Women and Cancer in Ireland 1994-2001

National Cancer Registry Ireland

The Women's Health Council
Comhairle Shláinte na mBan

Women and Cancer in Ireland 1994-2001

The Womens Health Council
Block D
Irish Life Centre
Abbey Street Lower
Dublin 1

Phone: +353 1 8783777
Fax: +353 1 8783710
Email: info@whc.ie

National Cancer Registry
Elm Court
Boreenmanna Road
Cork

Phone: +353 021 4318014
Fax: +353 021 4318016
Email: info@ncri.ie

Acknowledgements

The production of a document like this requires the active co-operation of many groups and individuals, all of whom it would be impossible to acknowledge individually.

The information on cancer incidence and survival is based on the data of the National Cancer Registry, and has been collected, processed and analysed since 1994 by dedicated and skilled Registry staff. The Registry, in turn, is dependent on the help and support of hospital staff throughout the country. Most of the data analysis was carried out by the members of the Writing Group; we would like to thank Dr Paul M Walsh for providing the relative survival figures for Ireland.

The Writing Group for this report was

National Cancer Registry
Linda Sharp
Sandra Deady
Harry Comber

Women's Health Council
Aoife O'Brien
Alessandra Fantini
Nicola Fitzsimon
Gwen Murphy
Helen Corrigan

Foreword

Dr. Elizabeth Keane, Chair of National Cancer Registry

On behalf of the Board of the National Cancer Registry Ireland I am pleased to present this report on "Women and Cancer in Ireland 1994—2001" which has been prepared in collaboration with the Women's Health Council. Cancer places a significant burden on the health of Irish women. It is the second most common cause of death, accounting for 3,400 deaths on average each year. Over 6,000 women are newly diagnosed with cancer with all it attendant concerns and implications on an annual basis. However, the impact of cancer on women can be minimized by increasing our understanding of its aetiology, improving prevention programmes and by earlier diagnosis, optimal treatment and appropriate palliative care.

This report provides an excellent up-to-date over view of the burden of cancer on Irish women. It compares our situation with our neighbours in Europe—reporting that Irish women are significantly more likely to suffer and die from cancer. It examines trends over time and predicts future patterns. Differences in cancer profiles and experiences between men and women are explored. Recommendations are made for the expansion of prevention and screening programmes and evidence is provided that will inform future policy, planning and resource allocation.

The report draws on the extensive data set collected and collated by the National Cancer Registry. The quality of cancer registry data is central to its utility. The excellent quality of this report is testimony to the commitment and dedication of the Director and staff of the Registry and all of those who assist in the collection of data on a continuous basis. Their support and enthusiasm is appreciated and acknowledged. The National Cancer Registry recognises the benefit of collaboration to maximise the potential of its data to influence policy and inform decision making thereby reducing the burden of cancer. It is hoped that the success of this first collaboration with the national Women's Health Council will provide the stimulus for further collaboration with both the Council and other interested parties.

Of crucial importance to the Cancer Registry is that information now available will be actively used in the planning of programmes for the prevention, diagnosis and treatment of cancer. This report on cancer in women will thus act as an archive for reference in the future, a yardstick by which to measure our collective efforts in the control of cancer and in particular improving the health status of women.

Dr. Elizabeth Keane

Professor Cecily Kelleher, Chairperson, Women's Health Council

In this report, we are privileged to join forces with the Republic of Ireland's National Cancer Registry to examine an issue of great concern to the general public and policymakers alike, Cancer. Once a word associated with unremitting fear, there is much that is positive to be said nowadays about the conditions embraced by this umbrella term. More effective treatments, in common with more focused knowledge about risk and prevention, are yielding results. Yet in an ageing population lifetime risk of cancer is increasing and we need to be proactive to reverse those trends.

Over the last five years the Women's Health Council has set out to examine what it is about the lives and circumstances of women that influence their health and well-being, in order to ensure the most appropriate public policy response, in this country and indeed on the international stage. This report examines explicitly how our incidence and mortality patterns of different cancers compare with other countries. In some cases differences highlighted are artefactual, due to different methods of reporting information for instance. However there appear to be very real differences in some outcomes too, that reflect the need to implement comprehensively screening programmes for conditions like cervical and breast cancer. What we learn about the health of women is the distaff examination of what influences the health of men. We point out in this report that women actually do better than men in trends and patterns of some cancers and in many lifestyle risk determinants and therefore the public health need is for men as much as women.

For many decades smoking has been discussed as a paradigmatic feminist issue, the symbol first of youthful emancipation, then of victimisation as women in the poorest circumstances were blamed for their habit. This report says without doubt smoking is bad news as a risk factor for ill-health for everyone, but especially for women. However lifestyle often serves as a signal for deeper issues requiring action as much as a problem in itself. The report also tells us that social disadvantage confers risk of many of the cancers on both men and women, of which smoking is just one lifestyle example and policies that serve to eliminate that disadvantage can only be for the public good. This is a report for a wide cross section of people, specialist care providers and planners, policymakers and commentators and for the interested general reader also. It brings together important documented evidence between one set of covers as an important resource for now and the future.

Professor Cecily Kelleher
La le Bhride,
1st February 2006

Contents

Chapter 1: Introduction

Background to the report

Cancer is the second most common cause of death in Ireland for both women and men and represents a significant burden on the health of the population. Moreover, both morbidity (numbers of new cases diagnosed) and mortality (numbers of deaths) have been steadily increasing in both sexes over the last decade. For example, in 1994, the first year for which national data are available, 5848 cases of malignant cancer were diagnosed in women in Ireland. By 2001, this had risen to 6699 new cases in women and, by 2006, we expect 7300 women to be diagnosed with cancer, almost 25% more than in 1994. In large part this is due to the demographic changes (increasing life expectancy and growth in the population aged 65 and older) occurring in Ireland, as in other developed countries. These trends have major implications for the health services in Ireland, both for initial diagnosis and treatment services and for longer-term health and social support for cancer survivors. As women constitute a greater proportion of the older population and have better overall survival from cancer, there are many more women than men living with cancer in Ireland.

Although major advances have been made in the past 10 years in understanding the molecular and genetic basis of cancer, cancer is primarily caused by lifestyle and environmental factors. While the relative importance of different risk factors for different types of cancer vary, much of the burden of the disease is a result of behaviours which are amenable to change — e.g. smoking, lack of physical activity, consumption of alcohol and poor diet – and the consequences of these behaviours, such as overweight and obesity. In many populations, including Ireland, levels and patterns of exposure to these factors have differed, and continue to differ, between the sexes. Moreover, many of the important risk factors — reproductive factors (e.g. number of children), use of hormones (e.g. hormone replacement therapy and the oral contraceptive pill) and sexual behaviour (resulting in infection with human papilloma virus) — are particularly relevant for women's cancers. Although current cancer trends reflect patterns of exposure to risk factors in the past, future incidence and mortality could be reduced by understanding these risk factors and taking steps to deal with them at the population level.

Although prevention is the primary aim of cancer control, early diagnosis and effective treatment are also central to reducing disability and death from cancer. Research in Ireland and internationally has shown major differences between women in the stage (extent) of their cancer when first diagnosed, in access to screening, and in the type of treatment received. These factors have also been shown to determine the rate of cure of cancers and the length of survival for those not cured. Many countries, including Ireland, have developed cancer policies in the past decade, with the aim of improving access, and ensuring that all cancer patients have appropriate, and evidence-based, treatment. These changes have major implications for women in Ireland, for example in the provision of breast and cervical screening programmes and in the expansion of specialist treatment centres for breast cancer.

Aim and objectives of the report

The National Cancer Registry and Women's Health Council share a wish to inform women of the facts about cancer, the choices available to them and their consequences. We also wish to contribute to the wider public debate on the role and direction of cancer services in Ireland, and offer this report as a contribution to that debate.

The report brings together, in one place for the first time, information on cancer in women in Ireland, in terms of the burden and causes of the disease, policy initiatives and service provision. The intention is to add to the knowledge base on cancer in women, thus contributing to the development and delivery of cancer prevention strategies and cancer diagnosis, treatment and follow-up services that are appropriate and responsive to the needs of women in Ireland.

The objectives of the report are:

- to provide an up-to-date overview of the burden of cancer among women in Ireland, in terms of both women diagnosed with the disease, and those who die from it;
- to collate the available evidence on patterns of exposure to the main risk factors for cancer in women in Ireland and identify any gaps in knowledge;
- to review the current situation with regard to policy and service provision;
- to consider prospects for the prevention of cancer in women in Ireland, at primary (through lifestyle changes), secondary (through screening and early detection) and tertiary (through appropriate management) levels; and
- to make recommendations in the areas of cancer policy and research needed to underpin future developments in cancer prevention and care for women in Ireland.

Report content

The report is organised in two sections: the first presents data on trends in cancer in Ireland during 1994 to 2001 (chapters 2—12) and the second discusses determinants of cancer, health policy and implications of the report findings (chapters 13—16).

Chapters 2—12 include data on cancer incidence, treatment, survival and mortality in Ireland, and offers comparisons with data from other countries. In the overview of all cancers (chapter 2), data on both women and men are presented for comparative purposes. Chapters 3—12 contain detailed information for each of the ten most frequently diagnosed cancers in women in Ireland, namely cancers of the breast (1st rank in terms of most common cancers), colorectum (2nd), lung (3rd) and ovary (4th), melanoma of the skin (5th), cancer of the uterus (6th), non-Hodgkin's lymphoma (7th), and cancers of the stomach (8th), cervix (9th) and pancreas (10th). Chapters 13 and 14 examine cancer risk factors for women in detail, along with available data on the prevalence of exposure to these among women in Ireland and, in particular, compliance with the recommendations of the European Code Against Cancer. The report ends with an overview of past and current cancer policy in Ireland (chapter 15), consideration of the implications of the report findings, and recommendations in relation to current services and for research (chapter 16).

Chapter 2: Overview; all cancers

Overall burden of cancer in Ireland

The burden of cancer, in terms of the number of diagnosed cases of the disease and the number of deaths, is greater among men in Ireland than among women. This pattern is also seen in other developed countries (Boyle & Ferlay, 2005), and is due to a combination of factors including: greater levels of exposure to risk factors (e.g. smoking) among men than women (see chapter 13); the relatively high survival for some for the cancers that occur most commonly amongst women (e.g. breast cancer); and the tendency for survival for the same type of cancers to be higher among women than men (Micheli et al., 1998; Coleman et al., 2003).

During the eight year period from 1994 to 2001, there were a total of 49,604 new malignant (see glossary) cancers* diagnosed in women in Ireland — an average of 6,201 each year. In men, over the same time, 52,954 new cancers were diagnosed — 6,619 each year on average.

In women in Ireland, during 1994 to 2001, there were 27,788 deaths from malignant cancer. On average, each year, 3,474 women died from cancer. The comparable figures for men were 32,030 deaths overall, with a yearly average of 4,004 deaths. This represents one-quarter of all deaths in Ireland during the period.

The estimated number of people who had ever been diagnosed with cancer (prevalence) in Ireland at the end of 2001 was 117,000, which is 3.2% of the population. There are more than twice as many of these cancer survivors among women as among men— 79,400 compared to 37,600. This is due to the mix of different types of cancers in the sexes (see below) and the relatively high survival rates for some of the female reproductive system cancers, which account for a large proportion of the disease in women. The large numbers of cancer survivors in the population suggest that there is likely to be a considerable need for ongoing health and social support, after initial courses of treatment have been completed.

* This total excludes non-invasive tumours (see glossary) and non-melanoma skin cancers. Non-melanoma skin cancers are very common (making up 29% of all cancers), but rarely life threatening. It is very difficult to record uniform data on these cancers, and most cancer registries do not attempt to collect this information. In this report, the term 'cancer' refers to malignant cancers only excluding non-melanoma skin cancer, unless otherwise specified.

Most common cancers in Ireland

Figures 2.1 and 2.2 show the ten most common types of cancer in women and men in Ireland. The average annual number of new cases diagnosed and the proportion of all cancers that each type of cancer makes up (relative frequency) are in table 2.1.

Figure 2.1: Total number of new cancers diagnosed, ten most common cancer sites, 1994-2001, females

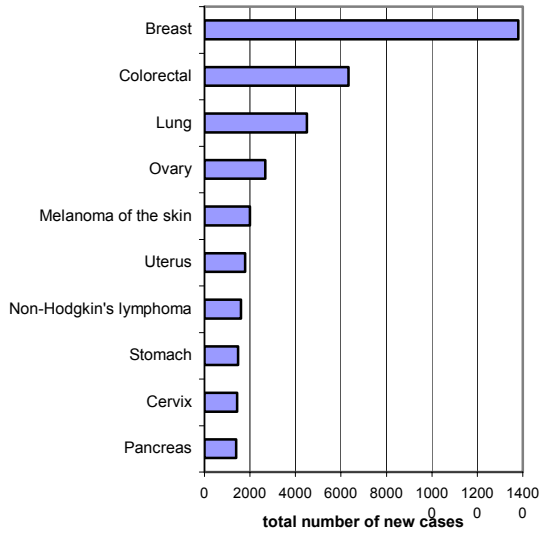


Figure 2.2: Total number of new cancers diagnosed, ten most common cancer sites, 1994-2001, males

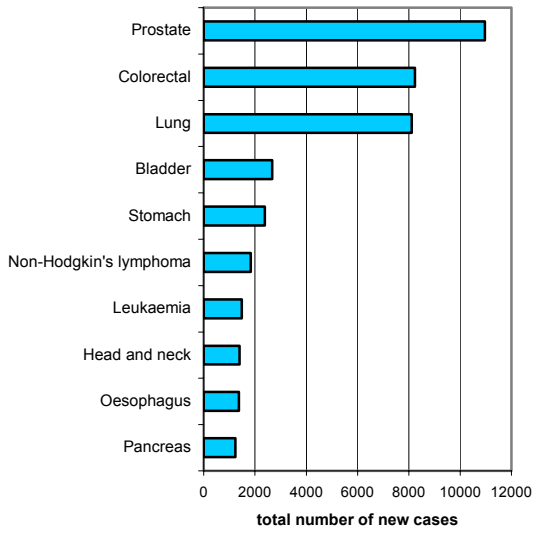


Table 2.1: Total and average annual numbers of new cases, with relative frequencies, ten most common cancers, by sex, 1994-2001

Females

Rank	*Cancer site*	*Average cases per year*	*Relative frequency*
1	Breast	1726	27.8%
2	Colorectal	792	12.8%
3	Lung	563	9.1%
4	Ovary	334	5.4%
5	Melanoma of the skin	249	4.0%
6	Uterus	223	3.6%
7	Non-Hodgkin's lymphoma	200	3.2%
8	Stomach	185	3.0%
9	Cervix	180	2.9%
10	Pancreas	175	2.8%
	All cancers	6201	100%

Males

Rank	*Cancer site*	*Average cases per year*	*Relative frequency*
1	Prostate	1371	20.7%
2	Colorectal	1029	15.5%
3	Lung	1014	15.3%
4	Bladder	333	5.0%
5	Stomach	297	4.5%
6	Non-Hodgkin's lymphoma	229	3.5%
7	Leukaemia	216	3.3%
8	Head and neck	202	3.0%
9	Oesophagus	185	2.8%
10	Pancreas	174	2.6%
	All cancers	6619	100%

By far the most common cancer in women is breast cancer, which accounts for 28% of all cancers in women in Ireland. Breast cancer is diagnosed more than twice as frequently among women as the next most common form of cancer (colorectal cancer; also known as cancer of the large bowel). The gynaecological cancers (ovary, uterus and cervix) comprise another 12% of cancers in women. In men, cancer of the prostate is the most frequently diagnosed tumour, making up 21% of all cancers. Colorectal cancer and lung cancer rank second and third in terms of number of cases in both women and men, although there are many more cases diagnosed in men than women each year (colorectal: 792 cases in women, 1029 in men; lung: 563 cases in women, 1014 in men). For lung cancer the greater disease burden in men than women is due to the higher frequency of smoking among men in the past; similarly, for colorectal cancer the male excess is also likely to be due to differences in exposure to risk factors between the sexes (see chapters 5 and 6 for more on risk factors for these cancers). Non-Hodgkin's lymphoma and cancers of the stomach and pancreas occur relatively commonly in both sexes, ranking 7th, 8th and 10th in women and 6th, 5th and 10th in men respectively. Melanoma of the skin is the 5th most commonly diagnosed cancer in women, but does not feature in the 'top ten' for men. Cancers of the bladder (4th rank), head and neck (8th) and oesophagus (9th) and leukaemia (7th) all appear in the top ten for men, but not for women, due to the dominance of the reproductive cancers in women.

Figure 2.3: Total number of deaths, ten most common causes of death from cancer, 1994-2001, females

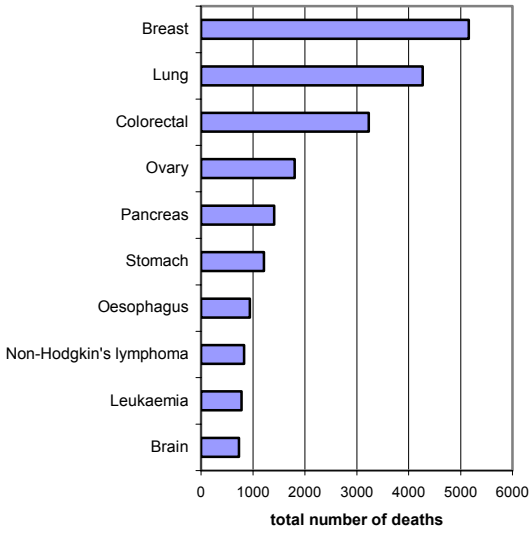


Figure 2.4: Total number of deaths, ten most common causes of death from cancer, 1994-2001, males

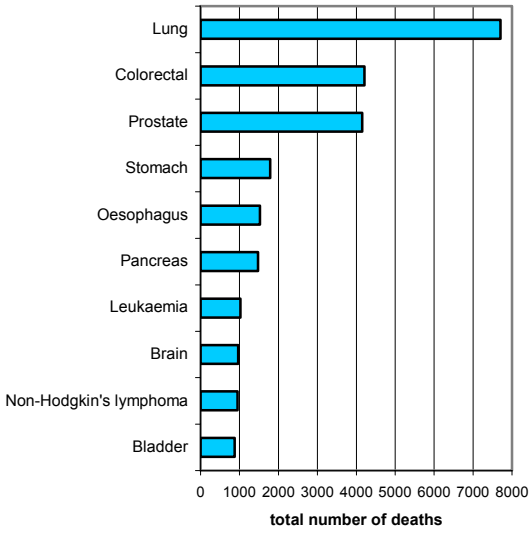


Table 2.2: Total and average annual numbers of deaths, with relative frequencies, ten most common causes of cancer-related death, by sex, 1994-2001

Females

Rank	*Cancer site*	*Average cases per year*	*Relative frequency*
1	Breast	644	18.5%
2	Lung	534	15.4%
3	Colorectal	404	11.6%
4	Ovary	225	6.5%
5	Pancreas	176	5.1%
6	Stomach	152	4.4%
7	Oesophagus	118	3.4%
8	Non-Hodgkin's lymphoma	104	3.0%
9	Leukaemia	98	2.8%
10	Brain	92	2.6%
	All cancers	3474	100%

Males

Rank	*Cancer site*	*Average cases per year*	*Relative frequency*
1	Lung	963	24.1%
2	Colorectal	526	13.1%
3	Prostate	519	13.0%
4	Stomach	224	5.6%
5	Oesophagus	191	4.8%
6	Pancreas	184	4.6%
7	Leukaemia	129	3.2%
8	Brain	121	3.0%
9	Non-Hodgkin's lymphoma	119	3.0%
10	Bladder	110	2.7%
	All cancers	4004	100%

Cancer mortality reflects a combination of disease incidence and survival. This means that cancers which are commonly diagnosed but have high survival rates (e.g. melanoma of the skin among women) may have a lesser effect on overall mortality than cancers which occur less frequently, but have a very low survival rate (e.g. cancer of the pancreas).

In terms of deaths from cancer, as for incidence, cancer of the breast dominates among women (figure 2.3; table 2.2). 18.5% of all cancer-related deaths in women in Ireland are due to breast cancer. The second and third most common causes of cancer-related death in women are lung and colorectal cancer; these tumours rank in first and second place as regards deaths from cancer among men (figure 2.4; table 2.2). The numbers

of deaths from colorectal cancer and, in particular, lung cancer among men are considerably higher than among women (lung: 534 deaths in women per year, 963 in men; colorectal: 404 in women, 526 in men), reflecting the patterns in incidence for these neoplasms. Cancer of the prostate accounts for 13.0% of cancer deaths in men, much lower than the relative frequency among cancer cases (20.7%). The only female-specific cancer to feature among the ten most frequent causes of cancer death is cancer of the ovary, which accounts for 6.5% of all cancer deaths. With the exception of the sex-specific cancers and bladder cancer in men, the other most common causes of death from cancer are similar among men and women. Cancers of the oesophagus and brain do not appear in the top ten most frequently diagnosed cancers in women, but are the 7th and 10th most common causes of cancer-related death; this is because both of these cancers have a relatively poor prognosis (chance of survival). Leukaemia, which is ranked 9th in women, is the 11th most common cause of cancer death in men.

Age distribution

The chances of developing, and dying from, cancer increases with increasing age (figures 2.5—2.12). This is primarily a result of accumulated exposure to cancer risk factors over a lifetime. Up to the age of 60, the number of cancers diagnosed in women, and the rates, exceed those in men; this is because breast cancer and some of the gynaecological tumours (e.g. cervix) have a lower average age at diagnosis than the other major cancers (e.g. lung, colorectal). Between 60 and 84, more men develop cancer than women and the increase in age-specific cancer rates with age is much more pronounced in men than women. As mentioned earlier, this is mainly due to the higher levels of exposure to cancer risk factors among men than women. In the 85 and older age group, the number of cases in women exceeds that in men, although the rate in men is higher. This is because there are more women, than men, of this age in the population. Summarizing this information, 18% of cancers in women present in those under 50. 27% are diagnosed in the 50–64 age group, 25% in women aged 65–74 and 30% in those aged 75 and older. For men the comparable figures are 10%, 24%, 34% and 32% respectively.

Similar patterns are seen for the numbers of deaths and mortality rates by age.

Figure 2.5: Numbers of cases diagnosed, by age and sex, all cancers, 1994-2001

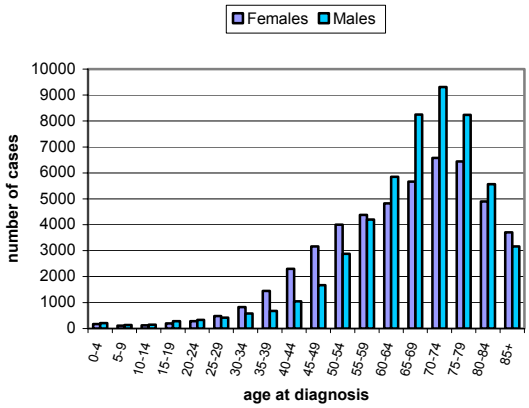


Figure 2.6: Age-specific incidence rates, by sex, all cancers, 1994-2001

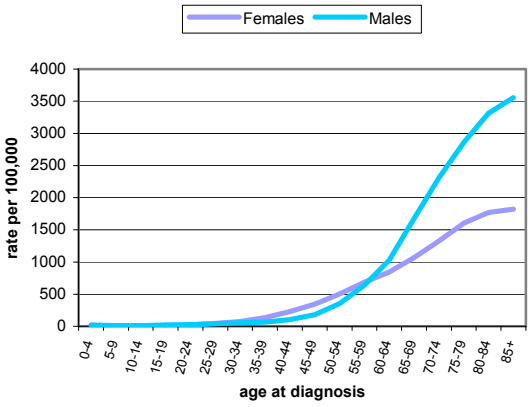


Figure 2.7: Age composition of patients at diagnosis, females, all cancers

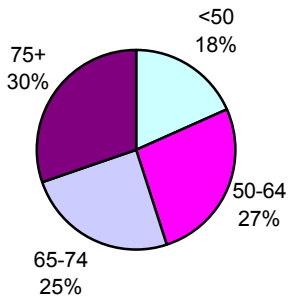


Figure 2.8: Age composition of patients at diagnosis, males, all cancers

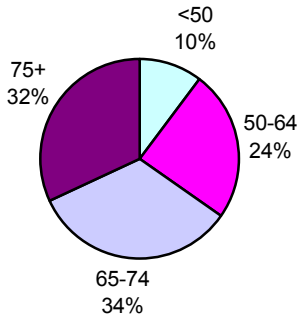


Figure 2.9: Numbers of deaths, by age and sex, all cancers, 1994-2001

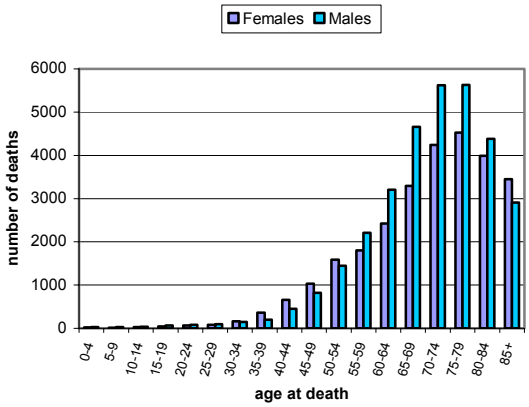


Figure 2.10: Age-specific mortality rates, by sex, all cancers, 1994-2001

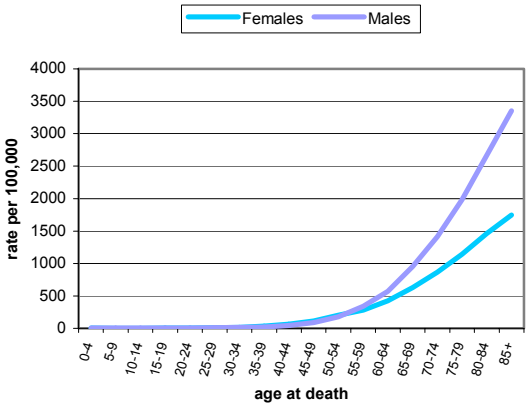


Figure 2.11: Age composition of patients at death, females, all cancers

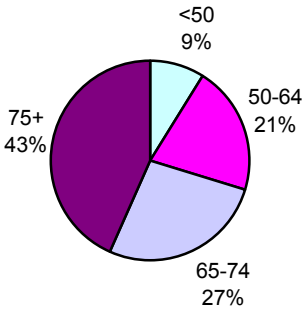
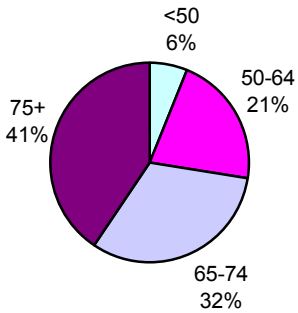


Figure 2.12: Age composition of patients at death, males, all cancers



Lifetime chance of developing cancer

The chance of being diagnosed with cancer by the age of 65 (cumulative risk) for women in Ireland is 13.7% and for men is 12.0%. These risks are equivalent to saying that 1 woman in every 7, and 1 man in every 8, will develop cancer by age 65. By the age of 75 years, the cumulative risks are 23.4% for women and 27.9% in men, which represents approximately 1 person in every 4.

Time trends

Figures 2.13 and 2.14 and table 2.3 show the annual number of cancers diagnosed and the rates, by year of diagnosis and sex, for the period 1994–2001. The rates are "age-standardised" which is a method of adjusting for, or taking account of, changes in the age distribution of the population over time (see glossary).
The number of cancer cases diagnosed in women increased steadily over the time period, rising from 5,848 in 1994 to 6,699 in 2001. There was also a consistent growth in numbers of cases in men, from 6,245 in 1994 to 7,280 in 2001. On average, the case numbers grew by 2.2% in women and by 2.4% in men each year. This was due, in part, to the ageing of the population. Once this had been taken into account, in the calculation of annual cancer rates, the magnitude of the increase was less pronounced—0.7% per annum in women and 0.9% per annum in men.

Figure 2.13: Numbers of cases diagnosed, by year of diagnosis and sex, all cancers, 1994-2001

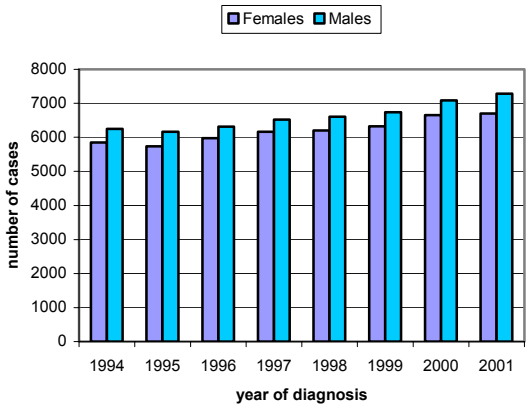


Figure 2.14: Age-standardised incidence rates, by year of diagnosis and sex, all cancers, 1994-2001

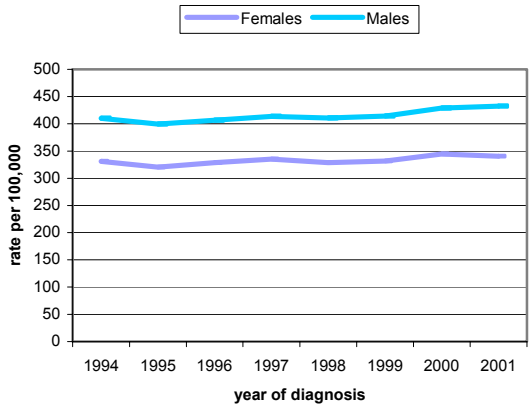


Table 2.3: Number of cases diagnosed, numbers of deaths, and age-standardised incidence and mortality rates (per 100,000 population), by year of diagnosis/death and sex, all cancers, 1994-2001

	Females					Males				
Year	Incidence		Mortality		Year	Incidence		Mortality	
	Number of cases	*Age-standardised rate*	*Number of deaths*	*Age-standardised rate*		*Number of cases*	*Age-standardised rate*	*Number of deaths*	*Age-standardised rate*
1994	5848	330.8	3429	181.9	1994	6245	410.2	3948	260.8
1995	5743	320.4	3411	177.7	1995	6162	399.2	4068	265.2
1996	5974	328.5	3396	172.8	1996	6315	406.6	3964	255.7
1997	6164	334.9	3490	177.2	1997	6523	413.1	3961	253.2
1998	6199	328.7	3439	171.0	1998	6610	410.3	4003	250.5
1999	6322	331.8	3470	169.8	1999	6737	414.1	4021	248.1
2000	6655	344.2	3574	173.8	2000	7082	429.0	4055	246.6
2001	6699	340.6	3579	169.1	2001	7280	432.1	4010	240.5
All years	49604	332.7	27788	174.0	All years	52954	414.5	32030	252.3

Figure 2.15: Numbers of deaths, by year of death and sex, all cancers, 1994-2001

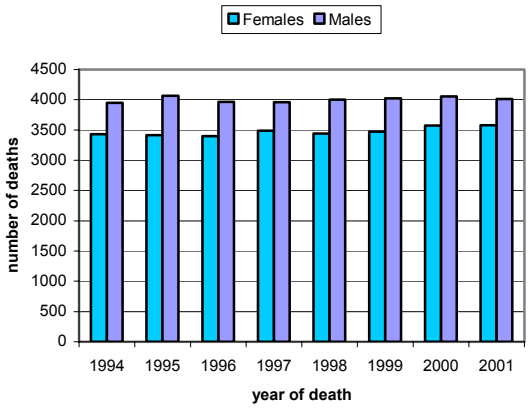
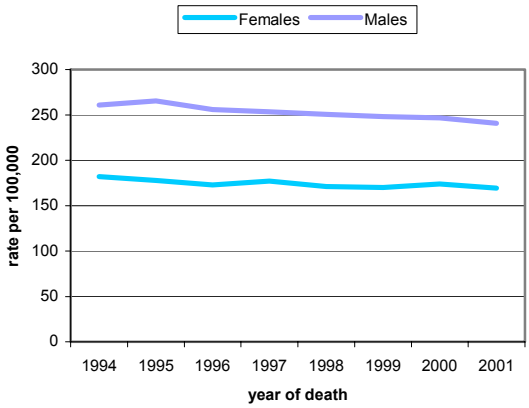


Figure 2.16: Age-standardised mortality rates, by year of death and sex, all cancers, 1994-2001



There was only a very modest rise in the annual numbers of deaths from cancer in either sex during 1994 to 2001 (figure 2.15). In women, it appeared that there was a slight rise in 2000 and 2001 compared to earlier years. The age-adjusted mortality rates in both sexes declined during 1994–2001 (figure 2.16). This was slightly more evident in men (average annual fall of 1.2%) than women (annual fall of 0.8%).

Cancer in Ireland in 2006

In Ireland, as in most developed countries, life expectancy is increasing and the proportion of the population aged 65 and older is growing. Because cancer is predominantly a disease of older people, this means that the numbers of people who will be affected with cancer is expected to rise in coming years.

In 2006, it is estimated that approximately 7400 women will be diagnosed with malignant cancer in Ireland. The number of men expected to develop cancer in 2006 is approximately 8000. In the absence of effective cancer prevention measures, these figures will grow in the years following 2006 for as long as the current demographic trends continue.

International comparisons: incidence and mortality

Figures 2.17 and 2.18 show incidence rates for all cancers in women and men in Ireland, other European countries and the USA. For both sexes, the incidence rate in the USA exceeds that in all of the western European countries considered. The rate for women in Ireland is 19% lower than that for women in the USA; the comparable figure for men is 23%. Within western Europe, for women, incidence rates tend to be higher among the northern countries than in the central and southern parts of the region. Incidence among women in Ireland is in the upper third of the countries surveyed, at a similar level to northern European populations, and 5% higher than in the UK. The variation in incidence across western Europe is less pronounced for men than for women. This suggests that differences between the countries of Europe with regard to cancer screening practices and exposure to risk factors are less pronounced among men than women; the European Cancer Health Indicators project (EUROCHIP) is currently examining methods of collating data in these areas (Micheli et al., 2003). Men in Ireland have an all-cancer incidence rate that is in the mid-range of the countries surveyed, and is 8% higher than the UK rate.

International comparisons in all cancer mortality are shown in figures 2.19 and 2.20. Among women, across western Europe there is an almost two-fold variation in all cancer mortality. The southern countries have the lowest rates and the countries of northern mainland Europe, Ireland and the UK have the highest rates. The rate for women in Ireland is exceeded only by that for Denmark. As for incidence, the geographical variations among men are less strong than those among women, and rates in Ireland fall in the middle of the range for western European countries ranked by mortality rate. For both sexes the all cancer mortality rate for Ireland is 13% higher than that for the USA. This is particularly noteworthy given the higher incidence in the USA than in Ireland. In part the higher mortality in Ireland is probably due to differences in the relative frequencies of different types of cancers between Ireland and the USA, but other factors are also likely to be in operation including different policies and practices with regard to screening, diagnosis, and treatment.

Figure 2.17: Age-standardised incidence rates for European countries and the USA, all cancers, females*

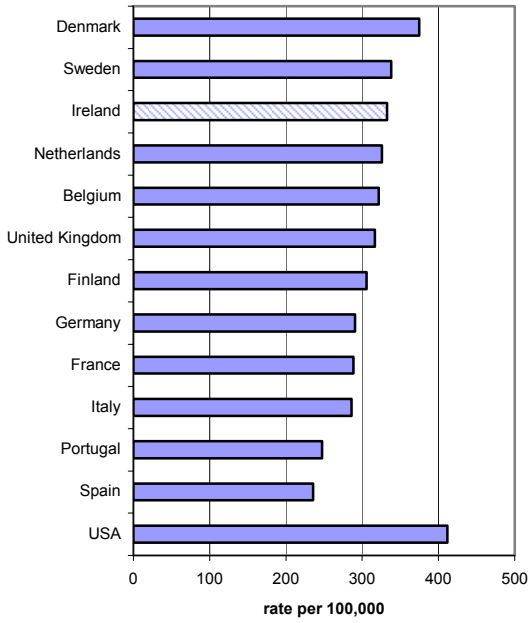
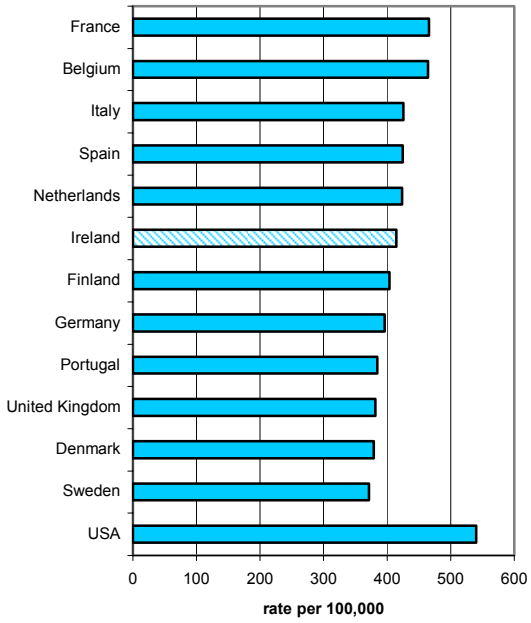


Figure 2.18: Age-standardised incidence rates for European countries and the USA, all cancers, males*



* years included are: Ireland, 1994–2001; other European countries, 1998; USA, 1992–2002

Figure 2.19: Age-standardised mortality rates for European countries and the USA, all cancers, females*

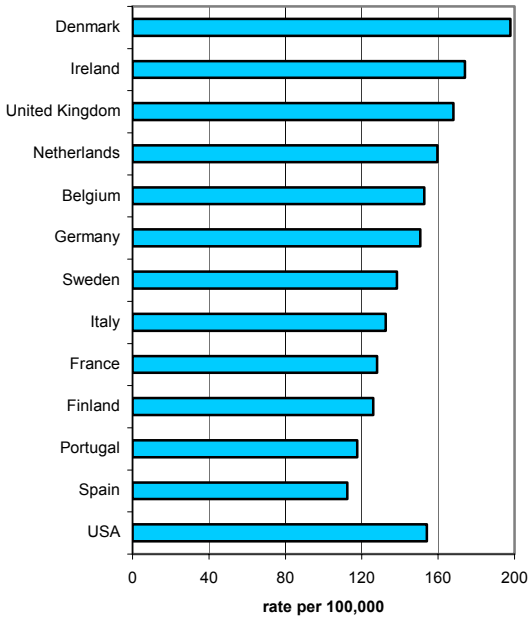
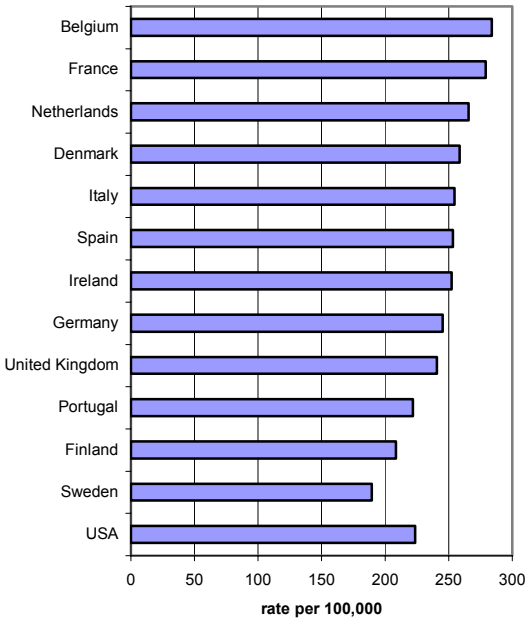


Figure 2.20: Age-standardised mortality rates for European countries and the USA, all cancers, males*

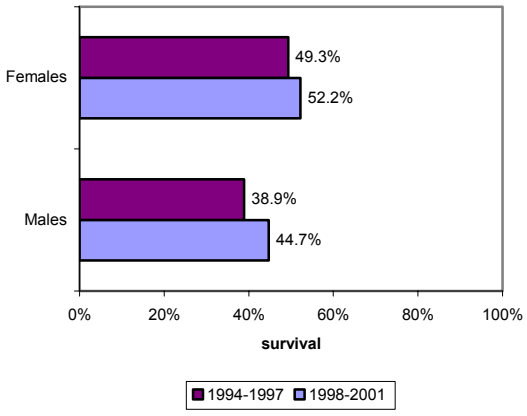


* years included are: Ireland, 1994–2001; other European countries, 1998; USA, 1992–2002

Survival

Survival at 5 years after diagnosis for individuals diagnosed with any type of cancer is shown in figure 2.21. These figures represent the survival of cancer patients relative to the population as a whole. Five-year survival is higher for women than for men. This is due to the different mix of good prognosis and poor prognosis cancers between the sexes. As seen in later chapters, the cancers that predominate in women (e.g. breast), or occur only in women (e.g. cervix, uterus), tend to have better survival prospects than some of the other common cancers (e.g. lung).

Figure 2.21: Relative survival (%) at five years after diagnosis, by sex and period of diagnosis, all cancers

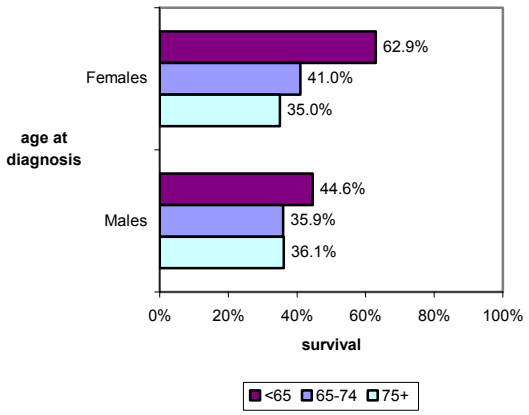


Survival has risen slightly, but significantly, over time for both sexes. For women, 5-year survival increased from 49.3% for patients diagnosed in 1994–1997 to 52.2% for patients diagnosed in 1998–2001. For men, 5-year survival was 38.9% for those diagnosed in the earlier period and 44.7% for those diagnosed in the later period.

Age at diagnosis with cancer is related to survival. In general younger patients have higher survival than older patients (figure 2.22). The cancers affecting younger patients (for example, breast and cervical cancer in women) also tend to be those with a better survival. This relationship is stronger for women than for men, and reflects the mix of different types of cancers diagnosed in men and women, and the relationships between age and survival for each individual type of cancer.

For women diagnosed between 1994–1997, survival at 5 years was 62.9% in those aged under 65 at diagnosis; in the 64–75 age group it was 41.0% and in those aged 75 and older it was 35.0%. For men, the contrast was between those aged 65 and under and those aged 65 and older; for the younger patients survival was 44.6%, while for the older patients it was around 36%. There was no difference in survival between men aged 64–74 and those aged 75 and older.

Figure 2.22: Relative survival (%) at five years after diagnosis, by sex and age at diagnosis, all cancers, 1994-1997



International comparisons: survival

Figures 2.23 and 2.24 show survival rates at 5 years after diagnosis for female and male cancer patients in Ireland and in other European countries. The survival rates for Ireland pertain to patients diagnosed in a more recent time period than those for other countries (1994–1997 for Ireland; 1990–1994 for other countries). Since survival has increased slightly over time, this means that Ireland will be ranked higher in these comparisons than would have been the case had data been available for patients diagnosed in 1990–1994.

For women, 5-year survival ranges from less than 40% to almost 60% across the countries of Europe. For men, the range is just over 20% to almost 50%. The ranking of the countries is similar for both sexes. The Eastern European populations have the lowest survival, followed by the UK, Denmark and Ireland. The highest survival is experienced by patients resident in Sweden, Switzerland, France and Germany. Survival for women in Ireland (49.3%) is just below the European average (51.2%), as is survival for men (38.9% for Ireland, 39.8% for Europe).

These geographical variations in all-cancer survival are partly a result of differences between countries in the mix of cancers diagnosed. For example, those countries with a high incidence of lung cancer (which has low survival), will tend to have lower all-cancer survival. As is clear in later chapters, however, there are also variations across Europe in survival for individual cancers. The reasons underlying these variations have been extensively debated and investigated over the past 10 years. The possible explanations include: variations between countries in (a) availability, and access to, effective cancer treatment; (b) the stage at which cancer patients are diagnosed; and (c) effectiveness of treatment for co-morbid conditions in patients (Coleman et al., 2003). The survival differences may also reflect artefacts in the data (e.g. quality of cancer registration

and follow-up of patients, including ascertainment of cases and deaths, in different countries), over-diagnosis (diagnosis of cancers that would not have caused symptoms in the patient's lifetime and would not have been diagnosed or treated in the absence of screening or early diagnostic activity) and lead time bias (earlier diagnosis without postponement of death)(Coleman et al., 2003).

Figure 2.23: Five-year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, all cancers, females

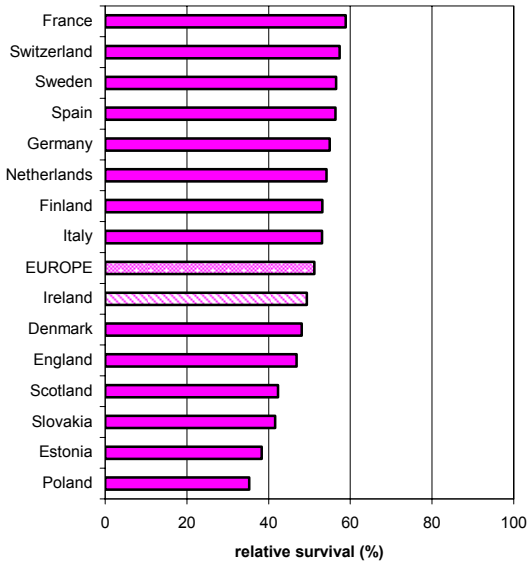
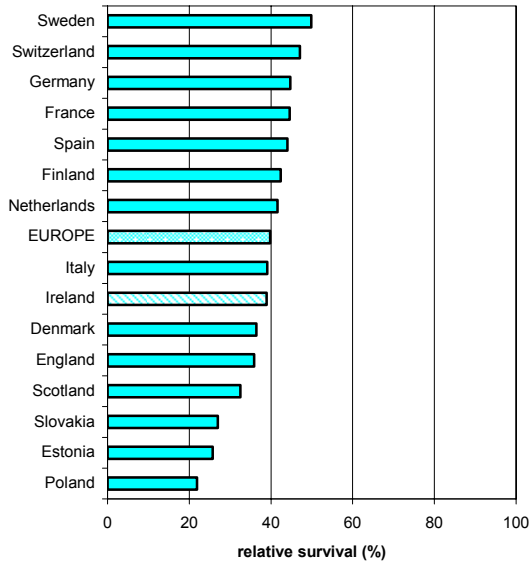


Figure 2.24: Five-year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, all cancers, males



* for Ireland, includes patients diagnosed 1994–1997; for other countries includes patients diagnosed 1990–1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 3: Breast cancer and carcinoma in situ

Key points

- *Cancer of the breast is the most commonly diagnosed cancer, and the leading cause of cancer-related death in women in Ireland.*
- *Each year an average of 1726 women are diagnosed with breast cancer. Almost 650 women die from breast cancer annually. Just over 90 women are diagnosed with breast carcinoma in situ, a pre-cancerous lesion of the breast.*
- *Half of all cases of breast cancer are diagnosed in women aged 59 and younger. The average age at death is 66 years. Women with breast carcinoma in situ are diagnosed with it, on average, at age 53.*
- *More than 25000 women are estimated to be living following a diagnosis of breast cancer in Ireland. Another 2000 have had a diagnosis of breast carcinoma in situ.*
- *During 1994 to 2001, the number of breast cancers diagnosed (incidence) rose by 4% each year. Some of this increase was due to population change and, when this is excluded, the rate of increase was 2% a year, with most of the increase taking place in the years since 1998. The average annual rate of increase in breast carcinoma in situ was 10%. Mortality rates doubled between 1950 and 1989, and have fallen since then, with rates in recent years approximately 80% of those in 1989.*
- *Breast cancer incidence was 26% lower in Ireland than in the USA. The rate in Ireland was in the middle of rates observed across western Europe. Mortality in Ireland was 33% higher than in the USA, and in the upper third of rates in European countries.*
- *Women in six areas[1] experienced rates of breast cancer that differed significantly from the national average; more cases were diagnosed than expected in the Eastern region, and fewer than expected in the Mid-Western, North Eastern, North Western, Western and South-Eastern areas. Women in the Midland area had higher mortality than expected.*
- *There was a modest relationship between deprivation and breast cancer incidence; women resident in more affluent areas had slightly higher rates than those in more deprived areas.*
- *More than 80% of women with breast cancer had surgery. The frequencies of use of radiation therapy (60% of women in 1998-2001) and hormone therapy (52% in 1998-2001), but not chemotherapy (46% in 1998-2001) increased between 1994-1997 and 1998-2001. Older women were more likely than younger women to receive hormone therapy, but less likely to have surgery, chemotherapy or radiation therapy.*
- *Survival improved slightly between 1994-1997 and 1998-2001, and at five years after diagnosis is now 77%. Survival is lower in older than younger women.*
- *Survival in Ireland is lower than the European average, but similar to levels in England and Scotland.*
- *Aspects of lifestyle (e.g. weight, physical activity, drinking alcohol) affect the risk of developing breast cancer. There may be possibilities for breast cancer prevention through lifestyle changes.*
- *Mammographic screening is effective in reducing breast cancer mortality rates in the population. Women should participate in breast screening from the age of 50.*

[1] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Summary

Cancer of the breast is the leading cause of cancer in women in Ireland (table 3.1). 27.8% of all new cancers are in the breast. On average, 1726 women are diagnosed with a breast cancer each year. The average age at diagnosis is 59 years. The chance of a woman in Ireland developing breast cancer by the age of 64 years is 5.4%, which corresponds to 1 woman in every 19. The chance of developing breast cancer by age 75 increases to 7.9%, or 1 woman in 13. It is estimated that more than 25300 women were living following a diagnosis of breast cancer in Ireland at the end of 2001. It is estimated that 2171 new cases will be diagnosed in Ireland in 2006.

Table 3.1: Summary information, incidence and prevalence, female breast cancer

Rank among the common cancers in women	1st
% of all new cancer cases	27.8%
Average number of new cases per annum	1726
Average age[¥] at diagnosis with breast cancer	59
Chance of developing breast cancer	
• by age 65	5.4%
• by age 75	7.9%
Estimated number of women alive in 2001 following a diagnosis of breast cancer	25300
Estimated number of cases that will be diagnosed in 2006	2171

In terms of cancer-related deaths, breast cancer also ranks first (table 3.2). More than 640 women die from cancer of the breast each year and this cancer accounts for 18.5% of all cancer deaths. The average age at death is 66. 22.2% of all person-years of life lost due to cancer in Ireland are a result of deaths from breast cancer and, on average, each woman who dies from the disease loses 18 years of life. Within the 5 years following diagnosis with breast cancer, 29% of women will have died from the disease.

Table 3.2: Summary information, mortality, female breast cancer

Rank among the common cancers in women	1st
Average number of deaths per annum	644
% of all cancer deaths due to breast cancer	18.5%
Average age[¥] at death from breast cancer	66
% women with breast cancer who die from the disease within 5 years of diagnosis	29%
% of person-years of life-lost due to breast cancer	22.2%
Average number of years of life-lost for a woman dying from breast cancer	18

[¥] The "average age" at diagnosis (or death) quoted in this report is the median age of all cases (deaths). 50% of cases (or deaths) are younger than the median age and 50% are older.

Risk factors and prevention

Table 3.3: Convincing, probable and possible risk factors for breast cancer

	Increasing risk	*Reducing risk*
Convincing or probable	Family history of breast cancer[1,2] Nulliparity and low parity[1,3] Late age at first pregnancy[1,3] Late natural menopause[1,3] Early menarche[1,3] Overweight/obesity/high body mass index and weight gain in adulthood (post-menopausal breast cancer)[4] Alcohol[5,6,7] Current or recent use of oral contraceptives[8,9] Current or recent use of hormone replacement therapy[8,9] Ionizing radiation exposure (including X-rays and gamma radiation)[10]	Physical activity[4] Breastfeeding[11] High body mass index (pre-menopausal breast cancer)[4,12] Tamoxifen (in pre-menopausal women at high-risk of breast cancer)[13]
Possible	Taller in adulthood[1,3]	Use of aspirin and other non-steroidal anti-inflammatory drugs[14,15]

1 Veronesi et al., 2005;
2 Breast cancer in first degree relatives(s);
3 Key et al., 2001;
4 IARC Working Group, 2002a;
5 WCRF/AICR, 1997;
6 Key et al., 2004;
7 Hamajima et al., 2002;
8 IARC Working Group, 2005a and 2005b;
9 combined oestrogen-progestogen formulations;
10 US Department of Health and Human Services, 2005;
11 Collaborative Group on Hormonal Factors in Breast Cancer, 2002;
12 in countries with a high incidence of breast cancer;
13 Levine et al., 2001;
14 Khuder & Mutgi, 2001;
15 Gonzalez-Perez et al., 2003

Up to 10% of breast cancer is hereditary and caused by mutations (changes) in genes. Women who have mutations in the *BRCA1* or *BRCA2* genes have a very high chance of developing breast cancer over their lifetime (Antoniou et al., 2003). Having one or more close relatives (sister, mother, daughter) who have been diagnosed with breast cancer also increases a woman's risk of getting the disease (Veronesi et al., 2005), particularly if more than one relative is affected and the affected relative(s) were diagnosed at a young age. Many of the other important risk factors for breast cancer relate to a woman's reproductive history (table

3.3)—early menarche (onset of menstrual periods), late age at first pregnancy, low parity (or no children), and late menopause all increase risk, while breastfeeding appears to reduce risk. These relationships suggest that oestrogen has an important role in breast cancer. This is supported by the observations that current, or recent, use of oral contraceptives and hormone replacement therapy (HRT) also increase risk. Lifestyle factors are also involved in breast cancer. Being overweight or obese increases risk of developing the disease in post-menopausal women. Higher levels of physical activity are associated with lower risk. Drinking alcohol raises the risk of breast cancer. These relationships suggest that there are prospects for prevention of breast cancer through changes in lifestyle.

Screening for breast cancer, using mammography (an X-ray of the breast), is effective in reducing mortality rates from breast cancer in the population (IARC Working Group, 2002b). Mammography detects breast tumours when they are at an early stage and would not be found clinically. This early detection, with appropriate treatment, improves chances of survival. The European Code Against Cancer (Boyle et al, 2003) recommends that women participate in breast screening from the age of 50. More information about screening for breast cancer in Ireland can be obtained from BreastCheck (http://www.breastcheck.ie/).

Age distribution

Breast cancer is relatively uncommon before the age of 30, but risk increases with age thereafter, especially up to the menopausal years. Risk continues to rise with age following the menopause but the rate of increase is less pronounced. In terms of numbers of cases, one quarter are diagnosed in women aged under 50, and a further 36% in the 50-64 age group (figure 3.1). The remaining 39% are distributed equally between women aged 65-74 years and those aged 75 and older. As regards deaths, 15% are in women under 50, 31% in the 50-64 age group, 23% in women aged 65-74 years and 31% in women aged 75 and older (figure 3.2).

Figure 3.1: Age composition of patients at diagnosis, female breast cancer

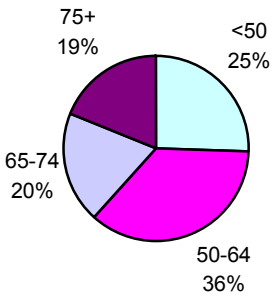
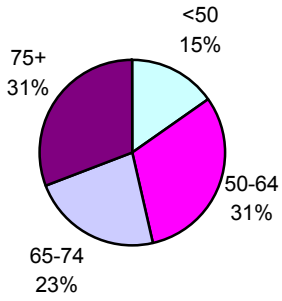


Figure 3.2: Age composition of patients at death, female breast cancer



Time trends

In the early 1990s it was noted that over the previous 30 years, in many populations, there had been a consistent rise in breast cancer incidence (Coleman et al., 1993). The introduction of mammography screening can cause an initial increase in incidence with a fall thereafter. However, the rising breast cancer rates do not seem to be due solely to the effects of screening (Coleman et al., 1993), and have continued in recent years (Bray et al., 2004a). This suggests that the underlying risk of the disease is rising, probably as a result of changing patterns of reproduction and exposure to lifestyle risk factors. Mortality rates have been falling in western Europe, North America and Australia since at least 1990 (Veronesi et al., 2005). In the USA, for example, this is thought to be almost equally due to the effects of screening and the introduction of adjuvant therapy (a treatment— chemotherapy, radiation therapy or hormone therapy - given after the primary treatment—usually surgery—to increase the chances of a cure) (Berry et al., 2005).

The number of breast cancers diagnosed in women in Ireland rose by 4% each year during 1994 to 2001. Once adjustment had been made for the ageing of the population, the incidence rates increased by 2% per year, with most of this growth taking place in the years since 1998 (figure 3.3). Incidence rates in 1994-1997 were 94 to 98 per 100,000, but had risen to 110 per 100,000 in 2001. The annual number of deaths was stable over the period. This translated into a modest fall in mortality rates, of just over 1% per year.

Figure 3.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female breast cancer

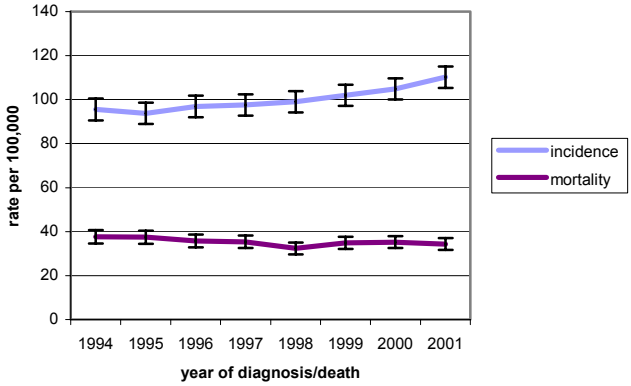
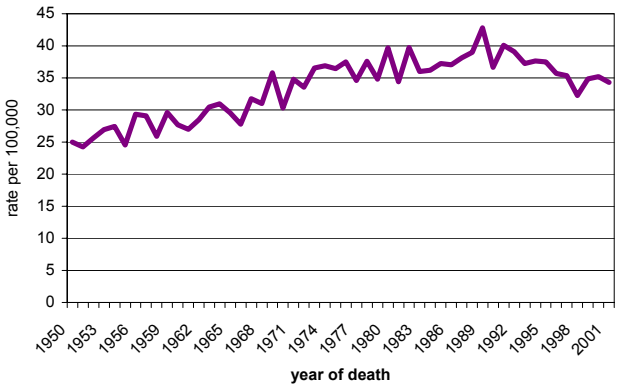


Figure 3.4: Age-standardised mortality rates, by year of death, 1950-2001, female breast cancer



The long-term trends in mortality from breast cancer in women in Ireland are shown in figure 3.4. Rates rose consistently from 1950 to reach a peak in 1989. During this time mortality almost doubled. Since 1990 rates have fallen steadily, and in the most recent years are about 80% of the 1989 level.

Geographical variations

Figures 3.5 and 3.6 show breast cancer incidence and mortality rates for women in Ireland, other European countries and the USA. Incidence rates in women in the USA exceed those in women in all western European countries, including Ireland. Incidence is 26% lower in women in Ireland than in women in the USA. Within western Europe, the rate in Ireland falls in the middle of the range of rates observed, being higher than the rate in southern countries, but lower than that in northern countries. Ireland falls in the upper half of the range of breast cancer mortality rates reported across western Europe. Mortality in Ireland was 33% higher than in the USA. These patterns reflect, in part, whether mammographic screening is offered, and if so, when its use became widespread, in different countries.

Figure 3.5: Age-standardised incidence rates for European countries and the USA, female breast cancer*

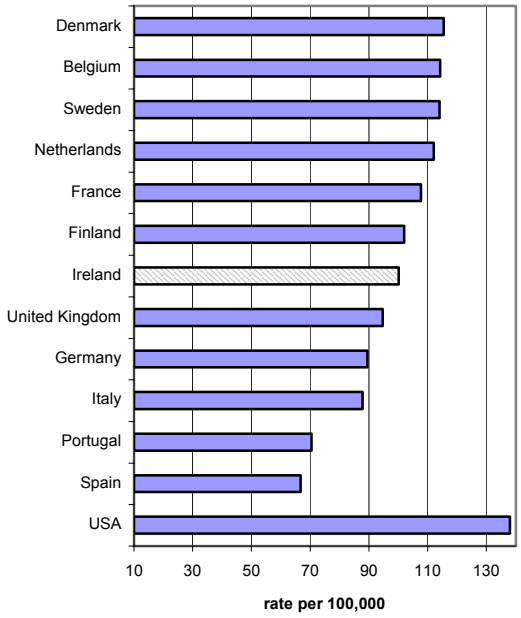
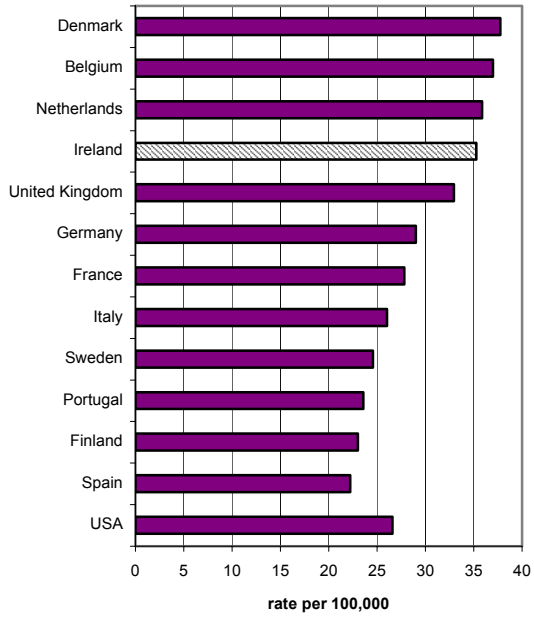


Figure 3.6: Age-standardised mortality rates for European countries and the USA, female breast cancer*

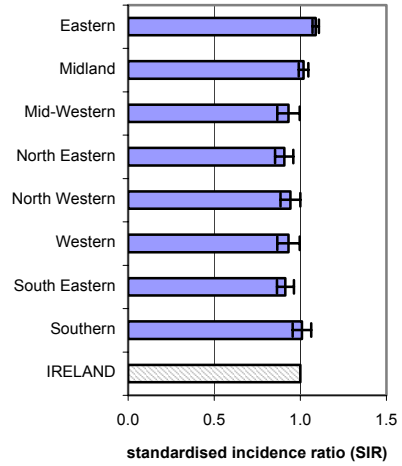


* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Geographical variation in breast cancer incidence and mortality in women in Ireland is shown in figures 3.7 and 3.8. These data are based on the former health board areas (see Appendix 3), as that is how the data were recorded for the years covered in this report. For women resident in six areas, the number of diagnosed cases was significantly different from that expected based on the incidence in Ireland as a whole. There were 10% more cases than expected in women resident in the Eastern area, while women resident in the Mid-West, North Eastern, North Western, Western and South-Eastern areas experienced between 6% and 10% fewer cases than expected. In terms of deaths, the only area in which mortality differed significantly from the national average was the Midland area, which had 7% more deaths than expected.

As noted above, the availability and uptake of mammographic screening impacts on breast cancer incidence and mortality patterns. The initial effect is a rise in the number of cases (due to the fact that screening detects cases earlier than they would have otherwise been diagnosed) followed, in the intermediate and longer-term, by declines in incidence and mortality rates (Moller et al., 2005). In Ireland, screening was offered from 2000 to women resident in the Eastern, North Eastern and Midland areas (www.breastcheck.ie; chapter 15). As yet, no strong, consistent, effect of screening on the geographical distribution of breast cancer in Ireland is apparent.

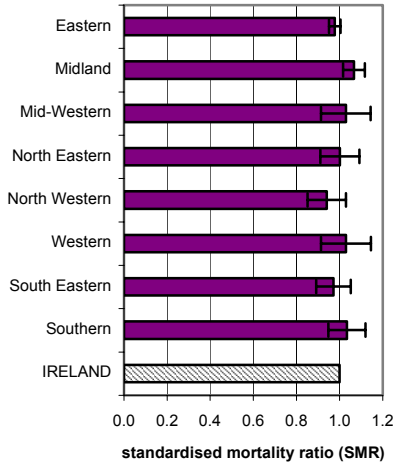
Figure 3.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas, 1994-2001, female breast cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	654	214
Midland	99	39
Mid-Western	141	58
North Eastern	130	53
North Western	99	38
Western	163	70
South Eastern	172	68
Southern	269	104

Figure 3.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas, 1994-2001, female breast cancer

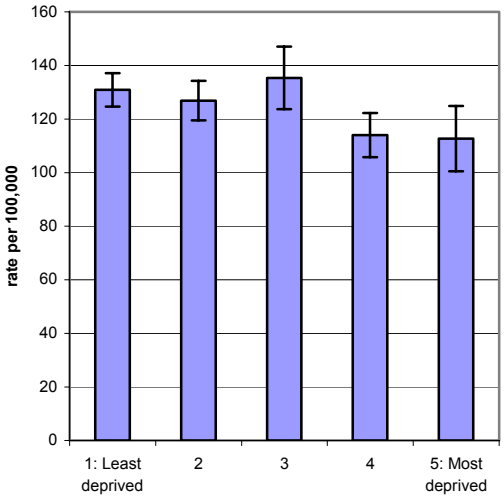


Deprivation

Breast cancer has been consistently, positively, associated with higher socio-economic status (Faggiano et al., 1997). In England and Wales, incidence—but not mortality—was higher in women resident in the most affluent areas, compared to those resident in the most deprived areas (Quinn et al., 2001). The divergence in incidence and mortality was a result of higher survival in those of higher socio-economic status.

In Ireland, there is only a modest relationship between breast cancer and socio-economic status, as measured by deprivation category of area of residence (figure 3.9), although the direction of the association was consistent with the international data. Incidence was slightly higher in women resident in more affluent areas (categories 1-3) than in women resident in more deprived areas (categories 4 and 5).

Figure 3.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female breast cancer



Stage at presentation and treatment

The extent of breast cancer at diagnosis describes whether the tumour has spread beyond the breast, to underlying tissue or muscle, elsewhere in the chest, lymph nodes in the underarm, or more distant sites (e.g. lung). Disease spread is one of the most important factors determining prognosis for a woman with breast cancer (Henson et al., 1991).

Information was available on disease spread at the time of diagnosis for just over 70% of breast cancers in women in Ireland. Of these, approximately one third of tumours were localised (confined to the breast), one third had spread into adjacent tissue and parts of the body, and the final third had spread to further away organs or sites (table 3.4). Older women tended to have more advanced disease; 25% of women aged 75 and older had localised disease, 26% regional disease and 50% distant spread.

Table 3.4: Extent of disease at diagnosis, 1994-2001, female breast cancer

*Extent**	*%*
Local	32%
Regional	33%
Distant	36%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Most women with breast cancer will undergo surgery to remove the cancer from the breast. Surgery may be breast conserving (e.g. a lumpectomy which removes the tumour and a small amount of surrounding tissue) or mastectomy (which removes the whole breast). In Ireland, more than 4 out of 5 women with breast cancer undergo surgery (table 3.5), although this falls to just over half of women aged 75 and older. It is also recommended that patients with particular types of breast cancer receive adjuvant therapy following surgery (chemotherapy, radiation therapy or hormone therapy[†]), to kill any remaining cancer cells (SIGN, 2005). This is reflected in the data which shows that, in 1998-2001, 59% of patients had radiation therapy, 52% hormone therapy and 46% chemotherapy.

The frequencies with which radiation and hormone therapy, but not chemotherapy, were used rose between 1994-1997 and 1998-2001. The effectiveness of adjuvant chemotherapy in reducing risk of recurrence and death was established by the mid-1990s (Early Breast Cancer Trialists' Collaborative Group, 1998), while the value of radiation and hormone therapy has been confirmed more recently (see, for example, Early Breast Cancer Trialists' Collaborative Group, 2000; Wilckens et al., 2003). In Ireland, older women are more likely than younger women to receive hormone therapy, but less likely to have chemotherapy or radiation therapy. As regards chemotherapy, this may be because it is not clear whether adjuvant treatment is of any benefit in women aged 70 and older (SIGN, 2005). Hormone therapy can be effective if given to patients with breast cancer that has spread throughout the body (Wilcken et al., 2003); since older women are more likely to have widespread disease, this might explain the higher frequency of hormone therapy use in older women.

Table 3.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female breast cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	60%	35%	21%	48%	64%	27%	6%	46%
Hormone therapy	37%	48%	49%	41%	47%	60%	62%	52%
Radiotherapy	62%	45%	22%	51%	69%	57%	27%	59%
Surgery	92%	82%	53%	83%	94%	87%	54%	85%
No tumour-directed treatment	2%	5%	17%	5%	2%	4%	17%	5%

* patients may receive more than one form of treatment; figures do not sum to 100%

[†] Often tamoxifen. This is different from hormone replacement therapy used for the treatment of menopausal symptoms.

Survival

There is evidence of a slight improvement in breast cancer survival over time in Ireland (figure 3.10). For women diagnosed in 1998-2001, five-year survival was 77.4%, compared to 73.0% for women diagnosed in 1994-1997. Age is related to prognosis, with survival decreasing with increasing age (figure 3.11). For women diagnosed in 1994-1997, five year survival in those under 65 at diagnosis was 75.8%, compared to 70.1% in the 65-74 age group and 67.3% in women 75 and older.

Figure 3.10: Relative survival (%) at one, three and five years after diagnosis, all ages, female breast cancer

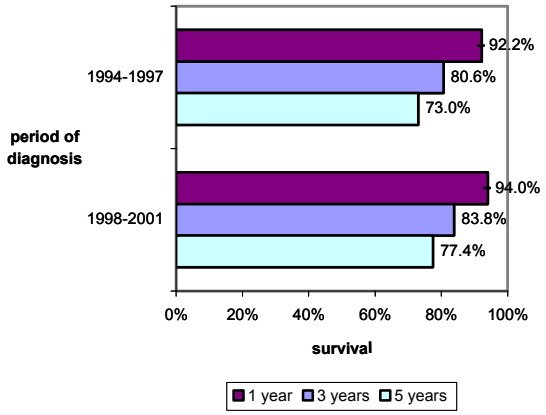


Figure 3.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female breast cancer

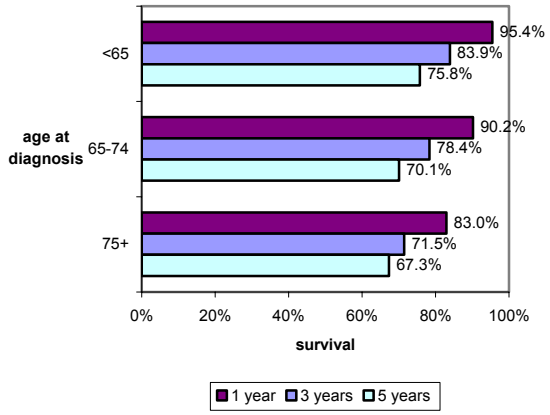
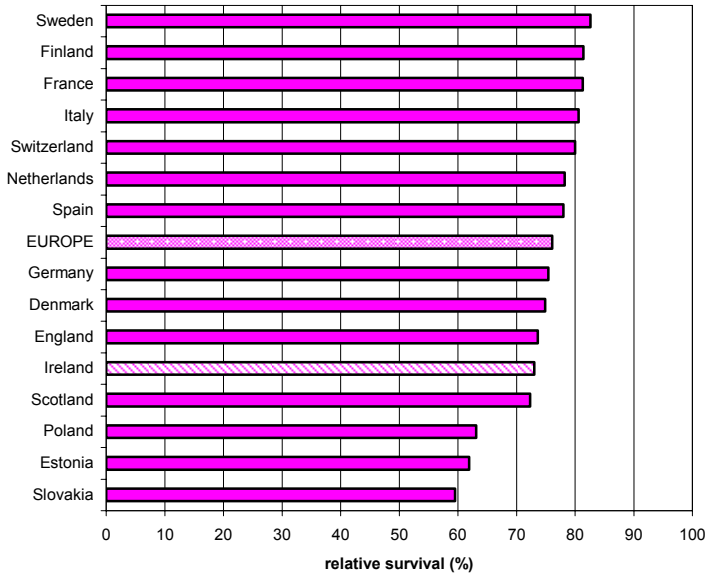


Figure 3.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female breast cancer



Five-year survival for women with breast cancer ranges from around 60% in the countries of eastern Europe, to more than 80% in Italy, France, Finland and Sweden (figure 3.12). Survival in women in Ireland is similar to that for women in England and Scotland; all three countries have rates below the European average. Much of these differences in survival are thought to be due to inter-country variations in stage at diagnosis (Sant et al., 2003a). Other factors that are likely to have contributed to the differences are given in chapter 2.

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Carcinoma *in situ* of the breast

Carcinoma *in situ* is a pre-malignant lesion of the breast. There are two main types—ductal and lobular carcinoma *in situ*. Lobular lesions seldom develop into invasive breast cancers. However, ductal lesions, if not detected, can go on to become invasive cancers. Ductal lesions are usually found by mammographic screening. Since carcinoma *in situ* is not itself a cause of death, only incidence data are presented below.

Summary

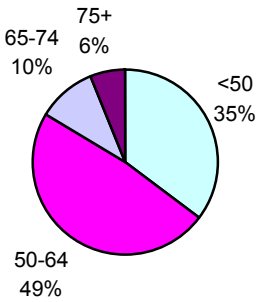
On average, 93 new cases of breast carcinoma *in situ* were diagnosed each year in women in Ireland during 1994-2001 (table 3.6). 80% of these tumours were ductal carcinoma *in situ*, 12% lobular, and the remaining 8% were other or mixed types. The average age at diagnosis is 53. The risk of developing a breast carcinoma *in situ* by the age of 75 years is 0.5%, with corresponds to 1 woman in 200. In 2001, an estimated 2100 women living in Ireland had been diagnosed with a breast carcinoma *in situ*.

Table 3.6: Summary information, incidence and prevalence, breast carcinoma in situ

Average number of new cases per annum	93
Average age at diagnosis with breast carcinoma *in situ*	53
Chance of developing breast cancer	
• by age 65	0.4%
• by age 75	0.5%
Estimated number of women alive with breast carcinoma *in situ* in 2001	2100

Age distribution

Figure 3.13: Age composition of patients at diagnosis, breast carcinoma *in situ*

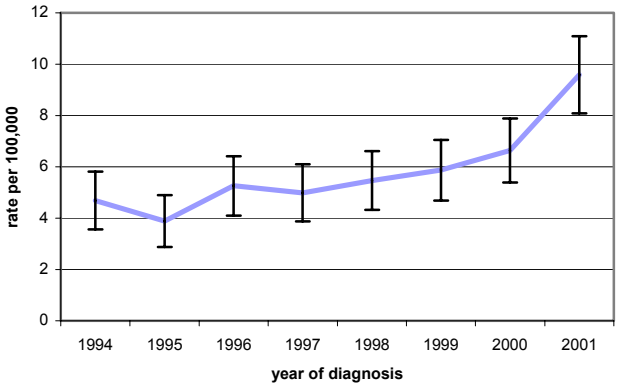


Breast carcinoma *in situ* is diagnosed most commonly in women aged 50-64 years; almost half of all cases are in this age group (figure 3.13). Another third of cases are in younger women (under 50). The lesion is less common in older women; only 10% of cases occur in women aged 65-74 and 6% in women 75 and older.

Time trends

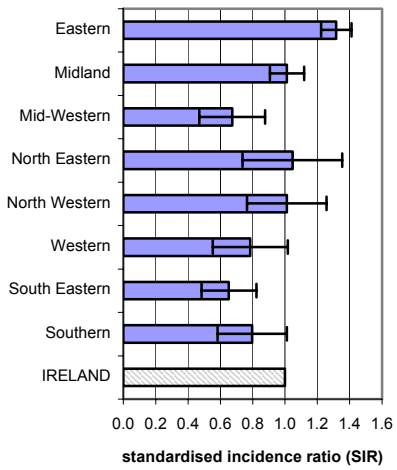
The number of cases of carcinoma *in situ* of the breast diagnosed in women in Ireland grew by, on average, 12% each year from 1994 to 2001. Age-adjusted rates rose steadily over the period (figure 3.14) and the rate in 2001 was more than double that in 1994. The average annual rate of increase was 10%. The pronounced increase in recent years may reflect the introduction of the breast cancer screening programme in 2000 (www.breastcheck.ie; chapter 15).

Figure 3.14: Age-standardised incidence rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, breast carcinoma *in situ*



Geographical variations

Figure 3.15: Standardised incidence ratios, with 95% confidence intervals, for former health regions, 1994-2001, breast carcinoma *in situ*



Average annual numbers of cases

	cases
Eastern	44
Midland	5
Mid-Western	6
North Eastern	8
North Western	6
Western	7
South Eastern	7
Southern	11

The geographical pattern of breast carcinoma *in situ* in Ireland is dominated by significantly higher incidence in the Eastern region than the national average (figure 3.15), which may result in part from the introduction of BreastCheck in this area (www.breastcheck.ie). Two areas had significantly fewer cases than expected (Mid-Western, South-Eastern) but these observations are based on relatively few cases per annum and should be interpreted with caution.

Chapter 4: Cervical cancer and carcinoma *in situ*

Key points

- *Cancer of the cervix is the 9th most frequently diagnosed cancer in women in Ireland. It is the 12th most common cause of cancer-related death.*
- *On average, each year 180 women are newly diagnosed with a cervical cancer, and 73 women die from the disease. Each year more than 800 women are diagnosed with cervical carcinoma in situ, a pre-cancerous lesion of the cervix.*
- *Half of all cases of cervical cancer are diagnosed in women aged 46 and under. The average age at death is 56 years. Women with cervical carcinoma in situ are diagnosed with it on average at 32.*
- *An estimated 2900 women are living with cervical cancer in Ireland. 31,200 women are estimated to have had a cervical carcinoma in situ.*
- *The number of new cases of cervical cancer (incidence) fluctuated between 1994-2001, but no particular trend was evident. The rate of cervical carcinoma in situ rose by 40% between 1994 and 2001; most of this increase took place from 1998. Mortality rates rose slightly from 1994 to 1996 and fell slightly thereafter. The trends in mortality since 1978 show an increase of 1.5% per year.*
- *Incidence and mortality rates for cervical cancer in Ireland fall in the mid-range of rates observed across Europe. They exceed those in the USA by 12% for incidence and 58% for mortality.*
- *Cervical cancer incidence in two areas (Eastern and Midland)1 was higher than expected and in one region (Western) was lower. There was considerable geographical variation in the rates of cervical carcinoma in situ across the areas; the Eastern and North Western areas had significantly more cases than expected while the Mid-Western, Western and South-Eastern had significantly fewer. Cervical cancer mortality was lower than expected in the North-Eastern area.*
- *There was a strong trend of increasing risk of cervical cancer with increasing deprivation. Women resident in the most deprived areas had incidence 2.6-times higher than those in the least deprived areas.*
- *Two-thirds of women in Ireland diagnosed with cervical cancer had surgery and more than half of women had radiotherapy. The proportion undergoing surgery was strongly inversely related to age at diagnosis. Use of radiotherapy was more common in the 65-74 age group, than in younger or older women. There was a major increase in the use of chemotherapy between 1994-1997 (7%) and 1998-2001 (32%).*
- *Survival improved slightly between 1994-1997 and 1998-2001. Survival at five years after diagnosis is 69.3% . Women under 65 have better survival rates than older women.*
- *Survival in Ireland is slightly lower than the European average.*
- *The sexually transmitted virus, HPV, is the most important risk factor for cervical cancer and carcinoma in situ. Risk of contracting HPV increases with increasing number of sexual partners.*
- *Well-organised, smear-based, cervical screening programmes are effective in reducing incidence and mortality from cervical cancer in the population. Women should participate in screening every 3-5 years from the age of 25.*

[1] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Summary

Cancer of the cervix (the neck of the womb) is the 9th most common cancer in women in Ireland, making up 2.9% of all cancers diagnosed (table 4.1). 180 women develop a cancer of the cervix each year on average. The average age at diagnosis is 46 years. The chance of being diagnosed with cervical cancer by the age of 65 is 0.7% (or approximately 1 woman in 140), and by age 75 is 0.8% (approximately 1 woman in 125). In 2001 an estimated 2900 women in Ireland were living following a diagnosis of cervical cancer. It is expected that 197 new cases of cervical cancer will be diagnosed in 2006.

Table 4.1: Summary information, incidence and prevalence, cervical cancer

Rank among the common cancers in women	9th
% of all new cancer cases	2.9%
Average number of new cases per annum	180
Average age at diagnosis with cervical cancer	46
Chance of developing cervical cancer	
• by age 65	0.7%
• by age 75	0.8%
Estimated number of women alive with cervical cancer in 2001	2900
Estimated number of cases that will be diagnosed in 2006	197

Cancer of the cervix ranks 12th in terms of the most common causes of cancer death in women in Ireland (table 4.2). Each year, on average, 73 women die from cervical cancer. It accounts for 2.1% of all cancer deaths. The average age at death is relatively young—56 years—meaning that cervical cancer accounts for 3.4% of all person years of life lost to cancer. Each women who dies from the disease loses, on average, 25 years of life. Just over one third of women diagnosed with cancer of the cervix die from it within 5 years.

Table 4.2: Summary information, mortality, cervical cancer

Rank among the common cancers in women	12th
Average number of deaths per annum	73
% of all cancer deaths due to cervical cancer	2.1%
Average age at death from cervical cancer	56
% women with cervical cancer who die from the disease within 5 years of diagnosis	36%
% of person-years of life-lost due to cervical cancer	3.4%
Average number of years of life-lost for a woman dying from cervical cancer	25

Risk factors and prevention

Table 4.3: Convincing, probable and possible risk factors for cervical cancer

	Increasing risk	*Reducing risk*
Convincing or probable	Infection with "high-risk" types of human papilloma virus (HPV)[1,2] Tobacco smoking[3,4,5] Use of combined oestrogen-progestogen oral contraceptives[4,6] High parity[4]	
Possible		Vegetables and fruits[7]

1 "high-risk" HPV types include 16, 18, 31, 33, 35, 39, 45, 51, 56, 58, 59, 66;
2 IARC Working Group. 2005c;
3 IARC Working Group, 2004b;
4 Castellsague & Munoz, 2003;
5 Plummer et al., 2003;
6 IARC Working Group, 2005a
7 WCRF/AICR, 1997

Human papillomavirus (HPV), a sexually transmitted infection, is by far the most important risk factor for cervical cancer (IARC Working Group, 2005c). Infection with particular strains of the virus (known as "high-risk" types) is associated with substantially increased risk of developing cervical cancer or pre-cancerous lesions of the cervix (known as cervical intra-epithelial neoplasia). HPV infection is very common; in most populations 50% of sexually active women have been infected with one or more HPV strains (Koutsky & Kiviat, 1999). In most people the virus causes no symptoms and the infection clears naturally within a few months. It is currently thought that some people are susceptible to persistent infections and it might be this susceptibility which increases risk of developing cervical lesions. The most consistent factor associated with risk of HPV infection is number of sexual partners; risk increases with increasing numbers of a woman's own sexual partners, and with increasing numbers of sexual partners of her male partners (Winer & Koutsky, 2004). Risk of cervical cancer is also increased with tobacco smoking, use of oral contraceptives and high parity (number of children) (table 4.3).

There is no doubt that a well-organised, high quality, smear-based cervical screening programme will substantially reduce the incidence of, and mortality from, cervical cancer in the population (IARC Working Group, 2005d). The role of HPV in the development of cervical lesions has led to suggestions that testing for HPV might have a role in cervical screening (Damasus-Awatai & Freeman-Wang, 2003); studies are currently underway in several countries to evaluate this. Vaccines against HPV are also under development (Shaw,

2005), but a vaccine is not expected to be available for at least 10 years. In the meantime, women should have regular smear tests. The European Code Against Cancer (Boyle et al, 2003) recommends that women should participate in screening from the age of 25 and the International Agency for Research on Cancer states that the interval between tests should be 3-5 years (IARC Working Group, 2005d). More information about screening for cervical cancer in Ireland can be obtained from the Irish Cervical Screening Programme (http://www.icsp.ie/home/default.asp).

Age distribution

In contrast to most other cancers, cancer of the cervix is a tumour of younger women; 60% of cases occur in women who are aged 50 or younger and a further 22% present in the 50-64 age group (figure 4.1). 10% of cases are in women aged 65-74 and 8% in the 75 and older age group. In terms of deaths, the majority (64%) are in women under 65, with the remainder occurring almost equally in those aged 65-74 and those aged 75 and older (figure 4.2).

Figure 4.1: Age composition of patients at diagnosis, cervical cancer

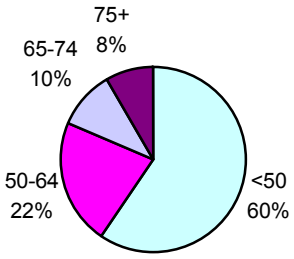
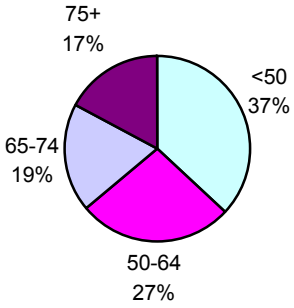


Figure 4.2: Age composition of patients at death, cervical cancer



Time trends

Incidence and mortality rates for cervical cancer depend very much on the availability, effectiveness and uptake of cervical screening in a population. In England, for example, incidence of cervical cancer fell dramatically between the late 1980s and mid-1995, an effect attributed to an increase in screening population coverage and improvements in the programme organisation in the late 1980s (Quinn et al., 1999). More generally, there have been declines over time in cervical cancer incidence in several European countries, with the largest decreases in northern Europe (Bray et al., 2005a). This appears to be against a background of increasing risk of cervical cancer in successive generations born after 1930 (Bray et al., 2005a). This suggests that in the absence of screening, incidence rates would be increasing in many populations, probably as a consequence of changes in sexual behaviour and hence in frequency of HPV infection.

In Ireland, there was no significant change in the number of cases of, or deaths from, cervical cancer diagnosed each year between 1994 and 2001. The incidence rate fluctuated between 9 per 100,000 and 13 per 100,000, but no striking trends were apparent over the period (figure 4.3). The mortality rate from cervical cancer in Ireland rose between 1994 and 1996. It declined slightly during 1997-1999 and fell more quickly in 2000 and 2001.

Figure 4.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, cervical cancer

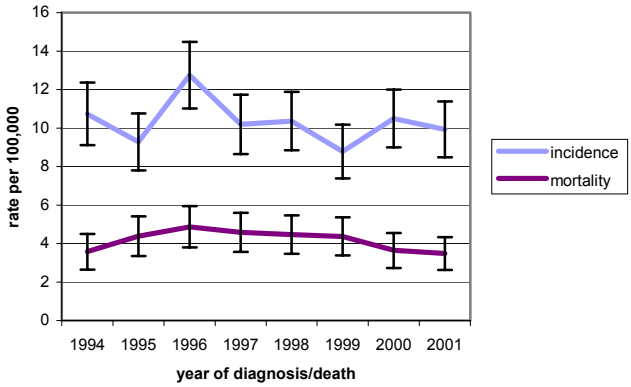


Figure 4.4: Age-standardised mortality rates, by year of death, 1978-2001, cervical cancer

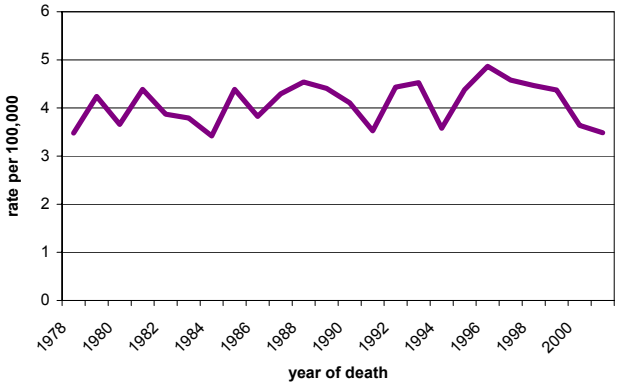


Figure 4.4 shows cervical cancer mortality rates in women in Ireland since 1978. Detailed analysis of these has revealed an average annual increase in mortality of 1.5% (Comber & Gavin, 2004). This contrasted with the steady decline in mortality in the countries of the UK over the same period. The absence of population-based screening in Ireland is the most likely explanation for these trends (Comber & Gavin, 2004).

Geographical variations

Figures 4.5 and 4.6 show cervical cancer incidence and mortality rates for women in Ireland, other European countries and the USA. The incidence in women in Ireland was in the mid-range of rates observed across western Europe and was 12% higher than the rate in women in the USA. Similarly, for mortality, rates in women in Ireland were in the mid-range across Europe. The death rate in Ireland was 58% higher than in the USA.

Figure 4.5: Age-standardised incidence rates for European countries and the USA, cervical cancer*

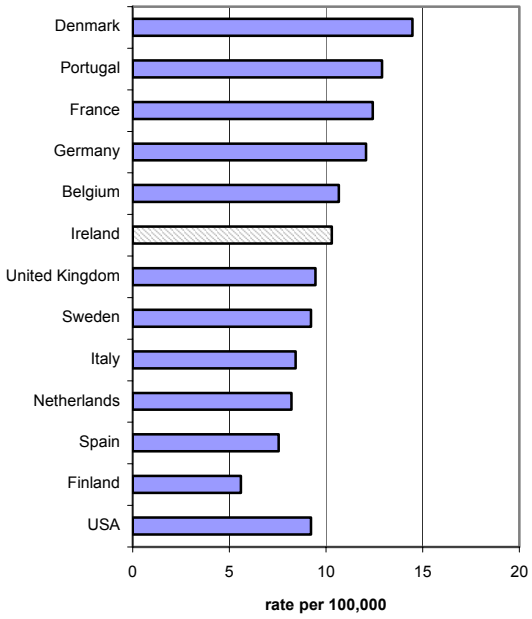


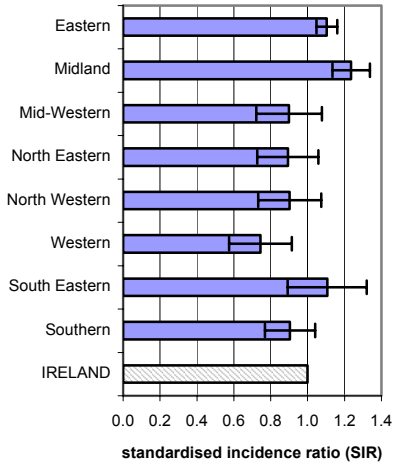
Figure 4.6: Age-standardised mortality rates for European countries and the USA, cervical cancer*

* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Geographical variation in cervical cancer incidence in women in Ireland is shown in figure 4.7. Incidence in the Eastern and Midland areas[1] was 10% and 24%, respectively, above the national average. Women resident in the Western area had 26% fewer cases of cervical cancer than expected from national rates; although statistically significant, this observation is based on an average of only 13 cases per year in the Western area and should be interpreted with caution. As regards mortality, only one area had a rate significantly different from the national average (figure 4.8); 28% fewer deaths occurred in women in the North Eastern area than would have been expected but as this was based on only 4 deaths per year the observation should be interpreted with care, as it may simply be due to random fluctuations. The first phase of the Irish Cervical Screening Programme commenced in the Mid-Western area in late 2000 (http://www.icsp.ie/home/default.asp; chapter 15); it is too early to be able to discern any effect of screening on the geographical distribution of cervical cancer in Ireland.

[1] See Appendix 3

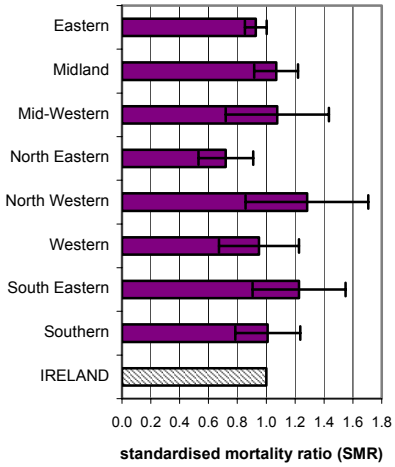
Figure 4.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas, 1994-2001, cervical cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	72	24
Midland	12	4
Mid-Western	14	7
North Eastern	13	4
North Western	9	6
Western	13	7
South Eastern	21	10
Southern	25	11

Figure 4.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas, 1994-2001, cervical cancer

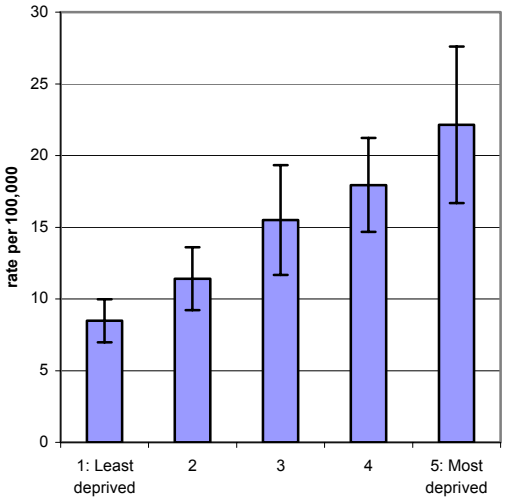


Deprivation

The risk of developing, or dying, from cervical cancer has been found to increase sharply with decreasing socio-economic status (Faggiano et al., 1997). This is probably due, in part, to socio-economic variations in participation in cervical cancer screening; women in the lower social classes have consistently been shown to be less likely to take part in screening (Segnan, 1997).

For women in Ireland, cervical cancer incidence rates rose steadily with increasing deprivation (figure 4.9). The rate in women resident in the most deprived areas was 2.6 times higher than that in women resident in the least deprived areas.

Figure 4.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, cervical cancer



Stage at presentation and treatment

The stage at diagnosis describes the extent to which the tumour has spread beyond the cervix, uterus and pelvis, to other more distant sites (e.g. bladder, intestine) and/or lymph nodes. Prognosis for women with cervical cancer is strongly related to the stage at diagnosis (Kosary, 1994).

Table 4.4: Extent of disease at diagnosis, 1994-2001, cervical cancer

*Extent**	*%*
Local	43%
Regional	17%
Distant	40%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Information is available on the extent of disease spread at the time of diagnosis for slightly more than half of cervical cancers in women in Ireland. Of these, 43% are localised (confined to the cervix; table 4.4). This proportion varies with age: 47% in women under 65 compared to 25% in the 65-74 age group and 19% of those over 75. The proportion in whom the disease was widespread (40% overall) is slightly higher among women over 65 (50%) than among those under 65 (38%).

For earlier stage cervical cancer the main form of treatment is surgery (usually hysterectomy) either with or without radiation therapy. For women with more advanced disease, treatment will usually involve radiotherapy together with chemotherapy. Two-thirds of women in Ireland diagnosed with cervical cancer had surgery (table 4.5). The proportion undergoing surgery was strongly related to age at diagnosis; a much smaller proportion of women aged over 65 had surgery compared to younger women. More than half of women with cervical cancer had radiation therapy and this treatment was used more frequently in the 65-74 age group than in younger or older women. It was recognised in the late 1990s that it could be of value to treat women using concomitant chemotherapy and radiation therapy (Green et al., 2001). This is a possible explanation for the major growth in the use of chemotherapy between 1994-1997 and 1998-2001; only 7% of women had chemotherapy in the earlier period compared to almost one-third in the later period. While less than 10% of patients overall had no cancer-related treatment in both time periods, this applied to 41% of women aged 75 and older in 1994-1997 and 29% of those aged 75 and older in 1998-2001.

Table 4.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, cervical cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	9%	2%	2%	7%	34%	34%	10%	32%
Radiotherapy	56%	74%	53%	58%	52%	76%	57%	55%
Surgery	71%	33%	18%	63%	73%	48%	27%	66%
No tumour-directed treatment	5%	16%	41%	9%	5%	6%	29%	7%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Survival at one year after diagnosis with cervical cancer exceeds 80% and the five year rate is more than 60%. Survival improved between 1994-1997 and 1998-2001; five year rates rose from 60.9% to 69.3% (figure 4.10). Age is a strong prognostic indicator; survival in women aged 65 and under is considerably higher than that in older women (figure 4.11).

Figure 4.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, cervical cancer

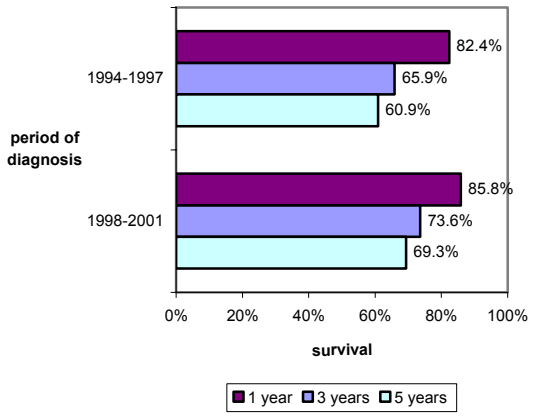


Figure 4.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, cervical cancer

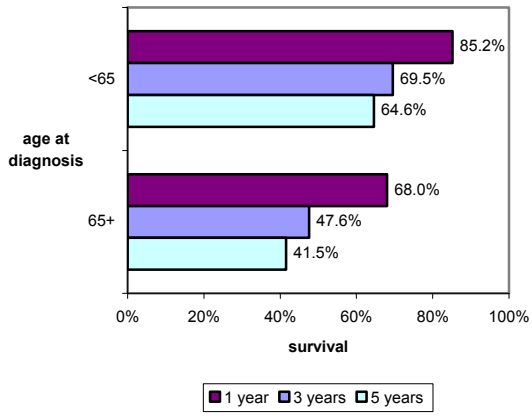
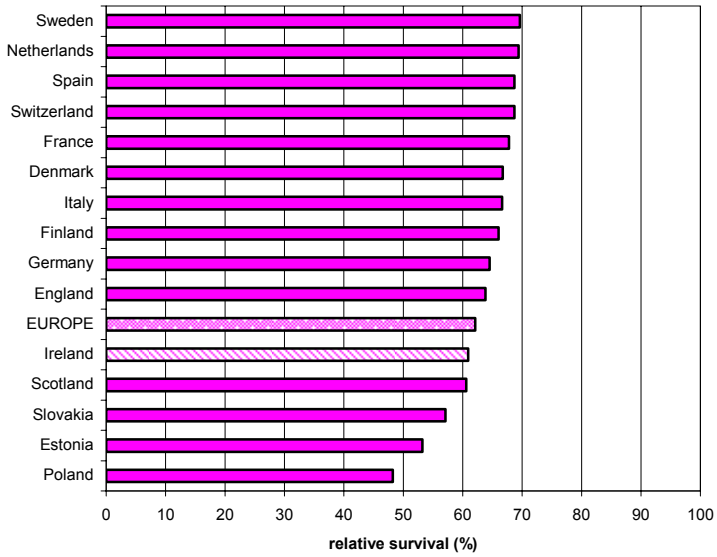


Figure 4.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, cervical cancer



Five-year survival rates for women with cervical cancer ranged from around 50% to almost 70% across the countries of Europe (figure 4.12). Survival for women in Ireland was slightly below the European average (Ireland: 60.9%; Europe 62.1%). Differences between countries in provision, uptake and effectiveness of cervical screening are almost certainly responsible for some of the variation in survival (Gatta et al., 1998).

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Carcinoma *in situ* of the cervix

Carcinoma *in situ* is a pre-cancerous lesion of the cervix. These lesions are mainly cervical intraepithelial neoplasia (grade III), which tend not to produce symptoms and are detected by smear-based screening. The aim of screening is to identify these (and less severe) pre-cancerous lesions and to treat them in order to prevent cervical cancer developing. Since women do not die from cervical carcinoma *in situ*, only incidence data are shown below.

Summary

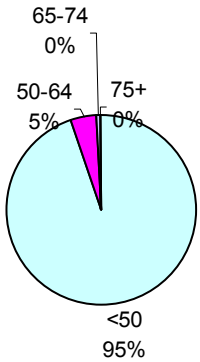
Each year in Ireland and average of 822 new cases of cervical carcinoma *in situ* are detected (table 4.6). The average age at diagnosis is 32. By the age of 65, one woman in every 31 in Ireland will have been diagnosed with a cervical carcinoma *in situ*. In 2001, an estimated 31,200 women in the population had been diagnosed with a cervical carcinoma *in situ*.

Table 4.6: Summary information, incidence and prevalence, cervical carcinoma in situ

Average number of new cases per annum	822
Average age at diagnosis with cervical carcinoma *in situ*	32
Chance of developing cervical cancer	
• by age 65	3.2%
• by age 75	3.2%
Estimated number of women alive with cervical carcinoma *in situ* in 2001	31200

Age distribution

Figure 4.13: Age composition of patients at diagnosis, cervical carcinoma *in situ*



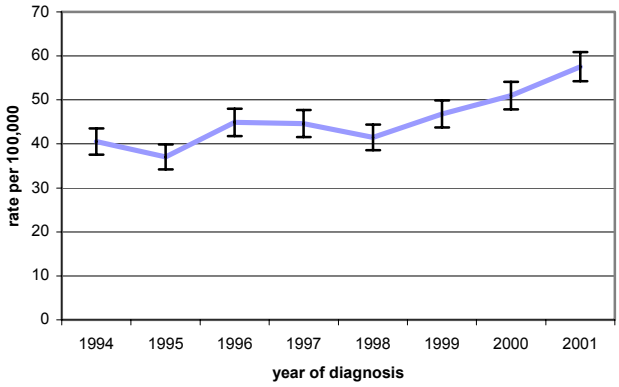
Cervical carcinoma *in situ* is a disease of younger women. 95% of cases are diagnosed in women aged under 50 (figure 4.13), and most of the remaining 5% occur in the 50-64 age group. There is only a handful of cases each year in women older than 65.

Time trends

The number of cases of carcinoma *in situ* of the cervix diagnosed in women in Ireland grew by, on average, 7% each year from 1994 to 2001. Age-adjusted rates rose steadily over the period, at an average of 5% per year (figure 4.14). There was a greater than 40% increase in rates between 1994 and 2001; most of this rise took place in the years from 1998.

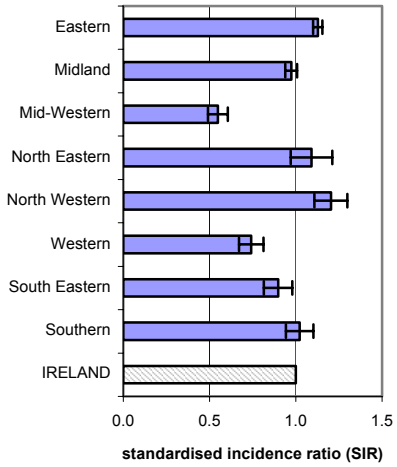
Since most carcinoma *in situ* would not be diagnosed in the absence of smear-based screening, these data suggest that there are considerable, and increasing, amounts of screening occurring in Ireland (see Chapter 15 for more information on cervical cancer screening in Ireland).

Figure 4.14: Age-standardised incidence rates, with 95% confidence intervals, by year of diagnosis, 1994-2001, cervical carcinoma *in situ*



Geographical variations

Figure 4.15: Standardised incidence ratios, with 95% confidence intervals, for former health areas, 1994-2001, cervical carcinoma *in situ*



Average annual numbers of cases

	cases
Eastern	388
Midland	44
Mid-Western	39
North Eastern	76
North Western	53
Western	58
South Eastern	79
Southern	128

There is considerable geographical variation in the incidence of cervical carcinoma *in situ* across the health areas (figure 4.15). In two areas, Eastern and North Western, there were significantly more cases than expected based on the national rates. In three areas, Mid-Western, Western and South-Eastern, significantly fewer cases than expected were observed; incidence in these areas was 45%, 25% and 10% below the national average respectively. It is probable that these data reflect the amount of screening occurring in each area.

Chapter 5: Colorectal cancer

Key points

- *Colorectal cancer is the 2nd most commonly diagnosed cancer in women in Ireland and the 3rd most common cause of cancer-related death.*
- *Approximately 790 women are newly diagnosed with colorectal cancer each year. 400 women die from colorectal cancer each year.*
- *The average age at diagnosis is 72 years and that of death is 75 years.*
- *An estimated 6500 women in Ireland are living following a diagnosis of colorectal cancer.*
- *The number of new cases per person (incidence rates) have been stable over the period from 1994-2001. Death rates have fallen slightly over the same period. This is part of a longer-term fall in mortality, apparent since the late 1970's.*
- *Incidence and mortality in Ireland are in the upper half of rates observed across western Europe. Incidence in Ireland is similar to that in the USA, but mortality is 26% higher.*
- *Within Ireland, incidence rates were higher than the national average in the Eastern, North Western and Midland areas*[*]*, and lower than average in the Mid-Western and Western areas. There was less variation in mortality rates; mortality was above average in the Eastern area and below average in the Mid-West.*
- *The lowest incidence rates were in women resident in the most deprived areas.*
- *Treatment for colorectal cancer is multi-modal. Three-quarters of women undergo surgery. 30% have chemotherapy and 13% radiotherapy. Women aged 75 and older are less likely to have surgery, chemotherapy or radiotherapy than younger women.*
- *Five-year survival rose slightly between 1994-1997 and 1998-2001, from 49.3% to 54.5%. Older women (75 and over) have poorer survival rates than younger women.*
- *Survival in Ireland is close to the European average.*
- *Elements of lifestyle (e.g. body mass, physical activity) and diet are thought to be important risk factors for colorectal cancer. This suggests that there may be considerable prospects for disease prevention through lifestyle and dietary changes.*
- *The European Code Against Cancer recommends that men and women aged 50 and older should participate in colorectal screening.*

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers.

Summary

Colorectal cancer is the second most common cancer in women in Ireland, accounting for 12.8% of all malignant neoplasms (table 5.1). Each year approximately 790 women are diagnosed with a colorectal tumour. 69% of these cancers arise in the colon and 23% in the rectum. The average age at diagnosis is 72 years. The risk of a woman in Ireland developing colorectal cancer by age 65 is 1.4% (or 1 in 71) and the risk by age 75 is 3.1% (1 in 32). It is estimated that there were approximately 6500 women diagnosed and living with colorectal cancer in Ireland in 2001. In 2006 it is estimated that approximately 911 women in Ireland will be diagnosed with colorectal cancer.

Table 5.1: Summary information, incidence and prevalence, female colorectal cancer

Rank among the common cancers in women	2nd
% of all new cancer cases	12.8%
Average number of new cases per annum	792
Average age at diagnosis with colorectal cancer	72
Chance of developing colorectal cancer	
• by age 65	1.4%
• by age 75	3.1%
Estimated number of women alive with colorectal cancer in 2001	6500
Estimated number of cases that will be diagnosed in 2006	911

There are slightly more than 400 deaths from colorectal cancer in women in Ireland each year (table 5.2). Colorectal tumours comprise 11.6% of all deaths from cancer and account for 9.6% of all person-years of life lost to cancer in Irish women. Each woman who dies from a colorectal tumour loses, on average, 13 years of life. The average age at death is 75 years. 45% of women diagnosed with colorectal cancer will die from the disease within 5 years.

Table 5.2: Summary information, mortality, female colorectal cancer

Rank among the common cancers in women	3rd
Average number of deaths per annum	404
% of all cancer deaths due to colorectal cancer	11.6%
Average age at death from colorectal cancer	75
% women with colorectal cancer who die from the disease within 5 years of diagnosis	45%
% of person-years of life-lost due to colorectal cancer	9.6%
Average number of years of life-lost for a woman dying from colorectal cancer	13

Risk factors and prevention

Table 5.3: Convincing, probable and possible risk factors for colorectal cancer

	Increasing risk	*Reducing risk*
Convincing or probable	Family history of colorectal cancer[1,2] Excess weight[3,4]	Physical activity[3,4] Hormone replacement therapy[3,12,13,14] Aspirin and other non-steroidal anti-inflammatory drugs[15]
Possible	Tobacco smoking[5,6] Alcohol[7,8,9] Red and processed meat[10,11]	Vegetables[7,16] Calcium[10,17] Fibre[18] Oral contraceptives[19]

1 First-degree relative with colorectal cancer;
2 Johns & Houlston, 2001;
3 Association observed for colon cancer; no association, or only weak association, with rectal cancer;
4 IARC Working Group, 2002a;
5 Giovannucci, 2001;
6 IARC Working Group, 2004b;
7 WCRF/AICR, 1997;
8 Bagnardi et al., 2001;
9 Cho et al., 2004;
10 Key et al., 2004;
11 Norat et al., 2005;
12 Beral et al., 2002;
13 Hulley et al., 2002;
14 Writing Group for the Women's Health Initiative Investigators, 2002;
15 IARC Working Group, 1997;
16 IARC Working Group, 2003, 2004a;
17 Weingarten et al., 2005;
18 Bingham et al., 2003;
19 Fernandez et al., 2001

Up to 10% of colorectal cancers are hereditary. Most of these are due to the genetic conditions of hereditary non-polyposis colorectal cancer (HNPCC) and familial adenomatous polyposis (FAP) (Hawkins & Ward, 2001), which are due to mutations (changes) in particular genes. Individuals with these conditions are at substantially increased risk of developing colorectal cancer. Excluding these genetic syndromes, people who have a first-degree relative (parent, child or sibling) with colorectal cancer have around a two-fold increased risk of developing the disease themselves (Johns & Houlston, 2001). For the overwhelming majority of cases, lifestyle

and environmental factors are important determinants of risk. Known and possible risk factors are summarised in table 5.3.

The importance of lifestyle factors in relation to risk of developing colorectal cancer suggests that there are likely to be opportunities for the prevention of the disease through changes in lifestyle and, possibly, diet. Chemoprevention with aspirin (or other agents) also offers possibilities for prevention (Arber & Levine, 2005).

Several different options for screening for colorectal cancer are available, including testing for blood in stool samples (faecal occult blood testing), flexible sigmoidoscopy (see glossary) and colonoscopy (see glossary). Evidence suggests that all of these have the potential to be cost-effective routes to reducing mortality from colorectal cancer in the population (Winawer, 2005). The European Code Against Cancer (Boyle et al, 2003) recommends that men and women aged 50 and older should participate in colorectal screening.

Age distribution

The majority of cases (69%) present in those aged 65 and older (figure 5.1). 23% present in the 50-64 age group with 8% occurring in those under 50 years. More than half (53%) of deaths are in women aged 75 and older (figure 5.2).

Figure 5.1: Age composition of patients at diagnosis, female colorectal cancer

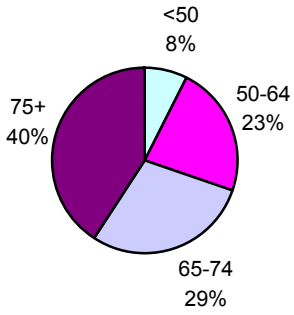
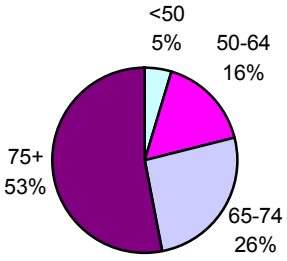


Figure 5.2: Age composition of patients at death, female colorectal cancer



Time trends

The trends in incidence and mortality from colorectal cancer over time are different. In many countries incidence rates have been rising over the past 30-40 years (Little & Sharp, in press). In most of these countries the increase has been most pronounced in men, or only seen in men. The explanation for the different trends between the sexes is not clear, but the trends suggest sex-specific changes in exposures to environmental and lifestyle risk factors (Little & Sharp, 2005). It has been proposed that the differences may be due to a protective effect of female hormonal factors (dos Santos Silva & Swerdlow, 1996); for example, it is possible that use of hormone replacement therapy or oral contraceptives, both of which are associated with reduced risk of colorectal cancer (Fernandez et al., 2001; Beral et al., 2002; Hulley et al., 2002; Writing Group for the Women's Health Initiative Investigators, 2002), may have influenced the incidence trends in women.
In contrast to the patterns in incidence, in developed countries, colorectal cancer death rates have declined steadily over the past 20-30 years (Coleman et al., 1993). This is due, at least in part, to declining proportions of patients presenting with more advanced disease over time (Robinson et al., 2002; Chu et al., 2002), itself most likely a consequence of increased availability and use of sigmoidoscopy, colonoscopy and, possibly, faecal occult blood testing.

In Ireland, colorectal cancer incidence rates in women have been stable during the period from 1994 to 2001 (figure 5.3). There was a 3% fall in the age-standardised mortality each year between 1994 and 2001. Inspection of the annual rates reveals that this decrease was mainly due to lower mortality in the latter half of the period (1998 to 2001).

Figure 5.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female colorectal cancer

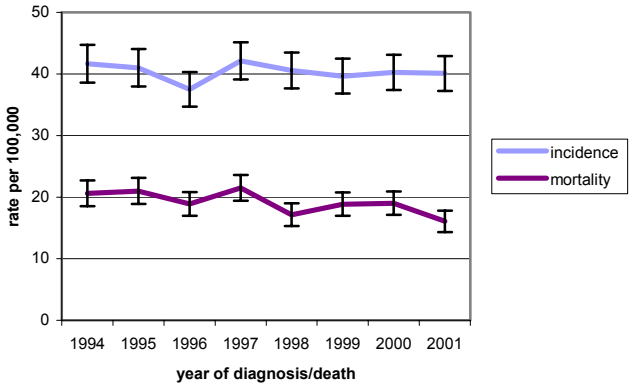
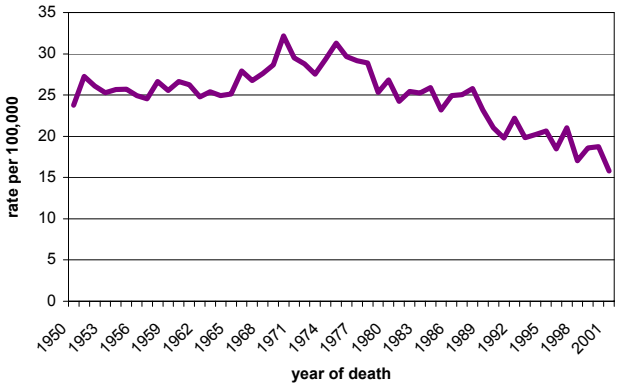


Figure 5.4: Age-standardised mortality rates, by year of death, 1950-2001, female colorectal cancer



The recent fall in colorectal cancer mortality rates in women in Ireland is part of a longer-term trend. Mortality rose steadily from 1950 to reach a peak in the mid 1970s and has fallen steadily thereafter (figure 5.4). Mortality in recent years is about half the rate in the mid-1970s.

Geographical variations

Colorectal cancer incidence among women in Ireland is in the upper half of rates across western Europe (figure 5.5). The rate among women in Ireland exceeds that for women in the UK by 20%, and is at a similar level to the rate in the USA. The reasons for the higher incidence in Ireland than the UK are not known, but it is most likely that there are differences in exposure to risk factors for the disease between the countries. Mortality from colorectal cancer among women in Ireland is among the highest in western Europe (figure 5.6). Mortality in women in Ireland is 13% higher than for women in the UK and 26% higher than for women in the USA. The reasons for the relatively high mortality in Ireland are unknown. Possible explanations include differences between countries in the types of colorectal tumours diagnosed (Gatta et al., 2003), the stage of tumours at diagnosis, and/or availability of treatment.

Figure 5.5: Age-standardised incidence rates for European countries and the USA, female colorectal cancer*

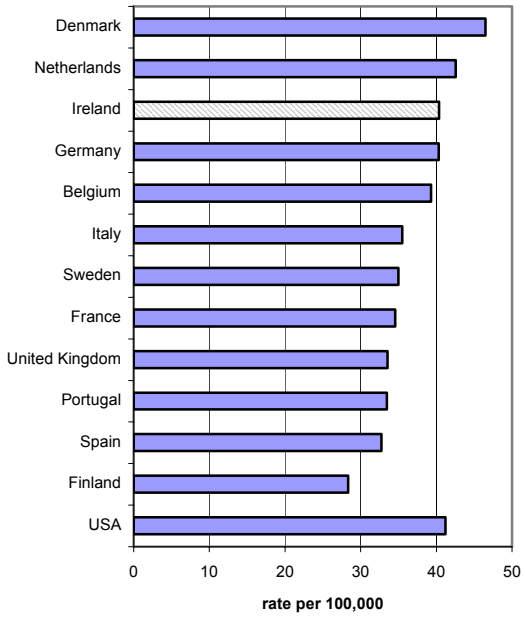
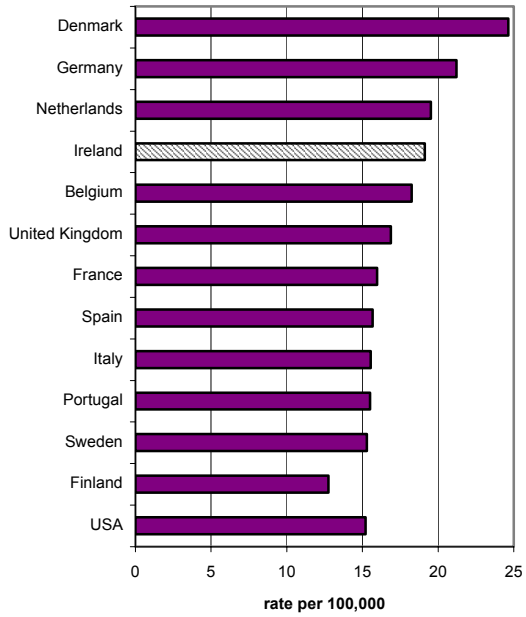


Figure 5.6: Age-standardised mortality rates for European countries and the USA, female colorectal cancer*

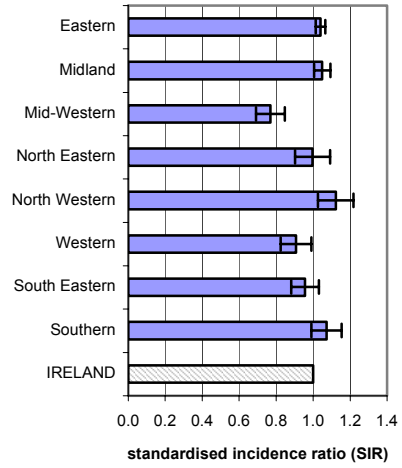


* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Geographical variation in colorectal cancer incidence and mortality in women in Ireland is shown in figures 5.7 and 5.8. Incidence rates were significantly higher than the national average in three areas[*]—Eastern, Midland and North Western—and significantly lower in two areas—Mid-Western and Western. There is less pronounced variation in colorectal cancer death rates. There were significantly more deaths than expected in women resident in the Eastern area and significantly fewer in women resident in the Mid-West.

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

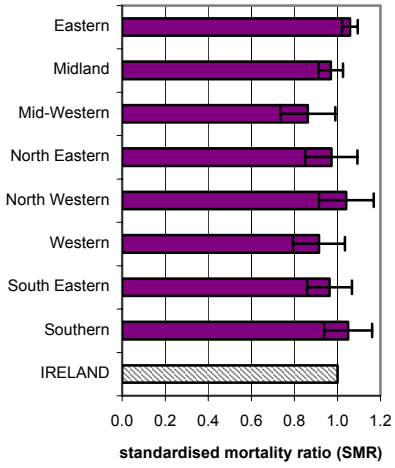
Figure 5.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female colorectal cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	274	140
Midland	47	22
Mid-Western	54	31
North Eastern	65	32
North Western	57	28
Western	78	41
South Eastern	83	43
Southern	134	67

Figure 5.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female colorectal cancer

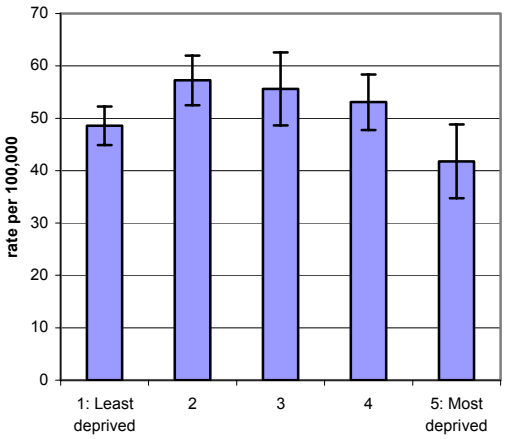


Deprivation

In most countries, the risk of colon cancer has been found to be higher in those with higher socio-economic status, while there is no consistent relationship between rectal cancer and socio-economic status (Faggiano et al., 1997).

Among women in Ireland, there was no strong trend in colorectal cancer incidence according to deprivation category of residence. However, women resident in the most deprived areas had the lowest incidence rates (figure 5.9).

Figure 5.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female colorectal cancer



Stage at presentation and treatment

The stage at diagnosis describes the extent of disease in terms of the spread of the cancer in relation to the colon and rectum, nearby organs and organs further away. Stage is a strong predictor of survival for both colon and rectal tumours (Reis et al., 2000).

Table 5.4: Extent of disease at diagnosis, 1994-2001, female colorectal cancer

*Extent**	*%*
Local	10%
Regional	40%
Distant	50%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Information is available on extent of disease for 80% of women diagnosed with colorectal cancer in Ireland. Of the cases that were staged, only 10% were diagnosed when the tumour was confined to the colon or rectum (table 5.4). In 50% of cases the tumour had spread to other organs at the time of diagnosis.

Colorectal cancer treatment is multi-modal and patients may have combinations of surgery, chemotherapy and radiotherapy. In recent years there has been a major expansion in the available chemotherapy regimens (Arnold & Schmoll, 2005). This is reflected in the data in table 5.5 which shows an increase in the proportion of female patients receiving chemotherapy from 23% for those diagnosed in 1994-97 to 30% of those diagnosed in 1998-2001. This increase was evident in both younger and older patients. Similar proportions of patients received surgery and radiotherapy in 1994-1997 and 1998-2001; approximately three-quarters received surgery and 11-13% radiotherapy. There is evidence that older patients with colon cancer can benefit from chemotherapy to the same extent as younger patients (Au et al., 2003). In Ireland, however, women aged 75 and older were less likely to have chemotherapy than younger women; older women were also less likely to undergo surgery or have radiotherapy. In both time periods, more than a third of older women received no tumour-directed treatment, compared to 14-17% of those aged 65-74 years and less than 10% of those aged under 65.

In detailed analyses for 1994-98, the chance of having surgery for colorectal cancer was decreased significantly in older women, those from more deprived areas and those with clinically advanced cancers (NicAmhlaoibh et al., 2004). The chance of having radiotherapy was related to age and whether the tumour was histologically confirmed. The factors predicting receipt of chemotherapy included patient age, tumour site and stage, and co-morbidity.

Table 5.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female colorectal cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	48%	23%	4%	23%	57%	36%	7%	30%
Radiotherapy	22%	11%	3%	11%	20%	17%	6%	13%
Surgery	87%	80%	63%	75%	86%	79%	61%	74%
No tumour-directed treatment	8%	17%	36%	22%	7%	14%	36%	21%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Survival rates for women diagnosed with colorectal cancer have risen slightly over time. Five-year relative survival for women diagnosed in 1998-2001 was 54.5%, compared to 49.3% for those diagnosed in 1994-1997 (figure 5.10). Survival decreases with increasing age at diagnosis (figure 5.11). For women diagnosed in 1994-1997, five-year survival for those aged under 65 was 56.0%, for those aged 65-74 was 49.6% and for those aged 75 and older was 44.6%.

For colorectal cancer patients diagnosed in 1994-1998, survival at five years was significantly higher for females than males (NicAmhlaoibh et al., 2004). This pattern has been found in other countries, and for other cancers, and may be due to sex differences in tumour biology, host defence mechanisms, awareness of symptoms, stage at diagnosis or access to treatment (Coleman et al., 2003). In Ireland, survival was also higher in younger patients, those resident in more affluent areas, non-smokers, those who were married and those having surgery. Survival was lower in patients with other co-morbid conditions at the time of cancer diagnosis.

Figure 5.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, female colorectal cancer

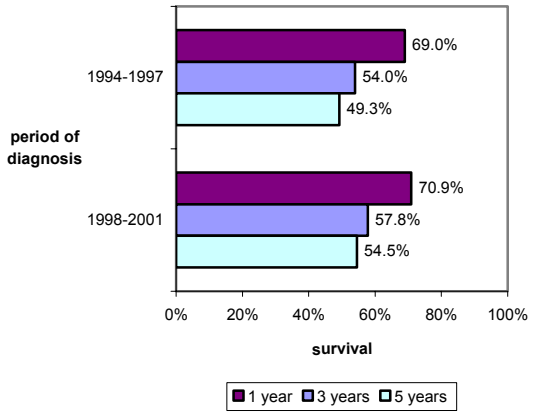


Figure 5.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female colorectal cancer

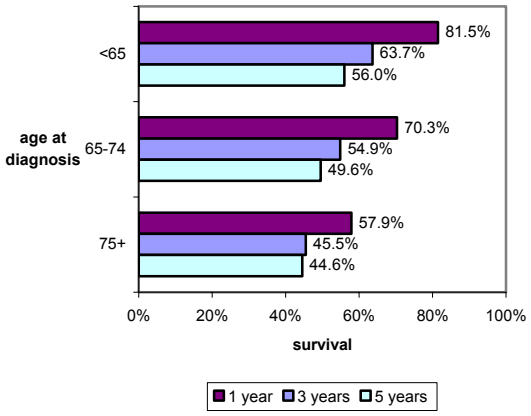
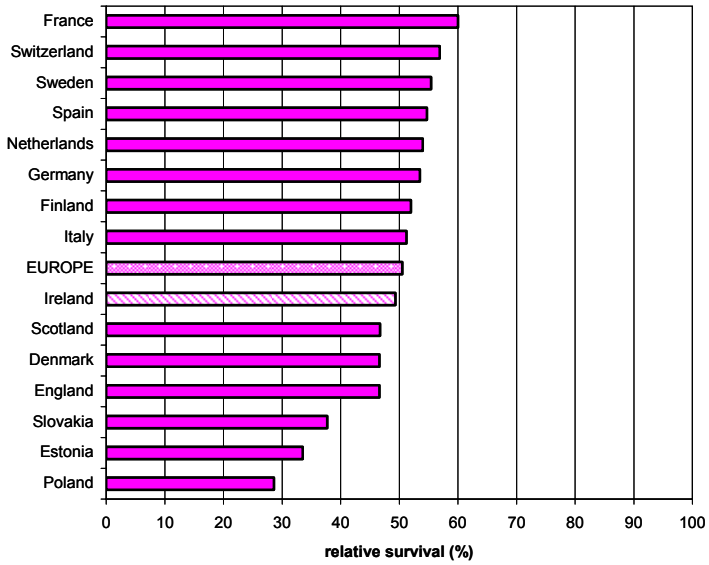


Figure 5.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female colorectal cancer



* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Figure 5.12 compares survival for women in Ireland with those from other European countries. Generally survival rates were higher among countries of western and central Europe and lower in the UK and eastern Europe. Survival for Irish women was close to the European average (Ireland 49.3%; Europe 50.5%) and similar to survival in Scotland and England. The variability in survival is thought to be due to differences in stage at diagnosis and wide inter-country variations in diagnostic and surgical practices (Gatta et al., 1998b; Gatta et al., 2000).

Chapter 6: Lung cancer

Key points

- *Lung cancer is the 3rd most frequently diagnosed cancer and ranks 2nd in terms of cancer-related deaths in women in Ireland.*
- *On average, each year, there are 560 new cases in women and 530 women die from lung cancer.*
- *The average ages at diagnosis and death are 72 and 73 years respectively.*
- *In 2001, approximately 700 women in Ireland were estimated to be living following a diagnosis of lung cancer.*
- *Trends in lung cancer closely reflect patterns of tobacco use in the population. Incidence rates rose by 2% annually between 1994-2001, while mortality rates were stable. Long-term trends in mortality showed very low rates prior to 1960, with a four-fold increase between 1960 and 1990, and a plateau since 1990.*
- *Women in Ireland have amongst the highest rates of lung cancer incidence and mortality in western Europe.*
- *The geographical patterns in incidence and mortality within Ireland are dominated by raised rates in the population resident in the Eastern area*[*]*.*
- *There was a strong trend of increasing incidence with increasing deprivation. Women resident in the most deprived areas had twice the rate of the disease as women resident in the least deprived areas.*
- *Just over half of lung cancer patients received no cancer-directed treatment. 12-14% underwent surgery, 16-17% had chemotherapy and approximately one third had radiotherapy. Proportions of patients receiving treatment fell with increasing patient age. There was no evidence of an increase in treatment rates over time.*
- *Survival at one year after diagnosis is approximately 25% and at five years approximately 10%. Younger women (under 65) have better survival rates than older women, but the relationship is not as strong as for some other cancers.*
- *Survival in Ireland is amongst the lowest in Europe.*
- *Smoking is, by far, the most important risk factor for lung cancer, causing more than 90% of cases. Both active and passive smoking increase risk. Tobacco control is essential for lung cancer prevention.*

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Summary

Lung cancer ranks third in terms of the most commonly diagnosed cancers in women in Ireland (table 6.1). With just over 560 new cases diagnosed each year, it accounts for 9.1% of all cancers. The average age at diagnosis is 72 years. One woman in 125 (0.8%) will develop lung cancer by the age of 65; by 75 this rises to 1 in 42 (2.4%). Approximately 700 women were estimated to be living with lung cancer in Ireland in 2001, reflecting the low survival rates (see below). It is estimated that approximately 660 new cases of lung cancer will be diagnosed in women in Ireland in 2006.

Table 6.1: Summary information, incidence and prevalence, female lung cancer

Rank among the common cancers in women	3rd
% of all new cancer cases	9.1%
Average number of new cases per annum	563
Average age at diagnosis with lung cancer	72
Chance of developing lung cancer	
• by age 65	0.8%
• by age 75	2.4%
Estimated number of women alive in 2001 following a diagnosis of lung cancer	700
Estimated number of cases that will be diagnosed in 2006	662

More than 530 women die from lung cancer each year in Ireland, making this the second most common cause of cancer death (table 6.2). 15.4% of all deaths from cancer are due to lung cancer. The average age at death is 73 years, and each woman who dies from the disease loses on average 14 years of life. Altogether, lung cancer accounts for 13.8% of all person-years of life lost due to cancer. Of those who develop the disease, 83% have died from it within 5 years of diagnosis.

Table 6.2: Summary information, mortality, female lung cancer

Rank among the common cancers in women	2nd
Average number of deaths per annum	534
% of all cancer deaths due to lung cancer	15.4%
Average age at death from lung cancer	73
% women with lung cancer who die from the disease within 5 years of diagnosis	83%
% of person-years of life-lost due to lung cancer	13.8%
Average number of years of life-lost for a woman dying from lung cancer	14

Risk factors and prevention

Table 6.3: Convincing, probable and possible risk factors for lung cancer

	Increasing risk	*Reducing risk*
Convincing or probable	Tobacco smoking[1] Involuntary (passive) smoking[1] Asbestos exposure[2] Radon exposure[2] Ionizing radiation exposure (including X-rays and gamma radiation)[2] Family history of lung cancer[3,4]	Fruit[5,8]
Possible	Alcohol[5,6] Overweight/obesity/high body mass index[7]	Physical activity[6,7] Aspirin and other non-steroidal anti-inflammatory drugs[9] Vegetables[5,10]

1 IARC Working Group, 2004b;
2 US Department of Health and Human Services, 2005;
3 First-degree relative(s) with lung cancer;
4 Matakidou et al., 2005;
5 WCRF/AICR, 1997;
6 Korte et al., 2002;
7 IARC Working Group, 2002a;
8 Miller et al., 2004;
9 Khuder et al., 2005;
10 IARC Working Group, 2003, 2004a

By far the most important risk factor for lung cancer is smoking. Both active and passive smoking increase risk (IARC Working Group, 2004b). In populations with prolonged cigarette use, 90% of lung cancer cases are due to cigarette smoking (IARC Working Group, 2004b). Duration of smoking is the strongest determinant of risk among smokers; the earlier the starting age or the longer the period of smoking, the higher the risk. Stopping smoking, at any age but particularly so before middle age, avoids most of the subsequent risk of lung cancer (Peto et al., 2000). For those who cease smoking at 40 years of age the cumulative risk of death from lung cancer by age 75 is less than one-fifth of that for those who continue to smoke; those who stop smoking at 50 have a cumulative risk of death from lung cancer by 75 of less than 40% of the risk of those continuing to smoke. Even stopping smoking at 60 years cuts the risk of lung cancer death before age 75 by almost 40%, compared to those who continue smoking.

The chances of developing lung cancer are also increased in those exposed to asbestos, radon and ionizing radiation. These and other factors that may affect risk are listed in table 6.3.

Several different methods of screening for lung cancer have been proposed—including chest radiography, computed tomography (see glossary) and sputum cytology (see glossary)—but the currently available evidence

does not support screening using any method (Humphrey et al., 2004). However, large randomised controlled trials are ongoing (Prorok et al., 2000; Humphrey et al., 2004) and this position may change in the future. Meanwhile, tobacco control, and to a lesser extent reduction in radon exposure, remain the only options for the prevention of lung cancer. It is to be hoped that the workplace smoking ban introduced in 2004 will be effective in reducing tobacco exposure in Ireland. For more information see the website of the Office of Tobacco Control (www.otc.ie).

Age distribution

Few cases of lung cancer are diagnosed in women aged under 50 years (figure 6.1). 21% of cases present in the 50-64 age group. The remaining cases are distributed equally between those aged 65-74 years and women aged 75 and older. As regards deaths from lung cancer, more than 40% are in women aged 75 and older, a further 35% occur in the 65-74 age group and the remaining quarter are in women under 65 years (figure 6.2).

Figure 6.1: Age composition of patients at diagnosis, female lung cancer

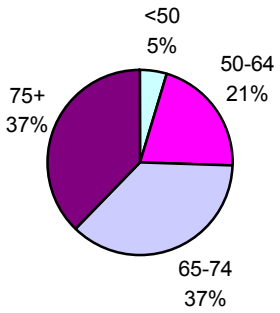
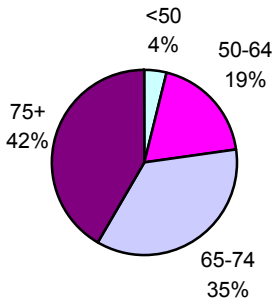


Figure 6.2: Age composition of patients at death, female lung cancer



Time trends

Time trends, of both incidence and mortality, in lung cancer are driven by the patterns of adoption of tobacco smoking in different populations. Countries where large numbers began to use tobacco in the first half of the 20th century saw high rates in the 1950s to the 1980s and, as smoking prevalence has declined, lung cancer incidence and mortality have plateaued or fallen (Peto et al., 2000; Bray et al., 2004b). Rates continue to rise in populations which adopted widespread tobacco use later, such as parts of southern and eastern Europe and China (Janssen-Heijnen & Coebergh, 2003; Zhang & Cai, 2003). In some populations, women began to smoke in large numbers some 20 or so years after men, meaning that the full effect of smoking on lung cancer in women will only be seen 20 or so years after rates peak(ed) in men. Currently, rates of lung cancer in women in most populations continue to rise (i.e. they have not yet peaked) (Devesa et al., 2005).

Information about smoking patterns among women in Ireland can be found in chapter 13.Over the period 1994 to 2001, the number of lung cancer cases diagnosed in women in Ireland grew by 3% each year. There was a slightly upward trend in incidence rates, with an average annual increase of 1.8% (figure 6.3). Mortality rates were stable over the same time period.

Figure 6.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female lung cancer

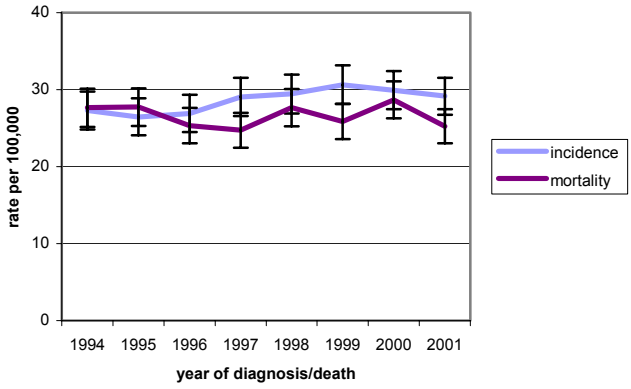


Figure 6.4: Age-standardised mortality rates, by year of death, 1950-2001, female lung cancer

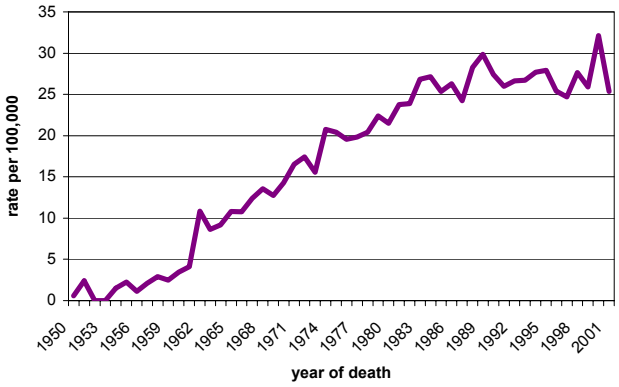


Figure 6.4 illustrates the impact of the evolution of the tobacco epidemic among women in Ireland. Deaths from lung cancer were rare prior to 1960. Mortality increased dramatically thereafter until the early 1990s and have been fairly constant since then. Assuming that the decrease in smoking prevalence among women, reported in the SLAN survey (Kelleher et al., 2003) persists, these mortality trends suggest that the lung cancer rates among women in Ireland have peaked, or are close to peaking.

Geographical variations

As for time trends, geographical variations in lung cancer closely reflect patterns of tobacco use in different countries and areas. Figures 6.5 and 6.6 show incidence and mortality rates for women in Ireland, other European countries and the USA. The rates in women in the USA exceed those for all of the European countries. Within Europe, the rates in Ireland are in the upper third, lower than those in Denmark and the UK, but higher than those in other countries.

Figure 6.5: Age-standardised incidence rates for European countries and the USA, female lung cancer*

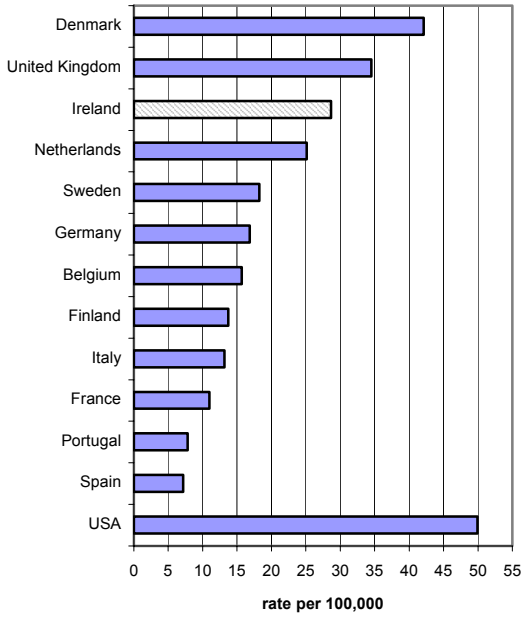
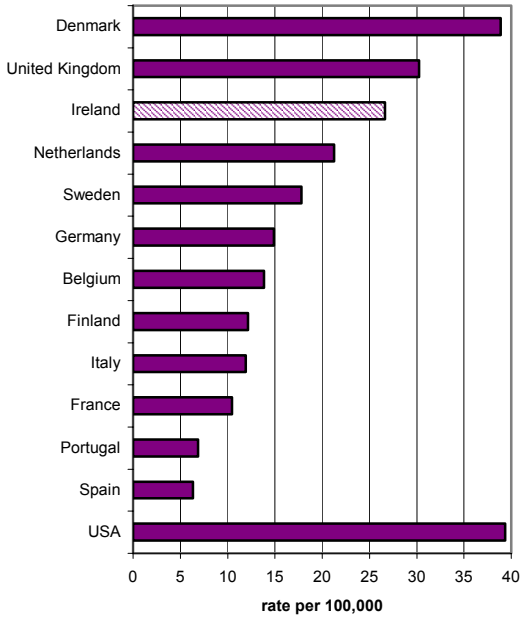


Figure 6.6: Age-standardised mortality rates for European countries and the USA, female lung cancer*



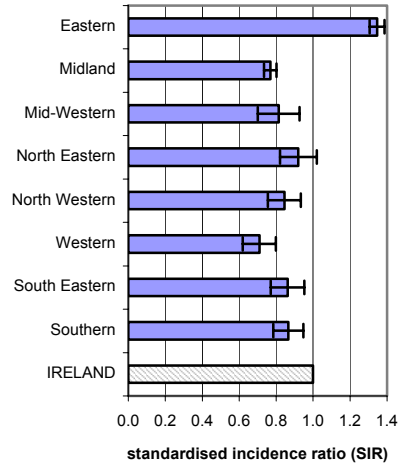
* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Within Ireland, the geographical pattern of lung cancer incidence and mortality is dominated by high rates in the Eastern area[*] (figures 6.7 and 6.8). Incidence in the Eastern area was 35% higher than the national average and mortality 32% higher. The large proportion of the population that is resident in the Eastern area means that rates in this area have a major impact on the national incidence and mortality, and hence almost every other area had an incidence and mortality significantly below the national average[‡].

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

[‡] These comments on the influence of the Eastern region on the overall national rates, and the relative positions of the other regions, apply to all of the cancers included in this report.

Figure 6.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female lung cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	250	232
Midland	25	23
Mid-Western	41	42
North Eastern	43	41
North Western	31	31
Western	43	41
South Eastern	53	53
Southern	77	70

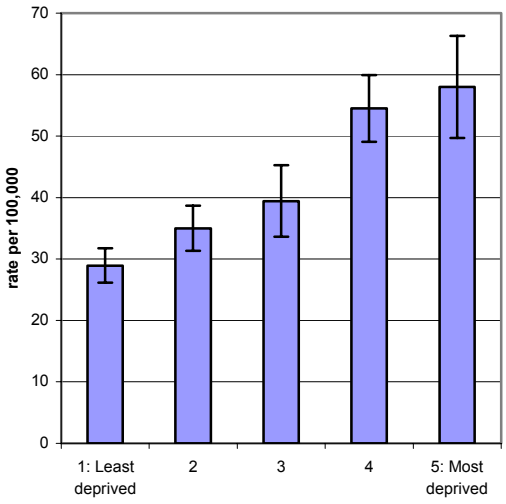
Figure 6.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female lung cancer

Deprivation

In most populations, there is a strong inverse relationship between socio-economic status and lung cancer incidence and mortality, particularly in men (Faggiano et al., 1997). In the UK, there is a strong correspondence between the areas with the highest deprivation and those with the highest rates of lung cancer (Quinn et al., 2005)

In women in Ireland there is a clear trend of increasing incidence with increasing deprivation (figure 6.9). The rate in women resident in the most deprived areas is twice that for women resident in the least deprived areas. This pattern corresponds with the higher rates of smoking among those in the lower social classes in Ireland (Kelleher et al., 2003; chapter 14)

Figure 6.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female lung cancer



Stage at presentation and treatment

The stage at diagnosis describes the spread of the cancer in relation to the lung, nearby organs and organs further away. Lung cancer survival depends on stage, or extent of disease at diagnosis (Fu et al., 2005). In its early stages lung cancer does not usually cause any symptoms; by the time symptoms, such as a chronic cough, hoarseness, coughing up blood, and chest pain, do appear, the cancer is often widespread.

Table 6.4: Extent of disease at diagnosis, 1994-2001, female lung cancer

*Extent**	*%*
Local	7%
Regional	22%
Distant	71%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Just over 60% of lung cancers in women in Ireland were staged at diagnosis. Of those staged, only 7% of patients had disease that was confined to the lung at diagnosis; in the majority of patients, the tumour had already spread beyond the lung to distant organs (table 6.4). The extent of disease at diagnosis did not vary with age.

Guidelines for the UK recommend that most patients with the most common type of lung cancer (non-small cell lung cancer) should be offered either surgery or radiotherapy, while those with the other type (small cell lung cancer) should be offered chemotherapy (SIGN, 2005b). Although active management has been associated with improved survival (Mahmud et al., 2003), low rates of treatment have been reported in some populations, most notably the UK (Gregor et al., 2001). Low treatment rates are also evident in Ireland. Approximately half of women with lung cancer received no tumour-directed therapy (table 6.5); this rose to more than 70% of women in the oldest age group and did not change notably between 1994-1997 and 1998-2001. The proportions receiving surgery (12-14%), radiotherapy (32-35%) and chemotherapy (16-17%) did not increase between the two time periods. All forms of therapy were less likely to be offered to older patients than younger patients.

In detailed analyses of cases diagnosed in 1994-1998, the likelihood that a patient with lung cancer did not receive active cancer-specific treatment was strongly associated with health board of residence, after adjusting for age, sex and deprivation (Mahmud et al., 2003). Compared to those resident in the Eastern board, those resident in the Mid-Western, North Eastern, South Eastern and Western boards were significantly less likely to receive treatment. Some of this variation is likely to be due to case-mix (e.g. differences in disease stage and proportions of patients with co-morbid conditions, both of which affect treatment options) and location of treatment facilities (e.g. radiotherapy); other contributing factors may be local differences in clinical practice and referral patterns (Mahmud et al., 2003).

Table 6.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female lung cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	31%	17%	4%	16%	32%	18%	5%	17%
Radiotherapy	48%	33%	20%	32%	49%	39%	23%	35%
Surgery	24%	14%	6%	14%	24%	13%	4%	12%
No tumour-directed treatment	28%	48%	73%	52%	25%	43%	72%	49%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Lung cancer survival at one year after diagnosis is around 25%, and at five years is approximately 10% (figure 6.10). There is a suggestion of a slight improvement in one year survival over time, but not any improvement in survival at three or five years. Age is associated with survival—in that younger patients have better prospects (figure 6.11) —but the relationship is not as strong as for several other cancers. In further analyses of patients diagnosed in 1994-1998, survival did not vary significantly by area of residence, after adjustment for other factors such as age and sex (NicAmhlaoibh et al., 2004).

Figure 6.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, female lung cancer

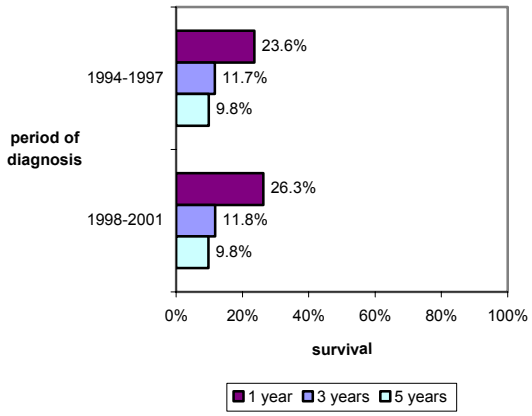


Figure 6.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female lung cancer

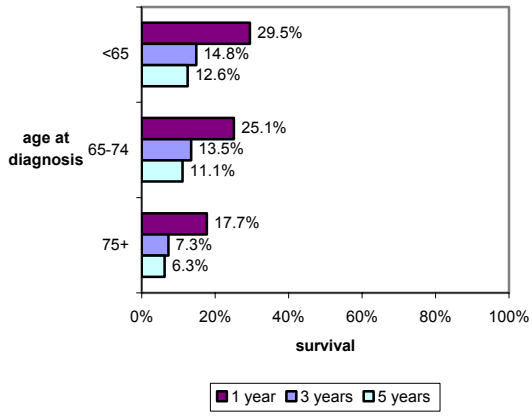
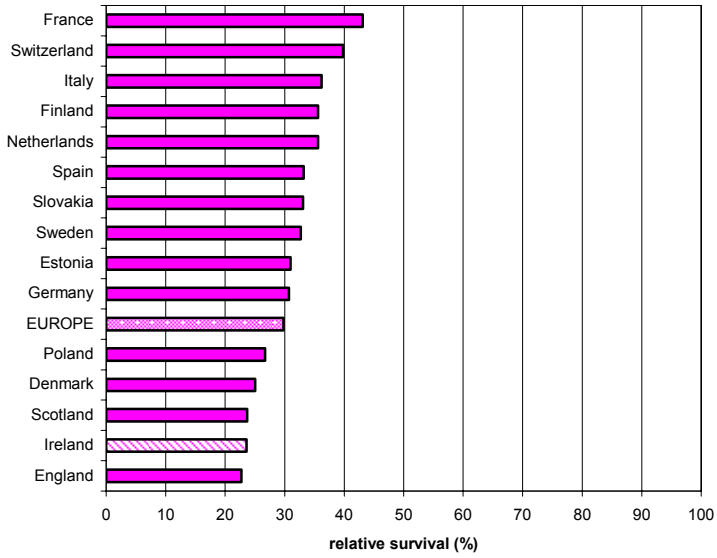


Figure 6.12: One year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female lung cancer



Survival at one year following diagnosis across the countries of Europe ranged from just over 20% to just over 40%. Survival for women diagnosed with lung cancer in Ireland was among the lowest reported, but was similar to survival in England and Scotland. More advanced stage at diagnosis, limited access to specialised care, and less aggressive treatment policies are likely to explain the poor survival for patients in the UK (Janssen-Heijnen et al., 1998; Mahmoud et al., 2003); similar explanations may hold for Ireland.

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 7: Melanoma of the skin

Key points

- *Melanoma of the skin is the 5th most frequently diagnosed cancer in women in Ireland. In terms of causes of death from cancer, it ranks 20th.*
- *Just under 250 new cases of melanoma are diagnosed annually in women in Ireland. On average, 33 women die from melanoma each year.*
- *50% of cases occur in women aged 59 years or younger. The average age at death is 71.*
- *An estimated 4700 women in Ireland were living in 2001 following a diagnosis of melanoma.*
- *The annual number of new cases rose by 3% between 1994-2001. Incidence rates increased by 1% per annum, with most of that rise taking place since1998. Mortality rates rose steadily from the early 1950s to the mid-late 1980s. In more recent years, there was a slight rise between 1994 and 1998 with a slight fall thereafter.*
- *The highest incidence and mortality rates from melanoma in Europe are seen in the northern countries of Denmark, Sweden and the Netherlands. The incidence rate in women in Ireland is only slightly lower than in the Scandinavian populations.*
- *Within Ireland, women resident in the Mid-Western and North Western health areas had 20% fewer cases than expected. The incidence in all other areas did not differ significantly from the national average.*
- *Incidence was highest in women resident in the least deprived areas.*
- *Surgery was the dominant form of treatment and 95% of women underwent surgery. 6% had chemotherapy and 5% radiotherapy. The proportions having each type of treatment varied little by age at diagnosis.*
- *Survival prospects for women with melanoma are very good; survival at one year after diagnosis exceeds 95% and at 5 years exceeds 85%.*
- *Survival in Ireland falls in the mid range of the rates observed across Europe.*
- *The main cause of melanoma of the skin is UV exposure, either in its natural form (sunlight) or from artificial sources (sunbeds/sunlamps). Chances of developing a melanoma are increased in individuals with large numbers of moles or freckles, and/or light skin, hair or eye colour. The best way to reduce risk is to limit sun exposure and exposure to artificial UV.*

Summary

Melanoma occurs when cancer cells form in melanocytes, the skin cells that are responsible for colouring the skin. Melanoma can develop anywhere in the body, but the most common sites are those that are exposed to sunlight. In women melanomas often occur on the arms and legs whereas in men the most common sites are the trunk (shoulders to hips) or head and neck.

Melanoma of the skin is the 5th most commonly diagnosed cancer in women in Ireland, accounting for 4.0% of all cancers (table 7.1). Just under 250 women are diagnosed with a melanoma each year. Half of the cases are in women under 59 years. The chance of being diagnosed with melanoma is 0.7% by age 65 (1 in 143) and rises to 1.1% (1 in 91) by age 75. In 2001, an estimated 4700 women in Ireland were living with melanoma. The number of cases expected in women in Ireland in 2006 is 300.

Table 7.1: Summary information, incidence and prevalence, female melanoma of the skin

Rank among the common cancers in women	5th
% of all new cancer cases	4.0%
Average number of new cases per annum	249
Average age at diagnosis with melanoma	59
Chance of developing melanoma	
• by age 65	0.7%
• by age 75	1.1%
Estimated number of women alive in 2001 following a diagnosis of melanoma	4700
Estimated number of cases that will be diagnosed in 2006	300

Since survival prospects for women with melanoma are very good (see below), mortality is low. The average annual number of deaths is 33 (table 7.2), making this the 20th most common cause of death from cancer. One percent of all deaths from cancer are due to melanoma. The average age at death is 71 years and 1.1% of all person years of life lost to cancer are a result of melanoma. 10% of women diagnosed with melanoma die from the disease within 5 years of diagnosis.

Table 7.2: Summary information, mortality, female melanoma of the skin

Rank among the common cancers in women	20th
Average number of deaths per annum	33
% of all cancer deaths due to melanoma of the skin	1.0%
Average age at death from melanoma	71
% women with melanoma who die from the disease within 5 years of diagnosis	10%
% of person-years of life-lost due to melanoma	1.1%
Average number of years of life-lost for a woman dying from melanoma	18

Risk factors and prevention

Table 7.3: Convincing, probable and possible risk factors for melanoma of the skin

	Increasing risk
Convincing or probable	Sun exposure (mainly recreational)[1-5]
	High number of naevi[6-9]
	History of sunburn[1,2,5]
	Fair skin, red or blond hair, green or blue eyes[1,7,10]
	High density of freckles[10]
	Sunbed/sunlamp use[11]
	Family history of melanoma[10,12]

1 IARC Working Group, 2001;
2 Elwood & Jopson, 1997;
3 Armstrong et al., 1997;
4 English et al., 1997;
5 Gandini et al., 2005 (a);
6 risk raised for high numbers of either common or atypical naevi or both;
7 Holly et al., 1987;
8 Grob et al., 1990;
9 Gandini et al., 2005 (b);
10 Gandini et al., 2005 (c);
11 Gallagher et al., 2005;
12 melanoma in one or more first-degree relatives

The main cause of melanoma of the skin is exposure to ultraviolet (UV) radiation, the primary source of which is sunlight (IARC Working Group, 2001; Gandini et al., 2005a). Intermittent, or recreational, sun exposure appears to be the most important factor affecting chances of developing melanoma. Evidence is accruing that exposure to artificial UV radiation, through the use of sunbeds or sunlamps, also raises melanoma risk (Gallagher et al., 2005). More generally, risk of developing a melanoma is increased in individuals with a high number of naevi (moles), a high density of freckles, light hair, skin or eye colour, and a history of sunburn (table7.3). Individuals with close family members who have had melanoma have an increased risk of developing it themselves.

The best way to lower risk of melanoma is to limit exposure to the sun and other sources of UV radiation. It is not currently clear whether use of sunscreen creams reduces risk (IARC Working Group, 2001), therefore the best advice is to limit the time spent in the sun, especially around midday, when the ultra-violet light is most intense and to cover the skin with clothes. The Sun Smart campaign provides more information on this (Irish Cancer Society, 2003). Use of sunbeds and sunlamps should also be avoided.

Age distribution

More than one third of cases of melanoma occur in women aged under 50 and a further quarter are in the 50-64 age group (figure 7.1). The remaining 40% are distributed between the 65-74 and 75 and older age groups. The pattern of age at death is somewhat different, with less than 40% of deaths in women under 65, 24% in the 65-74 age group and 38% in women 75 and older (figure 7.2).

Figure 7.1: Age composition of patients at diagnosis, female melanoma of the skin

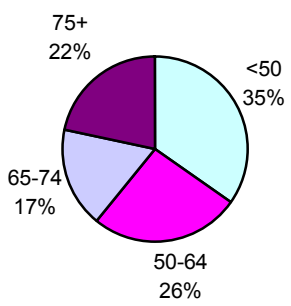
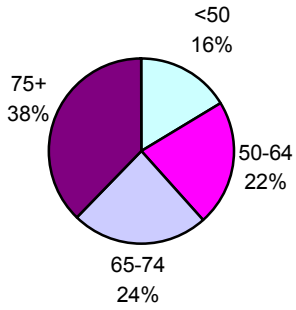


Figure 7.2: Age composition of patients at death, female melanoma of the skin



Time trends

The incidence of melanoma of the skin has been rising in fair-skinned populations worldwide for several decades. In many populations in Europe, or of European origin, between the early 1960s and the late 1980s, rates grew at between 3% and 7% per annum (Armstrong et al., 1997). This rate of growth has made melanoma the most rapidly increasing cancer in white populations, with the exception of lung cancer in women (Boyle et al., 1995). In recent years some populations have seen a slowing, or a levelling off, of the rate of increase, particularly in younger age groups (Bulliard et al., 1999; Marrett et al., 2001; de Vries et al., 2003). These trends are thought to be due to growing public awareness of the dangers of excessive sunbathing and, consequently, reductions in sun exposure (Marrett et al., 2001; de Vries et al., 2003), although firm data supporting these conclusions are not available.

The number of new cases of melanoma diagnosed in women in Ireland grew by 3% each year between 1994 and 2001. Once adjustments were made for changes in the age distribution of the population, incidence rates rose by 1% each year on average (figure 7.3). Most of this rise appeared to take place in the years since 1998. The annual mortality rate rose very slightly between 1994 and 1998 and declined thereafter.

Figure 7.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female melanoma of the skin

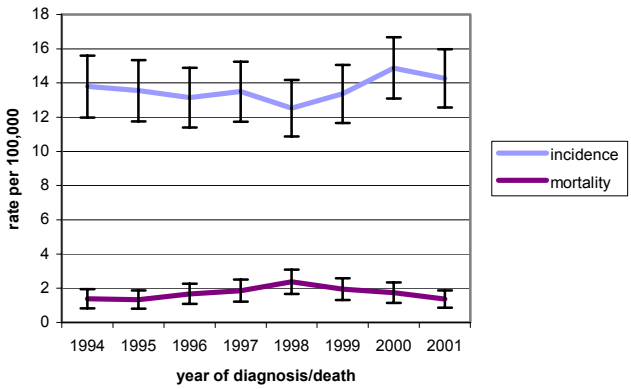
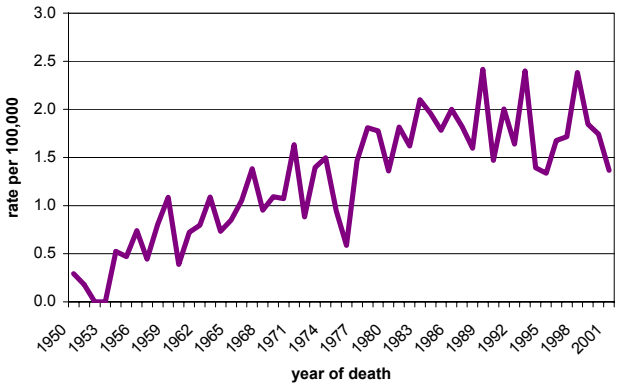


Figure 7.4: Age-standardised mortality rates, by year of death, 1950-2001, female melanoma of the skin



The relatively few deaths from melanoma each year mean that the mortality rates are subject to a lot of random fluctuation (figure 7.4). However, a clear trend of rising rates over time can be discerned. Mortality rose steadily from the early 1950s to the mid-late 1980s.

Geographical variations

Incidence and mortality rates for melanoma in women in western Europe and the USA are shown in figures 7.5 and 7.6. The highest incidence rates, 12 per 100,000 and above, are seen in women in the USA, in northern European countries and in Ireland. Rates of 8 per 100,000 and lower are found in southern Europe. Incidence among women in Ireland is more than 25% higher than that for women in the UK. In part, the higher rates in northern compared to southern countries are likely to reflect the fact that individual characteristics—such as skin, hair and eye colour—influence risk of developing melanoma. However, patterns of UV exposure (both natural and artificial) in different populations are also likely to be important. The geographical pattern in mortality reflects that for incidence, with the highest rates in northern Europe and the USA and lowest in southern Europe.

Figure 7.5: Age-standardised incidence rates for European countries and the USA, female melanoma of the skin*

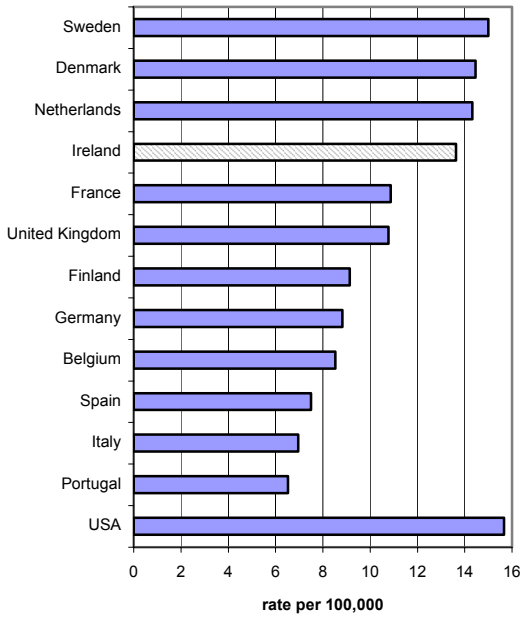
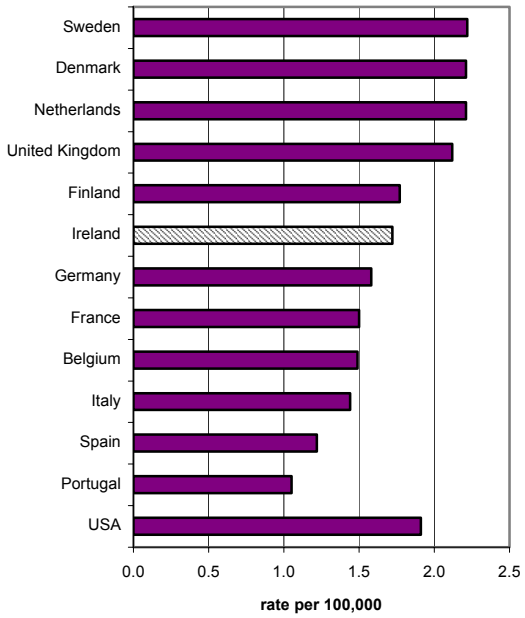


Figure 7.6: Age-standardised mortality rates for European countries and the USA, female melanoma of the skin*

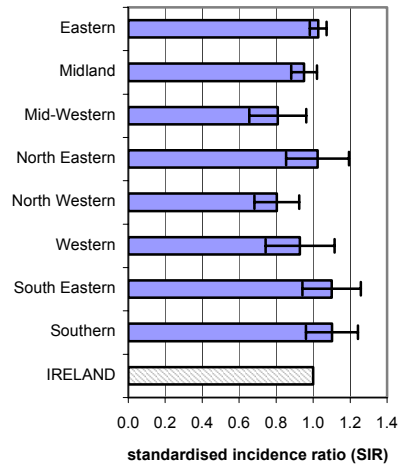


* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

In Ireland, women in the Southern and South Eastern areas* had 10% more cases of melanoma than would have been expected based on national rates, but these excesses were not statistically significant (figure 7.7). Incidence in the Mid-Western and North Western areas was 20% lower than expected and this did reach statistical significance. The relatively few deaths from melanoma in women in Ireland each year mean that it is difficult to make any meaningful comments on mortality by area (figure 7.8).

* The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

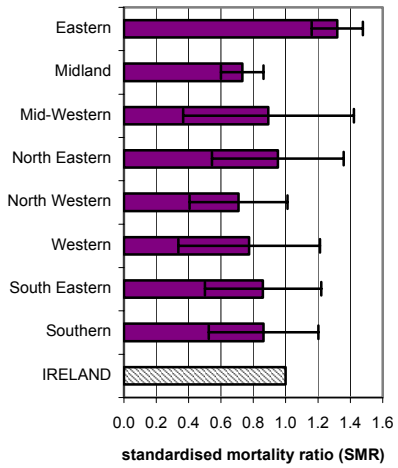
Figure 7.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female melanoma of the skin



Average annual numbers of cases and deaths

	cases	deaths
Eastern	90	15
Midland	13	1
Mid-Western	18	3
North Eastern	21	3
North Western	12	2
Western	23	3
South Eastern	30	3
Southern	42	5

Figure 7.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female melanoma of the skin

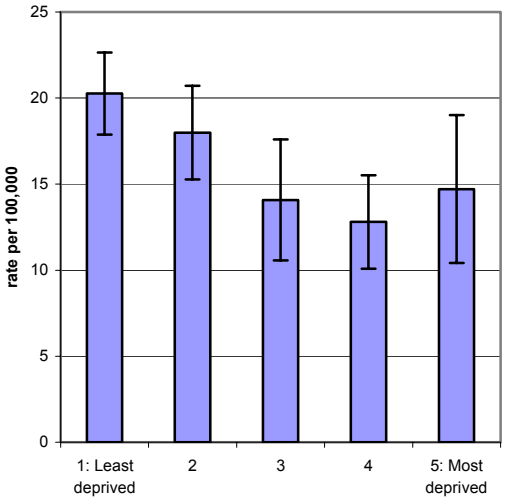


Deprivation

In most countries the highest risk of melanoma of the skin is among people with the highest socio-economic status (Faggiano et al., 1997). Consistent with this, in the UK there is a strong inverse relationship between melanoma and deprivation (Harris et al., 1998; Quinn et al., 2001). Although this pattern is thought to be due to differences between social classes in non-occupational exposure to UV radiation, there is little firm evidence to support this conclusion (Woodward & Boffetta, 1997; Stott, 1999).

Compatible with the trends in other countries, among women in Ireland, those resident in the most affluent areas had the highest incidence (figure 7.9). The rate fell with increasing deprivation for all but those in the most deprived category.

Figure 7.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female melanoma of the skin



Stage at presentation and treatment

The stage at diagnosis describes the spread of the melanoma through the dermis (the layer of skin below the epidermis, or topmost layer) to subcutaneous tissue and to lymph nodes. More advanced stage at diagnosis is associated with poorer survival (Chang et al., 1998). However, melanomas that have not spread beyond the site at which they developed are highly curable.

Table 7.4: Extent of disease at diagnosis, 1994-2001, female melanoma of the skin

*Extent**	*%*
Local	45%
Regional	18%
Distant	37%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

How far a melanoma has spread is not always clear until after surgical removal of the lesion and examination of lymph nodes. This is why information on disease spread was available at diagnosis for only 30% of melanomas in women in Ireland. Of those for which information was available, just under half were localised (table 7.4), and this proportion was higher in younger women. The proportion of women with distant disease was 37% overall, and increased with increasing age.

Surgical removal of the lesion, with removal of involved lymph nodes, is the treatment of choice for melanoma. Accordingly, 95% of women with melanoma in Ireland underwent surgery (table 7.5), and this proportion was similar in all age groups. 6% had chemotherapy and 4-5% radiotherapy. These percentages did not vary by age or over time.

Table 7.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female melanoma of the skin

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	8%	3%	1%	6%	8%	5%	2%	6%
Radiotherapy	4%	5%	5%	4%	4%	5%	6%	5%
Surgery	97%	95%	94%	96%	96%	94%	91%	95%
No tumour-directed treatment	3%	5%	6%	4%	3%	6%	7%	4%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Melanoma of the skin generally has a good prognosis. Survival at one year exceeds 95% and at five years is 87-89% (figure 7.10). The already high survival meant that there was little prospect for improvements between 1994-1997 and 1998-2001. There was no notable difference in survival by age at diagnosis (figure 7.11).

Figure 7.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, female melanoma of the skin

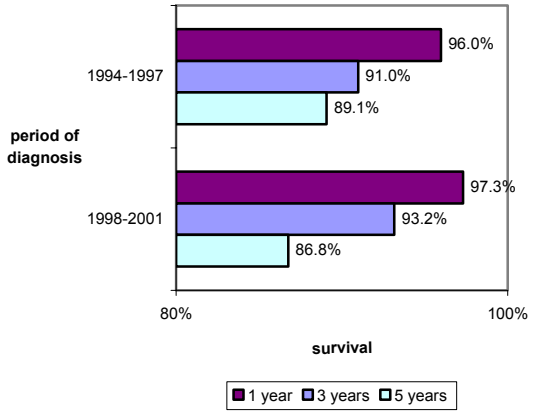


Figure 7.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female melanoma of the skin

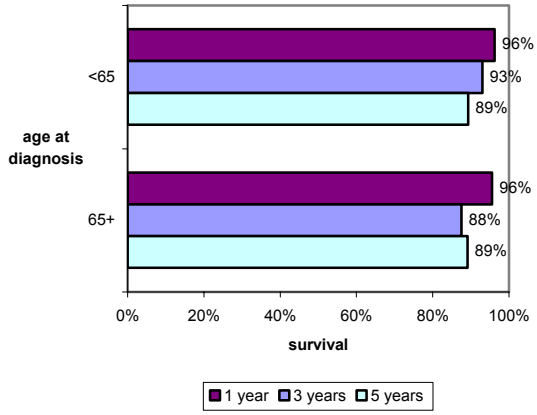
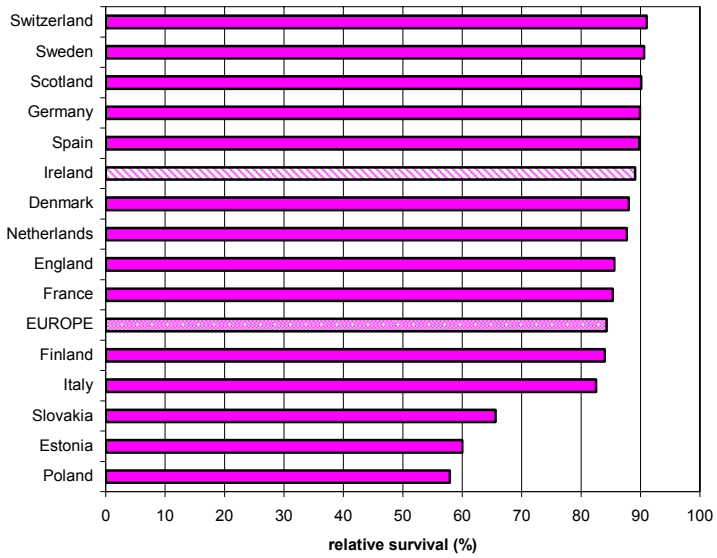


Figure 7.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female melanoma of the skin



In most countries in Europe, 5-year survival for women diagnosed with melanoma was 80% or higher (figure 7.12). Only the countries of eastern Europe had lower survival (65% or less). Ireland lay in the upper half of the group of countries with high survival. It has been suggested that differences in stage at presentation and histological type of lesion may be responsible for much of the international variation in survival (Smith et al., 1998).

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 8: Non-Hodgkin's Lymphoma

Key points

- *Non-Hodgkin's lymphoma is the 7th most commonly diagnosed cancer in women in Ireland. It ranks 8th in terms of causes of cancer-related deaths.*
- *Approximately 200 women are diagnosed with non-Hodgkin's lymphoma each year and just over 100 women die from this type of cancer.*
- *The average age at diagnosis is 66 and that of death is 72.*
- *Approximately 2100 women in Ireland were estimated to be living in 2001 following a diagnosis of non-Hodgkin's lymphoma.*
- *Both incidence and mortality rates rose over the period 1994-2001. The growth in mortality (4% per year, on average) was greater than that in incidence (2% per year). Mortality rates have risen more than 3-fold since between 1950 and the start of this century.*
- *Incidence and mortality rates for women in Ireland are amongst the highest in western Europe, but are lower than those in the USA.*
- *There was relatively little variation in incidence and mortality rates across the health areas.*
- *There was no association between non-Hodgkin's lymphoma incidence and deprivation.*
- *Approximately two-thirds of women with non-Hodgkin's lymphoma in Ireland undergo chemotherapy. Just under one-third have radiotherapy. Lower proportions of older women received chemotherapy or radiotherapy than younger women.*
- *Survival is about 50% at 5 years after diagnosis, and did not increase between 1994-1997 and 1998-2001. Survival decreases steadily with increasing age at diagnosis.*
- *Five year survival for women in Ireland is close to the European average.*
- *Other than having a weakened immune system, there are few definitive risk factors for non-Hodgkin's lymphoma.*

Summary

Non-Hodgkin's lymphoma is a cancer of lymphoid tissue, a part of the lymphatic system, itself part of the immune system. Because lymph tissue is found throughout the body, non-Hodgkin's lymphoma in adults can develop in almost any part of the body.

Non-Hodgkin's lymphoma ranks 7th in terms of the most frequently diagnosed cancers in women in Ireland (table 8.1). There are, on average, 200 new cases per year, accounting for just over 3% of all malignant neoplasms diagnosed. 66 years is the average age at diagnosis. The chance of developing non-Hodgkin's lymphoma by the age of 75 is 0.9% or 1 in 111. In 2001, there were an estimated 2100 women living with non-Hodgkin's lymphoma in Ireland. The number of new cases expected to be diagnosed in women in Ireland in 2006 is 246.

Table 8.1: Summary information, incidence and prevalence, female non-Hodgkin's lymphoma

Rank among the common cancers in women	7th
% of all new cancer cases	3.2%
Average number of new cases per annum	200
Average age at diagnosis with non-Hodgkin's lymphoma	66
Chance of developing non-Hodgkin's lymphoma	
• by age 65	0.5%
• by age 75	0.9%
Estimated number of women alive in 2001 following a diagnosis of non-Hodgkin's lymphoma	2100
Estimated number of cases that will be diagnosed in 2006	246

Non-Hodgkin's lymphoma makes up 3% of all deaths due to cancer and is the 8th most common cause of cancer death among women in Ireland (table 8.2). On average, just over 100 women die from this form of cancer each year. The average age at death is 72 years. Just over 3% of all person-years of life lost due to cancer are a result of non-Hodgkin's lymphoma. 38% of women diagnosed with this form of cancer will die from it within 5 years.

Table 8.2: Summary information, mortality, female non-Hodgkin's lymphoma

Rank among the common cancers in women	8th
Average number of deaths per annum	104
% of all cancer deaths due to non-Hodgkin's lymphoma	3.0%
Average age at death from non-Hodgkin's lymphoma	72
% women with non-Hodgkin's lymphoma who die from the disease within 5 years of diagnosis	38%
% of person-years of life-lost due to non-Hodgkin's lymphoma	3.1%
Average number of years of life-lost for a woman dying from non-Hodgkin's lymphoma	16

Risk factors and prevention

Table 8.3: Convincing, probable and possible risk factors for non-Hodgkin's lymphoma

	Increasing risk	*Reducing risk*
Convincing	Immunosuppression[1,2,3]	
or probable	Infection with Epstein-Barr Virus (EBV)[10]	
	Infection with Human T-cell leukaemia/lymphoma virus (HTLV-1)[14]	
Possible	Tobacco smoking[4]	Fruit[13]
	Hair dye[5,6,7]	
	Hepatitis C infection[8,9]	
	Occupational pesticide exposure[11,12]	

1 including individuals with congenital immunosuppression (e.g. ataxia telangiectasia) and acquired immunodeficiencies. The latter group include those with autoimmune conditions (e.g. rheumatoid arthritis, systemic lupus, celiac disease) and those with secondary immunodeficiency (including that which is drug induced for the purpose of suppressing post-transplant organ rejection and that arising as a result of HIV infection);
2 Fisher & Fisher, 2004;
3 Franceschi et al., 1999;
4 Morton et al., 2005;
5 Correa et al., 2000;
6 Schroeder et al., 2002;
7 Zhang et al., 2004;
8 Matsuo et al., 2004;
9 Gisbert et al., 2003;
10 Thompson & Kurzrock, 2004;
11 Schroeder et al., 2001;
12 de Roos et al., 2003;
13 IARC Working Group, 2003;
14 Muller et al., 2005

The factors that influence risk of developing non-Hodgkin's lymphoma are not well understood. The most firmly established risk factor is a weakened immune system. Individuals who have an inherited immune disorder, an autoimmune disease such as rheumatoid arthritis, psoriasis, etc, who are HIV positive, or who are taking immunosuppressive drugs following an organ transplant are at increased risk of developing non-Hodgkin's lymphoma. Infection with HTLV-1 (which is a retrovirus found in parts of Japan, the Caribbean and the USA) or with EBV (a herpes virus) is associated with raised risk, but both of these probably account for only a small proportion of cases (Muller et al., 2005). Other factors that may affect risk are listed in table 8.3.

For now, the best chance of reducing the incidence of non-Hodgkin's lymphoma at the population level is to take initiatives to prevent HIV infection.

Age distribution

One fifth of cases of non-Hodgkin's lymphoma are diagnosed in women aged under 50 (figure 8.1); another 28% present in the 50-64 age group and the remaining 52% are distributed equally between women aged 65-74 years and those aged 75 and older. As regards deaths, just over 30% are in women under 65, 28% in the 65-74 age group and the remaining 41% in those 75 and older (figure 8.2).

Figure 8.1: Age composition of patients at diagnosis, female non-Hodgkin's lymphoma

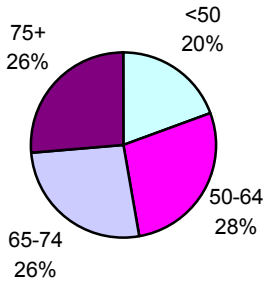
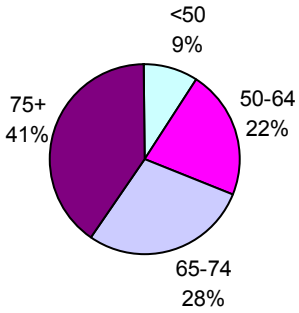


Figure 8.2: Age composition of patients at death, female non-Hodgkin's lymphoma



Time trends

Incidence and mortality rates of non-Hodgkin's lymphoma have been rising in many populations over the past two or three decades (Muller et al., 2005). In some populations, such as the USA, incidence doubled between the mid-1970s and the mid-1990s (Fisher & Fisher, 2004), with the most dramatic escalation in males aged 25-54 years. The reasons for the rise are not fully understood, but it is, in part, a consequence of the HIV epidemic. Another small part of the increase is due to improved reporting and better methods of diagnosis. Together these factors are estimated to explain about 50% of the rise (Fisher & Fisher, 2004); the other 50% is unexplained.

The numbers of cases of non-Hodgkin's lymphoma in women in Ireland rose by 4% per annum during 1994 to 2001. After adjusting for age, the annual increase in the incidence rate was 2% (figure 8.3). An upward trend in deaths and mortality rates is also evident, and this is slightly more pronounced than that for incidence. The annual number of deaths rose by 6% each year while the mortality rate grew by 4% per year.

Figure 8.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female non-Hodgkin's lymphoma

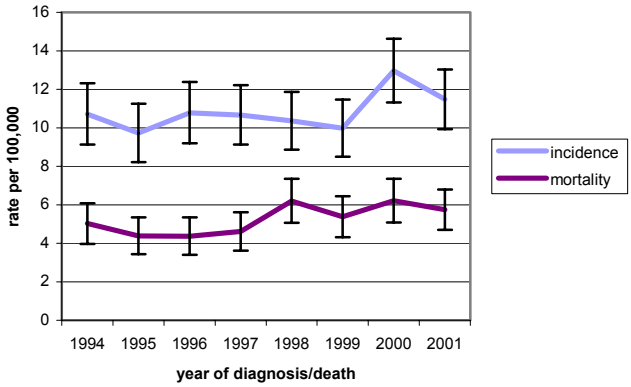


Figure 8.4: Age-standardised mortality rates, by year of death, 1950-2001, female lymphoma

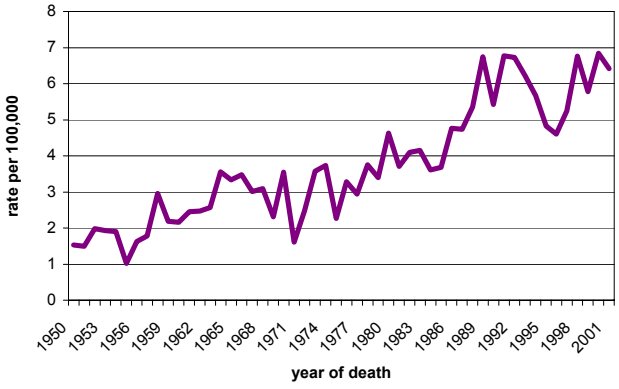


Figure 8.4 shows annual mortality rates for lymphoma from 1950 to 2001. Deaths from both non-Hodgkin's lymphoma and the less common Hodgkin's disease are included. There is a consistent upward trend over time. Between 1950 and the early years of this century there was a greater than 3-fold increase in mortality.

Geographical variations

Figures 8.5 and 8.6 show incidence and mortality rates for women in Ireland, other European countries and the USA. As is the case for time trends in non-Hodgkin's lymphoma, the reasons underlying the geographical variations in incidence, other than differences in prevalence of HIV infection between populations, are not known. Incidence rates in the USA tend to exceed those in all other countries (Muller et al., 2005), with some of this due to AIDS-associated lymphomas (Hartge & Devesa, 1992). In these data there is a 42% higher rate in women in the USA than in women in Ireland. Within western Europe, the rates in Ireland are in the upper third of those observed across the region. As regards mortality in western Europe, Ireland is second to Finland in terms of having the highest rates. In both countries, however, the rates are lower than in the USA.

Figure 8.5: Age-standardised incidence rates for European countries and the USA, female non-Hodgkin's lymphoma*

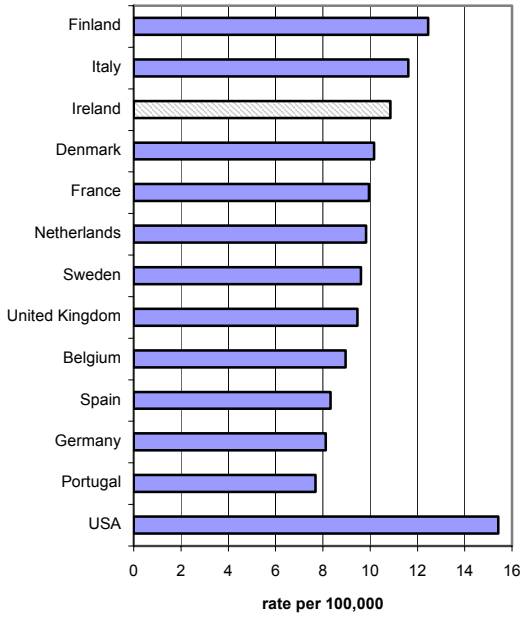


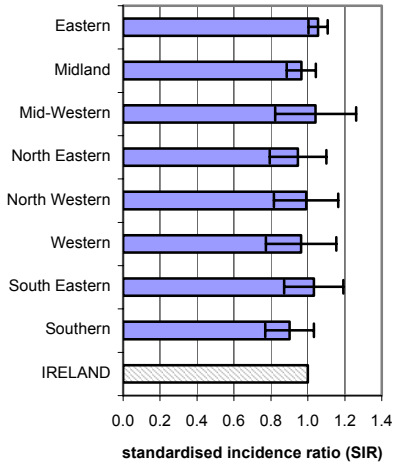
Figure 8.6: Age-standardised mortality rates for European countries and the USA, female non-Hodgkin's lymphoma *

* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Incidence and mortality of non-Hodgkin's lymphoma among women in Ireland by area[*] are shown in figures 8.7 and 8.8. The only area with incidence that differed significantly from the national average was the Eastern area; the number of cases diagnosed in women in this area was 6% higher than expected on the basis of national rates. Mortality in this area was also slightly raised, but not significantly. 17% fewer deaths than expected were observed in women in the Midland area, but this was based on an average of only 5 deaths per year. None of the other areas had mortality that differed significantly from the national average.

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers.

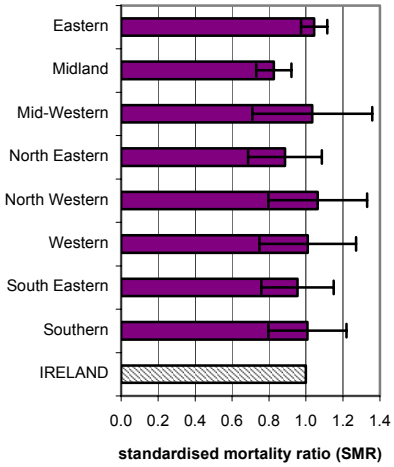
Figure 8.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female non-Hodgkin's lymphoma



Average annual numbers of cases and deaths

	cases	deaths
Eastern	72	36
Midland	11	5
Mid-Western	18	10
North Eastern	16	8
North Western	12	7
Western	20	11
South Eastern	23	11
Southern	28	17

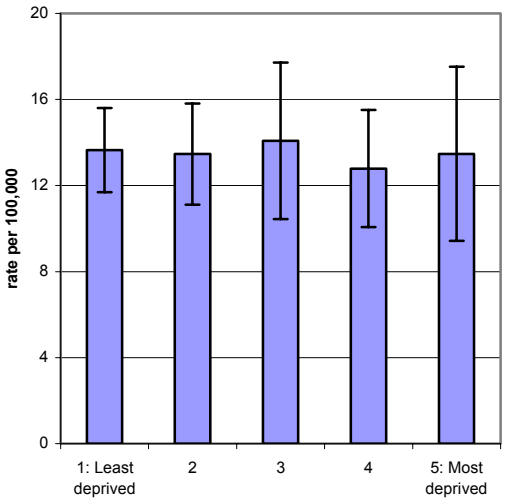
Figure 8.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female non-Hodgkin's lymphoma



Deprivation

In most populations no association has been found between non-Hodgkin's lymphoma and social class (Faggiano et al., 1997). The data on non-Hodgkin's lymphoma by deprivation category of residence among women in Ireland are consistent with this observation (figure 8.9).

Figure 8.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female non-Hodgkin's lymphoma



Stage at presentation and treatment

There are several different subtypes of non-Hodgkin's lymphoma. Two main groups are indolent and aggressive tumours. The different subtypes have different treatment regimes, prognoses and survival outcomes. It is difficult to accurately assign subtype, however, and for more than 40% of non-Hodgkin's lymphoma in Ireland the subtype is not recorded in medical records (Cronin et al., submitted).

The stage, or extent of disease at diagnosis, is one of the major predictors (together with subtype) of survival for patients with non-Hodgkin's lymphoma (Cronin et al., 2005).

Table 8.4: Extent of disease at diagnosis, 1994-2001, non-Hodgkin's lymphoma

*Extent**	*%*
Local	36%
Regional	20%
Distant	44%

* local=involvement of single lymph node region or extra-lymphatic site/organ or localized involvement in spleen only; regional=involvement of two or more lymph node regions, or spread to adjacent tissues/organs, or spleen plus lymph nodes involved; distant=spread to further away organs

Information on extent of disease at diagnosis is available for 79% of non-Hodgkin's lymphomas in women in Ireland. Of these, just over one third were locally confined and a further 20% exhibited regional spread (table 8.4). The proportion of patients with distant spread did not vary by age at diagnosis; locally confined lymphomas were slightly more common, and regionally spread lymphomas slightly less common, in women aged 75 and older than in younger women.

The predominant treatment for non-Hodgkin's lymphoma is chemotherapy, and this is used for both indolent and aggressive lymphomas (Fisher et al., 2004). In Ireland, around two-thirds of women with non-Hodgkin's lymphoma receive chemotherapy and the proportion was similar in both the earlier and later time periods (table 8.5). Indolent lymphomas can also be responsive to radiotherapy (Winter et al., 2004). In Ireland approximately 30% of patients underwent radiotherapy; again, there was no change in this proportion over time. 17% of patients in 1994-1997 and 22% in 1998-2001 underwent surgery. It has been suggested that elderly patients may benefit to the same extent as young patients from intensive treatment (Bordonaro et al., 2004). In Ireland, lower rates of all three forms of therapy were seen in older women than younger women, although the magnitude of the differences between the age groups were less for this cancer than for some others. Lower rates of treatment for older patients with non-Hodgkin's lymphoma have also been found in other populations, including the USA (Cronin et al., 2005) and the Netherlands (de Rijke et al., 1996).

Table 8.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female non-Hodgkin's lymphoma

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	73%	63%	43%	63%	78%	66%	43%	66%
Radiotherapy	29%	29%	26%	29%	33%	30%	23%	30%
Surgery	18%	17%	13%	17%	25%	22%	18%	22%
No tumour-directed treatment	13%	20%	32%	19%	11%	19%	32%	18%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Survival of women diagnosed with non-Hodgkin's lymphoma is around 70% at one year and 50% at 5 years (figure 8.10). There has been no improvement in survival between 1994-1997 and 1998-2001. Survival decreases steadily with increasing age at diagnosis (figure 8.11). Five-year survival for women diagnosed in 1994-1997 was 70.9% in those aged under 65, 44.7% in those aged 65-74 and 33.5% in those aged 75 and older.

Figure 8.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, female non-Hodgkin's lymphoma

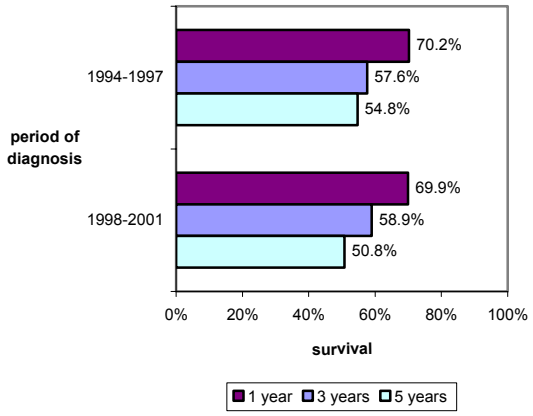


Figure 8.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female non-Hodgkin's lymphoma

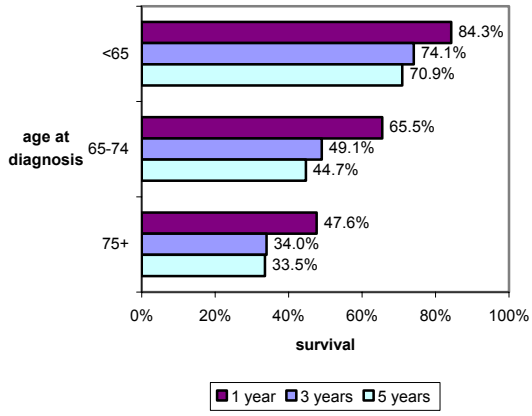
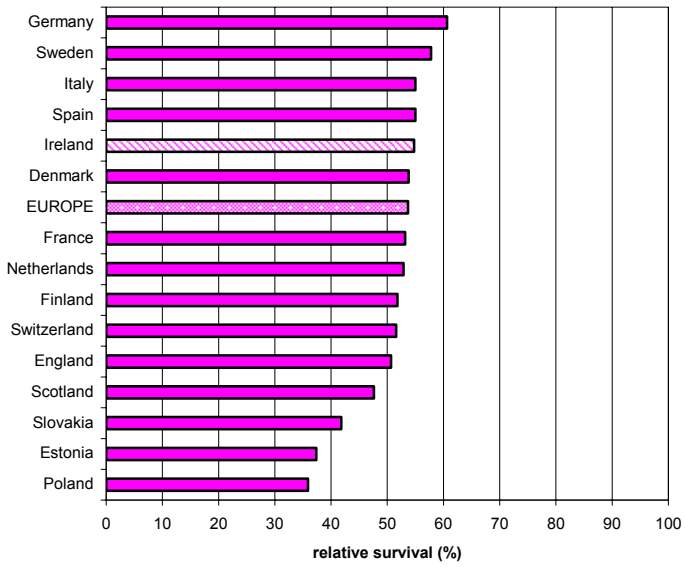


Figure 8.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female non-Hodgkin's lymphoma



There is variation in survival from non-Hodgkin's lymphoma across the countries of Europe (figure 8.12). Survival at five-years ranges from 60.6% in Germany to 35.9% in Poland, although most countries have survival between 51% and 56%. Survival for women in Ireland is approximately equal to the European average (Ireland 54.8%; Europe 53.7%). Possible explanations for survival variations are outlined in chapter 2.

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 9: Ovarian cancer

Key points

- *Cancer of the ovary ranks 4th both in terms of the most frequently diagnosed cancers and in terms of cancer-related deaths in women in Ireland.*
- *Approximately 330 new cases are diagnosed each year and 225 women die from the disease.*
- *Half of all cases are diagnosed in women aged under 62. The average age at death of affected women is 68.*
- *An estimated 2800 women in Ireland are living following a diagnosis of ovarian cancer*
- *Annual numbers of cases and deaths rose by 3% per year during 1994-2001; this was mainly a result of population ageing. Age-adjusted incidence and mortality rates were unchanged during the period. From 1950 to the early years of this century, however, mortality rates doubled.*
- *Incidence and mortality rates in Ireland exceed those in the USA (by 26% and 38% for incidence and mortality respectively) and most of western Europe. Rates in Ireland are at a similar level to those in the Nordic countries, which have traditionally had high rates.*
- *There is relatively little significant variation in either incidence or mortality rates across the former health board areas[*] of Ireland.*
- *There was no strong trend in incidence with deprivation, although women resident in the least deprived areas had the lowest rate.*
- *The dominant treatment regime is surgery and chemotherapy. More than half of women had chemotherapy and 50-60% underwent surgery. Rates of treatment were substantially lower among women aged 75 and older at diagnosis; over half of women in this age group had no tumour-directed treatment.*
- *Survival at five-years is 40% and has not changed between 1994-1997 and 1998-2001. Younger women (under 65) have better survival rates than older women.*
- *Survival in Ireland is in the upper half of rates observed across Europe.*
- *Prospects for prevention of ovarian cancer are not particularly encouraging at the moment. In terms of lifestyle factors, use of oral contraceptives and breastfeeding are both associated with reduced disease risk.*
- *Methods of screening for ovarian cancer in post-menopausal women are being evaluated, but the results of these studies are not expected for 10 years.*

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Summary

Ovarian cancer accounts for just over 5% of all cancers diagnosed in women in Ireland and ranks 4th in terms of the most commonly diagnosed tumours (table 9.1). Approximately 330 women are newly diagnosed with an ovarian cancer each year and the average age at diagnosis is 62 years. By the age of 75, one woman in 67 (1.5%) will have been diagnosed with ovarian cancer. It is estimated that there were approximately 2800 women diagnosed and living with ovarian cancer in Ireland in 2001. It is estimated that 400 new cases will be diagnosed in Ireland in 2006.

Table 9.1: Summary information, incidence and prevalence, ovarian cancer

Rank among the common cancers in women	4th
% of all new cancer cases	5.4%
Average number of new cases per annum	334
Average age at diagnosis with ovarian cancer	62
Chance of developing ovarian cancer	
• by age 65	1.0%
• by age 75	1.5%
Estimated number of women alive in 2001 following a diagnosis of ovarian cancer	2800
Estimated number of cases that will be diagnosed in 2006	403

There are approximately 225 deaths from ovarian cancer in women in Ireland each year, and this tumour ranks 4th in terms of causes of cancer-related death (table 9.2). 6.5% of all cancer deaths and 7.3% of person-years of life lost to cancer are from ovarian cancer. Each woman who dies from ovarian cancer loses on average of 17 years of life. At five years after diagnosis, just over half of women who have been diagnosed with ovarian cancer will have died from the disease.

Table 9.2: Summary information, mortality, ovarian cancer

Rank among the common cancers in women	4th
Average number of deaths per annum	225
% of all cancer deaths due to ovarian cancer	6.5%
Average age at death from ovarian cancer	68
% women with ovarian cancer who die from the disease within 5 years of diagnosis	54%
% of person-years of life-lost due to ovarian cancer	7.3%
Average number of years of life-lost for a woman dying from ovarian cancer	17

Risk factors and prevention

Table 9.3: Convincing, probable and possible risk factors for ovarian cancer

	Increasing risk	*Reducing risk*
Convincing or probable	Nulliparity or low parity[1,2] Family history of ovarian cancer[3,4]	Combined oestrogen-progestogen oral contraceptives[9] Breastfeeding[1,2]
Possible	Alcohol[5] High intake of fat[6,7] Infertility[1] Prolonged use of hormone replacement therapy[2,8]	Vegetables and fruit[6,7] Tubal ligation (sterilization)[10] Hysterectomy (without oophorectomy)[10]

1 Riman et al., 2004;
2 Lukanova & Kaaks, 2005;
3 Ovarian cancer in first degree relative(s);
4 Stratton et al., 1998;
5 Bagnardi et al., 2001;
6 WCRF/AICR, 1997;
7 La Vecchia, 2001;
8 Anderson et al., 2003;
9 IARC Working Group, 2005a;
10 Ness & Cottreau, 1999

Up to 10% of ovarian cancers are thought to be due to an inherited tendency to develop the disease. Some of the heritable ovarian cancers are due to mutations (changes) in breast cancer genes (known as *BRCA1* and *BRCA2*) and others are due to the hereditary non-polyposis colon cancer (HNPCC) syndrome. Even after this has been taken into account, the single greatest risk factor for ovarian cancer is a family history of the disease, particularly among first-degree relatives, and especially if the relatives were diagnosed with ovarian cancer at a young age and/or if more than one relative has been affected. Women with a mother, sister or daughter who have had ovarian cancer have at least a 3 times higher risk of developing the disease themselves than women without affected relatives (Stratton et al., 1998). The other major determinants of risk are factors that affect hormonal levels, either in terms of a woman's own circulating hormones (e.g. childbearing) or artificial hormones (e.g. oral contraceptives). These, and other possible risk factors, are listed in table 9.3.

Several options for screening for ovarian cancer have been proposed but it is not clear at the moment that any of these would reduce mortality from the disease in the population. Two very large trials, one in the USA and one in the UK, are evaluating whether regular measurement of levels of a protein in the blood (CA125) together with transvaginal ultrasound (see glossary) examinations might be effective screening strategies for ovarian cancer in post-menopausal women (Prorok et al., 2000; UK Cxollaborative Trial of Ovarian Cancer Screening, 2005). The results of these trials are expected in the next 10 years.

Age distribution

Almost one quarter of cases of ovarian cancer occur in women aged under 50 (figure 9.1). A further 32% present in women aged 50-64 years, with just over 20% presenting in the each of the 65-74 and 75 and older age groups. In terms of deaths, 42% are in women aged under 65, 27% in women aged 64-74 with the remaining 31% in women aged 75 and older (figure 9.2).

Figure 9.1: Age composition of patients at diagnosis, ovarian cancer

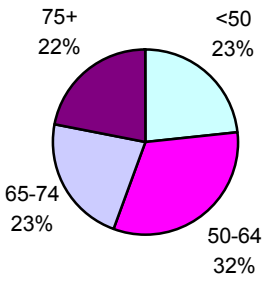
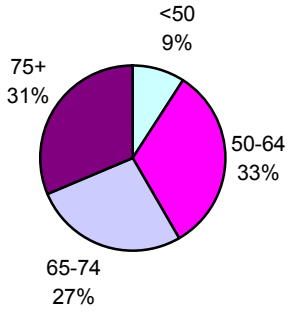


Figure 9.2: Age composition of patients at death, ovarian cancer



Time trends

The variation in ovarian cancer incidence and mortality across the countries of Europe has diminished over the past 40-50 years (Bray et al., 2005b). Northern European countries, which had high rates in the 1960s, have seen a decline in incidence and, in particular, in mortality. These decreases have been most pronounced in younger women, and have been ascribed, in large part, to the widespread use of oral contraceptives (Bray et al., 2005b). Meanwhile incidence and mortality rates in most of southern, eastern and central Europe, which were originally relatively low, have been rising, a pattern that is likely to be influenced by declining parity in these populations (Bray et al., 2005b).

Among women in Ireland, during 1994-2001, there was an average 3% annual increase in the numbers of cases and deaths. This was a consequence of the ageing of the population. The age-standardised incidence and mortality rates were unchanged over the period from 1994 to 2001 (figure 9.3).

Figure 9.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, ovarian cancer

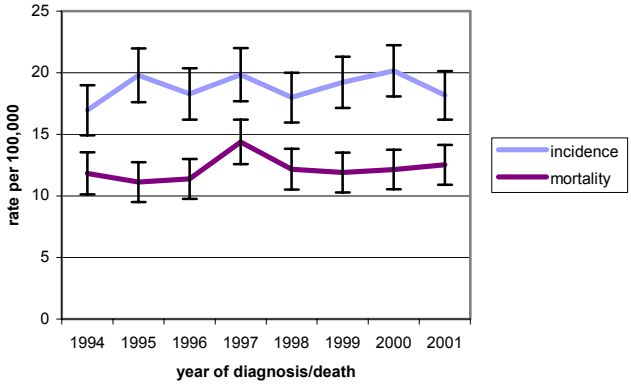
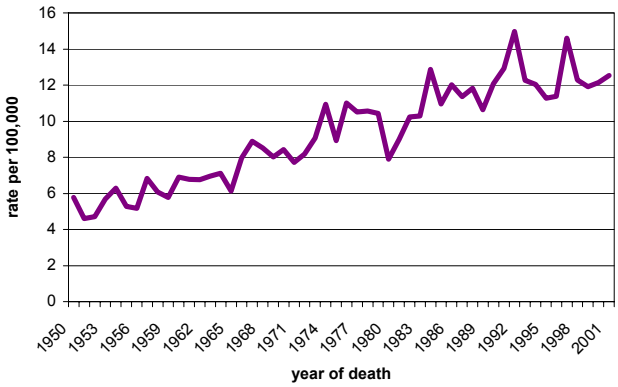


Figure 9.4: Age-standardised mortality rates, by year of death, 1950-2001, ovarian cancer



Analysis of mortality from cancer of the ovary since 1950 reveals a consistent upward trend in rates (figure 9.4). Mortality in the early years of this century was more than double the rate in 1950. The reasons for this trend are not known, but the similarity to the patterns in southern, eastern and central Europe (Bray et al., 2005b), suggests that decreasing parity in successive birth cohorts (Hopflinger, 1984; Mason, 2004) may be partly responsible.

Geographical variations

Figures 9.5 and 9.6 show ovarian cancer incidence and mortality rates for women in Ireland, other European countries and the USA. Incidence in Ireland was among the highest in Europe, at a similar level to the rates in Denmark and Finland; the Nordic countries have traditionally had a high incidence of ovarian cancer (Kjaerbye-Thygesen et al., 2005). Mortality in Ireland was second only to that in Denmark. Incidence was 26% higher and mortality 38% higher in women in Ireland than in women in the USA.

The reasons for the relatively high incidence and mortality rates in Ireland have not been investigated. As noted in table 9.3, parity, breastfeeding and oral contraceptive use affect risk. Parity has traditionally been higher in Ireland than in other countries in western Europe (Hopflinger, 1984; Mason, 2004), so this seems an unlikely explanation for relatively high rates. However, while use of oral contraceptives in Ireland has been increasing since the 1980s, particularly among young women, levels of use are lower than in the UK (Mason, 2004). In addition, although rising over time, levels of breastfeeding are much lower in Ireland than in other western European countries (HIPE & NPRS Unit, 2005; La Leche League,2004). These patterns may provide a partial explanation for the ovarian cancer rates in Ireland.

Figure 9.5: Age-standardised incidence rates for European countries and the USA, ovarian cancer*

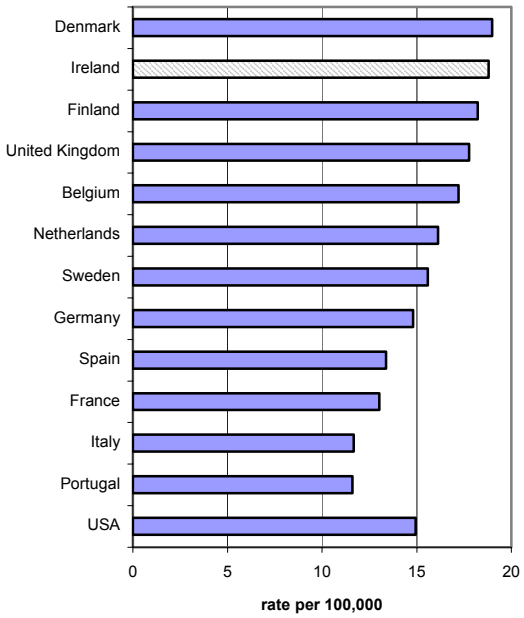


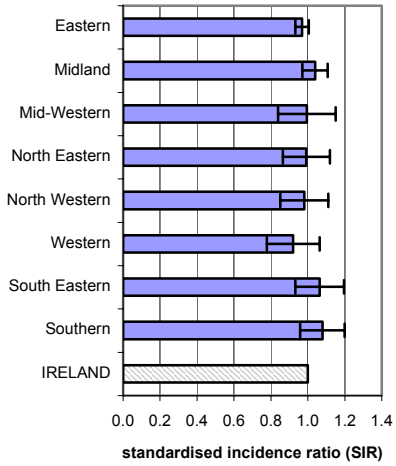
Figure 9.6: Age-standardised mortality rates for European countries and the USA, ovarian cancer*

* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Within Ireland, there was little notable geographical variation in either incidence or mortality (figures 9.7 and 9.8). While incidence was 6% and 8% higher than the national average in the South Eastern and Southern areas* respectively, these increases were not statistically significant. The apparently high mortality in the Mid-Western area (almost 20% more deaths than expected) was based on an average of only 23 deaths per annum.

* The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Figure 9.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, ovarian cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	112	76
Midland	20	12
Mid-Western	29	23
North Eastern	27	15
North Western	20	15
Western	32	21
South Eastern	39	24
Southern	56	39

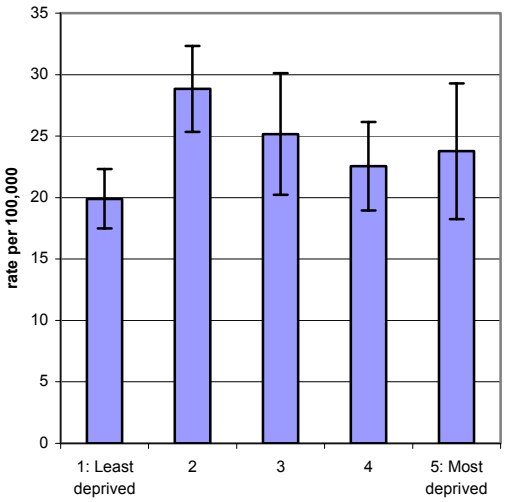
Figure 9.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, ovarian cancer

Deprivation

In some countries ovarian cancer incidence and mortality have been observed to increase with increasing socio-economic status (Faggiano et al., 1997). In other countries, including the UK and north America, no trends with socio-economic status are apparent.

In women in Ireland there was no gradient in risk with deprivation (figure 9.9). The lowest incidence rate, however, was in women resident in the least deprived areas.

Figure 9.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, ovarian cancer



Stage at presentation and treatment

The stage, or extent of disease at diagnosis, is an important predictor of survival for ovarian cancer (Tingulstad et al., 2003). However, ovarian tumours tend to cause vague symptoms and by the time definitive symptoms do appear, the cancer is usually quite advanced.

Table 9.4: Extent of disease at diagnosis, 1994-2001, ovarian cancer

*Extent**	*%*
Local	15%
Regional	18%
Distant	67%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Information on extent of disease at diagnosis is available for three-quarters of ovarian cancers in women in Ireland. Of these, only 15% were diagnosed when the disease was still localised (table 9.4). 67% presented when the disease was advanced. The proportion of localised tumours fell with increasing age (19% among women under 65 at diagnosis, 11% aged 65-74 and 9% aged 75 and older), while the proportion of tumours that had spread outside the ovary increased with age (59% aged under 65, 73% aged 65-74, 78% aged 75 and older).

Ovarian cancer is chemosensitive and the use of platinum-based chemotherapy has been shown to improve the prognosis of patients with advanced disease (SIGN, 2003). Just over half of women in Ireland with ovarian cancer received chemotherapy in 1994-1997 and in 1998-2001 (table 9.5). The proportion receiving chemotherapy was strongly related to age at diagnosis; only 24% of older women (75 and above) received this treatment compared to more than 60% aged under 65. A similar pattern has been observed in other populations (Maas et al., 2005; Uyer et al., 2005), despite chemotherapy having been shown to produce substantial improvements in survival among older women (Hershman et al., 2004). Surgery usually involves removal of the uterus (hysterectomy) and one or both ovaries and fallopian tubes, except in cases of early tumours in young women who wish to have children, when only the affected ovary may be removed. The proportion of women in Ireland undergoing surgery rose from 52% in 1994-1997 to 63% in 1998-2001, driven by a large increase in the proportion of younger women having surgical treatment (from 60% in to 79%). Approximately one quarter of patients had no tumour-directed therapy; this rose to more than half of patients aged 75 and older at diagnosis.

Table 9.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, ovarian cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	63%	54%	24%	53%	62%	53%	24%	51%
Radiotherapy	7%	6%	4%	6%	5%	6%	2%	5%
Surgery	60%	46%	35%	52%	79%	58%	27%	63%
No tumour-directed treatment	13%	27%	53%	25%	7%	25%	57%	22%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

One year survival for women diagnosed with ovarian cancer is 65-66%, and five year survival 40% (figure 9.10). Survival rates have not changed over time. Age is strongly associated with survival. Five-year survival in those aged under 65 at diagnosis is almost double that of older women (52% versus 26-28%; figure 9.11).

Figure 9.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, ovarian cancer

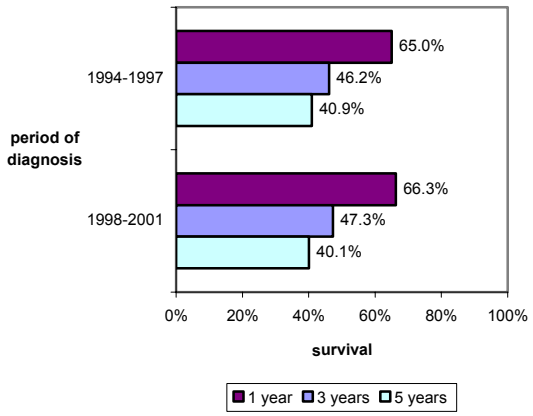


Figure 9.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, ovarian cancer

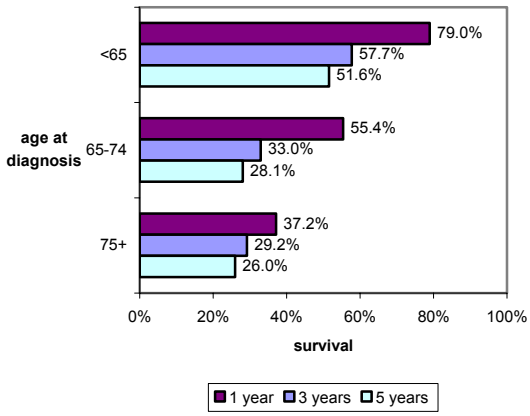
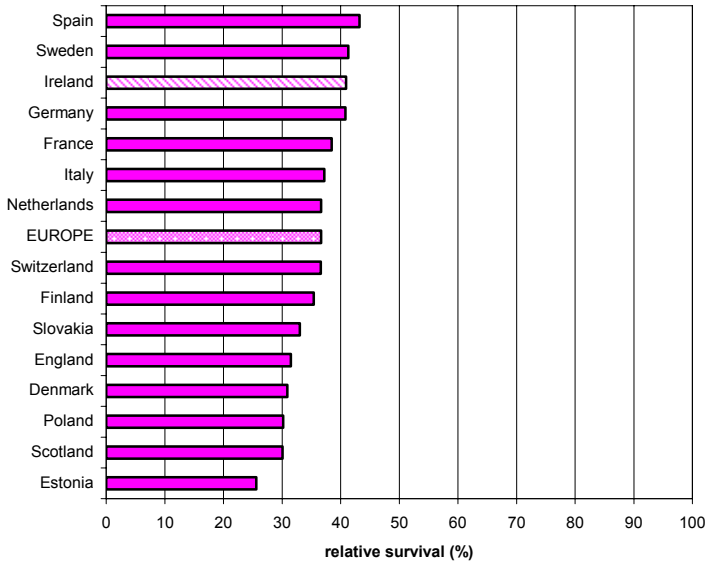


Figure 9.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, ovarian cancer



Survival for patients with ovarian cancer tends to be higher in the countries of western Europe than in the UK and eastern Europe (figure 9.12). Survival rates for women in Ireland exceed the European average (Ireland 40.9%; Europe 36.7%) and are among the highest observed across the continent.

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 10: Pancreatic cancer

Key points

- *Cancer of the pancreas is the 10th most commonly diagnosed tumour in women in Ireland. It ranks 5th in terms of cancer deaths.*
- *The fatality rate is very high and the number of deaths each year equals the number of new cases (approximately 175).*
- *The average ages at diagnosis and death are 74 and 75 respectively.*
- *Incidence and mortality rates have been stable over the period 1994-2001. Mortality doubled between 1950 and the mid 1970s, and has fallen slightly since then.*
- *Incidence and mortality rates for women in Ireland were similar to those for the USA and only slightly below those in the western European countries with the highest rates.*
- *There was little variation in incidence or mortality across the former health board areas.*
- *Incidence was higher among women resident in the most deprived areas than in those resident in other areas.*
- *Approximately 4 out of every 5 patients received no tumour-directed treatment, and this rose to 95% of women aged 75 and older at diagnosis. 10-11% of patients underwent surgery and, in 1998-2001, 12% had chemotherapy and 7% radiotherapy. The use of chemotherapy and radiotherapy doubled between 1994-1997 and 1998-2001.*
- *Survival at one-year was 14-15% and has not changed between 1994-1997 and 1998-2001. Women under 65 experience higher one-year survival than women aged 65 and older, but this effect has diminished by three and five years after diagnosis.*
- *One year survival for women in Ireland is slightly below the European average.*
- *The most firmly established risk factor for pancreatic cancer is smoking. Tobacco control, therefore, provides the best prospects for prevention.*

Summary

Cancer of the pancreas is the 10th most frequently diagnosed form of cancer in women in Ireland (table 10.1). Each year approximately 175 women are diagnosed with a pancreatic tumour, making up just under 3% of all new cancer diagnoses. One woman in 167 will develop cancer of the pancreas by the age of 75. Half of all cases occur in women aged under 74 years. Survival prospects are very poor (see below) and thus the estimated number of women living with pancreatic cancer in Ireland in 2001 was only around 100. It is estimated that 198 new cases will be diagnosed in women in Ireland in 2006.

Table 10.1: Summary information, incidence and prevalence, female pancreatic cancer

Rank among the common cancers in women	10th
% of all new cancer cases	2.8%
Average number of new cases per annum	175
Average age at diagnosis with pancreatic cancer	74
Chance of developing pancreatic cancer	
• by age 65	0.2%
• by age 75	0.6%
Estimated number of women alive in 2001 following a diagnosis of pancreatic cancer	100
Estimated number of cases that will be diagnosed in 2006	198

The very poor survival for pancreatic cancer (see below) means that it impacts on cancer mortality statistics to a greater extent than on incidence. It is the 5th leading cause of cancer death in women in Ireland (table 10.2). An average of 176 women die from pancreatic cancer each year, approximately equal to the number of new cases. 5.1% of all deaths from cancer, and 4.0% of lives lost to cancer, are due to pancreatic tumours. The average age at death is 75 years. Of women diagnosed with the disease, 85% have died from it within 5 years.

Table 10.2: Summary information, mortality, female pancreatic cancer

Rank among the common cancers in women	5th
Average number of deaths per annum	176
% of all cancer deaths due to pancreatic cancer	5.1%
Average age at death from pancreatic cancer	75
% women with pancreatic cancer who die from the disease within 5 years of diagnosis	85%
% of person-years of life-lost due to pancreatic cancer	4.0%
Average number of years of life-lost for a woman dying from pancreatic cancer	12

Risk factors and prevention

Table 10.3: Convincing, probable and possible risk factors for pancreatic cancer

	Increasing risk	*Reducing risk*
Convincing	Tobacco smoking[1]	
or probable	Type II diabetes[2]	
	Chronic pancreatitis[3]	
	Family history of pancreatic cancer[3,4,5]	
Possible	Obesity[6,7]	Vegetables and fruit[6,9]
	Carbohydrate and/or sugar intake[3,8]	

1 IARC Working Group, 2004b;
2 Huxley et al., 2005;
3 Michaud, 2004;
4 First-degree relative(s) with pancreatic cancer;
5 McWilliams et al., 2005;
6 WCRF/AICR, 1997;
7 Berrington de Gonzalez et al., 2003;
8 Howe et al., 1992;
9 IARC Working Group, 2003, 2004a

Approximately 5-10% of pancreatic cancer patients report a positive family history of the disease, but the genes that are responsible for the hereditary aspects of the disease have not been identified. The most firmly established risk factor for pancreatic cancer is smoking, and it has been estimated that around one third of cases are attributable to tobacco use (Siemiatycki et al., 1995; Soler et al., 1998). Disease risk increases with duration of smoking and number of cigarettes smoked. Individuals with type II diabetes or chronic pancreatitis also have increased risk of developing a pancreatic cancer. Other than this, relatively little is known about risk factors for pancreatic cancer. Energy balance and markers of this (including obesity and aspects of diet) may be involved, but the evidence is not definitive at present (table 10.3).

Currently the only prospect for the prevention of pancreatic cancer is tobacco control.

Age distribution

Only 20% of pancreatic tumours present in women aged under 65 years (figure 10.1). 30% are diagnosed in the 65-74 age group and the remaining 50% in women aged 75 and older. Because of the high fatality, the proportions of deaths by age group mirror those for newly diagnosed cases (figure 10.2).

Figure 10.1: Age composition of patients at diagnosis, female pancreatic cancer

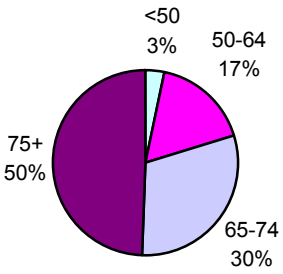
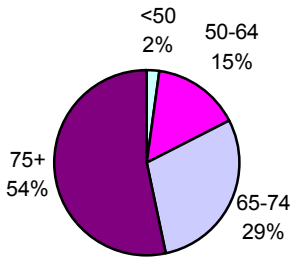


Figure 10.2: Age composition of patients at death, female pancreatic cancer



Time trends

Analysis of pancreatic cancer mortality since the 1950s has revealed different temporal trends in males and females (Sahmoun et al., 2003). Mortality rates have increased for women worldwide. In contrast, while mortality among men has steadily increased in some populations, in others, rates rose until about 1975 and then remained stable or decreased. The first pattern (steady increase) has been observed in countries which had low rates 40 or so years ago; the second pattern (initial rise followed by stabilization or decline) has been seen in countries that had high rates in the past. These trends have been interpreted as suggesting that environmental factors are likely to be important causes of pancreatic cancer (Michaud, 2004). In part they probably reflect differences between countries, and between the sexes within countries, in the adoption of widespread use of tobacco. It is likely, however, that other, as yet unknown, risk factors are also influencing these trends.

Pancreatic cancer incidence and mortality rates in women in Ireland during 1994 to 2001 are shown in figure 10.3. Rates have been stable over this time, at around 9 per 100,000 population. Similarly, there have been no notable trends in the annual number of cases and deaths.

Figure 10.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female pancreatic cancer

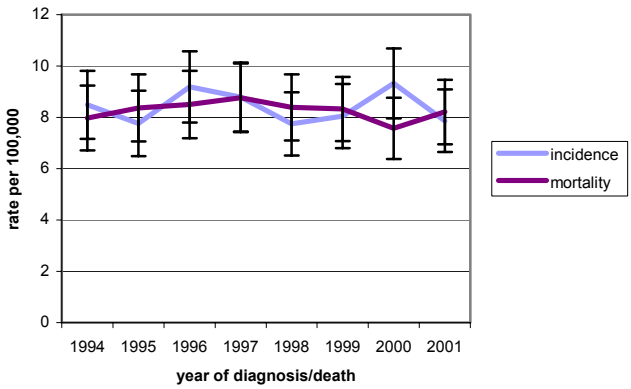
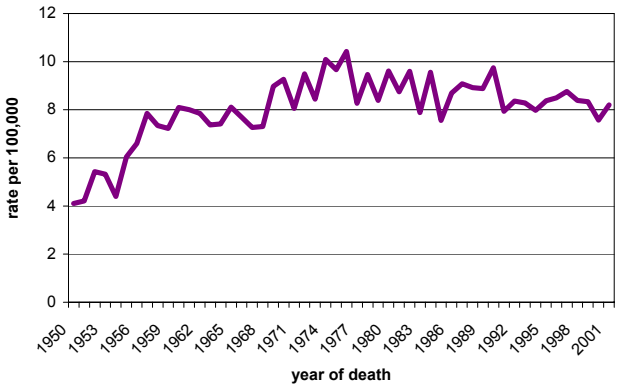


Figure 10.4: Age-standardised mortality rates, by year of death, 1950-2001, female pancreatic cancer



Long-term trends in pancreatic cancer mortality are shown in figure 10.4. Mortality rose from 1950 peaking in the mid-1970s. During that time the rate more than doubled. Since the mid-1970s, rates have declined somewhat, and in recent years were about 80% of the peak rate.

Geographical variations

Figures 10.5 and 10.6 show pancreatic incidence and mortality rates for women in Ireland, other European countries and the USA. Within Europe, the lowest incidence and mortality rates were observed in Spain, Portugal and France and the highest in the Nordic countries. The rates experienced by women in Ireland were only slightly lower than those in the Nordic countries, and were at a similar level to those for women in the USA.

Figure 10.5: Age-standardised incidence rates for European countries and the USA, female pancreatic cancer*

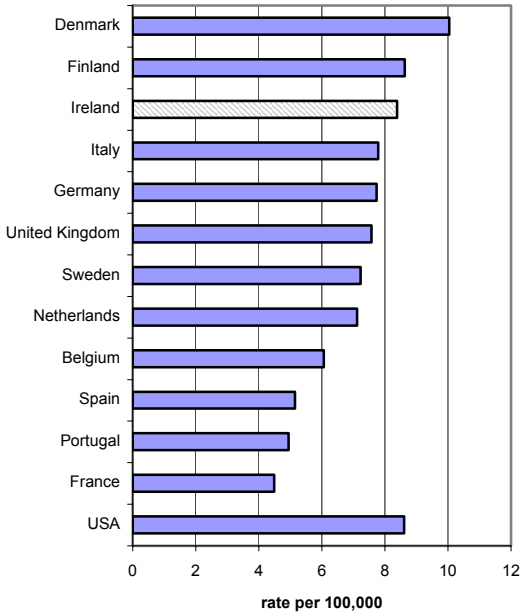
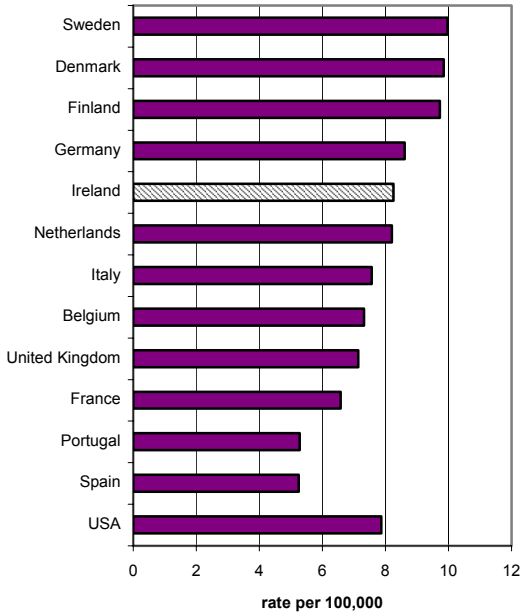


Figure 10.6: Age-standardised mortality rates for European countries and the USA, female pancreatic cancer*

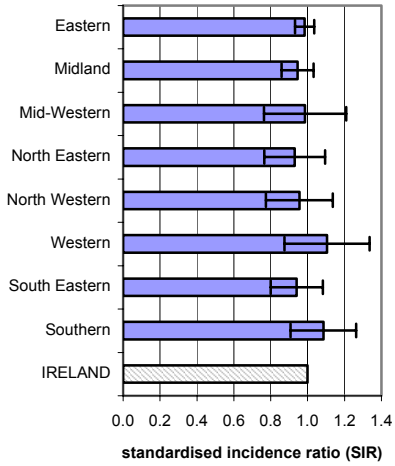


* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Pancreatic cancer incidence and mortality by area* is shown in figures 10.7 and10.8. In none of the areas did the incidence differ significantly from the national average. As regards mortality, significantly fewer deaths than expected (based on the national average) were observed in women resident in the North East; rates in none of the other areas differed significantly from that for Ireland as a whole.

* The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

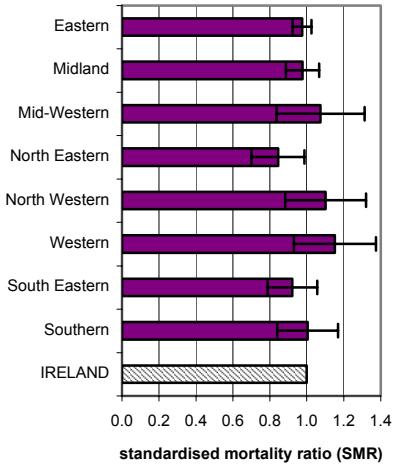
Figure 10.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female pancreatic cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	56	56
Midland	9	10
Mid-Western	15	17
North Eastern	13	12
North Western	11	13
Western	21	23
South Eastern	18	18
Southern	30	28

Figure 10.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female pancreatic cancer

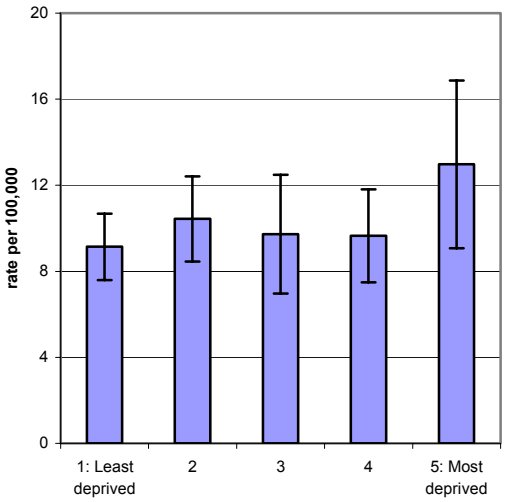


Deprivation

In several countries, mortality from pancreatic cancer has been found to be higher among women of lower social class (Faggiano et al., 1997).

The most striking feature of the incidence pattern according to deprivation category among women in Ireland is the higher rate in women in the most deprived areas (figure 10.9). Incidence in women in these areas was almost 13 per 100,000 while that for women in less deprived areas was 9-10 per 100,000. These observations are based on relatively few cases and should be interpreted with care.

Figure 10.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female pancreatic cancer



Stage at presentation and treatment

Pancreatic cancer tends to present late. The main symptoms of the disease—abdominal pain and jaundice—are thought to appear when the tumour is already at an advanced stage (Warshaw & Fernandez-del Castillo, 1992). Advanced tumour stage is a predictor of increased risk of mortality (Fesinmeyer et al., 2005).

Table 10.4: Extent of disease at diagnosis, 1994-2001, female pancreatic cancer

*Extent**	*%*
Local	8%
Regional	18%
Distant	74%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

It is difficult to determine the extent of the disease (i.e. whether it is confined to the pancreas or has spread to other adjacent or distant organs and lymph nodes) prior to surgery and this accounts for the fact that information on extent of disease at diagnosis is available for only 54% of pancreatic cancers in women in Ireland. Of those tumours for which stage is known, almost three-quarters had spread to distant organs by the time the cancer was diagnosed (table 10.4). This proportion was similar irrespective of the age of the patient.

Pancreatic tumours that have not spread to the stomach, spleen and other nearby organs may be suitable for surgical removal (resection) with curative intent. Most series estimate that a maximum of 15% of patients are likely to be suitable candidates for curative resection and hence the majority of those who are treated receive palliative surgical or medical interventions (Fitzsimmons et al., 1999). Among women in Ireland, around 80% receive no tumour-directed therapy (table 10.5). This proportion rises to 95% of women aged 75 and older. 10-11% undergo surgery, though it is not known whether this is for curative or palliative purposes (i.e. to relieve symptoms). Younger women are more likely to have surgery than older women and this is particularly true in recent years. The proportion receiving chemotherapy and radiotherapy increased between 1994-1997 and 1998-2001, but is still relatively low overall.

Table 10.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female pancreatic cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	20%	6%	1%	6%	36%	12%	1%	12%
Radiotherapy	10%	7%	1%	4%	18%	10%	1%	7%
Surgery	18%	14%	5%	10%	27%	13%	4%	11%
No tumour-directed treatment	67%	77%	95%	83%	49%	70%	94%	78%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

At one year after diagnosis, the survival rate for pancreatic cancer is in the region of 14-15% (figure 10.10). By three and five years after diagnosis, survival is around 6-8%. There was little change in survival over time. One-year survival is higher among women aged under 65 (22.4%) at diagnosis than among older women (13.5% and 11.1% in women aged 65-74 and 75 and older respectively; figure 10.11). By five years after diagnosis, this advantage has diminished and there is little difference in survival prospects by age.

Figure 10.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, female pancreatic cancer

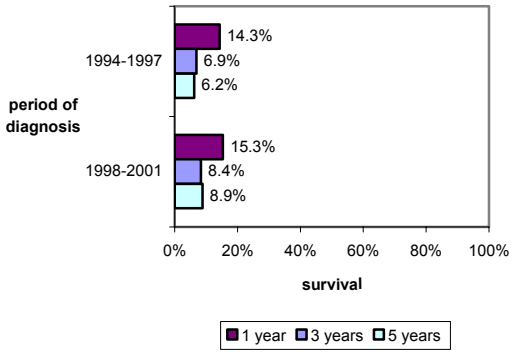


Figure 10.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female pancreatic cancer

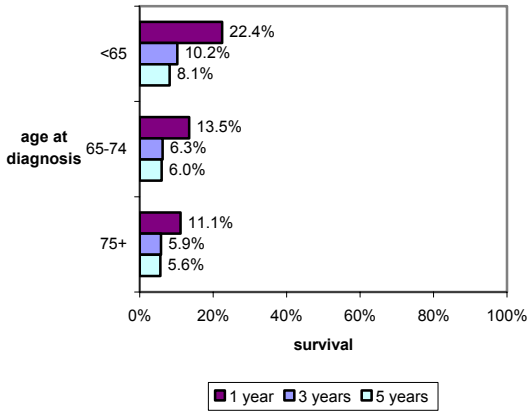
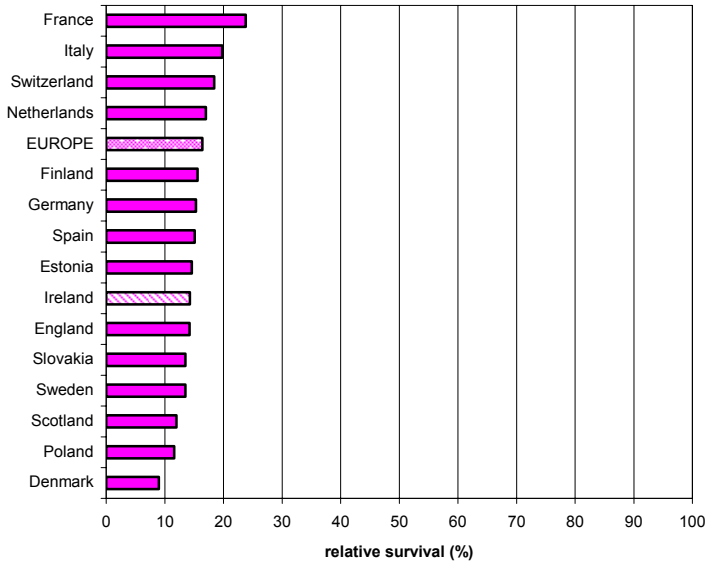


Figure 10.12: One year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female pancreatic cancer



One-year survival for women diagnosed with pancreatic cancer ranges from 10-14% for the UK, Sweden, Denmark and parts of eastern Europe to 20-25% for Italy and France (figure 10.12). Ireland falls into a group of countries with lower survival; survival for women in Ireland is below the European average (Ireland 14.3%; Europe 16.4%). Factors driving the survival variations are likely to include differences in stage at diagnosis, the likelihood that patients receive aggressive treatment (Faivre et al., 1998a), and whether treatment is delivered by a pancreatic cancer specialist (Parks et al., 2004).

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 11: Stomach cancer

Key points

- *Stomach cancer is the 8th most commonly diagnosed cancer in women in Ireland. In terms of deaths, it is the 6th most common form of cancer.*
- *Each year approximately 185 women develop cancer of the stomach and 150 women die from this form of cancer.*
- *The average age at diagnosis is 73 and that of death is 75.*
- *Approximately 570 women in Ireland were estimated to be living in 2001 following a diagnosis of stomach cancer.*
- *Both incidence and mortality rates have fallen steadily over the period 1994-2001. The decrease was greater for mortality (4% per year) than for incidence (1% per year). The decline in mortality is part of a long-term trend; mortality rates have been falling steadily since 1950.*
- *Incidence and mortality rates in Ireland are in the mid-range of the rates observed across western Europe, and are more than double the rates in the USA.*
- *There is considerable variation in incidence across Ireland with area*s in the east and north experiencing raised rates and those in the midlands and south lower rates.*
- *Stomach cancer incidence was approximately 50% higher among women resident in the most deprived areas compared to those resident in the least deprived areas.*
- *Half of all patients receive no tumour-directed therapy and this proportion is considerably higher in women aged 75 and older. The frequency of use of chemotherapy doubled (from 6% to 13%) between 1994-1997 and 1998-2001.*
- *Survival at five-years is less than 20% and has not changed between 1994-1997 and 1998-2001. Women under 65 experience higher survival than women aged 65 and older.*
- *Five year survival for women in Ireland is moderately lower than the European average.*
- *Currently the best chances for prevention of stomach cancer are likely to be lifestyle and diet modification (e.g. limiting salt intake, stopping smoking) together with control/eradication of Helicobacter pylori infection.*

* The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Summary

Cancer of the stomach is the 8th most common cancer among women in Ireland (table 11.1). Each year approximately 185 women are newly diagnosed with this form of cancer and it makes up 3.0% of all new cancers. The average age at diagnosis is 73 years. The risk of a woman in Ireland developing stomach cancer by age 75 is 0.7% (or 1 in 143). Survival rates are low (see below) and this is reflected in the prevalence; it is estimated that approximately 570 women who had been diagnosed stomach cancer were still alive at the end of 2001. It is estimated that 208 new cases will be diagnosed in Ireland in 2006.

Table 11.1: Summary information, incidence and prevalence, female stomach cancer

Rank among the common cancers in women	8th
% of all new cancer cases	3.0%
Average number of new cases per annum	185
Average age at diagnosis with stomach cancer	73
Chance of developing stomach cancer	
• by age 65	0.3%
• by age 75	0.7%
Estimated number of women alive in 2001 following a diagnosis of stomach cancer	570
Estimated number of cases that will be diagnosed in 2006	208

Approximately 150 women die from cancer of the stomach each year in Ireland, making this the 6th most common form of cancer-related death (table 11.2). Just over 4% of all deaths from cancer are due to stomach cancer and there are slightly more than 150 deaths from stomach cancer in women in Ireland each year. The average age at death is 75 years and each woman who dies from the disease loses on average 13 years of life. Two-thirds of women diagnosed with stomach cancer will die from it within 5 years of diagnosis.

Table 11.2: Summary information, mortality, female stomach cancer

Rank among the common cancers in women	6th
Average number of deaths per annum	152
% of all cancer deaths due to stomach cancer	4.4%
Average age at death from stomach cancer	75
% women with stomach cancer who die from the disease within 5 years of diagnosis	68%
% of person-years of life-lost due to stomach cancer	3.6%
Average number of years of life-lost for a woman dying from stomach cancer	13

Risk factors and prevention

Table 11.3: Convincing, probable and possible risk factors for stomach cancer

	Increasing risk	*Reducing risk*
Convincing	Helicobacter pylori infection[1]	Refrigeration of food[3]
or probable	Tobacco smoking[2]	Aspirin and other non-steroidal anti-inflammatory drugs[6,7]
	Salt[3,4]	
	Salt preserved foods[3,4]	
Possible	Alcohol[5]	Fruit[3,4,8,9]
		Vegetables, particularly cruciferous vegetables[3,4,8,9]

1 Helicobacter and Cancer Collaborative Group, 2001;
2 IARC Working Group, 2004b;
3 WCRF/AICR, 1997;
4 Key et al., 2004;
5 Bagnardi et al., 2001;
6 Gonzalez-Perez et al., 2003;
7 Wang et al., 2003;
8 IARC Working Group, 2003;
9 IARC Working Group, 2004a

Helicobacter pylori (H pylori) is a bacterium that causes inflammation and ulcers in the stomach and small intestine. 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). *H pylori* infection is one of the most firmly established risk factors for stomach cancer; the risk of developing stomach cancer is 6 times higher in those with the infection that those without it (Helicobacter and Cancer Collaborative Group, 2001). The infection can be treated with a protein pump inhibitor and antibiotics.

Smoking increases stomach cancer risk, while regular use of aspirin and other non-steroidal anti-inflammatory drugs is associated with reduced risk. Other than these factors, the main determinants of risk are related to diet and food storage (table 11.3).

The best route for prevention of stomach cancer is likely to be lifestyle and diet modification together with control/eradication of *H pylori* infection.

Age distribution

Relatively few cases of stomach cancer are diagnosed in women aged under 50 years (figure 11.1). 17% of cases are diagnosed in the 50-64 age group, while the majority of cases (70%) present in women aged 65 and older. As regards mortality, more than half of deaths occur in those aged 75 and over (figure 11.2).

Figure 11.1: Age composition of patients at diagnosis, female stomach cancer

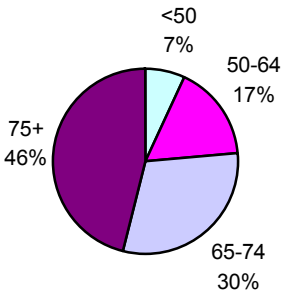
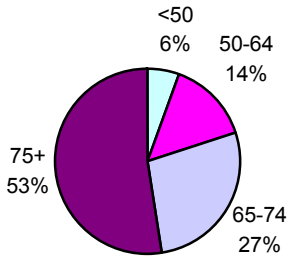


Figure 11.2: Age composition of patients at death, female stomach cancer



Time trends

Worldwide, over the last few decades, there have been substantial declines in the incidence of stomach cancer (Plummer et al., 2004). A similar pattern has been observed for mortality (Hoel et al., 1992). The reasons for the steadily falling rates are not fully understood but are thought to include a decline in prevalence of *H pylori* infection (due to a general improvement in sanitary conditions and increasing use of antibiotics) and improvements in diet and food storage (Pisani et al., 1997; Blaser et al., 1999; Plummer et al., 2004).

Over the period 1994-2001 both incidence and mortality rates for stomach cancer have steadily decreased in women in Ireland (figure 11.3). The magnitude of the decline is greater for mortality (3.7% per year on average) than for incidence (1% per year).

Figure 11.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, female stomach cancer

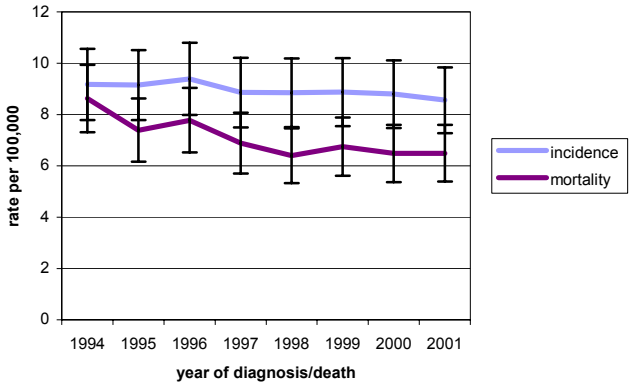
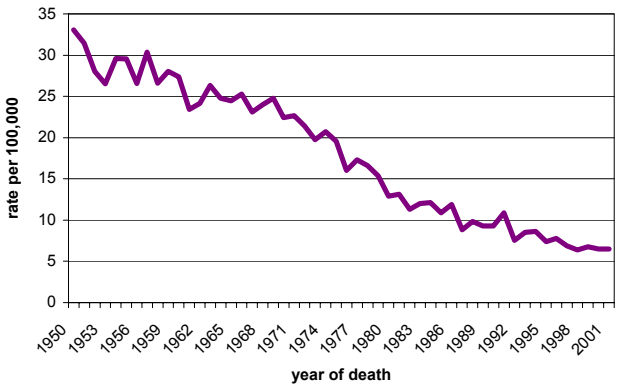


Figure 11.4: Age-standardised mortality rates, by year of death, 1950-2001, female stomach cancer



The fall in mortality since 1994 is part of a longer term trend, which is shown in figure 11.4. There has been a steady decrease in mortality rates from stomach cancer in women in Ireland since 1950. The rate of decline was greatest in the earlier years and has slowed somewhat in the last decade. The mortality rate in recent years is less than one quarter of what it was in the 1950s.

Geographical variations

Stomach cancer incidence and mortality rates for women in Ireland, other European countries and the USA are shown in figures 11.5 and 11.6. As with the time trends, the reasons underlying the geographical variations are not fully known. Variations between countries in uptake and prevalence of smoking and in widespread access to refrigeration in the home are likely to play a part, as are patterns of *H pylori* infection and levels of intake of salt and salted foods. With the exception of smoking, comparable international data on these factors is limited.

Incidence in Ireland is in the mid-range of rates observed across western Europe; it is lower than the rates in Portugal, Italy, Spain and Germany, but exceeds the rates in the UK, Netherlands, France and Denmark. Compared to the USA, women in Ireland have more than double the incidence of stomach cancer. A similar pattern is evident for mortality, with rates in Ireland falling in the upper half of the rates across Europe, and more than 2.5 times higher than those in the USA.

Figure 11.5: Age-standardised incidence rates for European countries and the USA, female stomach cancer*

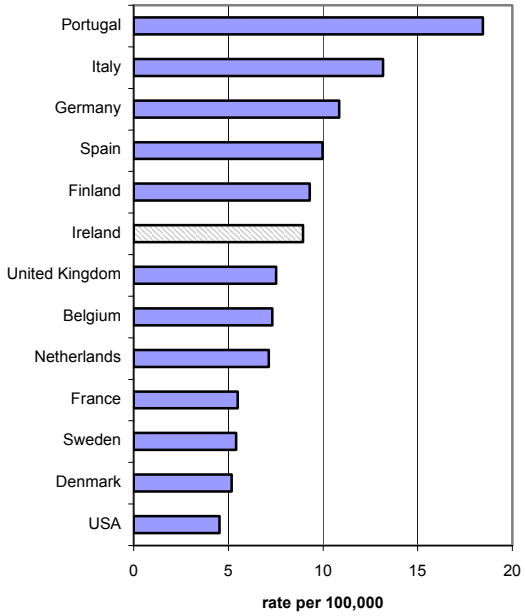
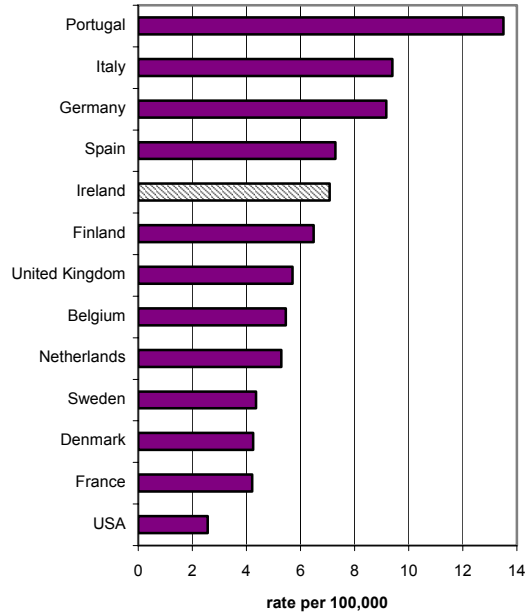


Figure 11.6: Age-standardised mortality rates for European countries and the USA, female stomach cancer*

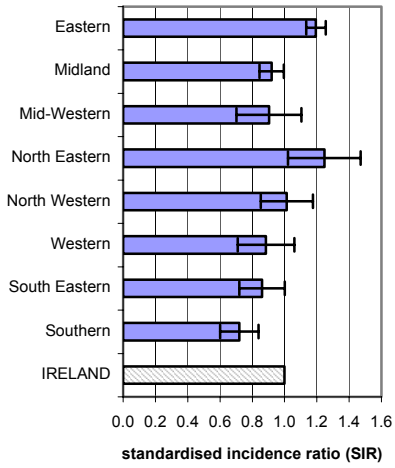


* years included are: Ireland, 1994-2001; other European countries, 1998; USA, 1992-2002

Female stomach cancer incidence and mortality in the former health board areas[*] is shown in figures 11.7 and 11.8. There is considerable variation in incidence across the country. Incidence rates significantly exceeded the national average for women resident in the North Eastern (25% above average) and the Eastern (19% above average) areas. Significantly fewer cases than expected were diagnosed among women resident in the Midland, South Eastern and Southern areas. Variations in mortality were less pronounced. A death rate significantly higher than the national average was observed in the Eastern area, while women resident in the Southern area experienced significantly fewer deaths than expected.

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

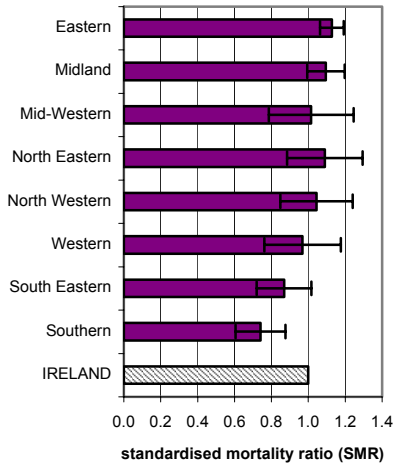
Figure 11.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female stomach cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	73	56
Midland	10	9
Mid-Western	15	14
North Eastern	19	14
North Western	12	11
Western	18	16
South Eastern	17	14
Southern	21	18

Figure 11.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, female stomach cancer

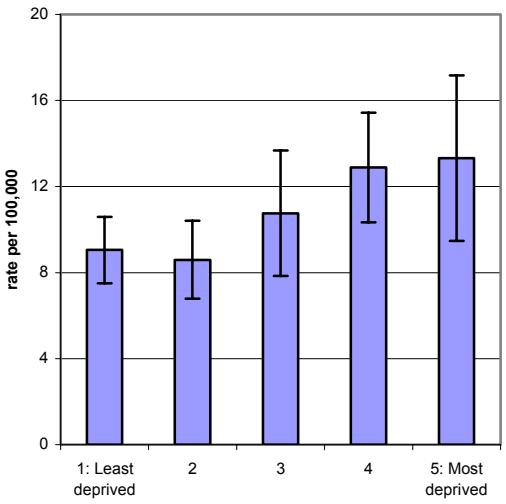


Deprivation

In many populations the risk of being diagnosed with, or dying from stomach cancer, is highest in the lower social classes (Faggiano et al., 1997). In England and Wales, a strong positive gradient of increasing incidence with increasing social deprivation has been observed (Quinn et al., 2005).

The pattern in women in Ireland is broadly consistent with these trends. Incidence is lowest in those resident in areas falling into the two least deprived categories, and rises with increasing deprivation (figure 11.9). Incidence was approximately 50% higher in women in the two most deprived categories compared to the least deprived categories.

Figure 11.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, female stomach cancer



Stage at presentation and treatment

The stage at diagnosis describes the extent of the cancer in terms of spread beyond the stomach lining to lymph nodes and organs further away. Stage at diagnosis is thought to be the main prognostic factor for stomach cancer and, as such, strongly predicts survival (Faivre et al., 2000). Early stage stomach cancer causes few symptoms and by the time signs such as weight loss, abdominal pain or swelling, nausea, vomiting and symptoms of peptic ulcer have appeared, it is likely that the tumour will be advanced (Layke & Lopez, 2004).

Table 11.4: Extent of disease at diagnosis, 1994-2001, female stomach cancer

*Extent**	*%*
Local	8%
Regional	33%
Distant	59%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Stage at diagnosis is available for 68% of stomach cancers in women in Ireland overall. Women aged 75 and older at diagnosis are less likely to be staged than younger women (52% versus >80%). Of the cancers for which stage is known, only 8% were localised at the time of diagnosis, while almost 60% had spread to distant organs (table 11.4). The proportions of patients with local, regional and distant disease did not vary by age at diagnosis.

The main treatment option for stomach cancer is surgical removal of the tumour and any regional lymph nodes (Catalano et al., 2005). However, the chances of postoperative complications, including tumour recurrence and patient death, are relatively high, particularly in elderly patients (Hansson et al., 2000; Layke & Lopez, 2004; Nanthakumaran et al., 2005). Treatment with chemotherapy and/or radiotherapy, either before or after surgery, may be of value for some groups of patients, but further research is needed in this area (Catalano et al., 2005). When the cancer has metastasised to other organs, any treatment given (most likely chemotherapy) will be palliative, for the relief of symptoms.

More than half of women diagnosed with stomach cancer received no tumour-directed treatment, and this proportion decreased only slightly between 1994-1997 and 1998-2001 (table 11.5). Age was strongly related to the likelihood of not receiving treatment; approximately a quarter of patients under 65 were not treated, compared to approximately 40% of those aged 65-74 and more than 70% of those aged 75 and older. Of those who did undergo treatment, surgery was most commonly used. The proportion receiving chemotherapy increased from 6% of patients diagnosed in 1994-1997 to 13% of those diagnosed in 1998-2001.

Table 11.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, female stomach cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	21%	2%	1%	6%	31%	16%	3%	13%
Radiotherapy	5%	3%	1%	3%	11%	10%	3%	7%
Surgery	59%	56%	21%	41%	55%	45%	26%	38%
No tumour-directed treatment	29%	41%	78%	55%	26%	43%	72%	52%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Survival at one and five years after diagnosis for cases presenting in 1998-2001 was 34.1% and 17.1% respectively (figure 11.10). There was no improvement in survival between 1994-1997 and 1998-2001. Survival is higher among younger patients (those aged under 65 at diagnosis; figure 11.11). The advantage for younger patients is most pronounced at one-year following diagnosis and has diminished somewhat by three and five years.

Figure 11.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, female stomach cancer

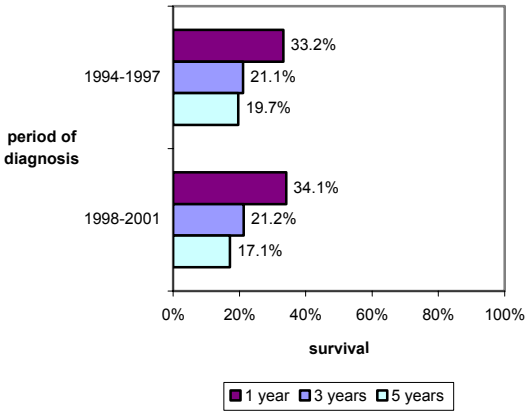


Figure 11.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, female stomach cancer

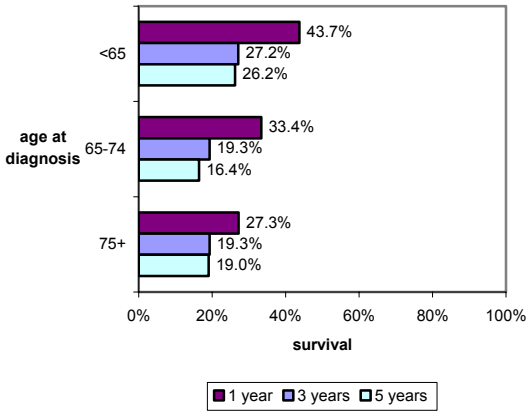
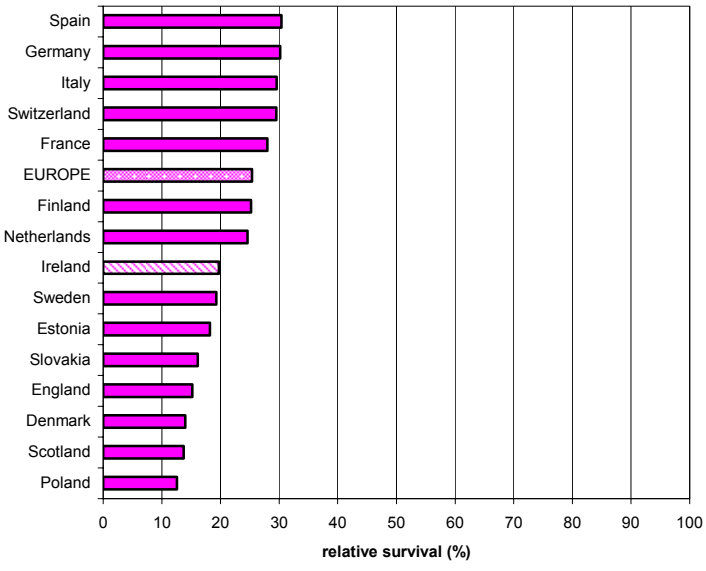


Figure 11.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, female stomach cancer



There was a two-fold variation in 5-year survival for women with stomach cancer across the countries of Europe (figure 11.12). Survival for women resident in Spain, Germany, Italy and Switzerland was almost 30%, while that for women resident in parts of eastern Europe and the UK was around 15%. The rate in Ireland (19.7%) was below the European average (25.4%). Most of the variability in stomach cancer survival across Europe appears to be due to differences in case-mix (e.g. patient age, tumour histology and location) and stage at diagnosis, with differences in treatment likely to be of less importance (Verdecchia et al., 2004).

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 12: Cancer of the uterus

Key points

- *Cancer of the uterus is the 6th most common form of cancer in women in Ireland. It ranks 17th in terms of causes of death from cancer.*
- *Approximately 223 new cases are diagnosed each year. Just under 50 women die from uterine cancer each year.*
- *The average age at diagnosis is 64 years. Half of deaths occur in women aged 72 and older.*
- *An estimated 3300 women in Ireland are living following a diagnosis of cancer of the uterus.*
- *During 1994 to 2001 there was a modest rise in both number of cases diagnosed each year and in incidence rates. Mortality also appeared to rise slightly, but this was compared to lower rates for a few years in early 1990s. Prior to that time, mortality rates had been stable since the late 1970s.*
- *Women in Ireland had half the incidence rate of cancer of the uterus as women in the USA. The rate in Ireland was also lower than that in other western European countries. Mortality rates in Ireland were lower than in western European countries, but higher than in the USA.*
- *Within Ireland, incidence was higher than expected in the Southern area[*] and lower than expected in the Eastern and North Eastern areas.*
- *Although there was no strong trend in incidence by deprivation category, the rate was lower in women resident in the most deprived areas, compared to those resident in more affluent areas.*
- *Surgery is the main form of treatment for cancer of the uterus and more than 90% of women had a surgical procedure. Around 40% had radiotherapy. Older women were less likely to be treated but the differential by age was less pronounced than for other forms of cancer.*
- *Survival prospects are good with almost 90% survival at one year after diagnosis and almost 80% at 5 years. Women diagnosed under 65 years of age have better survival than older women.*
- *Survival in Ireland was in the mid-range of rates observed across Europe.*
- *Aspects of lifestyle (e.g. obesity, physical activity) and use of hormonal medications (oral contraceptives, HRT) are important determinants of risk for cancer of the uterus. This suggests that there may be possibilities for prevention via changes in these areas.*

[*] The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

Summary

Cancer of the body of the uterus (womb) is the 6th most common form of cancer in women in Ireland. Slightly more than 220 new cases are diagnosed each year and this cancer comprises 3.6% of all malignant neoplasms diagnosed in women in Ireland (table 12.1). Half of cases present in women aged 64 and younger. The risk of developing cancer of the uterus is 0.7% (or approximately 1 in 140) by age 65 and 1.2% (approximately 1 in 80) by age 75. An estimated 3300 women were living with a cancer of the uterus in Ireland in 2001. In 2006, approximately 280 women are expected to be diagnosed with cancer of the uterus in Ireland.

Table 12.1: Summary information, incidence and prevalence, uterine cancer

Rank among the common cancers in women	6th
% of all new cancer cases	3.6%
Average number of new cases per annum	223
Average age at diagnosis with uterine cancer	64
Chance of developing uterine cancer	
• by age 65	0.7%
• by age 75	1.2%
Estimated number of women alive in 2001 following a diagnosis of uterine cancer	3300
Estimated number of cases that will be diagnosed in 2006	279

There are approximately 50 deaths from cancer of the uterus each year in women in Ireland, ranking this tumour 17th in terms of causes of cancer deaths (table 12.2). It comprised 1.4% of all deaths from cancer and the same percentage of life lost due to cancer. The average age at death for a women with cancer of the uterus is 72 years and each women dying of cancer of the uterus loses on average 14 years of life. One fifth of women diagnosed with a cancer of the uterus will die from the disease within 5 years.

Table 12.2: Summary information, mortality, uterine cancer

Rank among the common cancers in women	17th
Average number of deaths per annum	48
% of all cancer deaths due to uterine cancer	1.4%
Average age at death from uterine cancer	72
% women with uterine cancer who die from the disease within 5 years of diagnosis	21%
% of person-years of life-lost due to uterine cancer	1.3%
Average number of years of life-lost for a woman dying from uterine cancer	14

Risk factors and prevention

Table 12.3: Convincing, probable and possible risk factors for uterine cancer

	Increasing risk	*Reducing risk*
Convincing or probable	Overweight/obesity/high body mass index[1] Use of hormone replacement therapy (formulations containing progestogen for less than 10 days/month)[2,3,9] Early menarche[4] Late menopause[4] Nulliparity or low parity[4] Tamoxifen[5,6]	Combined oestrogen-progestogen oral contraceptives[2] Physical activity[1]
Possible	Increased saturated or total fat intake[7] Polycystic ovary syndrome[4,8] Diabetes[4]	Vegetables and fruit[7]

1 IARC Working Group, 2002a;
2 IARC Working Group, 2005b;
3 Lethaby et al., 2005;
4 Purdie & Green, 2001;
5 used for the prevention or treatment of breast cancer;
6 Braithwaite et al., 2003;
7 WCRF/AICR, 1997;
8 Hardiman et al., 2003;
9 among women who have not had a hysterectomy

Women with, or at high-risk, for the genetic syndrome hereditary non-polyposis colorectal cancer (HNPCC), which is due to mutations (changes) in particular genes, are at substantially increased risk of developing uterine cancer (Lynch & Lynch, 2005). However, this is likely to account for a very small proportion of cases of the disease. The main risk factors for cancer of the uterus are similar to those for cancers of the breast and ovary and are related to the amount of oestrogen to which the uterus is exposed. Overweight and obesity are strongly positively associated with the risk of developing uterine cancer while higher levels of physical activity reduce risk (IARC Working Group, 2002a); both of these risk factors are likely to act by affecting hormonal levels. Most of the other convincing or probable risk factors either reflect (e.g. age at menarche), or influence (e.g. number of pregnancies), oestrogen levels in the body or are external sources of hormones. Use of unopposed oestrogen hormone replacement therapy (HRT) increases risk of uterine cancer 10-fold (IARC Working Group, 2005b). However, the addition of progestogen to the formulation (on at least 10 days of the month) alleviates this risk. Use of the combined oral contraceptive pill is associated with decreased risk of cancer of the uterus. Other putative risk factors are listed in table 12.3.

Screening for cancer of the uterus in the general population is not currently justified; the screening tests that have been considered (transvaginal ultrasound and direct endometrial sampling; see glossary) do not perform

sufficiently well and there is no evidence that routine use of these would be effective in reducing uterine cancer mortality in the population (Robertson, 2003).

The importance of lifestyle factors suggests that there may be possibilities for prevention of uterine cancer through lifestyle changes.

Age distribution

Cancer of the uterus is mainly a disease of post-menopausal women. Only 11% of cases present in women aged 50 and younger; 42% are diagnosed in the 50-64 age-group, a further 28% in women aged 65-74 years and the remaining 19% in women aged 75 and older (figure 12.1). In terms of deaths, more than 40% occur in the oldest women (75 and older), with a further 33% in women aged 65-74 (figure 12.2). Only around one quarter of deaths are in women aged under 65.

Figure 12.1: Age composition of patients at diagnosis, uterine cancer

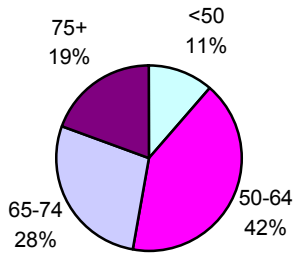
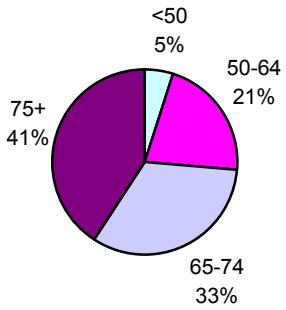


Figure 12.2: Age composition of patients at death, uterine cancer



Time trends

Incidence and mortality rates of cancer of the uterus depend on the number of women at risk i.e. women with an intact uterus. The frequency with which hysterectomy is performed thus directly affects the observed incidence of, and mortality from, this cancer, and changes in hysterectomy rates over time will influence disease rates. Because the population of women with an intact uterus is usually not known, incidence and mortality rates are almost always calculated for all women, and thus underestimate the true rates. However, it should be borne in mind that both time trends and international variations in incidence and mortality will be explained, at least in part, by patterns in hysterectomy rates between countries and over time.

Mortality rates from cancer of the uterus have been falling in North American and European populations since the 1950s (Purdie & Green, 2001). As regards incidence, rates have been rising in post-menopausal women in most northern and western European countries and, regardless of menopausal status, in several southern and eastern European countries (Bray et al., 2005c). It likely that changes in the prevalence of the risk factors for uterine cancer (table 12.3) over time and in different age groups are responsible for much of these incidence trends. Furthermore, current trends in obesity and fertility are likely to mean that uterine cancer will become a greater public health problem in the future (Bray et al., 2005d).

Among women in Ireland, during 1994-2001, a modest upward trend in incidence was apparent. Rates rose, on average, by 1.6% per year (figure 12.3) and numbers of cases by 3.7% per year. There was also a slight rise in mortality, with the number of deaths growing by 3.0% per annum and mortality rates by 1.0%.

Figure 12.3: Age-standardised incidence and mortality rates, with 95% confidence intervals, by year of diagnosis and death, 1994-2001, uterine cancer

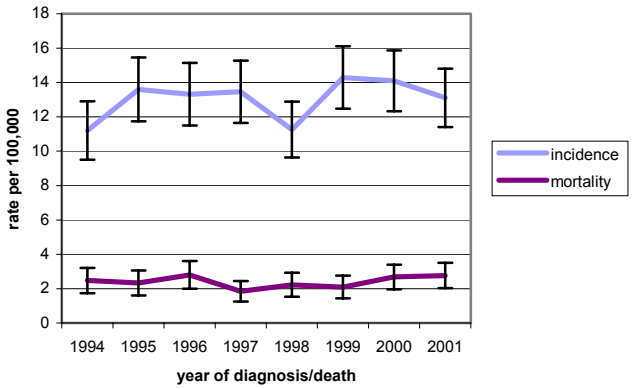
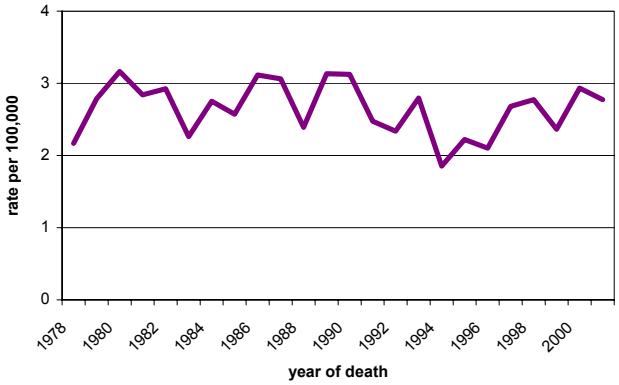


Figure 12.4: Age-standardised mortality rates, by year of death, 1978-2001, uterine cancer



Inspection of the longer-term trends in mortality (figure 12.4) shows that the recent increase seems to be a result of a few years with lower rates in the early 1990s. From the late 1970's to the early-1990s mortality was fairly stable; rates fell at the start of the 1990s in the mid-1990s and rose thereafter, returning to a similar level to those in the 1980s.

Geographical variations

Figures 12.5 and 12.6 present cancer of the uterus incidence and mortality rates for women in Ireland, other European countries and the USA. The incidence rate in the USA exceeds those in all western European countries. Women in Ireland have only half the incidence of cancer of the uterus as women in the USA. Incidence is also lower in Ireland than in the other countries of western Europe. As regards mortality, the rate was lower among women in Ireland than among women elsewhere in Europe. The mortality rate in Ireland was one-third higher than that in the USA.

Within Europe the frequency with which hysterectomies are undertaken varies (Bray et al., 2005c), meaning the true incidence and mortality of cancer of the uterus (i.e. among women with an intact womb) probably differ somewhat from the rates shown in figures 12.5 and 12.6. In the USA, hysterectomy is the most common surgical procedure in women, and one women in three is estimated to have had her uterus removed by age 60 (Farquhar & Steiner, 2002), meaning the true cancer incidence rate will be substantially higher than shown in figure 12.5.

Not all of the geographical differences are due to hysterectomies, however. The strong influence of reproductive and lifestyle factors on risk (table 12.3) suggests that much of the international variation is a result of differences between countries in exposure to the main risk factors for the disease.

Figure 12.5: Age-standardised incidence rates for European countries and the USA, uterine cancer*

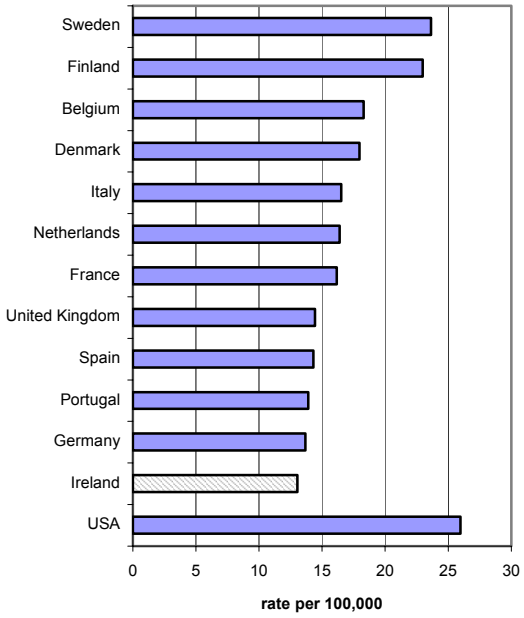
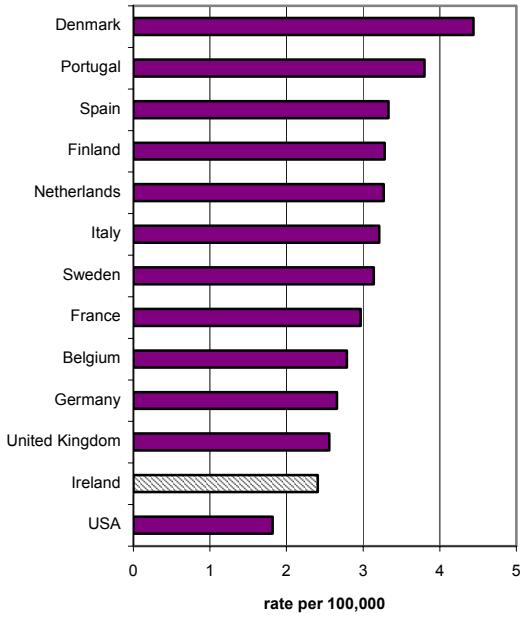


Figure 12.6: Age-standardised mortality rates for European countries and the USA, uterine cancer*



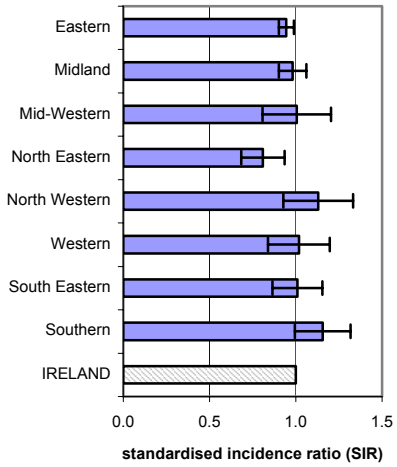
* years included are: Ireland, 1994-2001; other European countries, 1998; USA—incidence, 1992-2002; mortality, 1990-2002

Incidence and mortality rates by area* of residence at shown in figures 12.7 and 12.8. Incidence among women in the Southern area was 16% higher than the national average, while significantly fewer cases than expected were diagnosed in women resident in the Eastern and North Eastern areas. Mortality rates varied considerably across the country, but since these were based on relatively few deaths per annum, only those in two areas

* The term "area" refers to the former Eastern Regional Health Authority and health board areas, which were in place during the period to which this report refers (see Appendix 3).

were significantly different from the average for Ireland; 19% fewer deaths than expected occurred in women in the Eastern area and 17% fewer than expected in the Midland area.

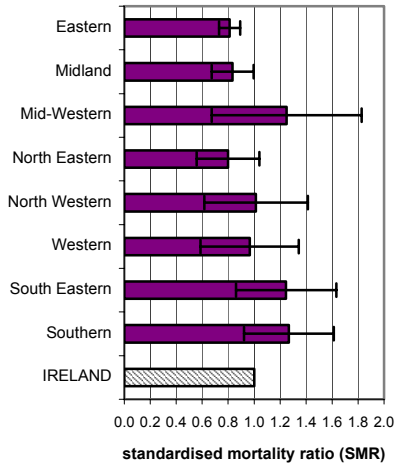
Figure 12.7: Standardised incidence ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, uterine cancer



Average annual numbers of cases and deaths

	cases	deaths
Eastern	72	13
Midland	12	2
Mid-Western	20	5
North Eastern	15	3
North Western	16	3
Western	23	5
South Eastern	25	7
Southern	40	10

Figure 12.8: Standardised mortality ratios, with 95% confidence intervals, for former health board areas*, 1994-2001, uterine cancer

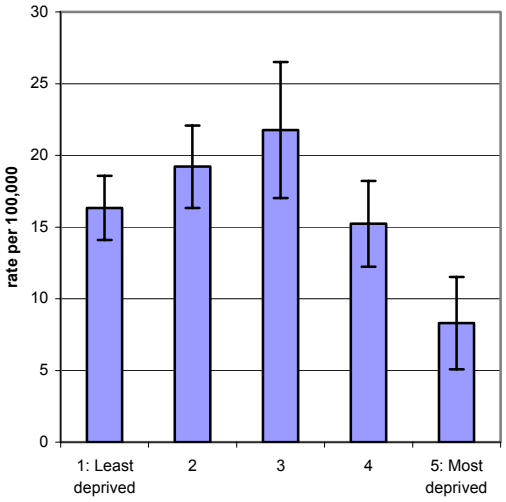


Deprivation

The available data on socio-economic status and uterine cancer is inconsistent (Faggiano et al., 1997). In some European countries, an excess of cases or deaths has been found in the lower social classes. In contrast, in the UK, incidence has been found to be slightly higher among women resident in more affluent areas, compared to those in deprived areas (Harris et al., 1998; Quinn et al., 2001), a pattern that may be explained, in part, by the higher prevalence of hysterectomy among women of lower socio-economic status (Marshall et al., 2000).

There is no strong trend in uterine cancer incidence by deprivation category of residence for women in Ireland (figure 12.9). However, the rates in women living in areas in the two most deprived categories (4 and 5) are lower than those for women resident in less deprived areas, but these observations are based on relatively small numbers of cases.

Figure 12.9: Age-standardised incidence rates, with 95% confidence intervals, by deprivation category of residence, 1994-1998, uterine cancer



Stage at presentation and treatment

The stage at diagnosis describes the spread of the cancer in terms of being confined to the uterus (localised), having spread to the cervix, ovaries, or elsewhere in the pelvis (regional) and having spread to distant lymph nodes or organs (distant). Usually a relatively high proportion of cases is detected when the disease is localised, probably due to the fact that the most common symptom is vaginal bleeding in post-menopausal women (Amant et al., 2005). The extent of disease at diagnosis is a strong predictor of survival prospects (Reis et al., 2001).

Table 12.4: Extent of disease at diagnosis, 1994-2001, uterine cancer

*Extent**	*%*
Local	38%
Regional	30%
Distant	32%

* local=tumour is confined to site of origin; regional=tumour has spread to immediately adjacent tissues and/or regional lymph nodes; distant=tumour has spread to distant organs

Information is available on the extent of disease at diagnosis for 43% of women with uterine cancer in Ireland. This is because it is often only possible to determine how far the cancer has spread once surgery is done. Of those cancers which were staged at diagnosis, 38% were confined to the uterus and 62% had spread to nearby or distant tissues or organs (table 12.4). These proportions did not vary to any great extent by age at diagnosis.

Surgery is the main form of treatment for uterine cancer and usually involves hysterectomy and/or removal of the ovaries and fallopian tubes (Amant et al., 2005). Following surgery women may be offered adjuvant radiation therapy, to reduce the risk of recurrence (Shaeffer & Randall, 2005). In Ireland, more than 90% of women in women with uterine cancer underwent surgery (table 12.5). Although the proportion having surgical procedures was lower among older women, it was still high in absolute terms and increased over time, from 75% of those diagnosed in 1994-1997, to 83% of those diagnosed in 1998-2001. In both time periods around 40% of women received radiation therapy. Again this was slightly less frequently used in older, compared to younger, women, although the differences by age were less pronounced than for some other cancer sites. Fewer than 10% of women received chemotherapy and this did not change over time.

Table 12.5: Percentages of patients receiving particular forms of treatment*, by period and age at diagnosis, 1994-2001, uterine cancer

	Period and age at diagnosis							
	1994-1997				*1998-2001*			
Treatment	*<65 years*	*65 -74 years*	*75 and older*	*Total*	*<65 years*	*65 -74 years*	*75 and older*	*Total*
Chemotherapy	8%	6%	2%	7%	11%	5%	2%	8%
Radiotherapy	45%	45%	27%	42%	39%	40%	32%	38%
Surgery	97%	89%	75%	91%	97%	94%	83%	93%
No tumour-directed treatment	2%	6%	18%	6%	2%	5%	14%	5%

* patients may receive more than one form of treatment; figures do not sum to 100%

Survival

Survival rates for uterine cancer are high—almost 90% at one year following diagnosis and almost 80% at five years (figure 12.10). There was no change in survival between 1994-1997 and 1998-2001. Age is related to survival, but the relationship is less strong than for some other forms of cancer (figure 12.11). The dichotomy is between women aged under 65 at diagnosis—who have better survival—and those aged 65 and older—who have poorer survival.

Figure 12.10: Relative survival (%) at one, three and five years after diagnosis, by period of diagnosis, all ages, uterine cancer

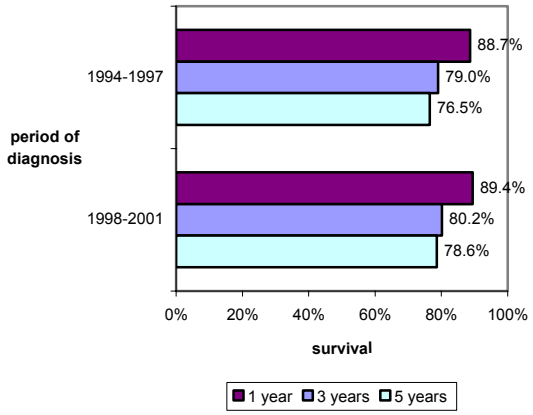


Figure 12.11: Relative survival (%) at one, three and five years after diagnosis, by age at diagnosis, 1994-1997, uterine cancer

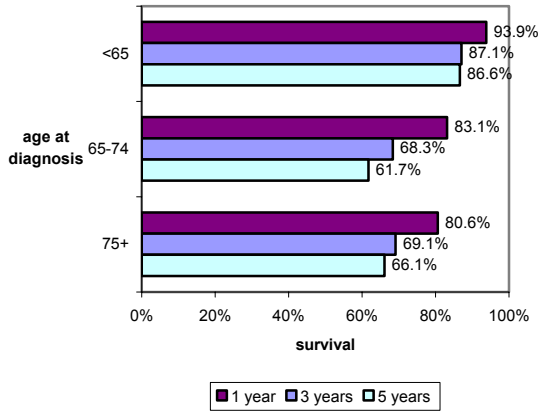
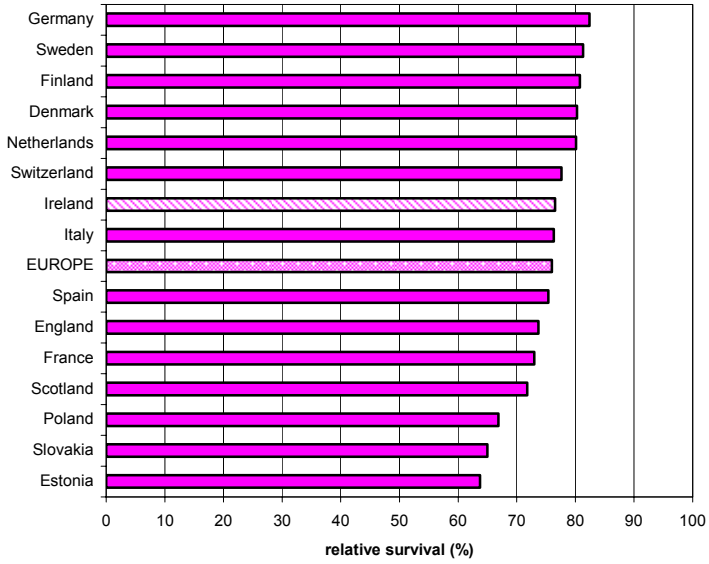


Figure 12.12: Five year relative survival (%) by country, for European patients diagnosed early-mid 1990s*, uterine cancer



Survival from cancer of the uterus for women in Ireland lies in the mid-range of rates observed across Europe, and very close to the average for Europe (figure 12.12; Ireland 76.5%; Europe 76.0%). The highest survival (at least 80% at 5 years) is seen in the countries of northern mainland Europe. Women in eastern Europe experience 5-year survival of less than 70%. It has been suggested that inter-country differences in survival, at least in patients diagnosed in the 1980s, were probably related to differences in patient management (Gatta et al., 1998a).

* for Ireland, patients included were diagnosed in 1994-1997; for other countries patients were diagnosed 1990-1994. "Europe" total is based on countries listed plus Austria, Czech Republic, Iceland, Norway, Malta, Slovenia and Wales.

Chapter 13: Risk Factors for cancer in women

Introduction

A woman's chances of developing cancer are affected by a number of factors. Some of these are intrinsic to a woman's individual make-up and are therefore not open to modification. A woman's age, her family's history of cancer, and her own personal medical history (for example her age at menarche) have all been associated with her chance of developing cancer. Obviously, these factors are all largely unavoidable for the individual but it is important to be aware of them and to ensure that risks are minimised as far as possible by participating in cancer screening and making healthy lifestyle choices.

The socio-economic and cultural environment in which a woman lives also contributes to her health, and therefore can affect her chances of developing cancer. Income levels are particularly significant here, with economic impoverishment most often synonymous with poor health (Lynch et al., 2000). Socio-economic differentials are prevalent for practically every health and health lifestyle indicator in Ireland, with wealthier socio-economic groups having consistent advantages over poorer. Related strong links have been made between health and levels of education, where people with a better education have better health and better health-related lifestyles than those who are less well educated (Women's Health Council, 2003).

Healthy lifestyle choices are essential as many of risk factors for cancer are associated with people's lifestyles and are thus modifiable. Smoking status is particularly significant here, together with body weight, amount of physical activity, exposure to the sun, sexual health and diet (especially consumption of fruit and vegetables). The European Code Against Cancer has highlighted the fact that the risk of cancer can be minimised by adopting a healthy lifestyle, and the main risk factors for cancer mentioned in the Code are related to an individual's lifestyle (Boyle et al., 2003).

Overall, health is a product of whether or not a person has sufficient income, adequate housing, and social or community bonds and support, in addition to her/his behaviour, diet and lifestyle. For many women, risk factors may thus co-exist and interact with each other. An integrated approach to prevention is therefore required, to take into account the multiple risk factors that may combine to affect women at high risk of developing cancer, as well as actions targeted at the whole population. Policy aimed at preventing cancer must also be cross-cutting and holistic in nature, focusing on both societal and individual factors that influence a person's chance of developing cancer.

This chapter will outline the main risk factors for cancer among women, pointing to both Irish and international research in the area.

Intrinsic Risk Factors for Cancer among Women

Age

Overall cancer rates have been found to increase exponentially with age, from fifteen years onwards. The exact relationship between ageing and cancer is not well understood at present (Repetto et al., 2003). However, it would appear that ageing tissues are more susceptible to late-stage carcinogens, possibly implying that older people are increasingly susceptible to environmental carcinogens (Balducci, 2000).

Demographic trends have indicated that the population of Ireland is becoming increasingly older, a fact that has serious implications for the provision of cancer services given the relationship between cancer and ageing. The increased risk of cancer among older people is particularly significant for women, as they have been found to live longer than men and this increased life expectancy may thus increase their risk of developing cancer.

This reports shows that more than half of the colorectal, lung, non-Hodgkins lymphoma, pancreatic, and stomach cancers in women in Ireland are diagnosed in those aged over 65 years. Health promotion programmes should be developed specifically for older people to deal with issues around smoking cessation, healthy diet and exercise. Education should also be provided for older people to ensure that they are aware of early signs of cancer, as research has shown that older people often present later with the disease. Research should also be carried out on the effectiveness of interventions in those aged over sixty-five years, particularly with regard to the evidence for extending cancer-screening programmes to older women.

Genetic factors

Women with a family history of cancer have been found to have an increased risk of developing some types of the disease themselves. This appears to be particularly the case for breast cancer; it has been estimated that up to 10% of breast cancer in Western countries is due to genetic predisposition (McPherson et al., 2000). Research has shown that a woman's risk of breast cancer is two or more times greater if she has a first degree relative (mother, sister, or daughter) who developed the disease before the age of 50, and the younger the relative when she developed breast cancer the greater the risk (McPherson et al., 2000). Susceptibility to developing some forms of breast cancer and ovarian cancer has also been linked to BRCA1 and BRCA2 genes. Women who have a mutation in one of these genes have a very high chance of developing breast cancer or ovarian cancer during their lifetime, compared to women who do not have the mutations.

Inherited biological factors go some way towards explaining the increased risk that a family history of cancer presents. Such factors that render an individual more susceptible to cancer include altered genes in the body's cells, abnormal hormone levels in the bloodstream, or a weakened immune system (US Department of Health & Human Services, 2003). It should also be noted, however, that genetic factors are not the only reason that a family history of cancer may increase a woman's risk of developing the disease. Higher rates of cancer in families may also be related to shared environmental exposures like diet or exposure to carcinogens at work (US Department of Health & Human Services, 2003).

Women with a family history of cancer must be made aware of the risk that this poses to their own chance of developing the disease. Where screening has been shown to be effective, they must be encouraged to attend for screening at regular intervals to ensure early identification of any precancerous or early cancer lesions. They should also made aware of the symptoms of cancers so that they may seek medical attention at an early stage and encouraged to adopt a healthy lifestyle in order to minimise their risk as much and as early as possible.

Reproductive health

Studies have found that reproductive patterns have implications in relation to women-specific cancers, particularly breast and endometrial cancers (Batty & Thune, 2000).

Menarche and Menopause

Researchers have found that early age at onset of menstruation (menarche) and late age at menopause can increase the risk of breast and endometrial cancer (Manderson et al., 2005, McPherson et al., 2000, Ames et al., 1995). Early age at menarche is defined as age twelve or below, while late age at menopause is fifty-five years and above. It has been suggested that the increased cumulative exposure to oestrogens which women experience as part of early menarche and late menopause may be responsible for the increased risk of these cancers (Ames et al., 1995).

Childbearing

Pregnancy and childbearing have been found to have a complicated relationship with cancer. Overall, it has been found that bearing children reduces a women's lifetime incidence of breast cancer (Ames et al., 1995, Dos Santos Silva & De Stavola, 2002). However, age at first birth is also relevant, with risk increasing for women who have their first child over the age of thirty, the highest risk group being women who have a first child after the age of 35 years (McPherson et al., 2000). Bearing a number of children (multiparity) however, has been found to contribute to increased risk of cervical cancer (Manderson et al., 2005). Not bearing children, or nulliparity, increases a woman's lifetime incidence of breast cancer (McPherson et al., 2000) as well as ovarian and endometrial cancers (Manderson et al., 2005). On a related issue, it should be noted that breastfeeding has also been found to have a protective effect against breast cancer (Dos Santos Silva & De Stavola, 2002, National Committee on Breastfeeding, 2005). A large study on the effect of breastfeeding on breast cancer in thirty countries found that the relative risk of breast cancer decreased by 4.3% for every (cumulative) month of breastfeeding, in addition to a decrease of 7% for each birth (Collaborative Group on Hormonal Factors in Breast Cancer, 2002).

Social & Economic Influences on Health Behaviours

In addition to the individual and biological factors that contribute to a woman's risk of developing cancer, social and economic factors must also be taken into account. The World Health Organisation has defined health as a 'state of complete physical, mental and social well-being', demonstrating the need to take contextual or social as well as individual and biological factors into consideration in any discussion on health and well-being.

The links between poverty and disadvantage and ill-health are well documented in health research. Socioeconomic status has been found to affect a person's risk of developing cancer, as well as her/his survival from the disease, as may be seen in the earlier chapters on specific cancers in this report. Overall in Ireland, research has shown that death rates for all cancers are twice as high in the least skilled occupational group than they are in the most affluent group (Burke et al., 2004).

Studies in many countries, including Ireland, have found important differences between the socioeconomic groups in the prevalence of risk factors for cancer, with risk being substantially higher in disadvantaged groups. This is probably because socioeconomic status not only reflects income but also a person's social and other circumstances. It influences access to education and employment, food and nutrition, work opportunities, housing and environmental conditions, levels of stress and social support, as well as age at bearing children (Brawley, 2002, Burke et al., 2004). Simply put, socioeconomic status influences many of the other extrinsic influences on cancer aetiology and behaviour, and leading an optimally healthy lifestyle may not be possible or affordable for people living in poverty or disadvantage.

Women in poorer socioeconomic groups may be at increased risk of developing cancer because they do not have access to resources informing them about factors that contribute to the disease (Wilkes et al., 1994, Samet & Yoon, 2001). In Ireland, research has found higher rates of smoking and drinking alcohol, and lower levels of fruit and vegetable consumption and exercise among people in less well-off socioeconomic groups (Kelleher et al., 2003, Friel et al., 1999). In the analysis of the National Health and Lifestyle Survey (SLÁN) data according to the European Code Against Cancer, women who complied with the Code were found to be those from wealthier social classes, with tertiary education, and were ineligible for GMS (see chapter 14 for further details). This clearly demonstrates that women with more social and financial resources also have more resources that enable them to lead healthy lifestyles.

A lack of social and economic resources may make it more difficult for people to take advantage of health promotion interventions. Research has shown that disadvantaged women have less access to health information and therefore may be more reluctant to take part in health promotion activities such as screening since they are not aware of its benefits. In the United States, it has been found that socioeconomic background impacts on women's willingness to present for breast and cervical screening, and that even when they do attend these women are doubtful that there is an effective intervention that might result in the prevention of the disease (Manderson et al., 2005). Breen and Figueroa (1996), also in the United States, found that higher socioeconomic status was related to greater access to services, and that living in a socioeconomically disadvantaged neighbourhood was a strong, consistent predictor of invasive cancer, particularly cervical cancer (Breen & Figueroa, 1996). Bradley et al (2002) similarly found that women who

lived in areas with higher poverty levels were more likely to have a late-stage breast-cancer diagnosis and therefore poorer survival rates than women from areas with less poverty.

Socioeconomic status has also been found to greatly impact on a person's access to effective healthcare in Ireland. In fact, Ireland has been identified as one of the developed countries with the most inequitable health systems (Coburn, 2004, van Doorslaer et al., 2006), clearly limiting the ability of those in disadvantaged groups to take full advantage of health promotion, screening, diagnostics and ongoing care services. Studies assessing the equity of the Irish health system have pointed out that, after controlling for need differences, people with higher incomes are significantly more likely to see a specialist than people with lower incomes (van Doorslaer et al., 2006). Higher income clearly gives people more access to comprehensive and advanced diagnostics, as well as treatment options not available through primary care.

Measures must be put in place to take account of these findings, and to combat the higher risk of and higher mortality from cancer among poorer socioeconomic groupings. Public health and social welfare programmes aimed at alleviating environmental conditions that may cause low-income women to be more susceptible to cancer may help to reduce socioeconomically driven disparities in cancer outcomes. Similarly, it has been suggested that public health programmes aimed at increasing preventative behaviours among people living in poverty or disadvantage may also lessen the gap in cancer outcomes (Bradley et al., 2002). In this regard it is worth mentioning the potential of the Social Personal and Health Education programme, a mandatory subject on the curriculum of all primary and post primary schools since September 2003. The Programme includes modules on nutrition and physical activity and the Dept of Health & Children also promotes a National Healthy Eating Week in schools each year. In addition, the School Meals Scheme, run by the Department of Education and Science in conjunction with the Department of Social and Family Affairs, which aims to supplement the nutritional intake of pupils from disadvantaged backgrounds is also useful. Finally, however, it is vital that the current inequalities intrinsic in the health system are also tackled, so that people from all socio-economic groups may be able to enjoy the same level of access and quality of care, ultimately reducing the disparity in morbidity and mortality from cancer in this country.

Modifiable Risk Factors related to Health Behaviours

Although some intrinsic and societal factors may be avoidable, for many women they are not easily modifiable. However, many important risk factors for cancer have a strong element of personal choice. Healthy lifestyle choices, for instance, are essential in preventing cancer, as some risk factors for the disease are associated with women's health behaviours.

Smoking

Cigarette smoke contains more than one hundred cancer-causing substances (US Department of Health & Human Services, 2003). Thus smoking and exposure to tobacco smoke have been found to be major risk factors for the development of cancer (IARC, 2004b). In addition to causing 90% of lung cancer, smoking has also been found to contribute to other cancers including cancers of the mouth, oesophagus, stomach, kidney, pancreas, bladder, leukaemia and possibly the colon (Ames et al., 1995, IARC, 2004b). Sufficient evidence has also been found to show that involuntary smoking—defined as exposure to secondhand or environmental tobacco smoke—causes lung cancer (IARC, 2004b). Epidemiologic studies consistently demonstrate that risk increases with duration and amount of smoking, and decreases with time since smoking cessation (Petro et al. 2002, Ernster, 2001). Women may be more susceptible to the effects of tobacco carcinogens than males; some studies have shown that when smoking the same number of cigarettes as men, women have higher rates of lung cancer (Samet & Yoon, 2001).

The WHO estimates that there are currently around four million deaths from tobacco each year worldwide, a figure that is expected to rise to 8.4 million by the year 2024 (Samet & Yoon, 2001). Worldwide in 1990, approximately 10% of female cancer deaths resulted from smoking (Ernster, 2001). Environmental tobacco smoke is also a risk, causing up to 3000 additional cases of cancer per year in the United States (Ames et al., 1995).

In the past, men were far more likely to smoke than women but in recent years the rate of smoking among women has grown considerably. In 1995, the global prevalence of smoking among women was estimated to be 12%, representing around 236 million women (Ernster, 2001). In Ireland, the Office of Tobacco Control has found that there is currently no appreciable difference between the sexes, with the present generation of young women no more or less likely to smoke than young men (Office of Tobacco Control & TNS mrbi, 2003). The SLÁN study, however, found that while 25% of women reported being regular or occasional cigarette smokers in 2002, this represented a decrease from 31% of women in 1998 (Kelleher et al., 2003).

Examining the reasons for taking up smoking, women have been found to smoke to relieve stress, anger, boredom or depression; they are more likely than men to cite smoking as a strategy for weight loss are and are also more likely to cite weight gain as a reason for relapsing after giving up smoking (Bedinghaus, 2001). In 2001, the United States Surgeon General noted that girls who initiate smoking tended to have less knowledge of the adverse consequences of smoking and the addictiveness of nicotine, and they also had a positive image of smokers. Women who continued to smoke or who failed to stop smoking were found to have lower education and employment levels than women who successfully gave up (US Surgeon General, 2002).

Research commissioned by the Office of Tobacco Control (OTC) in Ireland found that women are more likely to try to quit smoking than are men, but also that men have more successful quitting results (Office of Tobacco Control & TNS mrbi, 2003). Dr Harry Comber, Director of the NCRI, in a foreword to the OTC report, said the findings suggested that women need intensive, organised and prolonged support to quit smoking, and that the nature of this support may be different from that needed by men.

The importance of smoking cessation, therefore, should be heavily emphasised among women. However, because of gender-based differences in reasons for smoking, reasons for quitting and responses to pharmacologic agents, further research on gender-specific smoking cessation strategies is needed as a matter of some importance (Bedinghaus et al., 2001). Health promotion activities around smoking cessation should aim to target young girls, as the Health Behaviour in School-age Children study found that 20% of girls reported that they were current smokers, compared to 17% of their male counterparts (Kelleher et al., 2003). Studies in the US indicate that adolescent girls are more likely than adolescent boys to respond to smoking cessation programmes that include social support (US Surgeon General, 2002). Programmes should also be developed to target middle-aged women, as the NCRI has found that lung cancer is increasing most rapidly in older women (Office of Tobacco Control & TNS mrbi, 2003).

The need to reduce the prevalence of smoking has previously been recognised in health policy in Ireland, both in the National Health and the National Health Promotion Strategies. In addition, an increase in the Government levy on cigarettes has added €1.30 to their price per pack of 20 since 1999 and NICO, a special component of the Break the Habit anti-smoking campaign launched in 2000, was designed to target teenage girls with its emphasis on appearance and use of 'anti-cosmetics.

Overweight & Obesity

It has been found that obesity is an independent risk factor for most major causes of mortality. For many forms of cancer, the risk of developing the disease becomes higher with increasing weight, and the National Task Force on Obesity has estimated that between 8% and 42% of certain cancers are attributable to excess body fat (National Task Force on Obesity, 2005). The scientific justification for the European Code Against Cancer indicated a modest increased risk of breast cancer in postmenopausal women with a high body weight (among premenopausal women obesity is not associated with an increase in risk). Evidence has also linked overweight with increased risk for endometrial, kidney (renal cell) and colon cancer as well as adenocarcinoma of the lower oesophagus and the gastric cardia (Boyle et al., 2003, IARC, 2002a). A modest association was found between high body mass index and thyroid cancer; and there was limited evidence of an association between obesity and gallbladder cancer, especially in women (Boyle et al., 2003).

Obesity is now recognised as a health problem in Ireland. Rates of obesity have increased by 67% between 1990 and 2001, most likely due to increasingly sedentary lifestyles and poor diets (Bergin, 2002). Although a higher proportion of men than women were found to be obese in the SLÁN survey (16% of men compared to 12% of women), obesity is still a significant issue for women's health. An increase of 5% in the proportion of obese women was noted between the SLÁN 1998 and 2002 data.

In attempting to combat obesity and overweight, attention must be paid to the role of nutrition and healthy eating. Awareness should be raised on the issue of healthy body weight, particularly given the issues around the prevalence of overweight and obesity raised by the National Task Force on Obesity report (2005). The International Agency for Research on Cancer (IARC) has recommended maintaining a body mass index of 18.5 to 25, avoiding more than 5kg weight gain during adult life, and decreasing weight by 5-10% in already overweight persons (IARC, 2002a). Health promotion priorities should also promote positive messages about eating more fruit, vegetables and fish, and increase access to healthier choices for people, targeting in particular the workplace and less well-off groups. Research on the problem of increasing obesity rates among the female population of Ireland must be undertaken as a matter of urgency, particularly since the most effective treatment for obesity in women has not yet been determined, and exercise appears to be less effective in promoting weight loss in women than in men (Bedinghaus et al., 2001).

Exercise and Physical Activity

Numerous studies have found a reduction in cancer risk for physically active women (National Cancer Institute, 2005, IARC, 2002a). These studies provide evidence that regular exercise reduces the risk of a variety of cancers, including those of the colon, breast, endometrium, and possibly even the lung (National Cancer Institute, 2005, Batty & Thune, 2000, Ames et al., 1995, IARC, 2002a). The National Task Force on Obesity has suggested that humans have a biological need for physical activity and that decreasing activity rates in modern society have contributed to altered metabolic regulation and an increase in hypokinetic diseases such as cancer (National Task Force on Obesity, 2005). It is thought that increased physical activity causes changes in body mass, insulin resistance, metabolism, and hormone levels, which may help prevent tumour development (National Cancer Institute, 2005). It is important to note, however, that women who are physically active may also be different from their sedentary counterparts in genetic predisposition, dietary habits, and tobacco and alcohol use, thus also reducing their risk of cancer in other ways (Batty & Thune, 2000).

Modest exercise has been strongly associated with risk reduction in observational studies. The International Association for the Study of Obesity (IASO) has stated that 45-60 minutes of moderate intensity activity per day is required to prevent the transition to overweight or obesity, a recommendation supported by the United States Institute of Medicine (National Task Force on Obesity, 2005). Although a lifetime of regular vigorous activity is thought to be of greatest benefit, women who occasionally engage in physical activity also experience a reduced risk compared to inactive women. The US National Cancer Institute cited a recent major report which found that among postmenopausal women, walking 30 minutes per day was associated with a 20% reduction in breast cancer risk (National Cancer Institute, 2005).

The SLÁN survey in 2002 indicated that 53% of the Irish adult female population engage in some form of regular physical activity. Twenty-two percent of women said they performed mild exercise four or more times per week, 37% did moderate exercise three or more times per week, and 7% said they engaged in strenuous exercise three or more times per week (Kelleher et al., 2003). A comparative analysis of the SLÁN data, however, found a significant increase in the proportion of women not taking daily exercise between 1998 and 2002.

While physical activity is important throughout the life cycle, teenage girls and older women in particular should be targeted for health promotion activities in the area, as they have been found to have a higher prevalence of being sedentary than other age groups (Kelleher et al., 2003). A suggested target has been for women to accumulate thirty minutes or more of moderate intensity physical activity on most days of the week. Walking seems to be a form of activity which suits women; the North/South Ireland Food Consumption Survey found that 60% of women surveyed said it was their most important recreational activity (Irish Universities Nutrition Alliance, 2001). 'Moderate intensity exercise' is roughly the equivalent of walking briskly at 3 to 4 miles per hour (British Heart Foundation, 2002, IARC, 2002a).

The health promotion campaign Get A Life, Get Active (Department of Health and Children, 2001c) was launched in May 2001, and in 2002 it put particular emphasis on walking as a form of physical activity which is feasible for most people. Funding was provided to the Irish Heart Foundation's Slí na Slainte, routes developed and maintained to encourage people of all ages and abilities to walk for pleasure and good health. The Irish Sports Council (ISC) has stated its commitment to doing more to get young people excited by and involved in sport, and to ensuring that no one is excluded from sport on the grounds of age, gender, disability, religion, social position, ethnic origin or sexual orientation. In its strategy document, Sport for Life, it has also committed to carrying out research to measure the impact of its actions, including looking at indicators such as the number of people participating in sport by gender (among other grounds) with particular reference to

young people. The Council has established over 3500 km of waymarked recreational walking trails throughout Ireland, and has provided funds, through its grant scheme, to enable local groups to buy sports equipment, organise training programmes and sports festivals (Irish Sports Council, 2003). In order to address the recent finding in SLÁN that teenage girls and older women tend to be more sedentary, however, it is recommended that the ISC should put gender sensitive measures in place as part of its overall policy and funding strategy.

Sexual Health

Human papillomavirus (HPV), a sexually transmitted virus, has been causally associated with cervical cancer (Manderson et al., 2005). Epidemiological evidence gathered by the International Agency for Research on Cancer (IARC) from case-control studies, prospective cohort studies and case series provided convincing evidence that infection with a number of strains of HPV can lead to cervical cancer (IARC, 2005c). It should be noted, however, that although infection with HPV is significantly associated with cervical cancer, infection with HPV does not always mean that a woman will go on to develop cervical cancer (US Department of Health & Human Services, 2003). A comprehensive review of key studies in the area found that '…cervical cancer is a rare consequence of an infection by some mucosatropic types of HPV' (Bosch et al., 2002).

Risk of contracting HPV is increased in women who began sexual intercourse at age 16 or younger, and who have had multiple sexual partners (US Department of Health & Human Services, 2003, Manderson et al., 2005). At present, the levels and patterns of HPV infection in the population of Ireland remain unknown, and as such there is an urgent need for research to be carried out in this area.

Hormonal Contraceptives

Use of hormonal contraceptives also has implications for the development of cancer in women. Use of contraceptives or other hormone therapies such as HRT containing oestrogen appears to increase the risk for endometrial cancer (Ames et al., 1995); however, the addition of progestogens may reduce the risk somewhat (Ames et al., 1995) [1] . Similarly, use of hormonal contraceptives causes a small increase in relative risk of developing breast cancer, but McPherson et al (2000) have pointed out that such contraceptives are used at an age when the incidence of breast cancer is low anyway. The risk of liver cancer is also increased in long-term users of combined (oestrogen and protestogen) oral contraceptives (IARC, 2005a). Finally, it should also be noted that risks of endometrial and ovarian cancer are consistently decreased with the use of combined oral contraceptives (Ames et al., 1995, IARC, 2005a).

Worldwide, about 10% of women of reproductive age – around 100 million women – currently use combined hormonal contraceptives. The SLÁN survey for 2002 found that the contraceptive pill was the most frequently used form of contraception for 30% of the women surveyed, while 54.8% of women said that they had ever taken the contraceptive pill. The mean number of years on the pill was 5.4 (Kelleher et al., 2003).

IARC has stated that since use of combined oestrogen-progestogen contraceptives increases some cancer risks but decreases others, rigorous analysis is required on a country-by-country basis. It has also advised that each woman using hormonal products discusses the risks and benefits with her doctor, taking into account her personal circumstances and family history of cancer (IARC, 2005e).

[1] Oestrogens increase the division of endometrial cells, but progestogens reduce division; thus the addition of progestogens to oestrogen therapy after menopause may reduce the risk of endometrial cancer (Ames et al., 1995).

Hormone Replacement Therapy (HRT)

As with hormonal contraception, hormone replacement therapy (HRT) has also been implicated in the development of some cancers. In a number of studies, combined menopausal therapy (HRT which includes oestrogen plus progestogens) has been found to increase the risk of breast cancer among current or recent users, above the risk found among users of oestrogen-only therapy (Rossouw et al., 2002, IARC, 2005c). The risk of endometrial cancer was found to increase where progestogens are taken fewer than ten days per month –if progestogens are taken daily the risk is similar to that in women who never used hormonal therapy (IARC, 2005c).

It has been estimated that approximately 20 million women used HRT in developed countries at its peak around the year 2000 (IARC, 2005c). However, rates may have fallen since then in view of the concerns raised by the results of the Women's Health Initiative, randomised controlled trials which found increased risks of some cancers for users of HRT (Majumdar et al., 2004, Hersh et al., 2004). Exact figures for the number of women in Ireland currently using HRT are not known. Nationally representative research was carried out on women by the Saffron Initiative in 1998, however, and it found that of the population of women aged 45 and over in the survey, 10% had taken HRT in the past and 7.5% were taking it at the time of the research (Saffron Initiative Steering Committee, 1999). Given the health implications of use of HRT, it is important that data be consistently collected on rates of HRT use in Ireland so that this gap in information is addressed.

As with hormonal contraception above, the IARC has advised that women considering the use of hormone replacement therapy should discuss the risks and benefits with their doctors, taking into account their personal circumstances and family history of cancer (IARC, 1999, IARC, 2005e).

Sun Exposure

The US Department of Health and Human Services has indicated that ultraviolet radiation from the sun, sunlamps or tanning beds can cause damage to the skin, leading to increased risk of melanoma or other types of skin cancer (US Department of Health & Human Services, 2003). In white populations, the IARC has found that 80-90% of skin cancers are due to exposure to sunlight (IARC, 2001). Exposure during childhood and adolescence, particularly when sufficient to cause burns, appears to be particularly risky (Ames et al., 1995).

Research carried out on a nationally representative sample of non-Hispanic white adolescents in the United States showed that young women were the greatest consumers of tanning beds, with 28% of young females reporting three or more tanning sessions compared to 7% of males (Demko et al., 2003). Having a tan may be more socially desirable for women; research has found that while women may have considerable knowledge of the health dangers of tanning, they continue to link tanned skin to beauty, status, and attractiveness (Garvin & Wilson, 1999) and thus sunbed use may be explained for some women as helping them to achieve their 'ideal of beauty' (Fiala et al., 1997).

The Irish Cancer Society has highlighted the fact that pale or fair-skinned, fair or red-haired and blue/green/grey-eyed people are at greatest risk of over-exposure to ultraviolet radiation, as are those with a tendency to freckle. Risk can be reduced by covering up and wearing a hat in the sun; by using sunscreen with a sun protection factor of 15 or higher; by avoiding the sun between 11am and 3pm; and by protecting eyes with sunglasses that protect against UV rays (Irish Cancer Society, 2004, Boyle et al., 2003). On a note of caution, the IARC recommended that sunscreens alone should not be relied upon to prevent cancer;

epidemiological studies have shown significantly higher risks of melanoma in users of sunscreens than in non-users, possibly due to the fact that users of sunscreens deliberately spend more time in the sun than they otherwise would have done. Therefore, the IARC has recommended that use of sunscreens should only be one part of a comprehensive sun avoidance strategy (IARC, 2001).

Alcohol

The Global Burden of Disease study, published by the World Health Organisation, found that alcohol was the third most detrimental risk factor for European ill health and premature death. In 2002, alcohol-related death and disability accounted for 9.2% of the burden of disease, with only tobacco (12.2%) and high blood pressure (10.9%) causing more harm (Rehm et al., 2004). Over-consumption of alcohol has been linked to upper gastro-intestinal cancer, liver cancer and breast cancer (Cummings & Bingham, 1998). Research has shown that it is an important cause of oral and oesophageal cancer, and may also contribute to colorectal cancer (Ames et al., 1995).

Alcohol intake should be as low as one unit and certainly restricted to no more than two units a day for women (Cummings & Bingham, 1998, Boyle et al., 2003). Drinking above the guidelines of more than 14 standard drinks per week for women has been linked to an increased risk of long-term harm (Strategic Task Force on Alcohol, 2004).

Ireland continues to be amongst the highest consumers of alcohol in the world. A recent study showed that adults in Ireland had the highest reported consumption per drinker and the highest level of binge drinking in comparison to adults in other European countries (Ramstedt & Hope, 2004). The SLÁN survey found that 30% of males and 22% of females consume over the recommended upper limit of 21 standard drinks for men and 14 for women, with higher levels in the 18-29 year age group (Kelleher et al., 2003). Although women on average drink less than their male counterparts, it has been found that their long-term risk is almost as high, as women have a lower risk threshold than men (Tsianakas & Rice, 2004).

The Strategic Task Force on Alcohol was established by the Minister for Health and Children in January 2002. The group's mission is to recommend specific evidence-based measures to Government to prevent and reduce alcohol related harm in Ireland. The Task Force published an Interim Report in May 2002 which recommended actively enforced regulatory approaches to the alcohol market, and the evaluation of approaches that acknowledge the realities of drinking and intoxication in society (Strategic Task Force on Alcohol, 2002). The Task Force's Second Report was published in 2004. Its recommendations focus on regulating availability; controlling promotion of alcohol; enhancing society's capacity to respond to alcohol related harm; protecting public, private and working environments; the responsibility of the alcohol industry; providing information and education; putting in place effective treatment services; supporting non-governmental organizations; research and monitoring progress (Strategic Task Force on Alcohol, 2004). Recommendations corresponded to the ten strategy areas for alcohol action outlined in the WHO European Charter on Alcohol.

In Ireland the amount of alcohol drunk tends to decrease with age, with the highest consumption found among those aged 18-29 years (Ramstedt & Hope, 2004). In this regard, The Framework for Developing a College Alcohol Policy document, launched by the Department of Health & Children in 2001, was designed to assist colleges to develop campus alcohol policies which promote sensible drinking among students and limit alcohol-related harm on campus. It was developed following concerns about alcohol promotion practices on campus,

high risk drinking among students, and the impact of such drinking patterns on academic achievement, student personal problems and student attrition (National Working Group on Alcohol Consumption in Higher Education, 2001). The National Youth Council of Ireland runs a National Youth Health Programme which delivers training on alcohol and young people to youth sector workers; it is also developing an Alcohol Framework for the Youth Sector and a Code of Ethics on behalf of the Youth Welfare Sub-Committee of the National Youth Work Advisory Committee. [1]

Diet

Many studies have noted the importance of a healthy diet in preventing cancer. It has been estimated that about one-third of cancer may be avoidable by changes in diet (Willett, 1995, Ames et al., 1995).

Fruit and vegetables

Consumption of fruit and vegetables has been shown to have great benefits in cancer prevention. It has been suggested that the action of antioxidants, such as carotenoids and Vitamin E, as well as folic acid and the fibre contained in fruit and vegetables may lower the risk of cancer (Croce, 2001, Ames et al., 1995). Ames et al (1995) reviewed almost two hundred epidemiological studies, and found that they were consistent in relating lack of adequate consumption of fruits and vegetables to cancer incidence. The quarter of the population with the lowest dietary intake of fruits and vegetables compared to the quarter with the highest intake had roughly twice the cancer rate for most types of cancer (Ames et al., 1995). Allium vegetables (garlic, onions, leeks and chives) have also been shown to have beneficial effects against cancer, with reported protection against stomach and colorectal cancers, although evidence for a protective effect at other sites, including the breast, is insufficient (Bianchini & Vainio, 2001). In this regard, it should be noted that a recent large European investigation has concluded that the consumption of vegetables and fruit did not have any protective effect against breast cancer (van Gils et al.,2005). Researchers have suggested that the evidence is best for a protective effect of vegetables in the large bowel and for fruits and vegetables in stomach cancer (Cummings & Bingham, 1998). Fibre also aids in regular bowel movements, which decrease the time the colon is exposed to potential carcinogens thus reducing the risk of cancer.

An assessment of the SLÁN data showed that in 2002 compliance with the recommended five servings daily of fruit and vegetables (Boyle et al., 2003) was significantly higher in women than in men. However, there is still room for improvement, since a considerable proportion of women still do not comply with the European Code Against Cancer (ECAC) guidelines (see Chapter 14 for further details). Mean daily fibre intake was below the minimum of the recommended range in almost half of women in the *North/South Ireland Food Consumption Survey* carried out in the late 1990s (Irish Universities Nutrition Alliance, 2001).Women should aim to eat at least five portions of fruit and vegetables a day, and consumption of fibre should be around 18g/day (Cummings & Bingham, 1998).

Meat

High consumption of meat, especially red meat (beef, pork and lamb) and processed meat (sausages; hamburgers; smoked, cured and salted meat including ham and bacon; and canned meat) is linked with higher risk of bowel, breast and pancreatic cancer (Cummings & Bingham, 1998). Researchers in the European Prospective Study into Cancer and Nutrition (EPIC) found 'a consistent positive association between high intake of red and processed meat and colorectal cancer' (Norat et al., 2005). They found the association with

[1] Personal communication from Ms Marie-Claire McAleer, Research & Policy Officer, National Youth Council of Ireland

colorectal cancer risk was stronger for processed than for unprocessed red meat; that there was an inverse association between high intake of fish and colorectal cancer; and that risk was not associated with poultry intake.

In Ireland, results of the *North/South Ireland Food Consumption Survey* indicated that bacon and ham were the most commonly consumed meats (80%), followed by chicken (71%), sausages (59%) and beef (55%) (Irish Universities Nutrition Alliance, 2001). Women have been found to consume significantly less meat than men (Cosgrove et al., 2005), but studies have indicated that when compared with existing dietary recommendations, 86% of women had protein intakes above the Population Reference Intake (Fisher et al., 1997). It is also important to emphasise guidelines on meat consumption given the popularity of high-meat diets, such as the Atkins diet, in recent times. The World Cancer Research Fund's report on *Food, Nutrition and Cancer Prevention* recommended that red meat should provide less than 10% of total energy and that individuals should not consume more than 80g daily (Canon, 1997).

Fat

Diets high in fat are not convincingly linked to cancer, but because they contribute to obesity the current guidelines to lower total fat consumption to avoid heart disease are also appropriate for cancer.

In general, the dietary advice to reduce cancer risk is to:

- Eat plenty of fruit and vegetables (5-8 portions a day)
- Eat plenty of cereal foods, mainly in an unprocessed form (as a source of fibre)
- Maintain ideal body weight (body mass index 20-25); avoid fatty foods
- Eat red meat and processed meat in moderation (no more than 80-140g/day)
- Avoid high doses of vitamin supplements
- Alcohol in moderation (a maximum of 2 units per day for women)
- Avoid highly salted and mouldy foods (Cummings & Bingham, 1998, Boyle et al., 2003)

Conclusion

A woman's risk of developing cancer is affected by a number of different areas. Intrinsic factors, such as age, family history and personal medical history form one area of risk. Socio-economic or other social factors also have a mediating influence on a woman's circumstances thus affecting her risk of developing cancer. A woman's lifestyle, particularly her smoking status, body weight, exercise levels, diet, and exposure to the sun, has a huge influence on her risk of developing cancer, but importantly this is an area in which women can play an active role in reducing risk.

Improvements are still needed in encouraging women to eat a healthy diet, improve levels of daily exercise and promote moderate intake of alcohol. In developing health promotion policy and strategy for women, attention must be paid to the mediating influence of socio-economic circumstances so that the particular needs of disadvantaged women are taken into account. Policy aimed at preventing cancer must be cross-cutting and holistic in nature, focusing on both societal and individual factors that influence a woman's chance of developing cancer.

Chapter 14: European Code against Cancer and compliance in an Irish population as assessed from SLÁN data

Summary

In this chapter we examine compliance, or not, with five lifestyle-related recommendations of the Europe Against Cancer score. Our objective was to examine whether there is any evidence of electoral area variation in the patterns of lifestyle risk factors and to assess socio-demographic variation in risk also. We examine a composite five point score and also the individual lifestyle risk factors separately.

We find that area level variation is not a major factor in this analysis. For the overall composite score there is no significant area effect at all. At the level of individual factors there is some degree of area variation but this is largely explained by individual level characteristics. For instance, moderate alcohol consumption, non smoking, avoidance of obesity and recommended fruit and vegetable consumption all demonstrate some area level variation, but not daily physical activity pattern. However, when adjusted for individual level socio-demographic factors, only the obesity pattern demonstrates a residual impact of area not explained by the factors we tested. The odds ratios in this summary are based on multiple variable statistical models, please see main text for details.

Overall women in fact comply considerably better than men with the ECAC score. Men are less likely to drink moderately (OR 0.77), to be non obese (0.73) and women are more likely to consume fruit and vegetables (OR 2.4). Men have higher total and saturated fat consumption and women comply better with all of the recommended food pyramid shelves except cereal, bread and potato consumption.

There is clear evidence of social position as an influence on the SCORE. Overall, rural dwellers do better than urban dwellers and those with a GMS medical card fare less well. In the case of alcohol consumption there is an interesting interaction between gender and social position. Women with third level education and men with a medical card are each less likely to comply with the alcohol recommendation.

Smoking patterns are comparable between men and women, rural dwellers are more likely to be non smokers (OR 1.3), as are third level educated people (OR 1.3), but those with a medical card (OR 0.58) and those in social classes 5 and 6 are less likely to be non smokers (OR 0.55). There is some evidence of social capital indicators influencing smoking patterns. Those citing environmental problems are more likely to smoke (OR 1.2) whereas those in clubs or organisations are more likely to be non smokers (OR 1.4).

Third level educated people are more likely to be non obese, compared with primary educated only (OR 2.2), as are the middle-aged compared to younger and older people but there are no other significant social position indicators. Those undertaking brisk activity are more likely to be younger and there is a clear education gradient from tertiary OR 1.8) through secondary (OR 1.3) compared with primary educated only. Measures of social position also predict fruit and vegetable consumption. Those with a medical card are less likely (OR 0.71) and those with either third level education (OR 1.7) or in social class 1 or 2 (OR 1.2) more likely to comply with the recommendations.

We conclude that women report a more heath promoting lifestyle than men generally but socio-economic circumstances are important predictors of adverse lifestyle in both sexes. Some factors, notably alcohol consumption, are more adverse in higher educated women.

Introduction

A key question in cancer prevention is the degree to which so-called individual-level lifestyle risk factors in the population may be modified. For this an understanding of the prevalence of such risk factors is required but also a contextualised approach to their social and environmental determinants. In this report we are concerned with gender differences in cancers but also in an examination of how and whether risk factor profiles differ among men and women and the consequent policy implications. In the preceding chapters on site-specific cancers we pointed out that patterns of cancer may vary by area. This has important public policy implications because such variations may relate to disparities in treatment and care, but also to lifestyle and socio-economic circumstances of individuals living in different parts of the country or indeed to aspects of the social and physical environment that are in themselves either damaging or beneficial to the health of residents. In this chapter we examine in more detail the databases of the national Surveys of lifestyle, attitude and nutrition to see what these can tell us about such individual and area level variations.

In 1998 the Health Promotion Unit of the Department of Health and Children commissioned the first ever postal Survey of Lifestyles, Attitudes and Nutrition (SLÁN), and the survey was conducted again in 2002. In each a representative sample of the Irish adult population completed the questionnaire, giving a sample size in 1998 of 6,539 (62% response rate) and a sample size in 2002 of 5,992 (52% response rate). The methodology for SLAN has been described in detail in previous reports. In both rounds of SLAN a comprehensive lifestyle profile was undertaken, together with detailed socio-demographic information on respondents. In 2002, in addition to these measures, a section on neighbourhood and social capital indicators was also included. Data were collected at the level of electoral division across the 26 counties of the Republic of Ireland. Previous reports have indicated clearly that lifestyle risk factors vary according to age, education and other measures of social position. It has also been shown in the SLAN regional reports that there are variations between the Eastern area and other parts of the Republic of Ireland, but analyses have suggested that much of this is due to increasing urbanisation so that modern Ireland is becoming like the rest of industrialised Europe. The analysis in this chapter aims to explore this question further, with a particular emphasis on gender.

In health promotion terms it an important public education requirement to produce readily accessible and easy to comprehend messages that members of the public may act upon. There are many such strategies in place but one of the more well-established is the European Code Against Cancer (ECAC). This was first developed in 1987 and amended to the third and most recent edition in 2003. It was formulated based on best available evidence from epidemiological or population based surveys on strategies likely to reduce risk of developing cancer over the lifetime and feasible possibility of individual change. In its entirety the code includes 11 recommendations whereby individuals might reduce their risk of developing cancer as well as a number of additional notes on chemoprevention, screening and genetics. Information on the 5 lifestyle-related factors is available through the SLAN surveys. It is well established in the International literature that lifestyle choices are associated with social circumstances. Men and women differ in their health behaviours and some factors, like smoking, are inversely related to social position. More recently, trends in overweight and obesity have been linked to socio-economic circumstances. These questions have not been investigated in Ireland until relatively recently. Ireland is a rapidly changing country, with increasing urbanisation, rapidly shifting patterns

of affluence for many but significant disadvantage also. If policy to prevent cancer is to be effective then we need to understand as far as possible the determinants of a healthy or un-healthy lifestyle and facilitate individuals in making their own choices.

Our objective in the present analysis was to examine the risk factor distribution at both individual and area level in the Republic of Ireland using the SLÁN databases and as far as possible to determine what social or demographic factors influenced these population patterns. The 5 recommendations discussed in this chapter are those directly assessed in the SLÁN surveys of 1998 and 2002.

A note on statistical methodology

The five outcome variables used to assess compliance with the ECAC recommendations were defined as follows:

- non-smoking based on response to SLAN question "are you currently smoking"
- non-obesity based on BMI < 30 kg/m^2, calculated from height and weight
- physical activity based 7 or more occasions weekly of physical activity during leisure time lasting > 20 minutes at mild, moderate or strenuous levels
- Fruit and vegetable consumption based on >= 5 servings daily of fruit and vegetables
- Low alcohol based on <= 7 units per week for women and <= 14 units per week for men.

For details on procedures of age standardisation and multi-variate modelling please see appendix 1.

Table 14.1: Percentage meeting ECAC recommendations by gender and year of response (age adjusted to the 2002 Census)

	female		male	
Meeting recommendations:	1998	2002	1998	2002
Non-smoker	69%	74%	68%	72%
BMI <30 kg/m2	91%	88%	89%	86%
Daily exercise	27%	24%	28%	24%
5 fruit and vegetable servings-a-day	52%	64%	38%	44%
Moderate alcohol	76%	76%	72%	72%

Individual ECAC Recommendations

A higher proportion of women (than men) complied with the recommended level of alcohol intake in both SLÁN 98 and SLÁN 02 surveys. Compliance with the recommended 5 servings daily of fruit and vegetables was significantly higher in women than men in SLAN 02 and SLÁN 98 . The number of smokers declined between SLÁN 98 and SLÁN 02. Obesity levels rose significantly in both women and men while the proportion of men and women taking daily exercise decreased over the same time period.
The below table illustrates the percentage of the SLAN population meeting the recommendations for the Food Pyramid in the 2002 survey:

Table 14.2 : % of SLAN population meeting food pyramid recommendations

Shelf instruction	All	Male	Female	Male <50yrs	Female <50yrs	Male >50yrs	Female >50yrs
Top shelf (eat sparingly)	17.4% (1035)	16.9% (420)	17.6% (611)	16.3% (232)	17.7% (405)	18.8% (188)	17.4% (206)
Meat, fish, poultry & alternative (2 servings)	39.0% (2311)	37.2% (908)	40.2% (1400)	37.7% (535)	41.1% (935)	38.5% (373)	39.5% (465)
Milk, cheese & yoghurt (3 servings)	29.0% (1739)	27.7% (679)	29.8% (1053)	26.6% (380)	28.9% (661)	30.0% (299)	32.3% (392)
Fruit & vegetables (4+ servings)	68.9% (4014)	67.2% (1598)	70.1% (2403)	67.5% (945)	69.4% (1551)	66.9% (656)	71.5% (853)
Cereals, bread & potatoes (6+ servings)	33.4% (1954)	34.8% (812)	33.6% (1138)	35.3% (485)	34.2% (753)	34.1% (329)	32.7% (386)
Top 3 shelves combined	1.4% (88)	1.2% (40)	1.6% (58)	1.2% (17)	1.4% (32)	1.3% (13)	2.1% (56)
All	0.2% (10)	0.2% (5)	0.1% (5)	0.2% (3)	0.1% (3)	0.2% (2)	0.2% (2)

Women had higher compliance rates than men for all but the bottom shelf of cereals, bread and potatoes. The poorest rate of compliance for both sexes was the top shelf of energy dense high fat or high sugar foods recommended to be consumed sparingly. If we take the top three shelves as comprehending the ECAC message to moderate animal fat consumption we note that women comply better than men but the numbers complying with the top three shelves combined are very low. Notably negligible numbers of the population complied simultaneously with all shelf recommendations.

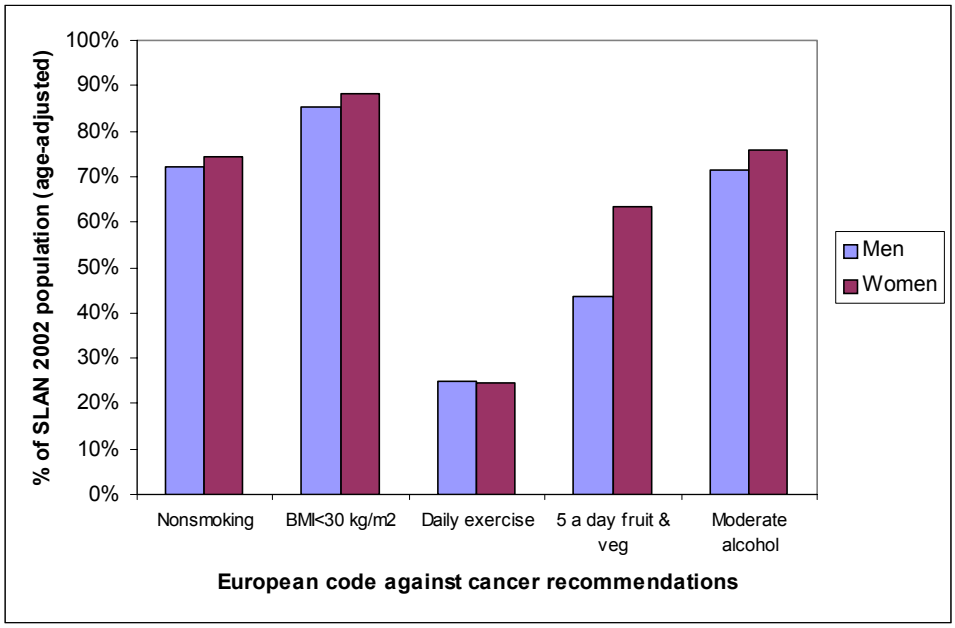


Figure 14.1: Percentage of SLÁN 2002 respondents meeting European Code Against Cancer recommendations by gender (age adjusted to the 2002 Census)

In the following section we examine whether the main lifestyle factors vary significantly by area at district electoral division level and then examine the degree to which this is explained by socio-demographic characteristics of people living in the area of whether there are factors overall and above this that need to be accounted for. For a note on methodology, see appendix 3.

Alcohol consumption

There is statistically significant evidence of factors at area level that influence the risk of drinking above the recommended amount, having adjusted for individual-level age and sex of survey participants (Variance = 0.161, SE = 0.039, Chi-square = 17.059/1df, $p < 0.001$). Men are less likely to meet the recommendations than women (odds ratio 0.77 95% CI (0.68, 0.88)) and older people are more likely to meet the recommendations for alcohol consumption (odds ratio per 10 year increase in age is 1.35). However, the variance at area level is halved by inclusion of an area-level indicator of location (that is whether people reside in an urban or rural location) but remains significant, indicating there are other factors at area level that have a small impact on the level of alcohol consumption (Variance = 0.082, SE = 0.030, Chi square 6.533/1df, p=0.01). Controlling for age and sex, people who live in rural areas are more likely to meet the alcohol recommendations than those who live in urban areas (odds ratio is 1.87, 95% CI (1.62, 2.16).

In a full statistical model, including location, GMS status and social class we find the following. People with GMS cards are more likely to meet the recommendations for alcohol consumption than those without. However this effect becomes non-significant when a variable indicating educational level is included in the model, probably due to the very strong dependence between GMS status and education, where 71.7% of primary-educated people have GMS cards in comparison to 26.7% of secondary-educated and 11.7% of tertiary-educated people.

There is a tendency for people with higher levels of education to have higher levels of alcohol consumption. Controlling for age, sex, location and education, class status has no additional effect on the risk of consuming over the recommended amount of alcohol (See parameter estimates below, Table 14.3a). It appears that the

remaining variance at area level may be explained by differences in educational profiles. In the full model the DED-level variance is further reduced to 0.062 (SE 0.037), Chi-square = 2.758, p=0.096.

Table 14.3a: Low Alcohol

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
Constant	1.139	0.171	44.573	<0.001
Male	-0.294	0.076	14.892	0.001
Age (centred)	0.025	0.003	65.648	<0.001
Rural (vs urban)	0.607	0.080	57.396	<0.001
Education (vs primary)			8.410	0.01
Secondary	-0.209	0.155		
Tertiary	-0.416	0.169		
Class (vs 1-2)			5.430	0.07
3-4	0.191	0.088		
5-6	0.016	0.118		
GMS	0.126	0.108	1.354	0.24
Random (DED)	0.062	0.037	2.758	0.096

To further develop this model, we include interactions between gender and the other explanatory variables. The interactions between gender and education and between gender and GMS status are significant, indicating these factors have different effects on the probability of moderate alcohol consumption in men and women. In particular, it appears that men with GMS cards are at increased risk of consuming over the recommended limits, and the impact of tertiary education on alcohol consumption is rather more important in women than in men. Parameter estimates for the model including interactions (but omitting the non-significant covariate indicating social class) are given in Table 14.3b below.

Table 14.3b. Low Alcohol (including significant gender interactions)

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
Constant	1.185	0.258	25.321	<0.001
Male	-0.346	0.305	1.207	0.27
Age (centred)	0.025	0.003	66.436	<0.001
Rural (vs urban)	0.639	0.081	62.818	<0.001
Education (vs primary)			24.530	<0.001
Secondary	-0.173	0.255		
Tertiary	-0.625	0.265		
Male*Education			14.068	<0.001
Male*2nd	0.160	0.312		
Male*3rd	0.431	0.320		
GMS	0.301	0.150	4.430	0.04
Male*GMS	-0.417	0.212	3.987	0.046
Random (DED)	0.068	0.038	3.184	0.07

Smoking status

There is some modest evidence of factors at area level that influence the probability of not smoking, having adjusted for individual-level age and sex (Variance = 0.057, SE = 0.028, Chi-square = 3.983/1df, p = 0.046). Adding further covariates to the model accounts for much of the DED-level variance in non-smoking. Parameter estimates for the full model are given in the table below.

Table 14.4: Non-smoking

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
Constant	1.342	0.154	75.619	<0.001
Male	-0.063	0.077	0.677	0.41
Age (centred)	0.032	0.003	108.445	<0.001
Rural (vs urban)	0.282	0.077	13.377	<0.001
Education (vs primary)			18.300	<0.001
Secondary	-0.038	0.132		
Tertiary	0.347	0.155		
Class (vs 1-2)			28.266	<0.001
3-4	-0.299	0.089		
5-6	-0.593	0.114		
GMS	-0.544	0.100	29.942	<0.001
Random (DED)	0.014	0.018	0.648	0.42

In the multivariate logistic model, there is no difference between men and women in the risk of smoking. As age increases the probability of meeting the recommendations (ie not smoking) increases. People who live in rural areas are less likely to smoke (OR for non-smoking 1.3, 95% CI 1.1, 1.5), and people with tertiary education are less likely to smoke than those with lower levels of education (OR for non-smoking in tertiary versus primary educated is 1.4, 95% CI (1.0, 1.9)). People with GMS cards are more likely to smoke than those without (OR for non-smoking 0.58, 95% CI (0.48, 0.70)). There is also an effect of social class, with people in lower social classes being at higher risk of smoking (OR for non-smoking in class 5-6 versus class 1-2 is 0.55, 95% CI (0.44, 0.69) and in class 3-4 versus class 1-2 is 0.74 95% CI (0.62, 0.88)).

There was no evidence of interactions between gender and any of the other explanatory variables – thus we may conclude that the effect of these explanatory variables is the same in men and women. Including neighbourhood and social capital indicators in the model provided evidence that these factors have some impact on the probability of meeting the smoking recommendation. People who reported 1-2 problems with their environment were more likely to be smokers than those reporting no problems (OR 1.2, 95% CI 1.0, 1.4). Levels of trust and social support had no effect on the risk of smoking. However civic engagement, as measured by membership of clubs and organisations, had a statistically significant effect on the risk of smoking, with people who reported membership of at least two organisations being significantly less likely to smoke than those who belonged to fewer than two organisations (OR 1.4, 95% CI 1.1, 1.7).

Obesity

The ECAC recommendation is to avoid obesity. There is evidence of factors at area level that influence the risk of obesity, having adjusted for individual-level age and sex (Variance = 0.213, SE = 0.082, Chi-square = 6.829/1df, p = 0.009). This remains the case in the full model, which includes the DED-level factor location (urban/rural) and individual level education, social class and GMS status. The parameter estimates for this model are given below (Table 14.5).

Table 14.5: Non-obesity

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
Constant	1.504	0.204	54.322	<0.001
Male	-0.319	0.106	9.054	0.003
Age (centred)	-0.008	0.005	2.711	0.10
Age squared	0.0013	0.0002	35.552	<0.001
Rural (vs urban)	0.039	0.117	0.114	0.74
Education (vs primary)			16.243	<0.001
Secondary	0.338	0.164		
Tertiary	0.767	0.200		
Class (vs 1-2)			4.592	0.10
3-4	-0.260	0.123		
5-6	-0.218	0.160		
GMS	-0.107	0.141	0.577	0.45
Random (DED)	0.197	0.079	6.130	0.01

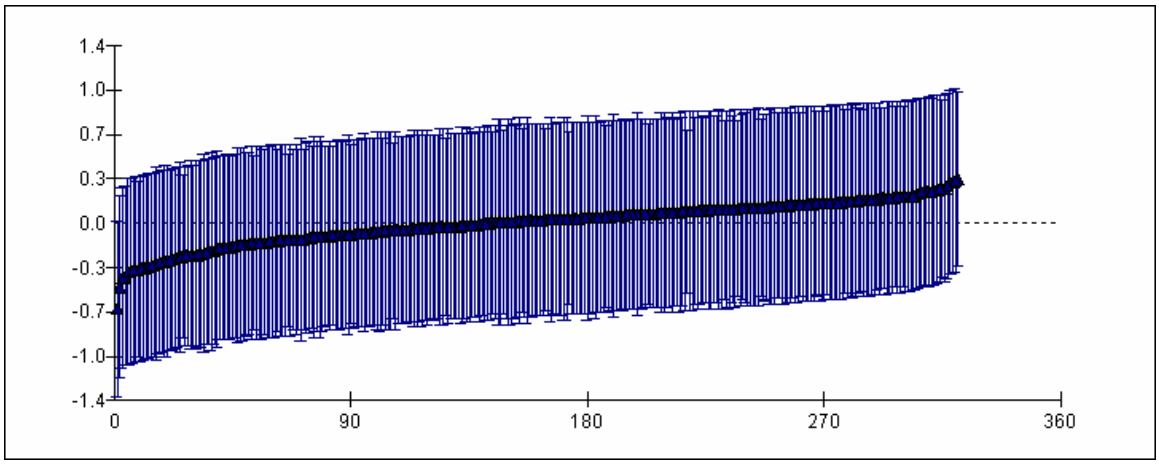
In the model including socio-demographic explanatory variables, sex and education emerge as statistically significant influences on obesity, with men more likely to be obese than women (OR for non-obesity 0.73, 95% CI (0.59, 0.89)) and people with higher education less likely to be obese than those with lower levels of education (OR for non-obesity in tertiary educated versus primary educated 2.2, 95% CI (1.5, 3.2)). An age squared term was significant, indicating that the people at lowest risk of obesity are the youngest and oldest in the population, and the risk of obesity is greatest in the middle of the age range (mean age 46.7 years). In the multivariate model, social class, GMS status and location did not emerge as significant predictors of non-obesity. There remains a small but significant part of the variance in the non-obesity outcome that it explained by other (unobserved) factors at area level after controlling for all covariates in the model of Table 14.5.

Interactions between gender and the other explanatory variables were tested for inclusion in this model, but none were significant, indicating that the effect of these factors on the non-obesity outcome is the same in men and women.

To further develop the model for non-obesity, and examine if any of the variance at area level might be attributed to social capital indicators, we included (along with the socio-demographic variables in the model above) explanatory variables indicating social support level, civic engagement (membership of clubs and organisations), self-reported environmental problems such as vandalism, rubbish and lack of access to public transport and other facilities, and level of trust. Of these only civic engagement emerged as a significant predictor of non-obesity. People who regularly attended two or more clubs or societies (for instance churches, social clubs, evening classes, political parties) were significantly less likely to be non-obese, and hence comply with the recommendation, (OR = 0.66, 95% CI 0.52, 0.84) than those who regularly attended just one or did not participate in clubs or societies. Trust, social support and self-reported environmental problems were not

significantly associated with compliance with non-obesity. The area-level variance remained significant in this model (estimate = 0.173, SE 0.080, Chi square = 4.723, p = 0.03). A ranked residual plot for this model, which plots the residual for each DED with 95% confidence intervals, illustrates the extent of variance in non-obesity at DED level (Figure 14.2).

Figure 14.2: Ranked residual plot for rate of non-obesity across DEDs. Bars indicate 95% Confidence Intervals.



Exercise

There is no evidence of factors at area level that influence the probability of engaging in daily exercise, having adjusted for individual-level age and sex (Variance = 0.038, SE = 0.027, Chi-square = 1.930/1df, p = 0.16) Parameter estimates for the full model are given in the table below (Table 14.6).

Table 14.6: Daily Exercise

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
Constant	-1.477	0.160	85.209	<0.001
Male	0.077	0.076	1.047	0.31
Age (centred)	-0.006	0.003	4.701	0.03
Rural (vs urban)	-0.102	0.075	1.850	0.17
Education (vs primary)			20.009	<0.001
Secondary	0.256	0.141		
Tertiary	0.585	0.156		
Class (vs 1-2)			2.410	0.30
3-4	-0.134	0.087		
5-6	-0.089	0.117		
GMS	0.317	0.100	9.993	0.002
Random (DED)	0.017	0.033	0.275	0.60

People with higher levels of education are more likely to engage in daily exercise (in leisure time) – the odds ratio for daily exercise in tertiary-educated people compared to those with primary education only is 1.8 (95% CI 1.3, 2.4), and for secondary educated people compared to primary educated is 1.3 (95% CI 1.0, 1.7). Daily exercise becomes less likely with increasing age. People with GMS cards are more likely to engage in daily exercise than those without (OR 1.4, 95% CI 1.1, 1.7). Social class and location have no independent effect on the probability of engaging in daily exercise and there is no difference between men and women. There is no evidence of additional factors at area level that have an impact on the probability of engaging in daily exercise.

Interactions between gender and the other explanatory variables were tested for inclusion in this model, but none were significant, indicating that the effect of these factors on the daily exercise outcome is the same in men and women.

Diet

There is some evidence that there are factors at area level that influence the probability of consuming a diet high in fruit and vegetables, having adjusted for individual-level age and sex (Variance = 0.052, SE = 0.023, Chi-square = 4.928/1df, p = 0.026) Parameter estimates for the full model are given in the table below (Table 14.7).

Table 14.7: Fruit & vegetable consumption

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
Constant	0.691	0.139	24.795	<0.001
Male	-0.882	0.068	167.508	<0.001
Age (centred)	0.012	0.003	21.014	<0.001
Age squared	-0.00058	0.00011	28.111	<0.001
Rural (vs urban)	0.052	0.070	0.553	0.46
Education (vs primary)			15.377	<0.001
Secondary	0.296	0.117		
Tertiary	0.510	0.134		
Class (vs 1-2)			11.449	0.003
3-4	-0.167	0.078		
5-6	-0.340	0.103		
GMS	-0.337	0.093	13.031	<0.001
Random (DED)	0.028	0.028	0.992	0.32

Women are more likely to meet the fruit and vegetable consumption recommendations than men (OR 2.4, 95% CI 2.1, 2.8). The probability of meeting these recommendations is greatest in those in the middle of the age range. People with GMS cards are less likely to meet the recommendations than those without (OR 0.71, 95% CI 0.59, 0.86). The probability of meeting the recommendations is higher in people with higher levels of education (OR for meeting recommendation in tertiary versus primary educated is 1.7 (1.3, 2.2)) and lower in those of social class 3-4 or 5-6 than those of social class 1-2 (OR for meeting recommendation in class 5-6 versus 1-2 is 0.71 (0.58, 0.87)). In the multivariate logistic model, location does not have a significant effect on meeting these requirements. There is no evidence of factors at area level that have an impact on meeting fruit and vegetable consumption recommendations after controlling for individual-level education, class and GMS status.

Interactions between gender and the other explanatory variables were tested for inclusion in this model, but none were significant, indicating that the effect of these factors on achieving the recommended levels of fruit and vegetable consumption is the same in men and women.

ECAC Composite Score

In this model we group respondents according to the number of the European Code Against Cancer with which they comply. The distribution of the compliance variable, measured on a 0-5 scale, was skewed towards higher scores, especially in women. The majority of the population scored 3 or 4 (a score of 3 meaning they comply with 3 of the recommendations). See Figure 14.3.

Table 14.8: ECAC score 0-5 (percentages age adjusted to 2002 Census)

	Female		Male	
ECAC rank 0-5	Number	% (Age Adjusted)	Number	%(Age Adjusted)
0	12	0.40%	14	0.72%
1	125	4.22%	153	7.84%
2	472	15.92%	429	21.99%
3	1029	34.72%	722	37.01%
4	1014	34.21%	518	26.55%
5	312	10.53%	115	5.89%

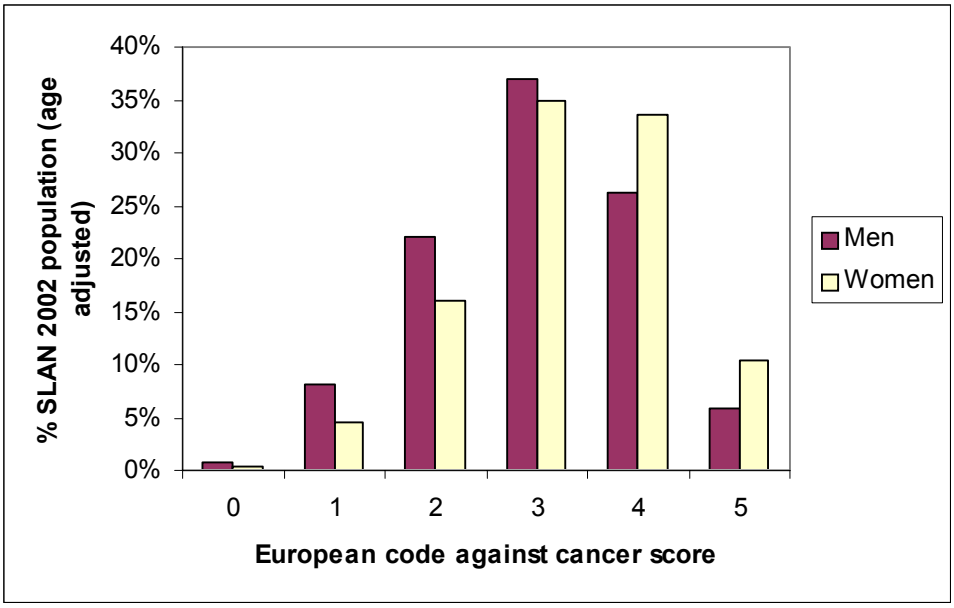


Figure 14.3: ECAC score 0-5 by gender SLAN 2002 (age adjusted to 2002 Census)

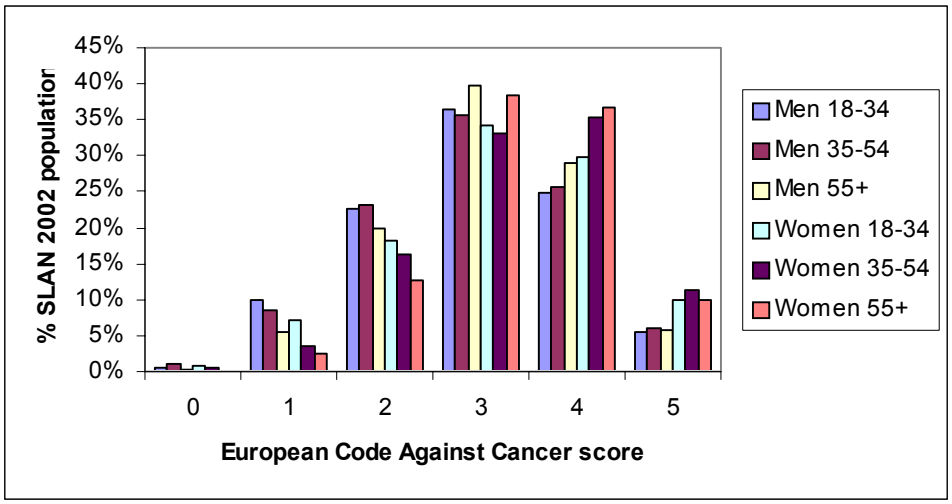


Figure 14.4: ECAC score 0-5 of SLÁN 2002 population by gender and age group

In SLÁN 2002 age emerged as being statistically significantly associated with low ECAC scores, with younger people tending to have lower scores. To examine the effect of socio-demographic factors on level of compliance with the ECAC recommendations, we fit multivariate models. The advantage of this is to adjust for relationships between the explanatory variables in their affect on ECAC score.

Model For ECAC score

Table 14.9: Model for ECAC score

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
SCORE 3				
Constant	0.473	0.082	33.688	<0.001
Male	-0.390	0.080	23.777	<0.001
Age (centred)	0.018	0.003	42.036	<0.001
Age squared	0.0003	0.0001	5.607	0.02
Rural (vs urban)	0.239	0.083	8.181	0.004
GMS)	-0.311	0.106	8.704	0.003
SCORE 4-5				
Constant	0.816	0.080	103.590	<0.001
Male	-0.825	0.081	103.577	<0.001
Age (centred)	0.022	0.003	62.596	<0.001
Age squared	0.00004	0.00013	0.073	0.79
Rural (vs urban)	0.365	0.085	18.476	<0.001
GMS	-0.514	0.104	24.100	<0.001
ED-level			4.923	0.18
Var Score 3	0.030	0.025		
Var Score 4-5	0.048	0.030		
Covariance	0.025	0.024		

There is no evidence of variability in this model in the categorised score at Electoral Division level – that is, we may conclude that all variability in the composite score is due to factors at individual level. Men are less likely to have high scores than women. The odds ratio for score 3 (versus 0-2) for men is 0.68 (95% CI 0.58, 0.79) and for score 4-5 (versus 0-2) for men is 0.44 (0.37, 0.51). The probability of higher scores increases with age, and there is also a quadratic effect in age which is statistically significant for the contrast between scoring 3 and scoring less than 3, whereby this increase is relatively small at younger ages, but the elderly are much more likely to comply with 3 than fewer of the recommendations (illustrated in Figure 14.5). Rural dwellers are more likely to have higher scores than urban dwellers, and people with GMS cards are less likely to have higher scores than those without.

.

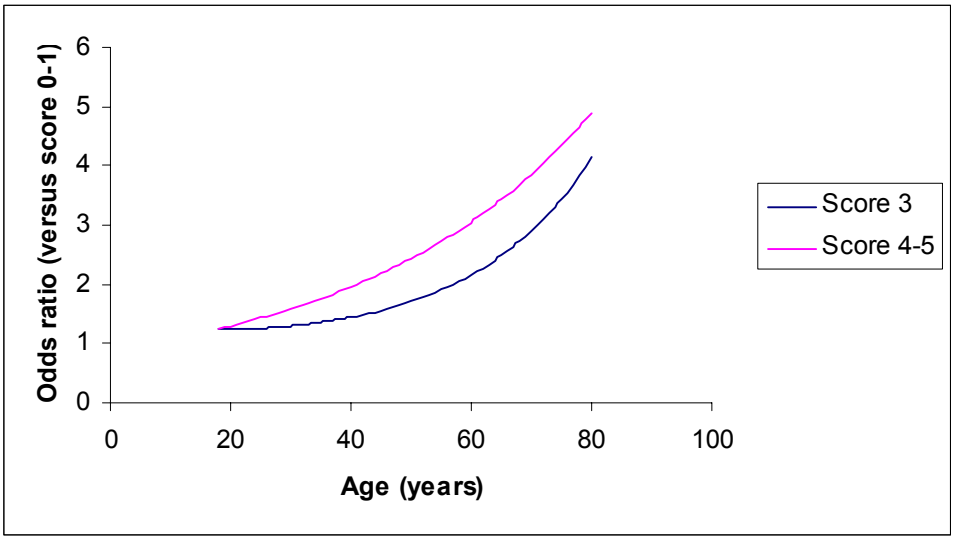


Figure 14.5: Predicted odds ratios for scoring 3 or 4-5 versus 0-2 for baseline respondent (female, urban, non-GMS)

Table 14.10: Final Model for ECAC score

PARAMETER	ESTIMATE	SE	CHI SQUARE	p
SCORE 3				
Constant	0.372	0.185	4.049	0.04
Male	-0.411	0.093	19.298	<0.001
Age (centred)	0.027	0.004	50.743	<0.001
Age squared	0.00015	0.00017	0.807	0.37
Rural (vs urban)	0.189	0.092	4.173	0.04
GMS	-0.255	0.128	4.003	0.05
Education			17.780	<0.001
Secondary	0.158	0.158		
Tertiary	0.596	0.180		
Social Class			4.188	0.12
Class 3-4	-0.220	0.108		
Class 5-6	-0.153	0.142		
SCORE 4-5				
Constant	0.561	0.188	8.859	0.003
Male	-0.788	0.092	72.709	<0.001
Age (centred)	0.033	0.004	78.268	<0.001
Age squared	-0.00012	0.00017	0.488	0.48
Rural (vs urban)	0.387	0.092	17.685	<0.001
GMS	-0.279	0.126	4.924	0.03
Education			21.455	<0.001
Secondary	0.378	0.161		
Tertiary	0.777	0.182		
Social Class			13.471	0.001
Class 2-3	-0.295	0.103		
Class 4-5	-0.473	0.142		

Table 14.9 now gives the parameter estimates for a multinomial model with no allowance for variation at area level, as this has been previously shown to be non-significant. In this model education and social class are included as explanatory variables. The effect of the quadratic term in age becomes non-significant and the effect of GMS status on compliance with recommendations is reduced when these variables are included in the model. People with higher levels of education are significantly more likely to meet a higher number of the ECAC recommendations, and people of lower social class are significantly less likely to meet a higher number of ECAC recommendations.

Chapter 15: National cancer policy & services in Ireland

Before examining cancer among women in Ireland in detail, it is useful to consider the context by outlining provisions put in place to deal with cancer in this country. This chapter is divided into two parts: the first part deals with policy and strategy in relation to cancer and is laid out in chronological order; the second part outlines Irish national cancer screening programmes.

Cancer Policy And Strategy in Ireland

The first specific strategy to deal with cancer in Ireland was published in 1996 and is still in operation. A new cancer strategy is due to be launched shortly by the Department of Health and Children.

Cancer Services in Ireland: A National Strategy (1996)

In 1995, the Minister for Health established a Cancer Strategy Group to outline the epidemiology of cancer in Ireland and internationally, assess the impact of cancer on Irish people and on the health services, examine the current provision of cancer services, and make recommendations for the future organization of the service. The work of the Group resulted in the publication of the document *Cancer Services in Ireland: A National Strategy* (Department of Health & Children, 1996). Preparation of the Strategy was also informed by the consultation process on women's health that preceded the publication of the national *Plan for Women's Health 1997-1999* (Department of Health and Children, 1997).

The two principal objectives of the Cancer Strategy were to:

- take all measures possible to reduce rates of illness and death from cancer, in line with targets established in *Shaping a Healthier Future*
- ensure that those who develop cancer receive the most effective care and treatment and that their quality of life is enhanced to the greatest extent possible.

The Strategy set objectives in relation to key elements of the Strategy: prevention, information, early detection, access, quality, treatment, co-ordination, cost-effectiveness, research and education. It included chapters on the epidemiology of cancer; health promotion; screening and early detection; cancer treatment services and their development; rehabilitation and palliative care; and cancer research.

A Plan for Women's Health 1997-1999 (1997)

The *Plan for Women's Health 1997-1999* (Department of Health and Children, 1997) was the first specific policy aimed at taking gender considerations into account in health policy in Ireland. Cancer was covered in the 'Combating Disease' chapter of the Plan. Actions outlined under the Plan included implementing the National Cancer Strategy, promoting awareness of the dangers of smoking for women, providing a national screening programme for breast cancer by the end of 1999, establishing a national screening programme for cervical cancer to be piloted in the Mid-Western Health Board area, improving current arrangements for taking and investigating cervical smears, and increasing awareness among women of the dangers of excessive exposure to sunlight.

Cancer Support Services in Ireland: Priorities for Action (1999)

In 1999, the Department of Health & Children, in conjunction with the former Eastern Health Board, published a report on Cancer Support Services in Ireland. The aim of the document was to make recommendations on the development and provision of psychosocial and support services for patients with cancer. The most notable finding of the report was that the health services at that time did not generally provide psychosocial support services for cancer patients in a structured and holistic way (Department of Health & Children & Eastern Health Board, 1999). Recommendations made included ensuring that every patient has access to a cancer specialist for diagnosis and treatment; making management of a patient's psychological state an integral part of cancer care through the provision of multi-disciplinary psycho-oncology services; developing best practice criteria for cancer counselling; registration and accreditation of complementary cancer therapies; and assisting with accommodation and travel costs for patients who must travel long distances for treatment (Department of Health & Children & Eastern Health Board, 1999).

National Health Promotion Strategy 2000-2005 (2000)

The *National Health Promotion Strategy 2000-2005* covered a number of key risk factors for cancer, including smoking, good nutrition and sensible use of alcohol (Department of Health & Children, 2000). The Strategy, in its section on 'Women' noted in particular the high prevalence of smoking among women aged 18 to 34 years, as well as the decline in levels of physical activity as women get older.

Development of Services for Symptomatic Breast Disease (2000)

In 2000, the report of the National Cancer Forum was published, making recommendations on the development of services for women with symptomatic breast disease. An important principle of the report was to ensure that women with breast symptoms were 'cared for in an efficient, sympathetic environment by highly trained specialists with access to high quality facilities' (O'Keeffe et al, 2000). The report envisaged fully staffed and resourced multi-disciplinary Specialist Breast Units established throughout the country, with at least two surgeons, two radiologists, two pathologists, two breast care nurses and clerical and administrative support attached to each. It recommended that diagnostic procedures and primary surgery be carried out in the Breast Units, with minimal delay between referral and appointment, and between first consultation and communication of the diagnosis to patient and GP. In all, the report recommended that thirteen Breast Units should be established, with five in the Eastern Health Board region, two in the Southern, and one each in the South Eastern, Mid-Western, Western, North-Eastern, North-Western and Midland Health Board areas. The report also recommended that a centralised Quality Assurance Office should be established to collect data from the regional Breast Units and produce a National Annual Report. In addition, the report specified that transport arrangements be put in place to facilitate women's attendance at Breast Units, and recommended that each Health Board should identify subgroups of women with particular transport difficulties.

The Department of Health & Children's *Annual Report 2004* stated that implementation of the report was ongoing, with six of the specialist breast units recommended fully operational, and the other seven at advanced stages of development (Department of Health & Children, 2005a).

Survey of Views and Perceptions of Women who Attended Symptomatic Breast Clinics (2000)

The Department of Health and Children commissioned the Women's Health Council to conduct research on the views and perceptions of women who attended symptomatic breast care clinics. The recommendations made in the report focused on shortening timeframes for initial clinic visits and diagnostic tests; ensuring that

women were provided with a full range of information and an unhurried opportunity to ask questions; providing the Breast Care Nurse with appropriate facilities to carry out her work; privacy; full range of treatment options; support and counseling; expanding the multi-disciplinary team to meet women's needs; and the need for a general public information campaign on breast health (Kennedy et al., 2000). The Council suggested that, put together, the recommendations would offer a model of woman-centered, holistic care that should be the standard for all women.

Quality & Fairness; A Health System for You (2001)

Under the National Health Strategy *Quality and Fairness*, the Government committed itself to continuing to implement the National Cancer Strategy, and stated that actions on major lifestyle factors identified in the Strategy would be enhanced (Department of Health and Children, 2001a). This included enhancing health promotion initiatives aimed at addressing the risk factors associated with cancer, specifically targeting a reduction in smoking for younger women; introducing further actions to promote sensible use of alcohol and examining possible further restrictions on alcohol advertising; continuing action to improve Irish diet and continuing measures to promote physical exercise. The Strategy also contained a commitment to enact and implement the Public Health (Tobacco) Bill as a matter of urgency, and to target a reduction in smoking through Government fiscal policies. In its chapter on 'Issues in Women's Health', the Strategy re-iterated the aim of the *National Health Promotion Strategy 2000-2005* to target a reduction in smoking for this group. The Strategy also noted that the first phase of a national programme of screening for breast cancer had commenced and that the National Cervical Screening Programme was launched in 2000. It re-stated its commitment to extend both screening programmes nationally.

Report of the National Advisory Committee on Palliative Care (2001)

The vast majority of all patients availing of palliative care services suffer from cancer. The National Advisory Committee on Palliative Care was established by the Minister for Health and Children in 1999 and it published its report in 2001 (Department of Health and Children, 2001b), outlining a comprehensive palliative care service and presenting a blueprint for its development. The report recommended that specialist palliative care services should be provided by an inter-disciplinary team under the direction of a consultant physician in palliative medicine. It stated that both specialist and non-specialist palliative care services should be available in all care settings, including acute general hospitals and the community. It also recommended that a national policy on palliative care should be formulated, to promote consistency of standards for all specialist palliative care centres.

The recommendations of the report are to be implemented by Government over a five to seven year period, at an estimated cost of €55.87m. An Expert Group on Design Guides for Specialist Palliative Care Units was also set up to examine the particular structural and spatial requirements of palliative care settings. Its aim is to develop a documentary source to be used by project teams preparing design briefs for palliative care units[1]. The Department of Health and Children's *Annual Report for 2004* stated that a national palliative care service was being developed, and that the Expert Group had almost completed its work. Six health boards had completed regional needs assessments for palliative care, and work in the other boards was at an advanced stage (Department of Health & Children, 2005a). The *Design Guidelines for Specialist Palliative Care Units* report was published by the Department of Health & Children in 2005 (see below).

[1] http://www.nationalcancerforum.ie/progress_to_date/docs/palliative_care.php

Promoting Women's Health; A Population Investment for Ireland's Future (2002)

The Women's Health Council made recommendations for future priorities in women's health in its *Promoting Women's Health; A Population Investment for Ireland's Future report* (2002). The Council proposed that cancer be a specific topic in women's health for priority action:

> *'The Cancer Strategy clearly sets out an unmet need in relation to preventive, early risk detection and treatment services and this report re-iterates the relatively high levels of some cancers in this country. The WHC endorses the recommendations in the strategy and recommends the speedy implementation in particular of the Breast and Cervical Screening programmes from pilot to full service phases with appropriate follow-up services in place' (Women's Health Council, 2002).*

Public Health (Tobacco) Act 2002

The Public Health (Tobacco) Act 2002 was signed by the President on the 27th March 2002; it provides a more comprehensive and strengthened legislative base for regulating and controlling the sale, marketing and smoking of tobacco products and for enforcing such controls.

The Development of Radiation Oncology Services in Ireland (2003)

An Expert Working Group on Radiation Oncology Services was established in mid-2000 to conduct a national assessment of needs for radiation oncology (radiotherapy) services. The Working Group published its report in October 2003 (Department of Health and Children, 2003a), providing a detailed plan for the further development of radiation oncology services nationally. The report identified a profound deficit in radiation oncology services in Ireland, and stated that a major programme was required to rapidly develop clinical radiation oncology treatment services to modern standards. In collaboration with Government, the first phase of the programme was the development of a clinical network of large centres in Dublin, Cork and Galway to begin to address existing deficits. It recommended that two treatment centres be located in the Eastern region; one supra-regional centre at Cork University Hospital; and another supra-regional treatment centre located at University College Hospital Galway. As part of the supra regional model of service provision, radiation oncology centres will be required to provide services on an equitable basis which will ensure that patients of equal need will have equal access, and that geography will not be a barrier. Radiation oncology centres at major teaching hospitals will be required to provide outreach services to hospitals in adjoining regions.

The Health Reform Process

The Health Service Reform Programme was announced by Government in June 2003, initiating an unprecedented change for the Irish Health System. The structures and processes of the Health System were reviewed, and during the process the future operation of cancer services in Ireland was touched upon. The *Audit of Structures and Functions in the Health System* report identified BreastCheck as a pilot programme run across a number of health boards that demonstrated the benefit of joint service delivery. However, in terms of providing a 'seamless' service to users, the report suggested that the health board model had failed to deliver adequately on integration (Watson Wyatt, 2003). More positively, in its review of the management of the health system, the *Report of the Commission on Financial Management and Control Systems in the Health Service* noted that seventy-six additional consultant cancer specialists had been appointed since 1997 (Department of Finance, 2003).

Looking to the future functioning of services, the *Report of the Taskforce on Medical Staffing* suggested that radiology be provided as a regional specialty by major hospitals or local hospitals, as appropriate (Department of Health & Children, 2003b). In addition, it recommended:

- Increased use of emerging and developed IT systems such as Picture Archiving and Communications Systems (PACS) to create 'filmless hospitals' and improve efficiency;
- Use of IT to order or review test results remotely from terminals on hospital wards;
- The introduction of clinical protocols in radiology to help inform the appropriate use and delivery of diagnostic procedures;
- Dedicated radiology facilities in emergency departments; and
- An extended working day for the radiology department.

The report also emphasised regional self-sufficiency for secondary care services and suggested that General Hospitals, equipped to deliver high-quality specialist in-patient care and provide an agreed range of specialties, be provided in areas where access to a Major Hospital for emergency care is problematic. General Hospitals would not provide the same comprehensive range of specialist services as a Major Hospital on a 24-hour, 7-day basis, however ((Department of Health & Children, 2003b).

Evaluation of "Cancer Services in Ireland: A National Strategy 1996" (2003)

The National Cancer Forum commissioned an external evaluation of the 1996 National Cancer Strategy. The evaluation reported that the Strategy represented a very positive development for cancer care services in Ireland. In particular, the evaluation noted that the Strategy's key goal (reducing the death rate from cancer in the under-65 age group by 15 per cent in the ten-year period from 1994) was reached in 2001, three years ahead of target. Additional specialist consultants and clinical nurse specialists had been appointed and new structures such of the Regional Directors of Cancer Services had been developed to support cancer services at a regional level.

However, the report also identified a number of gaps and barriers, principally:

- Lack of definition within strategy, which laid out principles rather than measurable activity
- Absence of a detailed implementation plan and planned approach
- Absence of a Human Resources plan
- Insufficient information and IT systems (waiting times, etc)
- Key terms were not defined in detail, e.g. supra-regional service
- Provision for public education for strategy buy-in was not given due priority
- Impossible to cost strategy and therefore difficult to trace benefits to particular investment streams (Deloitte, 2003)

The report identified a number of priorities for the future development of cancer treatment services under the headings organizational reform, health information, strengthening primary care, reform of acute hospital services, funding health, and developing human resources.

Public Health (Tobacco) Act 2002 (Section 47) Regulations 2003

The Public Health (Tobacco) Act 2002 (Section 47) Regulations 2003 placed a ban on smoking in the workplace in Ireland. The ban came into effect on the 29th March 2004, and means that smoking is forbidden in enclosed places of work in Ireland, including office blocks, pubs/bars, and restaurants[1].

Design Guidelines for Specialist Palliative Care Settings (2005)

Following on from a recommendation made in the report of the National Advisory Committee on Palliative Care (Department of Health & Children, 2001b), to ensure national consistency of standards for all specialist palliative care settings, an Expert Group on Design Guides for Specialist Palliative Care Units was set up to examine the particular structural and spatial requirements of palliative care settings. The report of the Expert Group was published in 2005. The Guidelines set out general design and planning considerations (site selection, general principles of design, furniture and finishes, etc.), functional content (pharmacy, catering, rehabilitation department, social work, education and training, bereavement support, mortuary, etc.), environmental and building services, and the planning and development process. The Guidelines stressed the importance of 'achieving quality environments, both internal and external, for the benefit of all those using, visiting and working in specialist palliative care facilities', and stressed the need for specialist palliative care units to work in a coordinated, collaborative and interdependent fashion with the full range of healthcare services in both hospital and community settings. The specialist palliative care in-patient unit was envisaged as the core essential element of specialist palliative care services, with palliative care services in other settings, including general hospitals and the community, having formal links with it. The Expert Group put forward a vision of the modern hospice as

> *'a place that celebrates, enables and facilitates life and living...where patients and their families receive the highest quality of physical, psychosocial and spiritual care, delivered by a trained inter-professional team…A hospice must be capable of meeting the needs of men and women, young and old, in-patients and out-patients, patients and families, those with cancer and those with other conditions, those who will be discharged home and those who will not, paid staff and volunteers. A hospice is a place where people can live, truly live, until they die (Department of Health & Children, 2005b).*

1 http://www.oasis.gov.ie/employment/health_and_safety_in_employment/ban_on_smoking_in_the_workplace_in_ireland.html

Current situation

The National Cancer Forum, established by the Minister for Health & Children to advise on the implementation of the National Cancer Strategy, is currently developing an updated National Cancer Strategy for Ireland[1]. The new National Cancer Strategy will re-examine the National Cancer Strategy (1996) in the light of service and clinical developments and set out the key priorities for the development of cancer services over the coming years.

The National Radiation Oncology Co-ordinating Group was established on foot of the Development of Radiation Oncology Services in Ireland report (Department of Health & Children, 2003a). The Group is made up of clinical, technical, managerial, academic and nursing expertise from different geographic regions and its aim is to facilitate improved access to existing and planned services. Also in 2004, €1 million funding was approved for the development of a National Telesynergy Network for Oncology Services. The aim of the network is to improve service delivery and efficiency, to better use consultant's time, reduce consultant and patient travel, and support earlier and better diagnosis.

In July 2005, the Government approved funding for a national network for radiation oncology services to be put in place by 2011 (Department of Health & Children, 2005c). The network will consist of:

- four large centres; two in Dublin—at St. James' (13 linear accelerators[2]) and Beaumont (7) hospitals; one in Cork (an additional three linear accelerators in Cork University Hospital, making seven in total in the area) and one in University College Hospital, Galway (an additional two linear accelerators, bringing the total to five in the area);
- two integrated satellite centres in Waterford (2 linear accelerators) and Limerick (2 linear accelerators);
- arrangements with the Northern Ireland health authorities for services to be provided in Belfast City Hospital for patients living in the North West, with further work to pursue the joint provision of a satellite centre for the North West linked to Belfast; and
- arrangements to ensure the continuity of St. Luke's expertise and ethos in the service.

The capital investment involved has been estimated at over €400 million, mainly funded through a Public-Private Partnership.The HSE will put in place a National Management Mechanism (which will assume many of the responsibilities of the Co-ordinating Group with regard to the HSE) to manage the delivery of this plan. An implementation oversight group will also be established, to report on the implementation of this policy.

[1] http://www.nationalcancerforum.ie/

[2] A linear accelerator is the device used for external beam radiation treatment for patients with cancer. It is the procedure most commonly used in radiation oncology treatment in Ireland.
http://www.oasis.gov.ie/health/cancer_services/radiation_oncology_services_in_ireland.html

Conclusion

Since the first specific strategy on cancer was published in Ireland in 1996, a great deal of work has been done in the area to extend strategy and policy to cover all areas of cancer services in this country. However, in reviewing policy and strategy formulated on cancer services in Ireland it is clear that although many reports have been undertaken by experts in the field, their recommendations have not always been fully implemented by government. In addition, much of the work has been done without making reference to the particular needs of patients, both women and men, (although it is encouraging to note that research has been undertaken on breast cancer with a view to improving services in the area for women with the disease). Both of these issues must be addressed if Ireland is to have efficient and effective cancer policy and services. In taking steps towards improving the situation, outstanding recommendations made in strategy documents should be implemented without delay, and it is essential that future cancer policy should consider the particular needs of women and men when making recommendations.

There is also a need to provide a comprehensive information service for women who have been diagnosed with cancer. The cancer clinical nurse specialists and cancer liaison nurses who have been appointed in most of the major cancer treatment centres are invaluable in this regard. They provide emotional and practical support and advice for the patient and her/his family, and they also act as a channel of communication between the patient and the oncology team. However, more funding is needed, to ensure that these nurses are available to all cancer patients. A 'one-stop shop' should also be developed to enable women to discuss their diagnosis with a professional, access any information they may need, and familiarise themselves with options to treat the disease. This would provide women with an alternative to the busy GP and would empower women to make fully informed decisions about their treatment options.

It is to be hoped that the findings of the present report will add to the knowledge base on cancer among women, and thus contribute to the development and delivery of accessible cancer services that are responsive and appropriate to women's needs.

Irish Cancer Screening Programmes

Cancer care services in Ireland are currently provided by GPs, hospitals and community care services in accordance with the *National Cancer Strategy* (Department of Health and Children, 1996) and *Quality and Fairness*(Department of Health and Children, 2001a). A screening programme for breast cancer and a pilot programme for cervical screening are already in place, and work is ongoing on both BreastCheck and the Irish Cervical Screening Programme to ensure that they are available to all women in the relevant age groups on a national basis.

BreastCheck, the National Breast Screening Programme

The National Breast Screening Board was established in 1998, with the purpose of preparing, instituting and carrying out a scheme for the early diagnosis and primary treatment of breast cancer in women. It has governance responsibility for the screening programme[1]. Phase One of BreastCheck began offering free breast screening to women aged 50-64 in the then Eastern Regional Health Authority, North Eastern and Midland Health Board areas in February 2000. In 2003, approval was given for the extension of BreastCheck to Wexford, Kilkenny and Carlow through the use of Mobile Screening Units. Screening commenced in Wexford in March 2004, in Carlow in April 2005 and the Programme aims to begin screening in Kilkenny in 2006. The current screening area covers around 160,000 women. It is serviced by two Clinical Screening Units based in Dublin: the Eccles Screening Unit at the Mater Misericordiae University Hospital, and the Merrion Screening Unit at St. Vincent's University Hospital. Six Mobile Screening Units are attached to these Clinical Units; women living at a distance from Clinical Screening Units attend for screening in Mobile Units to facilitate access.

Under Phase Two of the Programme, screening will be extended to the Western and Southern areas of the country. Approval was given for two new BreastCheck Clinical Units, to be located in Cork and Galway, in May 2005. The BreastCheck Clinical Unit in the Southern Area will be located at the South Infirmary-Victoria Hospital, with four associated mobile screening units covering Cork, Kerry, Limerick, Waterford and Tipperary South Riding. An estimated 71,188 women are in the target population. The Clinical Unit for the Western Area will cover a target population of 57,588 women, and it will be located at University College Hospital Galway. It will also have three associated mobile screening units covering Galway, Sligo, Roscommon, Donegal, Mayo, Leitrim, Clare and Tipperary North.

The overall goal of BreastCheck is to reduce breast cancer mortality by 20 per cent in the cohort of women screened between 2000-2010 (Department of Health and Children, 2001a). The Programme contacts women aged 50-64 every two years to offer a free breast x-ray (mammogram). The appointment takes around 30 minutes, should not be painful, and it has been found that less than 1% of the women screened are diagnosed with cancer. BreastCheck's most recent report is the *Annual Report 2004-2005*. During 2004, a total of 50,540 women attended for screening, 309 of whom were found to have breast cancer. This compared with 52,831 women screened, and 379 cancers detected in 2003 (BreastCheck, 2004, BreastCheck, 2005). In 2004 a greater proportion of women attending for screening were returning for subsequent screening, where the expected number of cancers detected is lower. BreastCheck's *Annual Report 2003* included a consumer research report on women's experiences of using the service and showed the programme to be performing to a high standard;

[1] http://www.breastcheck.ie/index.php

this was borne out again in the more recent report which found acceptance rates for the programme to be in excess of the target of 70% (BreastCheck, 2004, BreastCheck, 2005). BreastCheck also commissioned *NHS Quality Improvement Scotland* to conduct an independent external audit of the service, which was carried out in 2005. The audit found that BreastCheck was reaching all critical standards, with the primary treatment model, which integrates surgical assessment, planning and primary treatment into the service, regarded as a particular strength. The shortage of radiographic resources was identified as a key impediment to delivering and sustaining a two-year screening interval (BreastCheck, 2005).

The Irish Cervical Screening Programme (ICSP)

In 1992, the Minister for Health appointed a Cervical Screening Committee to review cervical screening in Ireland. The Committee recommended the establishment of a national cervical screening programme based on an age sex register that would screen women aged from 25 to 60 years at a five yearly interval within a primary care setting (Department of Health, 1996). In 1997 a ministerial decision was taken to establish a national cervical screening programme. Phase One was officially launched in October 2000, covering the Mid-Western Health Board area and targeting approximately 67,000 women between the ages of 25 and 60 living in counties Limerick, Clare and Tipperary North.

The Irish Cervical Screening Programme uses the smear test to screen for asymptomatic pre-cancerous cell changes in the neck of the womb (cervix), providing an opportunity for early clinical intervention to preclude invasive cancer. Colposcopy services are also co-ordinated by the ICSP, and information leaflets are offered on each aspect of the programme. The first phase of the ICSP issued an invitation letter to women aged between 25 and 60 in the Mid-West region, asking them to attend a GP for a free smear test. Women could also register with the programme on an opportunistic basis, either through their GP or by filling in and returning forms themselves.

A statistical review published by the ICSP in 2004 examined the outcomes of the cervical screening service up to December 2003. It found that coverage of the target population in the Board's region reached a level of 70.1% in 2003, within reach of international cervical screening targets of 80%. The majority of women accessed the service at the discretion of their doctor rather than in response to the ICSP's invitation letter. Altogether, 38,150 women were smear tested, with 5% requiring referral to colposcopy services (Irish Cervical Screening Programme, 2004). Two external reviews of the ICSP were also commissioned in 2004, with a view to extending the Programme nationally. One review, carried out by the Women's Health Council, evaluated the programme from the women's perspective, while the other by Dr Euphemia McGoogan looked at clinical and laboratory aspects. Both found positive results and concluded that the programme worked well, but they also identified weaknesses which will have to be addressed in the national roll-out of the programme.

The clinical review found that the main weakness of the ICSP was governance of the cytology laboratories. It stated that before the programme can be extended nationally, a transition period of 18 months or less is required to prepare and that work during this period should focus on rationalisation of laboratories, accreditation of laboratories, smear taker training, developing the Register of women eligible for inclusion and links to colposcopy (McGoogan, 2004). The review report stated that the cornerstone of the Programme must be quality assurance with clear governance and accountability, underpinned by both clinical and operational standards. The report recommended that a national Steering Group should be set up to oversee and provide

professional direction for the Programme, and stated that a secure funding policy from the Department of Health and Children is also essential (McGoogan, 2004).

The Women's Health Council report found that, in general, women who participated in the evaluation were very positive about the Irish Cervical Screening Programme. They expressed their appreciation that the screening programme was available to them, that the programme contacted them with an invitation to attend for screening and that the service was offered free of charge. The vast majority of women who attended for screening said that they would attend for another smear test when next contacted by the programme. Aspects of the programme with which women were dissatisfied, however, included the length of time taken to return test results, delays relating to colpsocopy, and the five year screening interval. Issues were also raised around informed consent and the related need for more information on the medical and administrative aspects of the Programme; referral for further tests; and rural access to and choice of smeartaker (Women's Health Council, 2004). The Council also called on the ICSP to consider the relationship between socio-economic factors and attendance for screening which will be particularly significant in the context of expansion of the programme to national level. The ICSP has recently begun the work on this area; it is in the process of establishing a national HSE ICSP steering group to address the issues to implement policy, which is due to meet shortly.

Research is also ongoing; for example, in June 2005 the ICSP published a report on the first series of visits to Colposcopy Services in the Republic of Ireland by the ICSP Colposcopy Quality Assurance team (Irish Cervical Screening Programme, 2005). The visits were carried out over a two-year period and Service provision was measured against the standards of the British Society for Colposcopy and Clinical Pathology (BSCCP) and the ICSP QA 1999 Guidelines. There are currently 18 colposcopy clinics in the Republic of Ireland, but the ICSP researchers concluded that the pace of development of the clinics was not uniform across the country and some of the clinics were not ready to take on the requirements of a national cervical screening programme. As a result of the report, funding for the computerisation of the clinics has now been provided by the ICSP, standardised information leaflets have been developed for all colposcopy clinics and colposcopy nurse-led smear taking clinics have been established in the HSE Mid-Western Area.

Conclusion

The development of cancer screening services in Ireland is an essential part of putting effective health promotion measures in place to reduce mortality from cancer among women in this country. As previous research carried out by the National Cancer Registry Ireland has demonstrated the effectiveness of cancer screening in reducing deaths from the disease (Campo et al., 2004), it is hoped that both screening programmes will be extended as a matter of urgency in order to provide women living in Ireland with optimum services to protect their health and reduce deaths from breast and cervical cancer.

As this chapter has demonstrated, much has been done at a policy level in Ireland to tackle the area of cancer and put strategy and services in place. However, not all of the strategy recommendations have been implemented and improvements are still needed. In compiling the present report, the WHC and NCRI hope to demonstrate that an increased awareness of gender differences in cancer rates and mortality and the development of appropriate and gender sensitive policy and services will contribute to reducing mortality in a targeted and effective way for both women and men in Ireland.

Chapter 16: Discussion & Recommendations

This report has demonstrated that cancer is a significant burden on the health of the female population in this country; it is the second most common cause of death among women in Ireland (CSO, 2005). Incidence rates have been steadily increasing over the last ten years, a trend that has been linked to the ageing of the population, and it has been estimated that in 2006, more than seven thousand women will be diagnosed with cancer in Ireland. It is, therefore, imperative that steps are taken to improve cancer strategy, policy and services, and that further research is conducted to fill any gaps in knowledge that currently exist in this country.

Priorities for the prevention of cancer among women

It is essential that urgent action be taken on cancer to reduce mortality among women in Ireland. Evidence presented in this report suggests that improving screening, as well as increasing women's awareness of and access to healthy lifestyle choices can be very beneficial in reducing the risk of developing cancer. Health promotion and prevention campaigns for women must therefore emphasise the importance of attendance for screening, cessation of smoking and raising awareness of the incidence of and risk factors for different forms of cancer.

Screening

As many cancers can be successfully treated if they are detected early, it is vital that resources are directed towards secondary prevention, in the form of screening programmes to minimise the burden of cancer disease on Irish women.

Breast and cervical cancer

Screening for breast and cervical cancer must be made available to all women in Ireland by rolling out the breast and cervical screening programmes to the whole country for women in appropriate age groups. These screening programmes must be monitored and evaluated on a regular basis to ensure their effectiveness.

Colorectal cancer screening

There is also an urgent need to develop a programme for colorectal screening to be made available to all relevant population groups in this country. Following the example set by the UK on colorectal screening, it may be necessary to run a pilot programme at first to assess uptake, acceptability, impact on colonoscopy and surgical services, etc, before taking a decision to roll out a programme on a national basis.

Although the European Code Against Cancer (Boyle et al, 2003) recommends that individuals undergo screening for colorectal cancer, and several screening tests are available, the decision on whether to implement a population-based screening programme may not be entirely straightforward. In some populations/cultures, there may be issues of acceptability of the screening tests, and this could impact on uptake, effectiveness and cost-effectiveness. In others, organisation of follow-up services for those with positive screening tests may prove a challenge. In the UK, for example, the decision to introduce a national screening programme (http://www.cancerscreening.nhs.uk/bowel/index.html) was only taken after extensive pilot exercises which established that screening by faecal occult blood (FOB) testing was workable in the context of the National Health Service (The UK CRC Screening Pilot Evaluation Team, 2003). A further area of complexity is added by the fact that newer screening modalities are under development. Results of a major trial of flexible sigmoidoscopy are expected in 2007 (UK Flexible Sigmoidoscopy Screening Trial Investigators, 2002); flexible

sigmoidoscopy offers an advantage over FOB-testing in that an individual would only need to be screened once during their lifetime, which is likely to influence cost-effectiveness. Before a decision is taken in Ireland on whether to introduce colorectal cancer screening, issues such as acceptability, uptake, follow-up services, and cost-effectiveness should be evaluated.

Genetic counselling and testing

In some populations, increased knowledge and awareness of the influence of genetic susceptibility in cancer development, and the availability of tests for mutations in genes associated with inherited forms of breast, ovarian and colorectal cancer, has lead to an increase in demand for information and genetic testing among the general public (Brain et al., 2000; Keku et al., 2003). It is likely that a similar trend will occur in Ireland (if not already happening). Individuals with a genetic mutation related to breast, ovarian or colorectal cancer can have a very high lifetime risk of developing cancer. The decision whether to have a genetic test can be a complex one, depending on many factors (Gwyn et al., 2003; Schwartz et al., 2005), and undergoing testing can have a major psychosocial impact (Pasacreta, 2003). Individuals, therefore, need appropriate support in order to make informed decisions about the best course of action for them. The proportion of cases caused by inherited predisposing genes is small and it is likely that any healthcare professional will see 2-3 patients each year who have concerns relating to their family history of cancer (Scottish Cancer Group Cancer Genetics Subgroup, 2001). Consideration should be given to the extension of the specialist genetic counseling and testing services currently available through the National Centre for Medical Genetics based in Dublin (http://www.genetics.ie). To maximize effectiveness, such services should be integrated across primary care and the hospital setting (Scottish Cancer Group Cancer Genetics Subgroup, 2001).

Raise awareness

There is also a need to raise awareness of the risk factors for cancer among Irish women and strengthen health promotion measures. Innovative age-appropriate health promotion strategies must be developed to make women aware of their risks of developing different forms of cancer, and to encourage them to attend their doctors promptly if they experience any possible symptoms indicative of cancer. For women aged under 65 years it is important to be aware of the risks and symptoms of cervical, breast, ovarian, and uterine cancers and of melanoma of the skin; while for women aged over 65 years, colorectal, lung, non-Hodgkin's lymphoma, pancreatic, and stomach cancers are more common.

In some cases it may be possible to extend existing health promotion campaigns to include a focus on cancer rather than having to develop entirely new programmes. For example, the *Breastfeeding In Ireland; Five Year Strategic Action Plan* (National Committee on Breastfeeding, 2005), highlighted the benefits of breastfeeding in contributing to a reduction in the risk of breast cancer. Similarly, campaigns on sexual behaviour could emphasise the link between HPV and cervical cancer, and campaigns on physical activity and obesity could also place more emphasis on cancer.

Smoking cessation

Smoking and exposure to tobacco smoke are major risk factors for the development of a range of cancers in women; as well as lung cancer, smoking has been found to contribute to cancers of the mouth, oesophagus, stomach, kidney, pancreas, bladder, leukaemia and possibly the colon. With this in mind, the need for effective smoking cessation programmes to be designed for women and targeted at their particular needs is

clear. Such programmes should also consider the higher rates of smoking among women from disadvantaged socio-economic groups, and put provisions in place to take their needs into account.

Geographical Variation in Incidence

The cancer-specific chapters in this report showed that geographical variation exists in the rates of certain cancers in Ireland. Within Ireland, the Eastern Region appears to have higher incidences rates of cancer than other areas of the country; this is, however, because the East dominates in terms of population, with almost one-third of the total population living in Dublin (CSO, 2005). This means that high rates of a particular cancer in the Eastern area will push up the national average rate and, as a result, the rates in all other areas may be below this average. SLAN data indicates that very little residual area variance remains when the composition of the population is taken into account; in essence this means that the East has more people who are very affluent or very disadvantaged than other parts of the country.

The geographical variation in rates of cancer mortality in Ireland may also be affected by the availability of screening for cancers of the breast and cervix in different regions of the country. As previously mentioned, BreastCheck is not yet available in all areas and the Irish Cervical Screening Programme has so far only operated in its pilot area in the Mid-West.

Geographical variation has also been noted in the European context, with geographical variations among men also found to be less strong than those among women. For women, Ireland has been found to have the highest incidence rate of ovarian cancer in Europe, as well as high incidence rates of colorectal, lung, non-Hodgkin's Lymphoma, and pancreatic cancers compared to the European average. This is probably due to variations in exposure to environmental and lifestyle risk factors for cancer in the different countries, but it is likely that it is also an effect of the availability of screening for breast, cervical and colorectal cancer thus again making the case for these services to be provided comprehensively to women in Ireland. It is also interesting to note that when an analysis was done of the relationship between cancer survival in European countries and numbers of cancer specialists per head of population, the countries with more specialists were found to rank higher in terms of overall survival. In the UK, these findings prompted massive investment in cancer treatment, and similar steps may be needed in this country.

On a more positive aspect, it should also be noted that Ireland has the lowest incidence and mortality rate of uterine cancer in Europe.

Low treatment and survival rates—vulnerable groups

Disadvantaged women

The data collected for this report has indicated that there are important differences between women in different socio-economic groups in incidence and mortality rates from cancer in this country. While incidence does not always appear to have a consistent relationship with socio-economic group, treatment and survival rates are lower among women from disadvantaged groups. For example, while incidence of colorectal cancer was found to be higher in women from more affluent groups, the chance of having surgery to treat colorectal cancer was found to be significantly lower for women from more deprived areas (NicAmhlaoibh et al, 2004). This has obvious implications for the survival of women from disadvantaged groups who develop colorectal cancer, and may demonstrate a need for services to be made more accessible for this group of women. Breast and uterine cancers and melanomas of the skin also had a higher incidence rate among women from higher socio-economic groups, but the incidence of cancers of the lung, cervix, ovaries, pancreas and stomach were higher in more deprived groups.

In order to begin addressing the variation in incidence of cancer among different socio-economic groups, it will again be important raise awareness about risk factors and develop innovative health promotion campaigns to educate women on symptoms and thereby improve stage at diagnosis. Public health and social welfare programmes that alleviate environmental conditions, which may make low-income women more susceptible to cancer, may also help to reduce socio-economically driven disparities in cancer outcomes. It is also be important to improve access to healthy choices for women in more deprived groups, for example by making healthy eating more affordable. It is essential that care be taken to improve the accessibility of cancer services, in order to ensure that all women in this country have access to optimal cancer care from an early stage and that the particular needs of disadvantaged women are addressed.

Older women

This report has indicated that older women are much less likely to receive treatment for cancer than women in younger age groups. There is a lack of evidence on why exactly this is the case, but one reason may be that older women are more likely to have additional medical conditions which act as contra-indications for treatment. In addition, it has been suggested that there may be a perception among clinicians that treatments are less effective among older women, or that this group may be worse affected by the toxicity of treatments such as chemotherapy or radiation therapy, but there is little or no research evidence to suggest that this is the case. In fact, research has shown that older people are usually excluded from clinical trials (McMurdo et al., 2005), and one systematic review of cancer clinical trials reported that patients aged over 65 years were under-represented, with only one-quarter to one-third of potentially eligible older patients enrolled (Townsley et al., 2005).

Research commissioned by the National Council on Ageing and Older People to explore the extent of ageism in services in Ireland found that age limits are used to determine the level of care provided in oncology services (McGlone, 2005). While clinical judgements may sometimes need to discriminate in terms of age and gender, it is important that scientific evidence rather than societal values underpins such decisions. Special attention must be paid to judgements which may be appear to be clinical but might actually reflect direct or indirect discrimination (Women's Health Council, 2005). In Britain, the National Institute for Health and Clinical

Excellence (NICE, 2005) recently published guidelines on Social Value Judgements. The Institute's general principle is

> *'…that patients should not be denied NHS treatment simply because of their age….wherever practical, NICE's advisory bodies should avoid issuing guidance that refers to age if this is being used as a presumed proxy for some aspect of patients' health status' (NICE, 2005).*

Whatever the explanation, the lower rate of treatment among women in older age groups is a serious concern given the ageing of the population, and the fact that women constitute a greater proportion of the older population. This means that there will be a concomitant increase in the numbers of older women suffering with cancer in Ireland, so it is vital that care is taken to ensure their treatment needs are appropriately addressed. Other countries have begun to develop cancer guidelines in part to help alleviate problems of differentials in cancer treatment and the subsequent effects on survival. The approach taken by, for example the SIGN programme in Scotland (SIGN,2006), should be considered in Ireland to ensure equity of evidence-based treatment across the population.

Survival from cancer has been found to be higher in women than in men, at least partly because the cancers that predominate in women, such as that of the breast, or occur only in women, such as those of cervix or uterus, tend to have better survival prospects than some of the other common cancers. This finding has important implications for service provision, as surviving cancer may mean a greater proportion of women will need to access support services such as rehabilitation care or counselling. For those who are not expected to survive, it is essential that palliative care services are properly resourced to deal with the increasing numbers of older women with cancer in the population. In line with the recommendations set out in the *Design Guidelines for Specialist Palliative Care Settings* (Department of Health & Children, 2005b), palliative services should be of high quality and should meet women's needs in a respectful, responsive and holistic manner.

Gaps in Research

During the course of this research, significant gaps were noted in the availability of Irish information in a number of areas. It is therefore proposed that further research be carried out in the following areas to add to the body of knowledge on cancer among women in Ireland and assist in the development of effective and efficient policy, strategy and services in the area.

Cancer risk factors

1. Further research is needed on risk factors for cancer in this country in order to better understand the reasons underlying trends in incidence in Ireland. Data on trends over time in cancer risk factors are also lacking in Ireland
2. More information is needed on the exposure to risk factors for women in different socio-economic groups. The priorities in this areas should include:
   - levels and patterns of HPV in Ireland and their links with cervical cancer
   - the level of use of sunbeds among women in Ireland and its links to melanoma
   - the number of women using HRT in Ireland and the length of time for which they are using it
   - use of oral contraceptives and the possible effects of other types of hormonal contraception such as the Mirena coil, or contraceptive implants.

   Research in these last two areas may also illuminate the reasons for the high incidence of ovarian cancer in Ireland.
3. Understanding of cancer in women in Ireland would also be improved by participation in international cohort and case-control studies of cancers whose risk factors are not well understood; the high incidence of non-Hodgkin's lymphoma in Ireland is one instance where such an effort would be worthwhile.

Health services research

Survival from some cancers is relatively poor for women in Ireland by international standards. Survival may be poor for a number of reasons, and research is needed to explore these.

1. Late diagnosis—are women diagnosed later in Ireland than in other countries? If so, is this due to access to health services (including screening) lack of information or other factors?
2. The absence of national guidelines on best practice for the majority of cancers means that treatment varies considerably around the country; research is needed into the reasons for this variation and to establish if this has adverse consequences for women.
3. The lower rate of treatment of older women was a consistent finding. Research should be carried out into the factors, including the attitudes of clinicians, which determine this low rate of treatment.
4. Cancer clinical trials should include older women where possible, as it cannot be assumed that results from younger patients enrolled in trials can automatically be extended to older people.

Appendix 1. Further information on SLAN analysis

Fat intake

The ECAC recommendation regarding dietary fat intake presents more difficulties than the other recommendations to interpret in an Irish context. The recommendation is to "Limit your intake of foods containing fats from animal sources". This poses some problems because:

a) It has no lower limit threshold

b) Fats from animal sources are closely but not precisely equated with percentage saturated fat intake in the diet.

c) It is also not clear that % fat consumption can be related directly to compliance with a specific health education message.

d) The food pyramid used as the main health education tool in the Republic of Ireland does not equate exactly with this instruction.

e) The percentage complying with the top 3 shelves is too low at 1.5% for multivariate or multilevel models.

Analysis of dietary saturated fat intake in the 2003 SLAN report (Kelleher et al 2003) shows a significant gender difference, with men consuming higher quantities of both total fat (85.3g as opposed to 77.61g) and saturated fat (33.42g as opposed to 27.91g) than women. Consumption of both total and saturated fat is significantly higher in younger people, people with only completed secondary school level education, lower social classes, those living in a rural location, and those not living alone. For this analysis we felt no single parameter comprehended the ECAC message about fat intake and hence have not included it in our model estimates. However we do present the information according to the Food Pyramid recommendations.

Age Standardisation:

In order to ensure comparability between SLAN 1998 and 2002, where relevant, age standardisation to the 2002 Census was carried out. This provides also prevalence figures weighted to the actual population rather than the response sample. As this may necessarily distort prevalence estimates, for example by giving undue weight to smaller groups in the dataset, statistical comparison was made using the un-adjusted data. Readers should be aware that the findings in this analysis may not be exactly comparable with other SLAN reports as the variables were selected to comply as closely as possible with ECAC recommendations.

Multi-variate models:

All the analyses in chapter 14 are based on so-called multivariate models. This means that the independent effect or not of any variable can be assessed in relation to a particular outcome of interest, in this case compliance or not with one of the five ECAC recommendations or the composite score across all five recommendations. The differences between men and women are highlighted, being the primary purpose of the report. In turn the social determinants of lifestyle risk factors are estimated for both men and women. It is of interest whether patterns vary by area, in this case electoral divisions. If so, models estimate whether that can be explained by the characteristics of individuals residing in such areas or if not fully explained in this way, suggests that other area level characteristics not accounted for in the analysis might be influential. This is assessed in this chapter by the use of multi-level statistical models, which are reported in more detail through the text.

Multilevel logistic regression models were fitted to each of the five dimensions that make up the ECAC score – namely low alcohol consumption, non-smoking, non-obesity, daily exercise and good diet. Each model includes as explanatory variables at individual level sex, age (centred on the mean age, 46.7 years), education, social class, and GMS status, and at area (Electoral Division) level an indicator of location – urban or rural. This was based on 325 ED in the SLAN 2002 data set. Age was included as a linear covariate, and an age-squared term was tested for evidence of a quadratic relationship in age in all models and included if this was significant. We also tested interactions between gender and the other explanatory variables in each model to examine whether these factors had different effects in men and women. The hierarchical structure of the data (individuals within electoral division areas) is allowed for by fitting a multivariate model. We examine the evidence for variation in each of these outcomes due to factors at area level over and above the influence of the explanatory variables included in the models. Models were fit in MLwiN Version 2.0, using 2nd order penalised quasi-likelihood and MCMC methods. Significance of parameter estimates was assessed by Wald tests.

Multi-level analysis therefore quantified the variance in score at Electoral Districts (ED) and at individual levels and allowed the testing of covariates at and across both levels. Ranked residual plots show 95% confidence interval error bars for each DED.

Multilevel multinomial model for ECAC score

Some preliminary analyses of the ECAC score indicate no evidence that there are factors at electoral division level that have an effect on the score. These analyses included multilevel models with the following responses: low ECAC score, high ECAC score and ECAC score as a Normally distributed (continuous) response. These analyses indicated that the relationship between explanatory variables and the ECAC score varies for different levels of the score. We therefore fit a multinomial logistic regression model, which does not assume any ordering in the data, to the categorised score (levels being score 0-2, score 3, score 4-5). This is fit as a multilevel model to allow for the possibility that there may be factors at area level that have an effect on the score. Parameter estimates for this model, including as explanatory variables gender, age, location and GMS status, are given in the text. Parameter estimates for each group are in comparison to the baseline group, score 0-2.

Appendix 2. Glossary

Adjuvant therapy

A treatment, such as chemotherapy, radiotherapy or hormonal therapy, which is given in addition to the main treatment (usually surgery) for cancer. It may be given before or after surgery. The aim of adjuvant therapy is to increase the chances of curing the disease, or stopping it spreading.

Age-standardised rate

The chances of developing, or dying from, cancer vary greatly by age. When rates of cancer are compared between different geographical areas/countries, it is necessary to adjust for (i.e. take into account) differences between the areas in the age distribution of the populations. If this is not done, the comparison in rates between the areas can be misleading. This method of adjusting for age differences is known as age-standardisation. The age-standardised (or "age-adjusted") rates presented in this report are standardised to the European Standard population.

The same comments apply when we want to compare rates over time within a single population/country. In developed countries like Ireland, the population is ageing and this affects the cancer rates over time. These population trends need to be taken into account by means of age-standardisation.

Annual percentage change

The average increase or decrease in a cancer rate, or numbers of cases or deaths, each year. It is used to measure trends over time.

Body mass index

A measure of an individual's body weight relative to their height; it is calculated as body weight (in kilograms) divided by height (in metres squared). It correlates strongly with body fat. A body mass index (BMI) of 25 or more is considered overweight and of 30 or higher is considered obese.

BRCA1/BRCA2

Genes involved in the development of some forms of breast cancer and ovarian cancer. Women who have a mutation in one of these genes have a very high chance of developing breast cancer or ovarian cancer during their lifetime, compared to women who do not have the mutations.

Cervical smear test

A cervical smear is a screening test done to look for early changes in the cells of the cervix (neck of the womb), which if not found and treated could go on to become cancer cells. It is a very simple procedure taking less than five minutes, during which a sample of cells is taken from the surface of the cervix and "smeared" onto a slide. The slide is sent to a laboratory for examination under a microscope to see if there are any changes in the cells.

Colposcopy

A woman who has had a smear test that showed changes in the cells on her cervix may be referred to hospital for a colposcopic examination. This involves a doctor or nurse using a special type of microscope (a colposcope) that magnifies the cervix so that it can be seen more clearly. If the doctor or nurse see a area on the cervix that looks abnormal, a small sample of tissue can be taken from the area and sent to the laboratory for examination. Alternatively the area may be removed under local anaesthetic using a very fine heated wire loop.

Chemotherapy

Treatment with drugs the aim of which is to destroy cancer cells.

Colonoscopy

An examination of the colon with a long, flexible, lighted tube called a colonoscope. It is done to look for cancers or for pre-cancerous lesions of the colon (polyps)

Comorbidity/comorbid condition

The presence of more than one health condition/disease in an individual at the same time (e.g. cancer plus another condition). Older cancer patients are usually more likely to have comorbid conditions than younger patients.

Computed tomography

An X-ray procedure that uses a computer to produce a detailed picture of a cross section of the body. It is also called a CAT or CT scan.

Confidence interval

A range of values for a quantity/variable (e.g. a rate), constructed so that the range has a specified probability (usually 95%) of containing the true value of the quantity/variable.

Cost-effectiveness

The relation between the costs (inputs) and results produced by a project/programme. A project/programme is more cost-effective when it achieves its results at a lower cost compared with alternative projects with the same intended results. The types of "costs" and "results" that are typically considered for screening programmes are costs to the health services and to the individuals/patients taking part, and deaths avoided or life-years saved.

Cumulative risk

The "lifetime risk" of developing cancer. It is usually calculated up to 65 or 75 years of age. It represents the chance that an average person will be diagnosed with cancer at some point before reaching the relevant age, and can be expressed as a percentage (e.g. 10%) or in terms of "1 person in every X people" (e.g. 1 in every 10).

Deprivation

This usually refers to socio-economic, or material, deprivation. It is measured on an area basis, rather than at the level of individual cancer patient; the area is the place where the patient lived at the time they were diagnosed with cancer. This means that every cancer patient in a defined small geographical area is assigned to the same deprivation category. The measure of deprivation used in this report was created by the Small Area Health Research Unit in Dublin from census data at district electoral division (Kelly & Sinclair, 1997), and is based on levels of unemployment, car ownership, overcrowding and rented accommodation in each area, together with measures of the proportion of the population in low social classes.

Endometrial sampling

A procedure which involves the removal of a sample of tissue from the endometrium (lining of the uterus) so that it can be examined under a microscope to determine whether there are any abnormalities present. The tissue can be obtained by biopsy or dilation and curettage (D&C), with or without a hysteroscopy (a test in which a gynaecologist can view the inside of the uterus through a thin lighted tube).

Extent of disease

See Staging/stage

FAP (Familial Adenomatous Polyposis)

A genetic (hereditary) condition that greatly increases a person's chances of developing colorectal cancer. People with this syndrome develop polyps (pre-cancerous lesions) in the colon and rectum and these polyps often go on to become cancerous.

HNPCC (Hereditary Non-Polyposis Colorectal Cancer)

A genetic (hereditary) condition which greatly increases a person's chances of developing colorectal, and some other forms of, cancer. The condition is caused by mutations in particular genes.

Hormone therapy

Treatment with hormones, or drugs that interfere with hormone production or the action of hormones in the body, with the aim of killing cancer cells or slowing their rate of growth. (It is different from hormone replacement therapy (HRT)).

Hormone replacement therapy (HRT)

A drug that includes a combination of female hormones (oestrogen and, usually also, progesterone). Women may take HRT to relieve the symptoms of the menopause.

Ionizing radiation

A type of radiation, which includes x-rays and gamma radiation. Gamma radiation can be used to treat cancer patients. Gamma rays, and materials and processes that emit gamma rays, are also used in the nuclear power and other industries, by the military, and in scientific research.

Incidence

An incident case of cancer is a new case that occurs/is diagnosed within a specified time period. Thus, the annual incidence of a disease is the total number of new cases diagnosed in a population in a one year period.

Invasive cancer

An invasive cancer is one which has spread beyond the layer of cells where it first developed, and has the potential to spread further.

In situ tumour

An *in situ* tumour is one which is confined to the small area in which it first arose. An *in situ* cancer, if not treated, may go on to become invasive.

Histologically verified

A cancer/tumour which has been examined in the laboratory, under a microscope, to confirm presence and type of cancer.

Lymph nodes

Small bean-shaped collections of immune system tissue found along lymphatic vessels (channels in the lymphatic system—an important part of the immune system). Invasive cancers sometimes penetrate the lymphatic vessels and spread to lymph nodes.

Malignant

A malignant cancer is one which grows by invasion into surrounding tissues and organs. The term is used interchangeably with "invasive" in this report.

Mammography

An X-ray of the breast, used in screening for breast cancer. Mammography can detect cancers at an early stage, when they are not causing symptoms, are very small and would not have been found by a clinical examination.

Menarche

The first menstrual period.

Mortality

The number of deaths from a particular disease (in this case, cancer) in a defined population in a defined period of time.

Mutation

A change in the structure of a gene, which may affect how the gene works. Some genetic mutations can be passed from parents to their offspring.

Naevi

A cluster of melanocytes on the skin. Commonly called moles.

Neoplasm

A growth of abnormal tissue. Also known as a tumour.

Non-melanoma skin cancer

There are two different types of skin cancer—melanoma and non-melanoma. Non-melanomas are, by far, the most common cancer in Ireland and most other developed populations. They are almost always easily treated and are rarely fatal. It is very difficult to collect accurate data on all non-melanoma skin cancers, and most cancer registries do not do this. It is usual practice to exclude non-melanoma skin cancers from the total of all malignant/invasive cancers.

Non-steroidal anti-inflammatory drugs (NSAIDs)

A group of medications which reduce inflammation and can be used to help relieve pain. Examples include aspirin, ibuprofen, naproxen, mefenamic acid and diclofenac acid.

Palliative treatment

Treatment that relieves symptoms (e.g pain), but is not expected to cure the disease. Can be given when a cancer has spread to other sites in the body and curative treatment is not possible. The main purpose of palliative treatment is to improve the patient's quality of life.

Parity

The number of live-born children that a woman has had. A nulliparous woman has not delivered any live-born children.

Prevalence

The total number of people living with a disease in a population at any given time. It reflects a combination of the incidence and survival for a particular cancer.

Radiotherapy

Treatment with high-energy rays (such as x-rays) the aim of which is to kill cancer cells. Radiotherapy may be used in as a treatment in its own right, or in combination with surgery—either to reduce the size of a cancer before surgery or to destroy any remaining cancer cells after surgery.

Radon

A radioactive gas that is released by uranium, a substance found in soil and rock. It can seep into homes through cracks in the foundations.

Rate

The number of cases (or deaths) from a disease that occur in a defined population during a specific time period (usually a year) divided by the number of people in the same population. Cancer rates are usually expressed per 100,000 population (i.e. the numbers of cases (deaths) that occur for every 100,000 people in the population).

Relative survival

The survival of a group of cancer patients relative to the survival of a group of individuals of the same age and sex who do not have cancer. It, therefore, describes how well cancer patients survive in comparison to those without cancer.

Risk factor

Something that increases or decreases a person's chances of developing cancer.

Screening

The search for cancer in people who do not have symptoms. The aim of screening is to detect the disease at an early stage when treatment may be most successful.

(Flexible) Sigmoidoscopy

A procedure which involves a doctor placing a slender, hollow, lighted tube into the rectum. It is done to help find cancer or pre-cancerous lesions (polyps) in the rectum and part of the colon. It can be used in screening for colorectal cancer.

Sputum cytology

An examination, under a microscope, of lung cells found in sputum (mucus and other matter brought up from the lungs by coughing). It has been proposed as a screening test for lung cancer.

Staging/stage

Staging is the process of finding out whether a cancer has spread from the site of origin, and if so, how far it has spread. The stage describes the size and the extent of disease at the time of diagnosis. Not all cancers are staged at diagnosis. This is because it is often impossible to do so without major surgery; the treatment given may not depend on the stage (and therefore staging investigations would not be justified); and/or the cancer is clearly advanced and no curative treatment is possible.

A *local cancer* is one that is limited to the organ in which it arose, without evidence of any spread. A *regional cancer* is one which has spread beyond the original site at which it arose, to nearby organs, tissues, or lymph nodes. A *distant cancer* is one that has spread from the site where it arose to distant organs or lymph nodes.

Standardised incidence/mortality ratio

The standardised incidence/mortality ratio (SIR/SMR) for a health board is the ratio of the observed/actual number of cases (deaths) in residents of the board to the number of cases/deaths expected to occur based on the overall national rate. The expected number is standardised for age. The SIR, or SMR, for all Ireland (i.e. the national average) is taken to be 1.0. Boards with SIRs/SMRs below 1.0 have lower incidence (mortality) than expected and boards with SIRs/SMRs above 1.0 have higher incidence (mortality) than expected.

Survival

The proportion/percentage of people with cancer who are still alive at a specified time (e.g. 5 years) after diagnosis.

Tamoxifen

A drug which blocks the effects of oestrogen on many organs, such as the breast; oestrogen can promote (encourage) the growth of some breast cancers.

Transvaginal ultrasound

A procedure used to examine the vagina, uterus, fallopian tubes, ovaries, and bladder. An instrument is inserted into the vagina, and sound waves bounce off organs inside the pelvic area, which are then converted, by a computer, into a picture known as a sonogram. The procedure is currently being evaluated as part of a screening test for ovarian cancer.

Tumour

See Neoplasm.

(Person) Years of life-lost

A measure of premature mortality due to a particular disease (in this case, cancer). It is an average, over everyone diagnosed with cancer, of the difference between the age at death and the age to which individuals would have been expected to live had they not had the disease.

Appendix 3. Data included in the report

Data sources

The figures on cancers diagnosed in Ireland included in this report are based on the data collected by the National Cancer Registry (NCR; www.ncri.ie). The data were extracted from the Registry database in late autumn 2005. Cancer registration is a dynamic process, and registrations may be added, changed or removed from the database over time as new information comes to light, sometimes several years after the original diagnosis. This means that the figures in this report may differ slightly from those published elsewhere. The figures on cancer mortality are based on data provided by the Central Statistics Office (www.cso.ie). For the calculations of survival among cancer patients in Ireland, follow-up was until the end of 2002.

The figures on cancer incidence and mortality in western European countries and the USA have been obtained from the EUCAN initiative of the International Agency for Research on Cancer (Ferlay et al., 1999; http://www-dep.iarc.fr) and the Surveillance Epidemiology and End Results (SEER) programme of the National Cancer Institute (http://seer.cancer.gov) respectively. The data on cancer survival in European countries was extracted from the reports and papers of the EUROCARE project (Sant et al., 2003b).

Cancers included

The individual cancers examined in detail in the report were selected because they were the ten most frequently diagnosed cancers in women in Ireland. Altogether they account for 75% of all cancers diagnosed in women in Ireland.

The major emphasis in the report is on malignant (invasive; see glossary) cancers, as these account for almost all cancer-related deaths. Thus, for each cancer site in the report, only malignant tumours have been analysed. The two exceptions to this are breast and cervical cancer, where non-invasive (*in situ*) tumours have also been included. This is because *in situ* tumours of the breast and cervix are almost exclusively diagnosed by screening, and examination of trends in the incidence of these tumours may be informative in relation to assessing screening activity in Ireland. To maintain comparability with the other types of cancer, the data on *in situ* tumours of the breast and cervix are presented separately from those for invasive cancers at these sites.

Time period covered

The data presented on cancer incidence (and survival) in Ireland are for the years 1994-2001, the full period for which, at the time of writing, national cancer registration data are available. Since national data are available on deaths from cancer for a much longer period, and to permit examination of long-term trends annual mortality rates have been presented for the years 1950 to 2001.

The exceptions to this are as follows. Firstly, with regard to mortality rates for cancers of cervix and uterus, data are presented for the years from 1978 onwards; this is because there were changes in coding of these tumours during the 1970s and data for earlier years can be difficult to interpret. Secondly, the data on cancer

incidence by deprivation category of residence (see glossary) relate to the period 1994 to 1998, since data for the later years are not currently available by deprivation category.

For the international comparisons in incidence and mortality, the available data for western European countries was for 1998, approximately the mid-year of the period covered by the Irish data. The data for the USA are for 1992-2002. As regards survival, the European data pertain to cases diagnosed in 1990-1994, while that for Ireland is for patients presenting in 1994-1997. Since survival has increased slightly over time, this means that Ireland will be ranked slightly higher in these comparisons than would have been the case had data been available for patients diagnosed in 1990-1994.

Deprivation index

The deprivation index is based on data from the 1996 Census of Population and was developed by Dr. Alan Kelly and the Small Area Health Research Unit at Trinity College, Dublin. We would like to thank Dr. Kelly for providing this index at the electoral district level. Incident cancers for 1994-1998 were assigned by the National Cancer Registry to an electoral district on the basis of the address given. The index is based on a range of census variables which are used to construct a composite index indicating area deprivation for each electoral district. There are approximately 350 electoral divisions in Ireland ranging in size from 23 to 25,000 residents. A detailed description of this index is given by Kelly (Kelly and Sinclair, 1997,). Some criticism has been made of the validity of this type of index, both in principle and specifically in its application to Ireland (Pringle, 1999; Cook et al, 2000). However, direct measures of household income are not available on an area base in Ireland. Individual-level measures of disadvantage would be preferable, but although the Registry records occupation and occupational status for each incident cancer, this information is absent from the medical record in over 50% of cases and therefore not usable.

Other data issues

The NCR records treatment undergone by cancer patients in approximately a one year period following diagnosis, since most treatment for the primary tumour would be expected to have started within this time. Any treatment delivered later at one year following diagnosis will not be included in the figures shown in the report, thus overall treatment rates may be slightly underestimated.
For all of the cancer sites, with the exception of lung and pancreas, the international comparisons of survival are based on survival at 5-years after diagnosis. Cancers of the lung and pancreas have a very poor prognosis and few patients survive to five years; for these cancers survival at one year is shown.

Although there has been a reorganisation of the health services in recent years, with the abolition of the health boards, it was decided to present cancer incidence and mortality within Ireland at the level of the former health board areas. This was because these were the health service administrative areas in operation during the time period covered by the report, and most cancer services were organised at this level. The health boards and their constituent counties are listed opposite.

health board	counties
Eastern	Dublin
	Kildare
	Wicklow
Midland	Laois
	Longford
	Offaly
	Westmeath
MidWestern	Clare
	Limerick
	Tipperary North
NorthEastern	Cavan
	Louth
	Meath
	Monaghan
NorthWestern	Donegal
	Leitrim
	Sligo
SouthEastern	Carlow
	Kilkenny
	Tipperary South
	Waterford
	Wexford
Southern	Cork
	Kerry
Western	Galway
	Mayo
	Roscommon

Appendix 5. References

Amant F, Moerman P, Neven P, Timmerman D, Van Limberg E, Vergote I. Endometrial cancer. Lancet 2005; 366: 491-505

Ames BN, Gold LS, Willett WC. The causes and prevention of cancer. Proc Natl Acad Sci USA 1995; 92: 5258-5265 (http://www.pnas.org/cgi/reprint/92/12/5258)

Anderson GL, Judd HL, Kaunitz AM, et al, Women's Health Initiative Investigators. Effects of estrogen plus progestin on gynaecologic cancers and associated diagnostic procedures: the Women's Health Initiative randomised trial. JAMA 2003; 290: 1739-1748

Antoniou A, Pharoah PD, Narod S, et al. Average risks of breast and ovarian cancer associated with BRCA1 or BRCA2 mutations detected in case series unselected for family history: a combined analysis of 22 studies. Am J Hum Genet 2003; 72: 1117-1130

Arber N, Levine B. Chemoprevention of colorectal cancer: ready for routine use? Recent Results Cancer Res 2005; 166: 213-230

Armstrong BK, Kricker A, English DR. Sun exposure and skin cancer. Australas J Dermatol 1997; 38 Suppl 1: S1-S6

Arnold D, Schmoll HJ. (Neo-)adjuvant treatments in colorectal cancer. Ann Oncol 2005; 16 Suppl 2: ii133-40

Au H-J, Mulder KE, Fields ALA. Systematic review of management of colorectal cancer in elderly patients. Clin Colorectal Cancer 2003; 3: 165-171

Bagnardi V, Blangiardo M, La Vecchia C, Corrao G. A meta-analysis of alcohol drinking and cancer risk. Br J Cancer 2001; 85: 1700-1705

Balducci L. Geriatric oncology: challenges for the new century. Eur J Cancer 2000; 36: 1741-1754

Batty D, Thune I. Does physical activity prevent cancer? BMJ 2000; 321: 1424-1425 (http://bmj.com/cgi/content/full/321/7274/1424)

Bedinghaus J, Leshan L, Diehr S. Coronary artery disease prevention: What's different for women? Am Fam Physician 2001; 63: 1290-1292 (http://www.findarticles.com/cf_0/m3225/7_63/72469822/print.jhtml)

Beral V, Banks E, Reeves G. Evidence from randomised trials on the long-term effects of hormone replacement therapy. Lancet 2002; 360:942-944

Bergin D. Cardiologist seeks fast-food ad curb. Irish Medical News, 2002

Berrington de Gonzalez A, Sweetland S, Spencer E. A meta-analysis of obesity and the risk of pancreatic cancer. Br J Cancer 2003; 89: 519-523

Berry DA, Cronin KA, Plevritis SK, Fryback DG, Clarke L, Zelen M, Mandelblatt JS, Yakovlev AY, Habbema JD, Feuer EJ; Cancer Intervention and Surveillance Modeling Network (CISNET). Effect of screening and adjuvant therapy on mortality from breast cancer. N Engl J Med 2005; 353:1784-92

Bianchini F, Vainio H. Allium vegetables and organosulfur compounds: Do they help prevent cancer? Environ Health Perspect 2001; 109: 893-902

Bingham SA, Day NE, Luben R, et al. Dietary fibre in food and protection against colorectal cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC): an observational study. Lancet 2003; 361:1496-1501

Blaser MJ. Hypothesis: the changing relationships of helicobacter pylori and humans: implications for health and disease. J Infect Dis 1999; 179: 1523-1530

Bordonaro R, Fratino L, Serraino D. Treatment of non-Hodgkin's lymphomas in elderly patients. Clin Lymphoma 2004; 5: 37-44

Bosch FX, Lorincz A, Munoz N, Meijer CJLM, Shah KV. The causal relation between human papillomavirus and cervical cancer. J Clin Pathol 2002; 55: 244-265 (http://jcp.bmjjournals.com/cgi/content/full/55/4/244?ck=nck)

Boyle P, Autier P, Bartelink H, Baselga J, et al. European Code Against Cancer and Scientific Justification; Third Edition. Ann Oncol 2003; 14: 973-1005 (http://annonc.oxfordjournals.org/cgi/content/full/14/7/973)

Boyle P, d'Onofrio A, Maisonneuve P, Severi G, Robertson C, Tubiana M, Veronesi U. Measuring progress against cancer in Europe: has the 15% decline targeted for 2000 come about? Annals of Oncology 2003; 14: 1312-1325

Boyle P, Ferlay J. Cancer incidence and mortality in Europe, 2004. Ann Oncol 2005; 16: 481-488

Boyle P, Maisonneuve P, Dore JF. Epidemiology of malignant melanoma. Br Med Bull 1995; 51: 523-547

Boyle P, Veronesi U, Tubiana M, Alexander FE, et al. European School of Oncology Advisory Report to the European Commission for the "Europe Against Cancer Programme" European Code Against Cancer. Eur J Cancer 1995; 31A: 1395-1405

Bradley CJ, Given CW, Roberts C. Race, socioeconomic status and breast cancer treatment and survival. J Natl Cancer Inst 2002; 94: 490-496 (http://www.jncicancerspectrum.oxfordjournals.org/cgi/reprint/jnci%3b94/7/490.pdf?ck=nck)

Brain K, Gray J, Norman P, et al. Randomized trail of a specialist genetic assessment service for familial breast cancer. J Natl Cancer Inst 2000; 92: 1345-1351.

Braithwaite RS, Chlebowski RT, Lau J, George S, Hess R, Col NF. Meta-analysis of vascular and neoplastic events associated with tamoxifen. J Gen Intern Med 2003; 18: 937-947

Brawley O. Disaggregating the effects of race and poverty on breast cancer outcomes. J Natl Cancer Inst 2002; 94: 471-473 (http://jncicancerspectrum.oxfordjournals.org/cgi/reprint/jnci%3b94/7/471.pdf)

Bray F, Dos Santos Silva I, Moller H, Weiderpass E. Endometrial cancer incidence trends in Europe: underlying determinants and prospects for prevention. Cancer Epidemiol Biomarkers Prev 2005; 14: 1132-1142

Bray F, Loos AH, McCarron P, Weiderpass E, Arbyn M, Moller H, Hakama M, Parkin DM. Trends in cervical squamous cell carcinoma incidence in 13 countries: changing risk and the effects of screening. Cancer Epidemiol Biomarkers Prev 2005; 14: 677-686

Bray F, Loos AH, Ostindier M, Weiderpass E. Geographical and temporal variations in cancer of the corpus uteri: incidence and mortality in pre- and postmenopausal women in Europe. Int J Cancer 2005; 117: 123-131

Bray F, Loos AH, Tognazzo S, La Vecchia C. Ovarian cancer in Europe: cross-sectional trends in incidence and mortality in 28 countries, 1953-2000. Int J Cancer 2005; 113: 977-990

Bray F, McCarron P, Parkin DM. The global patterns of female breast cancer incidence and mortality. Breast Cancer Res 2004; 6: 229-239

Bray F, Tyczynski JE, Parkin DM. Going up or coming down? The changing phases of the lung cancer epidemic from 1967 to 1999 in the 15 European Union countries. Eur J Cancer 2004; 40: 96-125

BreastCheck. Annual Report 2003. Dublin: The National Breast Screening Programme, 2004 (http://www.breastcheck.ie/publications/ar03.html)

BreastCheck. Annual Report 2004—2005. Dublin: The National Breast Screening Programme, 2005 (http://www.breastcheck.ie/publications/bc_areport04.pdf)

Breastcheck: the national screening programme in Ireland. Available from: URL www.breastcheck.ie

Breen N, Figueroa JB. Stage of breast and cervical cancer diagnosis in disadvantaged neighbourhoods: A prevention policy. Am J Prev Med 1996; 12: 319-326

British Heart Foundation. British Health Foundation statistics database annual compendium: 2002 edition. Oxford: British Heart Foundation, 2002 (http://www.dphpc.ox.ac.uk/bhfhprg/stats/2000/index.html)

Buckley MJ, O'Shea J, Grace A, English L, Keane C, Hourihan D, O'Morain CA. A community-based study of the epidemiology of Helicobacter pylori infection and associated asymptomatic gastroduodenal pathology. Eur J Gastroenterol Hepatol 1998; 10: 375-379

Bulliard JL, Cox B, Semenciw R. Trends by anatomic site in the incidence of cutaneous malignant melanoma in Canada, 1969-1993. Cancer Causes Control 1999; 10: 407-416

Burke S, Keenaghan C, O'Donovan D, Quirke B. Health in Ireland—An Unequal State. Dublin: Public Health Alliance, 2004 (http://www.publichealthallianceireland.org/index.php?id=3&type=page)

Campo J, Comber H, Gavin AT. All-Ireland Cancer Statistics 1998-2000. Cork: National Cancer Registry Ireland & Northern Ireland Cancer Registry, 2004

Canon G. (Ed). Food, Nutrition and the Prevention of Cancer: A Global Perspective. Washington DC: World Cancer Research Fund & American Institute for Cancer Research, 1997 (http://www.wcrf-uk.org/report/index.lasso?WCRFS=3E4DAC72116891C2F0Vpum9AF2E4)

Castellsague X, Munoz N. Chapter 3: Cofactors in human papillomavirus carcinogenesis – role of parity, oral contraceptives and tobacco smoking. J Natl Cancer Inst Monogr 2003; 31: 20-28

Catalano V, Labianca R, Beretta GD, Gatta G, de Braud F, Van Custem E. Gastric cancer. Crit Rev Oncol Hematol 2005; 54: 209-241

Central Statistics Office Ireland (CSO). Available from: URL www.cso.ie

Chang AE, Karnell LH, Menck HR. The National Cancer Data Base report on cutaneous and noncutaneous melanoma: a summary of 84,836 cases from the past decade. The American College of Surgeons Commission on Cancer and the American Cancer Society. Cancer 1998; 83: 1664-1678

Cho E, Smith-Warner SA, Ritz J, et al. Alcohol intake and colorectal cancer: a pooled analysis of 8 cohort studies. Ann Intern Med 2004; 148: 603-613

Chu KC, Tarone RE, Chow WH, Hankey BF, Ries LAG. Temporal patterns in colorectal cancer incidence, survival, and mortality from 1950 through 1990. J Natl Cancer Inst 2002; 86: 997-1006

Coburn, D. Beyond the income inequality hypothesis: class, neo-liberalism, and health inequalities. Social Science & Medicine 2004, 58, 41-56.

Coleman MP, Esteve J, Damiecki P, Arslan A, Renard H. Trends in Cancer Incidence and Mortality. Lyon: International Agency for Research on Cancer, 1993

Coleman MP, Gatta G, Verdecchia A, et al., and the EUROCARE Working Group. EUROCARE-3 summary: cancer survival in Europe at the end of the 20th century. Ann Oncol 2003; 14 (Suppl 5): v128-v149

Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50,302 women with breast cancer and 96,973 women without the disease. Lancet 2002; 360: 187-195

Comber H, Gavin A. Recent trends in cervical cancer mortality in Britain and Ireland: the case for population-based cervical cancer screening. Br J Cancer 2004; 91: 1902-1904

Correa A, Jackson L, Mohan A, Perry H, Helzlsouer K. Use of hair dyes, hematopoietic neoplasms and lymphomas: a literature review. II Lymphomas and multiple myeloma. Cancer Invest 2000; 18: 467-479

Cosgrove M, Flynn A, Kiely M. Consumption of red meat, white meat and processed meat in Irish adults in relation to dietary quality. Br J Nutr 2005; 93: 933-942

Croce CM. How can we prevent cancer? Proc Natl Acad Sci USA 2001; 98: 10986-10988 (http://www.pnas.org/cgi/doi/10.1073/pnas.221453098)

Cronin DP, LC. Harlan, LX. Clegg, JL. Stevens, G. Yuan, TA. Davis. Patterns of Care in a Random Population-Based Sample of Patients Diagnosed with Non-Hodgkin's Lymphoma. Hematol Oncol 2005; 23: 73-81

Cronin DP, Sharp L, Deady S, Comber H. Histological sub-type and other determinants of treatment and survival for patients diagnosed with non-Hodgkin's lymphoma in 1999-2001: a population-based study. Submitted for publication

CSO. Statistical Yearbook of Ireland 2005. Cork: Central Statistics Office, 2005 (http://www.cso.ie/releasespublications/statistical_yearbook_ireland_2005.htm)

Cummings JH, Bingham SA. Diet and the prevention of cancer. BMJ 1998; 317: 1636-1640 (http://bmj.com/cgi/content/full/317/7173/1636)

Damasus-Awatai G, Freeman-Wang T. Human papilloma virus and cervical screening. Curr Opin Obstet Gynaecol 2003; 15: 473-477

de Rijke JM, Schouten LJ, Schouten HC, et al. Age-specific differences in the diagnostics and treatment of cancer patients aged 50 years and older in the province of Limburg, The Netherlands. Ann Oncol 1996; 7: 677-685.

De Roos AJ, Zahm SH, Cantor KP, Weisenburger DD, Holmes FF, Burmeister LF, Blair A. Integrative assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men. Occup Environ Med 2003; 60: E11

De Vries E, Bray FI, Coebergh JW, Parkin DM. Changing epidemiology of malignant cutaneous melanoma in Europe 1953-1997: rising trends in incidence and mortality but recent stabilizations in western Europe and decreases in Scandinavia. Int J Cancer 2003; 107: 119-126

Deloitte. An Evaluation of "Cancer Services in Ireland: A National Strategy 1996" on behalf of the National Cancer Forum. Dublin: Department of Health & Children, 2003. (http://www.dohc.ie/publications/cancer_services_in_ireland_evaluation.html)

Demko CA, Borawski EA, Debanne SM, Cooper KD, Stange KC. Use of indoor tanning facilities by white adolescents in the United States. Arch Pediatr Adolesc Med 2003; 157: 854-860

Department of Education. Social, Personal and Health Education Programme, 2006 (http://www.sphe.ie)

Department of Health. Shaping a healthier future: A strategy for effective healthcare in the 1990s. Dublin: The Stationery Office, 1994.

Department of Health. Report of the Department of Health Cervical Screening Committee. Dublin: The Stationery Office, 1996

Department of Health & Children. Cancer Services in Ireland; A National Strategy. Dublin: Department of Health & Children, 1996 (http://www.nationalcancerforum.ie/publications_doc/Cancer.doc)

Department of Health and Children. A Plan for Womens Health 1997-1999. Dublin: The Stationery Office, 1997

Department of Health & Children and Eastern Health Board. Cancer Support Services in Ireland: Priorities for Action. Dublin: Department of Health & Children with the Eastern Health Board, 1999

Department of Health & Children. The National Health Promotion Strategy 2000-2005. Dublin: The Stationery Office, 2000 (http://www.doh.ie/pdfdocs/hpstrat.pdf)

Department of Health and Children. Quality and Fairness—A Health System for You. Dublin: The Stationery Office, 2001a. (http://www.doh.ie/pdfdocs/strategy.pdf)

Department of Health & Children. Report of the National Advisory Committee on Palliative Care. Dublin: Department of Health & Children, 2001b (http://www.dohc.ie/publications/pdf/nacpc.pdf?direct=1)

Department of Health and Children. Get a life, get active handbook; A handy guide to physical activity for a healthier heart. Dublin: Health Promotion Unit, Department of Health and Children, the Heart Health Task Force and the Irish Heart Foundation cooperation with the Centre for Sports Science and Health, Dublin City University, 2001c.

Department of Health & Children. Report of the Expert Working Group on the Development of Radiation Oncology Services in Ireland. Dublin, 2003a

Department of Health & Children. Report of the National Task Force on Medical Staffing. Dublin: The Stationery Office, 2003b (http://www.dohc.ie/publications/hanly_report.html)

Department of Health & Children. Annual Report 2004. Dublin: Department of Health & Children, 2005a (http://www.dohc.ie/publications/pdf/annual_report_2004.pdf?direct=1)

Department of Health & Children. Design Guidelines for Specialist Palliative Care Settings. Dublin: Department of Health & Children, 2005b. (http://www.dohc.ie/publications/pdf/design_guidelines_palliative.pdf?direct=1)

Department of Health & Children. Tanaiste and Minister for Health and Children, Mary Harney, T.D. announces National Network for Radiation Oncology Services. Dublin: Department of Health & Children, press release, 2005c (http://www.dohc.ie/press/releases/2005/20050725b.html. Accessed on 25th July 2005.)

Devesa SS, Bray F, Vizcaino AP, Parkin DM. International lung cancer trends by histologic type: male:female differences diminishing and adenocarcinoma rates rising. Int J Cancer 2005; 117: 294-299

Dos Santos Silva I, De Stavola, BL. Breast cancer aetiology: where do we go from here? In: A life course approach to womens health (Ed. Hardy, R.). Oxford: Oxford University Press, 2002

dos Santos Silva I, Swerdlow AJ. Sex differences in time trends of colorectal cancer in England and Wales: the possible effect of female hormonal factors. Br J Cancer 1996; 73: 692-697

Early Breast Cancer Trialists' Collaborative Group. Favourable and unfavourable effects on long-terns survival of radiotherapy for early breast cancer: and overview of the randomised trials. Lancet 2000; 355: 1757-1770.

Early Breast Cancer Trialists' Collaborative Group. Polychemotherapy for early breast cancer: an overview of the randomised trials. Lancet 1998; 352: 930-942.

Elwood JM, Jopson J. Melanoma and sun exposure: an overview of published studies. Int J Cancer 1997; 73: 198-203

English DR, Armstrong BK, Kricker A, Fleming C. Sunlight and cancer. Cancer Causes Control 1997; 8: 271-283

Ernster VL. Impact of Tobacco Use on Womens Health. In: Women and the Tobacco Epidemic; Challenges for the 21st Century (Ed. Yoon SY). Canada: The World Health Organisation in collaboration with the Institute for Global Tobacco Control & Johns Hopkins School of Public Health, 2001 (http://www.who.int/tobacco/media/en/WomenMonograph.pdf)

Europe Against Cancer. European Code Against Cancer and scientific justification: third edition (2003). Available from: URL www.cancercode.org

Eurostat (2005). Europe in Figures; Eurostat Yearbook. Luxembourg: Office for Official Publications of the European Communities, 2005 (http://epp.eurostat.cec.eu.int/portal/page?_pageid=1334,49092079,1334_49092702&_dad=portal&_schema=PORTAL)

Faggiano F, Partanen T, Kogevinas M, Boffetta P. Socioeconomic differences in cancer incidence and mortality. In: Kogevinas M, Pearce N, Susser M, Boffetta P, eds. Social Inequalities and Cancer. IARC Scientific Publications No. 138. Lyon: International Agency for Research on Cancer, 1997:65-176.

Faivre J, Forman D, Esteve J, Obradovic M, Sant M, and the EUROCARE Working Group. Survival of patients with primary liver cancer, pancreatic cancer and biliary tract cancer in Europe. Eur J Cancer 1998; 34: 2184-2190.

Faivre J, Forman D, Esteve J, Gatta G and the EUROCARE working group. Survival of patients with oesophageal and gastric cancers in Europe. European J Cancer 1998; 34: 2167-2175

Farquhar CM, Steiner CA. Hysterectomy rates in the United States 1990-1997. Obstet Gynecol 2002; 99: 229-234.

Ferlay J, Bray F, Sankila R, Parkin DM. EUCAN: Cancer incidence, mortality and prevalence in the European Union. Lyon: International Agency for Research on Cancer, 1999 (http://www-dep.iarc.fr/encr/download.htm)

Fernandez E, La Vecchia C, Balducci A, Chatenoud L, Franceschi S, Negri E. Oral contraceptives and colorectal cancer risk: a meta-analysis. Br J Cancer 2001; 84: 722-727

Fesinmeyer MD, Austin MA, Li CI, De Roos AJ, Bowen DJ. Differences in survival by histologic type of pancreatic cancer. Cancer Epidemiol Biomarkers Prev. 2005; 14: 1766-1773

Fiala B, Kopp M, Gunther V. Why do young women use sunbeds? A comparative psychological study. British J Dermatol 1997; 137: 950

Fisher AE, Van Horn L, McGill HC. Nutrition and Children; A Statement for Healthcare Professionals from the Nutrition Committee, American Heart Association. Circulation, 1997; 95: 2332-2333

Fisher RI, Mille TP, O'Connor OA. Diffuse aggressive lymphoma. Hematology 2004; Am Soc Hematol Educ Program: 221-236

Fisher SG, Fisher RI . The epidemiology of non-Hodgkin's lymphoma. Oncogene 2004; 23: 6524-6534

Fitzsimmons D, Johnson CD, George S, et al. Development of a disease specific quality of life (QoL) questionnaire module to supplement the EORTC core cancer QoL questionnaire, the QLQ-C30 in patients with pancreatic cancer. Eur J Cancer 1999; 35: 939-41

Franceschi SA, Dal Maso L, La Vecchia C. Advances in the epidemiology of HIV-associated non-Hodgkin's lymphoma and other lymphoid malignancies. Int J Cancer 1999; 83: 481-483

Friel S, Nic Gabhainn S, Kelleher C. The National Health and Lifestyle Surveys (SLÁN). Dublin & Galway: Department of Health Promotion, Department of Health and Children & Centre for Health Promotion Studies, NUI Galway, 1999

Fu JB, Ying Kau T, Severson RK, Kalemkerian GP. Lung cancer in women: Analysis of the National Surveillance, Epidemiology and End Results database. Chest 2005; 127: 768-777

Gallagher RP, Spinelli JJ, Lee TK. Tanning beds, sunlamps, and risk of cutaneous malignant melanoma. Cancer Epidemiol Biomarkers Prev 2005; 14: 562-566

Gandini S, Sera F, Cattaruzza MS, Pasquini P, Abeni D, Boyle P, Melchi CF. Meta-analysis of risk factors for cutaneous melanoma: I Common and atypical naevi. Eur J Cancer 2005; 41: 28-44

Gandini S, Sera F, Cattaruzza MS, Pasquini P, Picconi O, Boyle P, Melchi CF. Meta-analysis of risk factors for cutaneous melanoma: II Sun exposure. Eur J Cancer 2005; 41: 45-60

Gandini S, Sera F, Cattaruzza MS, Pasquini P, Zanetti R, Massini C, Boyle P, Melchi CF. Meta-analysis of risk factors for cutaneous melanoma: III Family history, actinic damage and phenotypic factors. Eur J Cancer 2005; 41: 2040-2059

Garvin T, Wilson K. The use of storytelling for understanding women's desires to tan: lessons from the field. The Professional Geographer 1999; 51: 297-306

Gatta G, Capocaccia R, Sant M, et al. Understanding variations in survival from colorectal cancer in Europe: a EUROCARE high resolution study. Gut 2000; 47: 533-538

Gatta G, Ciccolallo L, Capocaccia R, et al. Differences in colorectal cancer survival between European and US populations: the importance of sub-site and morphology. Eur J Cancer 2003t; 39: 2214-22

Gatta G, Faivre J, Capocaccia P, Ponz de Leon M. Survival of colorectal cancer patients in Europe during the period 1978-1989. Eur J Cancer 1998; 34: 2176-2183

Gatta G, Lasota MB, Verdecchia A and the EUROCARE Working Group. Survival of European women with gynaecological tumours, during the period 1978-1989. Eur J Cancer 1998; 34: 2218-2225

Giovannucci E. An updated review of the epidemiological evidence that cigarette smoking increases risk of colorectal cancer. Cancer Epidemiol Biomarkers Prev 2001; 10:725-731

Gisbert JP, Garcia-Buey L, Pajares JM, Moreno-Otero R. Prevalence of hepatitis C virus infection in B-cell non-Hodgkin's lymphoma: systemic review and meta-analysis. Gastroenterology 2003; 125: 1723-1732

Gonzalez-Perez A, Garcia Rodriguez, LA, Lopez-Ridaura R. Effects of non-steroidal anti-inflammatory drugs on cancer sites other than the colon and rectum: a meta-analysis. BMC Cancer 2003; 3: 28

Government of Ireland. Public Health (Tobacco) Act, 2002. Irish Statute Book. (http://acts.oireachtas.ie/en.act.2002.0006.1.html)

Green JA, Kirwan JM, Tierney JF, et al. Survival and recurrence after concomitant chemotherapy and radiotherapy for cancer of the uterine cervix: a systematic review and meta-analysis. Lancet 2001; 358: 781-786

Gregor A, Thomson CS, Brewster DH, et al. Management and survival of patients with lung cancer in Scotland diagnosed in 1995: results of a national population based study. Thorax 2001; 56: 212-217

Grob JJ, Gouvernet J, Aymar D, et al. Count of benign melanocytic nevi as a major indicator of risk of nonfamilial nodular and superficial spreading melanoma. Cancer 1990; 66: 387-395

Gwyn K, Vernon SW, Conoley PM. Intention to pursue genetic testing for breast cancer among women due for screening mammography. Cancer Epidemiol Biomarkers Prev 2003; 12: 96-102.

Hamajima N, Hirose K, Tajima K, et al. Alcohol, tobacco and breast cancer—collaborative reanalysis of individual data from 53 epidemiological studies, including 58.513 women with breast cancer and 95,067 women without the disease. Br J Cancer 2002; 87: 1234-1245

Hansson LE, Ekstrom AM, Bergstrom R, Nyren O. Surgery for stomach cancer in a defined Swedish population: current practices and operative results. Swedish Gastric Cancer Study Group. Eur J Surg 2000; 166: 787-795

Hardiman P, Pillay OC, Atiomo W. Polycystic ovary syndrome and endometrial carcinoma. Lancet 2003; 361: 1810-1812

Harris V, Sandridge AL, Black RJ, Brewster DH, Gould A. Cancer Registration Statistics Scotland, 1986-1995. Edinburgh: ISD Scotland Publications, 1998

Hartge P, Devesa SS. Quantification of the impact of known risk factors on time trends in non-Hodgkin's lymphoma incidence. Cancer Res 1992; 52 (19 Suppl): 5566s-5569s

Hawkins NJ, Ward RL. Sporadic colorectal cancers with microsatellite instability and their possible origin in hyperplastic polyps and serrated adenomas. J Natl Cancer Inst 2001; 93: 1307-1313

Helicobacter and Cancer Collaborative Group. Gastric cancer and Helicobacter pylori: a combined analysis of 12 case control studies nested within prospective cohorts. Gut 2001; 49: 347-353

Henson DE, Reis L, Freedman LS, Carriaga M. Relationship among outcome, stage of disease, and histologic grade for 22,616 cases of breast cancer. The basis for a prognostic index. Cancer 1991; 68: 2142-2149

Hersh, A. L., Stefanick, M. L. and Stafford, R. S. National Use of Postmenopausal Hormone Therapy: Annual Trends and Response to Recent Evidence. Journal of the American Medical Association 2004, 291, 47-53.

Hershman D, Jacobson JS, McBride R, et al. Effectiveness of platinum-based chemotherapy among elderly patients with advanced ovarian cancer. Gynecol Oncol 2004; 94: 540-549

HIPE & NPRS Unit, Economic and Social Research Institute (ESRI). Report on Perinatal Statistics for 2001. Dublin: ESRI and Department of Health and Children, 2005

Hoel DG, Davis DL, Miller AB, Sondik EJ, Swerdlow AJ. Trends in cancer mortality in 15 industrialized countries, 1969-1986. J Natl Cancer Inst 1992; 84: 313-320

Holly EA, Kelly JW, Shpall SN, Chiu SHG. Number of melanocytic nevi as a major risk factor for malignant melanoma. J Am Acad Dermatol 1987; 17: 459-468

Hopflinger F. Cohort fertility in Western Europe: comparing fertility trends in recent birth cohorts. Genus 1984: 40: 19-46

Howe GR, Ghadirian P, Bueno de Mesquita HB, et al. A collaborative case-control study of nutrient intake and pancreatic cancer within the search programme. Int J Cancer 1992; 51: 365-372

Hulley S, Furberg C, Barrett-Connor E, et al., and the HERS Research Group. Noncardiovascular disease outcomes during 6.8 years of hormone therapy: Heart and Estrogen/progestin Replacement Study follow-up (HERS II). JAMA 2002; 288:58-66

Humphrey LL, Teutch S, Johnson M. Lung cancer screening with sputum cytologic examination, chest radiography and computed tomography: an update for the US preventive services task force. Ann Intern Med 2004; 140: 740-753

Huxley R, Ansary-Moghaddam A, Berrington de Gonzalez A, Barzi F, Woodward M. Type II diabetes and pancreatic cancer: a meta-analysis of 36 studies. Br J Cancer 2005; 92: 2076-2083

IARC Working Group. IARC Handbooks of Cancer Prevention, Volume 1. Non-Steroidal Anti-Inflammatory Drugs. Lyon: International Agency on Research on Cancer, 1997

IARC Working Group. IARC Handbooks of Cancer Prevention, Volume 2. Carotenoids. Lyon: International Agency for Research on Cancer, 1998

IARC Working Group. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 72: Hormonal Contraception and Post-Menopausal Hormonal Therapy. Lyon: International Agency for Research on Cancer, 1999

IARC Working Group. IARC Handbooks of Cancer Prevention Vol. 5: Sunscreens. Lyon: International Agency for Research on Cancer, 2001

IARC Working Group. IARC Handbook of Cancer Prevention Vol. 6: Weight Control and Physical Activity in Cancer Prevention. Lyon: International Agency for Research on Cancer, 2002a

IARC Working Group. IARC Handbooks of Cancer Prevention. Volume 7: Breast cancer screening. Lyon: International Agency for Research on Cancer, 2002b

IARC Working Group. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 83: Tobacco smoke and Involuntary Smoking. Lyon: International Agency for Research on Cancer, 2002c (http://www-cie.iarc.fr/htdocs/indexes/vol83index.html)

IARC Working Group. IARC Handbook of Cancer Prevention. Volume 8: Fruit and Vegetables. Lyon: International Agency for Research on Cancer, 2003

IARC Working Group. IARC Handbook on Cancer Prevention. Volume 9: Cruciferous vegetables, isothiocyanates and indoles. Lyon: International Agency for Research on Cancer, 2004a

IARC Working Group. IARC Monograph on the Evaluation of Carcinogenic Risks to Humans. Volume 83: Tobacco Smoke and Involuntary Smoking. Lyon: International Agency for Research on Cancer, 2004b

IARC Working Group. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 91, Monograph no. 1 (draft) 2005a. http://www-cie.iarc.fr/htdocs/monographs/vol91/91-contraceptives.pdf 2005

IARC Working Group. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Combined estrogen-progestogen menopausal therapy. Volume 91, Monograph no. 2 (draft). 2005b http://www-cie.iarc.fr/htdocs/monographs/vol91/91-menop-ther.pdf 2005

IARC Working Group. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Human papillomaviruses; volume 90 (draft) 2005c http://www-cie.iarc.fr/htdocs/announcements/vol90.htm

IARC Working Group. IARC Handbook of Cancer Prevention. Volume 10: Cervix cancer screening. Lyon: International Agency for Research on Cancer, 2005d

IARC. Press Release no 167. IARC Monographs Programme Finds Combined Estrogen-Progestogen Contraceptives and Menopausal Therapy are Carcinogenic to Humans. 2005e http://www.iarc.fr/ENG/Press_Releases/pr167a.html#Vol91.

Irish Cancer Society. SunSmart. Save your skin. Available from URL: www.cancer.ie/sunsmart

Irish Cervical Screening Programme (ISCP). Available from: URL www.icsp.ie/home/default.asp

Irish Cervical Screening Programme (ISCP). Colposcopy Quality Assurance Visit Report 2003-2005. Limerick: Irish Cervical Screening Programme, 2005 (http://www.icsp.ie/_fileupload/publications/Colposcopy_Report_090605.pdf)

Irish Cervical Screening Programme (ISCP). Statistical Report, October 2000-December 2003. Limerick: Irish Cervical Screening Programme, 2004 (http://www.icsp.ie/_fileupload/publications/ICSP_StatsReport_0103.pdf)

Irish Sports Council (2003). Sport for Life; Statement of strategy 2003-2005. Dublin: Irish Sports Council, 2003 (http://www.irishsportscouncil.ie/strategy.asp)

Irish Universities Nutrition Alliance. IUNA North/South Ireland food consumption survey: Food and nutrient intakes, anthropometry, attitudinal data & physical activity patterns. Dublin: Food Safety Promotion Board, 2001

Janseen-Heijnen ML, Gatta G, Forman D, Capocaccia R, Coebergh JW. Variation in survival of patients with lung cancer in Europe, 1985-1989. EUROCARE Working Group. Eur J Cancer 1998; 34 (14 Spec No): 2191-2196

Janssen-Heijnen ML, Coebergh JW. The changing epidemiology of lung cancer in Europe. Lung Cancer 2003; 41: 245-258

Johns LE, Houlston RS. A systematic review and meta-analysis of familial colorectal cancer risk. Am J Gastroenterol 2001; 96: 2992-3003

Keku TO, Rakhra-Burris T, Millikan R. Gene testing: what the health professional needs to know. J Nutr 2003; 133 (11 Suppl 1): 3754S-3757S.

Kelleher C, Nic Gabhainn S, Friel S, Corrigan H, Nolan G, Sixsmith J, Walsh O, Cooke M. The National Health and Lifestyle Surveys (SLÁN). Galway: Health Promotion Unit, Department of Health and Children; Centre for Health Promotion Studies, National University of Ireland Galway; Department of Public Health Medicine and Epidemiology, University College Dublin, 2003 (http://www.doh.ie/publications/lifestyle.html)

Kelly A, Sinclair H (1997) Deprivation and health: identifying the black spots. J Health Gain 1: 13-14

Kennedy P, Quin S, Murphy-Lawless J, Hickey E. (2000). Survey of Views and Perceptions of Women who attended Symptomatic Breast Clinics. Dublin: The Womens Health Council, 2000 (http://www.whc.ie/publications/survey_breast_clinics.pdf)

Key TJ, Schatzkin A, Willett WC, Allen NE, Spencer, EA, Travis, RC. Diet, nutrition and the prevention of cancer. Public Health Nutrition 2004; 7: 187-200

Key TJ, Verkasalo PK, Banks E. Epidemiology of breast cancer. Lancet Oncol 2001; 2: 133-140

Khuder SA, Herial NA, Mutgi AB, Federman DJ. Nonsteroidal anti-inflammatory drug use and lung cancer: a metaanalysis. Chest 2005; 127: 748-754

Khuder SA, Mutgi AB. Breast cancer and NSAID use: a meta-analysis. Br J Cancer 2001; 84: 1188-1192

Kjaerbye-Thygesen A, Huusom LD, Fredericksen K, Kjaer SK. Trends in the incidence and mortality of ovarian cancer in Denmark 1978-2002. Comparison with other Nordic countries. Acta Obstet Gynecol Scand 2005; 84: 1006-1012

Korte JE, Brennan P, Henley SJ, Boffetta P. Dose-specific meta-analysis and sensitivity analysis of the relation between alcohol consumption and lung cancer risk. Am J Epidemiol 2002; 155: 496-506

Kosary CL. FIGO stage, histology, histologic grade, age and race as prognostic factors in determining survival for cancers of the female gynaecological system: an analysis of 1973-87 SEER cases of cancers of the endometrium, cervix, ovary, vulva and vagina. Semin Surg Oncol 1994; 10: 31-46

Koutsky L and Kiviat NB. Sexually Transmitted Diseases: Genital human papillomaviruses. New York: McGraw-Hill, 1999

La Leche League. Available from URL: www.lalecheleague.org/cbi/bfstats03.html

La Vecchia C. Epidemiology of ovarian cancer: a summary review. Eur J Cancer Prevention 2001; 10: 125-129

Layke JC, Lopez PP. Gastric cancer: diagnosis and treatment options. Am Fam Physician 2004; 69: 1133-1140

Lethaby A, Suckling J, Barlow D, Farquhar CM, Jepson RG, Roberts H. Hormone replacement therapy in postmenopausal women. Cochrane Database of Systematic Reviews 2005; 3

Levine M, Moutquin J-M, Walton R, Feightner J. Chemoprevention of breast cancer: a joint guideline from the Canadian task force on preventive health care and the Canadian breast cancer initiative's steering committee on clinical practice guidelines for the care and treatment of breast cancer. Canadian Medical Association 2001; 164: 1681-1690

Little J, Sharp L. The epidemiology of colorectal cancer. In: Cassidy J, Johnston P, Van Custem E (eds) Colorectal Cancer. Marcel Dekker (in press)

Lukanova A, Kaaks R. Endogenous hormones and ovarian cancer: epidemiology and current hypotheses. Cancer Epidemiol Biomarkers Prev 2005; 14: 98-107

Lynch HT, Lynch JF. What the physician needs to know about Lynch syndrome: an update. Oncol (Williston Park) 2005; 19: 455-463

Lynch JW, Davey Smith G, Kaplan GA, House JS. Income inequality and mortality: Importance to health of individual income, psychosocial environment, or material conditions. BMJ, 2000; 320: 1200-1204 (http://www.bmj.com/cgi/content/full/320/7243/1200)

Maas HA, Kruitwagen RF, Lemmens VE, Goey SH, Janssen-Heijnen ML. The influence of age and co-morbidity on treatment and prognosis of ovarian cancer: a population-based study. Gynecol Oncol 2005; 97: 104-109

Mahmud SM, Reilly M, Comber H. Patterns of initial management of lung cancer in the Republic of Ireland: a population-based observational study. Lung Cancer 2003; 41: 57-64

Majumdar, S. R., Almasi, E. A. and Stafford, R. S. Promotion and Prescribing of Hormone Therapy After Report of Harm by the Women's Health Initiative. Journal of the American Medical Association 2004, 292:1983-1988.

Manderson L, Markovic M, Quinn M. "Like roulette": Australian women's explanations of gynecological cancers. Soc Sci Med, 2005; 61: 323-332

Marrett LD, Nguven HL, Armstrong BK. Trends in the incidence of cutaneous malignant melanoma in New South Wales, 1983-1996. Int J Cancer 2001; 92: 457-462

Marshall SF, Hardy RJ, Kuh D. Socioeconomic variation in hysterectomy up to age 52: national, population based, prospective cohort study. BMJ 2000; 320: 1579

Mason C. Contraceptive Needs: The Evidence, A Literature Review. Crisis Pregnancy Agency Report No. 5. Dublin: Crisis Pregnancy Agency, 2004

Matakidou A, Eisen T, Houlston RS. Systematic review of the relationship between family history and lung cancer risk. Br J Cancer 2005: 93: 825-833

Matsuo K, Kusane A, Sugumar A, Nakamura S, Tajima K, Mueller NE. Effect of hepatitis C infection on the risk of non-Hodgkin's lymphoma: a meta-analysis of epidemiological studies. Cancer Sci. 2004; 95: 745-752

McGlone E. Ageism in the Health and Social Services Sector in Ireland. In From Ageism to Age Equality: Addressing the Challenges. Conference Proceedings (Ed. McGivern, Y.). Dublin: National Council on Ageing and Older People, 2005

McGoogan, E. Report on the Irish Cervical Screening Programme. Limerick: Health Board Executive (HeBE), 2004 (http://www.icsp.ie/_fileupload/publications/A_report_on_ICSP_July_2004.pdf)

McMurdo, M. E. T., Witham, M. D. and Gillespie, N. D. 'Including older people in clinical research'. British Medical Journal 2005,, 331, 1036-1037.

McPherson K, Steel CM, Dixon JM. ABC of Breast Diseases: Breast Cancer—Epidemiology, Risk Factors and Genetics. BMJ, 2000; 321: 624-628 (http://bmj.bmjjournals.com/cgi/reprint/321/7261/624.pdf)

McWilliams RR, Rabe KG, Olswold C, De Andrade M, Petersen, GM. Risk of malignancy in first-degree relatives with pancreatic carcinoma. Cancer 2005; 104: 388-394

Michaud DS. Epidemiology of pancreatic cancer. Minerva Chirurgica 2004; 59: 99

Micheli A, Capocaccia R, Martinez C, et al. Cancer control in Europe. A proposed set of European Cancer Health Indicators. Eur J Pub Health 2003; 13 (3 suppl): 116-119

Micheli A, Mariotto A, Hiorgi Rossi A, Gatta G, Muti P. The prognostic role of gender in survival of adult cancer patients. Eur J Cancer 1998; 34: 2271-2278

Miller AB, Altenberg HP, Bueno-de-Mesquita B, et al. Fruits and vegetables and lung cancer: findings from the European Prospective Investigation into Cancer and Nutrition. Int J Cancer 2004; 108: 269-276

Million Women Study Collaborators. Breast cancer and hormone-replacement therapy in the Million Women Study. Lancet, 2003; 362: 419-427

Moller B, Weedon-Fekjaer H, Hakulinen T, et al. The influence of mammographic screening on national trends in breast cancer incidence. Eur J Cancer Prev 2005; 14: 117-128

Morton LM, Hartge P, Holford TR, et al. Cigarette smoking and risk of non-Hodgkin lymphoma: a pooled analysis from the International Lymphoma Epidemiology Consortium (interlymph). Cancer Epidemiol Biomarkers Prev 2005; 14: 925-933

Muller AMS, Ihorst G, Mertelsmann R, Engelhardt M. Epidemiology of non-Hodgkin's lymphoma (NHL): trends, geographic distribution and etiology. Ann Hematol 2005; 84: 1-12

Murray LJ, McCrum EE, Evans AE, Bamford KB. Epidemiology of Helicobacter pylori infection among 4742 randomly selected subjects from Northern Ireland. Int J Epidemiol 1997; 26: 880-887

Nanthakumaran S, Fernandes E, Thompson AM, Rapson T, Glibert FJ, Park KG. Morbidity and mortality rates following gastric cancer surgery and contiguous organ removal, a population based study. Eur J Surg Oncol 2005; 31: 1141-1144

National Cancer Insitute. National Lung Screening Trial (NLST). Available from: URL www.cancer.gov/nlst

National Cancer Institute. Physical Activity and Cancer: Questions and Answers. (http://www.nci.nih.gov/cancertopics/factsheet/physical-activity-qa. Accessed on 15th June 2005)

National Centre for Medical Genetics. Available at http://www.genetics.ie

National Committee on Breastfeeding. Breastfeeding in Ireland – A Five Year Strategic Action Plan. Dublin: Department of Health & Children, 2005 (http://www.healthpromotion.ie/uploaded_docs/ACTIONplan.pdf)

National Task Force on Obesity. Obesity; The Policy Challenges. Dublin: Stationery Office, 2005 (http://www.dohc.ie/publications/report_taskforce_on_obesity.html)

National Working Group on Alcohol Consumption in Higher Education. Framework for Developing a College Alcohol Policy. Dublin: Health Promotion Unit, Department of Health & Children, 2001 (http://www.healthpromotion.ie/pdf/College.pdf)

Ness RB, Cottreau C. Possible role of ovarian epithelial inflammation in ovarian cancer. J Natl Cancer Inst 1999; 91: 1459-1467

NHS Bowel Cancer Screening Programme. Available at http://www.cancerscreening.nhs.uk/bowel/index.html

NHS National Institute for Clinical Excellence. Dyspepsia; Management of dyspepsia in adults in primary care. Clinical Guideline 2004;17

NicAmhlaoibh R, Mahmud S, Comber H. Patterns of care and survival from cancer in Ireland 1994 to 1998. Cork: National Cancer Registry, 2004

NICE. *Social Value Judgements: Principles for the Development of NICE Guidance*. London: National Institute for Health & Clinical Excellence, 2005. http://www.nice.org.uk/pdf/SocialValueJudgement-08_12_05.pdf

Norat T, Bingham S, Ferrari P, et al. Meat, fish and colorectal cancer risk: the European prospective investigation into cancer and nutrition. J Natl Cancer Inst 2005; 97: 906-916

O'Keefe B, O'Higgins N, O'Doherty A. Development of Services for Symptomatic Breast Disease. Dublin: National Cancer Forum, 2000 (http://www.nationalcancerforum.ie/publications_doc/breastdisease.doc)

Office for Tobacco Control. Promoting a tobacco free society. Available from: URL www.otc.ie

Office of Tobacco Control and TNS mrbi (2003). Irish Women and Tobacco: Knowledge, Attitudes and Beliefs. Research Report on Tobacco Use in Ireland. Kildare: Office of Tobacco Control, 2003 (http://69.20.28.11/Uploads/Publications%20-%20Irish%20Women%20and%20Tobacco%20low%20res%20version.pdf)

Parks RW, Bettschart V, Frame S, Stockton DL, Brewster DH, Garden OJ. Benefits of specialisation in the management of pancreatic cancer: results from a Scottish population- based study. Br J Cancer 2004; 91: 459-465

Pasacreta JV. Psychosocial issues associated with genetic testing for breast and ovarian cancer risk: an integrative review. Cancer Invest 2003; 21: 588-623.

Peto R, Darby S, Deo H, Silcocks P, Whitley E, Doll R. Smoking, smoking cessation and lung cancer in the UK since 1950: combination of national statistics with two case-control studies. BMJ 2000; 321: 323-329

Pisani P, Parkin DM, Munoz N, Ferlay F. Cancer and infection: estimates of the attributable fraction in 1990. Cancer Epidemiol Biomarkers Prev 1997; 6: 387-400

Plummer M, Franceschi S, Munoz N. Epidemiology of gastric cancer. IARC Scientific Publications No 157 2004; 311-326

Plummer M, Herrero R, Franceschi S, et al., and the IARC Multicentre Cervical Cancer Study Group. Smoking and cervical cancer: pooled analysis of the IARC multi-centric case-control study. Cancer Causes Control 2003; 14: 804-814

Prorok PC, Andriole GL, Bresalier RS, et al. Design of the prostate, lung, colorectal and ovarian (PLCO) cancer screening trial. Control Clin Trials 2000; 21: 273S-309S

Purdie DM, Green AC. Epidemiology of endometrial cancer. Best Practice & Research Clinical Obstetrics & Gynaecology 2001; 15: 341-354

Quinn M, Babb P, Jones J, Allen E. Effect of screening on incidence of and mortality from cancer of the cervix in England: evaluation based on routinely collected statistics. BMJ 1999; 318: 904-908

Quinn M, Babb PJ, Crock A, et al. Cancer Trends in England and Wales, 1950-1999. Studies on Medical and Population Subjects No. 66. London: The Stationery Office, 2001

Quinn M, Wood H, Cooper N, Rowan S.(eds) Cancer Atlas of the United Kingdom and Ireland 1991-2000. Studies on Medical and Population Subjects No. 68. Hampshire: HMSO, 2005

Ramstedt M, Hope A. Summary of "Irish drinking habits of 2002—Drinking and drinking-related harm in a European comparative perspective". In: Strategic Task Force on Alcohol, Second Report. Dublin: Health Promotion Unit, Department of Health & Children 2004, pp 50-55. (http://www.healthpromotion.ie/uploaded_docs/Strategic_Task_Force_on_Alcohol_Report_2004.pdf)

Rehm J, Room R, Monteiro M, Gmel G, Graham K, Rehn N, Sempos CT, Frick U, Jernigan D. Alcohol Use. In: Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors (Ed. Murray CJL). World Health Organisation, Geneva, 2004 (http://www.who.int/publications/cra/chapters/volume1/0000i-xxiv.pdf)

Reis LAG, Wingo PA, Miller DS, Howe HL, Weir HK, Rosenberg HM, Vernon SW, Cronin K, Edwards B. The annual report to the nation on the status of cancer, 1973-1997, with a special section on colorectal cancer. Cancer 2000; 88:2398-2424

Reis, LAG, Eisner MP, Kosary CL, et al. (eds). SEER Cancer Statistics Review 1973-1998. Bethesda, MD: National Cancer Institute, 2001.

Repetto L, Venturino A, Fratino L, Serraino D, Troisi G, Gianni W, Pietropaolo M. Geriatric oncology: a clinical approach to the older patient with cancer. Eur J Cancer 2003; 39: 870-880

Riman T, Nilsson S, Persson IR. Review of epidemiological evidence for reproductive and hormonal factors in relation to the risk of epithelial ovarian malignancies. Acta Obstet Gynecol Scand 2004; 83: 783-795

Robertson G. Screening for endometrial cancer. Med J Aust 2003; 178: 657-659

Robinson MHE, Thomas WM, Hardcastle JD, Chamberlain J, Mangham CM. Change towards earlier stage at presentation of colorectal cancer. Br J Surg 2002; 80: 1610-1612

Rossouw JE, Anderson GL, Prentice RL, LaCroix AZ, Kooperberg C, Hutchinson F, Stefanick ML, Jackson RD, Beresford SAA, Howard BV, Johnson KC, Kotchen JM, Ockene J. Risks and benefits of estrogen plus progestin in healthy postmenopausal women; Principle results from the Womens Health Initiative randomized controlled trial. JAMA, 2002; 288: 321-333

Saffron Initiative Steering Committee. The Saffron Report on Womens Lifetime Health Needs. Saffron Initiative, Dublin 1999

Sahmoun AE, D'Agostino RA Jr, Bell RA, Schwenke DC. International variation in pancreatic cancer mortality for the period 1955-1998. Eur J. Epidemiol. 2003; 18: 801-816

Samet JM, Yoon SY (Eds). Women and the Tobacco Epidemic; Challenges for the 21st Century. The World Health Organisation in collaboration with the Institute for Global Tobacco Control and Johns Hopkins School of Public Health. Canada 2001 (http://www.who.int/tobacco/media/en/WomenMonograph.pdf)

Sant M, Aareleid T, Berrino F, et al., and the EUROCARE Working Group. EUROCARE-3: survival of cancer patients diagnosed 1990-94-results and commentary. Ann Oncol. 2003;14(Suppl 5): v61-v118

Sant M, Allemani C, Capocaccia R, et al, and the EUROCARE Working Group. Stage at diagnosis is a key explanation of differences in breast cancer survival across Europe. Int J Cancer 2003; 106: 416-422.

Schroeder JC, Olshan AF, Baric R, et al. A case-control study of tobacco use and other non-occupational risk factors for f(14,18) subtypes of non-Hodgkin's lymphoma (United States). Cancer Causes Control 2002; 13: 159-168

Schroeder JC, Olshan AF, Baric R, et al. Agricultural risk factors for t(14;18) subtypes of non-Hodgkin's lymphoma. Epidemiology 2001; 12: 701-709

Schwartz MD, Peshkin BN, Tercyak KP, Taylor KL, Valdimarsdottir H. Decision making and decision support for hereditary breast-ovarian cancer susceptibility. Health Psychol 2005; 24 (Suppl 4): S78-S84.

Scottish Cancer Group Cancer Genetics Subgroup. Cancer Genetic Services in Scotland. Guidance to support the implementation of genetic services for breast, ovarian and colorectal cancer predisposition. Scottish Executive. Edinburgh: 2001.

SEER (Surveillance Epidemiology and End Results). Available from URL: //seer.cancer.gov/

Segnan N. Socioeconomic status and cancer screening. In: Kogevinas M, Pearce N, Susser M, Boffetta P, eds. Social Inequalities and Cancer. IARC Scientific Publications No. 138. Lyon: International Agency for Research on Cancer, 1997: 369-376

Shaeffer DT, Randall ME. Adjuvant radiotherapy in endometrial carcinoma. Oncologist 2005; 10: 623-631

Sharp L. Current trends in colorectal cancer: what they tell us and what we still do not know. Clin Oncol 2001; 13:444-447

Shaw AR. Human Papillomavirus vaccines in development: If they're successful in clinical trials, how will they be implemented? Gynecol Oncol 2005; Oct 3 {Epub ahead of print]

Siemiatycki J, Krewski D, Franco E, Kaiserman M. Association between cigarette smoking and each of 21 types of cancer: a multi-site case-control study. Int J Epidemiol 1995; 24: 504-514

SIGN (Scottish Intercollegiate Guidelines Network). Epithelial ovarian cancer. A national clinical guideline. Guideline 75. Edinburgh: NHS, 2003

SIGN (Scottish Intercollegiate Guidelines Network), 2006. (http://.www.sign.ac.uk)

SIGN (Scottish Intercollegiate Guidelines Network). Management of breast cancer in women. Guideline 84. Edinburgh: NHS, 2005

SIGN (Scottish Intercollegiate Guidelines Network). Management of patients with lung cancer. Guideline 80. Edinburgh: NHS, 2005

Smith JA, Whatley PM, Redburn JC. Improving survival of melanoma patients in Europe since 1978. Eur J Cancer 1998; 34: 2197-2203

Soler M, Chatenoud L, La Vecchia C, Franceschi S, Negri E. Diet, alcohol, coffee and pancreatic cancer: final results from an Italian study. Eur J Cancer Prev 1998; 7: 455-460

Stott MA. Tanning and sunburn: knowledge, attitudes and behaviour of people In Great Britain. J Pub Health Med 1999; 21: 377-384

Strategic Task Force on Alcohol. Interim report. Department of Health & Children, Dublin 2002

Strategic Task Force on Alcohol. Strategic Task Force on Alcohol—Second Report. Health Promotion Unit, Department of Health & Children, Dublin 2004 (http://www.healthpromotion.ie/uploaded_docs/Strategic_Task_Force_on_Alcohol_Report_2004.pdf)

Stratton JF, Pharoah P, Smith SK, Easton D, Ponder BA. A systematic review and meta-analysis of family history and risk of ovarian cancer. Br J Obstet Gynaecol 1998; 105: 493-499

The UK CRC Screening Pilot Evaluation Team. Evaluation of the UK Colorectal Cancer Screening Pilot. Final Report. NHS. Edinburgh, 2003.

Thompson MT, Kurzrock R. Epstein-Barr virus and cancer. Clinical Cancer Research 2004; 10: 803-821

Tingulstad S, Skjeldestad FE, Halvorsen TB, Hagen B. Survival and prognostic factors in patients with ovarian cancer. Obstet Gynecol 2003; 101: 885-891

Tsianakas V, Rice K. Gender in Policy and Planning. Gender Analysis Framework Case Study—Alcohol. Women's Health Victoria, Australia 2004. (http://www.whv.org.au/case-studies/alcohol-gia.pdf)

Townsley, C. A., Selby, R. and Siu, L. L. Systematic review of barriers to the recruitment of older patients with cancer onto clinical trials. Journal of Clinical Oncology 2005, 23, 3112-3124. UK Collaborative Trial of Ovarian Cancer Screening. Available from URL: www.ukctocs.org.uk

UK Flexible Sigmoidoscopy Screening Trial Investigators. Single flexible sigmoidocsopy screening to prevent colorectal cancer: baseline findings of a UK multicentre randomized trial. Lancet 2002; 359: 1291-1300.

US Department of Health & Human Services. Cancer and the Environment; What You Need to Know, What You Can Do. Washington: US Department of Health & Human Services, National Institutes of Health, National Cancer Institute, National Institute of Environmental Health Sciences, 2003 (http://www.cancer.gov/images/Documents/5d17e03e-b39f-4b40-a214-e9e9099c4220/Cancer%20and%20the%20Environment.pdf)

US Department of Health and Human Services. Report on Carcinogens, Eleventh Edition; Public Health Service, National Toxicology Program, 2005 (http://ntp-server.niehs.nih.gov/ntp/roc/roc11.zip)

US Surgeon General. Women and smoking: A report of the Surgeon General. Atlanta: Centers for Disease Control and Prevention, 2002 (http://www.cdc.gov/tobacco/sgr/sgr_forwomen/index.htm)

Uyer D, Frasure HE, Markman M, von Gruenigen VE. Treatment patterns by decade of life in elderly women (> or = 70 years of age) with ovarian cancer. Gynecol Oncol 2005; 98: 403-408

van Doorslaer, E., Masseria, C. and Koolman, X. Inequalities in access to medical care by income in developed countries. Canadian Medical Association Journal, 2006, 174, 177-183. Amant F, Moerman P, Neven P, Timmerman D, Van Limberg E, Vergote I. Endometrial cancer. Lancet 2005; 366: 491-505Verdecchia A, Corazziari I, Gatta G, Lisi D, Faivre J, Forman D, and the EUROCARE Working Group. Explaining gastric cancer survival differences among European countries. Int J Cancer 2004; 109: 737-741

van Gils CH, Peeters PH, Bueno-de-Mesquita HB, Boshuizen HC, Lahmann PH, Clavel-Chapelon F, Thiebaut A, Kesse E, Sieri S, Palli D, Tumino R, Panico S, Vineis P, Gonzalez CA, Ardanaz E, Sanchez MJ, Amiano P, Navarro C, Quiros JR, Key TJ, Allen N, Khaw KT, Bingham SA, Psaltopoulou T, Koliva M, Trichopoulou A, Nagel G, Linseisen J, Boeing H, Berglund G, Wirfalt E, Hallmans G, Lenner P, Overvad K, Tjonneland A, Olsen A, Lund E, Engeset D, Alsaker E, Norat T, Kaaks R, Slimani N, Riboli E. Consumption of vegetables and fruits and risk of breast cancer. JAMA 2005, 293: 183-193.

Veronesi U, Boyle P, Goldhirsch A, Orecchia R, Viale G. Breast cancer. Lancet 2005; 365: 1727-1741

Wall M. Harney gives go-ahead for two new BreastCheck units. Irish Times, 6th May 2005.

Wang WH, Huang JQ, Zheng GF, Lam SK, Karlberg J, Wong BC. Non-steroidal anti-inflammatory drug use and the risk of gastric cancer: a systematic review and meta-analysis. J Natl Cancer Inst 2003; 95: 1784-1791

Warshaw AL, Fernandez-del Castillo C. Pancreatic carcinoma. N Engl J Med 1992; 326: 455-465

WCRF/AICR (World Cancer Research Fund in Association with American Institute for Cancer Research) Food, Nutrition and the Prevention of Cancer: A Global Perspective. Menasha: American Institute for Cancer Research, 1997

Weingarten M, Zalmonovici A, Yaphe J. Dietary calcium supplementation for preventing colorectal cancer and adenomatous polyps. Cochrane Database Syst Rev 2005; Jul 20 (3): CD003548

Wilcken N, Hornbuckele, Ghersi D. Chemotherapy alone versus endocrine therapy alone for metastatic breast cancer. Cochrane Database Syst Rev 2003; (2): CD002747

Wilkes, G, Freeman, H. and Prout, M. Cancer and poverty: Breaking the cycle. Seminal Oncology Nursing 1994; 10: 79-88

Willett WC. Diet, nutrition and avoidable cancer. Environ Health Perspect 1995; 103: 165-170

Winawer SJ. Screening for colorectal cancer: progress and problems. Recent Results Cancer Res 2005; 166: 231-244

Winer RL, Koutsky LA The epidemiology of human papillomavirus infections. In: Rohan TE, Shah KV (eds). Cervical cancer: from etiology to prevention. Dordrecht: Kluwer Academic Publishers, 2004

Winter JN, Gascoyne RD, Van Besien K. Low-grade lymphoma. Hematology 2004; Am Soc Hematol Educ Program: 203-20, 2004

Womens Health Council. An Evaluation of the First Phase of the Irish Cervical Screening Programme from the Womans Perspective. Dublin: The Womens Health Council, 2004. (http://www.whc.ie/publications/Cervical.pdf)

Womens Health Council. Comments on Part 9 of the Health Act 2004 for the Handling of Complaints. Dublin: The Womens Health Council, 2005 (http://www.whc.ie/publications/Submissions_Comments%20on%20Health%20Act.pdf)

Womens Health Council. Promoting Womens Health: A Population Investment for Irelands Future. Dublin: The Womens Health Council, 2002 (http://www.whc.ie/publications/27401WHC.pdf)

Womens Health Council. Women, Disadvantage and Health. Dublin: The Womens Health Council, 2003 (http://www.whc.ie/publications/31657_WHC_Disadvantage.pdf)

Woodward A, Boffetta P. Environmental exposure, social class, and cancer risk. In: Kogevinas M, Pearce N, Susser M, Boffetta P, eds. Social Inequalities and Cancer. IARC Scientific Publications No. 138. Lyon: International Agency for Research on Cancer, 1997: 361-367

Writing group for the Women's Health Initiative Investigators. Risks and benefits of estrogen plus progestin in healthy postmenopausal women. Principal results from the Women's Health Initiative Randomized Controlled Trial. JAMA 2002; 288:321-333

Yakovlev AY, Habbema JD, Feuer EJ, Cancer Intervention and Surveillance Modelling Network (CISNET) Collaborators. Effect of screening and adjuvant therapy on mortality from breast cancer. N Engl J Med 2005; 353: 1846-1847

Zhang H, Cai B. The impact of tobacco on lung health in China. Respirology 2003; 8: 17-21

Zhang Y, Holford TR, Leaderer B, Boyle P, Zahm SH, Flynn S, Tallini G, Owens PH, Zheng T. Hair-coloring product use and risk of non-Hodgkin’s lymphoma: a population-based case-control study in Connecticut. Am J Epidemiol 2004; 159: 148-154

Appendix 4. Further Information

National Cancer Registry

The National Cancer Registry was established by the Minister for Health in 1991 under the National Cancer Registry Board (Establishment) Order. The mission of the National Cancer Registry is to collect high quality information on cancer and to promote the use of this information in reducing cancer incidence and improving survival. In pursuit of these objectives, the Registry began collecting comprehensive information on all cancers diagnosed in the population of Ireland in 1994.

This publication contains information on the ten most common cancers in women in Ireland. Similar data are available for other cancers, and for cancers in men, on application to the National Cancer Registry.

The National Cancer Registry also offers a rapid response service to individuals and organizations who need information on cancer incidence, mortality, treatment or survival. The service is available free of charge. As an extension to this service, the Registry also hosts an interactive web-based query service, which allows users to create their own data tables and/or to download subsets of the cancer registration dataset. This is available on the National Cancer Registry website (http://www.ncri.ie/data.cgi/index.shtml).

Copies of reports produced by the National Cancer Registry, and information on current research projects, are also available on the website (www.ncri.ie).

For further information or data, please contact:

National Cancer Registry
Elm Court
Boreenmanna Road
Cork

Phone: +353 021 4318014
Fax: +353 021 4318016
Email: info@ncri.ie

Women's Health Council

The Women's Health Council is a statutory body established in 1997 to advise the Minister for Health and Children on all aspects of women's health.

Following a recommendation of the national *Plan for Women's Health 1997-1999*, the Women's Health Council was set up as a centre of expertise on women's health issues, to foster research into women's health and advise the Minister for Health and children on women's issues generally.

The mission of the Women's Health Council is to inform and influence the development of health policy to ensure the maximum health and social gain for women in Ireland.

Its membership is representative of a wide range of expertise and interest in women's health.

Further information on the Council and its activities, including research reports, may be found on the website at www.whc.ie.

For further information please contact:

The Women's Health Council
Block D
Irish Life Centre
Abbey Street Lower
Dublin 1

Phone: +353 1 8783777
Fax: +353 1 8783710
Email: info@whc.ie

National Cancer Registry Ireland

The Women's Health Council
Comhairle Shláinte na mBan

National Cancer Registry
Elm Court
Boreenmanna Road
Cork

Phone: +353 021 4318014
Fax: +353 021 4318016
Email: info@ncri.ie

The Womens Health Council
Block D
Irish Life Centre
Abbey Street Lower
Dublin 1

Phone: +353 1 8783777
Fax: +353 1 8783710
Email: info@whc.ie

Women and Cancer in Ireland
Women's Health Council/National Cancer Registry
February 2006
ISBN 0-9531072-7-2