

Chapter 9

Kidney

Steve Rowan, Robert Haward, David Forman, Caroline Brook

Summary

- Each year in the UK and Ireland, kidney cancer* accounts for around 1 in 55 diagnosed cases of cancer and 1 in 55 deaths from cancer.
- There was a clear north-south divide in incidence – particularly for females – across Great Britain with relatively high rates in Scotland, parts of Wales and in the north of England (females) and low rates in the south east of England (including London) and the midlands (females).
- The geographical pattern of mortality rates was broadly similar to that for incidence.
- There appears to be an association between both incidence and mortality and socio-economic deprivation – more apparent in females – reflected in higher rates in the more urban areas of the north of England and lower rates in the south east.
- Possible risk factors for kidney cancer include smoking and obesity, both of which are associated with deprivation and may explain some of the geographical variation observed.

* In this chapter, data for the UK and Ireland refer to renal cell carcinomas (which make up about 85 per cent of all kidney cancers). However, where reference has been made to trends or survival in England and Wales, the data pertain to all kidney cancers (including cancers of the renal pelvis and ureter, see Table 9.1).

Table 9.1

Cases of and deaths from kidney cancer by sub-site, 1999^{1,2}

Cancer site	ICD10 code	ICD9 code	Percentages			
			Cases (England)		Deaths (England and Wales)	
			Males	Females	Males	Females
Kidney (renal cell carcinoma)	C64	189.0	88.2	87.8	95.9	95.6
Renal pelvis	C65	189.1	5.6	6.2	0.5	0.6
Ureter	C66	189.2	4.3	3.6	2.9	2.7
Other and unspecified urinary organs	C68	189.3–189.9	2.0	2.4	0.7	1.1
Total number of cases/deaths			2,946	1,914	1,696	1,033

Percentages may not add to 100 due to rounding.

Incidence and mortality

In the UK and Ireland in the 1990s, there were about 3,100 newly diagnosed cases of kidney cancer each year in males and about 1,900 cases in females. It accounted for 2.3 per cent of all newly diagnosed cancer cases in males and 1.4 per cent in females. Overall, the age-standardised incidence rates were 9.8 and 4.8 per 100,000 in males and females respectively, a male-to-female ratio of about 2:1. Kidney cancer is predominately a disease of the elderly with the age-specific incidence rates rising steeply, especially in males, from about age 50. For males in England and Wales, the lifetime risk³ of being diagnosed with kidney cancer was 1.1 per cent (1 in 90) in males, compared with 0.6 per cent (1 in 160) in females.⁴

In the 1990s, about 1,800 males and 1,200 females died from kidney cancer in the UK and Ireland each year. Kidney cancer accounted for 2.1 per cent of cancer deaths in males and 1.5 per cent in females. Overall, the age-standardised mortality rates were 5.6 and 2.6 per 100,000 in males and females respectively, a male-to-female ratio of about 2.2:1, slightly higher than that for incidence. The age-specific mortality rates followed a similar pattern to those for incidence, with rates rising steeply, particularly in males, from about age 50.

Incidence and mortality trends

In England and Wales, the age-standardised incidence rates of kidney cancer nearly doubled in both males and females, from 5.8 and 2.9 per 100,000, respectively, in 1971 to 11.1 and 5.1 per 100,000 in 1997. In line with incidence, the age-standardised mortality rates in males and females rose steadily from 3.1 and 1.5 per 100,000, respectively, in 1950 to 5.9 and 2.6 per 100,000 in 1999. The increases in both incidence and mortality were greatest in the older age groups.⁴

Survival

Survival from kidney cancer is modest, although there has been some improvement over time. For patients diagnosed in England and Wales in 1996–99, five-year age-standardised relative survival from kidney cancer was 45 per cent in males and 44 per cent in females. This compares with 41.5 per cent for males and 40 per cent for females diagnosed in 1991–95, an improvement of around 4 percentage points in both sexes.⁵ The European average for five-year survival from kidney cancer was slightly higher, being around 54 per cent for men and 57 per cent for women diagnosed in the early 1990s.⁶ In England and Wales, survival from kidney cancer has improved markedly since the early 1970s, when it was around 30 per cent for both sexes.⁷

Geographical patterns in incidence

For the constituent countries of the UK and Ireland, the age-standardised incidence rates of kidney cancer were above the UK and Ireland average in Scotland and Wales in both sexes, and in Northern Ireland in females only (Figure 9.1, Table B9.1). Rates were close to the average for males in Northern Ireland. Within England, incidence rates for males were noticeably lower than average in both sexes in the Eastern and London regions (Figure 9.1). Within each country, or region of England, the differences in the incidence rates between the highest and lowest health authorities were generally 30–50 per cent in males and 30–90 per cent in females (Figure 9.3).

The maps for incidence (Map 9.1) show the higher than average rates in Scotland and parts of Wales for both males and females and the lower rates in parts of the Eastern and London regions of England. There were also high rates in the more urban areas of the North West, Northern and Yorkshire, and Trent regions, particularly in females, suggesting a north-south divide in incidence.

Geographical patterns in mortality

Age-standardised mortality rates for kidney cancer were markedly higher than average only in Scotland, and were close to average for both males and females in the other four countries. Within England, the pattern of mortality rates by region was broadly similar to that for incidence, being below average in the Eastern and London regions in both males and females (Figure 9.2). Within each country, or region of England, the variability in mortality rates between the highest and lowest health authorities was broadly similar to that for incidence, with differences generally of 20–50 per cent in males and 30–60 per cent in females (Figure 9.4).

The maps for mortality (Map 9.2) show generally similar patterns to those for incidence. There were high mortality rates in some, but not all parts of Scotland for both males and females, as well as in the more urban areas of the North West, Northern and Yorkshire, and Trent regions, especially for females. Rates were low in the south of Ireland, parts of London, and the Eastern region. For females, rates were also low in parts of the South East and West Midlands regions, as well as in southern Scotland. The north-south divide seen on the maps appears to be more marked than for incidence.

Risk factors and aetiology

About 85 per cent of kidney cancers are renal cell carcinomas, with most of the remaining cases being transitional cell carcinomas of the renal pelvis and ureter. Renal cell carcinomas have a tendency to spread to other parts of the body via the blood stream rather than the lymph nodes, giving rise to metastases, particularly in the lungs.

For cancer of the renal pelvis and ureter, studies have found that cigarette smoking is a major risk factor,^{8–10} although for renal cell carcinoma, the association with smoking is weaker.^{10–14} The use of phenacetin-containing analgesics is a major risk factor for cancer of the renal pelvis and ureter,¹⁵ but there are no current UK Marketing Authorisations (product licenses) for any products containing phenacetin as an active substance.

There is evidence of increased risk of renal cell carcinoma with excess body weight^{13,16–18} and since the prevalence of obesity is increasing in the UK population, it may have contributed to the increasing incidence.¹⁹ In addition, medications related to the treatment of hypertension or the severity of hypertension itself are also possible risk factors.²⁰

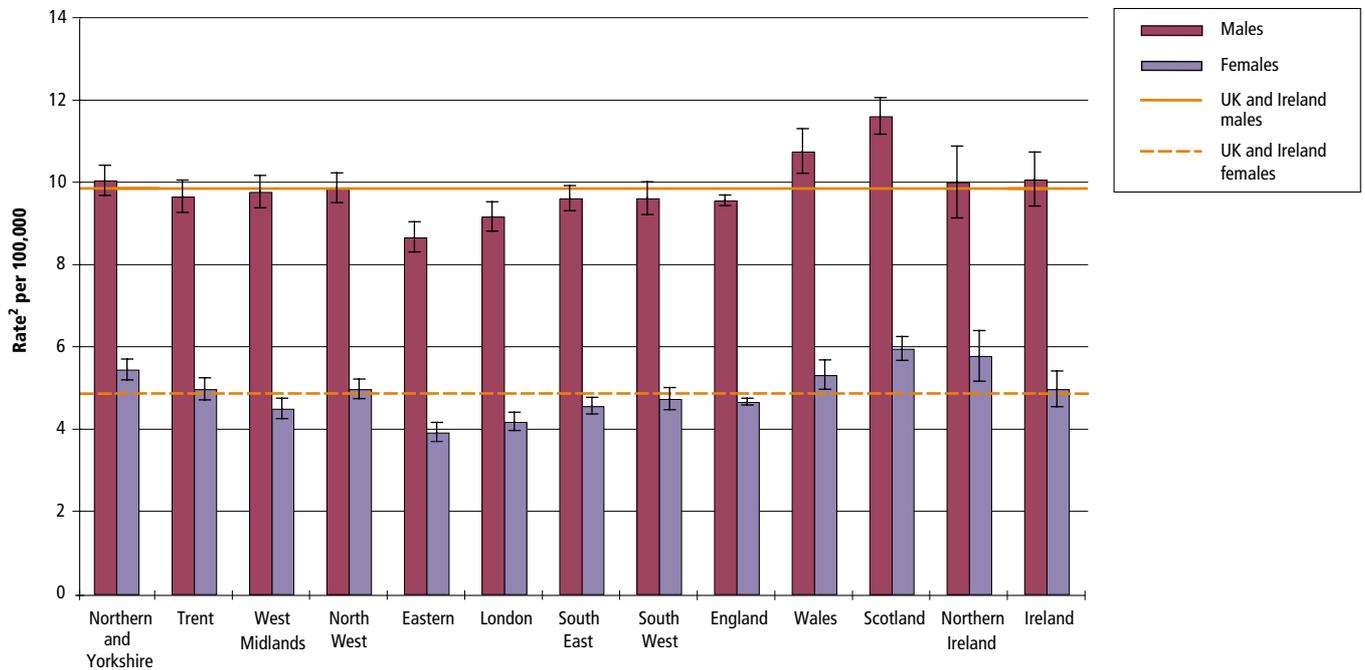
For patients who undergo renal dialysis, there is increased incidence of acquired cystic disease of the kidney, which predisposes to kidney cancer, particularly in males.²¹ While inherited factors such as von Hippel-Lindau Syndrome²² are very rare, these patients develop multiple types of cancer and are thus at greater risk of developing kidney cancer.

Although the main treatment is surgery, kidney cancer responds to biological treatments, the main ones being interleukin-2 and interferon. Kidney cancer is, however, not very responsive to chemotherapy or radiotherapy.

(continued on page 110)

Figure 9.1

Kidney: incidence by sex, country, and region of England
UK and Ireland 1991-99¹

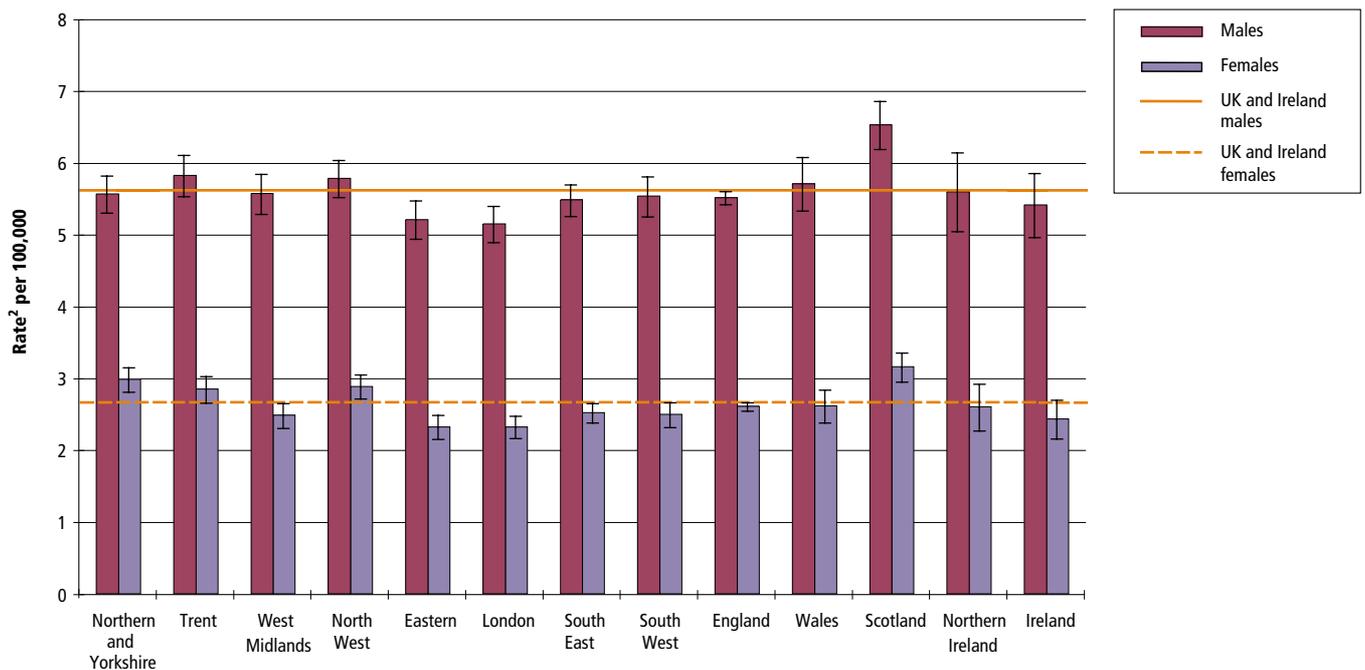


1 Northern Ireland 1993-99, Ireland 1994-99

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

Figure 9.2

Kidney: mortality by sex, country, and region of England
UK and Ireland 1991-2000¹

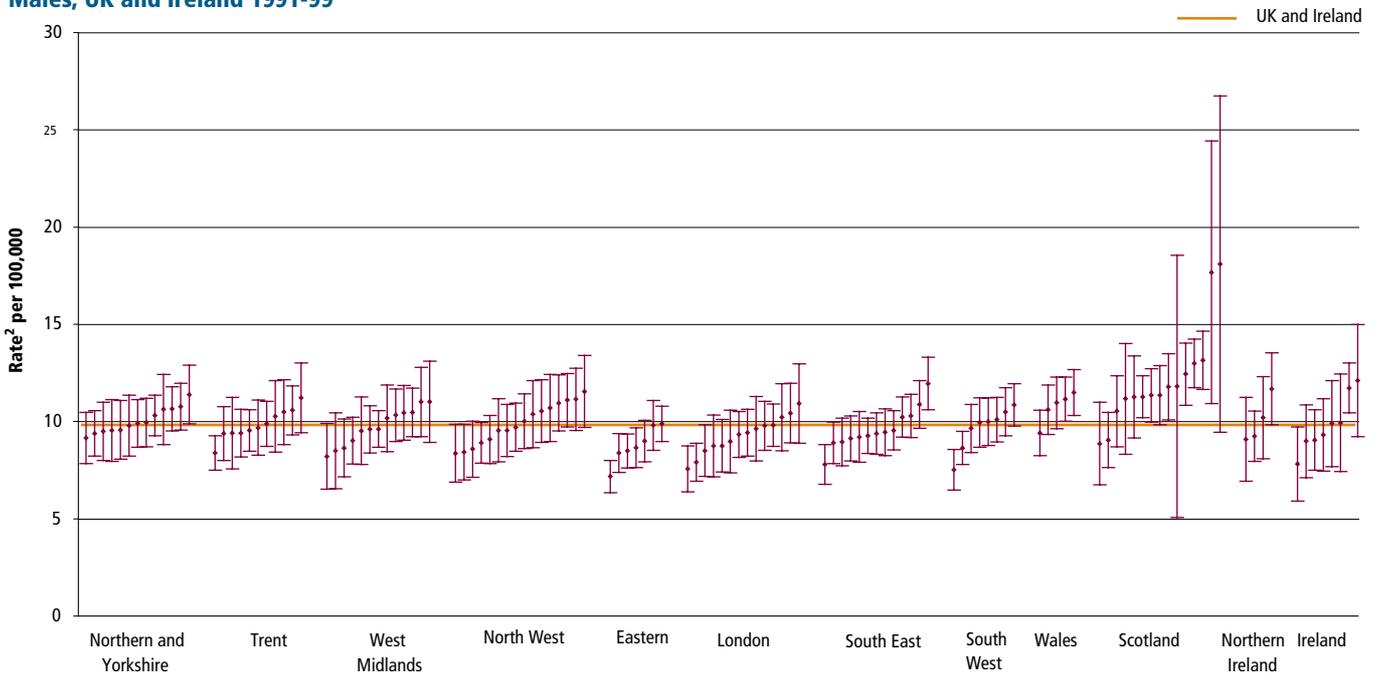


1 Scotland 1991-1999, Ireland 1994-2000

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

Figure 9.3a

Kidney: incidence by health authority within country, and region of England
Males, UK and Ireland 1991-99¹

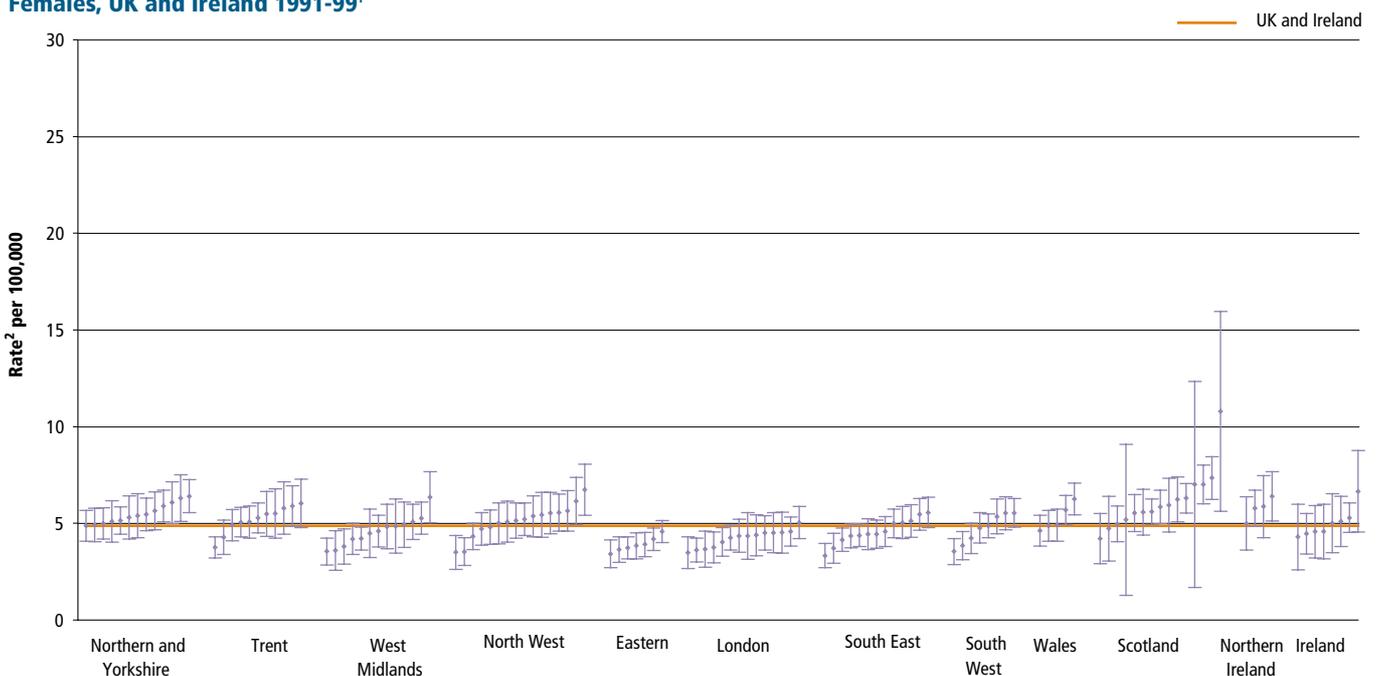


1 Northern Ireland 1993-99, Ireland 1994-99

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

Figure 9.3b

Kidney: incidence by health authority within country, and region of England
Females, UK and Ireland 1991-99¹

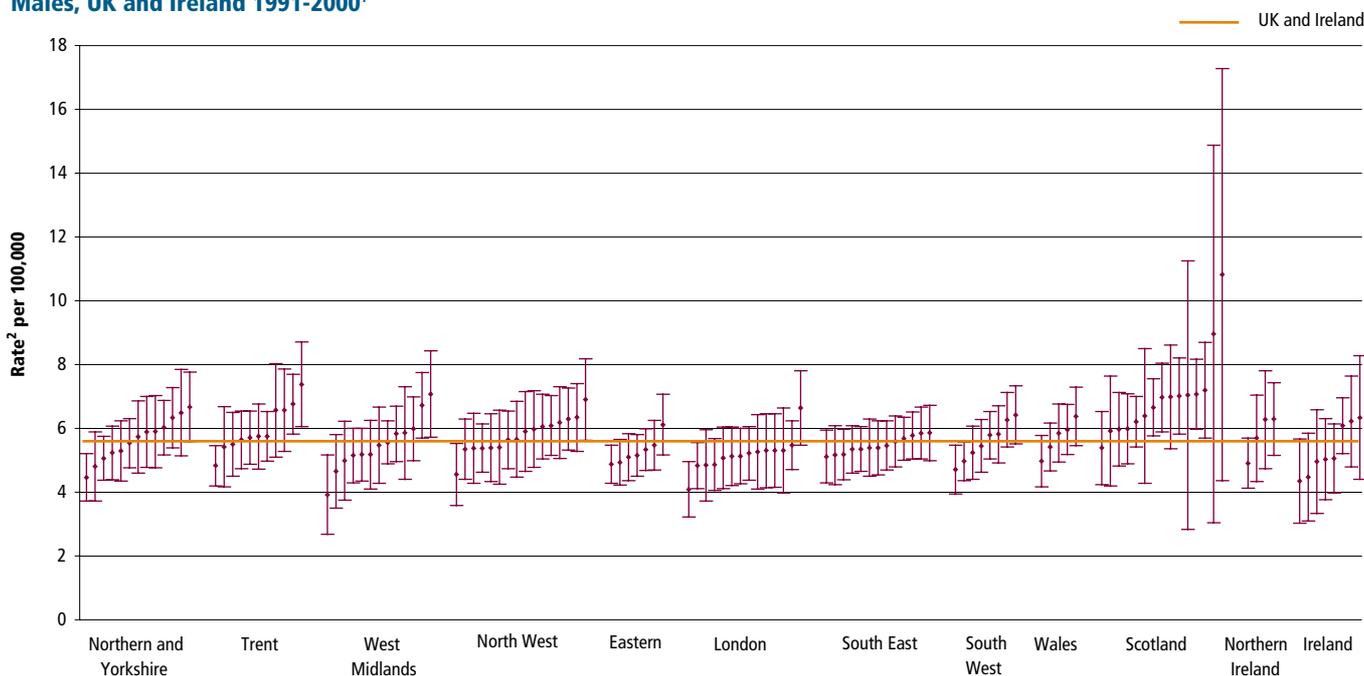


1 Northern Ireland 1993-99, Ireland 1994-99

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

Figure 9.4a

Kidney: mortality by health authority within country, and region of England
Males, UK and Ireland 1991-2000¹

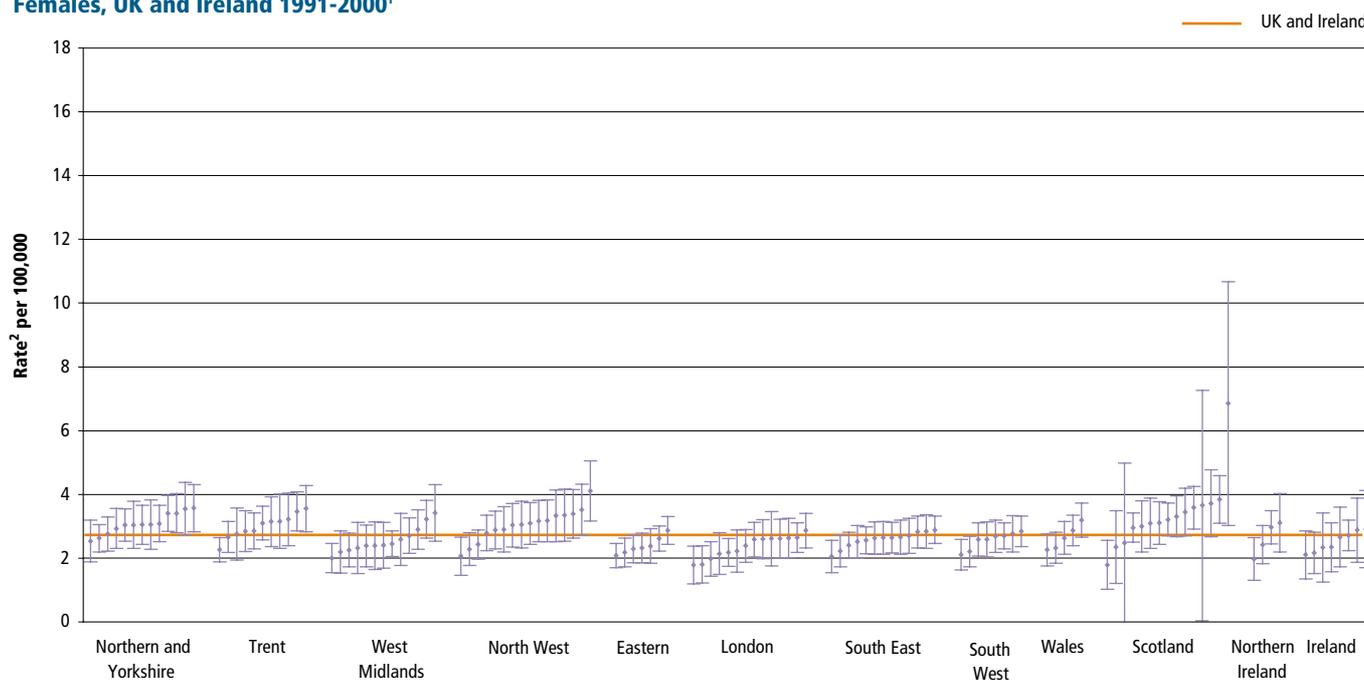


1 Scotland 1991-1999, Ireland 1994-2000

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

Figure 9.4b

Kidney: mortality by health authority within country, and region of England
Females, UK and Ireland 1991-2000¹

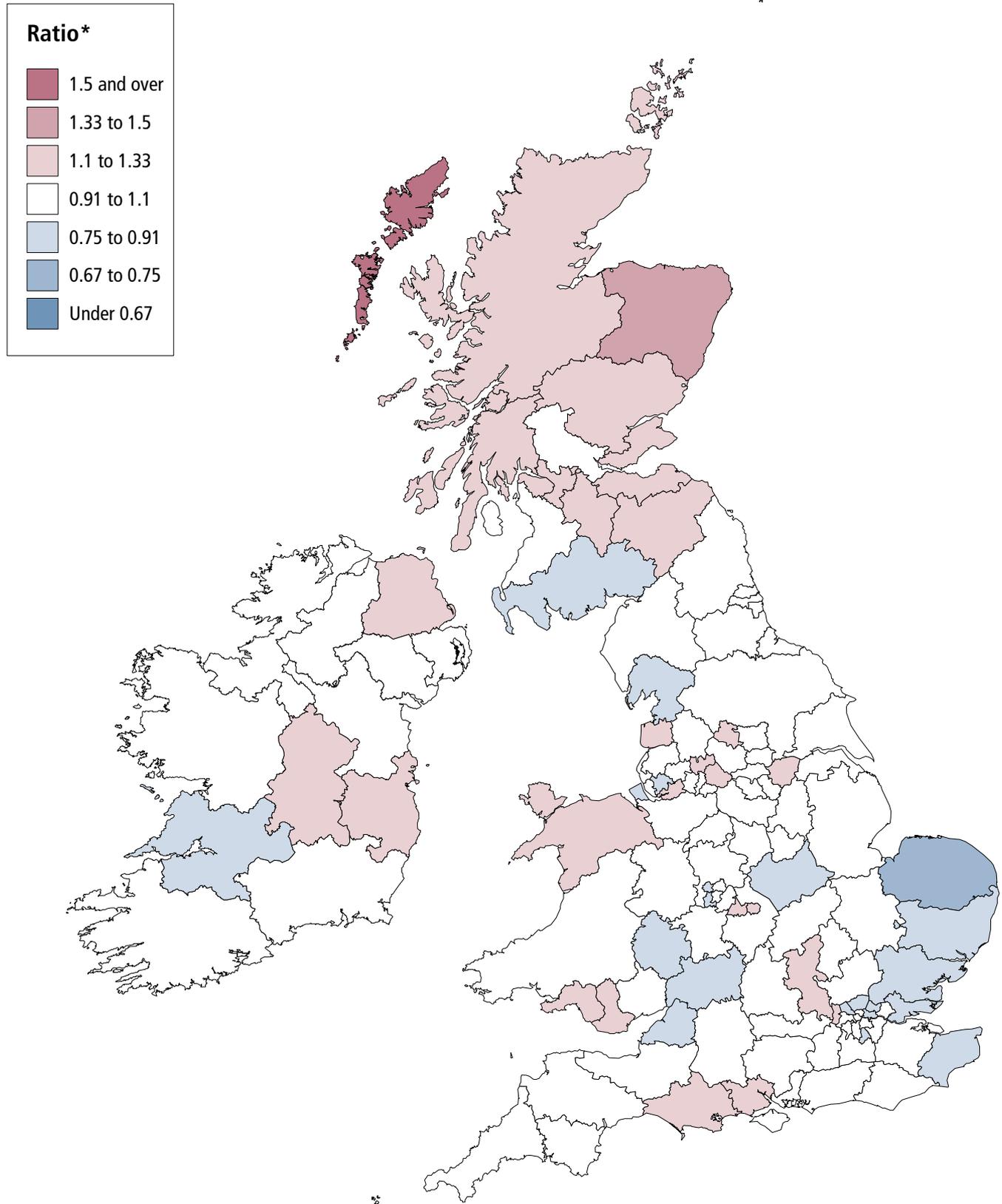


1 Scotland 1991-99, Ireland 1994-2000

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

Map 9.1a

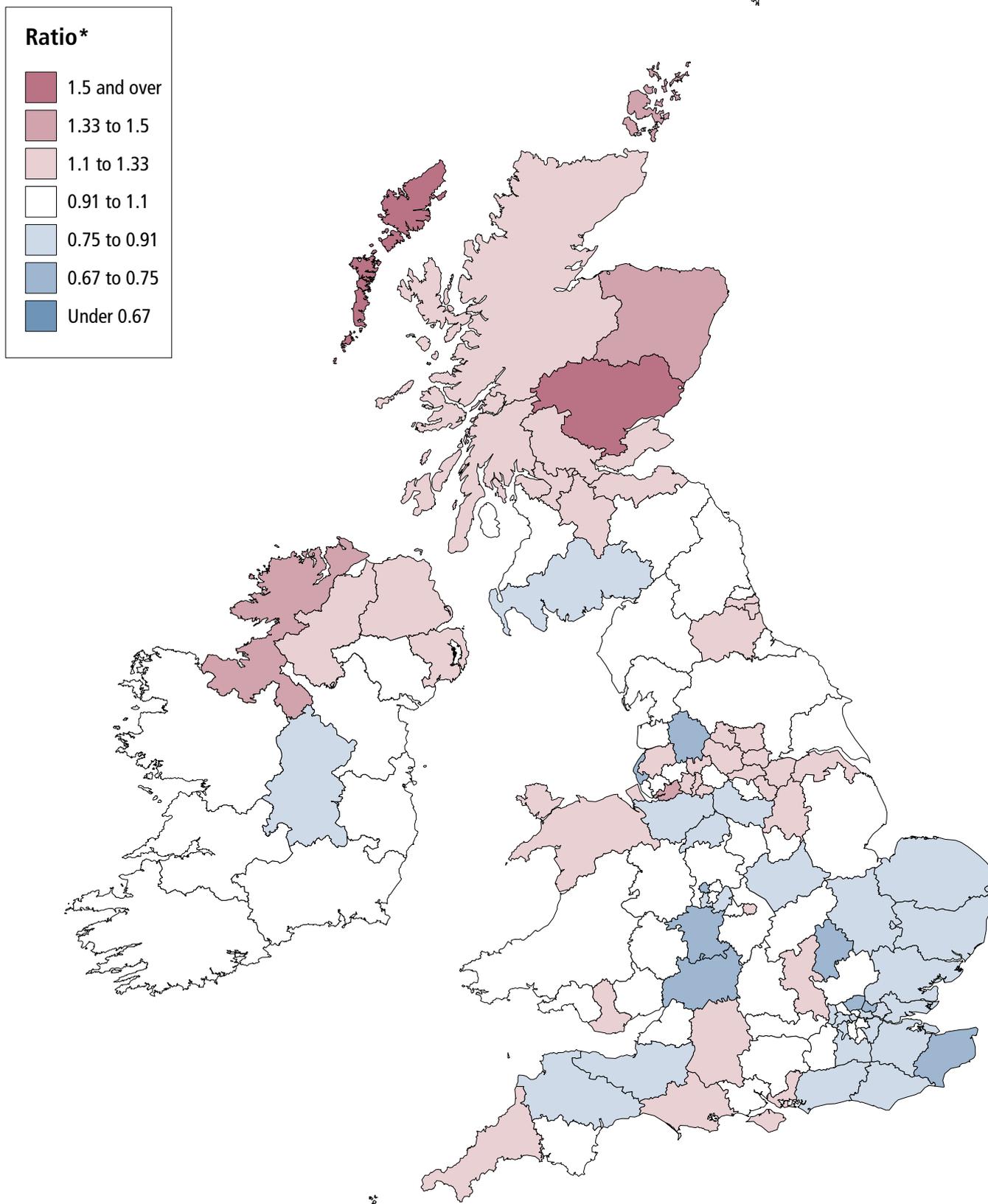
Kidney: incidence* by health authority
Males, UK and Ireland 1991-99



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

Map 9.1b

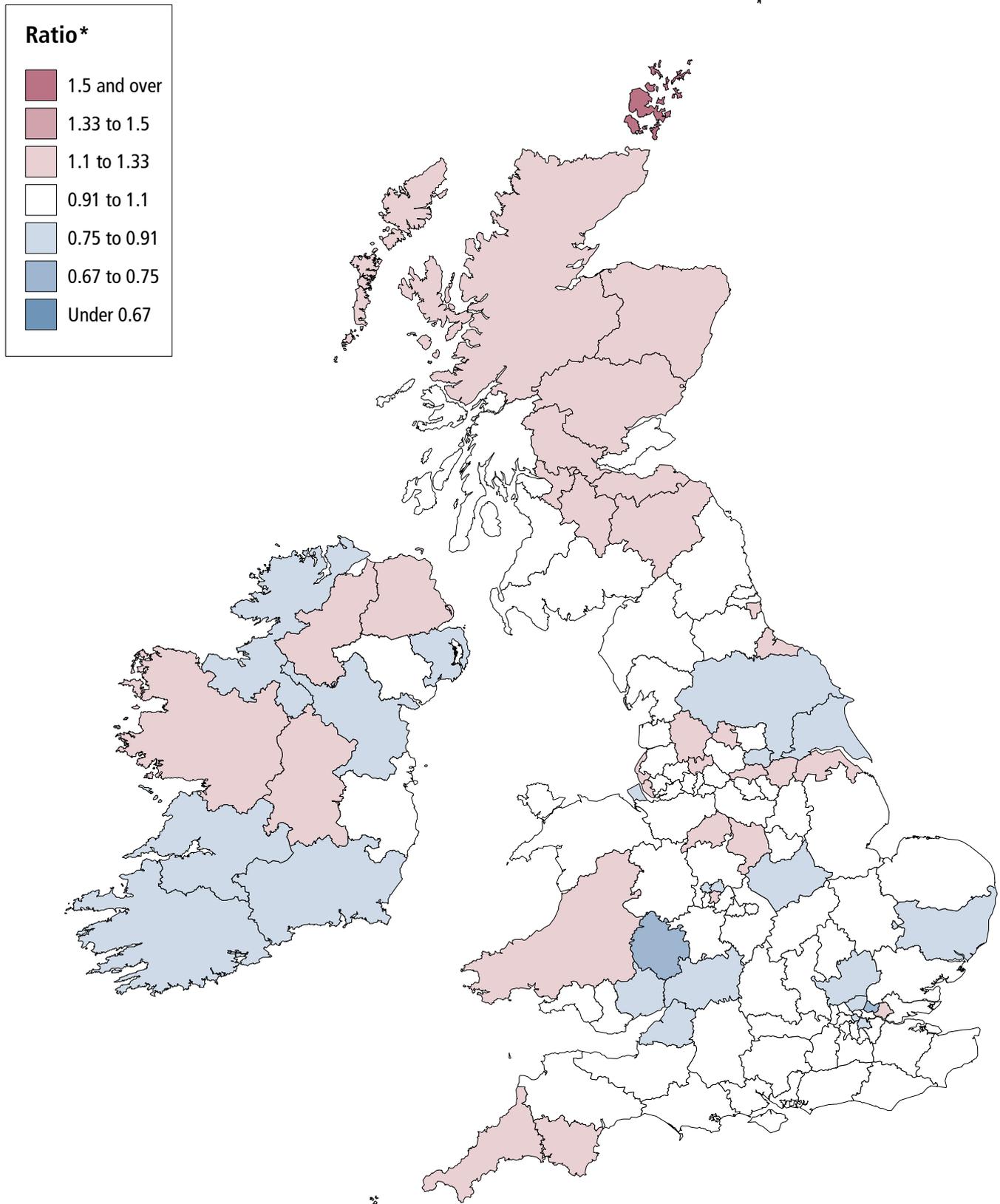
Kidney: incidence* by health authority
Females, UK and Ireland 1991-99



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

Map 9.2a

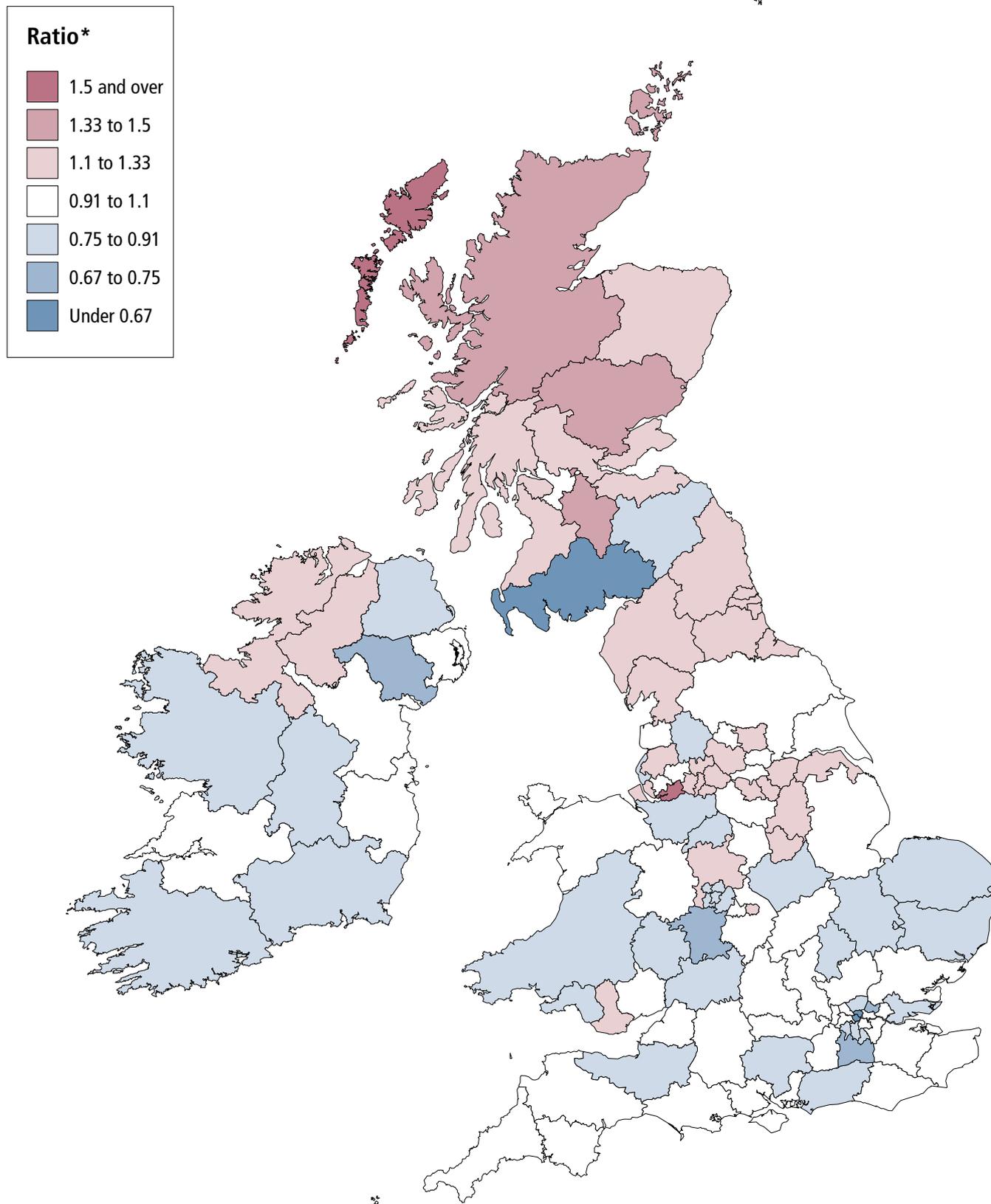
Kidney: mortality* by health authority
Males, UK and Ireland 1991-2000



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

Map 9.2b

Kidney: mortality* by health authority
Females, UK and Ireland 1991-2000



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

Socio-economic deprivation

For males diagnosed with kidney cancer in 1990–93 in England and Wales, there was no apparent gradient in incidence across categories of socio-economic deprivation, measured using the Carstairs index,²³ whereas for females, incidence was slightly higher among people living in more deprived areas than among those living in more affluent areas. The pattern for mortality was similar to that for incidence.⁴ Comparing the maps for incidence (Map 9.1) with that illustrating deprivation using the Carstairs index (see Appendix F), there appears to be some association between deprivation and kidney cancer in males, but the deprivation gap is again more apparent in females, particularly in the more deprived areas of the North West, Northern and Yorkshire, and Trent regions of England. In Scotland, rates were high across the majority of the country for both males and females.

Despite increases in survival from kidney cancer in England and Wales in the 1990s, there was a significant deprivation gap for males diagnosed in 1996–99, with a difference in five-year survival of 6 percentage points between patients from the most deprived and the most affluent areas. There was, however, no deprivation gap for females diagnosed in the same period.²⁴

The maps for mortality (Map 9.2) show higher rates in parts of the constituent countries which are known to have higher levels of socio-economic deprivation (see Appendix F), but as with the incidence maps – and in contrast to the results for survival – the relationship with deprivation is more apparent for females than males.

References

1. ONS. *Cancer Statistics Registrations: Registrations of cancer diagnosed in 1999, England*. Series MB1 No. 30. London: Office for National Statistics, 2002.
2. ONS. *Mortality Statistics 1999: Cause*. Series DH2 No. 26. London: The Stationery Office, 2000.
3. Schouten LJ, Straatman H, Kiemeny LALM, Verbeek ALM. Cancer incidence: Life table risk versus cumulative risk. *Journal of Epidemiology and Community Health* 1994; 48: 596–600.
4. Quinn MJ, Babb PJ, Brock A, Kirby L et al. *Cancer Trends in England and Wales 1950–1999*. Studies on Medical and Population Subjects No. 66. London: The Stationery Office, 2001.
5. ONS. *Cancer Survival: England and Wales, 1991–2001*. March 2004. Available at <http://www.statistics.gov.uk/statbasesdataset.asp?vlnk=7899>.
6. Sant M, Areleid T, Berrino F, Bielska Lasota M et al. EURO-CARE-3: survival of cancer patients diagnosed 1990–1994 – results and commentary. *Annals of Oncology* 2003; 14 Suppl 5: v61–v118.
7. Coleman MP, Babb P, Damiacki P, Grosclaude P et al. *Cancer Survival Trends in England and Wales, 1971–1995: Deprivation and NHS Region*. Studies on Medical and Population Subjects No. 61. London: The Stationery Office, 1999.
8. McLaughlin JK, Silverman DT, Hsing AW, Ross RK et al. Cigarette smoking and cancers of the renal pelvis and ureter. *Cancer Research* 1992; 52: 254–257.
9. Jensen OM, Knudsen JB, McLaughlin JK, Sorensen BL. The Copenhagen case-control study of renal pelvis and ureter cancer: role of smoking and occupational exposures. *International Journal of Cancer* 1988; 41: 557–561.
10. McCredie M, Stewart JH. Risk factors for kidney cancer in New South Wales. I. Cigarette smoking. *European Journal of Cancer* 1992; 28A: 2050–2054.
11. McLaughlin JK, Mandel JS, Blot WJ, Schuman LM et al. A population-based case-control study of renal cell carcinoma. *Journal of the National Cancer Institute* 1984; 72: 275–284.
12. La Vecchia C, Negri E, D'Avanzo B, Franceschi S. Smoking and renal cell carcinoma. *Cancer Research* 1990; 50: 5231–5233.
13. Kreiger N, Marrett LD, Dodds L, Hilditch S et al. Risk factors for renal cell carcinoma: results of a population-based case-control study. *Cancer Causes and Control* 1993; 4: 101–110.
14. Møllergaard A, Engholm G, McLaughlin JK, Olsen JH. Risk factors for renal cell carcinoma in Denmark. I. Role of socioeconomic status, tobacco use, beverages, and family history. *Cancer Causes and Control* 1994; 5: 105–113.
15. McCredie M, Stewart JH, Day NE. Different roles for phenacetin and paracetamol in cancer of the kidney and renal pelvis. *International Journal of Cancer* 1993; 53: 245–249.
16. Bergstrom A, Pisani P, Tenet V, Wolk A et al. Overweight as an avoidable cause of cancer in Europe. *International Journal of Cancer* 2001; 91: 421–430.
17. Møllergaard A, Engholm G, McLaughlin JK, Olsen JH. Risk factors for renal-cell carcinoma in Denmark. III. Role of weight, physical activity and reproductive factors. *International Journal of Cancer* 1994; 56: 66–71.
18. McCredie M, Stewart JH. Risk factors for kidney cancer in New South Wales, Australia. II. Urologic disease, hypertension, obesity, and hormonal factors. *Cancer Causes and Control* 1992; 3: 323–331.
19. Seidell JC, Flegal KM. Assessing obesity: classification and epidemiology. *British Medical Bulletin* 1997; 53: 238–252.
20. Heath CW, Jr., Lally CA, Calle EE, McLaughlin JK et al. Hypertension, diuretics, and antihypertensive medications as possible risk factors for renal cell cancer. *American Journal of Epidemiology* 1997; 145: 607–613.
21. Ishikawa I. Development of adenocarcinoma and acquired cystic disease of the kidney in hemodialysis patients. *Princess Takamatsu Symposium* 1987; 18: 77–86.
22. Latif F, Tory K, Gnarr J, Yao M et al. Identification of the von Hippel-Lindau disease tumor suppressor gene. *Science* 1993; 260: 1317–1320.
23. Carstairs V, Morris R. Deprivation and mortality: an alternative to social class? *Community Medicine* 1989; 11: 213–219.
24. Coleman MP, Rachet B, Woods LM, Mitry E et al. Trends and socio-economic inequalities in cancer survival in England and Wales up to 2001. *British Journal of Cancer* 2004; 90: 1367–1373.