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Parallel Session A

Cancer and geography

001 IS THERE A US PROSTATE CANCER BELT?

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Background and objective Several chronic diseases display geographic patterns of increased incidence or mortality in the southern US. State- and county-level maps describe increased prostate cancer mortality in a band of states spanning from Washington, DC, to Louisiana. A recent report has documented that birth in the so-called Stroke Belt (SB) region in the southern US predicts mortality from stroke independently of residence in a SB state in adulthood, when stroke onset is most common. Several studies have suggested that early-life risk factors may influence prostate cancer incidence and mortality, but no known prior research has examined whether place of birth within the US predicts prostate cancer related outcomes. The objective of this study is to assess the association between birth in the SB and subsequent mortality from prostate cancer.

Methods Prostate cancer specific mortality (underlying cause of death only) rates in the year 2000 for African-Americans and whites born in the continental US and aged 65–95 were calculated by linking national mortality records with population data in strata defined by birth state, state of residence at the census, race, sex, and age. Birth in a SB state (North Carolina, South Carolina, Georgia, Tennessee, Arkansas, Mississippi, or Alabama) was cross-classified against SB residence at the 2000 Census.

Results Adjusting for SB residence in 2000, odds of prostate cancer mortality were significantly elevated by 19% (OR 95% CI 1.11 to 1.27) for African-Americans born in the SB compared to those who were not born in the SB. Those who lived in the SB in 2000 experienced 9% (OR 95% CI 1.01 to 1.18) increased odds of prostate cancer mortality compared to those who did not reside in the SB in 2000, adjusting for birth in the SB. These associations were not observed among whites.

Conclusions These findings suggest important roles for geographically patterned childhood exposures—for example, differences in social or environmental conditions, or behavioural norms in diet, physical activity and smoking. Because of segregation patterns in the American South, it is possible that African American men born in the South are more subject to these types of exposures than white men born in the South. Alternatively, the differences in associations between whites and blacks may be an artefact of differential migration patterns. Future research should assess the additional influence of socio-economic status, cancer incidence, stage at diagnosis and survival time after diagnosis.

002 UPTAKE OF BREAST SCREENING: WHERE YOU LIVE ALSO MATTERS

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Objective To determine if area of residence is an independent factor influencing uptake of breast screening.

Design Record linkage study combining anonymised data from the National Breast Screening System and the Northern Ireland Longi-

tudinal Study with cohort attributes as per their 2001 census return. Five mutually exclusive areas were defined; the Belfast metropolitan area (BMA) (comprising 21% population) and the remaining parts the four Health Boards responsible for the organisation and promotion of screening but not part of the BMA.

Setting All women enumerated at the 2001 Census of Northern Ireland.

Participants 37 059 women aged 48–64 at the time of the census who had been invited for routine breast screening during the 3 years following the census.

Main outcome measure Attendance for routine breast screening in the 3 years following the census.

Results Overall uptake was 75% during the study period. In the fully adjusted model uptake was lower among women aged 60 and over, not currently married and among women whose general health was “not good” in the year before the census. Uptake was related to car ownership and housing tenure but not to educational status or NS-SEC. Even after adjustment for all other demographic and SES factors there was significant variation in uptake among Health Boards; uptake was lowest in the Eastern Board (OR 0.61, 95% CI 0.56 to 0.66, compared to the Northern Board) and lower again in the BMA (OR 0.49, 95% CI 0.45 to 0.53). The reduction in Belfast was evident across most social strata and was confirmed with maps and use of different definitions of “city”.

Conclusions Linkage of screening data to census-based longitudinal studies is an efficient and powerful way to increase the evidence base on sources of variation in uptake within the UK. This study shows that the lower breast screening uptake rate in and around the city is of concern as it affects a large number of women. It requires further investigation. The lower attendance rates are not due to socio-economic factors and appear to be independent of factors related to organisation of the service. Possible reasons and solutions for this problem will be discussed at presentation.

003 DEMOGRAPHIC ANALYSES OF PRIMARY BONE CANCER IN 0–49 YEAR OLDS IN GREAT BRITAIN, 1980–2005: A SMALL-AREA APPROACH

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Objective To examine geographical patterning in the incidence of primary bone cancers diagnosed in 0–49 year olds in Great Britain (GB) during the period 1980–2005. The analyses focussed on the two most common types in this age range, osteosarcoma and Ewing sarcoma. We specifically aimed to analyse putative associations with area characteristics including deprivation and population density.

Design The study accessed multiple data sources including population census, digital boundary, postcode directories and time series of Townsend deprivation scores. Incidence data from the 10 regional cancer registries in GB were accessed and analysed by census small-area level (census ward level for England and Wales; postcode sector level for Scotland).

Setting GB.

Participants Data from patients (0 to 49 years) diagnosed with a primary bone cancer between 1st January 1980 and 31st December 2005 and registered with one of the 10 regional cancer registries in GB.

Main outcome measure Negative binomial regression was used to examine the relationship between incidence rates and population density, Townsend deprivation index (and its components). The

models were fitted to small-area level data and aggregated to four age bands (0–14 years; 15–29 yrs; 30–49 years and 0–49 years) and by gender with the logarithm of the “at risk” population as an offset.

Results The study analysed 2566 cases of osteosarcoma and 1650 cases of Ewing sarcoma. After adjustment for age and gender there was a statistically significant negative association for the incidence of osteosarcoma with area-level Townsend deprivation score (RR for one unit increase in level of deprivation 0.975; 95% CI 0.963 to 0.986). For Ewing sarcoma, after adjustment for age and gender, there was a statistically significant negative association for incidence with population density (RR for an increase of one person per hectare 0.981; 95% CI 0.972 to 0.989) and also with non-car ownership (RR for an increase of one percent in non-car ownership 0.996; 95% CI 0.993 to 1.000).

Conclusion Higher deprivation appears to have a protective effect on the incidence of osteosarcoma. Higher incidence of Ewing sarcoma was associated with living in less densely populated areas and greater levels of car ownership, both of which are characteristic of rural areas. This study contributes to the growing body of evidence linking risk of Ewing sarcoma to some aspect of agriculture and suggests further study of environmental exposures or land use may be informative.

004

FLUORIDE AND BONE CANCER: IS THERE A LINK? SMALL-AREA ANALYSES OF PRIMARY BONE CANCER IN 0–49-YEAR-OLDS IN GREAT BRITAIN, 1980–2005

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Objective To analyse the putative association between incidence of primary bone cancer diagnosed in 0–49 year olds in Great Britain (GB) in 1980–2005 and fluoride in drinking water. The analyses focussed on osteosarcoma and Ewing sarcoma.

Design The study accessed multiple data sources including population census, digital boundary, postcode directory and fluoride monitoring at water supply zone level data. Incidence data from all 10 regional cancer registries were accessed and analysed by census ward. Residential postcode was used as a proxy for population distribution and the basis for making all census data compatible with 2001 census geography. Postcode distributions were also used to link water supply zones to census wards for England and Wales and postcode sectors for Scotland and enabled a fluoride level to be assigned to each census small-area in GB.

Setting GB.

Participants Data from patients (0 to 49 years) diagnosed with a primary bone cancer between 1980 and 2005 and registered with one of the 10 regional cancer registries in GB.

Main outcome measure Negative binomial regression was used to examine the relationship between incidence rates and census small-area fluoride levels. These models were fitted to census small-area data aggregated into four age bands (0–14; 15–29; 30–49 and 0–49 years) and by gender with the logarithm of the “at risk” population as an offset.

Results There were a total of 2566 osteosarcoma cases aged 0–49 years; 817 aged 0–14 years; 1315 aged 15–29 years and 434 aged 30–49 years. For Ewing sarcoma there were a total of 1650 cases aged 0–49 years; 659 aged 0–14 years; 800 aged 15–29 years

and 191 aged 30–49 years. After adjustment for age and gender, no statistically significant association was found between osteosarcoma or Ewing sarcoma and fluoride levels in drinking water. For example, for osteosarcoma the RR for 1 ppm increase in fluoride level 0.993; 95% CI 0.843 to 1.171 and for Ewing sarcoma RR 0.860; 95% CI 0.696 to 1.064.

Conclusion This is the first time the relationship between fluoride and bone cancer has been studied across the whole of GB at census ward level. No statistically significant associations between Ewing sarcoma or osteosarcoma and fluoride in drinking water were found.

Coronary heart disease

005

TRENDS IN CORONARY HEART DISEASE MORTALITY IN ENGLAND BY SOCIO-ECONOMIC CIRCUMSTANCES, 1982–2006

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Objective Understanding the scale of social inequalities in coronary heart disease (CHD) mortality and differential trends in these by age, gender and social position is crucial for assessing the impact on health inequalities of concomitant changes in risk factors, health-care, legislation and policy on health inequities.

Previous analyses of trends in Scotland suggest that falling CHD mortality rates may have recently begun to level in younger age-groups. Furthermore, the flattening of mortality rates was confined to the most socially deprived groups. Given the uncertainty attached to the estimates, the authors advised caution and suggested confirmatory research of these potentially important findings.

We therefore update previous analyses by examining socio-economic trends over a longer time-span, 1982–2006, and for England (to overcome the previous technical limitation of small counts).

Setting and methods Small areas (c.1500 people) in England were aggregated into equal quintiles by ascending scores on a composite index of multiple deprivation (with quintile 5 the most deprived group). CHD deaths and populations from 1981 to 2007 for each quintile group were used to calculate three-year moving averages of overall (age-standardised) and age-specific mortality rates for each social group, separately by gender for those aged 35 and over.

Trends by quintiles were analysed using joinpoint regression modelling to calculate annual percentage change estimates and to identify turning points in each series.

Results Social gradients in mortality were large and persistent. The rates of decline in age-standardised CHD mortality were socially patterned with the steepest fall in the most affluent quintile. Thus, while absolute inequalities narrowed over the period, relative inequalities increased slightly. For similar age and deprivation groups, rates fell faster for men than women. From 2000, mortality rates levelled off in the most affluent groups (q1 and q2) for women aged 45–54. For men aged 35–44, rates of fall were significantly lower in the most recent period compared to the early 1990s for all except q3, but are still either higher or at the same level as in the late 1980s.

Conclusions Comparisons across and within countries provide valuable insights into potential drivers of inequality for CHD—a leading cause of death in the UK, and worldwide. The differing results for England and Scotland are intriguing. These differences may be real or may reflect data artefact arising due to higher levels of selective health migration in deprived areas and uncertainties in accurately estimating the population structure.