

# Chapter 20

## Prostate

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### Summary

- In the UK and Ireland in the 1990s, prostate cancer accounted for 1 in 6 cancer cases and 1 in 9 cancer deaths in males.
- There was a band of slightly lower than average incidence across Northern Ireland and northern England, and a band of slightly higher than average incidence across the south of Ireland, Wales, London and southern England.
- A similar pattern was observed for mortality, although there was less variation than for incidence.
- Geographical variations in incidence may, to some extent, be explained by regional differences in the availability and uptake of prostate-specific antigen (PSA) testing.
- Specific causal factors for prostate cancer have not been identified; the higher incidence in London and the south of England suggests an association with affluence, although whether affluence is a marker of an as yet unidentified risk factor is not clear.

### Incidence and mortality

In males in the UK and Ireland, prostate cancer accounted for 17 per cent of all cancer cases and 12 per cent of all cancer deaths in the 1990s. This made prostate cancer the second commonest malignancy in males (after lung cancer), in terms of both incidence and mortality. In the 1990s the average number of prostate cancer cases per year in the UK and Ireland was 22,500, and the annual number of deaths was about 10,000. The corresponding age-standardised incidence and mortality rates were 65 and 29 per 100,000, respectively. Prostate cancer is typically a disease of old age and incidence in men aged 85 and over was around 1,000 per 100,000 (one per cent).

### Incidence and mortality trends

The age-standardised incidence of prostate cancer has doubled in the last three decades in the UK.<sup>1</sup> Similar increases were seen in other populations.<sup>2-4</sup> The recent trends are thought to be influenced mainly by changes in medical practice; a reduction

in the number of cases found incidentally with transurethral resection for benign prostatic hyperplasia or urinary obstruction (leading to a decrease in recorded prostate cancer incidence) has been far outweighed by increasing use of PSA testing in the 1990s (leading to an increasing recorded incidence of localised prostate cancer).<sup>5-9</sup> The age-standardised mortality rates have been much more stable over time.<sup>10,11</sup>

### Survival

In comparison with most other cancers, survival from prostate cancer is relatively high, with five-year relative survival of 65 per cent for patients diagnosed in England and Wales in 1996-99. One-year relative survival was very high at 87 per cent.<sup>12</sup> Survival rates were similar for patients diagnosed in the 1990s in Ireland,<sup>13</sup> Northern Ireland<sup>14</sup> and Scotland.<sup>15</sup> The estimated survival rates are highly sensitive to the inclusion of cases of localised cancer, detected by PSA testing. These cases tend to have a good prognosis, which has the effect of increasing the survival estimates. Using 'period' analysis, which accommodates recent changes in survival, the ten-year relative survival of prostate cancer patients in South East England has been estimated to have increased from 40 to 62 per cent from 1995 to 2000.<sup>16</sup>

### Geographical patterns in incidence

There was remarkably little variation in prostate cancer incidence within the UK and Ireland (Map 20.1), although any real variations in incidence are likely to have been masked by the consequences of different rates of PSA testing.

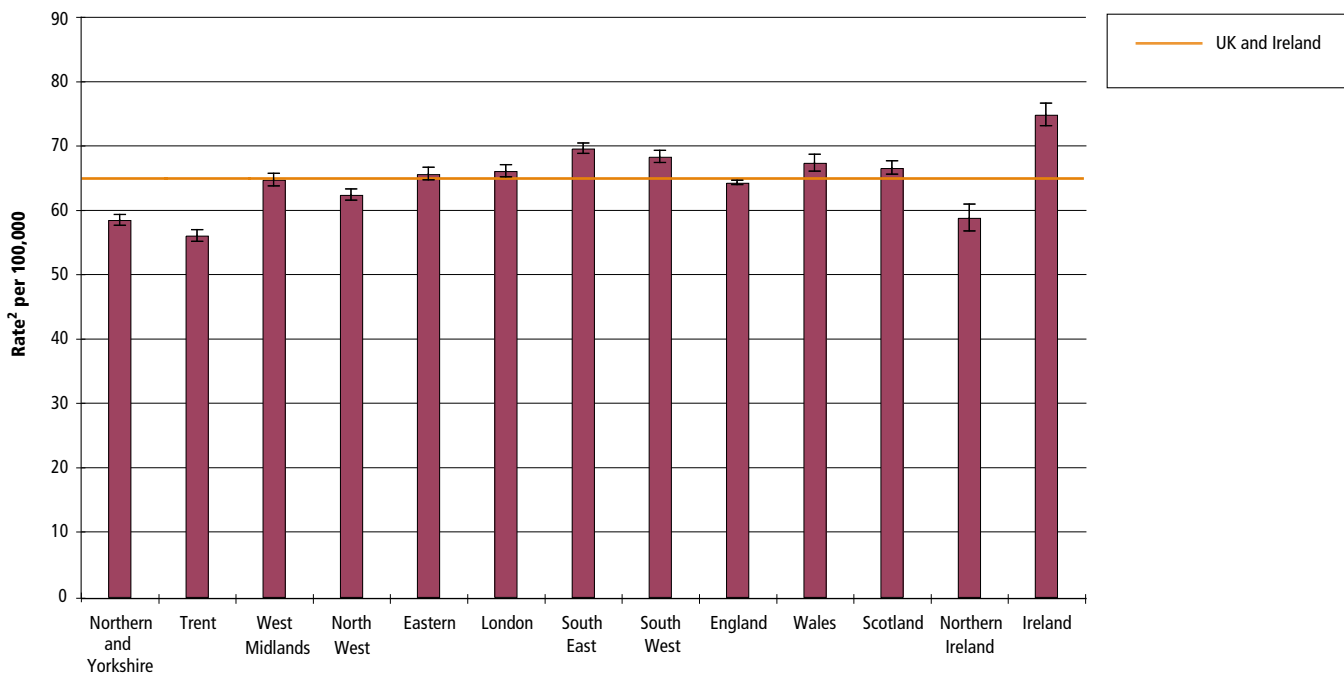
Table B20.1 shows that the range of age-standardised incidence rates varied from 56 per 100,000 in Trent to 75 per 100,000 in Ireland, a difference of 34 per cent. As well as in Trent, incidence was below the UK and Ireland average in Northern and Yorkshire; Northern Ireland; and the North West. Incidence was above average in the South East, South West, Wales, Scotland and London, in addition to Ireland. Despite these apparent variations 9 of the 13 countries and regions had an incidence rate within the interval 60 to 70 per 100,000 (Figure 20.1).

Considering the variations between health authority areas within countries and regions (Figure 20.3 and Map 20.1), two outliers with relatively high values are evident: Southampton and South West Hampshire; and Dorset – on the south coast of England. Three areas had relatively low rates: Sheffield; and Rotherham in the Trent region, and Gateshead and South Tyneside in the north east of England. It is perhaps noteworthy that the two areas with high incidence are adjacent, as are the two areas in Trent with low incidence.

(continued on page 216)

Figure 20.1

Prostate: incidence by country, and region of England  
UK and Ireland 1991-99<sup>1</sup>

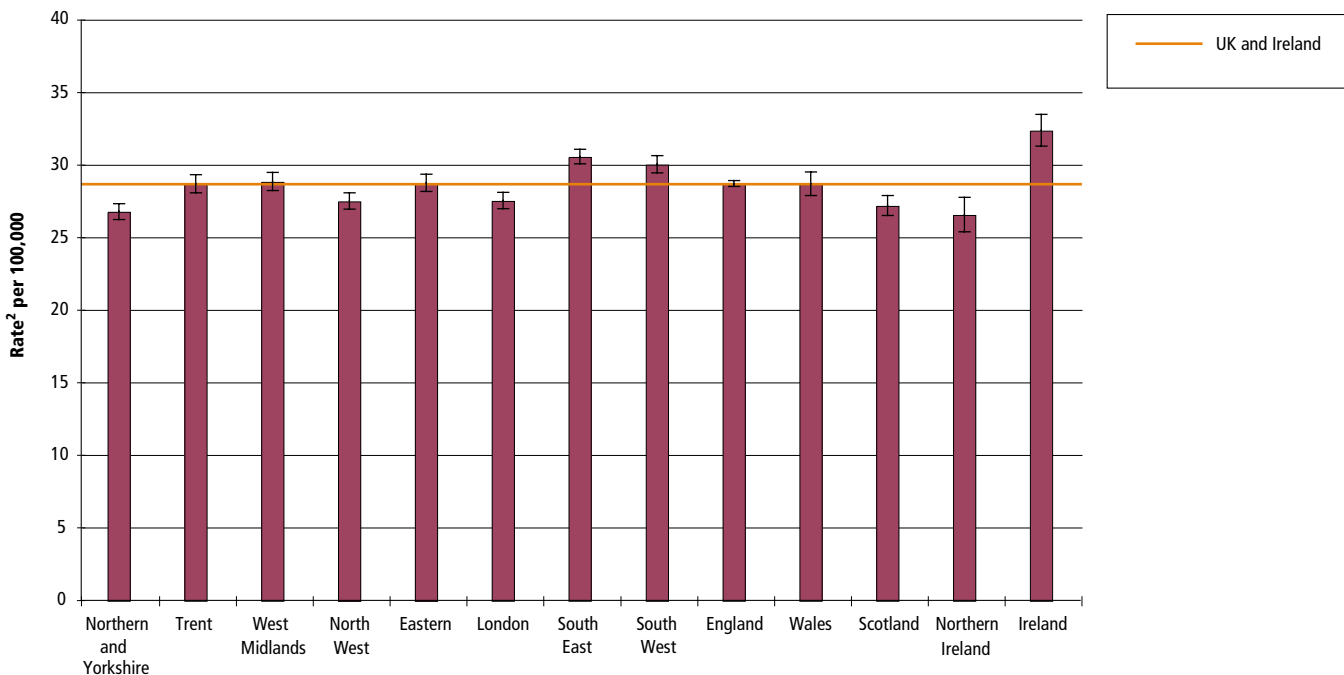


1 Northern Ireland 1993-99, Ireland 1994-99

2 Age standardised using the European standard population, with 95% confidence interval

Figure 20.2

Prostate: mortality by country, and region of England  
UK and Ireland 1991-2000<sup>1</sup>

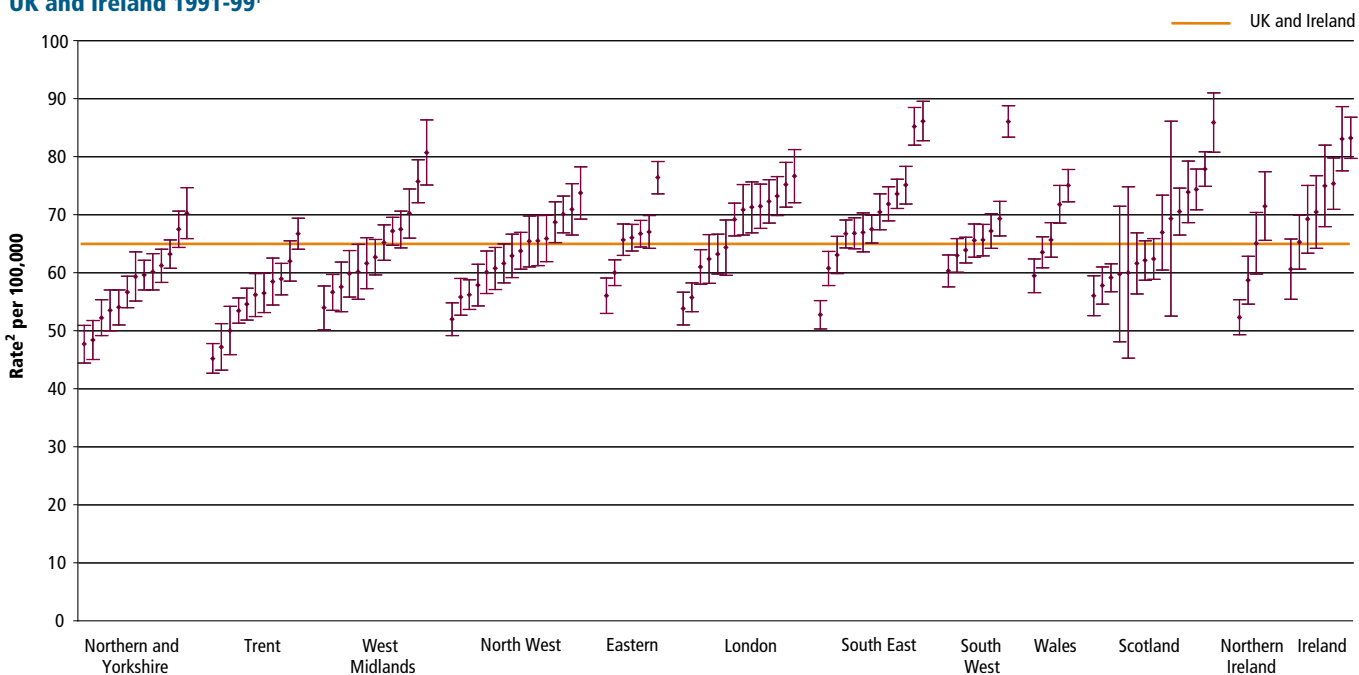


1 Scotland 1991-99, Ireland 1994-2000

2 Age standardised using the European standard population, with 95% confidence interval

Figure 20.3

Prostate: incidence by health authority within country, and region of England UK and Ireland 1991-99<sup>1</sup>

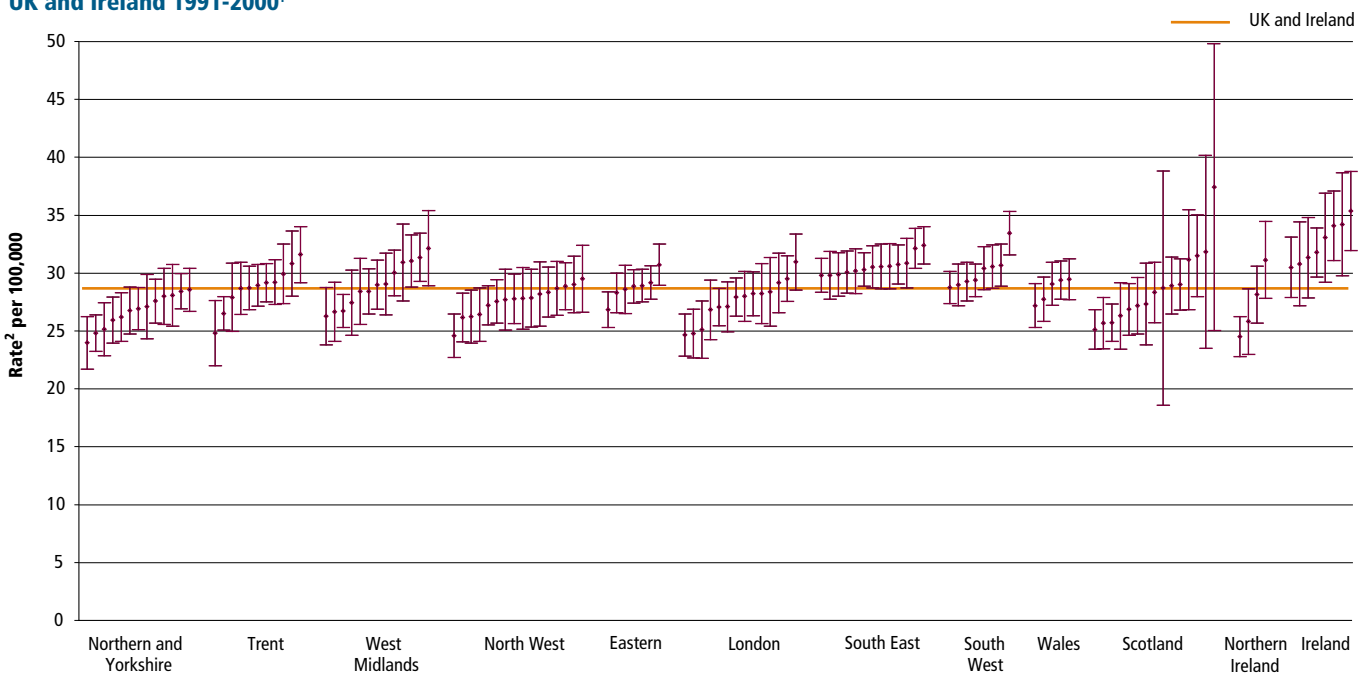


1 Northern Ireland 1993-99, Ireland 1994-99

2 Age standardised using the European standard population, with 95% confidence interval

Figure 20.4

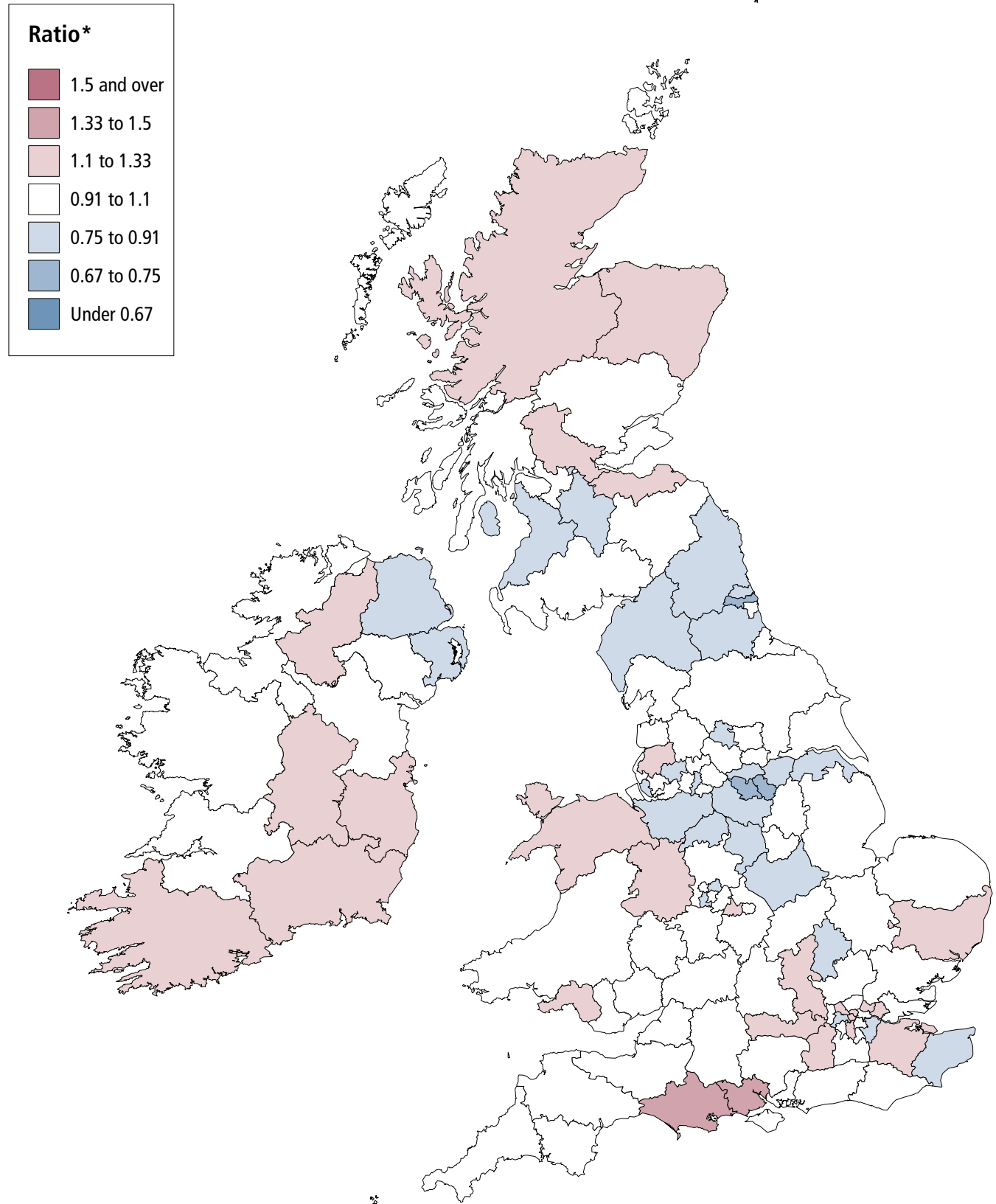
Prostate: mortality by health authority within country, and region of England UK and Ireland 1991-2000<sup>1</sup>



1 Scotland 1991-99, Ireland 1994-2000

2 Age standardised using the European standard population, with 95% confidence interval

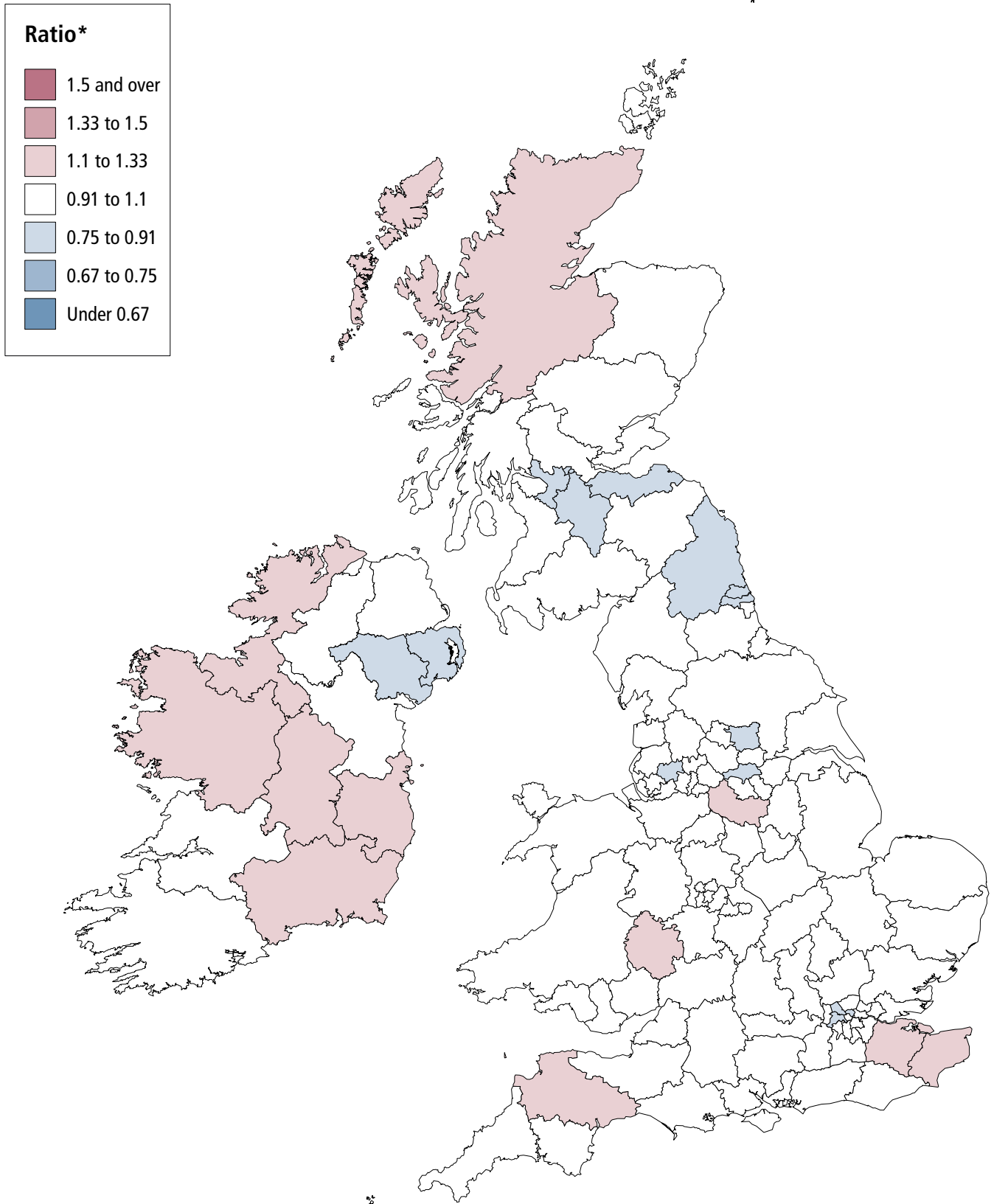
## Map 20.1

Prostate: incidence\* by health authority  
UK and Ireland 1991-99

\*Ratio of directly age-standardised rate in health authority to UK and Ireland average

## Map 20.2

### Prostate: mortality\* by health authority UK and Ireland 1991-2000



\*Ratio of directly age-standardised rate in health authority to UK and Ireland average

However, a detailed analysis of the geographical epidemiology of prostate cancer in Great Britain did not find any evidence of clustering at the level of 10,510 electoral wards.<sup>17</sup>

Considered overall, there is a weak geographical pattern across the UK and Ireland in prostate cancer incidence of slightly lower incidence in the central area comprising Northern Ireland, the north of the Northern and Yorkshire region, and a band stretching across England from South Cheshire in the North West to South Humber in the Trent region. In particular, rates were lower than average in 10 out of 13 health authorities in Northern and Yorkshire, and in 9 of 11 health authorities in Trent. An analysis of the spread of the practice of radical prostatectomy in England, secondary to the use of testing for PSA, found that the slowest uptake of this practice was in the Trent region.<sup>18</sup>

Areas of higher than average incidence were more scattered, with clusters in the south east of Ireland, the north of Scotland, and London and South East England. The particularly high rates in two health authorities on the south coast of England are likely to be related to the high proportions of elderly people living in these areas.

Internationally, prostate cancer incidence is highest in North America, Europe and Australia. Ireland and the UK have intermediate levels of incidence within the European range.<sup>19</sup>

### Geographical patterns in mortality

The variation in prostate cancer mortality in the UK and Ireland was similar to the variation in incidence, with slightly lower mortality rates in the central area comprising Northern Ireland, the far north east and the north west of England, and higher rates in Ireland (Map 20.2).

The range of variation between countries and regions was smaller for mortality than for incidence (22 per cent higher in Ireland than in Northern Ireland). Mortality was slightly below average in Northern and Yorkshire; Scotland; the North West; and London, in addition to Northern Ireland, and slightly above average in the South East and South West of England, as well as in Ireland. The ranked values in Table B20.1, and the map of mortality rates (Map 20.2) do not reveal any particular outliers or clusters. This pattern of less variation in mortality than incidence is observed across countries (Figure 20.2) as well as within countries (Figure 20.4), emphasising the likely role of PSA testing in detecting many asymptomatic cancers where it is widely used.<sup>20</sup>

The mortality-to-incidence ratio for prostate cancer was particularly high in Trent: 0.51 compared to 0.44 for the UK and Ireland overall (Table B20.1), which suggests lower uptake of PSA testing, some under-ascertainment of incident cases, or

lower survival of cases in the Trent region. A national analysis of cancer survival did not suggest particularly low survival rates in Trent.<sup>21</sup>

### Risk factors and aetiology

The aetiology of prostate cancer is not well known. Despite evidence of important variations in incidence from international comparisons and studies of migrants, specific causal factors (such as environmental, life-style, diet, and occupation) have not been identified conclusively. An area of current research is diet and obesity.<sup>22,23</sup> In the past, many studies have explored reproductive characteristics and sexual habits, including frequency of intercourse and masturbation, but with inconsistent results.<sup>24</sup>

It is clear that black men have higher incidence than white men. In the SEER Program of the United States National Cancer Institute, the age-standardised incidence in black men is about 70 per cent higher than in white men.<sup>19</sup> In the UK, the largest concentrations of black people are in London and particularly in Lambeth, Southwark and Lewisham (19 per cent); and East London and the City (14 per cent). Neither these areas, nor London as a whole, appear to have particularly high incidence rates of prostate cancer (Map 20.2).

Consistent with the relatively high incidence in Ireland observed in this study, a study of Irish migrants found increased incidence in Irish men living in the UK.<sup>25</sup>

The main difficulty with aetiological research in prostate cancer is the heterogeneity of the disease, ranging from highly prevalent but clinically indolent cancers, to highly aggressive and often fatal disease.<sup>26</sup> Any assessment of incidence or survival will be highly sensitive to the intensity of diagnostic procedures in the community (for example, through testing for PSA) and to temporal and spatial variation in the use of such procedures. The mortality rate is much less influenced by such changes. In research into possible causes of prostate cancer it is imperative that asymptomatic, PSA-detected disease is considered separately from symptomatic disease, as the risk factors could be different. Because of these issues, it may be preferable to use prostate cancer mortality as an endpoint, even in research into possible causes.

### Socio-economic deprivation

In England and Wales in the early 1990s, the incidence of prostate cancer was about 45 per cent higher in the most affluent groups compared with the most deprived; the gradient in prostate cancer mortality was of similar magnitude.<sup>1</sup> Survival was higher in men from affluent areas than in men from deprived areas, and the gap of about 7 percentage points in

five-year relative survival between these two groups was among the largest for the major types of cancer (data for England and Wales, patients diagnosed during 1996-99).<sup>27</sup>

The socio-economic gradient in incidence in the early 1990s is more likely to have been due to genuine variations in the occurrence of disease rather than over-diagnosis in the most affluent group.<sup>1</sup> In the case of over-diagnosis we would have expected less variation in mortality than was observed, and more variation in survival. The rapid increases in the apparent incidence of prostate cancer in the late 1990s (and into the twenty-first century) may have widened the gap in rates between the affluent and the deprived.

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