances. The Environment Agency identified 18 sites in Wales which were first licensed to accept household, commercial and industrial waste after 1985. The study was designed to test the hypothesis that there was no difference in the maternal risk of having a birth with a congenital anomaly for mothers living within three kilometres of these sites compared with mothers living between three and seven kilometres, either before a landfill becomes operational.

The second study was undertaken to find out if other local environmental exposures could explain poorer reproductive health in the area. Its aim was to assess whether there was a difference in the time taken to achieve a viable pregnancy for mothers living in wards close to the landfill site compared with others in the remaining electoral wards of the Rhondda valleys, after adjusting for potential confounders. We believe this is the first study to use time to pregnancy to assess the reproductive risk from living near a site of pollution, although it has been used in occupational settings.

We will present the results and discuss the place of both studies in the framework forinvestigating community concerns.

65 EVALUATING META-ETHNOGRAPHY: SYSTEMATIC ANALYSIS AND SYNTHESIS OF QUALITATIVE RESEARCH

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Introduction: With meta-analysis firmly established, interest is shifting towards how qualitative data can be brought into the evidence base. The application of conventional systematic review methodology to qualitative research presents philosophical and practical challenges. The aim of this research was to conduct a feasibility study that included a formative evaluation of criteria for assessing qualitative research and a research synthesis.

Methods: Ten qualitative studies of adult patients' perspectives of diabetes were purposefully selected to ensure diversity. Questions proposed by the Critical Appraisal Programme (CASP) were adapted and used to assess papers prior to entry into the synthesis. Each study was reviewed independently by two experienced social scientists to check consistency of assessment. The synthesis was conducted using the meta- ethnographic method.

Results: The level of agreement between reviewers was reasonable. Three papers were excluded from the synthesis: one because it was not qualitative research, one because the quality of the empirical work was poor and one because the qualitative findings reported were also recorded in another paper already included. All of the papers included contained typologies of patient responses to diabetes and these were successfully synthesized. In a second element of the synthesis, six key concepts were identified as being important in enabling a person with diabetes to achieve a balance in their lives and to attain a sense of wellbeing and control. These included: time and experience, trust in self, a less subservient approach to care providers, strategic non compliance with medication, effective support from care providers and an acknowledgement that diabetes is serious.

Conclusions: This evaluation confirmed the effectiveness of meta-ethnography as a method of synthesis. In addition, from it evolved a practical method of qualitative research assessment and data extraction. This process, however, requires further testing and evaluation before it could be recommended for widespread adoption.

66 SYSTEMATIC BIASES IN THE POPULATION ATTRIBUTABLE FRACTION FOR INFECTIOUS DISEASES

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Observational epidemiological studies are useful at identifying whether potential risk factors confer an increased risk of developing a disease. However, such relative risk estimates do not quantify the impact of the risk factor on the incidence of disease. The population attributable fraction or risk is a measure developed for chronic non-infectious diseases to estimate the proportion of cases that are caused by a specific risk factor. From a preventive and public health perspective it is an important measure, since it may guide policy decisions, and consequently its use has also been advocated in the field of infectious diseases. However, the traditional method for calculating

this measure relies on the assumption that the underlying risk of disease is equal in populations with and without the risk factor. This is invalid for infections since the force of infection depends on the prevalence of infection. Using simple models we show that the measure always underestimates the impact of the risk factor since it only takes the direct individual effect and not the indirect population effect of the risk factor into account. In addition, risk factors for infections may alter both the susceptibility to the disease—as for non-infectious diseases—and the infectiousness of the disease further complicating the issue. Finally, risk factors may be infections themselves thereby creating the possibility for an impact of the disease on the risk factor—an epidemiological synergy. We will explore these issues by looking at the impact of oral contraceptives, circumcision and other sexually transmitted diseases on HIV infection.

Ageing/vision

67 POSTPONING DISABILITY IN OLDER PEOPLE—HOW CAN WE INTERVENE EARLIER?

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Background: A full understanding of the process of disablement with ageing is imperative if we are to intervene earlier and slow down the onset of disability and the need for care. Models of the disablement process have variously described up to five stages: disease, disorder or injury; impairment; functional limitation; activity restriction; and handicap or the impact on social participation. However, current measures of disability concentrate on the more severe end of the spectrum and there has been little work within Europe allowing a better description of the process of disablement with age. This paper describes a more comprehensive approach to measuring the disablement process with illustrations from a longitudinal study of the onset of activity restriction as part of the Melton Mowbray Ageing Project (MMAP).
Methods: A baseline survey of a total population (N=1579) of people aged 75 years and older, undertaken in 1988 was linked with subsequent routine health assessments (up to a maximum of five) over ten years. Activity restriction was defined as having difficulty performing on their own, requiring help or aids or not doing any one of seven Activities of Daily Living (ADLs).
Results: Factors associated with onset of activity restriction were increasing age, increased contact with services, lower non-family social contact, difficulty with both vision and hearing, fair/poor self-rated health and cognitive functional limitations (in particular visuospatial skills).
Conclusion: In older people, sensory and cognitive functional limitations are an important precursor to more severe disability. More coherent measures of the whole spectrum of the disability process urgently need to be developed to allow for early detection and intervention that may slow down the process and therefore the burden of care. We discuss the form these might take, including the need to provide policy-makers with more concrete and transparent indication of service needs.

68 QUALITY OF LIFE AND MORTALITY IN POLISH ELDERLY (12 YEAR FOLLOW-UP CRACOW STUDY)

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The aim of the study carried out for 12 years was to examine the most important predictors of mortality in elderly. The attention has been paid to: 1. defining the extent and quality of differences in mortality patterns between males and females, 2. explaining the effect of the social factors on the observed differences in mortality patterns, 3. determining psychosocial predictors of mortality in males and females. The base study was conducted over the period 1986–1987 in the sample of 2605 elderly , interviewed on self-evaluation of health, chronic conditions, health behaviours, , socio-demographic data,

living arrangements, family status, occupational activity, daily living activity, and hierarchy of life values. Vital status of all individuals under study was ascertained by monitoring city vital records.
The influence of the independent variables measured at the baseline interview upon all-cause mortality was estimated 12 years after using the Cox proportional hazard model. Findings support previous knowledge on gender-related differences in survival rates between males and females. Multivariate regression model defining independent predictors of mortality demonstrated that the factors coming from the past such as level of education, occupation and chronic conditions had influence on mortality in males. Among factors coming from the present, physical mobility, and health-related behaviours had significant effect on mortality risk in males. Multivariate analysis performed for females based on the factors coming from the past confirmed the significant role of any formal education and life orientation (4 values) in decreasing the risk of mortality, while suffering from two or more chronic condition in the previous stages increased risk of death. Among current factors high level of mobility, positive self-rating of health, positive health behaviours and willingness to life increased the risk of death, while living alone less than 1 year and lack of children increased significantly mortality in females.

69 THE ANALYSIS OF ORDINAL QUALITY OF LIFE SCALES IN GERONTOLOGY

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To analyse ordinal quality of life scales, statistical methods such as ordinal regression models[1] are known to adequately summarise the data. However, when such models are applied the way the data has been generated is often overlooked.
In this paper we illustrate the use of ordinal regression models, in particular, the proportional odds model, the partial proportional odds model and the stereotype model in a study which was set up to assess the well-being and cognitive function of a sample of elderly individuals. The partial proportional odds and the stereotype models are often under-utilised largely due to the unavailability of software[2]. However, in this paper analysis based on these models has been carried out using the statistical software package SAS[3]. Furthermore, bootstrapping techniques have been applied to obtain valid estimates of the standard errors of the parameters in the stereotype and the partial proportional odds models. Strikingly different results were obtained using the ordinal regression models, which further emphasised the need to examine the way the data has been generated. We conclude by suggesting that this is particularly important for quality of life assessments as different types of data are obtained depending on the biological processes that generated the data. This need not be overlooked, as it is now possible to compute the appropriate ordinal regression models that allow for the different processes.

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2 Scott S, Goldberg M, Mayo N. 'Statistical Assessment of Ordinal Outcomes in Comparative Studies'. J Clin Epidemiol 1997; 50: 1: 45–55.
3 Hendrickx J. 'Special restrictions in multinomial logistic regression'. Stata Technical Bulletin, 2000 (sbe37): 18–26.

70 MORBIDITY FACTORS ASSOCIATED WITH URINARY INCONTINENCE IN WOMEN: THE MRC INCONTINENCE PROGRAMME

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Aims: Urinary incontinence in adults is a common and disabling condition. Symptomatically it can be divided into two broad groups—urge and stress incontinence, used as markers for underlying conditions. There are few prospective studies of urinary incontinence and no real attempt to describe the morbidity factors associated with urge and stress incontinence. The aims of this study are to formulate and test a model of co-morbidity based on cross-sectional and clinical relationships identified in the literature, and generate new hypotheses for further study.
Method: A fully representative prospective cohort study of a sample of 20,000 women aged 40 or more, registered with a general practitioner

and living in Leicestershire, UK. Information for this analysis was collected using postal questionnaires at baseline and 1 year follow-up. An in-depth study of non-responders was undertaken to detect possible biases. Incident cases were defined as new cases of stress or urge incontinence occurring with a monthly or more frequency. Baseline reported morbidity included neurological problems (MS, epilepsy, spinal cord injury) cardiovascular disease (hypertension, ischaemic heart disease, heart failure) problems of old age (memory problems, falls, osteoporosis and arthritis) and other problems including diabetes, depression and lower bowel dysfunction. Univariate and multivariate associations were investigated using logistic regression with adjustment for age and level of physical functioning.

Results: Baseline response was 63% and response to year 1 follow-up was 79%. There was little apparent bias between non-responders and responders. At 1 year follow-up the incidence of urge incontinence was 7.8% and of stress incontinence was 8.1%. Univariate associations suggest important relationships with memory problems, depression, heart failure, balance and falls, hearing and vision loss, lower bowel and other problems. The strength of these and multivariate relationships will be described.

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71 PREVALENCE AND CAUSES OF VISUAL IMPAIRMENT IN BANGLADESHI ADULTS—RESULTS OF THE NATIONAL BLINDNESS AND LOW VISION SURVEY OF BANGLADESH

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Purpose: The aim of this study was to determine the national prevalence rates and causes for blindness and low vision in adults 30 years of age and older in Bangladesh.

Methods: A nationally representative sample of 12,784 adults 30 years of age and older was selected based on multi-stage, cluster random sampling with probability-proportional-to-size procedures. The examination protocol consisted of an interview, visual acuity (VA) testing, auto-refraction and optic disc examination on all subjects. Corrected VA re-testing, cataract grading, and a dilated fundal examination were performed on all visually impaired subjects. The definitions of blindness ($<3/60$) and low vision ($<6/12$ to $\geq 3/60$) were based on the presenting visual acuity in the better eye. The World Health Organization / Prevention of Blindness proforma and its classification system for identifying the main cause of low vision and blindness for each examined subject was used.

Results: In total, 11,624 eligible subjects were examined (90.9% response rate) across the 154 cluster sites. A total of 162 persons were bilaterally blind (1.53% age-standardised prevalence) while a further 1,608 subjects (13.8%) had low vision ($<6/12$ VA) binocularly. Visual acuity was $>6/12$ in the 'better eye' in the remaining 9,854 subjects (84.8%); however 748 of these persons had low vision in the other eye. The main causes of low vision were cataract (74.2%), refractive error (18.7%) and macular degeneration (1.9%). Cataract was the singular predominant cause (85.1%) of blindness followed by macular degeneration (3.1%).

Conclusions: There are an estimated 645,000 blind adults (95% CI 550,000 to 740,000) in Bangladesh, the large majority of whom are suffering from operable cataract. This survey indicates the need for the development and implementation of a national plan for the delivery of effective eye care services, aimed principally at re-dressing the large cataract backlog and the inordinate burden of refractive error.

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72 EPIDEMIOLOGY OF SELF-RATED VISUAL DISTURBANCES. ANALYSES OF THE GERMAN HEALTH SURVEY 1998 INCLUDING 7124 PARTICIPANTS

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There are no population-based studies in Germany dealing with the occurrence and determinants of vision disorders as well as the utilization of eye glasses or contact lenses and eye doctors in the general population. Here, we present analyses of the population-based health survey (Public Use File BGS98) conducted in 1998 in Germany.

Methods: About 7124 male and female persons of the Federal Republic of Germany aged 18–79 years from of 113 cities and communities filled in a standardized questionnaire (response proportion: 61%) including questions on vision disorders, use of eye glasses or contact lenses, utilization of eye doctors in the preceeding year before interview. Effects of age, sex, social status und job group on the prevalence of vision disorders were estimated by logistic regression. Results are expressed as odds ratios (OR) with 95% confidence intervals (95% CI).

Results: About 64% reported vision disorders that required wearing eye glasses or contact lenses. Starting with the age group 45–49 years, the prevalence of vision disorders dramatically increased. Prevalences for short-sightedness decreased by age whereas prevalences for long-sightedness and combined vision disorders increased by age. Women had higher prevalences of vision disorders than men even after adjusting for social class and age (OR=1.64, 95%CI: 1.45–1.86). Higher social class as measured by Winkler's index was associated with higher prevalences of vision disorders (middle class: OR=1.26, 95%CI 1.07–1.48, upper class: OR=1.45, 95%CI 1.19–1.77). Utilization rates of eye doctors the last 12 months before the study were larger among women (30%) than men (23%, p=0.001) in general and among women (39%) compared to men with vision disorders (30%, p=0.001) even after adjusting for age and social status. Future research on the specific causes of visual disturbances in the general population of Germany may help estimating the avoidable public health burden.

Health perception and behaviour

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73 THE ROLE OF SCHOOL CONTEXT IN THE DECLINE OF YOUNG PEOPLE'S PERCEIVED HEALTH

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Towards the end of the 1990s the number of adolescents with perceived health problems has increased. Some evidence suggests that the increasing educational demands create psychological distress that amounts to the worsening of health. We explore the changes in perceived health of young people and the factors behind the changes. By using multilevel modelling we aim tofind out whether the observed changes can be attributed to school level factors or whether they are to a stronger degree explained by family and other background factors. Data come from a series of school based questionnaire surveys conducted in 109 schools around Finland in 1996, 1998 and 2000 among 14 and 15-year-old pupils (n=81 328). Health measures include self-reports of 8 psychosomatic symptoms and health status. Schools are characterised on the basis of pupils' reports on school ethos, safety and bullying while at the same time controlling for individual background (family structure, social class, health-related behaviour etc.). The findings show that particularly psychosomatic symptoms have increased. Both individual and school level factors appear to contribute significantly to the variation in symptoms which suggests that differences between schools in young people's perceived health are produced and reproduced by means of a complicated process that comprises individual susceptibility and the social and educational functioning of the school.

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74 PATTERNS OF SMOKING INITIATION IN SPAIN FROM 1948 TO 1992

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Background: The pattern of smoking initiation is of importance in understanding the prevalence of smoking and future trends in tobacco-related diseases.

Objective: To analyze the pattern of smoking initiation by sex and educational level in Spain.

Methods: Pooled data from the 1993, 1995, and 1997 Spanish National Health Interview Surveys were used (16,365 males and 17,478 females aged >15 years old). The age and smoking status of each subject were reconstructed for five calendar periods (1948–1952,

1958–1962, 1968–1972, 1978–1982, 1988–1992). Age-specific (10 to 24 years old) smoking initiation rates were calculated for males and females, and according to level of education (high education: university and secondary school; low education: primary and less than primary).

Results: There was a trend toward earlier age at start of smoking and higher initiation rates between 1958 and 1982, among males; and a subsequent decline in initiation rates, more apparent in males with higher level of education. Smoking initiation among females was rare until the 1960s, and from the period 1968–1972 onward a converging pattern with that of males was observed. Women with higher level of education started smoking before women with low education, but this pattern changed in 1978–1982, with higher initiation rates among less educated women during the last period studied.

Conclusions: These results could contribute to explain the tobacco epidemic in Spain, now at the end of stage III, as well as the recent increase in smoking related cancers among women. The observations are in agreement with diffusion-of-innovations theory and to the social and economic changes from the 1960s onward in Spain.

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75 DO CHILDHOOD SOCIO-ECONOMIC CIRCUMSTANCES HAVE AN EFFECT ON PERSISTENT SMOKING BEYOND ADULT CIRCUMSTANCES?

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Background: There are marked socio-economic gradients in cigarette smoking among men and women, with persistent smokers disproportionately drawn from lower socio-economic groups. They represent an important group, having continued to smoke despite all health education messages.

Aims: To establish whether socio-economic circumstances in early life influence adult persistent smoking beyond current circumstances.

Sample: 1958 British cohort of all births in England, Scotland and Wales, March 3–9th 1958, followed-up at ages 7, 11, 16, 23, 33 and 41 years. 11,419 subjects were included in the sample at age 41.

Main outcome measures: Persistent smoking from age 16 through 23, 33 and 41 years.

Methods: Univariate analyses of persistent smoking with the Registrar General's social class, separately for each age. A score for cumulative childhood social position, from birth to 16 years, ranging from 4 (most favourable circumstances) to 16 (least favourable) was derived. Logistic regression models predicting persistent smoking to 41 (compared to others) were constructed, with social class measures as predictor variables.

Results: 15% of men (452) and 13% of women (459) persisted smoking to age 41. An effect of childhood social position remained after adjustment for adult circumstances among men and women (odds of persistent smoking increased by 6% and 8% respectively for each 1-unit increase across the 12-point score of childhood circumstances). Social class at age 23 was associated with persistent smoking for both sexes: the adjusted odds increased by 32% for each unit increase over the 4-point scale for men and 41% for women. At 41 years, the adjusted odds increase by 34% for men and 15% for women for each unit increase in social class.

Conclusions: In this cohort of contemporary adults, persistent smoking was influenced by both early life and adult socio economic conditions, indicating the importance of lifetime circumstances for this health behaviour.

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76 EFFECTIVENESS OF THE NICOTINE PATCH FOR SMOKING CESSATION IS RELATED TO GENOTYPE

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There is strong evidence for a genetic component to the development and maintenance of tobacco addiction. Published work shows associations between smoking habit and polymorphisms in the dopamine D2 receptor (DRD2 C32806T) and in dopamine beta hydroxylase (DBH G1368A). We hypothesised that these alleles would predict smoking cessation using the nicotine transdermal patch.

We carried out a randomised controlled trial of the nicotine patch on 1686 heavy smokers in Oxfordshire in 1991–92. After one week, the cessation rates in the nicotine and placebo groups were 32.9% and 21.6% respectively (odds ratio 1.8). At 12 weeks, the cessation rates were 19.4% and 11.8% (odds ratio 1.8).

In 1999–2000 we contacted 1532 of the 1612 subjects not known to have died or emigrated. 840 (55%) returned follow-up questionnaires and 755 (49%) gave a blood sample, 378 of whom had received the nicotine patch, and 377 the placebo. We extracted and typed DNA for polymorphisms in DRD2 and DBH, and examined associations between these polymorphisms and smoking cessation in the trial.

Smokers carrying alleles associated with increased risk of tobacco dependence appear to benefit most from nicotine replacement therapy. At one week, the cessation odds ratio was 2.8 for subjects with the DRD2 CT/TT genotype compared with 1.4 for those with CC (p for difference in odds ratios 0.04); 2.1 for subjects with the DBH GA/AA genotype compared with 1.3 for those with GG (p=0.18); and 3.6 for those with both the DRD2 CT/TT and DBH GA/AA genotypes compared with 1.4 for others (p=0.01). At 12 weeks, the odds ratio for subjects with this combination of genotypes was 3.2 compared with 1.5 for others (p=0.06).

These results could have important implications for smokers who want to give up by identifying those likely to gain most benefit from the nicotine patch.

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77 PSYCHOLOGICAL DISTRESS AND EARLY MORTALITY RISK

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Several studies have found that depression is associated with an increased risk of overall and disease specific mortality.

The associations between depressive symptoms and 5, 10, 15, 20 year all-cause and coronary heart disease (CHD) mortality were evaluated, in the Renfrew and Paisley study, a prospective cohort study of 6,920 men and women, 45–64 years, followed up for 20 years. Psychological distress was assessed at baseline (1972) using the General Health Questionnaire (GHQ). The presence of GHQ caseness was defined as those respondents responding positively to 4 or more items on the GHQ. Mortality data were collected to end of 1996. The risk of all-cause and CHD mortality in respondents who were GHQ cases was compared to those who were not, using proportional hazards modelling.

GHQ caseness was associated with increased risk of 5 year all-cause mortality in age adjusted analysis (RR 1.96 95% CI 1.48–2.60) in men. In multivariate analysis GHQ caseness was still significantly associated with all-cause mortality in men, adjusting for socio-demographic, CHD risk factors and baseline physical illness (RR 1.49 95% CI 1.11–2.01). In further multivariate analysis of men and women free of baseline physical illness GHQ caseness was associated with an increased risk of 5-year all-cause mortality in men (RR 1.64 95% CI 0.97–2.76) and 10-year all-cause mortality in women (RR 1.40 95% CI 0.93–2.10). GHQ caseness was associated with 5-year CHD mortality in men adjusting for age, socio-demographic and CHD risk factors (RR 1.64 95% CI 1.02–2.56), and after adjusting for these factors and baseline physical illness (RR 1.36 95% CI 0.86–2.15).

Psychological distress may be associated with an increased risk of early mortality in men, and may be a consequence of baseline physical illness. The lack of any association between GHQ caseness and early all-cause and CHD mortality in women is intriguing and warrants further research.

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78 DOES SCREENING FOR A MODIFIABLE GENETIC CONDITION CAUSE DISTRESS? ABUNDANCE OF OPINION AND PAUCITY OF DATA

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Background: We report on a systematic review on the social and psychological aspects of screening for Familial Hypercholesterolaemia (FH), a modifiable genetic condition.

Objective: To assess whether the deleterious social and psychological effects of screening for FH have been demonstrated and whether they would outweigh potential benefits.

Methods: A systematic search of the electronic databases was conducted and known researchers in the field were contacted. A data assessment tool was designed to assess the quality and validity of the papers because available guidelines for systematically reviewing papers concentrate on quantitative methods and are of limited relevance. We developed an algorithm which could be used for both the qualitative and quantitative literature.

Results: We found sixteen papers which reported primary research. A further 21 papers expressed opinions unsupported by data. Methodological weaknesses were apparent in many study designs. The generalisability was limited, follow-up periods were short and often focussed on a pre-determined range of adverse effects. Interventions were poorly described, limiting transferability. 'Counselling' was repeatedly recommended, but the content was undefined and its effectiveness was untested. Fear of genetic discrimination was occasionally reported, but the problem may be larger and unreported due to such fears.

Conclusion: It is important to distinguish between opinion papers and empirical research. The weak evidence suggests that any negative effects of screening for FH in adults is short-term. More, and better, qualitative work may reveal a wider and unexpected range of adverse effects of screening. Adequately designed qualitative and quantitative research is urgently needed, and screening for FH on a population basis should not be introduced until this has been undertaken.

Child health

79 TRENDS IN RATES OF CEREBRAL PALSY AMONG VERY LOW BIRTHWEIGHT (VLBW) BABIES IN THE 1990S

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Aim: To ascertain whether the increasing survival rate in the 1990s among babies weighing less than 1500g at birth has been associated with increases in the rate of cerebral palsy among survivors.

Methods: The Oxford Register of Early Childhood Impairments uses multiple sources to identify children with cerebral palsy born to mothers resident in Berkshire, Buckinghamshire, Northamptonshire and Oxfordshire. Information is collected on the subtype and severity of motor deficit, and presence of associated sensory and intellectual impairments. Data from the register and from birth registration were used to calculate neonatal mortality rates among the 3853 children born from 1984 to 1995 weighing under 1500g and cerebral palsy rates among children who survived the neonatal period.

Results: The numbers of live born babies weighing less than 1500g increased steadily from 1984 to 1995 but neonatal mortality rates fell from 22.4% in the three year period 1984–86 to 16.8% in 1993–95. The rate of cerebral palsy per 1000 survivors rose from 62.9 in 1984–86 to 90.0 in 1987–89 before falling to 68.7 in 1990–92 and 43.5 in 1993–95. The proportion of surviving children with cerebral palsy who had a severe level of disability (limited/no walking or associated severe vision loss) increased in the late 1980s but fell in the 1990s.

Discussion: The fall in mortality and morbidity among very low birthweight babies in the early 1990s may have resulted from changes in neonatal management, such as the introduction of artificial surfactant and newer methods of ventilation.

Conclusion: With the introduction of further new technologies it is essential to continue to monitor the outcome of very low birthweight babies.

80 FETAL OR INFANT DEATH IN A TWIN PREGNANCY: CONSEQUENCE FOR THE SURVIVOR

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Aim: To determine the mortality and long term neurological morbidity for the surviving twin after a fetal or infant death of the co-twin.

Methods: Twin pregnancies delivered between 1981–92, with an antepartum or infant death, were identified from the Northern Perinatal Mortality Survey. Information on the neurological morbidity of infant survivors of a deceased co-twin was obtained by questionnaire completed by the community paediatrician or general practitioner.

Results: There were 111 children who survived infancy after a fetal death of a co-twin (group 1) and 142 from live born twin pairs in which one twin died in infancy (group 2). The cerebral palsy prevalence in group 1 was 93 (95% CI 43–169) per 1000 infant survivors. Cerebral palsy was more common in like-sex twins with a prevalence of 114 (95% CI 51–213) per 1000 survivors compared with 45 (95% CI 1–228) in unlike-sex twins. In group 2, the cerebral palsy prevalence was 154 (95% CI 84–223) per 1000 survivors in like-sex twins and 77 (95% CI 9–251) in unlike-sex twins. For twins born after 32 weeks of gestation, the cerebral palsy prevalence in group 1 was twice that of group 2. At earlier gestation, the cerebral palsy prevalence was higher group 2.

Conclusions: The risk of cerebral palsy is greater in like- compared with unlike-sex twins. It is very much higher in the surviving twin after a fetal co-twin death population and in the surviving twin whose co-twin died in infancy when compared with the general population.

81 CONGENITAL HEART DEFECTS AND PRE-ECLAMPSIA

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A common factor may increase the risk of both pre-eclampsia and congenital abnormalities, or they may be associated if a high risk foetus (a child with congenital abnormalities) could induce pre-eclampsia in the mother in order to increase placental perfusion (1). In this study we examined whether a correlation between pre-eclampsia and prevalence of congenital heart defects existed and, if so, which of the two mechanism is most likely.

Through linkage of the Danish National Hospital Discharge Registry with the Birth Registry we identified 15,160 first-born singletons following pre-eclampsia between 1980 and 1994. A random sample of 35,878 births without pre-eclampsia served as the reference population. We used 34,031 sibling pairs to examine whether a history of pre-eclampsia influenced the risk of giving birth to a second child with herat defects.

Pregnancies with pre-eclampsia had a slightly higher prevalence at birth of all congenital abnormalities in both genders, but especially of congenital heart defects in girls (OR:1.64, 95% CI: 1.15–2.28). Both genders appeared to have a lower birth weight in the presence of heart defects (140 and 180 grams less in boys and girls, respectively), but girls with heart defects born after a pregnancy with pre-eclampsia had a birth weight on average 162 grams (95% CI: 1, 323) higher than their counterparts without pre-eclampsia. Pre-eclampsia was associated with a slightly lower perinatal mortality (OR 0.57; 95% CI: 0.26–1.28) in girls with any congenital abnormality. A previous history of pre-eclampsia did not, however, influence the risk of heart defects.

Pre-eclampsia may provide a survival benefit to girls with heart defects, while boys probably had a higher intrauterine mortality in complicated pregnancies. The independence between heart defects and previous pre-eclampsia does not support a common genetic factor between these illnesses.

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82 THE HEALTH OF CHILDREN LOOKED AFTER BY LOCAL AUTHORITIES: A CASE CONTROLLED STUDY

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Aim: To assess the health needs and health care of school age children in local authority care.

Design: Prospective case controlled study, with structured interviews, using a schedule adapted from the Looking After Children Assessment and Action Records of the Department of Health.

Setting: Four unitary authority areas in south west Wales.

Participants: One hundred and forty-two children aged 5 to 16 in local authority care, and 119 controls matched by age and sex. Seventy-one carers looking after 87 children.

Results: Compared with home based children, those looked after by local authorities were significantly more likely to: experience changes in General Practitioner; have incomplete immunisations; receive inadequate dental care; suffer from anxieties and difficulties in inter-personal relationships; wet the bed; smoke; use illegal drugs; have been cautioned by police or charged with a criminal offence (p < 0.05 for all findings). They also tend to receive less health education. They were significantly more likely to have had a recent hearing or eye sight test (p < 0.001), and reported significantly less physical ill health overall (p < 0.001). Foster carers were satisfied with the physical health of young people in their care but were concerned with their emotional-behavioural problems, and the lack of services available to address these problems.

Conclusions: The overall health care of children who have been established in care for more than six months is significantly worse than for those living in their own homes, particularly with regard to emotional and behavioural health, and health promotion. In contrast to uncontrolled observational studies we have not found evidence of problems with the physical health of these children.

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83 FINNISH IMMIGRANTS IN SWEDEN HAVE GOOD INFANT OUTCOME DESPITE INCREASED RISK FACTORS

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Many studies have reported increased health problems related to child-bearing and infant outcome among immigrants, but also contradictory evidence exists. In 1940–1999 more than 545000 Finns emigrated to Sweden, which makes Finns the largest minority group in Sweden. Our aim was to investigate the fertility trends, the background of parturients and pregnancy outcomes among Finns in Sweden, and compare the finding to those on Swedes and Finns in Finland.

The data came from the Finnish and Swedish Medical Birth Registers. For years 1987–1998 all births of parturients born in Finland and giving birth in Sweden (N=118490) and to a 10% sample of the births of all Finnish parturients (n=75131).

Among Finns in Sweden the fertility rate per 1000 women aged 15–49 years was stable in 1978–1992 (average 50/1000), but declined below 30/1000 in 1996–1998. The change in the total fertility rate was less dramatic: the rate for Finns in Swede4n followed the total Swedish rate, but at a level that was 5 to 10% higher. Finns giving birth in Sweden were older, had more previous deliveries and miscarriages, and smoked more often than do Swedes in Sweden or Finns in Finland. The crude outcomes of children of Finns giving birth in Sweden were somewhat poorer than outcomes among Swedes in Sweden or Finns in Finland, but adjusting for age and parity removed these differences. If smoking was included in the model, the best outcomes were observed among Finns in Sweden.

Fertility trends followed the pattern in the residence country. The relatively good outcomes of children with Finnish mothers giving birth in Sweden shows that the migrants are in general healthy. Promoting the cessation of maternal smoking may further improve infant outcomes.

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84 INFLUENCE OF BIRTHWEIGHT AND INFANT FEEDING ON BLOOD CHOLESTEROL LEVELS IN CHILDREN

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Objectives: Factors acting early in life may influence cardiovascular risk. We examined whether infant feeding pattern or birthweight is independently related to total cholesterol (TC) and low density lipo-protein (LDL) in adolescence.

Design: Cross-sectional study, with retrospective ascertainment of a child's birthweight using parental recall and birth records.

Participants: 1532 school children (92% white) aged between 12.8 to 16.4 years (mean 15.1 years) with blood measurements of TC and LDL assessed after an overnight fast (response rate 63%); 842 (55%) were males.

Results: Males had lower TC and LDL than females, before and after adjustment for anthropometric variables. Birthweight showed a weak inverse association with TC and LDL. A 1 kg increase in birthweight was associated with a fall of 0.073 mmol/l in TC (95% CI -0.017 to 0.164, P=0.112) and a fall of 0.079 mmol/l (95% CI 0.002 to 0.157, P=0.046) in LDL. Adjustment for childhood BMI increased the strength of associations by one third. There was no clear difference in cholesterol between those breast or bottle fed. Those breast fed for 6 months or more had 0.146 mmol/l lower TC (95% CI 0.049 to 0.242, P=0.003) and 0.105 mmol/l lower LDL (95% CI 0.021 to 0.190, P=0.015) than those breast-fed for less than 6 months. These findings were unaffected by adjustments.

Conclusions: Increased birthweight was associated with lower TC and LDL in adolescence, though the effects were small. Amongst those breast-fed, prolonged breast-feeding (greater than 6 months) was associated with a more favourable lipid profile. However, bottle fed infants did not fit this pattern, having comparable TC and LDL to those breast-fed for 6 months or longer. Lack of association between bottle-feeding and TC in childhood is consistent with other studies, but contrasts with higher cholesterol levels in breast fed infants and lower levels in breast fed adults.

Social and economic factors

85 THE INFLUENCE OF SCHOOL CULTURE ON THE RISK OF SMOKING IN ADOLESCENCE

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Introduction: There is much evidence that smoking prevalence varies widely between schools, and some evidence that this cannot simply explained by many pupils with risk factors for smoking attending high prevalence schools and few such pupils attending low prevalence schools. There is also evidence that school tobacco control policy or school health education cannot explain the observed variation. This suggests that some more general school characteristics affect whether pupils smoke or not, but it is not known what these are.

Method: 23,282 pupils from 166 high schools completed a cross-sectional survey on regular smoking, sociodemographic information and adolescence smoking risk factors. School culture was measured indirectly from routinely published performance data. We classified school culture as committing, indeterminate or alienating, which we developed from Bernstein's typology. We used multilevel logistic regression to relate the risk of smoking to school culture, with and without adjustment for individual adolescent smoking risk factors.

Results: The odds ratio (95% confidence intervals) for committing and alienating school cultures relative to indeterminate were 0.71 (0.53–0.95) and 1.13 (0.96–1.34) respectively, χ^2=8.1, df=2, p=0.0044. Adjustment for pupil risk factors altered these risks slightly to 0.76 (0.58–1.01) and 1.24 (1.05–1.47) respectively, χ^2=11.2, df=2, p<0.001.

Conclusion: Even though committing schools served more deprived populations on average, the smoking prevalence was lower than in other school types. School culture is an important previously unidentified adolescent smoking risk factor.

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86 THE IMPORTANCE OF THE SOCIAL MEDICINE MOVEMENT IN GERMANY BEFORE THE FIRST WORLD WAR EXEMPLIFIED BY STUDIES OF THE SOCIAL CAUSES OF TUBERCULOSIS

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Although previously expressed by many individuals at different times in different countries, the notion that the aetiology of many diseases has a social component was systematically pursued for the first time in the German-speaking countries in the period immediately before the First World War. A large number of studies were undertaken into the

Mortality from tuberculosis by income, Hamburg 1910
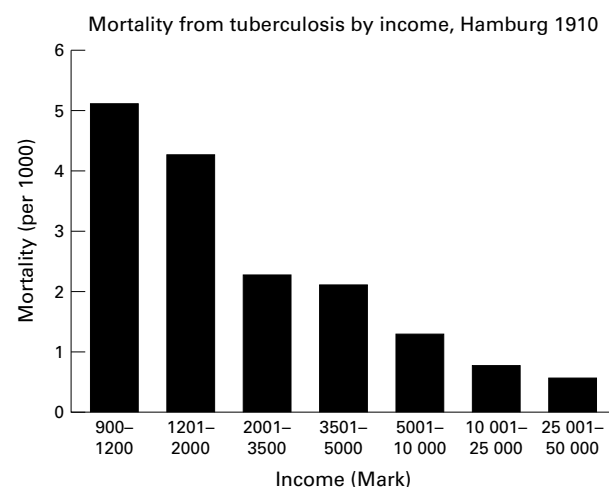
relationship between disease and social conditions. The findings persuaded many doctors that bacteriology was only one contribution to solving the problems of public health and that major steps forward could only be made if housing, sanitary and working conditions were improved for the majority of the population.In this presentation we will illustrate prevalent thinking in social medicine at this time using key publications such as Mosse and Tugendreich's 1913 volume 'Krankheit und Soziale Lage' (Illness and Social Position), with a focus on investigations into the social causes of tuberculosis, a major source of morbidity and mortality at this time. The figure shows data from one investigation into the relationship between income and mortality from tuberculosis. (Data from Mosse and Tugendreich, p 574). Findings for the relationship between tuberculosis and housing, nutrition, alcohol, and altitude will also be discussed, and the debate about the causes of the decline in tuberculosis mortality in this period considered. Finally the significance of eugenic ideas within the social medicine movement will be considered in relation, first, to the influence of these ideas in social democratic and progressive groups in northern Europe and North America during this period and, secondly, to the later catastrophic developments in Germany.

87 SOCIAL CAPITAL, THE ECONOMY AND HEALTH IN SOUTH YORKSHIRE COALFIELD COMMUNITIES

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Objectives: As part of the overall programme evaluation, South Yorkshire Health Action Zone, partnered by Single Regeneration Budget 5, commissioned a random sample survey of nine coalfield communities to establish baselines for and investigate links between levels of social capital, labour market measures and self-reported health, particularly mental health. A follow-up survey is anticipated in order to establish intervention effects. The concept of social capital is complex but resonates with traditions of social solidarity in the South Yorkshire coalfield.
Design and Method: Survey protocols and questions were developed iteratively by a Management Group, the research team and local community representatives. Nine areas were selected to reflect a balance of 'pit villages', inner urban areas and mixed communities. After initial training, local residents completed most of the 4217 interviews. The survey facilitated comparisons with national benchmarks multivariate statistical methods were used to model area effects and identify significant associations between self-reported health, dimensions of social capital and aspects of the local economy.
Outcome measures: Limiting long-term illness, Euroqol-5D and SF-36 Mental Health Score.
Results: Though all communities were relatively deprived, the different dimensions of social capital—trust, reciprocity, engagement, empowerment—varied significantly and quite consistently across areas and were positively related to higher labour market participation. Allowing for demographic characteristics, higher levels of trust and personal control, together with greater feelings of security and lower fear of crime, were clearly associated with better self-reported health.

Conclusions: Interventions designed to increase levels of social capital may be an effective approach in achieving health and economy targets in the regeneration of coalfield communities.

88 AN INVESTIGATION OF LINKS BETWEEN NEIGHBOURHOOD SOCIAL PROCESSES AND HEALTH USING DATA FROM THE BRITISH HOUSEHOLD PANEL STUDY

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To examine how levels of local neighbourhood social capital and social disorder are associated with the mental and physical health of individuals from a representative cross section of British households.
Design and Participants: The British Household Panel Study (BHPS) is an annual panel survey of a representative cross section of British households. Main measures: At wave eight respondents were asked eight questions about the area in which they lived. The responses are used to provide an index of the individual's perception of the level social capital in their neighbourhood. At wave seven respondents were asked eight questions that rate the severity of various community problems (e.g. vandalism and deliberate damage to property). The responses are used to provide an index of the individual's perception of the level of social disorder in their neighbourhood. Common mental disorders were assessed using the self-administered 12 item General Health Questionnaire (GHQ). Individual's self-rated health (poor) and satisfaction with health (not satisfied) are also considered. We also examine whether respondents reported problems related to heart or blood pressure or whether they reported problems related to arms, legs or hands including arthritis.
Results: With the exception of heart / blood pressure in women all health outcomes show an inverse gradient in risk by social capital after adjustment for age. Among men the steepest gradient was in low health satisfaction; the odds ratio in the highest group compared with the lowest was 0.51 (95% CI 0.36–0.71). Among women the steepest gradient was in GHQ, the odds of poor health in the highest group compared with the lowest was 0.50 (95% CI 0.41–0.61). Similar gradients in the odds of poor health outcomes are observed by level of social disorder for both men and women. Among men and women, adjustment for individual social support made little difference to the social capital and social disorder differences in the odds of poor health outcomes. Adjustment for individual deprivation reduced the social capital and social disorder gradients substantially. For example, the odds of heart / blood pressure problems in the highest compared with the lowest social capital group was raised from 0.77 to 0.83. Social capital and social disorder differences in the odds of poor health outcomes remained however.
Conclusions: Overall our results highlight the importance of examining variation in health within the wider context of an individual's physical and social environment, including neighbourhood social capital and sources of social disorder. Individuals who feel dissatisfied with their social environment are at greater risk of poor health. Although social disorder and social capital are weaker determinants of health than socio-economic factors, these measures continue to have a significant independent influence on health when socio-economic factors are controlled for.

89 UNEMPLOYMENT RATE AND SURVIVAL IN GENERAL POPULATION DURING TRANSITION IN POLAND

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Background: The relationship between unemployment and increased mortality has been reported in western industrialized countries with stable economy. The aim of this study was to assess the influence of changes in the rate of unemployment on survival of general population in Northern Poland at the time of economic transition.
Methods: To analyse the association between unemployment and risk of death we collected survival data from 62736 death certificates and data on unemployment rates from 8 regions of gdansk county from period 1992–1996. Kaplan-Meier method and Cox proportional hazard model were used in univariate and multivariate analysis. The change (%) of the unemployment rate in the year of death in the area of residence, sex and educational level (6 categories) were included into multivariate analysis. Separate analysis was conducted for each specific cause of death. Cause of death, place of residence, sex and educational level were identified according to death certificates.

Results: The change (%) of the unemployment rate was associated with significantly worse survival: Hazard ratio (HR) 1.02 95% confidence interval (CI) 1.016 to 1.024. The highest risk associated with the change (%) of the unemployment in the area of residence was for death from congenital defects (HR 1.16 95% CI 1.04 to 1.3) and for death from cardiovascular diseases (HR 1.036 95% CI 1.032 to 1.042). The positive change of the unemployment rate was also associated with worse survival compared to no increase (HR 1.2 95% CI 1.17 to 1.23 in univariate analysis and HR 1.1 95% CI 1.08 to 1.12 in multivariate analysis).

Conclusion: The changes of the unemployment rate may be a useful ecological measure of socioeconomic risk factors influencing survival.

90 HEALTH AND SOCIAL MOBILITY. A TEST OF THE SELECTION HYPOTHESIS BASED ON THE TURIN LONGITUDINAL STUDY

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Objectives: The study tests the thesis known in epidemiological literature as "selection effect". In particular it aims to assess the intensity of the influence of health status upon social mobility chances, observed among Turin population (1981–1991).

Material and methods: The data was drawn from the Turin Longitudinal Study archive (TLS), established to monitor health inequalities by combining census data, vital registration records and medical records. The study is based on all subjects who were resident in Turin at least in one population census (1971, 1981, 1991). The health status is expressed by an indicator which combines information about hospital admissions and their seriousness. Social mobility measure is based on an index which expresses upward and downward movements on a social desirability scale of occupations. The impact of health upon mobility chances was evaluated by comparing the careers of sick and healthy people and by comparing the gradient of health inequalities observed in healthy and sick people.

Results: The analysis shows the presence of a relation between health status and social mobility, but the "selection effect" shows a very low impact. Data collected in TLS allow us to evaluate the importance of other social factors which modulate, together with health status, people career chances. Among these, some factors such as gender, ethnicity and education are responsible of discrimination processes, which violate the equity principle. In Turin population, the four processes considered — gender, ethnic, education and health segregation — seem to be active; but, among them, health status can be considered the less relevant. The comparison of health inequality gradient observed in sick and healthy people shows that the epidemiological profile of sick people is very close to that of healthy people.

Conclusion: The hypothesis which indicates "selection effect" as responsible of health inequalities does not seem to be supported by TSL data.

Early life determinants of disease I

91 RELATION OF BIRTH WEIGHT, GESTATIONAL AGE, PATERNAL SOCIO-ECONOMIC POSITION, AND EARLY CHILDHOOD HEIGHT TO PREVALENT REDUCED DISTANT VISUAL ACUITY IN CHILDREN BORN IN ABERDEEN IN THE 1950s

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The relation of peri- and post-natal factors to reduced distant visual acuity in children has been little investigated. The purpose of the present study is to relate birth weight, gestational age, paternal socio-economic position at the birth of the child, and early childhood height to reduced distant visual acuity in primary school children in Aberdeen.

The Aberdeen Child Development Study was undertaken in a community of approximately fifteen thousand school children in the early 1960s. Almost 90% of these participants were matched to the Aberdeen Maternity and Neonatal Databank from which data on birth weight, gestational age and occupation of the father at the birth of the child were extracted. Results of the Snellen test of corrected distant visual acuity and the height of the child were recorded as part of a routine medical examination when the children were aged 5 to 12 years.

These analyses are confined to 6,896 children born as singletons at a gestational age of 37 completed weeks or more who had visual acuity data for both eyes. A total of 860 of these children were found to have reduced distant visual acuity (i.e., 6/9 or worse in the better eye). Height in childhood (p[linear trend]=0.007) and paternal occupational social class at the birth of the child (p[linear trend]=0.005), but not birth weight (p[linear trend]=0.27) or gestational age (p[linear trend]=0.33), were inversely related to reduced distant visual acuity after mutual adjustment for these factors in addition to sex and age at medical examination.

Within the category of term births, height in childhood and paternal occupational social class at the birth of the child, but not birth weight or gestational age, were related to reduced distant visual acuity in Aberdonian school children.

92 PERINATAL AND POSTNATAL DETERMINANTS OF CHILDHOOD IQ

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Perinatal and postnatal environmental factors have been shown to be predictors of childhood IQ. However parental, perinatal (especially gestational age) and postnatal variables have not been examined together in a population-based longitudinal study. We use a unique Aberdeen cohort to explore these issues.

The study population comprises 9,306 singleton children from the 1962 Aberdeen Child Development Study with complete longitudinal information. Size at birth (including gestational age) and childhood growth were available and were represented by SD scores adjusted for age at measurement. IQ at 7 and conditional change in IQ between 7 and 11 were the outcomes with all explanatory variables entered into regression analyses sequentially in accordance with their temporal ordering.

IQ scores at both 7 and 11 years were positively associated with birth weight for gestational age and childhood growth over the entire SD score ranges (p<0.001 for trends). Infants born at term had higher mean IQs than those born pre-term (109 vs 105, p<0.0001) or post-term (109 vs 107, p=0.0005). Childhood IQ showed strong inverse associations with father's social class at birth (p<0.001 for trend) and number of older siblings (p<0.001 for trend). Conditional change in IQ was most strongly inversely related to father's social class (p<0.001) and birth order (p<0.001) and positively to childhood growth (p<0.001) and maternal age (p<0.001). Size at birth became less important over time (p=0.01) but gestational age was a negative predictor of change (p=0.04).

Socially patterned maternal and perinatal characteristics are positively associated with cross-sectional measures of childhood IQ but postnatal social factors and childhood growth are most influential in its development. Social disadvantage and higher birth order in particular have a cumulative negative effect on IQ development. The postnatal socioeconomic environment is an important modifier of perinatal influences on childhood IQ.

93 EARLY LIFE INFLUENCES ON THE DEVELOPMENT OF SCHIZOPHRENIA AND PSYCHOSIS IN YOUNG ADULTS: A COHORT STUDY

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Background: Obstetric complications, low birthweight and season of birth are associated with an increased risk of developing schizophrenia. The importance of later childhood exposures in influencing risk of schizophrenia is unclear.

Methods: Cohort of 330,000 Swedish males aged 17–25 with data on birth characteristics, adult anthropometry and hospital admissions for

psychiatric disorder for a period of up to 7 years following army medical examination. We examined associations of birth and adult anthropometry with schizophrenia and non-schizophrenic, non-affective psychosis.

Results: Of the 247,814 subjects with complete data, 204 developed non-affective psychoses, including 80 cases of schizophrenia. There was an inverse j-shaped association between gestation-adjusted birthweight and schizophrenia - both low (<2.5kg) and high (>4.0 kg) birthweight were associated with increased risk—hazard ratios (95% CI) were 8.62 (2.08 to 35.70) and 3.08 (1.55 to 6.10) respectively in these groups compared to those with birthweights of 3501–4000g. Birthweight was not strongly related to non-schizophrenic, non-affective psychosis. Individuals born in the summer had a lower risk of developing schizophrenia (hazard ratio 0.43 (0.21 to 0.88)) compared to autumn or winter births. The population attributable fractions (PAF) for low birthweight, high birthweight and autumn/winter births were 4%, 16% and 26% respectively. Short stature was associated with an increased risk of schizophrenia; the hazard ratio in the tallest compared to the short quartile was 0.48 (0.22 to 1.01). The lowest risk of developing schizophrenia was seen in low birthweight babies who became tall adults.

Conclusions: These data provide further evidence that exposures early in the lifecourse may influence the risk of early onset schizophrenia, and that among obstetric complications, both high and low birthweight are associated with increased risk. Risk appears to be least in small babies who became tall adults. The population attributable fractions indicate that these risk factors may make important contributions to the aetiology of schizophrenia.

94 EFFECT OF SOCIOECONOMIC FACTORS AND FETAL GROWTH ON ADULT MORTALITY AND MORBIDITY

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Objectives: The objective of this study is to estimate the independent effect of fetal growth and socioeconomic class at birth and in adult life on all cause mortality, on specific causes of death and on risk of hospitalisation.

Methods: Subjects born in Turin (Italy) between 1920 and 1929 and still resident in 1971 were traced by the Turin Longitudinal Study, a historical cohort of resident subjects that combines census data, municipality registries and health information systems. Data about fetal growth and social class at birth were retrieved from obstetric records. The mortality follow-up was carried out from 1971 to 1998; analysis on morbidity is referred to the period 1995–98.

Results: Records were identified for 3559 subjects: at the end of follow-up 980 subjects had died and 697 had emigrated. All cause mortality was univariately associated with low birthweight only among males, with Kaplan-Meier estimates of risks ranging from 53% to 41% in the two extreme classes (<2500g and >3500g; p=0.03). All the other characteristics at birth were not associated with adult mortality. Conversely, both education and occupation in adult life were strongly associated with mortality (32% vs. 48% for highly and low educated men, respectively; p<0.001). The inverse relation with birthweight was confirmed among men when adjusting for age and father occupation, but it lost significance when considering socioeconomic status in adult life. As for women, the multivariate analysis highlighted an effect of paternal social class; the adjustment for adult socioeconomic circumstances attenuated all risks.

Conclusions: Our preliminary results suggest that the main risk factors for all cause mortality are socioeconomic conditions. Low birthweight is associated with mortality only among men, but its risk is strongly attenuated when adjusting for adult socioeconomic class. Results on specific causes of death and hospitalisation will allow a deeper understanding of these mechanisms.

95 BLOOD PRESSURE AND BLOOD GLUCOSE CONCENTRATION AMONGST MIDDLE-AGED MEN CONCEIVED AND/OR BORN ON GUERNSEY DURING THE 1940–45 GERMAN OCCUPATION

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Throughout the 1940–45 German occupation of the Channel Islands food rationing intensified, while severe shortages occurred during the siege which followed the liberation of northern France in 1944. To assess whether men born on Guernsey at different times during the occupation display any differential risk of cardiovascular disease or diabetes in later life, sociodemographic, behavioural and clinical data collected by the Guernsey Chest and Heart Association were anonymously linked to 608 (30.6%) of the 1987 male births registered between 1939–46. Blood pressure and blood glucose measurements (at age 40+) were compared amongst five separate birth cohorts, covering five contrasting periods of food availability: Cohort 1: January 1939 to May 1940—before the occupation (n=152); Cohort 2: June 1940 to May 1944—the four years of occupation prior to the siege (n=204); Cohort 3: June 1944 to May 1945—the siege (n=68); Cohort 4: June 1945 to March 1946—the nine months following the liberation of Guernsey (n=55); and Cohort 5: April 1946 to December 1946—the nine months thereafter (n=129). Systolic blood pressure was 5.8mmHg (95%CI: 1.7–9.9mmHg) higher amongst men in Cohort 1 than those in Cohort 5 (after controlling for potential confounders: age, body mass index, and familial clinical history); while blood glucose concentrations were 0.77mmol/l (95%CI: 0.37–1.17mmol/l), 0.65mmol/l (95%CI: 0.30–1.00) and 0.78mmol/l (95%CI: 0.35–1.20mmol/l) higher for men in Cohorts 1, 2 and 3 respectively than those in Cohort 5 (after controlling for age). These analyses suggest that exposure to severe food shortages during infancy (Cohort 3) and/or early childhood (Cohorts 1 and 2) might have a greater effect on clinical markers of cardiovascular disease and diabetes in later life, than exposure in utero alone (Cohort 4). Alternatively, they may reflect the protective effect of the additional rations and improved obstetric care provided for expectant mothers throughout the occupation.

96 POSTNATAL GROWTH MAY BE MORE IMPORTANT THAN FETAL GROWTH IN PROGRAMMING FORCED EXPIRATORY VOLUME IN ONE SECOND (FEV₁) AND FORCED VITAL CAPACITY (FVC)

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Several follow-up studies of children and adults have reported positive associations between birthweight and adult lung function. For example, the Hertfordshire study found that birthweight, but not weight at 1 year, was associated with FEV_1, although weight at 1 year was more strongly associated with mortality from chronic obstructive pulmonary disease (COPD).

We had detailed information on 951 individuals whose mothers enrolled them in a study of early growth and nutrition. Of these, 679 (71%) attended a full clinical examination in early adulthood (mean age 25), and 581 (61%) provided at least 2 acceptable measurements of FEV_1 and FVC on a calibrated pneumotachograph. We examined associations between body size at birth and 1 year, and height-adjusted FEV_1 and FVC, and their ratio, controlling for sex, age, current smoking, current asthma, and maternal smoking during pregnancy. Anthropometric measurements were converted to z-scores to facilitate comparison.

Abstract 96 Table 1

Explanatory variable	Standardised multiple regression coefficient (95% CI)		
	Height-adjusted FEV_1 (l)	Height-adjusted FVC (l)	FEV_1/FVC (%)
Weight at birth controlling for weight at 1 year	−0.01 (−0.05 to 0.03) p=0.58	0.03 (−0.02 to 0.08) p=0.24	−0.69 (−1.27 to −0.11) p=0.02
Weight at 1 year controlling for weight at birth	0.06 (0.02 to 0.10) p=0.002	0.10 (0.06 to 0.15) p<0.0005	−0.43 (−0.98 to 0.11) p=0.12

Height-adjusted FEV₁ was positively associated with weight at one year, but not with birthweight. Birthweight and weight at 1 year were positively associated with FVC in separate models, but the birthweight effect was greatly attenuated in a combined model (see table). There was also evidence of an interaction (p=0.05), whereby the effect of weight at age 1 on FVC was greater for babies of lower birth weight.

Our findings suggest that, in this cohort, postnatal growth may be more important than prenatal growth in determining later lung function.

Cancer I

Results: Intakes of carotene, especially alpha-carotene, from food and supplements were significantly and inversely associated with risk for ovarian cancer, predominantly in postmenopausal women. Intake of lycopene was significantly and inversely associated with risk for ovarian cancer, predominantly in pre-menopausal women. The association with alpha carotene was more apparent in women with invasive serous and mucinous tumours and the association with lycopene stronger for borderline serous tumours. Consumption of food items that were most strongly related to decreased risk for ovarian cancer were raw carrots and tomato sauce.
Conclusions: Consumption of fruits, vegetables, and food items high in carotene and lycopene may reduce the risk of ovarian cancer; but effects may vary by menopausal status.

97 THE LIFETIME RISK OF CANCER FROM DIAGNOSTIC X-RAYS

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The discovery of X-rays has provided enormous medical benefits to patients during the last century but it is also generally accepted that their use conveys some risk of cancer. It is difficult to study the potential risks directly using traditional epidemiological methods. However, it is possible to estimate the lifetime risk that could be associated with these low doses using risk estimates from populations exposed to higher doses of radiation, such as the Japanese atomic bomb survivors.

Data on the current annual frequency of common diagnostic X-rays, the estimated organ dose from X-rays and the risk models from the Japanese atomic bomb survivors were combined with cancer incidence and all cause mortality rates to estimate the proportion of lifetime cancer risk that could be attributable to diagnostic X-rays in the U.K and in fourteen other developed countries.

It was estimated that 1.6% of lifetime cancer risk in women could be attributable to diagnostic X-rays in the U.K., and 1.3% in men. This is equivalent to approximately 570 cases per year in women and 400 in men. Japan currently has the highest recorded annual use of diagnostic X-rays and it was estimated that 10.7% of lifetime cancer risk in women and 7.3% in men could be attributable to this level of diagnostic X-ray use. Estimates for the other countries lay between those for the U.K. and Japan.

Diagnostic X-rays could cause more than 1% of lifetime cancer risk in developed countries. However, as there are clear benefits from the use of diagnostic X-rays it is necessary for those involved in radiation protection to assess whether the benefits outweigh the risks.

98 POPULATION-BASED CASE-CONTROL STUDY OF CAROTENOIDS AND ANTIOXIDANTS IN RELATION TO OVARIAN CANCER RISK AMONG PRE- AND POSTMENOPAUSAL WOMEN

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Background: An inverse association between ovarian cancer risk, carotenoids and anti-oxidant vitamins has been reported by several epidemiologic studies and one experimental trial of a vitamin A analogue. Because recent studies related to breast cancer suggests that these associations might be modified by menopausal status, we examined relationships between the carotenoids and antioxidant vitamins as they might vary for ovarian cancer occurring pre- or postmenopausally.
Methods: We conducted a population-based case-control study in eastern Massachusetts and New Hampshire involving 549 women with newly-diagnosed epithelial ovarian cancer and 516 control women selected either by random digit dialling or through lists of residents. We estimated the consumption of the antioxidant vitamins A, C, D, and E and various carotenoids, including alpha and beta-carotene and lycopene using a validated dietary questionnaire. Multivariate logistic regression was used to calculate the exposure odds ratios adjusted for established ovarian cancer risk factors.

99 PRESENTATION AND SURVIVAL FOR COLORECTAL CANCER IN SCOTLAND

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Background: Survival following diagnosis of colorectal cancer is lower in the UK than in other European countries; both later presentation and management of the disease have been suggested as reasons for these differences.
Objectives: To describe patterns of presentation and survival in Scotland according to patient characteristics and the principal centre of treatment.
Subjects: Incident cases of colorectal cancer (ICD10 C18-C21) in 1997 (n=3,365), obtained from the Scottish Cancer Registry.
Main outcome measures: One- and two-year survival.
Methods: Multilevel logistic regression.
Results: One third of the patients died within one year and 46% within two years. Both patterning of presentation and survival were strongly associated with age and analyses were carried out separately for the under- and over-75 age groups. In the under-75s, late-presentation of the disease was more common amongst men and patients resident in more deprived areas (based on 1991 Carstairs scores for small areas). After adjusting for staging, mortality remained significantly increased in men (OR(95% CI)=1.4 (1.1–1.7)), and in patients resident in more deprived areas (e.g. OR(95% CI)=1.7 (1.2–2.4), comparing upper to lower quartile of deprivation). Patterns of presentation were less pronounced in the over-75s and, after adjusting for staging, there were no significant effects of sex or socioeconomic deprivation on mortality. Principal centre of treatment had little effect on survival compared to patient characteristics; however, there was evidence that outcomes for the over-75s were more influenced by hospital than those in the under-75s.
Conclusion: Within Scotland, there is evidence of social patterning of disease presentation and, given that outcomes improve notably with earlier presentation and treatment, the reasons for these inequalities should be addressed. A more detailed analysis of treatment following diagnosis might offer further insight into why mortality remained high among men and patients from deprived areas after accounting for differential presentation patterns.

100 SOCIOECONOMIC VARIATIONS IN TUMOUR SUBSITE AND HISTOPATHOLOGICAL SUBTYPE OF ADVERSE PROGNOSIS AMONG COLON CANCER PATIENTS

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Background: Different risk factors may exist for ascending and sigmoid colon cancer and this may be reflected in changes in subsite incidence. Differences in the frequency of poor prognosis histopathological subtypes (e.g. mucin-producing adenocarcinoma [MPA]) may account for worse survival previously described in more deprived patients.
Objective: To evaluate the socioeconomic (SE) variation in tumour subsite and histopathological subtype among colon cancer patients.
Method: Merseyside and Cheshire Cancer Registry (MCCR) data on tumour subsite, histopathological subtype and patient socioeconomic status (SES) were analysed for all cases diagnosed 1989–1996 (n=7234). Four subsites (ascending, transverse, sigmoid and other)

and two histopathology types (MPA and all other types) were used. SES was measured using Carstairs' index quintiles. Multiple logistic regression analysis was used to assess SE variation, adjusting for age (three age groups) and sex.

Results: With least deprived as the reference group:

ORs (95% CIs) for sigmoid colon tumour subsite were 1.09 (0.92–1.29), 1.08 (0.92–1.27), 1.11 (0.94–1.31) and 1.24 (1.05–1.47) for successively more deprived quintiles, showing increased risk with increasing deprivation.

ORs (95% CIs) for ascending colon tumour subsite were 1.16 (0.98–0.1.37), 1.11 (0.95–1.3), 0.94 (0.79–1.12) and 0.91 (0.77–1.09) for successively more deprived quintiles, showing no clear deprivation group gradient.

The ORs (95% CIs) for MPA were 0.88 (0.66–1.17), 0.82 (0.62–1.09), 0.56 (0.41–0.78) and 0.63 (0.46–0.86) for successively more deprived quintiles, showing increased likelihood of MPA with higher affluence.

Conclusion: For sigmoid colon cancers, the results support previous findings suggesting that colon tumour subsites should be treated separately in epidemiological studies examining the influence of SES. For histopathological subtype, the findings are not consistent with the suggestion that differences in tumour histopathology may account for worse survival in deprived patients.

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101 | ESTIMATING THE RISK OF COLORECTAL CANCER FOR PATIENTS WITH ULCERATIVE COLITIS: A META-ANALYSIS OF HETEROGENEOUSLY REPORTED STUDIES

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Background and Objectives: Controversy surrounds the underlying risk of Colorectal Cancer (CRC) in patients with Ulcerative Colitis (UC), with a large number of epidemiological studies reporting widely varying rates. Whilst it is accepted that patients with extensive disease for long duration are at greater risk, a quantitative assessment of such an elevation of risk is paramount in order that appropriate counselling and service provision may be provided.

Methods: A systematic review was undertaken which initially identified 116 epidemiological studies which the met pre-specified inclusion criteria. Where possible information was extracted on both length of follow-up and UC duration, so that Person-Years Duration (PYD) could be calculated and used in a meta-analysis.

Results: Of the 116 studies included only 41 studies provided sufficient information for overall PYD to be calculated, and only 19 of the 41 studies provided sufficient detail for decade-specific PYD to be calculated. Using a random effects meta-analysis the overall incidence rate, based on 41 studies, was estimated to be 3/1000 PYD with 95% CI 2/1000 PYD to 4/1000 PYD. The 19 studies which reported decade-specific follow-up yielded estimates for the incidence rate of 2/1000 PYD (95% CI 1/1000 to 2/1000) in the first decade, 7/1000 (95% CI 4/1000 to 12/1000) in the second and 12/1000 PYD (95% CI 7/1000 to 19/1000) in the third.

Discussion: Whilst such decade-specific incidence rates enable the cumulative risk to be calculated at a variety of time points, the analysis above ignores the fact that the remaining 22 studies which failed to stratify follow-up according to decade of disease duration had been excluded from this part of the analysis. We present and discuss an alternative Bayesian meta-analysis model which enables this deficiency to be considered, and thus allows for all incidence data to contribute to the estimation of cumulative risk.

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102 | GENETIC POLYMORPHISMS IN FOLATE METABOLISM, DIETARY FOLATE INTAKE AND COLORECTAL CANCER: A POPULATION-BASED CASE-CONTROL STUDY

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Introduction: Colorectal cancer (CRC) is the third most common cancer in males and the second most common in females in Scotland. Evidence suggests that a high vegetable intake is associated with reduced CRC risk. Vegetables are a major source of folate. There are functional polymorphisms in the methylenetetrahydrofolate reductase (MTHFR) gene which controls folate metabolism. Folate intakes are relatively low in Scotland. These functional polymorphisms may be of public health relevance for conditions where folate is aetiologically important. We present results from a population-based case-control study of folate, MTHFR and CRC.

Methods: Eligible cases were Grampian health board residents with histologically confirmed colorectal cancer diagnosed September 1998-February 2000. Population-based controls were selected from the Grampian Community Health Index and frequency matched with cases on age and sex. Subjects were asked to complete a food frequency questionnaire and provide a mouthwash sample by post. DNA was extracted from exfoliated buccal cells. PCR methods were used to determine the C677T and A1298C polymorphisms in MTHFR.

Results: 271 cases (62% of those eligible) and 409 controls (61%) participated. 632 samples were genotyped for A1298C. 87 cases (35.7%) and 162 controls (41.8%) were homozygous wild-type. Compared to homozygous wild-types, the odds ratios (OR) for heterozygous and homozygous variant subjects were 1.40 (95% confidence interval 0.99–1.99) and 1.02 (0.63-1.66) respectively. 657 samples were genotyped for C677T. Compared to homozygous wild-types, risk was reduced for heterozygotes (OR= 0.91; 0.65–1.26) and those homozygous for the C677T variant (OR=0.76; 0.44–1.32). Analyses of intake of folate and related micronutrients will be presented. Possible interactions between dietary folate and genotype will be considered.

Conclusion: An inverse association between CRC and the MTHFR C677T polymorphism was found - consistent with other studies. No clear association was apparent with the A1298C polymorphism, which may reflect the less marked effect on enzyme activity.

Infectious disease I

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103 | A COMMUNITY RANDOMISED TRIAL (CRT) TO EVALUATE IMPACT OF BEHAVIOURAL INTERVENTION, WITH OR WITHOUT SYNDROMIC STD MANAGEMENT, ON INCIDENCE OF HIV AND OTHER STDS IN RURAL UGANDA

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Objective: To evaluate the impact of a behavioural intervention (IEC), with or without syndromic STD management, from a CRT on incidence of HIV and other STDs in rural Uganda.

Methods: A three-arm CRT targeting all adults (13+years) residing in 18 rural communities (about 96,000 adults) was conducted between 1994–2000. Adults in 12 communities received a standardised IEC programme through community-based AIDS education, community meetings and information leaflets. In addition to IEC, improved STD management through government and private health units was implemented in six of these communities. The remaining six communities formed the comparison arm. They received routine government health services and general development activities. The interventions' impact was assessed using three serological surveys and interviews conducted on adults living in 3–5 villages in each community. Social marketing of condoms and HIV voluntary testing and counselling were implemented in all communities.

Results: Approximately 15,000 adults (72% of eligible population) were seen and bled at rounds 1 and 2, and 13,000 adults (91% of eligible) at round 3. Baseline HIV prevalence rates were 9–10% in all arms and baseline demographic, behavioural characteristics and STD prevalence were also similar. In the IEC communities, there were 391,995 attendances at 81,502 activities (mean of 6.1 per target adult), 164,063 leaflets distributed (2.6 per person) and 1,586,270 condoms (16.5 condoms per adult). In the STD communities a total of 12,242 cases (65% women) were seen over a 5-year period (7.7 per 100 adults/year). Overall there were 304 HIV incident events observed in 13,623 persons and 41,060 person years (rate of 7.4 per 1000 pyrs) in all arms.

Conclusion: This is the first HIV intervention trial of its type with an IEC component. The process data suggest that interventions were adequately implemented. Intervention impact on HIV and other STDs will be presented.

104   CHANGES IN HIV SURVIVAL IN A EUROPEAN COHORT OF PERSONS WITH WELL ESTIMATED DATES OF SEROCONVERSION

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Objective: To estimate survival following HIV seroconversion in each of four calendar periods approximating the availability of different levels of therapy; none; mono therapy; dual combination therapy and highly active antiretroviral therapy (HAART).

Methods: We estimated survival following seroconversion using Kaplan-Meier methods, allowing for late entry, in each of the periods; to 31.12.1988, 1989–1994, 1995–1996, and 1997–2000 for persons, aged 16 years or more, with documented times of seroconversion from 19 cohorts. For each period, persons entered the risk set on the date of seroconversion; the date of entry into the original cohort; or the first day of that period, whichever is the latest. Follow-up was censored on the last day of each period. Cox models, stratified by cohort, were used to investigate the possible effects of age, sex, and exposure category.

Results: Of 1878, 4804, 4656, 4889 persons at risk in each of the 4 calendar periods, 103 (5.5%), 870 (18.1%), 549 (11.8%), and 304 (6.2%) respectively died in those periods. As expected, age was found to be a prognostic factor. A 10 year increase in age at seroconversion was associated with a 94, 39, 33 and 45% increase in the risk of dying in those periods respectively. We estimated survival 10 years after HIV seroconversion for persons aged 25- 29 to be 61% (95% CI = 56-66%), 55% (95% CI = 48- 60%), and 88% (95% CI = 84- 91%) for the last three periods respectively. Few remained in the risk set 7 years after seroconversion in the period prior to 1989.

Conclusion: We found significant increases in survival expectations in the period in which HAART became available. Continued follow up of persons with known times of HIV seroconversion is crucial, however, in order to assess whether the improvements reported here are sustainable.

105   THE CLINICAL, SOCIAL AND ECONOMIC BURDEN OF CHICKENPOX IN A DEVELOPED COUNTRY

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A common but mild disease may place a greater economic burden on a community than one which is serious but rare. Chickenpox is common in children. It is becoming commoner in adults. We studied the burden of chickenpox in 1997 in England and Wales at four levels of severity.

    clinical disease, no health service usage (phase1)
    primary care consultation (2)
    hospital consultation (3)
    death (4)

    Two general practices were used for phase 1 (denominator:22181 persons); 19 for phase 2 (192485 persons); 17 General Hospitals in one Region (population 3.5m) for phase 3; and deaths covering a 3 - year period (1995–1997) for England and Wales (population 50m) analysed for phase 4.

    Phase 1: Nearly 85% of 897 respondents who had chickenpox consulted a health service professional.

    Phase 2: 677 patients with chickenpox in primary care were ascertained; 555 (83%) were interviewed. Mean duration of illness was 9.0 days (range 1–70). Mean days lost from normal activities were 2.6 (nursery groups), 5.2 (school), 5.5 (employment). The mean cost of chickenpox per case for primary care was £178.30.

    Phase 3: of 190 patients admitted with chickenpox, mean in-patient hospital stay was 3.9 days. Of 104 patients reported by Infection Control Teams, 72% were interviewed. Mean duration of in-patient stay was 4.7 days (range 1–17) and illness 11.2 days (range 3–34). Proportions of cases in socio-economic groups 1 and III N were higher than expected. 4/104 patients died. Mean cost per hospitalised patient was £2,621. Cost of inpatient stay for deceased cases was £8373 (range £1136 - £27,363).

    Phase 4: We estimated 25 deaths per year from chickenpox, equivalent to a case-fatality rate (CFR) of 9.22/100000. Adults accounted for 19% of GP consultations, and 81% of deaths. Twice as many men died from chickenpox as women.

    Chickenpox is a serious illness, especially in adults.

106   MOLECULAR EPIDEMIOLOGICAL APPROACHES TO STUDYING THE TRANSMISSION OF MYCOBACTERIUM LEPRAE

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Understanding of the transmission of M.leprae is fundamental to the development of measures to prevent the spread of infection. However our current understanding is limited because of difficulties in cultivation of M.leprae.

    The MILEP2 study was developed to assess new epidemiological tools that could be used to study transmission of M.leprae in endemic communities. The study, funded by the European Commission, was undertaken by partners in London (UCL), Bergen (Norway), Royal Tropical Institute in Amsterdam, Miraj (India) and AHRI (Ethiopia), and Aberdeen.

    The study aimed at defining leprosy transmission and protective immunity within leprosy endemic populations using PCR (polymer chain reaction) to detect small quantities of the M.leprae genome and measurement of mucosal immunity using a salivary IgA assay. The PCR method was developed for use with nasal swabs and the IgA method was based on an ELISA assay.

    Population surveys were conducted on 3 occasions over a period of 3 years in 3 villages in India and once in a village in Ethiopia. The results presented are for the PCR findings for the surveys in the 3 communities in India. A total of 3034 (81%) of the eligible population in the 3 villages were surveyed, 6.7% were household contacts of leprosy cases and 50.1% had received BCG. The proportions found to be PCR positive varied by village and between surveys in each village. Little difference in the proportion PCR positive was noted by BCG status however a distinct seasonal pattern was demonstrated with highest rates of positivity in the wet seasons over the 3 years.

    The use of PCR methods to describe the patterns of Mycobacterium leprae presence in endemic communities provides new evidence on understanding leprosy transmission. The work demonstrates the potential of this novel approach to studying the epidemiology of leprosy.

107   MENINGITIS PROPAGATION IN SOUTHERN TANZANIA: THE ROLE OF A VILLAGE VIDEO SHOW

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Background: The meningitis epidemic caused by Neisseria meningitidis reached Tanzania in 1992. In the following years, a total of 3679 cases were registered. We investigated an outbreak with an unusually high attack rate to examine local modes of propagation.

Methods: The outbreak occurred in a rural village close to the Mozambican border where a commercial video show, attended by 200 people, had featured in a windowless store room. During the following 2 days, 4 of the attendees died with symptoms suggestive of meningitis. A meningitis outbreak was then suspected and a treatment camp set up. We conducted a case-control study in which we drew cases from the records of the treatment centre and from a community-wide case search. We enrolled controls by randomly selecting 35 households from the village and interviewing all 108 household members who had not been cases.

Results: There were 85 meningitis cases, the attack rate was 16.0%. Sixteen cases died (case fatality rate 18.8%). The age- and sex-adjusted odds ratio for attendees of the video show was 8.0 (95%CI: 3.8–16.8). Restriction to cases with an onset in the first week (common incubation period of meningitis) gave an odds ratio of 10.0 (95%CI: 3.4–29.6). Among cases with an onset after day 7, the odds ratio was 2.5 (95%CI: 1.2–5.0).

Discussion: A key factor in explaining the severity of this outbreak was the transmission during a video show. Mobile commercial video shows have become increasingly popular in rural areas of developing countries. They often take place in congested show-rooms lacking ventilation, and attract visitors from surrounding villages. This combination provides ideal conditions for the transmission of meningitis. Our findings are a reminder that the introduction of new technologies to developing countries may have unexpected adverse health effects.

108 | RISK FACTORS FOR HERPES ZOSTER IN IMMUNOCOMPETENT ADULTS

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Background: Herpes zoster occurs when latent varicella-zoster-virus (VZV) reactivates following waning cell-mediated immunity. Zoster gives rise to significant morbidity, which may be best limited by preventing viral reactivation. However, determinants of zoster in immunocompetent adults are largely unknown.

Methods: Case-control study in South London. Cases were adults with recently diagnosed zoster and no underlying immunosuppressive conditions, presenting to general practices. For each case, two controls (with no history of zoster) were selected, individually matched by age, sex, and practice. Participants were interviewed at home, using a standardised questionnaire. Information was sought on 1) factors which might protect against zoster by boosting specific immunity, namely contacts with varicella cases or contacts with children (proxies for varicella contacts), and 2) possible determinants of generalised loss of cell-mediated immunity, including exposure to ultraviolet radiation (UVR), micronutrient intake and stressful events. Odds ratios were estimated using conditional logistic regression.

Results: Data from 244 cases and 485 controls were analysed. On univariate analysis, social contacts with children, occupational contacts with ill children and contacts with varicella cases all showed significantly graded protection against zoster, with less than one fifth the risk in the most heavily exposed individuals. Childhood UVR exposure was associated with an increased risk of zoster, as were sunburns causing severe erythema in the last ten years. Individuals experiencing two or more stressful events in the last two months were at more than three times the risk of zoster. Results of multivariate analyses will be presented.

Conclusions: Findings from multivariate analyses could have major implications for vaccination programmes, as widespread varicella vaccination of children could lead to increased incidence of adult zoster by decreasing exogenous VZV exposures. UVR analyses may provide insight into immune system programming in childhood, and new evidence of the deleterious effect of acute UVR exposure on cell-mediated immunity.

Prevention and evaluation

109 | ARE FRUIT TUCKSHOPS IN PRIMARY SCHOOLS EFFECTIVE IN INCREASING PUPILS' FRUIT CONSUMPTION? A CLUSTER RANDOMISED TRIAL

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Objective: To identify the effectiveness of fruit tuckshops in primary schools as a method to increase pupils' fruit consumption.

Design: Cluster randomised trial, with school as the unit of randomisation.

Main outcome measures: Fruit intake, measured by computerised 24-hour recall questionnaire.

Secondary outcomes: Frequency of reported fruit consumption in school; consumption of other snacks; fruit tuckshop sales.

Setting: Forty-three primary schools in South Wales and the Southwest of England.

Participants: Pupils in Years 5 and 6 (aged 9–11) attending these 43 schools. Baseline data were obtained from 1902 pupils, and follow-up data from 1924 pupils.

Intervention: The 23 intervention schools were asked to operate fruit tuckshops throughout the academic year 1999/2000. At least one type of fruit (or fruit juice) was sold each day, at 15p per item, and no other items were sold. The 20 control schools did not have any form of tuckshop.

Methods: At baseline (summer term 1999), pupils in all 43 schools completed the computerised questionnaire. This was repeated one year later, when pupils were also asked to complete a brief paper questionnaire with questions about fruit consumption attitudes and behaviour.

Results: Approximately 70,000 fruits were sold in the 23 intervention schools over the year, equating to 0.046 fruits per pupil per day. Four schools had ceased to operate their tuckshops by the end of the intervention year. Data from the computerised questionnaires indicated that there was no significant difference between intervention and control schools in pupils' intake of fruit or other snacks. However, in the paper questionnaire intervention school pupils were more likely to report that they ate fruit as a snack at school 'often' rather than 'sometimes' or 'not at all' (odds-ratio 1.55 (95% CI: 1.15,2.08) p=0.005).

Conclusions: Fruit tuck shops were successfully operated in the majority of schools, but had a limited impact on pupils' fruit consumption.

110 | A NATIONAL EVALUATION OF SCHOOL BREAKFAST CLUBS

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In Spring 1999 the Department of Health announced a new, multi-agency initiative to support the development of breakfast clubs in schools. 'Breakfast clubs' are a form of before-school provision, serving food to children who arrive early. Priority for funding under the scheme was to be given to schools in more deprived areas, such as those located in Health Action Zones or Sure Start areas. A multi-disciplinary team has been commissioned to undertake an evaluation, which continues until July 2001.

Methods: The evaluation has used three major strands of enquiry, these being: a survey of developing breakfast club provision; a cluster randomised controlled trial to measure outcomes; case studies of schools within the scheme.

Results: Over 250 schools have participated in the scheme, with clubs typically catering for 25 pupils a day. Descriptive data show that schools, families and service providers have generally regarded the clubs as having produced important, positive effects. These perceived benefits include improvements in nutrition and dietary behaviour, attendance and punctuality, concentration and performance in class, behaviour and socialisation at school. Interim analysis of baseline and first follow up data from the RCT examined whether breakfast clubs have an effect at the level of the school as a whole. This identified a possible improvement in concentration for children attending intervention schools and current analysis incorporating second follow up data is exploring whether a school level effect is sustained over a longer term. Further analyses at both the school and individual levels are currently being concluded. Provisional results indicate that primary school breakfast clubs have a beneficial impact on both problems with hyperactivity and social behaviour for the school population as a whole. Preliminary individual level findings are currently subject to further clarification.

Provisional Conclusion: Breakfast clubs have been well received by schools, families and service providers. Further analyses are being undertaken which seek to clarify preliminary findings.

111 | MONITORING SUCCESS OF ANTENATAL HIV SCREENING IN EUROPE

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Background: It has been apparent since 1992 that a reduction in mother to child transmission of HIV infection can only be achieved if maternal HIV status is known during pregnancy and interventions to reduce vertical transmission are offered to infected women. As a result policies on antenatal HIV testing have been developed throughout Europe. To assess the impact of these policies we analysed trends in perinatally acquired HIV/AIDS in selected countries in Europe.

Methods: Reports of perinatally acquired AIDS in infants aged less than one year, which were obtained from the European Non-Aggregate AIDS Data set (ENAADS), were analysed by year of diagnosis between 1992 and 1999. This analysis was restricted to infants born in France, Italy, Spain and the UK.

Results: In 1992 the number of paediatric AIDS diagnoses varied according to individual country, ranging from 11 in the UK to 32 in Spain. This variation reflects differences in maternal HIV prevalence between the countries. Between 1992 and 1999 the number of paediatric AIDS diagnoses decreased substantially in Italy, France and Spain (an estimated 94%, 93% and 85% reduction respectively). In the UK the number of paediatric AIDS cases doubled between 1992 and 1997, and then declined from 25 in 1997 to 10 in 1999.

Conclusion: Improved antenatal HIV detection and increased uptake of interventions to reduce mother to child transmission of HIV

has been accompanied by a decrease in numbers of early paediatric AIDS cases throughout Europe. Within the UK this decrease in paediatric AIDS cases has occurred more recently, reflecting an initial failure of antenatal HIV testing throughout the country.

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112 BY HOW MUCH DOES MORTALITY RISK DECLINE WHEN A PATIENT WITH CORONARY HEART DISEASE STOPS SMOKING? A SYSTEMATIC REVIEW SUPPORTED BY THE COCHRANE HEART GROUP

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Background: Smoking cessation is known to reduce risk of coronary heart disease (CHD) in 'healthy' people, but the magnitude of risk reduction among patients who already have CHD is uncertain.
Objectives: a) appraise cohort studies that estimate risk reduction when patients with CHD stop smoking, b) investigate sources of heterogeneity, and if appropriate carry out random effects meta-analysis.
Search strategy: Nine electronic databases were searched from onset, including MEDLINE, EMBASE, and Science Citation Index, supplemented by examining reference lists and contacting study investigators of large cardiovascular cohorts.
Selection criteria: Prospective cohort studies including smokers who continue and those who quit after a CHD diagnosis; involve at least two years follow-up; and include all-cause mortality outcome.
Data collection and analysis: We independently extracted duplicate data on: index CHD event, smoking/smoking cessation definitions, biochemical validation of cessation, follow-up duration and completeness, measurement and control of confounders, analysis and outcomes.
Results: 8577 hits were retrieved from the database searching. After screening, 20 studies met all inclusion criteria and had relevant information available (further data on request). Most cohorts were from clinical case-series. Some population-based cohorts have collected but not published relevant data. Quality of reporting varied considerably, with some not controlling for major confounders. Only two studies validated smoking status biochemically.
The study odds ratios (OR) were relatively consistent. On the basis of results to date, the crude pooled odds ratio (OR) of mortality for those who quit smoking compared with those who continue was 0.51 (95% CI 0.42–0.60). 'Higher quality' studies tended to report smaller reductions (pooled OR 0.61, 95% CI 0.53–0.69).
Conclusion: Despite limitations in study quality, and possibility of publication bias, there is strong evidence that quitting smoking is highly efficacious. This risk reduction may be greater than that for other secondary preventive therapies such as cholesterol lowering.

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113 THE LONG-TERM EFFECT OF DIETARY ADVICE IN MEN WITH CORONARY DISEASE: FOLLOW UP OF THE DIET AND REINFARCTION TRIAL (DART)

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Background: Observational studies suggest that increased intake of fish, reduced intake of saturated fat and increased intake of fibre lower coronary risk but the value of such advice in people with coronary disease is unclear.
Method: Between 1983 and 1987 2,033 men, who had recently suffered a myocardial infarction, were enrolled in a two-year trial of intensive dietary advice. Participants were randomised in a factorial design to receive advice to eat more fish (particularly fatty fish), less fat or more cereal fibre. Men allocated to receive no advice were given a sensible eating sheet. Men were flagged with the Office of National Statistics. Between 1999 and 2000 surviving men were sent a short questionnaire.
Results: By February 2000, after 21,147 person years of follow-up, 1083 (53%) of the men had died. Of these deaths 738 (68%) were attributed to coronary heart disease and 52 (5%) to stroke. Completed questionnaires were obtained from 879 (85%) of the 1,030 men alive at the beginning of 1999. Relative increases in fish and fibre intake were still present at ten years but were much smaller. The early reduction in all-cause mortality observed in those given fish advice—unadjusted hazard 0.70 (95% CI 0.54, 0.92) was followed by an increased risk over the next three years—unadjusted hazard 1.31

(95%CI 1.01, 1.70). Fat and fibre advice had no effect on coronary or all-cause mortality. The risk of stroke death was increased in the fat advice group—the overall unadjusted hazard was 2.03 (95% CI 1.14, 3.63). The results were unaltered after adjustment for baseline measures of disease severity and medication use.
Conclusions: In this study dietary advice following a myocardial infarction did not confer any long-term survival benefit. Further trials of advice to eat more fatty fish and cereal fibre are feasible and necessary.

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114 A COMPUTER SIMULATION MODEL OF THE PREVENTION AND TREATMENT OF CORONARY HEART DISEASE

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Background: The National Service Framework for Coronary Heart Disease (CHD) has set standards of care for CHD. Mathematical models can provide policymakers with a means of exploring the implications of different prevention and treatment strategies in terms of changes in mortality, morbidity and costs. This presentation will provide an overview of a project to develop a new national model that could be used for such a purpose.
Aims: The overall aim of this project is to develop a computer simulation model that integrates prevention and treatment of CHD. This paper presents the treatment model.
Methods: The model utilises a form of discrete event simulation called Patient Orientated Simulation Technique. Treatment pathways were constructed and data on epidemiology and natural history of CHD, efficacy of treatments and current usage were collected. Sources used were: consultation with experts, searching electronic databases for systematic reviews, RCTs and epidemiology studies (Medline, Premedline, Embase and Cochrane) and collecting data from routine datasets (e.g. British Cardiothoracic Surgeons database and the Health Survey for England).
Results: We have developed a user-friendly model for disease states: stable angina; unstable angina and myocardial infarction, with current outputs of deaths, lives saved and resource use. We have tested the validity of our model using prevalence and mortality data. We will provide a demonstration of model outputs using illustrative scenarios (based on NSF targets), e.g. the impact of reducing ambulance response times and faster time to thrombolysis. Methodological problems will be discussed, including: lack of data on the pathway to revascularisation; applying prognostic estimates; linkage to prevention and data limitations of existing national datasets.
Conclusions: Potentially, this model could be used to evaluate the impact of CHD policy directives; including the NSF targets. Further development will include incorporation of the CHD disease states: heart failure and arrhythmias and CHD symptoms as an outcome.

Local/environmental health

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115 THE EFFECTS OF THE CHARACTERISTICS OF NEIGHBOURHOODS AND THE CHARACTERISTICS OF INDIVIDUALS ON CAUSE-SPECIFIC MORTALITY

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Objectives: To assess the strength of the associations between area characteristics and cause-specific mortality, while adjusting for individual characteristics, and study whether the association between individual measures of social position and mortality vary in different types of areas.
Methods: 1990 census records of over 25-year-old men in the Helsinki Metropolitan area linked to death records in 1991–1995; almost 1.22 million person-years and 15 000 deaths. Individual characteristics were education, social class, housing tenure, housing density and living arrangements. Proportion of manual workers, proportion of over 60-year-olds, and social cohesion were measured for 55 small areas, and SAS Glimmix was used to fit multilevel models.

Results: In these data 36% of the over 15-year-old male population in 1990 did not live in the same area in 1985. Men in areas with high proportion manual workers and low social cohesion have high mortality, particularly among 25–64-year-olds. About 70% of this excess is explained by compositional differences of individuals in these areas. Accidents and violence, circulatory diseases and alcohol-related causes contribute most to these area effects. Area characteristics do not consistently modify or mediate the effects of individual social characteristics on mortality.

Conclusions: Unaccounted individual variability can not be excluded as an explanation for the observed area effects, but their existence for accidental and violent causes and alcohol related causes may be taken as evidence for a minor causal effect between area characteristics and mortality. However, overall these results indicate that area based measures have very modest independent effects on mortality, as compared to individual characteristics. Rather than the characteristics of geographic areas, the structure of peer-groups, family settings and other social context in which people interact may be more fruitful targets for further research and policy on contextual effects on mortality.

116 FROM LOCAL CONCERN TO RANDOMISED TRIAL: THE WATCOMBE HOUSING PROJECT

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Does improving housing conditions improve people's health? While poor housing is associated with poor health, we have lacked good evidence that improving housing results in better health. In Torbay, a survey by Watcombe estate residents revealed both high levels of damp and poor health of tenants. Torbay Council agreed to improve the houses. NHS R&D (SW) funded the evaluation.

Ten partner organisations are represented on the project steering group, including tenants from the estate. Improvements were carried out over two years. Houses were randomised to improvement in the first or second year: a local councillor drew house numbers from a bucket at a public meeting.

General (SF36 and GHQ12) health measures are collected annually in all adult tenants. Disease-specific measures are collected for adults reporting angina, arthritis or asthma and children reporting asthma. An environmental engineer visits each house annually to collect data on indoor air quality. In the first two years of data collection, response rates to both health and environmental surveys have been over 80%. This high level of participation has been fostered by the involvement of the tenants in the steering group and public meetings, the accessibility of the researcher to the tenants, production of newsletters and prizes (from local businesses) for participation in surveys.

All house improvements are now complete. The main interventions are installation of central heating, insulation, ventilation and double-glazed doors. Data collection will be complete in 2002, permitting comparisons before and after improvements and between improved and unimproved houses in year 2.

Extension of the project to all public housing stock in Torbay, now managed by the Riviera Housing Trust, is under discussion. The enthusiastic participation in the project by tenants, housing departments and voluntary organisations demonstrates the feasibility of transferring rigorous models of evaluation (such as randomised trials) to community settings.

117 THE HEALTH EFFECTS OF HOUSING IMPROVEMENTS: A SYSTEMATIC REVIEW OF INTERVENTION STUDIES

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Background: Development of evidence based housing policy has been impeded by a lack of research evidence linking housing and health.

Objective: To review the evidence from intervention studies of the effectiveness of housing improvements in generating positive health effects.

Design: A systematic review of experimental and non-experimental housing intervention studies.

Setting: Published and unpublished studies dating from 1936, in any language or format, were identified from 16 clinical, social science and grey literature databases, personal collections, expert consultation and reference lists.

Results: Eighteen completed primary intervention studies were identified, of which only 6 were identified using electronic databases. Eleven of the completed studies were prospective, of which six used control groups. Three of the retrospective studies used a control group. The interventions included rehousing, refurbishment, and energy efficiency measures. Many of the completed studies identified demonstrated small health gains following the intervention, eg. reduced illness episodes, improved mental health. However, small study populations and lack of comparable control groups and of controlling for confounders limit the generalisability of these findings.

Conclusions: There is a small body of evidence from intervention studies that housing improvements may be able to generate small health gains. This lack of evidence limits the capacity to develop evidence based healthy housing policy. Linking housing and health requires an holistic approach which recognises the multi-factorial and complex nature of poor housing and deprivation. Large scale, quasi-experimental studies which can provide comparative data on effectiveness and cost-effectiveness of different housing interventions are now required. Important methodological issues which relate more generally to systematic reviews of social interventions, such as search strategies and use of evidence, have been raised in this review. The lack of evidence from intervention studies may necessitate the incorporation of a broader range of evidence to inform healthy public policy.

118 THE FEAR OF CRIME AND AREA DIFFERENCES IN HEALTH: APPLYING MULTILEVEL MODELS OF SOCIAL CAPITAL IN EXPLAINING SOCIAL INEQUALITIES IN HEALTH

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Study objective: The fear of crime may be an important explanatory mechanism underlying social and geographical inequalities in health. A number of studies have shown that major health inequalities exist between different areas within the UK. However, there has been some debate about the mechanisms underlying area differences in health. It has been hypothesised that area differences in health may be partly explained by differences in social capital. The fear of crime in the local neighbourhood may be an indicator of social capital, as to some extent, it measures the breakdown in community trust and networks.

Design: This study examines cross sectional data from the 1996 British Crime Survey Health was measured by the respondent's self rating of general perceived health. Social capital was operationalised by using a measure of the fear of crime in the local area or neighbourhood. Multilevel logistic regression models were used to examine area differences in health.

Setting and Participants: A population representative sample survey of adults in England and Wales (N=16,090).

Main results: The fear of crime was found to be associated with self-rated health even after adjusting for health behaviours and a number of individual and household level socio-economic factors. Area differences in self-rated health were reduced to non-significance after health behaviours, socio-economic factors and the fear of crime were adjusted for in the regression model.

Conclusion: There is some evidence that fear of crime is associated with health and it may have an important role in explaining area differences in health.

119 ENVIRONMENTAL HEALTH IMPACT ASSESSMENT— DEVELOPING A QUANTITATIVE MODEL

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Introduction: European Union directives require large construction projects to undergo environmental impact assessment for planning permission. In the UK, about 250 environmental statements are submitted to local authorities each year. We have investigated the epidemiological basis of these environmental statements and developed a mathematical model to contribute to assessing health impacts.

Methods: We assessed the literature on environmental impact assessment, and read examples of environmental statements produced in the commercial field. We identified dimensions where epidemiological evidence could be applied, and information about the exposed population. We constructed a mathematical model of population mortality and morbidity, and assessed the effects of epidemiological hazard functions over time on population health status.

Results: Few environmental statements directly assess health effects. For fourteen domains typically recorded, quantitative estimates of human effects drawn from epidemiological and toxicological literature could be made for four (air, noise, carcinogens, traffic). The estimated exposed population varies for the different environmental dimensions. The model applies risks to the defined population and can be used to assess alternative planning options. We have applied the model to estimate impacts of two proposed waste incinerators.

Discussion: Epidemiology can be applied to environmental impact assessment. However, the current literature often does not describe risks for population subgroups, and different approaches need to be summed to estimate the total impact. There is a need for better hazard estimates in other areas of environmental impact, for example energy, water, hazardous incidents or socio-cultural effects. Epidemiology may also be used for modelling the health impact of broader public policies.

120 LANDMINE-RELATED INJURIES IN BOSNIA AND HERZEGOVINA 1991–2001: CHILDREN AND ADULTS

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Objective: To describe the patterns of landmine-related injuries of children and compare them to those of adults in Bosnia and Herzegovina, for the period 1991–2001.

Design: Retrospectively (war-years, 1991–95) and prospectively (post-war, 1996–2001) collected information on victims of mine-related injuries. Standard questionnaire completed by the International Committee for Red Cross (ICRC) field-worker following a visit to the victims' household, questionnaires returned monthly and entered on ICRC database.

Main outcome measures: Numbers of children (up to 18 years) and adults, who were victims of mine-related injuries and their distribution by factors including timing of injury, nature of the device, knowledge of the site being mined and whether the incident was 'preventable'.

Results: There were 4064 victims of mine-related injuries reported to the ICRC overall (1991–2001), of which 549 (14%) were children. Greater predisposition for male sex and spring season were features common to both; however, children differed significantly from adults in several respects including nature of the device (classical landmines: children 48%, adults 89%; p<0.001), knowledge of the site being mined (children 12%, adults 21%; p<0.001), others injured in the same incident (children 34%, 22%; p<0.001) and incident considered 'preventable' (children 57%, adults 2%; p<0.001).

Conclusions: The results highlight important differences between children and adults in the patterns of mine-related injuries, including a large modifiable behavioural component. Current knowledge on the subject of preventing mine-related injuries in children is mainly based on data pooled for children and adults and ignores significant behavioural differences. Approximately 25000 people are killed and maimed each year by landmines in over 70 countries, many of whom are children and have the greatest potential for years of life lost and disability. These study results can help tailor mine-awareness and other service-provision activities for children living in countries with landmines.

Contributors: We are grateful to The International Committee for Red Cross (ICRC), Sarajevo, for making the dataset available to us for analyses. The views expressed in this paper are of the authors alone and do not necessarily reflect the views of their respective organisations or ICRC.

Diet

121 DIETARY FOLATE INTAKE, THE DECLINE OF NTDS IN THE UK AND DISEASE RISK AMONGST MOTHERS OF AFFECTED BABIES

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A profound decline in the total prevalence (at birth and termination) of neural tube defect (NTD) has been observed in England and Wales over nearly 3 decades. Because there is concern about underreporting of NTD occurrence in the national figures, these trends have been validated using capture-recapture methods against the findings in a local NTD registry covering Oxfordshire and West Berkshire (including about 2% of the national total of birth and abortions) over the period 1965–1999. Similar downward trends have been observed in Irish and Scottish local Eurocat Registers. However there appears to be no decline in NTD (p)recurrence rates over the same period.

The likelihood that this decline (for spontaneous NTDs) can be accounted for by food fortification and periconceptual vitamin supplementation will be discussed and both consistent and changing features of NTD epidemiology will be presented from a case-control study.

The implications of these findings for the health of the women with compromised folate status who conceive NTD affected babies will be explored using cancer incidence and mortality data from long term cohort studies of such women.

122 KNOWLEDGE OF FOLIC ACID AND FOLIC ACID CONSUMPTION AMONG YOUNG WOMEN

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Background: Changes in women's knowledge and behaviours concerning folic acid consumption are the principal indicator in the evaluation of the Neural Tube Defects Primary Prevention Program in Poland.

Objective: To evaluate the association between knowledge and behaviours concerning folic acid among young women in Poland.

Material and methods: In December 1999 to February 2000 face-to-face interviews were conducted on the representative national sample of 3961 women aged 15–49 years. The subsample of 2673 women aged 18–40 years, non pregnant at the time of interview, was selected. The perfect knowledge about folic acid was defined by four questions (defining folic acid as a vitamin, knowing natural sources of folic acid and benefits for fetal development, knowing the time when the supplementation should begin). The group of women taking recommended folic acid supplementation was defined after calculation of the average daily dose of folic acid from multivitamin contents. A multivariate logistic regression model was estimated where the impact of knowledge was adjusted for social variables.

Results: The survey indicated that 12.6% of non pregnant women consumed at least 0.4 mg of folic acid daily. However, only 58% were sure that their multivitamin tablet contained folic acid. Only 10.2% of respondents reported perfect knowledge of folic acid. Women who had perfect knowledge took supplementation in 22.4%, while those which knowledge was worse only in 11.5%. The multivariate logistic regression model showed that the independent prognostic factors for daily folic acid supplementation were: very good material status (OR=3.9), being married and considering having a child, as combined variable (OR=3.1), perfect knowledge about folic acid (OR=2.0) and living in big towns (OR=1.7).

Conclusions: The results showed that good education campaign should increase folic acid consumption, however there are some social barriers, especially a high impact of economic status on folic acid consumption was documented.

123 FOLIC ACID FOOD FORTIFICATION AND OLDER PEOPLE WITH UNRECOGNIZED VITAMIN B12 DEFICIENCY

J. Grimley Evans[1], R. Clarke[1], P. Sherliker[1], J. Birks[1] for the collaborative group on vitamin B12 deficiency in older people. *[1]University of Oxford.*

Background: Fortification of flour with folic acid (FA) will reduce the number of conceptions with neural tube defects. It may also delay the diagnosis of vitamin B12 deficiency in older people by preventing the characteristic anaemia while the condition progresses to neurological damage. The aim of this study was to estimate the number of older people in the UK who might be affected.

Data: Blood levels of vitamin B12, folate, and homocysteine (tHcy), in 3533 people aged 65 and over from 3 recent UK population-based studies.

Results: Metabolically significant vitamin B12 deficiency was defined as blood levels of vitamin B12 <200pM with tHcy >20μM. It has been estimated that FA fortification at 140μg/100 g of flour or 240μg /100 g

Abstract 123 Table 1

| Age at risk (yr) | Population | | Prevalence of vitamin B-12 deficiency (Range: %) | No. in UK at risk of "masked" anaemia with folic acid fortification | |
	Study (N)	UK (N)		@ 140 µg/100 g	@ 240 µg/100 g
65–74	1047	5M	3–6	375–750	1050–2100
75+	2475	4M	8–19	800–1900	1920–4560

of flour would expose 0.25% and 0.6 to 0.7% of the older population, respectively, to daily intakes of FA exceeding 1 mg. Such intakes commonly prevent anaemia in vitamin B12 deficiency. The number of people likely to be affected has been estimated by multiplying the totals with FA daily intakes above 1 mg by the prevalence of metabolically significant vitamin B12 deficiency (see table).

Conclusions: Screening for vitamin B12 deficiency in older people may be required to prevent risks from delayed diagnosis due to FA fortification of food to prevent NTDs. Opportunistic screening for vitamin B12 deficiency may be sufficient for people aged 65–74 yrs but mandatory screening may be indicated for those aged over 75 years.

124 TEN-YEAR TRENDS IN DIETARY INTAKE BY DEPRIVATION INDEX IN AN AREA WITH A HIGH CORONARY HEART DISEASE MORTALITY

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Introduction: Nutrition may contribute to inequalities in health status, and several studies have highlighted the poor diet of those in lower socio-economic groups. In Scotland, dietary targets have been set for the consumption of certain foods such as fruit and vegetables, bread, breakfast cereals and oil-rich fish. The trends in consumption of these foods in high and low socio-economic groups were examined using dietary information collected as part of the WHO MONICA study.
Aim: To compare the trends in the consumption of key foods over ten years in the least affluent and most affluent quartiles in north Glasgow, Scotland as defined by the Carstairs deprivation index for their postcode of domicile.
Design: Four random cross-sectional random age- and gender-stratified population surveys carried out in 1986, 1989, 1992 and 1995.
Methods: Over 600 men and 600 women (aged 25–64 years) in each of the four survey years completed a lifestyle questionnaire including a food frequency section. The percentage achieving the consumption frequencies (age-standardised) equivalent to the Scottish dietary targets for 2005 were calculated by survey year, and by quartiles defined by the Carstairs index.
Results: Increasing trends in the reported consumption of fruit and vegetables, and oil-rich fish were observed over the ten-year period. However the trend to increase fruit and vegetable consumption in the least affluent groups was not significant, and in 1995 only 8% of men and 12 % of women in this group claimed consumption of these foods 4 or more times a day. In general a higher percentage of those in the most affluent group met the targets for the key foods.
Conclusion: In view of the higher than average risk of coronary heart disease in this population there is an urgent need to improve the diet as part of disease prevention.

125 LIFE-LONG VEGETARIANISM AND RISK OF BREAST CANCER: A POPULATION-BASED CASE-CONTROL STUDY AMONG SOUTH ASIAN MIGRANT WOMEN LIVING IN ENGLAND

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A population-based case-control study was conducted to assess the role of diet, including lifelong vegetarianism and meat-eating, on the aetiology of female breast cancer among South Asian ethnic migrant women from the Indian subcontinent. A total of 240 incident South Asian breast cancer cases were identified from Thames and West Midlands cancer registries. For each case, two age-matched South Asian controls were randomly selected from the case practice age-sex register. Subjects were interviewed by a nutritionist using a specifically-developed and validated food-frequency questionnaire to ascertain usual dietary intake prior to breast cancer diagnosis.

A significantly larger proportion of cases than controls had a higher educational level, higher social class, younger age at menarche, later age at menopause, late age at first birth, and were less likely to have breast-fed.

There was no difference in risk between lifelong meat eaters and non-meat eaters after adjusting for potential confounding variables (OR=1.41 95% CI= 0.93–2.14), and no evidence of a trend with increasing meat intake. Analysis of macronutrients showed no association between intakes of total energy, protein, fat and carbohydrates and breast cancer risk. Intake of NSP (fibre), however, showed a strong inverse association with breast cancer risk, with women in the highest quintile having only 58% of the odds of those in the lowest quintile (p=0.005 for linear trend). This inverse association was also present when analyses were restricted to non-meat eaters (p=0.01 for linear trend). Further analyses by source of NSP seem to suggest that the protective effect may be stronger for NSP from pulses and vegetables than from fruits or cereals.

The findings suggest that intake of meat from early life does not increase the risk of breast cancer. A diet rich in pulses and vegetables, as found in South Asian diets, may be protective.

126 VEGETABLES AND FRUIT CONSUMPTION AND RISK OF MORTALITY FROM CANCER, CORONARY HEART DISEASE, AND CEREBROVASCULAR DISEASE

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Dietary factors are known to be related to the onset, and the prevention of diseases, including cancer, heart and cerebral diseases. Previous findings, consistently, suggested a protective effect of vegetables and fruit consumption against the development of cancer and other important diseases.

We examined the relationship between green-yellow vegetables and fruit consumption and mortality from all causes, cancer, coronary heart disease, and cerebrovascular disease, in the Life Span Study (LSS) cohort. The LSS is a longitudinal study of 120,000 persons, including 94,000 exposed atomic-bomb survivors living in Hiroshima and Nagasaki. Since its implementation in 1950, both incidence of diseases and mortality of the study members based on vital-statistics surveys, death-certificate information, and other sources, are monitored.

The present study is based on the results of a mail survey performed during the 1979–1980 period. A questionnaire was sent to 55,650 atomic-bomb survivors, with a response rate of 72% (39,873 respondents). The diet of the subjects was assessed by a food frequency questionnaire for 22 dietary items including green-yellow vegetables and fruit. The LSS mortality follow-up was monitored until 1998, allowing us an 18-year follow-up period.

The relationship between vegetables and fruit consumption, and mortality was analyzed by the Cox proportional hazards regression model. The relative risks (RR) were adjusted for sex, age, smoking and drinking habits, education level, radiation dose, body mass index, and history of stroke, myocardial infarction, and diabetes.

Preliminary analysis showed that green-yellow vegetables and fruit were associated with a decreased risk of total cerebrovascular mortality. The RR (with 95% confidence interval [CI]) for those consuming vegetables almost daily was 0.90 (0.78–1.03), as compared with subjects who had vegetables once or less per week. The RR for fruit was 0.79 (0.70–0.91). Fruit intake was significantly, inversely associated with cerebral hemorrhage and infarction mortality.

Screening

127 EARLY DISCHARGE OF LOW-RISK WOMEN FROM CERVICAL SCREENING

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Background: The Scottish Cervical Screening Programme currently offers three-yearly screening to all women between the ages of 20 and 60, irrespective of their underlying risk of disease or their previous screening history. However, previous studies have indicated that well-screened women over the age of 50 are likely to be at low risk of cervical neoplasia. This study aimed to explore the implications of discharging these women from screening in a typical area of Scotland. **Methods:** 1. Case-control study of the screening histories of women with and without screen-detected cervical neoplasia between ages 50 and 59 in Lanarkshire. 2. Cross-sectional study of the prevalence of adequate screening histories among women currently aged 50 in Lanarkshire. 3. Use of routine screening programme statistics to estimate the effects of introducing an early discharge policy. **Results:** 1. Women reaching the age of 50 with two recent, consecutive, negative smears had reduced odds of screen-detected neoplasia in the subsequent decade. 2. The estimated odds ratio for all screen-detected neoplasia was 4.4 (95% confidence interval 1.6–13.2, p=0.002). 3. The estimated odds ratio for screen-detected high-grade squamous neoplasia was 17.0 (95% confidence interval 2.4–243.0, p=0.0004). 4. 54.0% (95% confidence interval 47.9%-59.9%) of screening participants currently aged 50 fulfilled the definition of adequate screening. 5. Discharging these women might be expected to reduce screening workload by approximately 10%, but those discharged would acquire an increased risk of cervical neoplasia—predominantly low-grade or glandular neoplasia—as a result. **Conclusion:** It is possible to identify a low-risk group within the screened population using routinely-available records. This type of information could be used to inform participative decision-making about individual women's need for screening, or to target the screening programme more closely on those with the greatest capacity to benefit from it.

128 TWENTY YEAR ANALYSIS OF BENEFITS AND HARMS FROM CERVICAL SCREENING

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The National Screening Committee and General Medical Council advise giving information about benefits and harms to enable informed choice about whether to participate in screening. Information about cervical screening has emphasised that screening saves lives, but has not explained that screen-detected abnormality is common and in most cases represents self-limiting cell change. Nor has the fact that missed cases and incurable cases are inevitable despite screening been successfully conveyed. Data on which to base information about the different screening outcomes is lacking.

We analysed records for women screened in Bristol from 1976 to 1996 to determine cumulative incidence for cytological and histological abnormality of the cervix. Using Office for National Statistics mortality data we modelled expected numbers of deaths from cancer of the cervix for this cohort of women a) assuming that pre-screening death rates and trends had continued, and b) assuming that cohort reductions in cervix cancer deaths had taken place equivalent to those observed for England and Wales as a whole.

Amongst 214,582 women with a recent test result there were 33,522 (15.6% of the total tested) who had ever had abnormal cytology, and 11,656 (5.4%) who had ever had abnormal histology during the twenty years from April 1976 to March 1996. Trends for each birth cohort and for each grade of abnormality yield information about diagnostic trends, reversibility of lesions, and rising incidence. The mortality modelling is near completion, and will enable numbers with screen-detected abnormality to be put in context against numbers who would have developed cancer were it not for screening. The indication is that at least 90% of women with abnormal results

would—without any intervention - have remained free of cervical cancer by the age of 70. These results should help to achieve better public and professional understanding of the consequences of screening.

129 RELATIONSHIP BETWEEN MENOPAUSE, USE OF HORMONE REPLACEMENT THERAPY AND THE SENSITIVITY AND SPECIFICITY OF SCREENING FOR BREAST CANCER

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Introduction: Previous studies suggest a detrimental effect of use of HRT on breast cancer screening but have been unable to account for important confounding factors. **Methods:** A total of 124,886 women participating in the Million Women Study at 10 NHS screening centres from June 1996 to March 1998 completed a study questionnaire immediately prior to screening. They were followed through the breast screening programme for recall to assessment following screening and screen-detected cancer, and through regional cancer registries for the occurrence of breast cancer in the interval following screening. **Results:** Overall, 5,367 (4.3%) women were recalled to assessment. Among women who had never used HRT, the adjusted proportion recalled to assessment with no subsequent diagnosis of breast cancer ("false positive recall") was 4.7% (95% CI 4.1–5.3%) in premenopausal women, 4.2% (3.7–4.7%) in perimenopausal women and 2.5% (2.3–2.7%) in postmenopausal women. Postmenopausal women who were currently using HRT had a significantly elevated rate of false positive recall of 4.0% (3.7–4.3%), compared to 2.5% among never users. Among current users the rate of false positive recall increased with increasing duration of use, however the effect of HRT did not differ significantly according to the type of preparation used or the dose of oestrogen. Former users of HRT had a significantly elevated risk of false positive recall (3.0%, 2.7–3.4%) compared to never users. The risk appeared to diminish following cessation of use and 5 years after ceasing use the rate of false positive recall did not differ significantly from that in never users. Overall, use of HRT could account for around 20% of the total cases of false positive recall in the NHSBSP annually. Preliminary data indicate that women who are currently using HRT have around double the rate of interval cancer compared to women who have never used HRT.

130 WILL SCREENING MAMMOGRAPHY IN THE EAST DO MORE HARM THAN GOOD?

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Background: Breast cancer screening by mammography has become routine practice in many Western countries, but there are no data about its efficacy in Asian women. We systematically reviewed the evidence for population-based screening for breast cancer and examined the applicability of these results to a Chinese population. **Methods:** Primary reports for the meta-analysis were identified by a search of MEDLINE and the Cochrane Library. Information on breast cancer incidence and mortality was collected from the International Agency for Research on Cancer and the Hong Kong Cancer Registry. Outcome measures included breast cancer-related mortality, the number needed to screen (NNS) to prevent one death, and the positive predictive value (PPV) of mammography. **Results:** We identified eight clinical trials conducted in Western women. The pooled relative risk for breast cancer-related death in the screened group was 0.82 (95% confidence interval = 0.72, 0.93). When applied to Hong Kong this translates into an NNS of 1,447 healthy women screened annually for 10 years to prevent one death, assuming the relative risk reduction is independent of the baseline risk. The PPV of mammography was between 1.8% and 13.4%. Therefore, for 100,000 Hong Kong Chinese women aged 50 or over screened annually for 10 years we would expect 8,980 false positive cases, 134 of them would sustain a biopsy-related complication. Only 69 breast cancer-related deaths would be avoided, assuming trial conditions and 100% uptake and follow-up. **Conclusions:** There is insufficient evidence to justify population-based breast cancer screening by mammography for women in Hong Kong and other Asian populations with low breast cancer prevalence.

131 IS SCREENING FOR HELICOBACTER PYLORI COST EFFECTIVE IN PREVENTING GASTRIC CANCER AND PEPTIC ULCER DISEASE?

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Background: Helicobacter pylori (Hp) infection is a major cause of gastric cancer and peptic ulcer disease. It fulfils many of the requisites for population screening. Trial data are not available. A US model suggested it would be cost effective to screen to prevent gastric cancer. We developed a simulation model in UK setting to evaluate the cost effectiveness of Hp screening to prevent gastric cancer and peptic ulcer disease.
Methods: The simulation used discrete event simulation. Parameter estimates were taken from peer reviewed literature, and routine data. Future trends in Hp associated gastric cancer were derived by age cohort modelling. The effect of Hp eradication on future risk of gastric cancer was modelled by using a lag time before the risk reverted to Hp negative state. GP Morbidity Survey, Hospital Episode Statistics and national mortality date were used for incidence of peptic ulcer. We compared no screening (but with opportunistic eradication in patients presenting with dyspepsia) versus screening, at different ages. Costs were of screening/eradication minus NHS costs averted from treating gastric cancer and peptic ulcer. Sensitivity analyses were undertaken. (eg tests, Hp prevalence, risks, lag times, opportunistic eradication, discount rates and costs).
Results: Best estimate of cost per life year saved at age 40 was £5870 (discount rate 6% costs 6% benefits) and £1030 when benefit discounted at 1.5%. Screening at age 40 was the preferred option. Hp prevalence, extent of opportunistic eradication, discount rate, and the lag time were key determinants of cost effectiveness. Only under very adverse scenarios did the cost/life year saved exceed £20,000.
Conclusion: Hp screening appears to be cost effective although there is uncertainty over efficacy of eradication on gastric cancer risk. Screening should be evaluated with the incidence of peptic ulcer and reversibility of pre-malignant pathology key outcomes.

132 CHARACTERISTICS OF RESPONDERS AND NON-RESPONDERS TO A RE-EXAMINATION 20 YEARS AFTER SCREENING

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Objective: To compare characteristics of cohort participants who attended (77% response) and did not attend (23%) a 20th year follow-up re-examination in the British Regional Heart Study (BRHS), based on data from a postal questionnaire completed in 1996 (92% response).
Methods: Between 1978–80, 7735 men (78% response) aged 40–59 years attended a health screening in a selected General Practice in each of 24 British towns. These men became the BRHS cohort, and over the following two decades, follow-up of subjects was maintained through biennial reviews of GP records and three self-completed postal questionnaires, the most recent made in November 1996 (Q96). Re-examination of survivors still living in Britain was carried out in 1998–2000. Data from Q96 provided the most recent information on both attenders and non-attenders to the re-examination.
Results: Non-attenders were older, more likely to have been in manual occupations, twice as likely to be widowed and twice as likely to be smokers. Significantly more non-attenders reported long-standing disability, peripheral vascular disease and bronchitis, suggesting that conditions impairing physical ability may be underestimated in re-examination data. Non-attenders reported only marginally more cardiovascular-related medical conditions, and in other medical conditions there were no significant differences in the percentage recalling a doctor-diagnosis. Regionally, non-response was higher in the north of England and Scotland.
Conclusion: Those with poorer health, less social contact, and lower incomes will be less likely to be continuing participants in clinical research studies, suggesting that information collected in population studies may misrepresent the health of wider society, by rating it better than it is. Information on non-responders should always be sought and taken into account in longitudinal studies to ensure that areas of bias are recognised.

Early life determinants of disease II

133 CARDIOVASCULAR DISEASE IN MOTHERS OF NEURAL TUBE DEFECT AFFECTED OFFSPRING

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Background: Folic acid supplements help prevent neural tube defects (NTDs) if taken in the pre-conceptual period. Observational evidence suggests that they may also prevent cardiovascular disease. This common preventative pathway, together with a strong ecological relationship points to a common aetiological mechanism for the two diseases. Mothers of children with NTDs have been shown to have elevated total plasma homocystiene (tHcy) and share specific genetic polymorphisms. Elevated tHcy has been associated with coronary heart disease (CHD). An NTD offspring may therefore be a proxy indicator that a woman is at greater risk of cardiovascular disease.
Aims: To determine whether women who have had a pregnancy affected by a NTD have excess CHD.
Methods: A retrospective cohort study including 3697 women, who had neural tube defect pregnancies between 1950 and 1970 and were registered with one of three birth registers in the UK ; South Wales, Birmingham and Liverpool. Details were submitted to the medical research division of the Office of National Statistics (ONS). Vital status and cause of death were obtained. Age and period specific death rates for all causes, CHD and lung cancer, as a proxy marker for socioeconomic status and smoking habit, were obtained from ONS for England and Wales. Expected number of deaths were calculated on the person years at risk for each subject over a follow up period of 31 years.
Results: 86% (3162) were traced. 428 (11.6%) women has died. The standardised mortality rates (SMR) were 118 (95% CI 106 to 129) for all causes of death (428 cases observed, 364 expected), 150 (95% CI 121 to 183) for coronary heart disease (90 observed, 60 expected) and 153 (95% CI 110 to 209) for lung cancer 40 observed, 26 expected).
Conclusions: Women who have had offspring affected by a neural tube defect may be at increased risk of coronary heart disease. The similar increased risk for lung cancer suggests that the CHD association may be due to confounding by socioeconomic status.

134 THE ROLE OF PRENATAL AND NEONATAL FACTORS IN THE AETIOLOGY OF CHILDHOOD BRAIN TUMOURS

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Background: Brain tumours are the most common type of childhood cancer after leukaemia, accounting for approximately 25% of childhood cancers. Despite being relatively common, the aetiology of this condition is largely unknown. The association with certain aspects of maternal reproductive history and characteristics of the index pregnancy, labour and delivery has been of interest for many years. As a result of low statistical power (due to small numbers), these studies have produced inconsistent and inconclusive findings. In addition, most studies have been based on data collected through retrospective maternal (or surrogate) interviews, which are open to recall bias and underreporting.
Objective: To evaluate whether factors/exposures occurring in pregnancy and/or around birth influence the risk of childhood brain tumours.

Design: A medical record based case-control study of brain tumours diagnosed in children before 15 years of age born at one of three hospitals in the South of England.

Subjects: 83 children diagnosed with a malignant brain tumour and 166 controls (individually matched on date of birth, sex and hospital of birth).

Main outcome measures: Associations were assessed using odds ratios (OR) calculated using conditional logistic regression. For each OR, 95% confidence intervals (95% CI) and two-sided P-values were obtained.

Results: Children who had a non-cephalic presentation (OR=3.3, 95% CI=0.8–13.9) or a low 1 minute apgar score (OR=2.7, 95% CI=1.0–7.4) were at an increased risk of developing a brain tumour. Children whose mothers had documented evidence of a clinically diagnosed viral infection during pregnancy had an eleven fold increase in risk (OR=10.6, 95% CI=1.1–503.2). No other aspects of the index pregnancy or delivery were associated with an increased risk.

Conclusions: The results of this investigation provide limited evidence for the role of prenatal and neonatal factors in the aetiology of childhood brain tumours; the finding for maternal viral infection warrants further investigation.

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135 | ADULT HEIGHT AND RISK OF BREAST CANCER: A POSSIBLE EFFECT OF EARLY NUTRITION

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Objectives: The increased risk of breast cancer related to early reproductive development and tallness indicates that foetal and childhood nutrition can be important for its aetiology. Caloric restriction sufficient to reduce adult height may therefore reduce breast cancer risk. During World War II (WWII) there was a marked reduction in average caloric intake in Norway. We hypothesised that a positive association between height and risk of breast cancer would be stronger among women who where born during this period of greater nutritional diversity than among women born before or after the war.

Methods: A total of 25,204 Norwegian women were followed up for an average of 10 years, and 215 incident cases of breast cancer were registered. We used Cox regression to estimate the relative risk (RR) of breast cancer associated with categories of adult height in five-year birth cohorts, starting in 1925. However, the birth cohort of WWII ranged from July 1940 to December 1945, while the subsequent birth cohort included all women born in January 1946 or later.

Results: We found the strongest positive association between height and risk of breast cancer among the 3,792 women (43 cases) who where born during WWII. For this period, women in the tallest tertile of height (>167 cm) had more than twice the risk of breast cancer compared with the shortest women (≤162 cm) (RR = 2.5; 95% CI = 1.2–5.5). Among women born before or after the war we found no clear association with height. Adjustment for BMI, smoking and physical activity did not change these results.

Conclusions: We propose that nutritional diversity during gestation among mothers to a greater degree is reflected in differences in height in the WWII cohort, and that the association with height may imply a role for early nutrition in breast cancer aetiology.

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136 | SOCIO-ECONOMIC STATUS IN CHILDHOOD BUT NOT ADULTHOOD PREDICTS HELICOBACTER PYLORI INFECTION: THE BRISTOL HELICOBACTER PROJECT

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Aim: We investigated the association of childhood and adulthood socio-economic status on H pylori (HP) infection in the general population within a community-based randomised controlled trial of HP eradication.

Methods: 10537 randomly selected participants aged 20–59 years from 7 primary care centres in England completed a questionnaire on demographic and socio-economic characteristics. HP status was ascertained using the ^{13}C-urea breath test. Anthropometry used standard methods. 1620 individuals testing positive were compared with the same number of randomly selected negatives (N=3240) using logistic models.

Abstract 136 Table 1

	HP negative (%)	HP positive (%)	OR* (95% CI)
Age	44.0 (SD 9.1)	48.4 (SD 8.0)	1.75† (1.60, 1.91)
Sex			
Male	731 (45.1)	799 (49.3)	1.00‡
Female	889 (54.9)	821 (50.7)	0.72 (0.59, 0.87)
Ethnicity			
White	1602 (98.9)	1565 (96.6)	1.00‡
Other	18 (1.1)	55 (3.4)	4.08 (2.10, 7.93)
Leg length	88.6 (SD 6.2)	87.8 (SD 6.9)	0.90§ (0.82, 0.98)
Childhood housing			
Rented	691 (42.9)	901 (55.9)	1.00‡
Owned	919 (57.1)	710 (44.1)	0.78 (0.67, 0.91)
Childhood bedroom occupancy			
Single use	909 (57.5)	701 (45.2)	1.00‡
2 sharing	523 (33.1)	572 (36.9)	1.24 (1.05, 1.46)
3 or more	148 (9.4)	278 (18.0)	2.01 (1.59, 2.55)

*OR adjusted for all other tabulated risk factors; †OR per 10 yrs; ‡reference category; §OR per quartile increase in leg length.

Results: HP prevalence was 15.4% (1620/10537). Childhood socio-economic measures (see table) were associated with HP whereas adult measures (unemployment, housing, car ownership, educational level) were not. Older age, male gender and Black or Asian race were associated with HP infection.

Conclusions: Crowded housing and possibly inadequate nutrition in childhood may facilitate HP infection and transmission.

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137 | INFLUENCE OF CHILDHOOD UNDER- AND OVER-WEIGHT ON ADULT HEALTH: DATA FROM THE THOUSAND FAMILIES STUDY

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Although obese children have been found to have higher mortality as adults, it is not clear whether this is a result of going on to be fat adults, or whether fatness in childhood itself confers greater risk. We have followed up the Newcastle Thousand Families 1947 birth cohort to explore the association between childhood body mass index (BMI), adult obesity and disease risk factors. Outcomes measured at age 50 years were: blood pressure, carotid artery intima-media thickness and fibrinogen; total, LDL and HDL cholesterol; triglycerides, fasting insulin and 2 hour glucose; BMI and % fat (impedance).

932 subjects were followed to age one year; 688 (74%) and 628 (67%) were measured at 9 and 13 years respectively; at age 50, 412 (44%) attended clinical examinations. BMI age nine was not significantly correlated with % fat age 50 (correlation coefficient r=0.10 P=0.07) although it was with BMI age 50 (correlation coefficient r = 0.24 p<0.001), suggesting tracking of build rather than fatness.

At age 50 both BMI and %fat were positively correlated with all the adult disease risk factors in both men and women. BMI at age 9 and 13 showed little correlation with adult risk factors, but when adjusted for adult BMI there was a significant inverse association (P<0.05) with measures of lipid and glucose metabolism in both sexes and with blood pressure in women. However when adjusted for adult %fat, rather than BMI, only the inverse associations in women with triglycerides and total cholesterol remained significant.

BMI was found to underestimate body fat in adults who were thin as children. For those overweight in childhood there was little tracking to adult obesity and no evidence of adverse adult health effects. Thinness in childhood offered no protection against adult fatness and was associated with a slightly higher adult disease risk.

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138 | SMALL FOR GESTATIONAL AGE, CHILDHOOD SOCIOECONOMIC CIRCUMSTANCES AND THE RISK OF A FIRST EVENT OF MYOCARDIAL INFARCTION—STOCKHOLM HEART EPIDEMIOLOGY PROGRAM (SHEEP)

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Objectives: To analyse if impaired fetal growth measured by birth weight for gestational age and socioeconomic circumstances early in life influence the risk of myocardial infarction later in life.

Methods: SHEEP is a population based case-referent study. All incident first events of myocardial infarction in the Stockholm region 1992–94 among Swedish men and women born 1922 to 1949 were

included. Obstetric records were available for 72% of all the Swedish born participants and 1010 cases and 1416 referents had valid information on birth weight and time of gestation. Social circumstances during childhood was measured by parent's occupation and questions on economical difficulties. The database also contained comprehensive risk factor information from questionnaires, interviews and a health examination.

Results: An increased risk of myocardial infarction was found only among the 10 percent smallest for gestational time. Compared with the rest they had a relative risk of 1.50 (95% CI: 1.16–1.92). The increase in risk was more pronounced for women. The association was only slightly attenuated by adjustments for parent's socioeconomic position. Subjects born to unskilled manual workers, skilled manual workers, low grade non-manuals, self-employed, and farmers were compared with subjects born in the home of middle or high grade non-manuals. The relative risks were 1.68 (95% CI: 1.37–2.05), 1.46 (95% CI: 1.19–1.78), 1.48 (95% CI: 1.16–1.89), 1.41 (95% CI: 1.09–1.83), and 1.29 (95% CI: 1.02–1.63). The risk gradient was similar among men and women and it was not explained by neither adult socioeconomic position nor impaired fetal growth.

Conclusions: Imparied fetal growth and social circumstances during childhood seems to be separate risk factors for incident non-fatal and fatal myocardial infarction.

138a | **WHICH STAGES OF ADULT LIFE ARE RELEVANT TO THE WIDENING OF SOCIAL INEQUALITIES IN CHD-RELATED BEHAVIOURS?**

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Introduction: There is strong evidence linking social differences in CHD-related behaviours to subsequent inequalities in CHD morbidity and mortality. There is uncertainty, however, concerning the processes and stages of life relevant to the development of these differences. Analyses of data gathered in 1984 and on re-interview in 1991 from cohorts of the Health and Lifestyle Survey aged 18–34, 35–49 and 50–64 help to identify age-sex-behaviour patterns in the lifetime development of social inequalities.

Method: A random sample of adults living in private households in Great Britain was interviewed in 1984 for the Health and Lifestyle Survey and re-interviewed seven years later in 1991. Numbers of men and women who took part in both interviews were 584, 602 aged 18–34, 586, 671 aged 35–49, and 400, 467 aged 50–64. Changes over the seven years in smoking, saturated fat intake and exercise were examined for any relationships to social class, education, housing, income and area deprivation. Changes were analysed separately for those following healthy and unhealthy behaviours in 1984.

Results: Those in more favourable socio-economic circumstances were more likely to continue with or change to healthy behaviours. For men, a clear pattern emerged of significant widening of social inequalities in smoking in those aged 18–34 and in dietary fat and exercise in those aged 35–49. For women, the pattern was less clear and showed significant widening of social inequalities in smoking and exercise in those aged 18–34 and in dietary fat in those aged 35–49. There was little evidence of widening of inequalities in those aged 50–64.

Conclusions: Changes of a developmental nature in dietary fat, smoking and exercise in young adulthood and in middle life follow a distinctive pattern which can assist in understanding the development of social inequalities and can suggest the appropriate stage of life for intervention.

Cancer II

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139 | **SEGREGATION ANALYSIS OF LUNG CANCER - RESULTS OF A CASE-FAMILY STUDY**

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Background: The contribution of familial factors to lung cancer development has been shown in previous studies. Using segregation analysis we examined how well models of inheritance fit the data at hand under consideration of environmental factors.

Materials and Methods: The analysis is based on a German case-control study of lung cancer. Each 1004 cases and controls (individually matched by age (+/-5 years), sex and region) were recruited between 1988 and 1993 and interviewed using a standardised questionnaire. Among the data assessed was family history of diseases. The information on 945 lung cancer cases and 4674 relatives (parents and siblings) was included in the analysis. Calculations were based on both logistic and time to event models. Parameter estimates were obtained by maximum likelihood methods using program package GAP.[1] Age, sex and smoking (estimated for siblings) were considered as covariates in the analysis.

Results: The analyses based on Cox regression yielded a better data fit than the logistic model. The models without genetic component were rejected when compared to the general model. Of the models including a genetic component the dominant or codominant model provided the best fit depending on the covariates considered.

Conclusions: Our findings support a genetic influence in lung cancer development and confirm the results of earlier segregation analyses.[2] [3] Population-based family studies with complete data on covariates are needed for confirmation of results.

1 Epicenter Software. GAP Genetic Analysis Package: Analyze. Volume 2. Pasadena, CA: 1997.
2 Gauderman WJ, Morrison JL, Carpenter CL, et al. Analysis of gene-smoking interaction in lung cancer. Genet Epidemiol 1997; 14: 199–214.
3 Sellers TA, Bailey-Wilson JE, Elston RC, Wilson AF, Elston GZ, Ooi WL, Rothschild H. Evidence for mendelian inheritance in the pathogenesis of lung cancer. J Natl Cancer Inst 1990; 82:1272–9.

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140 | **DOES DIET AFFECT RISK OF LUNG CANCER?**

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In 1975, it was reported on the basis of an observational study that the risk for lung cancer was about 60% lower in subjects with a high intake of vitamin A than in subjects with a low intake. Subsequent observational studies confirmed this negative association but suggested that the risk factor was provitamin A carotenoids, such as β-carotene, rather than vitamin A (i.e. pre-formed retinol) itself. Negative associations with lung cancer risk were also observed for a group of related dietary factors including intake of several non-provitamin A carotenoids and total intake of fruit and vegetables.

The consistent findings from observational studies led to the proposal that dietary β-carotene might reduce lung cancer risk and to the establishment of randomized controlled trials to test this hypothesis using supplements of β-carotene in human populations. However, the results of the trials were surprising and have given no support to the hypothesis: the two trials with the largest numbers of cases of lung cancer found that risk was significantly higher in subjects who took β-carotene than in those who did not, while other trials in lower risk subjects with smaller numbers of lung cancers reported no significant effect.

Despite the results of the trials, which indicate that β-carotene itself almost certainly does not protect against lung cancer, recently published observational studies continue to show an inverse association of fruit and vegetable intake with lung cancer risk, as do related indices such as carotene intake. The apparent protective effect of fruits and vegetables could be due to a biological effect of one or several of the thousands of chemicals naturally present in these foods, but it also remains possible that the observed association with fruits and vegetables may be partly due to confounding by other dietary factors and perhaps by smoking and non-dietary factors.

We have examined the relationship between diet and lung cancer in a case-control study of 982 cases of lung cancer and 1486 population controls in south-west England in which subjects were interviewed personally about their smoking habits and their consumption of foods and supplements rich in retinol or carotene. Analyses were performed for 15 dietary variables, including intake of pre-formed retinol and carotene. When these were considered individually there were significant associations (p<0.01) with lung cancer risk for 8 of them, after adjustment for smoking. When the 15 variables were considered simultaneously, significant associations after adjustment for smoking remained for 5: pre-formed retinol (increased risk), and fish liver oil, vitamin pills, carrots and tomato sauce (decreased risk).

It is unlikely that all 5 associations represent biological effects, or that they can all be explained by residual confounding by smoking, or

by biases. We conclude that there is at least one as yet unidentified factor that is causally related to lung cancer risk and of considerable importance in this population in terms of the number of cases of lung cancer that can be attributed to it.

Darby SC, Whitley E, Doll R, Key T, Silcocks P (2001) Diet, Smoking and Lung Cancer: a Case-control Study of 1000 Cases and 1500 Controls in South-west England. British Journal of Cancer 84:728–735.

141 THE INFLUENCE OF NUTRITION ON THE DEVELOPMENT OF THYROID CANCER

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Introduction: The role of diet on thyroid carcinogenesis has been addressed by several investigators. Commonly implicated food items are meat, shellfish, cheese and starchy food -increasing the risk- and fish, fruits and green vegetables -reducing it (Ron E, et. al. JNCI, 1987; Franceschi S, et. al. Int-J-Epidemiol. 1989). To further elucidate the role of dietary patterns on the development of thyroid cancer we conducted an interview based, case-control study, in Greece.

Patients and Methods: This hospital-outpatient based study included 113 persons with histologically verified thyroid cancer and 138 controls, serially matched by age, gender & health unit. Information on socioeconomic and demographic data, known risk factors and food consumption of more than 100 items was obtained through an interviewer administered prestructured questionnaire. We performed: (A) logistic regression analysis to explore the effect of consumption of all food items; (B) factor analysis (Principal Component Analysis, PCA), to identify possible dietary patterns; and (C) logistic regression analysis using the corresponding factor scores. In analyses (A) and (C) we adjusted for age, gender, $BMI(kgr/m^2)$, exposure to therapeutic radiation and total energy (Kcal/month).

Results: Only statistically significant associations are presented ($p<0.05$).

Increasing consumption of pork or lentils by 1 serv/month led to relative risks (RR) of 1.64 and 2.11 respectively, whereas for tomatoes, lemons or pasta led to RR's of 0.92, 0.92 and 0.75 respectively (analysis A). Significant RR's (analysis C) obtained using the factors extracted by PCA are shown in the table.

Abstract 141 Table 1

Factors	All histologic types	Papillary	Follicular
* Fruits	0.67	0.68	n.s.
* Raw vegetables	0.72	0.67	n.s.
* Cauliflower, pine-apple, grape-fruit, leek, dried fruits	0.70	0.72	n.s.
* Fish, cooked vegetables	n.s.	n.s.	2.84

Conclusion: Diet is important in thyroid cancer development; fruits and raw vegetables reduce the risk, while for follicular thyroid cancer fish and cooked vegetables increase the risk.

142 THE INFLUENCE OF REPRODUCTIVE AND HORMONAL FACTORS ON THYROID CANCER AMONG WOMEN IN KUWAIT

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Thyroid cancer is the second most common neoplasm among women in Kuwait and several other countries in the Middle East. Most of these countries also have relatively high birth and total fertility rates. We conducted a population-based study of 238 case-control pairs to examine potential relationships between reproductive and hormonal factors and thyroid cancer. The results indicate that events such as age at menarche, having ever been pregnant, menopausal status, and age at menopause were not associated with thyroid cancer. There was an association with age at last pregnancy and parity. Women who had their last pregnancy at ages ≥30 years were at a significantly increased risk (OR = 2.1; 95% CI : 1.2–3.8); there was also a significant trend in risk with increasing age at last pregnancy. There was a modest increase in risk among women who had borne ≥5 children (OR = 1.5; 95% CI : 0.9–2.5). A significant recent-birth effect, in relation to subsequent diagnosis of thyroid cancer, was observed during the second and third year following a birth (OR = 2.4; 95% CI : 1.3–4.2). In contrast, spontaneous abortion seemed to have a protective effect. There was a significant decrease in risk among women who had a miscarriage as the outcome of their first pregnancy (OR = 0.1; 95% CI : 0.03–0.4) and those who had experienced ≥3 miscarriages (OR = 0.3; 95% CI : 0.1–0.9; p-trend <0.05). The use of female hormones was not associated with thyroid cancer risk. The results provide the first indication in the literature of a possible link between history of post-partum thyroiditis and thyroid cancer (OR = 10.2; 95% CI : 2.3–44.8). These data provide support to the hypothesis that reproductive factors and patterns may influence, or contribute to, the risk of thyroid cancer among women.

143 RISK FACTORS ASSOCIATED WITH ENDOMETRIAL CANCER

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Background: The exposure to some of the agents known to affect the risk of endometrial cancer has changed over the years. For example, since unopposed oestrogen was shown to increase the risk it has become normal practice to prescribe opposed oestrogen to women with a uterus. On the other hand exposure to tamoxifen, which is associated with an elevated risk, has increased in recent years.

Objectives: To determine current risk factors for endometrial cancer.

Methods: A case-control study was carried out using the General Practice Research Database (GPRD). Endometrial cancer cases were identified and each case was matched with 6 controls by year of birth and practice. To be eligible, controls had to have an intact uterus on the event date. Conditional logistic regression analysis was carried out to identify factors affecting the risk of endometrial cancer. The following variables were considered for inclusion in the model: body mass index (BMI), smoking, hypertension, diabetes, presence of other cancers, gallbladder disease, endometriosis, and hormone replacement therapy (HRT).

Results: 808 cases of endometrial cancer were identified and matched to 4505 controls. The analysis resulted in the following risk factors: tamoxifen (OR_{adj} 2.81; CI_{95} 1.88–4.21); diabetes (OR_{adj} 3.04; CI_{95} 2.19–4.21); hypertension (OR_{adj} 1.51; CI_{95} 1.26–1.81); other cancers (OR_{adj} 2.32; CI_{95} 1.56–3.46), gallbladder disease (OR_{adj} 1.53; CI_{95} 1.09–2.15); and BMI ($p<0.05$). The OR for current smoking was significantly less than 1 (OR_{adj} 0.76; CI_{95} 0.66–0.90). The OR for HRT did not differ significantly from 1.

Conclusions: This study confirms earlier work suggesting an increased risk of tamoxifen on endometrial cancer. This has implications for the use of tamoxifen in breast cancer prevention. Other known risk factors confirmed in this study include diabetes and hypertension, as well as a protective effect of smoking (smokers' oestrogen levels are lower since these women generally are leaner).

144 TRENDS IN MORTALITY FROM CUTANEOUS MALIGNANT MELANOMA IN ANDALUSIA, SPAIN

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Background: Mortality rates from cutaneous malignant melanoma were on the rise among a certain number of European countries during the second half of the XXth century. But several recent studies have observed a stabilization in the values of the mortality rates in some of these countries.

Objectives: We describe mortality trends from cutaneous malignant melanoma in Andalusia, Spain, from 1975 to 1998 in order to know if we observe the same stabilization process of the rates.

Methods: Deaths (code172 from ICD 9th revision) and populations were obtained from the National (INE) and Andalusian (IEA) Statistic

Institute. Crude, age-standardized, truncated, cumulative and age-specific rates of mortality and potential years of life lost rates were made by gender. Poisson regression models were fitted in order to quantify the influence of age at death and year of decease on mortality trends.

Results: Age-standardized rates had a three fold increase in males, from 0.32 per 10^5 in 1975–79 to 1.04 per 10^5 in 1995–98 while they had more than a four fold increase in females, from 0.17 per 10^5 in 1975–79 to 0.78 per 10^5 in 1995–98. Truncated rates showed higher values than non-truncated rates in every time interval compared. Potential years of life lost rates (PYLL) increased also from 8.54 per 10^5 in males and 4.35 per 10^5 in females in 1975–79 to 20.52 per 10^5 and 17.92 per 10^5 respectively, in 1995–98. Poisson regression models showed a 6% and a 6.5% annual increases in males and females risks of death from cutaneous malignant melanoma.

Conclusions: There is not any evidence of stabilization in the rates of mortality from cutaneous malignant melanoma in Andalusia, where rates by this cause of death increased in males and females during the 1975–1998 period.

Infectious disease II

145 ESTIMATING THE PROBABILITY OF INFECTION IN A SEROLOGICAL STUDY OF AN OUTBREAK OF LEGIONNAIRES' DISEASE.

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In 1999 a large outbreak of Legionnaires' disease (LD) occurred in the Netherlands due to a whirlpool displayed at a trade fair. Blood samples were collected from exhibitors on this fair without LD (n=742). Quantitative titers of IgM and IgG antibodies against L. pneumophila were compared to those from a national serumbank (n=480). Titers, both in highly exposed exhibitors working near the whirlpool (n=140) and others (working elsewhere) were statistically significantly higher than those in the serumbank sample, while those of the highly exposed exhibitors were statistically significantly higher than those of other exhibitors. IgG or IgM levels above the 99th percentile of the serumbank values were observed in 20,7% of the highly exposed. As the distribution of titer values in highly exposed exhibitors is not bimodal, a substantial overlap exists between the titer values of those subclinically infected and those not infected. Thus the 99th percentile has low sensitivity for establishing subclinical infection. We therefore estimated the probability of infection by modelling the distribution of titers in exhibitors as a mixture of the distributions of infected and non-infected individuals. When assuming that the probability of infection is independent of the antibody titer before exposure this yields high prevalences of subclinical infection among the highly exposed (70–100%, dependent on the method used). As this assumption can be questioned, we also calculated the prevalence of infection by assuming that only the exhibitors with the lowest titers before exposure are infected. This yields a prevalence of subclinical infection in the highly exposed exhibitors of approximatedly 42%.

Whatever the underlying mechanism, the study shows that using cut-off values, as is common practice in clinical settings, might seriously underestimate the prevalence of subclinical infections. Moreover, in outbreak investigations such an approach decreases the power of serological surveys to identify a source.

146 THE NATURAL HISTORY OF CERVICAL HUMAN PAPILLOMAVIRUS INFECTION AND ITS RELATIONSHIP TO SEXUAL BEHAVIOUR IN YOUNG WOMEN

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Cervical Human Papillomavirus (HPV) infection, which has been strongly and consistently associated with cervical neoplasia, is one of the most common sexually transmitted diseases. To study the natural history of cervical HPV infection and its relationship to sexual behaviour, a cohort of 2011 women aged 15 to 19 were recruited from a family planning clinic in Birmingham, UK, between 1988 and 1992. At study entry, a detailed social, sexual and behavioural risk factor profile was assembled, a cervical smear taken, and cervical and serum samples stored for future virological examination. Subjects were asked to reattend at intervals of six months, when their risk factors were updated and further samples taken. Cervical samples were tested for HPV types considered low risk (6/11), or high risk (16, 18, 31, 33, 52, 58) because of their association with cervical neoplasia. The natural history of HPV infection is poorly defined, even in young women where the situation is likely to be less complex than that pertaining in older women. As an illustration, the incidence of cervical HPV infection was determined in 241 women recruited within six months of first having sexual intercourse and who had had only one sexual partner. 77 women tested positive for HPV; 25 for one or more high-risk types, 5 for only low-risk types, and 47 for other unidentified types. The cumulative risk at three years of cervical HPV infection was 45% (95% confidence interval 27% to 64%), and the median time from first intercourse to first detection of HPV was 4.9 months (range 0.3 to 59.0). 180 (75%) women reported using barrier contraception, albeit intermittently, at some period during this relationship. Further analyses will be presented relating to the rate of change of partners to the detection of new HPV types.

147 DO ATOPIC DISEASES, INFECTIONS AND VACCINATIONS AFFECT THE RISK FOR TYPE 1 DIABETES MELLITUS IN CHILDHOOD?

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Aims: Type 1 diabetes is an autoimmune disease associated with a destruction of the insulin producing beta-cells of the pancreatic islets. The development of the autoimmune process is thought to depend on both genetic and environmental factors. A nationwide population-based case-control study was performed in Germany during 1992–95 focusing on the association of environmental exposures and the risk for Type 1 diabetes in children under 5 years of age.

Methods: Data from 760 incident cases (71% of eligible) and 1871 population controls (43% of eligible), individually matched for age, sex, and place of residence, were analysed. Information on atopic diseases, childhood infections, antibiotic therapies, vaccinations and possible confounders were collected using a mailed questionaire. Data were analysed by multivariate conditional logistic regression adjusting for relevant confounders (family history of Type 1 diabetes, duration of breastfeeding, mother's age at birth, social status, number of children, current intake of cow's milk).

Results: Atopic eczema was significantly associated with a decreased risk for Type 1 diabetes (OR (95%-CI): 0.72 (0.53–0.97). Allergic rhinitis and asthma did not affect the diabetes risk. Varicella infection significantly reduced the risk for Type 1 diabetes (OR: 0.69 (0.54–0.87)). Other common childhood infections showed no association with the diabetes risk. Recent antibiotic therapies were significantly associated with an increased risk for Type 1 diabetes (p for trend = 0.013, OR for ≥5 vs. none: 1.61 (1.00–2.58)). Completed vaccinations against polio, diphtheria/tetanus, pertussis, and Haemophilus influenzae b were significantly associated with a decreased risk for Type 1 diabetes (ORs: 0.73 (0.55–0.98), 0.68 (0.49–0.94), 0.71 (0.56–0.91), 0.56 (0.37–0.83), respectively). Measles/mumps/rubella and BCG vaccination did not affect the diabetes risk.

Conclusions: This large nation-wide population-based case-control study indicated that atopic eczema, varicella infection and vaccinations, in particular Haemophilus influenzae b vaccination, may be protective against the development of Type 1 diabetes.

148 DEPRIVATION AND INVASIVE HAEMOPHILUS INFLUENZAE DISEASE: DID THE INTRODUCTION OF HIB CONJUGATE VACCINE CREATE ADDITIONAL HEALTH INEQUALITIES?

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Background: Differential uptake of health interventions between social groups could exacerbate already existing health inequalities. Following the introduction of Haemophilus influenzae type b (Hib) conjugate vaccine in 1992, we explored the relationship between invasive Hib disease and deprivation in the two years before and after introduction of the vaccine.

Methods: A descriptive study of children aged <5 years with laboratory confirmed invasive H influenzae disease admitted to a hospital in the West Midlands region between October 1990 and September 1994. Children were allocated to enumeration districts (ED) based on their postcode of residence. The EDs were then ranked using the different components of the Townsend deprivation score and divided into sextiles. Linear trend analysis was performed to determine relationships between disease rates and each of the variables studied both pre- and post-vaccine.

Results: Following the introduction of Hib conjugate vaccine the incidence of invasive H influenzae disease decreased dramatically across all socioeconomic groups. Prior to use of the vaccine there were no discernible trends in disease incidence in relation to deprivation. However, following the introduction of the vaccine disease differentials increased between the most affluent and most deprived children for all measures of deprivation. There were significant trends of increasing incidence with increasing levels of non-owner occupancy (p = 0.032) and lack of access to a car (p=0.049) in the post-vaccine period.

Interpretation: Despite an absolute reduction in the incidence of invasive H influenzae disease these results suggest that health inequalities may have widened following the introduction of the vaccine. Our results may well be relevant to the recently introduced meningococcal C vaccine. They also suggest that efforts to increase vaccine uptake in deprived communities should be intensified. Further research is required to determine the behavioural or psychosocial mechanisms by which non-owner occupancy and lack of a car influence health.

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149 | HAS ADVERSE PUBLICITY ABOUT MMR VACCINE HAD A RIPPLE EFFECT ON IMMUNISATION COVERAGE IN INFANTS?

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Introduction: In recent years coverage of the measles, mumps and rubella (MMR) vaccine at two years of age has fallen by about 4%, due to considerable adverse publicity about the vaccine following the publication of a paper that alleged a link between MMR, autism and inflammatory bowel disease. To examine whether the controversy surrounding MMR might also have affected immunisation coverage in younger children, we examined recent trends in coverage data for selected vaccines in children aged 12 months in England between 1996 and 1998.

Subjects and methods: Diphtheria, pertussis and Haemophilus influenzae type b (Hib) vaccines were selected for analysis from routine immunisation data, collected as part of the COVER (Cover of Vaccination Evaluated Rapidly) programme from 1996 to 1998. The number of health authorities achieving ≥95% coverage were identified in each year for each of the vaccines studied. Chi-square for linear trend was used to analyse trends across years.

Results: For all the vaccines examined a steady downward trend in the number of health authorities achieving high (≥95%) coverage was seen over the 3-year study period. For both diphtheria (p = 0.018) and Hib (p = 0.019) vaccines this trend was significant. A similar but non-significant downward trend was also seen for pertussis.

Comment: These results suggest that since 1996 there has been a significant and consistent reduction in the number of health authorities achieving at least 95% vaccine coverage for children aged 12 months. However, these results should be interpreted with caution. When vaccine coverage is high and the diseases the vaccines protect against become rare, concerns over vaccine safety increase. In addition, complacency towards vaccination may occur among parents and health professionals resulting in delayed reporting of immunisation. Thus, although the observed reduction in coverage coincides with adverse media publicity for MMR, other explanations should not be ignored.

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150 | EFFECTIVENESS OF INFLUENZA VACCINATION IN PREVENTING HOSPITALISATION IN SOUTHEAST WALES DURING THE WINTER OF 1999–2000: A CASE-CONTROL STUDY

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Background: Annual outbreaks of influenza vary in magnitude and virulence but may result in significant excess hospitalisations and deaths. Prevention strategies focus on the yearly administration of inactivated influenza virus vaccines to individuals predisposed to severe viral illness or complications.

Study objective: To quantify the effectiveness of the inactivated influenza vaccine in preventing hospitalisation and mortality in Southeast Wales during the winter of 1999–2000.

Setting: Southeast Wales's population, 550,000

Subjects: All patients hospitalised during week 52 of 1999 to week 3 of 2000, with an initial inpatient diagnosis of pneumonia, respiratory tract infection, bronchitis, asthma, chronic obstructive airways disease, influenza or acute viral infection.

Methods: Histories were taken from cases, vaccination status noted and acute and convalescent serum drawn where practical. Cases were then matched with controls randomly selected from primary care databases by GP practice, age, sex, ward-code generated Townsend score and risk status with regard to vaccination recommendations. Controls were then administered the same questionnaire as cases.

Results: 346 individuals were admitted to hospital during the study period with a history that fulfilled the case criteria. 70% of cases reported an antecedent influenza like illness (ILI) or were admitted with an acute viral infection, the remaining cases reported no preceding ILI but were admitted with community acquired pneumonia (16%) or exacerbation of chronic pulmonary disease (14%). Radiology and serology results are presented on the case dataset and morbidity and mortality examined by age and inpatient diagnosis. There was a significant difference in vaccine uptake between cases and controls (χ^2 =35.26) P <0.001 and an odds ratio of 0.32 confirmed previous estimates of the protective effect of influenza vaccination.

Conclusions: The morbidity and mortality associated with influenza infection in groups recommended for vaccination is significant. Vaccination is shown to be effective in reducing both in such groups.

Primary care

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150 | SEX DIFFERENCES IN THE MANAGEMENT OF ANGINA PECTORIS IN PRIMARY CARE.

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Background: To determine if the sex differences observed in the management of coronary heart disease (CHD) in specialist care settings also exist in primary care.

Methods: A cross-sectional retrospective review of GP medical records undertaken by trained data managers in 6 sentinel practices in Liverpool (UK).

Results: 925 patients (489 men, 436 women) unequivocally labelled as having angina pectoris were identified. Women were older than men, had a longer duration of angina and a lower prevalence of previous myocardial infarction (MI). These gender differences were adjusted for using multiple logistic regression (odds ratio greater than 1 favouring men). Women were more likely to have received GP care alone since diagnosis (OR=0.65, 95%CI 0.47–0.91), whilst men received specialist cardiac care (OR=1.45, 95%CI 1.07–1.97). Men were more likely to have their body mass index recorded (OR=1.35, 95%CI 1.02–1.78), but differences in the recording of BP, smoking and cholesterol did not remain statistically significant after adjustment (OR=0.77, 1.23 and 1.11 respectively). Men were more likely to be prescribed triple anti-anginal therapy (OR=1.55, 95%CI 1.01–2.37) and once daily aspirin (OR=2.07, 95%CI 1.56–2.74). The use of beta-blockers in patients with a previous MI was similar (OR=0.97), but men with angina were significantly more likely to have undergone

exercise ECG testing (OR=1.52, 95%CI 1.11–2.09) and coronary revascularisation (OR=1.68, 95%CI 1.01–2.78).

Conclusions: In primary care the management of men with angina is more intensive than that provided to women. Gender differences in the management of CHD reported from secondary care also exist in primary care.

151 | FACTORS ENCOURAGING THE UPTAKE OF NEW DRUGS IN GENERAL PRACTICE

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New drug uptake and displacement of old drugs are important factors driving up the national drug bill. Arguably, where new drugs offer advantages over old drugs, prescribing is appropriate, but often, new drugs offer little advantage over drugs they are displacing. Factors encouraging the uptake of new drugs are poorly understood. This study explores decision-making surrounding new drug prescribing from the perspective of GPs. Such an understanding is crucial if cost-effective prescribing is to be encouraged.

Using the critical incident technique, 107 GPs were interviewed about their reasons for initiating prescribing of nineteen new drugs. 721 critical incidents were identified and classified using a qualitative, thematic analysis. Reasons for prescribing were coded and distribution of reasons analysed.

GPs made little use of independent, scientific information, depending heavily on pharmaceutical companies and hospital colleagues as information sources. GPs frequently relied on only one channel of information and the decision to prescribe was seldom associated with an active information search. Prescribing was also associated with anecdotal testimonies, perceived consultant endorsement, patient requests, GPs attitudes and failure of previous treatment. A model of the decision-making process illustrating the factors influencing uptake of new drugs in general practice was developed.

New drug prescribing behaviour is complex and influenced by several, interwoven factors including both pharmacological and psychosocial reasons. The process of decision-making raises important concerns over the implementation of evidence-based medicine and has implications for the communication of new drug information. Decision-making underlying prescribing should fundamentally involve accumulation and critical evaluation of available information in order to select appropriately from various drug choices and relate this to individual patients, yet few GPs actively researched independent, scientific evidence. This suggests a need to facilitate GPs access to and appraisal of new drug information especially when independent, scientific evidence lags behind information provided by the pharmaceutical industry.

152 | PROMOTING HEALTHY LIFESTYLES FOR TEENAGERS IN THE GENERAL PRACTICE SETTING: THE ACE TRIAL

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Objective: To evaluate the effectiveness of inviting teenagers to practice nurse consultations with health and health behaviour advice and appropriate follow-up care.
Design: Randomised controlled trial.
Setting: Eight general practices: large and small, town-based and rural.
Participants: 1516 teenagers aged 14/15 years.
Intervention: Teenagers were randomised within practice. The intervention group were invited to attend a 20 minute consultation with a practice nurse to discuss mental and physical health and health-related behaviour; non-attenders were sent written information and questionnaires at home. The control group received usual care and were sent questionnaires at home.
Outcome measures: Mental and physical health, self-efficacy, health-related behaviour and use of health services were measured at baseline, three, and 12 months.
Results: 49% of the girls and 35% of the boys attended for a consultation. A further 27% (203) of the intervention group completed questionnaires at home. 63% (466) of the control group also completed questionnaires. 73% of the teenagers wanted to work on changing at least one health-related behaviour; the most common

were diet (34%), exercise (33%), dealing with stress (25%), and smoking (12%). Over one-third were offered follow-up care to address problems identified during the consultations. At three months intervention group teenagers reported positive behaviour change in significantly more areas than did the control group (p<0.05), and significantly more intervention group teenagers reported positive change in 'stage of change' (p<0.05) indicating increased intention to lead healthy lifestyles. At 12 months these differences between groups were no longer significant.

Conclusions: The consultation provided a unique opportunity to identify and address mental and physical health problems and encouraged teenagers to try to lead healthier lifestyles. Although further reinforcement may be needed to sustain behaviour change, if such interventions encourage even small a reduction in health-damaging behaviour, this could have a significant impact on public health.

153 | SECONDARY PREVENTION OF CORONARY HEART DISEASE AMONG PEOPLE WITH AND WITHOUT DIABETES IN PRIMARY CARE

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Background: Effective interventions exist to reduce the risk of recurrent coronary heart disease (CHD) in people with and without diabetes. The prevalence of risk factors and extent of use of interventions for recurrent CHD within the local population of 410,000 people had not previously been established.
Methods: An audit of secondary prevention was performed on a 50% sample of patients 35–75 years of age with a disease code indicating CHD in 13 of 60 general practices in north Cambridgeshire and west Norfolk during 1999. Data were collected from manual and electronic primary care records
Results: Data were collected from 790 men and 415 women of whom 16% and 15% respectively had a record of diabetes. People with diabetes were more likely to have a history of myocardial infarction (37% vs 32%) or revascularisation (16% vs 15%) and were less likely to have angina alone than people without diabetes (47% vs 53%) but the difference was not statistically significant (p=0.3). Data on smoking history were available for 1080 people and on body mass index (BMI) for 970 people. The distribution of risk factors and interventions by diabetes status is shown in the table.

Abstract 153 Table 1

Risk factor/intervention	People with diabetes n=191 (%)	Non-diabetics n=1014 (%)	p
Current smoker	21	25	0.3
BMI >30 kg/m^2	47	28	<0.001
Hypertension	31	25	0.05
Aspirin	71	70	0.9
Beta-blocker	27	43	<0.001
Statin	37	37	0.9

Conclusions: There is evidence of unmet need for secondary prevention of CHD in this population. Several differences in the pattern of need for behavioural and pharmacological interventions exist between people with and without diabetes. As risk of a further cardiovascular event is particularly high among people with diabetes it would be appropriate to give priority to this group when addressing secondary prevention of CHD in primary care.

154 | CARE NEED INDEX, A TOOL FOR THE DISTRIBUTION OF PRIMARY HEALTH CARE RESOURCES

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Study objective: To transform a composite index, Care Need Index (CNI), into a positive scale (mean=0; SD=20) in order to allocate health care resources. To compare the decile means (of the whole population) of the transformed CNI scale with the odds ratios (OR) of long-term illness (LTI) in CNI deciles.
Design: Cross-sectional studies. CNI is based on eight weighted factors: elderly living alone, children under 5, unemployed people, unskilled workers, single parents, overcrowding, high mobility and

foreign-born people (non-western countries). The weights were calculated from the ratings of 1,022 Swedish GPs on the impact of their workload. CNI was calculated on small area market statistics level. The original CNI scale was transformed into a new scale (mean=100; SD = 20) in order to avoid negative values. The decile means of the transformed CNI were calculated for the whole population divided into deciles, with approximately 850,000 persons per group. In an earlier study, the effects of socio-economic position of neighbourhood on self-reported LTI were estimated by a multilevel model.

Setting: The Swedish population.

Outcome measures: CNI means for the deciles of the whole Swedish population and OR of LTI in corresponding deciles.

Main results: The means of the transformed CNI for deciles ranged from 78 (most affluent areas, decile 1) to 129 (most deprived areas, decile 10). The ratio between the tenth and the first decile was 1.65. There was an approximately 70% increased risk of LTI for people living in the most disadvantaged neighbourhoods (OR=1.73) compared with those living in the most affluent areas (OR=1). There was a clear gradient for LTI from OR=1 (decile 1) to OR=1.73 (decile 10). The CNI means for the deciles corresponded to the odds ratios of LTI.

Conclusions: The transformed CNI can be used as weights to allocate resources, possibly combined with age.

155 "AMBULATORY SENSITIVE" HOSPITALISATIONS AND DEPRIVATION: THE EQUITY CHALLENGE FOR PRIMARY CARE

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The aim of the study was to provide a basis for ongoing monitoring of social gradients in hospital utilisation using national datasets, and to assist in evaluating equity of access to hospital and primary care services. 'Ambulatory sensitive' hospitalisations are hospitalisations amongst those aged 0–64 years that are potentially avoidable through prophylactic or therapeutic interventions deliverable in a primary health care setting (such as vaccine preventable diseases, early recognition and excision of melanoma, effective blood sugar control in people with diabetes). Primary medical care services in New Zealand are provided largely by private sector general practitioners. Consultations for low-income families are subsidised by the state, but patient charges apply in most instances.

Hospitalisation data were derived from national public hospital inpatient discharge datasets for the years 1996 and 1997, and categorised into three groups: unavoidable, preventable (hospitalisations amongst those aged 0–64 years resulting from diseases preventable through population-based health promotion strategies), and ambulatory sensitive hospitalisations. Socioeconomic deprivation was measured using the NZDep96 index of socioeconomic deprivation for small areas, which combines nine variables from the 1996 Census.

There was a strong and consistent relationship between area level socioeconomic deprivation and ambulatory sensitive hospitalisation rates. The findings of this study suggest that: people living in socioeconomically deprived areas have greater need for hospitalisation than those living in less deprived areas; at a national level, the public hospital system responds, at least in part, to the higher level of need amongst people living in socioeconomically deprived areas; and, primary care services face considerable challenges in reducing inequities in access to services, and in service provision, that result in the pronounced socioeconomic gradient in ambulatory sensitive hospitalisations. Particularly, increased attention should be paid to reducing financial and other barriers to access for vulnerable population groups in New Zealand.

Maternal health

156 RATIONALE AND DESIGN OF PRISM, A COMMUNITY-RANDOMISED TRIAL TO REDUCE DEPRESSION AFTER BIRTH

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PRISM (Program of Resources, Information and Support for Mothers) was developed to reduce physical and emotional ill-health of women in the year after birth when the burden of illness is substantial. Its context is research carried out across Victoria in1989–97, describing the extent of maternal health problems, their natural history, contributing factors from the mothers' perspectives, sources of help women had used and the advice women would now offer to other women in the same situation. Health Insurance Commission data showed a mother/baby having >7 visits to GPs in the first six months after birth. Despite frequent contacts very few of the mothers' health problems were disclosed to GPs, other doctors, or maternal and child health nurses. A GP survey found reluctance to initiate discussion on these problems. PRISM is a community randomised trial, of primary care and community-based strategies, including a community development component, and applicable to all mothers. The sample size to detect a 20% relative reduction in the prevalence of depression 6 months after birth (primary aim), with adjustment for clustering, and minimising the costs of implementation, was calculated to require 16 municipalities, each with 300 to 1500 births a year, for randomisation.

157 PSYCHOTHERAPEUTIC COUNSELLING FOR WOMEN AFTER ANTENATAL TRANSPORT: A PROSPECTIVE RANDOMISED TRIAL

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Women after antenatal transfer (in-utero-transport) are subject to severe psychosocial stressors. Anxiety about the baby's life and/or health, fear for their own health, and rapid change of attending staff. Anxiety and lack of continuity may interfere with parents' ability to cooperate with the staff of the Neonatal Intensive Care Unit (NICU) in caring for a premature infant.

Our psychotherapeutic counselling began upon admission and was aimed towards reduction of fear, improvement of communication between patients and staff and empowerment to apply patients' own resources and skills. Interventions were mainly supportive and not confrontative.

Women were randomised either to additional counselling or to standard medical care. Both the medical staff and the person who presented the tests were unaware of group allocation.

As psychometric tests we used the Freiburg Coping-with-Illness Questionnaire, the full and the 6-item version of the STAI, and the Parental Stress Scale at several time points.

Between Nov.1st 1999 and Oct. 31st 2000 169 women had an antenatal transfer; 161 were contacted, 108 were entered in the trial, 60 of them received counselling, 48 did not.

Mean gestational age at transfer was 27,2 weeks, at birth 29,1 weeks, mean birth weight 1.120 grams (range 550—2.830). Leading indications for transfer were PPROM / amniotic infection (28%), preeclampsia (13%), premature labour (22%), maternal condition (14%). Mode of delivery was c.section in 81%; none of these medical parameters differed between the 2 groups.

Women with counselling scored lower in both versions of the STAI-X, and applied different and more appropriate coping strategies. Parental stress was equal in both groups. NICU staff reported that counselled women cooperated better by taking over more responsibility.

We conclude that psychotherapeutic counselling is effective in the reduction of state anxiety and in improving coping mechanisms in a high risk population.

158 MATERNAL MORTALITY IN SENEGAL AND BANGLADESH: EVIDENCE OF A HEALTHY PREGNANT WOMAN EFFECT?

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Although it is generally believed that pregnancy exposes women to a wide variety of excess health risks that go beyond the direct obstetric complications of pregnancy, the epidemiological evidence in support

of such excess indirect risks is inconclusive. In this paper we examine the contribution of indirect causes of death to maternal mortality in Senegal and Bangladesh by using an epidemiological approach whereby the time spent during pregnancy and postpartum is considered a transient period of exposure to the health hazards of childbearing. We use data from unique demographic surveillance systems in Senegal and Bangladesh to calculate rate ratios comparing death rates in pregnant or recently pregnant women (exposed) with death rates in other women (unexposed), including and excluding direct obstetric deaths.

In Bangladesh, death rates during or shortly after pregnancy are more than twice as high as death rates outside this period. In Senegal, where all-cause death rates in women of reproductive age are twice as high as in Bangladesh, pregnancy unexpectedly does not confer additional risks to women aged 20 to 44. After excluding direct obstetric deaths, exposed women have surprisingly lower risks of death than unexposed women both in Bangladesh and Senegal. For the very young (15–19) and the very old (45–49) in Senegal, on the other hand, the excess risks associated with pregnancy are huge and, among women age 45 or older, persist even after excluding direct obstetric deaths.

Several interpretations of this finding are discussed, particularly the role of selective factors ("healthy pregnant woman effect"?). The apparent protective effect of pregnancy on women's health that is observed in this study illustrates the paradoxical nature of the concept of indirect causes of maternal mortality, and the difficulties in measuring the risks of death attributable to the pregnancy.

159 THE OUTCOME OF SEVERE OBSTETRIC MORBIDITY

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Objectives: To identify the impact of severe obstetric morbidity six months postpartum.
Design: A case-control study with women suffering a severe morbid event during pregnancy or labour and normal pregnant controls.
Setting: All 19 maternity units within the South East Thames Region, UK, between March 1st 1997 and February 28th 1998.
Results: There were 331 cases and 1339 controls identified from 48,262 deliveries. Six months after delivery, 23% (CI: 19, 28) of cases and 20% (CI: 18, 23) of controls were at risk of postnatal depression, 13% (CI: 10, 17) of cases had not restarted sexual intercourse compared with 4% (CI: 3, 6) of controls (p=). 32% of cases attended outpatients in the first six months and 9% required emergency admission to hospital (17% and 4% respectively for controls).
Conclusion: Even normal pregnancy and childbirth are traumatic for women as illustrated by the postnatal morbidity experienced by controls. A severe obstetric morbid event impacts on a woman's sexual health and well being and increases the workload of health services. Prevention and amelioration of severe obstetric morbid events would have profound effects.

160 SELF-HELP SMOKING CESSATION IN PREGNANCY: A CLUSTER RANDOMISED TRIAL

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Background: Low cost self-help health education materials have been shown to be effective in helping pregnant women quit smoking in the United States and Sweden, but none of these interventions are suitable for direct application in the UK.
Objective: To identify the effectiveness of such an approach when implemented within routine UK antenatal care.
Design: Cluster randomised trial, with community midwife as the unit of randomisation.
Main outcome measures: Smoking cessation rate at 27 weeks gestation, validated by urinary cotinine. Secondary outcomes: birth weight and gestation at delivery.
Setting: Three Hospital Trusts in the South-west of England.
Participants: 1532 pregnant women who were smokers at the outset of pregnancy.
Intervention: A series of 5 self-help booklets which comprise a step-by-step programme to increase motivation for quitting and to teach behavioural strategies for cessation and relapse prevention. The first

booklet was introduced by a midwife at the earliest opportunity in normal antenatal care and included a booklet for partners, family members and friends. Subsequent booklets were mailed directly to subjects.
Methods: All participants were posted a self-completion questionnaire at 27 weeks gestation. Those reporting that they had not smoked for at least seven days were asked to provide a urine sample for cotinine assay. After the end of pregnancy, hospital notes were scrutinised to identify birth weight and gestation at delivery.
Results: Of 1448 eligible participants recruited, 1322 (91%) completed a 27-week questionnaire. In terms of the primary outcome, provisional analysis indicates that among the 708 participants in the control group (normal care), 20.0% (95% CI: 16.4%, 23.6%) were non-smokers, validated by cotinine assay, while among the 607 participants in the intervention group (normal care plus Stop for Good self-help smoking cessation pack), 18.6% (14.7%, 22.6%) had quit the habit, a difference which was not statistically significant (p=0.61).
Conclusions: Self-help smoking cessation has not been effective when implemented during routine antenatal care in the UK.

161 REDESIGNING POSTNATAL CARE: RESULTS OF A CLUSTER RANDOMISED CONTROLLED TRIAL OF A NEW MODEL OF MIDWIFERY-LED, EVIDENCE-BASED, POSTNATAL CARE

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Background: Government reports have highlighted the poor evaluation and often inappropriate and fragmented delivery of postnatal care. Primary health care to postpartum women in developed countries continues to centre on screening for morbidities which are no longer the major burden of disease. Care fails to detect and manage the chronic morbidity following childbirth for which there is now considerable evidence. We report the findings of a trial of a new model of midwifery-led, evidence-based postnatal care on women's health.
Study population: Women receiving postnatal care between October 1997 and March 1999 in 36 general practices randomly selected from the West Midlands health region.
Study design: Cluster randomised controlled trial with general practice as the unit of randomisation.
Intervention: The new model was midwifery-led, focused on the identification and management of women's individual health problems, with GP contact only if required. Care was planned with the women and visit frequency and content based on need. Emphasis on routine monitoring and observations was reduced. Care duration was rationalised and extended, with home visits to 28 days and the final check undertaken by the midwife at 10–12 weeks. A symptom checklist was used by the midwives to ensure identification of health problems, and evidence-based guidelines developed to manage these. Main outcome measures were summary scores of mental (MCS) and physical (PCS) health from the SF36, and the Edinburgh Postnatal Depression Scale (EPDS) at 4 and 12 months.
Results: 1087 women were recruited from 17 intervention practices and 977 from 19 controls. At 4 months postpartum, the mean MCS for the intervention group was significantly higher than for controls. This improvement in psychological well-being was also shown in the EPDS comparisons between groups. There was no significant difference in physical well-being. Cost-effectiveness comparisons and women's views of care will also be presented.

161a HOW DO WE BEST DETECT SIDE-EFFECTS OF DRUGS TAKEN DURING PREGNANCY IN EUROPE

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Pregnant women and especially the unborn child may be more vulnerable to drugs that cross the placenta. Side-effects in this time period may be more severe and may have long lasting consequences for the child, the family and the society. In spite of this we have no routine monitoring of possible side-effect based upon an epidemiological design, except in Hungary. Most of the focus has been on congenital malformations and very little is known about diseases that may be detected in childhood or even later.

It is our strong believe that time has come to set up a more systematic approach to monitor the safety of medicine taken during pregnancy.

The EuroMap has explored several design options during the last 4 years; from follow-up studies based upon primary and second data and case-control designs focussing upon congenital malformations. A monitoring system should, in our experience, be based upon a combination of designs in order to be sensitive as well as specific. It has to cover several regions because prescription practice varies and it has to include long-term follow-up.

Due to lack of compliance to prescriptions actual intake has also to be recorded and due to problems with recall-bias case-control studies should be replaced with case-cross-over designs.

Obesity, diet and exercise

162 WHY IS OBESITY MORE COMMON IN MEAT-EATERS THAN VEGETARIANS? EXPLANATORY DIETARY FACTORS IN 56,000 EPIC PARTICIPANTS

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Obesity has a role in the aetiology of diabetes, cardiovascular disease and some cancers, and the prevalence of obesity is increasing. It is of interest to identify dietary factors that determine obesity, an indicator of which is body mass index (BMI). Categorisation of people according to dietary patterns may be useful in identifying dietary factors responsible for variation in BMI. Previous studies show non-meat eaters have lower BMI than meat-eaters, but data on vegans are limited.

A cross-sectional analysis was performed using the Oxford cohort of the European Prospective Investigation into Cancer and Nutrition (EPIC study). This included about 56,000 men and women volunteers, recruited to include a large proportion of vegetarian and vegan subjects. Between 1993 and 1999, subjects completed a food frequency questionnaire with additional questions on health, parity, anthropometric and lifestyle variables. Subjects were categorised into one of four dietary groups: meat-eater (may eat fish); fish-eater (fish but no meat); vegetarian (no meat or fish); vegan (no meat, fish, eggs or dairy products). Body mass index (weight (kg)/height (m)^2) was calculated from height and weight data and nutrient information was calculated using McCance & Widdowson's food tables.

53% of the cohort were meat-eaters, 15% fish-eaters, 29% vegetarian and 4% vegan. Age ranged from 20 to 97 with a mean of 45. 9.0% of meat-eaters were obese (BMI>30), compared with 3.9% of fish-eaters, 4.0% of vegetarians and 2.2% of vegans. Preliminary data indicate that intakes of total fat and saturated fat are greatest in meat-eaters and lowest in vegans, and that carbohydrate and fibre intake are significantly higher in vegans and vegetarians than in meat-eaters. The analysis will test the hypothesis that differences in obesity can be explained by differences in intake of total fat, saturated fat, fibre and alcohol.

163 BODY MASS INDEX IN MIDDLE AGE AND IN OLD AGE AND HEALTH STATUS IN OLD AGE

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Background: The long-term impact of mid-life body mass index (BMI) on health in old age has not been investigated. The relevance of mid-life and late-life BMI to health in old age is uncertain.
Objective: To explore the interplay of BMI in mid-life (baseline) and late-life (re-survey) on the health status of men in old age.
Design: Postal follow-up re-survey in 1997 of survivors of Whitehall civil servants who were first screened in 1967–70. Anthropometric measures recorded by GPs.
Outcomes: Poor self-reported general health, low score on SF-36 physical performance scale; unable to do at least one activity of daily living (disability).

Abstract 163 Table 1

Adjusted for age	Odds ratio (& 95% CI) of poor health for top v lowest quintile of BMI and BMI at the other time		
	Poor health	Poor physical performance	Disability
BMI in middle age	2.1 (1.2–3.9)	2.6 (1.7–4.0)	2.1 (1.4–3.2)
BMI in old age	0.5 (0.3–0.8)	1.1 (0.7–1.6)	0.9 (0.6–1.3)

Results: Of 8537 men alive at re-survey, 5127 (60%) had BMI measurements at both times. At re-survey, the median age was 77 years, and median follow-up period 29 years; 35% were in a higher, and 26% in a lower, BMI quintile than at baseline. Men in the 40–80th percentiles of BMI at re-survey (25.8–27.7) were least likely to report poor general health. Men with a high midlife BMI (> 27.0) had significantly increased risks of morbidity in old age independent of late-life BMI. The association of current BMI with poor physical performance and disability in old age was J- shaped before adjustment for baseline BMI and U-shaped afterwards.
Conclusion: High BMI in middle age increases the risk of morbidity in old age regardless of BMI in old age. Low BMI in late-life is associated with poor health status in old age, possibly due to reverse causality.

164 CAN HEALTH INTERVENTIONS COUNTERACT THE WIDENING OF SOCIAL INEQUALITIES IN DIETARY FAT AND EXERCISE IN MIDLIFE?

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Introduction: Re-interview evidence from the Health and Lifestyle Survey shows divergence in CHD-related behaviours between different social and economic groups over a seven-year period. This is most notable in dietary fat and exercise in men aged 35 to 49. The aim is to assess the potential of public health interventions for preventing this widening of social inequalities in CHD risk in this age group.
Method: A random sample of adults living in private households in Great Britain was interviewed in 1984 for the Health and Lifestyle Survey and re-interviewed seven years later in 1991. There were 586 men and 671 women aged 35–49 who took part in both interviews. Changes over the seven years in saturated fat intake and exercise were related to social class, education, housing, income and area deprivation. The extent of the divergence between social groups was compared with the magnitude of behaviour changes achieved in recent published intervention studies in free-living populations.
Results: In men, the mean (se) divergence between social groups over seven years in saturated fat intakes was 28g (4.3g) per week in those who had low levels of fat in 1984 and 14g (5.6g) in those who had high levels in 1984. This compares with reductions in weekly saturated fat achieved through intervention trials of around 87g (MRFIT). The divergence between social groups over seven years in proportions of men taking up exercise was around 7% which compares with take-up achieved through interventions of around 12% (meta-analysis).
Conclusions: Current approaches to interventions in diet and exercise, if they can be sustained, are likely to be sufficient to prevent the continued development of social inequalities in these CHD-related behaviours in the 35 to 49 age group provided the interventions are effective in those in less favourable socio-economic circumstances.

165 PHYSICAL INACTIVITY AND MORTALITY IN HONG KONG

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Objective: To study the risks of death attributable to physical inactivity in Hong Kong Chinese.
Methods: Case control study. From December 1998 to January 2000, information on physical activity about 10 years ago of deceased persons (cases) and of surviving persons (controls) was collected from the same informants who applied for death certificates in all 4 death registries. Cases who had chronic ill health or were home bound for 6

years or more before death were excluded. 24079 cases and 13054 controls aged 35 or above were included in the present analysis. Physical inactivity was defined as no exercise for at least 30 minutes during leisure time.

Results: 62% of the cases and 51% of the controls had not exercised during leisure time. After adjusting for age, education, smoking, alcohol drinking and physical activity level of the longest job, the odds ratios (95% CI) for all cause mortality for physical inactivity for the age of 35–69 and 70+ in men were 1.64 (1.44–1.86) and 1.42 (1.29–1.56), and in women, 1.19 (1.07–1.31) and 1.39 (1.28–1.52) respectively. Increased odds ratios with physical inactivity were observed for neoplastic, respiratory, cardiovascular and other causes of deaths. Significant trends of odds ratio increasing with decreasing level of physical activity were observed, except for respiratory (p=0.1) and vascular (0=0.06) deaths in women aged 35–69.

Conclusions: Physical inactivity is an important risk factor for mortality in Chinese. The population attributable risk is high because of the high prevalence of physical inactivity in both genders.

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166 **RESPIRATORY FUNCTION AND ABDOMINAL OBESITY IN OLDER MEN AND WOMEN: THE EPIC-NORFOLK RESULTS**

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Background: An inverse association between respiratory function and body mass index have been reported. However, the relationship with abdominal obesity is not clear. This study examined the relationship of abdominal obesity, measured using waist-hip ratio, body mass index and respiratory function in a large cohort of adult men and women.

Methods: A cross-sectional analysis of baseline waist-hip ratio and body mass index (BMI) in relation to forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) was done on 9903 men and 12151 women aged 45–79 years who were recruited to the EPIC-Norfolk cohort, and attended a health check and completed a health and lifestyle questionnaire.

Results: Mean FEV1 and FVC were lower among those in higher quintiles of WHR than in lower quintiles even after adjusting for age, height, and other covariates including smoking and BMI. The increase of 0.05 unit of WHR was associated with 0.09 L and 0.03 L decrease in FEV1 in men and women, respectively, and with 0.11 L and 0.05 L decrease in FVC in men and women, respectively. The negative relationship was still apparent after excluding cigarette smokers and those with previously known respiratory illness. In men, the effect of BMI independent of WHR was apparent only when smokers and those with prevalent respiratory illness were excluded.

Conclusion: Higher WHR was associated with lower FEV1 and FVC for both men and women even among healthy individuals and independent of BMI. This merits further investigation on the nature of underlying common factors of abdominal obesity and respiratory function.

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167 **MORTALITY AND BODY MASS INDEX IN A HEALTH CONSCIOUS COHORT**

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We examined the association of body mass index (BMI) with mortality in the Oxford Vegetarian Study, a prospective cohort of health-conscious individuals living in the United Kingdom. Approximately 40% of the subjects are vegetarians, and the mean BMI in the cohort is low (22 kg m^{-2}). Of 10,800 subjects, 1,102 died before the age of 90 after about 20 years follow-up. BMI was categorized in 2 kg m^{-2} increments (<18, 18-, 20-, 22-, 24-, 26-, 28+). Death rate ratios, relative to the reference category of 20–22 kg m^{-2}, were calculated for all causes of death, all malignant neoplasms, circulatory diseases, ischaemic heart disease, cerebrovascular disease, respiratory diseases, and all other causes combined. After adjusting for age, sex, smoking, social class and previous cardiovascular disease, death rate ratios for all causes combined in the lowest and highest BMI categories were 2.09 (95% CI 1.60–2.73) and 1.25 (0.94–1.67), respectively. Significantly raised death rate ratios in the lowest category of BMI were

observed for all cause of death categories examined except for all malignant neoplasms. Significantly raised death rate ratios in the highest category of BMI were observed only for circulatory diseases and ischaemic heart disease. These associations were observed among both young and old subjects, both men and women, among never smokers, among subjects with no previous cardiovascular disease, and after exclusion of the first five years of follow-up. These findings from an unusually slim cohort confirm the U-shaped relation between BMI and mortality and underline the importance of avoiding extreme underweight as well as avoiding obesity.

Miscellaneous

168 **MORTALITY PATTERN IN RUSSIA: INDIRECT TECHNIQUE USING SURVEY DATA ON WIDOWHOOD CONFIRMS THE PATTERN SEEN IN NATIONAL ROUTINE DATA**

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Objectives: The mortality crisis in Russia attracted considerable attention but doubts have been raised about validity of the mortality data. We assessed the use of the indirect technique, developed to estimate mortality in populations without reliable data, for the study of mortality in Russia by data independent from vital statistics.

Methods: Questionnaire data were collected from a national random sample of the Russian population (n=1600). Participants who have ever been married (82% of the sample) were asked about the date of birth and vital status of their first spouse. Mortality of the first spouses of the 531 men and 710 women with complete data were estimated.

Results: The estimated risks of death between ages 35 and 69 years were 57% in male and 17% in female spouses; figures, based on national data in 1990, are 52% and 25% for Russia and 31% and 20% for the United Kingdom. According to female spouses' reports, 38% of their husbands died from cardiovascular disease, 22% from cancer, and 14% of injuries and accidents. Mortality of male spouses was inversely related to education of their wives; the age-adjusted hazard ratios of death from all causes, compared to primary education, were 0.77 for secondary education and 0.57 for university education (p for trend 0.03). Mortality was also inversely related to ownership of household items (p for trend 0.001), but not to size of settlement, pride in Russia, membership in the Soviet Communist Party, nationality or self-assessed social status.

Conclusions: Although this study was relatively small, and mortality in women was probably underestimated (due to high male mortality), we found mortality pattern remarkably consistent with routinely collected data. This technique appears a useful tool to study the determinants of mortality in Russia and other populations without reliable or sufficiently extensive data.

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169 **COMPARISONS OF CAUSE SPECIFIC MORTALITY RATES IN ENGLAND AND WALES USING ICD-9 AND ICD-10: IMPLICATIONS FOR TIME TRENDS**

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From January 2001 deaths in England and Wales will be coded to the Tenth Revision of The International Classification Of Diseases (ICD-10). This is the first change in ICD revisions since 1979, and the most important revision since 1948. Changes in classification, especially in the rules for selecting the underlying cause of death from all the conditions mentioned on the death certificate, will have profound effects on cause specific mortality rates. For example, far fewer deaths will be attributed to pneumonias, and more to chronic debilitating diseases.

Those using national mortality data for epidemiological studies, monitoring public health, or evaluating progress toward public health targets need to be able to assess time trends across this change.

ONS is carrying out a bridge-coding study to measure the effects of the change in classification. Deaths registered in 1999 are being independently coded to both revisions, and the numbers of deaths attributed to specific conditions in each compared, using internationally

agreed groups of equivalent codes. Age and sex specific and overall adjusted comparability ratios will be produced for cause groupings used in national and international publications.

We will present national mortality rates showing the effect of the change in classification on important causes of death, including pneumonia, ischaemic heart disease and diabetes. We will also show how the comparability ratios from the national study can be used to adjust local or study specific mortality data to take account of these changes.

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170 EVIDENCE-BASED GUIDELINES FOR MINOR ILLNESS IN COMMUNITY PHARMACIES: A RANDOMISED CONTROLLED TRIAL (RCT)

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Objective: To compare the relative effectiveness and efficiency of implementation strategies for evidence-based guidelines for minor illness in community pharmacies.
Design: An RCT of 60 community pharmacies in Grampian, Scotland were stratified (by type and location) and randomised to four groups: Control, Educational outreach (EO), Continuing education (CE), EO and CE. All pharmacies were mailed evidence-based guidelines for the treatment of vaginal candidiasis. Pharmacies in the EO groups received one EO visit from a pharmacist. Staff from pharmacies in the CE groups were invited to a CE session (lecture plus workshop).
Outcome: Simulated patients (role-playing actors) made covert visits to participating pharmacies before and after guideline dissemination and educational interventions. Each pharmacy received seven visits (two pre- and five post-intervention), comprising seven scenarios. Pharmacies returned reply-paid postcards to report suspected simulated patient visits. The primary outcome measure was appropriateness of sale or non-sale of an anti-fungal. This outcome was derived from assessment forms completed by the actors after each visit. Appropriateness was defined by the guideline recommendations.
Results: Twenty-nine (97%) pharmacies received an EO visit and 24 (80%) pharmacies were represented by at least one member of staff at a CE meeting. Of the 120 scheduled baseline actor visits, 119 were completed. Of the 300 scheduled follow-up visits, 295 (98%) were completed. The visits (n=36) reported by one actor were excluded from analysis because of doubts regarding the veracity of the data. Pharmacy staff detected four visits. No significant difference was shown with the proportion of appropriate outcomes following educational outreach (41% versus 36%) nor CE (36% versus 41%). After adjusting for pre-intervention visits and clustering of observations within pharmacies, there was no statistically significant effect of the interventions, EO (OR=1.13, 95% CI 0.52 to 2.45) and CE (OR=0.88, 95% CI 0.41 to 1.91).

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171 A SYSTEMATIC REVIEW OF CHRONIC PAIN AFTER HERNIA REPAIR SURGERY

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Background: Until the last decade, chronic pain after inguinal hernia repair was reported as a rare and infrequent postsurgical complication. More recent studies have suggested up to 30% of patients reporting persistent pain at one year after surgery. Very few studies specifically addressed the issue of chronic pain after hernia repair. The aim of this study was to conduct a comprehensive review of the reporting and prevalence of chronic pain following inguinal hernia repair.
Methods: A systematic search of English literature published between 1987 to 2000 was undertaken on five bibliographic databases. Case definition of chronic pain was pain lasting for more than 3 months, beyond expected normal healing time (IASP, 1986)
Results: Total of 527 abstracts were identified, 101 studies critically appraised, 40 of which fulfilled inclusion criteria. The frequency of chronic pain after hernia repair ranged from 0 to 53% up to two years after surgery. Of 17 RCTs comparing laparoscopic and open repair, 8 (47%) reported less chronic pain and 4 (24%) reported more after laparoscopic surgery; 5 (29%) reported no difference. Of the 3 studies comparing open (mesh v. non-mesh) repair, 2 reported less chronic pain after mesh repair. Although studies follow-up patients for longer than 3 months and report overall morbidity, few defined chronic pain or clearly specified the timing of measurement of pain in relation to period of follow-up. Postoperative pain is only one of many outcomes measured after inguinal herniorrhaphy.
Conclusion: The frequency of chronic pain after hernia repair was much higher than previously reported. This disparity may be due to the definition used and the quality of reporting. Recent studies that specifically addressed the issue of chronic pain using a clear definition have reported a high frequency. Poor quality of reporting can limit estimation of true prevalence of chronic pain.

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172 TRENDS IN THE INCIDENCE OF CROHN'S DISEASE FROM 1969 TO 1998 IN THE OXFORD REGION, ENGLAND

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Background: The incidence of Crohn's disease (CD) has increased in some countries in recent decades. The explanation for this increase is unknown; one suggestion is that CD is associated with measles vaccine. We studied trends in CD, particularly in young people (<20 years). We also examined whether or not there was any evidence of an increase associated with the introduction of measles vaccine in 1968.
Methods: Anonymised data were obtained from the Oxford Record Linkage Study. Rates of first-recorded inpatient admissions for CD as the main diagnosis with no admission for at least three years previously, were taken as proxy for incidence. Incidence rates for ulcerative colitis (UC) were also calculated. Age-specific rates for CD, and for UC were examined for period and cohort effects, particularly in the young.
Results: The incidence of CD increased in the 1970s, but was relatively stable from 1979 to 1998 in both the young and older age groups. The rates in the young increased, on average, by only 0.2% per year (95% confidence interval: -2.0% to 2.4%). The incidence of UC was also stable over the last 20 years. Uptake in the early years of the measles vaccination programme was only about 50% nationally. If, as reported, the relative risk for the association of CD and measles vaccine was 3, a 50% uptake would double the rate in cohorts eligible for the vaccine. No such increase was found: the age-adjusted ratio of rates of CD for the post-vaccination cohorts relative to those for the earlier birth cohorts was 1.1 (1.0–1.3) considerably lower than the expected value of 2.
Comment: In the Oxford region, the incidence of CD and UC has been stable over the last 20 years. Our results were inconsistent with a marked increase in CD due to measles vaccine.

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173 PREVALENCE AND MANAGEMENT OF EPILEPSY IN ENGLAND AND WALES, 1994–1998: A STUDY EXPLORING TRENDS IN PRESCRIBING OF EXPENSIVE DRUGS

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Background: Until recently few drugs were available for treating epilepsy. Since 1990 there have been several new anti-epileptic drugs (AEDs) on the market but information on their use is lacking.
Study design: The General Practice Research Database was used to determine the age and sex specific prevalence of epilepsy and pattern of prescribing AEDs in a representative sample of 1.4 million patients in England and Wales between 1994–1998. PACT data was used to explore the cost implications.
Results: The age-standardised prevalence of epilepsy in 1998 was 7.4 per 1,000 in males and 7.2 per 1,000 in females. Disease prevalence was highest in those aged 85 years and over (10 per 1,000) and lowest in under fives (2 per 1,000). There was a 6 % increase in the age-standardised prevalence of epilepsy between 1994 and 1998. The percentage of patients prescribed newer AEDs increased from 8.3 % to 14.9 % in males and from 10.3 % to 16.9 % in females over the period. In 1998 this was highest in those aged 5–15 years (25.1% of males, 26.7% of females) and lowest in the elderly (1.7 % of males aged 75–84 years, 1.1 % of females aged 85 years and over). The cost of prescribing AEDs in the community has risen from £28 to £88 million in 10 years, mainly due to an exponential increase in the costs of prescribing newer AEDs.

Conclusion: Our findings reflect a common pattern of prescribing in the NHS; in which a disproportional increasing amount is spent on new and expensive drugs. Elderly patients, who are less represented in drug trials, also appear to have less access to newer drugs. In a cash-limited system like the NHS access to other aspects of care of which the elderly may be in most need is necessarily reduced.

174 THE IMPACT OF THE MILLENNIUM INFLUENZA OUTBREAK ON A DISTRICT GENERAL HOSPITAL IN SOUTHEAST WALES

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Background: Annual periods of influenza activity are associated with sudden increases in the number of individuals hospitalised with acute respiratory and cardiovascular illness. Excess admissions during these periods undoubtedly contribute to the resource crisis seen throughout the UK NHS during winter months.
Study objective: To examine the impact of the millennium influenza outbreak on the largest non-teaching hospital in the UK.
Setting: Southeast Wales population, 550,000.
Subjects: All patients admitted to hospital during week 52 of 1999 to week 3 of 2000, with an initial inpatient diagnosis of pneumonia, respiratory tract infection, bronchitis, asthma, chronic obstructive airways disease, influenza or acute viral infection (ICD10 J10–18, J20–22, J40–47).
Methods: Acute medical admissions and accident and emergency logs were reviewed daily to identify adult patients fulfilling study criteria. From face to face interviews and review of medical records, data was obtained on demography, residential status, chronic medical conditions predating the 1999–2000 influenza season, history of influenza like illness, smoking history and influenza and pneumococcal vaccination status.
Results: 346 individuals were admitted with respiratory illness during the study period resulting in a bed occupancy of 3592 bed days: each patient staying 10 days on average. Age at admission ranged from 21–95 years (mean 68.6yrs); the majority (70%) of cases occurring in those 65 yrs. and over. 89% of all cases had chronic medical diseases that made them eligible for vaccination under CMO vaccination guidelines. The uptake of influenza and pneumococcal vaccination among these high-risk individuals was only 33% and 21% respectively. Overall case fatality was 15% but increased with age and 7% of all individuals required either intensive or high dependency care.
Conclusions: This study provides insight into the impact of influenza on secondary care resources. The effective targeting of prevention strategies has great potential in reducing influenza related winter hospitalisations.

Stroke and other vascular disease

175 THE NORTH-SOUTH GRADIENT IN BRITAIN FOR STROKE INCIDENCE—IS IT THE SAME AS FOR CHD?

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Objective: To quantify the variation in incidence of stroke across Britain, and to assess whether it resembles the pattern for coronary heart disease (CHD)
Design: Prospective study
Setting: 24 British towns
Subjects: 7735 men followed from screening in 1978–80 for 20 years
Main outcomes: Incidences of stroke and CHD in different British regions
Results: At least one episode of stroke occurred for 483 men (0.31% per year), and of CHD for 1300 men (0.84% per year), but only 97 men suffered both stroke and CHD. Age standardised incidence rates over 20 years varied between the towns from 0.19 to 0.44% per year for stroke, and from 0.55 to 0.99% per year for CHD. Incidence for

both diseases was generally highest in Scottish towns and lowest in southern English towns ("north-south gradient"). Stroke incidence rates were only modestly related by town to CHD incidence (r=0.30), to average systolic blood pressure (r=0.17), and prevalence of current cigarette smoking (r=0.31). The age adjusted odds ratio for stroke in Scotland compared with southern England was 1.41 (95% CI 1.04 to 1.92); for CHD it was 1.43 (95% CI 1.13 to 1.80). After adjusting also for baseline blood pressure and smoking status, the odds ratio was 1.21 (95% CI 0.89 to 1.65) for stroke and 1.25 (95% CI 1.00 to 1.55) for CHD.
Conclusion: Similar north-south gradients existed for stroke and CHD. For both diseases, part of the variation is attributable to blood pressure distribution and cigarette smoking, but residual variation for CHD may be due to other influences with a north-south gradient.

176 SEXUAL INTERCOURSE AND RISK OF ISCHAEMIC STROKE AND CORONARY HEART DISEASE: THE CAERPHILLY STUDY

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Background and purpose: Sexual intercourse is popularly thought to be a source of physical stress. Our purpose was to examine the relation between frequency of sexual intercourse and risk of stroke and coronary heart disease.
Methods: Cohort study with 20 years follow up in Caerphilly, South Wales and five adjacent villages. 914 men aged 45–59 at time of recruitment in 1979 to 1983 were studied. Strokes and coronary heart disease events, both fatal and non-fatal were recorded and related to sexual intercourse frequency reported at baseline.
Results: Of the 914 men studied, 197 (21.5%) reported sexual intercourse less often than once a month, 231 (25.3%) reported sexual intercourse twice or more a week, and the remaining 486 (53.2%) men fell into the intermediate category. Frequency of sexual intercourse was not associated with all first ischaemic stroke events: age adjusted odds ratios for intermediate and low frequency of sexual intercourse of 0.61 (0.32, 1.16) and 0.71 (0.34, 1.49) respectively compared with the reference category of high frequency. The age-adjusted relative risk of fatal coronary heart disease contrasting low frequency of sexual intercourse (ie. less than monthly) with the highest group (at least twice a week) was 2.80 (95% CI 1.13, 6.96, test for trend, p=0.04) which was not attenuated by adjustment for a wide range of potential confounders. Longer follow up to 20 years showed attenuation of this risk.
Conclusions: The differential relationship between frequency of sexual intercourse, stroke and coronary heart disease suggests that confounding is an unlikely explanation for the observed association with fatal coronary heart disease events. Middle-aged men should be heartened to know that frequent sexual intercourse is not likely to result in a substantial increase in risk of strokes, and that some protection from fatal coronary events may be an added bonus.

177 DOES DEPRESSION CAUSE STROKE? THE CAERPHILLY STUDY

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Background and purpose: Mood disorder is common after stroke but little is known about its aetiological importance, although the general public often ascribe stroke to the experience of stress. Therefore, we examined whether mood disorder leads to an increased risk of ischaemic stroke.
Methods: The association between the General Health Questionnaire (GHQ, 30 item), a measure of mood disorder, and the incidence of non-fatal and fatal ischaemic stroke and transient ischaemic attack was measured using Cox regression modelling in a prospective observational study of 2201 men aged 45–59 years in Phase II of the Caerphilly cohort. Hazard ratios comparing those with high (5 or greater) and normal GHQ scores were calculated with adjustment for age and other covariates.
Results: 22% of men suffered from mood disorder indicated by a score of 5 or greater on the GHQ. There were 130 incident strokes recorded of which 17 were fatal and 113 non-fatal. The relative risk of

incident ischaemic stroke was 1.45 (95% CI 0.98, 2.14) for those who showed symptoms of mood disorder compared to those who did not. For fatal stroke the relative risk was 3.36 (1.29, 8.71) and for non-fatal stroke 1.25 (0.82,1.92). The results were unchanged after adjusting for body mass index, systolic blood pressure, smoking, heavy drinking, social class and marital status. However additionally controlling for previously diagnosed ischaemic heart disease, diabetes, respiratory disease and retirement due to ill health attenuated the relative risks, but not markedly. For fatal strokes the relative risk decreased when all confounding variables were included in the model. There was a graded association between degree of mood disorder and risk of fatal ischaemic stroke.

Conclusions: Mood disorder is a predictor of fatal ischaemic stroke, but not of non-fatal ischaemic stroke. Further work examining the mechanisms of this association is required.

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178 **SOCIO-ECONOMIC STATUS AS A DETERMINANT OF CLINICAL OUTCOME IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING**

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Aim: To investigate the effects of socio-economic status and pre-operative risk factors and in-hospital clinical outcomes of patients undergoing coronary bypass grafting (CABG).
Methods: Between July 1997 and June 2000, clinical data on 3578 patients with CABG were retrieved from the hospital Patient Analysis and Tracking System. Carstairs index, derived from patients' postcodes was used to measure socio-economic status and was divided into five groups. Category 1 (C1) denotes least deprived and 5 (C5) most deprived. Differences in patient baseline clinical risk factors and outcomes were tested using chi square and t-test for means. Logistic regression was used to determine effects of independent variables on clinical outcomes.
Results: Of the demographic details, the only significant difference observed was age; C1 (n=1008) 63.5+/-8.7 and C5 (n=175), 59+/-9.9 years (p=<0.005). Differences in baseline risk factors for diabetes, smoking and body mass index were all significantly higher in C5. Patients in C5 waited on average 19 days longer for CABG and remained in hospital 1 day more that patients in C1 but these differences were not statistically significant. Twelve (3%) in hospital deaths (all causes) occurred in C1 and 5 (1%) in C1 (p=0.28). Perioperative myocardial infarction (MI) occurred in 17 (2%) patients in C5 and 8 (5%) in C1 (p=0.01). Overall deaths at mean follow-up of 36 months was 19 (2%) in C5 and 7 (4%) in C1 (p=0.09). Using logistic regression to adjust for age, sex, risk factors and other perioperative complications, peri-operative MI was independently associated with deprivation, odds ratio 2.79 (95% confidence interval 1.18; 6.58).
Conclusion: Patients with socio-economic deprivation for CABG are younger, have more clinical risk factors and experience more postopertive MI than patients with least deprivation.

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179 **DIFFERENCES IN RISK FACTOR CONTROL AFTER CORONARY EVENTS BETWEEN EAST AND WEST GERMANY**

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Background: Higher age-standardised cardiovascular mortality rates have been reported for East compared to West Germany since reunification. To investigate possible underlying reasons, we analysed risk factor control in patients after coronary events according to region of residence.
Methods: The PIN (Post Infarction Care) Study included 2441 patients at admission (baseline) to 18 in-patient cardiac rehabilitation centres in Germany in 1997. The indications for admission were myocardial infarction, coronary artery bypass graft and percutaneous transluminal coronary angioplasty. Cardiac risk factors, recurrent clinical events, and medication were assessed at baseline as well as 6 and 12 months after discharge from the rehabilitation centres.
Results: Among all study patients (excluding those living in Berlin City), 1475 patients (mean age 6010 years; 79% male) lived in the West and 508 (mean age 6011 years; 78% male) in the East. At baseline, significantly higher levels of cholesterol (5.8 vs. 5.5 mmol/L; P<0.001) and body mass index (27.5 vs. 26.9 kg/m2;

P=0.002) were observed in patients from East Germany compared to those from West Germany. At the 12-month follow-up, the levels of cholesterol (5.6 vs. 5.3 mmol/L; P=0.001) and body mass index (28.1 vs. 27.2 kg/m2; P=0.001) remained significantly higher in East German compared to West German patients. There was no difference in blood pressure and smoking as well as in the occurrence of clinical events during the follow-up period.
Conclusion: Risk factor control in patients after coronary events shows some differences between East and West Germany. This may contribute to the regional variation of cardiovascular mortality rates and should be considered in preventive strategies.

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180 **LIPID LOWERING DRUG USE IN OLDER BRITISH MEN WITH ESTABLISHED CORONARY HEART DISEASE: EVIDENCE OF UNDERUSE**

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Purpose: To examine the extent of lipid-lowering drug use among older British men aged 60–75 years with established coronary heart disease.
Method: The British Regional Heart Study is a longitudinal study of 7735 men aged 40–59 years at entry in 1978–80 and selected from general practices in 24 British towns. At a 20 year follow-up assessment carried out between 1998 and 2000 all current medications were fully documented and subjects provided a fasting blood sample at the time of measurement. A detailed review of GP records was undertaken to establish any diagnosis of coronary heart disease present at the time of assessment.
Results: 3689 men aged 60–75 years participated (response rate 76%). Among 360 men with definite angina, 84 (23%) were receiving a lipid lowering drug, of which 78 (93%) were statins. Among 286 men with a previous definite MI, 102 (36%) were receiving lipid lowering drugs; of these 93 (91%) were statins. Among these men, the prevalence of lipid lowering drug use was higher in those with a history of coronary revascularization compared with those without (48% vs 32%, p = 0.02) and markedly higher among those whose MI was recent (1997-) compared with those whose MI was pre-1997 (51% vs 32%, p < 0.01). Most men with a history of MI not receiving lipid lowering therapy had a total cholesterol > 5.0 mmol/L (81%). Less than half of men with a history of MI or angina who were receiving lipid lowering drugs (48%) had a total cholesterol < 5.0 mmol/L.
Conclusion: Most older British men with established coronary heart disease are not receiving maximally effective lipid lowering drug therapy. A more systematic approach to secondary prevention, with a strong Primary Care emphasis, is essential if the benefits of lipid-lowering drugs are to be realized in practice.

Respiratory disease and air pollution

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181 **NATIONAL ASTHMA CASE-CONTROL STUDY: ASSOCIATION BETWEEN DEATH AND USE OF HEALTH SERVICES**

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Objective: To determine long and medium-term risk factors for premature asthma death in severe asthmatics by investigating associations between death and use of health services.
Design: Case-control study using primary care records.
Setting: Wales, West Midlands, Northampton and Kettering, East Anglia, North Essex, districts of the Northern Region and central Scotland.
Subjects: Largest asthma death case-control study ever undertaken. 681 cases, aged under 65, with asthma in part I of the death certificate were identified between 1994–1998; 149 were excluded leaving 532

valid cases. 532 hospital controls individually matched for age, district and date. Death certificates and available medical records were screened to ensure consistency of diagnosis of asthma.

Outcome measure: Death from asthma.

Results: The median age was 53 (IQR 40–59) for cases and 53 (IQR 40–58) for controls; 60% and 63% respectively were female. Cases had more chronic lung disease, obesity and an earlier age of onset, but similar evidence of atopy and family history of asthma. Although attendance at out-patients and previous asthma admissions were comparable for cases and controls, fewer general practice contacts in the last year, and greater length of time from last practice contact to index date were associated with higher risk of death. Also associated were: lower prescription of oral steroids and antibiotics by practices in the final three months, lack of PEFR recording in the last year, repeated non-attendance for asthma care, mention of a home nebuliser, home oxygen and wheelchair. Cases had significantly more domiciliary visits particularly for respiratory illness. Reporting of A&E attendance to practices was poor.

Conclusions: Higher risk of asthma death was associated with aspects of medical care amenable to change. Despite similar use of hospitals, there was under-use of primary care. Practices should be encouraged to continue a proactive approach to the management of severe asthmatic patients.

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182 ASTHMA AND SOCIAL CLASS—THE EVIDENCE FROM NATIONAL DATASETS

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Background: Reports on inequalities in asthma are inconsistent. Social class, based on occupation, is one of the most widely available social indicators. It can be used to reflect a range of factors (such as income, culture and educational attainment) that could affect the occurrence and severity of disease and its medical care.

Methods: Social class differentials in GP consultations for asthma, prevalence of asthma or its symptoms and male asthma mortality were studied (adjusting for age) using the Morbidity Statistics from General Practice 1991–2, the Health Survey for England 1995–97 and ONS mortality statistics 1991–93 respectively.

Results: Slightly more adults from manual than non-manual classes consult GPs for asthma (RR=1.2) and they consult slightly more often (RR=1.1), independently of current smoking habit. There is no class gradient in the prevalence of asthma though there is a clear trend (p<0.0001) in the prevalence of wheeze in adults with an OR (adjusted for smoking) of 1.7 for severe wheeze in class V compared to class I. There is also a trend in the proportion of wheeze diagnosed as asthma (p<0.001) with those in class I more likely to be diagnosed. In those who have never smoked, 44% more wheezers in class I are labelled asthmatics than in class V (p=0.03). The greatest class differentials are for mortality. The SMR for asthma in 20-64 year old men in class V was 229 compared to 51 for class I.

Conclusions: There is little class difference in prevalence or in GP consultations for asthma overall, but there is a 70% excess of severe asthma symptoms and a fivefold increase in asthma mortality for class V compared to class I. Though severe asthma may affect choice of occupation the larger differentials in severity and mortality could also be due to class differences in medical care.

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183 DOES AMBIENT NITROGEN DIOXIDE CAUSE ACUTE EXACERBATIONS OF DISEASE?

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Objectives: To determine whether nitrogen dioxide (NO_2) is causally related to mortality and/or morbidity.

Background: UK, European and WHO air quality guidelines include objectives for NO_2, although reviews have all concluded that there is little evidence that ambient NO_2 has acute effects of health.

Design: Systematic literature review of abstracts and papers up to the end of 2000, adhering to WHO guidelines, using the search term nitrogen dioxide exploded / all subheadings in four electronic databases.

Main outcome measure: Examination of published evidence using Bradford Hill's viewpoints.

Results: Most epidemiological studies of NO_2 have been published since the reviews were written. There is a positive association in most

time-series studies between daily or hourly NO_2 and total and cardio-vascular mortality; emergency hospital admissions for ischaemic heart diseases, acute myocardial infarction, chronic obstructive pulmonary disease (especially in people =65) and asthma (in children and adults); and more minor exacerbations of obstructive airways diseases. The association with total mortality is probably due to confounding by other pollutants. For the other associations, specificity, temporality, coherence, biological gradient and strength of association are strongly supportive of causality, including results from two- or multi-pollutant models. There is reasonable consistency, when the low power of many small studies are considered, and biological plausibility. The threshold of effect differs between epidemiological and most experimental studies but individuals at greatest risk (with pre-existing cardiorespiratory disease) are seldom involved in chamber studies. It is unknown by how much deaths are brought forward by NO_2 and whether admissions are additional or earlier than they otherwise would have been.

Conclusion: Ambient NO_2 is probably causally related to cardiovascular deaths and to emergency hospital admissions for ischaemic heart disease, acute myocardial infarction, chronic obstructive pulmonary disease in older people and asthma at all ages.

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184 MORTALITY AND TEMPERATURE IN SOFIA AND LONDON

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Background: Both hot and cold temperatures have been associated with increased mortality, independently of seasonal trends. We examine associations between mortality and temperature in two European capitals - Sofia and London.

Methods: Four years of daily deaths, air pollution and weather data were collected. Using generalised additive models, associations between mortality and temperature were analysed controlling for season, day of week, public holiday, and particulates. Temperature was entered as the average of the daily maxima over the previous week. Linear splines represented 'hot' and 'cold' effects.

Preliminary results: Sofia and London had similar mean daily maximum temperatures of 15.6 and 15.2 degrees respectively. However, the range was -9 to 37 in Sofia, versus -1 to 34 in London, and minimum temperatures reached -17 in Sofia against -6 in London. Initial associations were seen with cold in both cities, mortality declining as temperature rose, with a slight upturn again above about 25 degrees. After controlling for confounders, the cold effect in Sofia flattened, leaving an estimated rate increase of 0.04% (95% CI -0.14 to 0.21) per extra degree below 20, whereas in London there remained a significant rate increase of 0.49% (0.39 to 0.58). Heat effects were seen in both cities, with a rate increase of 1.49% (0.66 to 2.32) for every degree above 25 in Sofia, and of 0.99% (0.24 to 1.76) in London.

Conclusions: Strong associations were revealed between mortality and heat, particularly in Sofia. The association with low temperatures found in London was not found in Sofia, where people, lifestyles and/or facilities (e.g. housing) are perhaps adapted to more extreme cold.

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185 REDUCTION IN BOTH SEASONAL MORTALITY AND LONGER TERM MORTALITY TRENDS FOLLOWING RESTRICTIONS ON THE SULPHUR CONTENT OF FUEL OIL IN HONG KONG

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Background: Evidence on health benefits from air quality interventions is scarce. In 1990 Hong Kong Government restrictions on the sulphur content of industrial fuel led to an immediate fall in ambient SO_2 levels by up to 80% and SO_4 in RSP by 35% in industrial areas. No comparable changes occurred in the other criteria pollutants NO_2, total RSP and O_3.

Results: There was a marked effect on the seasonal mortality pattern in the following twelve months with reduction in the amplitude of the seasonal cycle. This was significant in the 65+ and all ages groups for

all causes, respiratory mortality and cardiovascular mortality. During 13 to 24 months following the intervention the winter mortality showed a higher peak than expected; during 25–60 months post-intervention it returned to patterns expected from models derived from the whole of the period of study 1985–1995. There was no change in the seasonal pattern of mortality from neoplasms. The slope in the annual trend in mortality declined with a turning point approximating to the mid-year of the intervention for all causes (all age groups), respiratory (all age groups) and cardiovascular (65+ and all ages groups) mortality. The observed effect of the intervention in this population of approximately 6 million, for changes in the increase in life expectancy for all ages, was equivalent to a total of 579,000 in males and 334,000 in females, person-years of life gained over the two years following the intervention.

Conclusion: Products of combustion from sulphur rich fuels have a specific and independent effect on mortality including respiratory and cardiovascular deaths. The Hong Kong air quality improvement through the use of low sulphur fuels is the first direct evidence that control of a single pollutant of this type is associated with both immediate and longer term health benefits at all ages.

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186 PARALLEL ANALYSES OF INDIVIDUAL AND ECOLOGICAL DATA ON RESIDENTIAL RADON AND LUNG CANCER IN SOUTH WEST ENGLAND

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Background: Individual based case-control studies support a positive association between residential radon exposure and lung cancer risk. However, several ecological studies have shown a strong negative association.

Methods: Data were available from a case-control study of residential radon based on 982 lung cancer cases and 1486 population controls. All subjects were aged less than 75 and were long-term residents of Devon and Cornwall. Two concurrent analyses were performed, the first based on individual data and the second on data aggregated at the district level.

Results: Analyses based on individual data were consistent with a positive association after adjusting for age, sex, smoking and social class. However, analyses based on aggregated data in the two counties were contradictory. The unadjusted odds ratios (OR) associated with a 100 Bqm^{-3} increase in radon exposure were 1.46 (95% CI 0.89, 2.38) in Cornwall and 0.36 (0.16, 0.82) in Devon. Adjustment for age, sex, smoking and social class reduced this discrepancy only slightly and additional adjustment for urban/rural status was required to produce similar results in the two counties (adjusted ORs: 1.40 (0.80, 2.45) and 1.32 (0.42, 4.34) in Cornwall and Devon respectively). Although important in the aggregated analyses, the urban/rural variable had no impact on the analyses based on individual data.

Conclusions: These results confirm that ecological studies, particularly those of weak associations, may be misleading even after accounting for major risk factors. In this example, additional adjustment was required at the aggregated level for a variable not seen to be important at the individual level. Most of the methods that have been recommended for overcoming the limitations of ecological studies would not have proved useful in identifying this variable in practise.

Diabetes

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187 OVERALL AND CARDIOVASCULAR MORTALITY IN PEOPLE WITH DIABETES IN ENGLAND AND WALES

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Aims: To assess overall and cardiovascular mortality in people with type 1 and type 2 diabetes in England and Wales.

Methods: The General Practice Research Database (GPRD) covering about 400 practices and 4.5 million people in England and Wales was used for the analysis. Mortality (overall and cardiovascular)

during 1992–2000 in a cohort of 5807 type 1 and 32061 type 2 diabetes patients was compared with mortality in controls with no record of diabetes matched for age, sex and general practice, controlling for age, sex, body mass index (BMI), smoking and hypertension. Cox proportional hazards survival regression was used for the analysis. Absolute risks and survival curves were derived by age and gender for mortality in type 1 and type 2 diabetes.

Results: Hazard ratios (HR) for overall mortality from type 1 diabetes were more than double in men than in controls (HR2.8, p<.001, 95% confidence interval (CI) 2.4–3.3), and 4-fold greater in women (HR4.4, p<.001, 95% CI 3.6–5.4). For type 2 diabetes HRs were 2.2 in men (p<.001, 95% CI 2.1–2.3) and 2.8 in women (p<.001, 95% CI 2.6–3.0). Mortality risks increased significantly with smoking, rising BMI and hypertension. In all age groups, mortality was greater for men than women, although the increase in mortality associated with both types of diabetes was greater for women than men. Data will also be presented on the incidence of and mortality from coronary heart disease and stroke in people with type 1 and type 2 diabetes.

Comments: The strengths of this study are its large size and use of non-diabetic controls (rather than the general population, as in most other studies) to estimate excess mortality in people with diabetes. The results show that, compared to people without diabetes, the overall risk of death is tripled in type 1 and doubled in type 2 diabetes.

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188 LIFESTYLE DETERMINANTS OF INSULIN RESISTANCE: THE CORK AND KERRY DIABETES AND HEART DISEASE STUDY

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Objective: To study the role of potentially modifiable environmental factors (general and central obesity, physical activity, cigarette smoking and alcohol intake) in the development of insulin resistance.

Methods: Cross sectional study involving 1018 men and women aged 50 to 69 years sampled from 17 general practice list in the South of Ireland. The overall response rate was 69%. Insulin resistance was estimated on the basis of fasting glucose and insulin, using the glucose homeostasis model (HOMA scores). Data on lifestyle and anthropometric measures were obtained using standard questionnaires.

Results: Body mass index and waist hip ratio were positively and significantly associated with HOMA scores independent of each other and of age and sex, partial correlation, r =0.47 (BMI) and r=0.15 (W/H ratio), both p=0.001. In analyses adjusted for age and sex, physical activity levels were significantly and inversely associated with HOMA score. This association remained significant on further adjustment for waist hip ratio but not BMI. There was a weak positive association, of borderline significance between cigarette smoking and HOMA score in age and sex adjusted analyses, which became non-significant on adjustment for either waist hip ratio or BMI. There was a U-shaped relationship between alcohol intake and HOMA scores with lowest levels in light drinkers (less than 18 units a week). This trend was accentuated on adjustment for age, sex and waist hip ratio, but attenuated (non-significant) on adjustment for BMI.

Conclusion: These results highlight the role of lifestyle risk factors in the development of insulin resistance. The effects of lifestyle variables appears to be mediated largely via the extent of obesity (BMI) rather than the distribution of obesity (waist/hip ratio). The relationship between alcohol intake and insulin resistance is similar to that between alcohol intake and coronary heart disease.

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189 DIABETES AND COGNITIVE FUNCTION IN THE CAERPHILLY STUDY

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Background: Evidence is gathering of an association between diabetes mellitus and cognitive function. Of interest is whether the association is a direct or indirect effect of diabetes.

Method: 2205 men aged 55–69 years who were eligible for inclusion into the third phase of the Caerphilly study were assessed for diabetes, blood glucose and cognitive function, along with other risk factors as

part of a study of ischaemic heart disease (IHD). Diabetes was assessed by self report. Blood glucose was estimated using fasting samples. Cognitive assessment included the AH4 (a test of problem solving ability). Mood was assessed at time of cognitive testing using the GHQ(30).

Findings: Diabetes data were collected for 2145 men, whole blood glucose was available for 1960 men and cognitive function was completed on 1746 men. Evidence of previous stroke was found for 77 men who were excluded from the analysis. Diabetes was associated with lower cognitive function both before and after adjustment for mood and IHD risk factors. Further analysis into the role of blood glucose in this association showed high blood glucose to be associated with lower cognitive performance only in diabetics.

Interpretation: The relationship between cognitive function, diabetes and blood glucose is complex. The extent to which lower performance is due to diabetes or to poor control of diabetes cannot be judged on present evidence. But each conclusion is of potential interest; one from an etiological perspective and one from a management perspective.

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190 **ADHERENCE TO ORAL HYPOGLYCAEMIC AGENTS IN PATIENTS WITH TYPE 2 DIABETES: IS THIS A PREDICTOR OF INSULIN REQUIREMENT?**

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Introduction: Non-adherence is an important cause of poor metabolic control in diabetes. We investigated adherence to oral hypoglycaemic agents (OHA) in type 2 diabetes, and whether patients require insulin as a result of poor adherence to OHAs.

Methods: The 'DARTS' diabetes information system and the 'MEMO' database of 17 million drugs dispensed since 1993, for the population of Tayside, Scotland (400,000), were used. Patients aged 35+ years with type 2 diabetes who had 180+ days of exclusive therapy with OHAs (sulphonylureas or metformin), in 1993–1996, prior to insulin treatment were identified. The intended duration of every OHA prescription was calculated from details on the prescription (total amount dispensed and drug regimen). Adherence was derived by dividing total intended duration of OHA therapy by time in study for each patient. It was compared between those who did and did not commence insulin therapy.

Results: There were 2,537 patients on sulphonylureas (51% male, mean age 67 yrs). 262 commenced insulin. Mean adherence was 93.7%. 63%of patients showed adherence >= 90%. There was improved adherence in patients who did (mean 100.4%) compared with those who did not (mean 92.9%) commence insulin (p < 0.001). There were 1,519 patients on metformin (49% male, mean age 64 yrs). 169 commenced insulin. Mean adherence was 85.4%. 50% of patients had adherence >=90%.Mean adherence was 82.0% and 85.8% in patients who did and did not commence insulin (p = 0.124). In a logistic regression model, other predictors of insulin therapy were age, diabetes duration, co-prescribing of OHAs and time in study.

Conclusion: Adherence to OHA in patients with type 2 diabetes is sub-optimal, but there is no evidence that patients require insulin as a result of poor adherence to OHAs.

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191 **AN ANALYSIS OF EQUITY IN ACCESS TO DIABETES HEALTH CARE IN THREE ETHNIC GROUPS**

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Background: Diabetes mellitus is an important health problem for people of African and African Caribbean descent living in the UK. The prevalence of disease is higher than in white Europeans and some evidence suggests that health outcomes may be particularly unfavourable. We evaluated whether African and African Caribbean people with diabetes have equitable access to diabetes care in relation to need.

Methods: We carried out a cross-sectional questionnaire survey of 2983 people with diabetes, registered at 29 general practices in south London. We examined the relationship between ten indicators of utilisation of diabetes care and ethnic group, in relation to need, using logistic regression. Analyses were adjusted for age, sex, duration of diabetes, cigarette smoking, eight items of self-reported morbidity and eight SF-36 questionnaire scales.

Results: There were 1899 respondents (64%). These included 799 white European, 522 African Caribbean and 163 African people with type 2 diabetes. After adjusting for need, African Caribbeans reported higher utilisation of care than white Europeans for four of the ten variables, and Africans for three. Neither group reported lower utilisation for any variable. African Caribbeans were more likely to be treated with tablets than diet alone (odds ratio 1.36, 95% confidence interval 1.06 to 1.75), to use self-monitoring (1.50, 1.15 to 1.96), to be treated for hypertension (1.83, 1.25 to 2.67), or to have attended a dietician in the last year (1.44, 1.13 to 1.83). Africans were more likely to have attended the GP (3.51, 1.22 to 10.07), or a dietician (2.05, 1.37 to 3.08), or an ophthalmologist (1.71, 1.06 to 2.76) in the last year.

Conclusions: There is no evidence from this study that African Caribbean or African subjects have less access to diabetes care in relation to need than white Europeans.

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192 **THE NEW BURDEN OF DIABETIC CARE**

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Background: Diabetes UK (previously the British Diabetic Association) recently recommended using the WHO 1998 criteria for diagnosing 'Type 2 diabetes'. This new diagnostic approach using a simple fasting plasma glucose (FPG) of >7.0mmol/L also provides a new category of 'Impaired fasting glucose' (IFG: 6.1 to <7.0mmol/L) for classifying those at increased risk of developing diabetes. The awaited National Service Framework on Diabetes will provide management guidelines.

Objective: To describe the prevalence of undiagnosed diabetes and IFG using these new criteria.

Design: In 1978–80, the British Regional Heart Study randomly sampled and recruited 7735 men aged 40–60 years from one general practice in each of 24 British towns. During 1998–2000, 4252 men (77% of survivors, now aged 60–80 years) were re-examined. All known diabetics, who were not asked to fast, were excluded (261 men = 6.1%). Men who failed to provide a blood sample or fasting time (249 men = 6.2%) and those who failed to fast >6 hours as requested (491 men: 13.1%) were also excluded from the analysis.

Results: 194 additional men (6.0%) met the new criteria for Type 2 diabetes and a further 604 (18.6%) were found to be in the IFG category. In the subset of men who fasted overnight for >8 hours, consistent with WHO protocol, the findings were similar, 171 (7.4%) with undiagnosed diabetes and 481(20.8%) with IFG.

Conclusions: It is evident from these British data that the prevalence of diagnosed diabetes is likely to increase considerably as increasing numbers of subjects at high risk for cardiovascular disease are screened for the presence of diabetes or IFG. It is extremely doubtful whether existing primary care teams can deal satisfactorily with these new responsibilities without an increase in resources.


Musculo-skeletal disease

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193 **FRACTURE RISK AND SOCIO-ECONOMIC STATUS: CLARIFYING THE LINK**

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Continuing debate over the link between socio-economic status and injury risk means that injury prevention is not being effectively targeted. Previous work has indicated that there is no link between area deprivation and childhood fracture rates within small areas of Wales[1]. The All Wales Injuries Surveillance System (AWISS) can generate population based injury data that may improve understanding of the relationship between deprivation and injuries.

Methods: Fracture data for the Cardiff and Newport unitary authorities were extracted from AWISS. These were divided into ward-based deprivation quartiles using Townsend scores. The quartile for the most affluent wards provided baseline data to calculate expected numbers of fractures, by ageband, in the remaining quartiles. Ratio of observed to expected numbers of fractures were calculated by ageband, sex and for home, work, school and sports related fractures.

Results: 10108 fractures to Cardiff and Newport residents were studied. Overall, the ratio of observed to expected fractures was 1.3 in the most deprived quartile. However, analysis by ten-year ageband showed fracture risk to be 3.3 times greater for 25–54 year olds in deprived areas (figure). For females the distribution was identical and the fracture risk 2.8 for the most deprived 35 to 44 year olds. The most deprived males aged 35—44 had a fracture risk 3.7 times that of their more affluent counterparts.

Ratio of observed to expected fractures by deprivation quartile
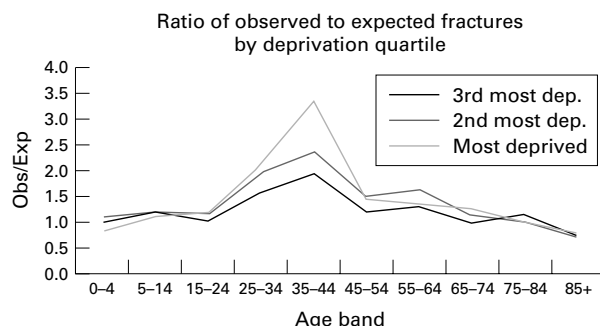
No increase in risk was seen for school or sports injuries, but in the most deprived areas, the risk of home injury was 1.5 times and work injury 2.1 times greater than affluent areas.

Discussion: Socio-economic status may be an important contributor to injury risk. Generalisation of the relationship between fracture incidence and socio-economic status across all ages is inappropriate. This has important implications for the design and targeting of injury prevention.

1 Lyons RA, Delahunty AM, Heaven M, McCabe M, Allen H, Nash P. Incidence of childhood fractures in affluent and deprived areas. *BMJ* 2000;320:149–149.

194 RISK FACTORS FOR FRACTURE: ANALYSIS OF DATA FROM A LARGE POPULATION-BASED COHORT STUDY

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Introduction: Despite the importance of fractures as a cause of morbidity and mortality among older women, large-scale data relating age, body mass index (BMI), exercise, menopause, use of hormone replacement therapy (HRT) and various other factors to the risk of fracture are limited.

Methods: We examine data on 90 625 women aged 50–69 who had completed a follow-up questionnaire three years after entry into the Million Women Study, a population-based cohort study. At recruitment, women gave information on several factors including age, height, weight, exercise, time since menopause, and use of HRT. At follow-up, women reported details of incident fractures including details regarding which bone was fractured.

Results: A total of 3 303 women reported fracturing a bone during the follow-up period. The incidence rates for 'classically osteoporotic' fracture (fracture of the hip, spine, or wrist) and 'other' fracture were 0.5 and 0.8 per 100 women per year respectively.

Preliminary analysis showed that, among women who had never used HRT, the risk of fracture increased with age and with time since menopause. These effects were stronger for classically osteoporotic than for other fractures. The risk of classically osteoporotic fracture decreased with increasing BMI and with increasing weight. Conversely, the risk of other fracture increased with increasing BMI and with increasing weight. There was no evidence of exercise or height having an effect on the risk of fracture.

Among post-menopausal women, use of HRT was associated with a decrease in risk of fracture and this decrease was greater for classically osteoporotic than for other fractures. Compared to never users,

current users of HRT had a relative risk of 0.47 (95% confidence interval = 0.40–0.55) for classically osteoporotic fracture and 0.84 (95% confidence interval = 0.75–0.95) for other fracture.

195 LOW BACK PAIN IN SCHOOLCHILDREN: OCCURRENCE AND RISK FACTORS

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Background: Low back pain (LBP) is a common complaint in adults and it has been demonstrated that mechanical and psychosocial factors are associated with both its onset and persistence. Recent surveys have shown that LBP is also common in childhood and it has been hypothesised that the high rates of LBP seen in schoolchildren may result from the carriage of heavy schoolbags on a regular basis. However, the influence of psychosocial factors on back pain in this age group has not been examined.

Methods: 1446 schoolchildren, aged 11—14yrs, from 39 schools in the Northwest of England were surveyed using a previously validated self-completion questionnaire. LBP was assessed and resulting disability was measured the modified Hanover Disability Schedule. Schoolbag weight, recorded over a five day period, was taken as a measure of daily mechanical load; and psychosocial factors were assessed using the Strengths and Difficulties Questionnaire: An instrument measuring hyperactivity, emotional problems, and behavioural disorders such as peer problems and conduct problems. Information was also collected on other pain syndromes.

Results: The one month period prevalence of LBP was 24%. Of these children, 65% reported limitation in >=3 daily activities as a result of their pain. Prevalence of the condition increased with age and was more common in girls (28%) than boys (19%). Daily mechanical load was found not to be associated with LBP. However, children demonstrating higher levels of adverse psychosocial factors were twice as likely to report low back pain than other children. Also, children who reported LBP were more than twice as likely to report other pain syndromes, such as stomach aches and headaches.

Conclusions: LBP in children ages 11—14yrs is almost as common as in adults, and is frequently disabling. The reporting of such pain is principally related to adverse psychosocial factors rather than to daily mechanical load. Also, those reporting LBP are more likely to report pain elsewhere in the body.

196 HIP PAIN AND HIP OSTEOARTHRITIS IN THE COMMUNITY: ASSOCIATIONS WITH OCCUPATIONAL AND LEISURE ACTIVITIES

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Background: We report results from a community survey examining associations between lifetime history of occupational physical demands and leisure activities with hip pain and hip OA.

Subjects and methods: 3385 adults aged 18–85 years were recruited from two general practices in South Manchester (88% response). A questionnaire measured hip pain and lifetime exposure to occupational physical demands and leisure activities. Case-control analysis was undertaken (cases = subjects with hip pain, controls = hip pain free). Exposure to occupational physical demands and leisure activities was calculated in person-years prior to the onset of hip pain (cases) or to a reference date (controls), and the association with hip pain assessed. A sub group of hip pain sufferers received a hip radiograph. Within this group those with and without OA were compared. Relationships are reported as odds ratios (OR).

Results: The prevalence of hip pain was 10.5%. 34% of hip pain sufferers had evidence of OA. Cumulative occupational exposures, in the highest quartile, significantly associated with hip pain included lifting weights >50lbs (OR 2.1); standing > 2hrs (OR 1.8); sitting >2hrs (OR 1.6); jumping between levels (OR 1.6); walking >2 miles/day (OR 2.1) and walking > 2 miles/day on rough ground (OR 2.2). Relationships with walking > 2 miles/day and climbing were stronger for hip pain and hip OA. Of the leisure activities assessed, lifetime cumulative exposure to track and field events (OR 1.9), walking (OR 1.6) and

jogging (OR 1.8) were significantly associated with hip pain. Associations with track/field (OR 2.7) and jogging (OR 2.8) were more pronounced in subjects with hip pain and hip OA.

Discussion: This study has shown that both occupational physical demands and leisure activities are associated with hip pain in the community. Whilst fewer physical exposures were related to hip pain and hip OA, the relationships were stronger.

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197 LONGER-TERM CLINICAL AND ECONOMIC BENEFITS OF OFFERING ACUPUNCTURE TO PATIENTS WITH CHRONIC LOW BACK PAIN ASSESSED AS SUITABLE FOR PRIMARY CARE MANAGEMENT—3 MONTH CLINICAL OUTCOMES

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Objectives: To undertake a pragmatic RCT to test the hypothesis that a population of patients with persistent low back pain, when given access to an acupuncture service, gain more relief from pain than those offered usual management only, for equal or less cost. To inform purchasing decisions regarding the provision of traditional acupuncture by the NHS.
Methods: The study is a pragmatic randomised controlled trial (n=240). Suitable patients are identified by their GP. Patients randomised to the experimental arm are offered the option of referral for up to 10 individualised treatments from one of six qualified Traditional acupuncture practitioners. The control group continue to receive usual management from their GP. The primary outcome measure is change in Bodily Pain (SF-36) at 3 months and 12 months post randomisation. The main outcome is cost-effectiveness at 12 months.
Results: 43 GPs are participating in the trial. 240 patients have been randomised. All patients randomised to the option of acupuncture have chosen to receive treatment. Clinical outcomes for all patients at three months will be presented. Data analysis on all complete data (n=160) was undertaken to ascertain if there was evidence of benefit at three-months that would justify applying for funding to evaluate twenty-four month outcomes. SF-36 Bodily Pain scores improved by 29.8 and 22.2 points in the acupuncture and normal management group respectively. A difference of 7.6 points is clinically and statistically significant (P=0.04). Differences between groups were also observed in other dimensions of the SF-36, and two additional back-pain measures (Oswestry, McGill). Process data (intervention and satisfaction with care) will also be presented.
Conclusions: It is possible to conduct a large pragmatic RCT of traditional acupuncture in a primary care setting. Positive clinical results at three months indicate potential for cost-effectiveness at 12 and 24 months.

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198 KNEE PAIN AND DISABILITY IN THE COMMUNITY: PREVALENCE, ASSOCIATIONS AND IMPLICATIONS FOR SERVICE PROVISION

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Background: The prevalence, severity and associations of knee pain were studied as part of a wider population health needs assessment of musculoskeletal disease in Greater Manchester.
Methods: The study population was an age and sex stratified sample from three general practices. A screening questionnaire was mailed which included questions on knee pain in the past month, basic demography, height and weight and the modified Stanford Health Assessment Questionnaire. Material deprivation as assessed by Townsend score was individually assigned based on resident census enumeration district. Townsend scores were aggregated into quintiles based on the local population. A follow-up questionnaire sent to those reporting knee pain included questions about pain severity and questions from the Lequesne score. A quota sample of respondents was examined by a consultant rheumatologist.
Results: 5981 screening questionnaires were mailed and 4512 (75%) were returned. 870 people were mailed a knee pain questionnaire and

705 (81%) returned it. The population prevalence of knee pain, adjusted for age, sex and material deprivation, was 19.7%. Associations were found between knee pain and increasing age, body mass index and deprivation. The adjusted population prevalence of severe knee pain was 3.5% and the presence of severe pain among those with knee pain was also associated with age, body mass index and deprivation. The odds of knee pain being present in people from Townsend quintile 5 compared with quintile 1 were 1.72 (1.27–2.33) and odds for the presence of severe pain were 3.23 (1.60–6.53). The proportion of people aged 65 or more needing referral for consideration of knee replacement surgery was 3.0–3.7%.
Conclusion: There is a considerable burden of knee pain in the community. Those commissioning services should be particularly aware of the associations with age and with deprivation and therefore the need for knee replacement surgery among marginalised communities.

Women's health

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199 HRT USAGE IN MINORITY ETHNIC GROUPS IN ENGLAND

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Objective: To describe the pattern of hormone replacement therapy (HRT) usage in women from minority ethnic groups in England.
Methods: The Health Survey for England (HSE) is an annual nationwide survey of a stratified random sample of the English population living in private households. In 1999 the HSE focused on ethnic minority groups, to include a sizeable number of Black Caribbean, South Asian (Indian, Pakistani and Bangladeshi) and Chinese informants. Interviews were translated in all languages. Details of current and past use of HRT were assessed in a self-completion questionnaire. This report is restricted to women aged 40–74 (n= 5286).
Results: Current and past use of HRT was more common among white women than among women from minority ethnic groups. Current use prevalence was 17% among white, 13% in Chinese, 8% in South Asian and 6% in Black Caribbean women. In all ethnic groups combined, those on HRT were significantly less likely to be overweight or to smoke, were more likely to be physically active, diagnosed with CVD, to be in non-manual social class, to have higher education, to be in the top quintile of CRP and, for those non-white, to have migrated to England before 1970 and have a good knowledge of the English language. After adjusting for age, smoking, physical activity, CRP, social class, income, education, self-perceived general health and self-reported CVD women from all ethnic minority groups were still less likely to be on HRT than whites: the odds of being on HRT were 0.4 (CI 0.2–0.8) in Black Caribbean, 0.5 (0.3–0.8) in South Asian and 0.6 (0.2–0.8) in Chinese women respectively.
Conclusions: In England, ethnicity does affect HRT use. Where the need arises, public health could help to ensure suitable use of HRT among all ethnic groups.

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234 DOES HORMONE REPLACEMENT THERAPY CONTAINING OESTROGEN AND PROGESTOGEN PROTECT AGAINST MYOCARDIAL INFARCTION?—A CASE CONTROL STUDY

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Background: Observational studies indicate that hormone replacement therapy (HRT) containing unopposed oestrogen is protective against myocardial infarction. Nowadays it is usual to prescribe preparations containing oestrogen with progestogen to women with an intact uterus in order to protect against endometrial cancer. In the past much of the apparent benefit of HRT has been attributed to a healthy user effect. To adjust for this a health conscious behaviour

score has been calculated in an attempt to examine whether combined HRT (containing oestrogen and progestogen) offers any protection against acute myocardial infarction (MI) in Caucasian women.

Design: A case-control study of women aged between 35–65 suffering from acute MI, with two age matched healthy controls from the same geographical area. Information was collected by interview and by abstraction from general practitioners' notes.

Setting: East Midlands, U.K.

Participants/Methods: A total of 559 cases suffering from non-fatal acute MI and 1118 healthy controls participated in the study. 84% of cases and 69% of controls identified were interviewed. Control refusals were replaced. For 68% of cases the controls were the first two selected. Conditional logistic regression was used to calculate odds ratios (OR) adjusted for diabetes, hypertension, smoking, alcohol, social class, family history and health conscious score.

Main results: The adjusted OR (95% CI) for ever users of HRT compared to non-users was 0.74 (0.55–1.00). Adjusted OR for type of HRT were 0.83 (0.53–1.29) for oestrogen only users, 0.77 (0.53–1.11) for combined only users and 0.53 (0.29–0.95) for users of both types of HRT. There was a trend (p<0.01) for reduced risk of MI with increasing duration of HRT use with the adjusted OR for 5 years or more use being 0.41 (0.20–0.84) for combined HRT and 0.45 (0.20–1.02) for oestrogen only.

Conclusion: This study shows that combined HRT use is associated with a lower MI risk which does not appear to be explained by a healthy user effect.

This study was funded by the NHS R&D Programme for Cardiovascular Disease and Stroke.

201 DECIDING WHETHER OVARIES SHOULD BE REMOVED TO PREVENT CANCER - WOMEN'S VIEWS OF DIFFERENT DECISION INTERVENTIONS

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Objectives: To undertake a qualitative evaluation of decision interventions designed to assist in the prophylactic oophorectomy (PO) decision. PO is undertaken in about 50% of abdominal hysterectomies as a prophylactic measure against ovarian cancer. It can result in longer-term health consequences which can make the clinical decision difficult. Interventions (both based on research evidence) were: a computerised Clinical Guidance Programme (CGP) which uses individual risks and values for health states to provide individualised guidance; and a paper-based decision chart file (DC)—which provides population-based information only.

Methods: Semi-structured in-depth interviews were undertaken with women awaiting hysterectomy: 10 assigned to the CGP and 6 assigned to the DC. Women were asked about information received, decision making in general and the decision interventions themselves. Data were structured and analysed by two researchers using Nud★ist.

Results: Women had experienced a lack of information from their surgical team coupled with lack of time to make a decision. Women were able to use both decision interventions. The decision aids helped those who were unsure to form intentions. Some of those assigned to the CGP found the tasks difficult and many saw the CGP as a "black box." Some felt they might not be able to trust the guidance. Most assigned to the DC found it easier to understand, but difficult to apply to their individual circumstances. The DC was viewed more positively insofar as it provided a sense of empowerment.

Conclusions: Different decision supporting interventions can be introduced in practice. The decision interventions described here could be regarded as complementary—aspects of both appear beneficial. Patients' attitudes towards decisions and decision interventions vary. And future developments should aim to meet these differing "meta-preferences" better. Perhaps a computerised aid which could provide different types and levels of decision support might be the next step.

202 ABORTION AND CANCER OF THE BREAST, OVARY, UTERUS AND CERVIX: CASE-CONTROL RECORD-LINKAGE STUDIES

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It has been suggested that interruption of pregnancy, particularly if it is induced rather than spontaneous, may increase the risk of cancer of the breast and reproductive tract. The greatest interest has focused on the risk of breast cancer, for which individual studies have given conflicting results. Most studies of this association have been case-control interview studies. An important consideration is whether such studies are inherently subject to reporting bias—that women with breast cancer may be more likely than control women to tell the interviewer if they have had an induced abortion when questioned about their reproductive history. Prospective cohort studies would avoid this source of bias; but it seems unlikely that large-scale long-term studies involving personal follow-up would be possible.

We undertook a series of nested case-control studies using linked, anonymised data from the Oxford region of the UK. 'Cases' were records of women with each cancer of interest. 'Controls' were records of women with a wide range of other, minor medical and surgical conditions. Records were analysed, comparing cases and controls, to identify prior hospital admissions coded as induced abortion, spontaneous abortion, or abortion unspecified as induced or spontaneous.

The study included 564 women with both abortion and breast cancer, including 214 women with at least 15 years between the two. Overall, as will be discussed, previous abortion was slightly less common in women with breast cancer than in controls. The ratio of observed to expected cases did not increase over time either for all abortions or for induced abortion, as would be expected if abortion was a cause of breast cancer. Results for the other cancers (not finalised at the time of writing) will be presented and discussed.

203 THE IMPACT OF TWO EDUCATIONAL INTERVENTIONS ON GP MANAGEMENT OF FAMILIAL BREAST/ OVARIAN CANCER

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Introduction and aims: GP referrals to family cancer clinics have been rising rapidly and clinics are struggling to meet the demand. Many referrals are of 'low risk' individuals and it has been suggested GPs should manage these women in primary care. This study aimed to investigate the effect of two educational interventions designed to improve GP management of familial breast/ovarian cancer.

Method: We developed an information pack and accompanying educational session for GPs. The usefulness of these interventions has been evaluated in a cluster randomised controlled trial in Oxfordshire and Northamptonshire. Practices were randomised to: A - in-practice educational session plus information pack; B - information pack alone; or C - neither educational session nor pack. The main outcome was the proportion of GPs making the correct referral decision on at least five of six family history vignettes. A secondary outcome was GPs' reported confidence in managing patients with a family history of breast/ovarian cancer.

Results: There was a 40% (95% CI: 30%,50%, p < 0.001) improvement in the proportion of GPs who made the correct referral decision on at least five of the six vignettes in Group A (79%) compared to the control group (39%), and a 42% (95% CI: 31%, 52%, p < 0.001) improvement in Group B (81%) compared to the control group. There was a trend in reported confidence in the management of individuals with a family history of breast/ovarian cancer from a mean confidence score of 2.3 in Group A, to 2.0 in Group B and 1.5 in Group C (p<0.001).

Conclusion: Providing GPs with an information pack significantly improved referral decisions regarding patients with a family history of breast/ovarian cancer. Although well received, an in-house educational session produced no additional improvements in referral decisions but did lead to greater levels of reported confidence.

204 UNDERSTANDING RISK: MID-AGE WOMEN AND HEART DISEASE

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For mid-age women in urban and rural Australia with reported heart disease, what does it mean to them to be 'at risk' of heart disease? How do these women understand heart disease and its associated risk factors? Moreover, how does this relate to their use of strategies to prevent heart disease prior to, or since, their diagnosis of heart disease?

This is a study undertaken in collaboration with the Australian Longitudinal Study on Women's Health (ALSWH), a longitudinal survey of more than 40, 000 Australian women designed to follow the health of three age cohorts of women. The heart disease study focused on the mid age cohort of women (49–54 yrs). Using both qualitative and quantitative methods, the mid age women and heart disease study found that 2.3% (319 of 14, 011) of the ALSWH mid age cohort reported that they had been told by a doctor that they had heart disease. However, very few of these mid age women considered themselves as 'at risk' of heart disease. This is despite 35% of the women interviewed reporting to have two or more recognised risk factors for heart disease. Although these women were very knowledgeable about risk factors, prevention and heart disease, only few women reported actually having employed preventive strategies against heart disease either prior to, or since, diagnosis. Most women did not perceive these issues as being relevant to their lives at this time. In the interviews conducted with the mid age women, it was clear that they considered heart disease to be a gendered disease and spoke of heart disease primarily as a "man's disease" in this age group. This research provides much-needed information about how women understand their risk of heart disease and their use of preventive strategies during mid-age.

Biomarkers

205 PLASMA TOTAL HOMOCYSTEINE AND HOSPITALISATIONS FOR CARDIOVASCULAR DISEASE: THE HORDALAND HOMOCYSTEINE STUDY

G. S. Tell[1,2], E. Nurk[1,2], S. E. Vollset[1,2], O. Nygård[1], H. Refsum[1], P. M. Ueland[1]. [1]Locus of Homocysteine and Related Vitamins; [2]Department of Public Health and Primary Health Care, University of Bergen, Norway.

Background: Elevated plasma total homocysteine (tHcy) has been associated with cardiovascular disease (CVD) and has been shown to be an independent risk factor for arterial and venous occlusive disease. The predictive power of tHcy on CVD morbidity has not been previously reported in a large population-based study.
Aim: To examine the association of a single tHcy measurement on subsequent hospitalizations due to CVD.
Methods and Results: A population-based prospective cohort study was conducted from 1992 to 1998 (mean follow-up 5.3 years) in Western Norway. The study included 17,361 individuals aged 40–42 or 65–67 years at baseline. Main outcome measure was CVD as the main hospital discharge diagnosis or coronary revascularization procedures during follow-up (n=1,275). At baseline, participants with prevalent CVD had higher mean tHcy values than individuals without CVD. Risk of CVD hospitalizations increased significantly with increasing baseline tHcy only in the oldest age group. Here, multiple risk factor-adjusted hospitalization rate ratios (HRR) in five tHcy categories (from <9 to =20 μmol/L) were: 1 (reference level), 1.00, 1.34, 1.67 and 1.94 (p-trend <0.0001). The relation between tHcy and CVD hospitalizations was significantly stronger among individuals with preexisting CVD compared to those without (HRRs per 5 μmol/L tHcy increment was 1.29 versus 1.10; p-interaction=0.022).
Conclusion: Plasma tHcy is a strong predictor of CVD hospitalizations in elderly individuals, especially among those with preexisting CVD. Our findings are compatible with the theory that tHcy primarily acts as a prothrombotic factor in the etiology of CVD.

206 PLASMA HOMOCYSTEINE (HCY) AND CARDIOVASCULAR DISEASE RISK FACTORS IN MIDDLE AGE MEN AND WOMEN

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Introduction: Raised homocysteine (Hcy) levels have emerged as a potentially important, modifiable risk factor for cardiovascular disease (CVD). Hcy levels are determined by inherited enzyme defects combined with inadequate dietary intake of nutritional co-factors (folic acid, Vitamins B12 and B6). Interrelations between homocysteine and established cardiovascular risk factors have not been studied in detail.
Aims: To investigate inter-relations between total Hcy and established lifestyle and biological CVD risk factors in a general population sample.

Methods: Cross-sectional study. We invited 1473 men and women aged 50 to 69 years, sampled from 17 general practice lists in the South of Ireland, of whom 1018 (69%) participated. Fasting blood samples were obtained from 899 participants for estimation of total Hcy, insulin, lipids and other established biological CVD risk factors. Data on diet, lifestyle and anthropometric measures were obtained using standard questionnaires.
Results: Hcy concentrations were inversely and significantly associated with dietary intake of fruit and vegetable and folic acid. Hcy levels (N, geometric means) were higher in men (431,11.24) than in women, (468,10.27); p = 0.001 and increased with age (r=0.2, p=0.001). Hcy levels (N, age/sex adjusted geometric means) were not significantly higher in subjects with established CVD (121,11.2) relative to those without CVD (778, 10.7), p=0.2. There were inconsistent relations with established lifestyle and biological CVD risk factors. Hcy was positively associated with waist/hip ratio but not with BMI. In analyses adjusted for age, sex and waist/hip ratio, Hcy was inversely and significantly associated with physical activity levels, but not associated with smoking, alcohol intake, blood pressure, plasma lipids, fasting glucose or insulin.
Conclusions: In this general population sample of middle-aged men and women, serum homocystein levels were not associated with prevalent CVD or with major CVD risk factors such as hypertension. These findings raise fundamental doubts about the Hcy–CVD hypothesis.

207 THE NUTRITIONAL DETERMINANTS OF SERUM LEVELS OF INSULIN-LIKE GROWTH-FACTOR-I (IGF-I) AND ITS MAIN BINDING PROTEINS IN ADULT MEN AND WOMEN

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Insulin-like growth factor-I (IGF-I) is a peptide hormone that stimulates cell growth in many tissue types and thus may play a role in the development of cancer. There is growing evidence from prospective studies that IGF-I is involved in the aetiology of several cancers, including the prostate, breast, colo-rectum and lung. Circulating levels of IGF-I and its main binding proteins are sensitive to nutrition and could be one mechanism through which diet may influence cancer risk. However, little is known about the dietary determinants of IGF-I levels in the general population.
Methods: To identify the nutritional determinants of circulating concentrations of IGF-I and its main binding proteins, cross-sectional data were taken from 696 and 294 men and women involved in the Oxford arm of the European Prospective Investigation into Cancer and Nutrition. The study population included equal numbers of meat-eaters, lacto-ovo-vegetarians and vegans to obtain a wide range of nutrient intake. Serum concentrations of IGF-I were measured in men and serum concentrations of IGF-I and its main binding proteins (IGFBP1, 2 and 3) were measured in women using immunoenzymatic assays.
Results: Serum IGF-I concentration was significantly 9–13% lower among vegan men and women compared with meat-eaters and vegetarians after adjustment for age and body mass index. Serum IGFBP-1 was significantly 45% higher among vegan women compared with meat-eaters and vegetarians. Serum IGFBP-2 was also significantly 37% higher among vegan women compared with meat-eaters, whilst vegetarian women had intermediate values. Serum concentrations of IGFBP-3 were similar between the three dietary groups.
Conclusion: A vegan diet is associated with a lower circulating IGF-I concentration and a higher IGFBP-1 and IGFBP-2 concentration compared with an omnivorous or vegetarian diet. Nutritional factors specific to a plant-based diet may reduce bioavailable IGF-I levels to an extent that is of clinical significance.

208 INSULIN LIKE GROWTH FACTOR I AND ITS BINDING PROTEIN-1 IN UMBILICAL CORD PLASMA IN RELATION TO SEVERE PREECLAMPSIA AND BIRTH WEIGHT: A PROSPECTIVE INVESTIGATION IN NORWAY

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Objectives: In severe preeclampsia, placental function and foetal growth are reduced. Insulin-like growth factor-I (IGF-I) and the binding proteins IGFBP-3 and IGFBP-1 could be involved in the underlying processes. In adult life, high levels of IGF-I have been linked to increased risk of several cancers, and preeclampsia has been associated with reduced risk of breast cancer in the female offspring. **Study design:** Umbilical cord blood was collected in 12,804 consecutive deliveries. By strict criteria, 258 singleton pregnancies with preeclampsia were identified, and 67 were classified as severe disease. As controls, 609 singleton pregnancies were selected. IGF-I, IGFBP-3, and IGFBP-1 were measured from umbilical plasma. Standardised birth weight was estimated as the ratio between the observed and expected birth weight, and adjusted for differences in gestational age.
Results: In severe preeclampsia, umbilical cord plasma IGF-I was lower and IGFBP-1 was higher than in controls (both p<0.01). In both groups, IGF-I decreased with decreasing birth weight, but at each standardised birth weight level, IGF-I was lower in the severe preeclampsia group. In contrast, umbilical IGFBP-1 increased with decreasing birth weight, and at low birth weights, IGFBP-1 was five-fold higher in the severe preeclampsia group than among controls. The results for IGFBP-3 corresponded to those for IGF-I, and the results for mild preeclampsia group were not significantly different from those of controls.
Conclusions: These results indicate that umbilical cord plasma IGF-I is strongly associated with foetal growth in general, and that in severe preeclampsia, placenta synthesis of IGF-I is inhibited. The strong association between severe preeclampsia and high cord plasma IGFBP-1 indicates close links to the preeclamptic process, possibly as part of compensatory mechanisms against restricted foetal growth, or alternatively, as part of the mechanisms that perpetuate preeclampsia. If intrauterine growth is important for malignancies in adult life, the role of pregnancy IGFs and other pregnancy hormones should be further examined.

209 CROSS-SECTIONAL ASSOCIATION BETWEEN ALCOHOL CONSUMPTION AND GLYCATED HAEMOGLOBIN LEVEL: THE EPIC-NORFOLK STUDY

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Background: Glycaemia, as measured by glycated haemoglobin, is positively related to all-cause and coronary heart disease mortality. Previous studies suggest that light to moderate drinking may have beneficial effects on glycaemia. We investigated the cross-sectional association between total level and type of alcohol consumed, and glycaemia in EPIC-Norfolk.
Methods: Cross-sectional study of 6414 non-diabetic men and women, aged 40–78 years, recruited from the general population. Alcohol intake was assessed by self-reported questionnaire.
Results: 10% of men and 18% of women reported drinking no alcohol. Among the drinkers, median alcohol intake was 8 units/week for men and 3 units/week for women. In analyses stratified by sex and adjusted for age, total energy intake, education, fruit and vegetable intake, smoking, family history of diabetes, physical activity, body mass index and waist:hip ratio, alcohol intake was inversely associated with HbA_{1c} in both men and women, although the association was stronger in women. A 1 unit/week increase in alcohol intake was associated with 0.0048% (s.e. = 0.00225; p-value = 0.031) and 0.017% (s.e. = 0.00343; p-value < 0.001) reduction in HbA_{1c} in men and women respectively. In similar multivariate analyses, wine intake was inversely associated with HbA_{1c} in men and women. When also adjusted for total alcohol intake, the association between wine intake and HbA_{1c} remained significant in men only. There were no consistent associations with intake of beer, spirits and fortified wines.
Conclusion: Alcohol intake was associated with lower HbA_{1c} level, an association not explained by confounding. The distinction between types of alcohol consumed was particularly important in men. Further research is required to establish whether the type of alcohol, or the drinking pattern associated with type of alcohol, is more important.

210 URINARY OESTROGEN METABOLITES AND MAMMOGRAPHIC PARENCHYMAL PATTERNS IN POSTMENOPAUSAL WOMEN

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Background: It has been hypothesised that women who metabolise their endogenous oestrogens predominantly via 16α-hydroxylation rather than via 2-hydroxylation and, as a result, have a low ratio of 2-hydroxyestrone (2-OHE1) to 16α-hydroxyestrone (16α-OHE1) are at increased risk of breast cancer. Epidemiological evidence in support of this hypothesis is scarce and mostly based on measurements made after the onset of the disease. To gain insight into the role of these metabolites in the aetiology of breast cancer we assessed their relationship with high density mammographic parenchymal patterns, a widely recognised indicator of risk of this tumour.
Methods: A case-control study was nested within a cross-sectional study on determinants of mammographic patterns carried out in a population-based mammography screening programme in Northern Greece. Urinary levels of 2-OHE1 and 16α-OHE1 were measured in a random sample of postmenopausal women with high and with low density mammographic patterns. Women in the two groups were matched on year of birth, years since menopause and date of urine collection.
Results: Women with high mammographic density had, on average, 58% higher levels of 2-OHE1 (P=0.002) and 15% higher levels of 16α-OHE1 (P=0.37) than women with low mammographic density. The ratio of 2-OHE1 to 16α-OHE1 was 35% higher (P=0.005) in the high density group. Women in the highest third of this ratio were 5-times more likely to have a high density mammographic pattern than those in the lowest third after adjusting for potential confounders (prevalence odds ratio=4.84; 95% CI: 1.48–15.80; test for trend P=0.004).
Conclusions: These findings do not support the hypothesis that a low ratio of 2-OHE1 to 16α- OHE1 is associated with an increase in breast cancer risk. In fact, they seem to indicate that a high rather than a low ratio may be implicated in the aetiology of this tumour at postmenopausal ages.