

The effect of rurality on cancer incidence and mortality

NCIN Data Briefing

Summary

Cancer incidence rates, adjusted for population age distribution, are different in rural and urban areas. Lung cancer rates are lower in rural areas with rates approximately 65% of those in urban areas. Breast and prostate cancer incidence rates are higher in village areas by approximately 8% and 11% respectively. Colorectal cancer incidence rates in village areas are higher in females, by 6%, but not males. The differences in incidence rates in towns compared to urban areas follow a similar pattern, but are generally closer to the rates in urban areas.

KEY MESSAGE:

There is a marked variation in age-adjusted cancer incidence and mortality rates between rural and urban areas. This is partly due to the variation in socio-economic deprivation but even when this is taken into account some significant differences remain.

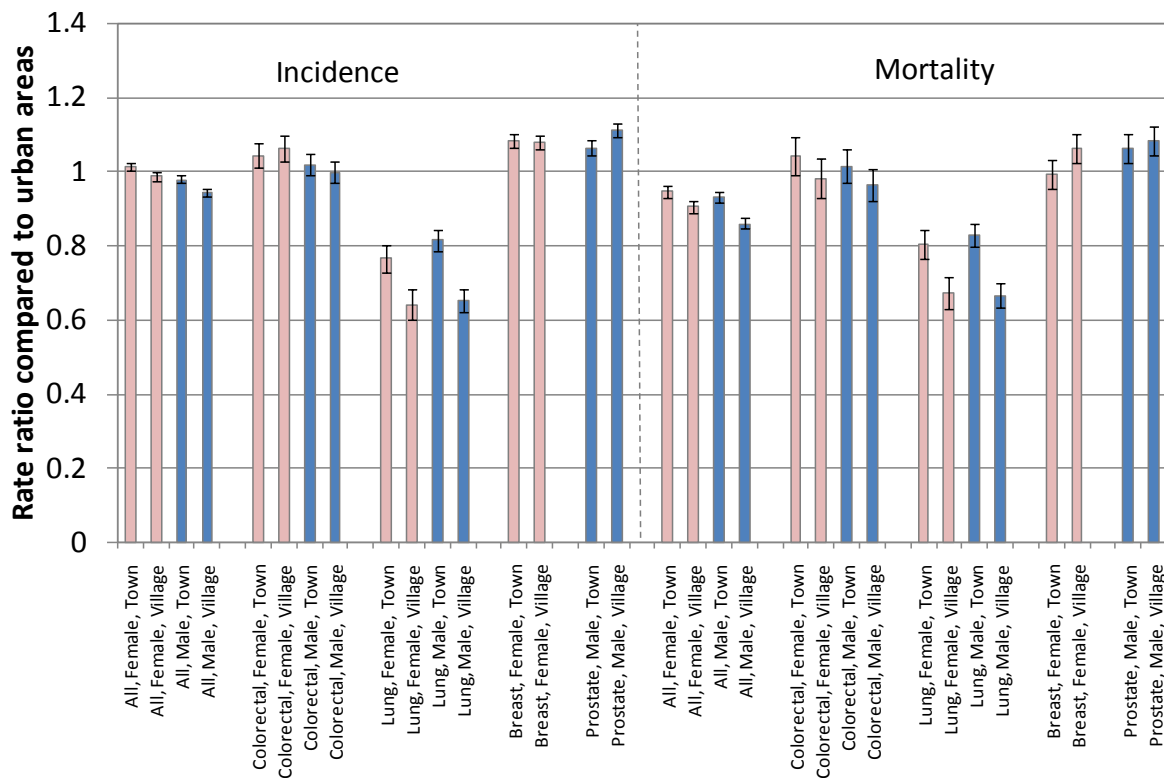


Figure 1: Age standardised incidence and mortality rate ratios by cancer type and sex for combined village areas to combined urban areas, and for combined town to combined urban groups (ratios below 1.0 indicate lower incidence in village or town areas), England 2004-2006. Data sources: National Cancer Data Repository, ONS population data.

The majority of the variation in cancer incidence and mortality rates with rurality is due to the effect of socio-economic deprivation: 24% of the urban areas are in the most deprived quintile, compared to less than 1% of village areas.

Some significant effects do appear to be due to rurality alone (although there may be other confounding factors, e.g. tobacco smoking). Lung cancer incidence rates in village areas are approximately 80% of those in urban areas for both males and females for persons within some but

not all deprivation quintiles. Breast and prostate cancers show smaller but statistically significant higher rates in more affluent populations.

Methods

ONS rural/urban categories 'Urban > 10K', 'Town and Fringe' and 'Village, Hamlet & Isolated Dwelling' are referred to in this paper as 'urban', 'town' and 'village', see (DEFRA 2009). Incidence data from the National Cancer Data Repository, 2004-2006, and mortality data from the ONS mortality file, 2006-2008, were geo-coded to Lower Super Output Area (LSOA) boundaries using the United Kingdom Association of Cancer Registries (UKACR) postcode directory. LSOA rurality was determined from the ONS Rural/Urban definition and deprivation from the Index of Multiple Deprivation (IMD) 2007 income domain.

Age standardised rates (to the European standard population) were calculated with the LSOAs aggregated by rurality alone, and stratified by both deprivation quintile and rurality. Rate ratios were calculated comparing village and town areas with urban areas by combining 'sparse surrounding area' and 'less sparse surrounding area' rurality sub-categories. ICD-10 codes used were: All cancers, C00-C97 excluding non-melanoma skin cancer, C44; Breast cancer, C50; Colorectal cancer, C18-C20; Lung cancer, C33-C34; and Prostate cancer, C61.

Results

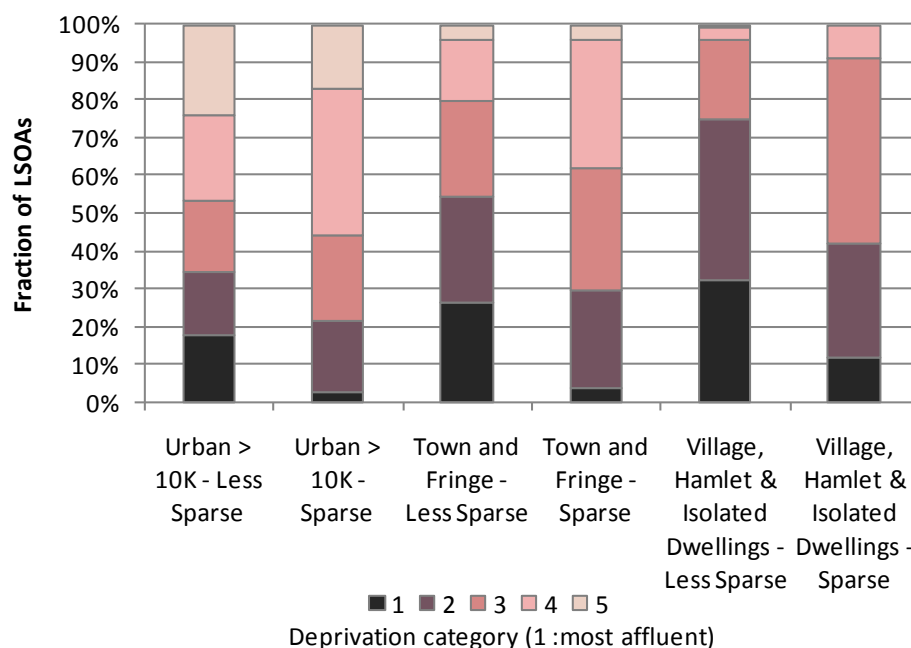
Figure 1 shows that rural areas have lower age-standardised incidence of lung cancer, and higher incidence of breast, prostate and colorectal cancers (in females). Incidence rate ratios for town to urban areas are generally similar to those for village to urban areas except that the ratio for lung cancer is closer to parity.

Mortality data shows a similar pattern, except that the all cancer mortality rates are significantly lower in town compared to village settings. This is likely to be largely a case-mix effect due to the lower incidence of lung cancer (which is a more important determinant of the mortality rate than the incidence rate).

However, Figure 2 shows that there is significant variation in socio-economic deprivation: 24% of the combined 'urban' areas are in the most deprived quintile, compared to less than 1% of village areas. We expect cancers that have a strong variation with socio-economic deprivation to have an apparent variation with rurality due to this uneven distribution of socio-economic variation within the rurality categories.

Figure 2: Lower Super Output Area population fractions.

Data sources: ONS rural/urban classifications by LSOA, ONS populations



The population of England is not evenly divided between rural/urban categories (Figure 3, note logarithmic scale). Approximately 80% of the population live in urban LSOAs. The other 20% are split between town and village categories. There is a comparatively small total population of approximately 700,000 in the 'Sparse' sub-categories, meaning that results presented in this document are dominated by the 'Less Sparse' categories.

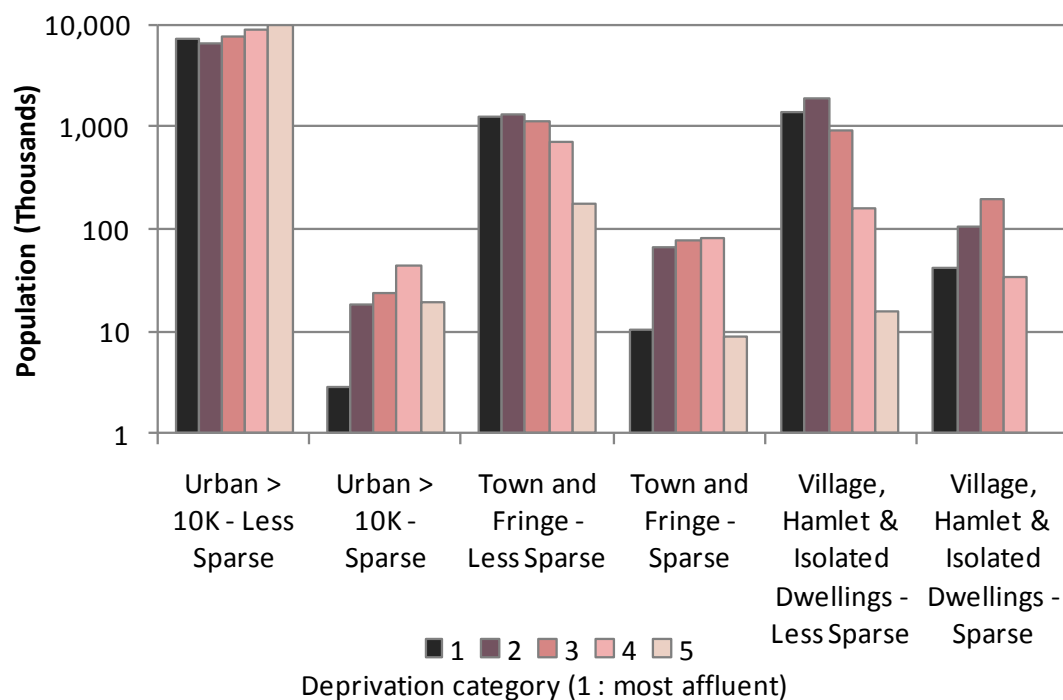


Figure 3: Population by Lower Super Output Area Rural/Urban category and Deprivation quintile (note logarithmic scale), England 2004-2006. Data sources: ONS Rural/Urban classifications by LSOA, ONS populations.

Incidence rates in village and urban areas, stratified by deprivation, were not significantly different for many combinations of sex, cancer type and deprivation quintile (Figure 4). The confidence intervals are wide for comparisons between urban and rural areas for the most deprived socio-economic quintiles due to the low population of rural areas in this socio-economic quintile.

Incidence rates for lung cancer in village areas were approximately 80% of the rate in urban areas in deprivation quintiles 2, 3 and 4 ($p < 0.001$ for both sexes).

Although numerically smaller, statistically significant higher incidence rates in village compared to village areas were also seen for more affluent population quintiles in breast and prostate cancer and for some areas of intermediate deprivation in female colorectal cancer.

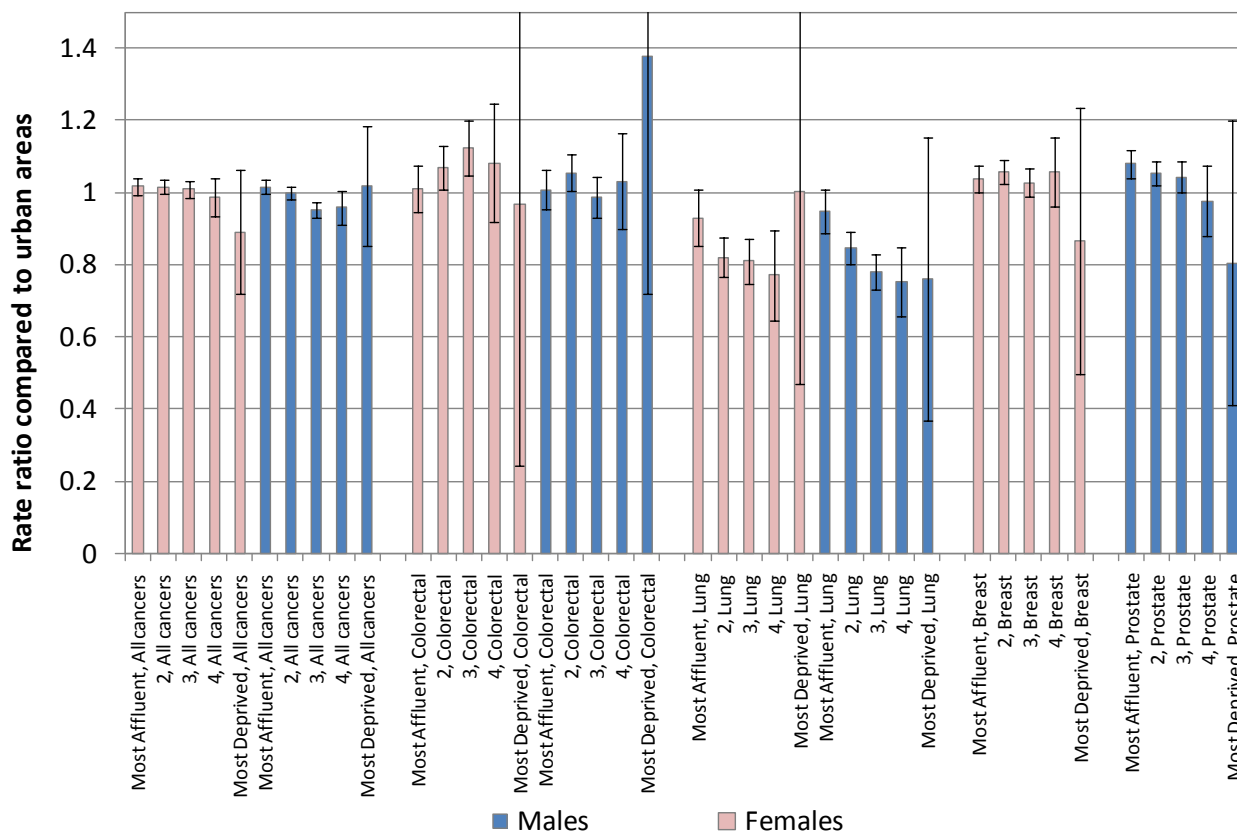


Figure 4: Age standardised incidence rate ratio by cancer type, sex and deprivation quintile, for combined Village, Hamlet and Dwelling groups to combined Urban groups. England 2004-06 (ratios below 1.0 indicate lower incidence in Village, Hamlet & Dwelling groups, Deprivation 1 = most affluent. Data sources: National Cancer Data Repository, ONS population data.

The comparison between incidence rates in town areas and urban areas is broadly similar to that between village and urban areas, though the deviation from parity for lung cancer is less pronounced. The average lung cancer incidence rates in town areas are 94% of the urban rates in deprivation categories 2, 3 and 4 across both males and females. Mortality rates (not shown) are broadly similar to incidence rates, though due to lower numbers the confidence intervals are wider.

FIND OUT MORE:

DEFRA 2009

Rural definition and Local Authority classification. Available online at:

<http://www.defra.gov.uk/evidence/statistics/rural/rural-definition.htm>

Other useful resources within the NCIN partnership:

Cancer Research UK CancerStats – Key facts and detailed statistics for health professionals

<http://info.cancerresearchuk.org/cancerstats/>

The National Cancer Intelligence Network is a UK-wide initiative, working to drive improvements in standards of cancer care and clinical outcomes by improving and using the information collected about cancer patients for analysis, publication and research. Sitting within the National Cancer Research Institute (NCRI), the NCIN works closely with cancer services in England, Scotland, Wales and Northern Ireland. In England, the NCIN is part of the National Cancer Programme.