

# Cancer in Ireland 1994-2004: A summary report

A report of cancer incidence, mortality, treatment and survival in the  
North and South of Ireland: 1994-2004



Cliffs of Moher, Co. Clare, Ireland

This report is accompanied by an extensive online version covering the  
top twenty cancer sites in Ireland.

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## Key findings

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### INCIDENCE AND MORTALITY

- Each year an average of 10,999 male and 10,510 female cancers\* were diagnosed between 2000 and 2004 with 5,921 male and 5,340 female cancer deaths annually.
- Rates† were lower in Northern Ireland by 10.0% for males, the difference a result of higher levels of prostate cancer in the Republic of Ireland. Female rates were 2.2% lower in Northern Ireland than the Republic of Ireland.
- The most common male cancers were prostate cancer, colorectal cancer, lung cancer and lymphoma, while among women they were breast cancer, colorectal cancer, lung cancer and ovarian cancer.
- Incidence rates increased for males by 1.8% per year during 1999-2004 and for females by 0.8% per year during 1994-2004. The number of cases increased by an average of 255 male and 217 female cases per year. The largest increases were in prostate cancer, liver cancer and malignant melanoma.
- Incidence rates were lower in Northern Ireland than in the Republic of Ireland for pancreatic cancer, bladder cancer, brain cancer and leukaemia among both sexes, for colorectal and prostate cancers among males and melanoma, breast cancer and cervical cancer among females. They were higher in Northern Ireland than in the Republic of Ireland for male lung and female uterine cancers.
- Incidence rates were highest in counties/councils with large urban areas and in areas of deprivation.
- Incidence rates among males were 4.6% lower than in the EU (15 countries) while female rates were 2.1% higher.
- Cancer death rates fell between 1994 and 2004 by 1.4% per year for males and 1.0% per year for females.
- Cancer death rates were 3.9% lower for males and 3.6% lower for females in Northern Ireland than in the Republic of Ireland during 2000-2004.

### TREATMENT

- During 2001 surgery was the most common form of treatment for stomach, colorectal, breast, cervical and ovarian cancer, with hormone therapy most commonly used for prostate cancer and radiotherapy the most common treatment for oesophageal and lung cancer.

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\* Excludes non-melanoma skin cancer (NMSC)

† European age-standardised incidence rates

- From 1996 to 2001 chemotherapy and radiotherapy use increased for oesophageal, stomach, colorectal, lung and breast cancer with chemotherapy use also increasing for cervical cancer and radiotherapy use increasing for prostate cancer. Surgery use increased for breast and ovarian cancers and decreased for oesophageal, lung and prostate cancers. Hormone therapy use decreased for breast cancer and increased for prostate cancer.
- During 2001 Northern Ireland had a higher proportion of oesophageal, cervical and prostate cancer patients receiving no tumour directed treatment, while the proportion was higher in the Republic of Ireland for colon cancer.

### *SURVIVAL\* AND PREVALENCE*

- Five-year survival was higher for females (51.6%) than males (46.8%) for patients diagnosed in 2000-2004.
- Five-year survival ranged from 5.4% for pancreatic cancer to 96.9% for testicular cancer among males, and from 6.8% for pancreatic cancer to 91.6% for melanoma among females.
- Five-year survival improved by 3.9% for males and 1.9% for females between 1994-1996 and 1997-1999.
- Five year survival was best at earlier disease stage and better in younger than older people.
- Five-year survival for males diagnosed in 2000-2004 was 5.2% higher in the Republic of Ireland than Northern Ireland. There was no significant difference between the two countries for females or for males when prostate cancer is excluded.
- Five-year survival from male prostate and bladder cancers was higher in the Republic of Ireland than in Northern Ireland. Among females five-year survival from pancreatic cancer, leukaemia and bladder cancer was higher in the Republic of Ireland, while survival from malignant melanoma was better in Northern Ireland.
- Despite survival improvements five-year survival for all cancers combined was lower in Northern Ireland and the Republic of Ireland than in the EU for males and females.
- 94,062 people diagnosed with cancer (ex. NMSC) during 1994-2004 were alive at the end of 2004. This increased to 158,541 if the easily treated non-melanoma skin cancer is included.
- At the end of 2004 the number of people living with cancer (ex. NMSC) diagnosed since 2000 per 100,000 people was 3.7% greater in Northern Ireland than the Republic of Ireland. This can be attributed to the higher proportion of older people resident in Northern Ireland.

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\* Age-standardised relative survival

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## Foreword

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This third all-Ireland cancer statistics report is a welcome addition to the series, which have been produced jointly by the Northern Ireland Cancer Registry and National Cancer Registry over the past ten years. As a result of this collaboration, supported by the National Cancer Institute (NCI), we are developing greater understandings of the patterns and causation of cancer, which will help to shape research and service delivery priorities that can benefit the people of the whole Island of Ireland. This is but one example of the value that is being derived from the unique partnership that is the All-Ireland NCI Consortium.

The detailed information on treatment and survival is particularly opportune and welcome. The development of the National Cancer Control Programme and the Northern Ireland Cancer Network (NICaN) will require detailed information on all elements of cancer patient care and outcomes. While the information is valuable in itself, comparative data from the two health services adds an additional dimension not available from within either jurisdiction. Detailed comparison of the performance of the two health services in prevention, early detection, treatment and aftercare helps put our achievements and future challenges into clearer perspective.

The report clearly shows that, despite different models of funding and provision, the similarities in cancer patterns between Ireland and Northern Ireland greatly outweigh the differences. This provides us with unique research opportunities to combine the data from the two registries to build on existing work to gain further insights into cancer aetiology, health services research and health economics.

Dr Tony Holohan  
Chief Medical Officer, Department of Health and Children

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I welcome this important report and wish to congratulate the registries on this collaboration, and the authors on a high quality report. Information is vital for the planning and evaluation of services and by comparing and contrasting how the health services North and South manage models of prevention through to treatment and care, we can record our achievements and plot out our future challenges.

Cancer is an important disease that causes a quarter of all deaths, and whilst the demonstrable improvements in survival are welcome, there is still much more to achieve and we can learn from each other in this respect. As outlined in our Cancer Control Plan we must ensure that we do everything we can to ensure that those whose lives are touched by cancer have access to skilled and appropriate treatment delivered promptly and with humanity. We must also ensure that we act as far as possible to prevent avoidable cancers, including those caused by smoking and other lifestyle issues.

The volume of data produced in the report is significant. Indeed the excellent summary is supplemented by a 350-page analysis of the main cancer sites. We must take note of the recommendations and the implications these will have in how we direct our collective services and research capital to combat ever more effectively the human suffering caused by cancer in its various manifestations.

I look forward to future reports and collaboration.

Dr Michael McBride  
Chief Medical Officer, Department of Health, Social Services & Public Safety Northern Ireland

## Acknowledgements

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This report would not have been possible without the dedicated efforts of cancer registry staff and the many people from various organisations who facilitate and guide this work. The Departments of Health and Children (ROI) and the Department of Health, Social Services and Public Safety (NI) have funded this report and provide funding and support on an ongoing basis for the work of their respective registries. This work would not have been possible without the secondment of David Donnelly from the Northern Ireland Statistics and Research Agency (NISRA) to the Northern Ireland Cancer Registry.



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## Introduction

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Cancer is a major public health issue in Ireland and is a considerable burden on the individuals who develop the disease, the families and friends of cancer patients and on the health services that treat and care for such patients. The levels of cancer are affected by many factors including changes in the population, new developments in treatment and care, screening programs and public health awareness. Monitoring of cancer levels in Ireland is performed by two cancer registries, the Northern Ireland Cancer Registry (NICR) and the National Cancer Registry of Ireland (NCRI), that collect comprehensive information on all new cases of cancer occurring in Northern Ireland (NI) and Republic of Ireland (ROI) respectively.

Both cancer registries share a primary objective of education and information provision, the former assisting the general public to make informed decisions about lifestyles, symptoms, the benefits of screening and the issues of treatment, the latter so that informed decisions can be made by policy makers about service provision including prevention. Another objective is to facilitate, promote and undertake research into cancer. With that in mind NICR and NCRI introduce the third all-Ireland cancer statistics report, which like the first two reports (released in 2001<sup>1</sup> and 2004<sup>2</sup>) aims to give a review of cancer in Ireland. It is aimed at both the general public and health professionals and covers a wide range of cancer related topics. It is presented in two versions: the current report “Cancer in Ireland 2000-2004: A summary report” which gives a general overview of the burden of cancer in Ireland and “Cancer in Ireland 1994-2004: A comprehensive report” which contains the same information but also has detailed chapters on the top twenty cancers in Ireland, more detailed supplementary tables and a detailed description of the methodology behind both reports. The later report is available online at [www.qub.ac.uk/nicr](http://www.qub.ac.uk/nicr) and [www.ncri.ie](http://www.ncri.ie).

Both reports cover the period of time from 1994 to 2004, which at the time of report production was the most up to date data available for all of Ireland. In addition the report specifically focuses on malignant cancer, which is one of four cancer behaviours, the other three being benign, in situ and uncertain. However, except for some in situ cancers and benign brain tumours these are rarely fatal. Only malignant cancers are thus included in this report.

Overall the report will give one of the most detailed and comprehensive looks at cancer in Ireland and the process of its registration thus far. We hope that it will help inform medical and health policy makers in the decisions they face and will also in some small way educate the general public in how they can reduce their risk of cancer by living a healthier lifestyle, checking for symptoms and availing of screening programs available to them.

### Note on methodology

Cancer registration occurs in many countries throughout the world; however there is a range of methodologies in use. While the approaches used by the cancer registries in Northern Ireland and Republic of Ireland are similar, a degree of data recoding and quality assurance was required in order to maximize comparability between the two countries. In addition a wide range of statistical methods was used in this report. These techniques are widely used but may not be familiar to the casual reader. For those wishing further detail on these techniques and on the data collection and quality assurance procedures (including indicators of data quality) the appendices to the comprehensive report, available on line, give a detailed description of both.

# 1. Cancer incidence

The burden of cancer in Ireland can be measured using cancer registration data in several ways. The most valuable with regard to allocation of health service resources and monitoring of prevention strategies is cancer incidence levels. This refers to the number of cases of cancer diagnosed within a population during a specific period of time. Breaking it down by various factors related to cancer can provide a very revealing and informative picture of the cancer situation in both countries within Ireland.

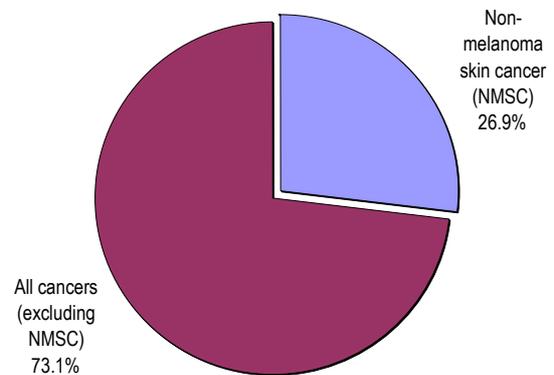
## 1.1: Cancer types

Of the 29,423 cancers diagnosed each year between 2000 and 2004 in Ireland the most common was non-melanoma skin cancer (NMSC) which accounted for 26.9% of cases (7,914 cases per year) (Fig. 1.1, Tab. 1.1). This cancer is rarely fatal and many cancer registries do not fully record incidence of this cancer. While NICR and NCRI have good quality data on this disease it is customary to omit it from cancer totals and to consider it a separate entity.

The number of cases of NMSC diagnosed annually was 12.9% higher among males than females, however the difference increased further once rates were adjusted for age with male incidence rates\* (EASIRs) 43.9% higher than those for females. Incidence rates for both sexes were lower in Northern Ireland than Republic of Ireland by 16.1% (p<0.001) for males and 25.1% (p<0.001) for females. This is almost certainly an artefact of the two different methods of collecting data. (Tab. 1.1)

**Figure 1.1: Malignant cancer and non-melanoma skin cancer: 2000-2004**

Percentage of all cancers combined



**Table 1.1: Incidence of non-melanoma skin cancer: 2000-2004**

Summary statistics

	Northern Ireland			Republic of Ireland			All-Ireland		
	Male	Female	All persons	Male	Female	All persons	Male	Female	All persons
Number of cases per year	1,204	1,062	2,266	2,993	2,655	5,648	4,197	3,717	7,914
Median age at diagnosis	71	74	72	70	71	70	70	72	71
Cumulative risk (Aged 0 to 74)	10.4%	6.6%	8.4%	12.5%	9.2%	10.8%	11.8%	8.3%	10.0%
Crude rate per 100,000 persons	145.3	122.3	133.6	153.8	134.8	144.3	151.3	131.0	141.0
EASIR ± 95% CI	146.3±3.7	93.9±2.7	116.3±2.2	174.3±2.8	125.3±2.2	146.8±1.7	165.2±2.2	114.8±1.7	136.7±1.4
% difference (NI vs ROI) ± 95% CI (+ NI higher, - NI lower)							-16.1% ±2.5	-25.1% ±2.5	-20.8% ±1.8

EASIR: European age-standardised incidence rate per 100,000 persons; CI: Confidence interval

The remainder of this report excludes non-melanoma skin cancer from the analysis except where indicated.

## 1.2: All cancers combined (excluding non-melanoma skin cancer, NMSC)

There were on average 21,509 cases of cancer (excluding NMSC) diagnosed each year in Ireland during 2000-2004, with slightly more cases among males than females (Male: 10,999; Female: 10,510). However, while male cases

\* The European age-standardised incidence rate (EASIR) takes account of the numbers in the population and their age structure.

exceeded female cases in Republic of Ireland by 9.0%, the reverse was true in Northern Ireland where the number of male cases was 4.3% lower than the number of female cases. For all cancers combined (ex. NMSC) incidence (EASIR) rates were higher for males in both countries – by 16.8% in Northern Ireland and by 26.8% in Republic of Ireland ( $p < 0.001$ ). The odds of developing cancer (ex. NMSC) before the age of 75 were approximately 1 in 4, while the odds were 1 in 3 if NMSC is included. (Tab. 1.2)

**Table 1.2:** Incidence of all cancers combined (ex. NMSC): 2000-2004

Summary statistics

	Northern Ireland			Republic of Ireland			All-Ireland		
	Male	Female	All persons	Male	Female	All persons	Male	Female	All persons
Number of cases per year	3,303	3,452	6,756	7,696	7,058	14,753	10,999	10,510	21,509
Median age at diagnosis	69	67	68	69	66	68	69	66	68
Cumulative risk (Aged 0 to 74)	27.6%	24.2%	25.6%	30.0%	24.6%	27.2%	29.2%	24.5%	26.7%
Crude rate per 100,000 persons	398.7	397.9	398.3	395.4	358.4	376.8	396.4	370.5	383.3
EASIR $\pm$ 95% CI	401.9 $\pm$ 6.1	344.1 $\pm$ 5.3	364.0 $\pm$ 4.0	446.4 $\pm$ 4.5	352.0 $\pm$ 3.8	390.0 $\pm$ 2.8	431.8 $\pm$ 3.6	349.3 $\pm$ 3.1	381.2 $\pm$ 2.3
% difference (NI vs ROI) $\pm$ 95% CI (+ NI higher, - NI lower)							-10.0% $\pm$ 1.6	-2.2% $\pm$ 1.8	-6.7% $\pm$ 1.2

EASIR: European age-standardised incidence rate per 100,000 persons; CI: Confidence interval

The rates of cancer (EASIR) were lower in Northern Ireland than in Republic of Ireland during 2000-2004 by 10.0% for males ( $p < 0.001$ ) and 2.2% for females ( $p = 0.017$ ) (Tab. 1.2). This was likely to be linked to differences between the two countries in incidence rates of specific types of cancer, in particular prostate cancer and female breast cancer. If these are excluded from the overall cancer total there was no significant difference in incidence rates of male or female cancer between the two countries.

### 1.3: Multiple tumours

Analysis of cancer incidence in this report is conducted on tumours diagnosed, but some people develop more than one tumour in their lifetime. During the time span of this report (1994-2004) there were 212,860 people diagnosed with cancer (ex. NMSC) with 3.4% having two or more tumours during the 11-year period, resulting in 220,261 tumours diagnosed. If NMSC is included this increased to 281,922 patients with 7.2% having two or more tumours resulting in 303,631 tumours diagnosed during 1994-2004. (Tab. 1.3)

**Table 1.3:** Multiple tumours affecting the same person: 1994-2004

Number and percentage of patients by country

		Northern Ireland		Republic of Ireland		All-Ireland	
		Number of patients	Percentage of patients	Number of patients	Percentage of patients	Number of patients	Percentage of patients
Including NMSC	1 tumour	83,324	93.3%	178,410	92.6%	261,734	92.8%
	2 tumours	5,602	6.3%	13,144	6.8%	18,746	6.6%
	3 or more tumours	403	0.5%	1,039	0.5%	1,442	0.5%
	Total patients	89,329	100.0%	192,593	100.0%	281,922	100.0%
Excluding NMSC	1 tumour	66,764	96.6%	138,906	96.6%	205,670	96.6%
	2 tumours	2,292	3.3%	4,690	3.3%	6,982	3.3%
	3 or more tumours	77	0.1%	131	0.1%	208	0.1%
	Total patients	69,133	100.0%	143,727	100.0%	212,860	100.0%

NMSC: Non-melanoma skin cancer

### 1.4: Age distribution

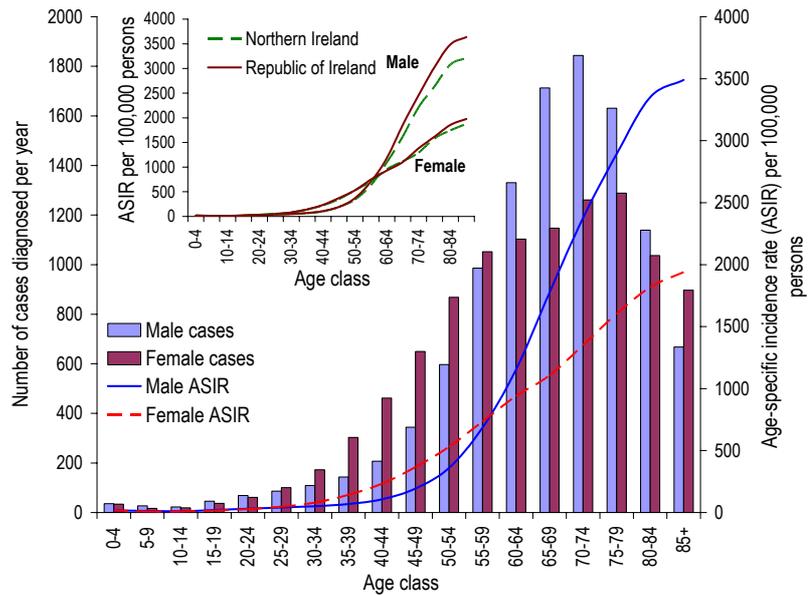
Cancer is more common with increasing age and half of the patients diagnosed in Ireland during 2000-2004 were aged over 68 years. The number of cases was greatest among 70-74 year olds for males, contributing 16.8% of all cases, and

among 75-79 year olds for females, contributing 12.3% of all cases. There were on average 156 new cases of cancer diagnosed annually in children (aged 0 to 14), which was 0.7% of all cancers registered. (Fig. 1.2)

Age-specific incidence rates climbed steadily with increasing five-year age group for males and females. For the majority of age groups these rates were greater in Republic of Ireland than in Northern Ireland, with the difference being greatest for older males. (Fig. 1.2)

**Figure 1.2:** Age distribution of all cancers combined (ex. NMSC) by sex and country: 2000-2004

Number of cases diagnosed per year with age-specific incidence rate (ASIR) per 100,000 persons

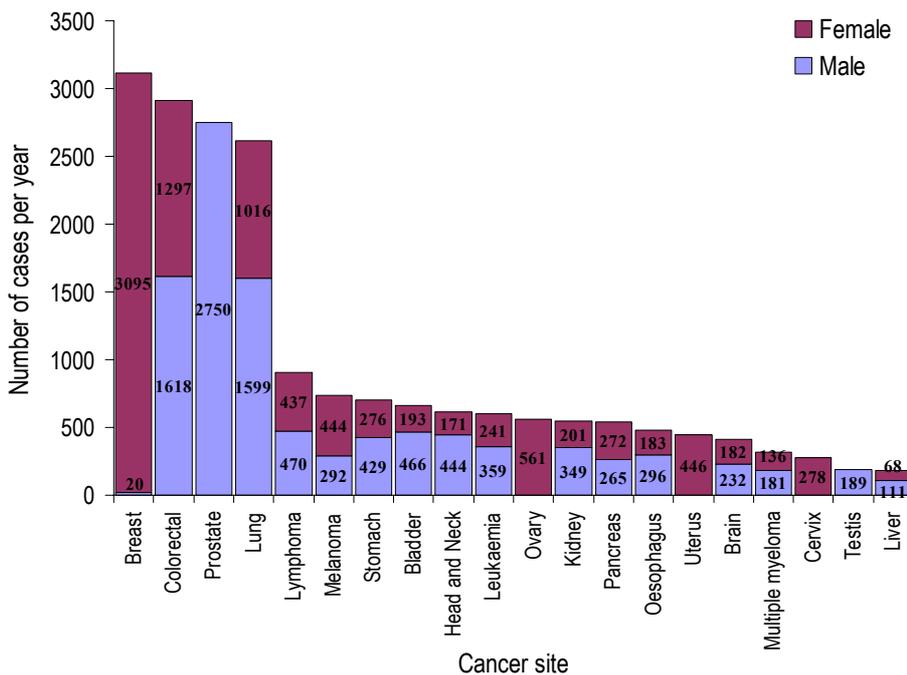


### 1.5: Cancer site and gender

Excluding non-melanoma skin cancer the top cancers in descending order during 2000-2004 were breast, colorectal, prostate, lung and lymphoma. Some of these diseases are gender specific but among those cancers common to both there was considerable variation between males and females. Male cases exceeded female cases for each of the top twenty cancers diagnosed during 2000-2004, except for pancreatic cancer and malignant melanoma. However the most common female cancer (breast cancer) had more cases diagnosed than the most common male cancer (prostate cancer). Females had three gender specific cancers (cervical cancer, uterine cancer and ovarian cancer) among the top twenty cancers as opposed to two male specific cancers (prostate cancer and testicular cancer). (Fig. 1.3)

**Figure 1.3:** Cancers in Ireland by sex and cancer site: 2000-2004

Number of cases diagnosed per year



Among men the most common cancers were prostate cancer, colorectal cancer, lung cancer and lymphoma, while among women they were breast cancer, colorectal cancer, lung cancer and ovarian cancer. The top male and female cancers (prostate and breast) made up approximately one quarter of all cancers (ex. NMSC) for their sex. Breast cancer cases were over twice as common as the next most frequent cancer (colorectal

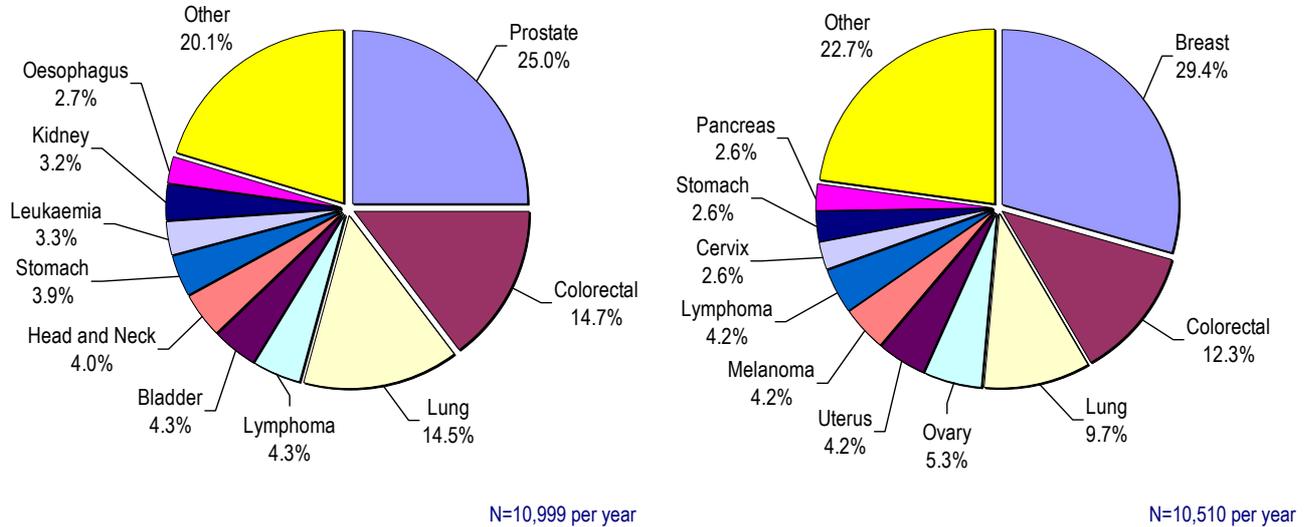
cancer) in women. Additionally there were almost 1,500 more cases per year of prostate cancer among males than of male colorectal cancer, the second most common male cancer. (Fig. 1.4)

**Figure 1.4:** Top 10 most common cancers in Ireland by sex: 2000-2004

Percentage of all cancers (ex. NMSC) diagnosed

(a) Male

(b) Female

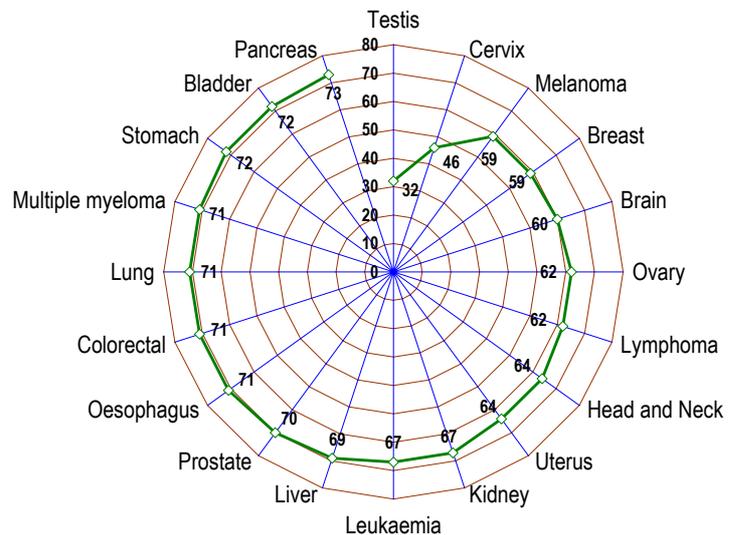


**1.5.1: Median age at diagnosis by cancer site**

Age at diagnosis varied considerably with cancer site during 2000-2004. The median age ranged from 32 years for testicular cancer to 73 years for pancreatic cancer. Only testicular cancer and cervical cancer had a median age of diagnosis less than 50 years of age. Breast cancer, the most common female cancer, had a median age at diagnosis of 59 years compared to a median age of 70 years for prostate cancer, the most common male cancer. Melanoma had a median age of diagnosis of 58 years among females and 60 among males. (Fig. 1.5)

**Figure 1.5:** Age at diagnosis by cancer site: 2000-2004

Median age at diagnosis

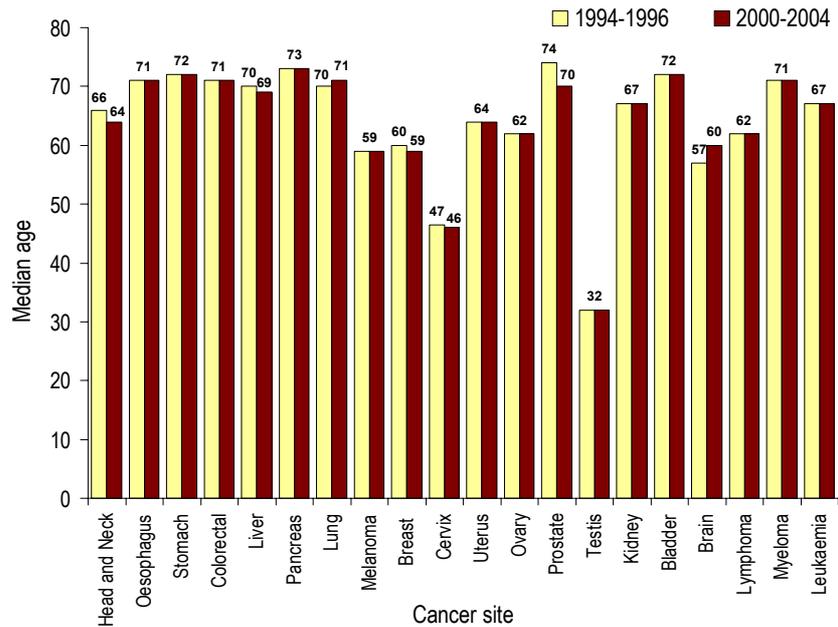


For the majority of cancer sites the median age at diagnosis in Ireland did not change between 1994-1996 and 2000-2004. The biggest change however occurred for prostate cancer patients where the median age of diagnosis fell from 75 to 72 in Northern Ireland, 74 to 70 in Republic of Ireland and 74 to 70 in Ireland overall. Other decreases occurred for head and neck cancer, liver cancer, breast cancer and cervical cancer, while increases occurred for brain cancer and lung cancer. (Fig. 1.6)

The increased median age of diagnosis of brain cancer between 1994-1996 and 2000-2004 could reflect the increased use of non invasive technologies (e.g. CT scans in the elderly). The change in median age of diagnosis for lung cancer may indicate the cohort effect of reduced smoking in younger people in more recent times compared with several

decades ago. The fall in median age of diagnosis for prostate cancer is the most marked of all changes and mirrors the increased use of PSA testing. The decrease in median age at diagnosis for cervical and breast cancer possibly reflects screening practices. The changes for head and neck cancer may be due to a fall in the percentage of these cancers that are cancers of the lip (1994-96: 10.5%; 2000-2004: 5.7%) which have an older age profile than most other head and neck cancers. (Fig. 1.6)

**Figure 1.6:** Changes in age at diagnosis over time in Ireland by cancer site: 1994-2004  
Median age at diagnosis

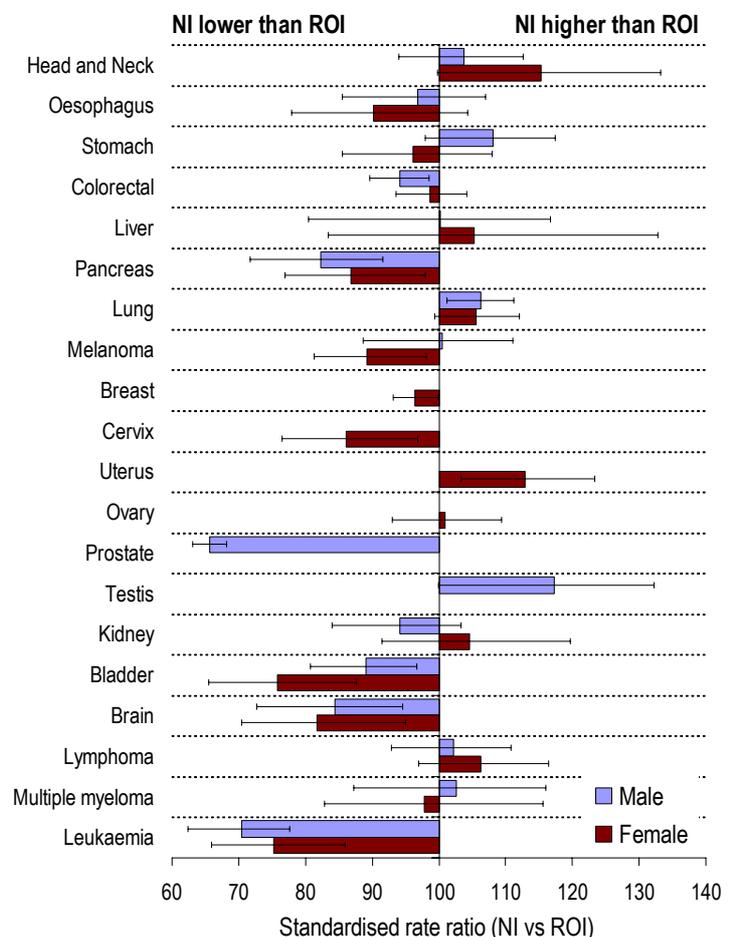


**1.5.2: Country comparisons of cancer site**

The proximity of the two countries in Ireland would suggest that there shouldn't be too much variation in levels of different cancers between the two countries. However some statistically significant differences in incidence rates (EASIR) exist with rates lower in Northern Ireland than Republic of Ireland for pancreatic cancer, bladder cancer, cancer of the brain, leukaemia, male colorectal cancer, female breast cancer, female melanoma, prostate cancer and cervical cancer, while rates were significantly higher in Northern Ireland for male lung cancer and cancer of the uterus. (Fig. 1.7)

Some of the differences in incidence rates are easily or at least partially explainable, such as more extensive PSA testing in Republic of Ireland causing elevated prostate cancer levels or possible coding differences between the two countries in the case of bladder cancer, but others such as the difference in brain cancer and male colorectal cancer remain unexplained. (Fig. 1.7)

**Figure 1.7:** Comparison of incidence rates in Northern Ireland to those in Republic of Ireland for the top twenty cancer sites: 2000-2004  
Standardised rate ratios using European age-standardised incidence rates



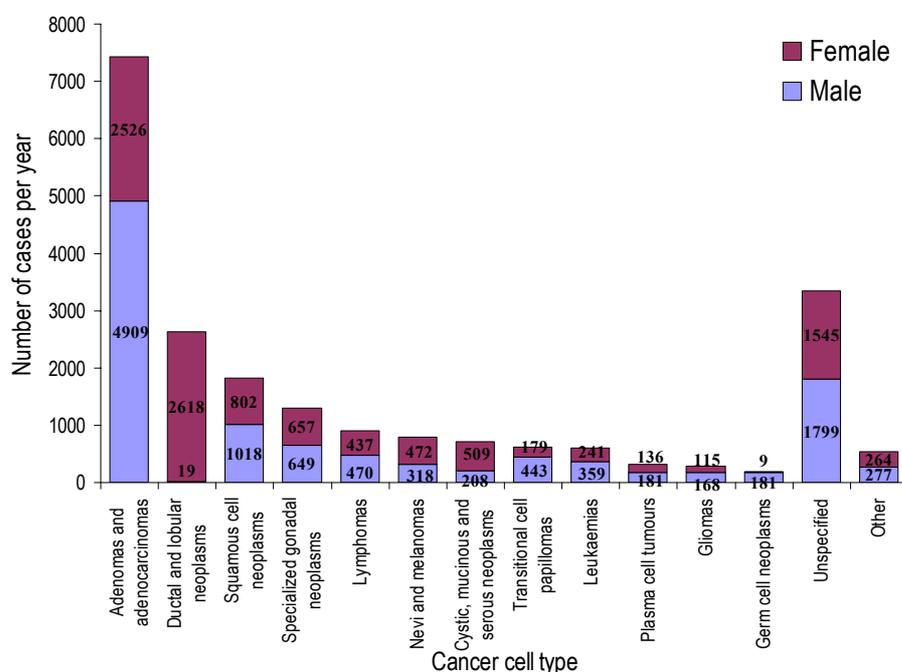
Note: Error bars that do not overlap the central line (i.e. SRR=100%) indicate a significant difference between countries

## 1.6: Cancer cell type

Cancer also varied by cell type during 2000-2004 with 34.6% of cancers (ex. NMSC) diagnosed in Ireland classified as adenocarcinomas, which are cancers that begin in the cells that line internal organs and have gland like properties. The number of male cases of this type was almost double that of female cases. Ductal and lobular neoplasms, which are mostly female breast cancers, made up 12.3% of all cancer cases (ex. NMSC). (Fig. 1.8)

The percentage of cases that had an unspecified cell type however was high during 2000-2004 at 15.5% (ex. NMSC), mainly as a result of no examination of the tissue being carried out. This percentage was higher in Northern Ireland than Republic of Ireland with 19.4% unspecified compared to 13.8%. (Fig. 1.8)

**Figure 1.8: Cancer in Ireland by sex and cell type: 2000-2004**  
Number of cases per year



## 1.7: Trends

The number of cancers (ex. NMSC) diagnosed in Ireland during 2000-2004 increased by an average of 255 male and 217 female cases each year between 1994 and 2004. The majority of this increase occurred in Republic of Ireland, probably as a result of the larger population and a higher rate of population growth, with annual increases of 216 male and 174 female cases. (Tab. 1.4)

Rates (EASIR) for males were static in Ireland between 1994 and 1999, however since 1999 they increased by an

**Table 1.4: Incidence of all cancers combined (ex. NMSC) by sex, country and year of diagnosis: 1994-2004**

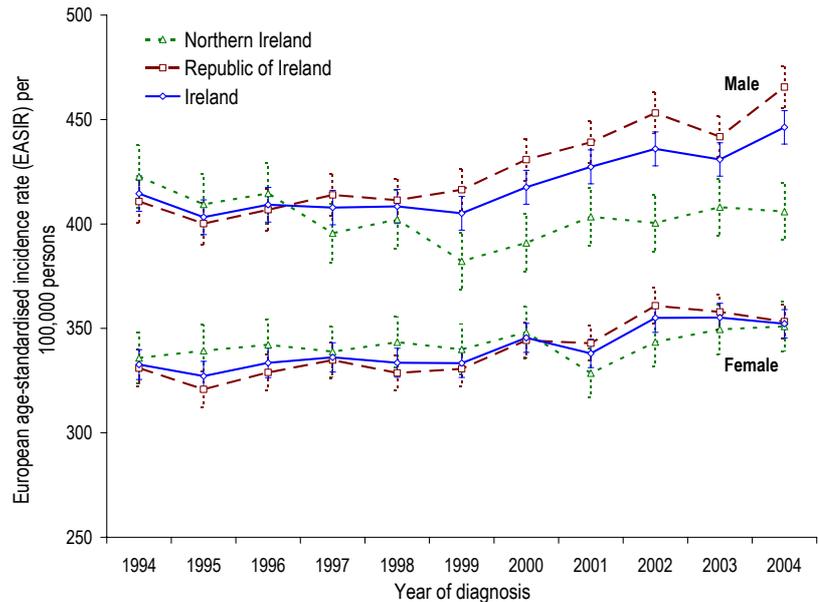
Number of cases and European age-standardised incidence rates (EASIR)

Year	Male						Female					
	Northern Ireland		Republic of Ireland		All-Ireland		Northern Ireland		Republic of Ireland		All-Ireland	
	Cases	EASIR	Cases	EASIR	Cases	EASIR	Cases	EASIR	Cases	EASIR	Cases	EASIR
1994	3,096	422.6 ±15.0	6,251	410.8 ±10.3	9,347	414.5 ±8.5	3,104	335.9 ±12.4	5,849	330.9 ±8.8	8,953	332.7 ±7.2
1995	3,039	409.4 ±14.6	6,174	400.2 ±10.1	9,213	403.2 ±8.3	3,157	339.3 ±12.4	5,750	320.8 ±8.6	8,907	327.2 ±7.1
1996	3,131	414.6 ±14.6	6,317	406.8 ±10.1	9,448	409.2 ±8.3	3,255	342.2 ±12.3	5,982	328.9 ±8.6	9,237	333.5 ±7.1
1997	3,017	395.6 ±14.2	6,535	413.9 ±10.1	9,552	407.8 ±8.2	3,277	338.9 ±12.1	6,162	334.8 ±8.6	9,439	336.1 ±7.0
1998	3,115	402.2 ±14.1	6,625	411.4 ±9.9	9,740	408.4 ±8.1	3,303	343.4 ±12.2	6,199	328.7 ±8.4	9,502	333.6 ±6.9
1999	2,989	382.1 ±13.7	6,751	416.4 ±9.9	9,740	405.1 ±8.1	3,317	339.9 ±12.1	6,320	330.6 ±8.4	9,637	333.3 ±6.9
2000	3,096	391.0 ±13.8	7,109	430.8 ±10.0	10,205	417.5 ±8.1	3,376	348.1 ±12.2	6,660	344.2 ±8.5	10,036	345.5 ±7.0
2001	3,251	403.4 ±13.9	7,397	439.1 ±10.0	10,648	427.3 ±8.1	3,268	328.5 ±11.7	6,751	342.9 ±8.4	10,019	338.0 ±6.8
2002	3,284	400.4 ±13.7	7,801	453.1 ±10.0	11,085	435.9 ±8.1	3,472	343.5 ±11.9	7,205	360.9 ±8.5	10,677	355.0 ±6.9
2003	3,418	408.0 ±13.7	7,773	441.7 ±9.8	11,191	430.9 ±8.0	3,541	349.5 ±12.0	7,291	357.9 ±8.4	10,832	355.2 ±6.9
2004	3,468	405.9 ±13.5	8,399	465.5 ±9.9	11,867	446.2 ±8.0	3,605	350.9 ±11.9	7,381	353.2 ±8.2	10,986	352.2 ±6.8

EASIR: European age-standardised incidence rate per 100,000 persons with 95% confidence interval

average of 1.8% each year up to 2004 ( $p=0.012$ ). In each individual country however the trend exhibited a different pattern. In Republic of Ireland there was an annual increase of 1.4% in rates between 1994 and 2004 ( $p<0.001$ ) with no indication of a change in the direction of the trend. In Northern Ireland rates decreased for males between 1994 and 1999 by 1.6% ( $p=0.012$ ) each year, however after 1999 there was no significant change as the decreasing trend was offset by increases in prostate cancer rates. (Fig. 1.9, Tab. 1.4)

**Figure 1.9: Changes in incidence rates by sex and country: 1994-2004**  
Trends in European age-standardised incidence rates for all cancers combined (ex. NMSC)

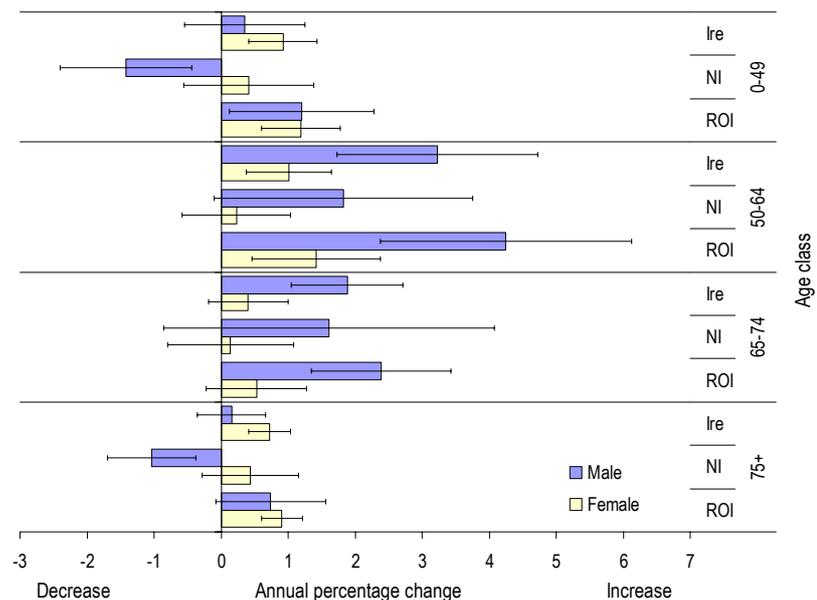


Female rates (EASIRs) increased between 1994 and 2004 in Ireland by 0.8% each year ( $p<0.001$ ). This was accounted for by increases in Republic of Ireland which had an annual percentage change (APC) in rates of 1.1% ( $p<0.001$ ). Female breast cancer was the major contributor to this increase although an increase in cancer levels was still observed when breast cancer was excluded (APC: 0.5%). In Northern Ireland there was no significant change in rates between 1994 and 2004 both with and without female breast cancer included. (Fig. 1.9, Tab. 1.4)

In men cancer rates (EASIRs) increased each year by 3.2% per year ( $p=0.002$ ) and 1.9% per year ( $p=0.001$ ) among those aged 50-64 and 65-74 respectively during 1997-2004. Rates however were static for males aged 0-49 and 75+ during 1994-2004 and for those aged 50-64 and 65-74 prior to 1997. There was no significant difference in trend for males aged 50-64 and 65-74 between Northern Ireland and Republic of Ireland.

However while rates decreased for males aged 0-49 and 75+ in Northern Ireland between 1994 and 2004 they increased in Republic of Ireland for 0-49 year olds and exhibited no significant change for those aged 75 and over. The decrease among those aged 0-49 in Northern Ireland is not explained by one particular type of cancer, although decreases in lung cancer in this age group play a small part. The increases in Republic of Ireland for this age group were due primarily to increases in prostate cancer diagnosis. (Fig. 1.10) Among females cancer rates (EASIRs) increased between 1994 and 2004 for

**Figure 1.10: Changes in incidence rates by sex, age and country: 1994-2004**  
Annual percentage change in European age-standardised incidence rates for all cancers combined (ex. NMSC)



Note: Trends for males aged 50-64 and 65-74 are measured from 1997-2004 due to a change in trend direction in 1997.

those aged 0-49 by 0.9% (p=0.003) per year, 1.0% (p=0.006) per year for those aged 50-64 and 0.7% (p<0.001) per year for those aged 75 and over. There was no significant change for females aged 65-74. Trends for females did not differ significantly between the two countries for any age group. (Fig. 1.10)

**1.7.1: Trends by cancer site**

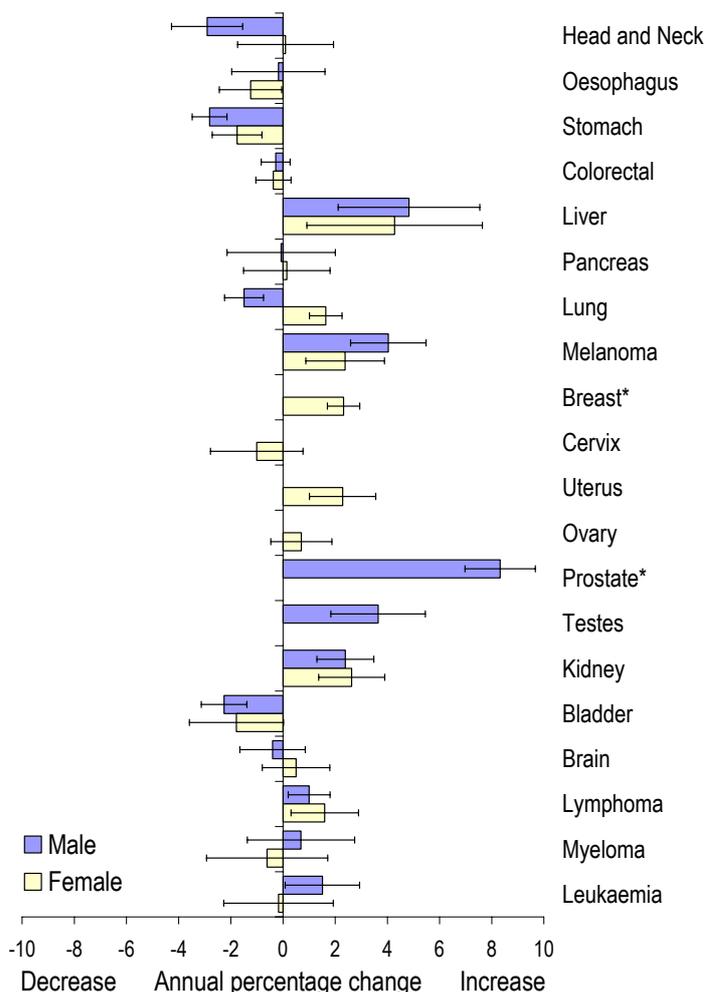
Trends in rates (EASIR) varied considerably by cancer site reflecting changes in lifestyles, environment, diagnostic procedures, screening programmes and the use of PSA testing. (Fig. 1.11)

For males rates of new cases diagnosed increased significantly between 1994 and 2004 for liver cancer, melanoma, prostate cancer (1997-2004 only), testicular cancer, kidney cancer, lymphoma and leukaemia. The largest increase was for prostate cancer which can be attributed to the increase in PSA testing as a diagnostic method. In fact the increasing trend in overall male cancer incidence rates was driven by increases in prostate cancer. If prostate cancer is removed from the analysis incidence rates from all cancers combined (ex. NMSC) fell among males during 1994-2000 by 1.7% (p<0.001) per year in Northern Ireland and 0.4% per year (p=0.004) in Republic of Ireland. Worryingly, melanoma cases increased in Ireland by approximately 50% between 1994 and 2004 making this the fastest rising preventable cancer. Rates of this cancer rose faster among males than females with a 74.4% increase in male cases compared to 32.3% for females. Decreases in male incidence rates were observed for cancer of the head and neck, stomach cancer, lung cancer and bladder cancer. These decreases can mostly be attributed to the decline of smoking among males. (Fig. 1.11)

Among females rates of new cases diagnosed increased significantly between 1994 and 2004 for liver cancer, lung cancer, melanoma, breast cancer (1997-2004 only), cancer of the uterus, kidney cancer and lymphoma. Significant decreases in incidence rates for females were only observed for oesophageal cancer and stomach cancer. It is likely some of the increase in breast cancer is linked with increased detection due to breast cancer screening. (Fig. 1.11)

For most cancer sites there was no significant difference in annual percentage change (APC) in rates of new cancers (EASIRs) for males and females between Northern Ireland and Republic of Ireland. In fact significant differences existed only for male kidney cancer, male leukaemia, female liver cancer and female lung cancer. Despite the lack of significant differences in APCs there were a number of cancer sites where the trend direction differed between the two countries.

**Figure 1.11: Changes in incidence rates in Ireland by sex and cancer site: 1994-2004**  
Annual percentage change in European age-standardised incidence rates

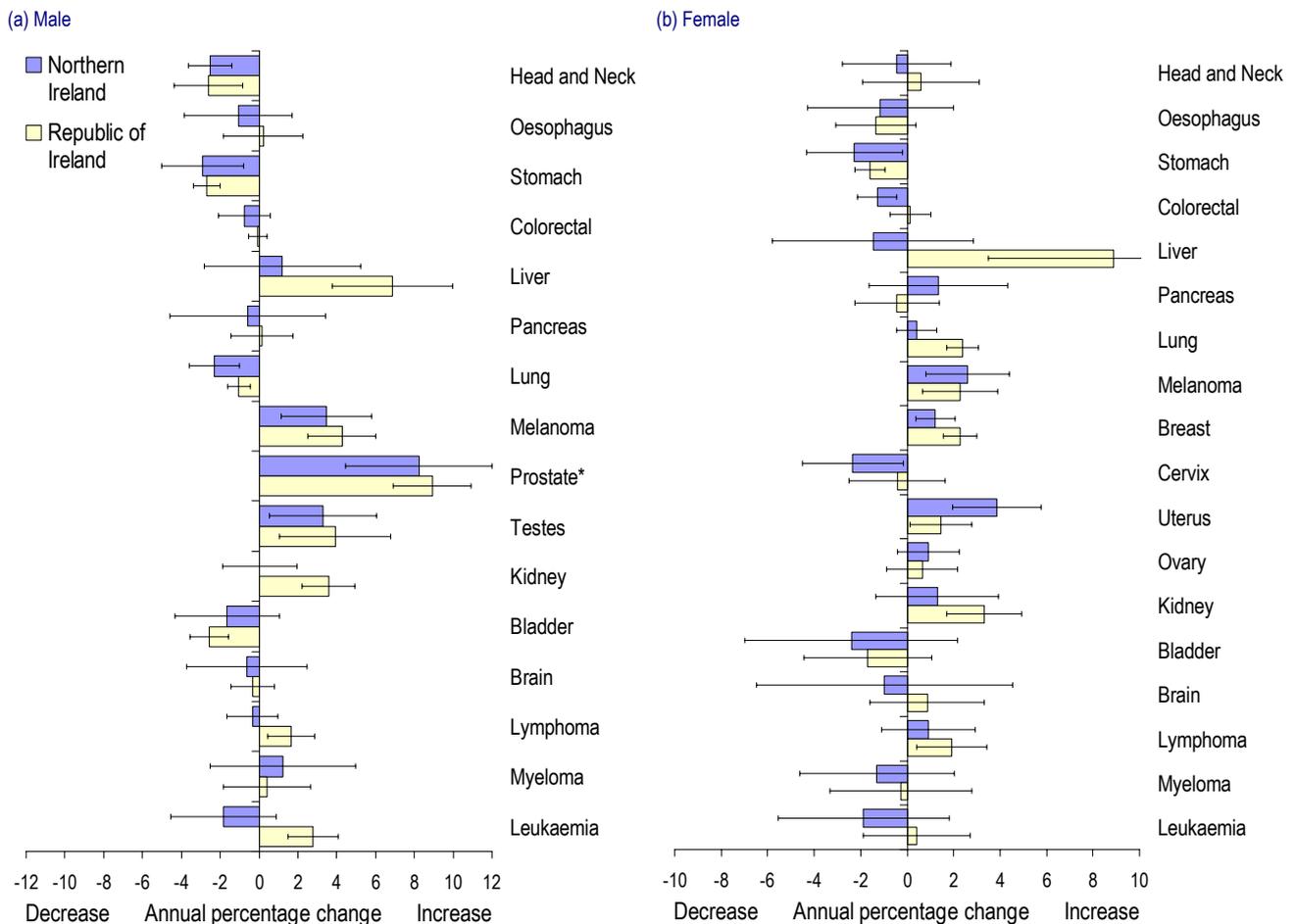


\* Trend for 1997-2004 period only

For males liver cancer, kidney cancer, lymphoma and leukaemia all increased and bladder cancer decreased significantly between 1994 and 2004 in Republic of Ireland while remaining static in Northern Ireland. For females colorectal and cervical cancer decreased between 1994 and 2004 in Northern Ireland but remained static in Republic of Ireland, while female liver cancer, kidney cancer, lymphoma and lung cancer all increased in Republic of Ireland but remained static in Northern Ireland. (Fig. 1.12)

**Figure 1.12: Changes in incidence rates in Ireland by sex, cancer site and country: 1994-2004**

Annual percentage change in European age-standardised incidence rates



\*Trend for 1997-2004 period only

### 1.8: Socio-economic factors

During 2000-2004 there were more cases of new cancers recorded in areas of deprivation compared with more affluent areas. Rates (EASIR) among the 20% most deprived population in Northern Ireland were 25.4% ( $p < 0.001$ ) higher than rates among the 20% most affluent population. In Republic of Ireland the difference was 12.4% ( $p < 0.001$ ). The exact relationship between incidence and deprivation however was slightly different in each country. While in Northern Ireland incidence rates decreased steadily with increasing affluence, in Republic of Ireland the relationship was U-shaped with those in the second, third and fourth deprivation quintile having the lowest incidence rates. (Fig. 1.13)

Cancer rates in Republic of Ireland were higher in the more affluent groups than the equivalent populations in Northern Ireland. Rates in the most affluent band in Northern Ireland were 13.5% lower than those in the equivalent Republic of Ireland population. Excluding prostate cancer and breast cancer from the analysis this difference falls to 9.5% and therefore the majority of the difference cannot be explained by higher uptake of breast cancer screening or higher use of

PSA testing among the more affluent. It is likely however that at least some of the difference between countries is a result of differences in how deprivation is measured. (Fig. 1.13)

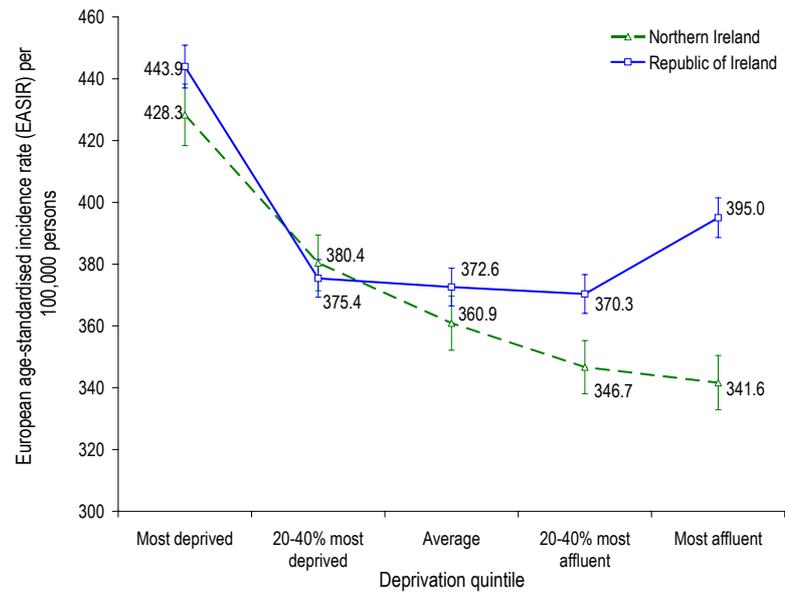
**1.8.1: Socio-economic variations by cancer site**

The relationship between cancer rates and deprivation differed depending upon cancer site during 2000-2004. This link was primarily driven by lifestyle factors with smoking levels in particular causing the higher rates of many cancers in deprived areas. Those cancers which have higher rates in more affluent areas were those either with higher uptake rates for screening, either through programmes or opportunity (breast cancer, melanoma), PSA testing (prostate cancer) or more frequent holidays in sunnier climates (melanoma).

The impact of the inequality between areas of deprivation and affluence on overall cancer levels can be quite marked. For example if the incidence rates of lung cancer among the most affluent groups, where smoking rates are lowest, applied to the most deprived groups there would be approximately 750 fewer cases of lung cancer each year in Ireland. (Tab. 1.5, Fig. 1.14)

**Figure 1.13: Cancer incidence rates and deprivation: 2000-2004**

European age-standardised incidence rates for all cancers combined (ex. NMSC) by country specific deprivation quintile

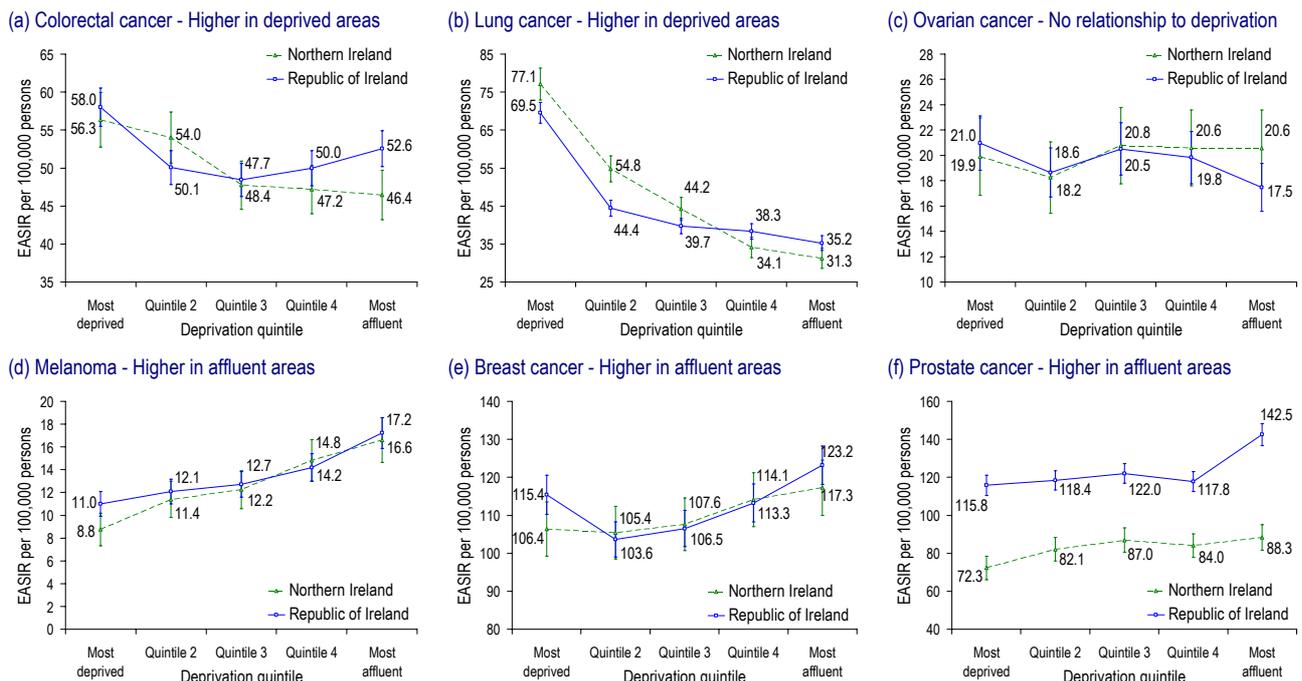


**Table 1.5: Summary of relationship between cancer sites and deprivation**

	Cancer site
<b>Incidence rates higher in deprived than affluent areas</b>	Head & Neck, Oesophagus, Stomach, Colorectal, Lung, Cervix, Kidney, Bladder
<b>No significant relationship</b>	Uterus, Ovary, Testes, Lymphoma, Leukaemia
<b>Incidence rates higher in affluent than deprived areas</b>	Melanoma, Breast, Prostate

**Figure 1.14: Cancer incidence rates and deprivation by cancer site: 2000-2004**

European age-standardised incidence rates (EASIR) for selected cancers by country specific deprivation quintile



## 1.9: Geographic variations

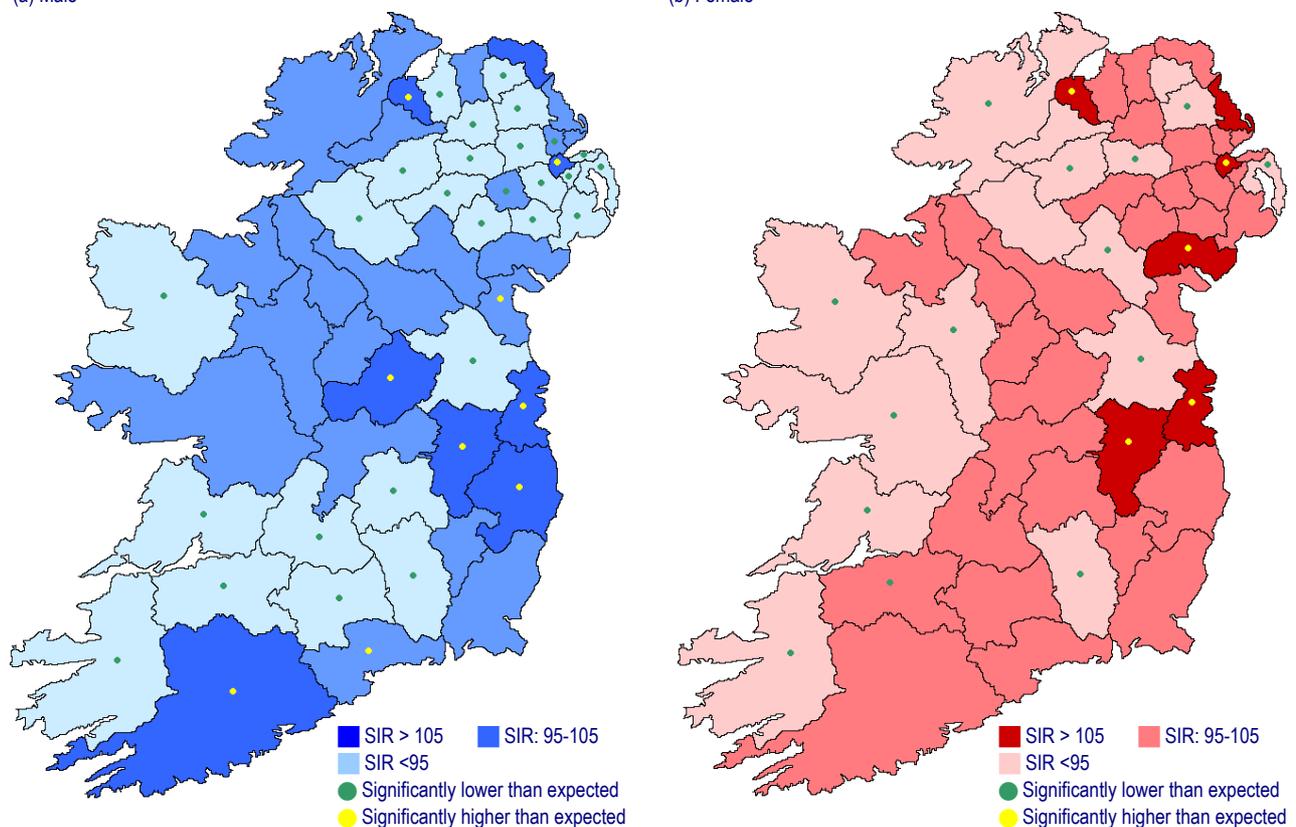
Among males rates of all cancers combined (ex. NMSC) during 1994-2004 were higher than the average rate for all of Ireland in nine district councils/counties: Dublin, Belfast, Derry, Cork, Kildare, Wicklow, Westmeath, Waterford and Louth had higher than average rates for all cancers combined (ex. NMSC). Significantly lower than average male incidence rates occurred in 27 district councils/counties, many of which were in central and southern Northern Ireland and in the south west of Republic of Ireland excluding Cork and Waterford. Among females incidence rates were higher than expected in Dublin, Belfast, Derry, Kildare and Newry & Mourne, while significantly lower than average female incidence rates occurred in 14 district councils/counties with many of these in the west of Ireland. Note however that compared to the average rate for new cases of cancer in Ireland, some smaller geographic areas will have significantly higher or lower incidence rates of different cancers by chance. (Fig. 1.15)

**Figure 1.15:** Geographic variations in cancer incidence rates by sex: 1994-2004

Standardised incidence ratios for counties (ROI)/councils (NI) relative to all of Ireland for all cancers combined (ex. NMSC)

(a) Male

(b) Female



### 1.9.1: Geographic variations by cancer site

The relationship between incidence rates and geographic area differed depending upon cancer site for similar reasons that resulted in the variation by socio-economic factors, i.e. lifestyle, uptake of screening, use of PSA testing etc. These variations are summarised in table 1.6 with the major urban areas of Belfast and Dublin in particular, and to a lesser extent Derry and Cork, frequently having higher incidence rates of the most common types of cancer (e.g. lung cancer) compared to Ireland as a whole. (Tab. 1.6, Fig. 1.16)

**Table 1.6: Geographic variations in cancer incidence rates by cancer site: 1994-2004**

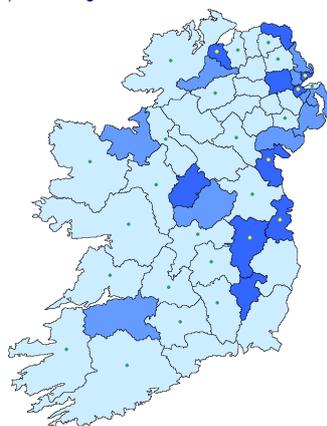
Counties (ROI)/councils (NI) with standardised incidence ratios relative to all of Ireland which are significantly higher than 100%

Cancer site	Geographic areas with significantly higher incidence rates than Ireland (number of cases in 1994-2004)	
	Male	Female
Head & Neck	Belfast(382), Cookstown(45), Derry(102), Dublin(986), Galway(239), Longford(55)	Belfast(164), Coleraine(35), Derry(49)
Oesophagus	Belfast(204)	Carlow(23),Cork(187),Kildare(50)
Stomach	Belfast(368), Derry(96), Dublin(939), Limavady(39), Newry & Mourne(120)	Belfast(271), Cavan(49), Dublin(690), Louth(67), Monaghan(45), Newry & Mourne(72)
Colorectal	Cork(1,496), Derry(298), Dublin(3,033), Newry & Mourne(293)	Cork(1,179), Donegal(399), Newry & Mourne(247)
Liver	Belfast(93),Cork(99),Dublin(221),Waterford(33)	Belfast(60)
Pancreas	Cork (252), Leitrim (35)	Cork(271), Mayo(92)
Lung	Belfast(1,583), Carrickfergus(151), Derry(342), Dublin(3,621), Kildare(381), Louth(313)	Belfast(1,058), Derry(241), Dublin(2,543)
Melanoma	Cork(262), Dublin(562), North Down(70)	Cork(418), Dublin(930), South Tipperary(80), Waterford(104)
Breast	-	Dublin(6,444), Kildare(714), North Down(603)
Cervix	-	Belfast(197), Carrickfergus(33), Dublin(677), Leitrim(25), Wicklow(80)
Uterus	-	Antrim(53), Kildare(109)
Ovary	-	Dungannon(68)
Prostate	Carlow(229), Cork(2,370), Donegal(808), Dublin(4,345), Galway(1,129), Kerry(770), Kildare(471), Offaly(337), Roscommon(381), Sligo(367), Waterford(548), Wicklow(520)	-
Testes	Cork(177), Derry(49)	-
Kidney	Coleraine(53), Offaly(56), Westmeath(59)	None
Bladder	Belfast(345), Donegal(178), Dublin(1,047), Wicklow(128)	Dublin(472)
Brain	Cork(237)	None
Lymphoma	Belfast(303), Craigavon(92)	Armagh(65), Carrickfergus(48), Castlereagh(85), Dublin(895), Newry & Mourne(86)
Myeloma	None	Cork(161)
Leukaemia	Cork(329), Limerick(141), North Tipperary(60)	Limerick(99), Louth(58)

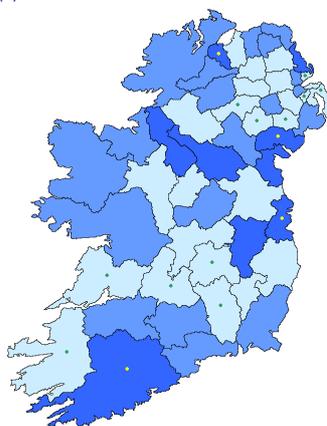
**Figure 1.16: Geographic variations in cancer incidence rates for selected cancers: 1994-2004**

Standardised incidence ratios for counties (ROI)/councils (NI) relative to all of Ireland for selected cancers

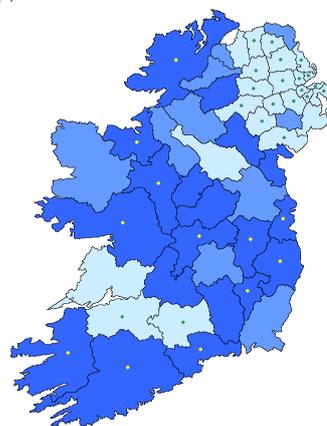
(a) Male lung cancer



(b) Male colorectal cancer

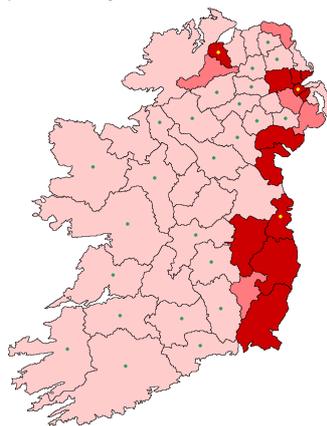


(c) Prostate cancer

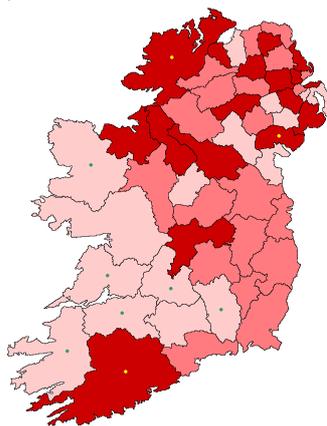


■ SIR > 105  
■ SIR: 95-105  
■ SIR < 95  
● Significantly lower than expected  
● Significantly higher than expected

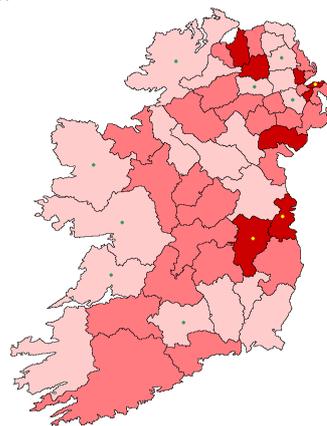
(d) Female lung cancer



(e) Female colorectal cancer



(f) Female breast cancer



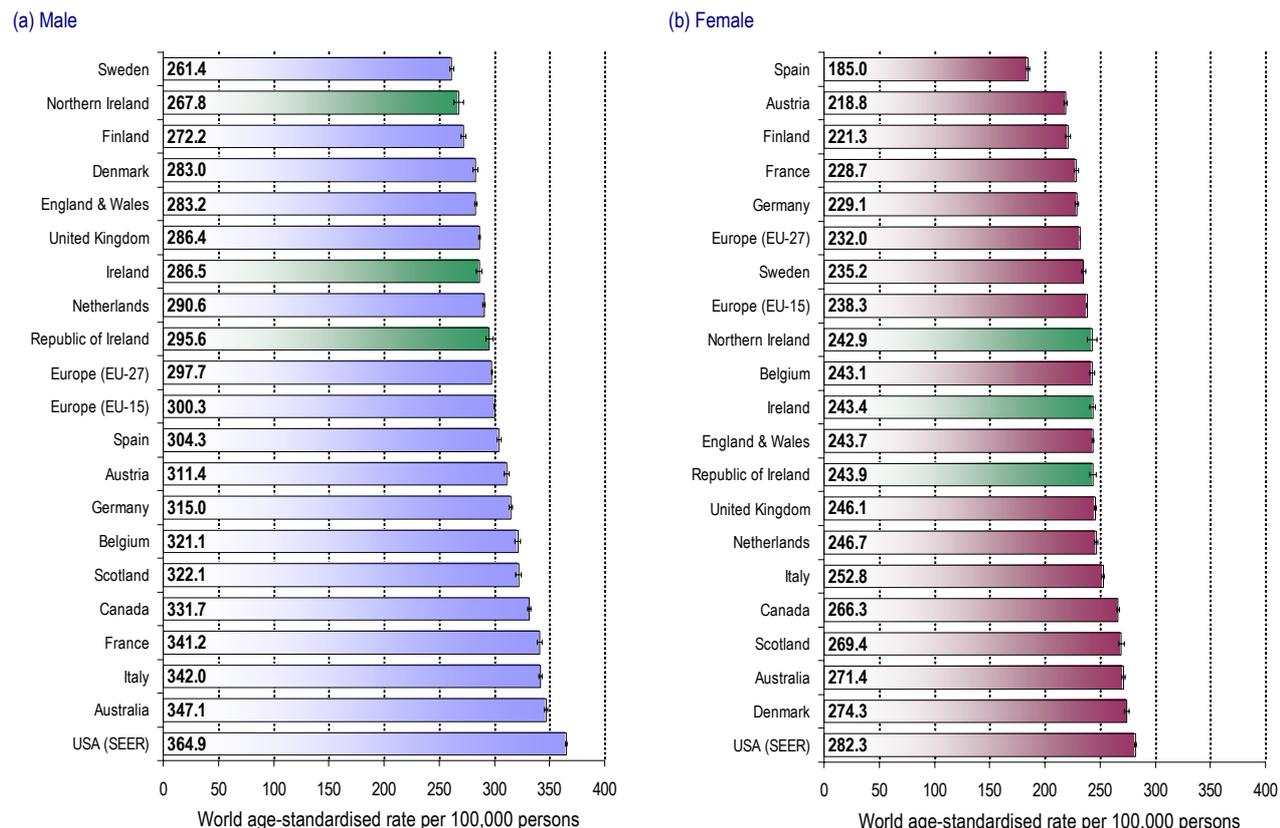
■ SIR > 105  
■ SIR: 95-105  
■ SIR < 95  
● Significantly lower than expected  
● Significantly higher than expected

### 1.10: International comparisons

Among males rates for all cancers combined (ex. NMSC) were 4.6% (p<0.001) lower in Ireland than in the European Union (15 countries) with male rates in Northern Ireland 10.8% (p<0.001) lower than in the EU compared to 1.5% (p=0.010) lower in Republic of Ireland. This is likely due to variations in prostate cancer rates. Female rates were however 2.1% (p<0.001) higher in Ireland than in the European Union (15 countries) with a similar difference in observed in both Northern Ireland (2.0%) and Republic of Ireland (2.4%). Rates in Ireland were similar to those in the UK for both males and females but were lower than those in USA, Canada and Australia. (Fig. 1.17)

**Figure 1.17: International comparisons of incidence rates for all cancers combined (ex. NMSC): 1998-2000**

World age-standardised incidence rates: Source - IARC<sup>3</sup>



### 1.11: Stage of cancers

The percentage of patients assigned a stage at diagnosis in Ireland depended upon the cancer site\* and ranged from poor (oesophageal and prostate cancer, less than 50%) to very good (colorectal, breast and melanoma, greater than 80%). Fortunately the availability of staging information is improving for most cancer sites although little change has occurred for oesophageal and prostate cancer. Variations in staging levels exist between Northern Ireland and Republic of Ireland with only oesophageal and stomach cancer having a similar percentage of staged cancers in the two countries. During 2001 Republic of Ireland had better information for colorectal, lung and breast cancers and Northern Ireland had better information for ovarian, cervical and prostate cancers. (Fig. 1.18, Supple. tab. 2)

Comparisons of stage between Northern Ireland and Republic of Ireland are thus difficult due to the different percentage of cases with an unknown stage. However there were more cases of malignant melanoma with thinner lesions in

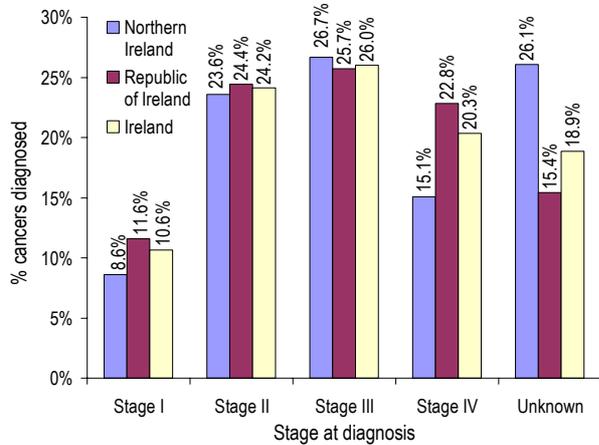
\* Only oesophageal, stomach, colorectal, lung, breast, ovarian, cervical and prostate cancers are considered due to unavailability of information on other cancer sites in Northern Ireland. Breslow depth for malignant melanoma is also analysed.

Northern Ireland than Republic of Ireland. In general cervical cancer, melanoma and breast cancer had the highest proportion of early disease while at least one third of lung and stomach cancers and a fifth of colorectal, ovary and oesophageal cancers presented with late Stage IV disease. (Fig. 1.18, Supple. tab. 2)

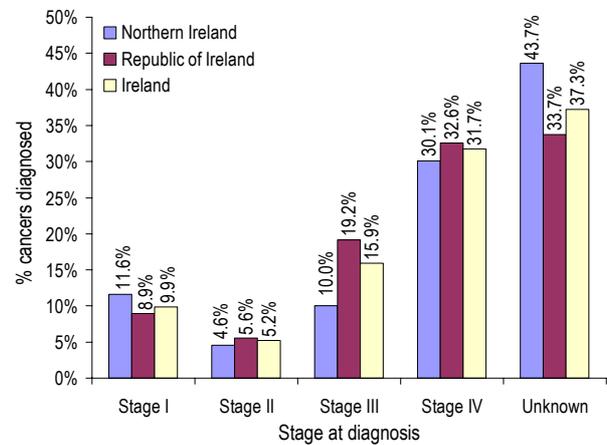
**Figure 1.18: Stage of cancer diagnosed for selected cancers: 2000-2004 or 2001 only**

Percentage of patients aged 15-99 (first diagnosis of cancer only, death certificate only diagnosis excluded)

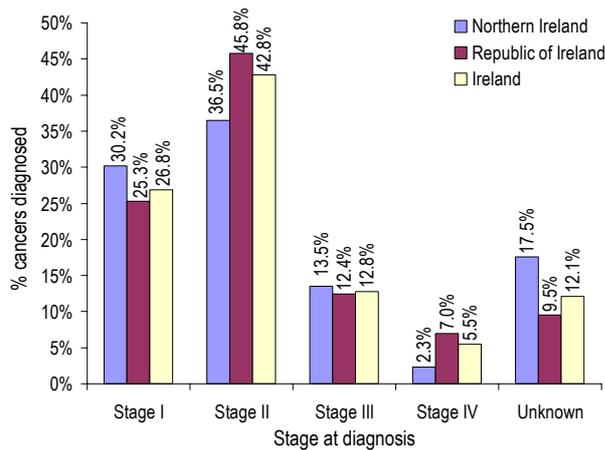
(a) Colorectal: 2000-2004



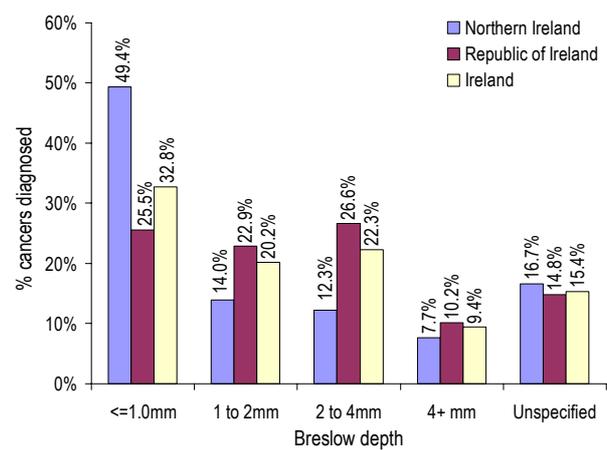
(b) Lung: 2001 only



(c) Breast: 2000-2004



(d) Malignant melanoma: Breslow depth 2000-2004



## 2: Treatment of cancer patients

Treatment information in Northern Ireland is only available in detail for selected years (1996 & 2001) and selected cancer sites (oesophagus, stomach, colorectal, lung, breast, cervix, ovary and prostate), thus information for all of Ireland is also restricted to these years and sites. Patients aged 15-99 with a diagnosis of one of these cancers as their first (or only) cancer (measured from 1994) who were not registered by death certificate only (or by autopsy), and thus possibly received some form of treatment, are included in the following analysis.

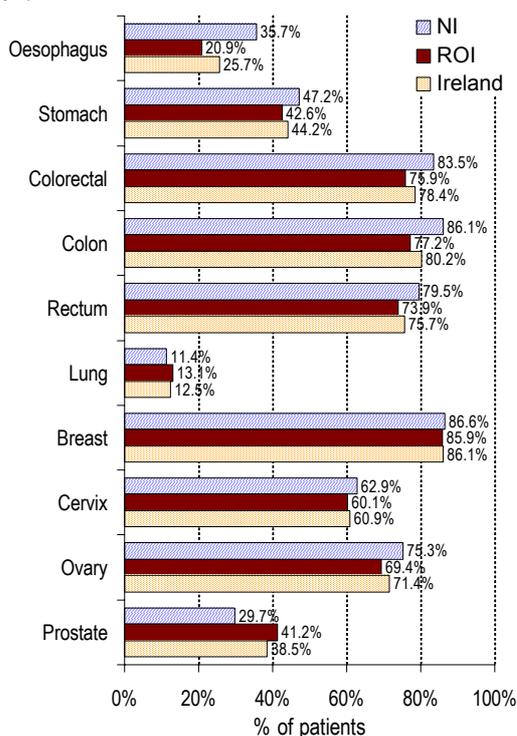
### 2.1: Treatment by cancer site

During 2001 surgery was the most common form of treatment received by patients with stomach, colorectal, breast, cervical or ovarian cancer, with hormone therapy most commonly used for prostate cancer patients and radiotherapy the most common form of treatment for oesophageal and lung cancer patients. (Fig. 2.1)

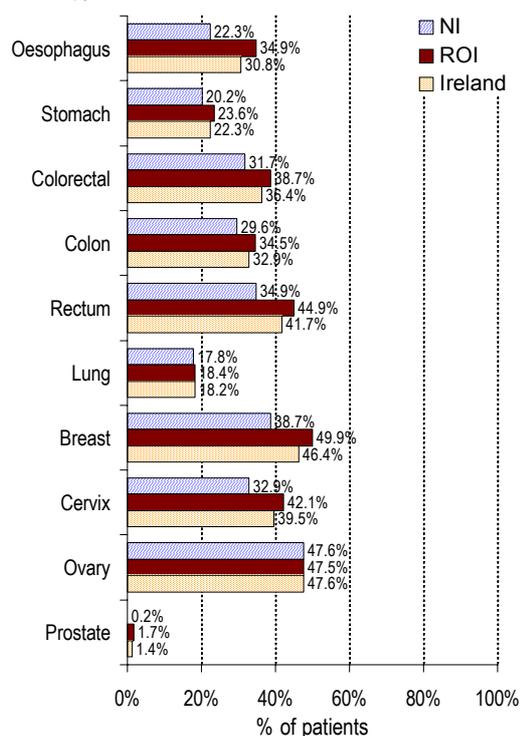
**Figure 2.1: Tumour directed treatment received by cancer patients in Ireland for selected cancer sites: 2001**

Percentage of patients aged 15-99 (first diagnosis of cancer only, death certificate only diagnosis excluded)

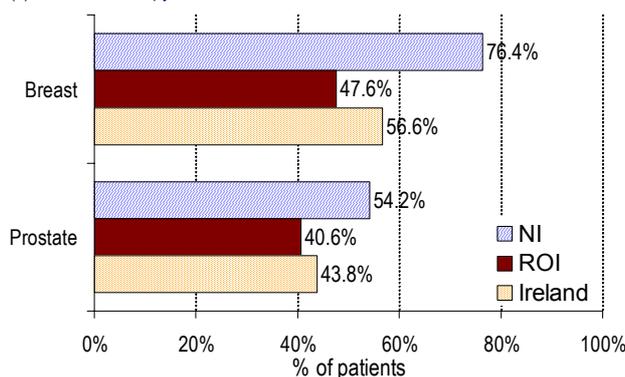
(a) Surgery



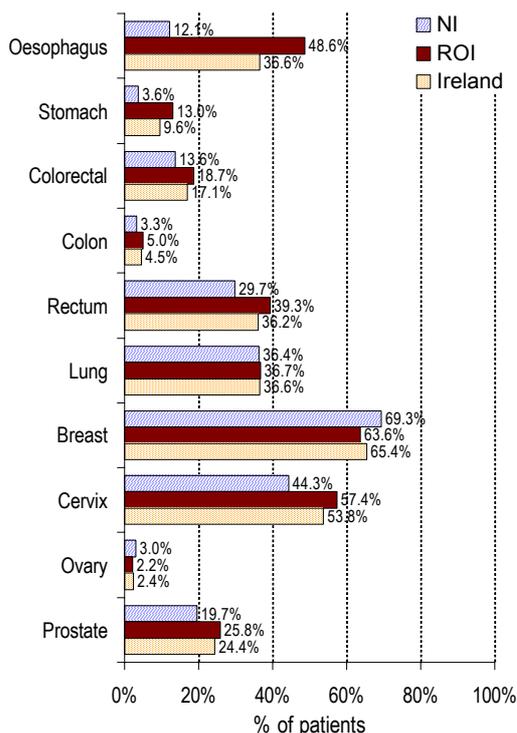
(b) Chemotherapy



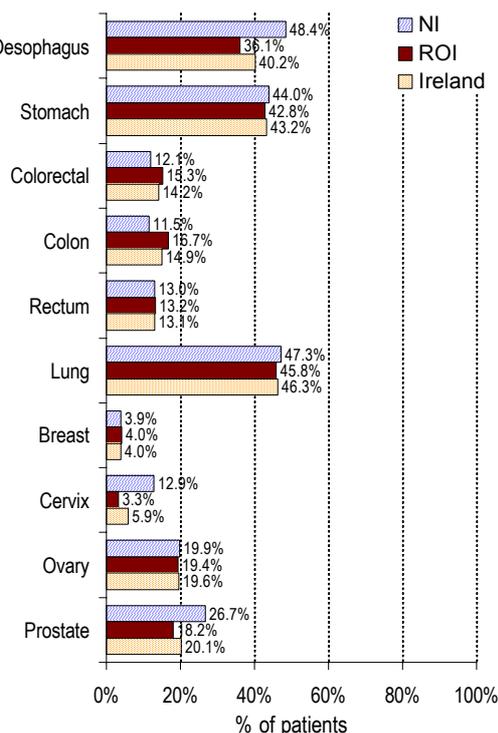
(c) Hormone therapy



(d) Radiotherapy



(e) No tumour directed treatment



A high proportion of patients received some form of tumour directed treatment for most cancer types, particularly for breast and cervical cancers, however among patients with a low survival cancer (lung, oesophageal and stomach) almost half did not have a record of receiving any form of tumour directed treatment. (Fig. 2.1)

## 2.2: Treatment: North/South differences

While there were remarkable similarities in treatment of some cancers (e.g. lung cancer, ovarian cancer), treatment levels in Northern Ireland and Republic of Ireland differed for particular cancer sites and types of treatment. In some cases these differences may be a result of differences in approach to management of cancer patients, the stage at which patients were diagnosed, age of patient, general health of patient or the cell type affected by the cancer. However there is no direct evidence to suggest that these factors are the sole cause of any differences between the two countries.

The key differences between Northern Ireland and Republic of Ireland during 2001 for the cancer sites for which information was available were as follows:

- **Oesophageal cancer:** The use of surgery as a treatment was 14.8% higher in Northern Ireland than in Republic of Ireland, while the use of chemotherapy and radiotherapy was 12.6% and 36.5% lower respectively. The proportion of patients receiving no tumour directed treatment was 12.3% higher

**Table 2.1:** Treatment differences between Northern Ireland and Republic of Ireland: 2001  
Differences in percentage of patients receiving treatment types between countries for selected cancer sites (+ NI higher, - NI lower)

	Surgery	Chemotherapy	Radiotherapy	Hormone therapy	No treatment
Oesophagus	+14.8%*	-12.6%*	-36.5%*	-	+12.3%*
Stomach	+4.6%	-3.4%	-9.4%*	-	+1.2%
Colorectal	+7.6%*	-7.0%*	-5.1%*	-	-3.2%*
Colon	+8.9%*	-4.9%*	-1.7%	-	-5.1%*
Rectum	+5.6%*	-10.0%*	-9.6%*	-	-0.2%
Lung	-1.7%	-0.6%	-0.3%	-	+1.5%
Breast	+0.7%	-11.2%*	+5.6%*	28.8%*	-0.2%
Cervix	+2.8%	-9.2%	-13.1%	-	+9.6%*
Ovary	+5.9%	+0.1%	+0.8%	-	+0.5%
Prostate	-11.5%*	-	-6.1%*	13.5%*	+8.5%*

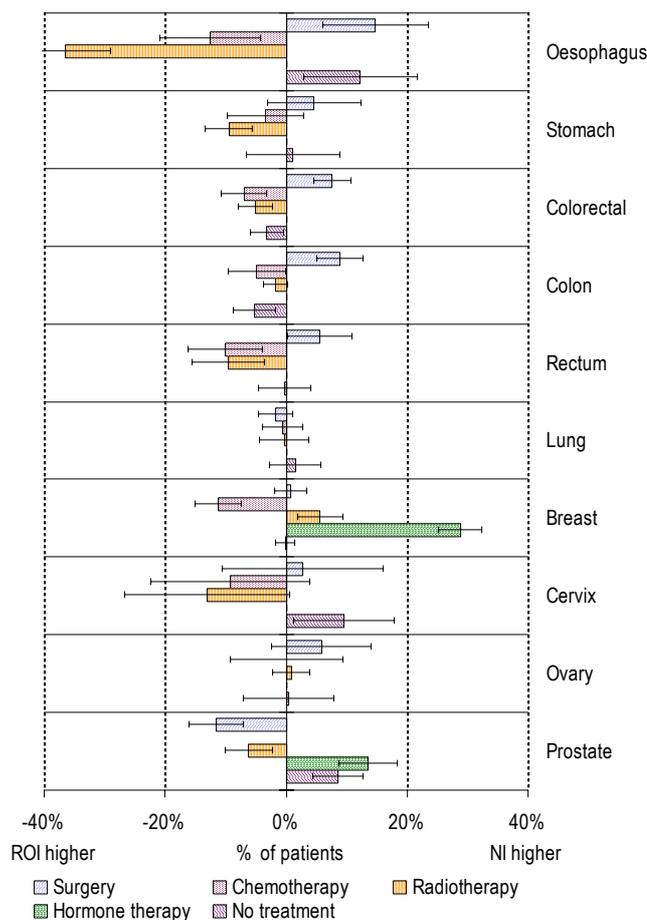
\* Significant difference at 95% confidence level (p<0.05)

in Northern Ireland than Republic of Ireland.

- **Stomach cancer:** There was no significant difference between Northern Ireland and Republic of Ireland in the proportion of patients receiving surgery or chemotherapy or receiving no tumour directed treatment after diagnosis. However the use of radiotherapy was 9.4% lower in Northern Ireland than in Republic of Ireland.
- **Colorectal cancer:** Use of surgery was 7.6% higher in Northern Ireland than Republic of Ireland. However chemotherapy and radiotherapy use were both lower in Northern Ireland, by 7.0% and 5.1% respectively. The differences in the use of radiotherapy were found mainly in the treatment of cancer of the rectum. Overall the proportion of patients receiving no tumour directed treatment was 3.2% lower in Northern Ireland than Republic of Ireland.
- **Lung cancer:** There was no significant difference in the proportions of patients receiving different treatment types between the two countries.
- **Breast cancer:** During 2001 5.6% more patients received radiotherapy and 28.8% more received hormone therapy in Northern Ireland than Republic of Ireland, while 11.2% fewer patients received chemotherapy in Northern Ireland.
- **Cervical cancer:** There was no conclusive difference between Northern Ireland and Republic of Ireland in the proportion of patients receiving surgery, chemotherapy or radiotherapy although the proportion receiving no tumour directed treatment was 9.6% higher in Northern Ireland. This difference however may reflect incomplete data collection in Northern Ireland.
- **Ovarian cancer:** There were no significant differences between Northern Ireland and Republic of Ireland in the proportion of patients receiving surgery, chemotherapy or radiotherapy or in the proportion receiving no tumour directed treatment during 2001.
- **Prostate cancer:** The proportion of patients receiving surgery as a treatment was 11.5% lower in Northern Ireland than Republic of Ireland while radiotherapy use was 6.2% higher. Hormone therapy use was 13.5% higher in Northern Ireland, while the receipt of no tumour directed treatment was 8.5% higher. (Fig. 2.1, Fig. 2.2, Tab. 2.1)

**Figure 2.2: Treatment differences between Northern Ireland and Republic of Ireland: 2001**

Differences in percentage of patients receiving treatment types between countries for selected cancer sites



To generalise, patients with cancer in Northern Ireland were less likely to have radiotherapy and/or chemotherapy and more likely to have surgery or no tumour directed treatment than those in Republic of Ireland. It should be noted that for some patients with advanced disease invasive treatments may not be in the best interest of the patient.

## 2.3: Changes in treatment levels over time

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As a result of changes in cancer management in both Northern Ireland and Republic of Ireland, treatment levels for particular cancer sites and types of treatment changed quite dramatically between 1996 and 2001 in Ireland. The key changes for the cancer sites for which information was available were as follows:

- **Oesophageal cancer:** The use of chemotherapy and radiotherapy increased by 14.7% and 8.8% respectively, while surgery use decreased by 8.3%. The proportion of patients receiving no tumour directed treatment decreased by 7.6%. The increase in chemotherapy use occurred in both countries (NI: 13.0%, ROI: 15.9%). The increase in radiotherapy use however was only present in Republic of Ireland (14.3%), as were the decreases in surgery use (11.3%) and the proportion of patients receiving no tumour directed treatment (11.3%).
- **Stomach cancer:** The use of chemotherapy and radiotherapy increased by 12.4% and 5.4% respectively, with no significant change in surgery levels or the proportion of patients receiving no tumour directed treatment. While the increase in the use of chemotherapy between 1996 and 2001 was present in both Northern Ireland (6.9%) and Republic of Ireland (15.6%), the increase in the use of radiotherapy was only present in Republic of Ireland where an 8.7% increase occurred.
- **Colorectal cancer:** Use of chemotherapy and radiotherapy increased by 13.4% and 7.7% respectively while the proportion receiving no tumour directed treatment decreased by 2.9%. The increase in radiotherapy was driven solely by its increased use in treating cancer of the rectum. Chemotherapy and radiotherapy increases of similar sizes were present in both Northern Ireland and Republic of Ireland.
- **Lung cancer:** Chemotherapy and radiotherapy use increased by 5.2% and 4.2% respectively while surgery use decreased by 2.7%. Changes in the percentage of patients receiving radiotherapy, surgery or no tumour directed treatment were only significant in Republic of Ireland; however chemotherapy use did increase significantly in both countries.
- **Breast cancer:** For breast cancer patients the use of surgery as a treatment increased by 3.4%, chemotherapy use increased by 16.0% and radiotherapy use increased by 14.8%, while hormone therapy use decreased by 11.4%. The increase in use of radiotherapy was observed in both Northern Ireland (12.2%) and Republic of Ireland (16.4%), as was the increase in the use of chemotherapy (NI: 14.8%; ROI: 16.0%), the increase in the use of surgery (NI: 5.4%; ROI: 2.5%) and the decrease in treatment using hormone therapy (NI: 5.7%; ROI: 13.1%). The decreased use of hormone therapy may reflect better targeting of treatment as this treatment works best for those who are oestrogen receptor positive.
- **Cervical cancer:** The use of chemotherapy increased in Ireland by 33.4% with no significant change in use of surgery or radiotherapy. The proportion of patients receiving no tumour directed treatment decreased by 5.0%. The increase in the use of chemotherapy was apparent in both Northern Ireland (23.1%) and Republic of Ireland (37.6%).
- **Ovarian cancer:** Compared to 1996 the use of surgery increased in Ireland by 17.7%, although this was driven by improvements in Republic of Ireland only, where there was a 25.7% increase in surgery use. Consequently, the proportion of patients receiving no tumour directed treatment decreased by 7.8%, again driven by the changes in Republic of Ireland (11.8%).

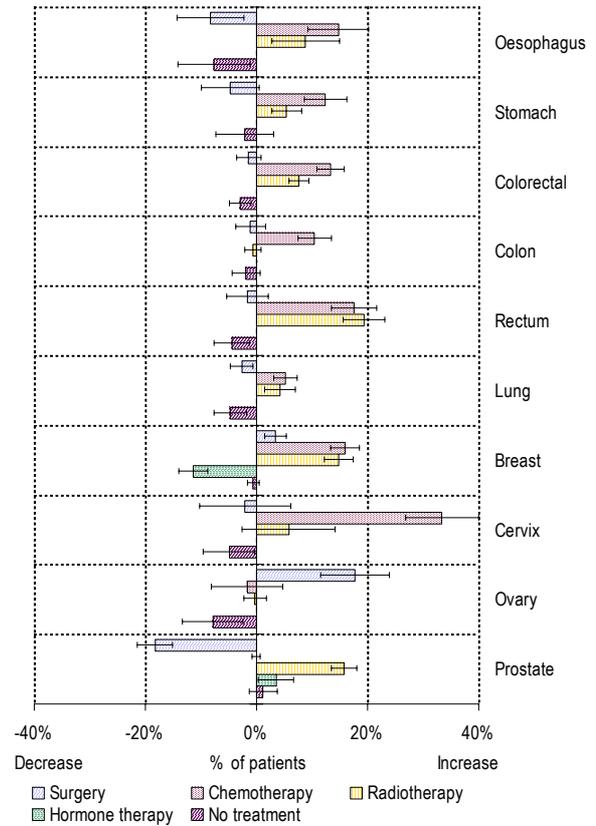
- **Prostate cancer:** Use of radiotherapy and hormone therapy in 2001 was 15.8% and 3.5% higher respectively compared to their use in 1996 while surgery use was 18.3% lower. There was no change in the proportion of patients receiving no tumour directed treatment although an increase of 5.7% was observed in Northern Ireland. The increase in use of radiotherapy was observed in both Northern Ireland (13.0%) and Republic of Ireland (16.4%), as was the decrease in treatment using surgery (NI: 23.3%; ROI: 17.0%), however the increase in the use of hormone treatment only occurred in Republic of Ireland with a 6.1% increase. (Fig. 2.3)

The similarities in changes in treatment of breast cancer and cervical cancer are reassuring. Changes between 1996 and 2001 in other cancers have been more marked in Republic of Ireland than Northern Ireland. This requires further study, however it must be remembered that differences may reflect differences in data collection, data availability or the greater number of cases available for analysis in Republic of Ireland which leads to easier detection of significant changes.

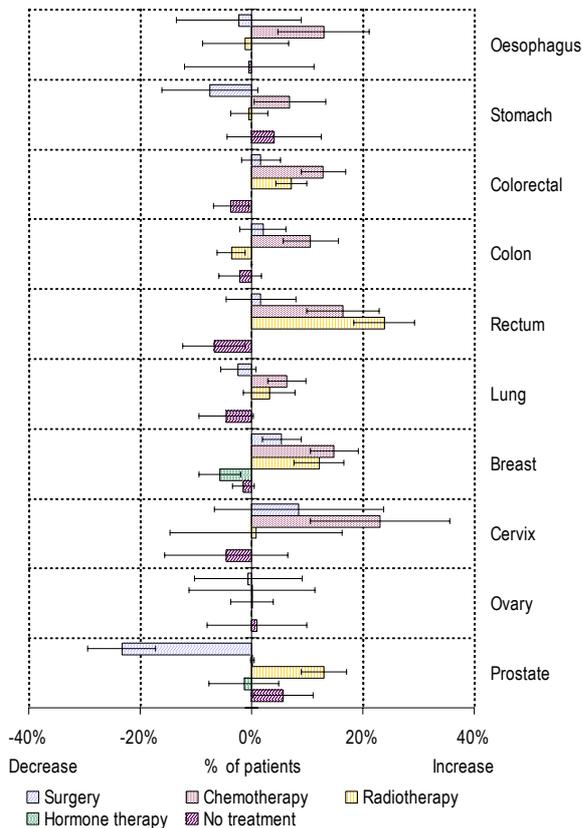
**Figure 2.3:** Treatment changes between 1996 and 2001 in Ireland

Differences in the percentage of patients receiving treatment types between 1996 and 2001 for selected cancer sites

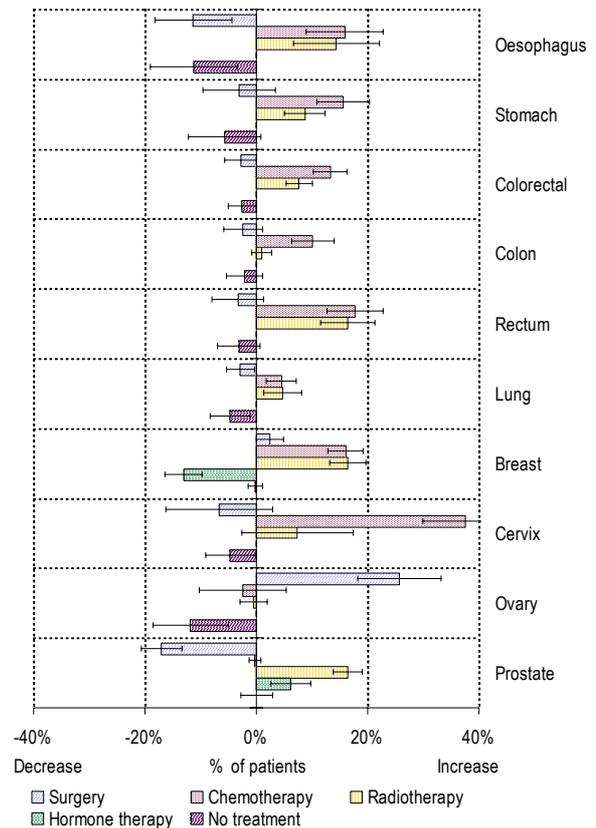
(a) Ireland



(b) Northern Ireland



(c) Republic of Ireland



### 3. Survival of cancer patients

Five-year (age-standardised) relative survival (ASRS) for patients with cancer (ex. NMSC) diagnosed in Ireland during 2000-2004 was estimated to be 49.6% and was 4.8% ( $p < 0.001$ ) higher for females than males diagnosed during the period. (Fig. 3.1, Tab. 3.1)

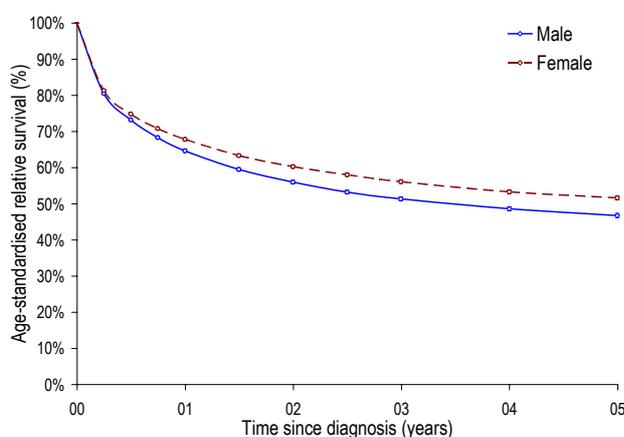
**Table 3.1:** Survival for patients with cancer (ex. NMSC) by country and sex: 2000-2004  
One and five-year age-standardised relative survival: Period analysis estimates

		Age-standardised relative survival (95% CI)		
		Male	Female	All
1-year	Northern Ireland	62.3% (61.5%, 63.1%)	67.5% (66.8%, 68.3%)	65.2% (64.7%, 65.8%)
	Republic of Ireland	65.7% (65.2%, 66.2%)	68.0% (67.5%, 68.6%)	67.1% (66.8%, 67.5%)
	All-Ireland	64.7% (64.2%, 65.1%)	67.9% (67.4%, 68.3%)	66.5% (66.2%, 66.8%)
5-year	Northern Ireland	43.2% (42.2%, 44.2%)	51.5% (50.6%, 52.4%)	47.9% (47.2%, 48.5%)
	Republic of Ireland	48.4% (47.7%, 49.1%)	51.7% (51.1%, 52.4%)	50.4% (50.0%, 50.9%)
	All-Ireland	46.8% (46.2%, 47.3%)	51.6% (51.1%, 52.2%)	49.6% (49.2%, 50.0%)

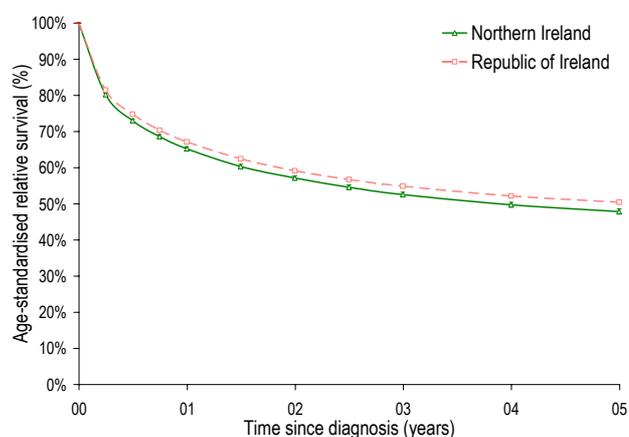
**Figure 3.1:** Survival for patients with cancer (ex. NMSC) by sex and country: 2000-2004

Age-standardised relative survival: Period analysis estimates

(a) All-Ireland



(b) Northern Ireland and Republic of Ireland



The difference in survival (ASRS) between males and females was apparent in both Northern Ireland and Republic of Ireland, although the difference between the two sexes was slightly larger in Northern Ireland. Additionally for males five-year survival (ASRS) for patients diagnosed with cancer (ex. NMSC) during 2000-2004 was 5.2% ( $p < 0.001$ ) higher in Republic of Ireland than in Northern Ireland. There was no significant difference in survival (ASRS) between the two countries for females (Fig. 3.1, Tab. 3.1). The differences for males however were due to the higher levels of prostate cancer in Republic of Ireland where survival from this cancer was higher due to increased use of PSA testing with lead-time bias affecting survival estimates. Excluding prostate cancer there was no significant difference in five-year survival (ASRS) between the two countries for males.

#### 3.1: Survival by cancer site

Survival varied considerably by cancer site with estimates of five-year survival (ASRS) for male patients diagnosed in 2000-2004 ranging from 5.4% for pancreatic cancer to 96.9% for testicular cancer, while among females five-year survival (ASRS) ranged from 6.8% for pancreatic cancer to 91.6% for malignant melanoma. Lung, liver, oesophageal, stomach and brain cancer also had very poor survival for both males and females, while five-year survival (ASRS) from male prostate and female breast cancers was above 75%. (Fig. 3.2)

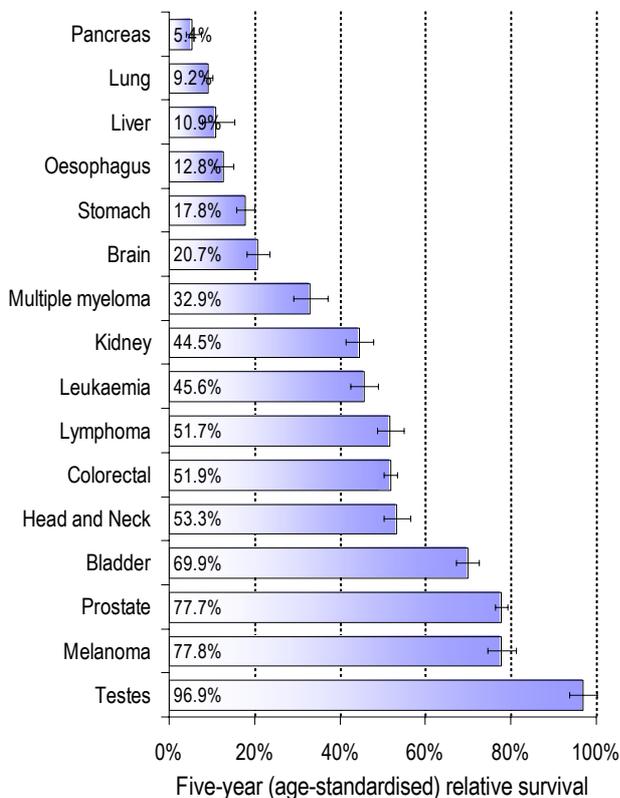
For most cancers five-year survival (ASRS) appeared higher among females than males, although few of these differences were statistically significant. Cancers where survival was conclusively higher among females were: lung

cancer, malignant melanoma, kidney cancer and brain cancer. Survival from prostate cancer (the most common male cancer) was similar to that from breast cancer (the most common female cancer) for patients diagnosed in 2000-2004. (Fig. 3.2)

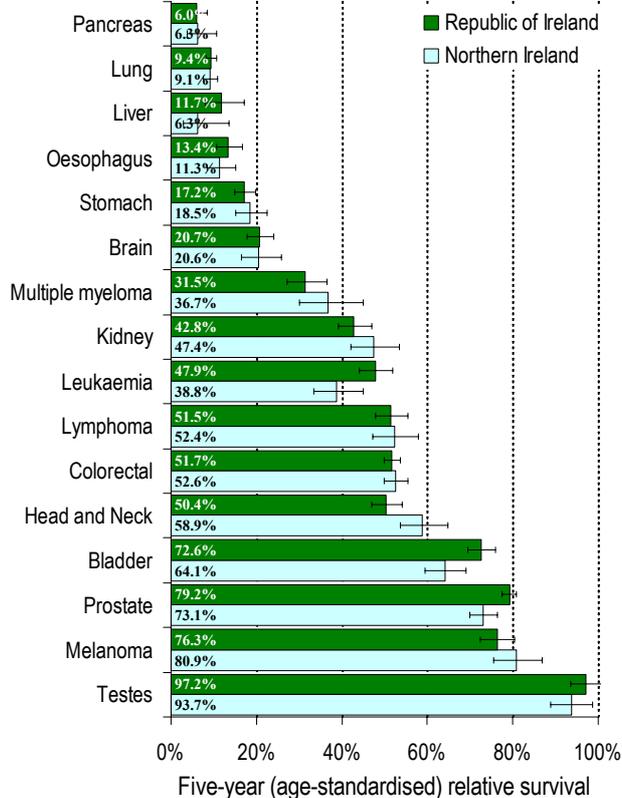
**Figure 3.2:** Survival for patients with cancer by country, sex and cancer site: 2000-2004

Five-year age-standardised relative survival: Period analysis estimates

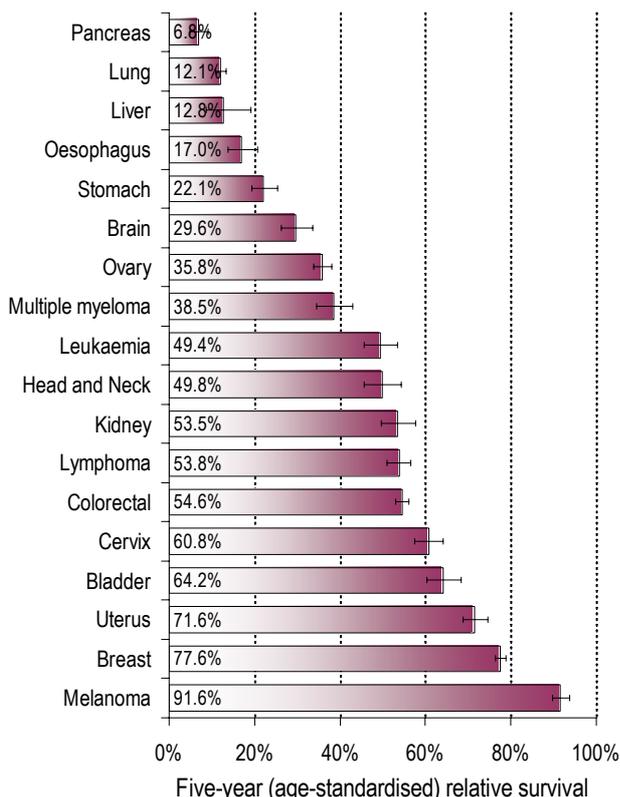
(a) Male – All-Ireland



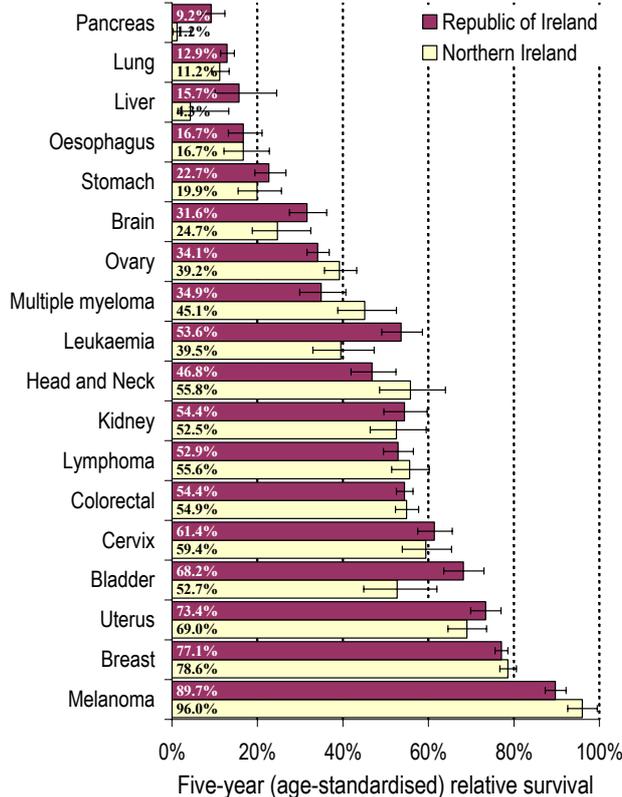
(b) Male – Northern Ireland and Republic of Ireland



(c) Female – All-Ireland



(d) Female – Northern Ireland and Republic of Ireland



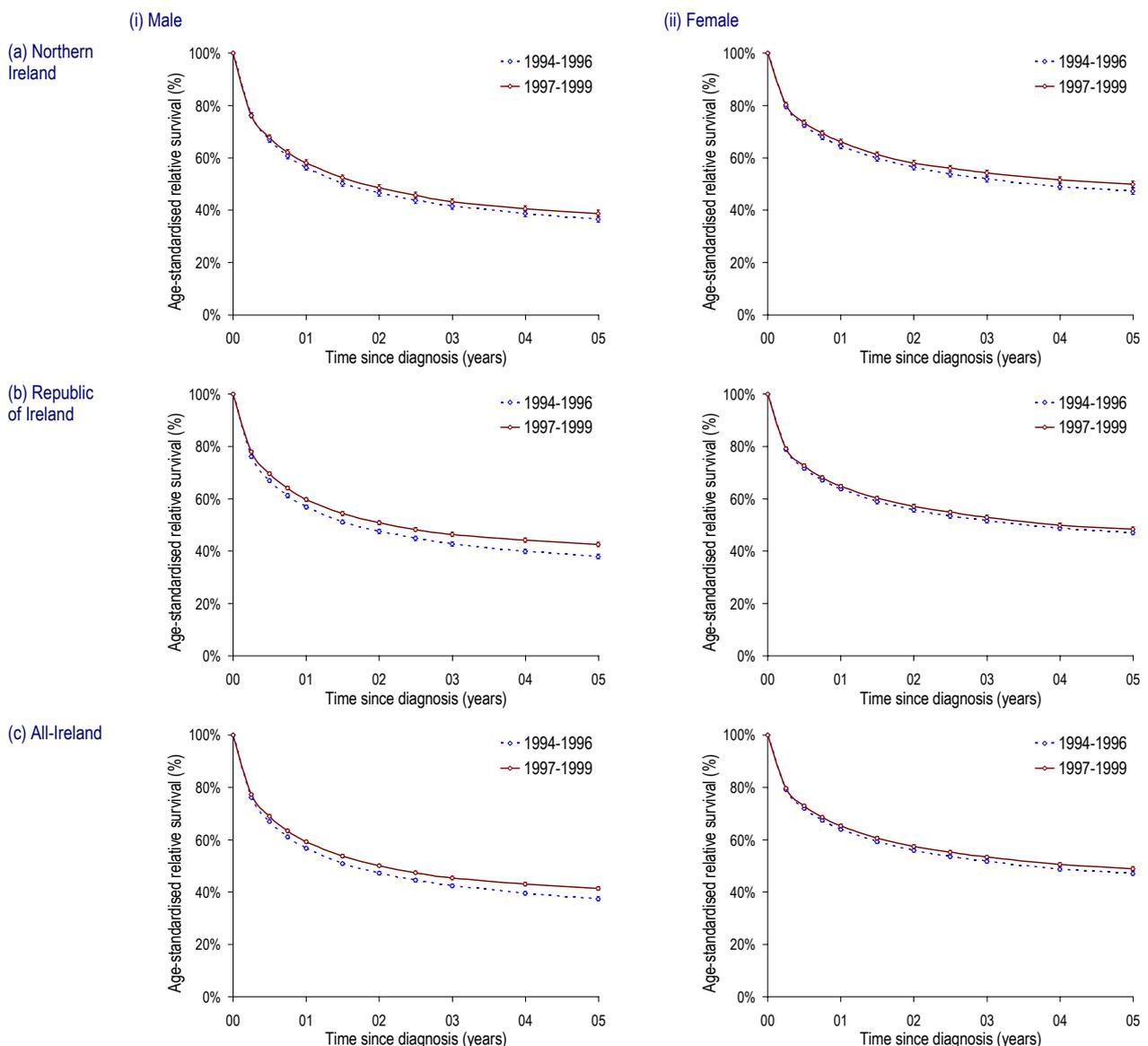
There was very little significant variation between Northern Ireland and Republic of Ireland in five-year survival (ASRS) for most cancer sites for patients diagnosed in 2000-2004. However five-year survival (ASRS) from male prostate and bladder cancers was higher in Republic of Ireland than in Northern Ireland. Among females five-year survival (ASRS) from pancreatic cancer, leukaemia and bladder cancer was higher in Republic of Ireland, while survival from malignant melanoma was better in Northern Ireland. (Fig. 3.2)

### 3.2: Changes in survival over time

Five-year survival (ASRS) for patients with cancer (ex. NMSC) in Ireland improved by 3.9% ( $p < 0.001$ ) for males and 1.9% ( $p = 0.008$ ) for females between 1994-96 and 1997-99. Improvements were significant in both countries for males and females combined with a 2.7% ( $p = 0.002$ ) increase in Northern Ireland and a 3.0% ( $p < 0.001$ ) increase in Republic of Ireland between the two three-year periods. These changes however were not apparent in both countries for both sexes with no significant change for males in Northern Ireland or females in Republic of Ireland. However, five-year survival (ASRS) for females with cancer (ex. NMSC) in Northern Ireland increased by 2.7% ( $p = 0.002$ ) between 1994-96 and 1997-99, while male five-year survival (ASRS) increased in Republic of Ireland by 4.7% ( $p < 0.001$ ). (Tab. 3.2, Fig. 3.3)

**Figure 3.3:** Changes in survival for patients with cancer: 1994-1999

Age-standardised relative survival by sex, country and period of diagnosis



**Table 3.2:** Changes in survival for patients with cancer: 1994-1999

One and five-year age-standardised relative survival by sex, country and period of diagnosis

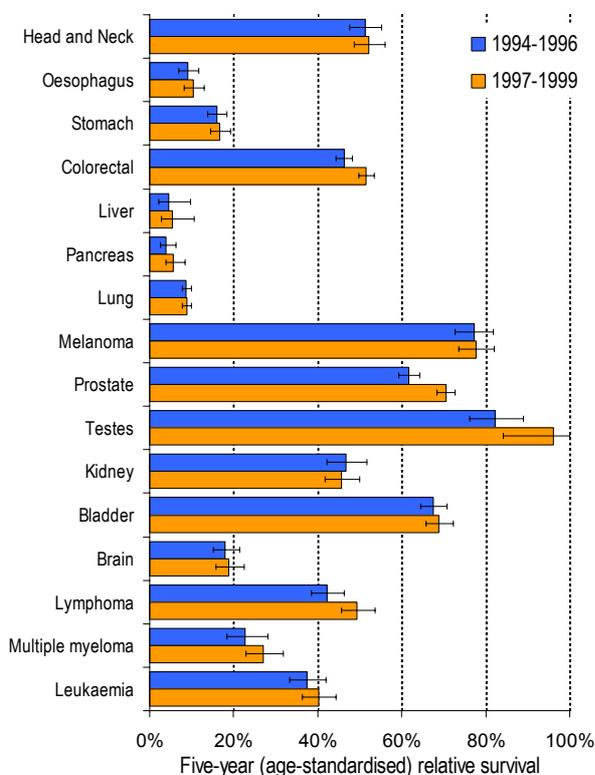
		Age-standardised relative survival (95% CI)			
		1-year		5-year	
		1994-1996	1997-1999	1994-1996	1997-1999
All persons	Northern Ireland	60.7% (60.0%, 61.5%)	62.6% (61.9%, 63.3%)	42.3% (41.5%, 43.2%)	45.0% (44.1%, 45.8%)
	Republic of Ireland	60.6% (60.1%, 61.1%)	62.5% (62.0%, 63.0%)	42.8% (42.2%, 43.5%)	45.8% (45.2%, 46.4%)
	All-Ireland	60.7% (60.2%, 61.1%)	62.5% (62.1%, 62.9%)	42.6% (42.1%, 43.1%)	45.5% (45.0%, 46.0%)
Male	Northern Ireland	56.3% (55.2%, 57.4%)	58.2% (57.1%, 59.2%)	36.5% (35.4%, 37.8%)	38.8% (37.6%, 40.0%)
	Republic of Ireland	56.9% (56.1%, 57.7%)	59.7% (59.0%, 60.5%)	37.9% (37.1%, 38.8%)	42.6% (41.7%, 43.4%)
	All-Ireland	56.7% (56.1%, 57.3%)	59.2% (58.6%, 59.8%)	37.5% (36.8%, 38.2%)	41.4% (40.7%, 42.1%)
Female	Northern Ireland	64.4% (63.4%, 65.4%)	66.2% (65.2%, 67.2%)	47.2% (46.0%, 48.4%)	49.9% (48.8%, 51.1%)
	Republic of Ireland	63.8% (63.0%, 64.5%)	64.8% (64.1%, 65.5%)	47.1% (46.3%, 48.0%)	48.5% (47.6%, 49.3%)
	All-Ireland	64.0% (63.4%, 64.6%)	65.3% (64.7%, 65.9%)	47.1% (46.4%, 47.8%)	49.0% (48.3%, 49.7%)

Examination of the improvement in survival for all cancers combined (ex. NMSC) by cancer site illustrates improvement in almost all cancers. Although some apparent improvements were not statistically significant (e.g. for cervical cancer and testicular cancer) three of the four most common cancers showed significant improvement. Five-year survival (ASRS) for patients diagnosed in 1997-1999 was higher than for those diagnosed in 1994-1996 by 5.3% for male colorectal cancer, 4.2% for female colorectal cancer, 3.7% for female breast cancer and 8.8% for male prostate cancer, the latter at least in part due to lead-time bias with detection of an increased number of prostate cancers due to PSA testing. Survival did not worsen for any cancer site. (Fig. 3.4)

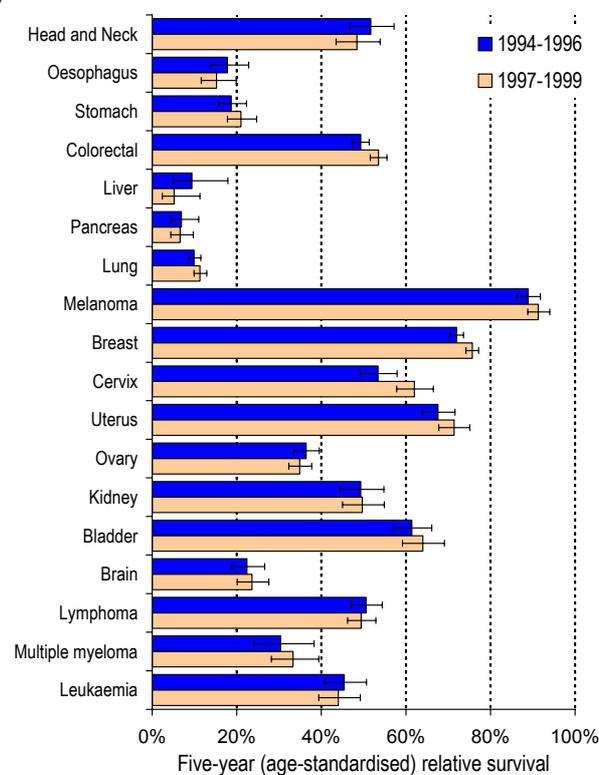
**Figure 3.4:** Changes in survival for patients with cancer by cancer site: 1994-1999

Five-year age-standardised relative survival by sex, cancer site and period of diagnosis

(a) Male



(b) Female



### 3.3: Observed survival

While relative survival is an adjusted measure that reflects only deaths as a result of cancer, observed survival includes causes of death other than cancer and thus represents survival actually experienced by cancer patients. It is useful to

include this as it gives patients and their carers a realistic picture of actual survival, which by definition is lower than relative survival. For those diagnosed with cancer (ex. NMSC) during 1997-1999 in Ireland, 32.6% of males and 44.8% of females survived five years. Observed survival improved in Ireland between 1994-1996 and 1997-1999 by 3.8% ( $p<0.001$ ) for males and 2.2% ( $p<0.001$ ) for females. Significant improvements occurred during this period among both males and females in Republic of Ireland and Northern Ireland. However five-year observed survival was 3.2% ( $p<0.001$ ) higher in Republic of Ireland for males than in Northern Ireland, although there was no significant difference among females. (Tab. 3.3)

**Table 3.3:** Actual survival for patients with cancer (ex. NMSC) by country and sex: 1994-1999

One and five-year observed survival – unadjusted for age.

		Observed survival (95% CI)			
		1-year		5-year	
		1994-1996	1997-1999	1994-1996	1997-1999
All persons	Northern Ireland	58.4% (57.7%, 59.1%)	60.1% (59.4%, 60.9%)	35.5% (34.8%, 36.2%)	37.9% (37.2%, 38.7%)
	Republic of Ireland	58.5% (57.9%, 59.0%)	60.6% (60.1%, 61.1%)	35.6% (35.1%, 36.1%)	39.1% (38.6%, 39.6%)
	All-Ireland	58.4% (58.0%, 58.9%)	60.4% (60.0%, 60.8%)	35.6% (35.2%, 36.0%)	38.7% (38.3%, 39.1%)
Male	Northern Ireland	53.1% (52.1%, 54.2%)	54.7% (53.7%, 55.8%)	28.5% (27.5%, 29.4%)	30.4% (29.5%, 31.4%)
	Republic of Ireland	53.7% (52.9%, 54.4%)	56.5% (55.8%, 57.2%)	29.0% (28.3%, 29.6%)	33.6% (32.9%, 34.3%)
	All-Ireland	53.5% (52.9%, 54.1%)	55.9% (55.4%, 56.5%)	28.8% (28.3%, 29.4%)	32.6% (32.1%, 33.2%)
Female	Northern Ireland	63.5% (62.5%, 64.5%)	65.1% (64.1%, 66.1%)	42.3% (41.3%, 43.3%)	44.8% (43.8%, 45.8%)
	Republic of Ireland	63.5% (62.8%, 64.3%)	64.8% (64.1%, 65.5%)	42.7% (42.0%, 43.5%)	44.9% (44.1%, 45.6%)
	All-Ireland	63.5% (62.9%, 64.1%)	64.9% (64.3%, 65.5%)	42.6% (42.0%, 43.2%)	44.8% (44.2%, 45.4%)

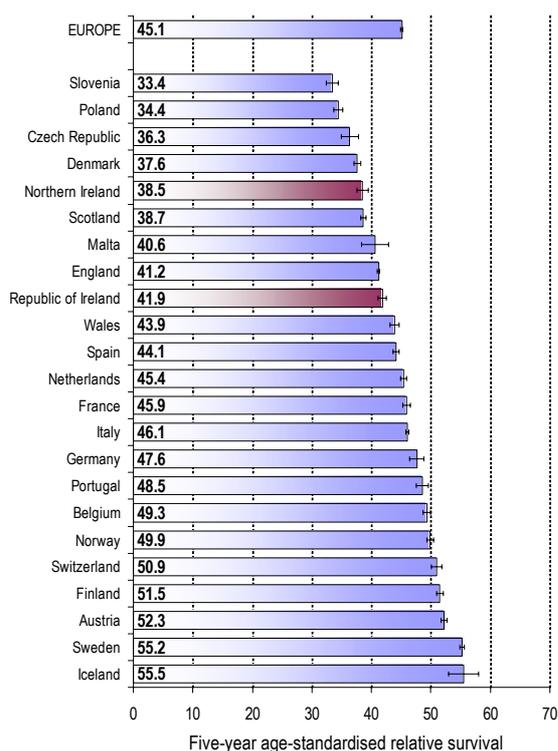
### 3.4: European comparisons

Five-year survival (ASRS) from cancer (ex. NMSC) for patients diagnosed in 1995-1999 in Republic of Ireland was 3.2% ( $p<0.001$ ) lower for males and 6.6% ( $p<0.001$ ) lower for females than the European average of 45.1% for males and

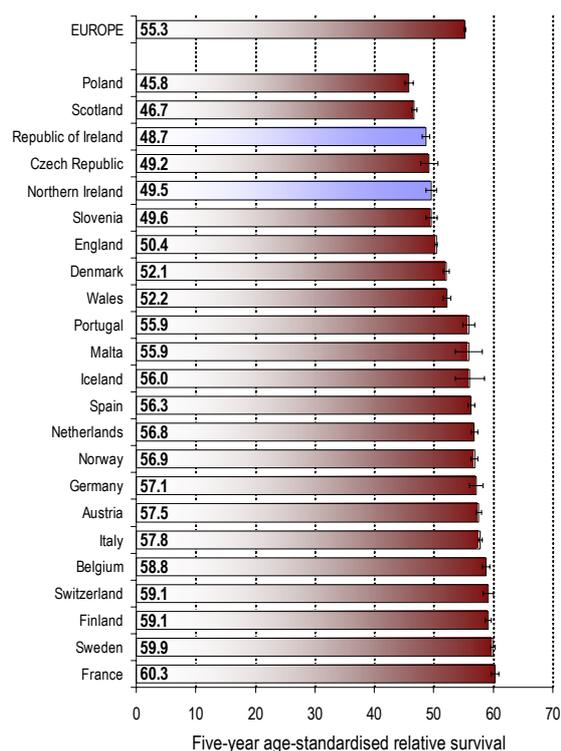
**Figure 3.5:** European comparisons of survival for patients with cancer (ex. NMSC): 1995-99

Five-year age-standardised relative survival: Source - EUROCARE-IV<sup>4</sup>

(a) Male



(b) Female



55.3% for females. In Northern Ireland five-year survival (ASRS) was 6.6% ( $p < 0.001$ ) lower for males and 5.8% lower for females than the European average (Fig. 3.5). These differences are however likely linked to variations in the proportions of different cancer types in each country.

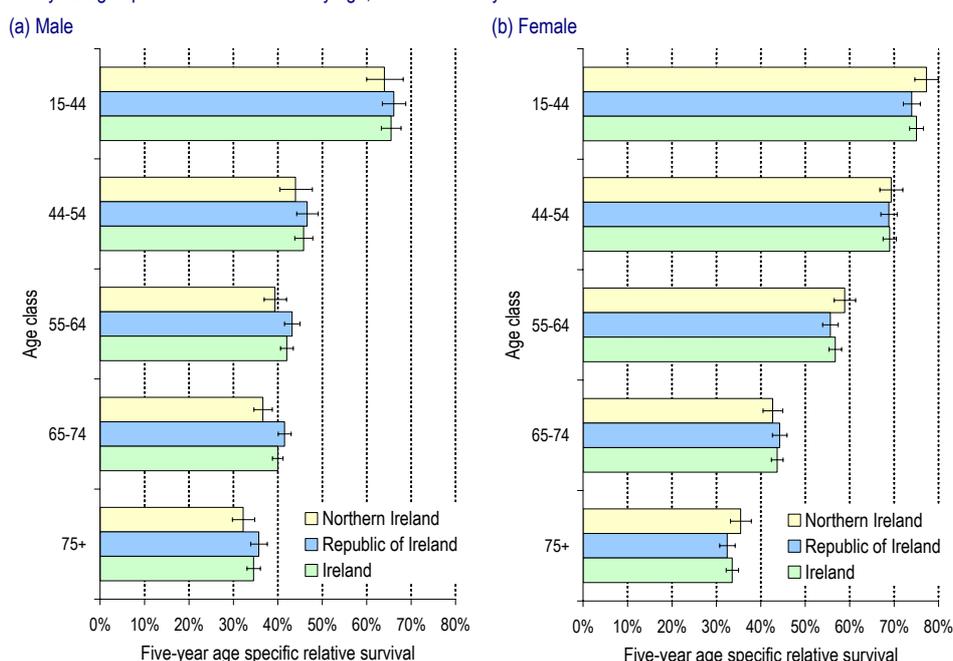
### 3.5: Survival and age

Five-year relative survival varied by age for patients diagnosed with cancer (ex. NMSC) in Ireland during 1997-1999 with five-year survival dropping by 30.9% ( $p < 0.001$ ) for males between ages 15-44 and ages 75+ and by 41.5% ( $p < 0.001$ ) for females. For males the difference between these age groups increases to 39.5% ( $p < 0.001$ ) if prostate cancer is excluded. These

differences were also significant in both Republic of Ireland and Northern Ireland with similar differences in five-year survival between those aged 15-44 and 75+. There were no conclusive differences in survival between males and females for any particular age class or between Northern Ireland and Republic of Ireland with the exception of males aged 65-74 among whom five-year survival was 4.9% ( $p = 0.007$ ) lower in Northern Ireland. The fall off in survival with increasing age may relate to the type of cancers which occur more commonly with age and their survival but also to the presence of other diseases which may influence treatment choices or affect overall survival. (Fig. 3.6)

**Figure 3.6:** Survival for patients with cancer (ex. NMSC) by age: 1997-1999

Five-year age-specific relative survival by age, sex and country



Five-year survival (ASRS) improved by 3.6% ( $p < 0.001$ ) for patients aged 15-64 and by 2.3% for patients aged 65 and over in Ireland between 1994-1996 and 1997-1999. Increases in five-year survival (ASRS) were also apparent in Northern Ireland and Republic of Ireland for both of these age groups. (Fig. 3.6)

For patients aged 15-64 or patients aged 65 and over there was no significant difference in five-year survival (ASRS) for patients diagnosed in 1997-1999 between Northern Ireland and Republic of Ireland. (Tab. 3.4)

**Table 3.4:** Survival for patients with cancer (ex. NMSC) by age: 1994-1999

Five-year age-standardised relative survival by age, country and period of diagnosis

	Five-year age-standardised relative survival (95% CI)			
	15-64		65+	
	1994-1996	1997-1999	1994-1996	1997-1999
Northern Ireland	53.5% (52.3%, 54.8%)	56.4% (55.2%, 57.7%)	34.2% (33.1%, 35.4%)	36.7% (35.5%, 37.8%)
Republic of Ireland	52.0% (51.1%, 52.9%)	56.0% (55.1%, 56.8%)	36.2% (35.4%, 37.1%)	38.4% (37.6%, 39.3%)
All-Ireland	52.5% (51.8%, 53.2%)	56.1% (55.4%, 56.8%)	35.5% (34.8%, 36.2%)	37.8% (37.2%, 38.5%)

### 3.6: Survival and stage

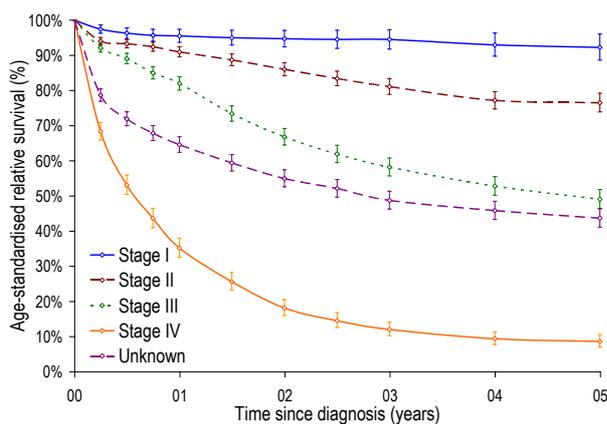
Stage at diagnosis was probably the biggest factor influencing survival from cancer for patients diagnosed in Ireland. For example:

- For colorectal cancer five-year survival (ASRS) ranged from 92.3% for patients diagnosed at Stage I to 8.6% for patients diagnosed at Stage IV. Survival for patients without a stage assigned was closest to that for patients diagnosed at Stage III.
- For lung cancer patients diagnosed in 1996 and 2001 three-year survival (ASRS) for patients diagnosed at Stage I was 42.7% higher ( $p < 0.001$ ) than those diagnosed at Stage IV, whose survival after three years (ASRS) was only 2.0%. Again survival for those with an unknown stage was closest to those diagnosed at Stage III.
- For patients diagnosed in 1997-1999 five-year survival (ASRS) from breast cancer ranged from 98.3% at Stage I to 20.6% at Stage IV. Five-year survival (ASRS) for patients without a stage assigned was approximately half way between that for patients diagnosed at Stage II and Stage III, at 71.4%.
- For patients diagnosed in 1997-1999 survival from prostate cancer varied depending upon the Stage at diagnosis, with three-year survival (ASRS) from Stage I & II disease 96.6% compared to 54.9% from Stage III & IV disease. Three-year survival (ASRS) for patients without a stage assigned was 85.8%. (Fig. 3.7)

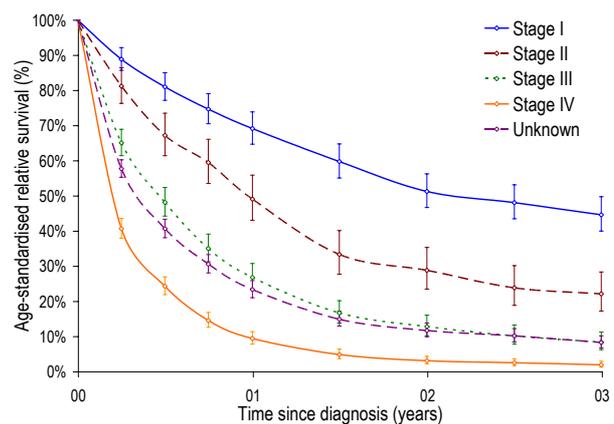
**Figure 3.7:** Survival for patients with cancer by stage: 1997-1999 or 1996 & 2001

Age-standardised relative survival by stage for selected cancers and years

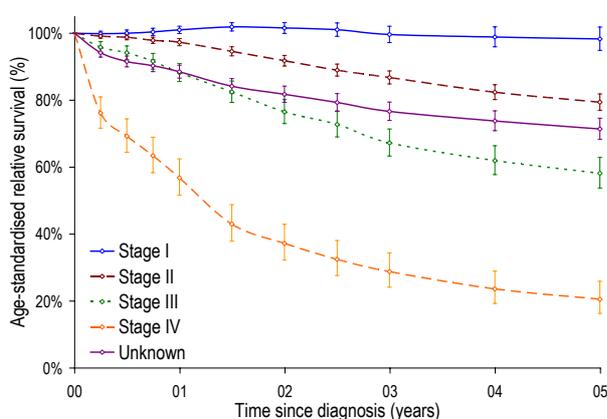
(a) Colorectal: 1997-1999



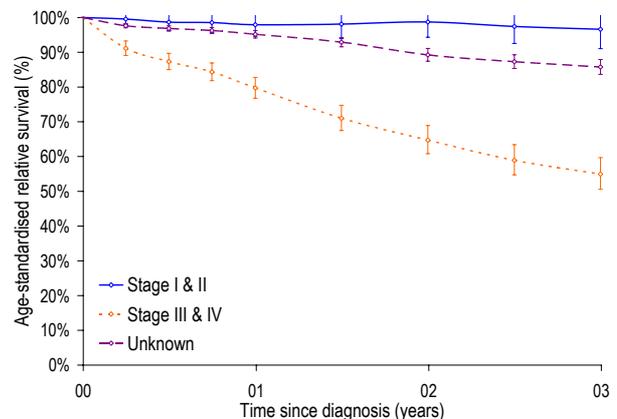
(b) Lung: 1996 & 2001



(c) Breast: 1997-1999



(d) Prostate: 1996 & 2001



It is difficult to compare accurately survival outcomes by stage between Northern Ireland and Republic of Ireland as large proportions of cancers were recorded as stage unknown, this despite detailed searches of notes. The percentage of patients assigned a stage at diagnosis in Ireland depended upon the cancer site and ranged from poor (oesophageal and prostate cancer, less than 50%) to very good (colorectal, breast and melanoma, greater than 80%). For lung,

oesophageal, prostate and stomach cancers approximately 70% of patients presented as late Stage IV disease or were unstaged. By contrast colorectal cancers had approximately 40% of patients at Stage IV or unstaged. For breast (70%) and cervical cancer (48%) the majority of patients presented with early Stage I or Stage II disease. While the percentage of unknown stage for breast cancer was higher in Northern Ireland at 17.5% compared with 9.5% for Republic of Ireland, the converse was the case for cervical cancer where 29% of cases were unstaged in Republic of Ireland compared with 9% for Northern Ireland. For ovarian cancer more patients in Republic of Ireland were recorded as late Stage IV (27%) compared with Northern Ireland (12%). (Supple. tab. 3)

## 4: Cancer mortality

During 2000-2004 there was an average of 5,921 male and 5,340 female deaths per year from cancer. For consistency with incidence data this includes malignant cancers only and excludes non-melanoma skin cancer (NMSC) which due to being easily treatable contributes only 57 deaths per year, a small number compared to the number of cases diagnosed. In the absence of other causes of death males had a 15.1% risk of dying from cancer before the age of 75 compared to 11.5% for females. (Tab. 4.1)

European age-standardised mortality rates (EASMRs) among males were 42.9% higher than among females ( $p < 0.001$ ) in 2000-2004, with a similar difference between males and females existing in both Northern Ireland and Republic of Ireland. However mortality was generally higher in Republic of Ireland, with male rates 3.9% ( $p = 0.001$ ) and female rates 3.6% ( $p = 0.006$ ) lower in Northern Ireland. (Tab. 4.1)

**Table 4.1:** Deaths from all cancers combined (ex. NMSC): 2000-2004

Summary statistics

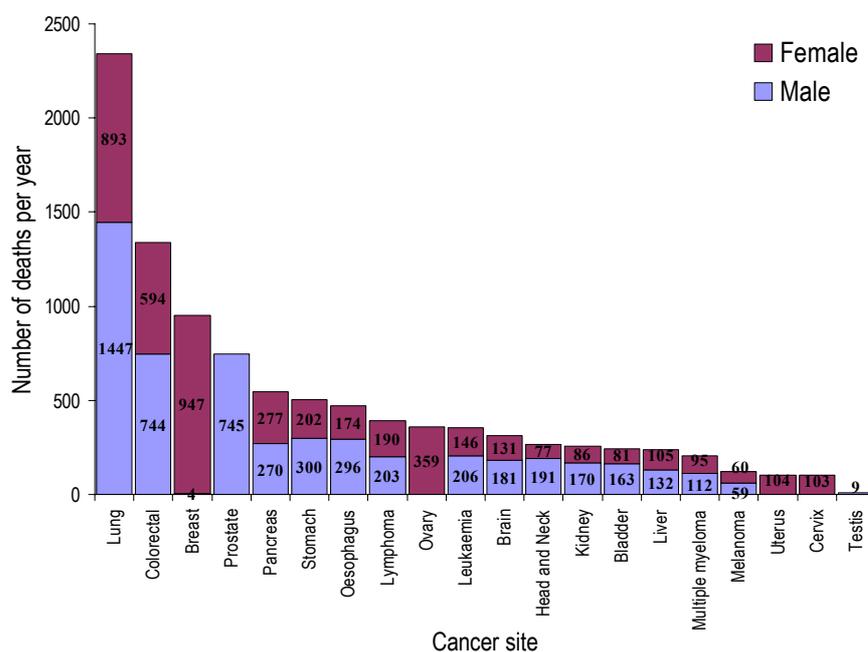
	Northern Ireland			Republic of Ireland			All-Ireland		
	Male	Female	All persons	Male	Female	All persons	Male	Female	All persons
Number of deaths per year	1,879	1,784	3,662	4,042	3,556	7,598	5,921	5,340	11,261
Median age at death	73	74	73	72	73	73	72	73	73
Cumulative risk (Aged 0 to 74)	15.0%	11.4%	13.0%	15.1%	11.6%	13.3%	15.1%	11.5%	13.2%
Crude rate per 100,000 persons	226.7	205.5	215.9	207.7	180.6	194.1	213.4	188.2	200.7
EASMR $\pm$ 95% CI	226.5 $\pm$ 4.6	158.9 $\pm$ 3.5	185.7 $\pm$ 2.8	235.8 $\pm$ 3.3	164.8 $\pm$ 2.5	193.8 $\pm$ 2.0	232.6 $\pm$ 2.7	162.8 $\pm$ 2.0	191.0 $\pm$ 1.6
% difference (NI vs ROI) $\pm$ 95% CI (+ NI higher, - NI lower)							-3.9% $\pm$ 2.4	-3.6% $\pm$ 2.6	-4.2% $\pm$ 1.7

EASMR: European age-standardised mortality rate per 100,000 persons; CI: Confidence interval

### 4.1: Cancer site

Lung cancer was the biggest cause of cancer death during 2000-2004, making up 20.8% of all cancer deaths (2,340 deaths per year). The next most common cancers causing fatality were colorectal cancer, breast cancer, prostate cancer and pancreatic cancer. Of the top twenty most common cancers testicular cancer had the least number of deaths per year (9 per year in 2000-2004) with bone and gallbladder cancers causing more deaths per year, although these cancers had lower incidence levels. Among the cancers present in both males and females the number of male deaths exceeded female deaths for each of the top twenty

**Figure 4.1:** Cancer deaths in Ireland by sex and cancer site: 2000-2004  
Number of deaths per year



cancers except for pancreatic cancer and malignant melanoma. However the most common female cancer, breast cancer, had more deaths each year than the most common male cancer (prostate cancer). (Fig. 4.1)

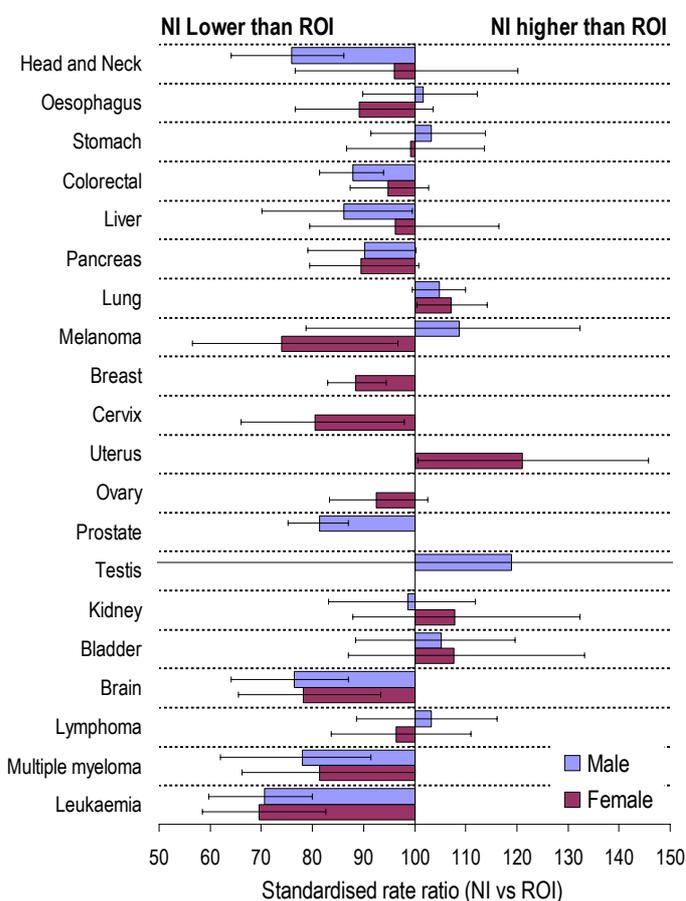
Given that some cancers are gender specific and both males and females have different lifestyles, the distribution of cancer type differs by sex. Among males the most common causes of cancer death were lung, prostate, colorectal, stomach and oesophageal cancer, while among females they were breast, lung, colorectal, ovary and pancreatic cancer. Among males the number of lung cancer deaths was almost double that of prostate cancer; however for Ireland as a whole the number of lung cancer deaths was slightly lower than the number of breast cancer deaths among females. In Northern Ireland however the number of lung cancer deaths exceeded breast cancer deaths in contrast to Republic of Ireland where breast cancer deaths were higher than lung cancer deaths. This reflects the lower rates of breast cancer mortality in Northern Ireland. (Fig. 4.1)

#### 4.1.1: Country comparisons of cancer site

Comparing cancer death rates (EASMR) for Northern Ireland and Republic of Ireland illustrates very similar patterns to those of incidence rates, although due to smaller numbers of deaths than cases some of the results are not statistically significant (e.g. higher death rates from male lung cancer and cancer of the uterus in Northern Ireland than Republic of Ireland; higher death rates from pancreatic cancer in Republic of Ireland than Northern Ireland). Changes from the pattern of incidence rates include similar cancer death rates between the two countries for bladder cancer, higher mortality rates in Republic of Ireland than Northern Ireland for multiple myeloma, male liver cancer and male head & neck cancer, and higher mortality rates of female lung cancer in Northern Ireland than Republic of Ireland.

There are explanations for the difference in the comparisons between Northern Ireland and Republic of Ireland for incidence and cancer death rates including difference in survival rates or differences in coding approaches. (Fig. 4.2)

**Figure 4.2:** Comparison of cancer death rates in Northern Ireland to those in Republic of Ireland for the top twenty cancer sites: 2000-2004  
Standardised rate ratios using European age-standardised mortality rates



Note: Error bars that do not overlap the central line (i.e. SRR=100%) indicate a significant difference between countries

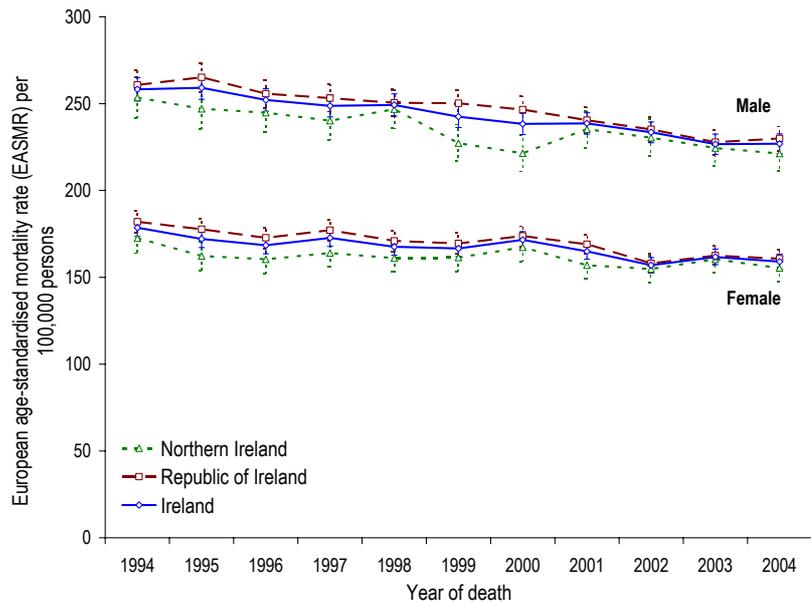
## 4.2: Trends

Cancer mortality rates (EASMR) for all persons decreased in Ireland between 1994 and 2004, the magnitude of which varied by sex and country. For males the annual percentage change was -1.4% (p<0.001) with a similar rate of change in Republic of Ireland and Northern Ireland (NI: -1.3% p<0.001; ROI: -1.5% p<0.001). The difference between countries

was slightly greater, but still not significantly, for females with a decrease of 0.7% (p=0.018) in Northern Ireland and 1.2% (p<0.001) in Republic of Ireland. Overall the annual decrease in female cancer death rates in Ireland during 1994-2004 was 1.0% (p<0.001). (Fig. 4.3)

Despite the decreasing rates the number of cancer deaths increased in Ireland by an average of 15.4 male (NI: 7.0; ROI: 8.5) and 30.2 female (NI: 11.6; ROI: 18.6) deaths per year. This was due to the growth and ageing of the population. (Fig. 4.3)

**Figure 4.3: Changes in cancer death rates by sex and country: 1994-2004**  
Trends in European age-standardised mortality rates for all cancers combined (ex. NMSC)



**4.2.1: Trends by cancer site**

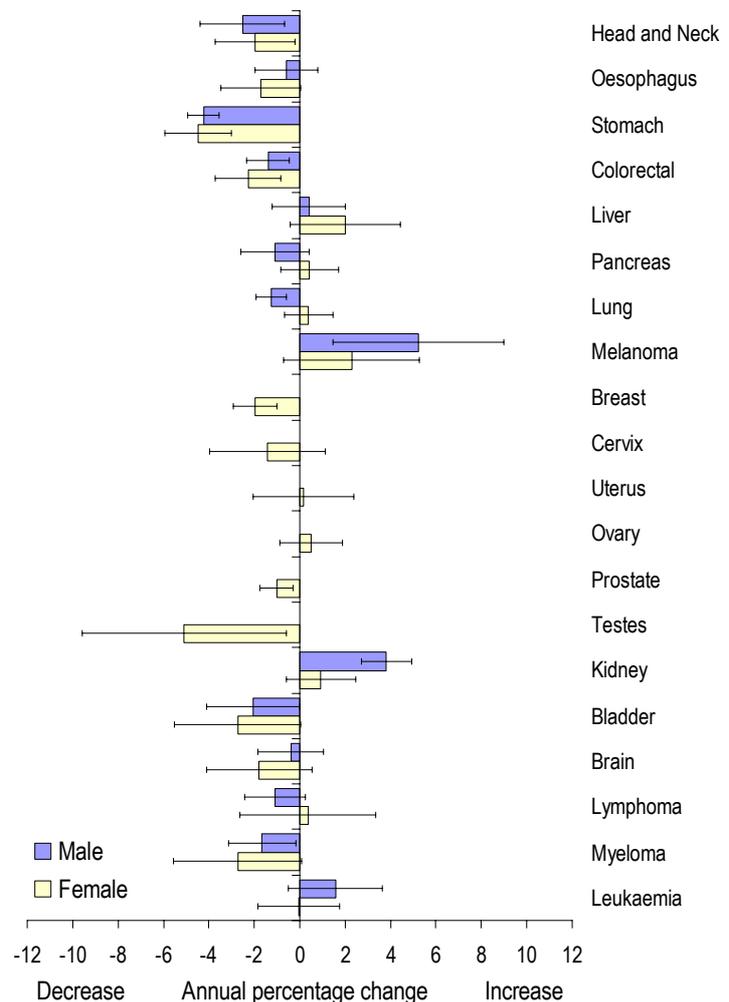
Trends in cancer death rates (EASMR) varied considerably by cancer site. Although for many cancer sites trends reflected those of incidence rates, changes in survival or the delayed impact of factors influencing changes in incidence rates resulted in different patterns. Additionally the presence of a smaller number of deaths than cases sometimes resulted in trends not being statistically significant compared to significant results for incidence rates. (Fig. 4.4)

For males cancer death rates increased significantly between 1994 and 2004 for melanoma and kidney cancer with decreases in head and neck cancer, stomach cancer, colorectal cancer, lung cancer, prostate cancer, testicular cancer and multiple myeloma. The decreases in colorectal cancer and myeloma were not present in the examination of incidence rates, reflecting the improvements in survival. (Fig. 4.4)

Among females there were no significant increases in cancer death rates between

**Figure 4.4: Changes in cancer death rates in Ireland by sex and cancer site: 1994-2004**

Annual percentage change in European age-standardised mortality rates



1994 and 2004 despite increases in incidence rates for several cancer sites. Mortality rates however decreased for head and neck cancer, stomach cancer, colorectal cancer and breast cancer. Only the decrease in stomach cancer was noticed in examination of incidence rates while incidence of breast cancer actually increased during 1994-2004, the difference in trend compared to mortality rates a result of improvements in survival. (Fig. 4.4)

### 4.3: Geographic variations

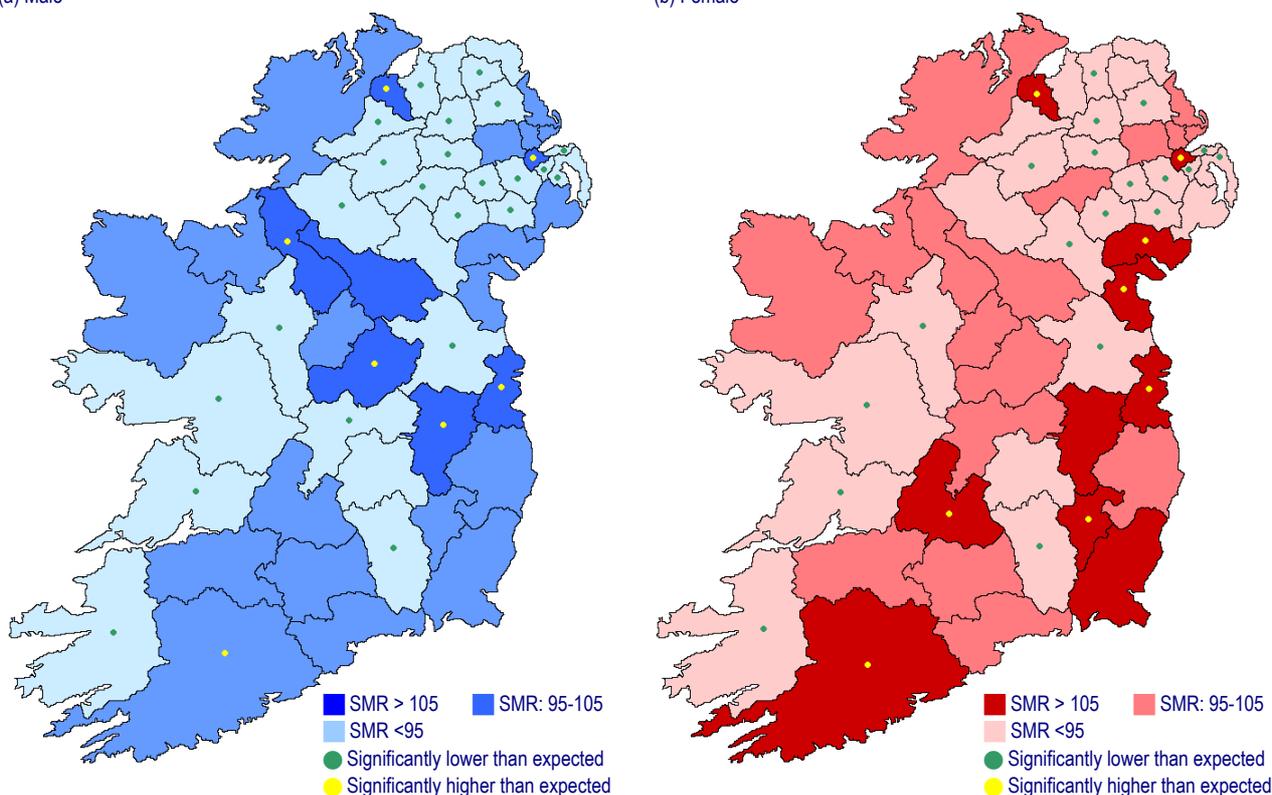
During 1994-2004 the levels of cancer mortality varied throughout Ireland, with higher rates of male and female cancer death in counties/councils that contain the four largest urban areas in Ireland, namely Dublin, Belfast, Cork and Derry. Male cancer death was also higher in Kildare, Leitrim and Westmeath while female mortality as a result of cancer was also higher in Carlow, Newry & Mourne, Louth and North Tipperary. Due to the higher concentrations in urban areas, 23 counties/councils had lower than expected mortality levels for males while 19 had lower mortality levels for females. The majority of these were in Northern Ireland. (Fig. 4.5)

**Figure 4.5:** Geographic variations in cancer death rates by sex: 1994-2004

Standardised mortality ratios for counties (ROI)/councils (NI) relative to all of Ireland for all cancers combined (ex. NMSC)

(a) Male

(b) Female



## 5: Prevalence

At the end of 2004 there were 158,541 people living with a diagnosis of cancer (including NMSC) in Ireland having been diagnosed in 1994-2004. 95,069 of these people were diagnosed in 2000-2004, with 49.5% of these people male and 29.7% resident in Northern Ireland. (Tab. 5.1)

Excluding NMSC there were 94,062 people living in Ireland at the end of 2004 who had been diagnosed with cancer during 1994-2004, which was 42.7% of all cancers diagnosed during this period. Of these people 34,491 were originally diagnosed in 1994-1999, 30.6% of those diagnosed during these years. (Tab. 5.2)

Among those diagnosed in 2000-2004 with cancer (ex. NMSC) there were 59,571 people still alive at the end of 2004, 55.4% of all those diagnosed since 2000. Of these 47.9% were male and 69.5% were resident in Republic of Ireland. (Tab. 5.2)

**Table 5.1:** Prevalence of cancer (including NMSC) in Ireland: 2004

Number of people diagnosed within period and alive at the end of 2004 by country, sex and period of diagnosis

		Diagnosed 1994-2004		Diagnosed 2000-2004	
		Prevalence	% of cases diagnosed during period	Prevalence	% of cases diagnosed during period
Northern Ireland	Male	21,830	46.0%	13,488	59.8%
	Female	25,957	53.7%	14,715	65.2%
	All persons	47,787	49.9%	28,203	62.5%
Republic of Ireland	Male	54,026	49.6%	33,705	63.1%
	Female	56,728	57.3%	33,161	68.3%
	All persons	110,754	53.3%	66,866	65.5%
All-Ireland	Male	75,856	48.5%	47,193	62.1%
	Female	82,685	56.1%	47,876	67.3%
	All persons	158,541	52.2%	95,069	64.6%

**Table 5.2:** Prevalence of cancer (excluding NMSC) in Ireland: 2004

Number of people diagnosed within period and alive at the end of 2004 by country, sex and period of diagnosis

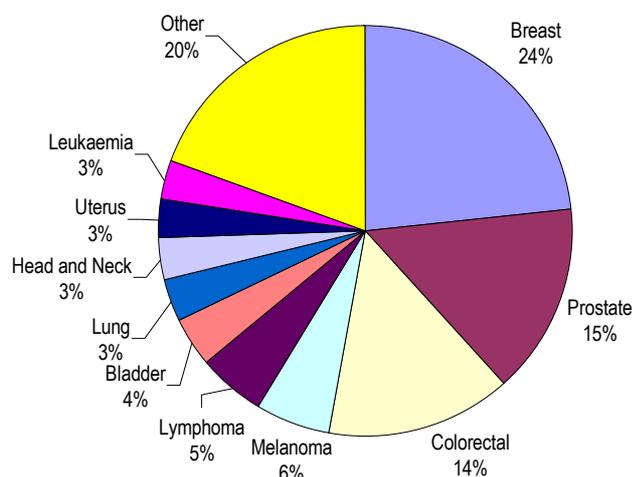
		Diagnosed 1994-2004		Diagnosed 2000-2004	
		Prevalence	% of cases diagnosed during period	Prevalence	% of cases diagnosed during period
Northern Ireland	Male	12,387	35.5%	8,146	49.3%
	Female	17,125	46.7%	10,011	58.0%
	All persons	29,512	41.2%	18,157	53.8%
Republic of Ireland	Male	30,076	39.0%	20,407	53.0%
	Female	34,474	48.2%	21,007	59.5%
	All persons	64,550	43.4%	41,414	56.1%
All-Ireland	Male	42,463	37.9%	28,553	51.9%
	Female	51,599	47.7%	31,018	59.0%
	All persons	94,062	42.7%	59,571	55.4%

### 5.1: Cancer site

Prevalence of cancer varies considerably by cancer site and depends upon the incidence rates and observed survival for patients with that particular cancer. At the end of 2004 female breast cancer was the most common cancer among those diagnosed during 1994-2004 and still alive. The next most common were prostate cancer and colorectal cancer making up 15% and 14% respectively, meaning that breast cancer prevalence was 9% higher than the next most common cancer, a result of high incidence and good survival. Despite high incidence levels, prevalence of lung cancer was relatively low due to the poor survival from the disease. (Fig. 5.1, Tab. 5.3)

**Figure 5.1:** Prevalence of cancer in Ireland by cancer site (ex. NMSC): 2004

Percentage of people diagnosed in 1994-2004 and alive at the end of 2004 by cancer site



**Table 5.3: Prevalence of cancer in Ireland by cancer site: 2004**

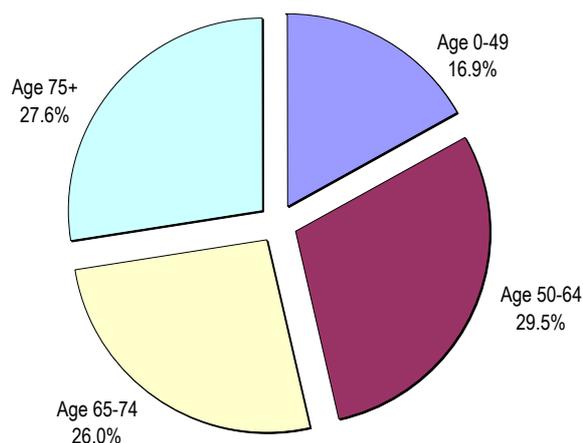
Number of people diagnosed in 1994-2004 and alive at the end of 2004 by country, sex and cancer site

	Northern Ireland			Republic of Ireland			All-Ireland		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Head and Neck	806	319	1,125	1,509	517	2,026	2,315	836	3,151
Oesophagus	154	108	262	342	212	554	496	320	816
Stomach	293	181	474	540	398	938	833	579	1,412
Colorectal	2,301	2,186	4,487	4,925	4,068	8,993	7,226	6,254	13,480
Liver	40	23	63	101	60	161	141	83	224
Pancreas	41	43	84	135	148	283	176	191	367
Lung	638	468	1,106	1,184	933	2,117	1,822	1,401	3,223
Malignant melanoma	638	1,091	1,729	1,299	2,415	3,714	1,937	3,506	5,443
Breast	47	7,317	7,364	81	14,557	14,638	128	21,874	22,002
Cervix	-	593	593	-	1,335	1,335	-	1,928	1,928
Uterus	-	1,007	1,007	-	1,915	1,915	-	2,922	2,922
Ovary	-	850	850	-	1,611	1,611	-	2,461	2,461
Prostate	3,391	-	3,391	10,785	-	10,785	14,176	-	14,176
Testes	558	-	558	1,118	-	1,118	1,676	-	1,676
Kidney	483	334	817	979	650	1,629	1,462	984	2,446
Bladder	766	264	1,030	1,919	795	2,714	2,685	1,059	3,744
Brain and other CNS	142	149	291	410	368	778	552	517	1,069
Lymphoma	791	800	1,591	1,715	1,569	3,284	2,506	2,369	4,875
Multiple myeloma	193	160	353	348	274	622	541	434	975
Leukaemia	366	279	645	1,177	829	2,006	1,543	1,108	2,651
Non-melanoma skin	9,443	8,832	18,275	23,950	22,254	46,204	33,393	31,086	64,479
Other	739	953	1,692	1,509	1,820	3,329	2,248	2,773	5,021
<b>All (excluding NMSC)</b>	<b>12,387</b>	<b>17,125</b>	<b>29,512</b>	<b>30,076</b>	<b>34,474</b>	<b>64,550</b>	<b>42,463</b>	<b>51,599</b>	<b>94,062</b>
<b>All (including NMSC)</b>	<b>21,830</b>	<b>25,957</b>	<b>47,787</b>	<b>54,026</b>	<b>56,728</b>	<b>110,754</b>	<b>75,856</b>	<b>82,685</b>	<b>158,541</b>

## 5.2: Age distribution

The median age for a member of the population living with cancer (ex. NMSC) at the end of 2004 and diagnosed since 1994 was 66 years of age, with 29.5% aged 50-64 and 26.0% aged 65-74. A small proportion of people living with cancer were children (aged 0-14) with 509 boys and 426 girls diagnosed with cancer in 1994-2004 alive at the end of 2004. (Fig. 5.2)

**Figure 5.2: Prevalence of cancer in Ireland by age: 2004**  
Percentage of people diagnosed in 1994-2004 and alive at the end of 2004 by age



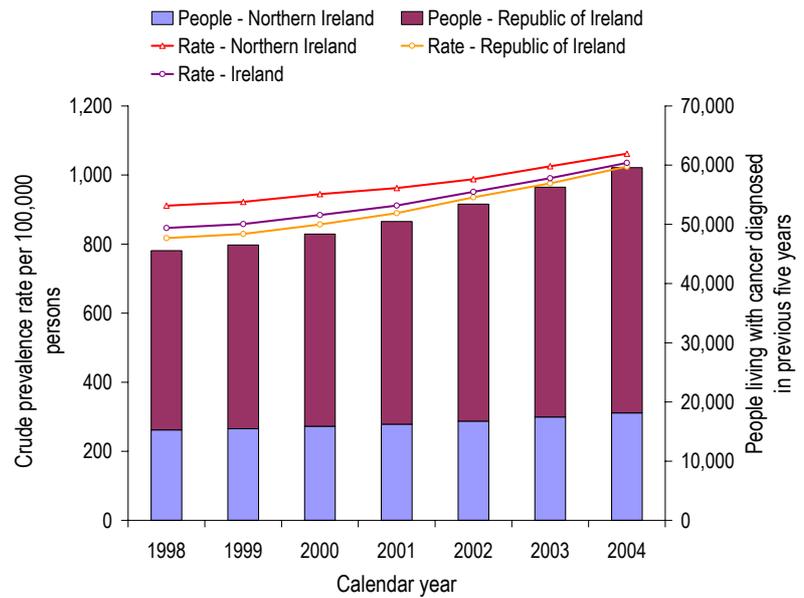
## 5.3: Trends

The number of people alive at the end of each year who have had a diagnosis of cancer (ex. NMSC) within the previous five years increased between 1998 and 2004 by an average of 2,379 per year. The majority of the increase occurred in Republic of Ireland where there was an increase of 1,900 people per year living with the disease compared to an annual increase of 479 people per year in Northern Ireland. (Fig. 5.3)

While some of this increase was due to improvements in survival and subsequent reduction in mortality rates the majority of this increase was likely due to changes in the population, particularly in Republic of Ireland. However crude rates also increased over the seven years by 3.5% each year ( $p < 0.001$ ), although crude rates do not remove the effect of the changing age profile of the population which contributes to increases in cancer incidence. The increase in crude rates was slightly higher in Republic of Ireland than in Northern Ireland with significant increases of 4.0% ( $p < 0.001$ ) and 2.6% ( $p < 0.001$ ) per year respectively. However at the end of 2004 the number of people living with cancer (ex. NMSC) diagnosed since 2000 per 100,000 people was 3.7% greater in Northern Ireland than Republic of Ireland. This can be attributed to the higher proportion of older people resident in Northern Ireland. (Fig. 5.3)

**Figure 5.3: Prevalence of cancer in Ireland over time: 2004**

Number of people (and crude rate per 100,000 persons) living with cancer (ex. NMSC) at the end of each calendar year, who were diagnosed within the previous five years



## Discussion

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This is the third report to compare cancer incidence and mortality figures from Northern Ireland and Republic of Ireland and the first to also investigate treatment and survival in detail. This summary, along with the more detailed comprehensive report available online, provides us with a large amount of information on cancer in the island of Ireland and highlights similarities and differences that may trigger further research, allow discussion of the reasons for variation and encourage standardisation of treatments for the benefit of patients.

Cancer is a major cause of mortality and morbidity in Ireland causing over a quarter of all deaths with approximately 30,000 patients diagnosed annually (including non-melanoma skin cancer) and 94,000 people living having had a diagnosis of a serious cancer. We cannot forget the patients and their families, friends and carers. The collection and analysis of accurate data on cancer provides a window through which we can document current patterns of care and monitor future improvements.

Differences in the experience of cancer between Northern Ireland and Republic of Ireland have been highlighted in this report. The rates of male cancer cases in the South of Ireland have been skewed upward by the higher levels of prostate cancer. There are however lower rates of cancers among women in Northern Ireland. For the majority of cancers rates are lower in Northern Ireland than Republic of Ireland, this however is only significant for colorectal cancer in males, cancer of the pancreas, bladder, brain and leukaemia in both sexes and cervical cancer in women. Cancer rates in Northern Ireland are however greater than in Republic of Ireland for male lung cancer and cancer of the uterus.

### Lung cancer

Some of the major cancers are preventable. Lung, oesophageal, stomach, head and neck, kidney, bladder and cervical cancer all have a common risk factor in tobacco use. Most of these cancers especially lung, oesophagus and stomach have very poor survival and pull down the average population survival. Lung cancer rates among females in Ireland are increasing with over 350 women in Northern Ireland and over 660 women in Republic of Ireland diagnosed with lung cancer each year. The fall in lung cancers in males (along with the reduction in head and neck cancers) are very welcome, however, there are still over 1,600 cases of male lung cancer diagnosed annually in Ireland. This, with the 1,450 male and 890 female deaths each year from lung cancer, represents a tragic loss of life with overwhelming consequences for families and society.

Tobacco use is also a major factor in explaining the higher rates of cancer in the urban areas of Belfast, Dublin, Cork and Derry. It is also a major contribution to the health differences and life expectancy between the more affluent and more deprived in the population and is a major cause of health inequality.

**Further efforts must be made to reduce tobacco consumption in our society especially among women and groups from deprived areas.**

### Prostate cancer

Among males the rates of cancer occurrence and cancer survival have changed markedly between 1994 and 2004, particularly in latter years, largely due to the influence of changing rates of prostate cancer. This has come about, not because of changing risk factors but due to increased detection of prostate cancer with the widespread use of Prostate

Specific Antigen (PSA) testing. This is a difficult area with scientific evidence of the benefit of PSA testing very scarce. PSA testing for prostate cancer does not meet the well defined and internationally accepted criteria for a screening test.<sup>5</sup> While prostate cancer is a serious disease and the PSA blood test is an easy examination to perform, studies have only recently shown a small reduction in deaths where PSA screening has been used and only after a considerable time period. There are two major international case control studies examining this issue: the Prostate, Lung, Colorectal and Ovarian cancer (PLCO) trial in the USA<sup>6</sup> and the European Randomised Screening for Prostate Cancer (ERSPC) trial.<sup>7</sup> Preliminary, but inconclusive, results have been released from these trials<sup>8,9</sup>, but it is expected that it will be several years before these trials report final results and conclusions.

Meanwhile many men have had a PSA test which has resulted in further investigation and treatment with questionable benefit for the patient. Studies have shown that many healthy men have small areas of prostate cancer which will cause them no symptoms, nor affect their life expectancy in any way. Many people die with, but not of, their prostate cancer. Rates of prostate cancer have increased markedly in both areas, by 45% in Northern Ireland between 1999 and 2004 (with little change prior to 1999) and by 105% in Republic of Ireland between 1994 and 2004. The differences in prostate cancer findings in Republic of Ireland and Northern Ireland have resulted in the observed differences in overall numbers of male cancers which are higher in Republic of Ireland and in higher observed survival for all cancers combined and for prostate cancer due to lead-time bias and the counting of very small cancers of no clinical significance.

**Further research should be undertaken to document the effect on men's health and economic consequences of the differences in the investigation and treatment of prostate cancer between the two countries in Ireland.**

### **Breast cancer**

Breast cancer is the most commonly diagnosed cancer in women (excluding non-melanoma skin cancer). While we must not forget the 20 men diagnosed annually with breast cancer the numbers of female cancers (3,095 cases per year) permit meaningful comparisons between countries and between areas within countries.

The pattern for new cases illustrates the impact of the breast screening service in Northern Ireland since 1993 and introduced for approximately half of the population of Republic of Ireland in 2000. This is reflected by the highest increase occurring in those aged 50-64 years and in the greater Dublin area where, in the period covered by this report, the first round of screening of this population had just been completed. Deaths from breast cancer are lower in Northern Ireland than Republic of Ireland. The patterns pose some interesting questions.

Breast cancer cases continue to rise in both areas as does the age-standardised incidence rate indicating that the ageing of the population is not the only factor. Other risk factors include late age of first pregnancy, nulliparity, not breast feeding, external oestrogens (e.g. HRT) and obesity in post menopausal women. In Ireland there are at least 21,874 women alive who had a diagnosis of breast cancer. Many of these women are very healthy and lead normal lives; others feel the effects of the cancer or its treatment and require ongoing care.

**The rising levels of breast cancer are yet another reason to address the rising obesity levels and encourage breast feeding.**

## **Melanoma**

Melanoma, although it currently only accounts for 3.4% of cancers, is rising rapidly in Ireland. It also affects a younger age group than many cancers. The differences between Republic of Ireland and Northern Ireland are quite marked with lower female rates in Northern Ireland, poorer female survival in Republic of Ireland and later stage of presentation in Republic of Ireland.

Melanoma is caused by UV radiation exposure especially sunburn in childhood. It is most common in fair skinned people who are the majority of residents of the UK and Ireland. Skin cancer prevention and early detection programmes have been organised in Northern Ireland for approximately 15 years.

**Further investigation of the differences between countries is warranted and care in the sun programmes should be considered in Republic of Ireland as well as Northern Ireland.**

## **Cervical cancer**

The existence of a cervical screening programme for all women aged 20-65 since 1989 has contributed to the reduction in cervical cancers in Northern Ireland being more marked in recent years. The National Cancer Screening Service launched a national, population-based cervical screening programme in Republic of Ireland in September 2008 for all women in Republic of Ireland aged 25 to 60. Screening will be provided every three years for women aged 25 to 44 and every five years for women aged 45 to 60. Prior to the introduction of this programme, cervical screening in Republic of Ireland, although widespread, was largely opportunistic.

## **Uterine cancer**

Other than male lung cancer, cancer of the uterus is the only cancer where Northern Ireland has higher rates than Republic of Ireland. The risk factors for uterine cancer include; obesity, nulliparity and exogenous oestrogen (e.g. HRT). Levels of this cancer are rising in both Northern Ireland and Republic of Ireland, although the exact reason for the increase is unknown.

**Further study into the rising rates of uterine cancer is warranted.**

## **Treatment**

Cancer treatment data for patients diagnosed in Northern Ireland and Republic of Ireland have been compared for the first time in this report. Despite differing organisation of health care, treatment patterns are remarkably similar, with surgery the main treatment for most cancers. Similar trends are documented, for example the increased use of chemotherapy between the time periods studied. There are, however, unexplained differences in treatment between Northern Ireland and Republic of Ireland for patients diagnosed with similar cancers.

**The reasons for these differences, their impact on survival and the implications for service provision should be investigated further.**

## **Stage of cancer at diagnosis**

Many patients present with late stage disease, while for several important cancers a high proportion were unstaged. Stage at presentation is the single most important determinant of cancer survival; we need urgent investigation of the

reasons why so many patients in Ireland present late with their cancers, and of the actions which need to be taken to remedy this. Screening, although useful, will never cover more than a small minority of cancers.

**We need to introduce methods of ensuring that all diagnosed cancers are staged, and that this staging is recorded to international standards.**

### **Survival**

Survival is the real test of countries programmes of prevention, early detection and treatment. The improvements in overall survival and survival for the major cancer sites are very welcome. While the number of cancers for some sites was too small to detect an improvement, in no cancer did cancer survival get worse. The higher survival among males from Republic of Ireland can be directly linked to the over-diagnosis of early prostate cancer in Republic of Ireland compared with Northern Ireland.

**Five-year survival for both males and females were however lower than the equivalent European average. This highlights the need for further improvement through:**

- **prevention of tobacco related cancers, which have a very poor survival;**
- **education of the population about warning symptoms;**
- **use of validated screening and early detection programmes to pick cancers up at an earlier stage where treatment is most likely to achieve cure;**
- **application of knowledge on cancer prevention and treatments so what is known to improve outcomes is applied to all patients.**

This report, and the detailed analysis of the major cancers covered in the larger electronic version, highlights the value of achieving high quality cancer registration for the island of Ireland.



## APPENDICES

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- *GLOSSARY*
- *ABBREVIATIONS*
- *FURTHER INFORMATION*



National  
Cancer  
Registry  
Ireland



## Glossary

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**Age-specific rate:** The rate that events occur per 100,000 persons of a particular age class. It is calculated using the formula:

$$a_i = \frac{r_i}{n_i} \times 100,000$$

where  $a_i$  is the age-specific rate for age class  $i$ ,  $r_i$  is the number of events in age class  $i$  and  $n_i$  is the number of person years of observation in age class  $i$ .

**Age-standardised rate (ASR):** The rate per 100,000 persons that has been adjusted to take account of different age structures between geographic areas or time periods by adopting a reference population. It is calculated by the direct method using the following formula:

$$ASR = \frac{\sum_{i=1}^A a_i w_i}{\sum_{i=1}^A w_i}$$

where ASR is the age-standardised rate,  $a_i$  is the age-specific rate for age class  $i$ ,  $w_i$  is the standard population of age class  $i$  and  $A$  is the number of age intervals.

**Annual percentage change (APC):** The percentage increase or decrease per year in the age-standardised rate (ASR). It is calculated by fitting a regression line to the natural logarithm of the rates using calendar year as a regression variable, i.e.  $y = mx + b$ , where  $y = \ln(ASR)$ ,  $x$  is the calendar year, and  $b$  is a constant. The annual percentage change (APC) is thus given by

$$APC = 100 \times (e^m - 1)$$

The calculation assumes that the age-standardised rates increase or decrease at a constant rate over the period examined.

**Behaviour:** The manner in which a tumour acts, i.e. benign, in situ, uncertain or malignant.

**Benign tumour:** A tumour that neither invades nor destroys the tissue in which it originates, nor spreads to distant sites in the body.

**Cancer:** A disease resulting from the breakdown in the normal growth of body cells as a result of faults or damage to the genes that control for cell growth.

**Cancer registry:** An organisation that collects comprehensive information on all new cases of cancer occurring in a defined population.

**Cancer site:** The body place that a cancer originates in, e.g. lung, breast or prostate.

**Cell type:** Classification of a cancer according to the type of cell that the tumour resembles. The most common categories include: carcinoma, lymphoma, leukaemia, sarcoma and glioma. Carcinomas represent the most common cancers with sub categories frequently used including adenocarcinoma, squamous cell carcinoma and basal cell carcinoma.

**Chemotherapy:** Treatment of cancer through the use of drugs to kill cancer cells.

**Confidence interval:** The range of values calculated to have a specified (usually 95%) probability of containing the true value of an observation. Thus the 95% confidence interval for a rate is the range of values within which there is a 95% probability of finding the true value for the rate.

**County:** A geographic area used in Ireland. There are a total of 32 counties, 26 of which are in Republic of Ireland, the boundaries of which are used for administrative purposes. Local Government in Northern Ireland no longer uses the six counties in Northern Ireland.

**Crude rate:** The rate per 100,000 persons that an event occurs among a given population. It is calculated by using the formula:

$$C = \frac{R}{N} \times 100,000$$

where C is the crude rate, R is the number of events and N is the population within which the events occur.

**Cumulative risk:** The risk of an individual developing cancer before age 75 assuming the absence of other causes of death. It is derived using the formula:

$$CR_{0-74} = 100 \left[ 1 - \exp \left( - \frac{1}{100} \sum_{i=1}^A \frac{a_i t_i}{100000} \right) \right]$$

where  $a_i$  is the age-specific rate per 100,000 persons for age class  $i$ ,  $t_i$  is the duration of age class  $i$ ,  $A$  is the number of age intervals between 0 and 74 and  $CR_{0-74}$  is the cumulative risk of developing cancer before the age of 75.

**Deprivation quintile:** The division of census output areas (in Northern Ireland) and electoral districts (in Republic of Ireland) into five groups of approximately equal populations based upon their level of economic deprivation.

**Diagnosis:** The process whereby the nature of a patient's illness is identified through medical examination.

**District council:** A geographic area in Northern Ireland defined for Local Government purposes. There are currently 26 district councils in Northern Ireland. District councils are also referred to as Local Government Districts (LGDs).

**European standard population:** A standard population using the age distribution per 100,000 persons given in the table below. The same age distribution is used for males and females.

Age class	Population						
0-4	8,000	25-29	7,000	50-54	7,000	75-79	2,000
5-9	7,000	30-34	7,000	55-59	6,000	80-84	1,000
10-14	7,000	35-39	7,000	60-64	5,000	85+	1,000
15-19	7,000	40-44	7,000	65-69	4,000		
20-24	7,000	45-49	7,000	70-74	3,000	Total	100,000

**Expected survival:** The survival expected in a subset of the general population whose characteristics are the same as that of the group of cancer patients being studied. The method used in this report is the Ederer II method, which uses the formula:

$$E_i = \prod_{k=1}^i \left( 1 - \frac{P_k(h)}{n_k} \right)$$

where  $E_i$  is the expected survival for a time  $i$  after the date of diagnosis,  $k$  is the same predefined time interval between the date of diagnosis and  $i$  as used in the calculation of observed survival,  $n_k$  is the number of patients alive entering interval  $k$  and  $P_k(h)$  is the probability of a similar person,  $h$ , in the general population surviving to the end of interval  $k$ . This latter value is taken from life tables derived from population data and deaths from all causes.

**Hormone therapy:** The treatment of cancer through the addition, removal or blockage of hormones.

**ICD10:** The tenth edition of the International Classification of Diseases and Related Health Problems, which is published by the World Health Organisation (WHO).<sup>10</sup> It provides a detailed description of known diseases and injuries and is used in the production of morbidity and mortality statistics.

**Incidence:** The number of new cases of a cancer diagnosed in a particular period for a particular population.

**In situ tumour:** An early cancer that is confined to the layer of cells where it originated.

**Lead time bias:** An artificial increase in survival time as measured from the date of diagnosis where earlier detection has not resulted in a delay to the patient's death. The only impact is that patients and services are aware they have cancer for a longer period of time.

**Life table:** A table that shows the life expectancy of a person at each age and sex. Also usually included in life tables is:

- the probability that a person of a given age will die before their next birthday;
- the number of people out of 100,000 live births who survive to a given age;
- the number of people who die at a given age.

**Local Government District:** See district council.

**Log-linear model:** A mathematical model in which a continuous variable,  $y$ , is related to an explanatory variable,  $x$ , by the following equation:

$$\ln(y) = mx + b$$

where  $b$  is a constant value and  $m$  is the gradient of the straight line that best fits the data.

**Malignant:** A cancer that can invade and destroy nearby tissue and spread to other parts of the body.

**Microscopic verification:** A diagnosis of cancer based upon microscopic verification of a tissue specimen including histological confirmation, examination of cytology specimens, and diagnoses of leukaemia based on haematological examination.

**Mid-year population estimate:** An estimate of the population in a region. Population estimates are based upon the number of births, deaths and migration flows for regions that have occurred since the last population census.

**Mortality:** The number of deaths from a particular cause for a particular period of time and population.

**Observed survival:** The probability,  $S_i$ , that a patient with cancer will be alive at the end of a particular length of time,  $i$ , after the date of diagnosis. It is calculated using the formula

$$S_i = \prod_{k=1}^i \left( 1 - \frac{d_k}{n_k - \frac{1}{2}w_k} \right)$$

where  $k$  is a predefined time interval between the date of diagnosis and  $i$ ,  $d_k$  is the number of deaths from any cause occurring during interval  $k$ ,  $n_k$  is the number of patients alive entering interval  $k$  and  $w_k$  is the number of patients withdrawn alive during the  $k^{\text{th}}$  interval.

**Passive follow up:** A method of cancer registration in which the status of a patient is identified by the matching of cancer registrations with death registrations. This approach is used by both NICR and NCRI.

**Pathology:** The identification of cancer through the study of cells through a microscope.

**Period analysis:** An approach used to estimate patient survival for more recent periods of time that cannot be obtained using cohort analysis due to insufficient follow up time. This approach utilises the survival experience of patients still alive in the period of interest rather than of those diagnosed during the period.

**Prevalence:** The number of current cases of a disease within a population.

**P-value:** The probability of an event occurring given a null hypothesis is true. In any statistical tests in this report the null hypothesis is taken to be that there is no difference between two mean values or rates. A small p-value (typically less than 0.05) suggests that the two means or rates tested are significantly different. In this case the result is called statistically significant.

**Radiotherapy:** The application of radiation to either destroy or reduce the size of malignant tumours.

**Relative survival:** The ratio of the observed survival of a given group of patients to the expected survival for a group of persons in the general population with the same characteristics (usually sex and age, but also country in this report).

**Screening:** A method of checking for the presence of cancer when there are no signs or symptoms.

**Stage:** A measure of how far a malignancy has spread in the body. Staging is carried out using a number of laboratory and clinical tests at diagnosis. The most common classification used is the TNM stage that includes information on the extent of the primary tumour (T), the absence or presence of lymph node metastasis (N) and the absence or presence of distant metastasis (M).

**Standardised incidence ratio (SIR):** The ratio of the number of newly diagnosed cancers observed in a given population to the number of cases expected in a reference population of the same size. The expected number of incidence is calculated by applying a standard set of age-specific rates to the given population. The formula for the standardised incidence ratio (SIR) is:

$$SIR = \frac{\sum_{i=1}^A r_i}{\sum_{i=1}^A \frac{a_i n_i}{100000}}$$

where  $a_i$  is the age-specific rate in the reference population,  $n_i$  is the observed population in age class  $i$  and  $r_i$  is the observed number of cases in age class  $i$ .

**Standardised mortality ratio (SMR):** The ratio of the number of cancer deaths observed in a given population to the number of deaths expected in a reference population of the same size. The SMR is calculated in the same manner as the standardised incidence ratio using deaths due to cancer instead of the number of newly diagnosed cases.

**Standardised rate ratio:** The ratio of two age-standardised rates which have used the same standard population.

**Statistical significance:** See p-value.

**Surgery:** An operative procedure conducted to remove cancerous tissue or control its spread. Investigative surgery conducted to diagnose or investigate the presence of cancer is not included in the definition of surgery used throughout this report.

**Survival curve:** A plot of survival probability against time.

**Tumour:** An abnormal mass of tissue resulting from uncontrolled cell growth and causing a swelling of the body. Tumours may have one of four behaviours: benign, in situ, uncertain or malignant.

**Uncertain tumour:** A tumour, which at the time of diagnosis, cannot be classified as either benign or malignant.

**Vital status:** Whether or not a patient is alive or dead at the censor date.

**World standard population:** A standard population using the age distribution per 100,000 persons given in the table below: The same age distribution is used for males and females.

Age class	Population						
0-4	12,000	25-29	8,000	50-54	5,000	75-79	1,000
5-9	10,000	30-34	6,000	55-59	4,000	80-84	500
10-14	9,000	35-39	6,000	60-64	4,000	85+	500
15-19	9,000	40-44	6,000	65-69	3,000		
20-24	8,000	45-49	6,000	70-74	2,000	Total	100,000

## Abbreviations

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APC	Annual percentage change
ASIR	Age-specific incidence rate
ASMR	Age-specific mortality rate
ASR	Age-standardised rate
ASRS	Age-standardised relative survival
CI	Confidence interval
CNS	Central nervous system
CR <sub>0-74</sub>	Cumulative risk before age 75
DCO	Death certificate only
DHSSPSNI	Department of Health and Social Services and Public Safety, Northern Ireland
DOHC	Department of Health and Children
EASIR	European age-standardised incidence rate
EASMR	European age-standardised mortality rate
EU	European Union
EU-15	European Union using the 15 countries making up the EU from 1995-2004
EU-27	European Union using the 27 countries making up the EU from 2007 to present
HPV	Human papillomavirus
HRT	Hormone replacement therapy
IARC	International Agency for Research on Cancer
NCRI	National Cancer Registry, Ireland
NHL	Non-Hodgkin's lymphoma
NI	Northern Ireland
NICR	Northern Ireland Cancer Registry
NHS	National Health Service
NMSC	Non-melanoma skin cancer
ROI	Republic of Ireland
SIR	Standardised incidence ratio
SMR	Standardised mortality ratio
SRR	Standardised rate ratio
WASIR	World age-standardised incidence rate

## Further information

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## SUPPLEMENTARY TABLES

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- *Table 1: Cases and rates: European age-standardised incidence rates by sex, country and cancer site: 2000-2004*
- *Table 2: Stage: Stage at diagnosis for cancer patients by sex, country and cancer site: 2000-2004 or 2001 only*
- *Table 3: Treatment: Proportion of patients receiving the four main treatment types or any form of tumour directed treatment by cancer site, country and year of diagnosis: 1996 & 2001*
- *Table 4: Survival: Five-year (age-standardised) relative survival by sex, country, cancer site and period of diagnosis: 1994-2004*
- *Table 5: Cancer mortality: Deaths and European age-standardised mortality rates by sex, country and cancer site: 2000-2004*
- *Figure 1: Geographic areas: District councils (Northern Ireland) and counties (Republic of Ireland) in Ireland*



National  
Cancer  
Registry  
Ireland



**Table 1: Cases and rates****European age-standardised incidence rates by sex, country and cancer site: 2000-2004**

MALE	All-Ireland		Northern Ireland		Republic of Ireland	
	Cases per year	EASIR	Cases per year	EASIR	Cases per year	EASIR
Head and Neck (C00-C14, C30-C32)	444	17.7 (17.0, 18.5)	145	18.2 (16.9, 19.5)	299	17.5 (16.7, 18.4)
Oral (C00-C14)	267	10.7 (10.1, 11.2)	87	10.9 (9.9, 12.0)	180	10.5 (9.8, 11.2)
Nose and sinuses (C30-C31)	20	0.8 (0.6, 0.9)	9	1.1 (0.8, 1.4)	11	0.6 (0.4, 0.8)
Larynx (C32)	158	6.3 (5.9, 6.8)	49	6.2 (5.4, 6.9)	109	6.4 (5.9, 6.9)
Oesophagus (C15)	296	11.7 (11.1, 12.3)	92	11.4 (10.4, 12.5)	204	11.8 (11.1, 12.5)
Stomach (C16)	429	16.8 (16.1, 17.5)	147	17.7 (16.4, 19.0)	282	16.4 (15.5, 17.3)
Small intestine (C17)	44	1.7 (1.5, 1.9)	15	1.9 (1.5, 2.3)	28	1.6 (1.4, 1.9)
Colorectal (C18-C21)	1,618	63.6 (62.2, 65.0)	501	61.1 (58.7, 63.5)	1,117	64.9 (63.2, 66.6)
Colon (C18)	937	36.7 (35.7, 37.8)	299	36.2 (34.3, 38.0)	639	37.0 (35.7, 38.3)
Rectum (C19-C21)	681	26.9 (26.0, 27.8)	202	24.9 (23.3, 26.4)	478	27.8 (26.7, 28.9)
Liver & intrahepatic bile ducts (C22)	111	4.4 (4.0, 4.7)	36	4.4 (3.7, 5.0)	76	4.4 (3.9, 4.8)
Gallbladder (C23-C24)	63	2.5 (2.2, 2.7)	18	2.2 (1.7, 2.6)	45	2.6 (2.3, 3.0)
Pancreas (C25)	265	10.4 (9.9, 11.0)	75	9.1 (8.2, 10.1)	190	11.1 (10.4, 11.8)
Other digestive (C26)	25	1.0 (0.8, 1.2)	7	0.9 (0.6, 1.1)	18	1.1 (0.9, 1.4)
Lung (C33-C34)	1,599	62.8 (61.4, 64.2)	542	65.5 (63.0, 67.9)	1,057	61.6 (59.9, 63.2)
Bone (C40-C41)	28	1.0 (0.9, 1.2)	6	0.7 (0.4, 1.0)	23	1.2 (1.0, 1.4)
Malignant melanoma (C43)	292	11.3 (10.7, 11.9)	91	11.4 (10.3, 12.4)	201	11.3 (10.6, 12.0)
Non-melanoma skin cancer (C44)	4,197	165.2 (163.0, 167.5)	1,204	146.3 (142.6, 150.0)	2,993	174.3 (171.5, 177.1)
Mesothelioma (C45)	68	2.7 (2.4, 3.0)	45	5.5 (4.8, 6.2)	22	1.3 (1.1, 1.6)
Connective and soft tissues (C47, C49)	76	2.9 (2.6, 3.2)	21	2.5 (2.1, 3.0)	55	3.1 (2.8, 3.5)
Breast (C50)	20	0.8 (0.6, 0.9)	7	0.8 (0.5, 1.1)	13	0.8 (0.6, 1.0)
Penis (C60)	37	1.5 (1.3, 1.7)	15	1.9 (1.4, 2.3)	22	1.3 (1.1, 1.6)
Prostate (C61)	2,750	109.1 (107.3, 110.9)	666	80.6 (77.9, 83.4)	2,084	122.7 (120.4, 125.1)
Testes (C62)	189	6.5 (6.1, 6.9)	60	7.2 (6.4, 8.0)	128	6.2 (5.7, 6.6)
Kidney (C64-C66, C68)	349	13.8 (13.2, 14.5)	107	13.3 (12.1, 14.4)	241	14.1 (13.3, 14.9)
Bladder (C67)	466	18.3 (17.6, 19.1)	141	16.9 (15.6, 18.2)	325	19.0 (18.1, 19.9)
Brain and other central nervous system (C70-C72)	232	8.9 (8.4, 9.5)	65	7.9 (7.1, 8.8)	167	9.4 (8.8, 10.0)
Thyroid gland (C73)	35	1.3 (1.1, 1.5)	10	1.3 (0.9, 1.6)	25	1.4 (1.1, 1.6)
Lymphoma (C81-C85, C96)	470	18.2 (17.4, 18.9)	150	18.4 (17.1, 19.7)	320	18.0 (17.1, 18.9)
Hodgkin's lymphoma (C81)	71	2.5 (2.3, 2.8)	20	2.4 (1.9, 2.9)	51	2.6 (2.2, 2.9)
Non-Hodgkin's lymphoma (C82-C85, C96)	399	15.6 (15.0, 16.3)	130	16.0 (14.8, 17.3)	269	15.5 (14.6, 16.3)
Multiple myeloma (C90)	181	7.1 (6.6, 7.6)	60	7.2 (6.4, 8.0)	121	7.0 (6.5, 7.6)
Leukaemia (C91-C95)	359	14.0 (13.4, 14.7)	89	10.9 (9.9, 11.9)	270	15.5 (14.7, 16.3)
Lymphoid leukaemia (C91)	199	7.8 (7.3, 8.3)	42	5.1 (4.4, 5.8)	157	9.1 (8.5, 9.7)
Myeloid leukaemia (C92)	129	5.0 (4.6, 5.4)	43	5.2 (4.5, 6.0)	87	4.9 (4.4, 5.3)
Monocytic leukaemia (C93)	3	0.1 (0.0, 0.2)	0	0.0 (0.0, 0.1)	2	0.1 (0.1, 0.2)
Other specified leukaemia (C94)	7	0.3 (0.2, 0.4)	1	0.1 (0.0, 0.2)	7	0.4 (0.2, 0.5)
Unspecified leukaemia (C95)	21	0.8 (0.7, 1.0)	3	0.4 (0.2, 0.6)	18	1.0 (0.8, 1.2)
All (excluding NMSC) (C00-C96, ex. C44)	10,999	431.8 (428.2, 435.4)	3,303	401.9 (395.8, 408.1)	7,696	446.4 (441.9, 450.8)
All cancers (C00-C96)	15,196	597.1 (592.8, 601.3)	4,507	548.2 (541.1, 555.4)	10,689	620.7 (615.4, 625.9)

## Supplementary table 1 continued...

FEMALE	All-Ireland		Northern Ireland		Republic of Ireland	
	Cases per year	EASIR	Cases per year	EASIR	Cases per year	EASIR
Head and Neck (C00-C14, C30-C32)	171	5.7 (5.3, 6.1)	61	6.3 (5.6, 7.1)	110	5.5 (5.0, 5.9)
Oral (C00-C14)	122	4.1 (3.8, 4.4)	43	4.4 (3.8, 5.0)	78	4.0 (3.6, 4.4)
Nose and sinuses (C30-C31)	17	0.5 (0.4, 0.6)	5	0.5 (0.3, 0.7)	11	0.5 (0.4, 0.7)
Larynx (C32)	33	1.1 (0.9, 1.3)	12	1.4 (1.1, 1.8)	20	1.0 (0.8, 1.2)
Oesophagus (C15)	183	5.4 (5.0, 5.7)	59	5.0 (4.4, 5.6)	124	5.6 (5.1, 6.0)
Stomach (C16)	276	8.2 (7.7, 8.6)	95	7.9 (7.2, 8.7)	181	8.2 (7.7, 8.8)
Small intestine (C17)	31	1.0 (0.8, 1.2)	12	1.1 (0.8, 1.4)	19	0.9 (0.7, 1.1)
Colorectal (C18-C21)	1,297	40.5 (39.4, 41.5)	437	40.1 (38.4, 41.9)	860	40.6 (39.4, 41.9)
Colon (C18)	875	26.9 (26.1, 27.7)	291	26.3 (24.9, 27.7)	584	27.2 (26.2, 28.2)
Rectum (C19-C21)	422	13.6 (13.0, 14.2)	146	13.8 (12.8, 14.9)	276	13.5 (12.7, 14.2)
Liver & intrahepatic bile ducts (C22)	68	2.2 (1.9, 2.4)	24	2.2 (1.8, 2.6)	44	2.1 (1.8, 2.4)
Gallbladder (C23-C24)	102	3.0 (2.7, 3.3)	28	2.4 (2.0, 2.8)	74	3.3 (3.0, 3.7)
Pancreas (C25)	272	8.0 (7.6, 8.5)	84	7.3 (6.6, 8.0)	188	8.4 (7.9, 9.0)
Other digestive (C26)	37	0.9 (0.8, 1.1)	15	1.1 (0.8, 1.4)	23	0.9 (0.7, 1.0)
Lung (C33-C34)	1,016	32.4 (31.5, 33.3)	352	33.6 (32.0, 35.3)	664	31.9 (30.7, 33.0)
Bone (C40-C41)	22	0.7 (0.6, 0.9)	5	0.5 (0.3, 0.7)	17	0.8 (0.6, 1.0)
Malignant melanoma (C43)	444	15.1 (14.4, 15.7)	132	14.0 (12.9, 15.1)	312	15.6 (14.8, 16.4)
Non-melanoma skin cancer (C44)	3,717	114.8 (113.1, 116.6)	1,062	93.9 (91.2, 96.6)	2,655	125.3 (123.1, 127.5)
Mesothelioma (C45)	9	0.3 (0.2, 0.4)	5	0.5 (0.3, 0.7)	4	0.2 (0.1, 0.3)
Connective and soft tissues (C47, C49)	54	1.8 (1.6, 2.0)	17	1.7 (1.3, 2.1)	37	1.8 (1.6, 2.1)
Breast (C50)	3,095	110.8 (109.1, 112.6)	994	108.2 (105.1, 111.3)	2,101	112.2 (110.0, 114.4)
Vulva (C51)	61	1.9 (1.7, 2.1)	25	2.3 (1.9, 2.7)	36	1.7 (1.4, 1.9)
Vagina (C52)	14	0.4 (0.3, 0.5)	5	0.5 (0.3, 0.7)	8	0.4 (0.3, 0.5)
Cervix uteri (C53)	278	9.9 (9.4, 10.4)	80	8.9 (8.0, 9.8)	199	10.4 (9.7, 11.0)
Uterus (C54-C55)	446	15.9 (15.2, 16.5)	161	17.2 (15.9, 18.4)	285	15.2 (14.4, 16.0)
Corpus uteri (C54)	423	15.1 (14.5, 15.8)	158	17.0 (15.7, 18.2)	266	14.2 (13.4, 15.0)
Uterus, unspecified (C55)	22	0.7 (0.6, 0.9)	3	0.2 (0.1, 0.3)	19	1.0 (0.8, 1.2)
Ovary including borderline (C56)	561	19.5 (18.7, 20.2)	187	19.6 (18.3, 20.9)	374	19.5 (18.6, 20.4)
Ovary (C56)	494	17.1 (16.4, 17.8)	165	17.1 (15.8, 18.3)	330	17.1 (16.3, 18.0)
Ovary - borderline (C56)	67	2.4 (2.1, 2.7)	22	2.6 (2.1, 3.1)	45	2.4 (2.0, 2.7)
Other female genital (C57)	10	0.4 (0.3, 0.5)	4	0.4 (0.2, 0.6)	6	0.3 (0.2, 0.4)
Kidney (C64-C66, C68)	201	6.7 (6.3, 7.2)	70	6.9 (6.2, 7.7)	131	6.6 (6.1, 7.2)
Bladder (C67)	193	5.9 (5.5, 6.3)	56	4.9 (4.3, 5.5)	137	6.4 (5.9, 6.9)
Brain and other central nervous system (C70-C72)	182	6.2 (5.8, 6.6)	50	5.4 (4.7, 6.1)	133	6.6 (6.1, 7.1)
Thyroid gland (C73)	92	3.2 (2.9, 3.5)	30	3.4 (2.8, 3.9)	62	3.1 (2.7, 3.4)
Lymphoma (C81-C85, C96)	437	14.5 (13.9, 15.2)	153	15.1 (14.0, 16.2)	284	14.2 (13.4, 14.9)
Hodgkin's lymphoma (C81)	60	2.0 (1.8, 2.3)	17	2.0 (1.6, 2.4)	43	2.1 (1.8, 2.3)
Non-Hodgkin's lymphoma (C82-C85, C96)	377	12.5 (11.9, 13.1)	136	13.1 (12.0, 14.1)	242	12.1 (11.4, 12.8)
Multiple myeloma (C90)	136	4.1 (3.8, 4.5)	47	4.1 (3.5, 4.6)	89	4.2 (3.8, 4.6)
Leukaemia (C91-C95)	241	7.6 (7.2, 8.1)	66	6.3 (5.6, 7.0)	175	8.3 (7.8, 8.9)
Lymphoid leukaemia (C91)	125	4.0 (3.7, 4.3)	29	2.8 (2.3, 3.2)	96	4.6 (4.2, 5.0)
Myeloid leukaemia (C92)	91	3.0 (2.7, 3.2)	32	3.1 (2.6, 3.6)	60	2.9 (2.6, 3.2)
Monocytic leukaemia (C93)	1	0.0 (0.0, 0.1)	1	0.1 (0.0, 0.1)	0	0.0 (0.0, 0.0)
Other specified leukaemia (C94)	4	0.1 (0.1, 0.2)	0	0.0 (0.0, 0.1)	4	0.2 (0.1, 0.3)
Unspecified leukaemia (C95)	19	0.5 (0.4, 0.6)	4	0.3 (0.2, 0.5)	15	0.6 (0.5, 0.8)
All (excluding NMSC) (C00-C96, ex. C44)	10,510	349.3 (346.2, 352.4)	3,452	344.1 (338.8, 349.5)	7,058	352.0 (348.3, 355.8)
All cancers (C00-C96)	14,227	464.2 (460.7, 467.7)	4,514	438.1 (432.1, 444.0)	9,713	477.4 (473.0, 481.7)

EASIR: European age-standardised incidence rates per 100,000 persons with 95% confidence interval

**Table 2: Stage****Stage at diagnosis for cancer patients by sex, country and cancer site: 2000-2004 or 2001 only**

		Male			Female			All		
		Northern Ireland	Republic of Ireland	All-Ireland	Northern Ireland	Republic of Ireland	All-Ireland	Northern Ireland	Republic of Ireland	All-Ireland
<b>2000-2004</b>										
Colorectal	Stage I	8.5%	11.6%	10.7%	8.8%	11.6%	10.6%	8.6%	11.6%	10.6%
	Stage II	23.2%	23.5%	23.4%	24.0%	25.5%	25.0%	23.6%	24.4%	24.2%
	Stage III	27.4%	26.6%	26.9%	25.8%	24.5%	25.0%	26.7%	25.7%	26.0%
	Stage IV	15.9%	24.2%	21.6%	14.2%	21.1%	18.8%	15.1%	22.8%	20.3%
	Unknown	25.0%	14.0%	17.4%	27.2%	17.2%	20.6%	26.1%	15.4%	18.9%
Breast	Stage I	-	-	-	30.2%	25.3%	26.8%	-	-	-
	Stage II	-	-	-	36.5%	45.8%	42.8%	-	-	-
	Stage III	-	-	-	13.5%	12.4%	12.8%	-	-	-
	Stage IV	-	-	-	2.3%	7.0%	5.5%	-	-	-
	Unknown	-	-	-	17.5%	9.5%	12.1%	-	-	-
Cervix	Stage I	-	-	-	45.4%	34.2%	37.3%	-	-	-
	Stage II	-	-	-	18.9%	7.0%	10.4%	-	-	-
	Stage III	-	-	-	17.3%	21.7%	20.4%	-	-	-
	Stage IV	-	-	-	8.9%	8.3%	8.4%	-	-	-
	Unknown	-	-	-	9.4%	28.9%	23.4%	-	-	-
Ovary	Stage I	-	-	-	32.6%	12.7%	19.4%	-	-	-
	Stage II	-	-	-	4.6%	2.2%	3.0%	-	-	-
	Stage III	-	-	-	29.9%	27.4%	28.3%	-	-	-
	Stage IV	-	-	-	11.8%	26.9%	21.8%	-	-	-
	Unknown	-	-	-	21.1%	30.7%	27.5%	-	-	-
Melanoma	<=1.0mm	46.6%	20.9%	28.9%	51.3%	28.5%	35.3%	49.4%	25.5%	32.8%
	1 to 2mm	14.9%	22.2%	19.9%	13.4%	23.3%	20.3%	14.0%	22.9%	20.2%
	2 to 4mm	14.7%	29.0%	24.5%	10.6%	25.1%	20.8%	12.3%	26.6%	22.3%
	4+ mm	10.1%	12.9%	12.0%	6.1%	8.4%	7.7%	7.7%	10.2%	9.4%
	Unknown	13.8%	15.0%	14.6%	18.7%	14.6%	15.8%	16.7%	14.8%	15.4%
<b>2001 only</b>										
Oesophageal	Stage I	7.1%	4.8%	5.6%	6.8%	0.0%	2.3%	7.0%	3.1%	4.4%
	Stage II	9.2%	8.2%	8.5%	10.2%	9.6%	9.8%	9.6%	8.7%	9.0%
	Stage III	15.3%	15.5%	15.4%	6.8%	11.4%	9.8%	12.1%	14.0%	13.4%
	Stage IV	15.3%	18.8%	17.7%	15.3%	18.4%	17.3%	15.3%	18.7%	17.6%
	Unknown	53.1%	52.7%	52.8%	61.0%	60.5%	60.7%	56.1%	55.5%	55.6%
Stomach	Stage I	10.4%	9.6%	9.9%	12.5%	12.0%	12.2%	11.3%	10.5%	10.8%
	Stage II	4.2%	5.6%	5.1%	5.8%	7.8%	7.0%	4.8%	6.4%	5.8%
	Stage III	17.4%	16.3%	16.7%	6.7%	12.6%	10.3%	12.9%	14.9%	14.2%
	Stage IV	31.9%	35.2%	34.1%	28.8%	35.3%	32.8%	30.6%	35.2%	33.6%
	Unknown	36.1%	33.3%	34.3%	46.2%	32.3%	37.6%	40.3%	33.0%	35.6%
Lung	Stage I	11.2%	9.0%	9.8%	12.3%	8.8%	10.1%	11.6%	8.9%	9.9%
	Stage II	4.0%	5.4%	4.9%	5.7%	5.8%	5.8%	4.6%	5.6%	5.2%
	Stage III	9.9%	20.3%	16.5%	10.3%	17.3%	14.9%	10.0%	19.2%	15.9%
	Stage IV	33.2%	33.5%	33.4%	24.7%	31.2%	28.9%	30.1%	32.6%	31.7%
	Unknown	41.7%	31.9%	35.4%	47.0%	36.8%	40.3%	43.7%	33.7%	37.3%
Prostate	Stage I	2.0%	0.3%	0.7%	-	-	-	-	-	-
	Stage II	19.1%	6.7%	9.6%	-	-	-	-	-	-
	Stage III	13.0%	3.2%	5.5%	-	-	-	-	-	-
	Stage IV	12.8%	13.5%	13.3%	-	-	-	-	-	-
	Unknown	53.1%	76.2%	70.9%	-	-	-	-	-	-

## Table 3: Treatment

Proportion of patients receiving the four main treatment types or any form of tumour directed treatment by cancer site, country and year of diagnosis: 1996 & 2001

	1996					2001				
	Surgery	Chemo-therapy	Radio-therapy	Hormone therapy	Any** Treatment	Surgery	Chemo-therapy	Radio-therapy	Hormone therapy	Any** Treatment
<b>OESOPHAGUS</b>										
Northern Ireland	38.0%	9.3%	13.2%	-	51.2%	35.7%	22.3%	12.1%	-	51.6%
Republic of Ireland	32.2%	19.0%	34.3%	-	52.6%	20.9%	34.9%	48.6%	-	63.9%
All-Ireland	34.0%	16.0%	27.8%	-	52.2%	25.7%	30.8%	36.6%	-	59.8%
<b>STOMACH</b>										
Northern Ireland	54.6%	13.3%	4.1%	-	60.1%	47.2%	20.2%	3.6%	-	56.0%
Republic of Ireland	45.7%	8.0%	4.3%	-	51.5%	42.6%	23.6%	13.0%	-	57.2%
All-Ireland	49.0%	9.9%	4.2%	-	54.7%	44.2%	22.3%	9.6%	-	56.8%
<b>COLORECTAL</b>										
Northern Ireland	81.9%	18.8%	6.6%	-	84.3%	83.5%	31.7%	13.6%	-	87.9%
Republic of Ireland	78.7%	25.4%	11.0%	-	82.2%	75.9%	38.7%	18.7%	-	84.7%
All-Ireland	79.9%	23.0%	9.4%	-	82.9%	78.4%	36.4%	17.1%	-	85.8%
<b>COLON</b>										
Northern Ireland	84.1%	19.0%	6.9%	-	86.4%	86.1%	29.6%	3.3%	-	88.5%
Republic of Ireland	79.6%	24.4%	4.1%	-	81.3%	77.2%	34.5%	5.0%	-	83.3%
All-Ireland	81.3%	22.4%	5.1%	-	83.2%	80.2%	32.9%	4.5%	-	85.1%
<b>RECTUM*</b>										
Northern Ireland	77.8%	18.5%	5.8%	-	80.3%	79.5%	34.9%	29.7%	-	87.0%
Republic of Ireland	77.2%	27.2%	22.8%	-	83.7%	73.9%	44.9%	39.3%	-	86.8%
All-Ireland	77.4%	24.1%	16.9%	-	82.5%	75.7%	41.7%	36.2%	-	86.9%
<b>LUNG</b>										
Northern Ireland	13.7%	11.4%	33.2%	-	48.1%	11.4%	17.8%	36.4%	-	52.7%
Republic of Ireland	16.0%	13.9%	31.9%	-	49.5%	13.1%	18.4%	36.7%	-	54.2%
All-Ireland	15.2%	13.0%	32.4%	-	49.0%	12.5%	18.2%	36.6%	-	53.7%
<b>BREAST</b>										
Northern Ireland	81.2%	23.8%	57.1%	82.0%	94.7%	86.6%	38.7%	69.3%	76.4%	96.1%
Republic of Ireland	83.4%	33.9%	47.2%	60.6%	95.8%	85.9%	49.9%	63.6%	47.6%	96.0%
All-Ireland	82.7%	30.4%	50.6%	68.0%	95.4%	86.1%	46.4%	65.4%	56.6%	96.0%
<b>CERVIX</b>										
Northern Ireland	54.3%	9.8%	43.5%	-	82.6%	62.9%	32.9%	44.3%	-	87.1%
Republic of Ireland	66.8%	4.5%	50.0%	-	92.1%	60.1%	42.1%	57.4%	-	96.7%
All-Ireland	62.9%	6.1%	48.0%	-	89.1%	60.9%	39.5%	53.8%	-	94.1%
<b>OVARY</b>										
Northern Ireland	75.9%	47.4%	2.9%	-	81.0%	75.3%	47.6%	3.0%	-	80.1%
Republic of Ireland	43.8%	50.0%	2.6%	-	68.8%	69.4%	47.5%	2.2%	-	80.6%
All-Ireland	53.7%	49.2%	2.7%	-	72.6%	71.4%	47.6%	2.4%	-	80.4%
<b>PROSTATE</b>										
Northern Ireland	53.0%	0.0%	6.7%	55.5%	79.0%	29.7%	0.2%	19.7%	54.2%	73.3%
Republic of Ireland	58.2%	2.0%	9.4%	34.5%	81.9%	41.2%	1.7%	25.8%	40.6%	81.8%
All-Ireland	56.8%	1.5%	8.6%	40.2%	81.1%	38.5%	1.4%	24.4%	43.8%	79.9%

\* Includes rectosigmoid junction and anus; \*\* Tumour directed treatment

**Table 4: Survival****Five-year (age-standardised) relative survival by sex, country, cancer site and period of diagnosis: 1994-2004**

	ALL-IRELAND		NORTHERN IRELAND		REPUBLIC OF IRELAND	
	Male	Female	Male	Female	Male	Female
<b>ALL CANCERS (EXCLUDING NMSC)</b>						
2000-2004*	46.8% (46.2%, 47.3%)	51.6% (51.1%, 52.2%)	43.2% (42.2%, 44.2%)	51.5% (50.6%, 52.4%)	48.4% (47.7%, 49.1%)	51.7% (51.1%, 52.4%)
1997-1999	41.4% (40.7%, 42.1%)	49.0% (48.3%, 49.7%)	38.8% (37.6%, 40.0%)	49.9% (48.8%, 51.1%)	42.6% (41.7%, 43.4%)	48.5% (47.6%, 49.3%)
1994-1996	37.5% (36.8%, 38.2%)	47.1% (46.4%, 47.8%)	36.5% (35.4%, 37.8%)	47.2% (46.0%, 48.4%)	37.9% (37.1%, 38.8%)	47.1% (46.3%, 48.0%)
<b>HEAD &amp; NECK</b>						
2000-2004*	53.3% (50.4%, 56.5%)	49.8% (45.6%, 54.3%)	58.9% (53.6%, 64.7%)	55.8% (48.6%, 64.0%)	50.4% (46.9%, 54.2%)	46.8% (41.9%, 52.4%)
1997-1999	52.2% (48.8%, 56.0%)	48.4% (43.5%, 53.9%)	53.4% (47.5%, 60.0%)	47.9% (40.2%, 57.1%)	51.7% (47.5%, 56.3%)	48.9% (42.7%, 55.9%)
1994-1996	51.3% (47.7%, 55.1%)	51.7% (46.7%, 57.2%)	53.6% (47.4%, 60.6%)	54.8% (46.9%, 64.0%)	49.9% (45.7%, 54.6%)	49.1% (42.9%, 56.2%)
<b>OESOPHAGUS</b>						
2000-2004*	12.8% (10.7%, 15.2%)	17.0% (13.9%, 20.7%)	11.3% (8.4%, 15.2%)	16.7% (12.2%, 22.8%)	13.4% (10.8%, 16.7%)	16.7% (13.2%, 21.1%)
1997-1999	10.3% (8.2%, 13.0%)	15.2% (11.6%, 19.9%)	12.8% (9.1%, 18.2%)	10.5% (6.5%, 16.9%)	8.9% (6.5%, 12.1%)	16.8% (12.3%, 22.9%)
1994-1996	9.0% (6.9%, 11.7%)	17.8% (13.9%, 22.8%)	6.4% (3.8%, 10.7%)	17.0% (10.8%, 26.9%)	10.9% (8.1%, 14.7%)	17.9% (13.4%, 23.9%)
<b>STOMACH</b>						
2000-2004*	17.8% (15.9%, 20.0%)	22.1% (19.3%, 25.3%)	18.5% (15.2%, 22.4%)	19.9% (15.5%, 25.6%)	17.2% (14.9%, 19.9%)	22.7% (19.4%, 26.7%)
1997-1999	16.7% (14.4%, 19.3%)	21.0% (17.8%, 24.7%)	17.6% (13.8%, 22.5%)	17.5% (12.9%, 23.7%)	16.1% (13.4%, 19.3%)	22.3% (18.3%, 27.0%)
1994-1996	16.0% (13.9%, 18.5%)	18.7% (15.7%, 22.3%)	16.9% (13.2%, 21.7%)	17.7% (13.1%, 23.8%)	15.6% (13.0%, 18.6%)	19.8% (16.0%, 24.6%)
<b>COLORECTAL</b>						
2000-2004*	51.9% (50.4%, 53.5%)	54.6% (53.0%, 56.2%)	52.6% (49.9%, 55.4%)	54.9% (52.3%, 57.7%)	51.7% (49.9%, 53.6%)	54.4% (52.5%, 56.4%)
1997-1999	51.6% (49.7%, 53.5%)	53.5% (51.6%, 55.5%)	53.2% (49.9%, 56.7%)	54.8% (51.6%, 58.1%)	50.9% (48.7%, 53.2%)	52.7% (50.4%, 55.2%)
1994-1996	46.3% (44.3%, 48.3%)	49.3% (47.3%, 51.3%)	48.7% (45.5%, 52.2%)	47.9% (44.8%, 51.2%)	45.1% (42.7%, 47.6%)	50.3% (47.8%, 52.9%)
<b>LIVER</b>						
2000-2004*	10.9% (7.7%, 15.3%)	12.8% (8.6%, 19.2%)	6.3% (2.9%, 13.5%)	4.3% (1.4%, 13.3%)	11.7% (8.0%, 17.1%)	15.7% (10.1%, 24.5%)
1997-1999	5.5% (2.9%, 10.5%)	5.2% (2.4%, 11.3%)	1.4% (0.2%, 8.1%)	5.5% (2.1%, 14.1%)	7.5% (3.8%, 14.7%)	3.0% (0.8%, 11.4%)
1994-1996	4.6% (2.2%, 9.8%)	9.4% (5.0%, 17.9%)	7.9% (3.4%, 18.6%)	11.0% (5.8%, 21.0%)	1.4% (0.4%, 5.3%)	8.9% (4.6%, 17.6%)
<b>PANCREAS</b>						
2000-2004*	5.4% (3.9%, 7.5%)	6.8% (5.0%, 9.2%)	6.3% (3.7%, 10.8%)	1.2% (0.3%, 4.4%)	6.0% (4.3%, 8.5%)	9.2% (6.8%, 12.4%)
1997-1999	5.6% (3.8%, 8.4%)	6.6% (4.4%, 9.7%)	1.9% (0.6%, 5.8%)	2.3% (0.7%, 7.2%)	7.4% (4.9%, 11.3%)	8.2% (5.6%, 12.2%)
1994-1996	4.0% (2.6%, 6.3%)	6.9% (4.4%, 11.0%)	3.3% (1.3%, 8.4%)	9.6% (7.3%, 12.5%)	4.6% (2.8%, 7.5%)	6.9% (4.2%, 11.3%)
<b>LUNG</b>						
2000-2004*	9.2% (8.3%, 10.2%)	12.1% (10.9%, 13.4%)	9.1% (7.5%, 11.0%)	11.2% (9.3%, 13.4%)	9.4% (8.3%, 10.6%)	12.9% (11.4%, 14.6%)
1997-1999	8.9% (7.8%, 10.0%)	11.3% (9.9%, 12.9%)	9.0% (7.4%, 11.0%)	11.5% (9.3%, 14.3%)	8.8% (7.5%, 10.3%)	11.2% (9.5%, 13.3%)
1994-1996	8.7% (7.7%, 9.9%)	9.9% (8.6%, 11.5%)	8.0% (6.5%, 10.0%)	9.1% (7.2%, 11.7%)	9.1% (7.9%, 10.7%)	10.3% (8.5%, 12.3%)
<b>MELANOMA</b>						
2000-2004*	77.8% (74.6%, 81.2%)	91.6% (89.7%, 93.7%)	80.9% (75.4%, 86.9%)	96.0% (92.6%, 99.5%)	76.3% (72.4%, 80.4%)	89.7% (87.3%, 92.2%)
1997-1999	77.8% (73.7%, 82.1%)	91.3% (88.8%, 94.0%)	85.1% (78.1%, 92.8%)	94.4% (89.9%, 99.1%)	74.6% (69.7%, 79.8%)	89.8% (86.7%, 93.0%)
1994-1996	77.2% (72.8%, 81.8%)	88.9% (86.2%, 91.8%)	84.9% (77.8%, 92.7%)	90.4% (85.3%, 95.8%)	72.7% (67.2%, 78.6%)	88.0% (84.7%, 91.5%)
<b>BREAST</b>						
2000-2004*	-	77.6% (76.4%, 78.8%)	-	78.6% (76.7%, 80.6%)	-	77.1% (75.6%, 78.6%)
1997-1999	-	75.7% (74.2%, 77.2%)	-	77.5% (75.1%, 80.0%)	-	74.7% (72.8%, 76.6%)
1994-1996	-	72.0% (70.4%, 73.6%)	-	75.0% (72.4%, 77.6%)	-	70.3% (68.3%, 72.4%)
<b>CERVIX</b>						
2000-2004*	-	60.8% (57.5%, 64.2%)	-	59.4% (53.9%, 65.4%)	-	61.4% (57.5%, 65.6%)
1997-1999	-	62.0% (57.8%, 66.5%)	-	63.7% (57.0%, 71.2%)	-	61.6% (56.3%, 67.4%)
1994-1996	-	53.4% (49.3%, 57.9%)	-	55.0% (48.7%, 62.2%)	-	54.2% (48.9%, 60.1%)

## Supplementary table 4 continued...

	All-Ireland		Northern Ireland		Republic of Ireland	
	Male	Female	Male	Female	Male	Female
<b>UTERUS</b>						
2000-2004*	-	71.6% (68.8%, 74.5%)	-	69.0% (64.6%, 73.6%)	-	73.4% (69.9%, 77.0%)
1997-1999	-	71.4% (67.8%, 75.1%)	-	69.7% (64.0%, 76.0%)	-	72.2% (67.7%, 77.0%)
1994-1996	-	67.6% (63.9%, 71.6%)	-	64.9% (58.9%, 71.6%)	-	69.4% (64.6%, 74.4%)
<b>OVARY</b>						
2000-2004*	-	35.8% (33.8%, 38.0%)	-	39.2% (35.7%, 43.2%)	-	34.1% (31.6%, 36.8%)
1997-1999	-	34.9% (32.3%, 37.7%)	-	39.4% (34.8%, 44.7%)	-	32.5% (29.5%, 35.9%)
1994-1996	-	36.4% (33.5%, 39.5%)	-	36.7% (32.0%, 42.1%)	-	36.2% (32.6%, 40.1%)
<b>PROSTATE</b>						
2000-2004*	77.7% (76.3%, 79.3%)	-	73.1% (69.9%, 76.5%)	-	79.2% (77.5%, 80.9%)	-
1997-1999	70.5% (68.5%, 72.7%)	-	62.7% (58.4%, 67.5%)	-	73.0% (70.7%, 75.4%)	-
1994-1996	61.7% (59.2%, 64.3%)	-	57.8% (53.1%, 62.9%)	-	63.3% (60.4%, 66.3%)	-
<b>TESTES</b>						
2000-2004*	96.9% (93.7%, 100.2%)	-	93.7% (88.9%, 98.7%)	-	97.2% (93.6%, 100.9%)	-
1997-1999	96.2% (84.3%, 109.8%)	-	97.3% (80.4%, 117.7%)	-	90.7% (75.1%, 109.6%)	-
1994-1996	82.3% (76.2%, 88.9%)	-	84.4% (75.6%, 94.4%)	-	82.7% (78.3%, 87.4%)	-
<b>KIDNEY</b>						
2000-2004*	44.5% (41.4%, 47.9%)	53.5% (49.7%, 57.7%)	47.4% (42.0%, 53.4%)	52.5% (46.4%, 59.5%)	42.8% (39.1%, 46.9%)	54.4% (49.6%, 59.7%)
1997-1999	45.7% (41.8%, 49.9%)	49.7% (45.0%, 54.9%)	51.3% (44.6%, 59.1%)	48.1% (41.1%, 56.4%)	42.6% (38.1%, 47.6%)	51.1% (44.9%, 58.2%)
1994-1996	46.7% (42.1%, 51.8%)	49.3% (44.4%, 54.8%)	47.6% (40.6%, 55.8%)	50.3% (41.9%, 60.3%)	46.0% (40.2%, 52.8%)	49.0% (43.0%, 55.8%)
<b>BLADDER</b>						
2000-2004*	69.9% (67.2%, 72.7%)	64.2% (60.3%, 68.4%)	64.1% (59.4%, 69.1%)	52.7% (44.9%, 62.0%)	72.6% (69.4%, 76.0%)	68.2% (63.6%, 73.0%)
1997-1999	68.9% (65.7%, 72.3%)	64.0% (59.2%, 69.1%)	62.7% (56.9%, 69.1%)	54.0% (45.9%, 63.4%)	71.5% (67.6%, 75.6%)	69.1% (63.4%, 75.2%)
1994-1996	67.5% (64.4%, 70.8%)	61.4% (57.1%, 66.1%)	62.0% (56.3%, 68.3%)	49.9% (42.5%, 58.7%)	69.7% (65.9%, 73.7%)	66.7% (61.6%, 72.3%)
<b>BRAIN</b>						
2000-2004*	20.7% (18.3%, 23.5%)	29.6% (26.2%, 33.6%)	20.6% (16.4%, 25.9%)	24.7% (18.8%, 32.5%)	20.7% (17.9%, 24.1%)	31.6% (27.5%, 36.2%)
1997-1999	18.9% (15.8%, 22.5%)	23.6% (20.1%, 27.6%)	14.5% (10.3%, 20.4%)	22.3% (17.0%, 29.2%)	20.7% (16.8%, 25.4%)	24.0% (19.7%, 29.2%)
1994-1996	18.0% (15.2%, 21.4%)	22.4% (18.9%, 26.6%)	14.7% (10.5%, 20.6%)	17.8% (12.0%, 26.4%)	19.5% (16.0%, 23.8%)	24.3% (20.3%, 29.2%)
<b>LYMPHOMA</b>						
2000-2004*	51.7% (48.8%, 54.9%)	53.8% (51.1%, 56.6%)	52.4% (47.3%, 58.0%)	55.6% (51.4%, 60.2%)	51.5% (47.9%, 55.4%)	52.9% (49.5%, 56.5%)
1997-1999	49.4% (45.6%, 53.6%)	49.4% (46.2%, 52.9%)	48.9% (42.6%, 56.1%)	50.6% (45.4%, 56.4%)	49.5% (44.9%, 54.7%)	48.5% (44.4%, 52.9%)
1994-1996	42.3% (38.6%, 46.4%)	50.6% (47.0%, 54.4%)	43.6% (37.8%, 50.3%)	47.2% (41.7%, 53.5%)	41.9% (37.1%, 47.3%)	52.3% (47.7%, 57.4%)
<b>MULTIPLE MYELOMA</b>						
2000-2004*	32.9% (29.1%, 37.2%)	38.5% (34.5%, 43.0%)	36.7% (30.0%, 45.0%)	45.1% (38.8%, 52.5%)	31.5% (27.1%, 36.6%)	34.9% (29.9%, 40.7%)
1997-1999	27.1% (23.0%, 31.8%)	33.3% (28.2%, 39.4%)	27.9% (21.1%, 37.1%)	43.9% (36.0%, 53.6%)	26.8% (21.9%, 32.8%)	27.2% (21.2%, 34.9%)
1994-1996	22.8% (18.4%, 28.1%)	30.4% (24.1%, 38.3%)	22.0% (15.0%, 32.3%)	35.1% (27.4%, 45.1%)	22.9% (17.6%, 29.6%)	26.3% (20.8%, 33.3%)
<b>LEUKAEMIA</b>						
2000-2004*	45.6% (42.5%, 49.0%)	49.4% (45.6%, 53.5%)	38.8% (33.3%, 45.1%)	39.5% (33.0%, 47.3%)	47.9% (44.2%, 51.9%)	53.6% (49.1%, 58.6%)
1997-1999	40.2% (36.4%, 44.4%)	44.0% (39.4%, 49.2%)	31.1% (25.2%, 38.4%)	34.4% (27.0%, 43.7%)	44.0% (39.4%, 49.2%)	48.7% (43.1%, 55.2%)
1994-1996	37.5% (33.4%, 42.0%)	45.4% (40.7%, 50.7%)	29.2% (22.7%, 37.7%)	38.2% (30.5%, 48.0%)	40.4% (35.5%, 46.0%)	48.6% (42.9%, 55.1%)

\* Derived using period analysis

**Table 5: Cancer mortality****Deaths and European age-standardised mortality rates by sex, country and cancer site: 2000-2004**

	All-Ireland		Northern Ireland		Republic of Ireland	
	Deaths per year	EASMR	Deaths per year	EASMR	Deaths per year	EASMR
<b>MALE</b>						
Head and Neck (C00-C14, C30-C32)	191	7.6 (7.1, 8.1)	51	6.3 (5.5, 7.0)	140	8.3 (7.6, 8.9)
Oesophagus (C15)	296	11.6 (11.0, 12.2)	97	11.8 (10.7, 12.8)	199	11.6 (10.9, 12.3)
Stomach (C16)	300	11.7 (11.1, 12.3)	101	12.0 (10.9, 13.1)	199	11.6 (10.9, 12.4)
Colorectal (C18-C21)	744	29.3 (28.4, 30.3)	221	26.9 (25.3, 28.5)	523	30.6 (29.4, 31.7)
Colon (C18)	488	19.3 (18.5, 20.0)	150	18.3 (17.0, 19.7)	338	19.7 (18.8, 20.7)
Rectum (C19-C21)	256	10.1 (9.5, 10.6)	71	8.5 (7.6, 9.4)	185	10.8 (10.1, 11.5)
Liver & intrahepatic bile ducts (C22)	132	5.2 (4.8, 5.6)	39	4.7 (4.0, 5.3)	93	5.4 (4.9, 5.9)
Pancreas (C25)	270	10.7 (10.1, 11.2)	82	9.9 (9.0, 10.9)	188	11.0 (10.3, 11.7)
Lung (C33-C34)	1,447	56.8 (55.5, 58.1)	488	58.6 (56.3, 61.0)	959	55.9 (54.3, 57.5)
Malignant melanoma (C43)	59	2.3 (2.1, 2.6)	20	2.5 (2.0, 3.0)	40	2.3 (1.9, 2.6)
Non-melanoma skin cancer (C44)	35	1.4 (1.2, 1.6)	7	0.9 (0.6, 1.2)	27	1.6 (1.3, 1.9)
Prostate (C61)	745	29.4 (28.4, 30.4)	215	25.5 (24.0, 27.1)	530	31.4 (30.1, 32.6)
Testes (C62)	9	0.3 (0.2, 0.4)	3	0.4 (0.2, 0.6)	6	0.3 (0.2, 0.4)
Kidney (C64-C66, C68)	170	6.8 (6.4, 7.3)	55	6.7 (5.9, 7.6)	115	6.8 (6.3, 7.4)
Bladder (C67)	163	6.5 (6.0, 6.9)	55	6.7 (5.9, 7.5)	108	6.3 (5.8, 6.9)
Brain and other central nervous system (C70-C72)	181	7.0 (6.6, 7.5)	47	5.8 (5.1, 6.6)	134	7.6 (7.0, 8.2)
Lymphoma (C81-C85, C96)	203	7.9 (7.4, 8.4)	67	8.1 (7.2, 9.0)	136	7.8 (7.2, 8.4)
Hodgkin's lymphoma (C81)	16	0.6 (0.5, 0.8)	5	0.6 (0.4, 0.8)	11	0.6 (0.5, 0.8)
Non-Hodgkin's lymphoma (C82-C85, C96)	186	7.3 (6.8, 7.8)	62	7.5 (6.7, 8.3)	124	7.2 (6.6, 7.8)
Multiple myeloma (C90)	112	4.4 (4.0, 4.8)	31	3.7 (3.1, 4.3)	81	4.8 (4.3, 5.2)
Leukaemia (C91-C95)	206	8.0 (7.5, 8.5)	52	6.3 (5.5, 7.1)	155	8.9 (8.3, 9.5)
All (excluding NMSC) (C00-C96, ex. C44)	5,921	232.6 (230.0, 235.3)	1,879	226.5 (221.9, 231.1)	4,042	235.8 (232.5, 239.0)
All cancers (C00-C96)	5,955	234.0 (231.4, 236.7)	1,886	227.4 (222.8, 232.1)	4,069	237.4 (234.1, 240.7)
<b>FEMALE</b>						
Head and Neck (C00-C14, C30-C32)	77	2.4 (2.1, 2.6)	25	2.3 (1.9, 2.7)	52	2.4 (2.1, 2.7)
Oesophagus (C15)	174	4.9 (4.5, 5.2)	56	4.5 (4.0, 5.1)	118	5.1 (4.6, 5.5)
Stomach (C16)	202	5.8 (5.4, 6.1)	71	5.7 (5.1, 6.4)	131	5.8 (5.3, 6.2)
Colorectal (C18-C21)	594	17.1 (16.4, 17.7)	197	16.5 (15.4, 17.6)	397	17.4 (16.6, 18.2)
Colon (C18)	429	12.2 (11.7, 12.8)	138	11.3 (10.4, 12.2)	291	12.7 (12.0, 13.4)
Rectum (C19-C21)	165	4.8 (4.5, 5.2)	59	5.2 (4.5, 5.8)	105	4.7 (4.3, 5.1)
Liver & intrahepatic bile ducts (C22)	105	3.1 (2.8, 3.4)	34	3.0 (2.5, 3.5)	70	3.1 (2.8, 3.5)
Pancreas (C25)	277	8.0 (7.6, 8.4)	89	7.4 (6.7, 8.2)	188	8.3 (7.8, 8.9)
Lung (C33-C34)	893	27.7 (26.8, 28.5)	314	29.0 (27.5, 30.5)	578	27.0 (26.0, 28.1)
Malignant melanoma (C43)	60	1.8 (1.6, 2.1)	16	1.5 (1.1, 1.8)	43	2.0 (1.7, 2.3)
Non-melanoma skin cancer (C44)	23	0.5 (0.4, 0.6)	8	0.5 (0.3, 0.7)	15	0.6 (0.4, 0.7)
Breast (C50)	947	31.2 (30.3, 32.1)	297	28.7 (27.2, 30.3)	650	32.5 (31.3, 33.6)
Cervix uteri (C53)	103	3.6 (3.3, 3.9)	30	3.1 (2.5, 3.6)	73	3.8 (3.4, 4.2)
Uterus (C54-C55)	104	3.2 (2.9, 3.4)	40	3.6 (3.0, 4.1)	65	2.9 (2.6, 3.3)
Ovary (C56)	359	11.7 (11.1, 12.2)	116	11.1 (10.1, 12.0)	243	12.0 (11.3, 12.7)
Kidney (C64-C66, C68)	86	2.6 (2.4, 2.9)	32	2.7 (2.3, 3.2)	54	2.5 (2.2, 2.9)
Bladder (C67)	81	2.2 (2.0, 2.4)	30	2.3 (1.9, 2.7)	51	2.1 (1.9, 2.4)
Brain and other central nervous system (C70-C72)	131	4.5 (4.1, 4.8)	36	3.8 (3.2, 4.3)	95	4.8 (4.4, 5.3)
Lymphoma (C81-C85, C96)	190	5.7 (5.4, 6.1)	64	5.6 (4.9, 6.2)	126	5.8 (5.3, 6.3)
Hodgkin's lymphoma (C81)	11	0.4 (0.3, 0.5)	3	0.3 (0.2, 0.5)	8	0.4 (0.3, 0.5)
Non-Hodgkin's lymphoma (C82-C85, C96)	179	5.4 (5.0, 5.8)	61	5.3 (4.7, 5.9)	118	5.4 (5.0, 5.9)
Multiple myeloma (C90)	95	2.6 (2.4, 2.9)	29	2.3 (1.9, 2.7)	66	2.8 (2.5, 3.1)
Leukaemia (C91-C95)	146	4.2 (3.8, 4.5)	39	3.2 (2.8, 3.7)	107	4.7 (4.2, 5.1)
All (excluding NMSC) (C00-C96, ex. C44)	5,340	162.8 (160.8, 164.8)	1,784	158.9 (155.4, 162.3)	3,556	164.8 (162.3, 167.3)
All cancers (C00-C96)	5,363	163.3 (161.3, 165.4)	1,792	159.4 (155.9, 162.8)	3,571	165.3 (162.8, 167.8)

EASMR: European age-standardised mortality rate per 100,000 persons with 95% confidence interval

## Figure 1: Geographic areas

District councils (NI) and Counties (ROI) in Ireland

