

**North Yorkshire County Council
Scrutiny of Health Committee
23 June 2017**

Monitoring the human health impacts of shale gas extraction

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1 Purpose of the Report

- 1.1 This paper provides an update to the Scrutiny of Health Committee on progress to monitor human health impacts from shale gas extraction at Kirby Misperton and follows on from the previous proposal dated 3rd March 2017. Data presented here shows baseline health data at small area level around the site.

2 Background

- 2.1 The most useful and reliable information in relation to the potential risks to human health will come from environmental monitoring data. Environmental monitoring, required as part of the environmental permit conditions as well as the baseline monitoring will provide direct evidence to determine the potential for any exposure of the local population to emissions from the site. Information regarding the baseline environmental monitoring is publically available through the website for the British Geological Survey here:
<http://www.bgs.ac.uk/research/groundwater/shaleGas/monitoring/yorkshire.html>

3 Surveillance of local health data

- 3.1 Purpose of the surveillance:
Concerns have been about the potential health effects of shale gas extraction at Kirby Misperton. An assessment of the currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with shale gas extraction will be low if the operations are properly run and regulated. Where potential risks have been identified in the literature, these were typically the result of operational failure and poor regulatory framework. In light of the regulatory approach in the UK, and experience from similar industries, it is expected that well managed exploration sites will only make a small contribution to local concentrations of pollutants.
- 3.2 Baseline health data used:
The data shown here (Figures 1 to 14) is drawn from existing sources of routinely collected health information. These sources have been selected as they are able to provide a reliable baseline for data comparison. The baseline data shows rates for 5 year time periods.
- 3.3 Health indicators and data sources shown here:
- Hospital admission rates for cancer, respiratory disease and cardiovascular disease (*Source: Hospital Episode Statistics*)

- Deaths rates from cancer, respiratory disease and cardiovascular disease (*Source: Office of National Statistics*)
- Rate of low birth weight babies (*Source: Office of National Statistics*)

3.4 Data comparison:

The data is presented at Lower Super Output Area (LSOA). LSOAs are a geography of small areas covering the whole country, which are used to collect and publish small area statistics. Each LSOA covers roughly 650 households and 1,500 individuals. The area 5km around the site covers six LSOA areas and these are labelled here as areas E01027774; E01027776; E01027800; E01027801; E01027793 and E01027794. Four areas for comparison have also been included. These LSOA areas are labelled E01027557; E01027562; E01027742; E01027753. These four areas lie within national parks boundaries and do not have PEDL licences available therefore will represent populations that will not be close to any shale gas extraction sites (Appendix 1).

3.5 Quality and Timeliness of data:

The data used is derived from routinely collected sources. As such, the data should be of good quality. Nevertheless, all data relies on the reliability of those individuals and organisations collecting and recording the data. For example, variation in disease recording between hospitals may account for changes in diagnosis or admission rates. This is particularly true when analysing statistics involving only a small number of residents.

3.6 Important considerations in interpretation of data and terms used

3.6.1 Small area statistics:

Due to the relatively low numbers of residents who live near the drilling site, the data collected will concern only small numbers of individuals, and the admission rates and death rates from these conditions is likely to be very low. Drawing reliable conclusions from these numbers may therefore be difficult. In this report, graphs are used to show differences in health data between areas. Although the height of the columns on the graphs may look different, statistics experts can judge if two values are truly different by comparing what are called “confidence intervals” (sometimes known as error bars) of the numbers. Rates of admissions and deaths will naturally vary in small areas from one year to the next. The use of 5 years’ worth of data for the baseline here helps to reduce some of the differences that would be seen if just one years’ worth of data was considered. These confidence intervals are represented on the graphs in this report like this:



3.6.2 Assessment of exposure:

Whilst environmental and meteorological monitoring will be undertaken and provide the best available indication of the potential for exposure to the population in the area, it will be challenging to accurately assess to what extent a specific individual living in the area has been exposed to any potential pollutants produced by the site. However, well managed

and regulated exploration sites are expected to only make a small contribution to local concentrations of pollutants.

3.6.3 Cause and effect relationship

Linking a possible environmental exposure to a health outcome is also complex. Many diseases have several potential causes, and therefore identifying the impact of an exposure on a background of other contributing factors (such as genetics, smoking status, alcohol intake, etc.) is difficult. Furthermore, the potential emissions from shale gas extraction are not necessarily unique to that activity (e.g. vehicle or industrial emissions) therefore some individuals may already be exposed to these pollutants.

4 Summary

The baseline health data shows that there is variation in disease and death rates between the small geographical areas shown here and prior to any shale gas extraction activity at Kirby Misperton. This is expected due to the small underlying populations being considered and it is not possible to interpret these differences further. The small geographic areas include six areas close to the site and four areas within North Yorkshire but at considerable distance away from the site to allow comparison between broadly similar populations of North Yorkshire residents.

Cardiovascular disease

Figure 1: Admission rate for cardiovascular disease (DSR per 100,000 population), 2011/12 to 2015/16

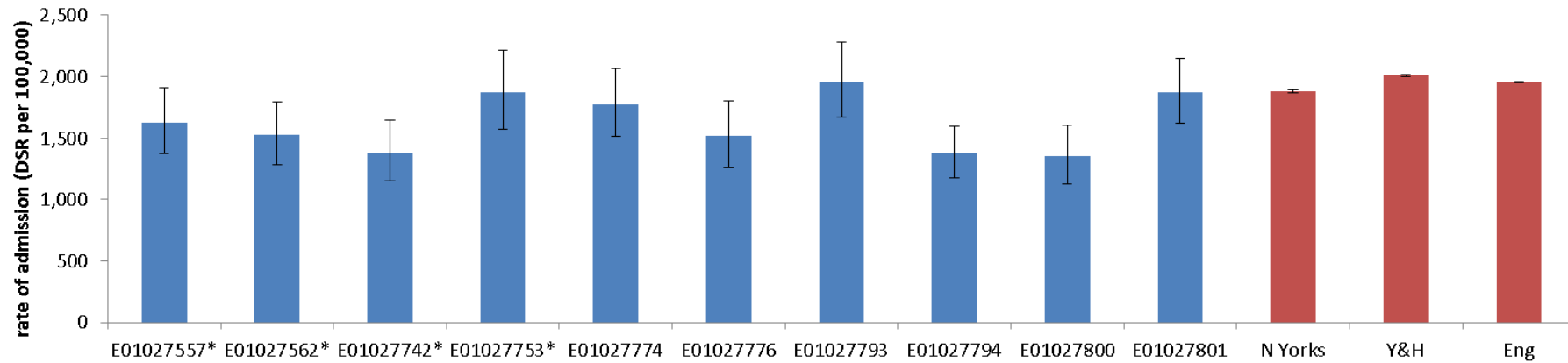
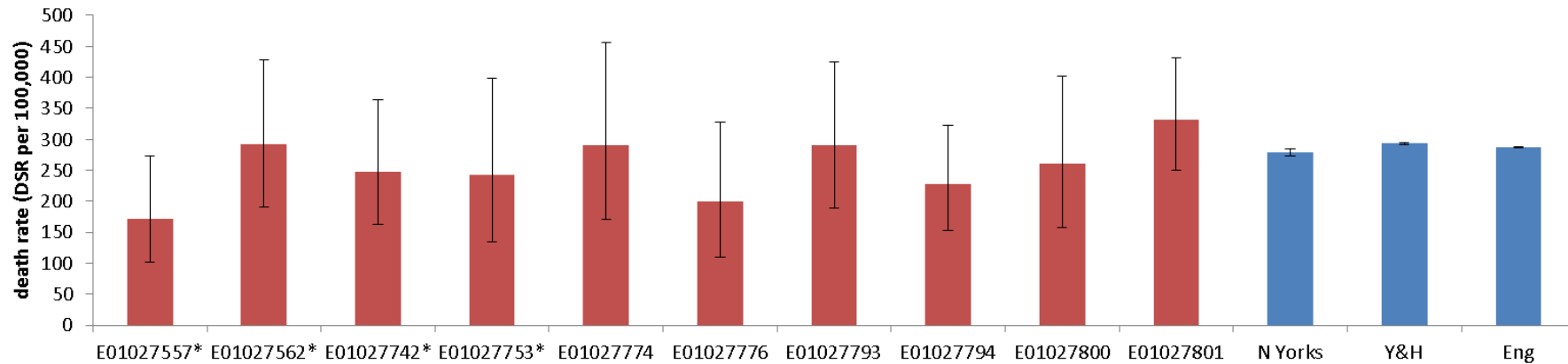


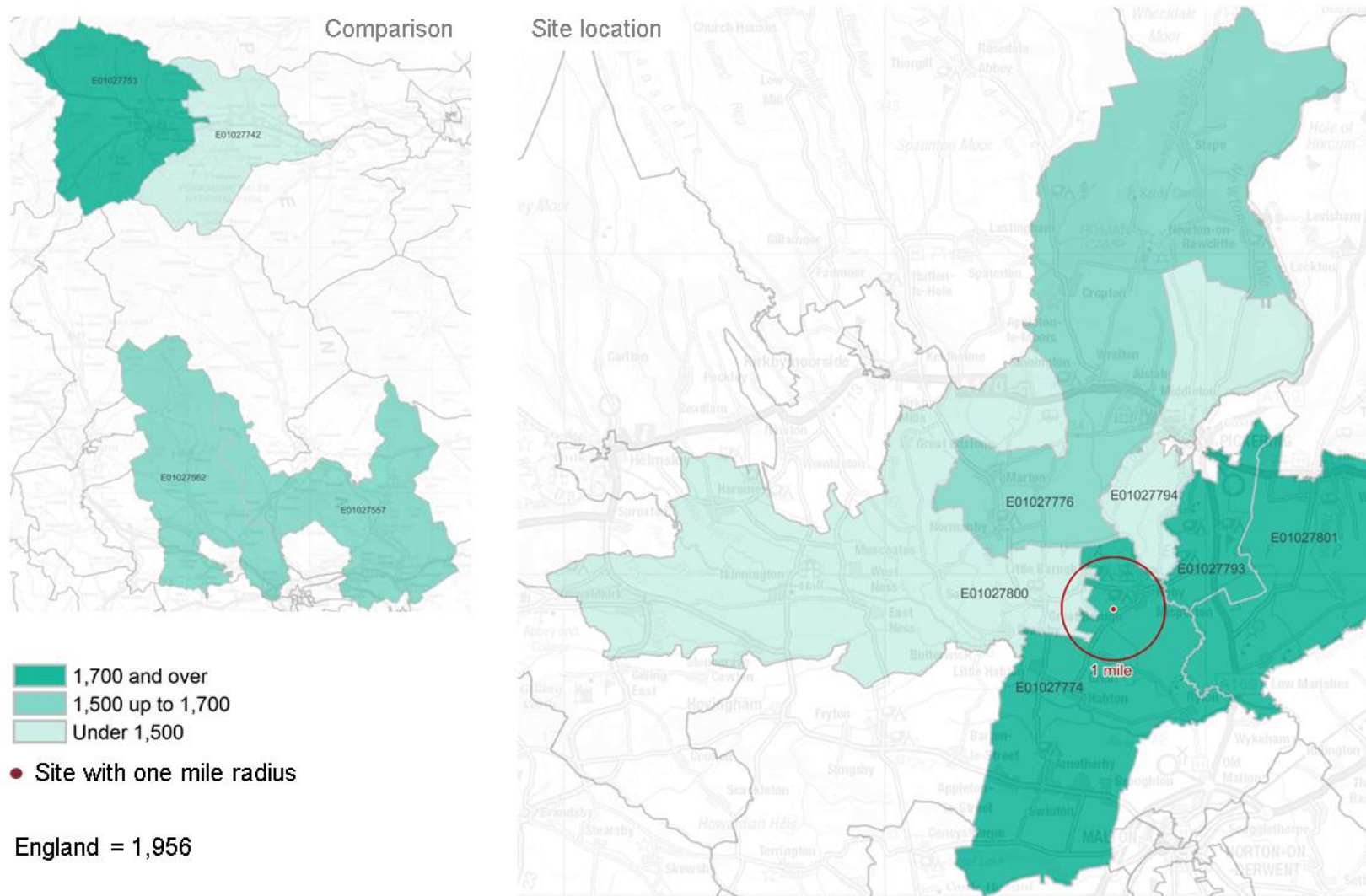
Figure 2: Death rate for cardiovascular disease (DSR per 100,000 population) 2011 to 2015



All bars shown with confidence intervals for the data; *indicates comparison LSOA area

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Figure 3: Map of cardiovascular disease admission rate by LSOA (DSR per 100,000) 2011/12 to 2015/16

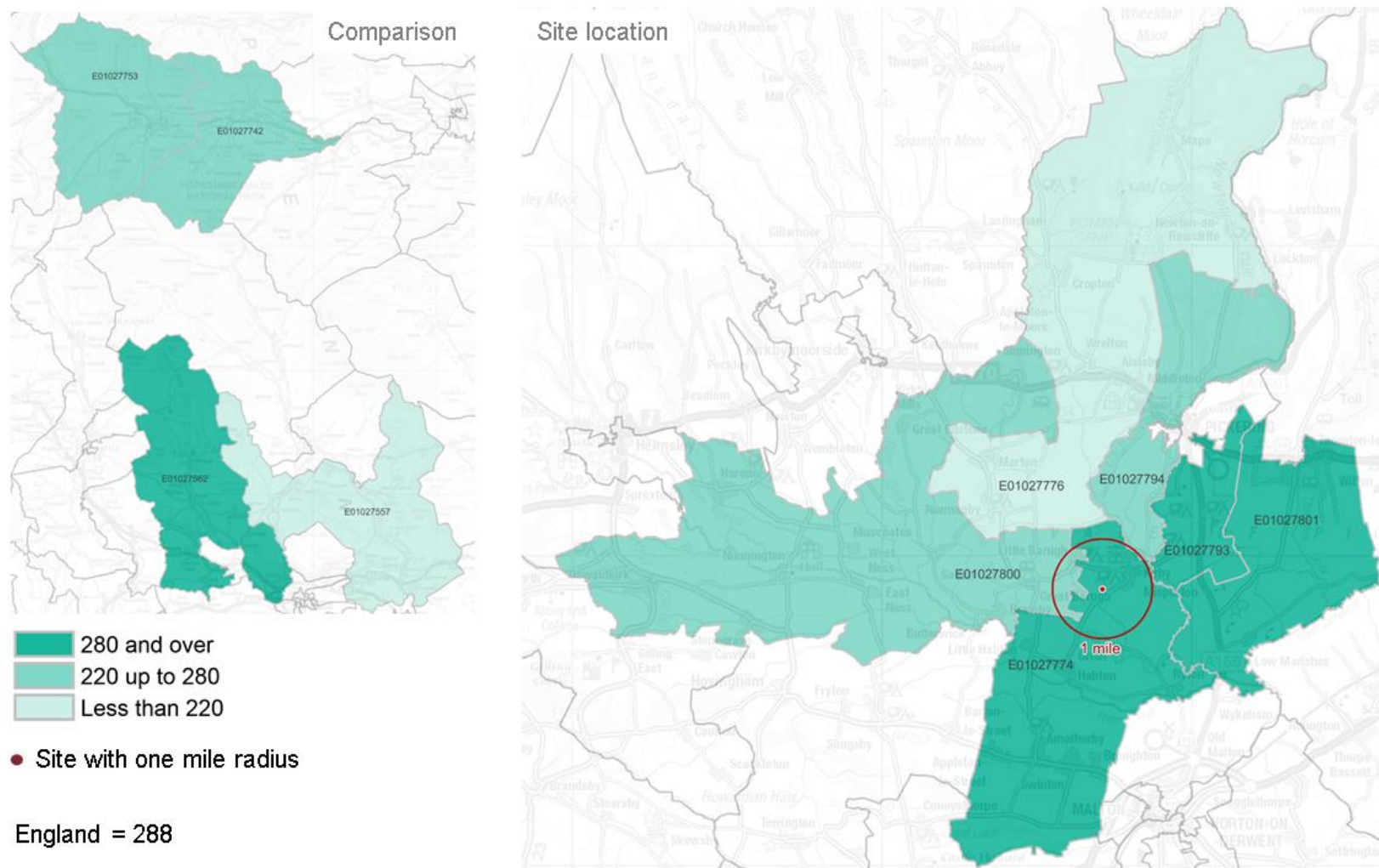


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Figure 4: Map of cardiovascular death rate by LSOA (DSR per 100,000) 2011 to 2015



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Respiratory disease

Figure 5: Admission rate for respiratory disease (DSR per 100,000 population), 2011/12 to 2015/16

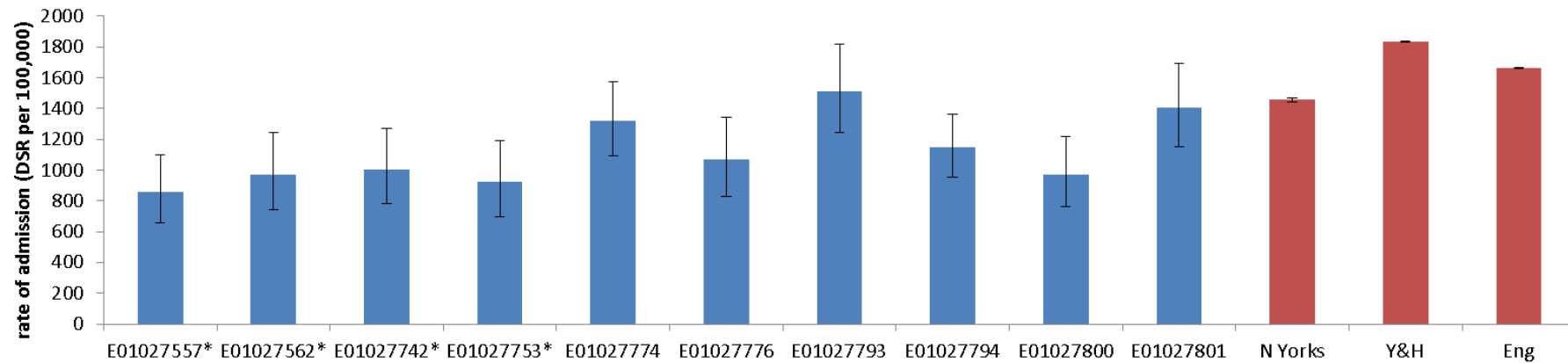
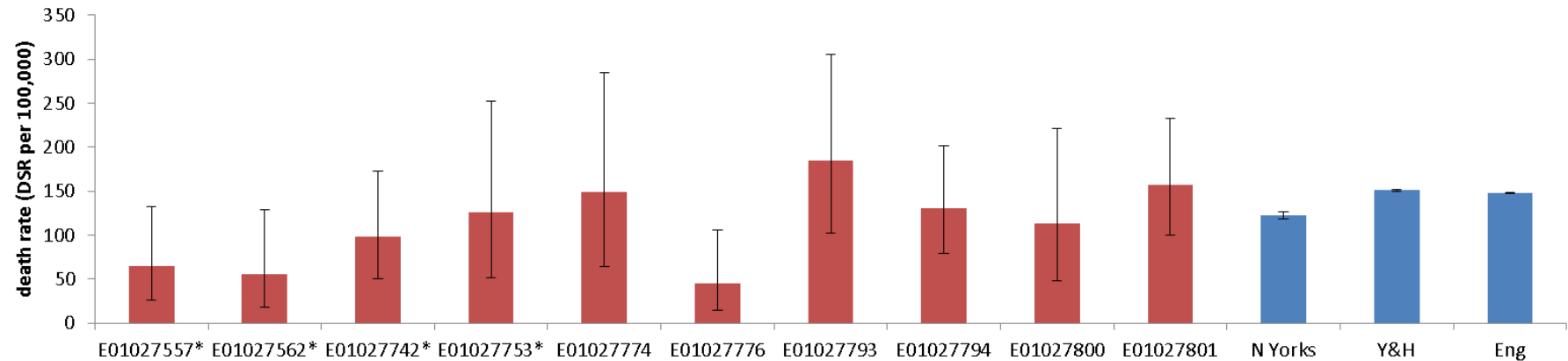


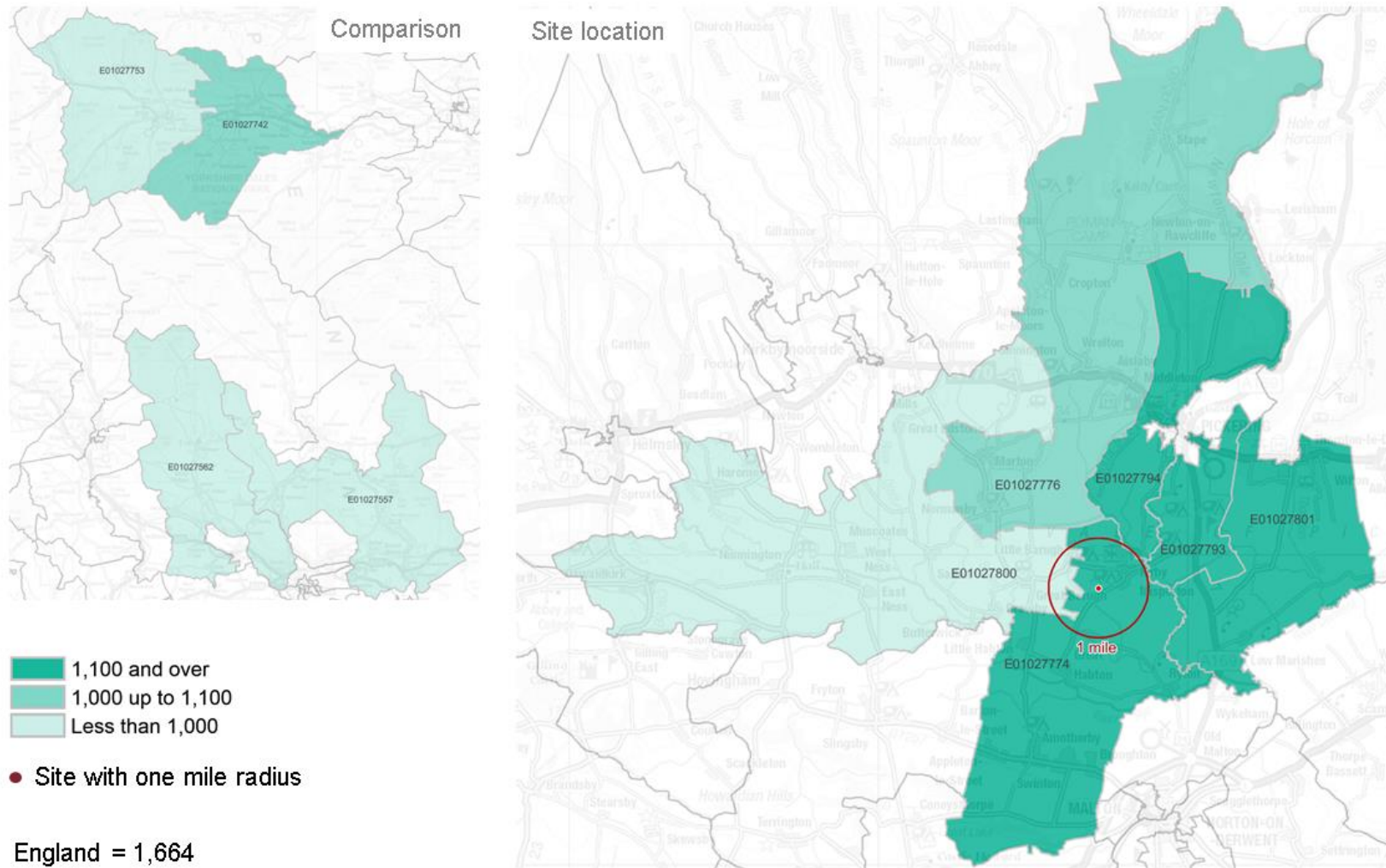
Figure 6: Death rate for respiratory disease (DSR per 100,000 population) 2011 to 2015



All bars shown with confidence intervals for the data; *indicates comparison LSOA area

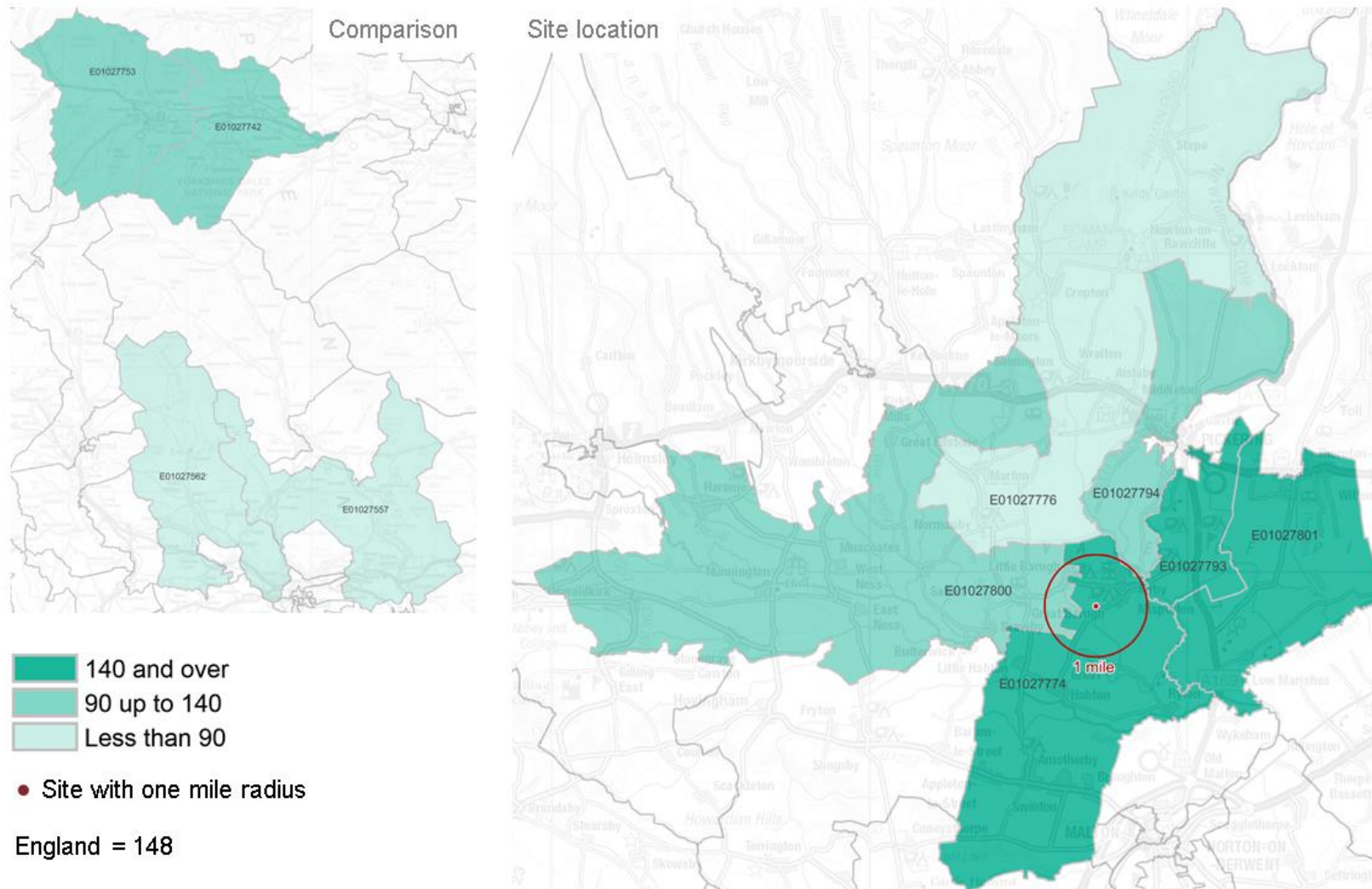
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Figure 7: Map of respiratory admission rate by LSOA (DSR per 100,000) 2011/12 to 2015/16



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Figure 8: Map of respiratory death rate by LSOA (DSR per 100,000) 2011 to 2015



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Cancer

Figure 9: Admission rate for cancer (DSR per 100,000 population), 2011/12 to 2015/16

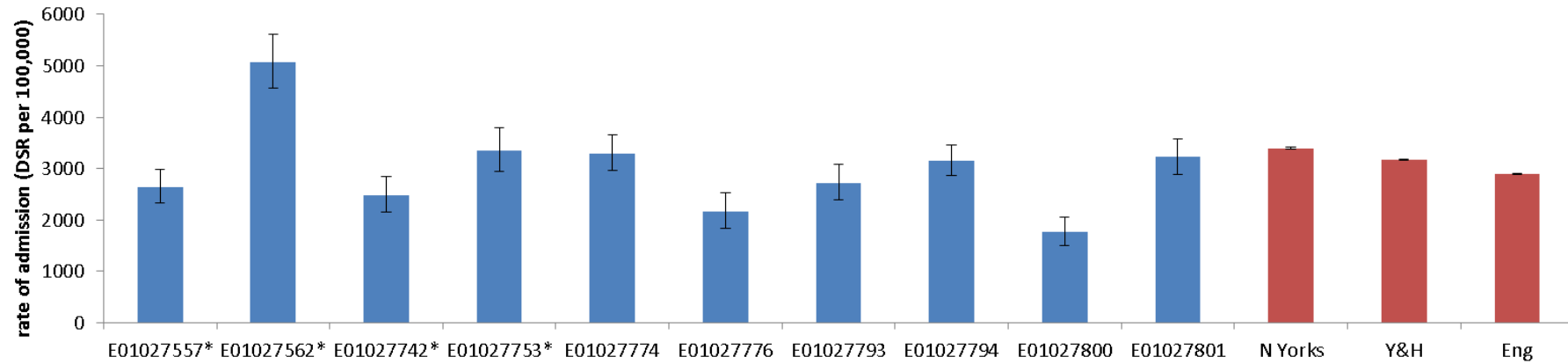
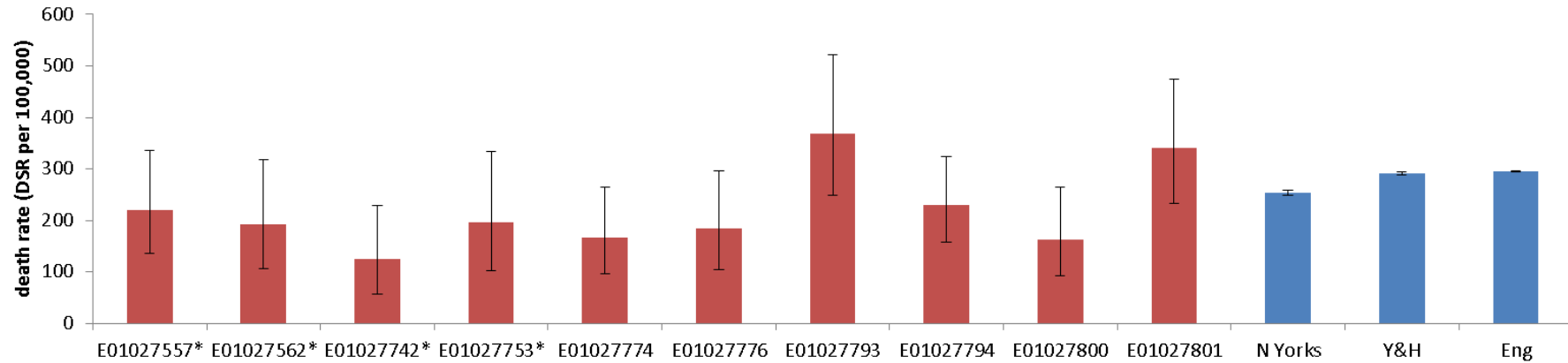


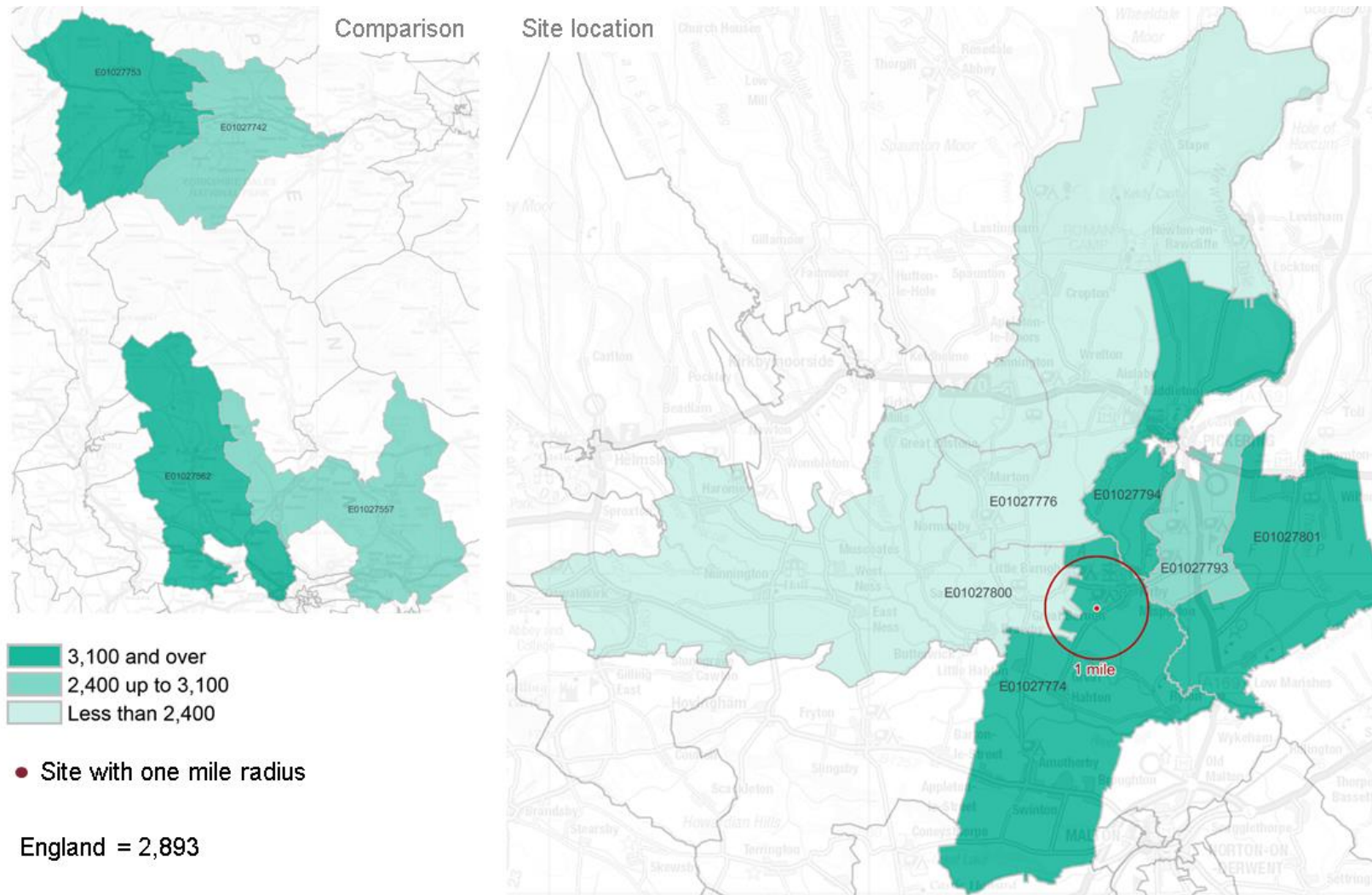
Figure 10: Death rate for cancer (DSR per 100,000 population) 2011 to 2015



All bars shown with confidence intervals for the data; *indicates comparison LSOA area

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Figure 11: Map of cancer admission rate by LSOA (DSR per 100,000) 2011/12 to 2015/16

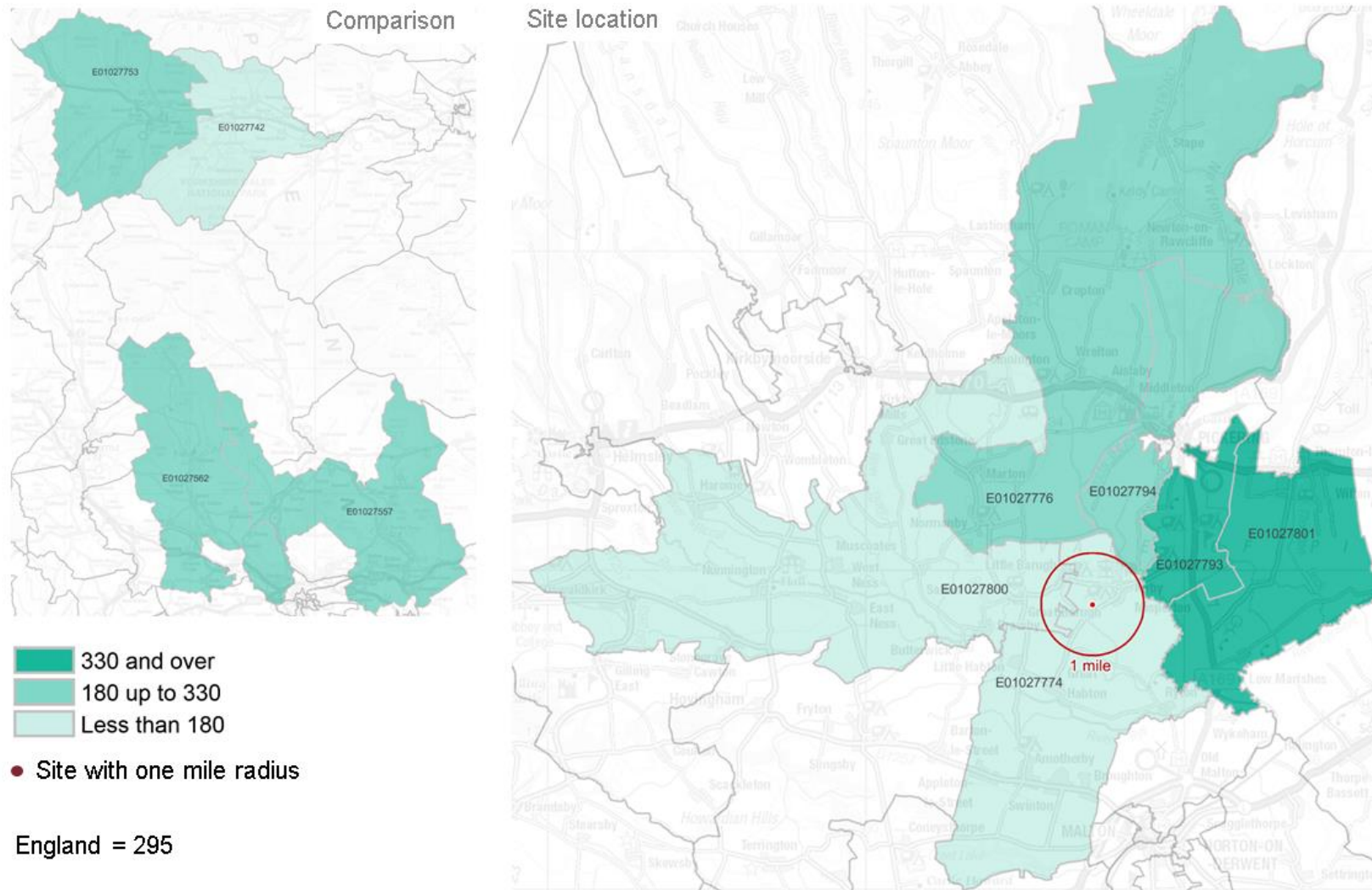


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Figure 12: Map of cancer death rate by LSOA (DSR per 100,000) 2011 to 2015



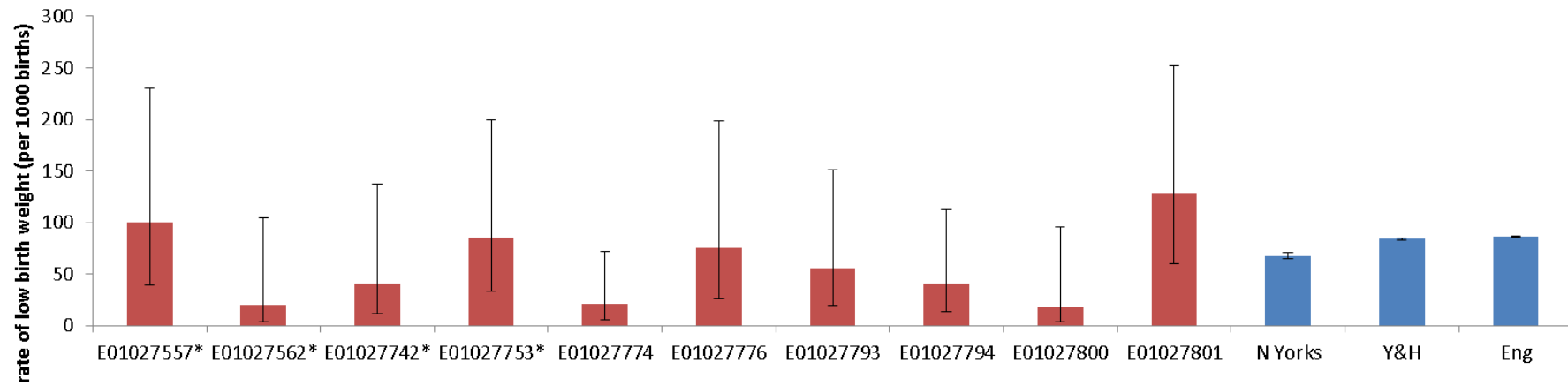
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Birth weight

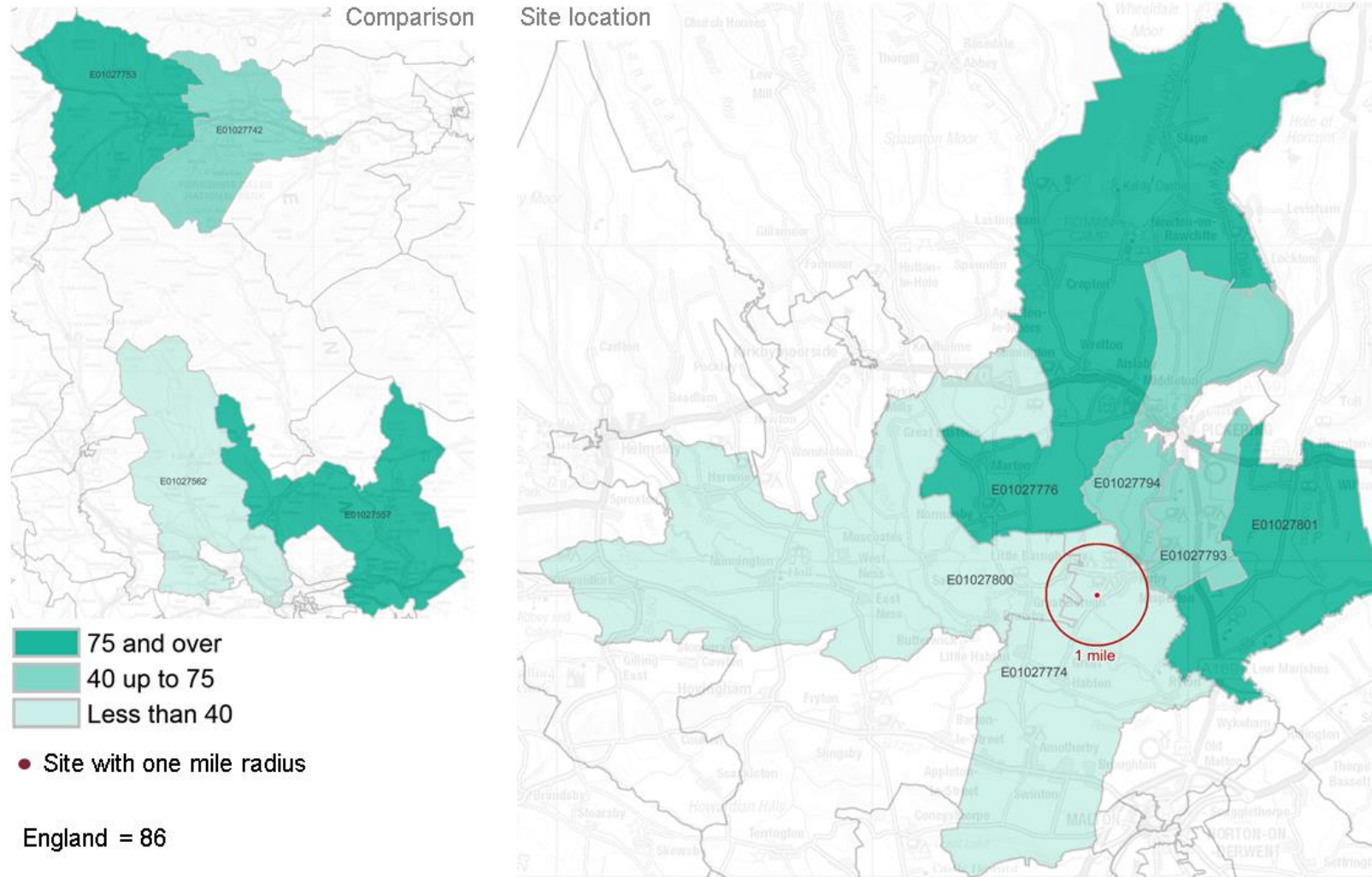
Figure 13: Rate of low birth weight (rate per 1000 births), 2011 to 2015



All bars shown with confidence intervals for the data; *indicates comparison LSOA area

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Figure 14: Map of low birth weight rate by LSOA (DSR per 1000 births) 2011 to 2015

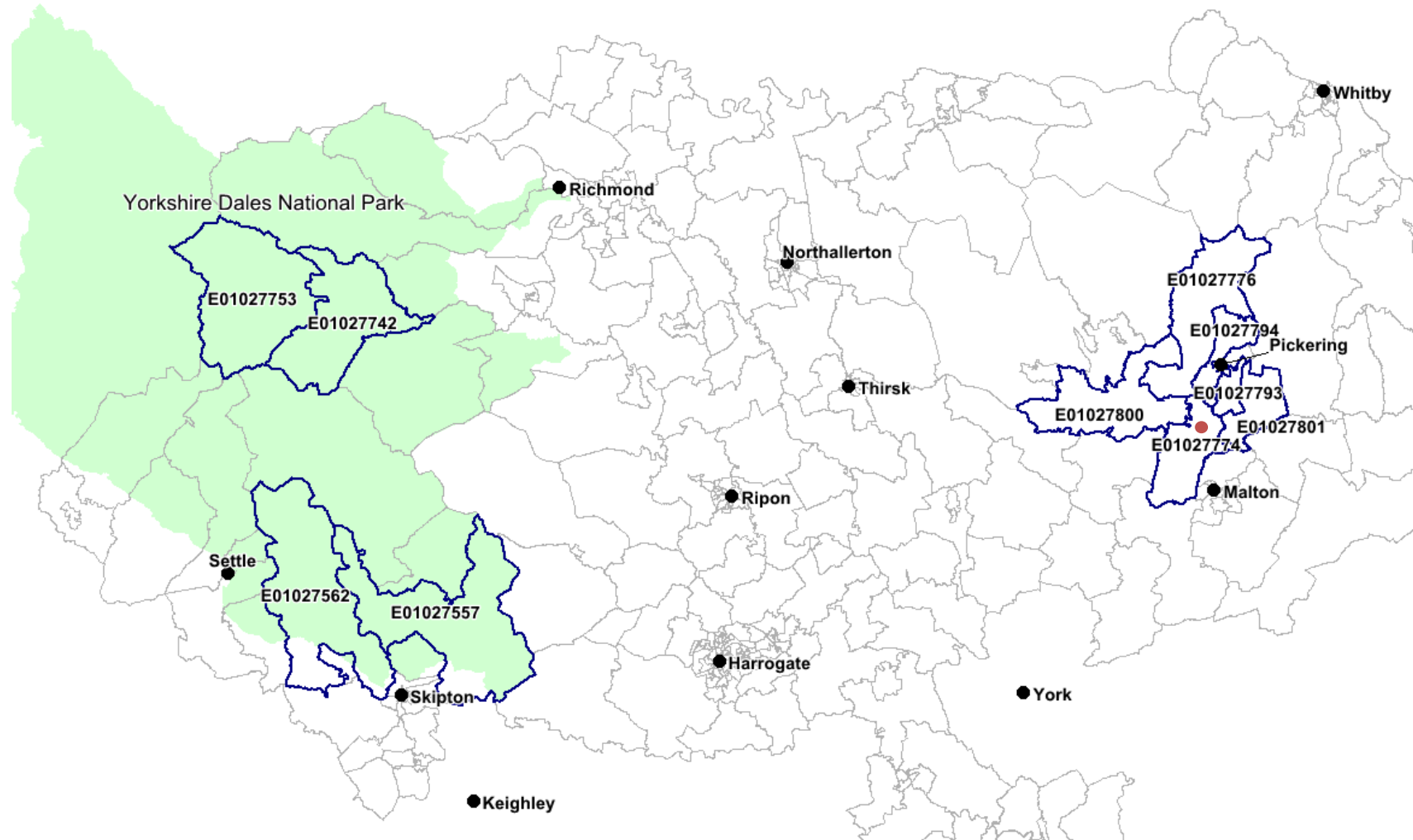


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Appendix 1: location of LSOA areas around the Kirby Misperton site and comparison LSOA areas



Appendix 2: Other terms used and definitions

DSR (Direct Standardised Rate): this is a rate that is calculated to allow data for different areas to be compared. It would not be appropriate to compare death rates for cardiovascular disease, for example, for two areas – one with a high proportion of very elderly residents and one with a high proportion of young families and children. Using a DSR adjusts for any differences that would otherwise be expected due to the age structure of a population.

Rate of low birth weight: All births (live and still births) with a recorded birth weight under 2500g as a percentage of all live births with stated birth weight.

Admission rate for Cancer: All hospital admissions with a primary cause of cancer (DSR per 100,000 population)

Admission rate for Respiratory disease: All admissions with a primary cause of respiratory disease including admissions for asthma and chronic obstructive airways disease (DSR per 100,000 population).

Admission rate for Cardiovascular disease: All admissions with a primary cause of cardiovascular disease including admissions for heart attacks and strokes (DSR per 100,000 population).

Death rate for Cancer: All deaths with an underlying cause for cancer (DSR per 100,000 population)

Death rate for Respiratory disease: All deaths with an underlying cause for respiratory disease including deaths from asthma and chronic obstructive airways disease (DSR per 100,000 population)

Death rate for Cardiovascular disease: All deaths with an underlying cause for cardiovascular disease including deaths from heart attacks and strokes (DSR per 100,000 population).