All-Ireland cancer statistics 1994-96

A joint report on incidence and mortality for the island of Ireland

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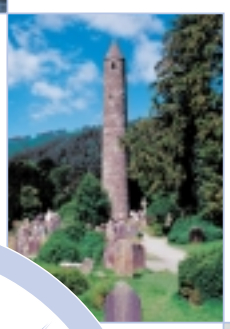

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CONTENTS

I. Summary

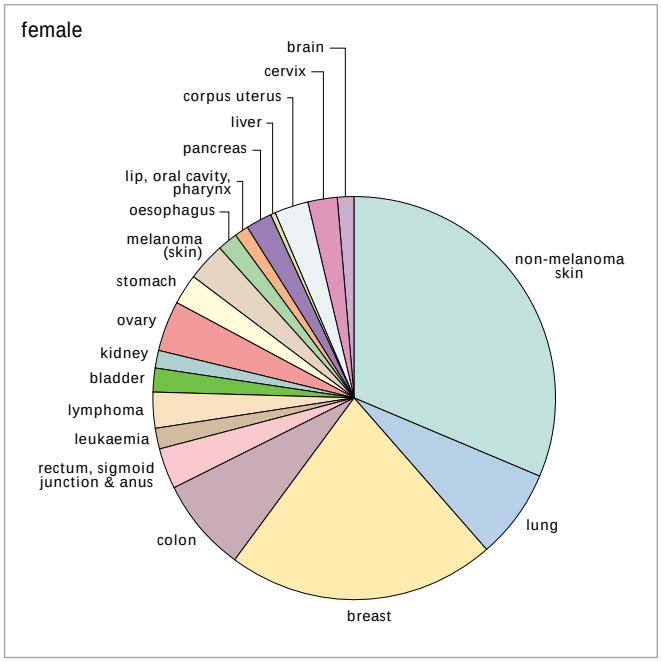
What is the report?

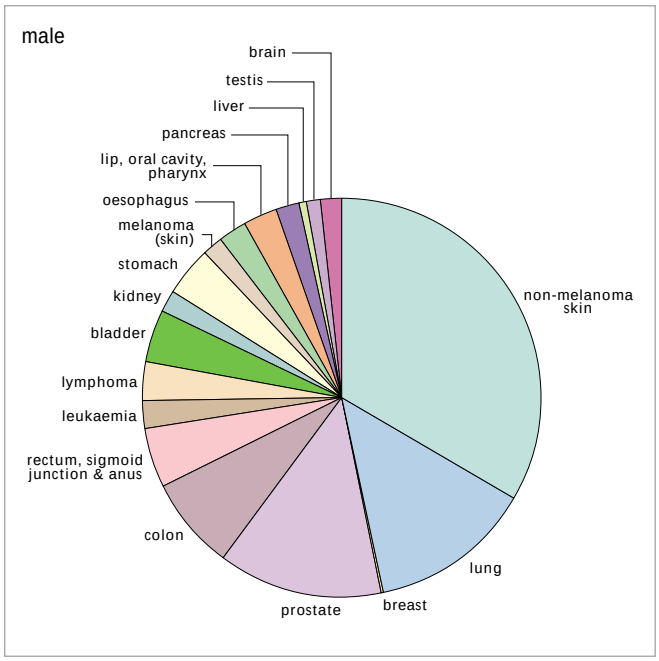
This is the first collaborative report of the two cancer registries in the island of Ireland. It is the result of a concerted effort of data harmonisation and analysis, and documents the similarities and differences in cancer patterns on an all-Ireland basis.

The data

- Cancer incidence and deaths, over 3 years.
- Over 25,000 malignant (invasive) cases per year, or almost 18,000 excluding non-melanoma skin cancer.
- Almost 11,000 cancer deaths per year.

Most common cancers





Who was involved?

- National Cancer Registry (Ireland)
- Northern Ireland Cancer Registry
- The Institute of Public Health in Ireland
- National Cancer Institute (USA)
- Department of Health, Social Services and Public Safety (Northern Ireland)
- Department of Health & Children (Ireland)

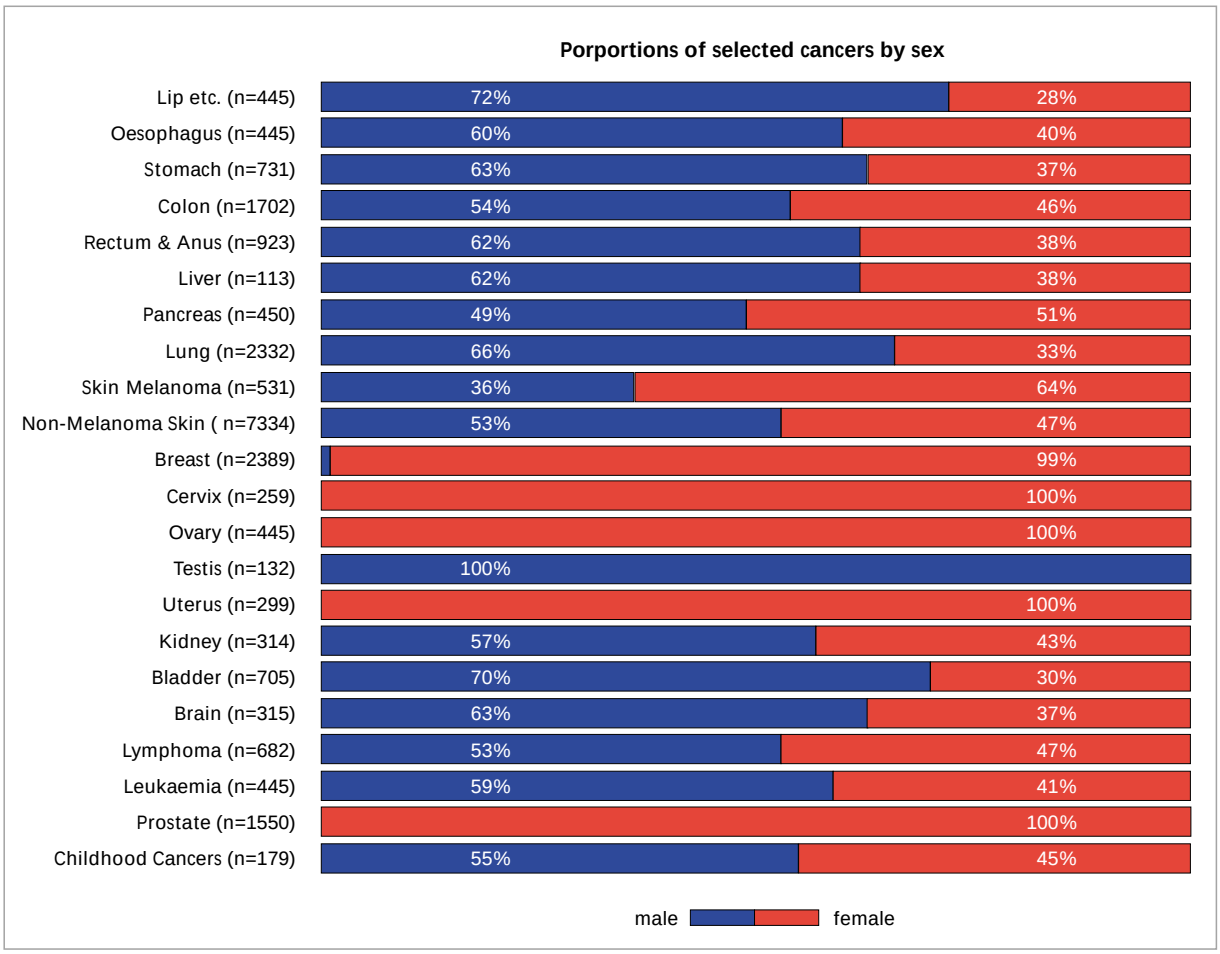
Annual average cases and deaths from cancer, Ireland, 1994-96, ranked by numbers of cases

female		cancer type	male	
cases	deaths		cases	deaths
3445	10	non-melanoma skin	3889	30
793	790	lung	1539	1511
2368	969	breast	21	6
826	495	colon	876	535
-	-	prostate	1550	718
360	139	rectum & anus	563	205
268	242	stomach	463	358
210	87	bladder	495	178
317	150	lymphoma	365	190
338	46	melanoma of skin	193	39
230	247	pancreas	220	251
183	162	leukaemia	262	123
445	296	ovary	-	-
177	175	oesophagus	268	266
124	59	lip, mouth, pharynx	321	133
148	130	brain	200	167
156	68	kidney	206	113
299	60	corpus uteri	-	-
259	105	cervix uteri	-	-
-	-	testis	132	12
43	80	liver	70	112
80	11	childhood cancers	99	24
8787	5108	all excluding NMS	9077	5839
12233	5118	all cancers	12967	5869

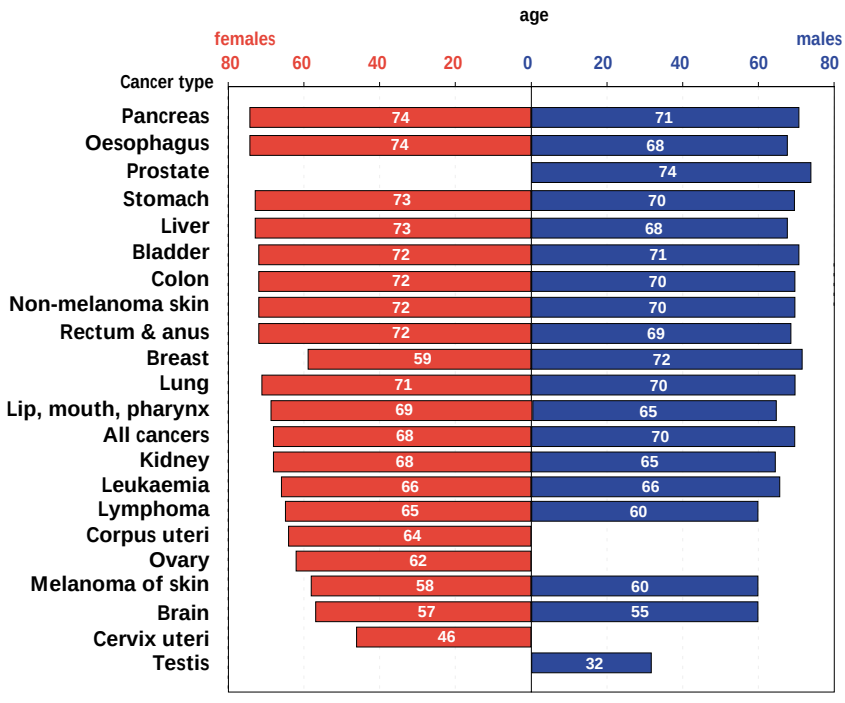
Important facts

- Age-standardised cancer incidence rates are 30% higher in men than in women.
- There is a 1-in-3 chance of developing cancer by age 74; 1-in-4 if skin cancer is excluded.
- Age-standardised cancer mortality rates are almost 50% higher for men than for women.
- Females have a 1-in-8 chance, males a 1-in-6 chance, of dying of cancer by age 74.
- Urban populations had higher rates of cancer: 10% higher for females, 15% for males.
- Lung cancer accounted for 1/4 of cancer deaths in men, 1/5 overall.
- Breast cancer accounted for 1/5 of cancer deaths in women.
- The Republic of Ireland had the highest rate of oesophageal cancer among women in the EU.
- Overall similarities between Northern Ireland (NI) and the Republic (RoI), but, where differences existed, incidence rates generally were more often higher in NI.

Gender and cancer



Although overall numbers of cancer were similar for men and women, the proportion of men to women for individual cancers varied. Apart from the sex-specific cancers (reproductive organs and breast), more men than women were diagnosed with almost all cancers. The highest ratio of men to women was for lip, lung and bladder cancers, while the highest ratio of women to men was for melanoma and pancreatic cancer.



Median age at diagnosis (age above and below which there were equal numbers of patients)

Age profile

Cancer is predominantly a disease of middle age and old age. Half of all patients were aged 68 or over at the time of diagnosis.

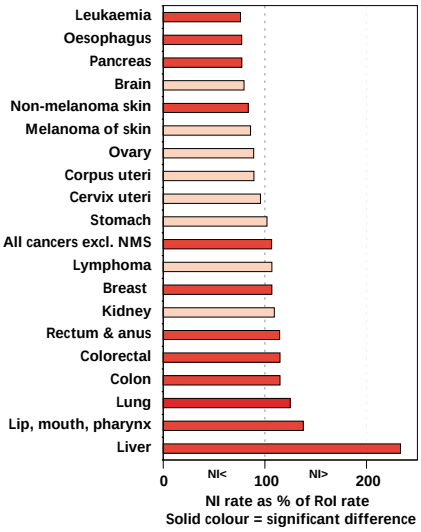
Patients diagnosed with melanoma and cancers of the breast, cervix and brain were relatively young, with more than 60% aged under 65. Half of those with cancer of the testis were diagnosed under 32 years. On the other hand, fewer than 30% of patients with cancers of the bladder, pancreas and prostate were aged under 65 at the time of diagnosis.

For most cancers that occurred in both sexes women tended to be slightly older at the time of diagnosis than men. Melanoma and breast cancer were exceptions to this trend.

Cancer patterns: geographical comparisons of cancer incidence rates

Comparisons below are based on age-standardised incidence rates (corrected to a standard European age-structure to remove the influence of age on rates). For some cancers, inadequate data were available for a given comparison. Figures for 'all cancers' exclude the less harmful, non-melanoma skin cancers (NMS).

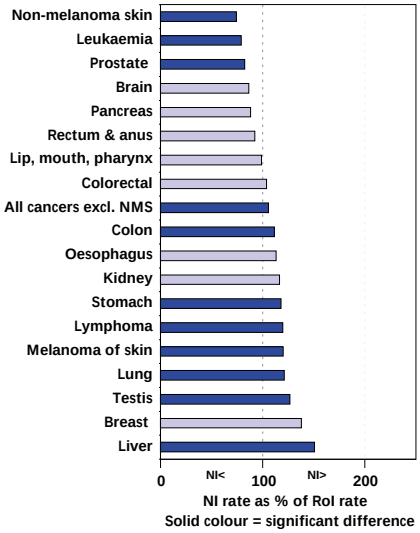
Northern Ireland v. Republic of Ireland rates



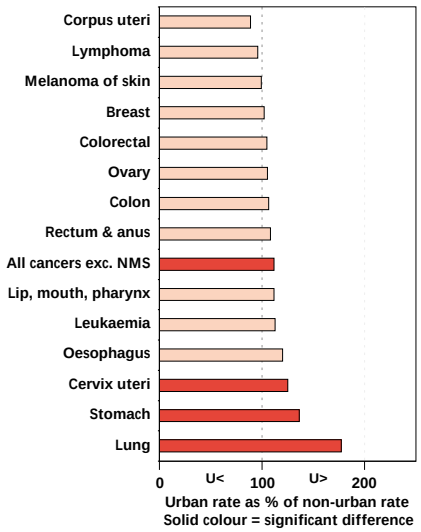
For many cancers, differences between NI and RoI rates were relatively small, and not statistically significant.

However, for a number of cancers (and depending on sex), rates were significantly different (solid colours).

Overall, cancer rates (excluding NMS) were an estimated 6-7% higher in Northern Ireland.

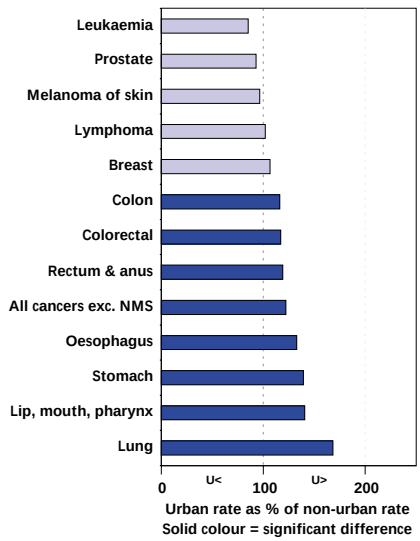


Urban (city) v. non-urban rates

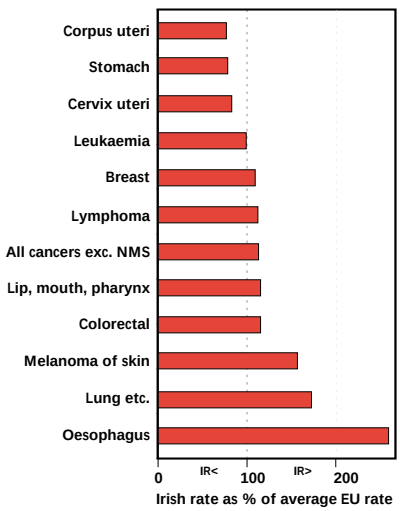


Rates of a number of cancers were significantly higher (solid colours) in urban populations than in populations outside of the cities. This is in line with international findings.

Higher urban rates may reflect the influence of tobacco smoking and other risk factors linked to social deprivation and poverty.

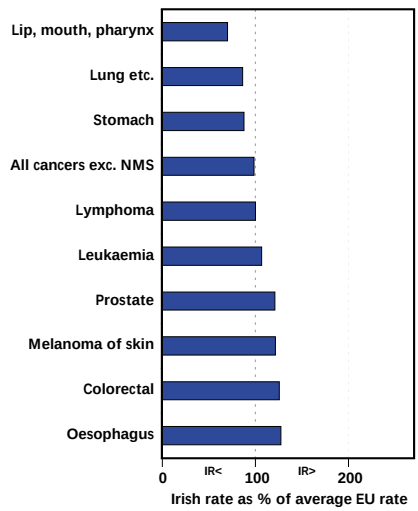


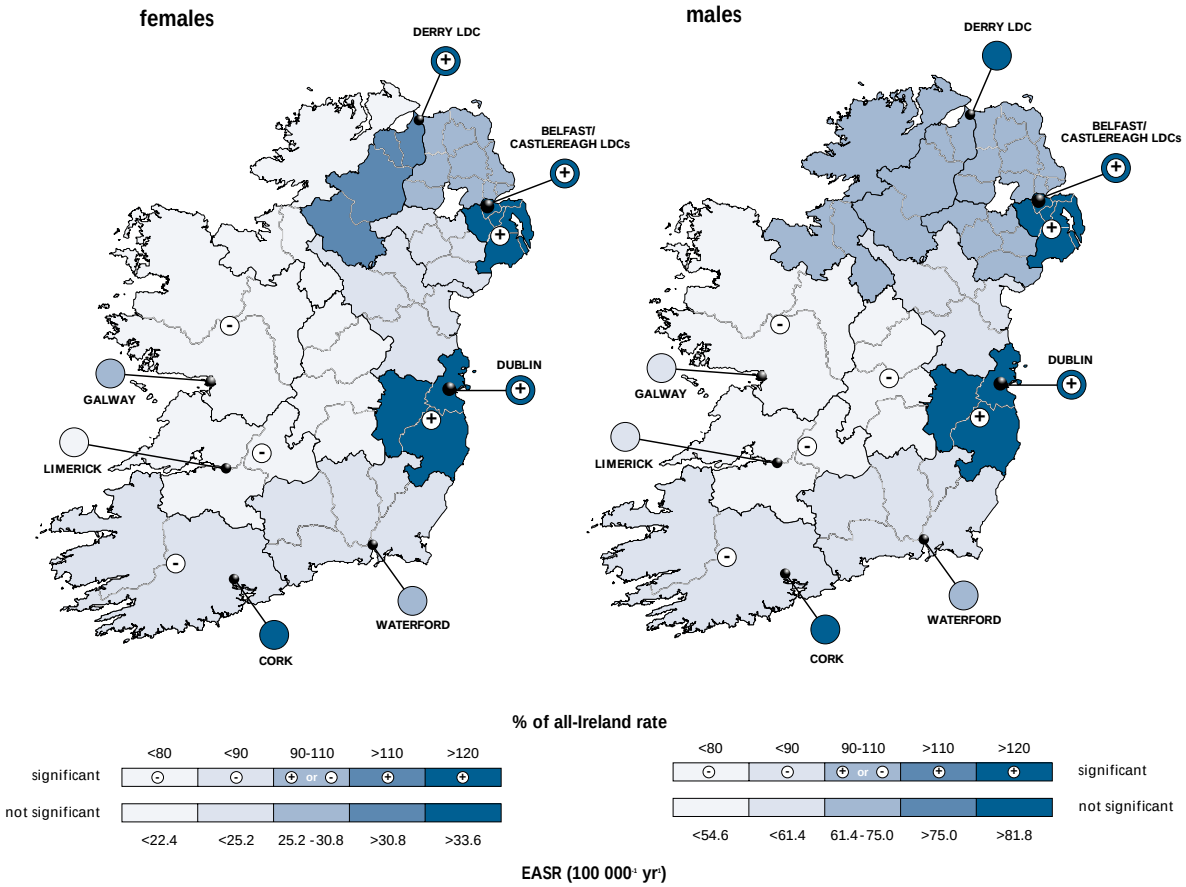
Irish v. EU average rates



For cancers as a whole, rates among Irish women were higher than the EU average. Rates among Irish men were similar to the EU average.

Among males, the different major cancers showed a relatively even mix of 'high' and 'low' Irish rates. Relatively more cancer types in females occurred at high rates (in EU terms).





Sample map from main report: Lung cancer: age-standardised incidence rates (as % of all-Ireland rate) by health-board areas, 1994-96. Rates within cities are included within health-board rates and also indicated separately. Rates significantly different from the rest of Ireland are indicated. Variation within Ireland is particularly striking for lung cancer, largely reflecting higher rates in the cities.

Age-standardised incidence and mortality rates (EASRs: cases or deaths per 100,000 persons per year), and cumulative risks ('lifetime risk' to age 74), for selected malignant cancers, all Ireland, 1994-96.

		Incidence (new cases)				Mortality			
		female		male		female		male	
Description	ICD-10	EASR	risk, 1 in	EASR	risk, 1 in	EASR	risk, 1 in	EASR	risk, 1 in
Lip, mouth, pharynx	C00-C14	4.4	290	14.5	82	1.9	700	6.0	210
Oesophagus	C15	5.8	240	12.1	103	5.5	260	11.9	111
Stomach	C16	8.8	150	20.5	62	7.6	195	16.0	86
Colorectal cancers	C18-21	40.9	32	64.2	20	20.0	73	32.9	42
Colon	C18	28.3	45	39.0	32	15.6	93	23.7	59
Rectum & anus	C19-C21	12.6	102	25.2	48	4.4	340	9.2	145
Liver	C22	1.4	860	3.1	400	2.5	550	5.0	250
Pancreas	C25	7.5	175	9.7	140	7.8	175	11.1	123
Lung	C34	28.0	41	68.2	17	27.0	44	66.5	19
Melanoma of skin	C43	12.9	100	8.5	160	1.6	840	1.8	870
Non-melanoma skin (NMS)	C44	117.4	12	173.7	8	0.3	6600	1.4	1600
Breast	C50	96.0	13	0.9	1400	36.2	36	0.3	4600
Cervix uteri	C53	10.5	120	-	-	4.2	300	-	-
Corpus uteri	C54	12.1	94	-	-	2.1	540	-	-
Ovary	C56	17.4	70	-	-	11.0	109	-	-
Prostate	C61	-	-	67.1	21	-	-	31.8	67
Testis	C62	-	-	5.0	280	-	-	0.5	3500
Kidney	C64	5.0	250	9.3	125	2.3	580	5.1	250
Bladder	C67	7.0	180	21.9	62	2.5	690	7.8	240
Brain	C71	5.7	210	8.6	130	4.9	240	7.3	160
Lymphoma	C81-C85	11.8	100	15.8	80	5.1	245	8.3	150
Leukaemia	C91-C95	6.5	190	11.2	120	4.1	340	7.0	205
All cancers except NMS	C00-43,45-97	325.1	4	399.4	4	173.9	8	258.6	6
All malignant cancers	C00-C97	442.5	3	573.2	3	174.0	8	260.0	6

II. ACKNOWLEDGMENTS

Many individuals and organisations have contributed, directly or indirectly, to the production of this report, and we gratefully acknowledge their contributions.

The main funding for the report was provided by the Department of Health and Children of Ireland, and the Department of Health, Social Services and Public Safety for Northern Ireland, on behalf of the All-Ireland Consortium on Cancer. The Consortium was established by the October 1999 Memorandum of Understanding between these Departments and the National Cancer Institute of the United States Department of Health and Human Services.

Additional funding for the report was provided by the All-Ireland Institute of Public Health. The Northern Ireland Cancer Registry's work as a whole is also supported financially by the Ulster Cancer Foundation. Administrative support to the Registries is provided by the Queen's University of Belfast and University College Cork.

We are grateful to the staff and Board of the National Cancer Registry (NCR), and to the staff, Council, Management Group and Research Advisory Group of the Northern Ireland Cancer Registry (NICR), for their continued efforts and support. This includes the Tumour Registration Officers and Tumour Verification Officers who provide our most direct link to the medical and healthcare community. For specific assistance with the present report, we thank Mary Chambers (NCR), Fiona Dwane (NCR), Deirdre Fitzpatrick (NICR), Colin Fox (NICR), Dr Richard Middleton (NICR), Irene O'Driscoll (NCR), Dr Marie Reilly (NCR), Dr Piaras O'Lorcain (NCR) and the many staff of both registries who helped with checking and proof-reading

At the Institute of Public Health, Dr Kevin Balanda provided much useful advice on presentation of data at the All-Ireland scale, and we thank Dr Jane Wilde, Director of the Institute, for contributing this report's Introduction.

For continued cooperation in relation to Census and Death Certificate records, we acknowledge the Central Statistics Office (Republic of Ireland) and the Registrar General's Office (Northern Ireland).

Finally, we acknowledge perhaps the most essential component of cancer registration in Ireland, namely the support and cooperation of hospitals, hospices, screening services, medical records staff, pathologists, clinicians and general practitioners. We hope that this fruitful cooperation will continue, to allow collation of the comprehensive data required for monitoring cancer at national and All-Ireland scales.

III. WELCOMING STATEMENTS

We welcome this report, which marks a milestone in the development of the National Cancer Registry of Ireland and the Northern Ireland Cancer Registry. It also identifies the major work undertaken behind the scenes by the Ireland, Northern Ireland and National Cancer Institute Consortium in its work to intensify co-operation in relation to cancer. This detailed scientific document will provide a useful baseline reference on cancer in the island for years to come. Its findings also raise questions for further research and we hope will be the first of many joint scientific reports on this topic.

This major collaborative effort has resulted in an enhanced dataset for cancer research covering all the island of Ireland. We congratulate the authors, and in particular Dr Paul Walsh on his diligence and hard work. This report and others from both of the Registries identify the major benefit for cancer control of cancer registries.

Bairbre de Brún MLA
Minster for Health and Social Services

Micheál Martin T.D.
Minister for Health and Children

IV. Introduction

The publication of this report represents an important collaborative effort aimed at producing benefit for the health of people on the island of Ireland.

The report is a product of a partnership involving many people led by the two cancer registries. It forms part of the vision for collaborative work set out by the All Ireland Consortium on Cancer.

There is now increasing interest in and understanding of the benefits of cooperation for public health. Combining the data sets of the Cancer Registries of Ireland and Northern Ireland allows us to identify where similar patterns exist and where differences occur. The comparison is important. It provides a significant step in developing research which will help our understanding of the causes of cancer and what improves survival; point to the possibilities for prevention; assist in the planning and establishment of screening services; and improve the quality of services for treatment and care.

The Institute of Public Health in Ireland, with its aim of promoting cooperation for public health across the island of Ireland, is delighted to be associated with this timely and significant report.

In undertaking this work the authors are to be congratulated. Their efforts contribute to the vital task of developing the highest quality provision of preventive, treatment and care services for people on the island of Ireland.

Dr Jane Wilde, Director, The Institute of Public Health in Ireland

V. BACKGROUND

Health services

Republic of Ireland

The population at the 1996 census was 3,646,161--1,809,595 males and 1,836,566 females. Cancer patients in Ireland can avail of either private or public health care. All public and private hospitals allow the Registry full access to case information. The majority of cancer patients (about 84% of incident cases) attend public hospitals. There are two main publicly funded radiotherapy centres in Ireland, located in Dublin and Cork, and two smaller private centres both in Dublin. Almost all cancer treatment is provided within the country. No co-ordinated screening programmes existed in Ireland in the period 1994 to 1996, but population-based breast screening for about 50% of the population began in 2000. Opportunistic but unorganised cervical screening has existed for many years but it is not possible to estimate the proportion of the population covered. A population-based cervical screening project recently began in one health-board area.

Northern Ireland

Health Services for the Northern Ireland population of 1.6 million is organised along the lines of the National Health Service except that Health & Social Services are combined. Administratively there are four Health & Social Services Boards and a Regional Department of Health and Social Services. All residents are registered with a General Practitioner, who, apart from accident and emergencies, are the first point of call when a patient has concerns about health. Health care is free at the point of use, paid for through taxation. There is a relatively small private health care market. Population based breast screening has been offered to all women aged 50 to 64 since 1993 and population based cervical screening has been available to all women over 20 since the late 1980s, but earlier in a less organised fashion.

Cancer registration

Republic of Ireland

The National Cancer Registry was founded in 1991 and began collecting population data from the entire country in 1994. In 1991 it took over the functions of the Southern Tumour Registry, which had provided population-based registration for about one sixth of the country since 1975. The Registry is administered by the National Cancer Registry Board, whose members are mainly medical practitioners, and is fully funded by the Department of Health and Children.

The Registry has a staff of 33, 18 of whom are engaged in active data collection. Reporting of cancer cases is not obligatory and the Registry collects most of its information through active case finding and data abstraction. Most notifications come from pathology departments, with a smaller number from other hospital sources, death certificates and GPs. The Registry has full access to all death certificates issued in Ireland since 1994 and uses these for case-finding and follow-up. Death certificates are followed up with the hospital of death or the certifying doctor if the cancer is not already registered. At present the Registry does not accept an unconfirmed death certificate (DCO) as the basis for registration. Living patients are actively followed up by enquiry from their GP at five years after diagnosis. All data are extracted directly onto laptop computers and no paper forms are generated. The ICD-O coding system (version 2) is used for both topography and morphology. All malignant, in situ and uncertain cancers are registered, as well as benign intracranial and intraspinal cancers. CIN III of cervix is not registered on the basis of cytology but only if confirmed by biopsy. All non-melanoma skin cancers are currently registered.

Northern Ireland

The Northern Ireland Cancer Registry was re-established in 1994 to replace an older incomplete Registry and acquires its data electronically from pathology laboratories, hospital patient administration systems and death records. There is electronic patient and tumour matching followed by inspection of notes where there are inconsistencies on missing information. When a case is known only from a death notification the GP records are inspected to determine information about the diagnosis and its date. The Northern Ireland Cancer Registry has produced two reports, "Cancer Deaths in Northern Ireland – An Analysis of Patterns and Trends" and "Cancer Incidence in Northern Ireland 1993-95". Both of these are available on the Cancer Registry's web page at www.qub.ac.uk/nicr/intro.htm. A report on cancer survival will be produced in 2001.

General

In summary, each registry within its respective geographical area of coverage

- aims to collate data on all incident (newly diagnosed) cases of cancer from hospital and other relevant sources (including malignant/invasive cancers, in situ cancers, and tumours of uncertain behaviour) and all benign tumours of the brain and central nervous system;
- also obtains copies of cancer and other mortality data from death certificates collated by the relevant statutory authority (the Director General's Office in Northern Ireland, the Central Statistics Office in the Republic);
- publishes reports and otherwise disseminates information on cancer incidence and mortality rates (based on cancer data in combination with official census statistics);
- but maintains full confidentiality of patient records, through secure transmission and in-house encoding of data.

For cancer incidence, data items of relevance include details of patient (e.g. date of birth, address), tumour (e.g. date and basis of diagnosis, site, morphology), and treatment. Current status of each patient (alive or dead) is also recorded and updated, to allow analysis of survival rates. Mortality data collated are less comprehensive, and include (most importantly) date of death, primary or underlying cause of death (including cancer type where relevant), patient name and address.

Cancer incidence and mortality data are collated in different ways (with the cancer registries having primary responsibility for incidence data only), and allow assessment of the cancer burden in Ireland from different viewpoints. Linkage between the two datasets is important, however, as it assists with assessment of data quality and of patient survival. Death certificates may also be the initial source of information on "new" cancer cases, but both registries attempt to confirm such cases through other sources.

The two Irish registries differ in a number of details of their scope and operation (see Table V.1). Most importantly, data collation by the NICR is mainly by passive electronic transmission from primary sources (e.g. hospitals), with further electronic or manual validation of data by registry staff. In contrast, collation of incidence data by the NCR is largely undertaken manually by registry staff, with further electronic and manual checking centrally. Routine electronic collation of data allows the NICR to register a wider range of benign tumours, and some non-cancerous conditions (e.g. asbestosis, Barrett's oesophagus) that may be linked to or possible precursors of cancer.

Checking and assurance of data quality, and of completeness of cancer registration (case ascertainment), forms an important part of both registries' operations. Particular care is required with data on the same patient or tumour from multiple sources, both to avoid duplication of cases and to identify the most valid data. Data quality is considered high, and comparable, in the two registries (Gavin *et al*. 1999; NCR 1999, 2000), based on a range of standard measures (Parkin *et al*. 1994).

Table V.1 Summary comparison of cancer registry operation in Northern Ireland and the Republic of Ireland

	Northern Ireland Cancer Registry	*National Cancer Registry (Ireland)*
First year of comprehensive data collation (incidence)	1993	1994
Computing infrastructure	Customised version of a generic cancer registration system developed by Thames Cancer Registry.	In-house registration system.
Main *coding scheme (incidence data)	Initially ICD-9, now ICD-10 (with ICD-9 to ICD-10 translation).	ICD-O.2 (with translation to ICD-10).
Main *coding scheme (mortality data)	ICD-9 (with translation to ICD-10).	ICD-9 (with translation to ICD-10 or ICD-O.2).
Mode of data collection (passive or active)	Passive, secure electronic transmission of all data from primary sources, e.g. hospitals (with further manual checking by Tumour Verification Officers, and other validation).	Active, manual collection of most incidence data by Tumour Registration Officers, with secure electronic transmission to Registry; limited passive electronic transmission.
SOURCES OF DATA:		
Hospital pathology laboratories	+	+
Hospitals	Hospital Patient Administration Systems (PAS).	Hospital Inpatient Enquiry (HIPE), other inpatient & outpatient data.
Radiology units	+	+
Death certificates	Registrar General's Office.	Central Statistics Agency.
General Practitioner (GP) cases	Central Services Agency, to verify Death Certificate notifications.	Direct notification, especially for GP-only cases of some skin cancers.
Other sources	Breast and cervical screening services, hospices; malignant melanoma, leukaemia/lymphoma & colorectal cancer registries.	Various

*Coding schemes: International Classification of Diseases, 9th (ICD-9) or 10th revision (ICD-10), and International Classification of Diseases for Oncology, 2nd revision (ICD-O.2).

Further processing and combination of data for All-Ireland report

The present report is based on cancer incidence and mortality data for the period 1994-96, as held by the two Irish registries in May/June 2000. Incidence data had already undergone internal checking and validation within each registry. However, further checks and data processing were undertaken before analysis for this report (see Appendix 1). This helped to ensure (as far as possible) data consistency and comparability within and between the Northern Ireland (NICR) and Republic of Ireland (NCR) datasets. In part, this entailed applying the same rules in relation to coding, inclusion or exclusion of particular cases. Where necessary, data were re-coded to a common classification (generally ICD-10). Previous reports of the registries have been based on ICD-9 coding of data (for Northern Ireland: Gavin *et al*. 1999) or on a combination of ICD-10 and ICD-O.2 coding (for the Republic: NCR 1997-2000). Where anomalies were found in the data, or queries were raised, these were channelled through relevant data-management staff in each registry, to assist with ongoing processes of data-cleaning. Re-coded or queried cases were also flagged within the working datasets used for this report.

Data checking and translation were aided by use of the IARCtools program of the International Association for Research on Cancer (Ferlay 1999), and look-up tables within or generated from that program. Detailed reference was also made to site, morphology and tumour-behaviour codes within ICD-O.2 (Percy *et al*. 1990), ICD-9 (WHO 1977) and ICD-10 (WHO 1992). The in-house data-coding manuals used by the two registries were also used to identify, and adjust for, any differences in processing of similar data.

Once data had been checked (and re-coded as necessary) against common rules, they were combined in All-Ireland datasets for (a) incidence and (b) mortality, organised primarily by ICD-10 code. These datasets included a mix of malignant, in situ, unspecified and benign neoplasms, along with some non-neoplastic conditions. Data extraction and analysis for this report (see Chapter VI) was, in general, based on malignant neoplasms only.

VI. NOTES ON DATA PRESENTATION

The layout and contents of the chapters presenting data for each cancer 'site' (or combination of sites) are summarised below. Note that chapters for some sites or site-combinations provide less detailed, summary data only. Attention is drawn to the need for careful interpretation of comparative data. Appendix 1 provides a much fuller description of data included, processing and presentation than is given here.

Data included

Only malignant (invasive) cancers diagnosed during 1994-96, or deaths attributed to malignant cancer during 1994-96, in patients resident in the island of Ireland, are included. Incident cases and deaths attributed to non-malignant (non-invasive) tumours, or tumours of uncertain behaviour, are not considered in detail here. However, brief additional details are provided for some conditions (e.g. in situ neoplasms of the uterine cervix, benign tumours of the brain).

Multiple or repeat occurrences of cancers of the same site and/or morphological type, identified by the International Agency for Research on Cancer (IARC) checking program for multiple primaries, are excluded. Different registries, or different countries, may have their own rules for reporting of such cases, but use of IARC's rules allows standardised comparison of data.

Further details on treatment of data are given in Chapter V and Appendix 1.

Each main chapter has the following sections.

- Chapter heading
- Key facts
- Summary statistics (all Ireland)
- Age Profile
- Geographical variation in incidence rates: within Ireland
  - NI v. RoI
  - Urban v. other populations
  - Regional comparisons
- Geographical variations in incidence rates: international
- Comment: risk factors, early detection and survival
- For health gain

Data presentation

Chapter headings: major cancer sites or categories used

The cancer sites/combinations presented here are defined by the codes used in ICD-10 (the tenth revision of the International Statistical Classification of Diseases and Related Health Problems: WHO 1992). These codes, and the corresponding codes from the previous version of ICD (ICD-9: WHO 1977), are listed below each chapter heading. Data are analysed by primary site – i.e. sites of secondary tumours are not considered (but cases known only from secondaries are included under "primary site unknown").

Chapters are presented for major cancer sites, combinations of sites or other categories (e.g. lymphomas).

Key facts

The main points of each chapter are summarised here. Where comparisons of Northern Ireland v. Republic of Ireland or urban v. non-urban figures are given, these refer to statistically significant differences only (further details in main text).

Summary statistics

Incidence and mortality data for malignant cancers are tabulated and summarised for females and males, for Ireland as a whole, based on combined data from the period 1994-96.

Age profile

Age-specific rates are presented in graphical form by sex and five-year age-class (0-4 years to 85+ years) for all Ireland, Northern Ireland (NI) and the Republic of Ireland (RoI). Numbers of cases diagnosed per 100 000 persons per year are shown.

Geographical variation in incidence rates: within Ireland

NI v. RoI

European age-standardised incidence rates (EASRs) based on All-Ireland, Northern Ireland (NI) and Republic of Ireland (RoI) data are tabulated and compared for 1994-96 as a whole, and for urban and non-urban subsets of the data. Statistically significant differences (based on a Z-test approximation, Estève *et al*. 1994) are highlighted, as are any further differences that appear to be consistent. (See Appendix 3 for denominator populations used.)

Urban v. other populations

Incidence rates are compared between urban (city) populations and other populations within Ireland. The urban groupings used are indicated in Appendix 3 and Fig. A1.1.

Regional comparisons

For further assessment of geographical variation within the island of Ireland, age-standardised incidence rates are compared among the administrative areas used by the relevant health boards during the period 1994-96 (Appendix 3, Fig. A1.1). These relate to the health-board areas in which cancer patients were ordinarily resident at the time of diagnosis, and not to the areas in which patients were diagnosed (or treated).

In total, twelve health-board areas are considered (four in NI, eight in RoI). For the seven that include major urban (city) populations, incidence rates are calculated for (a) the whole area, (b) the urban part and (c) other ("non-urban") parts of the area. Further comparisons are made between rates for each city and the combined "urban" rate for other Irish cities as a whole, and between rates for "non-urban" areas and the combined non-urban rate for the rest of Ireland.

Geographical variation in incidence rates: international

Comparison is made with estimated incidence for the 15 European Union (EU) member states in 1995, from the EUCAN database (Ferlay *et al*. 1999). Note that, in the case of some member states, sample sizes (numbers of cases) are small, particularly based on only a single year. EUCAN figures for some member states (those not covered completely by cancer registries) are estimates based, in part, on extrapolations from mortality data. References to the ranking of individual member states within the EU in 1995 should thus be treated with some caution.

Estimates for the United Kingdom (England, Wales, Scotland and Northern Ireland) are combined within EUCAN. More detailed estimates are available for the period 1994-96, for Scotland (European Network of Cancer registries 1999), England/Wales (Quinn *et al*. 2000), and Northern Ireland (this report). In some cases, these data suggest a different ranking of UK rates within the EU than EUCAN figures suggest.

Comment: risk factors, early detection, and survival

A brief summary is given of current knowledge of the risk factors involved or implicated in specific cancers. Risk factors are much better known for some cancers (e.g. lung cancer) than others, and in many cases the evidence is incomplete, circumstantial or controversial. Useful reviews of relevant information include Smans *et al*. (1992), Peckham *et al*. (1995), Weinberg (1998), American Cancer Society (2000a,b), and, especially, Schotenfeld & Fraumeni (1996) and World Cancer Research Fund / American Institute for Cancer Research (1997).

Summary notes are also provided on early symptoms and the potential for early detection of a given cancer. A general indication of survival prospects (from date of diagnosis) is given, based on the EUROCARE-2 study (Berrino *et al*. 1999). Useful sources or reviews of relevant information include Peckham *et al*. (1995), American Cancer Society (2000a,b) and websites of the US National Cancer Institute.

Recommendations and health gain

Recommendations for further action and for health gain are made in some chapters.

VII. GENERAL GLOSSARY OF TERMS

Age-specific rate	The annual rate (incidence or mortality) within a specific five-year age-class (e.g. 55-59 years); usually expressed per 100 000 individuals.
Age-standardised rate (cf. Direct age-standardisation)	The incidence or mortality rate within a specific population, corrected for age-structure in order to allow comparison with populations of different age-structure.
Benign tumour	Usually a slow-growing tumour, that may displace but does not invade or infiltrate surrounding tissue; a tumour considered not to have malignant or invasive potential.
Cancer	Sometimes used as a synonym of "malignant neoplasm" but includes any tumour or neoplasm with malignant potential - including in situ tumours that have not (yet) invaded surrounding tissue but may have the potential to do so. Excludes benign tumours.
CIN III	Abbreviation for "cervical intraepithelial neoplasia, grade III", considered an in situ tumour of the uterine cervix (the most frequent tumour type detected by cervical screening).
Confidence interval/limits	The 95% confidence interval is most widely used: this is the range of values within which we are said to be 95% confident that the true value of a measurement or estimate (e.g. incidence rate) lies. For example, a mean rate expressed as 5.0 ± 0.4 (95% confidence limits) means that we are 95% confident that the rate lies between 4.6 and 5.4, based on the data available.
Crude rate	The overall incidence or mortality rate (number of cases divided by total population) without any correction for age-structure of the population. Crude rates of cancer will generally be higher in a population with a higher proportion of older people, and are thus not directly comparable with populations having a younger age-profile.
Cumulative rate	The sum of age-specific rates up to a particular age (typically 74).
Cumulative risk	An overall estimate of the likelihood of a person developing a particular cancer by a particular age (usually by age 74), derived from the cumulative rate.
Direct age-standardisation	Age-standardisation of a rate by applying the age-specific rates for a study population to a standard (e.g. World or European) population's age-structure.
ICD-9	The ninth revision of the International Statistical Classification of Diseases and Related Health Problems (WHO 1977).
ICD-10	The tenth revision of the International Statistical Classification of Diseases and Related Health Problems (WHO 1992).
ICD-O.1	First edition of the International Classification of Diseases for Oncology (WHO 1976).
ICD-O.2	Second edition of the International Classification of Diseases for Oncology (Percy *et al*. 1990).
Incidence rate	The number of cases diagnosed within a defined period (usually a year) divided by the population at risk; generally expressed as cases per 100 000 persons per year.
In situ tumour	A tumour with invasive potential, but currently confined to superficial tissues (e.g. epithelium of skin), without invasion of deeper layers.
Invasive tumour	A malignant tumour that is not (or is no longer) confined to superficial tissues (cf. in situ tumour).
Leukaemia	A malignant disease of the blood and blood-forming organs characterised by uncontrolled proliferation of leukocytes (white blood cells).
Lymphoma	A solid malignant tumour originating in lymphoid tissue, generally in lymph nodes.
Malignant tumour	Used in this report (and in ICD-10) as a synonym of "invasive tumour" or "invasive cancer", but sometimes used more loosely to include in situ cancers (of malignant or invasive potential).
Median	The value of an observation having equal numbers of observations above and below that value (e.g. a disease with a median age at diagnosis of 45 years would have approximately equal numbers of cases diagnosed in patients younger than and older than 45).
Metastasis	The distant spread of a cancer from its original (primary) site to other parts of the body.
Mortality/incidence ratio	The ratio between numbers of deaths from a particular cancer (as recorded on death certificates) and the number of incident cases within the same period.
Neoplasm	Equivalent to "tumour" (see below).
Non-melanoma skin cancer (NMS)	Skin cancers other than melanomas. These are primarily basal cell and squamous cell carcinomas among invasive skin cancers.
Prevalence / prevalence rate	The total, current number of cases or rate of a disease within a population, including cases diagnosed in earlier years.
Primary tumour	A tumour that originated in the tissue, or in the part of the body, where it is located.
Secondary tumour	A tumour originating in one tissue, or one part of the body, but which has become established (through metastatic spread from the primary tumour) in a different location.
Statistical significance	An estimate of the likelihood of a finding (e.g. of difference between two sets of values) having occurred due to chance alone. Data are said to have reached conventional levels of statistical significance ($P<0.05$) if the probability that a result could have arisen by chance is less than 0.05 (5%).
Tumour	An abnormal tissue growth ("neoplasm") characterised by abnormal and excessive division of cells; may be benign or may have malignant potential.

1. ALL MALIGNANT CANCERS

ICD-O.2 C00-C80 *ICD-10* C00-C97 *ICD-9* 140-208

This category includes all malignant cancers, but subtotals are also provided for all cancers excluding non-melanoma skin cancer (NMS), as international data on NMS are not widely available.

Key facts (all cancers)

- Average of 25 200 new cases per year, 1994-96: 12 233 in females, 12 967 in males.
- Average of 10 987 deaths per year: 5118 in females, 5869 in males.
- Age-standardised rates higher in males than females, by about 30% (incidence), 50% (mortality).
- Non-melanoma skin cancer was the most frequent cancer in both sexes (30% of all cases), with lung and related cancers second most frequent for both sexes combined (10% of cases). Breast cancer was the second most frequent in females (19% of cases) and prostate second most frequent in males (12% of cases).
- Lung and related cancers were the most frequent causes of cancer deaths overall (22% of deaths) and in males (27%), with breast cancer the most frequent cause in females (19%).
- Higher incidence rates in urban than rural populations, by about 10% (females), 15% (males).

Key facts (all cancers excluding non-melanoma skin cancer)

- Average of 17 864 new cases per year, 1994-96: 8787 in females, 9077 in males.
- Average of 10 947 deaths per year: 5108 in females, 5839 in males.
- Higher incidence rates for Northern Ireland (NI) than the Republic (RoI), by about 7% (females), 6% (males).
- Higher incidence rates in urban populations, by about 12% (females), 22% (males).
- Rates for Irish (especially NI) females higher than the reported EU average, rates for males close to average.

Summary statistics

Tables 1.1-1.2

Incidence 1994-96

On average each year, 12 233 new cases of malignant cancer (8787 excluding non-melanoma skin cancer) were diagnosed in females, 12 967 (9077 excl. NMS) in males, in Ireland as a whole. European-age-standardised rates (EASRs) were significantly higher among males than females, by about 30% (95% confidence limits 28-31%), or (excluding non-melanoma skin cancer) 23% (95% confidence limits 21-25%). On average, females were estimated to have a 30% (1-in-3) chance of developing malignant cancer by age 74, males a 36% (1-in-3) chance. Equivalent figures for malignant cancer excluding NMS were 23% (1 in 4) for females, 27% (1 in 4) for males.

Mortality 1994-96

Annual averages of 5118 deaths among females and 5869 deaths among males were attributed to malignant cancer (or, excluding non-melanoma skin cancer, 5108 and 5839 deaths, respectively). This represents just over 2 deaths for every 5 incident cases, or (excluding NMS) about 3 deaths for every 5 cases. European-age-standardised mortality rates were significantly higher in males than females, by about 49% (95% confidence limits 46-53%) – a more marked disparity than for incidence. On average, females were estimated to have a 12% (1-in-8) chance, males a 17% (1-in-6) chance, of dying from malignant cancer by age 74. The disparity between males and females reflects, at least in part, higher levels of tobacco-related cancers in males, which have a poorer survival.

Table 1.1 Summary statistics, all Ireland 1994-96: all malignant cancers

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	12 233	12 967	5118	5869
% of total	100.0	100.0	100.0	100.0
Cumulative risk (0-74 yrs) %	29.6	36.1	12.4	17.2
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	460.0	499.0	192.5	225.8
World age-standardised rate	311.3 ±3.5	385.3 ±3.9	116.8 ±2.0	168.6 ±2.6
European age-standardised rate	442.5 ±4.7	573.2 ±5.7	174.0 ±2.9	260.0 ±3.9
Mortality/incidence ratio	0.42	0.45	-	-

Table 1.2 Summary statistics, all Ireland 1994-96: all malignant cancers excluding non-melanoma skin cancer

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	8787	9077	5108	5839
% of total	71.8	70.0	99.8	99.5
Cumulative risk (0-74 yrs) %	23.2	27.2	12.4	17.1
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	330.4	349.3	192.1	224.7
World age-standardised rate	232.5 ±3.0	270.8 ±3.3	116.6 ±2.0	167.8 ±2.6
European age-standardised rate	325.1 ±4.1	399.4 ±4.8	173.7 ±2.9	258.6 ±3.9
Mortality/incidence ratio	0.58	0.64	-	-

Summary of main cancer categories

Figure 1.1

Non-melanoma skin cancers (NMS) were the most frequent malignant cancers in both sexes, accounting for 29% of all incident cases. However, NMS was rarely fatal, accounting for only 0.4% of all cancer deaths. Lung and related cancers were the next most frequent category of incident cases (10% of total), and the main category of cancer deaths both overall (22% of total) and for males (27%). Among females, breast cancer was the second most frequent cancer (19% of incident cases) and the most frequent cause of cancer deaths (also 19% of total). Breast cancer was the third most frequent category overall, for both incidence and mortality. Colon cancer was the fourth most frequent cancer overall (7% of incident cases and 9% of cancer deaths). Prostate cancer was the third most frequent cancer in males (12% of incident cases and deaths), and fifth most frequent overall.

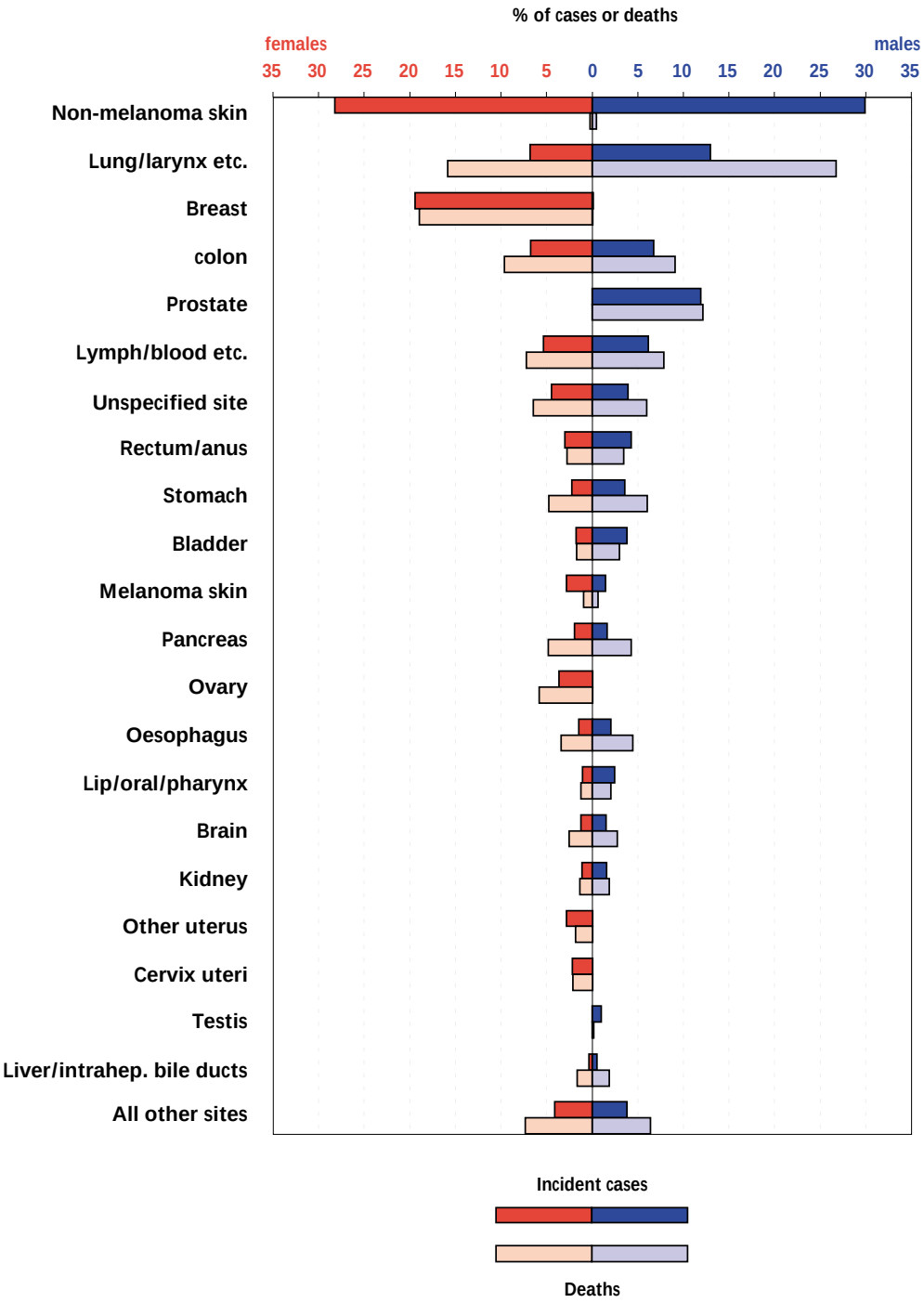


Figure 1.1 Malignant cancers ranked by percentage of incident cases, with comparative data for deaths, all Ireland, 1994-96: site breakdown.
See *Appendix Tables 2* and *3* for further details

Age profile

Figure 1.2

Very low incidence rates of malignant disease were recorded among children. In both sexes, there was a very marked increase in age-specific rates up to 80/85+ years. Rates among males, in particular, accelerated markedly from about age 50/55 onwards. Females showed some evidence of a levelling-off in rates in the very oldest age-classes. Rates among females were consistently higher than among males from 25 to 59 years (all cancers excluding NMS). From about age 60 onwards, rates in males were markedly higher than in females (about twice as high as in females from about age 75 onwards). Both Northern Ireland (NI) and Republic of Ireland (RoI) showed very similar age-profiles for both sexes, but with some indication of a more marked increase in cancer rates with age in NI males.

For all malignant cancers combined, median age at diagnosis was 68 years for females overall (that is, half of the patients were aged 68 or over at the time of diagnosis). This differed little between NI (69 years) and RoI (68 years). The median age at diagnosis for males was 70 years (69 in NI, 70 in RoI). Excluding NMS, the median ages at diagnosis were 67 years for females and 69 years for males (equal NI and RoI).

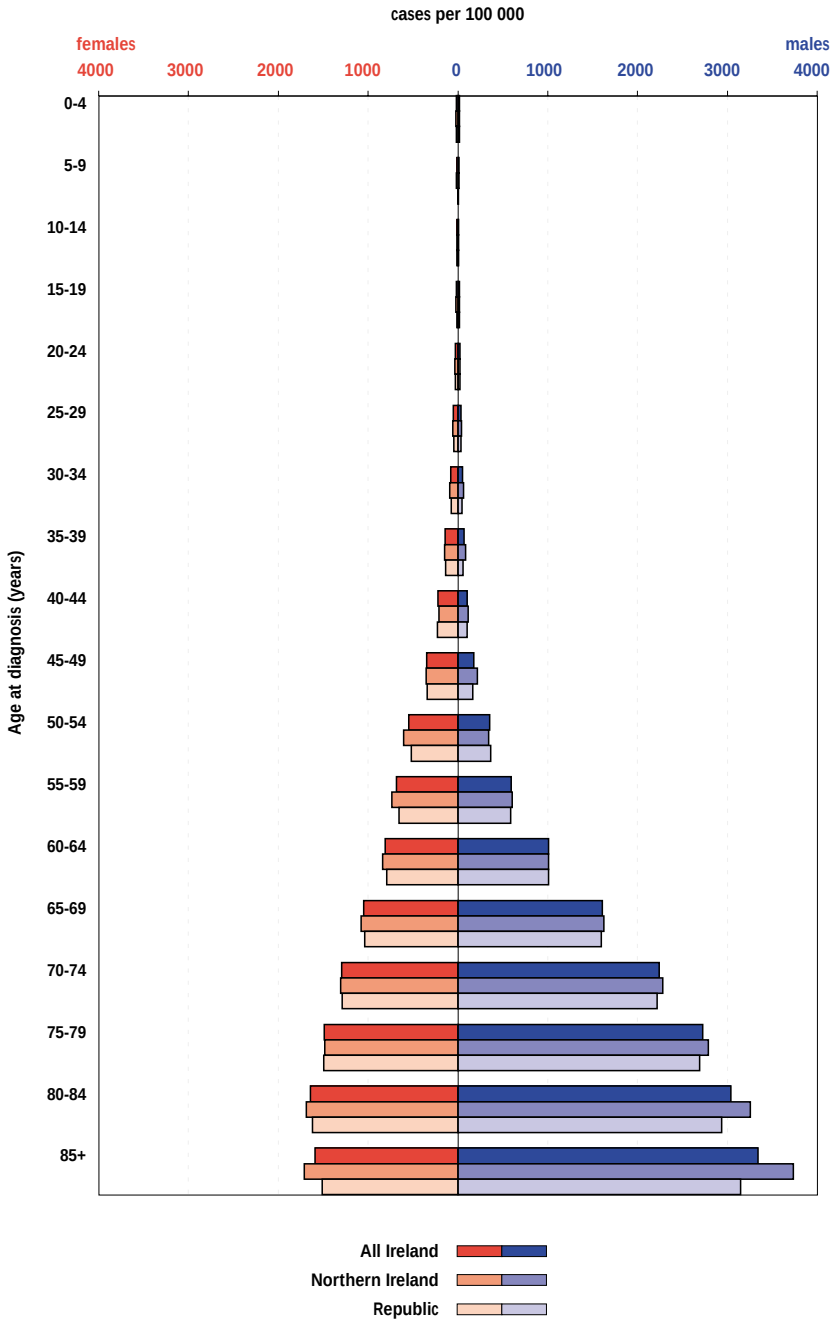


Figure 1.2 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: all malignant cancers excluding non-melanoma skin cancer.

Age-profiles for cases including NMS were broadly similar.

Tables 1.3-1.4 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: (1.3) all malignant cancers, (1.4) all cancers excluding NMS

1.3 All cancers		females				males			
		all	urban		non-urban	all	urban		non-urban
All-Ireland	EASR	442.5	475.3	**	431.3	573.2	639.9	**	554.9
	±95% confidence limits	4.7	9.7		5.4	5.7	12.8		6.4
NI	EASR	444.8	436.8		448.6	562.5	589.0	**	555.9
	±95% confidence limits	8.1	15.1		9.6	10.0	19.7		11.7
			**		**	**	**		
RoI	EASR	441.3	501.8	**	422.8	578.5	673.6	**	554.5
	±95% confidence limits	5.8	12.8		6.5	7.0	16.9		7.7

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

1.4 All except NMS		females				males			
		all	urban		non-urban	all	urban		non-urban
All-Ireland	EASR	325.1	352.5	**	315.8	399.4	465.0	**	380.7
	±95% confidence limits	4.1	8.5		4.6	4.8	11.0		5.3
NI	EASR	338.9	348.0		335.1	414.6	466.2	**	395.7
	±95% confidence limits	7.2	13.6		8.5	8.6	17.5		9.8
		**			**	**			**
RoI	EASR	317.9	356.1	**	306.4	392.4	464.7	**	374.4
	±95% confidence limits	4.9	10.9		5.6	5.8	14.1		6.3

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Tables 1.3-1.4, Figures 1.3-1.4

All cancers

NI v. RoI

Age-standardised incidence rates for all malignant cancers combined did not show any significant overall difference for females but were significantly higher among males in RoI than NI. (However, see below on rates excluding non-melanoma skin cancer). Rates among urban populations for both sexes were significantly higher in RoI than NI, but rates among "non-urban" female populations were significantly lower in RoI. The higher rates in RoI reflect the inclusion of non-melanoma skin cancers (NMS), for which completeness of registration may be lower in NI.

Urban v. other populations

Cancer rates were significantly higher in urban than in non-urban populations at All-Ireland, RoI and (except for females) NI scales. All-Ireland rates for malignant cancers as a whole were about 10% (95% confidence limits 8-13%) higher in urban females, 15% (13-18%) higher in urban males, compared with populations outside of the main cities.

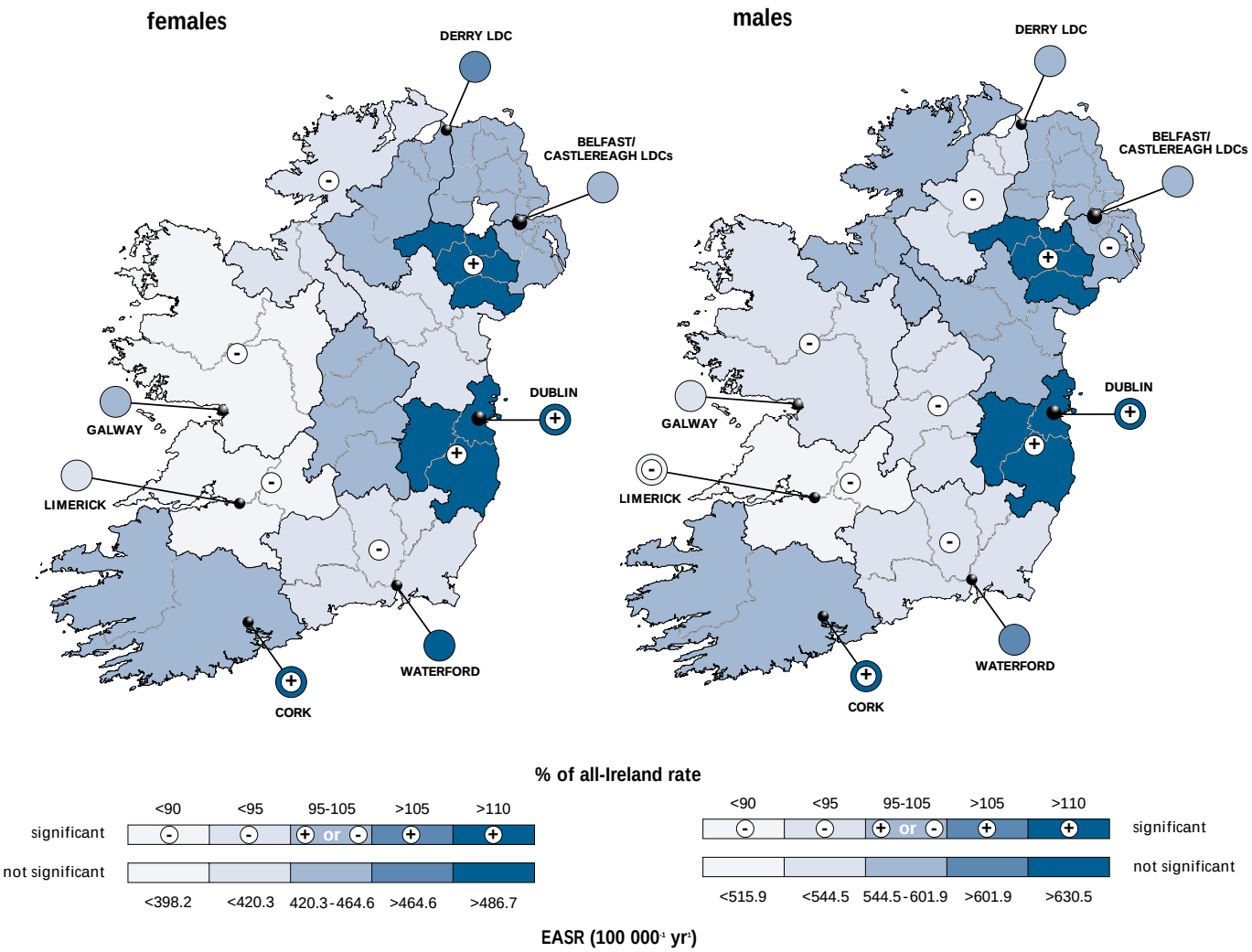
Regional comparisons

A large number of health-board areas (and cities) showed significantly high or low rates in comparison with the rest of Ireland. In part, this reflects the generally higher rates within the cities (and especially Dublin's influence on the figures). The patterns are broadly similar whether or not non-melanoma skin cancers are included, although there are a number of differences.

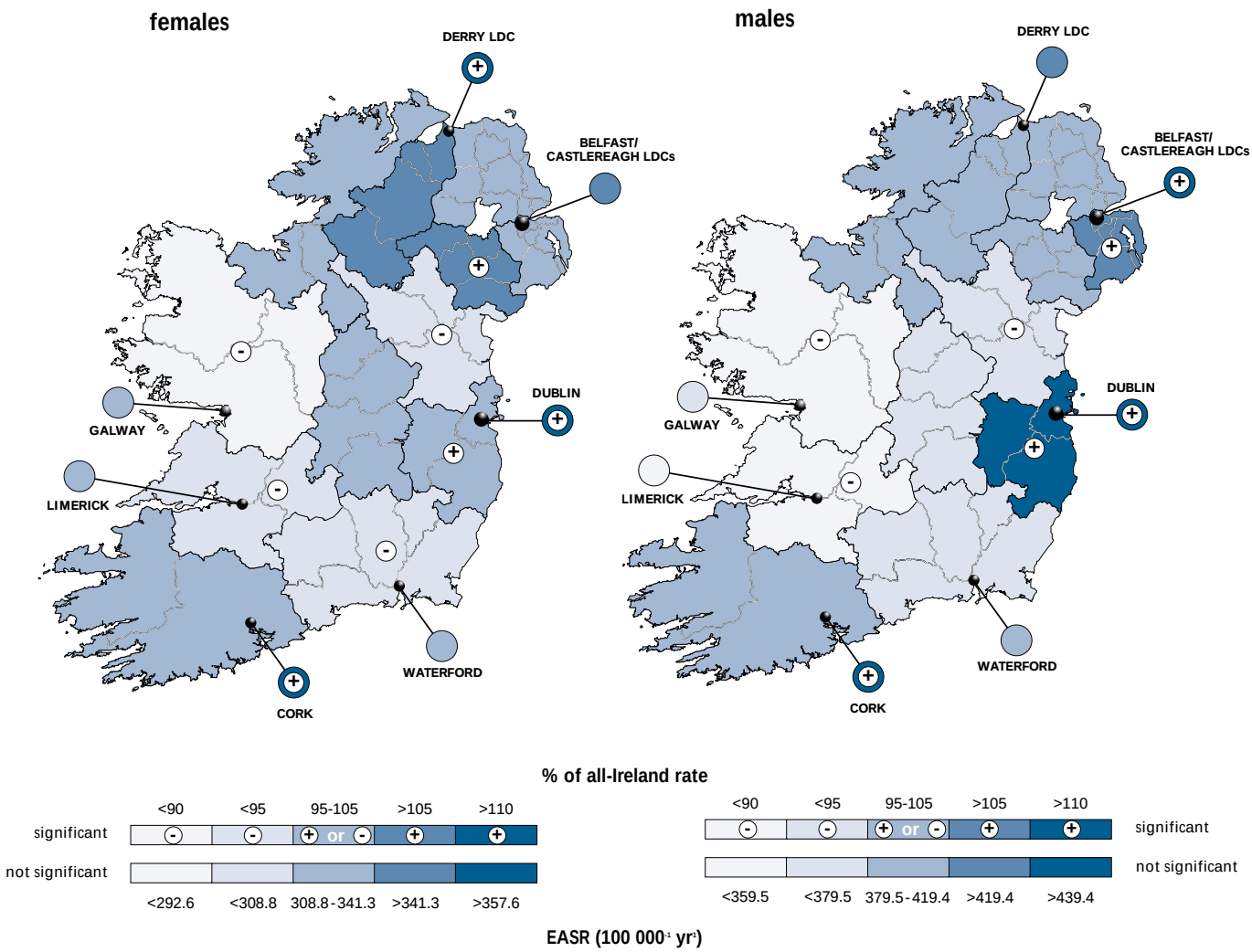
In addition to the mapped comparisons, significant variations also occurred among the seven urban populations considered. Among females, rates for malignant cancers as a whole were significantly higher in Dublin and Cork, and significantly lower in Belfast/Castlereagh and Limerick, than in other urban populations. "All cancer" rates among males in Dublin and Cork were significantly higher, but in Belfast, Derry, Limerick, and Galway significantly lower, compared with other urban populations.

Figures 1.3-1.4 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: (1.3) all malignant cancers, (1.4) all excluding non-melanoma skin cancer.
Rates within cities are included within health-board rates and are also indicated separately. Rates significantly different from the rest of Ireland are indicated.

1.3 All malignant cancers



1.4 All excluding non-melanoma skin cancer



All cancers excluding non-melanoma skin

NI v. RoI

Excluding non-melanoma skin cancer, rates were significantly higher in NI for both sexes, by about 7% (95% confidence limits 4-9%) in females and 6% (3-8%) in males. Non-urban populations also had significantly higher rates in NI, but urban populations showed no differences in rates between NI and RoI.

Urban v. other populations

Excluding NMS, rates were about 12% (8-15%) higher in urban females and 22% (19-26%) higher in urban males. Similar urban/non-urban differences were evident in most health-board areas, including significant differences within RoI Eastern and Southern regions (both sexes), and NI Eastern and Western regions (males).

Regional comparisons

Again, a large number of health-board areas (and cities) showed significantly high or low rates in comparison with the rest of Ireland.

In addition to the mapped comparisons, significant variations also occurred (for males only) among the seven urban populations considered. Rates among males in Cork city were significantly higher, but in Limerick and Galway significantly lower, than in other urban populations.

Geographical variation in incidence rates: international

Table 1.5, Figures 1.5

Comparisons here exclude non-melanoma skin cancer, as international data are generally less complete for NMS. All-Ireland rates of malignant cancers were similar to recent figures for England/Wales, and lower than Scottish rates, for both sexes. Rates for Irish (especially NI) females appeared to be higher than the EU average, while rates for Irish males were broadly similar to the EU average. Figures from EUCAN (Ferlay *et al*. 1999), which do not give separate rate estimates for the countries of the UK, indicate that, among females, RoI had the 4th highest recorded rate of cancer of 15 EU countries in 1995, while the UK had the 6th highest rate. In contrast, RoI had the 11th (UK the 12th) highest recorded rate among EU males in 1995.

Table 1.5 International comparison of reported incidence rates for all malignant cancer (excluding non-melanoma skin cancer) (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**325.1**	**399.4**
Northern Ireland[1]	338.9	414.6
Republic of Ireland[1]	317.9	392.4
Scotland[2]	377.9	472.0
England & Wales[3]	322.7	391.6
United Kingdom, incl. NI[4]	311.4	377.6
Denmark (highest EUCAN rate, females)[4]	377.1	393.9
Belgium (highest EUCAN rate, males)[4]	285.3	440.2
European Union average[4]	282.8	405.9

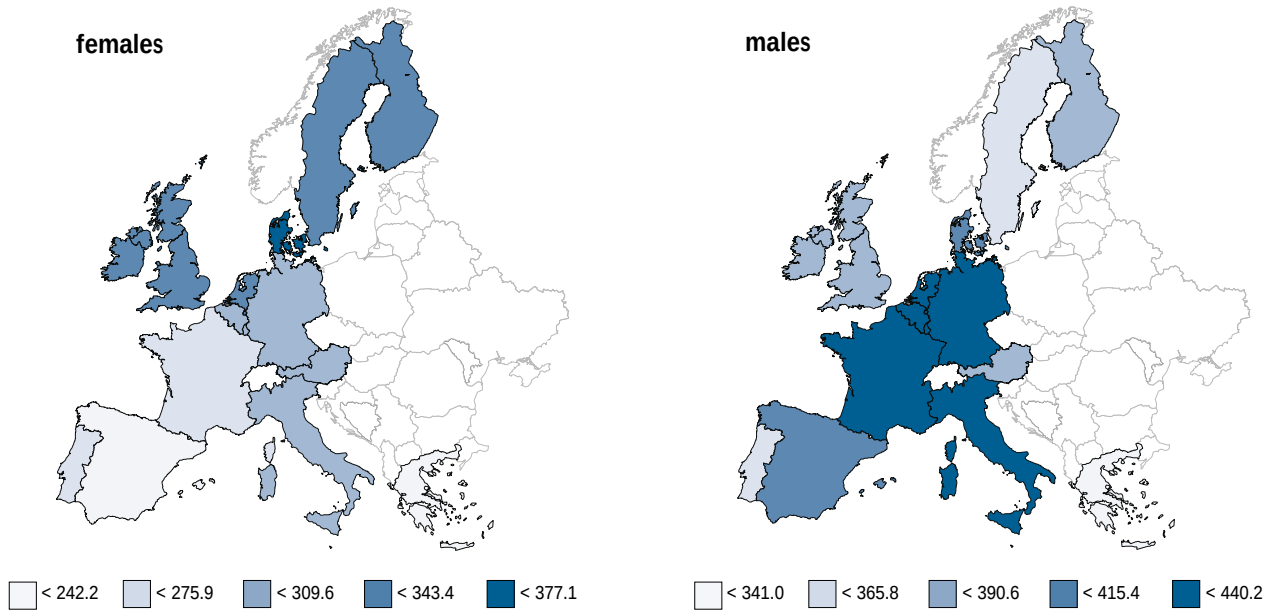


Figure 1.5 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: all malignant cancers, excluding non-melanoma skin cancer.

Source: Ferlay *et al.* 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

Smoking and dietary factors account for a high proportion of cancers internationally, along with excessive exposure to sunlight in the case of skin cancers. Familo-genetic and hormonal factors, infectious agents, and alcohol consumption also appear to play significant roles in at least some cancers. However, for many types of cancer, the factors involved (and potential for risk-reduction) are poorly known, inadequately quantified or not widely agreed. In particular, the possible roles of environmental contaminants, ionising radiation and electromagnetic fields are poorly known.

The symptoms, and potential for early detection, of malignant cancer vary between cancer sites (see other chapters). In general, however, survival prospects are improved, or treatment options are at least widened, the earlier a particular case is diagnosed. Survival rates are generally estimated relative to the general population (of the same age-composition), with relative survival five years from date of diagnosis considered the most important measure. Based on malignant cancers other than non-melanoma skin cancers, European data indicate an average five-year relative survival rate of about 50% in females, 35% in males (Berrino *et al*. 1999). Average survival rates for patients diagnosed with particular cancers can vary considerably from this figure (cf. other chapters).

For health gain

- Focus on prevention, especially smoking and dietary factors, would reduce cancer incidence and mortality.
- Increased awareness should be promoted among the population about the importance of early investigation of symptoms.
- Ensure symptoms are investigated as early as possible.
- Participation in clinical trials, which can advise on the best outcomes, should be enhanced.
- The organisation of services should be such as to ensure that those with the disease have as good an outcome as possible.
- The full range of palliative care services should be available for those with established disease.

2. MALIGNANT CANCER OF THE LIP, ORAL CAVITY AND PHARYNX

ICD-O.2 C00-C14 *ICD-10* C00-C14 *ICD-9* 140-149

This grouping of sites includes the lip, mouth, tongue, salivary glands, tonsils and pharynx, sometimes referred to as "head and neck" (also sometimes including larynx [C32], not included here).

Key facts

- Average of 445 new cases per year, 1994-96: 124 in females, 321 in males.
- Average of 192 deaths per year: 59 in females, 133 in males.
- Age-standardised incidence and mortality rates about three times higher in males than females.
- Higher incidence rate for females in Northern Ireland (NI) than in Republic (RoI), by about 40%.
- Higher incidence rates for males in urban compared with other populations, by about 40%.
- All-Ireland incidence rate above EU average for females, below EU average for males.

Summary statistics

Table 2.1

Incidence 1994-96

On average each year, 124 new cases of malignant cancer of the lip, oral cavity and pharynx were diagnosed in females, 321 in males, in Ireland as a whole. European-age-standardised rates were significantly higher among males than females, by about 229% (95% confidence limits 191-272%). On average, females were estimated to have a 1-in-290 chance of developing one of these cancers by age 74, males a 1-in-82 chance.

Mortality 1994-96

Annual averages of 59 deaths among females and 133 deaths among males were attributed to these cancers, equivalent to 4 to 5 deaths for every 10 incident cases. Mortality rates (EASRs) were significantly higher in males than females, by about 208% (95% confidence limits 156-271%). On average, females were estimated to have a 1-in-700 chance, males a 1-in-210 chance, of dying from these cancers by age 74.

Table 2.1 Summary statistics, all Ireland 1994-96: malignant cancer of the lip, oral cavity and pharynx

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	124	321	59	133
% of total	1.0	2.5	1.2	2.3
Cumulative risk (0-74 yrs) %	0.35	1.22	0.14	0.48
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	4.7	12.3	2.2	5.1
World age-standardised rate	3.1 ±0.3	10.1 ±0.7	1.3 ±0.2	4.0 ±0.4
European age-standardised rate	4.4 ±0.5	14.5 ±0.9	1.9 ±0.3	6.0 ±0.6
Mortality/incidence ratio	0.48	0.41	-	-

Age profile

Figure 2.1

Cancers of the lip, oral cavity and pharynx are rare in children and young adults, but show a marked increase in age-specific rates from about 35 years onward (especially in males). Possible indications of multiple peaks in age-specific incidence, or of relatively flat peaks across broad age-groupings, may reflect the heterogeneous nature of this group of cancer sites, as well as small numbers of cases. Rates in those below age 35 (albeit low) were generally higher among females than males. From age 40 onwards rates were more than twice (generally three times) as high among males. No consistent differences were evident between age-specific rates for NI and RoI, and random errors associated with small numbers of cases (overall, and among sub-sites of this category) may contribute to apparent discrepancies. Median age at diagnosis was 69 years for females overall (67 in NI, 70 in RoI), and 65 years for males (both NI and RoI).

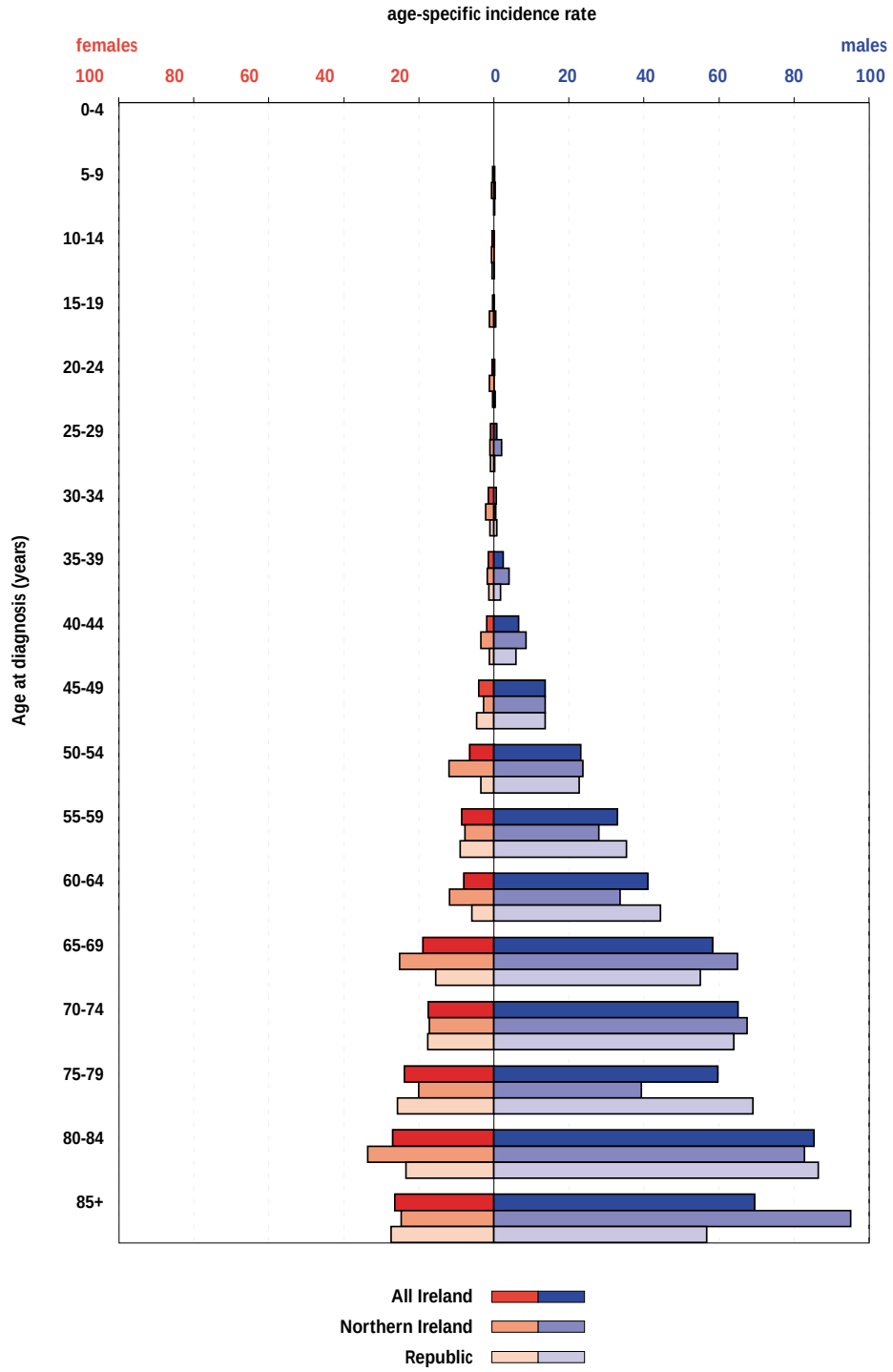


Figure 2.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the lip, oral cavity and pharynx.

Table 2.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the lip, oral cavity and pharynx

		females			males			
		all	urban	non-urban	all	urban		non-urban
All-Ireland	EASR	4.4	4.8	4.3	14.5	18.7	**	13.3
	±95% confidence limits	0.5	1.0	0.5	0.9	2.2		1.0
NI	EASR	5.4	5.3	5.5	14.4	19.3	**	12.5
	±95% confidence limits	0.9	1.7	1.1	1.6	3.6		1.8
		**		**				
RoI	EASR	3.9	4.7	3.7	14.5	18.4	**	13.6
	±95% confidence limits	0.5	1.2	0.6	1.1	2.8		1.2

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 2.2

NI v. RoI

Rates among females were significantly higher in NI than RoI, by about 38% (95% confidence limits 10-73%) overall, and were also higher for "non-urban" populations. In contrast, little or no difference between NI and RoI was evident among males, for any combination or subset of data.

Urban v. other populations

Rates among males were significantly higher in urban than in other populations, by about 41% (95% confidence limits 21-65%) for Ireland as a whole. Urban rates were also significantly high for males in both NI and RoI. No significant (or consistent) differences were evident for females. At regional scales, estimated rates were not consistently higher in urban populations, but were significantly higher for males in Belfast and Dublin compared with other parts of NI Eastern and RoI Eastern areas, respectively.

Geographical variation in incidence rates: international

Table 2.3, Figure 2.2

All-Ireland rates among females for cancer of the lip, oral cavity and pharynx (combined) were above average for the EU, and intermediate between rates for England/Wales and Scotland. The lower rate among RoI females, however, was close to the EU and England/Wales estimates. Rates among Irish males were lower than the EU average, and slightly lower than Scottish rates, but higher than rates in England/Wales. In 1995, estimates from EUCAN (Ferlay *et al*. 1999) indicated that, among females, RoI had the 6th highest recorded rate of these cancers among 15 EU member states, while the UK had the 9th highest rate. Among males, RoI had the 9th highest recorded rate in the EU in 1995, UK the 14th highest rate.

Table 2.3 International comparison of incidence rates for malignant cancer of the lip, oral cavity and pharynx (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	4.4	14.5
Northern Ireland[1]	5.4	14.4
Republic of Ireland[1]	3.9	14.5
Scotland[2]	6.5	15.3
England & Wales[3]	3.9	9.1
United Kingdom, incl. NI[4]	3.5	8.8
Finland (highest EUCAN rate)[4]	5.8	42.9
European Union average[4]	3.8	20.7

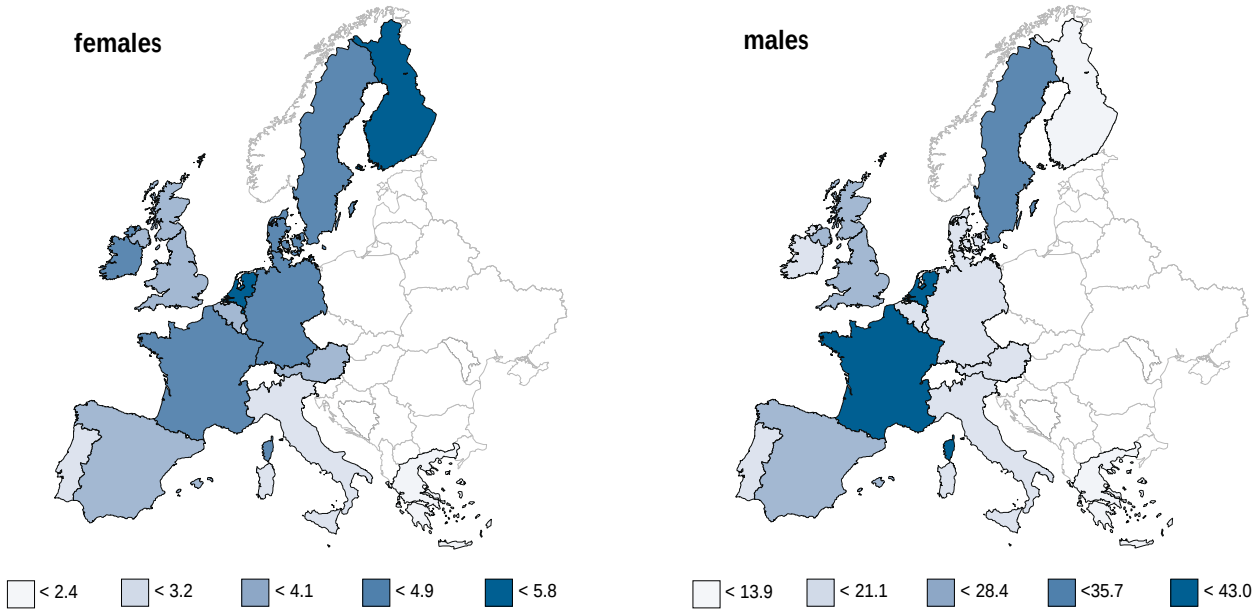


Figure 2.2 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant cancer of the lip, oral cavity and pharynx.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union*.

Comment: risk factors, early detection, and survival

Overall, tobacco use and excessive consumption of alcohol are believed to account for most cancers of the oral cavity and pharynx in developed countries. As with oesophageal cancer, smoking and alcohol consumption in combination have a multiplicative influence on cancer risk. Dietary deficiencies (in particular, lack of vitamin A and C) are also possibly involved, and there is convincing evidence that regular consumption of fruit and vegetables has a protective effect. A role of infectious agents is also implicated, although unconfirmed, in this group of cancers: in particular, an apparent association between nasopharyngeal cancer and infection with Epstein-Barr virus.

Symptoms, and potential for early detection, vary among the heterogeneous mix of sites included in this category. Frequently, early symptoms are not apparent or are ignored, while pharyngeal cancers may be clinically less obvious or accessible compared with other sites. Early symptoms are infrequent in the case of cancers of the nasopharynx, while cancers of the hypopharynx are also usually well-advanced when detected (symptoms including sore throat or a neck mass). Cancers of the oropharynx may cause mild discomfort, or the sensation of a foreign body, at early stages, but these symptoms may not be obvious. Cancers of the oral cavity (including tongue) may produce symptoms of pain, discomfort or irritation, and earlier detection may occur during routine dental examination. Salivary gland tumours often present as lumps, but other causes may have to be ruled out.

Average survival prospects reflect, in part, the stage at which these cancers are typically detected. Combined European data for malignant cancer of the oral cavity, tongue and pharynx (i.e. excluding lip and salivary glands) indicate an average five-year relative survival rate (from date of diagnosis) of about 48% in females and 34% in males (Berrino *et al*. 1999). For individual sites, average survival prospects are highest in the case of cancer of the lip (five-year relative survival 90-91%), followed by cancers of salivary glands, oral cavity, tongue, oropharynx, nasopharynx and, lowest (at 24-28%) hypopharynx (Berrino *et al*. 1999).

For health gain

- The population should be encouraged to stop smoking, eat a diet with a high level of fresh fruit and vegetables, moderate alcohol consumption, and seek early diagnosis of suspicious symptoms.
- Everyone, but especially older people, should have regular check-ups with a dentist.
- Research is needed to understand why the levels of pharyngeal cancer are higher in women in Northern Ireland.

3. MALIGNANT CANCER OF THE OESOPHAGUS

ICD-O.2 C15 *ICD-10* C15 *ICD-9* 150

Key facts

- Average of 445 new cases per year, 1994-96: 177 in females, 268 in males.
- Average of 441 deaths per year: 175 in females, 266 in males.
- Age-standardised incidence and mortality rates about twice as high in males as in females.
- 8th most common site for cancer incidence in males, 13th in females.
- 5th most common cause of cancer deaths in males, 7th in females.
- Higher rates, by about 23%, among females in Republic of Ireland (RoI) than in Northern Ireland (NI).
- Higher rates, by about 33%, among males in urban compared with other populations.
- Rates higher than EU average for both sexes (almost three times as high as EU average for females).

Summary statistics

Table 3.1

Incidence 1994-96

On average each year, 177 new cases of malignant oesophageal cancer were diagnosed in females, 268 in males, in Ireland as a whole. Oesophagus was the 8th most common cancer site in females, and 13th most common in females. European-age-standardised rates were significantly higher among males than females, by about 111% (95% confidence limits 87-137%). On average, females were estimated to have a 1-in-240 chance of developing this cancer by age 74, males a 1-in-103 chance.

Mortality 1994-96

Annual averages of 175 deaths among females and 266 deaths among males were attributed to oesophageal cancer: almost exactly one death for every incident case (reflecting poor survival rates). This was the fifth most common cause of cancer deaths in males, seventh most common in females. Mortality rates (EASRs) were significantly higher in males than females, by about 115% (95% confidence limits 91-142%). On average, females were estimated to have a 1-in-260 chance, males a 1-in-111 chance, of dying from this cancer by age 74.

Table 3.1 Summary statistics, all Ireland 1994-96: malignant cancer of the oesophagus

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	177	268	175	266
% of total	3.5	4.6	3.4	4.5
Cumulative risk (0-74 yrs) %	0.41	0.97	0.39	0.90
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	6.7	10.3	6.6	10.2
World age-standardised rate	3.7 ±0.3	8.1 ±0.6	3.5 ±0.3	7.8 ±0.6
European age-standardised rate	5.8 ±0.5	12.1 ±0.8	5.5 ±0.5	11.9 ±0.8
Mortality/incidence ratio	0.99	0.99		

Age profile

Figure 3.1

No cases of oesophageal cancer were diagnosed before age 25, and only 1% of all cases were in patients under 35. Rates increased markedly from about age 45/50, and peaked at 80 years and over. For all age-classes, rates were markedly higher among males than females (generally at least a two-fold difference). Patterns were broadly similar between NI and RoI, with small sample sizes (numbers of cases) possibly accounting for some variation in patterns from age 75 onwards. Median age at diagnosis was 74 years for females overall (equal in NI and RoI), and 68 years for males (67 in NI, 69 in RoI).

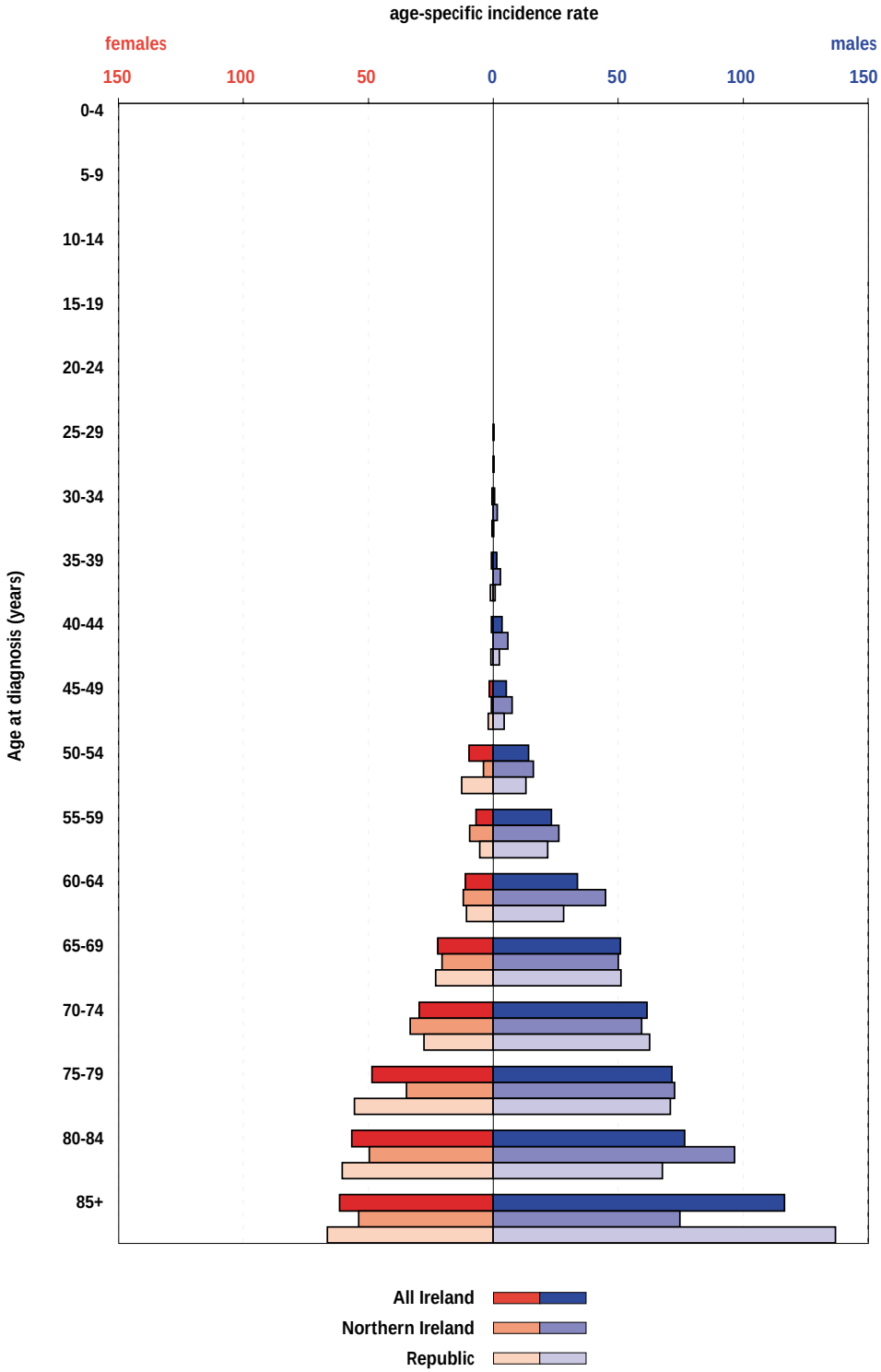


Figure 3.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the oesophagus.

Table 3.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the oesophagus

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	5.8	6.6	5.5	12.1	15.0 **	11.3
	±95% confidence limits	0.5	1.1	0.6	0.8	2.0	0.9
NI	EASR	5.0	4.9	5.1	13.2	17.5 **	11.6
	±95% confidence limits	0.8	1.4	1.0	1.5	3.5	1.7
		*	*			*	
RoI	EASR	6.1	7.7 *	5.7	11.7	13.6 *	11.2
	±95% confidence limits	0.7	1.5	0.7	1.0	2.5	1.1

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 3.2, Figure 3.2

NI v. RoI

Among females, overall incidence rates were significantly higher in RoI than NI, by about 23% (95% confidence interval 2-48%), with RoI also higher than NI rates in urban populations. Among males, overall rates did not differ significantly, but rates in urban populations were significantly higher in NI than RoI (the opposite of the pattern for females).

Urban v. other populations

Among males, rates of oesophageal cancer were significantly higher in urban than in other populations, by an estimated 33% (95% confidence interval 12-58%) for Ireland as a whole. Significantly higher urban rates were also seen for males at NI and RoI scales. Among females, only RoI showed a significantly higher rate in urban populations, with no difference apparent from NI data.

Regional comparisons

Incidence rates of oesophageal cancer in women were significantly high in RoI Eastern area compared with the rest of Ireland, but other regional variation was not statistically significant. Among males, rates were significantly high in RoI Southern area (excluding Cork city) in comparison with other "non-urban" populations.

Geographical variation in incidence rates: international

Table 3.3, Figure 3.3

Rates of oesophageal cancer in Ireland were much higher than the EU average for females, and also substantially higher than the EU average for males. The rates were similar to estimates for England/Wales, but lower than Scottish figures. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that, among females, RoI had the highest recorded rate of oesophageal cancer of EU member states, while the UK had the second highest rate. Among males, RoI had the third highest recorded rate in the EU in 1995 (UK 2nd highest rate). A notable feature of oesophageal cancer rates in Britain and Ireland is the much lower (two-fold) male/female ratio than for the EU as a whole. Average rates for males in the EU are over four times as high as rates for females, while in France and Spain there is a ten-fold difference between the sexes.

It is possible that variation in coding of cancer of the cardia (gastro-oesophageal junction, normally coded to stomach, ICD-10 C16) may contribute in part to the geographical patterns seen for cancer of the oesophagus.

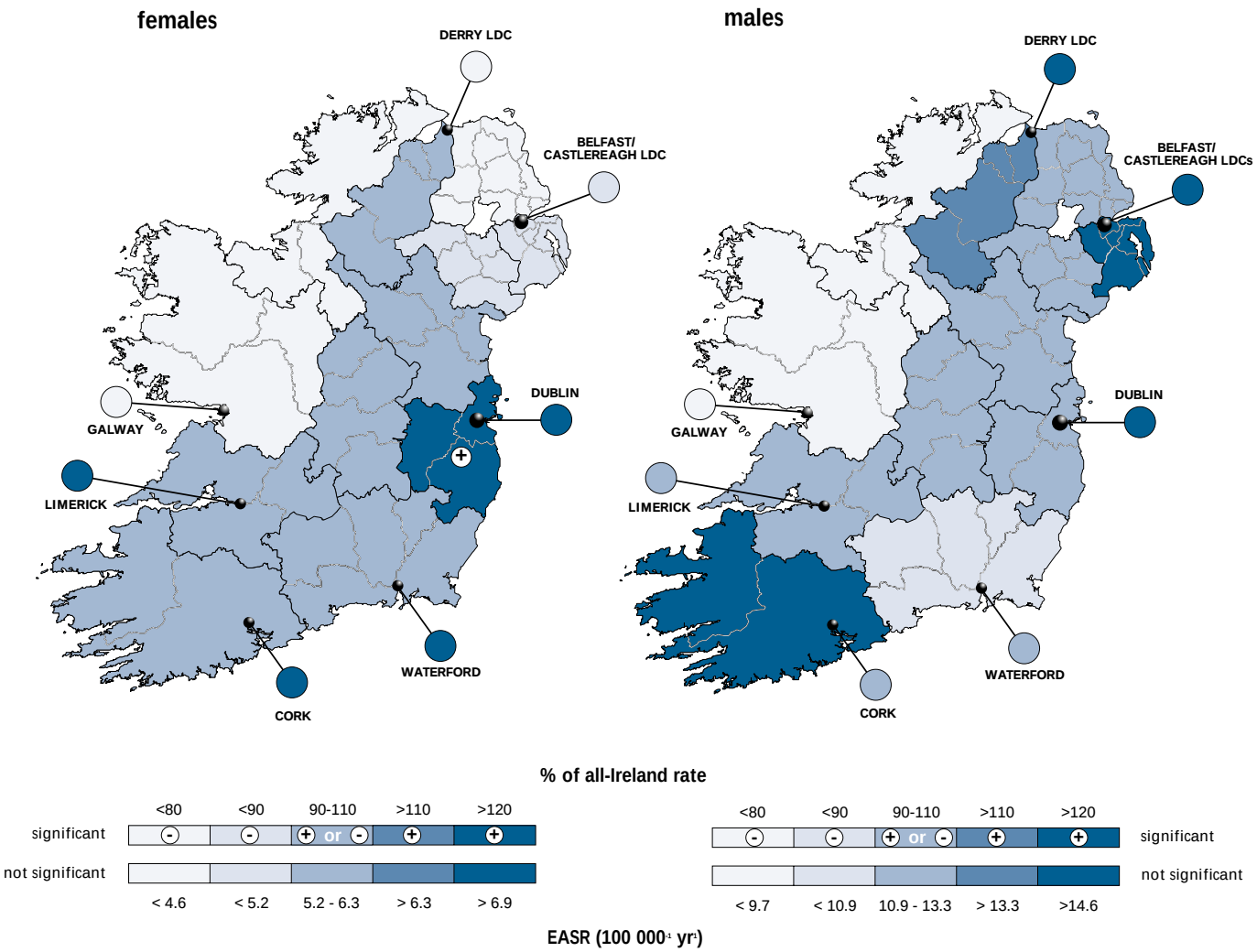


Figure 3.2 Age-standardised incidence rates (as % of all-Ireland rate) by health-board areas, 1994-96: malignant cancer of the oesophagus.
Rates within cities are included within health-board rates and also indicated separately. Rates significantly different from the rest of Ireland are indicated.

Table 3.3 International comparison of reported incidence rates for malignant cancer of the oesophagus (European age-standardised rates per 100 000 per year).

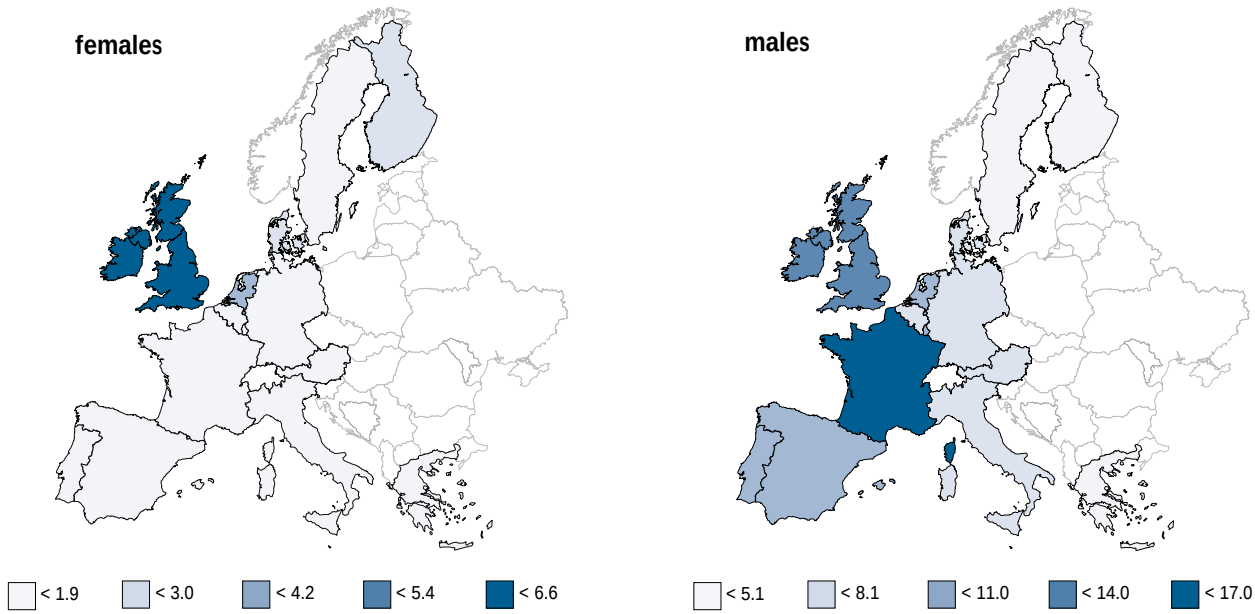
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**5.8**	**12.1**
Northern Ireland[1]	5.0	13.2
*Republic of Ireland[1]	*6.1	11.7
Scotland[2]	8.5	17.5
England & Wales[3]	5.8	12.5
United Kingdom, incl. NI[4]	5.9	12.9
France (highest EUCAN rate, males)[4]	1.8	17.0
European Union average[4]	2.2	9.5

*RoI = highest EUCAN rate for females, 1995

Figure 3.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant cancer of the oesophagus.

Source: Ferlay *et al.* 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*



Comment: risk factors, early detection, and survival

The risk of oesophageal cancer is greatly increased by tobacco smoking and by excessive alcohol consumption, which between them account for the majority of cases in developed countries. For cigarettes, heavy smoking is associated with a 5- to 10-fold risk (with the risk particularly high for high-tar cigarettes, pipes and cigars). This is likely to contribute to higher rates of oesophageal cancer in urban populations. Strong links to alcoholism have also been demonstrated, with possibly up to a 20-fold risk in the heaviest drinkers. In individuals who both smoke and drink heavily, the combined risk is greater than the sum of the individual risks. The condition known as Barrett's oesophagus (a chronic metaplasia of the lower oesophagus) also increases the risk of oesophageal cancer. A population-based study of Barrett's oesophagus and oesophageal cancer is ongoing in NI. Other (possible) factors involved in oesophageal cancers include dietary deficiencies, dietary contaminants or by-products (notably nitrosamines) and thermal irritation (from hot foodstuffs and drinks). There is convincing evidence that consumption of fresh fruit and vegetables has a protective effect.

Specific symptoms are generally lacking during the early course of oesophageal cancer, and those symptoms that do occur (e.g. a burning sensation) may be shared by benign conditions such as gastro-oesophageal reflux (heartburn). Later symptoms include dysphagia (difficulty or pain in swallowing food), recorded in the majority of patients at diagnosis. Respiratory symptoms may also occur late in the disease's progression. Greater awareness is needed of the possibility of this disease, particularly among high-risk individuals (e.g. smokers). As diagnosis typically does not occur until a late stage, survival prospects are generally poor. European data indicate average five-year relative survival of only 12% in females and 8% in males (Berrino et al. 1999).

Recommendation

Further investigation is needed into the possible factors accounting for disproportionately high rates of oesophageal cancer among women in some parts of Europe (including Ireland).

For health gain

- The population should be encouraged to stop smoking, eat a diet with a high level of fresh fruit and vegetables, moderate alcohol consumption and seek early diagnosis of symptoms.

4. MALIGNANT CANCER OF THE STOMACH

ICD-O.2 C16 *ICD-10* C16 *ICD-9* 151

Key facts

- Average of 731 new cases per year, 1994-96: 268 in females, 463 in males.
- Average of 600 deaths per year: 242 in females, 358 in males.
- Age-standardised incidence and mortality rates about twice as high in males as in females.
- 6th most common site for cancer incidence in males, 7th in females.
- 4th most common cause of cancer deaths in males, 6th in females.
- Higher incidence rate, by about 18%, among males in Northern Ireland (NI) than in the Republic (RoI).
- Higher incidence rates in urban compared with other populations, by about 37% (females), 39% (males).
- All-Ireland incidence rates for both males and females lower than the EU average.

Summary statistics

Table 4.1

Incidence 1994-96

On average each year, 268 new cases of malignant stomach cancer were diagnosed in females, 463 in males, in Ireland as a whole. Stomach was the sixth most common cancer site in males, and seventh most common in females. European-age-standardised rates were significantly higher among males than females, by about 134% (95% confidence limits 113-156%). On average, females were estimated to have a 1-in-150 chance of developing this cancer by age 74, males a 1-in-62 chance.

Mortality 1994-96

Annual averages of 242 deaths among females and 358 deaths among males were attributed to stomach cancer: about 4 deaths for every 5 incident cases. This was the fourth most common cause of cancer deaths in males, sixth in females. Mortality rates (EASRs) were significantly higher in males than females, by about 111% (95% confidence limits 90-133%). On average, females were estimated to have a 1-in-195 chance, males a 1-in-86 chance, of dying from this cancer by age 74.

Table 4.1 Summary statistics, all Ireland 1994-96: malignant cancer of the stomach

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	268	463	242	358
% of total	2.2	3.6	4.7	6.1
Cumulative risk (0-74 yrs) %	0.67	1.6	0.51	1.16
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	10.1	17.8	9.1	13.8
World age-standardised rate	5.8 ±0.5	13.6 ±0.7	4.8 ±0.4	10.3 ±0.6
European age-standardised rate	8.8 ±0.6	20.5 ±1.1	7.6 ±0.6	16.0 ±1.0
Mortality/incidence ratio	0.90	0.77		

Age profile

Figure 4.1

Only about 1% of stomach cancer cases were in patients below age 35, but rates increased markedly from middle age onwards. This increase in age-specific rates was sustained and produced a peak in incidence rates in the very oldest age-classes (80 years and over) for both sexes. From age 40 onwards, rates were consistently, and markedly, higher in males than in females. The age profile for incidence rates was similar in NI and RoI, but NI rates for males were consistently higher than RoI rates from age 40 onwards. Median age at diagnosis was 73 years for females and 70 years for males, with no difference between NI and RoI.

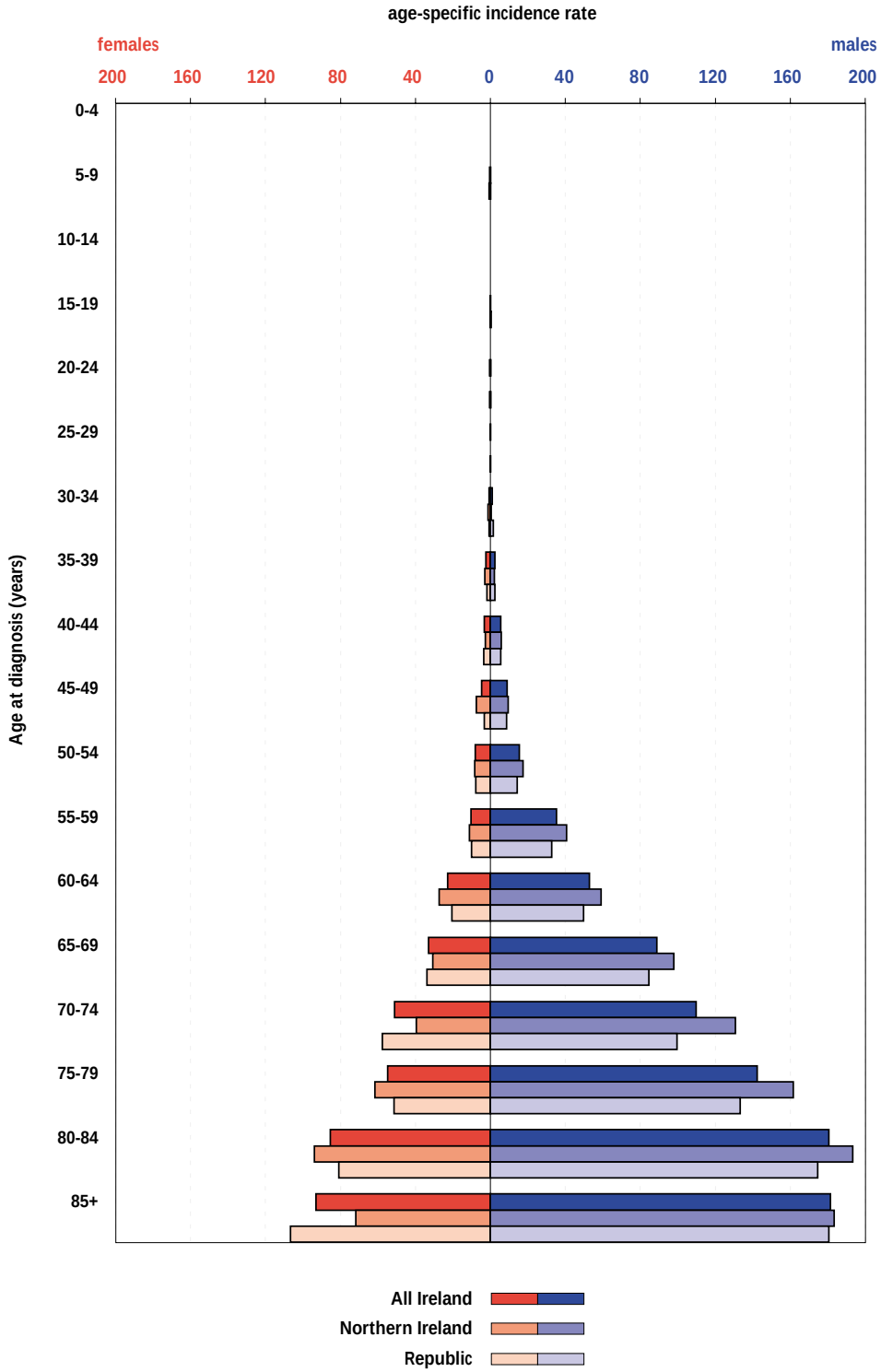


Figure 4.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the stomach.

Table 4.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the stomach

		females				males			
		all	urban		non-urban	all	urban		non-urban
All-Ireland	EASR	8.8	10.9	**	8.0	20.5	26.2	**	18.8
	±95% confidence limits	0.6	1.4		0.7	1.1	2.6		1.2
NI	EASR	8.9	10.3		8.3	22.8	26.9	**	21.3
	±95% confidence limits	1.1	2.2		1.3	2.0	4.2		2.3
						*			
RoI	EASR	8.7	11.4	**	7.9	19.4	25.8	**	17.8
	±95% confidence limits	0.8	1.8		0.9	1.3	3.3		1.4

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in rates: within Ireland

Table 4.2, Figure 4.2

NI v. RoI

Incidence rates among males were significantly higher, by about 18% (95% confidence limits 5-32%), in NI than in RoI. There was no significant difference for females.

Urban v. other populations

Stomach cancer rates were highest in urban populations, at All-Ireland, NI and RoI scales (statistically significant for all comparisons except NI females). Overall, rates were about 37% (95% confidence limits 16-61%) higher in urban females, 39% (95% confidence limits 23-59%) higher in urban males. The same pattern was evident for males in all seven health-board regions with urban (city) populations, although the difference was significant only in RoI Eastern area. The pattern for females varied between regions, but RoI Eastern region again had a significantly high urban rate.

Regional comparisons

For females, there was little significant regional variation in incidence rates, but rates in RoI North Eastern region and Dublin city were significantly higher than elsewhere in Ireland. (Dublin city also had significantly higher rates among women than other urban populations.) Regional variations were more evident in males, although in part this may reflect greater statistical confidence based on the larger numbers of cases in males. Rates were significantly high among males in Belfast city and RoI Eastern region (including Dublin city), and significantly low in RoI Mid Western, RoI Western and RoI Southern region outside of Cork city.

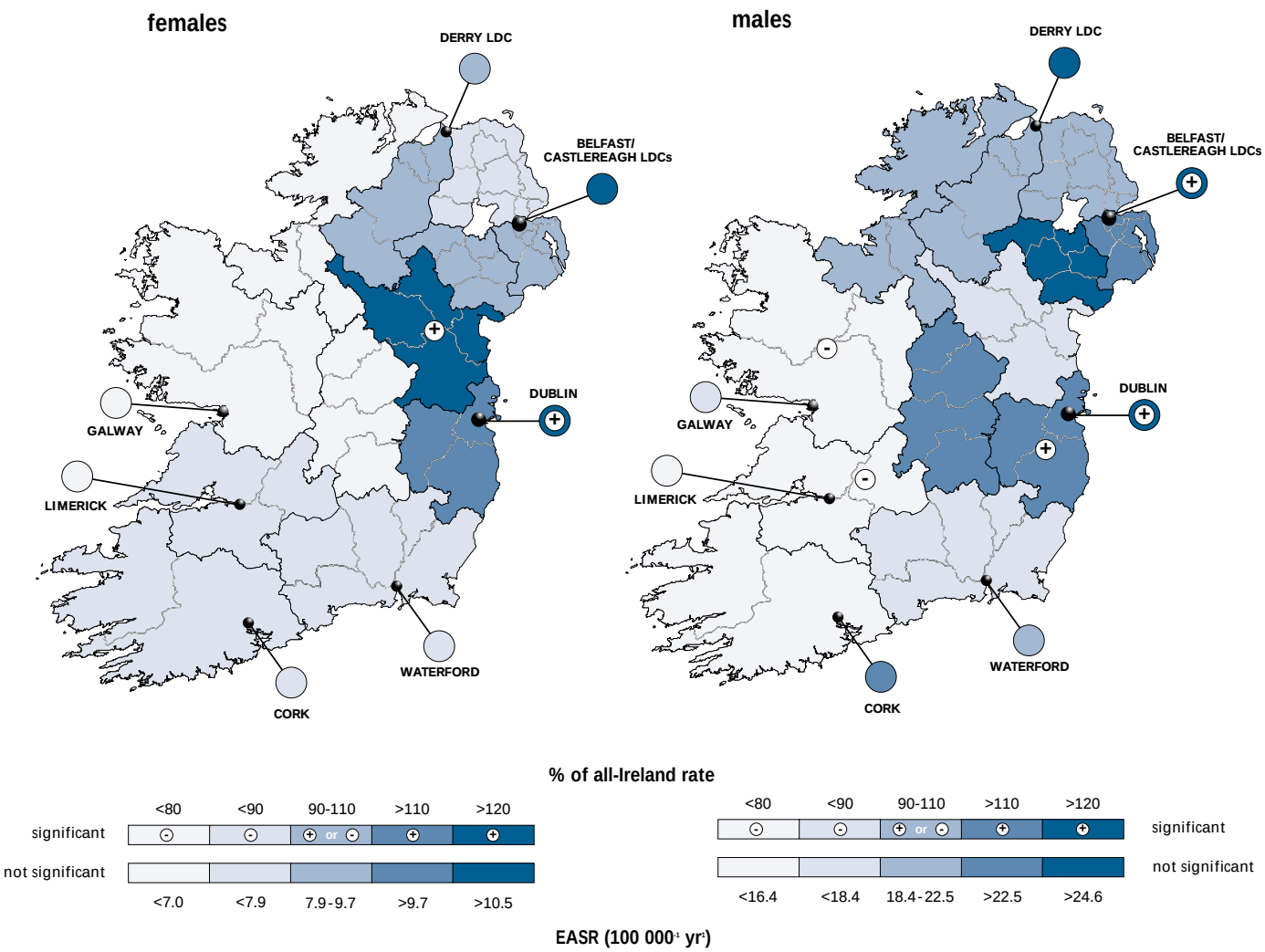


Figure 4.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: malignant cancer of the stomach.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 4.3, Figure 4.3

Rates of stomach cancer in Ireland were higher than in England/Wales for females, but broadly similar for males (higher in NI). Rates were generally lower than in Scotland, with the exception of the similar rate in NI males. Within the EU, All-Ireland rates were lower than the EU averages for both sexes. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that RoI females had the 7th highest recorded rate of stomach cancer of 15 EU member states, while the UK had the 12th highest rate. For males, rates for RoI were the 9th, for the UK the 8th highest recorded in the EU.

Table 4.3 International comparison of incidence rates for malignant cancer of the stomach (European age-standardised rates per 100 000 per year).
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**8.8**	**20.5**
Northern Ireland[1]	8.9	22.8
Republic of Ireland[1]	8.7	19.4
Scotland[2]	10.4	22.9
England & Wales[3]	7.9	21.0
United Kingdom, incl. NI[4]	8.2	19.8
Portugal (highest EUCAN rates)[4]	20.9	44.3
European Union average[4]	11.2	23.4

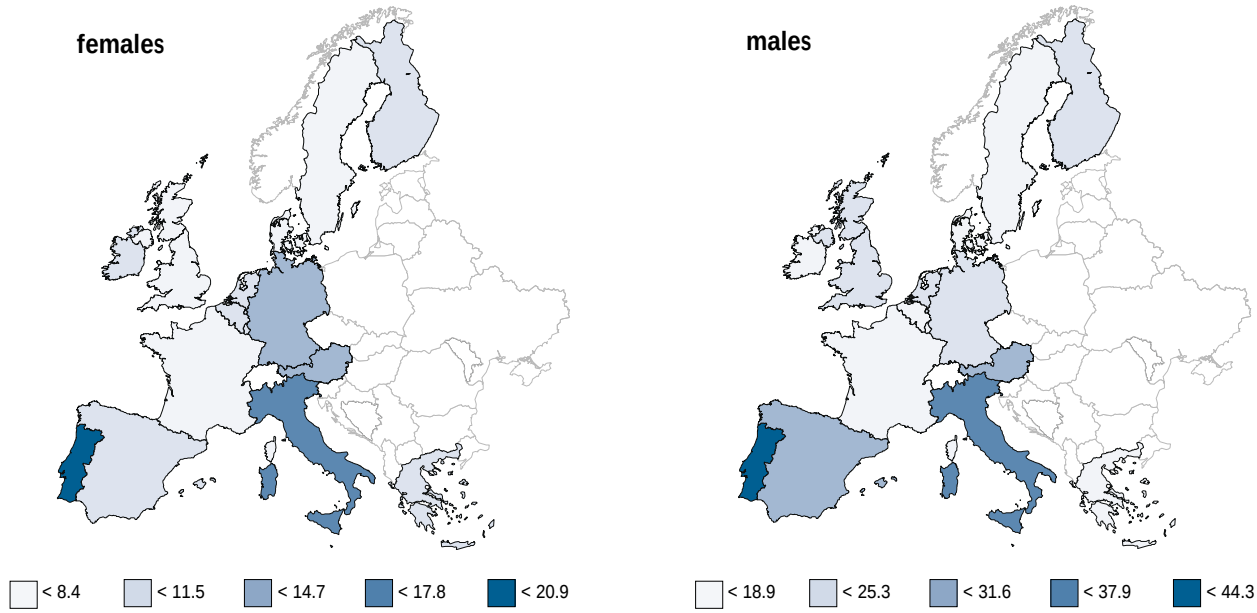


Figure 4.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant cancer of the stomach.

Source: Ferlay *et al*. 1999. EUCAN. *Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

Dietary factors are believed to play an important role in this cancer. There is convincing evidence that consumption of vegetables and fruit decreases risk, while consumption of salted food probably increases risk. Decreases in mortality rates from stomach cancer in western countries have been associated (at least in part) with improvements in food-preservation (in particular, availability of refrigeration as an alternative to salting). Grilling or barbecuing of meat and fish possibly increase risk. Alcohol consumption possibly increases the risk of cancer of, specifically, the gastric cardia (gastro-oesophageal junction). Evidence for an influence of other dietary factors is either considered insufficient or no relationship to risk has been found. Infection by the bacterium *Helicobacter pylori* has been found to increase the risk of stomach cancer. Chronic atrophic gastritis (which often progresses to a gastric ulcer) increases the risk of stomach cancer, and can arise as a result of *Helicobacter* infection or excessive salt intake. Cigarette smoking is considered a further likely risk factor for stomach cancer.

Gastric cancers detected at an early stage have, on average, a much better prognosis than 'late' gastric cancers (with invasion of the muscularis layer). Early detection can be difficult, although radiological screening of high-risk populations (notably in Japan) may be practicable. Where incidence of stomach cancer is low, targeted endoscopic screening of older individuals presenting with dyspepsia (indigestion symptoms) may increase detection rates for early cancers. The great majority of stomach cancers are still detected at a late stage, and five-year relative survival rates are accordingly low: on average, about 24% in females and 21% in males for Europe as a whole (Berrino *et al*. 1999).

For health gain

- The population should be encouraged to eat a diet with a high content of fresh fruit and vegetables and seek an early diagnosis of symptoms.
- Further research into the pathogenesis and prevention of *Helicobacter pylori* infection should be encouraged.

5. MALIGNANT COLORECTAL CANCER

ICD-O.2 C18-C21 *ICD-10* C18-C21 *ICD-9* 153-154

This combination of sites includes the colon (ICD-10 code C18), rectosigmoid junction (C19), rectum (C20), anus and anal canal (C21). See Chapters 6 (colon) and 7 (anorectal cancer) for further details. As assignment of cases, and particularly, deaths between rectum and distal colon may be unreliable, combined colorectal data are preferable for international comparisons.

Key facts

- Average of 2624 new cases per year, 1994-96: 1185 in females, 1439 in males.
- Average of 1369 deaths per year: 630 in females, 739 in males.
- Age-standardised rates higher in males than females, by about 57% (incidence), 64% (mortality).
- Higher incidence rates among females in Northern Ireland (NI) than in the Republic (RoI), by about 15%.
- Higher incidence rates in urban compared with other populations of males, by about 17% overall.
- All-Ireland incidence rates for both sexes higher than EU average, for males the highest reported in the EU.

Summary statistics

Table 5.1

Incidence 1994-96

On average each year, 1185 new cases of malignant colorectal cancer were diagnosed in females, 1439 in males, in Ireland as a whole. European-age-standardised rates were significantly higher among males than females, by about 57% (95% confidence limits 50-64%). On average, females were estimated to have a 1-in-32 chance of developing one of these cancers by age 74, males a 1-in-20 chance. Median age at diagnosis was 72 years for females and 69 years for males.

Mortality 1994-96

Annual averages of 630 deaths among females and 739 deaths among males were attributed to colorectal cancer: just over 5 deaths for every 10 incident cases. Mortality rates (EASRs) were significantly higher in males than females, by about 64% (95% confidence limits 54-85%). On average, females were estimated to have a 1-in-73 chance, males a 1-in-42 chance, of dying from this cancer by age 74.

Table 5.1 Summary statistics, all Ireland 1994-96: malignant colorectal cancer

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	1185	1439	630	739
% of total	9.7	11.1	12.3	12.6
Cumulative risk (0-74 yrs) %	3.2	5.1	1.4	2.4
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	44.6	55.4	23.7	28.5
World age-standardised rate	27.4 ±1.0	42.9 ±1.3	12.8 ±0.7	21.3 ±0.9
European age-standardised rate	40.9 ±1.4	64.2 ±1.9	20.0 ±1.0	32.9 ±1.4
Mortality/incidence ratio	0.53	0.51		

Table 5.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant colorectal cancer

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	40.9	42.3	40.4	64.2	72.5 **	61.9
	±95% confidence limits	1.4	2.8	1.6	1.9	4.4	2.2
NI	EASR	44.6	44.0	44.9	65.9	71.0	64.2
	±95% confidence limits	2.5	4.6	3.0	3.5	7.0	4.0
		**		**			
RoI	EASR	38.9	41.3	38.2	63.5	73.2 **	60.9
	±95% confidence limits	1.7	3.6	1.9	2.4	5.6	2.6

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 5.2

NI v. RoI

Rates of colorectal cancer among females were significantly higher in NI than in RoI, by about 15% (95% confidence limits 7-23%) overall. Urban and non-urban subpopulations showed the same pattern, statistically significant for non-urban females. Rates did not differ significantly between NI and RoI for males.

Urban v. other populations

For males, rates were significantly higher in urban than in other populations, by about 17% (95% confidence limits 9-26%) overall. This difference was also significant for males in RoI, but not NI (although the same pattern was apparent). Females showed no significant differences in rates between urban and other populations.

Geographical variation in incidence rates: international

Table 5.3, Figure 5.1

Rates of colorectal cancer in Ireland were above average for the EU, higher than estimates for England/Wales, and similar to or slightly less than Scottish rates. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that, among males, RoI had the highest rate of colorectal cancer of 15 EU member states, while the UK had the tenth highest rate. Among females, RoI had the third highest rate in the EU in 1995, UK the ninth highest rate.

Table 5.3 International comparison of incidence rates for malignant colorectal cancer (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**40.9**	**64.2**
Northern Ireland[1]	44.6	65.9
*Republic of Ireland[1]	38.9	*63.5
Scotland[2]	43.9	64.7
England & Wales[3]	35.3	52.3
United Kingdom, incl. NI[4]	35.0	51.1
Denmark (highest EUCAN rate, females)[4]	43.2	57.5
European Union average[4]	35.0	51.1

*RoI = highest EUCAN rate for males, 1995

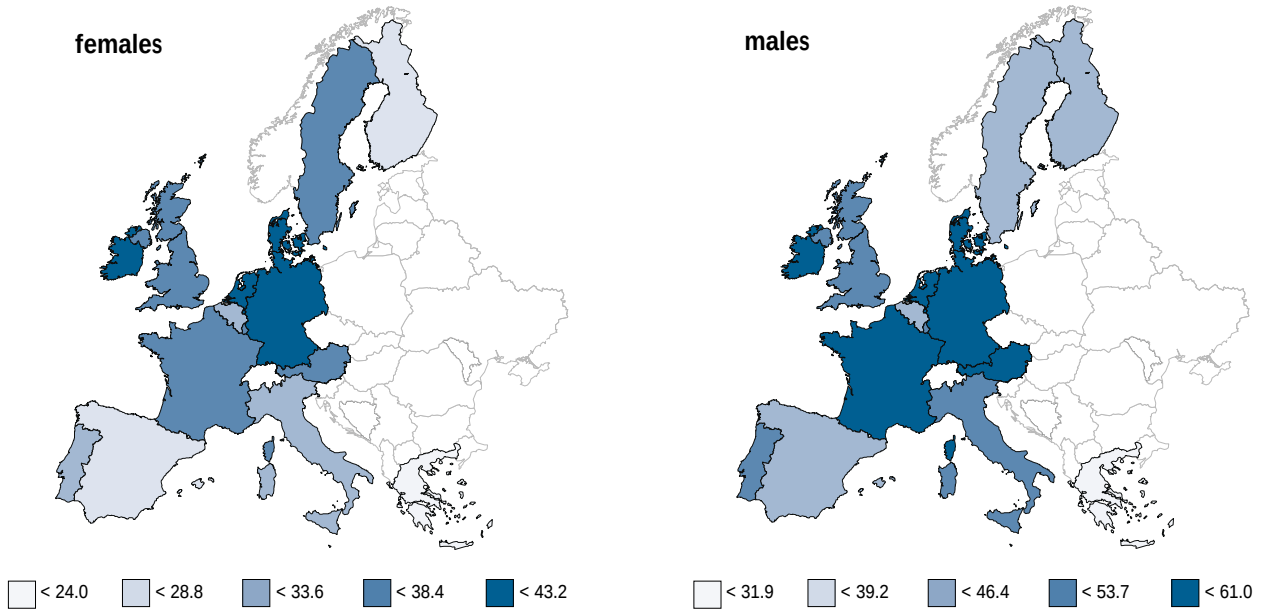


Figure 5.1 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant colorectal cancer.
Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union*.

Comment: risk factors, early detection and survival

Risk factors for colorectal cancer as a whole include a strong familio-genetic component in some patients, through inheritance of specific genes. Familial adenomatous polyposis, and hereditary non-polyposis colon cancer, are two of the more important such conditions. Overall, however, dietary and related factors, are believed to be particularly important. There is strong evidence that consumption of vegetables has a protective effect against colorectal cancer as a whole. The apparent protective effect of dietary fibre against colorectal cancer relates primarily to vegetables and, perhaps, fruit rather than cereals. This possibly indicates that other components of vegetables (rather than fibre itself) are of particular importance (e.g. possibly carotenoids). Increased physical activity probably decreases the risk of colon cancer (in particular). Consumption of red meat and of alcohol probably increase the risk of colorectal cancer, while a range of other factors (including high fat consumption) possibly increase risk. A number of chronic diseases, including chronic inflammatory bowel disease (ulcerative colitis), are also believed to contribute to the risk of colorectal cancer. Probably related to this, non-steroidal anti-inflammatory drugs such as aspirin appear to have a protective effect. There is strong evidence that human papilloma virus plays an important role in the aetiology of anal cancer, in combination with cofactors such as smoking and infection with herpes simplex virus.

Most colorectal cancers arise, through a multi-step process, from pre-existing, benign adenomas, although most people with colorectal adenomas do not show obvious symptoms and do not progress to malignant cancer. Early symptoms of colorectal cancer usually include a change in bowel habits and bleeding (sometimes only evident through associated anaemia). Pain, weight loss and systemic symptoms other than anaemia are usually associated with late stages; obstruction or perforation of the bowel may occur. Colorectal cancers are, on average, detected earlier than cancers of the upper digestive tract, where early symptoms are generally less obvious. A number of potential screening options (including faecal occult blood tests) are under study. Colonoscopy, digital rectal examination and barium enema are routinely used in higher-risk individuals (e.g. those with a family history of colorectal cancer, or with long-term ulcerative colitis), in addition to their use in symptomatic patients.

Estimated five-year relative survival rates (from diagnosis date) are broadly similar for colon (about 48% for both sexes) and anorectal cancers (about 44%), based on European data (Berrino *et al*. 1999).

Recommendations

Further research is needed into the factors behind the very high rates of colorectal cancer in Ireland relative to Europe as a whole.

For health gain

- The population should eat a high fibre, lower fat diet, consuming five portions of fruit or vegetables per day.
- There should be increased awareness that changes in bowel habit, weight loss or passing blood require urgent investigations.
- Those with a family history, especially of a young relative with cancer of the colon, should contact specialists about the advisability of regular surveillance.

6. MALIGNANT CANCER OF THE COLON

ICD-O.2 C18 *ICD-10* C18 *ICD-9* 153

This site includes the colon, from caecum and appendix to sigmoid colon, but excludes the rectosigmoid junction and overlapping tumours of colon and rectum. See also Chapters 5 (colorectal cancer, including all sites from colon to anus) and 7 (anorectal cancer).

Key facts

- Average of 1702 new cases per year, 1994-96: 826 in females, 876 in males.
- Average of 1025 deaths per year: 490 in females, 535 in males.
- Age-standardised rates higher in males than females, by about 38% (incidence), about 51% (mortality).
- 3rd most common site for cancer incidence in females, 4th most common in males.
- 3rd most common cause of cancer deaths in both sexes.
- Higher incidence rates in Northern Ireland (NI) than in the Republic (RoI), by about 15% in females and 11% in males.
- In males, higher overall incidence rate, by about 16%, in urban compared with other populations.

Summary statistics

Table 6.1

Incidence 1994-96

On average each year, 826 new cases of malignant colon cancer were diagnosed in females, 876 in males, in Ireland as a whole. Colon was the third most common cancer site in females (after skin and breast), and fourth most common in males (after skin, prostate and lung). European-age-standardised rates were significantly higher among males than females, by about 38% (95% confidence limits 30-46%). On average, females were estimated to have a 1-in-45 chance of developing this cancer by age 74, males a 1-in-32 chance.

Mortality 1994-96

Annual averages of 490 deaths among females and 535 deaths among males were attributed to colon cancer: about 3 deaths for every 5 incident cases. This was the third most common cause of cancer deaths in both sexes. Mortality rates (EASRs) were significantly higher in males than females, by about 52% (95% confidence limits 41-64%). On average, females were estimated to have a 1-in-93 chance, males a 1-in-59 chance, of dying from this cancer by age 74.

Table 6.1 Summary statistics, all Ireland 1994-96: malignant cancer of the colon

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	826	876	490	535
% of total	6.7	6.8	9.6	9.1
Cumulative risk (0-74 yrs) %	2.2	3.1	1.1	1.7
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	31.0	33.7	18.4	20.6
World age-standardised rate	18.9 ±0.8	25.9 ±1.0	10.0 ±0.6	15.3 ±0.8
European age-standardised rate	28.3 ±1.2	39.0 ±1.5	15.6 ±0.8	23.7 ±1.2
Mortality/incidence ratio	0.59	0.61		

Age profile

Figure 6.1

Colon cancer was very rarely found in individuals below age 35 (<1% of all cases). From middle age onwards, incidence rates increased markedly in both sexes, to reach a peak in the very oldest age-classes (80 years onwards). Patterns were similar for NI and RoI, although rates were higher for NI especially in the older age-classes. Incidence rates initially showed little difference between the sexes but from about age 60 onwards rates were consistently, and markedly, higher in males. Nevertheless, more than half of all colon cancers diagnosed from age 70 onwards were in women, reflecting the older age-profile of the female population. Median age at diagnosis was 72 years for females and 70 years for males (70 in NI, 69 in RoI).

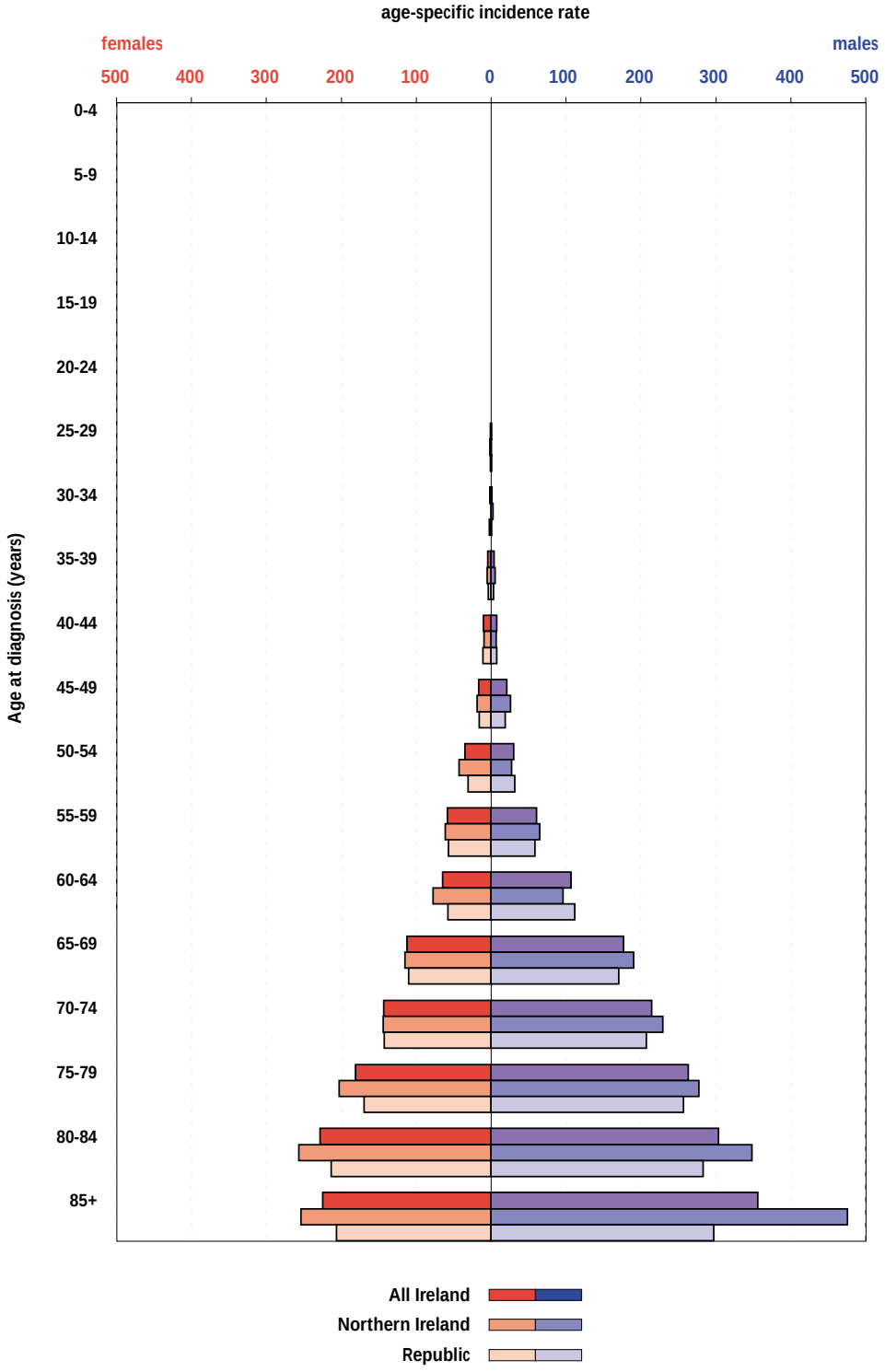


Figure 6.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the colon.

Table 6.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the colon

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	28.3	29.0	28.1	39.0	43.8 **	37.7
	±95% confidence limits	1.2	2.3	1.4	1.5	3.4	1.7
NI	EASR	30.9	29.7	31.5	41.9	46.1	40.6
	±95% confidence limits	2.1	3.8	2.5	2.8	5.7	3.2
		**		**	**		*
RoI	EASR	26.3	28.7	26.4	37.7	42.1 **	36.5
	±95% confidence limits	1.4	3.0	1.6	1.8	4.3	2.0

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 6.2, Figure 6.2

NI v. RoI

Rates of colon cancer were significantly higher in NI than in RoI over the period 1994-96 as a whole, in both females and males, by an estimated 15% (95% confidence limits 5-25%) and 11% (2-21%), respectively. Urban and non-urban subsets of the data showed the same general pattern, although the difference was not statistically significant for urban populations.

Urban v. other populations

Colon cancer rates in males were significantly higher in urban populations, for Ireland as a whole (by about 16%, 95% confidence limits 6-27%) and for RoI. Females in RoI and males in NI showed similar patterns, but the differences were not statistically significant. At the scale of health boards, rates were significantly higher in the urban parts of NI Western and RoI Western areas (females) and RoI Southern area (males).

Regional comparisons

Colon cancer rates in women were significantly higher in Derry and in NI Northern and RoI North Western health-board areas than elsewhere, and significantly lower than expected in RoI Mid Western area. Rates in men were significantly above expected in Cork city. Rates for males in Limerick city were significantly lower than rates for urban populations elsewhere.

Geographical variation in incidence rates: international

Table 6.3

Colon cancer rates for Irish males were almost as high as in Scotland, and (especially in NI) were well above the estimated rate for England/Wales. Rates for women were not quite as high in relative terms, although NI rates were similar to those for Scotland.

See Chapter 5 (colorectal cancer) for comparisons with other European Union data.

Figure 6.2 Age-standardised incidence (as % of All-Ireland rate) by health-board areas, 1994-96 malignant cancer of the colon.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

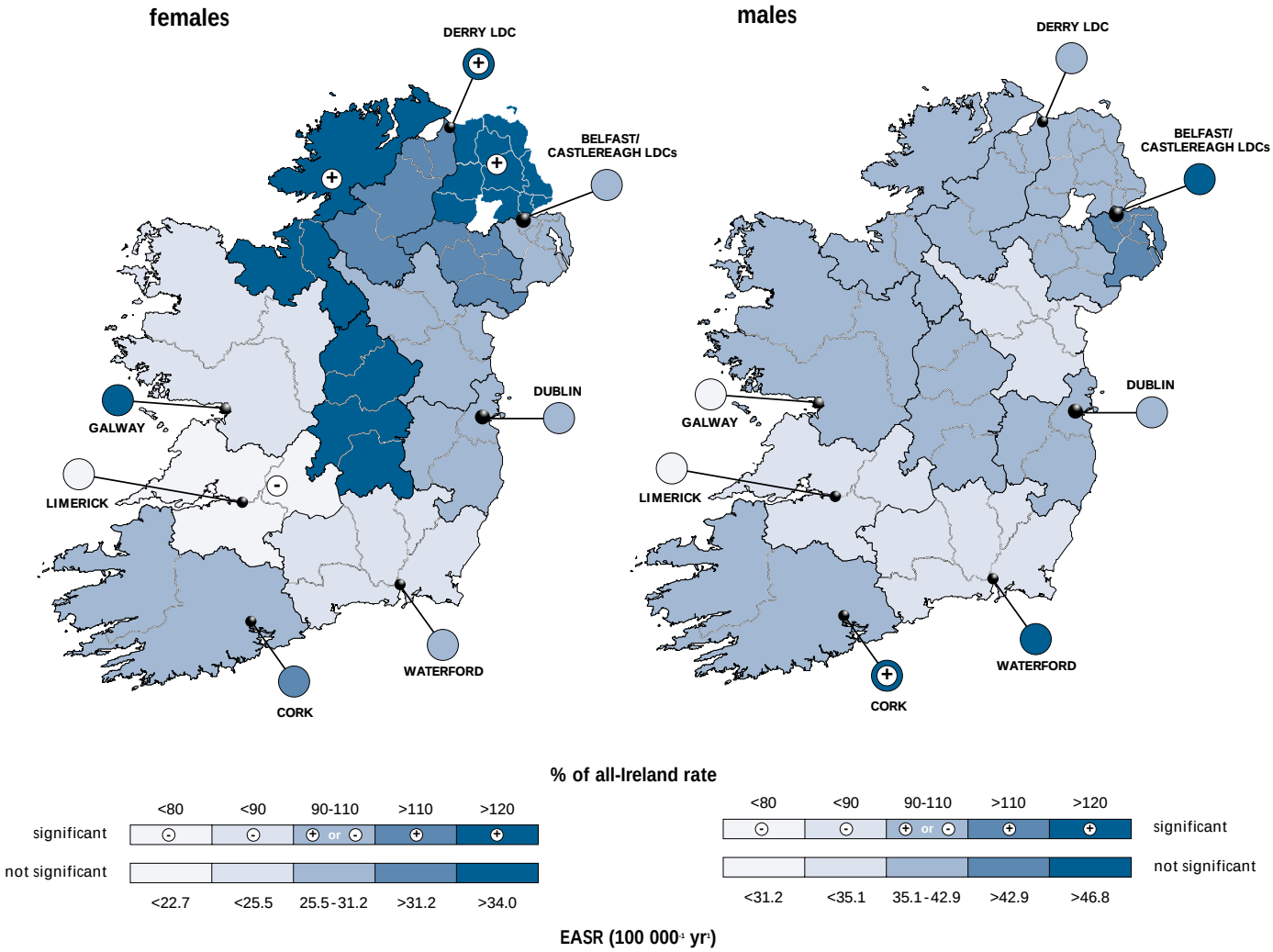


Table 6.3 International comparison of incidence rates for malignant cancer of the colon (European age-standardised rates per 100 000 per year).
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000).

	EASR (females)	EASR (males)
All-Ireland[1]	**28.3**	**39.0**
Northern Ireland[1]	31.0	41.9
Republic of Ireland[1]	26.9	37.7
Scotland[2]	30.8	40.7
England & Wales[3]	23.7	30.8

Comment: risk factors, early detection and survival

See Chapter 5 (colorectal cancer).

7. MALIGNANT CANCER OF THE RECTUM, RECTOSIGMOID JUNCTION AND ANUS

ICD-O.2 C19-C21 *ICD-10* C19-C21 *ICD-9* 154

These cancers are generally referred to as anorectal cancers. See also Chapters 5 (colorectal cancers, including anorectal and colon cancer) and 6 (colon cancer).

Key facts

- Average of 923 new cases per year, 1994-96: 360 in females, 563 in males.
- Average of 344 deaths per year: 139 in females, 205 in males.
- Age-standardised incidence and mortality rates twice as high in males as in females.
- Rectum was the 7th most common cancer site in males, 9th in females, for both incidence and mortality.
- Incidence rate among females about 14% higher in Northern Ireland (NI) than in the Republic (RoI).
- In males, higher incidence rate, by about 20%, in urban compared with other populations.

Summary statistics

Table 7.1

Incidence 1994-96

On average each year, 360 new cases of malignant anorectal cancer were diagnosed in females, 563 in males, in Ireland as a whole. Most cases (77%) were cancer of the rectum, which was the seventh most common cancer site in males, and ninth most common in females. European-age-standardised rates were significantly higher among males than females, by about 101% (95% confidence limits 85-107%) – a higher male/female disparity than seen for colon cancer. On average, females were estimated to have a 1-in-102 chance of developing this cancer by age 74, males a 1-in-48 chance.

Mortality 1994-96

Annual averages of 139 deaths among females and 205 deaths among males were attributed to anorectal cancer: about 2 deaths for every 5 incident cases. Most cases (77%, as for incidence) were cancer of the rectum, which was the seventh most frequent cause of cancer deaths in males, ninth in females. Mortality rates (EASRs) were significantly higher in males than females, by about 107% (95% confidence limits 81-136%). On average, females were estimated to have a 1-in-340 chance, males a 1-in-145 chance, of dying from this cancer by age 74.

Table 7.1 Summary statistics, all Ireland 1994-96: malignant cancer of the rectum, rectosigmoid junction and anus

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	360	563	139	205
% of total	2.9	4.3	2.7	3.5
Cumulative risk (0-74 yrs) %	1.0	2.1	0.30	0.69
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	13.5	21.7	5.2	7.9
World age-standardised rate	8.5 ±0.6	17.0 ±0.8	2.8 ±0.3	6.0 ±0.5
European age-standardised rate	12.6 ±0.8	25.2 ±1.2	4.4 ±0.5	9.2 ±0.7
Mortality/incidence ratio	0.39	0.36		

Age profile

Anorectal cancer showed a similar age-profile to that for colon cancer, with a rapid rise in incidence rates from middle-age onwards and a peak in the oldest age-classes. As with colon cancer, rates were higher in NI than RoI for older females. Median age at diagnosis was 72 years for females overall (73 in NI, 70 in RoI), and 69 years for males.

Table 7.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the rectum, rectosigmoid junction and anus

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	12.6	13.3	12.3	25.2	28.7 **	24.1
	±95% confidence limits	0.8	1.6	0.9	1.2	2.7	1.4
NI	EASR	13.7	14.3	13.4	24.0	24.9	23.7
	±95% confidence limits	1.4	2.6	1.6	2.1	4.1	2.4
		*				*	
RoI	EASR	12.0	12.6	11.8	25.8	31.2 **	24.4
	±95% confidence limits	1.0	2.0	1.1	1.5	3.7	1.6

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 7.2, Figure 7.2

NI v. RoI

Rates of anorectal cancer among females were significantly higher in NI than in RoI (consistent with higher rates of colon cancer among NI females), by an estimated 14% overall (95% confidence limits 1-31%). Males showed no significant overall difference between NI and RoI, but rates among urban populations of males were significantly higher in RoI than NI (opposite to the pattern in females).

Urban v. other populations

Anorectal cancer rates were significantly higher in urban than in non-urban populations of males, by about 19% (95% confidence limits 6-34%) overall. Urban rates were also significantly high for males in RoI. No significant differences were evident for females.

Regional comparisons

Incidence rates in women showed no significant regional variation. Among males, rates were significantly high in Cork city and in RoI Eastern area (especially Dublin city). Regional patterns of variation did not correspond very closely to those shown by colon cancer, apart from high rates of both categories of cancer in Cork city.

Geographical variation in incidence rates: international

Table 7.3

All-Ireland rates of anorectal cancer in men were intermediate between estimated rates for England/Wales and Scotland. Rates among women also were higher than in Scotland and, especially, England/Wales.

See Chapter 5 (colorectal cancer) for comparisons with other European Union data.

Figure 7.2 Age-standardised incidence (as % of All-Ireland rate) by health-board areas, 1994-96: malignant cancer of the rectum, rectosigmoid junction and anus.
Rates within cities are included within health-board rates and also indicated separately. Rates significantly different from the rest of Ireland are indicated.

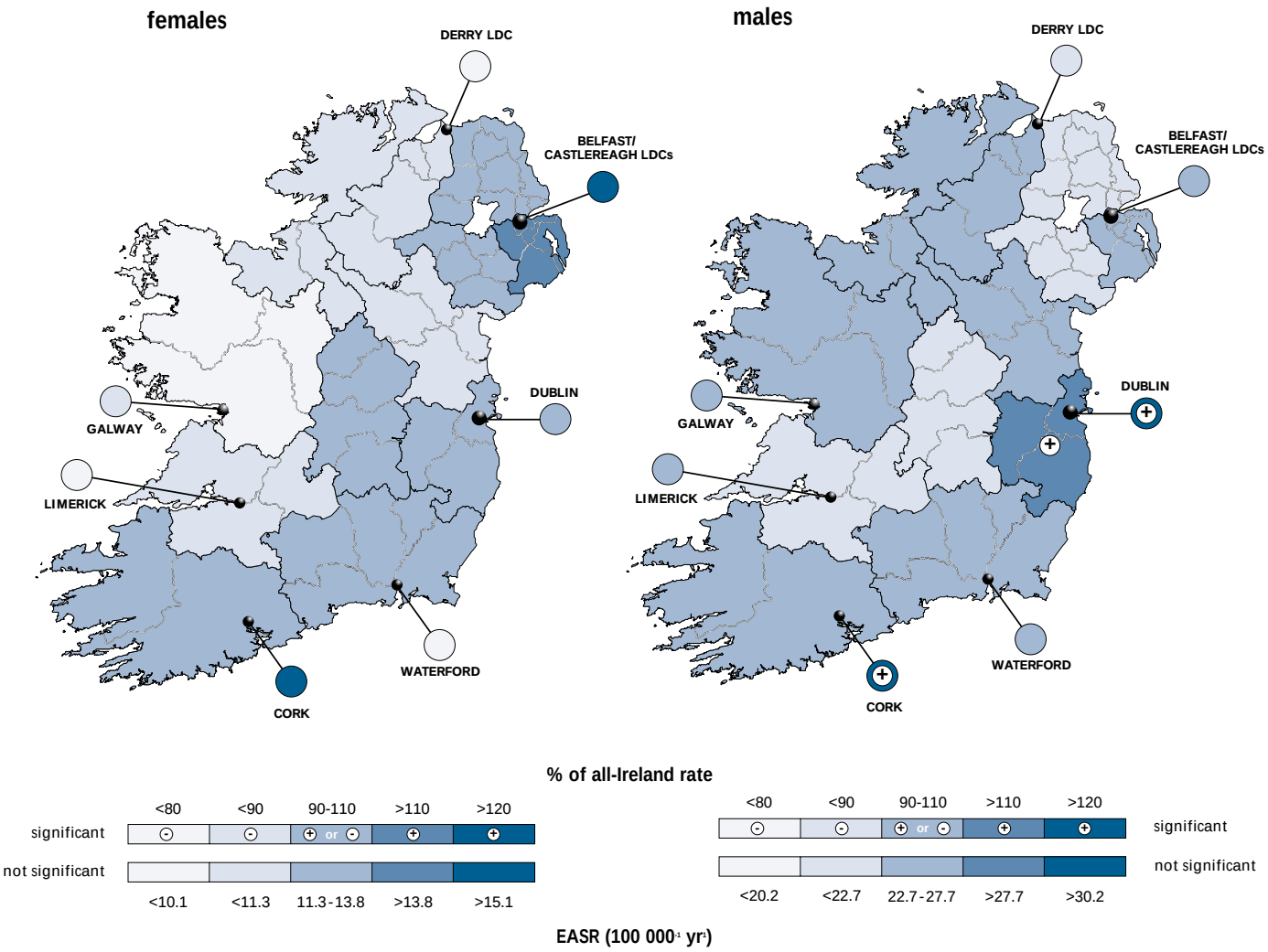


Table 7.3 International comparison of incidence rates for malignant cancer of the rectum, rectosigmoid junction and anus (European age-standardised rates per 100 000 per year).
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000).

	EASR (females)	EASR (males)
All-Ireland[1]	**12.6**	**25.2**
Northern Ireland[1]	13.7	24.0
Republic of Ireland[1]	12.0	25.8
Scotland[2]	13.0	23.9
England & Wales[3]	11.5	21.5

Comment: risk factors, early detection and survival

See under colorectal cancer (Chapter 5).

For health gain

- The population should eat a high fibre, low fat diet, consuming five portions of fruit or vegetables per day.
- There should be increased awareness that changes in bowel habit, weight loss or passing blood require urgent investigations.

8. MALIGNANT CANCER OF THE LIVER AND INTRAHEPATIC BILE DUCTS (summary)

ICD-O.2 C22 *ICD-10* C22 *ICD-9* 155

Key facts

- Average of 113 new cases per year, 1994-96: 43 cases in females, 70 in males.
- Average of 192 deaths per year: 80 in females, 112 in males.
- Age-standardised incidence and mortality rates about twice as high in males as in females.
- 11th most common cause of cancer deaths in males, 12th in males.
- Incidence rates in Northern Ireland (NI) about 130% higher for females, 50% for males, than the Republic (RoI).
- Incidence rates well below EU 1995 averages.

Summary statistics

Table 8.1

Incidence 1994-96

Primary, malignant cancer of the liver and intrahepatic bile ducts is uncommon. On average each year, 43 new cases were diagnosed in females and 70 in males, in Ireland. European-age-standardised rates were significantly higher among males than females, by about 122% (95% confidence limits 76-180%). On average, females were estimated to have a 1-in-860 chance of developing this cancer by age 74, males a 1-in-400 chance. Median age at diagnosis was 73 years for females and 68 years for males.

Recorded rates of malignant liver cancer (per 100 000 per year) were significantly higher (P<0.01) in Northern Ireland (NI) than the Republic (RoI), by about 133% (95% confidence limits 56-248%) for females, 51% (12-104%) for males. Possible variation in diagnosis or coding practices (relating to primary v. secondary or unspecified liver tumours) may contribute to these differences.

Mortality 1994-96

Annual averages of 80 deaths among females and 112 deaths among males were attributed to liver cancer: about 5 deaths for every 3 incident cases. This marked excess of deaths over new cases suggests that the mortality data may include a substantial proportion of unrecognised secondary tumours and that liver cancer mortality data, in general, are unreliable. Poor average survival rates also contribute to the high M/I ratio. Liver cancer was the 11th most common reported cause of cancer deaths in males, 12th for females. Mortality rates (EASRs) were significantly higher in males than females, by about 95% (95% confidence limits 63-132%). On average, females were estimated to have a 1-in-550 chance, males a 1-in-250 chance, of dying from this cancer by age 74.

Table 8.1 Summary statistics, all Ireland 1994-96: malignant cancer of liver and intrahepatic bile ducts

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	43	70	80	112
% of total	0.4	0.5	1.6	1.9
Cumulative risk (0-74 yrs) %	0.12	0.25	0.18	0.40
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	1.6	2.7	3.0	4.3
World age-standardised rate	0.9 ±0.2	2.1 ±0.3	1.6 ±0.2	3.3 ±0.4
European age-standardised rate	1.4 ±0.3	3.1 ±0.4	2.5 ±0.3	5.0 ±0.5
Mortality/incidence ratio	1.86	1.60		

9. MALIGNANT CANCER OF THE PANCREAS (summary)

ICD-O.2 C25 *ICD-10* C25 *ICD-9* 157

Key facts

- Average of 450 new cases per year, 1994-96: 230 in females, 220 in males.
- Average of 498 deaths per year: 247 in females, 251 in males.
- Age-standardised rates (EASRs) higher in males, by about 28% (incidence), 43% (mortality).
- 9th most common site for cancer incidence in males, 11th in females.
- 5th most common cause of cancer deaths in females, 6th in males.
- Incidence rates for females about 23% higher in Republic of Ireland (RoI) than in Northern Ireland (NI).
- Incidence rates for females higher than, for males similar to, EU 1995 averages.

Summary statistics

Table 9.1

Incidence 1994-96

On average each year, 230 new cases of malignant pancreatic cancer were diagnosed in females, 220 in males, in Ireland as a whole. Pancreas was the 9th most common cancer site in males, and 12th most common in females. European age-standardised rates were significantly higher among males than females, by about 28% (95% confidence limits 15-43%), despite the higher number of cases among females. On average, females were estimated to have a 1-in-175 chance, males a 1-in-140 chance, of developing this cancer by age 74. Median age at diagnosis was 74 years for females and 71 years for males.

EASRs for females were significantly higher in the Republic of Ireland (RoI) than in Northern Ireland (NI), by about 23% (95% confidence limits 4-45%).

Mortality 1994-96

Annual averages of 247 deaths among females and 251 deaths among males were attributed to pancreatic cancer: about 11 deaths for every 10 incident cases. The high mortality/incidence ratio reflects the fact that pancreatic cancer is generally detected late, with consequent poor survival prospects. This was the fifth most common reported cause of cancer deaths in females, sixth in males. Mortality rates (EASRs) were significantly higher in males than females, by about 43% (95% confidence limits 29-59%). On average, females were estimated to have a 1-in-176 chance, males a 1-in-123 chance, of dying from this cancer by age 74.

Table 9.1 Summary statistics, all Ireland 1994-96: malignant cancer of the pancreas

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	230	220	247	251
% of total	1.9	1.7	4.8	4.3
Cumulative risk (0-74 yrs) %	0.57	0.71	0.57	0.81
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	8.7	8.5	9.3	9.7
World age-standardised rate	4.9 ±0.4	6.3 ±0.5	4.9 ±0.4	7.2 ±0.5
European age-standardised rate	7.5 ±0.6	9.7 ±0.8	7.8 ±0.6	11.1 ±0.8
Mortality/incidence ratio	1.07	1.14		

10. MALIGNANT CANCER OF THE BRONCHUS AND LUNG

ICD-O.2 C34 *ICD-10* C34 *ICD-9* 162.2-162.9

Key facts

- Average of 2332 new cases per year, 1994-96: 793 in females, 1539 in males.
- Average of 2301 deaths per year: 790 in females, 1511 in males.
- Age-standardised incidence and mortality rates more than twice as high in males as in females.
- 3rd most common site for cancer incidence in males, 4th most common in females.
- Most common cause of cancer deaths in males, 2nd most common in females.
- Incidence rates higher in Northern Ireland (NI) than in the Republic (RoI), by about 25% (females), 21% (males).
- Higher incidence rates in urban compared with other populations, by about 77% (females), 68% (males).
- Incidence rates in males below average, but in females well above average, for the EU.

Summary statistics

Table 10.1

Incidence 1994-96

On average each year, 793 new cases of lung cancer (including cancer of the bronchus) were diagnosed in females, 1539 in males, in Ireland as a whole. Lung was the third most common cancer site in males (after skin and prostate), and fourth most common in females (after skin, breast and colon). European-age-standardised rates were significantly higher among males than females, by about 144% (95% confidence limits 132-157%). On average, females were estimated to have a 1-in-41 chance of developing this cancer by age 74, males a 1-in-17 chance.

Mortality 1994-96

Annual averages of 790 deaths among females and 1511 deaths among males were attributed to lung cancer: almost as many deaths as incident cases, reflecting low average survival rates. This was the most common cause of cancer deaths in males, and second most common in females. Mortality rates (EASRs) were significantly higher in males than females, by about 146% (95% confidence limits 134-160%). On average, females were estimated to have a 1-in-44 chance, males a 1-in-19 chance, of dying from this cancer by age 74.

Table 10.1 Summary statistics, all Ireland 1994-96: malignant cancer of the bronchus and lung

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	793	1539	790	1511
% of total	6.5	11.9	15.4	25.7
Cumulative risk (0-74 yrs) %	2.5	5.8	2.3	5.3
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	29.8	59.2	9.7	58.2
World age-standardised rate	19.0 ±0.8	45.6 ±1.4	18.1 ±0.8	43.7 ±1.3
European age-standardised rate	28.0 ±1.2	68.2 ±2.0	27.0 ±1.1	66.5 ±2.0
Mortality/incidence ratio	0.99	0.98		

Age profile

Figure 10.1

Few cases of malignant lung cancer (<1% of total cases) were diagnosed before age 40, but rates rose steeply thereafter in both sexes, peaking from age 65/70 onwards. Rates for NI were higher than rates for RoI in most age-classes, especially for older males. Patterns were, in general, similar between NI and RoI, but rates in NI males appeared to peak at a slightly later age. Median age at diagnosis was 71 years for females overall (69 in NI, 71 in RoI), and 70 years for males (69 in NI, 70 in RoI).

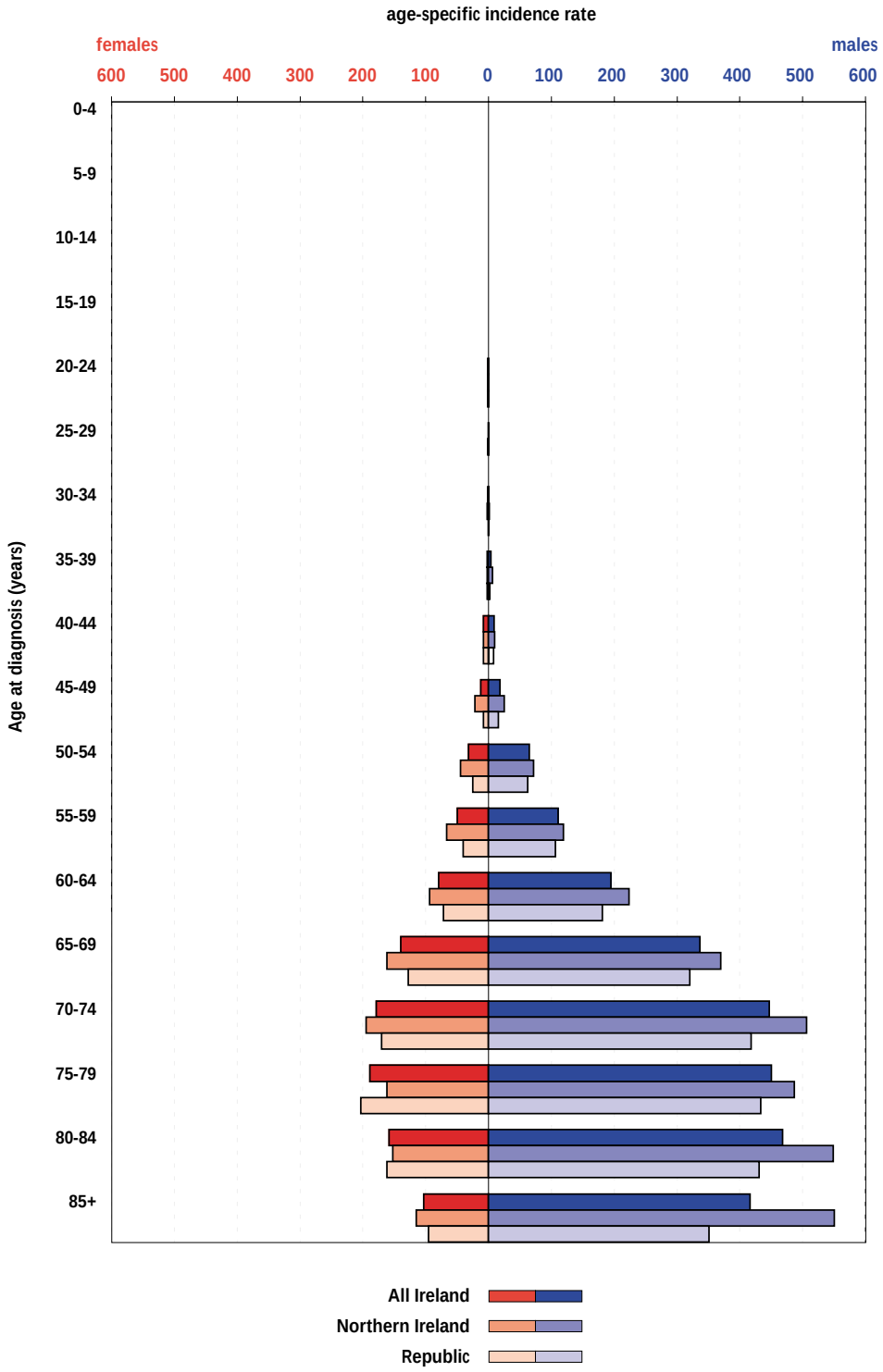


Figure 10.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the bronchus and lung.

Table 10.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the bronchus and lung

		females				males			
		all	urban		non-urban	all	urban		non-urban
All-Ireland	EASR	28.0	41.3	**	23.3	68.2	99.3	**	59.0
	±95% confidence limits	1.2	2.8		1.2	2.0	5.1		2.1
NI	EASR	32.2	44.6	**	27.0	77.3	102.8	**	67.5
	±95% confidence limits	2.2	4.8		2.4	3.7	8.2		4.1
		**			**	**			**
RoI	EASR	25.8	39.3	**	21.6	63.8	97.1	**	55.4
	±95% confidence limits	1.4	3.5		1.4	2.3	6.4		2.4

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 10.2, Figure 10.2

NI v. RoI

Overall incidence rates were significantly higher in NI than RoI, by about 25% (95% confidence limits 14-37%) in females and 21% (14-29%) in males. Urban and non-urban subsets of the data showed the same pattern, although the differences were not statistically significant for urban populations.

Urban v. other populations

Lung cancer rates were significantly higher for urban than for other populations, whether based on NI, RoI or All-Ireland data. All-Ireland rates were an estimated 77% (95% confidence limits 60-95%) higher in urban females, 68% (57-81%) higher in urban males, compared with populations outside of the main conurbations. Urban rates for both sexes were also significantly higher than non-urban rates in four health-board areas (NI Eastern, NI Western, RoI Eastern and RoI Southern) of the seven with urban populations.

Regional comparisons

Incidence rates for lung cancer showed marked variation among the 12 health-board areas, for both sexes, to a far greater degree than most cancer sites. However, much of this reflected the generally higher rates of lung cancer seen in urban populations (see above).

Among the main urban populations, rates were significantly higher in Dublin city (males) compared with other urban areas as a whole (although rates were similar in Belfast). In contrast, rates for Limerick city (both sexes) and Galway city (males) were significantly lower than urban rates for other regions as a whole.

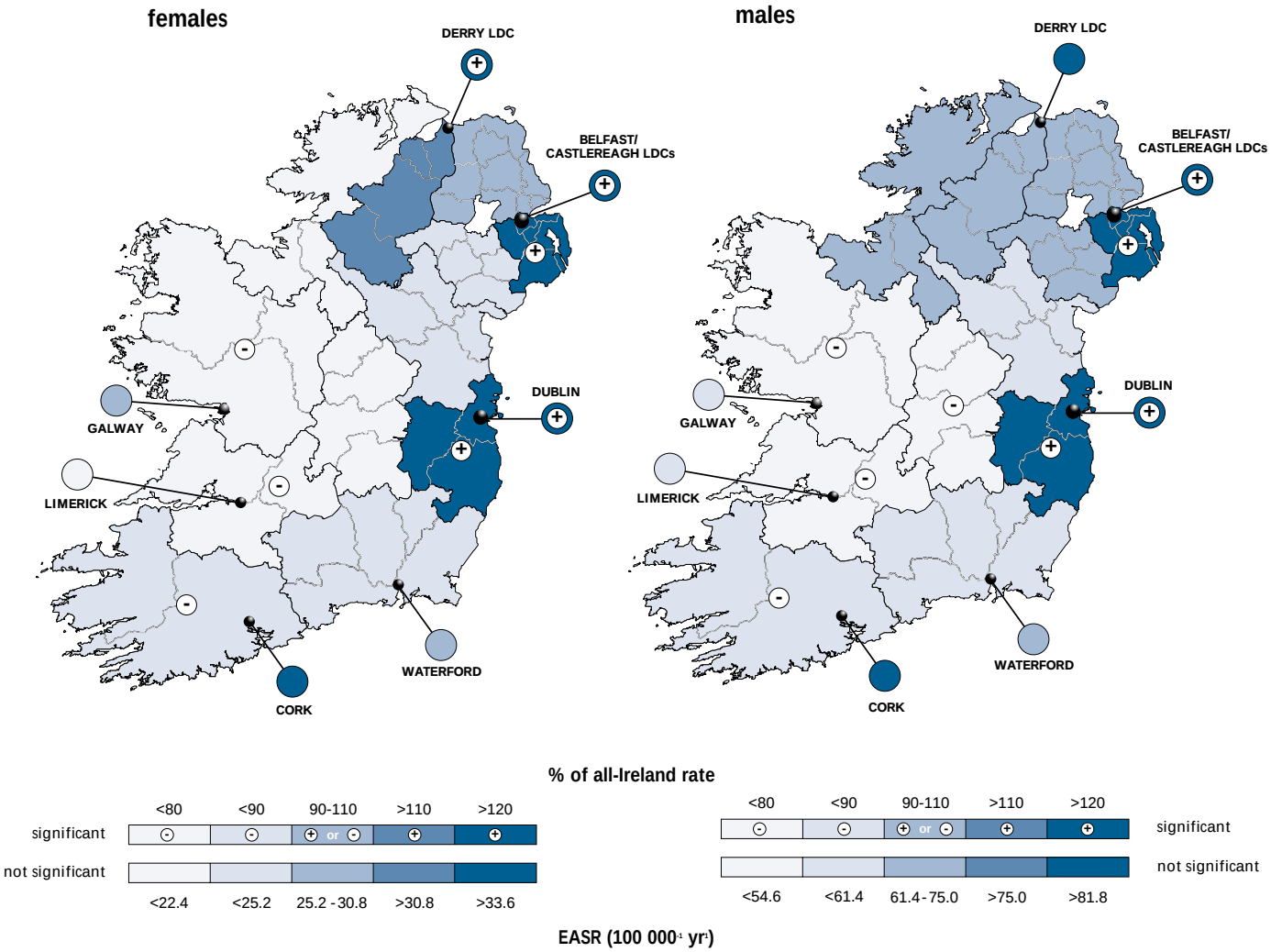


Figure 10.2 Age-standardised incidence (as % of All-Ireland rate) by health-board areas, 1994-96: malignant cancer of the bronchus and lung.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 10.3, Figure 10.3

Figures here additionally include the trachea, to allow direct comparison with published international data, but this has little effect on figures as the number of cases of tracheal cancer is small compared with bronchus and lung. Overall rates of lung and related cancer in Ireland (and in RoI) were lower than estimates for Britain (especially Scotland), for both sexes. However, rates for NI were similar to those for England/Wales. In comparison with other EU figures, All-Ireland rates for males were below average, but rates for Irish females were well above the EU average. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that RoI males had only the 13th highest (3rd lowest) recorded rate of lung and related cancer of 15 EU member states, while the UK had the 6th highest rate. In contrast, RoI had the 3rd highest recorded rate (UK 2nd highest) among EU females in 1995.

Table 10.3 International comparison of incidence rates for malignant cancer of the trachea, bronchus and lung (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**28.1**	**68.4**
Northern Ireland[1]	32.4	77.6
Republic of Ireland[1]	25.9	64.0
Scotland[2]	51.9	107.4
England & Wales[3]	34.6	79.3
United Kingdom, incl. NI[4]	34.1	81.1
Denmark (highest EUCAN rate, females)[4]	42.3	71.7
Belgium (highest EUCAN rate, males)[4]	15.5	121.1
European Union average[4]	16.0	79.3

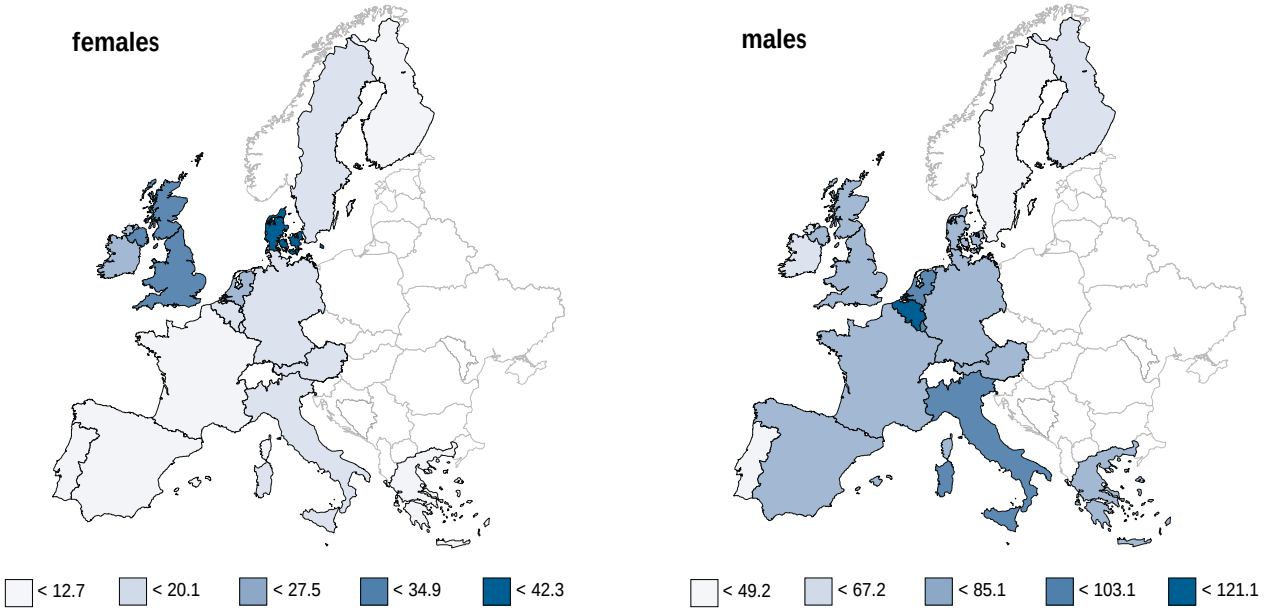


Figure 10.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant cancer of the trachea, bronchus and lung.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

Tobacco smoking (including passive smoking) is the primary risk factor for lung cancer and is estimated to account for up to 80-90% of deaths from lung cancer in developed countries. Smoking is more common in lower socio-economic groups, and this is generally reflected in higher rates of lung cancer in urban populations. Other factors, including natural radon levels and certain occupational exposures (especially to asbestos), also contribute to overall rates.

Symptoms of lung cancer can include a persistent cough (or a change in cough), chest pain, blood in sputum, and recurring pneumonia or bronchitis. However, early stages of the disease are often asymptomatic. Early detection is thus infrequent (mainly from chest radiographs taken for other purposes), and most cases of lung cancer are not diagnosed and treated until at an advanced stage. Partly as a consequence, five-year relative survival rates (from diagnosis date) are low overall: on average, only 10-11% based on European figures (Berrino *et al*. 1999). Palliative treatment can help manage symptoms and improve quality of life, but avoidance or early cessation of smoking remain the most important determinants of health status and survival prospects relating to lung cancer.

For health gain

- The focus for reducing incidence and deaths from lung cancer must be on prevention.
- Actions to reduce smoking levels include:
  - Reducing the numbers who start to smoke by banning advertising, increasing taxation, reducing availability of tobacco products and enhancing health education.
  - Helping those who smoke to stop.
- Controlling environmental (passive) tobacco smoke will help reduce the levels of lung cancer and deaths.

11. MALIGNANT MELANOMA OF SKIN

ICD-O.2 **C44** (morphology M8720/3-M8780/3) *ICD-10* **C43** *ICD-9* **172**

Key facts

- Average of 531 new cases per year, 1994-96: 338 in females, 193 in males.
- Average of 85 deaths per year: 46 in females, 39 in males.
- Age-standardised incidence rates about 50% higher in females than in males.
- 6th most frequent category for cancer incidence in females, 12th in males.
- 12th most frequent cause of cancer deaths in males, 15th in females.
- Median age at diagnosis 58 years for females and 60 years for males, lower than that for all cancers.
- Higher incidence rate among males in Northern Ireland (NI) than the Republic (RoI), by about 14%.
- Incidence rates higher than EU average for males and, especially, females.

Summary statistics

Table 11.1

Incidence 1994-96

On average each year, 338 new cases of malignant melanoma of the skin were diagnosed in females, 193 in males, in Ireland as a whole. Melanoma of the skin was the 6th most frequent category of malignant cancer in females, but only the 12th most frequent in males. European-age-standardised rates were significantly higher among females than males, by about 52% (95% confidence limits 37-69%). On average, females were estimated to have a 1-in-100 chance of developing this cancer by age 74, males a 1-in-160 chance.

In addition to the invasive cases for which data are presented here, substantial numbers of in situ (pre-invasive) cases are diagnosed annually, equivalent to about 30% of the total of in situ and malignant melanomas of the skin.

Mortality 1994-96

Annual averages of 46 deaths among females and 39 deaths among males were attributed to malignant melanoma of the skin: about 3 deaths for every 20 incident cases. This was the 12th most frequent cause of cancer deaths in males, 15th most frequent in females. Mortality rates (EASRs) did not differ significantly between males and females, despite higher incidence rates in females, reflecting lower average survival rates in males. On average, females were estimated to have a 1-in-840 chance, males a 1-in-870 chance, of dying from this cancer by age 74.

Table 11.1 Summary statistics, all Ireland 1994-96: malignant melanoma of the skin

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	338	193	46	39
% of total	2.8	1.5	0.9	0.7
Cumulative risk (0-74 yrs) %	1.00	0.63	0.12	0.12
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	12.7	7.4	1.7	1.5
World age-standardised rate	10.0 ±0.7	6.2 ±0.5	1.1 ±0.2	1.2 ±0.2
European age-standardised rate	12.9 ±0.8	8.5 ±0.7	1.6 ±0.3	1.8 ±0.3
Mortality/incidence ratio	0.13	0.20 -		

Age profile

Figure 11.1

Malignant melanoma of the skin is a significant cancer from about age 20 or 25 onwards. Based on All-Ireland data, rates then appeared to rise fairly gradually to about age 50, with a steeper increase in rates thereafter, reaching a peak in age-classes from 75 years onwards. Rates were substantially higher among females than males in all age-classes between 15 and 69 years, especially in the range 15-34 years. Although patterns were broadly consistent between NI and RoI, the age-profile of NI patients indicates, on average, earlier occurrence (or at least diagnosis) of this cancer than in RoI. Median age at diagnosis was 58 years for females overall (56 in NI, 59 in RoI), and 60 years for males overall (57 in NI, 63 in RoI). This is one of the few cancers where median age at diagnosis was earlier in females than males.

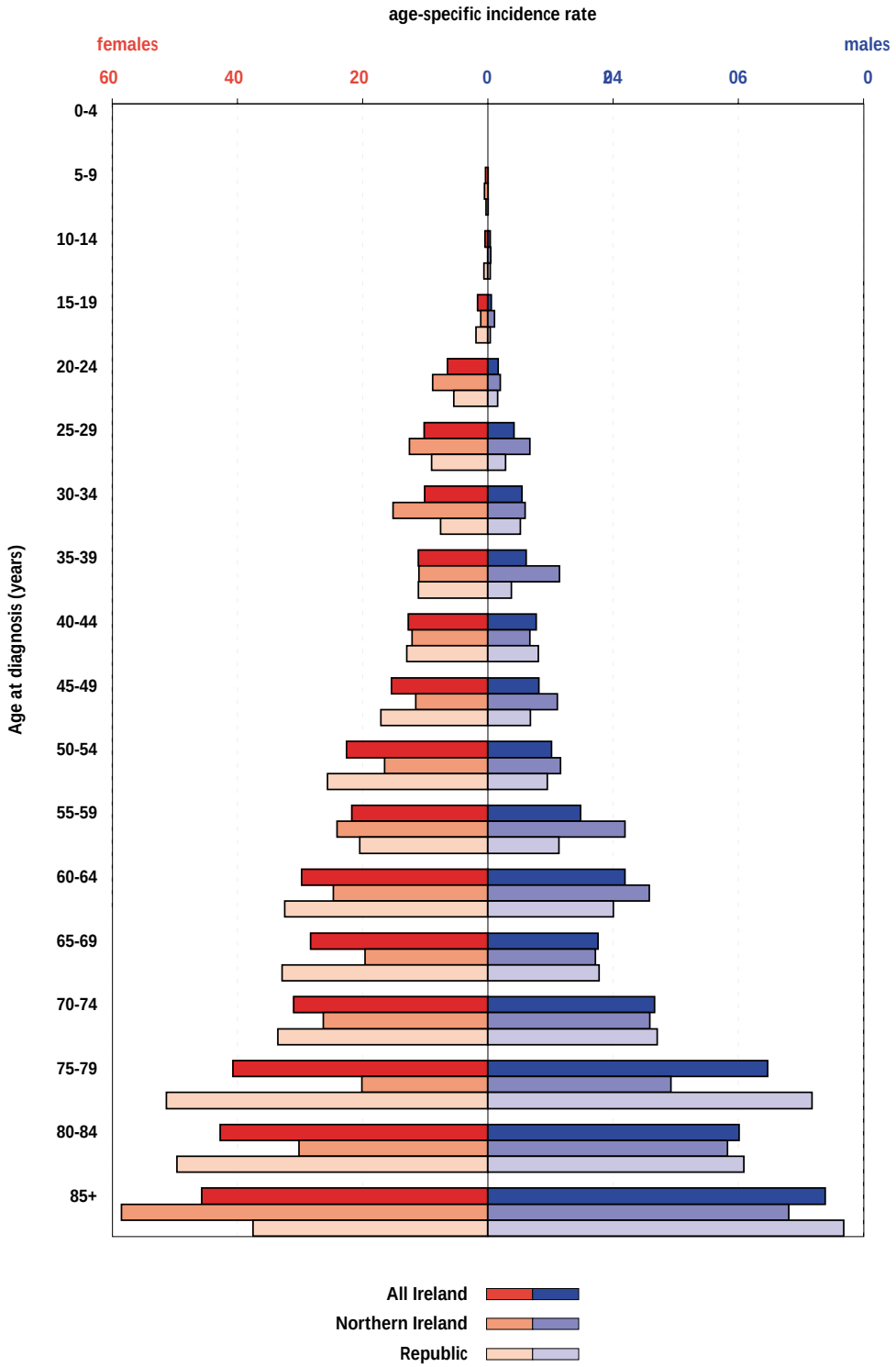


Figure 11.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant melanoma of the skin.

Table 11.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant melanoma of the skin

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	12.9	12.8	12.9	8.4	8.2	8.5
	±95% confidence limits	0.8	1.6	0.9	0.7	1.5	0.8
NI	EASR	11.8	10.2	12.4	9.5	7.8	10.1
	±95% confidence limits	1.4	2.4	1.6	1.3	2.3	1.6
			*		*		*
RoI	EASR	13.4	14.5	13.1	7.9	8.5	7.8
	±95% confidence limits	1.0	2.2	1.2	0.8	1.9	0.9

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 11.2, Figure 11.2

NI v. RoI

Rates of malignant melanoma of the skin among males were significantly higher in NI than RoI, by about 14% (95% confidence limits 1-31%) overall. Rates for non-urban males were also significantly higher in NI. Among females, overall rates did not differ significantly between NI and RoI, although rates appeared to be higher in RoI than NI (opposite to the pattern among males). Only the rate for urban populations of females showed a significant difference, with a higher rate in RoI.

Urban v. other populations

Incidence rates did not differ significantly between urban and non-urban populations, whether at All-Ireland, NI, RoI or regional scales. Apparent patterns differed between NI (rates apparently highest in non-urban populations) and RoI (rates apparently highest in urban populations), but this could not be confirmed statistically based on the data available.

Regional comparisons

No significant overall variation in incidence rates was detected among health-board areas, for either sex. However, among populations outside of the cities, females from NI Southern area showed a significantly higher rate compared with non-urban populations elsewhere in Ireland.

Geographical variation in incidence rates: international

Table 11.3, Figs. 11.3

Within Britain and Ireland, malignant melanoma of the skin occurred at a higher rate in Ireland (both NI and RoI) than in England/Wales. Rates for RoI females and NI males were particularly high, in relative terms, and similar to those for Scotland. All-Ireland rates for males and (especially) females were above the EU average. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that RoI females had the third highest, UK females the sixth highest, recorded rate of 15 EU member states. For males, RoI had the sixth highest, UK the eighth highest, recorded rate in the EU. Within the EU, a quite marked north-south gradient is evident, with melanoma rates highest in the more northern countries (especially Sweden). This may be consistent with the hypothesis that intermittent sunlight exposure in sun-sensitive individuals may be a critical factor in melanoma development (see below).

Figure 11.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: malignant melanoma of the skin.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

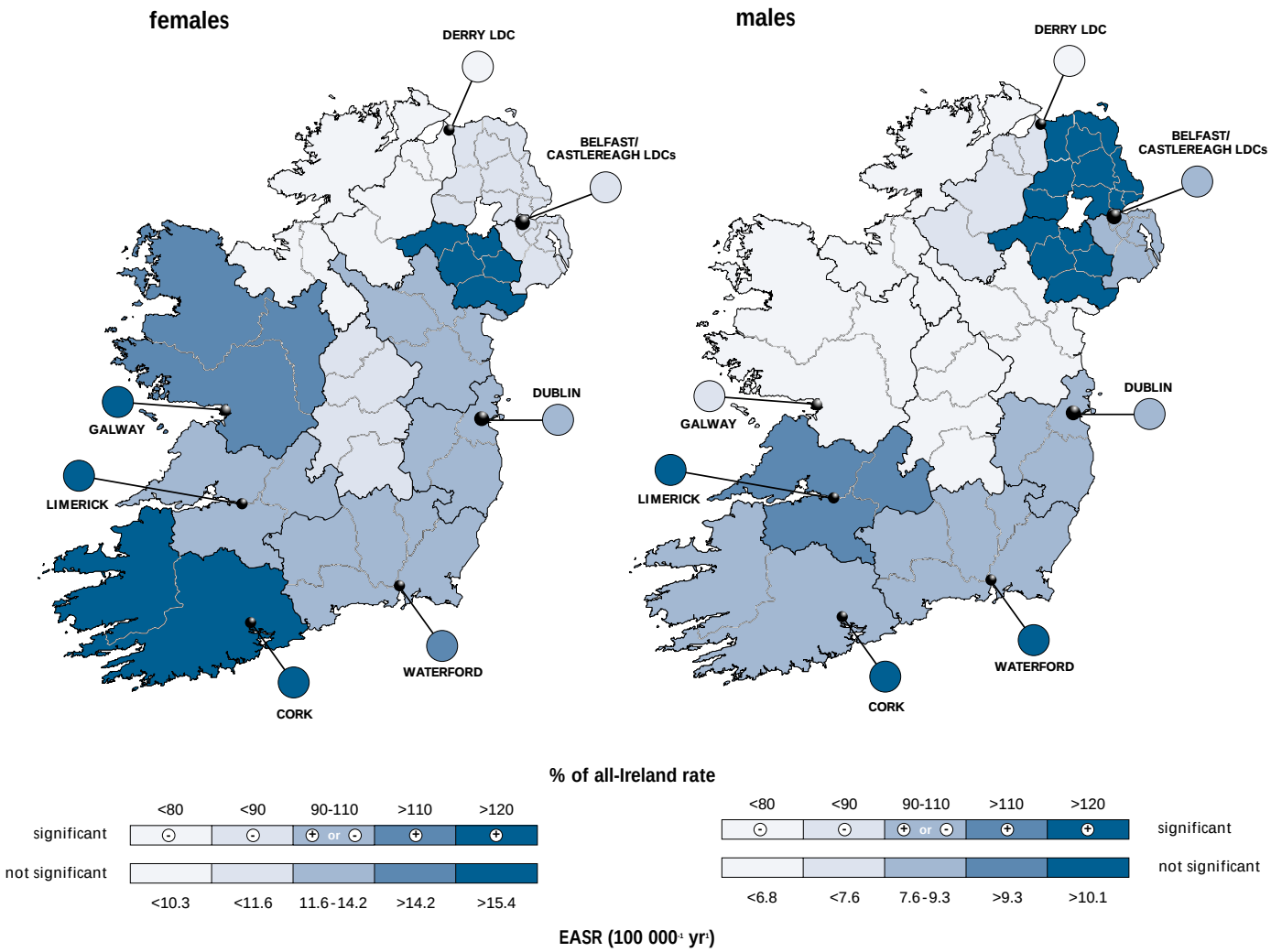


Table 11.3 International comparison of incidence rates for malignant melanoma of the skin (European age-standardised rates per 100 000 per year).
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**12.9**	**8.5**
Northern Ireland[1]	11.8	9.5
Republic of Ireland[1]	11.8	9.5
Scotland[2]	12.9	9.5
England & Wales[3]	9.0	7.2
United Kingdom, incl. NI[4]	9.9	7.7
Denmark (highest EUCAN rate, females)[4]	17.2	13.5
Sweden (highest EUCAN rate, males)[4]	14.8	15.2
European Union average[4]	8.0	7.0

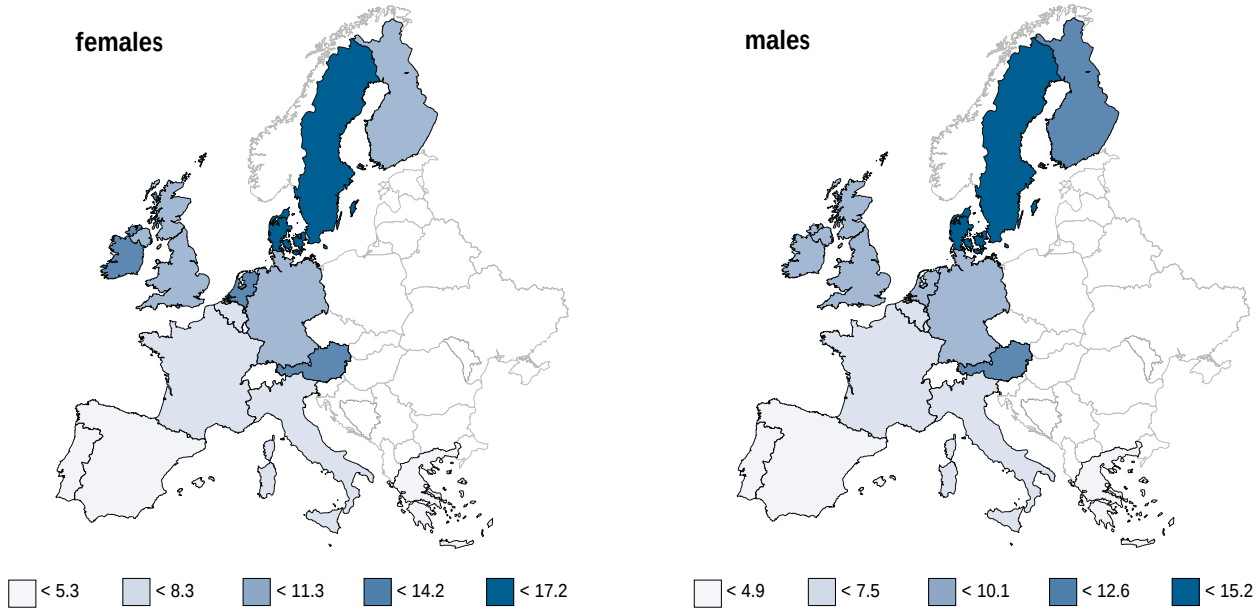


Figure 11.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant melanoma of the skin.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

Excessive exposure to direct sunlight, particularly in fair-skinned individuals, is believed to be the primary risk factor for melanoma of the skin. The relationship between sun exposure, tanning and melanoma may be complex, however. The strongest evidence exists for an effect of intermittent or recreational exposure in sun-sensitive individuals, particularly related to frequency of severe sunburn. Sunburn during childhood or adolescence may be particularly critical. Inherited genetic susceptibility or defects account for a proportion of cases. Evidence for this comes from studies of familial melanoma, and from molecular genetic studies. There is only limited evidence to suggest that factors other than sun exposure or inherited factors may be important in the aetiology of melanoma.

Melanomas of the skin are generally first apparent as moles having an unusual appearance or showing changes in colour or size. Compared to normal moles, melanomas typically are asymmetric (A) in shape; show irregular boundaries (B); show variation in colour (C), having mixed shades of paler and darker brown, black or blue; and generally have diameter >6 mm (D). This 'ABCD' formula provides a basis for initial diagnosis of melanoma. Symptoms such as itching or bleeding generally do not occur until later stages. Melanomas that are detected early (particularly at the in situ, pre-invasive stage) are especially amenable to successful surgical treatment, but late-stage melanomas (particularly those with distant metastases) generally have a poor prognosis. Improvements in prognosis have largely reflected earlier detection, and five-year relative survival rates are high overall: averages of about 70% in males and 82% in females, based on European data (Berrino *et al*. 1999). Poorer survival in men may reflect, in part, differences in the site-distribution and average thickness of melanoma at presentation.

For health gain

- The public must be encouraged to take 'Care in the Sun' at home and abroad by:
  - avoiding the sun 11 am – 3 pm and seeking shade
  - covering up with hat, T-shirt, sunglasses
  - using minimum factor 15 sunscreen.
- The public must be encouraged to become aware of changes in the skin which could indicate the presence of skin cancer and especially malignant melanoma.
- Professionals must ensure a fast track approach to the diagnosis of suspicious lesions and treatment according to agreed guidelines.

12. MALIGNANT NON-MELANOMA SKIN CANCER

ICD-O.2 C44 (selected morphologies) *ICD-10* C44 *ICD-9* 173

This category consists predominantly of squamous and basal cell cancer of the skin, and *excludes*:

- malignant melanoma of the skin (ICD-10 code C43), and other cancer morphologies that can occur in skin but that have more appropriate ICD-10 codes, especially Kaposi's sarcoma (C46) and lymphomas (C81-C85);
- cancers occurring on the skin of the genital organs (ICD-10 codes C51-52, C60, C63);
- multiple or repeat occurrences of the same type of skin cancer in the same individual (only one incident case of basal cell carcinoma and one of squamous cell carcinoma is counted per patient-lifetime).

Key facts

- Average of 7334 new cases per year, 1994-96: 3445 in females, 3889 in males.
- Average of 40 deaths per year: 10 in females, 30 in males.
- Age-standardised incidence rates about 48% higher in males than females.
- By far the most common type of cancer in both females and males.
- Recorded incidence rates higher in Republic of Ireland (RoI) than in Northern Ireland (NI), by about 16% for females and 26% for males, but this possibly reflects differences in registration practice.

Summary statistics

Table 12.1

Incidence 1994-96

On average each year, 3445 new cases of malignant non-melanoma skin cancer (NMS) were registered in females, 3889 in males, in Ireland as a whole. NMS cases (primarily squamous cell and basal cell carcinomas) were by far the most common category of cancer in both females and males (29% of all malignant cancer cases). European-age-standardised rates were significantly higher among males than females, by about 48% (95% confidence limits 44-52%). On average, females were estimated to have a 1-in-12 chance of developing these cancers by age 74, males a 1-in-8 chance. Median age at diagnosis was 72 years for females and 70 years for males.

Mortality 1994-96

On average, only 10 deaths among females and 30 deaths among males were attributed to non-melanoma skin cancer each year. This represents about 1 death for every 200 incident cases, reflecting the fact that these cancers are rarely fatal. Reported mortality rates (EASRs) were significantly higher in males than females, by about 370% (95% confidence limits 200-645%), but inaccurate certification of causes of death may possibly contribute. On average, females were estimated to have a 1-in-6600 chance, males a 1-in-1600 chance, of dying from these cancers by age 74.

Table 12.1 Summary statistics, all Ireland 1994-96: malignant non-melanoma skin cancer

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	3445	3889	10	30
% of total	28.2	30.0	0.2	0.5
Cumulative risk (0-74 yrs) %	8.4	12.2	0.02	0.06
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	129.6	149.7	0.37	1.14
World age-standardised rate	78.9 ±1.7	114.4 ±2.1	0.18 ±0.07	0.82 ±0.18
European age-standardised rate	117.4 ±2.4	173.7 ±3.2	0.29 ±0.11	1.40 ±0.30
Mortality/incidence ratio	0.003	0.008		

Table 12.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant non-melanoma skin cancer

		females	males
All-Ireland	EASR	117.4	173.7
	±95% confidence limits	2.4	3.2
NI	EASR	105.9	148.0
	±95% confidence limits	3.8	5.2
		**	**
RoI	EASR	123.4	186.5
	±95% confidence limits	3.0	4.1

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Comparison of incidence rates within Ireland

Table 12.2

NI v. RoI

Recorded incidence rates of non-melanoma skin cancer (NMS) were significantly higher in RoI than in NI for both males and females. Overall, the rates for females were about 16% (95% confidence limits 12-21%) higher in RoI, for males about 26% (21-31%) higher in RoI.

However, these differences may possibly reflect, in part, higher case ascertainment (completeness of registration) in RoI than NI, as a result of a more targeted effort to collate all NMS cases in RoI. In particular, registration of clinically-diagnosed cases (where no biopsy results are available) may be more complete in RoI. Involvement of other factors cannot be excluded however.

Note also that the NMS rates shown here for RoI are substantially lower than rates previously published in the annual reports for RoI (NCR 1997-1999). For the present report, International Agency for Research on Cancer (IARC) rules on multiple primaries have been applied, for international standardisation purposes. For patients that have more than one malignant tumour of a given site, and of a given morphological class, only the first recorded cancer is included. Skin is considered a single "site" in this context, but basal and squamous cell carcinomas are distinguished. Although these rules apply to all cancer sites, only for skin are multiple primary cancers sufficiently common for this to affect figures significantly. The total number of new skin cancers each year could thus be about 20% higher than the figures presented here suggest.

Geographical variation in incidence rates: international

International figures on rates on non-melanoma skin cancer (NMS) are not generally available as many registries do not register these cancers.

Comment: risk factors and early detection

As with melanoma of the skin, excessive exposure to direct sunlight is the main risk factor for non-melanoma skin cancer, with fair-skinned individuals particularly at risk. Outdoor workers may be at special risk, and this may account, in part, for the higher rates of NMS among males. This is the opposite of the pattern for melanoma of the skin, where rates are higher among females. Occupational exposures, e.g. to petrochemical or arsenic compounds, may account for a small number of cases. Trauma, for example a burn, can in rare cases lead to skin cancer at the site of injury, later in life. Other factors that may play a role in some cases include certain viruses, immunosuppression, and certain rare genetic conditions.

Although non-melanoma skin cancers are rarely fatal, local tissue damage is minimised if treatment occurs at an early stage. Awareness of changes in the skin, e.g. scaliness, ulceration that does not heal, changes in the appearance of a bump or nodule or associated itching or pain, improves the likelihood of early detection.

13. MALIGNANT CANCER OF THE BREAST

ICD-O.2 C50 *ICD-10* C50 *ICD-9* 174 (females), 175 (males)

Key facts

- Average of 2389 new cases per year, 1994-96: 2368 in females, 21 in males, 1994-96.
- Average of 975 deaths per year: 969 in females, 6 in males.
- 2nd most common site for cancer incidence (after skin) and most common cause of cancer deaths, in females.
- Median age at diagnosis 59 years for females, lower than for cancers as a whole.
- Incidence rates for females about 7% higher in Northern Ireland (NI) than in Republic (RoI), possibly reflecting population-based screening in NI.
- No significant overall differences in incidence rates between urban and other populations.
- Incidence rates above EU average.

Summary statistics

Table 13.1

Incidence 1994-96

On average each year, 2368 new cases of malignant breast cancer were diagnosed in females, 21 in males, in Ireland as a whole. In females, breast was the most frequent cancer site after skin. On average, females were estimated to have a 1-in-13 chance of developing this cancer by age 74, males a 1-in-1400 chance.

Mortality 1994-96

Annual averages of 969 deaths among females and 6 deaths among males were attributed to breast cancer: about 2 deaths for every 5 incident cases. This was the most frequent cause of cancer deaths in females. On average, females were estimated to have a 1-in-36 chance, males a 1-in-4600 chance, of dying from this cancer by age 74.

Table 13.1 Summary statistics, all Ireland 1994-96: malignant cancer of the breast

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	2368	21	969	6
% of total	19.3	0.2	18.9	0.1
Cumulative risk (0-74 yrs) %	7.5	0.1	2.8	<0.1
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	89.0	0.8	36.5	0.2
World age-standardised rate	70.2 ±1.7	0.6 ±0.2	25.3 ±1.0	0.2 ±0.1
European age-standardised rate	96.0 ±2.3	0.9 ±0.2	36.2 ±1.4	0.3 ±0.1
Mortality/incidence ratio	0.41	0.30		

Age profile

Figure 13.1

No cases of malignant breast cancer were diagnosed in age-classes below 20 years (female) or 35 years (male). In females, incidence rates rose steeply from about age 30 to 50, and remained high in all age-classes thereafter. In males, most of the few cases were from ages 65/70 onwards. The patterns were similar for Northern Ireland and the Republic of Ireland, albeit with slightly higher rates in most age-classes in NI males and females. Higher rates in NI for women aged 50-64 years may reflect systematic screening of that age-class (introduced in NI in 1993). Median age at diagnosis was 59 years for females overall (60 in NI, 59 in RoI), lower than the median age for cancers as a whole, and 72 years for males (74 in NI, 70 in RoI).

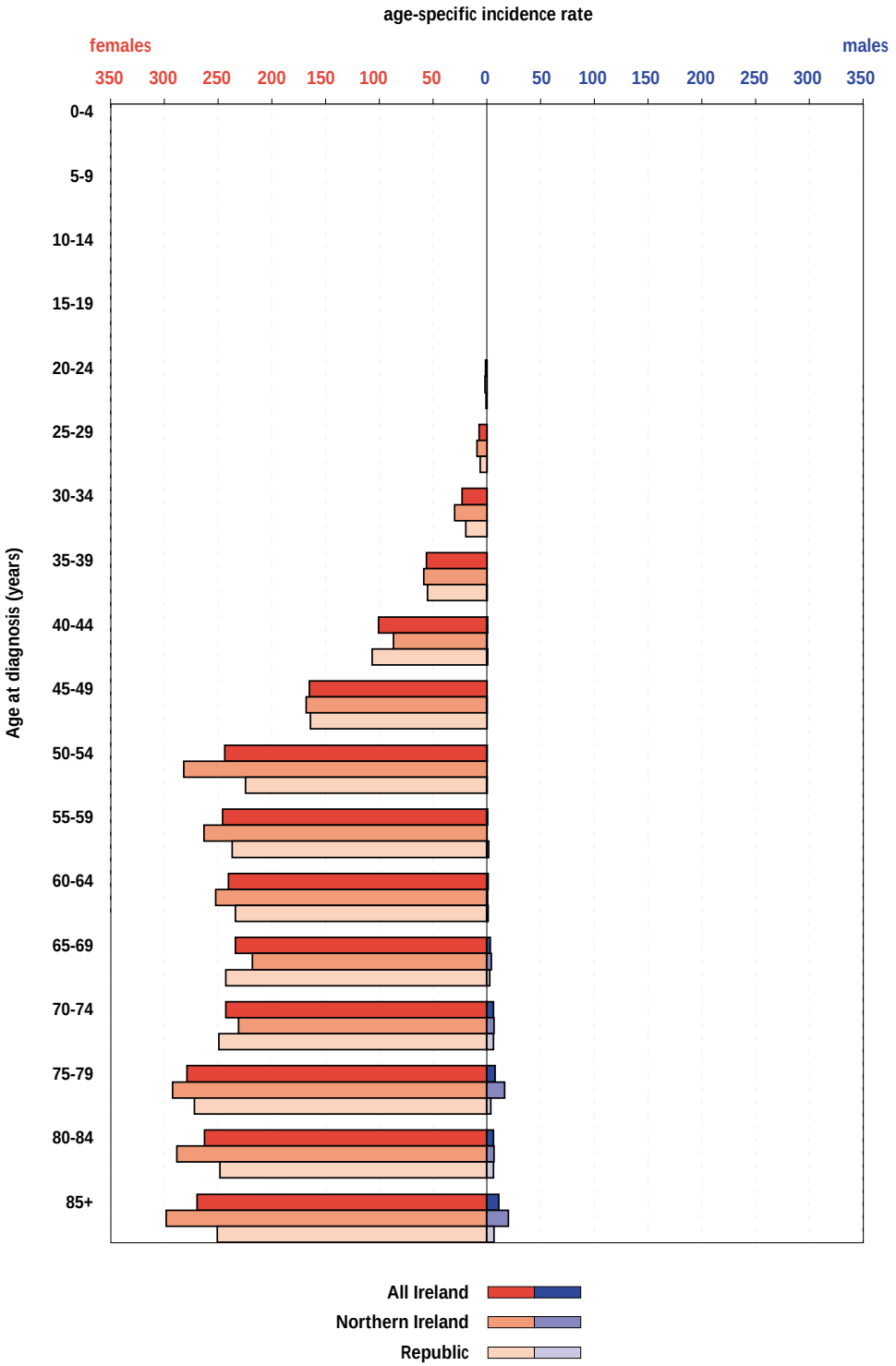


Figure 13.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the breast.

Table 13.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the breast

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	96.0	97.5	95.6	0.92	0.97	0.91
	±95% confidence limits	2.3	4.7	2.6	0.2	0.5	0.3
NI	EASR	100.1	95.4	102.1	1.14	1.23	1.10
	±95% confidence limits	4.1	7.5	4.9	0.5	0.9	0.5
		**		**			
RoI	EASR	93.8	98.8	* 92.3	0.82	0.80	0.83
	±95% confidence limits	2.8	6.1	3.1	0.3	0.6	0.3

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 13.2, Figure. 13.2

NI v. RoI

For females, age-standardised incidence rates were slightly but significantly higher in NI than RoI, by about 7% (95% confidence limits 1-12%). Incidence rates for males did not differ significantly between NI and RoI. Rates for female populations outside of the main cities were also significantly higher in NI, but rates for the main urban populations did not differ significantly. Higher rates for Northern Ireland may reflect, at least in part, higher detection rates as a result of systematic screening of women aged 50-64 years.

Urban v. other populations

Overall, no significant differences in incidence rates were detected between urban and other populations. Within RoI, urban populations of females had significantly higher rates than non-urban populations, but there was no significant difference (and possibly the opposite pattern) within NI.

Regional comparisons

Rates for females were significantly higher in NI Southern health-board area, and significantly lower in RoI North Eastern and RoI South Eastern areas, than elsewhere. Compared with populations outside of the cities, rates were significantly high in NI Southern and RoI Eastern areas and significantly low in RoI North Eastern and RoI South Eastern areas. Incidence rates for males did not vary significantly between regions.

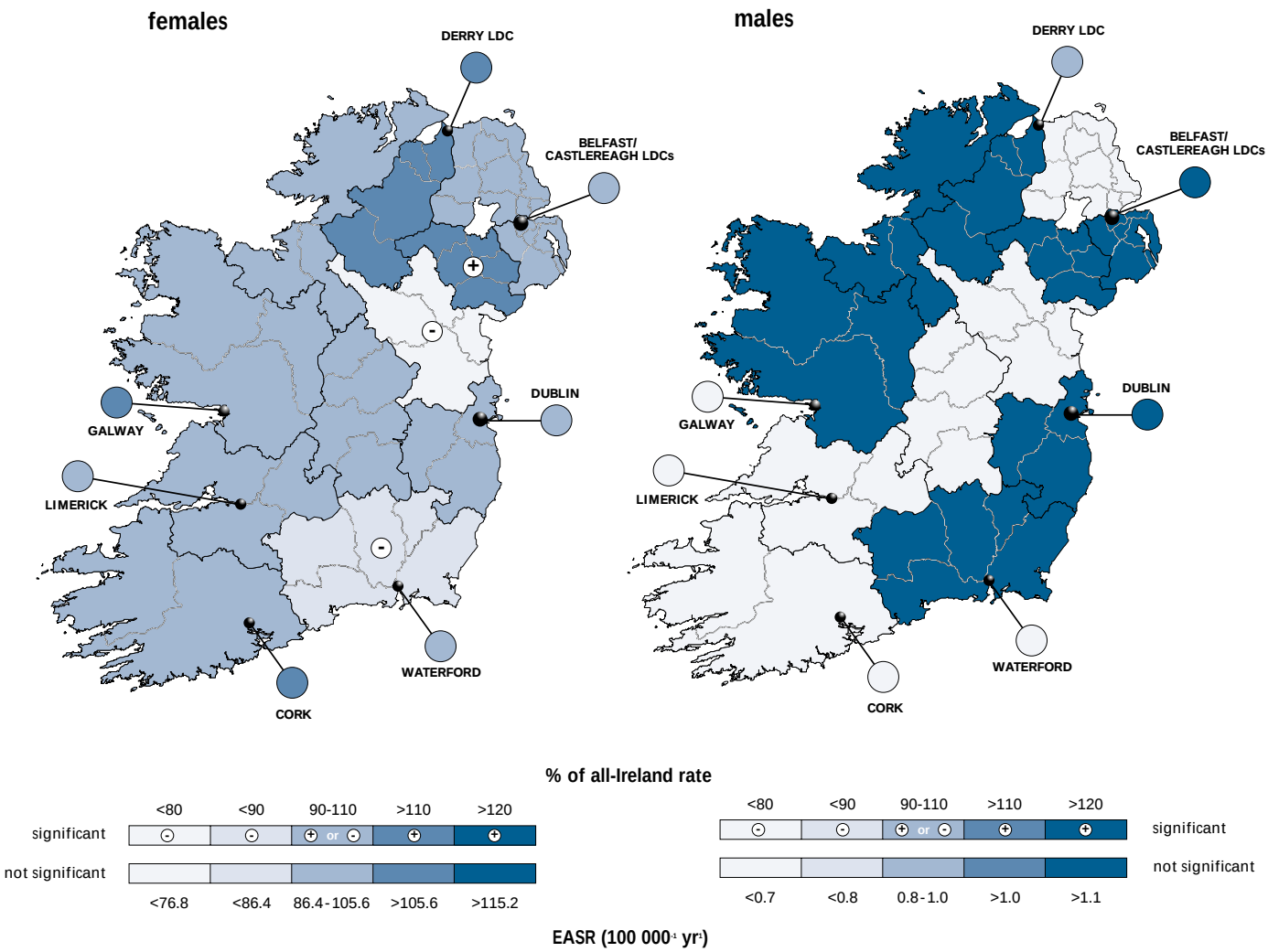


Figure 13.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: malignant cancer of the breast.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 13.3, Figure. 13.3

Overall rates for malignant breast cancer in women were lower in Ireland, especially RoI, than in England/Wales and Scotland. The relatively low rates for the Republic compared with the UK may, in part, be an artefact of the absence of formalised screening. Rates for Ireland as a whole, and for both NI and RoI, were above-average for the EU. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that RoI had the 8th highest recorded rate of female breast cancer of 15 EU member states, while the UK had the 9th highest rate. More complete data, based on 1994-96 estimates for England/Wales, suggest that the UK may rank higher than RoI.

Table 13.3 International comparison of incidence rates for malignant breast cancer (European age-standardised rates per 100 000 females per year).
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR
All-Ireland[1]	**96.0**
Northern Ireland[1]	100.1
Republic of Ireland[1]	93.8
Scotland[2]	105.7
England & Wales[3]	103.5
United Kingdom, incl. NI[4]	92.4
Netherlands (max. EUCAN rate)[4]	119.6
European Union average[4]	88.8

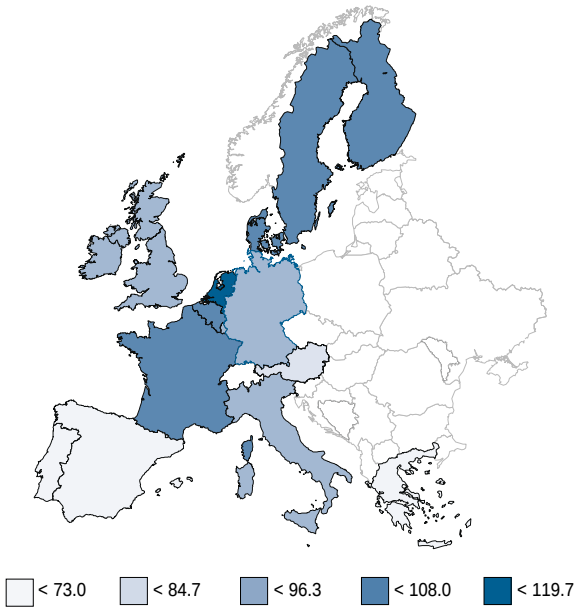


Figure 13.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: malignant cancer of the breast (females).

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

Risk factors for breast cancer in women include hormonal, genetic and dietary factors, but the relative importance of such factors, how they interact and the potential for avoidance of risk are not fully known or widely agreed. Research suggests quite different causes for breast cancer developing before and after the menopause. Risk is increased in women having an earlier onset of menstruation, no children, later age at first birth or later onset of menopause, indicating a role for reproductive hormones. Higher risk is also associated with a family history of breast cancer, while specific inherited mutations account for a small percentage of cases. The influence of dietary and nutritional factors has been subject of much study, but few clearcut conclusions have been drawn. Rapid growth and greater adult height appear to increase the risk of breast cancer. Consumption of green vegetables probably has a protective effect, while substantial weight gain (over a period of years or decades) and high intake of alcohol probably increase risk. High consumption of fat, particularly saturated fat, and of meat possibly increases the risk of breast cancer. Many other dietary factors (including consumption of dairy products) have also been studied as possible risk factors, but without clear agreement between studies. Of other factors studied, high doses of ionising radiation at a young age increase the risk of breast cancer, but this is probably not a significant risk factor in population terms.

Early detection of breast cancer is best achieved through mammography (breast X-ray), which may identify tumours (or possible tumours) before other signs or symptoms become apparent. Regular self-examination of the breasts, and clinical check-ups, can also help detect possible tumours. Many cases are detected as breast lumps (the majority of which prove to be non-cancerous) or associated swelling, dimpling or tenderness. All such signs, or other possible symptoms, should be investigated further, to confirm whether or not cancer is actually involved. Population-based screening has been fully operational in Northern Ireland since 1993, with women aged 50-64 routinely invited for mammography every three years. A similar programme has been introduced in the Republic of Ireland from 2000, initially for half of the female population.

Overall, European data indicate an average five-year relative survival rate (from date of diagnosis) of 73% in females and 72% in males (Berrino *et al*. 1999). As for other cancers, survival prospects are higher, on average, for cases detected at an early stage.

Recommendation

Given the high incidence of breast cancer in Ireland and most western countries, and the lack of general agreement on modifiable risk factors, much further research is needed on risk-reduction, perhaps particularly relating to dietary factors.

For health gain

- Women should ensure that they eat a healthy diet and do not exceed the recommended levels of fat intake.
- Women in the appropriate age groups should attend for breast screening when invited.
- Those with a strong family history should seek professional advice on the value of mammography at a younger age.
- Women should be advised to seek early diagnosis for symptoms of breast cancer (a lump, discharge from the nipple, puckering of the skin, thickening of breast tissue).

14. MALIGNANT CANCER OF THE UTERINE CERVIX

ICD-O.2 C53 *ICD-10* C53 *ICD-9* 180

Key facts

- Average of 259 new cases (105 deaths) per year, 1994-96.
- 10th most common site for cancer incidence, and 10th most common cause of cancer deaths, in females.
- Median age at diagnosis 46 years, much lower than for cancers as a whole.
- Incidence rates about 25% higher in urban compared with other populations.
- Incidence rates below average for the EU.

Summary statistics

Table 14.1

Incidence 1994-96

On average each year, 259 new cases of malignant cervical cancer were diagnosed in Ireland. This was the tenth most common site of malignant cancer in women. On average, Irish women were estimated to have a 1-in-120 chance of developing the malignant form of this cancer by age 74.

Note: A further 1150 non-invasive cases of cervical cancer were diagnosed each year, primarily through screening (smear followed by confirmatory tests). Most such cases refer to "severe dysplasia", which for cancer registration purposes is considered equivalent to in situ cancer of the cervix (intraepithelial neoplasia grade III, or CIN III) (Percy *et al*. 1990). Positive smears not confirmed by detailed histology are excluded from this figure.

Mortality 1994-96

Annual averages of 105 deaths among females were attributed to cervical cancer: about 2 deaths for every 5 malignant cases. This was the tenth most common cause of cancer deaths in females. On average, females were estimated to have a 1-in-300 chance of dying from this cancer by age 74.

Note: some deaths from cancer of the cervix may have been noted as "uterine cancer" and included within mortality data for "uterus, unspecified" (ICD-10 code C55).

Table 14.1 Summary statistics, all Ireland 1994-96: malignant cancer of the uterine cervix

	NEW CASES	DEATHS
Cases per year	259	105
% of total	2.1	2.1
Cumulative risk (0-74 yrs) %	0.83	0.34
Rates per 100 000 per year (±95% conf. limits):		
Crude rate	9.7	3.9
World age-standardised rate	8.4 ±0.6	3.1 ±0.4
European age-standardised rate	10.5 ±0.8	4.2 ±0.5
Mortality/incidence ratio	0.41	

Age profile

Figure 14.1

There were no cases of malignant cervical cancer in age-classes below 20 years. From age-class 20-24 onwards, All-Ireland incidence rates increased markedly to a peak in age-class 40-44. Age-specific rates then declined up to about age 60/65, followed by a smaller peak in age-class 70-74. This bimodal pattern may reflect, in part, early detection of cervical cancer through screening programmes in both NI and RoI (mainly involving women below 65 years) in combination with more advanced (later-detected) cancers in older women. Patterns were broadly similar between NI and RoI, and some apparent differences may reflect small sample sizes for NI. Median age at diagnosis was 46 years overall (48 in NI, 45 in RoI), much lower than for most cancers.

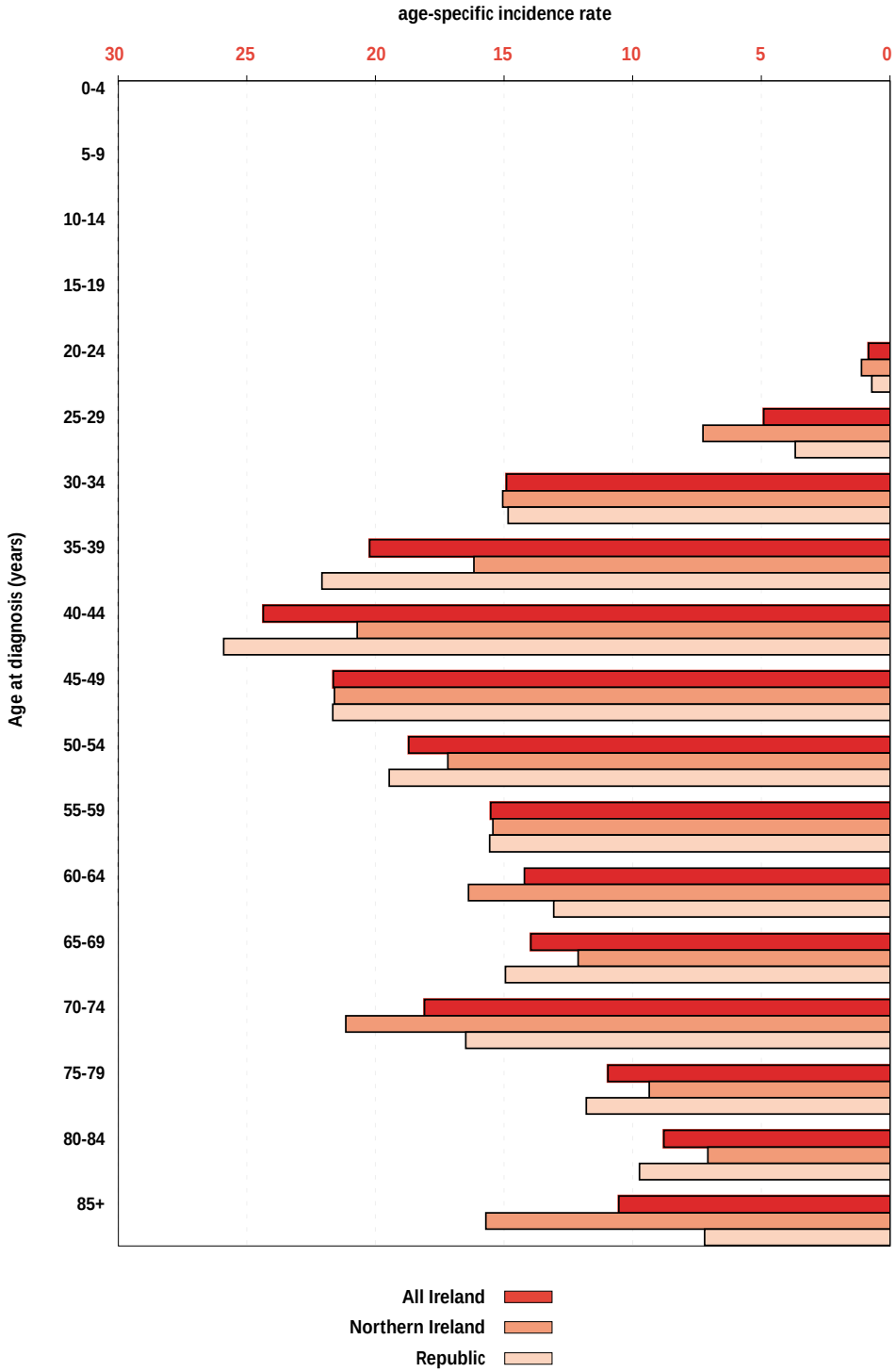


Figure 14.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the uterine cervix.

Table 14.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the uterine cervix

		all	urban		non-urban
All-Ireland	EASR	10.5	12.5	**	10.0
	±95% confidence limits	0.8	1.7		0.8
NI	EASR	10.2	12.7	*	9.3
	±95% confidence limits	1.3	2.8		1.5
RoI	EASR	10.7	12.5	*	10.2
	±95% confidence limits	0.9	2.2		1.0

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 14.2

NI v. RoI

There was no significant difference in rates between NI and RoI, for any subset of the data.

Urban v. other populations

For Ireland as a whole, incidence rates were significantly higher, by an estimated 25% (95% confidence limits 6-49%) among urban compared with other populations. Urban rates were also significantly higher than non-urban rates within both NI and RoI. Five of the seven health-board regions with relevant (city) populations showed the same apparent pattern, but the differences were not statistically significant.

Geographical variation in incidence rates: international

Table 14.3, Figure 14.2

Rates of malignant cervical cancer in Ireland were similar to those in England/Wales, lower than in Scotland, and below average for the EU. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that RoI had the ninth highest recorded rate of cervical cancer of 15 EU member states, while the UK as a whole had the fifth highest rate. (However, EUCAN figures for the UK appear to be overestimates, in comparison with available data for Northern Ireland, Scotland and England/Wales.)

Table 14.3 International comparison of incidence rates for malignant cancer of the uterine cervix (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR
All-Ireland[1]	**10.5**
Northern Ireland[1]	10.2
Republic of Ireland[1]	10.7
Scotland[2]	12.3
England & Wales[3]	10.3
United Kingdom, incl. NI[4]	13.7
Portugal (highest EUCAN rate)[4]	18.8
European Union average[4]	12.6

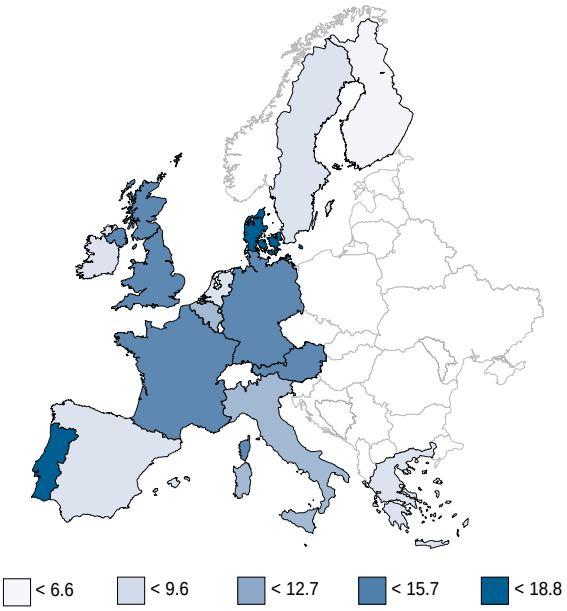


Figure 14.2 Age-standardised incidence rates (per 100 000 females per year) in the EU, 1995: malignant cancer of the uterine cervix.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection and survival

Infection by certain human papilloma viruses (especially HPV-16) is now considered the primary risk factor for cervical cancer. Related risk factors include high numbers of sexual partners and early age at first intercourse. Other factors contributing to increased risk include smoking, high parity (number of children), long-term use of oral contraceptives, and lower socio-economic status.

Symptoms of cervical cancer include abnormal vaginal bleeding or discharge, and it is important that such symptoms are investigated, if only to exclude other causes. However, cytological screening (the smear test) is currently the most effective means of early detection of cervical cancer. Women aged 20 to 65 should have a smear test at least every three to five years. Pre-invasive in situ lesions make up the majority of 'positive' test results. Not all in situ cases would necessarily progress to invasive cancer, but detection and treatment of such cases contributes to reducing the incidence of invasive cervical cancer. In England, a 42% decline in invasive cervical cancer incidence between 1988 and 1997 has been attributed to screening (Quinn *et al*. 1999). Early treatment of invasive cases is also facilitated, and an effective screening programme can be expected to reduce total mortality rates from cervical cancer. A population-based screening programme is in place in Northern Ireland, while screening in the Republic is being expanded from its current, less formalised structure.

Five-year relative survival rates (from date of diagnosis) are moderately high, averaging 62% for invasive cases across Europe as a whole (Berrino *et al*. 1999).

For health gain

- Measures to reduce smoking including special programmes targeted for women should be promoted.
- All eligible women should be encouraged to attend for a cervical smear.

15. MALIGNANT CANCER OF THE UTERINE CORPUS

ICD-O.2 C54 *ICD-10* C54 *ICD-9* 182

This category includes the main body of the uterus, but excludes the cervix (ICD-10 code C53: Chapter 14) and unspecified parts of the uterus (C55).

Key facts

- Average of 299 new cases (60 deaths) per year, 1994-96.
- 7th most common site for cancer incidence, and 14th most common cause of cancer deaths, in females.
- Incidence rates below the EU average.

Summary statistics

Table 15.1

Incidence 1994-96

On average each year, 299 new cases of malignant cancer of the uterine corpus (body of uterus) were diagnosed in females, in Ireland as a whole. This was the seventh most common cancer site in females and more common than invasive cancer of the cervix. On average, Irish women were estimated to have a 1-in-94 chance of developing this cancer by age 74.

Mortality 1994-96

Annual averages of 60 deaths were attributed to cancer of the uterine corpus: about 1 death for every 5 incident cases. This was the 14th most common cause of cancer deaths in females. On average, females were estimated to have a 1-in-540 chance of dying from this cancer by age 74.

Table 15.1 Summary statistics, all Ireland 1994-96: malignant cancer of the uterine corpus

	NEW CASES	DEATHS
Cases per year	299	60
% of total	2.4	1.2
Cumulative risk (0-74 yrs) %	1.06	0.18
Rates per 100 000 per year (±95% conf. limits):		
Crude rate	11.2	2.2
World age-standardised rate	8.6 ±0.6	1.4 ±0.2
European age-standardised rate	12.1 ±0.8	2.1 ±0.3
Mortality/incidence ratio	0.20	

Age profile

Figure 15.1

Less than 1% of malignant cancers of the uterine corpus occurred in women below age 35, but rates increased markedly from age 45 onwards (post-menopause). The highest rates occurred from age 55 onwards, with evidence of a broad peak in incidence across most of the older age-classes, apparently with a further, narrower peak in age-class 80-84. Patterns for NI and RoI were generally similar, and smaller sample sizes for NI may account for some minor discrepancies.

Median age at diagnosis was 64 years overall (65 in NI, 63 in RoI). The age-profile for cancer of this site thus has more in common with that for ovarian cancer (median 62 years) than that for cervical cancer (46 years). This is likely to reflect, in part, the common role of hormonal factors in cancer of the ovary and uterine corpus, and earlier detection (through screening) of cervical cancer compared with other gynaecological cancers.

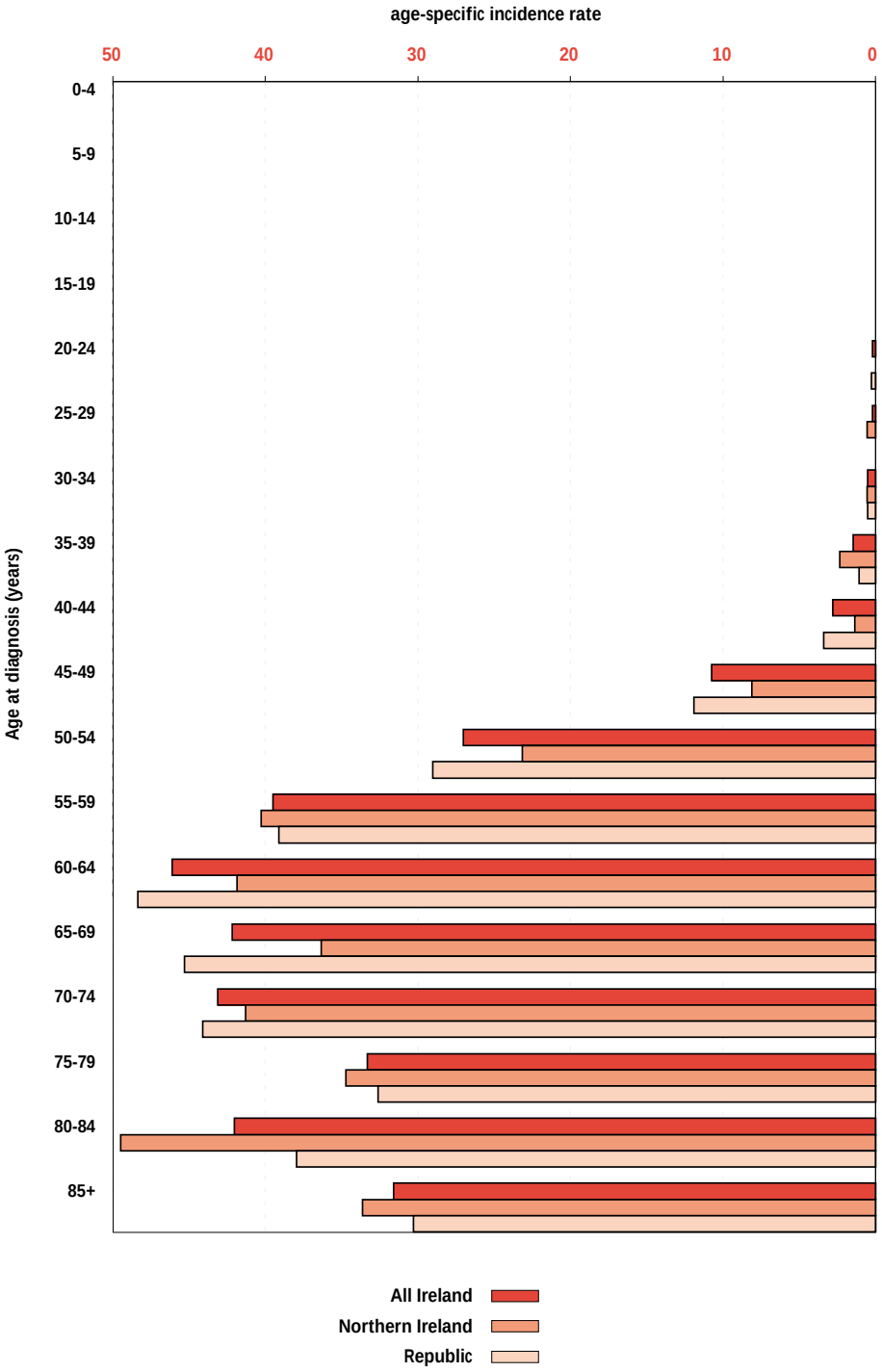


Figure 15.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the uterine corpus.

Table 15.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the uterine corpus

		all	urban	non-urban
All-Ireland	EASR	12.1	11.0	12.4
	±95% confidence limits	0.8	1.5	1.0
NI	EASR	11.2	10.0	11.7
	±95% confidence limits	1.3	2.4	1.6
RoI	EASR	12.5	11.6	12.7
	±95% confidence limits	1.0	2.0	1.2

Geographical variation in incidence rates: within Ireland

Table 15.2

NI v. RoI

Although rates of cancer of the uterine corpus appeared to be slightly lower in NI than RoI, the difference was not statistically significant.

Urban v. other populations

There was no significant difference in rates between urban and non-urban populations, although the figures for both NI and RoI suggest that rates may have been slightly lower in urban populations.

Geographical variation in incidence rates: international

Table 15.3, Figure 15.2

Irish rates for malignant cancer of the uterine corpus were below average for the EU, and slightly lower than recent estimates for England/Wales and Scotland. Figures from EUCAN (Ferlay *et al*. 1999) indicate that, in 1995, RoI had the 12th highest recorded rate of this cancer among the 15 EU member states, while the UK as a whole had the 13th highest rate.

Table 15.3 International comparison of incidence rates for malignant cancer of the uterine corpus (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR
All-Ireland[1]	**12.1**
Northern Ireland[1]	11.2
Republic of Ireland[1]	12.5
Scotland[2]	12.9
England & Wales[3]	12.5
United Kingdom, incl. NI[4]	13.1
Italy (highest EUCAN rate)[4]	23.4
European Union average[4]	15.5

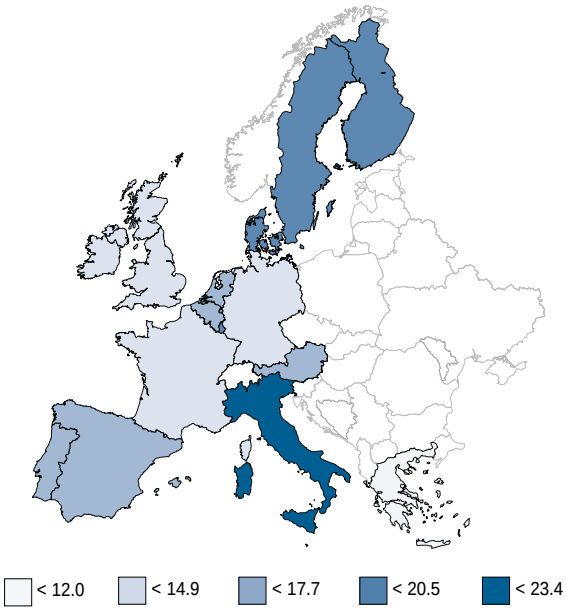


Figure 15.2 Age-standardised incidence rates (per 100 000 females per year) in the EU, 1995: malignant cancer of the uterine corpus.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection and survival

Hormonal factors play an important role in cancers of the uterine corpus (which mainly involve the endometrium or uterine lining). Factors that elevate levels or availability of oestrogens (or have the opposite effect on progesterone levels), including oestrogen-replacement therapy at menopause, increase the risk of endometrial cancers. Risk is increased five- to ten-fold by long-term oestrogen use (unless combined with progesterone treatment). Treatment of breast cancer with tamoxifen also slightly increases the subsequent risk of endometrial cancer. Late menopause, and absence of child-bearing, have also been implicated as risk factors. Risk is markedly decreased (by an average 50%) in women who have used combined oral contraceptives (which also have a protective effect against ovarian cancer). In addition to hormonal or hormone-mediated factors (which may account for around 50% of overall risk), other factors are also implicated. The risk of this cancer is increased in women with severe obesity, hypertension or diabetes mellitus, and there is a familio-genetic involvement in some cases. Dietary and nutritional factors are also believed to play a role. For example, there is evidence of positive correlations with high protein, fat and calorie intake, but an apparent protective effect of high intake of green vegetables.

Smear tests are not effective as a means of screening for early endometrial cancer, and screening by other methods may only be practical among high-risk individuals (e.g. tamoxifen-treated women). Regular pelvic examination in women over 40 may however be of value. Awareness of possible symptoms is also important, especially intermenstrual, post-menopausal or abnormally heavy uterine bleeding. Although such symptoms are more likely to have other causes, they should nevertheless be investigated further. If detected and treated at an early stage (as is generally the case), survival from cancer of the uterine corpus can be high. Overall, European data indicate an average five-year relative survival rate (from date of diagnosis) of about 75% (Berrino *et al*. 1999).

16. MALIGNANT CANCER OF THE OVARY

ICD-O.2 C56.9 *ICD-10* C56 *ICD-9* 183.0

This category includes so-called "borderline" malignancies of the ovary, which are categorised as malignant cancers under ICD-O.2 and ICD-10 (but were classed as tumours of uncertain behaviour under ICD-O.1 and ICD-9). Such tumours generally (but not always) have lower malignant potential. To facilitate international comparisons, figures are also provided for ovarian cancer excluding borderlines, and for ovary in combination with other uterine adnexa (ICD-10 C56 & C57.0-57.4 = ICD-9 183.0-183.9).

Key facts

- Average of 445 new cases (408 excluding "borderline" malignancies) and 296 deaths per year, 1994-96.
- 5th most common site for cancer incidence, and 4th most common cause of cancer deaths, in females.
- Incidence rates above EU average (even if "borderline" malignancies are excluded from Irish figures).

Summary statistics

Table 16.1

Incidence 1994-96

On average each year, 445 new cases of malignant ovarian cancer were diagnosed in Ireland as a whole (408 cases if “borderline” malignancies are excluded). This was the fifth most common cancer site in females (whether or not “borderlines” are included). On average, females were estimated to have a 1-in-70 chance of developing this cancer by age 74.

Mortality 1994-96

Annual averages of 296 deaths were attributed to ovarian cancer: 6 or 7 deaths for every 10 incident cases. Mortality rates for ovarian cancer are relatively high (e.g. in comparison with uterine cancers), as a high proportion of cases is not detected until the disease has progressed to an advanced stage. This was the fourth most common cause of cancer deaths in females. On average, females were estimated to have a 1-in-109 chance of dying from this cancer by age 74.

Table 16.1 Summary statistics, all Ireland 1994-96: malignant cancer of the ovary

	NEW CASES		DEATHS
	incl. “borderlines”	excl. “borderlines”	
Cases per year	445	408	296
% of total	3.6	3.3	5.8
Cumulative risk (0-74 yrs) %	1.43	1.32	0.92
Rates per 100 000 per year (±95% conf. limits):			
Crude rate	16.7	15.3	11.1
World age-standardised rate	12.8 ±0.7	11.6 ±0.7	7.7 ±0.6
European age-standardised rate	17.4 ±1.0	15.9 ±0.9	11.0 ±0.8
Mortality/incidence ratio	0.66	0.73	

Age profile

Figure 16.1

Incidence rates of ovarian cancer showed a fairly gradual increase from very low rates in teenagers up to about age 35, with a more rapid increase from about age 35 to 55. Peak rates were recorded among women over 65. Rates among NI women appeared to level off after about age 70, but a more sustained increase with age was apparent in RoI, up to about age 85. Age-specific rates generally appeared to be lower among NI women (but see Geographical variation, below). Median age at diagnosis was 62 years overall (62 in NI, 63 in RoI).

The proportion of "borderline" malignancies among total malignant cancers of the ovary was highest in younger women (but note that sample sizes are very small for some age-classes). In women age 55 or more, less than 10% of malignant ovarian cancers were diagnosed as "borderline" malignancies.

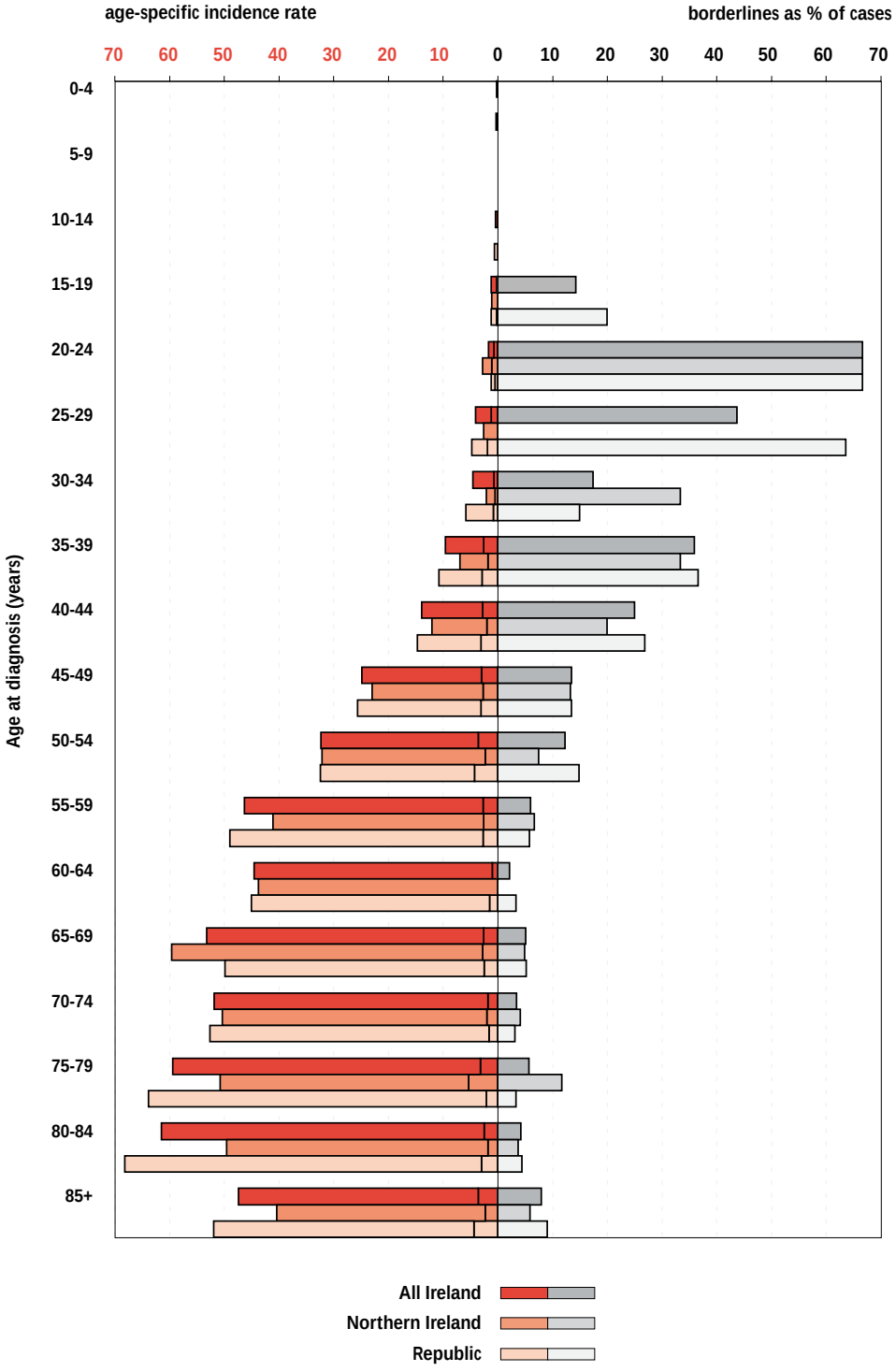


Figure 16.1 Average annual age-specific incidence rates (per 100,000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the ovary

Table 16.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the ovary

		all cases			cases excluding “borderline” cancers		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	17.4	18.1	17.2	15.9	16.9	15.6
	±95% confidence limits	1.0	2.0	1.1	0.9	1.9	1.1
NI	EASR	16.2	15.4	16.5	15.0	14.9	15.0
	±95% confidence limits	1.6	2.9	1.9	1.6	2.9	1.9
			*				
RoI	EASR	18.0	19.8	17.5	16.4	18.2	15.8
	±95% confidence limits	1.2	2.6	1.4	1.2	2.5	1.3

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 16.2, Figure 16.2

NI v. RoI

Estimated rates of malignant ovarian cancer were apparently higher in RoI than NI, but the difference was significant only for urban populations (data including " borderline" malignancies). When "borderline" malignancies are excluded, rates in NI remain lower than in RoI, but the differences are not statistically significant.

One possible contributory factor to the apparently lower rate in NI is that the present analysis excludes some ovarian tumours originally diagnosed as of uncertain behaviour (i.e. malignancy not confirmed, but tumour not specified as “borderline”). In NI, a higher proportion of ovarian tumours were diagnosed (or coded) as unspecified neoplasms of uncertain behaviour, compared with RoI.

Urban v. other populations

There were no significant differences in rates between urban and other populations.

Regional comparisons

Data in Fig. 16.2 include "borderline" malignancies. No significant variation in ovarian cancer rates was demonstrated among health-board areas.

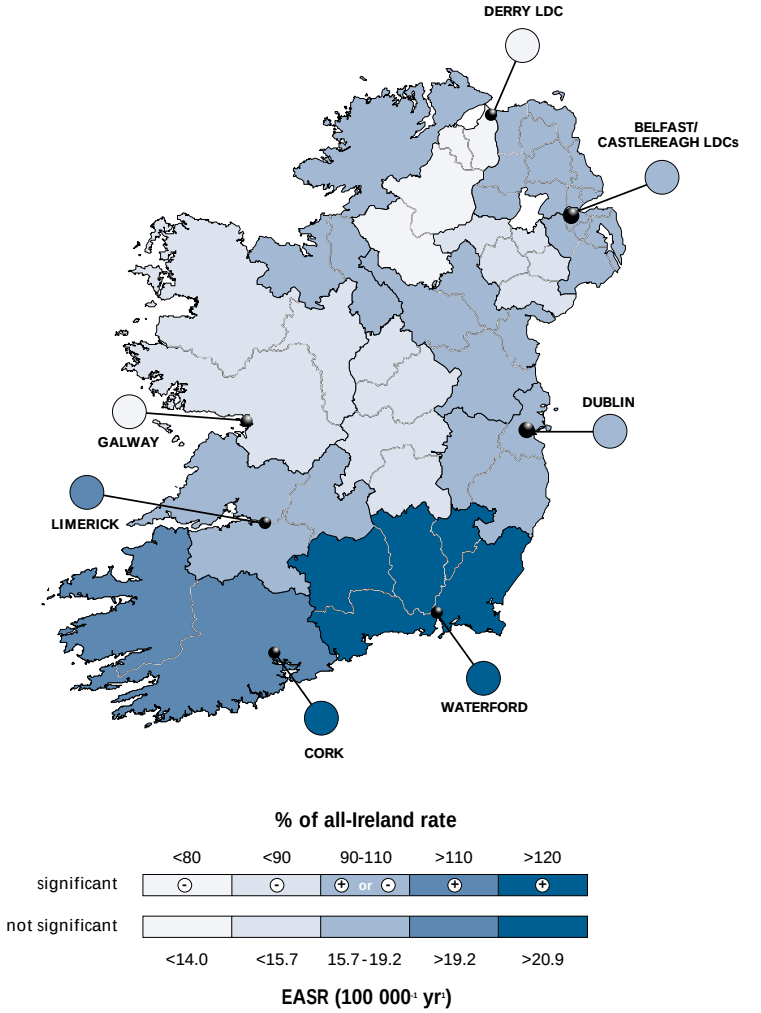


Figure 16.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: malignant cancer of the ovary.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 16.3, Figure 16.3

Caution is needed when comparing ovarian cancer rates between countries, as different coding rules may have been applied in different cases, particularly in relation to the inclusion or exclusion of borderline malignancies as malignant cancers. Figures from EUCAN (Ferlay *et al*. 1999) suggest that, in 1995, RoI had the fourth highest rate of ovarian (and related) cancer of 15 EU member states, while the UK had the fifth highest rate. There appears to be a marked north-south gradient in ovarian cancer rates within Europe, with rates highest in Scandinavian countries and Finland. It is difficult at present to assess the true ranking of Irish rates internationally, but Irish rates of malignant ovarian cancer nevertheless appear to be higher than the EU average.

Note that EU 1995 data from EUCAN are based on ICD-9 code 183 ("malignant neoplasm of ovary and other uterine adnexa"), equivalent to ICD-10 codes C56 and C57.0-57.4. In addition to ovary, they include fallopian tube, broad ligament, parametrium, round ligament and unspecified uterine adnexa. England/Wales 1994-96 data are broadly comparable to this (ICD-10 codes C56 and C57, which may include some other or unspecified parts of the female genital organs). Inclusion of other uterine adnexa in the Irish figures has a negligible effect on rates.

Table 16.3 International comparison of incidence rates for malignant cancer of the ovary and other uterine adnexa (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	including "borderlines"	not known	excluding "borderlines"
***All-Ireland**[1]	**17.5**	**-**	**16.0**
***Northern Ireland**[1]	16.3	-	15.1
*Republic of Ireland[1]	18.2	-	16.5
Scotland[2]	-	17.2	-
England & Wales[3]	-	17.8	-
United Kingdom, incl. NI[4]	-	16.2	-
Sweden (highest EUCAN rate)[4]	-	20.5	-
European Union average[4]	-	13.8	-

*Irish figures here include other uterine adnexa, and are thus slightly higher than rates given in Tables 16.1-16.2.

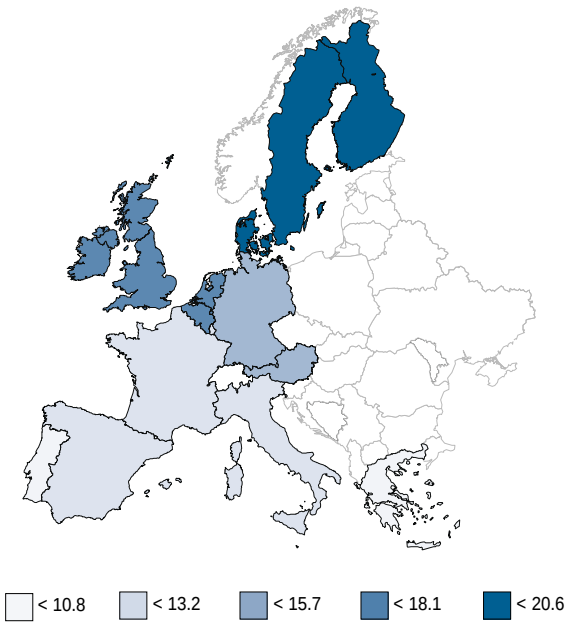


Figure 16.3 Age-standardised incidence rates (per 100 000 females per year) in the EU, 1995: malignant cancer of the ovary and other uterine adnexa.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

A number of lines of evidence indicate that hormonal factors (related to the frequency of ovulation) play an important role in the development of ovarian cancer. The risk of ovarian cancer is higher among women who have never borne children, compared with women who have. Use of the oral contraceptive pill has been shown to reduce the risk of ovarian (and endometrial) cancer by about 50%, and the risk is also lower in women who cannot ovulate. Inherited familial factors are also involved in a proportion of cases, and previous history of breast cancer is known to increase the risk of ovarian cancer. Other factors (e.g. diet, obesity) may also play a role, but more research is needed to clarify these and the potential for further risk-reduction.

Ovarian cancer is often asymptomatic in its early stages, and no effective method of routine screening is currently established. Studies are underway in the USA to assess the potential value of screening older women by a combination of transvaginal sonography and measurement of serum levels of the CA125 antigen. Of the possible symptoms of ovarian cancer, distension of the abdomen (from fluid accumulation) is the most common but is generally seen in late stages of the disease. This, and other non-specific symptoms such as abdominal discomfort, should always be investigated further. However, most patients are at advanced stages when diagnosed, and prognosis is thus generally poor. For Europe as a whole, five-year relative survival rates (from date of diagnosis) average about 35% (Berrino *et al*. 1999).

17. MALIGNANT CANCER OF THE PROSTATE

ICD-O.2 C61.9 *ICD-10* C61 *ICD-9* 185

Key facts

- Average of 1550 new cases (718 deaths) per year, 1994-96.
- 2nd most common cancer site, and 2nd most common cause of cancer deaths, in males.
- Incidence rates about 18% higher in Republic of Ireland (RoI) than in Northern Ireland (NI).
- Incidence rates above average for the EU, especially in RoI.

Summary statistics

Table 17.1

Incidence 1994-96

On average each year, 1550 new cases of malignant prostate cancer were diagnosed in males, in Ireland as a whole. Prostate was the second most common cancer site in males (after skin). On average, Irish males were estimated to have a 1-in-21 chance of developing this cancer by age 74.

Mortality 1994-96

An annual average of 718 deaths among males was attributed to malignant prostate cancer: about 9 deaths for every 20 incident cases. This was the second most common cause of cancer deaths in males (after lung). On average, males were estimated to have a 1-in-67 chance of dying from this cancer by age 74.

Table 17.1 Summary statistics, all Ireland 1994-96: malignant cancer of the prostate

	NEW CASES	DEATHS
Cases per year	1550	718
% of total	11.9	12.2
Cumulative risk (0-74 yrs) %	4.7	1.5
Rates per 100 000 per year (±95% conf. limits):		
Crude rate	59.6	27.6
World age-standardised rate	41.5 ±1.2	18.3 ±0.8
European age-standardised rate	67.1 ±2.0	31.8 ±1.4
Mortality/incidence ratio	0.45	

Age profile

Figure 17.1

With a single exception, no cases of malignant prostate cancer were diagnosed in patients below age 40, and there were very few cases (only 0.5% of the total) below age 50. Thereafter, rates rose rapidly and steadily with age, peaking in the oldest age-class (85+ years). Patterns were very similar for NI and RoI, but RoI rates were higher for all age-classes between 50 and 84 years. Median age at diagnosis was 74 years (for both NI and RoI).

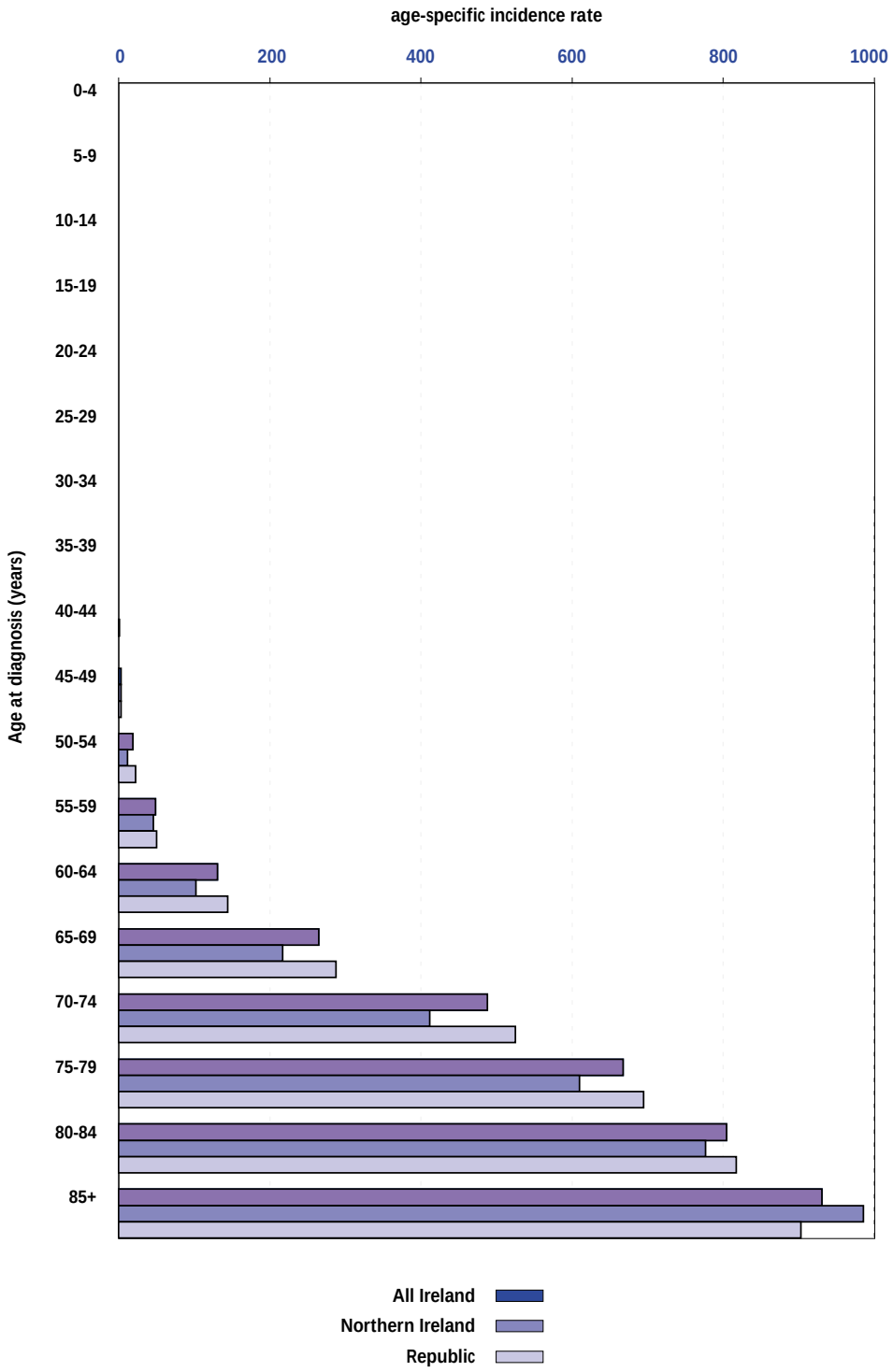


Figure 17.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: malignant cancer of the prostate.

Table 17.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: malignant cancer of the prostate

		all	urban		non-urban
All-Ireland	EASR	67.1	63.4		68.3
	±95% confidence limits	2.0	4.1		2.3
NI	EASR	60.0	50.7	**	63.9
	±95% confidence limits	3.3	6.0		4.0
		**	**		*
RoI	EASR	70.6	72.0		70.2
	±95% confidence limits	2.5	5.7		2.7

Geographical variation in incidence rates: within Ireland

Table 17.2, Figure 17.2

NI v. RoI

Rates of prostate cancer were significantly higher in RoI than in NI during 1994-96 as a whole, by an estimated 18% (95% confidence limits 11-25%). Rates in RoI were also significantly higher for both urban and non-urban components of the population.

Although population-based screening for this cancer is not undertaken in either NI or RoI, variation in usage of Prostate Specific Antigen (PSA) testing might contribute in part to geographical variation in detection rates of this cancer. (Note, however, that figures presented include only those cancers of the prostate that were confirmed by further tests.) Variations in the proportion of cases detected incidentally (e.g., during surgery for other conditions, or at post-mortem) could also contribute to apparent geographical variations in incidence.

Urban v. other populations

NI figures showed a significantly lower rate of prostate cancer in urban compared with other populations, but there was no significant difference within the RoI figures. At a regional level, only RoI Eastern health-board area showed a significant difference between urban and non-urban areas, with urban rates again lower.

Regional comparisons

Prostate cancer rates were significantly lower in NI Eastern health-board area and Belfast, and significantly higher in RoI Eastern and RoI South Eastern areas, than elsewhere. Urban populations in Waterford and Cork cities had (despite wide confidence limits) significantly higher rates than other urban populations in Ireland as a whole.

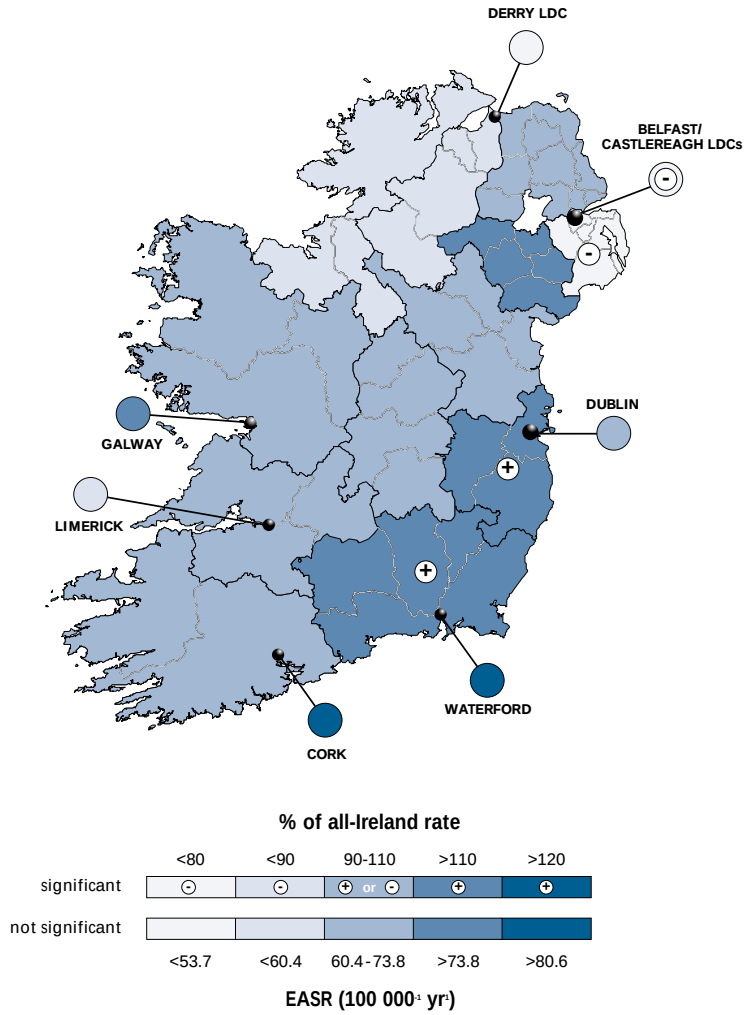


Figure 17.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: malignant cancer of the prostate.
Rates within cities are included within health-board rates and also indicated separately. Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 17.3, Figure 17.3

Prostate cancer rates for Ireland as a whole, and especially for RoI, were above average for the EU. Compared with England/Wales, All-Ireland and RoI rates were higher but NI rates were lower. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that RoI had the 5th highest recorded rate of prostate cancer of 15 EU member states, while the UK as a whole had the 10th highest rate. The UK rate quoted by EUCAN appears to be an underestimate, however, while the revised 1995 figure for RoI is > 69.8 cases per 100 000 (higher than the mapped rate).

Table 17.3 International comparison of incidence rates for malignant cancer of the prostate (European age-standardised rates per 100 000 per year).
Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR
All-Ireland[1]	**67.1**
Northern Ireland[1]	60.0
Republic of Ireland[1]	70.6
Scotland[2]	67.5
England & Wales[3]	64.6
United Kingdom, incl. NI[4]	50.6
Finland (highest EUCAN rate)[4]	100.7
European Union average[4]	55.5

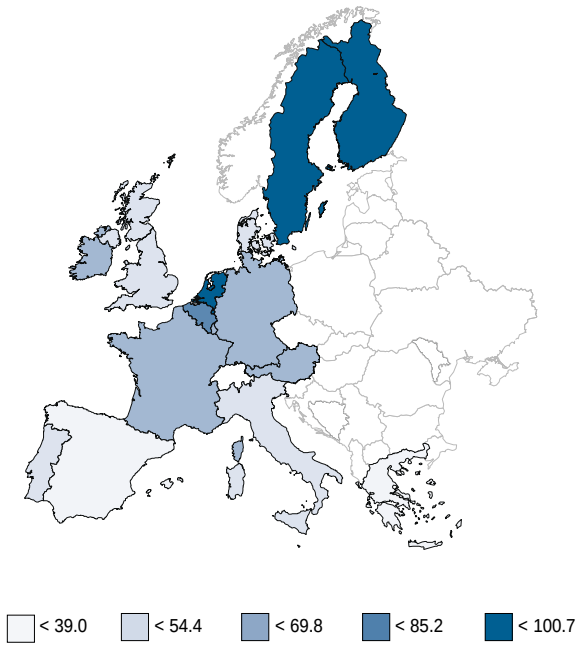


Figure 17.3 Age-standardised incidence rates (per 100 000 males per year) in the EU, 1995: malignant cancer of the prostate.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

There is evidence that hormonal (or hormone-mediated) factors play an important role in the development of prostate cancer. Although most research has focused on the involvement of sex hormones (particularly testosterone), recent work has also identified a link between high blood-levels of insulin-like growth factor 1 (IGF-1) and risk of prostate cancer. In terms of ultimate causative factors, there is research suggesting that variation in prostate cancer rates internationally is not simply a reflection of genetic factors, but also reflects environmental factors. Genetic predisposing factors are involved in a proportion of cases, however, and links to inherited variations in at least one specific gene have been established to date. Further clarification of the protective or harmful involvement of dietary and other factors, and the mechanisms through which they operate, is required.

Prostate cancer may present as symptoms relating to urination, or abdominal pain, but other conditions (prostate infection and benign enlargement of the prostate) have many of the symptoms in common. Cases are often detected incidentally, including post mortem, without there being other evidence of the disease. Research is underway internationally to assess the possible value of systematic screening for elevated levels of Prostate Specific Antigen (PSA) among males. Although individuals can already request this test within Ireland, its possible use for population-based screening is controversial. Proponents of screening argue that mortality from prostate cancer can be reduced through earlier detection. Others argue (among other points) that this benefit needs to be adequately quantified and also needs to be weighed against effects on quality of life and on health-care resources. Note, however, that a high proportion of men develop prostate cancer in old age, and slow-growing cancers (without obvious symptoms and perhaps having little impact on mortality) are relatively frequent. Overall five-year relative survival rates (from date of diagnosis) average about 56% for Europe as a whole (Berrino *et al*. 1999).

For health gain

- Men's health, including raised awareness of the importance of early investigation of symptoms, should be a focus for a general health education programme.

18. MALIGNANT CANCER OF THE TESTIS (summary)

ICD-O.2 C62 *ICD-10* C62 *ICD-9* 186

Key facts

- Average of 132 new cases (but only 12 deaths) per year, 1994-96.
- Median age at diagnosis 32 years (much younger than for most cancers).
- Incidence rate about 27% higher in Northern Ireland (NI) than in the Republic (RoI).
- All-Ireland incidence rates lower than, but NI rates similar to, EU average.

Summary statistics

Table 18.1

Incidence 1994-96

On average each year, 132 new cases of malignant testicular cancer were diagnosed in Ireland as a whole. Irish males were estimated to have, on average, a 1-in-280 chance of developing this cancer by age 74, or a 1-in-380 chance by age 40. Testicular cancer is primarily a disease of young men, and median age at diagnosis was 32 years.

European age-standardised rates were significantly higher in Northern Ireland than in the Republic by about 27% (95% confidence limits 2-57%).

Mortality 1994-96

Only 12 deaths annually, on average, were attributed to testicular cancer: just under 1 death for every 10 incident cases. This reflects major advances in treatment of this cancer and consequent improvements in survival. On average, males were estimated to have a 1-in-3500 chance of dying from this cancer by age 74.

Table 18.1 Summary statistics, all Ireland 1994-96: malignant cancer of the testis

	NEW CASES	DEATHS
Cases per year	132	12
% of total	1.0	0.2
Cumulative risk (0-74 yrs) %	0.36	0.03
Rates per 100 000 per year (±95% conf. limits):		
Crude rate	5.1	0.45
World age-standardised rate	4.8 ±0.5	0.39 ±0.13
European age-standardised rate	5.0 ±0.5	0.46 ±0.15
Mortality/incidence ratio	0.09	

19. MALIGNANT CANCER OF THE KIDNEY, EXCEPT RENAL PELVIS (summary)

ICD-O.2 C64 *ICD-10* C64 *ICD-9* 189.0

Figures presented here relate to kidney only, but comparison with EU figures is based on kidney in combination with renal pelvis (ICD-10 C65), ureter (C66), and urethra, paraurethral gland and unspecified urinary organs (C68).

Key facts

- Average of 341 new cases per year, 1994-96: 135 in females, 206 in males.
- Average of 181 deaths per year: 68 in females, 113 in males.
- Age-standardised incidence and mortality rates about twice as high in males as in females
- 10th most common site for cancer incidence in males, 16th in females.
- 10th most common cause of cancer deaths in males, 13th in females.
- All-Ireland incidence rates (for kidney and other urinary-organ cancers, excluding bladder) similar to EU average for females, below EU average for males.

Summary statistics

Table 19.1

Incidence 1994-96

On average each year, 135 new cases of malignant cancer of the kidney were diagnosed in females, 206 in males, in Ireland as a whole. Kidney was the 10th most common cancer site in males, 16th most common in females. European-age-standardised rates were significantly higher among males than females, by about 88% (95% confidence limits 65-114%). On average, females were estimated to have a 1-in-250 chance of developing this cancer by age 74, males a 1-in-125 chance. Median age at diagnosis was 68 years for females and 65 years for males.

Mortality 1994-96

Annual averages of 68 deaths among females and 113 deaths among males were attributed to cancer of the kidney: about 5 deaths for every 10 incident cases. This was the 10th most common cause of cancer deaths in males, 13th in females. Mortality rates (EASRs) were significantly higher in males than females, by about 127% (95% confidence limits 88-172%). On average, females were estimated to have a 1-in-580 chance, males a 1-in-250 chance, of dying from this cancer by age 74.

Table 19.1 Summary statistics, all Ireland 1994-96: malignant cancer of the kidney, except renal pelvis

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	135	206	68	113
% of total	1.1	1.6	1.3	1.9
Cumulative risk (0-74 yrs) %	0.40	0.80	0.17	0.41
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	5.1	7.9	2.5	4.3
World age-standardised rate	3.5 ±0.4	6.7 ±0.5	1.6 ±0.2	3.5 ±0.4
European age-standardised rate	5.0 ±0.5	9.3 ±0.7	2.3 ±0.3	5.1 ±0.6
Mortality/incidence ratio	0.44	0.55		

20. MALIGNANT CANCER OF THE BLADDER (summary)

ICD-O.2 C67 *ICD-10* C67 *ICD-9* 188

Key facts

- At least 705 cases per year, 1994-96: 210 in females, 495 in males.
- Average of 265 deaths per year: 87 in females, 178 in males.
- Age-standardised incidence and mortality rates about three times higher in males than females.
- 5th most common site for cancer incidence in males, 12th (or higher) in females.
- 8th most common cause of cancer deaths in males, 11th in females.
- Irish incidence rates above EU average for females, at least, but international comparisons are complicated by lack of consistency in how "malignant" tumours of the bladder are defined.

Summary statistics

Table 20.1

Incidence 1994-96

On average each year, at least 210 new cases of malignant bladder cancer were registered in females and at least 495 in males, in Ireland as a whole. (Some uncertainty in these figures reflects lack of international consensus on the definition of malignant bladder cancer.) Bladder was the 5th most common cancer site in males (regardless of definitions used), and at least the 12th most common in females. European-age-standardised rates were significantly higher among males than females, by about 211% (95% confidence limits 180-243%). On average, females were estimated to have at least a 1-in-180 chance of developing this cancer by age 74, males at least 1-in-62 chance. Median age at diagnosis was 72 years for females and 71 years for males.

Mortality 1994-96

Annual averages of 87 deaths among females and 178 deaths among males were attributed to bladder cancer during 1994-96: up to 2 deaths for every 5 incident cases. This was the 8th most common cause of cancer deaths in males, 11th in females. Mortality rates (EASRs) were significantly higher in males than females, by about 214% (95% confidence limits 167-269%). On average, females were estimated to have a 1-in-690 chance, males a 1-in-240 chance, of dying from this cancer by age 74.

Table 20.1 Summary statistics, all Ireland 1994-96: malignant cancer of the bladder

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	210	495	87	178
% of total	1.7	3.8	1.7	3.0
Cumulative risk (0-74 yrs) %	0.57	1.61	0.14	0.42
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	7.9	19.0	3.3	6.9
World age-standardised rate	4.7 ±0.4	14.2 ±0.8	1.5 ±0.2	4.7 ±0.4
European age-standardised rate	7.0 ±0.6	21.9 ±1.1	2.5 ±0.3	7.8 ±0.7
Mortality/incidence ratio	0.41	0.36		

21. MALIGNANT CANCER OF THE BRAIN (summary)

ICD-O.2 C71 *ICD-10* C71 *ICD-9* 191

Figures presented are for primary, malignant tumours. Cancer of the meninges (ICD-10 C70) or of the central nervous system (C72) other than the brain itself are excluded, except where comparison is made with EU figures.

Key facts

- Average of 315 new cases per year, 1994-96: 148 in females, 200 in males.
- Average of 297 deaths per year: 130 in females, 167 in males.
- Age-standardised incidence and mortality rates about 50% higher in males than females.
- 11th most common site for cancer incidence in males, 15th in females.
- 8th most common cause of cancer deaths in females, 9th in males.
- Median age at diagnosis 57 years for females and 55 years for males (lower than for cancers as a whole).
- All-Ireland rates (malignant cancer of brain, meninges & central nervous system) similar to EU average.

Summary statistics

Table 21.1

Incidence 1994-96

On average each year, 148 new cases of malignant cancer of the brain were diagnosed in females, 200 in males, in Ireland as a whole. This was the 11th most common site of malignant cancers in males, and 16th most common in females. European-age-standardised rates were significantly higher among males than females, by about 51% (95% confidence limits 33-81%). On average, females were estimated to have a 1-in-210, males a 1-in-130, chance of developing this cancer by age 74. Median age at diagnosis was 57 years for females, 55 years for males, lower than for cancers as a whole.

These figures exclude brain tumours diagnosed as benign or of unspecified behaviour (but which nevertheless can cause death). These averaged a further 20 cases in females, 18 in males, each year.

Mortality 1994-96

Annual averages of 130 deaths among females and 167 deaths among males were attributed to malignant cancer of the brain: 8 or 9 deaths for every 10 incident cases. This was the eighth most common cause of cancer deaths in females, ninth in males. Mortality rates (EASRs) were significantly higher in males than females, by about 48% (95% confidence limits 29-70%). On average, females were have estimated to have a 1-in-240 chance, males a 1-in-160 chance, of dying from this cancer by age 74.

Note that it is possible that some deaths ascribed to malignant brain tumours may have referred to fatal tumours that were, nevertheless, of benign or uncertain behaviour.

Table 21.1 Summary statistics, all Ireland 1994-96: malignant cancer of the brain

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	148	200	130	167
% of total	1.2	1.5	2.5	2.8
Cumulative risk (0-74 yrs) %	0.47	0.74	0.42	0.63
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	5.6	7.7	4.9	6.4
World age-standardised rate	4.8 ±0.5	7.0 ±0.6	3.7 ±0.4	5.6 ±0.5
European age-standardised rate	5.7 ±0.5	8.6 ±0.7	4.9 ±0.5	7.3 ±0.7
Mortality/incidence ratio	0.87	0.83		

22. LYMPHOMA

ICD-O.2 morphologies M9590/3-M9714/3 *ICD-10* C81-C85 *ICD-9* 200-201, 202.0-202.2, 202.8

Lymphomas comprise a mixed group of neoplastic conditions that arise in lymphoreticular tissues, principally the lymph nodes, and typically occur as solid tumours in those tissues. They include Hodgkin's disease (C81), follicular [nodular] non-Hodgkin's lymphoma (NHL) (C82), diffuse NHL (C83), peripheral & cutaneous T-cell lymphomas (C84), and other/unspecified types of NHL (C85).

Key facts

- Average of 682 new cases per year, 1994-96: 317 in females, 365 in males.
- Average of 340 deaths per year: 150 in females, 190 in males.
- Age-standardised rates higher in males than females, by about 33% (incidence), 63% (mortality).
- Incidence rate among males about 20% higher in Northern Ireland (NI) than in the Republic (RoI).
- All-Ireland incidence rate for females higher than, for males similar to, EU average.

Summary statistics

Table 22.1

Incidence 1994-96

On average each year, 317 new cases of lymphoma were diagnosed in females, 365 in males, in Ireland as a whole. European-age-standardised rates were significantly higher among males than females, by about 33% (95% confidence limits 22-46%). On average, females were estimated to have a 1-in-100 chance of developing lymphoma by age 74, males a 1-in-80 chance.

Most diagnoses (48%) were of "other and unspecified" non-Hodgkin's lymphoma, with diffuse NHL (23%) the next most frequent ICD-10 category. Hodgkin's disease accounted for 16%, follicular NHL 9%, and peripheral and T-cell lymphomas 4% of cases.

Mortality 1994-96

Annual averages of 150 deaths among females and 190 deaths among males were attributed to lymphoma: about 5 deaths for every 10 incident cases. Mortality rates (EASRs) were significantly higher in males than females, by about 63% (95% confidence limits 44-86%). On average, females were estimated to have a 1-in-245 chance, males a 1-in-150 chance, of dying from lymphoma by age 74.

Table 22.1 Summary statistics, all Ireland 1994-96: lymphoma

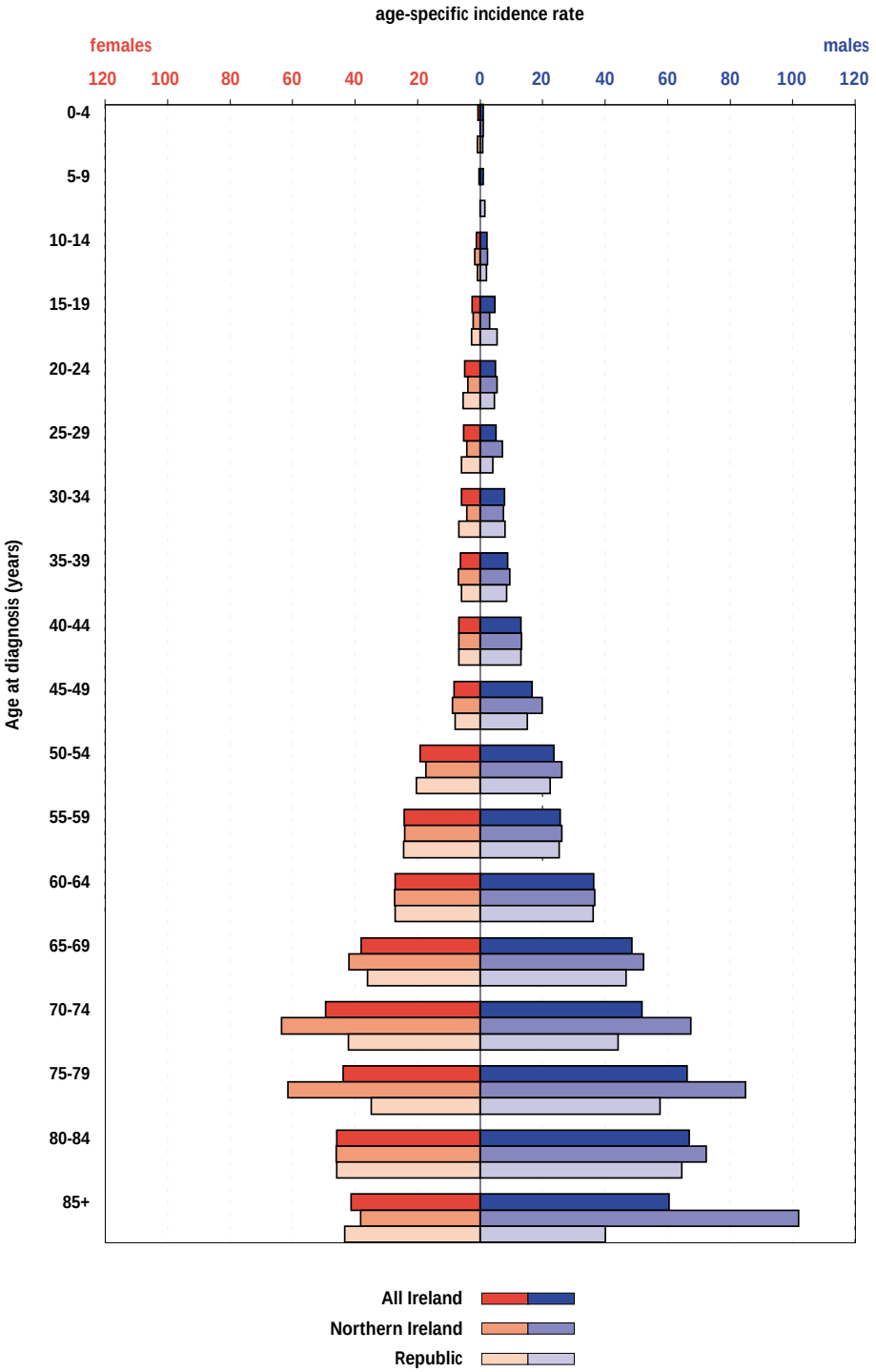
	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	317	365	150	190
% of total	2.6	2.8	2.9	3.2
Cumulative risk (0-74 yrs) %	0.99	1.25	0.41	0.67
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	11.9	14.0	5.7	7.3
World age-standardised rate	8.9 ±0.6	11.9 ±0.7	3.4 ±0.4	5.8 ±0.5
European age-standardised rate	11.8 ±0.8	15.8 ±1.0	5.1 ±0.5	8.3 ±0.7
Mortality/incidence ratio	0.47	0.52		

Age profile

Figure 22.1

Lymphoma was recorded very rarely in children, but rates appeared to show a very gradual increase from about age 10 onwards. A more marked increase was seen from about age 40 in males and about age 50 in females, and All-Ireland rates peaked in males from about age 75 onwards, females from about age 70. Rates were higher among males than females in most age-classes. Patterns were broadly similar for NI and RoI, which had very similar age-specific rates up to about age 70. For older males, and females aged 70-79, rates were higher in NI. Median age at diagnosis was 65 years for females overall (67 in NI, 62 in RoI) and 60 years for males (62 in NI, 58 in RoI).

Hodgkin's disease made up only a small proportion of lymphoma cases overall, but the proportion was highest in younger age-classes. The age-profile was more even than for lymphomas as a whole, but with an indication of bimodality (separate peaks in young-to-middle-aged and older adults).



Figures 22.1 Average annual age-specific incidence rates (per 100 000) for All Ireland, Northern Ireland and Republic of Ireland, 1994-96: all lymphomas (including Hodgkin's disease and non-Hodgkin's lymphomas).

Table 22.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: lymphoma

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	11.8	11.4	11.9	15.8	16.0	15.7
	±95% confidence limits	0.8	1.5	0.9	1.0	2.0	1.1
NI	EASR	12.3	11.1	12.8	17.7	17.5	17.8
	±95% confidence limits	1.4	2.4	1.6	1.8	3.4	2.1
					**		**
RoI	EASR	11.5	11.6	11.5	14.8	14.9	14.8
	±95% confidence limits	1.0	2.0	1.1	1.1	2.5	1.3

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 22.2, Figure 22.2

NI v. RoI

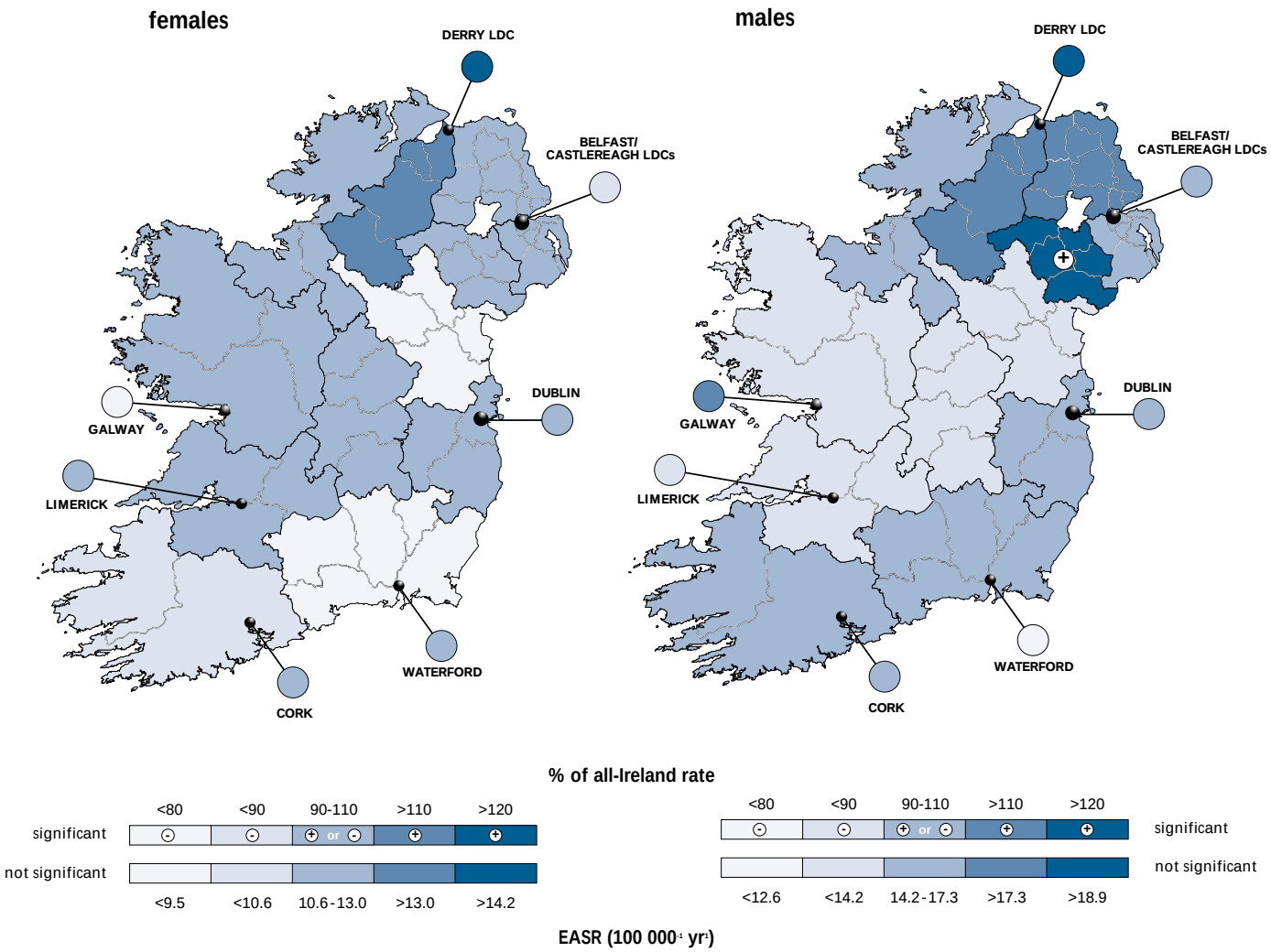
Lymphoma rates in males were significantly higher in NI than in RoI for 1994-96 as a whole, by an estimated 20% (95% confidence limits 5-36%). Rates were also significantly higher in NI than RoI for non-urban (but not for urban) populations. Rates in females showed no significant differences between NI and RoI.

Urban v. other populations

There were no significant differences between urban and other populations at any scale (All-Ireland, NI, RoI or regional).

Regional comparisons

Incidence rates of lymphoma were significantly higher (57 cases) among males in NI Southern health-board area than elsewhere in Ireland. Otherwise, there was no significant variation among regions.



Figures 22.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: lymphoma.

Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 22.3, Figures. 22.3-4

Rates of lymphoma (Hodgkin's disease and non-Hodgkin's lymphomas combined) among Irish females were above the EU average. Rates among Irish males, as a whole, were similar to the EU average, but NI figures were higher than the EU average. In 1995, figures from EUCAN (Ferlay et al. 1999) indicated that, among females, RoI had the third highest recorded rate of lymphoma of 15 EU member states, while the UK had the second highest rate. RoI had the seventh highest recorded rate among EU males in 1995 (UK third highest rate).

Geographical patterns of lymphoma in Europe appear to differ quite markedly between non-Hodgkin's lymphomas (NHL) and Hodgkin's disease (Figs. 25.3-25.4). However, small numbers of cases for the latter, and possible geographical variations in diagnostic criteria, could contribute to apparent differences. Separate incidence rates for NHL and Hodgkin's disease should thus be interpreted with caution.

Figures presented below for other Scotland, England/Wales and the EU additionally include, within the category "non-Hodgkin's lymphoma", malignant histiocytosis, hairy cell leukaemia, Letterer-Siwe disease, malignant mast-cell tumours, true histiocytic lymphoma and "other and unspecified malignant neoplasms of lymphoid and histiocytic tissue". The specific conditions listed here are rare (total 9 cases in Ireland 1994-96) and their inclusion would not change the Irish figures for NHL rates. Inclusion of "other and unspecified" conditions would have a more marked effect on apparent rates for Ireland, but would include (for example) some diagnoses of leukaemia for which the basis of diagnosis was not considered adequate for more precise registration.

Table 22.3 International comparison of incidence rates for lymphoma (European age-standardised rates per 100 000 per year): non-Hodgkin's lymphomas (NHL), Hodgkin's disease and total.

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)			EASR (males)		
	NHL	Hodgkin's	total	NHL	Hodgkin's	total
All-Ireland[1]	**10.2**	**1.65**	**11.8**	**13.2**	**2.59**	**15.8**
Northern Ireland[1]	10.8	1.54	12.3	14.7	2.97	17.7
Republic of Ireland[1]	9.8	1.70	11.5	12.4	2.40	14.8
Scotland[2]	11.6	2.0	13.5	14.8	2.9	17.6
England & Wales[3]	9.8	-	-	14.4	-	-
United Kingdom, incl. NI[4]	9.6	2.17	11.7	14.7	2.59	17.3
Italy (highest EUCAN total rates)[4]	10.3	2.04	12.4	16.7	2.75	19.4
European Union average[4]	8.5	1.74	10.3	13.5	2.33	15.8

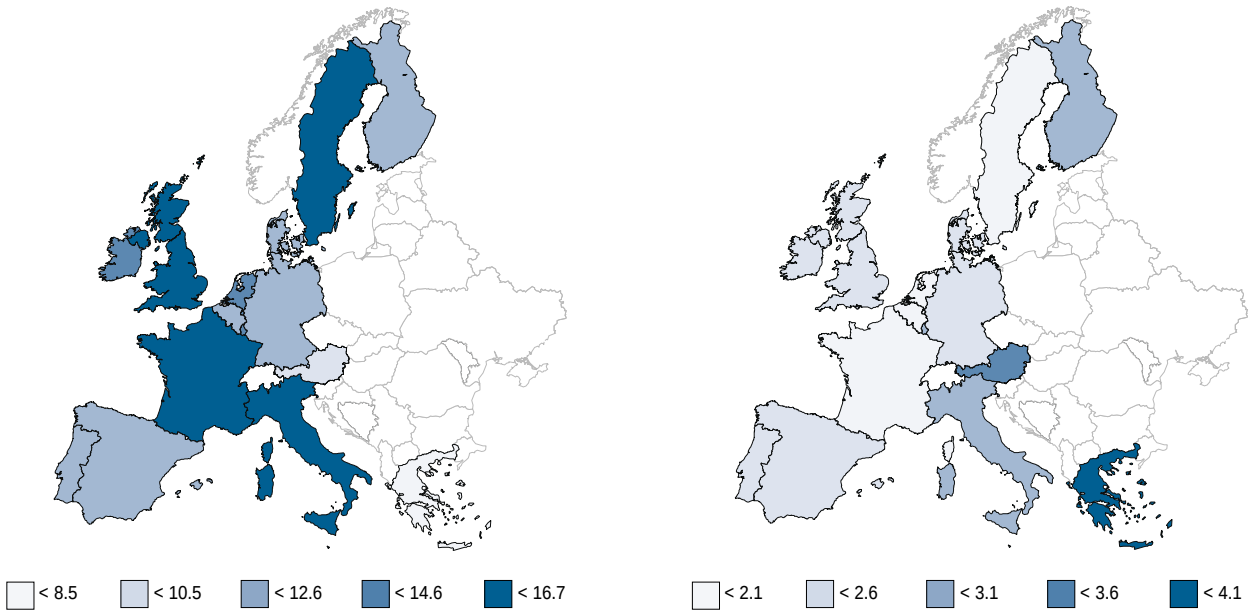


Figure 22.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: (left) non-Hodgkin's lymphomas, (right) Hodgkin's disease (males).

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union*.

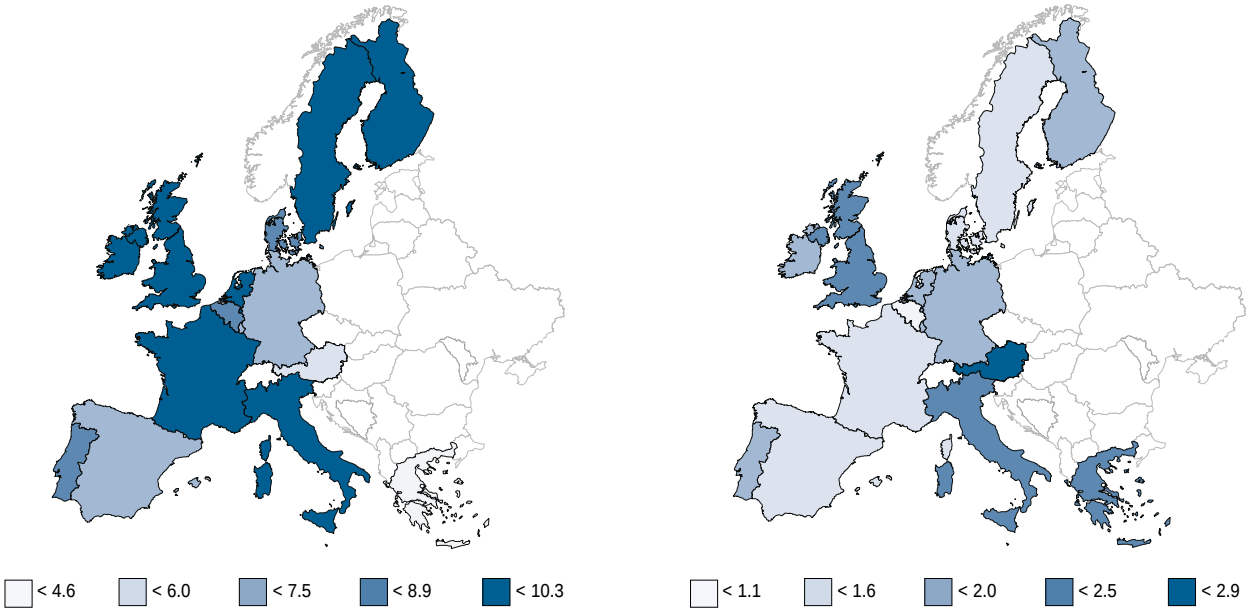


Figure 22.4 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: (left) non-Hodgkin's lymphomas, (right) Hodgkin's disease (females).

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection, and survival

Infectious agents and/or immunodeficiencies are implicated, or suspected, in many lymphomas, although the precise agents, their quantitative role and the mechanisms involved are generally unclear. In Burkitt's lymphoma (a B-cell lymphoma), infection by Epstein-Barr virus appears to be linked (at least in parts of Africa where this lymphoma occurs at high rates) to a high proportion of cases. Other B-cell lymphomas occur at higher than expected rates in immunosuppressed and immunodeficient individuals (including AIDS patients). Again, this suggests (or is consistent with) involvement of infectious agents. Some occupational exposures (including exposure to pesticides and solvents) have also been identified as possible risk factors for non-Hodgkin's lymphomas. In general, however, the aetiology of lymphomas is poorly known, in part a reflection of the range of conditions included within this broad classification.

Painless swelling of lymph nodes (principally in the neck area) is the most frequent early symptom of Hodgkin's disease, with other symptoms, including fever, night-sweats, itching or weight loss, in a smaller proportion of patients. Advances in treatment of Hodgkin's disease, particularly in chemotherapy, have led to high cure rates.

Patients with non-Hodgkin's lymphomas (NHLs) typically present with symptomatic lymphadenopathy, including swollen lymph nodes, but with a greater likelihood of systemic symptoms than in the case of Hodgkin's disease. A proportion of NHL sub-types, considered "indolent" in nature, are characterised by slow but relentless progression of disease, with low cure rates. Other NHLs show a more malignant, and more rapidly fatal, progression of disease if untreated, but cure rates are currently higher (especially in early-stage cases, typically without systemic symptoms). For NHLs as a whole, cure rates and post-treatment survival rates are lower than for Hodgkin's disease. Further progress is needed, particularly in curative treatment of indolent lymphomas.

For non-Hodgkin's lymphomas, estimated five-year relative survival rates (from date of diagnosis) average 49% for Europe as a whole, in both females and males (Berrino et al. 1999). Equivalent figures for Hodgkin's disease average 74% in females, 72% in males.

Recommendation

The high rates of lymphomas in Irish females should be investigated further.

23. LEUKAEMIA

ICD-O.2 morphologies M9800/3-9827/3, M9840/3-M9941/3 *ICD-10* C91-C95 *ICD-9* 204-208

Leukaemias involve the production and release of neoplastic white blood cells by blood-forming tissues (principally bone marrow). Included here are lymphoid (ICD-10 code C91), myeloid (C92), monocytic (C93), other specified (C94) and unspecified leukaemias (C95), but not plasma cell leukaemia (C90.1).

Key facts

- Average of 445 new cases per year, 1994-96: 183 per year in females, 262 in males.
- Average of 285 deaths per year: 123 in females, 162 in males.
- Age-standardised incidence and mortality rates about 70% higher in males than females.
- Incidence rates higher in the Republic of Ireland (RoI) than in Northern Ireland (NI), by about 24% for females and about 21% for males, although part of this difference may reflect differences in diagnostic (or diagnosis-coding) practices.
- All-Ireland rates for females similar to EU average, but male rates slightly above average.

Summary statistics

Table 23.1

Incidence 1994-96

In Ireland as a whole an average of 183 new cases of leukaemia was diagnosed in females and 262 in males each year. European-age-standardised rates were significantly higher among males than females, by about 71% (95% confidence limits 53-91%). On average, Irish females were estimated to have a 1-in-190, males a 1-in-120, chance of developing leukaemia by age 74.

The majority of cases were lymphoid leukaemias (52% of all leukaemias). Of these, acute lymphoblastic leukaemia was the most frequent diagnosis in children (67% of all leukaemias), chronic lymphocytic leukaemia (CLL) in older patients (37%). The remainder were mainly myeloid leukaemias (35% of all cases, and 14% of childhood cases). It should be noted that diagnosis of CLL, in relation to other chronic conditions, is particularly problematical and may not always be reliable.

Mortality 1994-96

Annual averages of 123 deaths among females and 162 deaths among males were attributed to leukaemia: about 3 deaths for every 5 incident cases. Mortality rates (EASRs) were significantly higher in males than females, by about 71% (95% confidence limits 49-98%). On average, Irish females were estimated to have a 1-in-340 chance, males a 1-in-205 chance, of dying from leukaemia by age 74.

Table 23.1 Summary statistics, all Ireland 1994-96: leukaemia

	NEW CASES		DEATHS	
	females	**males**	**females**	**males**
Cases per year	183	262	123	162
% of total	1.5	2.0	2.4	2.8
Cumulative risk (0-74 yrs) %	0.52	0.85	0.30	0.49
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	6.9	10.1	4.6	6.2
World age-standardised rate	5.3 ±0.5	8.6 ±0.6	3.0 ±0.3	4.9 ±0.5
European age-standardised rate	6.5 ±0.6	11.2 ±0.8	4.1 ±0.4	7.0 ±0.6
Mortality/incidence ratio	0.67	0.61		

Age profile

Figure 23.1

In contrast to most other cancers, substantial rates of leukaemia were recorded in the youngest age-classes (0-4 and to a lesser extent 5-9 years). This largely reflects rates of acute lymphoblastic leukaemia, which peaked in age-class 0-4 (5.2 cases per 100 000 females, 6.8 per 100 000 males). Rates were low, and relatively constant, from about age 10 to 40, but increased rapidly thereafter (especially from about age 60 onwards). There was no consistent difference between male and female rates up to about age 60, but rates in older males were much higher, and showed a more sustained increase with age, than in females. Patterns in NI and RoI were broadly similar. NI appeared to have higher rates than RoI in children below age 10, but there was no consistent difference from about age 10 to 50. In age-classes from 50 years upwards, rates were generally lower in NI than in RoI. Median age at diagnosis was 66 years for females overall (62 in NI, 67 in RoI) and also 66 years for males (67 in NI, 66 in RoI).

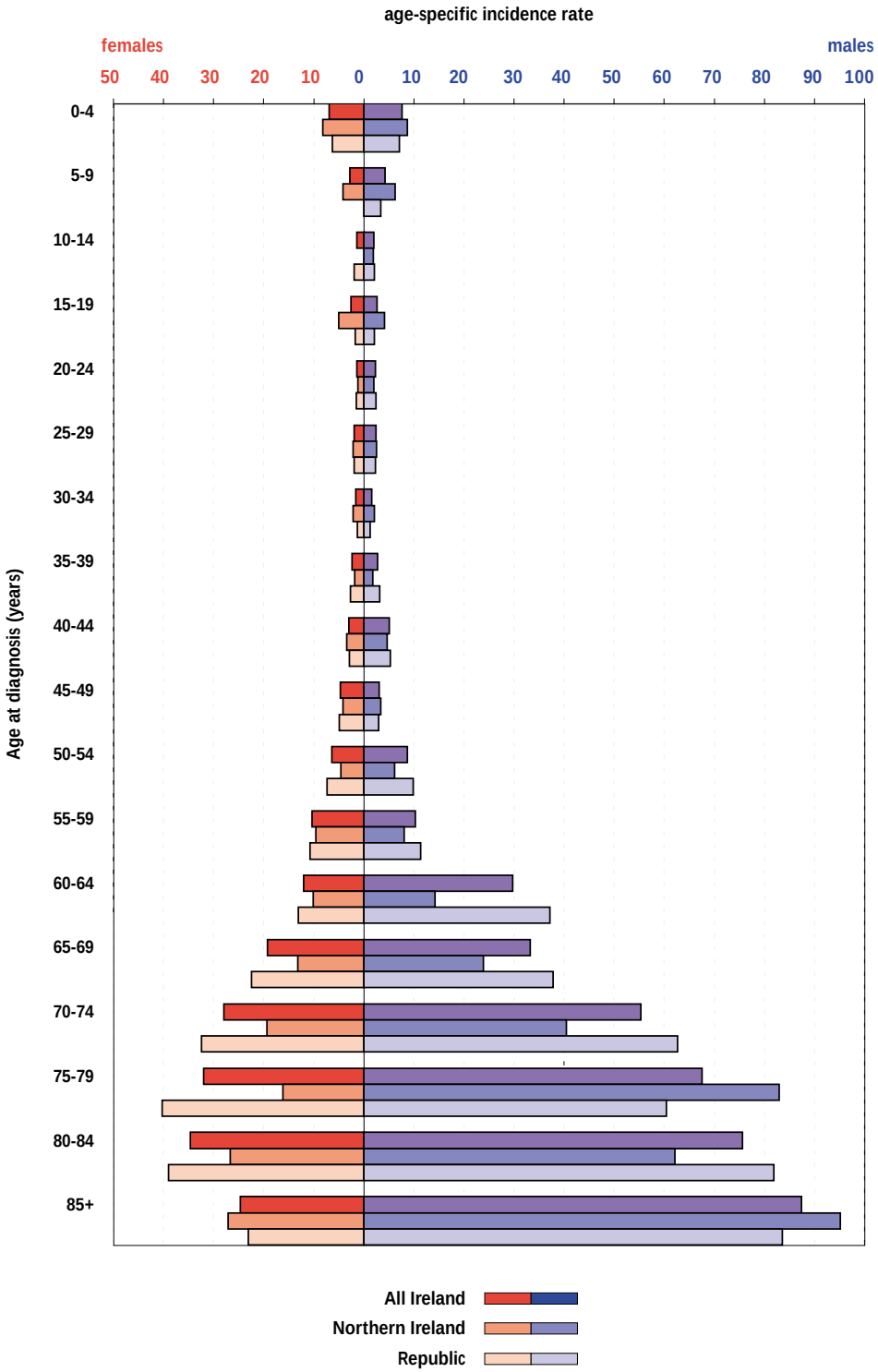


Figure 23.1 Average annual age-specific incidence rates (per 100 000) or All Ireland, Northern Ireland and Republic of Ireland, 1994-96: leukaemia.

Table 23.2 Comparisons of European age-standardised incidence rates (± 95% confidence limits) within Ireland: leukaemia

		females			males		
		all	urban	non-urban	all	urban	non-urban
All-Ireland	EASR	6.5	7.1	6.3	11.2	9.8	11.5
	±95% confidence limits	0.6	1.2	0.6	0.8	1.6	0.9
NI	EASR	5.7	6.3	5.4	9.8	7.5 *	10.7
	±95% confidence limits	0.9	1.9	1.1	1.3	2.2	1.6
		*			*	*	
RoI	EASR	7.0	7.7	6.7	11.8	11.3	11.9
	±95% confidence limits	0.7	1.6	0.8	1.0	2.1	1.1

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 23.2, Figure 23.2

NI v. RoI

Leukaemia rates were significantly higher in RoI than NI - by about 24% (95% confidence limits 3-49%) for females and about 21% (4-41%) for males.

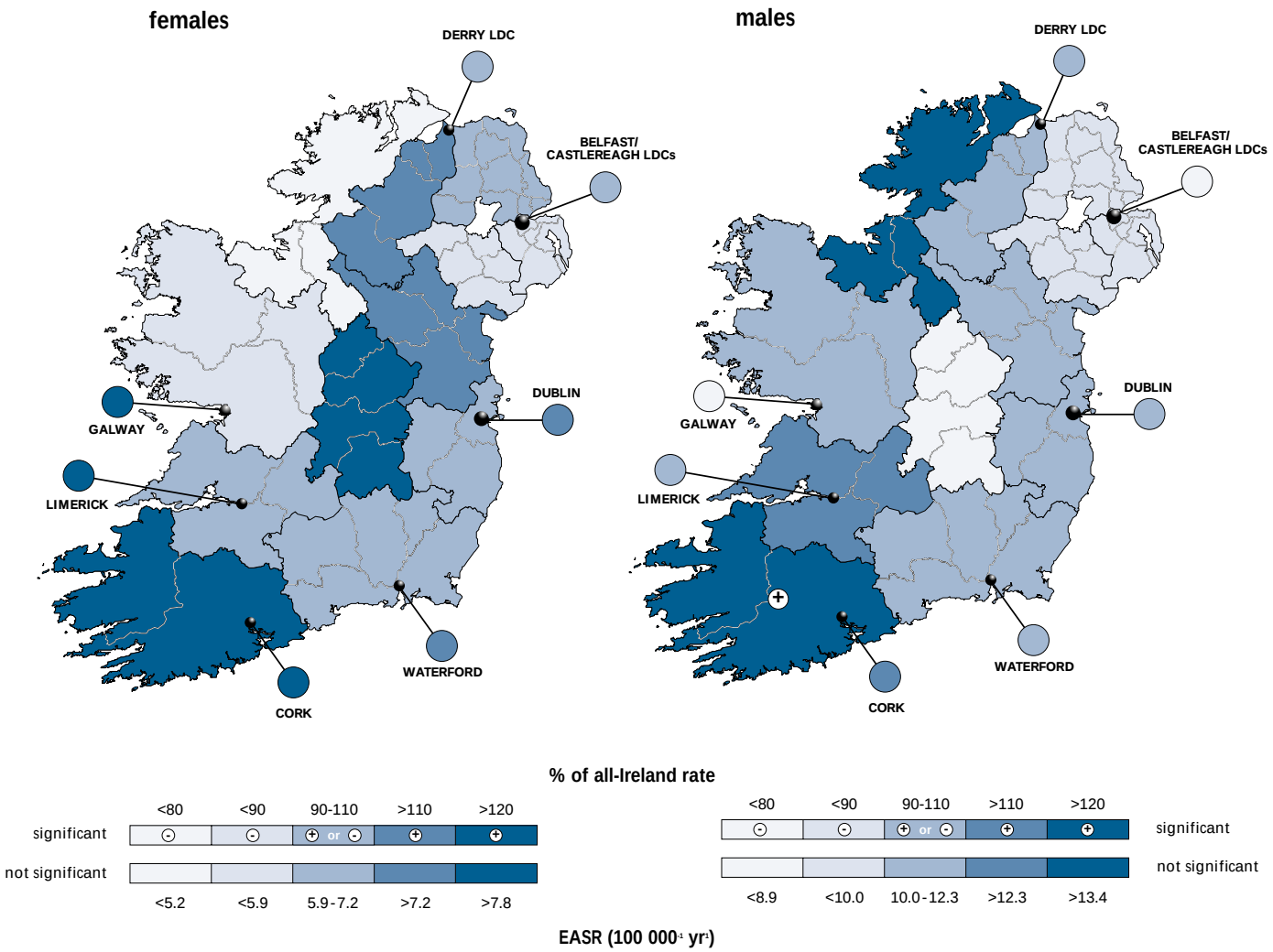
Diagnoses of chronic lymphocytic leukaemia (which can be difficult to distinguish from chronic, non-malignant diseases of the haematopoietic system) appear to be relatively more frequent in RoI than NI, and this may contribute to differences in overall leukaemia rates. Exclusion (from the figures presented here) of diagnoses of leukaemia where histological confirmation was not explicitly coded may also have contributed to apparent differences. The proportion of non-histological diagnoses was apparently higher for NI, although, at most, this might account for a 10% difference between RoI and NI rates.

Urban v. other populations

For Ireland as a whole there was no significant overall variation in rates between urban and other populations, but, among NI males, rates were significantly higher for non-urban than for urban populations. At a regional scale, only NI Eastern health-board area showed a significant difference (lower rate among urban males). There was some indication (though without statistical confirmation) that leukaemia rates in females were higher among urban compared with other populations, at all scales (including all seven health-board areas with city populations). Rates in males appeared to show the opposite pattern.

Regional comparisons

Leukaemia rates among males were significantly higher in RoI Southern health-board area (n = 110 cases) than elsewhere in Ireland. Other variation among regions (although apparently marked in some cases) was not statistically significant, reflecting small sample sizes (numbers of cases) in most regions.



Figures 23.2 Age-standardised incidence rates (as % of All-Ireland rate) by health-board areas, 1994-96: leukaemia.
Rates within cities are included within health-board rates and also indicated separately.
Rates significantly different from the rest of Ireland are indicated.

Geographical variation in incidence rates: international

Table 23.3, Figure 23.3

Overall rates of leukaemia in Ireland were similar to the EU average for females, and slightly above the EU average for males. For both sexes, however, NI rates were below the EU average. Rates in Ireland were broadly similar to those in England/Wales and Scotland. In 1995, figures from EUCAN (Ferlay *et al*. 1999) indicated that, among males, RoI had the 2nd highest recorded rate of leukaemia of 15 EU member states, while the UK had the 6th highest rate. RoI had the 12th highest recorded rate among EU females in 1995 (UK 6th highest rate), but the 1994-96 figure for RoI would be equivalent to 3rd or 4th highest in the EU. This highlights the need for caution in interpreting international comparisons based on small samples.

Table 23.3 International comparison of incidence rates for leukaemia (European age-standardised rates per 100 000 per year).

Year/source: 1. 1994-96 (this report); 2. 1994-96 (ENCR 2000); 3. 1994-96 (Quinn *et al*. 2000); 4. 1995 (Ferlay *et al*. 1999).

	EASR (females)	EASR (males)
All-Ireland[1]	**6.5**	**11.2**
Northern Ireland[1]	5.7	9.8
Republic of Ireland[1]	7.0	11.8
Scotland[2]	6.4	12.0
England & Wales[3]	6.9	11.2
United Kingdom, incl. NI[4]	6.4	10.5
Italy (highest EUCAN rate, males)[4]	7.4	11.9
European Union average (1995)[4]	6.4	10.5

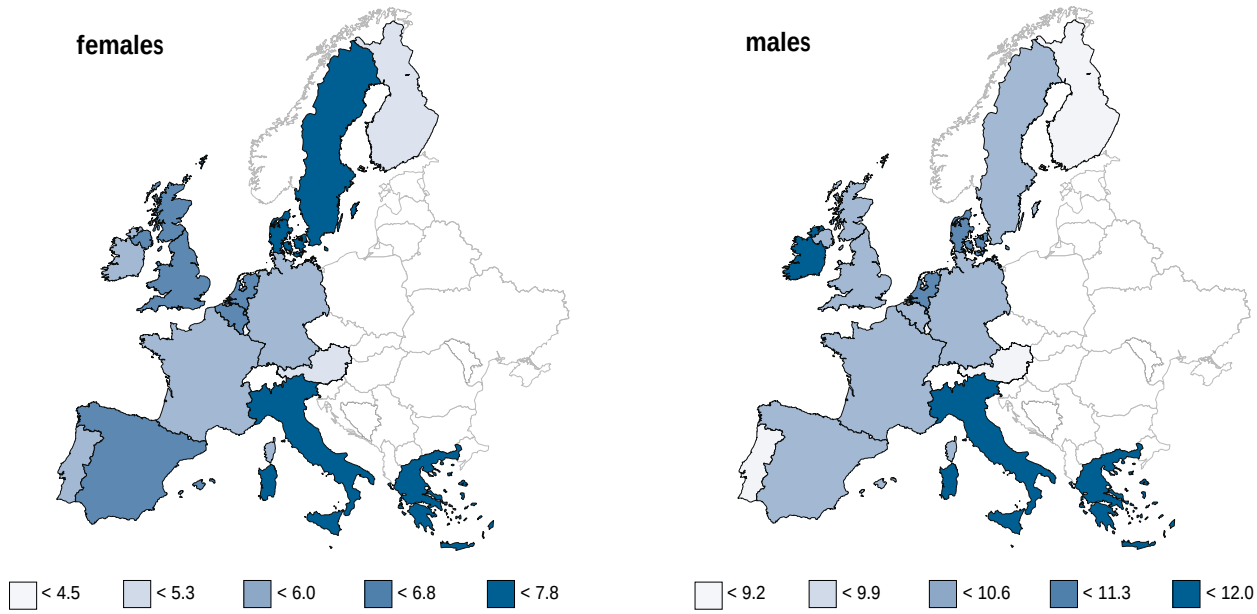


Figure 23.3 Age-standardised incidence rates (per 100 000 per year) in the EU, 1995: leukaemia.

Source: Ferlay *et al*. 1999. *EUCAN. Cancer incidence, mortality and prevalence in the European Union.*

Comment: risk factors, early detection and survival

Factors involved in the development of leukaemia are poorly known or their possible role has proven difficult to quantify. In part, this reflects the range of conditions included within the term "leukaemia". Ionising radiation has a role, at least in high doses. The effect of relatively low doses of radiation (including therapeutic radiation such as X-rays, natural gamma radiation from radon, and gamma radiation from the nuclear industry and weapons tests) is controversial and not clearly established. Other known risk factors include exposure to a number of chemicals, including certain chemotherapeutic agents and the solvent benzene. Exposure to pesticides may be an important risk factor. Exposure to electromagnetic fields has been implicated on the basis of circumstantial evidence, but not clearly demonstrated as a risk factor. The role of infectious agents is receiving increasing attention, but, apart from the involvement of human T-cell leukaemia/lymphoma virus-I (HTLV-I) in certain rare leukaemias, little specific information is available. Wider involvement of infectious agents in the development of leukaemia than currently established could, nevertheless, prove to be the case. A pre-natal genetic defect may be involved in acute lymphoblastic leukaemia in children, but it has been suggested that a further event, possibly infection, may be required to trigger full-blown leukaemia.

Patients with acute leukaemias most frequently present with non-specific symptoms such as fatigue, weakness, pallor, haemorrhages (e.g. easy or spontaneous bruising), or infection (generally bacterial). Some of these symptoms reflect anaemia

associated with infiltration of bone-marrow by neoplastic white cells (which also produces bone-pain as a frequent symptom). Advances in chemotherapeutic treatment of acute lymphoblastic leukaemia (ALL) have led to high rates of remission (restoration of normal blood counts and normal cell-composition in the bone marrow). Prognosis is poorer for patients with acute myeloid leukaemia (AML), unless a compatible sibling donor is available for bone-marrow transplantation, but the effectiveness of chemotherapy for AML (especially in children) is improving.

Early stages of chronic lymphocytic leukaemia (CLL) may be asymptomatic, and in many patients the disease is detected incidentally from a routine blood test. Symptoms, when they appear, are broadly similar to those for acute leukaemias. Average survival rates of early-stage CLL patients are generally high, but with little evidence of any further improvements if treated (complete remission being rare in CLL). Treatment is most useful when symptoms have developed, but is generally more palliative than curative in effect (especially in older patients). However, improvements in chemotherapy may yet allow improvement in survival rates from CLL.

For leukaemias as whole, estimated five-year relative survival rates (from date of diagnosis) average 35-36%, based on European data (Berrino *et al*. 1999).

Recommendation

Diagnoses of leukaemia should, whenever possible, be confirmed histologically (generally by bone-marrow aspiration), and this should always be coded explicitly in hospital and cancer-registry data, to avoid misinterpretation (or exclusion) of valid diagnoses.

24. CHILDHOOD CANCERS (0-14 years)

ICD-O.2 C00-C80 | *ICD-10* C00-C97 | *ICD-9* 140-208 | *ICCC* I-XII

Summaries are presented for children below 15 years of age, by ICD-10 sites/categories (malignant neoplasms only) and by International Classification of Childhood Cancer (ICCC) groups. ICCC groups additionally include benign or unspecified intracranial and central nervous system (CNS) tumours.

Key facts

- Average of 179 new cases of childhood cancer per year (80 in females, 99 in males), including benign intracranial and CNS tumours, 1994-96.
- Average of 164 malignant cases per year (72 in females, 92 in males) and 35 deaths (11 female, 24 male).
- Age-standardised incidence rates about 20% higher in males than females for malignant cancers.
- Age-standardised mortality rates about twice as high in males as in females.
- Incidence rates about 20% higher in Northern Ireland (NI) than in the Republic (RoI).
- All-Ireland incidence rates for childhood cancer are in the mid-range of EU values.

Summary statistics

Table 24.1, Figure 24.1

Incidence 1994-96

On average each year, 164 new cases of malignant cancer were diagnosed in children under 15 years of age in Ireland (72 in females, 92 in males). Childhood cancers are very rare, and amounted to less than 1% of all malignant cancers during 1994-96. European-age-standardised rates were significantly higher among males than females, by about 21% (95% confidence limits 16-26%). Rates were highest in the youngest age-class (0-4 years). On average, children were estimated to have a 1-in-560 chance (females) or 1-in-460 chance (males) of developing malignant cancer by age 14. Risk and rate estimates are about 5% higher (average 181 cases per year) if non-malignant intracranial and CNS tumours are included (ICCC grouping).

Leukaemias (mainly acute lymphoblastic leukaemia), and malignant tumours of the brain, were the most frequent diagnoses in children, each accounting for over 20% of malignant cases. Of the ICCC categories (Figure 24.1), tumours of the central nervous system (and miscellaneous intracranial and intraspinal tumours) were the most frequent, followed by leukaemias.

Mortality 1994-96

In children under the age of 15, annual averages of 11 deaths among females and 24 deaths among males were attributed to malignant cancer: about 1 death for every 5 incident cases. Mortality rates (EASRs) were significantly higher in males than females, by about 106% (95% confidence limits 88-125%) – a more marked disparity than seen for incidence rates. On average, females were estimated to have a 1-in-3800 chance, males a 1-in-1800 chance, of dying from malignant cancer by age 14.

The most frequent causes of death from malignant cancer in children were brain tumours (36 deaths, 33% of total) and leukaemias (30 deaths, 27% of total). A high proportion of deaths from leukaemias, lymphomas and related conditions occurred among male children (79% of deaths, compared with 59% of incident cases).

Table 24.1 Summary statistics, all Ireland 1994-96: all malignant cancers in children (0-14 years).

Note that crude and age-standardised rates here are per 100 000 children per year, and are not directly comparable with rates in other chapters (expressed per 100 000 persons in the whole population).

	NEW CASES		DEATHS	
	females	males	females	males
Cases per year	72	92	11	24
% of total	0.6	0.7	0.2	0.4
Cumulative risk (0-74 yrs) %	0.18	0.22	0.03	0.06
Rates per 100 000 per year (±95% conf. limits):				
Crude rate	11.7	14.2	1.7	3.7
World age-standardised rate	12.4 ±1.7	14.9 ±1.8	1.8 ±0.6	3.7 ±0.9
European age-standardised rate	12.2 ±1.6	14.7 ±1.8	1.8 ±0.6	3.7 ±0.9
Mortality/incidence ratio	0.15	0.26		

Figure 24.1 Childhood cancers (0-14 years), all Ireland, 1994-96: summary by International Classification of Childhood Cancer (ICCC) groups.

*Note: groups III & X include some benign or unspecified intracranial or central nervous system tumours.

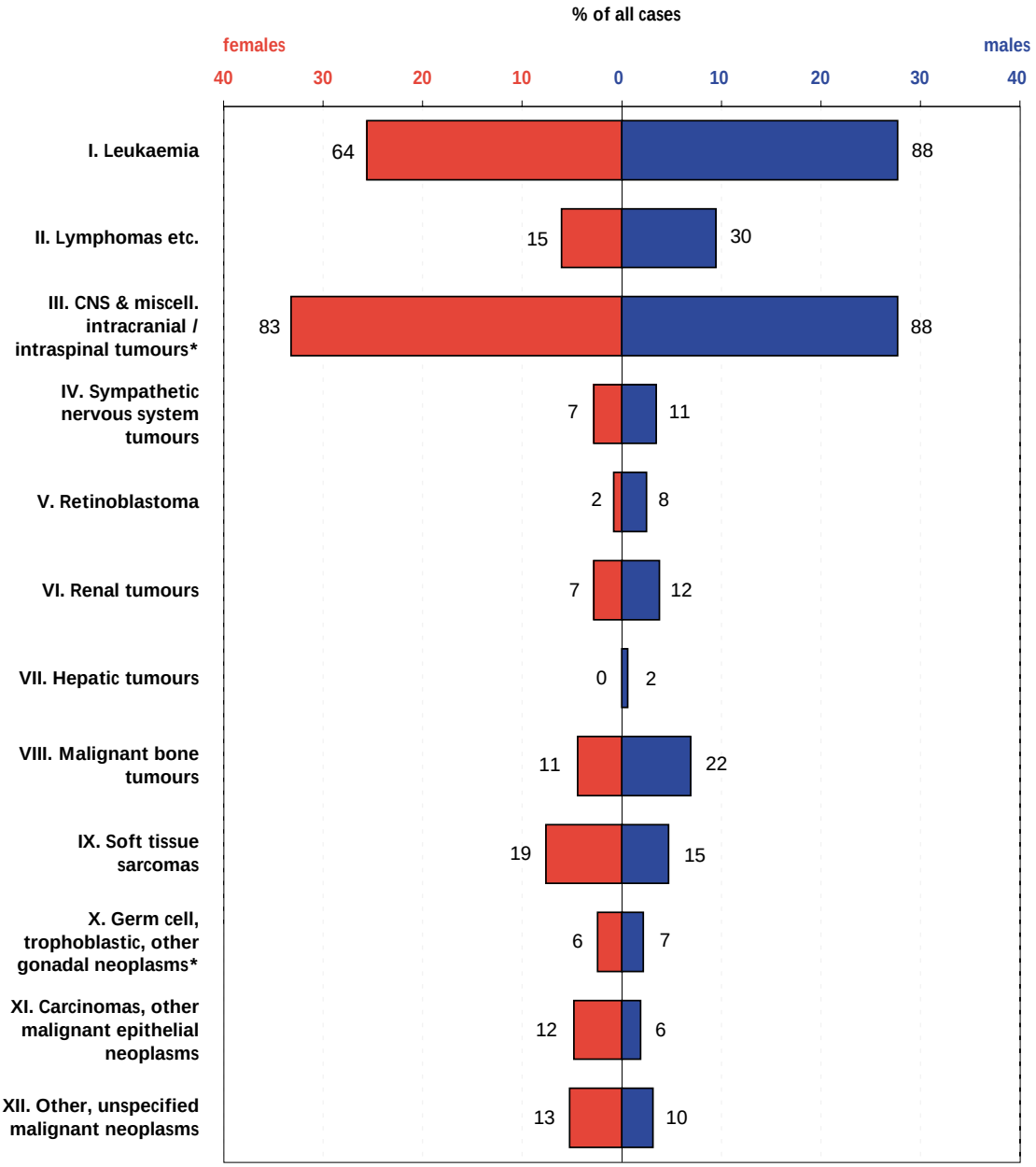


Table 24.2 Comparisons of European age-standardised incidence (± 95% confidence limits) within Ireland: all malignant cancers in children (0-14 years)

		females					males		
		all	urban		non-urban		all	urban	non-urban
All-Ireland	EASR	12.2	9.4	**	12.9		14.7	15.6	14.7
	±95% confidence limits	1.6	3.1		1.9		1.8	4.0	2.0
NI	EASR	13.3	6.4	**	16.0		16.4	19.6	16.0
	±95% confidence limits	3.1	4.0		3.9		3.3	6.9	3.8
		*	**		**		**	**	
RoI	EASR	11.5	11.5		11.5		13.9	12.8	14.1
	±95% confidence limits	1.9	4.5		2.1		2.1	4.8	2.3

*,** indicates statistically significant differences (*=P<0.05; **=P<0.01)

Geographical variation in incidence rates: within Ireland

Table 24.2

NI v. RoI

Rates of malignant cancer in children were significantly higher in NI than RoI, by about 16% overall (95% confidence limits 9-24%) in females and about 18% (11-24%) in males. However, the opposite pattern was evident for females in urban populations, where the rate was significantly higher in RoI.

Urban v. other populations

Among females in NI, rates were significantly higher in non-urban than in urban populations, but there was no significant difference in RoI. (The overall significant difference between urban and non-urban rates for Irish females reflects the NI difference only.) Males showed no significant differences.

Geographical variation in incidence rates: international

Data on childhood cancers have not been compiled on an EU-wide basis, but 1995 data from 11 of the 15 EU member states are available from EUROCIM (European Network of Cancer Registries 1999). European-age-standardised rates in most countries were in the range 10-14 malignant cases per 100 000 females, with a minimum of 6 per 100 000 in Italy and a maximum of 35 per 100 000 in Spain. Male childhood cancer rates were in the range 13-16 per 100 000 for most countries, with a minimum of 13 per 100 000 in Germany and Austria and a maximum of 36 per 100 000 in Spain. All-Ireland rates (12-13 cases per 100 000 for females, 15-16 for males) were in the mid-range of EU figures, and similar to rates for Scotland and England/Wales.

Comment: risk factors, early detection, and survival

Although childhood cancers are rare, they attract much public, medical and scientific attention, and there has been much speculation about (and research into) possible causes. The factors involved are, in general, still poorly known, particularly for the most frequent cancers in children (leukaemia and brain tumours). The possible roles of ionising radiation and of electromagnetic fields have proved particularly controversial. Research to date has found little evidence of a major role for these, with the exception of higher doses of diagnostic or therapeutic radiation sometimes used in hospitals in the past. Inherited familial factors play an important role in some specific childhood cancers, but their overall contribution is believed to be small. Childhood cancers occur at the highest rate in the youngest age-class (0-4 years). This suggests that a high proportion of genetic changes associated with, or predisposing, childhood cancer occur at the embryonal or foetal stage. Environmental 'triggers' either pre-natally or shortly after birth may be necessary in most cases, and infectious agents possibly act as one such trigger (e.g. in leukaemia). However, low underlying rates of spontaneous mutation during normal cell division may (during rapid childhood growth) also account for a proportion of cases.

Reflecting the range of cancers that occur in children, a wide range of symptoms may occur, but they can be particularly difficult to recognise in younger children. Awareness of possible symptoms is important. Depending on the cancer, symptoms may include, for example, unusual swelling, pallor, loss of energy, weight loss, pain or limping, easy bruising, unexplained fever, headaches, or sudden visual changes. Survival rates depend on the type of cancer, and the stage at which it is detected, but in recent years treatments for the main childhood cancers have had a high success rate. Overall, five-year relative survival rates of about 70-80% are typical.

Summary of report's recommendations

- There is a need for a uniform system for coding of occupational/social groupings to allow collection of better occupational data by the registries.
- Further investigation is needed into the possible factors accounting for disproportionately high rates of oesophageal cancer among women in some parts of Europe (including Ireland).
- Further research is needed into the factors behind the very high rates of colorectal cancer in Ireland relative to Europe as a whole.
- Given the high incidence of breast cancer in Ireland and most western countries, and the paucity of general agreement on modifiable risk factors, much further research is needed on risk-reduction, perhaps particularly relating to dietary factors.
- The high rates of lymphomas (in European terms) recorded in Irish women should be investigated further.
- Diagnoses of leukaemia should be confirmed histologically, and this should always be coded explicitly in hospital and cancer-registry data, to avoid misinterpretation (or exclusion) of valid diagnoses.

European code against cancer

Certain cancers may be avoided and general health improved if you adopt a healthier lifestyle.

1. Do not smoke. Smokers, stop as quickly as possible and do not smoke in the presence of others.
2. If you drink alcohol, whether beer, wine or spirits, moderate your consumption.
3. Increase your daily intake of vegetables and fresh fruits.
4. Avoid becoming overweight, increase physical activity and limit intake of fatty foods.
5. Avoid excessive exposure to the sun and avoid sunburn, especially in children.
6. Apply strict regulations aimed at preventing any exposure to known cancer-causing substances. Follow all health and safety instructions on substances which may cause cancer.

More cancers may be cured if detected early

7. See a doctor if you notice a lump, a sore which does not heal (including in the mouth), a mole which changes in shape, size or colour, or any abnormal bleeding.
8. See a doctor if you have persistent problems, such as a persistent cough, persistent hoarseness, a change in bowel or urinary habits or an unexplained weight loss.

For women

9. Have a cervical smear regularly. Participate in organised screening programmes for cervical cancer.
10. Check your breasts regularly. Participate in organised mammographic screening programmes if you are over 50.

Appendix 1. Summary of data checking, processing and presentation for All-Ireland report

Data included

Only malignant (invasive) cancers diagnosed during 1994-96, or deaths attributed to malignant cancer during 1994-96, in patients resident in the island of Ireland, are included. Incident cases and deaths attributed to non-malignant (non-invasive) tumours, or tumours of uncertain behaviour, are not considered in detail here. However, brief additional details are provided for some conditions (e.g. in situ neoplasms of the uterine cervix, benign tumours of the brain).

Data checking

This list is not necessarily complete. Checks or translations were applied to, or required for, both National Cancer Registry (NCR) and Northern Ireland Cancer Registry (NICR) data, unless otherwise indicated, and mainly refer to incidence data.

Exclusion of multiple primaries or duplicate records of same cancer	The IARCtools program was used to identify duplicate cases (defined on the basis of site and/or morphology), which were flagged and excluded from all analyses for the present report. This is in line with IARC recommendations for international comparisons of data.
Data translations	ICD-O.2 to ICD-10 (NCR incidence data); ICD-9 to ICD-10 (mortality and NICR incidence); ICD-10 (via ICD-O.2) to ICCC (International Classification of Childhood Cancers, incidence).
Non-standard and pre-ICD-O.2 morphology codes	Non-standard (e.g. registry-specific) codes, and older codes from the first and 'field-test' editions of ICD-O, were converted to the most appropriate ICD-O.2 morphology code.
ICD-10 v. morphology code	Morphology codes were checked in detail against ICD-10 codes for lymphomas (C81-C85). ICD-10 C80 (primary site unknown) was recoded to a more specific site if morphology specified a 'default' site under IARC rules. Records coded as ICD-0.2 C77 ("secondary and unspecified malignant neoplasm of lymph nodes") were recoded to C81-C85, C88 or C96 as appropriate if the morphology allowed designation of these sites under IARC rules. (NICR) Cases with SNOMED codes indicating a non-neoplastic condition were re-coded to the correct ICD-10 code if necessary, and excluded from analyses for the present report.
ICD-10 v. ICD-O.2 (NCR)	ICD-10 codes generated by IARCtools translation were further checked to ensure that ICD-10 codes were appropriate given the ICD-O.2 site, morphology and behaviour specified.
ICD-10 code v. tumour behaviour (NICR)	Cases with tumour behaviour coded as "6" (metastases) were changed to behaviour "3" (malignant) and re-coded if necessary to ICD-10 C80 (primary site unknown).
ICD-10 codes C77-C79 (NICR)	Cases coded as secondary malignant neoplasms (without earlier or concurrent records of primaries) were re-coded to ICD-10 C80 ("primary site unknown") or to a more specific primary site (if tumour morphology allowed).

ICD-10 v. ICD-9 codes	Discrepancies in ICD-9 to ICD-10 translation were identified, mainly relating to over-specific translations for tumours that were in situ, benign or of uncertain behaviour. Where ICD-10 codes generated from ICD-9 codes did not match the morphology code (e.g. for subtypes of lymphoma), the ICD-10 codes were corrected. (NICR)
ICD-O.2 code v. morphology (NCR)	Records coded as ICD-0.2 C80.9 (site unknown) were re-coded to a more specific site if the morphology allowed designation of a default site under IARC rules. Records coded as ICD-O.2 C77 (lymph nodes) were re-coded to ICD-O.2 C80.9 (unspecified site) if tumour morphology was not specified as a lymphoma or related condition.
Records with changes to original behaviour code	Cases where the behaviour originally coded was known to have been changed were highlighted, and the most appropriate behaviour (based on available supporting information) was used to define the relevant ICD-O.2 and ICD-10 codes.
"Borderline" malignancies of the ovary	For the five specific "borderline malignancy" morphologies classified as tumours of uncertain behaviour in ICD-O.1 but re-classified as malignant in ICD-O.2, morphology codes were updated as necessary to the ICD-O.2 revision: M8441/1 changed to 8442/3, 8450/1 to 8451/3, 8460/1 to 8462/3, 8470/1 to 8472/3, and 8471/1 to 8473/3. A further morphology field was generated, to record the ICD-O.1 equivalent for all borderline ovarian malignancies (allowing comparison with data based on the older rules). For all other morphologies of ovarian neoplasms, the original behavioural code was used. (NICR)
Carcinoid tumours	For sites other than appendix, tumours originally coded as M-8240/1 ("carcinoid tumour, not otherwise specified") were re-coded to M-8240/3 (malignant), to follow ICD-O.2 guidelines. For the appendix, tumours coded as M-8240/1 were not re-coded to M-8240/3, as the default behaviour for carcinoids of the appendix is still "1" (uncertain behaviour") in ICD-O.2. However, tumours of the appendix that were originally coded as M-8240/3 were retained, to allow for occasional (but rare) diagnoses of malignant carcinoids.
Bladder tumours	An attempt was made to re-code bladder tumours to common rules, as coding can vary markedly between registries (some of which include in situ or unspecified diagnoses among "malignant" tumours). Problems may also exist with definitions of "benign" tumours of this site. Retrospective re-coding of NCR and NICR cases proved particularly difficult, and for simplicity this report presents only cases already coded as "malignant".
Common coding of basis of diagnosis	The NCR currently applies stricter rules than the NICR in relation to acceptable bases of diagnosis for some cancers – for example requiring microscopic verification for most specific morphologies. As retrospective re-coding of NCR data was not possible, NCR rules were applied to NICR data, resulting in some NICR cases being re-coded to less specific cancers. Although detailed morphological data (relating to histological types of neoplasm) are not presented in this report, the morphology assigned to a neoplasm can determine the ICD-10 'site' code in some cases. Data published here for NICR, in particular, may thus differ slightly from previously-published figures.

Codes for basis of diagnosis were matched, and re-coded to a common scheme for NCR and NICR datasets, based on the NCR's seven basic categories (more finely categorised in NICR).

Microscopic verification included diagnoses based on histology, cytology, bone marrow or blood film (NCR data), and was taken to include histopathology, haematology, cytology, neuropathology, oral pathology or "mixed sources" in NICR data.

Radiology was not specified further in NCR data, but was taken to include CT (computerised tomography) scan, MRI (magnetic resonance imaging) scan, ultrasound, ERCP (endoscopic retrograde cholangiopancreatography), plain and contrast radiology, as in NICR data.

Post-mortem was assumed not to include microscopic verification, unless explicitly coded as such in original records.

Clinical was taken to include both general practitioner (GP) data and clinical opinion in NICR .

"Death certificate only" (DCO) cases were excluded from analyses for this report, as they are not registered by the NCR.

NICR cases with "PSA level" [prostate-specific antigen] or "tamoxifen" as basis of diagnosis, for prostate and breast cancer respectively, were excluded from this report as having insufficient bases of diagnosis.

Other and Unknown bases of diagnosis (NCR data) were considered equivalent to the remaining bases of diagnosis in the NICR dataset, which were assumed (in the absence of explicit coding) not to have microscopic verification. This included data where basis was coded as cancer registration card, colorectal registry, hospital PAS (patient administration systems), endoscopy and surgery.

Re-coding of morphology and/or ICD-10 code where basis of diagnosis insufficient (based on NCR coding rules)

In general, malignant neoplasms were re-coded to M-8000/3 ("malignant neoplasm" otherwise unspecified) if diagnosis was not microscopically verified, with some exceptions (skin, melanoma of eye, central nervous system and multiple myeloma).

Morphological diagnoses of malignant skin cancers (and Kaposi's sarcoma or lymphoid cancers where site was skin) were accepted for any basis of diagnosis.

However, clinical (visual) diagnoses of two in situ morphologies, M-8081/2 (Bowen's disease, or squamous cell carcinoma in situ) and M-8742/2 (lentigo maligna), were not accepted, but were re-coded to malignant conditions: respectively, M-8070/3 (squamous cell carcinoma, not otherwise specified) and M-9720/3 (melanoma, NOS).

Malignant melanoma of the eye was accepted for any basis of diagnosis.
For malignant neoplasms of the central nervous system (but not for intracranial endocrine glands), morphologies and tumour behaviours were accepted based on radiological diagnoses if microscopic verification was unavailable.

Retinoblastoma of the eye was re-coded to M-8000/3 (malignant neoplasm of eye) if not microscopically verified, although there may be a case for accepting visual diagnoses of this condition.

Mesothelioma was re-coded to M-8000/3 (malignant neoplasm), and the site code to ICD-10 C76.1 ("thorax") if microscopic verification was not available, but there may be a case for accepting visual (post-mortem as well as clinical) diagnoses of this condition.

	For female genital organs, diagnoses of malignant neoplasms were not accepted on the basis of cytology alone (usually relating to smear tests of the uterine cervix). Diagnoses of cervical cancer or of "severe dysplasia" of the cervix were given the ICD-10 (non-neoplasm) code N87.2 (with SNOMED morphology code M74008), and not coded as neoplasms (in situ or malignant), unless confirmed by histology. Multiple myeloma was accepted only if radiology or bone-marrow was basis of diagnosis. For neoplasms of haematopoietic, lymphoid and related tissues (ICD-10 C81-C96), other than lymphoid neoplasms in skin, radiologically diagnosed multiple myeloma (see above), or radiologically diagnosed lymphomas of the CNS, morphology was re-coded to M-8000/3 if microscopic verification was not coded. Such cases were provisionally re-coded to C96.9 ("malignant neoplasm of lymphoid, haematopoietic and related tissue"), but the ICD-O.2 site code was retained as (or re-coded to) C77 (lymph nodes) or C42 (haematopoietic and reticuloendothelial systems) as appropriate. A possible problem may arise with NI v RoI comparisons of lymphoma and leukaemia rates, if a higher proportion of NI cases have "inadequate" (in NCR terms) basis of diagnosis: NI rates may be underestimated compared to RoI (although total "blood/lymph/etc" rates should be less affected).
Recoding of geographical data to health-board, urban and non-urban areas	Data geocoded to county and district electoral division (NCR), or local district council (NICR), were further coded to the appropriate health-board administrative area, and to "urban" (city) or "non-urban" populations.
Extraction of data for analysis	For most analyses data extraction was by ICD-10 code (malignant neoplasms, selected codes), sex, five-year age-class, years (1994-96 combined) and geography (country: health-board: urban or non-urban).

Recommendations on data coding

- Agreement should be attempted on routine use of IARC "multiple-primary" checks in publications of the Irish registries, to facilitate continued comparability of data.
- More formalised, or more complete, standardisation of coding rules and bases of diagnosis between the Irish registries should be attempted, preferably in line with wider international recommendations (where available).
- Coding manuals for Tumour Registration Officers (TROs; National Cancer Registry), Tumour Verification Officers (TVOs; Northern Ireland Cancer Registry) and staff entering data in hospital systems should be updated or clarified as necessary, to eliminate ambiguities as far as possible.
- Within each registry, regular checks should be made for consistency in coding practices between different TROs, TVOs and hospitals, as relevant.
- Further clarification and agreement is required as to acceptable bases of diagnosis, particularly for neoplasms of lymphoid, haematopoietic and related tissue, tumours of the eye, and mesothelioma. Lymphomas and leukaemias with a clinical diagnosis only are a particular problem in relation to comparability of data.

- The basis of diagnosis should always clearly distinguish microscopically verified diagnoses from other diagnoses (e.g. clinical). Where data have not been directly coded by the registry, but coded, for example, by hospital staff, the data should be followed up to identify (and re-code) cases where microscopic verification was undertaken but was not explicitly coded.

- Where data have been re-coded by a registry, or where a choice was made between several possible coding options (e.g. different morphological diagnoses), an "audit trail" should be retained so that the "original" details can be retrieved, or so that alternative rules can be applied retrospectively.

Data Presentation

The layout and contents of the chapters presenting data for each cancer 'site' (or combination of sites) are summarised below. Note that chapters for some sites or site-combinations provide less detailed, summary data only. Attention is drawn to the need for careful interpretation of comparative data.

Chapter headings: major cancer sites or categories used

The cancer sites/combinations presented here are defined by the codes used in ICD-10 (the tenth revision of the International Statistical Classification of Diseases and Related Health Problems: WHO 1992). These codes, and the corresponding codes from the previous version of ICD (ICD-9: WHO 1977), are listed below each chapter heading. Data are analysed by primary site – i.e. sites of secondary tumours are not considered (but cases known only from secondaries are included under "primary site unknown"). ICD-10 codes relate mainly to cancer site (precise location within the body), but a number of codes are based partly or wholly on cancer histology. These latter, morphology-based, cancers include melanoma of the skin, non-melanoma skin cancers, lymphomas, leukaemias and related neoplasms.

Equivalent topography (site) codes used in the second edition of the International Classification of Diseases for Oncology (ICD-O.2) are also presented where possible (Percy *et al*. 1990). For most cancers, the ICD-O.2 codes match ICD-10 'site' codes, but mesothelioma, Kaposi's sarcoma, lymphomas, leukaemias and related conditions are primarily defined (within ICD-10) by morphology rather than site/location. In particular, "extra-nodal" lymphomas (occurring in lymphatic tissue other than in lymph nodes) may occur in a range of locations within the body - lymphomas can thus have an ICD-O.2 site code of C77 (lymph node) or a range of other codes. Extraction and analysis of data using ICD-O.2 thus requires a combination of topography and morphology codes.

Chapters are presented for major cancer sites, combinations of sites or other categories (e.g. lymphomas). The site, or combinations used, include most of the 18 categories of malignant neoplasm used in the standard European shortlist of causes of death (see Appendix Tables 2-3). Additional chapters are provided for further sites or combinations for which data have previously been presented in reports of the Northern Ireland Cancer Registry or National Cancer Registry (Ireland) (Gavin *et al*. 1999, NCR 1997-2000). Appendix Tables are also provided for all ICD-10 categories.

Key facts

The main points of each chapter are summarised here. Where comparisons of Northern Ireland v. Republic of Ireland or urban v. non-urban figures are given, these refer to statistically significant differences only (further details in main text).

Summary statistics

Incidence and mortality data for malignant cancers are tabulated and summarised for females and males, for Ireland as a whole, based on combined data from the period 1994-96. The relative frequency of each cancer is compared between sexes and placed in context relative to other cancers. Ranking of cancer sites is based on sites specified by major (three-digit) ICD-10 codes, excluding combined sites based on several ICD-10 codes. Data tabulated include average numbers of cases, cases as percentages of all cancer cases, crude rates (annual numbers of cases divided by total Irish population), cumulative risks (average likelihood of developing a particular cancer before age 75), and age-standardised rates (corrected to standard World and European age-structures). Where appropriate, 95% confidence limits are provided for rate estimates. See also Statistical formulae and special terminology (Appendix 2) and general Glossary of terms (Chapter VII).

Detailed reference is not made to numbers of cases, or incidence rates, within individual years (1994, 1995 and 1996), as meaningful assessment of possible trends is not possible based on only three years' data. Figures for any

individual year will also have wider confidence limits than figures based on several years combined, and differences may thus be more apparent than real. Assessment of possible trends is planned for future reports in this series, based on at least five years' data.

Age profile

Age-specific rates are presented in graphical form by sex and five-year age-class (0-4 years to 85+ years) for all Ireland, Northern Ireland (NI) and the Republic of Ireland (RoI). Numbers of cases diagnosed per 100 000 persons per year are shown. Actual numbers of cases within each age-class would show a younger age-profile (biased downwards by the higher populations of younger compared with older people). Median age at diagnosis (the age with approximately equal numbers of cases diagnosed above and below that age) is also given.

Geographical variation in incidence rates: within Ireland

As with assessment of temporal variation in incidence rates, it is important to be aware that methodological factors (or factors relating to health services) may contribute to apparent geographical variation in cancer incidence rates. Assessment of the statistical significance of geographical variations will not necessarily help with this, except by highlighting variations for which underlying causes (artefactual or genuine) require further investigation. Conversely, a real difference in underlying cancer rates may exist for some comparisons, but the data may be so sparse (or internally variable) that the differences are not apparent or statistically significant.

NI v. RoI

European age-standardised incidence rates (EASRs) based on All-Ireland, Northern Ireland (NI) and Republic of Ireland (RoI) data are tabulated and compared for 1994-96 as a whole, and for urban and non-urban subsets of the data. Statistically significant differences (based on a Z-test approximation, Estève et al. 1994) are highlighted, as are any further apparent differences that appear to be consistent. (See Appendix 3 and Appendix Table 1 for denominator populations used).

Criteria for statistical significance: Comparisons between NI and RoI involved up to three comparisons per sex, based on overall, urban and non-urban datasets. Strictly, an adjustment should be made for the number of multiple comparisons involved (see also Regional comparisons below). As the number of comparisons here is small (sometimes only one), an unadjusted test is used, but results significant at the $P<0.05$ or the $P<0.01$ level are distinguished.

Urban v. other populations

Many cancers are known to show an association with poverty and social deprivation. Meaningful analysis on a national or, particularly, cross-border scale can be difficult, because of inadequacies or variations in the way in which occupation or social grouping are recorded. However, poverty-associated illnesses in developed countries often occur at higher rates in cities, where deprivation rates are generally highest. For this report, we compare incidence rates between urban (city) populations and other populations within Ireland. The urban groupings used are indicated in Appendix 3 and Fig. A1.1.

Note that slightly different groupings of "urban" populations could have been chosen. In particular, within Co Dublin significant urban populations also occur outside of Dublin County Borough (used as the approximate equivalent of Dublin city for the purposes of this report). Note also that, for the cities other than Dublin and Belfast, population sizes are small, and confidence limits on estimated cancer rates thus tend to be relatively wide. At a regional scale, it may thus be difficult to confirm significant differences between urban and other populations. However, if the various regions appear to show a consistent directional difference between urban and non-urban rates, this is highlighted in the text.

Criteria for statistical significance: Comparisons between urban and other populations involved up to three comparisons per sex, based on All-Ireland, NI, and RoI datasets. Strictly, an adjustment should be made for the number of multiple comparisons involved (see also Regional comparisons below). As the number of comparisons here is small (sometimes only one), an unadjusted test is used, but results significant at the $P<0.05$ or the $P<0.01$ level are distinguished.

Regional comparisons

For further assessment of geographical variation within the island of Ireland, age-standardised incidence rates are compared among the administrative areas used by the relevant health boards during the period 1994-96 (Appendix 3, Fig. A1.1). These relate to the health-board areas in which cancer patients were ordinarily resident at the time of diagnosis, and not to the areas in which patients were diagnosed (or treated). In NI, the health-board areas do not follow county boundaries but are based on combinations of local district council areas. In RoI, the health-board areas correspond exactly to groups of counties, with the exception of RoI Mid Western area (which includes only the North Riding section of Co Tipperary) and RoI South Eastern area (which includes Tipperary's South Riding). Note

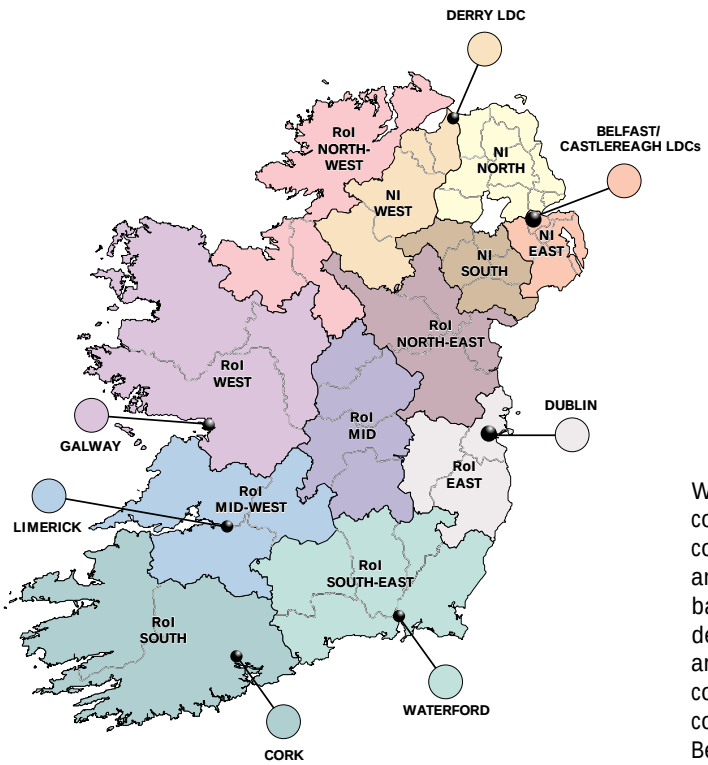
that the RoI Eastern Health Board has subsequently been reorganised as the Eastern Regional Health Authority, with its own constituent boards.

In total, twelve health-board areas are considered (four in NI, eight in RoI). For the seven that include major urban (city) populations, incidence rates are calculated for (a) the whole area, (b) the urban part and (c) other ("non-urban") parts of the area. For each sex and cancer site, the rate for each area (or urban/non-urban section thereof) is compared statistically (by a Z-test approximation) against the rate for the rest of Ireland combined (i.e. Ireland excluding the population being compared). This approach is particularly useful in the case of large areas or cities (e.g. Dublin), which can have a strong influence on the All-Ireland rate and for which comparisons against the All-Ireland rate (rather than the "rest of Ireland" rate) may thus be less informative. For consistency, however, this approach has been applied to each area in turn, and to the urban and "other" (i.e. non-city) subsections of each area.

Further comparisons are made between rates for each city and the combined "urban" rate for other Irish cities as a whole, and between rates for "non-urban" areas and the combined non-urban rate for the rest of Ireland.

Criteria for statistical significance: Comparisons between health-board areas (or their urban or non-urban components) and the rest of Ireland involved a total of 26 comparisons per sex (based on 12 areas, 8 cities and 8 non-urban sub-populations). An adjustment was thus made to compensate for the number of comparisons made. The critical value of Z was set as 3.09 (statistical significance at P<0.05 level, for 26 comparisons). For comparisons between each urban (city) population and the "urban" rate for the rest of Ireland, critical Z was set as 2.734 (P<0.05 for 8 comparisons); between "non-urban" areas (or sub-areas) and the non-urban rate for the rest of Ireland, critical Z was set as 2.866 (P<0.05 for 12 comparisons).

Figure A1.1 Health-board areas and urban sub-populations used for presentation of Irish cancer incidence data, 1994-96.



Within Republic of Ireland, the areas comprise groups of counties (or vice-counties in the case of Tipperary North and South), and urban populations are based on "county borough" (CB) definitions. Within Northern Ireland, the areas comprise groups of local district councils (LDCs), and urban populations correspond to Derry LDC ("Derry") and Belfast and Castlereagh LDCs ("Belfast").

Geographical variation in incidence rates: international

Comparison is made with estimated incidence for the 15 European Union (EU) member states in 1995, from the EUCAN database (Ferlay *et al*. 1999). Note that, in the case of some member states, sample sizes (numbers of cases) are small, particularly based on only a single year. EUCAN figures for some member states (those not covered completely by cancer registries) are estimates based, in part, on extrapolations from mortality data. References to the ranking of individual member states within the EU in 1995 should thus be treated with some caution.

Differences in rates may be small, confidence limits of estimates may be wide, and the ranking of some states may not reflect the 'true' situation. A more robust assessment can be made of how Irish rates compare with the overall EU average for a given cancer. It is possible, however, that underestimates or overestimates within some member states may bias the EU average downwards or upwards. Other methodological differences (e.g. coding schemes used, accuracy of diagnoses) may also contribute in some cases to apparent variations within the EU. Appropriate reference is made to this possibility in relation to a number of specific cancers (e.g. ovarian cancer).

Estimates for the United Kingdom (England, Wales, Scotland and Northern Ireland) are combined within EUCAN. More detailed estimates are available for the period 1994-96, for Scotland (European Network of Cancer registries 1999), England/Wales (Quinn *et al*. 2000), and Northern Ireland (this report). In some cases, these data suggest a different ranking of UK rates within the EU than EUCAN figures suggest. In part, this may reflect the inclusion of additional years. In addition, estimates have, in some cases, been updated since the preliminary 1995 figures provided to EUCAN.

Comment: risk factors, early detection and survival

A brief summary is given of current knowledge of the risk factors involved or implicated in specific cancers. Risk factors are much better known for some cancers (e.g. lung cancer) than others, and in many cases the evidence is incomplete, circumstantial or controversial. Useful reviews of relevant information include IARC (1987), Smans *et al*. (1992), Peckham *et al*. (1995), Weinberg (1998), American Cancer Society (2000a,b), and, especially, Schotenfeld & Fraumeni (1996) and World Cancer Research Fund / American Institute for Cancer Research (1997).

Chromosomal changes are associated with most (perhaps all) cancers, in particular relating to the presence of activated oncogenes and the loss of tumour-suppressor genes. However, reference to genetic factors is generally made here only where specific, inherited chromosomal mutations or errors, or strong familial patterns suggestive of such inherited factors, have been found (e.g., colorectal cancer). Age, *per se*, is not discussed as a 'risk factor' for individual cancers. Age-associated risk may variously reflect, for example, cumulative risk from underlying factors, the multi-step process that is involved in tumour formation, risk associated with specific hormonal events, and decline in the body's cellular-repair or protective mechanisms.

Summary notes are also provided on early symptoms and the potential for early detection of a given cancer. A general indication of survival prospects (from date of diagnosis) is given, based on the EUROCARE-2 study (Berrino *et al*. 1999). Note that early detection of cancer will not necessarily improve survival prospects, but it will generally improve the options available for appropriate treatment. The treatment options available, and the quality of their provision, may be crucial to survival. Useful sources or reviews of relevant information include Peckham *et al*. (1995), American Cancer Society (2000a,b) and websites of the US National Cancer Institute.

Recommendations for further action and for health gain are also made in some chapters.

Appendix 2. Statistical formulae and special terminology

See also Chapter VII (Glossary) and Appendix 1.

Incident case (malignant cancers)

Any invasive or malignant case first diagnosed in a resident of Northern Ireland or the Republic of Ireland during the calendar years 1994-1996. For the purposes of this all-Ireland report, IARC "multiple primary" rules were applied to persons having a previously or simultaneously diagnosed cancer. A separate case was only included in calculations here if it was not identified by the IARC (Ferlay 1999) program as a "duplicate" cancer of the same category (site and/or morphology, depending on the cancer). Cases notified by death certificate only and not confirmed from other sources ("DCOs") were excluded from incidence figures in this report.

Population at risk

For the Republic of Ireland, official Central Statistics Office census figures were used for the 1996 population at national, health-board regional and city (county borough) scales. Health-board regional populations were calculated by combining the relevant counties (with the exception of Tipperary North and South ridings, which are part of separate health-board regions). Official CSO national estimates (based on extrapolation from the 1991 census and/or interpolation between the 1991 and 1996 censuses) were used for 1994 and 1995 national populations. County, city (county borough) and regional populations were estimated by linear interpolation of the population trends between the 1991 and 1996 censuses (as for the 1995 report of the National Cancer registry: NCR 1998), but adjusted to provide the same national totals as in official CSO estimates for 1994 and 1995.

For Northern Ireland, official estimates for 1994, 1995 and 1996, based on extrapolation from the 1991 census, were used for the NI total, health-board areas and urban sub-populations (Derry local district council and Belfast/Castlereagh LDCs).

Crude rate

The number of incident cases or deaths divided by the population at risk; usually expressed per 100 000 persons per year.

Age-specific rate

The number of cases per person in a specific age-class, usually for five-year age-classes up to age 85+, generally expressed per 100 000 persons per year.

European (EASR) and World (WASR) age-standardised rate

The incidence rate that would have been found if the population being studied had the same age-composition (proportion of total population in each five-year age-class) as a hypothetical European or World population. The rates are calculated by applying the age-specific rates for Ireland (or any subdivision thereof) to a theoretical European or World standard population; usually expressed per 100 000 persons per year:

$$ASR = \frac{\sum_{i=1}^{15} a_i . w_i}{\sum_{i=1}^{15} w_i}$$

where: ai=age -specific rate for the ith age group; wi=standard "World" or "European" weights

Directly standardised rate ratio (DSRR)

This is the ratio between two directly age-standardised rates (e.g. EASRs), and is analogous to (but calculated differently from) a standardised incidence ratio (SIR). (SIRs are ratios between indirectly age-standardised rates.) Generally expressed as a percentage.

Cumulative rate

The total accumulated cancer incidence or mortality rate up to a given age, i.e. the sum of the annual incidence or mortality rates (per 100 000 per year). For childhood cancers, ages 0-14 are used; for overall lifespan, ages 0-74 are generally used. Cumulative rate to age 74 is calculated as:

$$cumulative\ rate = \sum_{i=1}^{15} a_i * 5$$

where:

ai=age specific rate for the ith age-class; 5 = number of years included in each of the 15 age-classes used (0-4 to 70-74 years).

Cumulative risk to age 74

The risk to an "average" individual, given current cancer rates, of developing a cancer before his or her 75th birthday (assuming survival to that date); usually expressed as a percentage. Cumulative risk is derived from cumulative rate as follows:

$$cumulative\ risk = 1 - e^{-cumulative\ rate}$$

Note that cumulative risk takes no account of differences in risk factors between individuals or of possible future changes in incidence, but is based on the average Irish male or female, and the most recent (1994-96) estimates of incidence rates for the Irish population. Note also that that substantial numbers of cancer cases occur in individuals aged 75 years or more. As the normal life expectancy in Ireland is close to 75 years, the cumulative risk to age 74 is a good approximation to the "lifetime risk" of developing cancer.

Mortality/incidence (M/I) ratio

The number of deaths for a period (usually a year) divided by the number of incident cases of the same condition for the same period. This ratio is primarily intended for monitoring data quality, as major variation in the ratio, e.g. between cancer registries, countries or years, may indicate variation in case ascertainment (proportion of incident cases registered). However, it can also provide a crude indication of cause-specific survival rate (cancers with poorer average survival rates usually having a higher M/I ratio). For a few cancers, more deaths than incident cases are recorded annually at present. This may reflect methodological factors (e.g. differences in diagnostic criteria applied to deaths and incident cases), poor average survival rates, and/or different time-trends in incidence and mortality rates.

Relative survival

The ratio between the survival of cancer cases and the expected survival of the same number of persons with the same age- and sex-composition in the general population, typically expressed on a one-year, three-year and five-year basis. Patient survival was not assessed on an all-Ireland basis for the present report, but European data (from the EUROCARE-2 study, Berrino *et al*. 1999) are summarised briefly for the major cancers.

Further notes on analysis of incidence data

Comparison of rates between populations or years

Comparative incidence data presented in this report are calculated as directly age-standardised rates (based on a notional standard European population: see above). Where rates are expressed as "% of expected", or % greater or less than another rate, this is based on directly age-standardised rate ratios (DSRRs), rather than indirectly age-standardised ratios (SIRs). Where multiple comparisons are made among populations or years (for a given cancer and sex), a statistical correction is made to minimise the number of "chance" differences that would otherwise be highlighted as statistically significant.

Denominator

The denominator for Irish data was the number of person-years at risk (see above) during 1994-96 for a given population (all-Ireland, NI, RoI, regional or other sub-population).

Numerator

All malignant cancers incident (first diagnosed) in residents of Northern Ireland or the Republic of Ireland between 1 January 1994 and 31 December 1996 (or within a specific year), and which had been registered before 1 January 2000, are included in this report. For cancers diagnosed at post-mortem, the date of diagnosis was taken as the date of death. However, cancers known from death certificate only and not confirmed from other sources ("death certificate only" or DCO cases) have not been included in this report, as a high proportion may have been diagnosed before 1994. Such cases account for only c. 2% of all "new" (previously unregistered) cancers in Ireland annually (Gavin *et al*. 1999).

Treatment of missing address data

For Northern Ireland cases where the local district council and/or health-board were not available at the time of analysis, cases were allocated on an age-class-specific basis to NI health-board areas (and to Derry and Belfast/Castlereagh local district councils) in proportion to the population of each area. No adjustment was made for the smaller number of Republic of Ireland cases where health-board region (or city v. other status) was not known.

Treatment of missing age data

Of 75 600 incident cases for Ireland as a whole, 1994-96, 40 (0.05%) had no age available. (These figures exclude cases identified by IARC's checking program as multiple primaries of the same cancer.) For each cancer site (ICD-10 three-digit code), cases with missing age were allocated to five-year age-classes in proportion to the age-distribution of known-age cases, before calculation of incidence rates. (However, in the chapter on childhood cancer, only cases known to have been diagnosed at <15 years of age are included.)

Statistical comparisons

See Appendix 1.

Further notes on analysis of mortality data

Numerator

The deaths analysed are all those that occurring during 1994-96 which had been officially registered by 1 January 2000. Only deaths where cancer was given as the primary cause of death have been included. This is the equivalent of "underlying cause of death" as recommended internationally.

Cancer coding and classification

Two related systems of coding of neoplasms are in common use: the International Classification of Diseases (ICD) and the International Classification of Diseases for Oncology (ICD-O). ICD-O.2 (version 2) is routinely used by the National Cancer Registry (Ireland) for recording new registrations in the Republic of Ireland. The "site" coding axis corresponds to the malignant neoplasms section of ICD-10 (version 10), but includes also benign, in situ and uncertain neoplasms, distinguishing between these by a second "morphology/behaviour" axis. However, ICD (version 9 or 10) is commonly used for registration of deaths and by many registries (including the Northern Ireland Cancer Registry) for published data. Neither system is completely satisfactory for the presentation of registration data, but, for comparability, ICD-10 is used throughout the present report. For childhood cancers, further summaries are also provided using the International Classification of Childhood Cancer (ICCC).

Appendix 3. Average annual populations by health-board region and other subdivision, Ireland, 1994-96

For estimation of cancer incidence and mortality rates, combined 1994-96 populations were used (including age-class breakdown by five-year intervals: Appendix Table 1). Urban sub-populations are indicated as RoI county boroughs (CBs) or relevant NI local district councils (LDCs).

	health-board area	area abbreviation	sub-population	urban definition used	females	males
All-Ireland	all	All-Ireland	all		2,659,262	2,598,428
Northern Ireland	all	NI	all		845,462	807,795
Republic of Ireland	all	RoI	all		1,813,800	1,790,633
All-Ireland	all	All-Ireland	urban		635,623	577,579
			non-urban		2,023,740	2,020,849
NI	all	NI	urban		238,799	216,357
			non-urban		606,663	591,438
RoI	all	RoI	urban		396,824	361,222
			non-urban		1,417,076	1,429,411
NI	Eastern	NI E	all		346,347	319,373
			non-urban		159,652	153,226
			urban	Belfast & Castlereagh LDCs	186,695	166,147
NI	Western	NI W	all		136,622	135,505
			non-urban		84,517	85,296
			urban	Derry LDC	52,104	50,210
NI	Southern	NI S	all/non-urban		151,314	148,969
NI	Northern	NI N	all/non-urban		211,180	203,947
RoI	Eastern	RoI E	all		662,499	622,695
			non-urban		409,458	394,875
			urban	Dublin CB	253,041	227,820
RoI	Midland	RoI Mid	all/non-urban		100,914	104,038
RoI	Mid Western	RoI MW	all		156,644	159,052
			non-urban		129,755	133,920
			urban	Limerick CB	26,889	25,132
RoI	North Eastern	RoI NE	all/non-urban		151,004	153,851
RoI	North Western	RoI NW	all/non-urban		104,166	106,088
RoI	Southern	RoI S	all		271,909	271,639
			non-urban		206,032	210,377
			urban	Cork CB	65,877	61,262
RoI	South Eastern	RoI SE	all		193,198	196,479
			non-urban		171,694	175,909
			urban	Waterford CB	21,505	20,569
RoI	Western	RoI W	all		173,566	176,792
			non-urban		144,054	150,353
			urban	Galway CB	29,512	26,438

Appendix 4. Useful websites

This list is not intended to be complete, but includes a selection of the most useful or relevant websites providing access to information on cancer. Links to other websites may be found in many of the sites listed here. Note that information on medical treatments, screening or other aspects may not always be directly applicable to Ireland, or to individual patients. Patients and other individuals concerned about possible symptoms of cancer, or any aspect of healthcare, should always seek professional medical advice.

American Cancer Society	Voluntary US organisation	www.cancer.org
CancerHelp UK	Information website for the general public (UK Cancer Research Campaign)	www.cancerhelp.org.uk
Cancer*Index*	Guide to internet resources on cancer, including many links	www.cancerindex.org
CancerLit®	Access to over 1.5 million citations and abstracts of scientific publications on cancer (US National Cancer Institute)	www.cancernet.nci.nih.gov/cancerlit.html
CancerNet™	Medical information on cancer, including PDQ® (Physician Data Query) cancer information summaries (US National Cancer Institute)	www.cancernet.nci.nih.gov
Cancer Research Campaign	UK research charity	www.crc.org.uk
International Association for Research on Cancer (IARC)	Access to European and World statistics on cancer	www.iarc.fr
International Union Against Cancer	International non-governmental organisation	www.uicc.org
Irish Cancer Society	Irish charity	www.irishcancer.ie
MEDLINE / PubMed	Online searches of published medical information (US National Library of Medicine)	www.nlm.nih.gov or www.ncbi.nlm.nih.gov
National Cancer Registry (Ireland)	Statutory cancer registry covering the Republic of Ireland	www.ncri.ie
National Cancer Institute	Statutory US body website	www.nci.nih.gov or www.cancer.gov
Northern Ireland Cancer Registry	Statutory cancer registry covering Northern Ireland	www.qub.ac.uk/nicr/intro.htm
VhiHealthe	Health information site of the Vhi Healthcare company (Republic of Ireland)	www.vhi.ie/topic/cancer

Appendix Table 1(a). Denominator populations of males (by five-year age-class) used for estimation of Irish cancer incidence and mortality rates.

Population/region	subgroup	Year(s)	0-4	5-9	10-14	15-19	20-24	25-29	30-34
World	standard	standard	12,000	10,000	9,000	9,000	8,000	8,000	6,000
European	standard	standard	8,000	7,000	7,000	7,000	7,000	7,000	7,000
All-Ireland	all	1994-96 sum	587,802	647,858	719,953	705,542	643,810	572,556	566,594
NI	all	1994-96 sum	193,602	204,758	202,353	190,942	197,810	194,056	185,894
RoI	all	1994-96 sum	394,200	443,100	517,600	514,600	446,000	378,500	380,700
All-Ireland	urban	1994-96 sum	126,124	128,441	135,930	147,300	176,434	155,413	134,865
All-Ireland	other	1994-96 sum	461,678	519,417	584,023	558,242	467,376	417,143	431,729
NI	urban	1994-96 sum	53,277	54,543	52,627	50,078	54,021	53,306	50,629
NI	other	1994-96 sum	140,325	150,215	149,726	140,864	143,789	140,750	135,265
RoI	urban	1994-96 sum	72,847	73,899	83,304	97,222	122,413	102,106	84,236
RoI	other	1994-96 sum	321,353	369,201	434,296	417,378	323,587	276,394	296,464
NI E	all	1994-96 sum	74,127	76,717	74,688	70,374	75,843	77,049	74,758
NI E	other	1994-96 sum	34,797	37,176	37,169	34,433	35,302	36,105	35,424
NI E	urban	1994-96 sum	39,331	39,541	37,519	35,941	40,541	40,944	39,334
NI W	all	1994-96 sum	34,813	38,254	39,216	36,018	34,882	31,693	29,800
NI W	other	1994-96 sum	20,866	23,253	24,108	21,881	21,402	19,331	18,505
NI W	urban	1994-96 sum	13,946	15,002	15,108	14,137	13,480	12,362	11,295
NI S	all/other	1994-96 sum	38,052	39,650	39,604	36,700	36,440	36,216	34,402
NI N	all/other	1994-96 sum	46,610	50,136	48,845	47,850	50,645	49,099	46,934
RoI E	all	1994-96 sum	142,058	149,946	170,829	178,368	176,807	152,732	145,688
RoI E	other	1994-96 sum	97,418	105,885	121,458	121,351	99,205	83,961	90,643
RoI E	urban	1994-96 sum	44,640	44,060	49,371	57,018	77,602	68,771	55,045
RoI Mid	all/other	1994-96 sum	22,923	26,726	32,208	30,902	22,840	19,974	21,313
RoI Mid W	all	1994-96 sum	34,087	39,202	46,541	46,428	39,329	31,008	32,027
RoI Mid W	other	1994-96 sum	28,618	33,564	40,161	38,987	31,523	24,754	26,549
RoI Mid W	urban	1994-96 sum	5,469	5,638	6,379	7,441	7,805	6,254	5,478
RoI NE	all/other	1994-96 sum	34,557	40,397	47,772	44,842	34,619	29,877	31,274
RoI NW	all/other	1994-96 sum	23,084	27,249	31,913	29,834	22,573	18,931	19,463
RoI S	all	1994-96 sum	57,854	65,962	77,385	77,090	65,918	55,477	57,585
RoI S	other	1994-96 sum	45,546	52,668	62,015	58,987	45,367	40,341	44,538
RoI S	urban	1994-96 sum	12,307	13,293	15,370	18,102	20,550	15,137	13,047
RoI SE	all	1994-96 sum	42,973	49,669	58,355	56,935	44,672	38,934	40,690
RoI SE	other	1994-96 sum	38,346	44,809	52,966	50,655	38,689	33,921	35,937
RoI SE	urban	1994-96 sum	4,627	4,860	5,389	6,280	5,983	5,013	4,753
RoI W	all	1994-96 sum	36,665	43,949	52,598	50,200	39,242	31,567	32,660
RoI W	other	1994-96 sum	30,861	37,902	45,804	41,819	28,770	24,634	26,747
RoI W	urban	1994-96 sum	5,804	6,047	6,794	8,381	10,472	6,933	5,913
All-Ireland	94	1994	199,536	218,693	245,378	232,061	216,101	187,356	186,303
All-Ireland	95	1995	196,066	215,165	239,675	235,381	214,509	189,600	188,541
All-Ireland	96	1996	192,200	214,000	234,900	238,100	213,200	195,600	191,750
NI	94	1994	65,536	68,193	67,578	62,861	67,201	64,256	60,403
NI	95	1995	64,566	67,865	67,275	63,981	66,509	63,600	61,441
NI	96	1996	63,500	68,700	67,500	64,100	64,100	66,200	64,050
RoI	94	1994	134,000	150,500	177,800	169,200	148,900	123,100	125,900
RoI	95	1995	131,500	147,300	172,400	171,400	148,000	126,000	127,100
RoI	96	1996	128,700	145,300	167,400	174,000	149,100	129,400	127,700

35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	total
6,000	6,000	6,000	5,000	4,000	4,000	3,000	2,000	1,000	500	500	100,000
7,000	7,000	7,000	7,000	6,000	5,000	4,000	3,000	2,000	1,000	1,000	100,000
539,598	506,322	480,518	401,405	338,769	302,263	267,256	225,560	152,409	92,464	44,605	7,795,284
167,698	149,622	144,918	129,905	110,369	97,763	87,756	74,060	48,209	28,964	14,705	2,423,384
371,900	356,700	335,600	271,500	228,400	204,500	179,500	151,500	104,200	63,500	29,900	5,371,900
114,775	100,571	95,433	85,537	79,478	73,904	65,014	52,703	32,740	19,314	8,760	1,732,736
424,823	405,751	385,085	315,868	259,291	228,359	202,242	172,857	119,669	73,150	35,845	6,062,548
44,371	37,690	35,408	32,853	29,619	28,033	25,803	21,683	13,402	8,237	3,491	649,070
123,327	111,932	109,510	97,052	80,750	69,730	61,953	52,377	34,807	20,727	11,214	1,774,314
70,404	62,881	60,026	52,684	49,860	45,871	39,210	31,020	19,338	11,077	5,269	1,083,666
301,496	293,819	275,574	218,816	178,540	158,629	140,290	120,480	84,862	52,423	24,631	4,288,234
67,583	59,152	58,024	52,878	44,938	41,219	37,639	32,696	20,995	12,793	6,646	958,120
33,128	30,160	30,919	26,836	21,323	18,192	16,036	14,011	9,367	5,610	3,692	459,679
34,455	28,992	27,106	26,042	23,615	23,027	21,603	18,685	11,628	7,183	2,954	498,441
26,668	24,805	23,200	19,428	16,582	14,175	12,757	10,481	7,067	4,403	2,274	406,516
16,753	16,108	14,898	12,617	10,579	9,169	8,556	7,483	5,293	3,349	1,737	255,887
9,916	8,698	8,302	6,811	6,004	5,006	4,201	2,998	1,774	1,054	537	150,629
30,719	26,973	26,101	22,970	19,686	17,079	14,914	12,282	8,102	4,759	2,259	446,907
42,728	38,692	37,593	34,628	29,162	25,290	22,447	18,600	12,045	7,009	3,526	611,841
133,776	123,122	114,964	92,383	76,837	65,592	53,673	41,938	26,574	15,300	7,496	1,868,085
88,892	83,973	77,314	59,487	45,148	35,800	27,513	21,163	13,644	7,843	3,925	1,184,626
44,885	39,149	37,650	32,895	31,688	29,793	26,161	20,775	12,930	7,457	3,571	683,459
21,444	20,559	18,687	15,061	13,013	12,436	11,237	10,164	6,853	3,981	1,795	312,114
32,787	32,066	30,516	24,576	20,629	18,800	16,608	14,072	9,652	6,026	2,803	477,156
28,081	27,592	26,223	20,890	17,024	15,554	13,982	11,958	8,448	5,348	2,502	401,759
4,705	4,474	4,293	3,686	3,605	3,246	2,626	2,115	1,203	678	301	75,397
32,160	31,606	29,428	23,495	18,810	16,937	15,296	13,506	9,248	5,340	2,390	461,553
20,224	20,446	20,106	16,636	14,041	13,016	12,363	11,282	8,570	5,747	2,784	318,264
56,243	54,398	51,704	41,970	35,820	32,252	28,557	24,101	17,254	10,712	4,636	814,916
44,653	43,697	41,432	32,643	26,984	24,279	21,916	19,073	14,105	9,028	3,855	631,130
11,590	10,701	10,271	9,326	8,835	7,973	6,641	5,028	3,149	1,684	780	183,787
40,186	39,138	36,797	30,370	25,948	23,550	21,272	17,816	11,944	6,944	3,245	589,436
36,280	35,318	33,216	27,220	23,143	21,087	19,417	16,343	10,990	6,418	2,974	527,728
3,906	3,820	3,581	3,150	2,805	2,463	1,855	1,473	954	526	271	61,708
35,079	35,365	33,397	27,010	23,303	21,916	20,494	18,620	14,105	9,452	4,752	530,375
29,761	30,627	29,168	23,384	20,377	19,520	18,566	16,990	13,003	8,719	4,407	451,060
5,318	4,738	4,230	3,625	2,926	2,396	1,928	1,630	1,101	732	345	79,315
177,213	166,878	157,289	128,737	110,797	100,426	88,826	75,711	49,679	30,388	13,790	2,585,062
178,935	168,744	160,529	133,068	112,972	100,337	88,930	75,049	50,630	30,876	14,515	2,593,622
183,450	170,700	162,700	139,600	115,000	101,500	89,500	74,800	52,100	31,200	16,300	2,616,600
54,613	49,378	47,789	41,837	36,397	32,526	29,326	24,711	15,379	9,288	4,490	801,762
55,735	49,644	48,229	43,268	36,772	32,437	29,230	24,649	15,930	9,576	4,515	805,222
57,350	50,600	48,900	44,800	37,200	32,800	29,200	24,700	16,900	10,100	5,700	816,400
122,600	117,500	109,500	86,900	74,400	67,900	59,500	51,000	34,300	21,100	9,300	1,783,300
123,200	119,100	112,300	89,800	76,200	67,900	59,700	50,400	34,700	21,300	10,000	1,788,400
126,100	120,100	113,800	94,800	77,800	68,700	60,300	50,100	35,200	21,100	10,600	1,800,200

Appendix Table 1(b). Denominator populations of females (by five-year age-class) used for estimation of Irish cancer incidence and mortality rates

Population/region	subgroup	Year(s)	0-4	5-9	10-14	15-19	20-24	25-29	30-34
World	standard	standard	12,000	10,000	9,000	9,000	8,000	8,000	6,000
European	standard	standard	8,000	7,000	7,000	7,000	7,000	7,000	7,000
All-Ireland	all	1994-96 sum	556,761	614,693	681,584	672,799	610,269	573,094	590,604
NI	all	1994-96 sum	184,961	194,193	192,984	181,599	182,369	192,694	192,804
RoI	all	1994-96 sum	371,800	420,500	488,600	491,200	427,900	380,400	397,800
All-Ireland	urban	1994-96 sum	120,895	123,643	128,675	149,770	190,581	163,040	146,683
All-Ireland	other	1994-96 sum	435,866	491,050	552,909	523,029	419,688	410,054	443,921
NI	urban	1994-96 sum	51,711	53,198	50,199	48,551	53,613	55,936	56,876
NI	other	1994-96 sum	133,250	140,995	142,785	133,048	128,756	136,758	135,928
RoI	urban	1994-96 sum	69,184	70,445	78,476	101,219	136,968	107,104	89,806
RoI	other	1994-96 sum	302,616	350,055	410,124	389,981	290,932	273,296	307,994
NI E	all	1994-96 sum	71,405	74,024	70,931	67,915	71,783	78,743	80,999
NI E	other	1994-96 sum	33,451	35,145	35,132	32,515	30,612	35,215	36,440
NI E	urban	1994-96 sum	37,955	38,879	35,799	35,400	41,171	43,528	44,560
NI W	other	1994-96 sum	19,664	21,705	22,977	20,857	18,746	18,127	17,842
NI W	urban	1994-96 sum	13,756	14,319	14,400	13,151	12,442	12,408	12,316
NI S	all/other	1994-96 sum	35,629	37,270	38,232	34,138	32,174	34,451	33,851
NI N	all/other	1994-96 sum	44,506	46,875	46,444	45,538	47,223	48,965	47,795
RoI E	all	1994-96 sum	132,721	142,980	159,983	173,535	184,300	162,996	159,327
RoI E	other	1994-96 sum	90,096	100,654	113,982	114,233	97,055	90,589	100,927
RoI E	urban	1994-96 sum	42,625	42,326	46,002	59,302	87,245	72,408	58,400
RoI Mid	all/other	1994-96 sum	22,011	25,400	30,576	28,348	19,739	18,692	20,892
RoI Mid-W	all	1994-96 sum	32,332	36,822	44,420	44,132	35,290	29,607	32,371
RoI Mid-W	other	1994-96 sum	27,086	31,419	38,140	36,369	26,951	23,262	26,762
RoI Mid-W	urban	1994-96 sum	5,245	5,404	6,281	7,763	8,339	6,345	5,609
RoI NE	all/other	1994-96 sum	32,503	38,734	45,090	41,689	30,143	28,600	32,051
RoI NW	all/other	1994-96 sum	21,691	25,752	29,985	28,905	20,813	18,406	20,235
RoI S	all	1994-96 sum	54,828	62,182	74,075	73,394	61,365	54,105	57,912
RoI S	other	1994-96 sum	43,469	49,682	59,468	54,656	39,209	38,629	43,933
RoI S	urban	1994-96 sum	11,359	12,500	14,607	18,738	22,156	15,476	13,979
RoI SE	all	1994-96 sum	40,942	47,196	55,063	52,961	39,130	37,699	41,207
RoI SE	other	1994-96 sum	36,421	42,558	49,889	46,797	32,943	32,579	36,262
RoI SE	urban	1994-96 sum	4,521	4,638	5,175	6,164	6,187	5,120	4,945
RoI W	all	1994-96 sum	34,772	41,434	49,407	48,235	37,119	30,295	33,805
RoI W	other	1994-96 sum	29,339	35,856	42,995	38,984	24,078	22,540	26,933
RoI W	urban	1994-96 sum	5,434	5,578	6,412	9,251	13,042	7,755	6,873
All-Ireland	all	1994	188,874	207,585	231,779	220,953	203,411	188,865	195,077
All-Ireland	all	1995	185,687	204,308	226,805	224,346	203,758	190,329	196,927
All-Ireland	all	1996	182,200	202,800	223,000	227,500	203,100	193,900	198,600
NI	all	1994	62,674	64,585	64,579	59,153	62,211	64,665	63,177
NI	all	1995	61,787	64,408	64,105	60,546	61,258	63,829	64,227
NI	all	1996	60,500	65,200	64,300	61,900	58,900	64,200	65,400
RoI	all	1994	126,200	143,000	167,200	161,800	141,200	124,200	131,900
RoI	all	1995	123,900	139,900	162,700	163,800	142,500	126,500	132,700
RoI	all	1996	121,700	137,600	158,700	165,600	144,200	129,700	133,200

35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	total
6,000	6,000	6,000	5,000	4,000	4,000	3,000	2,000	1,000	500	500	100,000
7,000	7,000	7,000	7,000	6,000	5,000	4,000	3,000	2,000	1,000	1,000	100,000
553,882	505,268	476,213	396,021	341,787	316,730	308,305	287,543	219,131	159,397	114,006	7,977,787
173,182	149,768	148,313	133,921	116,787	109,930	107,405	99,343	74,931	56,597	44,606	2,536,387
380,700	355,500	327,900	262,100	225,000	206,800	200,900	188,200	144,200	102,800	69,400	5,441,400
122,705	104,765	99,766	91,521	87,701	85,495	83,800	77,108	56,486	42,501	31,732	1,906,868
431,177	400,503	376,447	304,500	254,086	231,235	224,505	210,435	162,645	116,896	82,274	6,071,219
48,603	38,973	36,960	35,616	33,004	32,915	33,210	31,575	22,971	18,032	14,454	716,397
124,579	110,795	111,353	98,305	83,783	77,015	74,195	67,768	51,960	38,565	30,152	1,819,990
74,102	65,792	62,806	55,905	54,697	52,581	50,590	45,533	33,515	24,469	17,278	1,190,471
306,598	289,708	265,094	206,195	170,303	154,219	150,310	142,667	110,685	78,331	52,122	4,251,229
71,927	60,119	60,314	55,422	48,988	47,951	48,524	45,916	34,808	26,920	22,349	1,039,040
33,947	30,339	31,445	27,209	22,085	20,439	20,416	18,838	14,946	11,240	9,541	478,956
37,980	29,780	28,869	28,213	26,903	27,512	28,108	27,078	19,861	15,680	12,807	560,084
16,946	15,327	14,808	12,426	10,559	9,671	9,631	8,851	6,847	4,918	3,649	253,552
10,623	9,194	8,091	7,403	6,101	5,402	5,102	4,496	3,110	2,352	1,647	156,313
30,327	26,581	26,515	23,409	20,527	19,080	17,823	16,340	12,243	8,910	6,440	453,943
43,359	38,547	38,584	35,261	30,612	27,825	26,325	23,739	17,923	13,497	10,521	633,540
143,147	131,123	120,035	95,951	82,663	72,908	67,607	59,614	44,218	31,613	22,775	1,987,497
96,265	89,734	80,525	60,511	47,095	37,699	33,141	28,621	21,443	14,874	10,932	1,228,375
46,882	41,389	39,511	35,441	35,568	35,209	34,465	30,994	22,775	16,739	11,843	759,122
20,890	19,685	17,633	14,154	12,212	11,875	11,843	11,273	8,483	5,533	3,502	302,742
31,910	31,002	29,121	23,256	19,237	17,723	17,828	16,869	12,782	9,032	6,198	469,931
27,093	26,455	24,642	19,339	15,552	14,242	14,487	13,989	10,685	7,558	5,234	389,264
4,816	4,547	4,479	3,917	3,685	3,480	3,340	2,881	2,098	1,473	964	80,668
32,224	29,957	27,900	21,574	17,793	16,582	16,363	15,895	12,189	8,420	5,306	453,013
20,577	19,887	18,691	14,566	13,105	11,967	12,458	12,591	10,252	7,514	5,103	312,498
56,176	52,846	49,352	39,883	34,788	32,293	31,605	29,746	23,342	16,832	11,004	815,726
44,026	41,954	38,768	30,186	25,263	23,629	23,616	22,422	17,889	13,008	8,287	618,095
12,150	10,891	10,584	9,697	9,525	8,664	7,989	7,324	5,452	3,823	2,717	197,631
40,059	37,242	34,645	28,592	24,393	23,098	22,057	21,332	15,614	10,924	7,440	579,595
35,868	33,490	31,081	25,479	21,540	20,503	19,785	19,264	14,241	9,797	6,587	515,081
4,192	3,752	3,564	3,113	2,853	2,596	2,272	2,068	1,373	1,128	853	64,514
35,717	33,759	30,522	24,124	20,809	20,354	21,140	20,879	17,321	12,932	8,072	520,698
29,655	28,547	25,854	20,386	17,743	17,723	18,617	18,613	15,504	11,626	7,171	432,162
6,062	5,213	4,668	3,738	3,066	2,632	2,523	2,266	1,817	1,306	901	88,536
180,550	165,920	155,340	126,860	112,196	105,951	103,098	96,288	71,897	52,049	36,056	2,642,549
184,232	168,248	159,273	131,261	114,391	104,979	102,807	95,955	72,634	53,548	37,150	2,656,638
189,100	171,100	161,600	137,900	115,200	105,800	102,400	95,300	74,600	53,800	40,800	2,678,600
55,750	49,420	49,040	43,160	38,596	37,051	35,698	33,388	24,397	18,549	13,856	839,949
57,832	49,648	49,273	44,661	38,991	36,379	35,907	33,055	24,834	18,948	14,050	843,738
59,600	50,700	50,000	46,100	39,200	36,500	35,800	32,900	25,700	19,100	16,700	852,700
124,800	116,500	106,300	83,700	73,600	68,900	67,400	62,900	47,500	33,500	22,200	1,802,600
126,400	118,600	110,000	86,600	75,400	68,600	66,900	62,900	47,800	34,600	23,100	1,812,900
129,500	120,400	111,600	91,800	76,000	69,300	66,600	62,400	48,900	34,700	24,100	1,825,900

Appendix Table 2. Malignant cancers ranked by numbers of incident cases, all Ireland, Northern Ireland and Republic of Ireland, 1994-96. The major sites or site-combinations included here are from the neoplasm section of the standard European shortlist of "causes of death", along with additional sites/combinations for which Irish incidence is equally high.

Description	ICD-10 codes	all cases		female cases			
		All-Ireland		All-Ireland		NI	
		number	% total	number	% total	number	% total
[a]Non-melanoma skin	C44	22 000	29.1	10 334	28.2	3 289	26.0
[b]Larynx, trachea, bronchus, lung	C32-C34	7 546	10.0	2 483	6.8	958	7.6
Breast	C50	7 167	9.5	7 104	19.4	2 496	19.7
Colon	C18	5 106	6.8	2 477	6.7	942	7.4
Prostate	C61	4 648	6.1	0	0.0	0	0.0
[c]Lymphoid/haematopoietic & related tissue	C81-C96	4 353	5.8	1 949	5.3	676	5.3
[a]Unspecified site	C80	3 151	4.2	1 621	4.4	603	4.8
Rectum & anus	C19-C21	2 767	3.7	1 079	2.9	418	3.3
Stomach	C16	2 191	2.9	803	2.2	280	2.2
Bladder	C67	2 114	2.8	629	1.7	219	1.7
Melanoma of skin	C43	1 592	2.1	1 013	2.8	309	2.4
Pancreas	C25	1 350	1.8	691	1.9	207	1.6
Ovary	C56	1 335	1.8	1 335	3.6	417	3.3
Oesophagus	C15	1 334	1.8	531	1.4	163	1.3
Lip, oral cavity & pharynx	C00-C14	1 333	1.8	371	1.0	151	1.2
[a]Brain	C71	1 046	1.4	445	1.2	130	1.0
Kidney, except renal pelvis	C64	1 022	1.4	404	1.1	143	1.1
Other parts of uterus	C54-C55	1 018	1.3	1 018	2.8	352	2.8
Cervix uteri	C53	776	1.0	776	2.1	247	1.9
[a]Testis	C62	397	0.5	0	0.0	0	0.0
Liver & intrahepatic bile ducts	C22	338	0.4	129	0.4	70	0.6
[a]All other sites		3 005	4.0	1 502	4.1	586	4.6
[a]All sites excl. non-melanoma skin	C00-43, C45-97	53 590	70.9	26 360	71.9	9 367	74.1
All sites	C00-C97	75 600	100	36 699	100	12 657	100

Notes:
[a] These sites or site-combinations are not included in the European causes-of-death shortlist.
[b] See *Chapter 10* for bronchus and lung subtotal.
[c] See *Chapters 22-23* for lymphoma and leukaemia subtotals.

female cases		male cases						Description
RoI		All-Ireland		NI		RoI		
number	% total	number	% total	number	% total	number	% total	
7 045	29.3	11 666	30.0	3 198	26.0	8 468	31.8	[a]Non-melanoma skin
1 525	6.3	5 063	13.0	1 849	15.0	3 214	12.1	[b]Larynx, trachea, bronchus, lung
4 608	19.2	63	0.2	25	0.2	38	0.1	Breast
1 535	6.4	2 629	6.8	908	7.4	1 721	6.5	Colon
0	0.0	4 648	11.9	1 334	10.8	3 314	12.5	Prostate
1 273	5.3	2 404	6.2	794	6.5	1 610	6.1	[c]Lymphoid/haematopoietic & related tissue
1 018	4.2	1 530	3.9	445	3.6	1 085	4.1	[a]Unspecified site
661	2.7	1 688	4.3	526	4.3	1 162	4.4	Rectum & anus
523	2.2	1 388	3.6	499	4.1	889	3.3	Stomach
410	1.7	1 485	3.8	470	3.8	1 015	3.8	Bladder
704	2.9	579	1.5	208	1.7	371	1.4	Melanoma of skin
484	2.0	659	1.7	198	1.6	461	1.7	Pancreas
918	3.8	0	0.0	0	0.0	0	0.0	Ovary
368	1.5	803	2.1	284	2.3	519	2.0	Oesophagus
220	0.9	962	2.5	306	2.5	656	2.5	Lip, oral cavity & pharynx
315	1.3	601	1.5	175	1.4	426	1.6	[a]Brain
261	1.1	618	1.6	220	1.8	398	1.5	Kidney, except renal pelvis
666	2.8	0	0.0	0	0.0	0	0.0	Other parts of uterus
529	2.2	0	0.0	0	0.0	0	0.0	Cervix uteri
	0.0	397	1.0	144	1.2	253	1.0	[a]Testis
59	0.2	209	0.5	85	0.7	124	0.5	Liver & intrahepatic bile ducts
916	3.8	1 503	3.9	625	5.1	878	3.3	[a]All other sites
16 993	70.7	27 230	70.0	9 096	74.0	18 134	68.2	[a]All sites excl. non-melanoma skin
24 043	100	38 901	100	12 294	100	26 608	100	All sites

Appendix Table 3. Malignant cancers ranked by numbers of deaths, all Ireland, Northern Ireland and Republic of Ireland, 1994-96. The major sites or site-combinations included here are from the neoplasm section of the standard European shortlist of "causes of death", along with additional sites/combinations for which Irish incidence is equally high.

Description	ICD-10 codes	all cases		female cases			
		All-Ireland		All-Ireland		NI	
		number	% total	number	% total	number	% total
[b]Larynx, trachea, bronchus, lung	C32-C34	7 143	21.7	2 428	15.8	821	16.1
Colon	C18	3 075	9.3	1 471	9.6	491	9.6
Breast	C50	2 927	8.9	2 908	18.9	970	19.1
[c]Lymphoid/haematopoietic & related tissue	C81-C96	2 499	7.6	1 113	7.2	358	7.0
Prostate	C61	2 154	6.5	0	0.0	0	0.0
[a]Unspecified site	C80	2 037	6.2	989	6.4	393	7.7
Stomach	C16	1 800	5.5	726	4.7	231	4.5
Pancreas	C25	1 493	4.5	740	4.8	225	4.4
Oesophagus	C15	1 324	4.0	526	3.4	159	3.1
Rectum & anus	C19-C21	1 032	3.1	418	2.7	155	3.0
[a]Brain	C71	889	2.7	389	2.5	87	1.7
Ovary	C56	888	2.7	888	5.8	277	5.4
Bladder	C67	795	2.4	260	1.7	94	1.8
Lip, oral cavity & pharynx	C00-C14	576	1.7	178	1.2	63	1.2
Liver & intrahepatic bile ducts	C22	575	1.7	240	1.6	93	1.8
Kidney, except renal pelvis	C64	541	1.6	203	1.3	60	1.2
Cervix uteri	C53	315	1.0	315	2.1	101	2.0
Other parts of uterus	C54-C55	280	0.8	280	1.8	91	1.8
Melanoma of skin	C43	253	0.8	137	0.9	53	1.0
[a]Non-melanoma skin	C44	119	0.4	30	0.2	9	0.2
[a]Testis	C62	35	0.1	0	0.0	0	0.0
[a]All other sites		2 241	6.8	1 116	7.3	358	7.0
[a]All sites excl. non-melanoma skin	C00-43, C45-97	32 842	99.6	15 325	99.8	5 080	99.8
All sites	C00-97	32 961	100	15 355	100	5 089	100

Notes:

[a] These sites or site-combinations are not included in the European causes-of-death shortlist.

[b] See Chapter 10 for bronchus and lung subtotal.

[c] See *Chapters 22-23* for lymphoma and leukaemia subtotals.

female cases		male cases						Description
RoI		All-Ireland		NI		RoI		
number	% total	number	% total	number	% total	number	% total	
1 607	15.7	47 15	26.8	1 566	28.2	3 149	26.1	[b]Larynx, trachea, bronchus, lung
980	9.5	1 604	9.1	489	8.8	1 115	9.2	Colon
1 938	18.9	19	0.1	2	0.0	17	0.1	Breast
755	7.4	1 386	7.9	453	8.2	933	7.7	[c]Lymphoid/haematopoietic & related tissue
0	0.0	2 154	12.2	635	11.4	1 519	12.6	Prostate
596	5.8	1 048	6.0	343	6.2	705	5.8	[a]Unspecified site
495	4.8	1 074	6.1	338	6.1	736	6.1	Stomach
515	5.0	753	4.3	218	3.9	535	4.4	Pancreas
367	3.6	798	4.5	250	4.5	548	4.5	Oesophagus
263	2.6	614	3.5	177	3.2	437	3.6	Rectum & anus
302	2.9	500	2.8	128	2.3	372	3.1	[a]Brain
611	6.0	0	0.0	0	0.0	0	0.0	Ovary
166	1.6	535	3.0	190	3.4	345	2.9	Bladder
115	1.1	398	2.1	93	1.7	305	2.5	Lip, oral cavity & pharynx
147	1.4	335	1.9	115	2.1	220	1.8	Liver & intrahepatic bile ducts
143	1.4	338	1.9	123	2.2	215	1.8	Kidney, except renal pelvis
214	2.1	0	0.0	0	0.0	0	0.0	Cervix uteri
189	1.8	0	0.0	0	0.0	0	0.0	Other parts of uterus
84	0.8	116	0.7	34	0.6	82	0.7	Melanoma of skin
21	0.2	89	0.5	21	0.4	68	0.6	[a]Non-melanoma skin
0	0.0	35	0.2	12	0.2	23	0.2	[a]Testis
758	7.4	1 095	6.4	364	6.6	731	6.1	[a]All other sites
10 245	99.8	17 517	99.5	5 530	99.6	11 987	99.4	[a]All sites excl. non-melanoma skin
10 266	100	17 606	100	5 551	100	12 055	100	All sites

Appendix Table 4. Numbers of newly diagnosed malignant cancer cases, and incidence rates, by ICD-10 site and sex, All-Ireland, 1994-96

		both sexes		female					
						rates (per 100,000)			cum. risk
Description	ICD-10	cases	% total	cases	% total	crude	WASR	EASR	% (0-74)
Lip	C00	208	0.28	18	0.05	0.23	0.14	0.20	0.02
Base of tongue	C01	67	0.09	14	0.04	0.18	0.10	0.16	0.01
Other/unspecified tongue	C02	217	0.29	68	0.19	0.85	0.59	0.80	0.06
Gum	C03	42	0.06	15	0.04	0.19	0.10	0.16	0.01
Floor of mouth	C04	113	0.15	26	0.07	0.33	0.20	0.31	0.02
Palate	C05	51	0.07	17	0.05	0.21	0.17	0.22	0.02
Other/unspecified mouth	C06	82	0.11	35	0.10	0.44	0.27	0.41	0.03
Parotid gland	C07	92	0.12	35	0.10	0.44	0.30	0.39	0.03
Other/unspecified major salivary glands	C08	45	0.06	21	0.06	0.26	0.20	0.27	0.02
Tonsil	C09	83	0.11	18	0.05	0.23	0.17	0.24	0.03
Oropharynx	C10	44	0.06	10	0.03	0.13	0.09	0.13	0.01
Nasopharynx	C11	62	0.08	20	0.05	0.25	0.20	0.24	0.02
Pyriform sinus	C12	89	0.12	18	0.05	0.23	0.14	0.21	0.02
Hypopharynx	C13	69	0.09	38	0.10	0.48	0.28	0.43	0.04
Other/ill-defined lip, oral cavity, pharynx	C14	69	0.09	18	0.05	0.23	0.16	0.23	0.02
Oesophagus	C15	1334	1.76	531	1.45	6.66	3.70	5.76	0.41
Stomach	C16	2191	2.90	803	2.19	10.07	5.81	8.77	0.67
Small intestine	C17	184	0.24	77	0.21	0.97	0.64	0.94	0.08
Colon	C18	5106	6.75	2477	6.75	31.05	18.92	28.34	2.20
Rectosigmoid junction	C19	539	0.71	213	0.58	2.67	1.67	2.49	0.20
Rectum	C20	2121	2.81	805	2.19	10.09	6.35	9.37	0.73
Anus & anal canal	C21	107	0.14	61	0.17	0.76	0.49	0.70	0.05
Liver & intrahepatic bile ducts	C22	338	0.45	129	0.35	1.62	0.92	1.38	0.12
Gallbladder	C23	148	0.20	100	0.27	1.25	0.77	1.16	0.10
Other/unspecified biliary tract	C24	265	0.35	117	0.32	1.47	0.77	1.23	0.09
Pancreas	C25	1350	1.79	691	1.88	8.66	4.91	7.55	0.57
Other/ill-defined digestive organs	C26	150	0.20	71	0.19	0.89	0.45	0.73	0.05
Nasal cavity & middle ear	C30	48	0.06	20	0.05	0.25	0.15	0.23	0.02
Accessory sinuses	C31	37	0.05	14	0.04	0.18	0.10	0.14	0.01
Larynx	C32	525	0.69	93	0.25	1.17	0.82	1.17	0.11
Trachea	C33	24	0.03	10	0.03	0.13	0.07	0.11	0.01
Bronchus & lung	C34	6997	9.26	2380	6.49	29.83	19.01	27.98	2.47
Thymus	C37	10	0.01	5	0.01	0.06	0.06	0.08	0.01
Heart, mediastinum, & pleura	C38	42	0.06	13	0.04	0.16	0.11	0.15	0.01
Other/ill-defined respiratory/intrathoracic	C39	2	<0.01	1	<0.01	0.01	<0.01	0.01	0.00
Bone & articular cartilage of limbs	C40	87	0.12	33	0.09	0.41	0.39	0.38	0.03
Bone & articular cartilage other/unspecified	C41	62	0.08	22	0.06	0.28	0.23	0.26	0.02
Melanoma	C43	1592	2.11	1013	2.76	12.70	9.99	12.88	1.00
Non-melanoma skin	C44	22009	29.11	10339	28.17	129.60	78.97	117.39	8.43
Mesothelioma	C45	90	0.12	8	0.02	0.10	0.10	0.13	0.01
Kaposi's sarcoma	C46	20	0.03	1	<0.01	0.01	0.01	0.01	<0.01
Peripheral nerves & autonomic nervous system	C47	22	0.03	11	0.03	0.14	0.15	0.15	0.01
Retroperitoneum & peritoneum	C48	39	0.05	21	0.06	0.26	0.17	0.24	0.02
Other connective & soft tissue	C49	332	0.44	139	0.38	1.74	1.40	1.72	0.13
Breast	C50	7167	9.48	7104	19.36	89.05	70.22	95.98	7.49
Vulva	C51	165	0.22	165	0.45	2.07	1.23	1.82	0.14
Vagina	C52	59	0.08	59	0.16	0.74	0.52	0.73	0.06
Cervix uteri	C53	776	1.03	776	2.11	9.73	8.43	10.54	0.83
Corpus uteri	C54	896	1.19	896	2.44	11.23	8.56	12.05	1.06
Uterus, unspecified	C55	122	0.16	122	0.33	1.53	1.19	1.63	0.14
Ovary	C56	1335	1.77	1335	3.64	16.73	12.80	17.44	1.43
Other/unspecified female genital organs	C57	26	0.03	26	0.07	0.33	0.23	0.34	0.03
Placenta	C58	2	<0.01	2	0.01	0.03	0.02	0.02	<0.01
Penis	C60	105	0.14	-	-	-	-	-	-
Prostate	C61	4649	6.15	-	-	-	-	-	-
Testis	C62	397	0.53	-	-	-	-	-	-
Other/unspecified male genital organs	C63	20	0.03	-	-	-	-	-	-

(continued overleaf)

male rates						
		rates (per 100,000)			cum. risk	
cases	% total	crude	WASR	EASR	% (0-74)	Description
190	0.49	2.44	1.88	2.80	0.23	Lip
53	0.14	0.68	0.57	0.79	0.07	Base of tongue
149	0.38	1.91	1.60	2.28	0.19	Other/unspecified tongue
27	0.07	0.35	0.27	0.41	0.03	Gum
87	0.22	1.12	0.94	1.32	0.12	Floor of mouth
34	0.09	0.44	0.36	0.51	0.04	Palate
47	0.12	0.60	0.49	0.72	0.06	Other/unspecified mouth
57	0.15	0.73	0.55	0.84	0.06	Parotid gland
24	0.06	0.31	0.26	0.36	0.03	Other/unspecified major salivary glands
65	0.17	0.83	0.74	1.03	0.09	Tonsil
34	0.09	0.44	0.37	0.51	0.05	Oropharynx
42	0.11	0.54	0.49	0.61	0.06	Nasopharynx
71	0.18	0.91	0.77	1.09	0.09	Pyriform sinus
31	0.08	0.40	0.32	0.47	0.04	Hypopharynx
51	0.13	0.65	0.50	0.73	0.06	Other/ill-defined lip, oral cavity, pharynx
803	2.06	10.30	8.13	12.13	0.97	Oesophagus
1388	3.57	17.81	13.55	20.50	1.60	Stomach
107	0.28	1.37	1.09	1.59	0.14	Small intestine
2629	6.76	33.73	25.93	39.03	3.08	Colon
326	0.84	4.18	3.23	4.83	0.41	Rectosigmoid junction
1316	3.38	16.88	13.27	19.64	1.65	Rectum
46	0.12	0.59	0.48	0.72	0.05	Anus & anal canal
209	0.54	2.68	2.11	3.07	0.25	Liver & intrahepatic bile ducts
48	0.12	0.62	0.45	0.70	0.05	Gallbladder
148	0.38	1.90	1.44	2.24	0.16	Other/unspecified biliary tract
659	1.69	8.45	6.29	9.68	0.71	Pancreas
79	0.20	1.01	0.74	1.19	0.08	Other/ill-defined digestive organs
28	0.07	0.36	0.29	0.42	0.03	Nasal cavity & middle ear
23	0.06	0.30	0.24	0.37	0.03	Accessory sinuses
432	1.11	5.54	4.58	6.58	0.59	Larynx
14	0.04	0.18	0.15	0.21	0.02	Trachea
4617	11.87	59.23	45.60	68.19	5.78	Bronchus & lung
5	0.01	0.06	0.06	0.07	0.01	Thymus
29	0.07	0.37	0.31	0.40	0.03	Heart, mediastinum, & pleura
1	<0.01	0.01	0.01	0.01	0.00	Other/ill-defined respiratory/intrathoracic
54	0.14	0.69	0.67	0.63	0.05	Bone & articular cartilage of limbs
40	0.10	0.51	0.45	0.52	0.04	Bone & articular cartilage other/unspecified
579	1.49	7.43	6.20	8.45	0.63	Melanoma
11670	30.00	149.7	114.6	173.7	12.16	Non-melanoma skin
82	0.21	1.05	0.88	1.25	0.12	Mesothelioma
19	0.05	0.24	0.22	0.26	0.02	Kaposi's sarcoma
11	0.03	0.14	0.13	0.15	0.01	Peripheral nerves & autonomic nervous system
18	0.05	0.23	0.19	0.26	0.02	Retroperitoneum & peritoneum
193	0.50	2.48	2.19	2.75	0.22	Other connective & soft tissue
63	0.16	0.81	0.60	0.92	0.07	Breast
-	-	-	-	-	-	Vulva
-	-	-	-	-	-	Vagina
-	-	-	-	-	-	Cervix uteri
-	-	-	-	-	-	Corpus uteri
-	-	-	-	-	-	Uterus, unspecified
-	-	-	-	-	-	Ovary
-	-	-	-	-	-	Other/unspecified female genital organs
-	-	-	-	-	-	Placenta
105	0.27	1.35	1.09	1.58	0.12	Penis
4649	11.95	59.64	41.52	67.13	4.67	Prostate
397	1.02	5.09	4.76	5.04	0.36	Testis
20	0.05	0.26	0.19	0.30	0.01	Other/unspecified male genital organs

Appendix Table 4 *(continued)*

		both sexes		female					
						rates (per 100,000)			cum. risk
Description	ICD-10	cases	% total	cases	% total	crude	WASR	EASR	% (0-74)
Kidney, except renal pelvis	C64	1022	1.35	404	1.10	5.06	3.50	4.96	0.40
Renal pelvis	C65	74	0.10	20	0.05	0.25	0.16	0.23	0.02
Ureter	C66	63	0.08	29	0.08	0.36	0.20	0.30	0.03
Bladder	C67	2114	2.80	629	1.71	7.88	4.68	7.05	0.57
Other/unspecified urinary organs	C68	78	0.10	16	0.04	0.20	0.11	0.17	0.01
Eye & adnexa	C69	155	0.21	79	0.22	0.99	0.77	0.96	0.08
Meninges	C70	16	0.02	8	0.02	0.10	0.07	0.10	0.01
Brain	C71	1046	1.38	445	1.21	5.58	4.83	5.69	0.47
Spinal cord, cranial nerves & other parts of cns	C72	43	0.06	19	0.05	0.24	0.24	0.22	0.02
Thyroid gland	C73	320	0.42	228	0.62	2.86	2.34	2.87	0.22
Adrenal gland	C74	43	0.06	16	0.04	0.20	0.21	0.21	0.02
Other endocrine glands & related structures	C75	42	0.06	22	0.06	0.28	0.23	0.28	0.02
Other & ill-defined sites	C76	216	0.29	123	0.34	1.54	0.88	1.31	0.10
Secondary & unspecified lymph nodes	C77	41	0.05	37	0.10	0.46	0.39	0.52	0.05
Unspecified site	C80	3151	4.17	1621	4.42	20.32	11.77	17.82	1.37
Hodgkin's disease	C81	328	0.43	134	0.37	1.68	1.54	1.65	0.13
Follicular [nodular] non-hodgkin's lymphoma	C82	177	0.23	95	0.26	1.19	0.98	1.30	0.11
Diffuse non-hodgkin's lymphoma	C83	467	0.62	217	0.59	2.72	1.86	2.66	0.23
Peripheral & cutaneous t-cell lymphomas	C84	91	0.12	41	0.11	0.51	0.41	0.55	0.04
Other & unspecified types of nhl	C85	982	1.30	464	1.26	5.82	4.08	5.66	0.49
Malignant immunoproliferative diseases	C88	36	0.05	13	0.04	0.16	0.11	0.15	0.01
Multiple myeloma, malignant plasma cell neoplasms	C90	715	0.95	321	0.87	4.02	2.45	3.67	0.31
Lymphoid leukaemia	C91	695	0.92	269	0.73	3.37	2.68	3.14	0.25
Myeloid leukaemia	C92	462	0.61	204	0.56	2.56	2.03	2.52	0.20
Monocytic leukaemia	C93	18	0.02	9	0.02	0.11	0.12	0.11	0.01
Other leukaemias of specified cell type	C94	48	0.06	18	0.05	0.23	0.15	0.21	0.01
Leukaemia of unspecified cell type	C95	114	0.15	50	0.14	0.63	0.39	0.56	0.04
Other/unspec. Lymphoid, haematopoietic & related	C96	220	0.29	114	0.31	1.43	0.84	1.20	0.08
Independent (primary) multiple sites	C97	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Lip & mouth	C00-C08	917	1.21	249	0.68	4.58	2.07	2.92	0.22
Pharynx	C09-C14	416	0.55	122	0.33	2.24	1.04	1.47	0.13
Lip, oral cavity & pharynx	C00-C14	1333	1.76	371	1.01	6.82	3.11	4.40	0.35
Rectum & anus	C19-C21	2767	3.66	1079	2.94	19.83	8.50	12.56	0.98
Colorectal cancers	C18-21	7873	10.41	3556	9.69	65.35	27.42	40.90	3.16
Larynx & trachea/bronchus/lung	C32-C34	7546	9.98	2483	6.77	45.63	19.91	29.26	2.58
Other parts of uterus	C54-C55	1018	1.35	1018	2.77	18.71	9.75	13.68	1.20
Lymphoma	C81-C85	2045	2.71	951	2.59	17.48	8.86	11.82	0.99
Leukaemia (excl. Plasma cell leukaemia)	C91-C95	1337	1.77	550	1.50	10.11	5.36	6.54	0.52
Lymphoid/haematopoietic & related tissue	C81-C96	4353	5.76	1949	5.31	35.82	17.63	23.37	1.91
All sites excl. Non-melanoma skin	C00-43,45-97	53591	70.9	26360	71.8	484.4	232.5	325.1	23.2
All sites	C00-C97	75600	100.0	36699	100.0	674.4	311.5	442.5	29.6

male rates						
		rates (per 100,000)			cum. risk	
cases	% total	crude	WASR	EASR	% (0-74)	Description
618	1.59	7.93	6.69	9.31	0.80	Kidney, except renal pelvis
54	0.14	0.69	0.54	0.81	0.06	Renal pelvis
34	0.09	0.44	0.35	0.50	0.05	Ureter
1485	3.82	19.05	14.21	21.93	1.61	Bladder
62	0.16	0.80	0.64	0.94	0.08	Other/unspecified urinary organs
76	0.20	0.97	0.87	1.11	0.08	Eye & adnexa
8	0.02	0.10	0.11	0.12	0.01	Meninges
601	1.54	7.71	7.02	8.58	0.74	Brain
24	0.06	0.31	0.30	0.33	0.02	Spinal cord, cranial nerves & other parts of cns
92	0.24	1.18	0.99	1.36	0.11	Thyroid gland
27	0.07	0.35	0.37	0.37	0.03	Adrenal gland
20	0.05	0.26	0.24	0.27	0.02	Other endocrine glands & related structures
93	0.24	1.19	0.92	1.39	0.10	Other & ill-defined sites
4	0.01	0.05	0.04	0.06	<0.01	Secondary & unspecified lymph nodes
1530	3.93	19.63	14.83	22.54	1.75	Unspecified site
194	0.50	2.49	2.30	2.59	0.20	Hodgkin's disease
82	0.21	1.05	0.92	1.22	0.09	Follicular [nodular] non-hodgkin's lymphoma
250	0.64	3.21	2.67	3.61	0.28	Diffuse non-hodgkin's lymphoma
50	0.13	0.64	0.53	0.73	0.06	Peripheral & cutaneous t-cell lymphomas
518	1.33	6.65	5.54	7.60	0.62	Other & unspecified types of nhl
23	0.06	0.30	0.21	0.33	0.03	Malignant immunoproliferative diseases
394	1.01	5.05	3.84	5.80	0.46	Multiple myeloma, malignant plasma cell neoplasms
426	1.10	5.46	4.88	6.00	0.47	Lymphoid leukaemia
258	0.66	3.31	2.67	3.66	0.28	Myeloid leukaemia
9	0.02	0.12	0.10	0.13	0.01	Monocytic leukaemia
30	0.08	0.38	0.29	0.44	0.03	Other leukaemias of specified cell type
64	0.16	0.82	0.62	0.93	0.06	Leukaemia of unspecified cell type
106	0.27	1.36	1.00	1.48	0.10	Other/unspec. Lymphoid, haematopoietic & related
0	0.00	0.00	0.00	0.00	0.00	Independent (primary) multiple sites
668	1.72	8.57	6.92	10.03	0.84	Lip & mouth
294	0.76	3.77	3.20	4.44	0.39	Pharynx
962	2.47	12.34	10.12	14.48	1.22	Lip, oral cavity & pharynx
1688	4.34	21.65	16.97	25.19	2.10	Rectum & anus
4317	11.10	55.38	42.90	64.22	5.11	Colorectal cancers
5063	13.02	64.95	50.33	74.99	6.35	Larynx & trachea/bronchus/lung
-	-	-	-	-	-	Other parts of uterus
1094	2.81	14.03	11.95	15.76	1.25	Lymphoma
787	2.02	10.10	8.56	11.16	0.85	Leukaemia (excl. Plasma cell leukaemia)
2404	6.18	30.84	25.56	34.54	2.67	Lymphoid/haematopoietic & related tissue
27231	70.0	349.3	270.8	399.4	27.2	All sites excl. Non-melanoma skin
38901	100.0	499.0	385.4	573.2	36.1	All sites

Appendix Table 5. Numbers of newly-diagnosed malignant cancer cases, and European-age-standardised incidence rates, by ICD-10 site, 1994-96 (females): comparative data, Northern Ireland and Republic of Ireland

		ALL IRELAND			NORTHERN IRELAND			REPUBLIC OF IRELAND		
		1994-96			1994-96			1994-96		
Description	ICD-10	cases	EASR	95%c.I.	cases	EASR	95%c.I.	cases	EASR	95%c.I.
Lip	C00	18	0.20	0.09	12	0.39	0.23	6	0.10	0.08
Base of tongue	C01	14	0.16	0.09	6	0.21	0.18	8	0.13	0.10
Other/unspecified tongue	C02	68	0.80	0.20	28	0.96	0.37	40	0.72	0.23
Gum	C03	15	0.16	0.09	9	0.28	0.20	6	0.10	0.08
Floor of mouth	C04	26	0.31	0.13	6	0.25	0.20	20	0.35	0.16
Palate	C05	17	0.22	0.11	10	0.37	0.23	7	0.14	0.11
Other/unspecified mouth	C06	35	0.41	0.14	11	0.38	0.24	24	0.42	0.17
Parotid gland	C07	35	0.39	0.14	12	0.41	0.24	23	0.39	0.16
Other/unspecified major salivary glands	C08	21	0.27	0.12	9	0.36	0.24	12	0.22	0.13
Tonsil	C09	18	0.24	0.11	6	0.21	0.18	12	0.24	0.14
Oropharynx	C10	10	0.13	0.08	2	0.07	0.11	8	0.16	0.12
Nasopharynx	C11	20	0.24	0.11	14	0.55	0.30	6	0.09	0.07
Pyriform sinus	C12	18	0.21	0.10	3	0.12	0.14	15	0.25	0.14
Hypopharynx	C13	38	0.43	0.14	14	0.44	0.25	24	0.42	0.17
Other/ill-defined lip, oral cavity, pharynx	C14	18	0.23	0.11	9	0.38	0.26	9	0.15	0.10
Oesophagus	C15	531	5.76	0.52	163	5.01	0.81	368	6.15	0.66
Stomach	C16	803	8.77	0.64	280	8.91	1.11	523	8.74	0.78
Small intestine	C17	77	0.94	0.22	32	1.13	0.42	45	0.84	0.25
Colon	C18	2,477	28.34	1.17	942	30.95	2.09	1,535	26.93	1.41
Rectosigmoid junction	C19	213	2.49	0.35	56	1.80	0.50	157	2.86	0.47
Rectum	C20	805	9.37	0.68	333	10.89	1.24	472	8.53	0.80
Anus & anal canal	C21	61	0.70	0.18	29	1.00	0.38	32	0.56	0.21
Liver & intrahepatic bile ducts	C22	129	1.38	0.25	70	2.20	0.54	59	0.94	0.25
Gallbladder	C23	100	1.16	0.24	35	1.15	0.39	65	1.17	0.30
Other/unspecified biliary tract	C24	117	1.23	0.23	34	0.97	0.35	83	1.36	0.31
Pancreas	C25	691	7.55	0.59	207	6.59	0.95	484	8.08	0.75
Other/ill-defined digestive organs	C26	71	0.73	0.18	31	0.86	0.32	40	0.64	0.21
Nasal cavity & middle ear	C30	20	0.23	0.10	11	0.34	0.21	9	0.17	0.12
Accessory sinuses	C31	14	0.14	0.08	4	0.14	0.15	10	0.15	0.10
Larynx	C32	93	1.17	0.25	38	1.31	0.44	55	1.10	0.30
Trachea	C33	10	0.11	0.07	6	0.19	0.16	4	0.07	0.07
Bronchus & lung	C34	2,380	27.98	1.17	914	32.22	2.18	1,466	25.79	1.37
Thymus	C37	5	0.08	0.07	2	0.10	0.14	3	0.07	0.08
Heart, mediastinum, & pleura	C38	13	0.15	0.09	5	0.19	0.17	8	0.14	0.10
Other/ill-defined respiratory/intrathoracic	C39	1	0.01	0.01	0	0.00	0.00	1	0.01	0.02
Bone & articular cartilage of limbs	C40	33	0.38	0.13	4	0.16	0.15	29	0.49	0.18
Bone & articular cartilage other/unspecified	C41	22	0.26	0.11	11	0.36	0.22	11	0.21	0.13
Melanoma	C43	1,013	12.88	0.82	309	11.77	1.36	704	13.44	1.02
Non-melanoma skin	C44	10,339	117.39	2.37	3,290	105.98	3.83	7,049	123.38	3.00
Mesothelioma	C45	8	0.13	0.09	5	0.25	0.22	3	0.07	0.08
Kaposi's sarcoma	C46	1	0.01	0.02	0	0.00	0.00	1	0.02	0.04
Peripheral nerves & autonomic nervous system	C47	11	0.15	0.09	2	0.08	0.11	9	0.18	0.12
Retroperitoneum & peritoneum	C48	21	0.24	0.11	2	0.10	0.13	19	0.31	0.15

Description	ICD-10	cases	EASR	95%c.I.	cases	EASR	95%c.I.	cases	EASR	95%c.I.
Other connective & soft tissue	C49	139	1.72	0.29	60	2.26	0.60	79	1.45	0.33
Breast	C50	7,104	95.98	2.30	2,496	100.13	4.07	4,608	93.76	2.78
Vulva	C51	165	1.82	0.29	69	2.20	0.55	96	1.62	0.34
Vagina	C52	59	0.73	0.19	30	1.11	0.42	29	0.54	0.20
Cervix uteri	C53	776	10.54	0.75	247	10.21	1.30	529	10.66	0.92
Corpus uteri	C54	896	12.05	0.82	293	11.24	1.34	603	12.46	1.03
Uterus, unspecified	C55	122	1.63	0.30	59	2.40	0.63	63	1.24	0.32
Ovary	C56	1,335	17.44	0.97	417	16.23	1.62	918	18.04	1.21
Other/unspecified female genital organs	C57	26	0.34	0.14	10	0.37	0.24	16	0.33	0.17
Placenta	C58	2	0.02	0.03	1	0.04	0.07	1	0.02	0.03
Kidney, except renal pelvis	C64	404	4.96	0.50	143	5.25	0.90	261	4.81	0.61
Renal pelvis	C65	20	0.23	0.10	9	0.33	0.22	11	0.18	0.11
Ureter	C66	29	0.30	0.11	11	0.32	0.19	18	0.29	0.14
Bladder	C67	629	7.05	0.58	219	6.92	0.97	410	7.11	0.72
Other/unspecified urinary organs	C68	16	0.17	0.09	10	0.31	0.20	6	0.10	0.09
Eye & adnexa	C69	79	0.96	0.22	19	0.65	0.31	60	1.13	0.29
Meninges	C70	8	0.10	0.07	4	0.18	0.18	4	0.07	0.07
Brain	C71	445	5.69	0.54	130	5.03	0.89	315	6.06	0.69
Spinal cord, cranial nerves & other parts of cns	C72	19	0.22	0.10	6	0.25	0.20	13	0.21	0.11
Thyroid gland	C73	228	2.87	0.38	95	3.75	0.77	133	2.48	0.43
Adrenal gland	C74	16	0.21	0.11	6	0.25	0.20	10	0.21	0.13
Other endocrine glands & related structures	C75	22	0.28	0.12	14	0.57	0.30	8	0.14	0.10
Other & ill-defined sites	C76	123	1.31	0.24	28	0.80	0.31	95	1.58	0.33
Secondary & unspecified lymph nodes	C77	37	0.52	0.17	36	1.52	0.51	1	0.02	0.04
Unspecified site	C80	1,621	17.82	0.91	603	18.96	1.60	1,018	17.18	1.10
Hodgkin's disease	C81	134	1.65	0.28	39	1.54	0.49	95	1.70	0.35
Follicular [nodular] non-hodgkin's lymphoma	C82	95	1.30	0.27	15	0.62	0.32	80	1.64	0.37
Diffuse non-hodgkin's lymphoma	C83	217	2.66	0.37	29	0.94	0.36	188	3.56	0.53
Peripheral & cutaneous t-cell lymphomas	C84	41	0.55	0.17	11	0.43	0.26	30	0.61	0.22
Other & unspecified types of non-hodgkin's lymphoma	C85	464	5.66	0.54	249	8.80	1.14	215	4.03	0.56
Malignant immunoproliferative diseases	C88	13	0.15	0.08	3	0.12	0.13	10	0.17	0.11
Multiple myeloma & malignant plasma cell neoplasms	C90	321	3.67	0.42	96	3.19	0.67	225	3.93	0.54
Lymphoid leukaemia	C91	269	3.14	0.39	69	2.48	0.61	200	3.50	0.50
Myeloid leukaemia	C92	204	2.52	0.36	63	2.36	0.60	141	2.59	0.44
Monocytic leukaemia	C93	9	0.11	0.08	4	0.14	0.14	5	0.10	0.09
Other leukaemias of specified cell type	C94	18	0.21	0.10	5	0.15	0.14	13	0.25	0.14
Leukaemia of unspecified cell type	C95	50	0.56	0.16	16	0.53	0.28	34	0.58	0.20
Other/unspecified lymphoid, haematopoietic & related	C96	114	1.20	0.23	77	2.30	0.54	37	0.61	0.20
Independent (primary) multiple sites	C97	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Lip & mouth	C00-C08	249	2.92	0.38	103	3.60	0.73	146	2.58	0.43
Pharynx	C09-C14	122	1.47	0.27	48	1.78	0.53	74	1.33	0.31
Lip, oral cavity & pharynx	C00-C14	371	4.40	0.47	151	5.38	0.90	220	3.91	0.54
Rectum & anus	C19-C21	1,079	12.56	0.78	418	13.68	1.39	661	11.95	0.95
Colorectal cancers	C18-21	3,556	40.90	1.41	1,360	44.63	2.51	2,196	38.89	1.70
Larynx & trachea/bronchus/lung	C32-C34	2,483	29.26	1.20	958	33.72	2.23	1,525	26.95	1.41
Other parts of uterus	C54-C55	1,018	13.68	0.87	352	13.64	1.49	666	13.69	1.07
Lymphoma	C81-C85	951	11.82	0.78	343	12.33	1.36	608	11.54	0.95
Leukaemia (excl. Plasma cell leukaemia)	C91-C95	550	6.54	0.57	157	5.66	0.92	393	7.02	0.72
Lymphatic/haematopoietic & related tissue	C81-C96	1,949	23.37	1.08	676	23.60	1.86	1,273	23.27	1.33
All sites excl. Non-melanoma skin	C00-43, C45-97	26,360	325.09	4.07	9,367	338.87	7.16	16,993	317.86	4.94
All sites	C00-C97	36,699	442.48	4.70	12,657	444.86	8.11	24,042	441.25	5.77

Appendix Table 6. Numbers of newly-diagnosed malignant cancer cases, and European-age-standardised incidence rates, by ICD-10 site, 1994-96 (males): comparative data, Northern Ireland and Republic of Ireland

		ALL IRELAND			NORTHERN IRELAND			REPUBLIC OF IRELAND		
		1994-96			1994-96			1994-96		
Description	ICD-10	cases	EASR	95%c.I.	cases	EASR	95%c.I.	cases	EASR	95%c.I.
Lip	C00	190	2.80	0.41	64	2.96	0.74	126	2.73	0.48
Base of tongue	C01	53	0.79	0.22	8	0.37	0.26	45	0.99	0.29
Other/unspecified tongue	C02	149	2.28	0.37	57	2.62	0.69	92	2.13	0.44
Gum	C03	27	0.41	0.16	14	0.65	0.34	13	0.29	0.16
Floor of mouth	C04	87	1.32	0.28	28	1.29	0.48	59	1.33	0.34
Palate	C05	34	0.51	0.17	12	0.56	0.32	22	0.49	0.21
Other/unspecified mouth	C06	47	0.72	0.21	16	0.79	0.39	31	0.69	0.25
Parotid gland	C07	57	0.84	0.22	16	0.79	0.40	41	0.87	0.27
Other/unspecified major salivary glands	C08	24	0.36	0.15	8	0.37	0.26	16	0.36	0.18
Tonsil	C09	65	1.03	0.25	21	1.06	0.46	44	1.02	0.30
Oropharynx	C10	34	0.51	0.17	10	0.50	0.32	24	0.51	0.21
Nasopharynx	C11	42	0.61	0.19	9	0.40	0.26	33	0.71	0.24
Pyriform sinus	C12	71	1.09	0.26	11	0.54	0.32	60	1.35	0.34
Hypopharynx	C13	31	0.47	0.17	10	0.47	0.30	21	0.47	0.20
Other/ill-defined lip, oral cavity, pharynx	C14	51	0.73	0.20	22	0.98	0.41	29	0.61	0.22
Oesophagus	C15	803	12.13	0.85	284	13.19	1.55	519	11.66	1.02
Stomach	C16	1,388	20.50	1.10	499	22.85	2.03	889	19.38	1.30
Small intestine	C17	107	1.59	0.30	43	1.95	0.59	64	1.40	0.35
Colon	C18	2,629	39.03	1.52	908	41.92	2.77	1,721	37.66	1.81
Rectosigmoid junction	C19	326	4.83	0.53	73	3.25	0.76	253	5.58	0.70
Rectum	C20	1,316	19.64	1.08	437	19.96	1.89	879	19.51	1.31
Anus & anal canal	C21	46	0.72	0.21	16	0.75	0.37	30	0.71	0.26
Liver & intrahepatic bile ducts	C22	209	3.07	0.42	85	3.98	0.86	124	2.64	0.47
Gallbladder	C23	48	0.70	0.20	15	0.72	0.37	33	0.69	0.24
Other/unspecified biliary tract	C24	148	2.24	0.37	46	2.13	0.62	102	2.29	0.45
Pancreas	C25	659	9.68	0.75	198	8.97	1.27	461	10.04	0.93
Other/ill-defined digestive organs	C26	79	1.19	0.27	30	1.37	0.50	49	1.10	0.31
Nasal cavity & middle ear	C30	28	0.42	0.16	13	0.60	0.33	15	0.33	0.17
Accessory sinuses	C31	23	0.37	0.15	7	0.35	0.26	16	0.38	0.19
Larynx	C32	432	6.58	0.63	156	7.45	1.18	276	6.16	0.74
Trachea	C33	14	0.21	0.11	5	0.26	0.23	9	0.19	0.12
Bronchus & lung	C34	4,617	68.19	1.99	1,688	77.33	3.73	2,929	63.83	2.34
Thymus	C37	5	0.07	0.06	2	0.09	0.12	3	0.06	0.07
Heart, mediastinum, & pleura	C38	29	0.40	0.15	5	0.22	0.19	24	0.49	0.20
Other/ill-defined respiratory/intrathoracic	C39	1	0.01	0.03	0	0.00	0.00	1	0.02	0.04
Bone & articular cartilage of limbs	C40	54	0.63	0.17	22	0.83	0.35	32	0.56	0.20
Bone & articular cartilage other/unspecified	C41	40	0.52	0.16	12	0.47	0.27	28	0.53	0.20
Melanoma	C43	579	8.45	0.70	208	9.53	1.31	371	7.94	0.82
Non-melanoma skin	C44	11,670	173.73	3.20	3,198	147.89	5.20	8,472	186.10	4.02
Mesothelioma	C45	82	1.25	0.27	45	2.13	0.63	37	0.83	0.27
Kaposi's sarcoma	C46	19	0.26	0.12	2	0.09	0.12	17	0.34	0.16
Peripheral nerves & autonomic nervous system	C47	11	0.15	0.09	2	0.08	0.11	9	0.18	0.12
Retroperitoneum & peritoneum	C48	18	0.26	0.12	4	0.18	0.17	14	0.30	0.16

Description	ICD-10	cases	EASR	95%c.l.	cases	EASR	95%c.l.	cases	EASR	95%c.l.
Other connective & soft tissue	C49	193	2.75	0.39	79	3.59	0.80	114	2.38	0.44
Breast	C50	63	0.92	0.23	25	1.14	0.45	38	0.82	0.27
Penis	C60	105	1.58	0.31	42	1.97	0.61	63	1.40	0.35
Prostate	C61	4,649	67.13	1.97	1,334	59.97	3.28	3,315	70.57	2.45
Testis	C62	397	5.04	0.50	144	5.88	0.97	253	4.65	0.58
Other/unspecified male genital organs	C63	20	0.30	0.13	11	0.53	0.32	9	0.19	0.13
Kidney, except renal pelvis	C64	618	9.31	0.74	220	10.31	1.38	398	8.85	0.88
Renal pelvis	C65	54	0.81	0.22	22	0.96	0.41	32	0.74	0.26
Ureter	C66	34	0.50	0.17	20	0.91	0.40	14	0.31	0.17
Bladder	C67	1,485	21.93	1.14	470	21.38	1.97	1,015	22.19	1.39
Other/unspecified urinary organs	C68	62	0.94	0.24	50	2.35	0.67	12	0.26	0.15
Eye & adnexa	C69	76	1.11	0.25	25	1.08	0.43	51	1.12	0.31
Meninges	C70	8	0.12	0.08	4	0.16	0.16	4	0.09	0.09
Brain	C71	601	8.58	0.70	175	7.84	1.17	426	8.92	0.86
Spinal cord, cranial nerves & other parts of cns	C72	24	0.33	0.13	7	0.30	0.23	17	0.34	0.17
Thyroid gland	C73	92	1.36	0.28	37	1.70	0.55	55	1.21	0.32
Adrenal gland	C74	27	0.37	0.14	14	0.61	0.32	13	0.27	0.15
Other endocrine glands & related structures	C75	20	0.27	0.12	10	0.46	0.29	10	0.18	0.12
Other & ill-defined sites	C76	93	1.39	0.29	56	2.60	0.69	37	0.81	0.27
Secondary & unspecified lymph nodes	C77	4	0.06	0.06	1	0.04	0.08	3	0.07	0.08
Unspecified site	C80	1,530	22.54	1.15	445	20.20	1.91	1,085	23.65	1.43
Hodgkin's disease	C81	194	2.59	0.37	67	2.97	0.72	127	2.40	0.43
Follicular [nodular] non-hodgkin's lymphoma	C82	82	1.22	0.27	18	0.84	0.39	64	1.41	0.35
Diffuse non-hodgkin's lymphoma	C83	250	3.61	0.45	28	1.26	0.47	222	4.72	0.63
Peripheral & cutaneous t-cell lymphomas	C84	50	0.73	0.20	22	1.01	0.43	28	0.59	0.22
Other & unspecified types of non-hodgkin's lymphoma	C85	518	7.60	0.66	254	11.64	1.45	264	5.70	0.70
Malignant immunoproliferative diseases	C88	23	0.33	0.14	5	0.21	0.19	18	0.39	0.18
Multiple myeloma & malignant plasma cell neoplasms	C90	394	5.80	0.58	111	5.09	0.96	283	6.15	0.73
Lymphoid leukaemia	C91	426	6.00	0.58	109	4.61	0.88	317	6.67	0.75
Myeloid leukaemia	C92	258	3.66	0.46	93	4.20	0.87	165	3.41	0.53
Monocytic leukaemia	C93	9	0.13	0.09	6	0.27	0.21	3	0.07	0.08
Other leukaemias of specified cell type	C94	30	0.44	0.16	7	0.32	0.24	23	0.49	0.20
Leukaemia of unspecified cell type	C95	64	0.93	0.23	9	0.40	0.26	55	1.19	0.33
Other/unspecified lymphoid, haematopoietic & related	C96	106	1.48	0.29	65	2.81	0.69	41	0.86	0.27
Independent (primary) multiple sites	C97	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Lip & mouth	C00-C08	668	10.03	0.77	223	10.40	1.38	445	9.87	0.93
Pharynx	C09-C14	294	4.44	0.51	83	3.96	0.86	211	4.67	0.64
Lip, oral cavity & pharynx	C00-C14	962	14.48	0.93	306	14.36	1.63	656	14.53	1.13
Rectum & anus	C19-C21	1,688	25.19	1.22	526	23.96	2.07	1,162	25.80	1.51
Colorectal cancers	C18-21	4,317	64.22	1.94	1,434	65.88	3.46	2,883	63.46	2.35
Larynx & trachea/bronchus/lung	C32-C34	5,063	74.99	2.09	1,849	85.03	3.92	3,214	70.18	2.46
Lymphoma	C81-C85	1,094	15.76	0.95	389	17.72	1.79	705	14.81	1.11
Leukaemia (excl. Plasma cell leukaemia)	C91-C95	787	11.16	0.80	224	9.79	1.31	563	11.84	1.00
Lymphoid/haematopoietic & related tissue	C81-C96	2,404	34.54	1.40	794	35.62	2.51	1,610	34.05	1.69
All sites excl. Non-melanoma skin		27,231	399.45	4.78	9,096	414.57	8.58	18,135	392.41	5.77
All sites	C00-C97	38,901	573.18	5.72	12,294	562.46	9.98	26,607	578.50	6.99

Appendix Table 7. Numbers of deaths from malignant cancer, and mortality rates, by ICD-10 site and sex, All-Ireland, 1994-96

		both sexes		female					
						rates (per 100,000)			cum. risk
Description	ICD-10	cases	% total	cases	% total	crude	WASR	EASR	% (0-74)
Lip	C00	29	0.09	5	0.03	0.06	0.03	0.04	0.00
Base of tongue	C01	8	0.02	2	0.01	0.03	0.02	0.03	0.00
Other/unspecified tongue	C02	136	0.41	42	0.27	0.53	0.32	0.46	0.03
Gum	C03	13	0.04	7	0.05	0.09	0.06	0.08	0.01
Floor of mouth	C04	33	0.10	10	0.06	0.12	0.08	0.12	0.01
Palate	C05	10	0.03	1	0.01	0.01	0.00	0.01	0.00
Other/unspecified mouth	C06	63	0.19	22	0.14	0.28	0.13	0.21	0.01
Parotid gland	C07	43	0.13	18	0.12	0.23	0.11	0.19	0.01
Other/unspecified major salivary glands	C08	9	0.03	4	0.03	0.05	0.02	0.03	0.00
Tonsil	C09	35	0.11	5	0.03	0.06	0.06	0.08	0.01
Oropharynx	C10	19	0.06	5	0.03	0.06	0.04	0.06	0.00
Nasopharynx	C11	33	0.10	13	0.08	0.16	0.10	0.14	0.01
Pyriform sinus	C12	32	0.10	4	0.03	0.05	0.03	0.05	0.00
Hypopharynx	C13	36	0.11	20	0.13	0.25	0.14	0.22	0.02
Other/ill-defined lip, oral cavity, pharynx	C14	77	0.23	20	0.13	0.25	0.15	0.22	0.02
Oesophagus	C15	1324	4.02	526	3.43	6.59	3.52	5.52	0.39
Stomach	C16	1800	5.46	726	4.73	9.10	4.85	7.59	0.52
Small intestine	C17	62	0.19	30	0.20	0.38	0.20	0.31	0.02
Colon	C18	3075	9.33	1471	9.58	18.44	10.02	15.62	1.07
Rectosigmoid junction	C19	107	0.32	45	0.29	0.56	0.29	0.46	0.03
Rectum	C20	896	2.72	354	2.31	4.44	2.42	3.76	0.26
Anus & anal canal	C21	29	0.09	19	0.12	0.24	0.14	0.22	0.01
Liver & intrahepatic bile ducts	C22	575	1.74	240	1.56	3.01	1.65	2.54	0.18
Gallbladder	C23	103	0.31	75	0.49	0.94	0.55	0.84	0.07
Other/unspecified biliary tract	C24	113	0.34	61	0.40	0.76	0.36	0.59	0.03
Pancreas	C25	1493	4.53	740	4.82	9.28	4.93	7.78	0.57
Other/ill-defined digestive organs	C26	755	2.29	365	2.38	4.57	2.36	3.76	0.23
Nasal cavity & middle ear	C30	13	0.04	4	0.03	0.05	0.02	0.04	0.00
Accessory sinuses	C31	25	0.08	9	0.06	0.11	0.07	0.10	0.01
Larynx	C32	227	0.69	54	0.35	0.68	0.41	0.62	0.05
Trachea	C33	14	0.04	5	0.03	0.06	0.04	0.07	0.01
Bronchus & lung	C34	6902	20.94	2369	15.43	29.69	18.08	27.01	2.29
Thymus	C37	7	0.02	4	0.03	0.05	0.04	0.05	0.01
Heart, mediastinum, & pleura	C38	128	0.39	19	0.12	0.24	0.17	0.23	0.02
Other/ill-defined respiratory/intrathoracic	C39	1	0.00	1	0.01	0.01	0.00	0.01	0.00
Bone & articular cartilage of limbs	C40	22	0.07	10	0.07	0.13	0.06	0.10	0.01
Bone & articular cartilage other/unspecified	C41	93	0.28	34	0.22	0.43	0.30	0.40	0.03
Melanoma	C43	253	0.77	137	0.89	1.72	1.09	1.57	0.12
Non-melanoma skin	C44	119	0.36	30	0.20	0.38	0.18	0.30	0.02
Mesothelioma	C45	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Kaposi's sarcoma	C46	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Peripheral nerves & autonomic nervous system	C47	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Retroperitoneum & peritoneum	C48	61	0.19	29	0.19	0.36	0.23	0.33	0.03
Other connective & soft tissue	C49	138	0.42	74	0.48	0.93	0.64	0.88	0.07
Breast	C50	2927	8.88	2908	18.94	36.45	25.36	36.30	2.79
Vulva	C51	71	0.22	71	0.46	0.89	0.43	0.69	0.04
Vagina	C52	23	0.07	23	0.15	0.29	0.17	0.26	0.02
Cervix uteri	C53	315	0.96	315	2.05	3.95	3.13	4.16	0.34
Corpus uteri	C54	179	0.54	179	1.17	2.24	1.43	2.10	0.18
Uterus, unspecified	C55	101	0.31	101	0.66	1.27	0.68	1.07	0.08
Ovary	C56	888	2.69	888	5.78	11.13	7.67	11.02	0.92
Other/unspecified female genital organs	C57	8	0.02	8	0.05	0.10	0.07	0.11	0.01
Placenta	C58	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Penis	C60	31	0.09	-	-	-	-	-	-
Prostate	C61	2154	6.54	-	-	-	-	-	-
Testis	C62	35	0.11	-	-	-	-	-	-
Other/unspecified male genital organs	C63	4	0.01	-	-	-	-	-	-

(continued overleaf)

male rates						
		rates (per 100,000)			cum. risk	
cases	% total	crude	WASR	EASR	% (0-74)	Description
24	0.14	0.31	0.21	0.36	0.02	Lip
6	0.03	0.08	0.06	0.10	0.00	Base of tongue
94	0.53	1.21	0.95	1.39	0.11	Other/unspecified tongue
6	0.03	0.08	0.06	0.09	0.01	Gum
23	0.13	0.29	0.26	0.36	0.03	Floor of mouth
9	0.05	0.12	0.10	0.14	0.01	Palate
41	0.23	0.53	0.40	0.61	0.04	Other/unspecified mouth
25	0.14	0.32	0.23	0.36	0.02	Parotid gland
5	0.03	0.06	0.04	0.07	0.01	Other/unspecified major salivary glands
30	0.17	0.38	0.30	0.44	0.04	Tonsil
14	0.08	0.18	0.15	0.21	0.02	Oropharynx
20	0.11	0.26	0.21	0.29	0.03	Nasopharynx
28	0.16	0.36	0.29	0.43	0.04	Pyriform sinus
16	0.09	0.21	0.17	0.25	0.02	Hypopharynx
57	0.32	0.73	0.59	0.85	0.08	Other/ill-defined lip, oral cavity, pharynx
798	4.53	10.24	7.77	11.86	0.90	Oesophagus
1074	6.10	13.78	10.30	15.96	1.16	Stomach
32	0.18	0.41	0.31	0.48	0.04	Small intestine
1604	9.11	20.58	15.25	23.72	1.69	Colon
62	0.35	0.80	0.64	0.95	0.08	Rectosigmoid junction
542	3.08	6.95	5.27	8.09	0.60	Rectum
10	0.06	0.13	0.10	0.16	0.01	Anus & anal canal
335	1.90	4.30	3.27	4.95	0.40	Liver & intrahepatic bile ducts
28	0.16	0.36	0.24	0.39	0.03	Gallbladder
52	0.30	0.67	0.47	0.75	0.05	Other/unspecified biliary tract
753	4.28	9.66	7.19	11.13	0.81	Pancreas
390	2.22	5.00	3.64	5.78	0.37	Other/ill-defined digestive organs
9	0.05	0.12	0.10	0.15	0.01	Nasal cavity & middle ear
16	0.09	0.21	0.17	0.25	0.02	Accessory sinuses
173	0.98	2.22	1.74	2.59	0.21	Larynx
9	0.05	0.12	0.10	0.13	0.01	Trachea
4533	25.75	58.15	43.69	66.49	5.31	Bronchus & lung
3	0.02	0.04	0.03	0.04	0.00	Thymus
109	0.62	1.40	1.11	1.65	0.15	Heart, mediastinum, & pleura
0	0.00	0.00	0.00	0.00	0.00	Other/ill-defined respiratory/intrathoracic
12	0.07	0.15	0.12	0.17	0.01	Bone & articular cartilage of limbs
59	0.34	0.76	0.66	0.84	0.07	Bone & articular cartilage other/unspecified
116	0.66	1.49	1.19	1.74	0.12	Melanoma
89	0.51	1.14	0.83	1.39	0.06	Non-melanoma skin
0	0.00	0.00	0.00	0.00	0.00	Mesothelioma
0	0.00	0.00	0.00	0.00	0.00	Kaposi's sarcoma
0	0.00	0.00	0.00	0.00	0.00	Peripheral nerves & autonomic nervous system
32	0.18	0.41	0.31	0.47	0.04	Retroperitoneum & peritoneum
64	0.36	0.82	0.72	0.94	0.07	Other connective & soft tissue
19	0.11	0.24	0.20	0.31	0.02	Breast
-	-	-	-	-	-	Vulva
-	-	-	-	-	-	Vagina
-	-	-	-	-	-	Cervix uteri
-	-	-	-	-	-	Corpus uteri
-	-	-	-	-	-	Uterus, unspecified
-	-	-	-	-	-	Ovary
-	-	-	-	-	-	Other/unspecified female genital organs
-	-	-	-	-	-	Placenta
31	0.18	0.40	0.32	0.46	0.03	Penis
2154	12.23	27.63	18.28	31.79	1.50	Prostate
35	0.20	0.45	0.39	0.46	0.03	Testis
4	0.02	0.05	0.03	0.05	0.00	Other/unspecified male genital organs

Appendix Table 7 *(continued)*

		both sexes		female					
						rates (per 100,000)			cum. risk
Description	ICD-10	cases	% total	cases	% total	crude	WASR	EASR	% (0-74)
Kidney, except renal pelvis	C64	541	1.64	203	1.32	2.54	1.55	2.27	0.17
Renal pelvis	C65	2	0.01	0	0.00	0.00	0.00	0.00	0.00
Ureter	C66	8	0.02	6	0.04	0.08	0.05	0.06	0.01
Bladder	C67	795	2.41	260	1.69	3.26	1.49	2.50	0.15
Other/unspecified urinary organs	C68	7	0.02	4	0.03	0.05	0.03	0.05	0.00
Eye & adnexa	C69	32	0.10	17	0.11	0.21	0.11	0.18	0.02
Meninges	C70	13	0.04	10	0.07	0.13	0.07	0.11	0.01
Brain	C71	889	2.70	389	2.53	4.88	3.71	4.93	0.42
Spinal cord, cranial nerves & other parts of cns	C72	9	0.03	5	0.03	0.06	0.06	0.07	0.01
Thyroid gland	C73	108	0.33	70	0.46	0.88	0.52	0.80	0.06
Adrenal gland	C74	22	0.07	5	0.03	0.06	0.06	0.06	0.00
Other endocrine glands & related structures	C75	21	0.06	13	0.08	0.16	0.11	0.17	0.01
Other & ill-defined sites	C76	330	1.00	169	1.10	2.12	1.13	1.74	0.11
Secondary & unspecified lymph nodes	C77	1	0.00	0	0.00	0.00	0.00	0.00	0.00
Unspecified site	C80	2037	6.18	989	6.44	12.40	6.84	10.50	0.80
Hodgkin's disease	C81	104	0.32	37	0.24	0.46	0.33	0.43	0.04
Follicular [nodular] non-hodgkin's lymphoma	C82	3	0.01	1	0.01	0.01	0.01	0.02	0.00
Diffuse non-hodgkin's lymphoma	C83	11	0.03	5	0.03	0.06	0.03	0.05	0.00
Peripheral & cutaneous t-cell lymphomas	C84	11	0.03	4	0.03	0.05	0.04	0.05	0.01
Other & unspecified types of nhl	C85	892	2.71	404	2.63	5.06	3.04	4.55	0.36
Malignant immunoproliferative diseases	C88	0	0.00	0	0.00	0.00	0.00	0.00	0.00
Multiple myeloma, malignant plasma cell neoplasms	C90	623	1.89	294	1.91	3.69	2.06	3.19	0.24
Lymphoid leukaemia	C91	321	0.97	115	0.75	1.44	0.81	1.18	0.07
Myeloid leukaemia	C92	415	1.26	202	1.32	2.53	1.79	2.40	0.19
Monocytic leukaemia	C93	8	0.02	3	0.02	0.04	0.02	0.03	0.00
Other leukaemias of specified cell type	C94	1	0.00	0	0.00	0.00	0.00	0.00	0.00
Leukaemia of unspecified cell type	C95	109	0.33	48	0.31	0.60	0.34	0.48	0.03
Other/unspec. Lymphoid, haematopoietic & related	C96	1	0.00	0	0.00	0.00	0.00	0.00	0.00
Lip & mouth	C00-C08	344	1.04	111	0.72	2.04	0.77	1.17	0.08
Pharynx	C09-C14	232	0.70	67	0.44	1.23	0.52	0.77	0.06
Lip, oral cavity & pharynx	C00-C14	576	1.75	178	1.16	3.27	1.29	1.94	0.15
Rectum & anus	C19-C21	1032	3.13	418	2.72	7.68	2.85	4.45	0.30
Colorectal cancers	C18-21	4107	12.46	1889	12.30	34.71	12.87	20.07	1.37
Larynx & trachea/bronchus/lung	C32-C34	7143	21.67	2428	15.81	44.62	18.53	27.70	2.35
Other parts of uterus	C54-C55	280	0.85	280	1.82	5.15	2.12	3.17	0.26
Lymphoma	C81-C85	1021	3.10	451	2.94	8.29	3.44	5.10	0.41
Leukaemia (excl. Plasma cell leukaemia)	C91-C95	854	2.59	368	2.40	6.76	2.95	4.09	0.30
Lymphoid/haematopoietic & related tissue	C81-C96	2499	7.58	1113	7.25	20.45	8.46	12.38	0.94
All sites excl. Non-melanoma skin	C00-43,45-97	32841	99.6	15324	99.8	281.6	116.9	173.9	12.5
All sites	C00-C97	32960	100.0	15354	100.0	282.2	117.1	174.2	12.5

male rates						
		rates (per 100,000)			cum. risk	
cases	% total	crude	WASR	EASR	% (0-74)	Description
338	1.92	4.34	3.49	5.15	0.41	Kidney, except renal pelvis
2	0.01	0.03	0.02	0.03	0.00	Renal pelvis
2	0.01	0.03	0.02	0.03	0.00	Ureter
535	3.04	6.86	4.67	7.84	0.42	Bladder
3	0.02	0.04	0.03	0.06	0.00	Other/unspecified urinary organs
15	0.09	0.19	0.15	0.23	0.01	Eye & adnexa
3	0.02	0.04	0.02	0.04	0.00	Meninges
500	2.84	6.41	5.56	7.31	0.63	Brain
4	0.02	0.05	0.05	0.06	0.00	Spinal cord, cranial nerves & other parts of cns
38	0.22	0.49	0.35	0.54	0.04	Thyroid gland
17	0.10	0.22	0.22	0.25	0.02	Adrenal gland
8	0.05	0.10	0.11	0.11	0.01	Other endocrine glands & related structures
161	0.91	2.07	1.55	2.41	0.16	Other & ill-defined sites
1	0.01	0.01	0.01	0.01	0.00	Secondary & unspecified lymph nodes
1048	5.95	13.44	10.03	15.39	1.15	Unspecified site
67	0.38	0.86	0.72	0.96	0.08	Hodgkin's disease
2	0.01	0.03	0.02	0.03	0.00	Follicular [nodular] non-hodgkin's lymphoma
6	0.03	0.08	0.07	0.09	0.01	Diffuse non-hodgkin's lymphoma
7	0.04	0.09	0.07	0.11	0.01	Peripheral & cutaneous t-cell lymphomas
488	2.77	6.26	4.90	7.12	0.57	Other & unspecified types of nhl
0	0.00	0.00	0.00	0.00	0.00	Malignant immunoproliferative diseases
329	1.87	4.22	3.14	4.91	0.34	Multiple myeloma, malignant plasma cell neoplasms
206	1.17	2.64	2.14	2.91	0.20	Lymphoid leukaemia
213	1.21	2.73	2.12	3.13	0.23	Myeloid leukaemia
5	0.03	0.06	0.05	0.07	0.01	Monocytic leukaemia
1	0.01	0.01	0.01	0.01	0.00	Other leukaemias of specified cell type
61	0.35	0.78	0.56	0.88	0.05	Leukaemia of unspecified cell type
1	0.01	0.01	0.01	0.02	0.00	Other/unspec. Lymphoid, haematopoietic & related
233	1.32	2.99	2.31	3.49	0.26	Lip & mouth
165	0.94	2.12	1.72	2.47	0.23	Pharynx
398	2.26	5.10	4.03	5.95	0.48	Lip, oral cavity & pharynx
614	3.49	7.88	6.01	9.20	0.69	Rectum & anus
2218	12.60	28.45	21.26	32.91	2.37	Colorectal cancers
4715	26.78	60.49	45.52	69.21	5.53	Larynx & trachea/bronchus/lung
-	-	-	-	-	-	Other parts of uterus
570	3.24	7.31	5.79	8.31	0.67	Lymphoma
486	2.76	6.23	4.87	7.00	0.49	Leukaemia (excl. Plasma cell leukaemia)
1386	7.87	17.78	13.81	20.23	1.49	Lymphoid/haematopoietic & related tissue
17517	99.5	224.7	167.7	258.4	17.1	All sites excl. Non-melanoma skin
17606	100.0	225.9	168.6	259.8	17.2	All sites

Appendix Table 8. Numbers of deaths from malignant cancer, and European-age-standardised mortality rates, by ICD-10 site, 1994-96 (females): comparative data, Northern Ireland and Republic of Ireland

		ALL IRELAND			NORTHERN IRELAND			REPUBLIC OF IRELAND		
		1994-96			1994-96			1994-96		
Description	ICD-10	cases	EASR	95%c.I.	cases	EASR	95%c.I.	cases	EASR	95%c.I.
Lip	C00	5	0.04	0.04	1	0.02	0.04	4	0.06	0.06
Base of tongue	C01	2	0.03	0.04	1	0.05	0.09	1	0.02	0.04
Other/unspecified tongue	C02	42	0.46	0.15	18	0.58	0.28	24	0.39	0.16
Gum	C03	7	0.08	0.06	1	0.05	0.10	6	0.10	0.09
Floor of mouth	C04	10	0.12	0.07	2	0.07	0.11	8	0.14	0.10
Palate	C05	1	0.01	0.01	0	0.00	0.00	1	0.01	0.02
Other/unspecified mouth	C06	22	0.21	0.09	13	0.36	0.21	9	0.13	0.09
Parotid gland	C07	18	0.19	0.09	4	0.09	0.09	14	0.24	0.13
Other/unspecified major salivary glands	C08	4	0.03	0.03	3	0.07	0.08	1	0.01	0.02
Tonsil	C09	5	0.08	0.07	0	0.00	0.00	5	0.12	0.11
Oropharynx	C10	5	0.06	0.06	1	0.02	0.03	4	0.08	0.08
Nasopharynx	C11	13	0.14	0.08	5	0.18	0.17	8	0.12	0.09
Pyriform sinus	C12	4	0.05	0.05	3	0.09	0.10	1	0.03	0.05
Hypopharynx	C13	20	0.22	0.10	4	0.11	0.12	16	0.27	0.14
Other/ill-defined lip, oral cavity, pharynx	C14	20	0.22	0.10	7	0.23	0.18	13	0.22	0.12
Oesophagus	C15	526	5.51	0.49	159	4.71	0.77	367	5.93	0.63
Stomach	C16	726	7.59	0.58	231	6.93	0.96	495	7.96	0.73
Small intestine	C17	30	0.31	0.12	12	0.33	0.20	18	0.29	0.14
Colon	C18	1,470	15.58	0.84	491	15.07	1.42	980	15.89	1.04
Rectosigmoid junction	C19	45	0.46	0.14	13	0.35	0.20	32	0.52	0.19
Rectum	C20	354	3.76	0.41	135	4.13	0.74	219	3.56	0.50
Anus & anal canal	C21	19	0.22	0.10	7	0.20	0.15	12	0.23	0.14
Liver & intrahepatic bile ducts	C22	240	2.54	0.34	93	2.85	0.61	147	2.37	0.40
Gallbladder	C23	75	0.84	0.20	23	0.71	0.30	52	0.90	0.25
Other/unspecified biliary tract	C24	61	0.59	0.16	27	0.71	0.29	34	0.53	0.19
Pancreas	C25	740	7.78	0.59	225	6.91	0.95	515	8.26	0.75
Other/ill-defined digestive organs	C26	365	3.75	0.40	123	3.65	0.69	242	3.81	0.50
Nasal cavity & middle ear	C30	4	0.04	0.04	1	0.02	0.03	3	0.05	0.06
Accessory sinuses	C31	9	0.10	0.07	3	0.11	0.13	6	0.10	0.08
Larynx	C32	54	0.62	0.17	12	0.40	0.24	42	0.74	0.24
Trachea	C33	5	0.07	0.06	1	0.04	0.07	4	0.08	0.09
Bronchus & lung	C34	2,369	26.99	1.13	808	27.19	1.97	1,561	26.92	1.39
Thymus	C37	4	0.05	0.05	1	0.04	0.08	3	0.06	0.07
Heart, mediastinum, & pleura	C38	19	0.23	0.11	6	0.24	0.20	13	0.23	0.13
Other/ill-defined respiratory/intrathoracic	C39	1	0.01	0.01	0	0.00	0.00	1	0.01	0.02
Bone & articular cartilage of limbs	C40	10	0.10	0.07	0	0.00	0.00	10	0.16	0.10
Bone & articular cartilage other/unspecified	C41	34	0.40	0.14	11	0.40	0.24	23	0.41	0.17
Melanoma	C43	137	1.57	0.27	53	1.76	0.50	84	1.47	0.33
Non-melanoma skin	C44	30	0.29	0.11	9	0.23	0.15	21	0.33	0.14
Mesothelioma	C45	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Kaposi's sarcoma	C46	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Peripheral nerves & autonomic nervous system	C47	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Retroperitoneum & peritoneum	C48	29	0.33	0.12	5	0.19	0.17	24	0.40	0.17

Description	ICD-10	cases	EASR	95%c.l.	cases	EASR	95%c.l.	cases	EASR	95%c.l.
Other connective & soft tissue	C49	74	0.88	0.21	34	1.11	0.39	40	0.76	0.24
Breast	C50	2,908	36.24	1.37	970	35.02	2.32	1,938	36.91	1.71
Vulva	C51	71	0.69	0.17	28	0.73	0.29	43	0.66	0.21
Vagina	C52	23	0.26	0.11	12	0.42	0.25	11	0.17	0.11
Cervix uteri	C53	315	4.16	0.47	101	3.89	0.79	214	4.29	0.59
Corpus uteri	C54	179	2.10	0.32	39	1.25	0.41	140	2.54	0.44
Uterus, unspecified	C55	101	1.07	0.22	52	1.48	0.42	49	0.84	0.25
Ovary	C56	888	11.01	0.76	277	10.18	1.25	611	11.48	0.95
Other/unspecified female genital organs	C57	8	0.11	0.08	1	0.04	0.07	7	0.15	0.11
Placenta	C58	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Kidney, except renal pelvis	C64	203	2.27	0.33	60	2.00	0.54	143	2.42	0.41
Renal pelvis	C65	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Ureter	C66	6	0.06	0.06	2	0.05	0.07	4	0.07	0.08
Bladder	C67	260	2.50	0.32	94	2.55	0.54	166	2.46	0.39
Other/unspecified urinary organs	C68	4	0.05	0.05	0	0.00	0.00	4	0.07	0.07
Eye & adnexa	C69	17	0.18	0.09	0	0.00	0.00	17	0.28	0.13
Meninges	C70	10	0.11	0.07	2	0.07	0.10	8	0.13	0.09
Brain	C71	389	4.93	0.51	87	3.40	0.74	302	5.75	0.67
Spinal cord, cranial nerves & other parts of cns	C72	5	0.07	0.06	2	0.07	0.10	3	0.06	0.07
Thyroid gland	C73	70	0.80	0.20	15	0.51	0.27	55	0.96	0.26
Adrenal gland	C74	5	0.06	0.06	2	0.06	0.09	3	0.06	0.07
Other endocrine glands & related structures	C75	13	0.17	0.09	3	0.11	0.13	10	0.20	0.13
Other & ill-defined sites	C76	169	1.74	0.28	45	1.24	0.39	124	2.01	0.37
Secondary & unspecified lymph nodes	C77	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Unspecified site	C80	989	10.49	0.68	393	11.80	1.23	596	9.74	0.82
Hodgkin's disease	C81	37	0.43	0.14	14	0.48	0.26	23	0.41	0.17
Follicular [nodular] non-hodgkin's lymphoma	C82	1	0.02	0.03	1	0.05	0.09	0	0.00	0.00
Diffuse non-hodgkin's lymphoma	C83	5	0.05	0.04	2	0.05	0.07	3	0.04	0.05
Peripheral & cutaneous t-cell lymphomas	C84	4	0.05	0.05	1	0.03	0.06	3	0.07	0.07
Other & unspecified types of non-hodgkin's lymphoma	C85	404	4.55	0.46	143	4.59	0.79	261	4.51	0.57
Malignant immunoproliferative diseases	C88	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Multiple myeloma & malignant plasma cell neoplasms	C90	294	3.19	0.38	86	2.62	0.58	208	3.49	0.50
Lymphoid leukaemia	C91	115	1.18	0.23	33	1.04	0.38	82	1.26	0.29
Myeloid leukaemia	C92	202	2.40	0.34	66	2.46	0.62	136	2.37	0.41
Monocytic leukaemia	C93	3	0.03	0.04	1	0.02	0.03	2	0.04	0.06
Other leukaemias of specified cell type	C94	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Leukaemia of unspecified cell type	C95	48	0.48	0.14	11	0.30	0.18	37	0.58	0.19
Other/unspecified lymphoid, haematopoietic & related	C96	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Independent (primary) multiple sites	C97	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Lip & mouth	C00-C08	111	1.17	0.23	43	1.29	0.41	68	1.10	0.27
Pharynx	C09-C14	67	0.77	0.19	20	0.63	0.29	47	0.84	0.25
Lip, oral cavity & pharynx	C00-C14	178	1.94	0.30	63	1.93	0.51	115	1.93	0.37
Rectum & anus	C19-C21	418	4.45	0.45	155	4.67	0.78	263	4.31	0.55
Colorectal cancers	C18-21	1,888	20.03	0.95	646	19.74	1.62	1,243	20.20	1.18
Larynx & trachea/bronchus/lung	C32-C34	2,428	27.68	1.15	821	27.63	1.98	1,607	27.75	1.41
Other parts of uterus	C54-C55	280	3.16	0.39	91	2.73	0.59	189	3.38	0.50
Lymphoma	C81-C85	451	5.09	0.49	161	5.20	0.84	290	5.02	0.60
Leukaemia (excl. Plasma cell leukaemia)	C91-C95	368	4.09	0.44	111	3.82	0.75	257	4.25	0.54
Lymphatic/haematopoietic & related tissue	C81-C96	1,113	12.37	0.76	358	11.64	1.27	755	12.77	0.95
All sites excl. Non-melanoma skin		15,324	173.7	2.87	5,080	166.5	4.82	10,245	177.6	3.58
All sites	C00-C97	15,354	174.0	2.88	5,089	166.7	4.83	10,266	177.9	3.59

Appendix Table 9. Numbers of deaths from malignant cancer, and European-age-standardised mortality rates, by ICD-10 site, 1994-96 (males): comparative data, Northern Ireland and Republic of Ireland

		ALL IRELAND			NORTHERN IRELAND			REPUBLIC OF IRELAND		
		1994-96			1994-96			1994-96		
Description	ICD-10	cases	EASR	95%c.I.	cases	EASR	95%c.I.	cases	EASR	95%c.I.
Lip	C00	24	0.36	0.15	2	0.12	0.17	22	0.48	0.21
Base of tongue	C01	6	0.10	0.08	1	0.04	0.08	5	0.12	0.11
Other/unspecified tongue	C02	94	1.39	0.29	28	1.30	0.49	66	1.44	0.35
Gum	C03	6	0.09	0.07	2	0.09	0.13	4	0.09	0.08
Floor of mouth	C04	23	0.37	0.15	7	0.35	0.27	16	0.37	0.18
Palate	C05	9	0.14	0.09	1	0.05	0.09	8	0.18	0.12
Other/unspecified mouth	C06	41	0.61	0.19	6	0.30	0.25	35	0.75	0.25
Parotid gland	C07	25	0.36	0.15	5	0.21	0.19	20	0.43	0.20
Other/unspecified major salivary glands	C08	5	0.07	0.07	0	0.00	0.00	5	0.11	0.10
Tonsil	C09	30	0.44	0.16	8	0.35	0.25	22	0.49	0.21
Oropharynx	C10	14	0.21	0.11	5	0.23	0.21	9	0.20	0.13
Nasopharynx	C11	20	0.29	0.13	5	0.23	0.20	15	0.31	0.16
Pyriform sinus	C12	28	0.43	0.16	4	0.20	0.20	24	0.53	0.22
Hypopharynx	C13	16	0.25	0.13	5	0.26	0.23	11	0.25	0.15
Other/ill-defined lip, oral cavity, pharynx	C14	57	0.86	0.22	14	0.66	0.35	43	0.95	0.29
Oesophagus	C15	798	11.86	0.84	250	11.43	1.44	548	12.07	1.03
Stomach	C16	1,074	15.98	0.98	338	15.73	1.71	736	16.09	1.19
Small intestine	C17	32	0.48	0.17	14	0.67	0.35	18	0.38	0.18
Colon	C18	1,604	23.73	1.19	489	22.65	2.05	1,115	24.26	1.45
Rectosigmoid junction	C19	62	0.95	0.24	15	0.71	0.37	47	1.07	0.31
Rectum	C20	542	8.09	0.69	156	7.17	1.15	386	8.53	0.87
Anus & anal canal	C21	10	0.17	0.11	6	0.32	0.26	4	0.09	0.10
Liver & intrahepatic bile ducts	C22	335	4.95	0.54	115	5.30	0.99	220	4.79	0.64
Gallbladder	C23	28	0.39	0.15	4	0.18	0.17	24	0.49	0.20
Other/unspecified biliary tract	C24	52	0.75	0.21	15	0.71	0.37	37	0.77	0.25
Pancreas	C25	753	11.14	0.81	218	9.88	1.33	535	11.74	1.02
Other/ill-defined digestive organs	C26	390	5.78	0.59	111	5.08	0.96	279	6.10	0.74
Nasal cavity & middle ear	C30	9	0.15	0.10	6	0.28	0.22	3	0.09	0.10
Accessory sinuses	C31	16	0.25	0.13	4	0.18	0.18	12	0.28	0.16
Larynx	C32	173	2.59	0.39	50	2.33	0.65	123	2.70	0.48
Trachea	C33	9	0.13	0.09	1	0.04	0.08	8	0.17	0.12
Bronchus & lung	C34	4,533	66.53	1.96	1,515	68.99	3.52	3,018	65.35	2.37
Thymus	C37	3	0.04	0.05	1	0.05	0.09	2	0.04	0.06
Heart, mediastinum, & pleura	C38	109	1.65	0.31	75	3.51	0.81	34	0.75	0.26
Other/ill-defined respiratory/intrathoracic	C39	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Bone & articular cartilage of limbs	C40	12	0.17	0.10	1	0.05	0.09	11	0.23	0.14
Bone & articular cartilage other/unspecified	C41	59	0.84	0.22	22	0.92	0.39	37	0.80	0.26
Melanoma	C43	116	1.75	0.33	34	1.65	0.56	82	1.80	0.40
Non-melanoma skin	C44	87	1.35	0.29	21	1.00	0.44	68	1.59	0.39
Mesothelioma	C45	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Kaposi's sarcoma	C46	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Peripheral nerves & autonomic nervous system	C47	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Retroperitoneum & peritoneum	C48	32	0.47	0.16	13	0.59	0.33	19	0.40	0.19

Description	ICD-10	cases	EASR	95%c.I.	cases	EASR	95%c.I.	cases	EASR	95%c.I.
Other connective & soft tissue	C49	64	0.94	0.23	25	1.13	0.45	39	0.85	0.27
Breast	C50	19	0.31	0.14	2	0.10	0.13	17	0.41	0.20
Penis	C60	31	0.46	0.16	13	0.59	0.33	18	0.39	0.18
Prostate	C61	2,154	31.83	1.39	635	29.33	2.35	1,519	33.04	1.72
Testis	C62	35	0.46	0.15	12	0.50	0.28	23	0.44	0.19
Other/unspecified male genital organs	C63	4	0.05	0.05	2	0.08	0.11	2	0.04	0.05
Kidney, except renal pelvis	C64	338	5.15	0.56	123	5.73	1.02	215	4.87	0.66
Renal pelvis	C65	2	0.03	0.04	1	0.05	0.09	1	0.02	0.04
Ureter	C66	2	0.03	0.04	1	0.05	0.10	1	0.02	0.04
Bladder	C67	535	7.85	0.69	190	8.69	1.27	345	7.45	0.81
Other/unspecified urinary organs	C68	3	0.06	0.07	0	0.00	0.00	3	0.09	0.10
Eye & adnexa	C69	15	0.23	0.12	3	0.17	0.20	12	0.26	0.15
Meninges	C70	3	0.04	0.04	0	0.00	0.00	3	0.06	0.06
Brain	C71	500	7.31	0.65	128	5.88	1.03	372	7.99	0.82
Spinal cord, cranial nerves & other parts of cns	C72	4	0.06	0.06	0	0.00	0.00	4	0.09	0.08
Thyroid gland	C73	38	0.54	0.18	13	0.61	0.34	25	0.51	0.20
Adrenal gland	C74	17	0.25	0.12	5	0.23	0.21	12	0.26	0.15
Other endocrine glands & related structures	C75	8	0.11	0.08	1	0.03	0.07	7	0.14	0.11
Other & ill-defined sites	C76	161	2.41	0.38	33	1.59	0.55	128	2.81	0.50
Secondary & unspecified lymph nodes	C77	1	0.01	0.02	1	0.03	0.07	0	0.00	0.00
Unspecified site	C80	1,048	15.41	0.95	343	15.79	1.70	705	15.20	1.14
Hodgkin's disease	C81	67	0.96	0.23	15	0.68	0.34	52	1.08	0.30
Follicular [nodular] non-hodgkin's lymphoma	C82	2	0.03	0.04	0	0.00	0.00	2	0.04	0.06
Diffuse non-hodgkin's lymphoma	C83	6	0.09	0.07	4	0.18	0.18	2	0.05	0.06
Peripheral & cutaneous t-cell lymphomas	C84	7	0.11	0.08	3	0.13	0.15	4	0.10	0.09
Other & unspecified types of non-hodgkin's lymphoma	C85	488	7.14	0.64	177	8.06	1.20	311	6.70	0.76
Malignant immunoproliferative diseases	C88	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Multiple myeloma & malignant plasma cell neoplasms	C90	329	4.93	0.54	98	4.68	0.95	231	5.05	0.67
Lymphoid leukaemia	C91	206	2.91	0.41	58	2.47	0.65	148	3.13	0.52
Myeloid leukaemia	C92	213	3.13	0.43	81	3.74	0.84	132	2.85	0.50
Monocytic leukaemia	C93	5	0.07	0.06	0	0.00	0.00	5	0.11	0.09
Other leukaemias of specified cell type	C94	1	0.01	0.03	1	0.04	0.08	0	0.00	0.00
Leukaemia of unspecified cell type	C95	61	0.88	0.23	16	0.72	0.36	45	0.96	0.29
Other/unspecified lymphoid, haematopoietic & related	C96	1	0.02	0.03	0	0.00	0.00	1	0.03	0.05
Independent (primary) multiple sites	C97	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00
Lip & mouth	C00-C08	233	3.50	0.46	52	2.48	0.68	181	3.97	0.59
Pharynx	C09-C14	165	2.47	0.38	41	1.94	0.60	124	2.73	0.49
Lip, oral cavity & pharynx	C00-C14	398	5.97	0.60	93	4.41	0.91	305	6.71	0.77
Rectum & anus	C19-C21	614	9.20	0.74	177	8.21	1.23	437	9.69	0.93
Colorectal cancers	C18-21	2,218	32.94	1.40	666	30.86	2.39	1,552	33.96	1.72
Larynx & trachea/bronchus/lung	C32-C34	4,715	69.24	2.00	1,566	71.36	3.58	3,149	68.22	2.42
Lymphoma	C81-C85	570	8.32	0.69	199	9.05	1.27	371	7.97	0.82
Leukaemia (excl. Plasma cell leukaemia)	C91-C95	486	7.01	0.64	156	6.97	1.12	330	7.05	0.78
Lymphoid/haematopoietic & related tissue	C81-C96	1,386	20.28	1.09	453	20.70	1.94	933	20.09	1.32
All sites excl. Non-melanoma skin		17,517	258.6	3.88	5,530	254.1	6.77	11,987	260.7	4.74
All sites	C00-C97	17,604	259.9	3.89	5,551	255.1	6.79	12,055	262.3	4.75

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