8 Prostate cancer

8.1 Summary

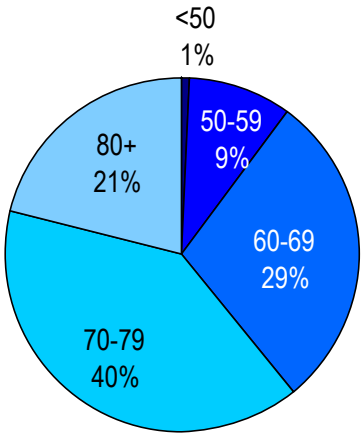
Prostate cancer is the most commonly diagnosed cancer in men in Ireland. When non-melanoma skin cancer is excluded, prostate cancer accounts for 23% of all new cancers in men. Each year, approximately 1,525 men are diagnosed with a prostate tumour. During 1994 and 2003, the incidence of prostate cancer rose faster than that of any other cancer; rates increased by an average of 7.1% annually. This has been driven, in large part, by large increases in the frequency of prostate specific antigen (PSA) testing in Ireland over this period (Drummond et al, 2009a).

Table 8.1 Summary information for prostate cancer in Ireland, 1994-2003

% of all new cancer cases	16%
% of all new cancer cases excluding non-melanoma skin cancer	23%
Average number of new cases per year	1,525
Average number of deaths per year	517
Age standardised incidence rate per 100,000 (European standard population)	94.5
Estimated annual percentage change in rate 1994-2003	7.1%

Prostate cancer is predominantly a disease of older age. Less than 1% of cases present in those aged under 50, while 90% occur in those 70 and older (figure 8.1). Just over one-fifth of cases are diagnosed in men aged 80 years and older.

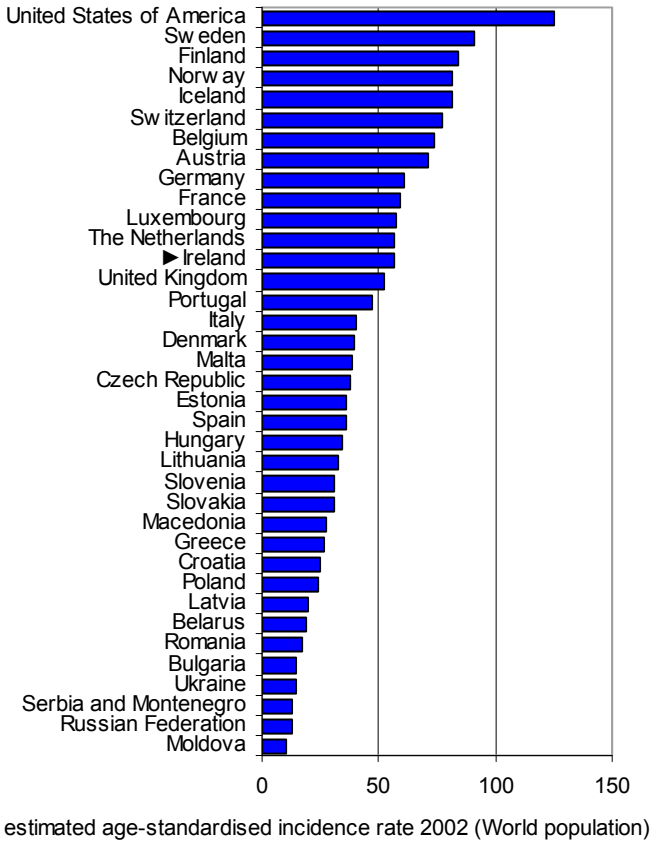
Figure 8.1 Age distribution of prostate cancer cases, 1994-2003



8.2 International variations in incidence

Prostate cancer incidence in Ireland in 2002 was low by western European and US standards, although comparable to the UK and many southern and eastern European countries (figure 8.2). The wide range in incidence rates observed in developed western populations is more likely to be due to differences in the frequency of PSA "screening" in different countries, than to major differences in the underlying disease incidence. It should be noted that the data given here are estimates made by the International Agency for Research on Cancer based on previous years, and, because of the large increase in incidence over time in Ireland, the estimated incidence rate shown is well below the actual 2002 rate.

Figure 8.2 Estimated incidence rate per 100,000 in 2002 for Europe and USA: prostate cancer



Source: GLOBOCAN 2002 (Ferlay et al, 2004)

8.3 Risk factors

Table 8.2 Risk factors for prostate cancer, by strength of evidence

	Increases risk	Decreases risk
Convincing or probable	Family history of prostate cancer[1,2]	Foods containing lycopene[3,4]
	Diets high in calcium[3]	Selenium or foods containing selenium[4]
Possible	Obesity (aggressive prostate cancer)[4]	Obesity (non-aggressive prostate cancer)[5]
		Aspirin and other non-steroidal anti-inflammatory drugs[6]

[1] First degree relative(s) with prostate cancer; [2] Damber and Aus, 2008; [3] lycopene is a carotenoid found in tomatoes and tomato products; [4] World Cancer Research Fund / American Institute for Cancer Research, 2007; [4] Giovannucci and Michaud, 2007; [5] Bosetti et al, 2006

It has long been known that having a first degree relative affected by prostate cancer increases a man's risk of developing the disease. Recently, advances have been made in uncovering the genetic basis underpinning familial risk. Several regions of the genome have been implicated in prostate cancer, but as yet the specific genes involved have not been identified (Easton and Eeles, 2008).

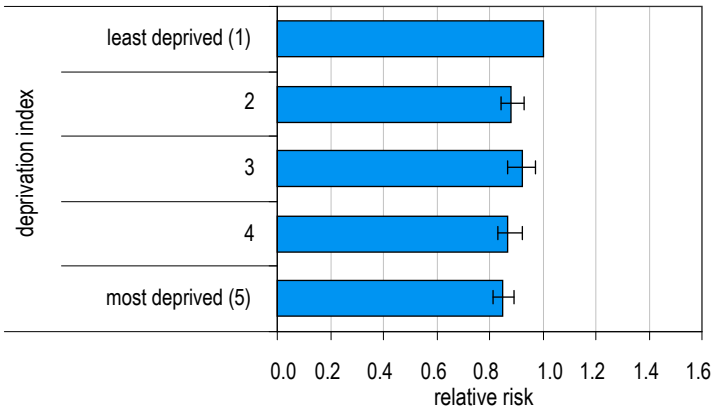
Despite extensive study, relatively little is known about prostate cancer aetiology. The few clearly established risk factors relate to diet (table 8.2). Lycopene is a carotenoid with strong anti-oxidant activities found in tomatoes and tomato products, such as puree, sauce, and soup. There is a substantial amount of evidence that higher levels of intake of lycopene-containing foods and products are associated with decreased prostate cancer risk. The mineral selenium is present in soil and makes its way into vegetables. It is also found in brazil nuts, fish, whole-grains and wheat-germ, and can be taken in the form of dietary supplements. There is reasonably strong evidence to suggest that intake of selenium or selenium-containing foods is inversely associated with prostate cancer. In contrast, prostate cancer risk increases, in a dose-response fashion, with higher dietary calcium intake.

There is some evidence that obesity may be associated with reduced risk of non-aggressive prostate cancer but increased risk of aggressive disease. It has been suggested that this may be due to a detection bias relating to the ability to detect prostate cancer in obese men (Buschemeyer and Freedland, 2007).

Meta-analyses suggest the possibility that regular use of aspirin and other non-steroidal anti-inflammatory drugs may be associated with a small reduction in risk, but the results of the individual studies are inconsistent.

8.4 Electoral district characteristics and cancer incidence

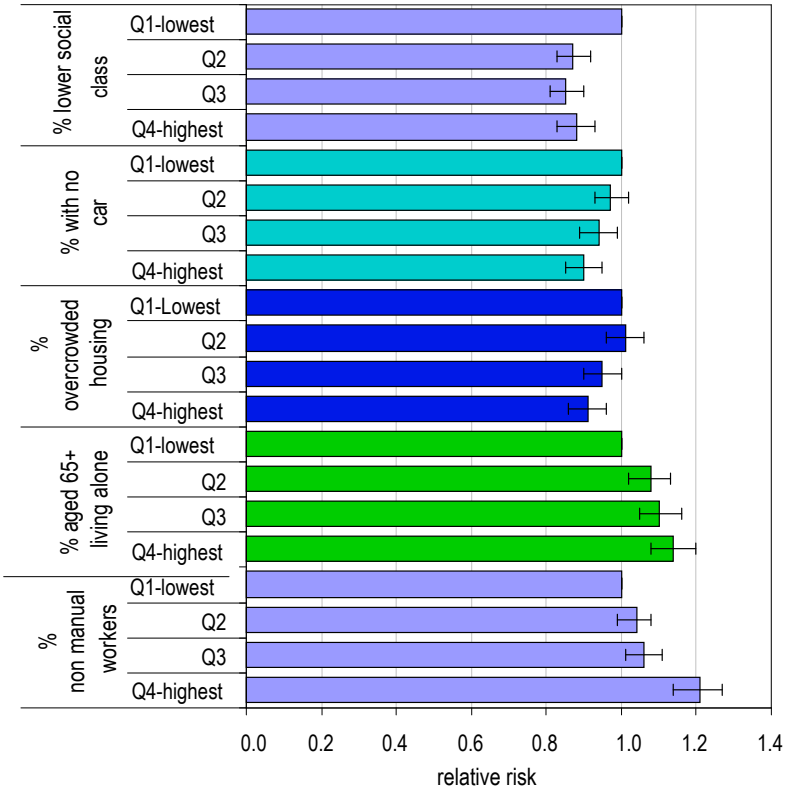
Figure 8.3 Adjusted relative risks of prostate cancer by deprivation index: males



Adjusted for population density

The incidence of prostate cancer was negatively associated with deprivation (figure 8.3). Men living in the most deprived areas were 15% less likely to be diagnosed with prostate cancer than those resident in the least deprived areas (RR=0.85, 95% CI 0.81-0.89).

Figure 8.4 Adjusted relative risks of prostate cancer by area characteristics: males



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

Incidence of prostate cancer was lower among men resident in areas with a higher proportion of overcrowded housing, individuals in lower social classes and persons who did not own a car (figure 8.4). In contrast, men living in areas with the highest proportion of non-manual workers had 20% higher risk of prostate cancer compared to men in areas with the lowest proportion of non-manual workers.

The risk of prostate cancer increased steadily with an increase in the proportion of people aged 65 and over living alone.

Socio-economic variation

The observed inverse association between prostate cancer and a composite area-based measure of socio-economic status has also been seen in England and Wales (Rowan, 2007), Northern Ireland (Donnelly et al, 2009) and the USA (Liu et al, 2001). The observed associations with various other socio-economic variables are

consistent with these findings. In England and Wales, the gap in incidence between the least and most deprived areas has increased over time (Rowan, 2007). These patterns suggest that the socio-economic variations in incidence are an artefact of differences in the frequency of PSA "screening" in different groups of men, although data are lacking to confirm this in Ireland.

8.5 Mapping and geographical variation

Geographical variation

Prostate cancer incidence was highest around the major urban centres - Dublin, Cork, Waterford and Galway - but, as with breast cancer, not Limerick (map 8.1). Within the two largest cities, there was a very clear divide between the more affluent areas (e.g. south of Dublin), which had a higher incidence, and the rest. There were also distinct areas of higher incidence in the northwest of the country, in Sligo and Donegal.

Looking at the data available from the SLÁN survey (Appendix 1), the distribution of obesity had some similarities with that of prostate cancer incidence, although the closest correspondence seemed to be with levels of private health insurance.

Map 8.1 Prostate cancer, smoothed relative risks: males