9 Stomach cancer

9.1 Summary

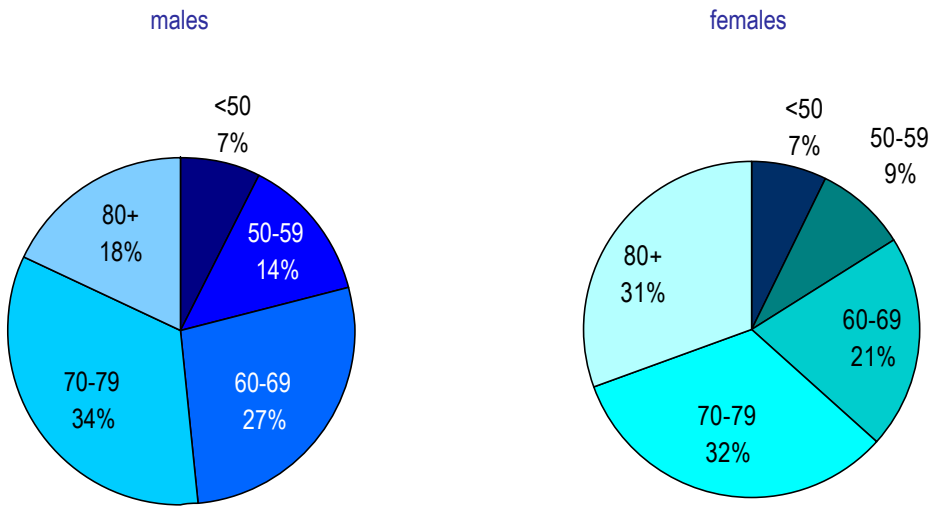
Stomach cancer ranks seventh in terms of the most common cancers in Ireland, accounting for 4.1% of all malignant neoplasia in men and 2.8% in women, when non-melanoma skin cancer is excluded (table 9.1). Each year, approximately 292 men and 183 women are diagnosed with a stomach tumour. During 1994-2003, incidence rates fell in both sexes.

Table 9.1 Summary information for stomach cancer in Ireland, 1994-2003

	females	males
% of all new cancer cases	2.0%	2.9%
% of all new cancer cases excluding non-melanoma skin cancer	2.8%	4.1%
Average number of new cases per year	183	292
Average number of deaths per year	218	366
Age standardised incidence rate per 100,000 (European standard population)	8.7	18.1
Estimated annual percentage change in rate 1994-2003	-1.7%	-3.0%

More than half of all men and women with stomach cancer were aged over 70 at diagnosis - 63% of women and 52% of men (figure 9.1). The higher proportion of older women probably reflects their higher life expectancy. Only 7% of cases present in those aged under 50.

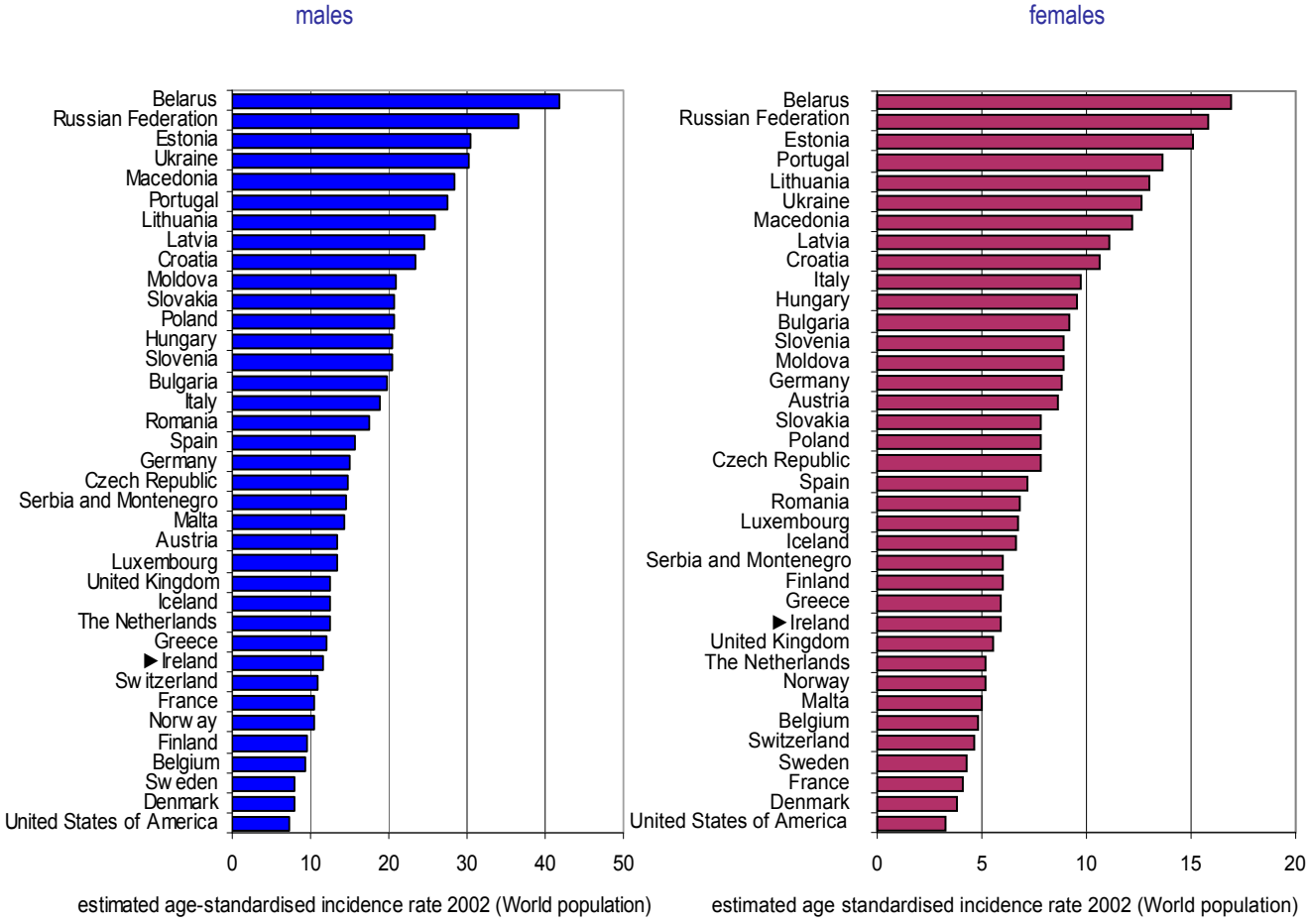
Figure 9.1 Age distribution of stomach cancer cases, 1994-2003, males and females



9.2 International variations in incidence

Stomach cancer incidence in both men and women in Ireland in 2002 is in the lower half of rates across western Europe (figure 9.2). Rates in Ireland were similar to those in the UK for both sexes. The rate in both men and women was lower in the USA than in any European country.

Figure 9.2 Estimated incidence rate per 100,000 in 2002 for Europe and USA: stomach cancer



Source: GLOBOCAN 2002 (Ferlay et al, 2004)

9.3 Risk factors

Table 9.2 Risk factors for stomach cancer, by strength of evidence

	Increases risk	Decreases risk
Convincing or probable	*Helicobacter pylori* infection[1]	Non-starchy vegetables, particularly green/yellow vegetables or allium vegetables[3,6,7]
	Tobacco smoking[2]	Fruit[3,6]
	Salt, salted and salty foods, or salt preserved foods[3]	Refrigeration[8]
	Low socio-economic status[4]	
Possible	Alcohol[5]	Aspirin and other non-steroidal anti-inflammatory drugs[9]

[1] Helicobacter and Cancer Collaborative Group, 2001; [2] International Agency for Research on Cancer, 2004b; [3] World Cancer Research Fund / American Institute for Cancer Research, 2007; [4] Faggiano et al, 1997; [5] International Agency for Research on Cancer, in press; [6] International Agency for Research on Cancer, 2003; [7] allium vegetables include garlic, onions and leeks; [8] World Cancer Research Fund / American Institute for Cancer Research, 1997; [9] Bosetti et al, 2006

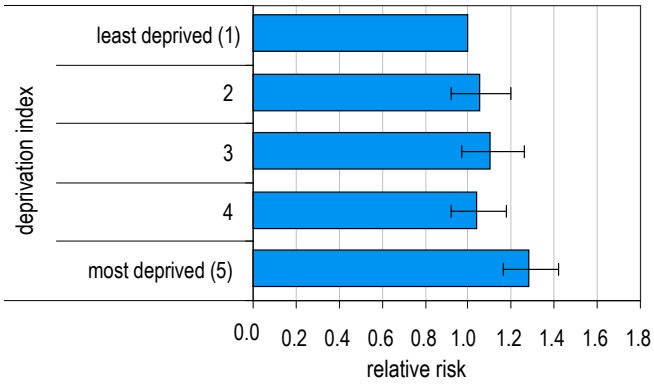
Risk factors for stomach cancer are summarised in table 9.2. *Helicobacter pylori (H pylori)* is a bacterium that lives in the stomach and causes inflammation and ulcers. Although the source of *H pylori* infection is not known, infection is common. Surveys in Ireland suggest a prevalence of 40-50% (Murray et al, 1997, Buckley et al, 1998). The risk of stomach cancer is six-fold higher in those with *H pylori* infection than in those without it (Helicobacter and Cancer Collaborative Group, 2001), and it has been suggested that it may be a necessary (but not sufficient) cause of tumours arising in the distal region of the stomach (International Agency for Research on Cancer, 1994).

Smoking is firmly established as a cause of stomach cancer and risk increases with duration of smoking and number of cigarettes smoked. Those with low socio-economic status have increased risk of stomach cancer, probably, in part, reflecting variations in tobacco use by social class.

Other than these factors, the main risk factors are related to food and food preservation. There is substantial and consistent evidence that higher intakes of salt, salty foods or foods preserved in salt are associated with increased risk. Risk is reduced in individuals with higher intakes of fruit and non-starchy vegetables, particularly green/yellow vegetables and those of the allium family. More than 10 studies have reported a significant reduction in disease risk with use of refrigeration. However, it is thought that the association is not due to refrigeration *per se* but rather is a consequence of other factors related to refrigerator use, such as lower intake of foods preserved with salt, or higher intake of fresh perishable foods (e.g. vegetables and fruit) (World Cancer Research Fund / American Institute for Cancer Research, 2007). While there are some suggestions that increased consumption of alcohol may be associated with increased risk of stomach cancer, most studies have not adequately controlled for *H pylori* infection or other aspects of diet (International Agency for Research on Cancer, in press).

9.4 Electoral district characteristics and cancer incidence

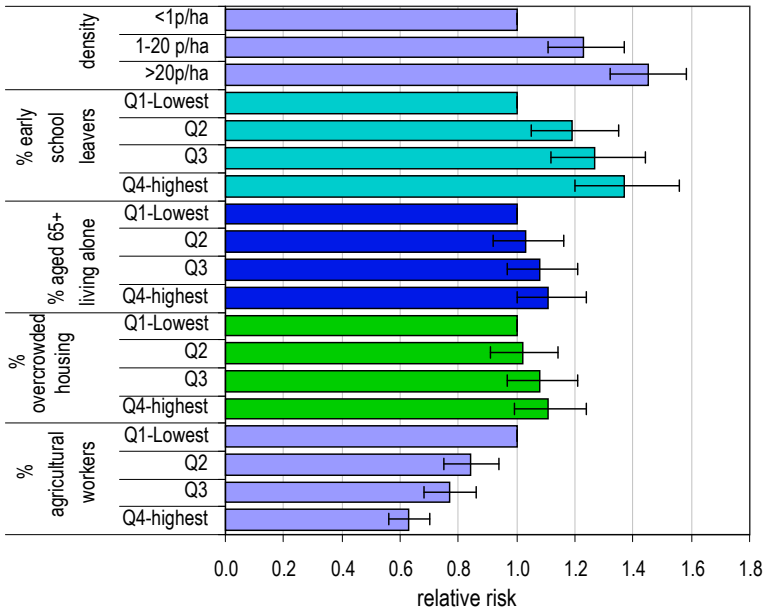
Figure 9.3 Adjusted relative risks of stomach cancer by deprivation index: males



Adjusted for population density

The deprivation index of the area of residence was significantly associated with stomach cancer incidence in men (figure 9.3). Incidence was almost 30% higher in the most deprived, compared to the least deprived, areas (RR=1.28, 95% CI 1.16-1.42).

Figure 9.4 Adjusted relative risks of stomach cancer by area characteristics: males



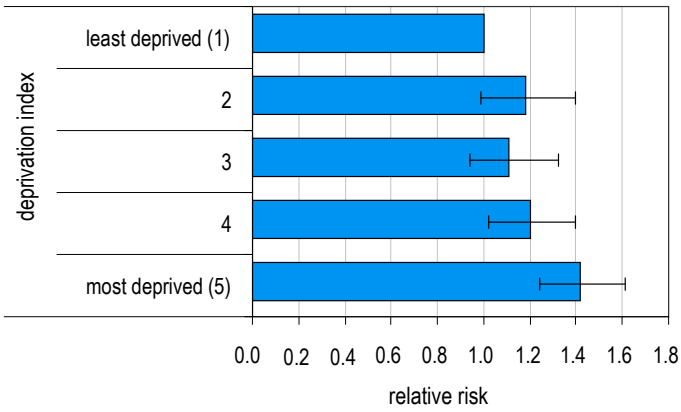
All variables mutually adjusted except % of agricultural workers (not adjusted for density)

As with several other cancer sites, incidence of stomach cancer in men was higher in more densely populated areas (RR most vs least populated areas=1.45, 95% CI 1.32-1.58) and lower where there was a high proportion of agricultural workers (figure 9.4).

Consistent with the relationship to deprivation, there was a trend of increasing risk with an increasing proportion of early school leavers. A similar, but less strong, relationship was also seen with overcrowding.

Stomach cancer incidence in men was also slightly higher in areas with a higher proportion of persons aged 65 and over who were living alone.

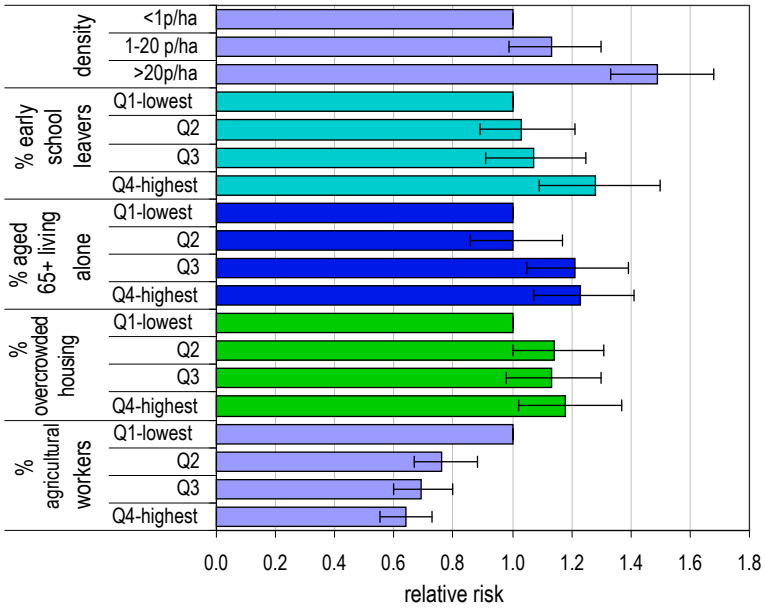
Figure 9.5 Adjusted relative risks of stomach cancer by deprivation index: females



Adjusted for population density

As for men, the deprivation index of the area of residence was associated with stomach cancer incidence in women (figure 9.5). Women who lived in the most deprived areas had a 40% higher risk of stomach cancer than women who lived in the least deprived areas (RR=1.42, 95% CI 1.24-1.61).

Figure 9.6 Adjusted relative risks of stomach cancer by area characteristics: females



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

As for men, there was a strong association between population density and stomach cancer in women. The relative risk in the most densely populated, compared to the least densely populated, areas was 1.49 (95% CI 1.33-1.68; figure 9.6).

Positive associations were also seen with the proportion of early school leavers, the proportion of overcrowded homes, and the proportion of those aged 65 and over living alone.

Incidence decreased with an increase in the proportion of agricultural workers in an area.

Socio-economic variation

The factors associated with elevated stomach cancer risk were similar for women and men; in both sexes there was an association with deprivation, the proportion of early school leavers and of people 65 and over living alone; and a stronger association with population density. The magnitude of the observed associations with population density and the various socio-economic variables were stronger than those seen for most other cancer sites. As for lung cancer, these patterns probably reflect, at least in part, geographical and social class variations in smoking patterns in Ireland (Office of Tobacco Control, 2009).

9.5 Mapping and geographical variation

Geographical variation

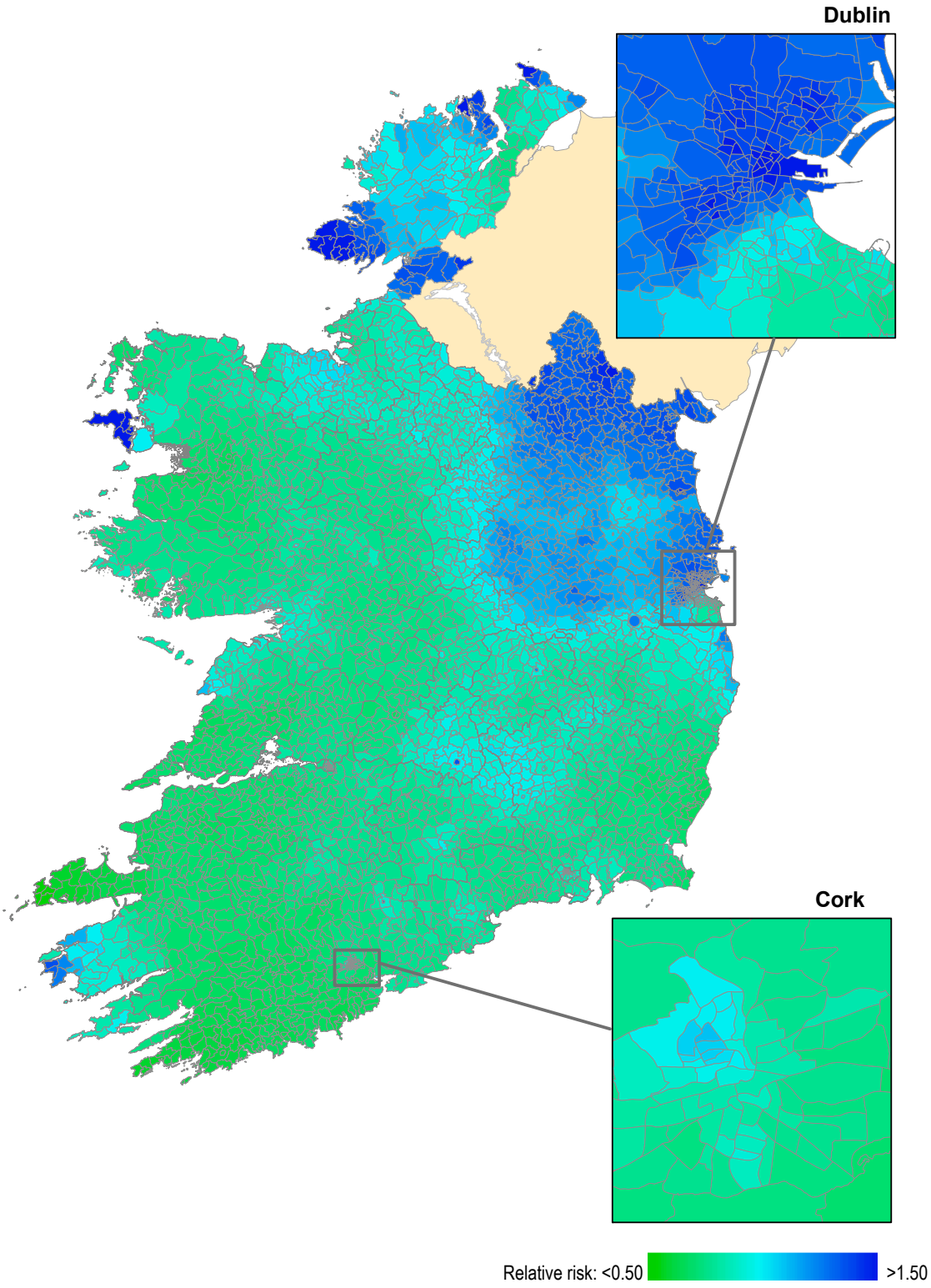
Stomach cancer showed one of the strongest patterns of geographical clustering (map 9.1), with incidence highest in two clearly defined areas, one stretching across the northeast, from Dublin through Louth, Monaghan and Cavan, and the other in south Donegal. In Dublin city, there was a very clear division between the south and southeast of the city, which had a low incidence, and the north and west where incidence was high. The overall incidence was low in the city of Cork, but higher in the northwest of the city.

The pattern of distribution was quite similar for men and women (maps 9.2 and 9.3) although the area of high was less widespread in the northeast for women. Westmeath, northern Offaly and Kildare had a higher risk in men but not in women.

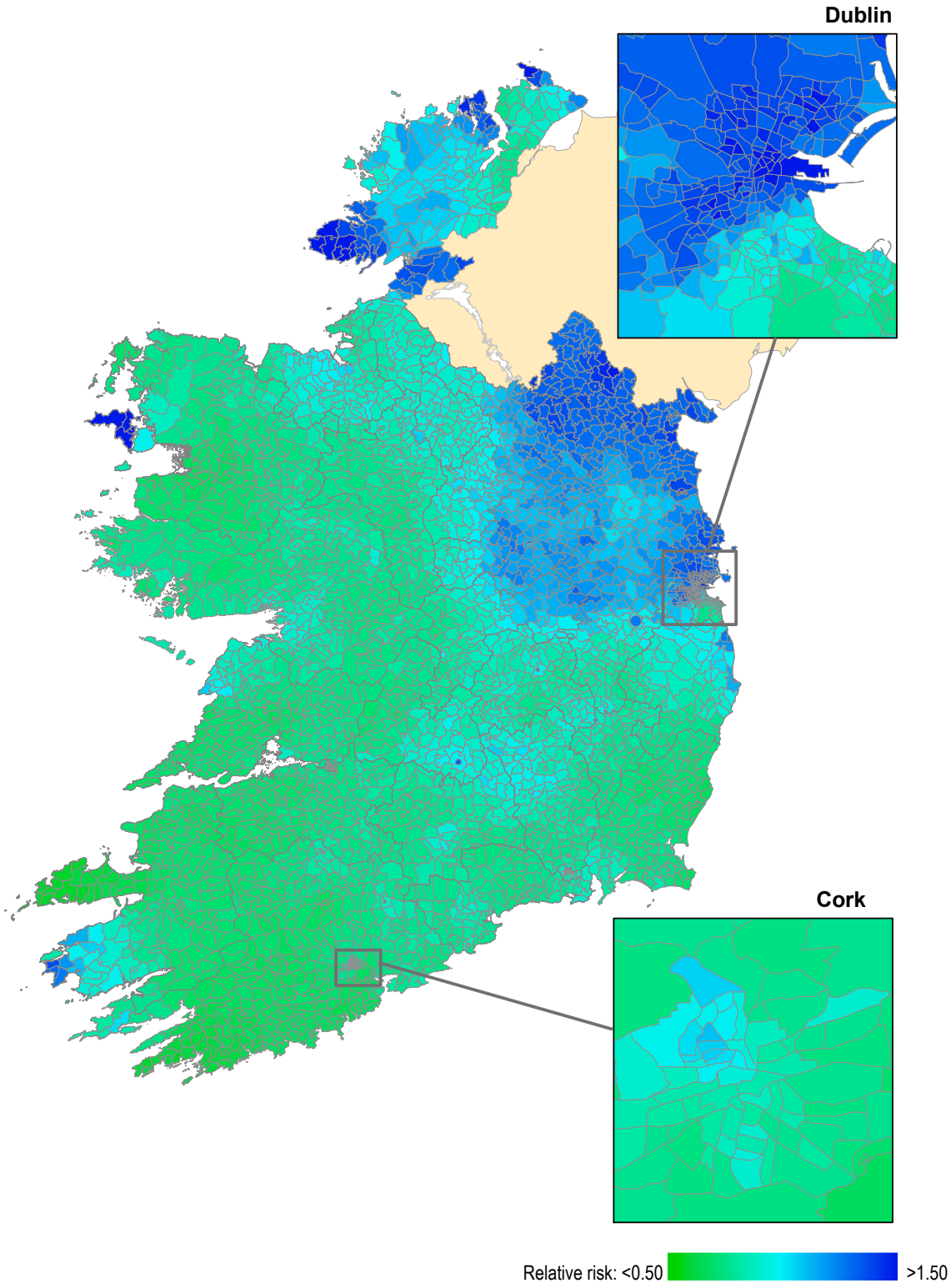
It would be interesting to know whether the areas of higher incidence in the north extend into Northern Ireland. To date, incidence rates for Northern Ireland have only been mapped at the level of district councils (Donnelly et al, 2009). Although it is more difficult to see clear geographical patterns in data at this level, there are some clear areas of higher incidence in the North, specifically around Belfast, and areas close to the border in the south (Newry) and northwest (Derry, Limavady, and Strabane).

There were some similarities between the pattern of incidence in Ireland and the geographical distribution of levels of current smoking reported in the SLÁN survey (Appendix 1), although the specific areas of highest stomach cancer incidence and smoking prevalence did not entirely correspond.

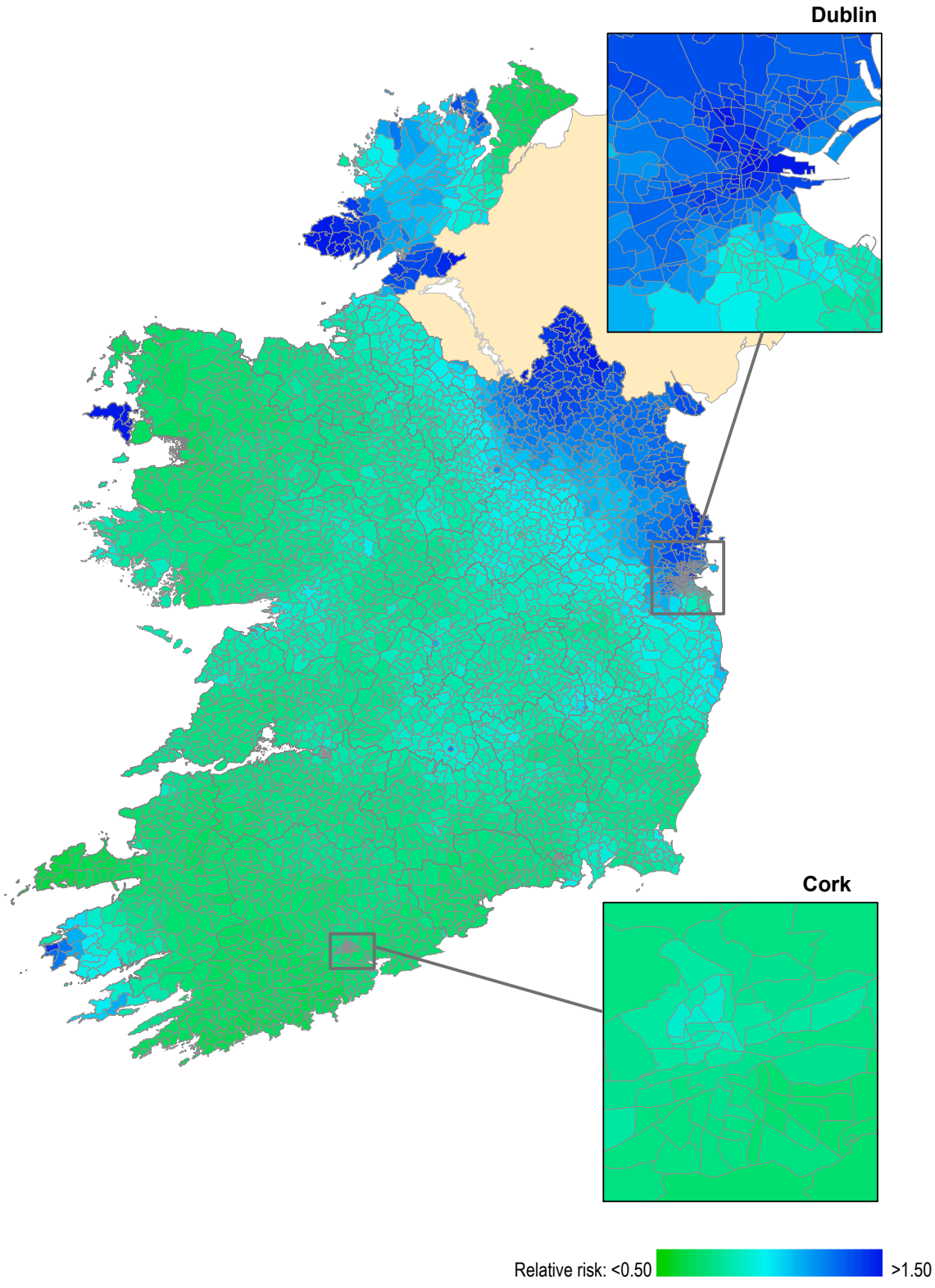
Map 9.1 Stomach cancer, smoothed relative risks: both sexes



Map 9.2 Stomach cancer, smoothed relative risks: males



Map 9.3 Stomach cancer, smoothed relative risks: females



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