# 10 Bladder cancer

## 10.1 Summary

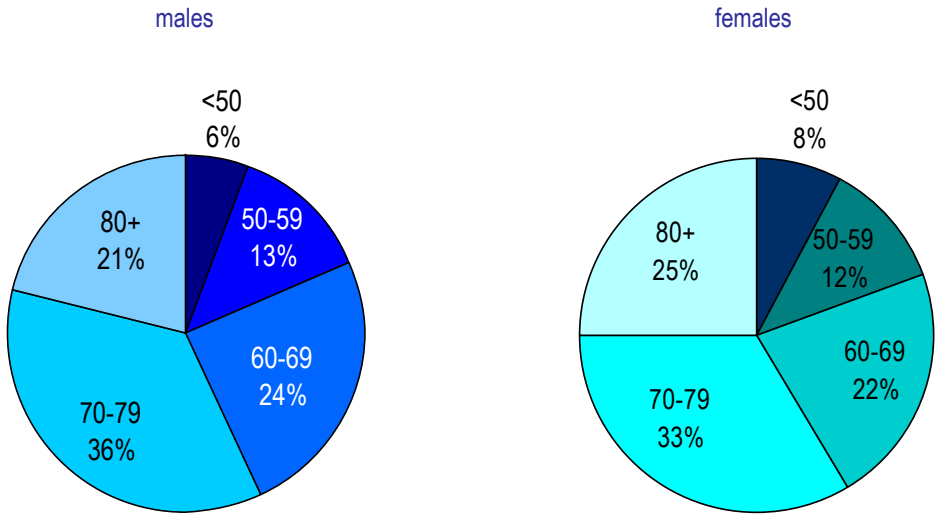
Bladder cancer is the eighth most common malignant cancer in Ireland, accounting for 3.5% of all malignant neoplasia, 4.7% in males and 2.0% in females (table 10.1). Each year, approximately 331 men and 132 women are diagnosed with a bladder tumour. Incidence rates fell between 1994 and 2003 by 1.3% and 2.4% per annum in women and men respectively.

Table 10.1 Summary information for bladder cancer in Ireland, 1994-2003

| | females | males |
|---|---|---|
| % of all new cancer cases | 1.5% | 3.3% |
| % of all new cancer cases excluding non-melanoma skin cancer | 2.0% | 4.7% |
| Average number of new cases per year | 132 | 331 |
| Average number of deaths per year | 53 | 112 |
| Age standardised incidence rate per 100,000 (European standard population) | 6.6 | 20.6 |
| Estimated annual percentage change in rate 1994-2003 | -1.3% | -2.4% |

Bladder cancer is a disease of older people - 58% of women and 57% of men are aged over 70 at diagnosis (figure 10.1), while only around 6-8% of cases present in those aged under 50. The age distributions in men and women are similar.

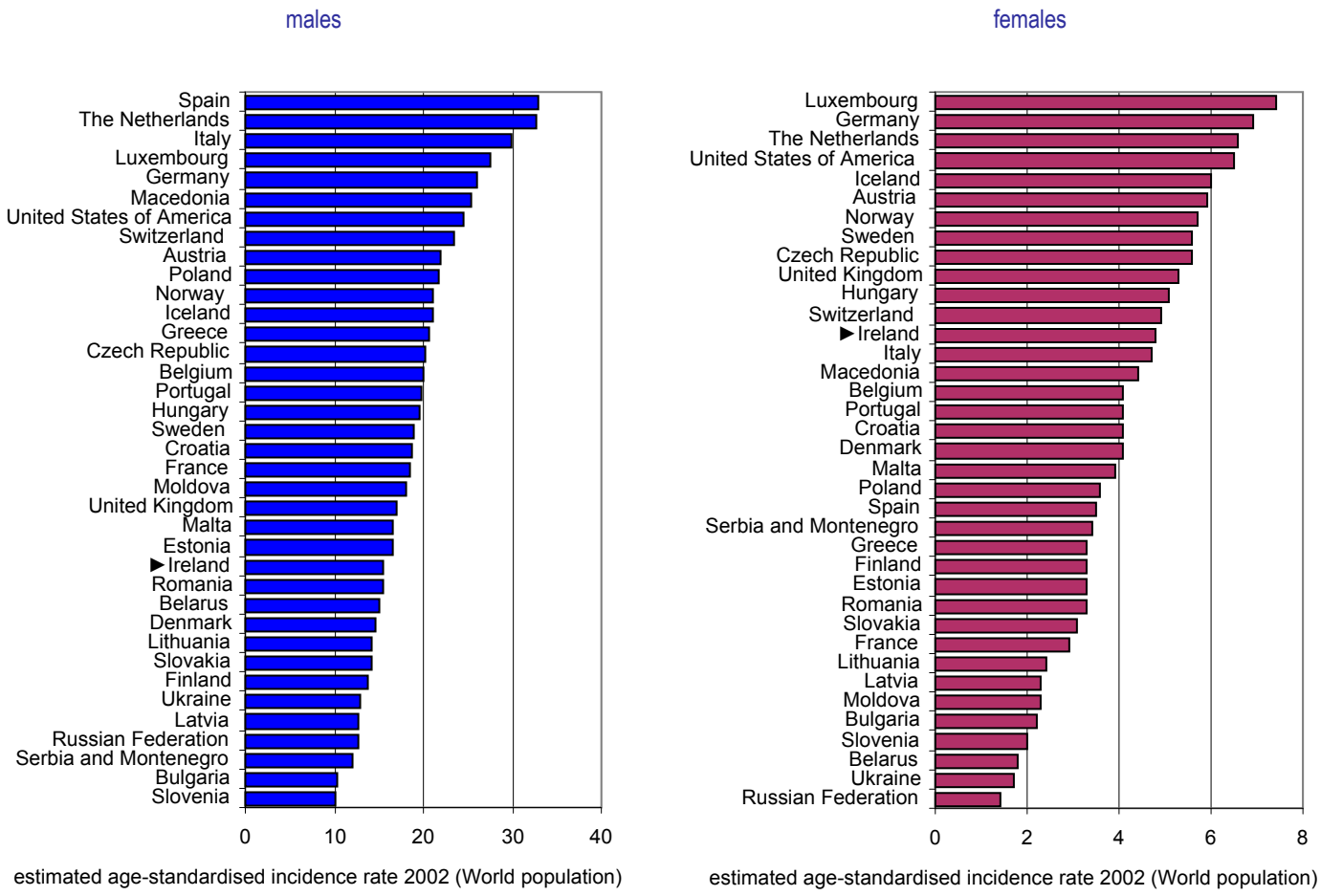
Figure 10.1 Age distribution of bladder cancer cases, 1994-2003, males and females



## 10.2 International variations in incidence

Bladder cancer incidence in men in Ireland is among the lowest in western Europe (figure 10.2), while that in women is in the mid-range. The rates for both men and women were similar to, but a little lower, than those in the UK. However, international comparisons of bladder cancer rates are made difficult by inconsistencies in the coding and classification of these cancers.

Figure 10.2 Estimated incidence rate per 100,000 in 2002 for Europe and USA: bladder cancer




Source: GLOBOCAN 2002 (Ferlay et al, 2004)

## 10.3 Risk factors

Table 10.2 Risk factors for bladder cancer, by strength of evidence

| | Increases risk | Decreases risk |
|---|---|---|
| *Convincing or probable* | Tobacco smoking[1] | |
| | Various occupations and employment in particular industries and product manufacture[2,3] | |
| | Occupational exposure to aromatic amines[3,4] | |
| *Possible* | Arsenic and disinfection by-products in drinking water[5,6] | |
| | Type II diabetes[7] | |

[1] International Agency for Research on Cancer, 2004b; [2] Reulen et al, 2008; 3 Scélo and Brennan, 2007; [4] International Agency for Research on Cancer, 1987; [5] Villanueva et al, 2004; [6] World Cancer Research Fund / American Institute for Cancer Research, 2007; [7] Larsson et al, 2006

Tobacco smoking is the major known cause of bladder cancer (table 10.2) and it has been estimated that two-thirds of all cases in men, and one-third in women, are due to smoking (Brennan et al, 2000, Brennan et al, 2001). The risk of developing bladder cancer increases with duration of cigarette smoking and number of cigarettes smoked (International Agency for Research on Cancer, 2004b). Risk is also increased in those who smoke pipes or cigars, but do not smoke cigarettes (Pitard et al, 2001). Stopping smoking results in an immediate decrease in risk (Scélo and Brennan, 2007).

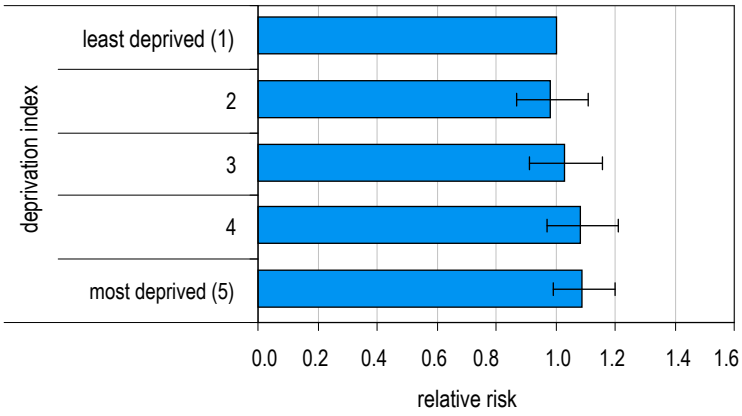
and employment in various industries or in manufacturing of specific products (including aluminium production and magenta manufacture) have been positively associated with bladder cancer risk. As regards specific exposures, the most consistent evidence relates to aromatic amines, in particular 2-naphthylamine and 4-aminobiphenyl, which are used in the dyeing and rubber industries; workers exposed to these are at increased risk of the disease.

Other than smoking and occupational exposures, the factors involved in bladder cancer aetiology are largely unknown. Positive associations have been reported between volume of tap water consumed and bladder cancer risk (Villaneuva et al, 2006). This may be due to increased intake of carcinogenic chemicals contained in the water, such as arsenic (International Agency for Research on Cancer, 2004a) or disinfection by-products (e.g. trihalomethanes), but the results of studies are not consistent.

Individuals with type II diabetes may have a modest increased risk of developing bladder cancer.

## 10.4 Electoral district characteristics and cancer incidence

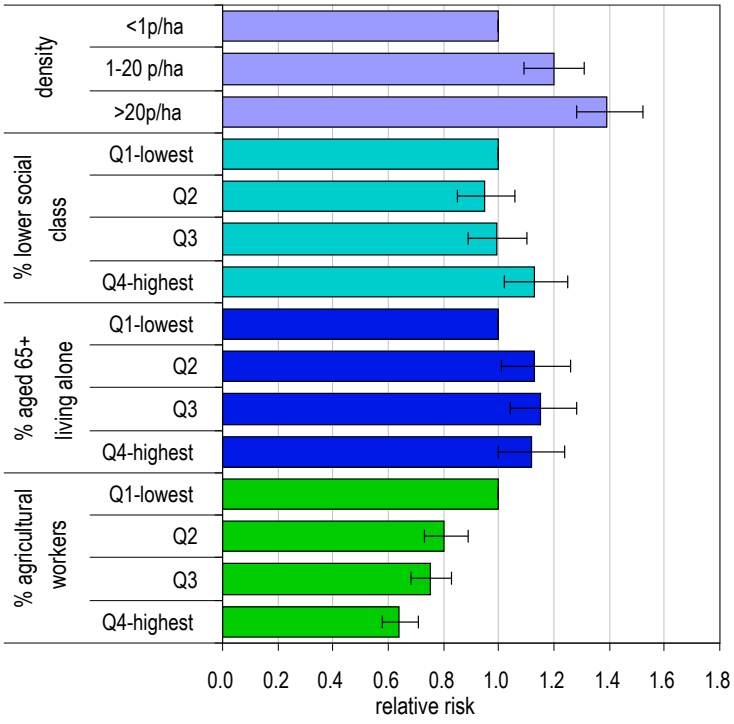
### Figure 10.3 Adjusted relative risks of bladder cancer by deprivation index: males




*Adjusted for population density*

The most deprived areas had a slightly raised risk of bladder cancer in men compared to the least deprived (figure 10.3), but this was not statistically significant.

### Figure 10.4 Adjusted relative risks of bladder cancer by area characteristics: males

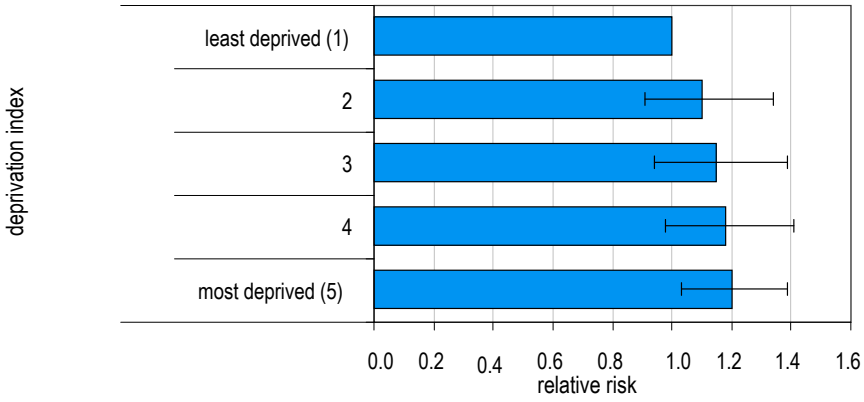



*All variables mutually adjusted except %of agricultural workers (not adjusted for density)*

Bladder cancer incidence was strongly associated with population density (figure 10.4). Urban areas (>20p/ha) had a 40% higher risk of bladder cancer than the least densely populated areas (RR=1.39, 95% CI 1.28-1.52). Consistent with this, a higher percentage of agricultural workers was associated with a lower risk of bladder cancer.

Of the other socio-demographic variables, only the percentage in the lowest social class and the percentage of persons aged 65 and older living alone were associated with elevated risk. Both of these associations were weak.

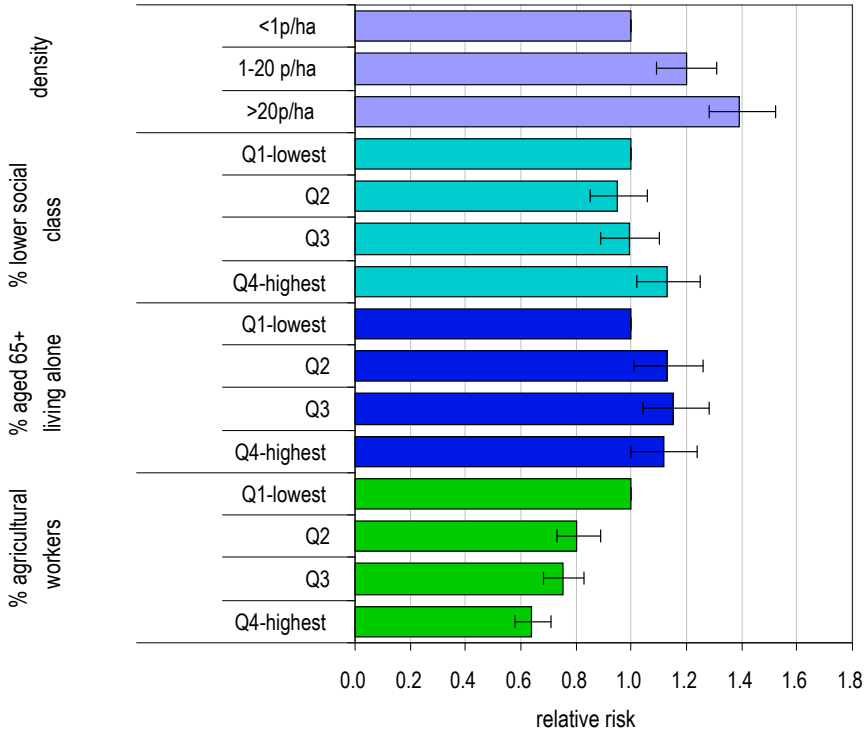
Figure 10.5 Adjusted relative risks of bladder cancer by deprivation index: females




Women living in the most deprived areas had a significantly increased risk of bladder cancer compared to those in the least deprived areas (RR=1.20, 95% CI 1.03-1.39; figure 10.5).

*Adjusted for population density*

Figure 10.5 Adjusted relative risks of bladder cancer by area characteristics: females




As with males, population density and the percentage of agricultural workers were strongly associated with bladder cancer incidence in women (figure 10.6). A high frequency of lower social class was associated with a raised risk, compared to low frequency (RR=1.19, 95% CI 1.01-1.40).

There was a weak relationship between incidence and the proportion of people aged 65 and older living alone.

*All variables mutually adjusted except % of agricultural workers (not adjusted for density)*

## Socio-economic variation

The associations between area characteristics and bladder cancer incidence were identical for men and women - a strong relationship to urban residence and a much weaker relationship to social class and to the proportion of elderly living alone. In England also, only a very modest association between bladder cancer and deprivation is

apparent (National Cancer Intelligence Network, 2008). Therefore, although tobacco consumption is the best established risk factor, the links to deprivation/socio-economic status appear to be much weaker than for lung cancer. This suggests that other risk factors must be important.

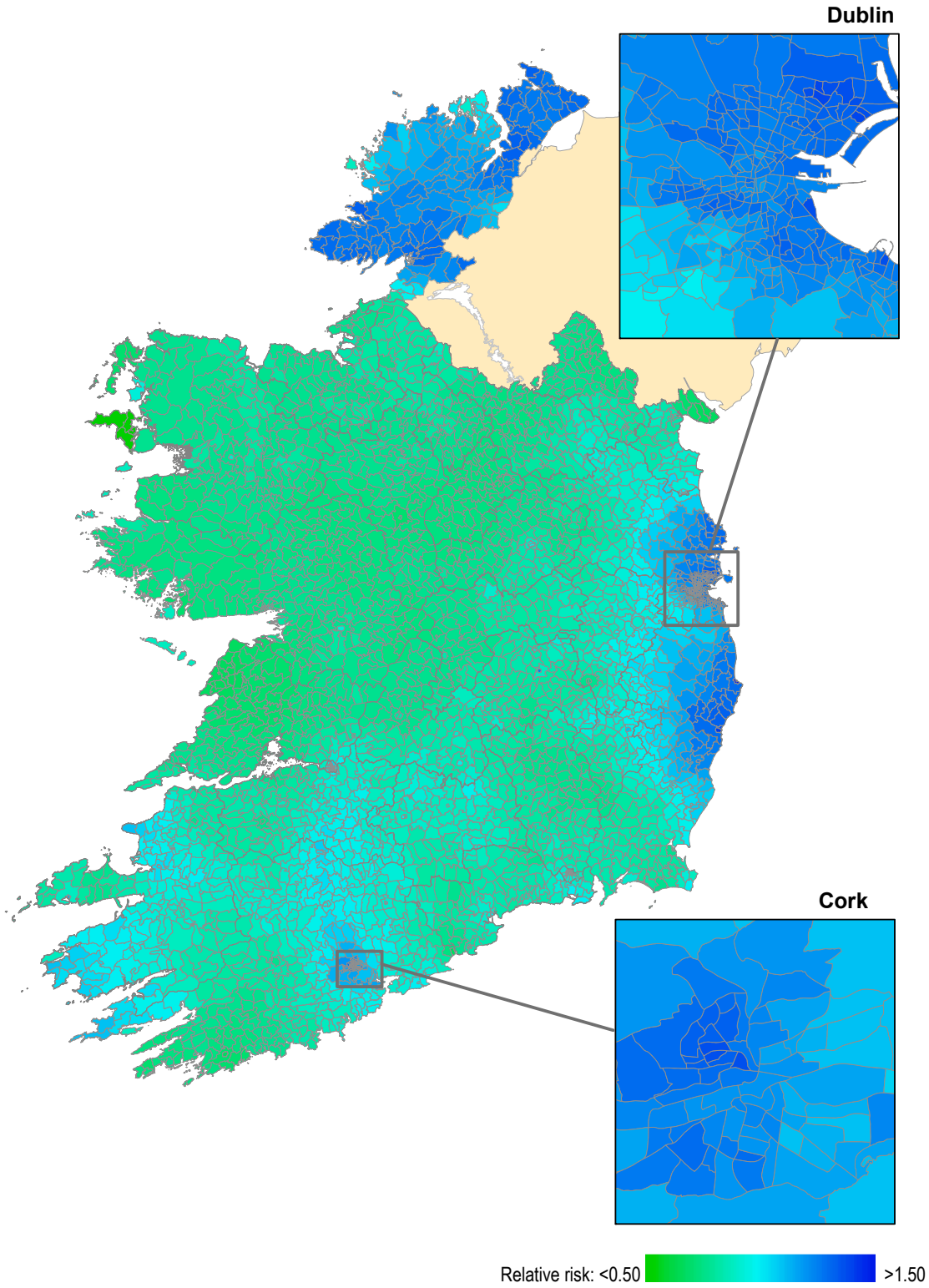
## 10.5 Mapping and geographical variation

### Geographical variation

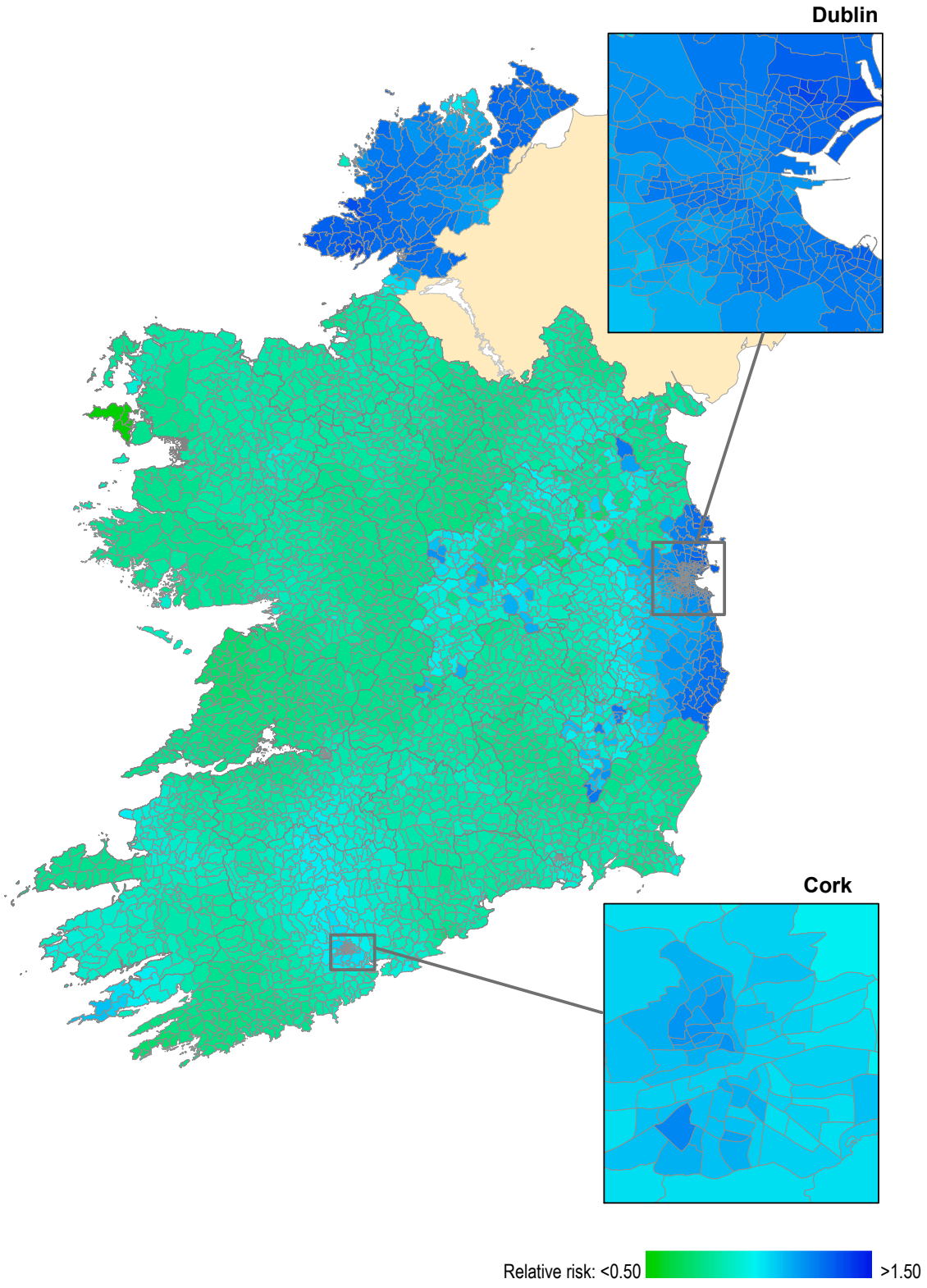
The geographical pattern of bladder cancer for both sexes combined was mostly determined by the much higher incidence in men (maps 10.1-10.3). There was more marked geographical variation for men than for women, with two notable areas of high incidence - along the east coast in Dublin and Wicklow, and in Co. Donegal. There was a less pronounced area of high incidence around Cork. Within Dublin, the north-south gradient seen for lung cancer (map 7.2) and for stomach cancer (map 9.2) was not apparent for bladder cancer (map 10.3). For women, the pattern was somewhat different, and less distinct, but there were again areas of higher incidence around Dublin (mainly confined to the city) and in Donegal, confined mainly to the Inishowen peninsula, and a trend of slightly increasing incidence heading towards the southwest.

There were some similarities between these maps and those for lung cancer (maps 7.1-7.3), illustrating the influence of tobacco on bladder cancer risk. However, some of the areas with higher bladder cancer incidence did not have particularly high rates of lung cancer (e.g. most of Co. Donegal for men, southwest for women). In addition, there was no striking correspondence between the geographical distribution of bladder cancer and that of levels of current smoking reported in the SLÁN survey (Appendix 1). These observations suggest that other aetiological factors play a role in bladder cancer incidence in Ireland.

Map 10.1 Bladder cancer, smoothed relative risks: both sexes



Map 10.2 Bladder cancer, smoothed relative risks: males



Map 10.3 Bladder cancer, smoothed relative risks: females