6 Colorectal cancer

6.1 Summary

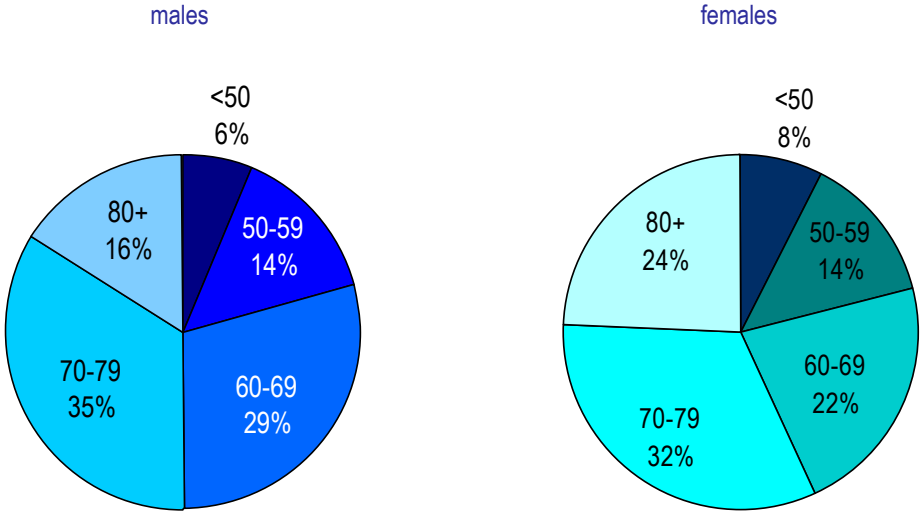
Colorectal cancer is the second most common cancer in Ireland (excluding non-melanoma skin cancer). It accounts for 12% of all malignant neoplasia in females and 15% in males (table 6.1). Each year, approximately 1,032 men and 787 women are diagnosed with a colorectal tumour. 69% of these cancers arise in the colon and 23% in the rectum. During 1994-2003, incidence rates decreased slightly in both sexes.

Table 6.1 Summary information for colorectal cancer in Ireland, 1994-2003

	females	males
% of all new cancer cases	9%	11%
% of all new cancer cases excluding non-melanoma skin cancer	12%	15%
Average number of new cases per year	787	1,032
Average number of deaths per year	405	521
Age standardised incidence rate per 100,000 (European standard population)	39.3	64.0
Estimated annual percentage change in rate 1994-2003	-0.4%	-0.2%

The majority of colorectal cancers are diagnosed in individuals aged 70 and older - 51% of cancers in males and 55% in females (figure 6.1). The age distribution is similar in both sexes, although with a higher proportion of cases in men aged 60-69 (29%, compared to 22% in women) and a higher proportion in women aged 80 and older (24% compared to 16% in women).

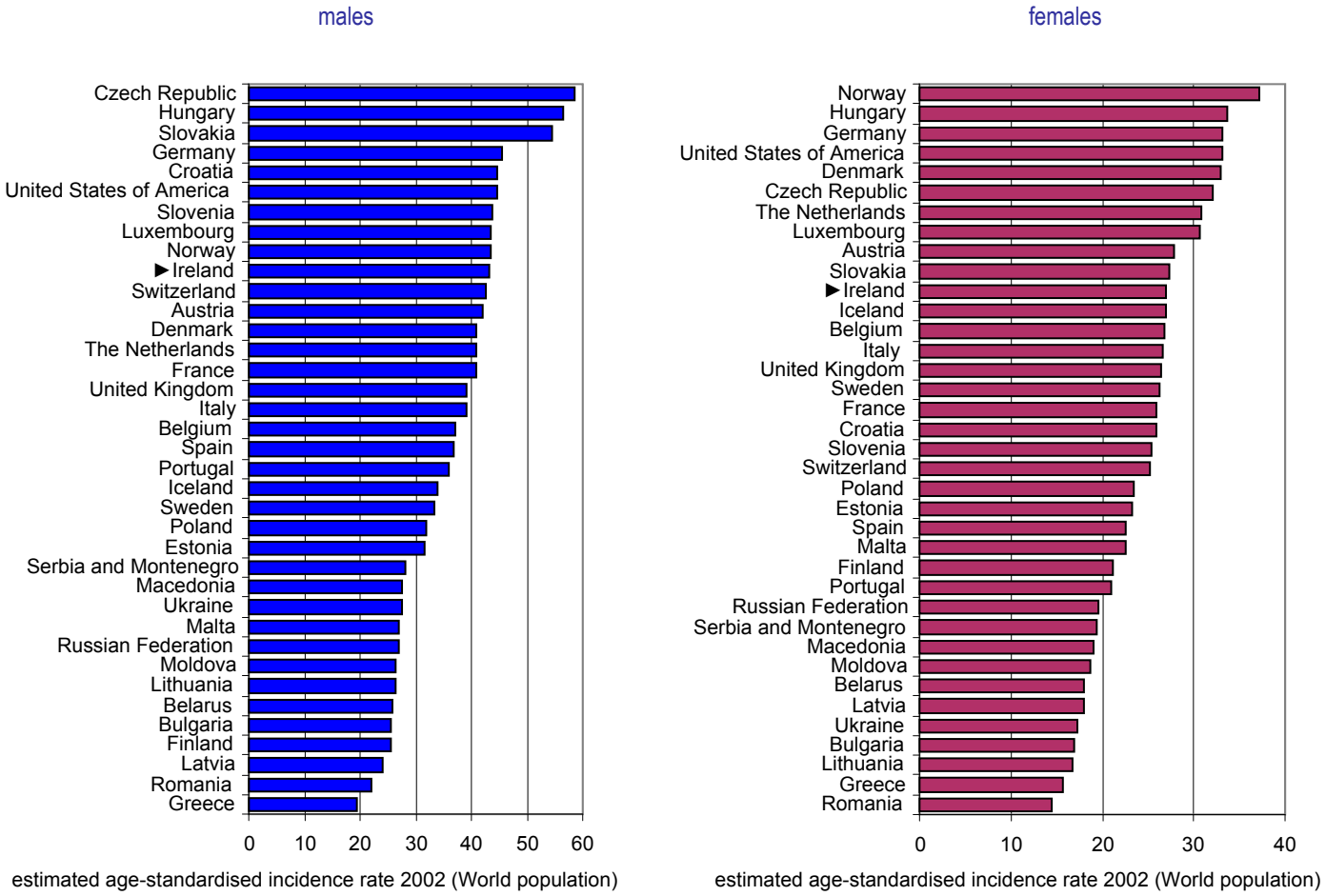
Figure 6.1 Age distribution of colorectal cancer cases, 1994-2003, males and females



6.2 International variations in incidence

Colorectal cancer incidence in both men and women in Ireland is in the upper half of rates across western Europe (figure 6.2). The rate among men in Ireland exceeds that for men in the UK by 10%, while the rate for women is almost the same in the two countries.

Figure 6.2 Estimated incidence rate per 100,000 in 2002 for Europe and USA: colorectal cancer



Source: GLOBOCAN 2002 (Ferlay et al, 2004)

6.3 Risk factors

Table 6.2 Risk factors for colorectal cancer, by strength of evidence

	Increases risk	Decreases risk
Convincing or probable	Family history of colorectal cancer[1,2]	Physical activity[3,4]
	Body fatness, in particular, abdominal fatness[3, 4]	Foods containing dietary fibre[4]
	Alcohol [4,5]	Garlic[4]
	Red and processed meat[4]	Milk and/or calcium[4]
		Hormone replacement therapy[8]
		Aspirin and other non-steroidal anti-inflammatory drugs[9]
Possible	Tobacco smoking[6,7]	Non starchy vegetables[4,10]
		Fruit[4,10]
		Fish[4]
		Oral contraceptives[8]

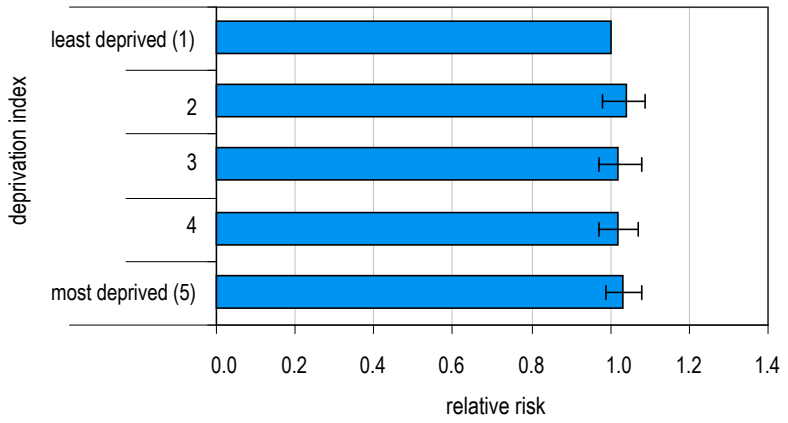
[1] First degree relative(s) with colorectal cancer; [2] Johns and Houlston, 2001; [3] International Agency for Research on Cancer, 2002; [4] World Cancer Research Fund / American Institute for Cancer Research, 2007; [5] International Agency for Research on Cancer, in press; [6] Giovannucci, 2001; [7] International Agency for Research on Cancer, 2004b; [8] International Agency for Research on Cancer, 2007b; [9] International Agency for Research on Cancer, 1997; [10] International Agency for Research on Cancer, 2003

Up to 10% of colorectal cancers are hereditary and most are due to the genetic syndromes of familial adenomatous polyposis (FAP) and hereditary non-polyposis colorectal cancer (HNPCC) (Hawkins and Ward, 2001). Excluding these syndromes, individuals who have a first degree relative with colorectal cancer have around a two-fold increased risk of developing the disease themselves. Similarly to the other common cancers, recent genome-wide association studies have revealed several more candidate loci for predisposition to colorectal cancer, but the specific genes involved have not yet been identified (Easton and Eeles, 2008).

Lifestyle factors are extremely important in colorectal cancer (table 6.2). There is strong evidence that higher levels of body fatness, and in particular central adiposity, are positively associated with risk. On the other hand, there is a consistent inverse association with physical activity, particularly for colon cancer, and risk decreases in a dose-response fashion with increased frequency or intensity of activity. In terms of diet, alcohol is a cause of both colon and rectal cancers and a large number of studies have found increased risk in those with higher intakes of red and processed meats (meats preserved by smoking, curing or salting, such as ham, bacon or salami). Several other aspects of diet have been associated with lower risk, including higher intakes of foods containing dietary fibre, milk and/or calcium and garlic. Increased consumption of fish, fruit and non-starchy vegetables may also reduce risk. There are suggestions that smoking is associated with increased colorectal cancer risk with a lag period of 35 years or more, but it is possible that this may be due to residual confounding (International Agency for Research on Cancer, 2004b). There is convincing evidence that regular use of aspirin or other non-steroidal anti-inflammatory drugs may reduce colorectal cancer risk by up to half. Risk is decreased in women taking hormone replacement therapy and may also be reduced in those who have taken oral contraceptives.

6.4 Electoral district characteristics and cancer incidence

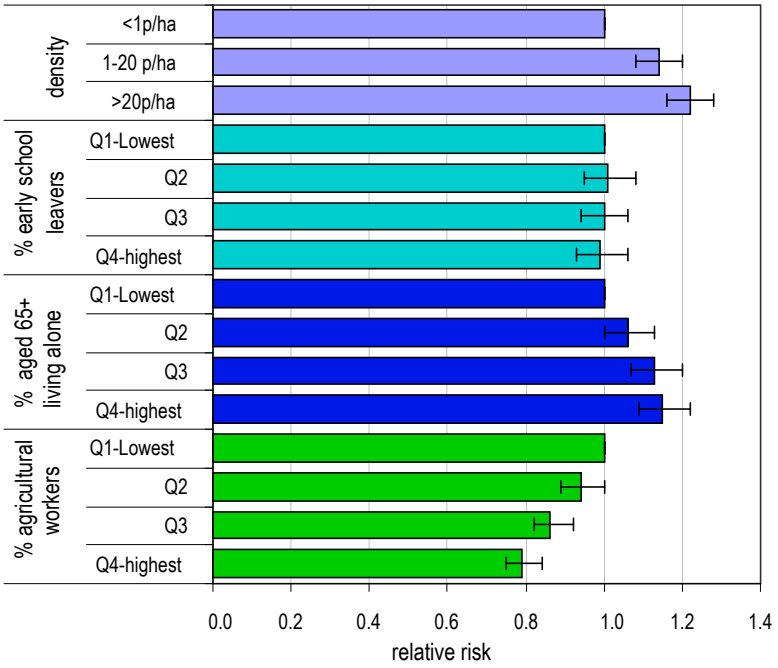
Figure 6.3 Adjusted relative risks of colorectal cancer by deprivation index: males



Adjusted for population density

A modest association was found between deprivation and colorectal cancer incidence in men (figure 6.3). Those living in the most deprived areas had a small increased risk of being diagnosed, compared to those resident in the least deprived areas (RR=1.06, 95% CI 1.00-1.12).

Figure 6.4 Adjusted relative risks of colorectal cancer by area characteristics: males



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

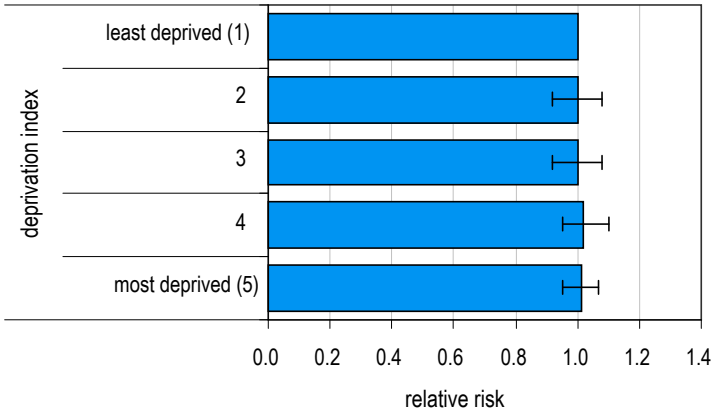
There was a clear positive association between population density and colorectal cancer incidence in men (figure 6.4), with risk more than 20% higher in the most densely, compared to the least densely, populated areas (RR=1.22, 95% CI 1.16-1.28).

Consistent with this, areas with higher numbers of agricultural workers had lower risk.

There was no association with any other measures of socio-economic status.

As with most other cancers, areas with a high proportion of persons aged over 65 who lived alone had a higher risk of colorectal cancer.

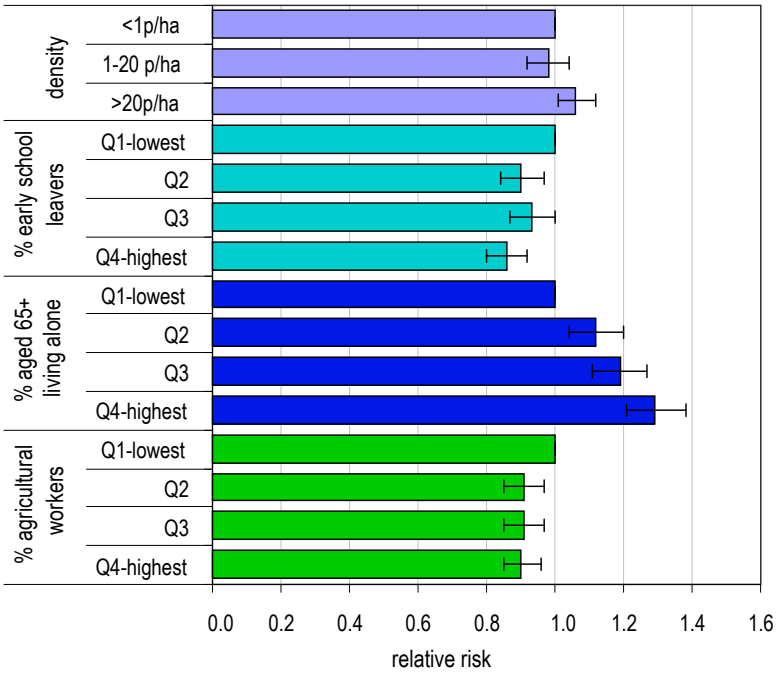
Figure 6.5 Adjusted relative risks of colorectal cancer by deprivation index: females



Adjusted for population density

No association was found between deprivation and colorectal cancer incidence in women (figure 6.5).

Figure 6.6 Adjusted relative risks of colorectal cancer by area characteristics: females



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

The association of high population density with increased colorectal cancer risk was weaker for women than for men, as was the link to the proportion of agricultural workers in the area (figure 6.6).

Areas with the highest proportion of early school leavers had a significantly lower risk.

There was a strong positive relationship between the proportion of persons aged over 65 living alone and colorectal cancer in females.

Socio-economic variation

Deprivation was only weakly associated with colorectal cancer incidence in males, and not in females. Generally, the evidence on socio-economic status and colorectal cancer is inconsistent (Faggiano et al, 1997), but it is intriguing that a similar finding was reported in the UK (National Cancer Intelligence Network, 2008). For both sexes, areas of high population density were associated with increased risk, but this association was much stronger for men. For women, on the other hand, there was a significant relationship between incidence and the proportion of early school leavers, which was not seen for men. These relationships suggest somewhat different

patterns of risk factors for men and women, which would be in keeping with aspects of the aetiological evidence, such as that relating to the role of exogenous hormones. Different dietary patterns and the relationship of these with socio-economic status may also account for the male/female differences observed.

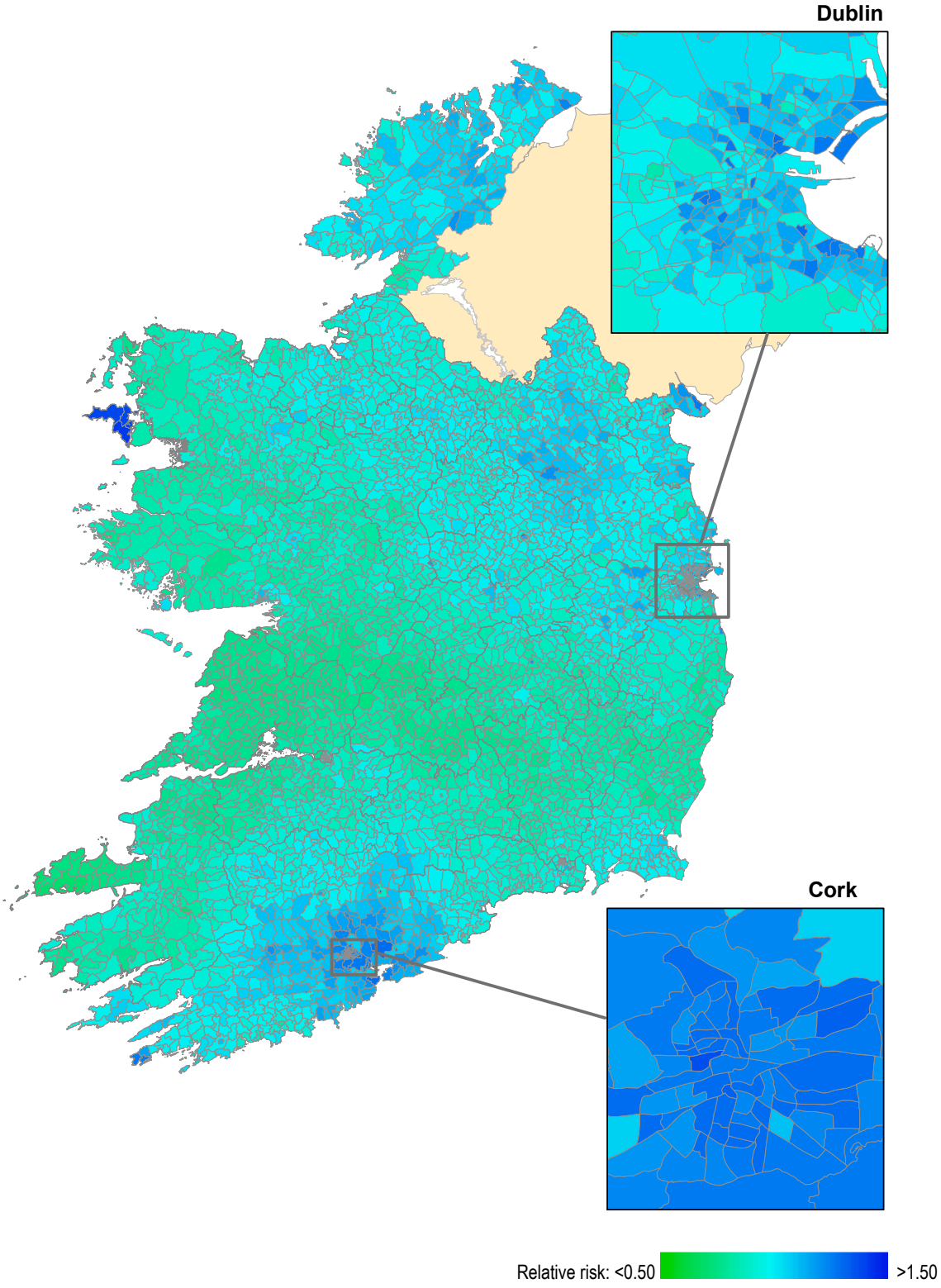
6.5 Mapping and geographical variation

Geographical variation

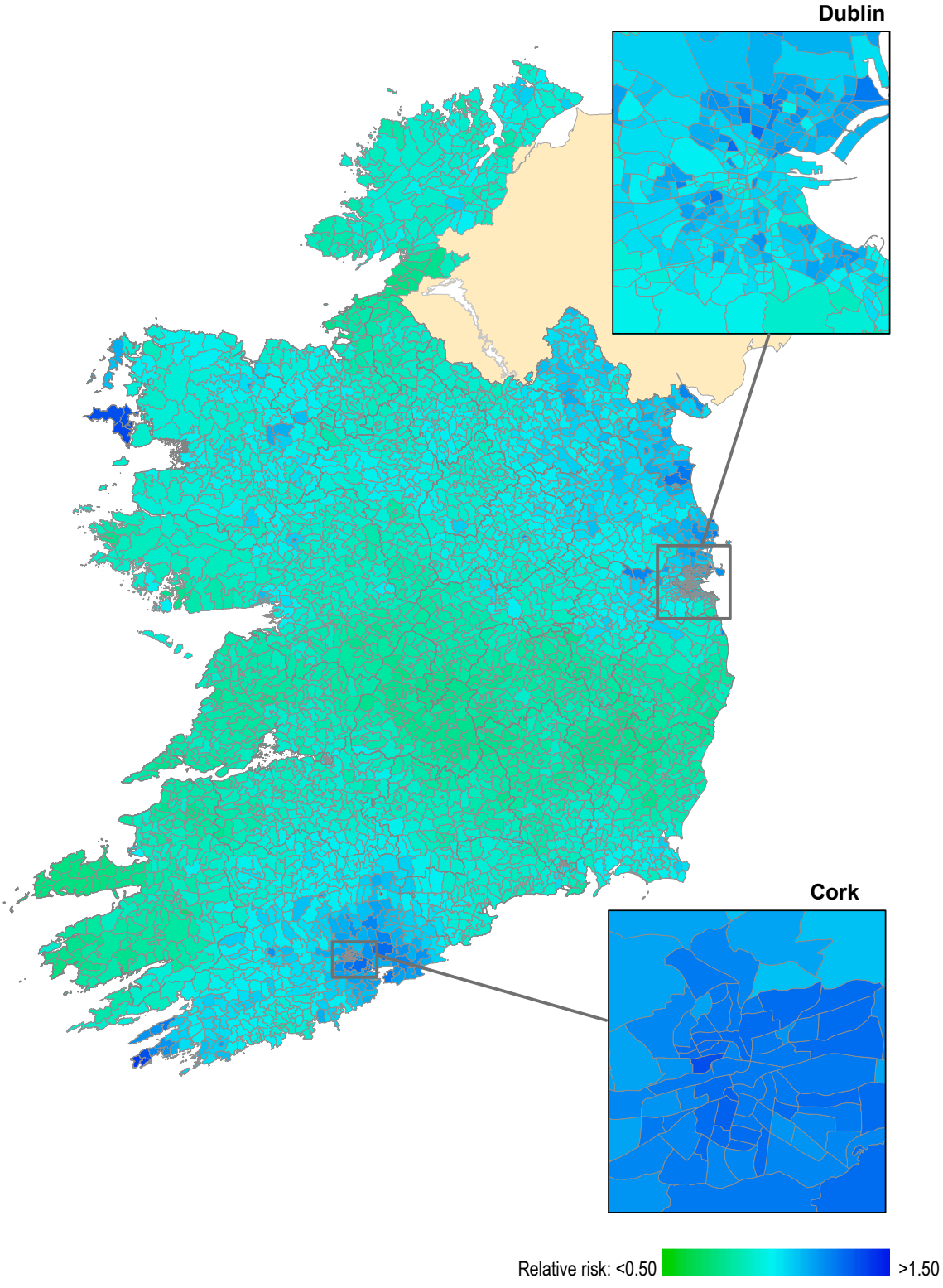
Compared to some other cancer sites, the geographical variation in colorectal cancer incidence was relatively modest. For both sexes combined, colorectal cancer incidence was higher than average in two areas - in Co. Cork, in an area centred on Cork City but extending into the far southwest, and in the north and centre of the country, in a broad band from Dublin heading through the northeast towards Donegal (map 6.1). Incidence also seemed to be higher in south Wexford. In the urban areas of Dublin and Cork, there was no overall geographical pattern, but the overall incidence was higher in Cork than Dublin. The patterns were similar when males and females were considered separately, although for males the area of high incidence in the north was largely confined to the northeast, while for women there was more marked high incidence in the centre of the country and in the northwest in particular (maps 6.2 and 6.3).

Comparing these patterns with the SLÁN risk factor maps (Appendix 1), the closest match seems to be with areas with a high prevalence of obesity. The geographical distribution of low fibre intake is quite different from that of colorectal cancer, despite its known association with higher cancer risk. There was no striking correspondence between the distribution of heavy alcohol consumption and that of colorectal cancer.

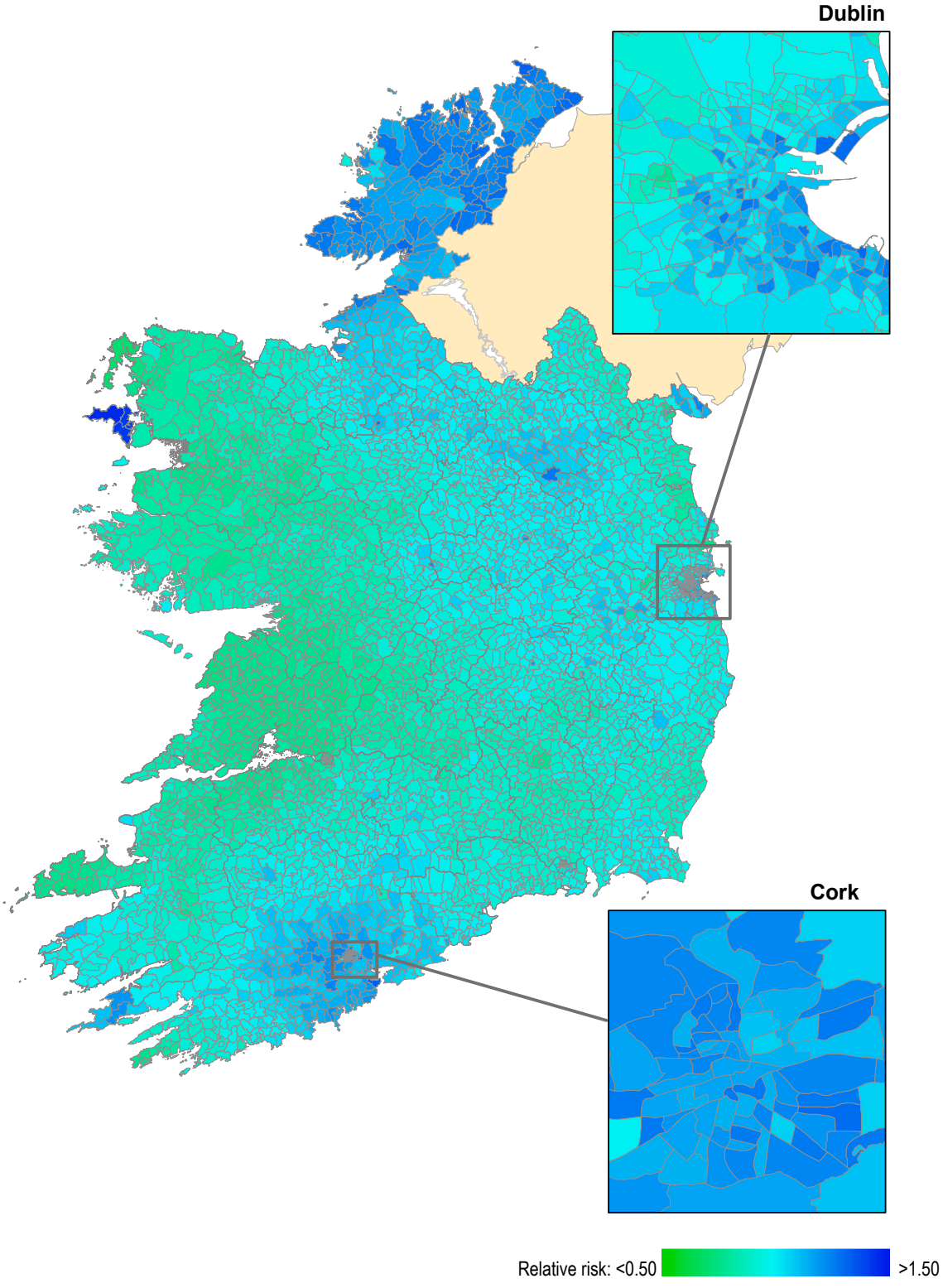
Map 6.1 Colorectal cancer, smoothed relative risks: both sexes



Map 6.2 Colorectal cancer, smoothed relative risks: males



Map 6.3 Colorectal cancer, smoothed relative risks: females



7 Lung cancer

7.1 Summary

Lung cancer is the third most common cancer in Ireland, accounting for 15% of cancers in men and 9% in women, if non-melanoma skin cancer is excluded (table 7.1). Each year, approximately 1,025 men and 585 women are diagnosed with a lung tumour. In women, the incidence rate rose significantly during 1994 and 2003, by 2.2% per annum, whereas in men it fell slightly (1.0% per annum).

Table 7.1 Summary information for lung cancer in Ireland, 1994-2003

	females	males
% of all new cancer cases	7%	10%
% of all new cancer cases excluding non-melanoma skin cancer	9%	15%
Average number of new cases per year	585	1,025
Average number of deaths per year	541	963
Age standardised incidence rate per 100,000 (European standard population)	29.4	63.4
Estimated annual percentage change in rate 1994-2003	2.2%	-1.0%

The majority of those diagnosed with lung cancer were aged 70 and over (figure 7.1). Less than 5% of cases presented in those aged under 50. Male lung cancer patients were younger on average than females - 48% were under 70, compared to 41% of females.

Figure 7.1 Age distribution of lung cancer cases, 1994-2003, males and females