INCREASING INCIDENCE AND GEOGRAPHICAL ANALYSES OF THYROID CANCER IN GREAT BRITAIN, 1976 - 2005

Dr Richard J.Q. McNally,
Reader in Epidemiology,
Institute of Health and Society,
Newcastle University

Richard.McNally@ncl.ac.uk

INTRODUCTION (1)

- Exact aetiology of thyroid cancer not known
- Exposure to ionizing radiation in early life is a risk factor in children & young people
- Can be a risk even at low levels

INTRODUCTION (2)

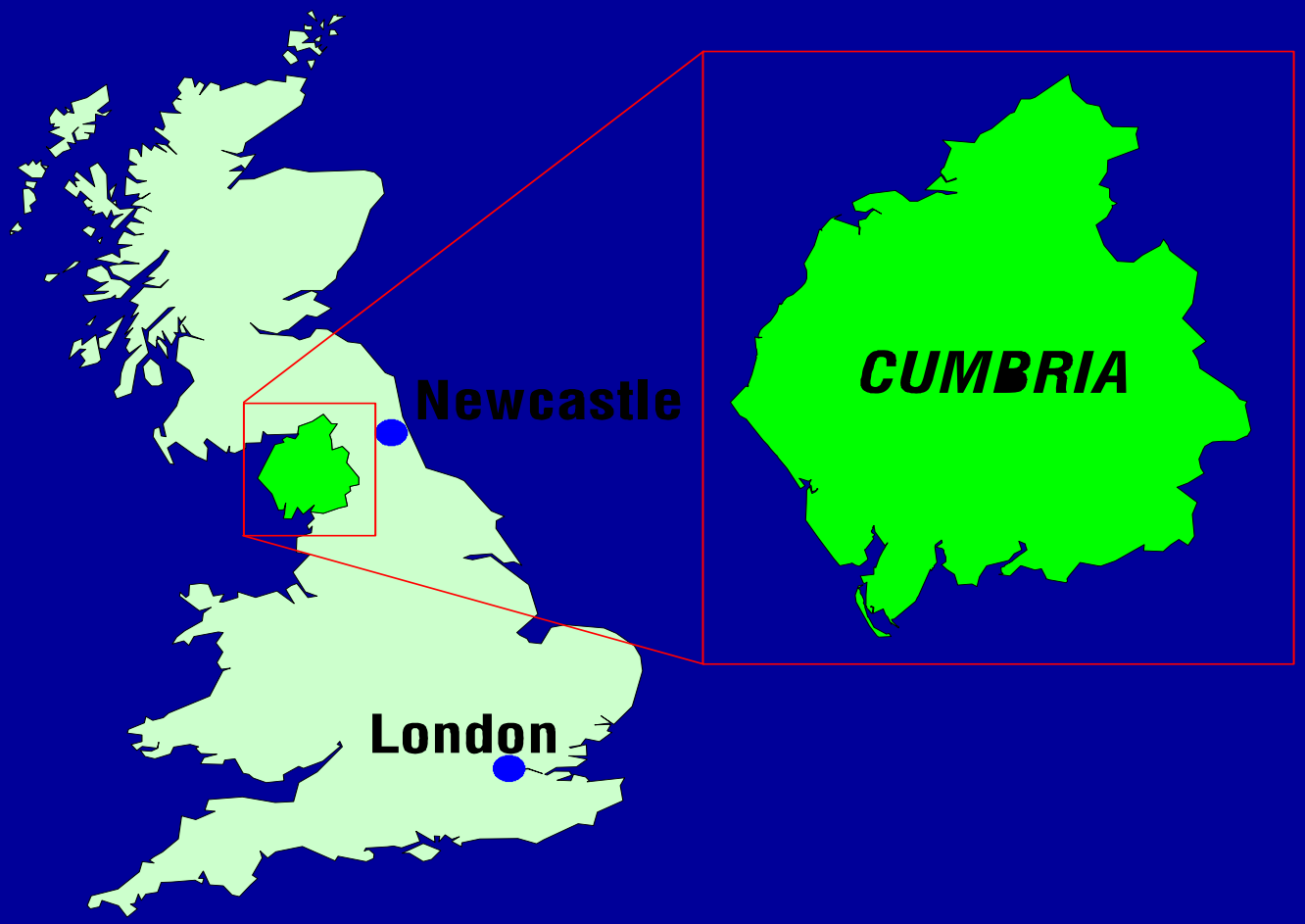
- The nuclear accident in Chernobyl on 26th April 1986 released a radioactive cloud
- Reached northern England on 2nd May 1986
- Increases in incidence (after accident) reported in other parts of Europe & USA

INTRODUCTION (3)

- Statistically significant increase in incidence in 0 – 24 year olds from northern England during post-Chernobyl period (1987 – 2005) previously found

- Increase was notably high in Cumbria

INTRODUCTION (4)



OBJECTIVES (1)

- To examine temporal trends & geographical variation in the incidence of primary thyroid cancers using an extended age-range & geographical area of Great Britain, diagnosed 1976–2005

- 0–49 year olds
- Northern England + Scotland + Wales

AIMS

- (1) To analyse age, period & cohort effects
- (2) To compare incidence between the pre- & post-Chernobyl periods (1976–1986 & 1987–2005)
- (3) To analyse putative associations with area-based measures of deprivation & population density

METHODS (1)

- Cases eligible for this study were all those diagnosed with primary differentiated (papillary or follicular) thyroid carcinoma

- Case data were obtained from four population-based regional registries in GB: Northern & Yorkshire, North West, Wales & Scotland

METHODS (2)

- Cases were allocated to census small areas, allowing linkage to population data from the 1981, 1991 & 2001 censuses

- Age-standardised rates (ASRs) & 95% confidence intervals (CIs) were calculated

METHODS (3)

- An adaptation of the Clayton-Schifflers method was used to analyse age-period-cohort effects. Negative binomial regression was used as data were sparse

- The following effects were analysed: age, sex, drift (linear trend), non-linear period & non-linear cohort

METHODS (4)

- Relative risks (RRs) & 95% CIs were calculated for each geographical area

- Negative binomial regression was used to examine the effects of area-based measures of deprivation & population density

RESULTS (1)

- 4327 cases analysed
- Males: ASR = 3.9 per million persons per year (95% CI 3.6–4.1)
- Females: ASR = 12.5 per million persons per year (95% CI 12.0–12.9)

RESULTS (2)

- For temporal trends the best fitting negative binomial regression model included: age ($P<0.001$), sex ($P<0.001$) & drift (linear trend, $P<0.001$)

- Non-linear period ($P=0.42$) & non-linear cohort ($P=0.71$) were NOT statistically significant

RESULTS (3)

- The most marked statistically significant increases were seen in the areas of:

- North Yorkshire (RR=2.55; 95% CI 1.49–4.36)
- Hartlepool (RR=5.53; 95% CI 1.28–23.98)
- North East Lincolnshire (RR=2.55; 95% CI 1.05–6.19)

RESULTS (4)

- North Lincolnshire (RR=3.46; 95% CI 1.02 –11.77)
- York (RR=4.28; 95% CI 1.29–14.15)
- Cumbria (RR=2.89; 95% CI 1.47–5.67)
- Caerphilly (RR=2.67; 95% CI 1.00–7.14)
- Rhondda (RR=14.41; 95% CI 1.96–106.07)

RESULTS (5)

- The Scottish Borders (RR=3.64; 95% CI 1.42–9.33)
- North Ayrshire (RR=2.76; 95% CI 1.06–7.21)
- North Lanarkshire (RR=2.82; 95% CI 1.51–5.28)

RESULTS (6)

- There were statistically significant associations with:

- Population density (RR for an increase of one person per hectare=1.016; $P<0.001$)

- Deprivation (RR for an increase of one unit in the deprivation score=1.071; $P<0.001$)

CONCLUSIONS (1)

- There has been a linear increase in the incidence of thyroid cancer which has led to a doubling of the number of cases diagnosed over a twenty year span

- The reasons for this increase are not well understood, but it is consistent with findings from other countries

CONCLUSIONS (2)

- Higher incidence of thyroid cancer was observed in a number of different geographical regions

- Higher rates were also associated with urban living and greater deprivation, indicating that other environmental or lifestyle factors may play a role in aetiology

FURTHER WORK

- Investigate the relationship between incidence of thyroid cancer and area-based level of caesium-137 deposition as measured in 1986

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