CANCER IN IRELAND 1994-2017 WITH ESTIMATES FOR 2017-2019:

ANNUAL REPORT OF THE NATIONAL CANCER REGISTRY

National Cancer Registry Ireland

2019 Annual Report

ABBREVIATIONS

95% CI	95% confidence interval
APC	Annual percentage change
ASR	Age-standardised rate
CIN	Cervical intraepithelial neoplasia
CLL	Chronic lymphocytic leukaemia
CNS	Central nervous system
CSO	Central Statistics Office
ESP	European standard population
IARC	International Agency for Research on Cancer
ICBP	International Cancer Benchmarking Partnership
ICD	International Statistical Classification of Diseases and Related Health Problems
MIR	Mortality-to-incidence ratio
NCCP	National Cancer Control Programme
NCRI	National Cancer Registry, Ireland
NMSC	Non-melanoma skin cancer
NOS	Not otherwise specified
RS	Relative survival
TNM	Tumour, node, metastasis (staging)
WHO	World Health Organisation

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FOREWORD

The National Cancer Registry is now in its 26th year of data-collection, having begun registration of cancers and related tumours in 1994. Over this time the registry has provided surveillance of trends in cancer incidence, treatment, survival, and prevalence, along with associated clinical and demographic aspects of the patient population. Previous annual reports have documented increases in numbers of cases diagnosed annually, but also that rates of cancer, corrected for population and age, have begun to level off or even decline for many cancer types. Survival improvements over time have also been identified across most cancer types, associated with improvements in cancer treatment and other interventions, notably screening for some cancers.

This year's report estimates that numbers of invasive cancers (excluding non-melanoma skin cancer) have risen to about 23,890 cases diagnosed annually during 2017-2019 (12,770 males and 11,120 females), or 35,441 cases including all invasive cancers. As also noted in last year's report, these figures represent almost a doubling of case-numbers since the registry's early years (1994-1996), much of the increase being a reflection of population growth and ageing. Just over 9,000 deaths from cancer currently occur per year.

Ongoing increases in the average survival of cancer patients are also documented, based on updated survival statistics published here. In turn, the number of cancer survivors continues to grow, and we estimate that about 180,000 cancer survivors previously diagnosed with an invasive cancer (other than non-melanoma skin cancer) were alive at the end of 2017. This figure is equivalent to almost 4% of the Irish population, and is likely to reach 200,000 mark by 2020.

On the whole, the implications of the above trends are largely positive, in terms of an individual's risk of developing or dying from cancer. But, as the cancer projections report published by NCRI earlier this year highlighted, there is uncertainty as to the magnitude of further increases in the annual number of cases diagnosed. A further analysis is currently underway at NCRI, funded by the Irish Cancer Society, to assess the proportions of cancer attributable to established risk factors and, if possible, the potential implications of ongoing or future changes in these factors.

Evidence of progress against cancer in Ireland also needs to be assessed within a wider international context. Figures summarised here, from our collaboration with the International Cancer Benchmarking Partnership, shows that Ireland ranks quite high compared with six other high-income countries (across three continents) in terms of survival improvements over time. But we are still behind the best-performing countries in terms of current survival rankings.

The National Cancer Registry's new strategy aims to build on the decades of cancer surveillance already undertaken, and progress towards collection of fuller and more relevant follow-up data. To position the registry for this, but also to maximise the efficiency, timeliness and quality of existing data collection, we are currently undertaking an intensive process of review and improvement. That the registry continues to deliver important outputs like this report, is a credit to our dedicated staff.

Director, National Cancer Registry

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1. REPORT AT A GLANCE

Who are we, and what do we do?

The National Cancer Registry of Ireland (NCRI) works on behalf of the Department of Health and collects information from all hospitals in Ireland on the number of persons diagnosed with cancer and the types of cancer (or related tumour) they have.

NCRI also follows up the numbers dying from their cancer or from other causes. All the patient's personal and private details are removed before summaries of this information are made available to public and health professionals through our annual cancer report and other reports on our website.

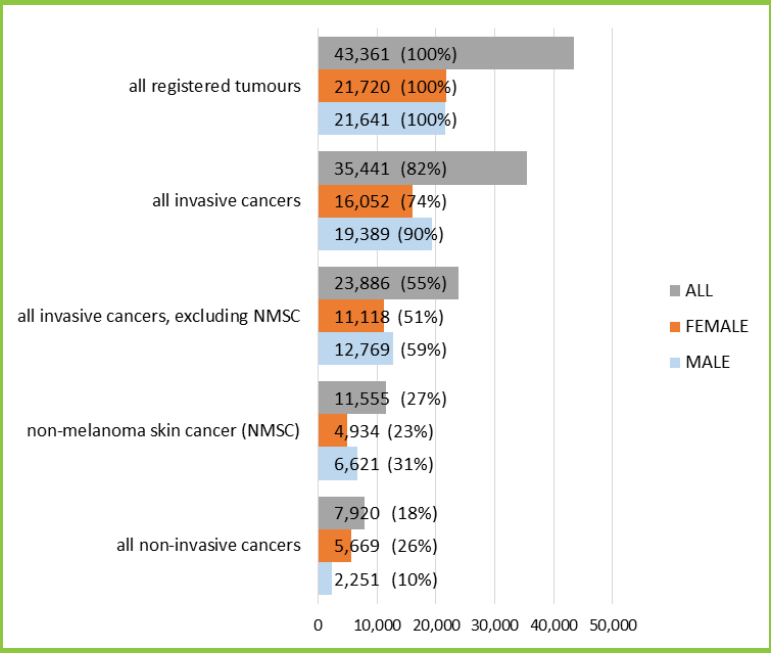
How are the numbers reported?

The process of collecting and checking all of this information is done largely by hand and hence is time-consuming, even with increasing use of electronic data sources. Our staff collect cancer diagnosis information and then use an agreed system of coding (The International Classification of Diseases) to group the cancers into different types.

After a process of collating diverse information from Irish hospitals and carefully assigning it to the correct person followed by anonymisation, the annual cancer report is published.

What have we found?

Over the years 2017-2019 the average number of 'registered tumours' in males and females is estimated at just over 43,000 per year. Just over half of these (excluding non-invasive and non-melanoma skin cancers) are life-changing invasive cancers which require extensive treatment.



CANCER CASES:

ANNUAL AVERAGE 2017-2019, BY CANCER TYPE

Percentages represent the proportion of *'all registered tumours'*

For example, non-melanoma skin cancer (NMSC) made up 31% of all registered tumours in males, 23% in females, or 27% overall.

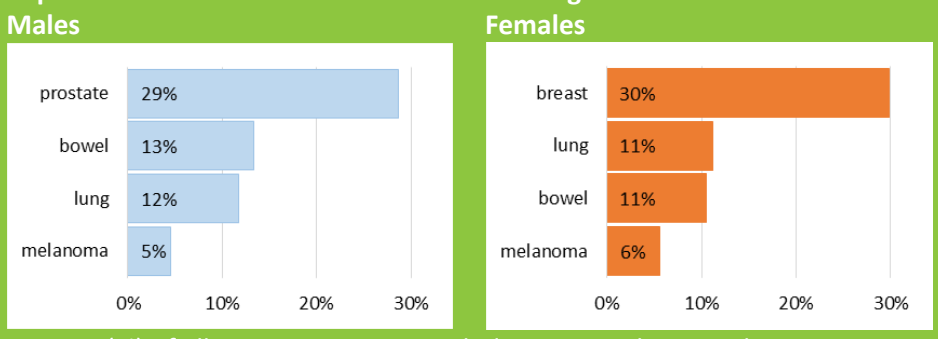
How many people were diagnosed with cancer?

- On average, 43,361 cancers or related tumours were diagnosed each year during 2017-2019.
- Approximately 18% of these were non-invasive neoplasms (in situ carcinomas, tumours of uncertain behaviour and benign brain and CNS tumours).
- 27% were non-melanoma skin cancers.
- Invasive cancers (including NMSC) were estimated to average 35,441 cases per year during 2017-2019.
- The figure most often quoted in international comparisons (*"all invasive cancer, excluding NMSC"*) was estimated at 23,890 cases (12,770 male and 11,120 female) diagnosed annually during 2017-2019, or 55% of all registered tumours.

What are the most common cancers?

- Excluding NMSC, prostate and female breast cancer were the most commonly diagnosed invasive cancers overall, and each comprised almost one-third of all invasive cancers in men and women respectively during the period 2017-2019.
- Colorectal (bowel) cancer, lung cancer, melanoma of skin and NHL were the 2nd, 3rd, 4th and 5th most common cancers in males, respectively.
- Lung cancer, colorectal cancer, melanoma of skin, and uterine cancer (corpus uteri) were the 2nd, 3rd, 4th and 5th most common cancers in females respectively

Top four most common incident cancers during 2017-2019



Percent (%) of all invasive cancers, excluding non-melanoma skin cancer

How many people die of cancer?

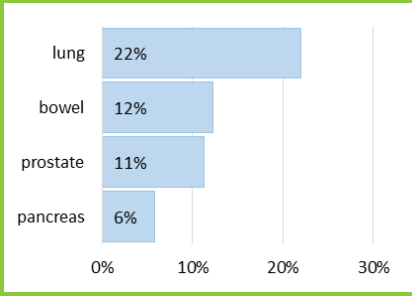
- Of all deaths occurring in 2016, 31% were attributable to cancer. Another 30% were attributable to cardiovascular disease [1].
- On average there were 9,023 deaths per year from invasive cancer (4,756 in males, 4,268 in females) during the period 2014-2016, or 9,233 deaths per year from any neoplasm.
- The risk of dying of cancer before age 75 was approximately 1 in 10 for women and 1 in 8 for men.

What are the most common causes of cancer deaths?

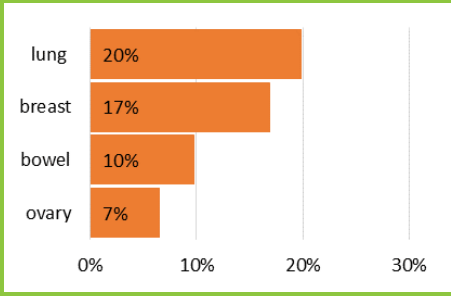
- Lung cancer was the leading cause of cancer death in both sexes during 2014-2016.
- In males, cancer of the bowel, prostate and pancreas were the 2nd, 3rd, and 4th most common categories of cancer deaths, respectively.
- In females, cancer of the breast, bowel and ovary were the 2nd, 3rd and 4th most common categories of cancer deaths, respectively.

Top four most common causes of cancer death during 2014-2016

Males



Females

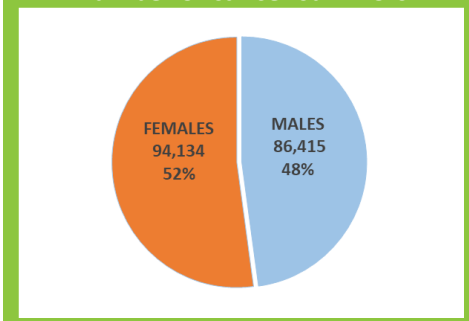


Percent(%) of all cancer deaths

How many previously diagnosed cancer patients are still alive?

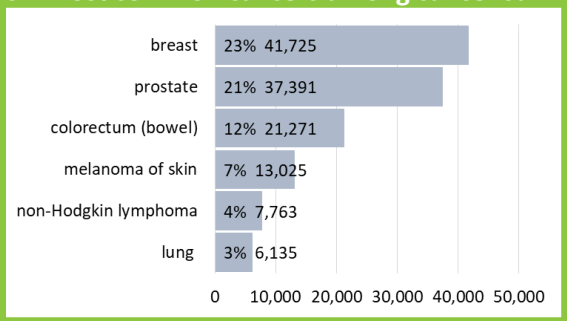
- Over 180,000 cancer patients or former cancer patients were alive in Ireland at the end of 2017 (about 3.8% of the Irish population) and this is likely to reach 200,000 by 2019 or 2020.
- The top six most common cancers among survivors were: breast cancer (23% of all cancer survivors), prostate cancer (21%), colorectal cancer (12%) and skin melanoma (7%), non-Hodgkin lymphoma (4%) and lung cancer (3%) which together make up 70% of all cancer survivors.

Number of cancer survivors



Total number =180,550 (100%)

The six most common cancers among cancer survivors



What proportion of cancer patients are still alive at 5 years after diagnosis?

The six major cancers with highest 5-year survival are:

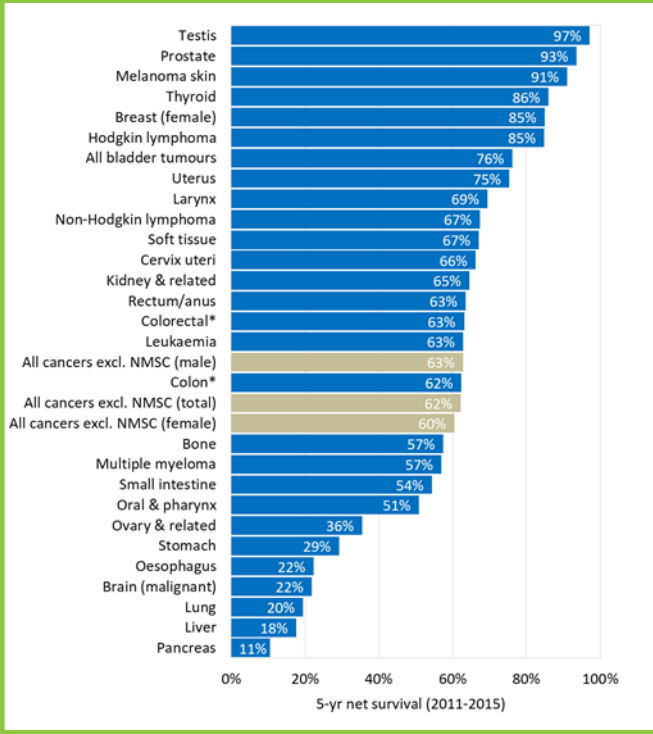
- Testis
- Prostate
- Melanoma of skin
- Thyroid
- Breast (female)
- Hodgkin lymphoma

The six major cancers with lowest 5-year survival are:

- Pancreas
- Liver
- Lung
- Brain
- Oesophagus
- Stomach

These proportions continue to improve over time, across almost all cancers, based on data available since 1994.

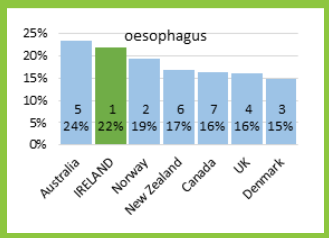
5 –year net survival for the diagnosis period (2011-2015)

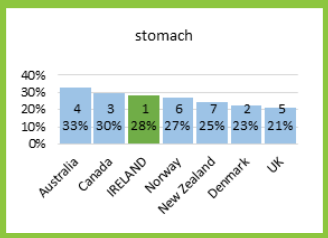


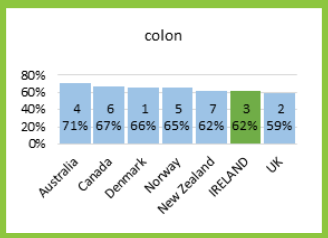
*Colorectal: excludes carcinoid tumours of the appendix

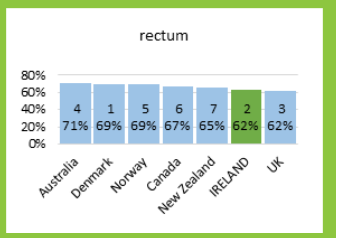
How does cancer survival in Ireland compare with other countries?

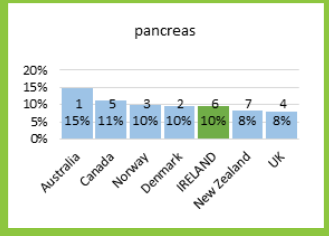
- Recent SURVMARK-2 study [2] comparing the percentage of patients that survived 5 years across 7 high-income countries
- 7 cancers with poor to moderate survival prospects
- The percentage in the bars represent 5-yr survival (ranked by country) during the most recent period 2010-2014

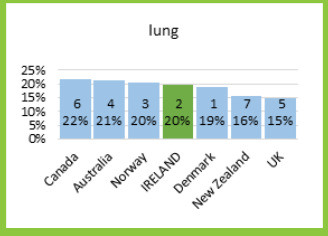


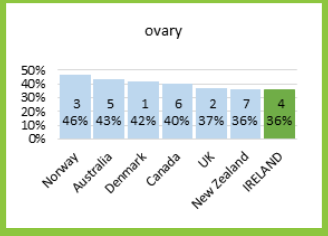












The numbers above the percentages show how countries ranked for the improvement between diagnosis period 1995-1999 *&* 2010-2014

- Across the seven countries included, survival figures for Irish patients during 2010-2014 were the 2nd highest for oesophageal cancer, 3rd highest for stomach cancer, 5th highest for pancreatic, 4th

highest for lung cancer, but only 6th highest (2nd lowest) for colon and rectal cancer and lowest for ovarian cancer.
- Ireland showed the biggest improvements in survival (comparing 2010-2014 with 1995-1999) of any of the seven countries for oesophageal and stomach cancers, the 2nd highest improvement for rectal and lung cancers, the 3rd highest improvement for colon cancer, the 4th highest improvement for ovarian cancer but the 2nd lowest improvement for pancreatic cancer.
- Ireland is making good progress in terms of survival improvements for all cancers included, but still has some way to go to match the best-performing countries.

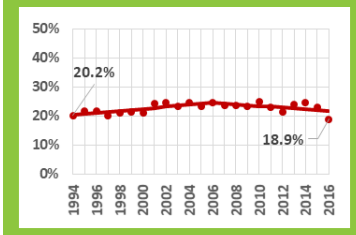
What is the breakdown of cases by cancer stage at diagnosis?

For the diagnosis period 2014 to 2016:

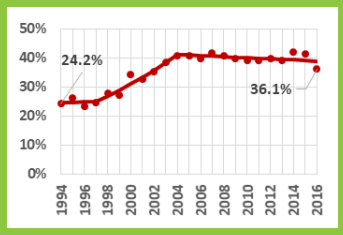
- COLORECTAL CANCER: just over 1 in 2 (57%) were diagnosed at late stage (Stage III/IV), with 1 in 4 (25%) diagnosed at the distant metastatic stage (stage IV)
- LUNG CANCER: about 7 in 10 (70%) were diagnosed at late stage (stage III/IV), and almost 1 in 2 (45%) were diagnosed at the metastatic stage (Stage IV)
- BREAST CANCER in women: 1 in 5 (20%) were diagnosed at late stage (stage III/IV), and about 1 in 14 (7%) were diagnosed at the metastatic stage.
- PROSTATE CANCER: about 1 in 3 (32%) were diagnosed at late stage (stage III/IV), and about 1 in 7 (14%) were diagnosed at stage IV.
- The proportion of cancer patients with distant metastatic disease has generally declined in recent years (or longer-term).

TRENDS IN METASTATIC ('M1' OR 'STAGE IV') CANCER (1994-2016)

Colorectal cancer M1 cases/all cases (%)

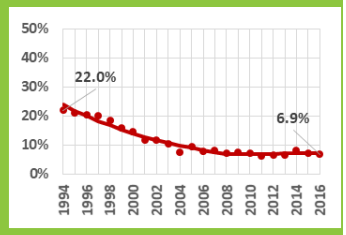


Lung cancer M1 cases/all cases (%)



Breast cancer M1 cases/all cases (%)

Prostate cancer M1 cases/all cases (%)



2. CANCER INCIDENCE 2017-2019

TABLE 2-1
ESTIMATED ANNUAL AVERAGE INCIDENCE, RATE AND CUMULATIVE RISK OF THE MOST COMMON CANCERS: 2017-2019‡

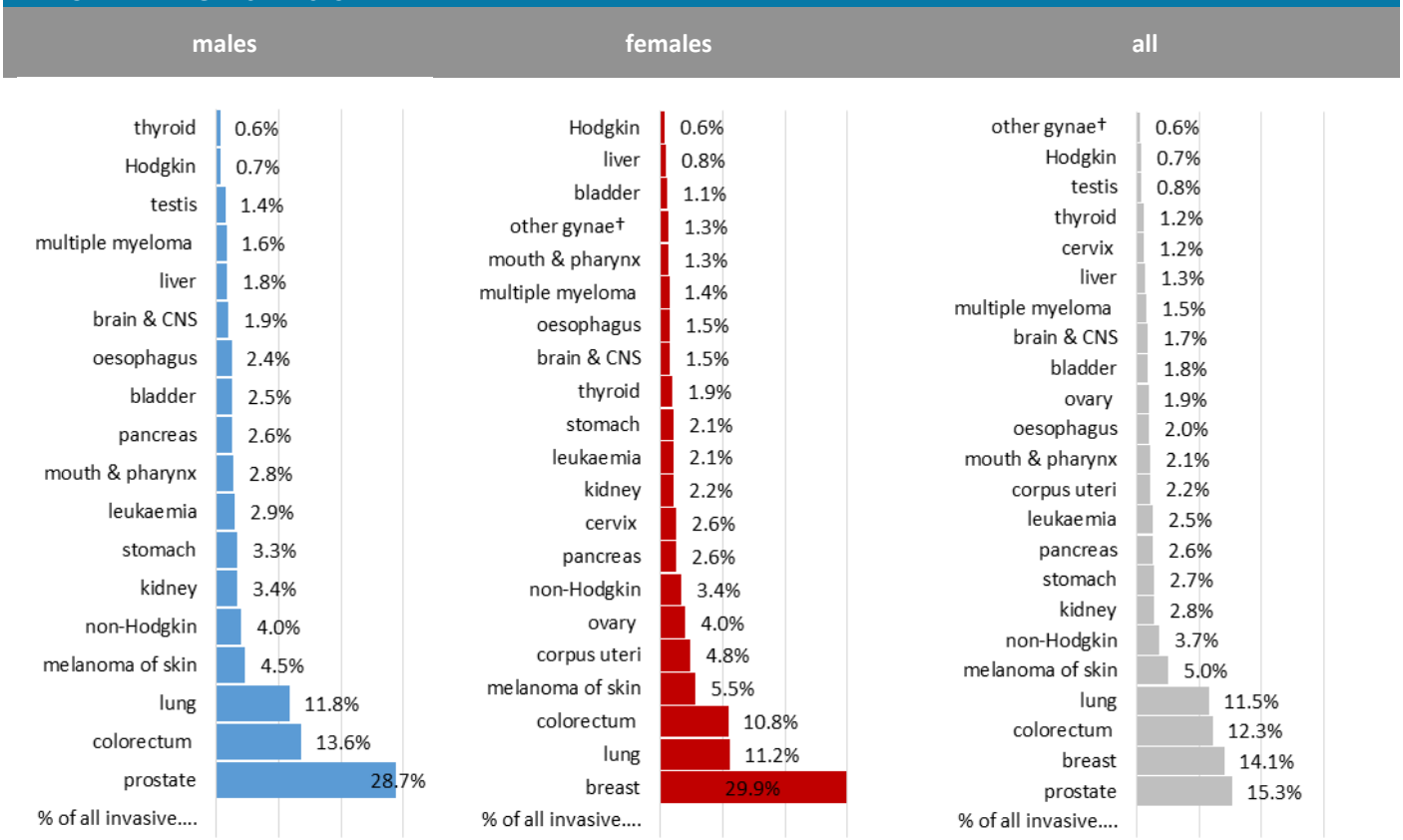
	Case count			Rate*/100,000		Risk # to age 75 1 in: …	
ICD cancer site **	male	female	all	male	female	male	female
C00-96 all invasive	19,389	16,052	35,441	719.4	553.4	2	3
C00-96 all invasive, ex. NMSC C44	12,769	11,118	23,886	478.3	390.9	3	4
C00-96, D00-48: all registered	21,641	21,720	43,361	802.5	771.9	2	2
D00-48 all non-invasive	2,251	5,669	7,920	83.0	218.5	16	7
mouth & pharynx	359	144	503	14.0	5.2	83	226
oesophagus	310	164	475	11.5	5.1	110	267
stomach	421	228	649	15.4	7.4	88	179
colorectum and anus	1,731	1,205	2,935	63.8	40.2	21	33
liver	226	92	318	8.4	3.0	148	424
pancreas	330	290	619	12.1	9.2	111	149
lung	1,505	1,244	2,749	54.8	41.5	23	28
melanoma of skin	579	615	1,194	21.8	22.2	62	57
non-melanoma skin cancer (C44)	6,621	4,934	11,555	241.2	162.5	6	9
breast	28	3,323	3,351	1.0	123.5	1196	10
cervix		284	284		11.0		119
corpus uteri		532	532		19.4		57
ovary		441	441		15.6		78
other gynaecological †		143	143		4.8		277
prostate	3,665		3,665	139.3		8	
testis	180		180	7.6		183	
kidney	431	242	673	16.4	8.4	74	143
bladder~	321	121	442	11.4	3.7	139	443
all brain & CNS	343	383	726	13.3	14.0	94	93
malignant brain & CNS	240	168	407	9.3	6.1	134	204
benign brain & CNS	68	179	247	2.6	6.4	472	205
uncertain brain & CNS	35	36	72	1.4	1.5	909	972
thyroid	74	207	281	2.9	8.1	410	152
Hodgkin lymphoma	92	70	162	3.8	2.9	331	458
non-Hodgkin lymphoma	504	376	881	18.9	12.9	70	94
multiple myeloma	203	154	357	7.5	5.1	170	247
leukaemia	371	236	607	14.0	8.2	95	158
other invasive cancers	1,201	839	2,040				

‡ Average age-standardised rates for 2014-2016 period were projected onto populations in 2017- 2019.
Estimated average annual case counts and rates for 2017-2019 are presented in the table.
* Rates are standardised to the 1976 European standard population; see Appendix II for rates standardised to the 2013 ESP.
** Invasive cancer included all tumours classified as behaviour 3 in ICD-O-3 classification (including some neoplasms previously classified as uncertain behaviour, e.g. polycythaemia vera).
# Cumulative risk of developing a type of cancer before age 75 expressed as a proportion, e.g. 1 in 3.
† Vulva, vagina, uterus (NOS) and placenta.
~ Bladder cancer figures revised to exclude some in situ tumours & tumours of uncertain behaviour misclassified as invasive in previous reports.

- Taking known cancer incidence rates during 2014-2016, and applying these rates to population estimates for 2017-2019, an average of 43,361 cancers or other (non-invasive) tumours diagnosed annually was estimated for the period 2017-2019, representing an age-standardised incidence rate of 772 female cases and 803 male cases per 100,000 per year (Table 2-1).

- Approximately 18% of these were non-invasive tumours (in situ carcinomas, tumours of uncertain behaviour and benign brain and CNS tumours) and 27% were invasive non-melanoma skin cancers (NMSC, estimated 11,555 cases per year) (Table 2-1).
- Invasive cancers (incl. NMSC) were estimated to average 35,441 cases per year during 2017-2019, or an age-standardised rate of 553 female and 719 male cases per 100,000 per year.
- For all invasive cancers excluding NMSC, the figures most often quoted in international comparisons, an estimated 23,886 cases (12,769 males and 11,118 females) were diagnosed annually during 2017-2019, or 67% of all invasive cases.
- This is equivalent to an incidence rate of 391 cases per 100,000 females and 478 cases per 100,000 males per year — 22% higher for men than for women.
- The annual average number of invasive cancers excluding NMSC during 2017-2019 was 95% higher than the average during 1994-1996 (12,270 – 6,350 male and 5,920 female).
- The cumulative lifetime risk (to age 75 years) of being diagnosed with an invasive cancer other than NMSC was approximately 1 in 3 for men and 1 in 4 for women.
- There figures assume that average annual cancer incidence rates did not change between the period 2014-2016 and 2017-2019, and that the Irish population estimates or projections available for 2017-2019 at the time of writing are accurate.

FIGURE 2-1:
ESTIMATED PERCENTAGES AND RANK OF THE MOST COMMONLY DIAGNOSED INVASIVE CANCER (EXCLUDING NMSC): ANNUAL AVERAGE 2017-2019



Low-incidence invasive cancers are not shown (c.10%), therefore percentages do not sum to 100%
†Other gynaecological cancers: vulva, vagina, uterus (NOS) and placenta

- If NMSC cases are excluded, prostate and female breast cancer were the most commonly diagnosed invasive cancers overall, each comprising almost one-third of all invasive cancers in men and women respectively, during the period 2017-2019 (Figure 2-1).
- Colorectal cancer, lung cancer, melanoma of skin and non-Hodgkin lymphoma were the 2nd, 3rd, 4th and 5th most common cancers in males respectively.
- Lung cancer, colorectal cancer, melanoma of skin, and uterine cancer (corpus uteri) were the 2nd, 3rd, 4th and 5th most common cancers in females respectively.

A more detailed breakdown of incidence statistics by cancer site is given in Appendix I & II.

3. CANCER MORTALITY 2014-2016

- Of deaths occurring in 2016, 73.6% were attributed to 3 main chapters in the ICD-10 classification: IX (I00-I99) diseases of the circulatory system (30.1%), II (C00-D48) cancers and other neoplasms (30.7%), and X (J00-J99) diseases of the respiratory system (12.8%) [1].
- An annual average of 9,023 deaths from invasive cancer (4,756 in males, 4,268 in females) occurred during the period 2014-2016, or 9,233 deaths from any neoplasm (Table 3-1).
- This represents an estimated age-standardised mortality rate of 145 invasive cancer deaths per 100,000 females and 191 deaths per 100,000 males per year (Table 3-1) — 32% higher for men than for women. The estimated lifetime risk (to age 75 year) of dying from invasive cancer was approximately 1 in 10 for women and 1 in 8 for men.

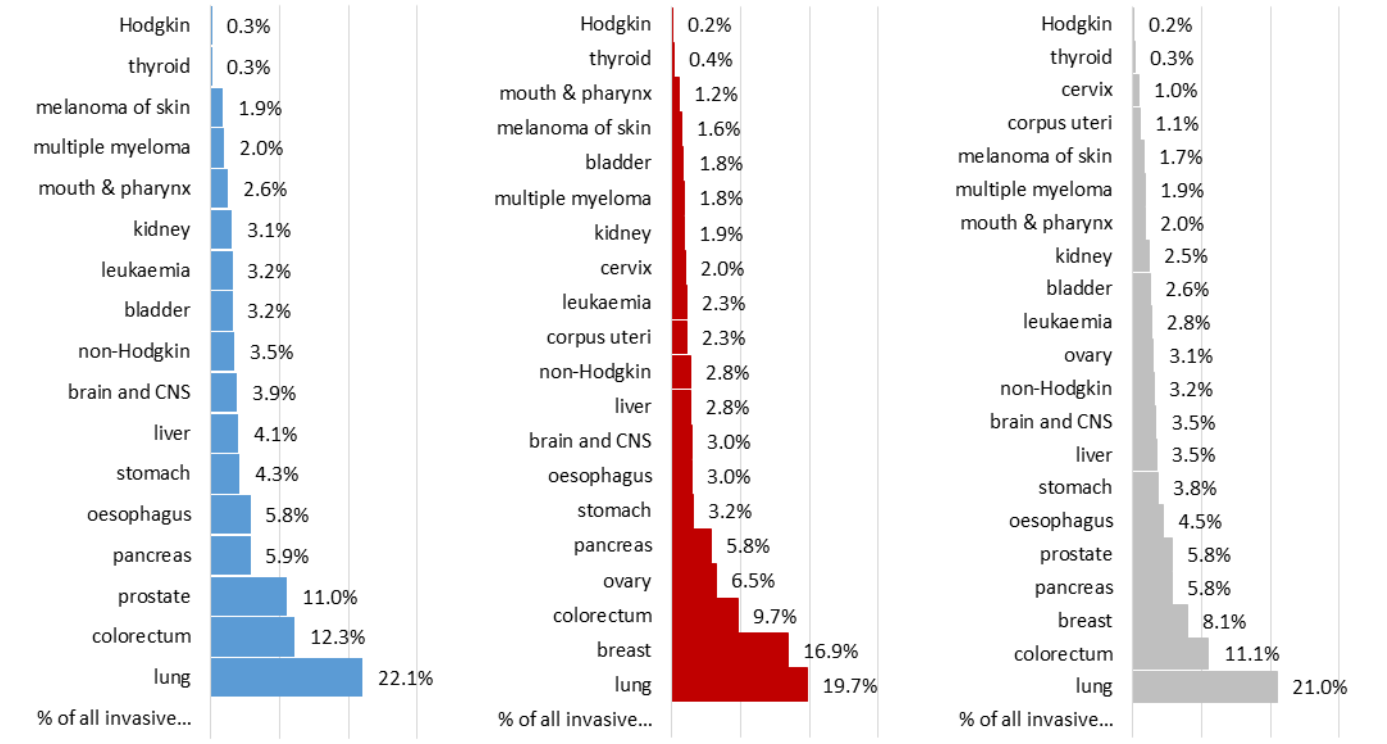
TABLE 3-1:
ANNUAL AVERAGE MORTALITY ATTRIBUTABLE TO CANCER: 2014-2016

	DEATHS			Rate*/100,000		Risk # to age 75 1 in: …	
	male	female	all	male	female	male	female
all neoplasms	4,871	4,362	9,233	195.8	148.0	8	10
C00-96 all invasive	4,756	4,268	9,023	191.2	145.3	8	10
mouth & pharynx	124	52	176	5.1	1.8	241	729
oesophagus	277	129	406	11.3	4.2	118	352
stomach	205	137	342	8.2	4.5	181	391
colorectum	584	415	998	23.4	13.4	68	118
liver	195	121	316	7.8	4.1	174	368
pancreas	279	248	526	11.2	8.2	125	175
lung	1,050	841	1,891	42.2	29.3	32	43
melanoma of skin	89	68	156	3.5	2.2	411	729
breast	5	723	728	0.2	25.9	6,735	54
cervix		87	87		3.4		366
corpus uteri		100	100		3.4		364
ovary		279	279		10.0		126
prostate	525		525	20.8		132	
testis	6		6	0.2		5,678	
kidney	148	79	227	6.0	2.6	234	568
bladder	154	77	231	6.1	2.3	392	817
brain & CNS	187	127	314	7.8	4.9	158	237
thyroid	13	17	30	0.5	0.6	1,879	2,761
Hodgkin lymphoma	12	8	20	0.5	0.3	2,809	4,443
non-Hodgkin lymphoma	164	120	284	6.5	3.8	237	416
multiple myeloma	95	78	174	3.8	2.5	432	690
leukaemia	153	97	250	6.1	3.1	259	470
other cancers	612	1,282	1,894	24.7	43.5		

Source of data: Central Statistics Office, Ireland.
*Rates are standardised to the 1976 European standard population.
Cumulative risk of dying of a cancer before age 75 expressed as a proportion, e.g. 1 in 10.
See Appendix III for other cancers.

- Lung cancer was the leading cause of cancer death in both sexes, with an average of 1,891 deaths per year or 20% of cancer deaths in women and 22% of cancer deaths in men during the period 2014-2016 (Table 3-1, Figure 3-1).
- Colorectal cancer was the next most common cause of cancer death overall (but 3rd most common in females), with an average of 998 deaths per year or 10% of cancer deaths in females and 12% of cancer deaths in males. Deaths from lung, colorectal, breast and prostate cancers combined made up almost half (46%) of all deaths from cancer during this period.
- Deaths from cancers of the pancreas, oesophagus, and stomach in males ranked 4th, 5th and 6th respectively, and comprised 16% of all cancer deaths in males. Mortality rankings for these high-fatality cancers were much higher than their incidence rankings (Figure 3-1).
- Deaths from cancers of the ovary and pancreas ranked 4th and 5th respectively in female and comprised 12.3% of cancer deaths in women, again much higher than the incidences ranking for these high fatality cancer (Fig. 3-1). A more detailed breakdown of mortality statistics is given in Appendix III.

FIGURE 3-1:
ESTIMATED PERCENTAGES AND RANK OF THE MOST COMMON CANCER DEATHS: ANNUAL AVERAGE 2014-2016



Cancers accounting for smaller percentages of cancer deaths (c.10% in total) are not shown, therefore percentages do not sum to 100%. Mortality data was provided by the Central Statistics Office (CSO)

4. PREVALENCE

Complete cancer prevalence is defined as the number of persons surviving with, or following a diagnosis of, cancer in a given population at a particular point in time, the index date. For a cancer registry, fixed-duration prevalence is the number of cancer survivors calculated directly from observed data collected by the cancer registry since it was established.

The NCRI began national collation of cancer registration in 1994 and it currently holds 24 years of complete or near-complete incidence and follow-up information on cancer cases, up to the end of 2017. However, there remains a subset of cancer patients alive at the end of 2017 who are not included in NCRI data because they were diagnosed before 1994. The size of this hidden subset was estimated. The sum of the fixed-duration cancer survivor population (1994-2017) and estimated numbers of survivors from the hidden cancer subset (pre-1994) gives an estimate of complete prevalence, presented below (Table 4-1).

TABLE 4-1.
FIXED DURATION AND ESTIMATED COMPLETE PREVALENCE BY AGE AND SEX: NUMBER OF CANCER SURVIVORS* AT END OF 2017.

sex	age‡	Fixed duration (1994-2017)	%	%	Complete prevalence	%	%
all		**164,752**	**100.0%**	**100.0%**	**180,550**	**100.0%**	**100.0%**
	<50	23,471	14.2%		24,104	13.4%	
	50+	141,281	85.8%		156,445	86.6%	
males		**81,126**	**100.0%**	**49.2%**	**86,415**	**100.0%**	**47.9%**
	<50	9,144	11.3%		9,416	10.9%	
	50+	71,982	88.7%		76,999	89.1%	
females		**83,626**	**100.0%**	**50.8%**	**94,134**	**100.0%**	**52.1%**
	<50	14,327	17.1%		14,688	15.6%	
	50+	69,299	82.9%		79,446	84.4%	

*survivors of any invasive cancer other than non-melanoma skin cancer (ICD-10 C00-96 excluding C44), counting only the first invasive cancer per patient and ignoring any subsequent cancers in other body sites.
‡ Age category on 31/12/2017.

- The figure reported for complete cancer prevalence (up to 31/12/2016) in last year's annual report was 173,051 [3]. For this report (up to 31/12/2017) the same figure was estimated at 180,550 (Table 4-1) which comprised c.3.8% of the Irish population in 2017.

- These figures include patients still undergoing active treatment or palliative treatment at the end of 2017, in addition to longer-term survivors (either cured or potentially at risk of recurrence or relapse).

TABLE 4-2
FIXED DURATION AND ESTIMATED COMPLETE PREVALENCE, BY CANCER TYPE: NUMBER OF CANCER SURVIVOR AT THE END OF 2017

	Fixed duration (1994-2017)	Complete to end of 2017	%*
breast	37,506	41,725	23.1%
prostate	36,843	37,391	20.7%
colorectum	19,707	21,271	11.8%
melanoma of skin	11,550	13,025	7.2%
non-Hodgkin lymphoma	7,066	7,763	4.3%
lung	6,001	6,135	3.4%
corpus uteri	5,055	5,676	3.1%
leukaemia	4,776	5,373	3.0%
kidney	4,799	5,055	2.8%
testis	3,223	4,588	2.5%
bladder	3,277	4,553	2.5%
cervix uteri	3,672	4,514	2.5%
mouth & pharynx	2,936	3,087	1.7%
ovary	2,463	3,041	1.7%
thyroid	2,870	3,015	1.7%
Hodgkin lymphoma	2,077	2,810	1.6%
stomach	2,035	2,150	1.2%
brain and spinal cord	1,559	2,064	1.1%
multiple myeloma	1,714	1,738	1.0%
oesophagus	1,289	1,335	0.7%
other malignant gynaecological†	935	1,027	0.6%
pancreas	757	782	0.4%
liver	655	665	0.4%

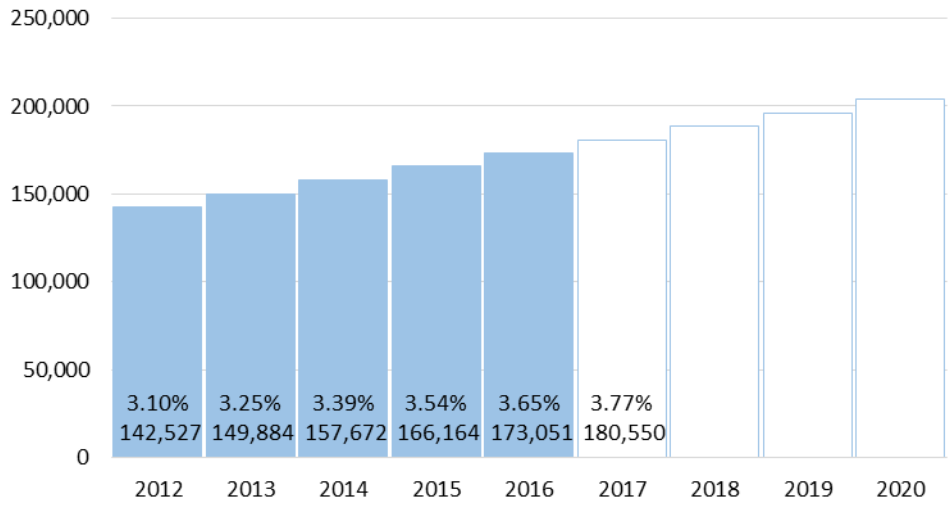
†Other gynaecological malignancies: vulva, vagina, uterus (NOS) and placenta
*Percentage of all cancer survivors (complete prevalent cancers, C00-43, C45-96)

The number of survivors of a given cancer type is related to its incidence rate, median age at diagnosis and survival prospects. Rare, high-fatality cancers diagnosed in elderly patients comprise only a small proportion of cancer survivors. Conversely, common cancers with good survival prospects diagnosed in younger persons will tend to predominate in the prevalent cancer population.

Overall, the top most common cancers in the prevalent cancer population were: breast cancer (23% of all cancer survivors), prostate cancer (21%), colorectal cancer (12%) and skin melanoma (7%) (Table 4-2). These percentages are not mutually exclusive (i.e. they do not add up to 100% of the 'all cancer' set displayed in Table 4-1), as some cancer survivors had been diagnosed with more than one type of cancer. In some cases the patient's first cancer may have been of a rarer type not listed in Table 4-2.

Lung cancer, a common but high-fatality cancer accounted for only 3% of survivors, and less common, high-fatality cancers such as liver, pancreatic, oesophageal cancers and multiple myeloma each comprised $\leq$1% of cancer survivors.

FIGURE 4-1
ESTIMATED COMPLETE CANCER PREVALENCE IN IRELAND UP TO END OF 2017



The numbers within base of the bars show the numbers living with a cancer diagnosis at the end of the year on the x-axis. Percentages represent the proportion of the Irish population living with a cancer diagnosis. Figures for 2017 are based on the latest available data at the time of writing this report, and projections are provided for years 2018 to 2020.

Since the establishment of the cancer registry, the numbers of cancers diagnosed increased annually due to growth of our population which increased by over 1 million between 1996 and 2016 [4]. Moreover, the proportion of the population most likely to be diagnosed with cancer (65+ years) expanded by over 50% over the same 20-year period. In combination with ongoing improvements in survival for most cancer types, this has resulted in a growing numbers of cancer survivors in the general population.

In summary, it is estimated that there were over 180,000 cancer survivors at the end of 2017, and this number is likely to reach 200,000 by the end of 2020 (Figure 4-1).

5. CANCER SURVIVAL

Five-year net survival for patients diagnosed during 1994-2015

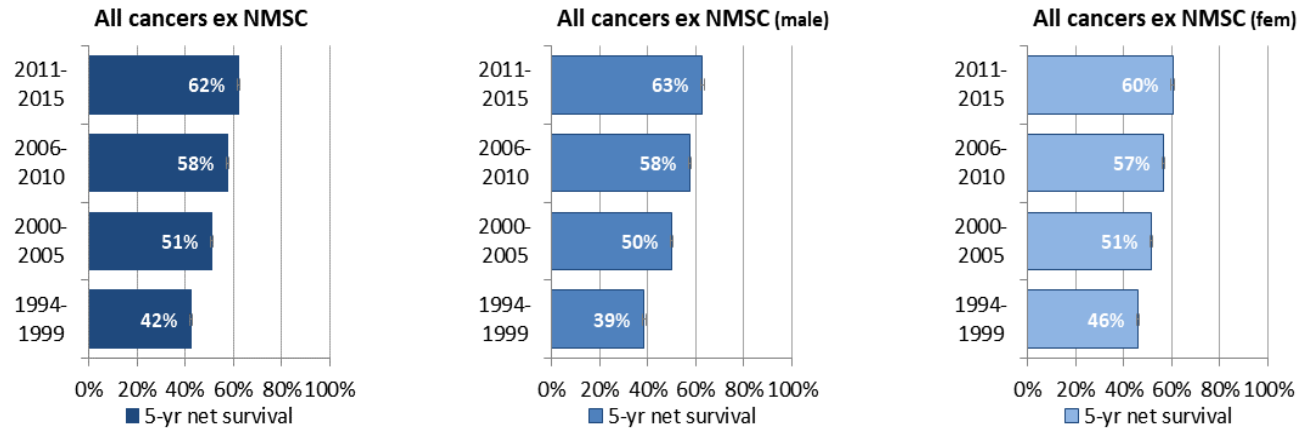
Updated five-year net survival statistics are presented below for the most commonly diagnosed cancers, comparing survival of Irish cancer patients across four diagnosis periods from 1994-1999 to 2011-2015 (Figures 5-1 & 5-2). Net survival is the expected survival in the hypothetical situation in which cancer is the only cause of death, thus it is similar to actual survival in younger patients but higher than actual survival in older patients. It measures an outcome that is broadly equivalent to cause-specific survival, without requiring cause-of-death information.

Survival is not presented for non-melanoma skin cancer (NMSC) as 5-year net survival averages close to 100% (although is lower for some subtypes). Site definitions (in terms of ICD-10 codes) are mainly those used in the EUROCARE international survival collaboration: for details, see https://www.ncri.ie/data/survival-statistics.

All estimates are age-standardised i.e. survival for all ages 15-99 (15-64 for testicular cancer, 20-99 for bone cancer) was standardised to recommended population age weights [5]. The age-groups used differ for prostate cancer, and greater weighting is given to younger patients for some cancers (melanoma, bone, cervix, testis, brain and thyroid), reflecting difference in typical age at diagnosis for these cancers. Survival statistics for paediatric cases are not presented but were published by NCRI in 2017 [6].

International comparisons of survival are presented in a later section.

FIGURE 5-1
AGE-STANDARDISED 5-YEAR NET SURVIVAL OF IRISH CANCER PATIENTS, BY DIAGNOSIS PERIOD



- Average five-year net survival has increased markedly over time, reflecting improvements in survival for specific cancers but also, to some extent, an increased predominance of cancers with more favourable prognoses (Figure 5-1).
- Survival estimates are presented by individual cancer type or grouping in Figure 5-2 below, and compared over time in Figure 5-3.

FIGURE 5-2
AGE-STANDARDISED 5-YEAR NET SURVIVAL OF IRISH CANCER PATIENTS, BY DIAGNOSIS PERIOD AND CANCER TYPE

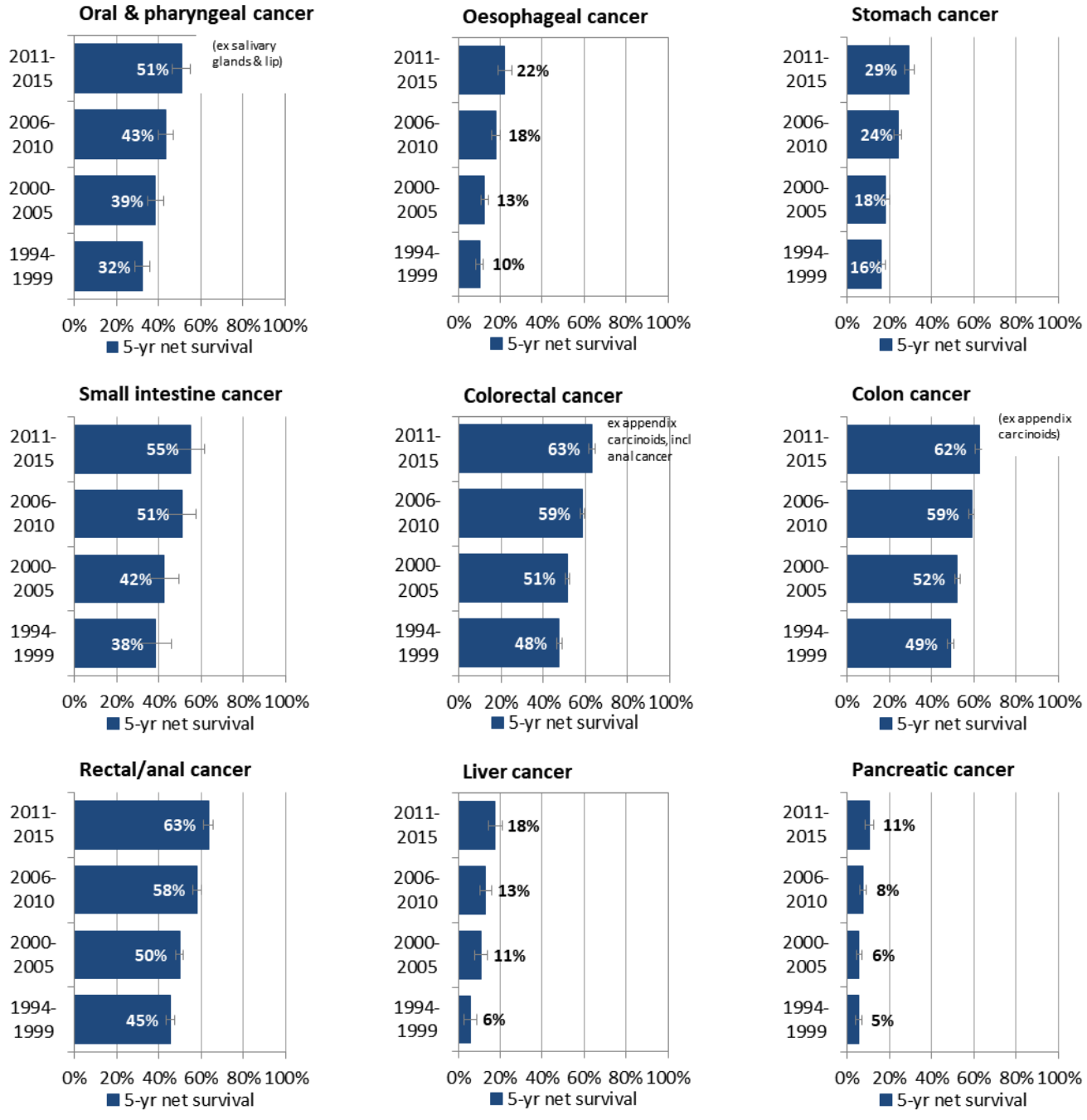


FIGURE 5-2
AGE-STANDARDISED 5-YEAR NET SURVIVAL OF IRISH CANCER PATIENTS, BY DIAGNOSIS PERIOD AND CANCER TYPE

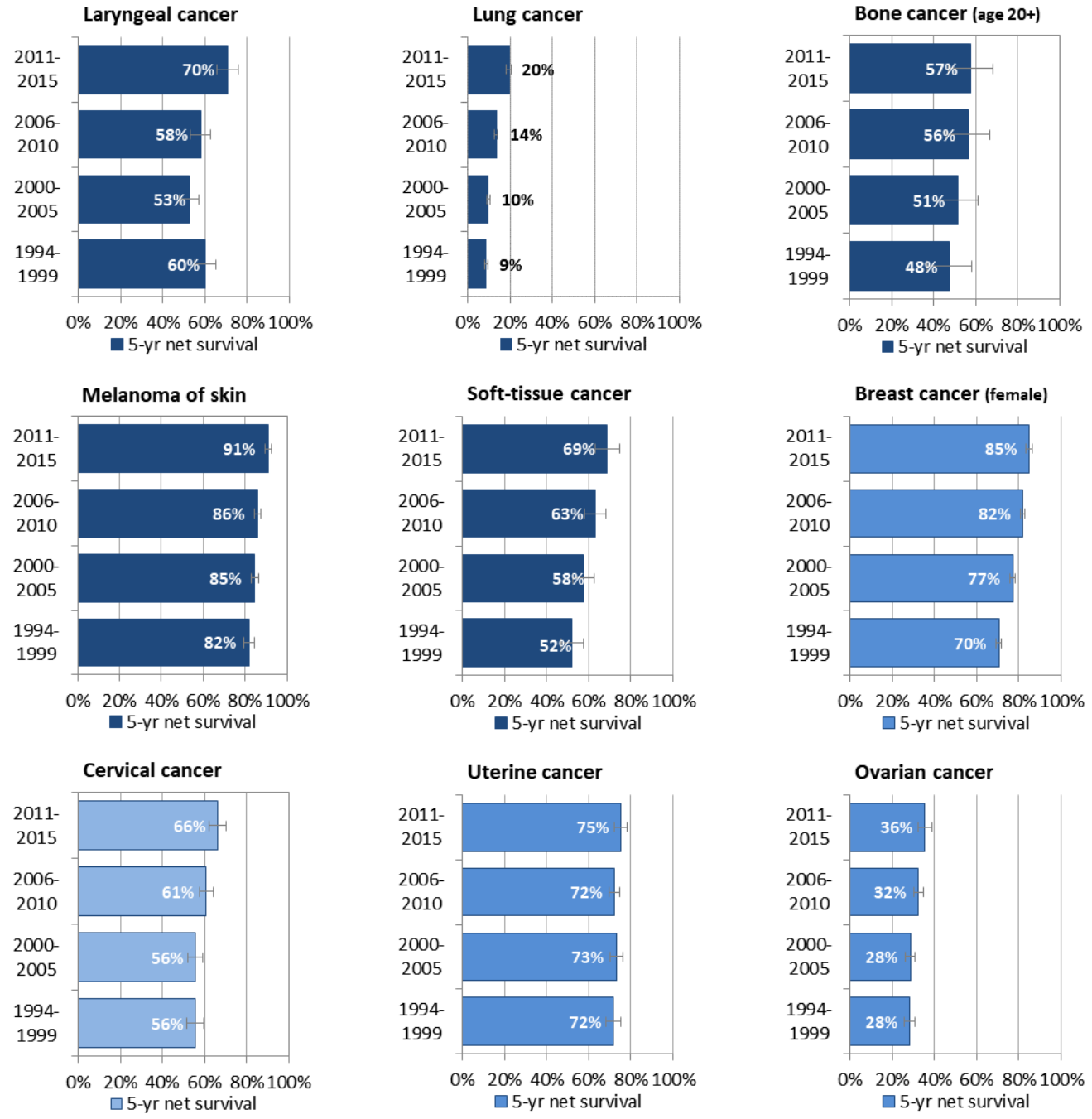
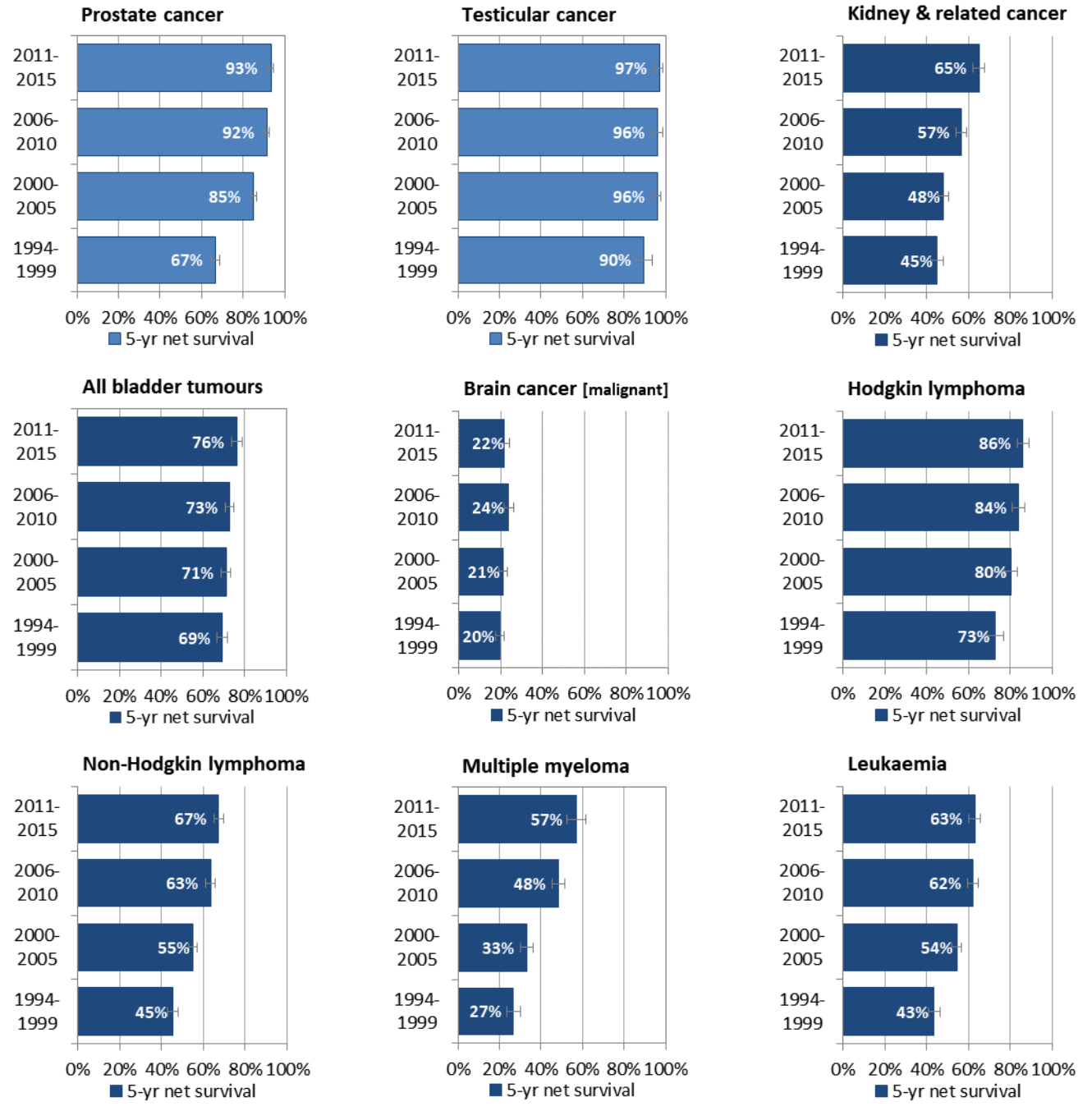


FIGURE 5-2
AGE-STANDARDISED 5-YEAR NET SURVIVAL OF IRISH CANCER PATIENTS, BY DIAGNOSIS PERIOD AND CANCER TYPE



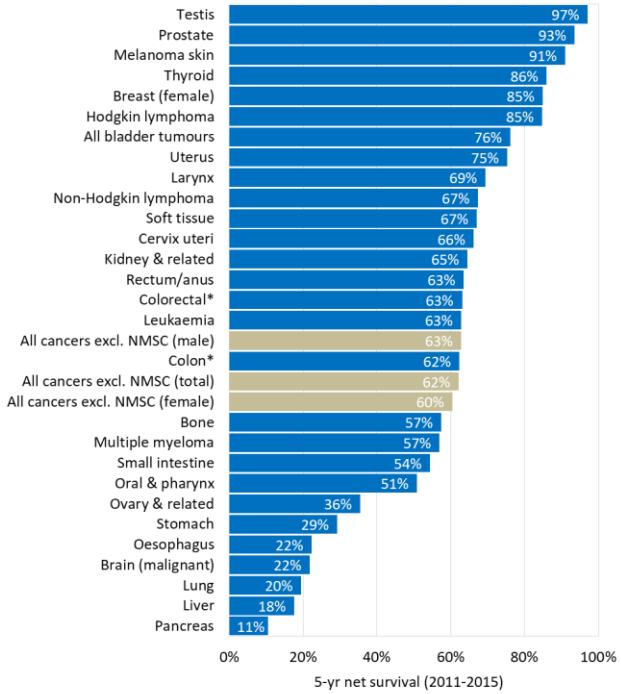
- Almost all cancer types examined showed good evidence of improvements in survival over time, but the magnitude and timing of these improvements varied quite substantially by cancer type (Figure 5-2).

- Rankings of cancer type by average recent survival, and by the extent of survival improvements over time, are presented in the next section (Figure 5-3).

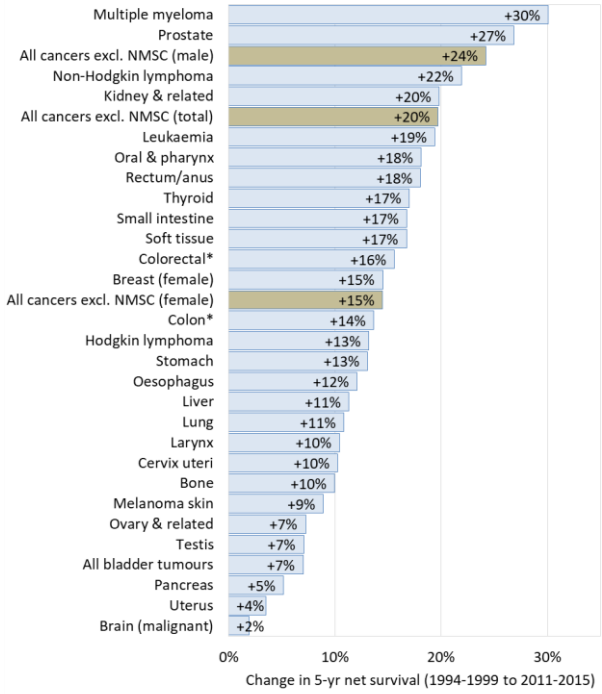
Ranking of cancer type in Ireland for five-year net survival

FIGURE 5-3
SURVIVAL IN IRISH CANCER PATIENTS RANKED BY (A) RECENT SURVIVAL OR (B) SURVIVAL IMPROVEMENTS

(A) Age standardised 5-year net survival, 2011-2015 diagnosis period



(B) Change in 5-year net survival: 1994-1999 to 2011-2015



*excluding appendix and carcinoid tumours

- Five-year net survival of patients diagnosed during 2011-2015 varied widely by cancer type, from only 11% for pancreatic cancer, 18% for liver, 20% for lung, 22% for brain and oesophageal and 29% for stomach cancer, to 85% for Hodgkin lymphoma and female breast cancer, 86% for thyroid cancer, 91% for melanoma of skin, 93% for prostate and 97% for testicular cancer (Figure 5-3A).

- Improvements in average five-year net survival, comparing diagnosis period 1994-1999 with 2011-2015, were highest for multiple myeloma (+30 % points), prostate cancer (+27%), non-Hodgkin lymphoma (+22%), kidney cancer (+20%) and leukaemia (+19%); and lowest for brain (+2%), uterine (+4%), pancreatic cancer (+5%) and for bladder tumours, testicular and ovarian cancers (+7%) (Figure 5-3B).

International comparisons of cancer survival: SURVMARK-2 project

In this section, we present a summary of results for relative survival from the International Cancer Benchmarking Partnership's (ICBP) SurvMark-2 project3. This project, using data and funding support from collaborating cancer registries, aims to establish the most up-to-date international cancer survival benchmarks for a group of cancers of poor to moderate average survival – those of the lung, oesophagus, stomach, ovary, colon, rectum, and pancreas - across seven developed countries (Australia, Canada, Denmark, Ireland, New Zealand, Norway, and the UK).

- Progress against cancer was assessed in terms of time-trends in survival alongside trends in incidence rates and mortality rates for seven major cancer types across seven high-income countries. The main finding was that "*Progress in cancer control (i.e., increased survival, decreased mortality and incidence) over the study period was evident for stomach, colon, lung (in males), and ovarian cancer*." For those cancers, most populations included in the study showed "*Increases in survival paralleled by decreases in incidence and mortality*". For the others cancers (oesophageal, rectal, pancreatic and female lung cancer), survival improvements were seen in almost all populations, but many populations showed increases in incidence or mortality rates since the 1990s, thus overall progress was less evident [2].

- The paper notes that "*Cancer survival continues to increase across high-income countries; however, international disparities persist*" and that further work is needed to assess the role of differences in stage at diagnosis, treatment and co-morbidity (the most likely factors contributing to survival disparities).

- A summary of 5-year net survival is presented below for each of the countries represented in the partnership (Figure 5-4). The percentages within the red arrow bars give the absolute change in 5-year net survival from 1995-1999 to 2010-2014. Countries are ranked in order of the highest net survival attained in 2010-2014 for each cancer: oesophageal cancer (Australia, 23.3%); stomach cancer (Australia, 32.6%); colon cancer (Australia, 70.2%); rectal cancer (Australia, 70.65); pancreatic cancer (Australia, 14.4%); lung cancer (Canada, 21.5%); ovarian cancer (Norway, 45.7%).

FIGURE 5-4
5-YEAR NET SURVIVAL CHANGES: 1995-1999 TO 2010-2014 (SURVMARK-2)

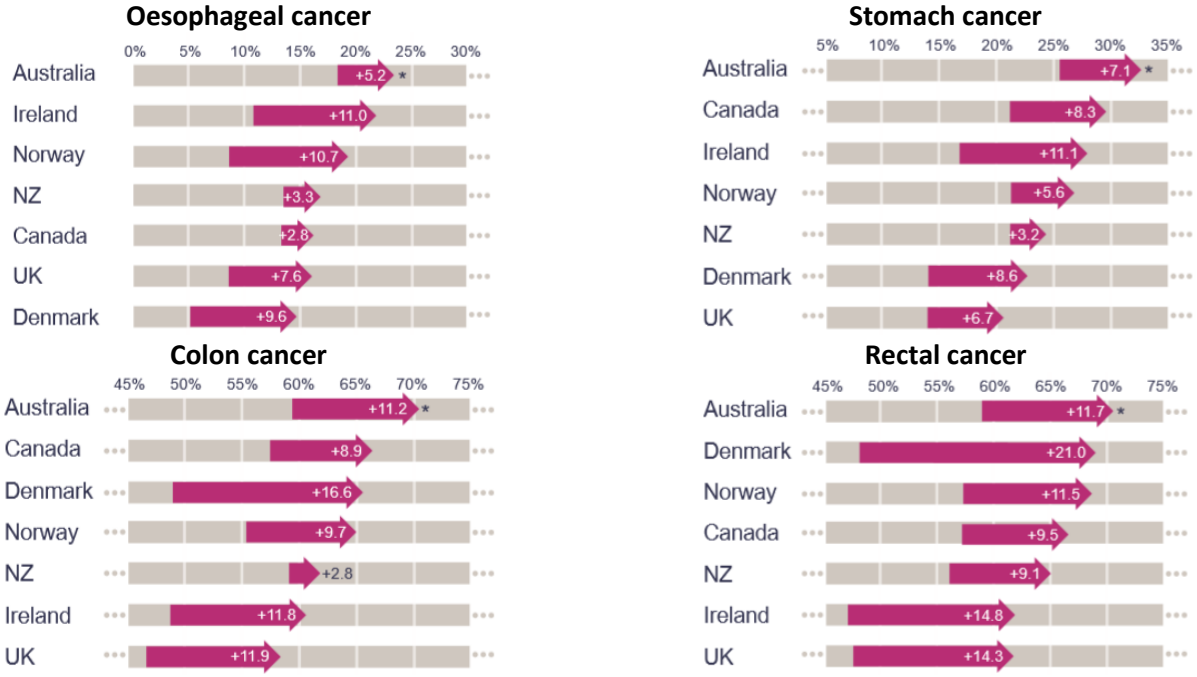
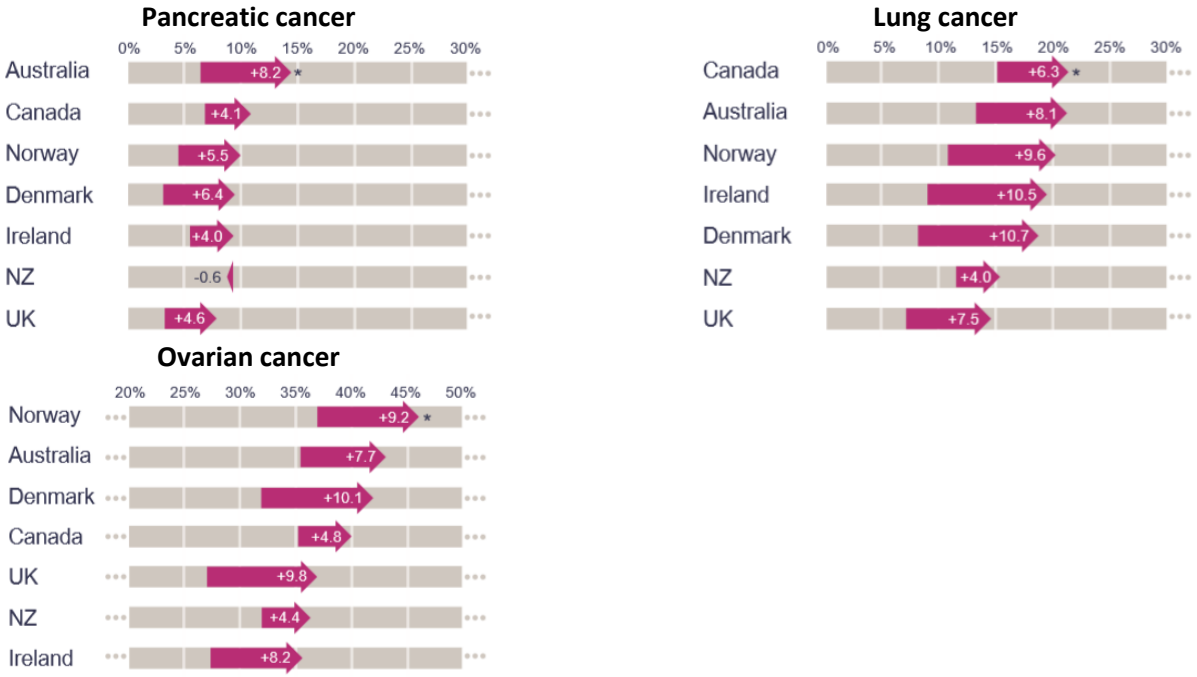
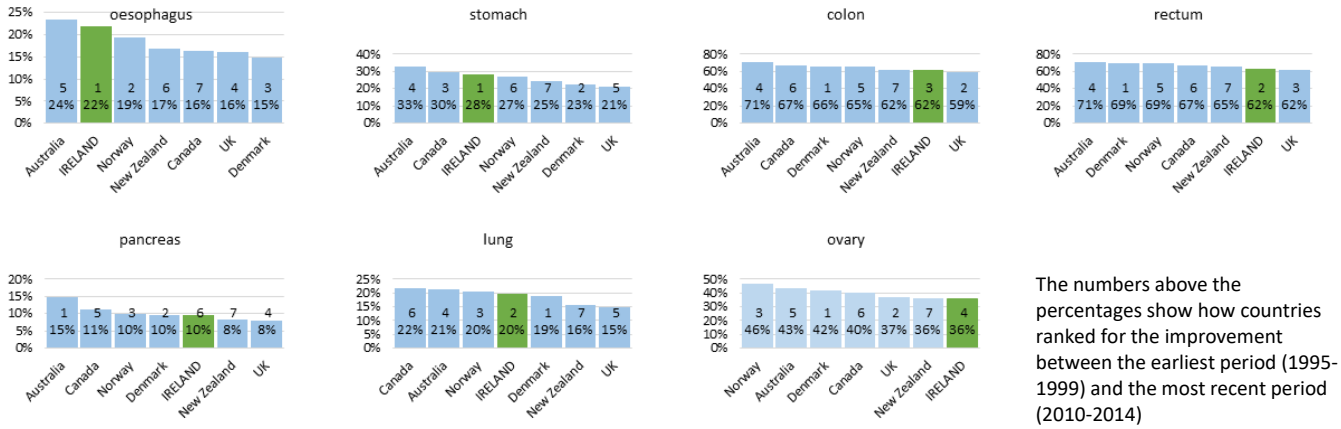


FIGURE 5-4
5-YEAR NET SURVIVAL CHANGES: 1995-1999 TO 2010-2014 (SURVMARK-2)



- These survival trends over time are summarised further below, by cancer type and country (Figure 5-5).
- Irish survival figures were generally higher than, or similar to, survival figures for the UK, except for ovarian cancer.
- Overall, Ireland is making good progress in terms of survival improvements for all cancers included, but still has some way to go to match the best-performing countries.

FIGURE 5-5
5-YEAR NET SURVIVAL BY CANCER TYPE, 2010-2014: RANKED BY COUNTRY & SUMMARISING IMPROVEMENTS FROM 1995-1999 TO 2010-2014 (SURVMARK-2)



The numbers above the percentages show how countries ranked for the improvement between the earliest period (1995-1999) and the most recent period (2010-2014)

- For oesophagus and stomach cancers Ireland ranked 2nd and 3rd for survival (2010-2014) respectively, and 1st for the improvement over the full period (1995-2014), (Figure 5-5).
- For colon and rectal cancer Ireland ranked 6th for survival (2010-2014), but 3rd and 2nd respectively for improvement over the full period.
- For pancreatic cancer Ireland ranked 5th for survival (2010-2014), and 6th for overall improvement over the full period.
- For lung cancer Ireland ranked 4th for survival (2010-2014), but 2nd for overall improvement over the full period (1995-2014).
- For ovarian cancer Ireland ranked lowest (7th) for survival (2010-2014), and 4th for improvement over the whole period (1995-2014).

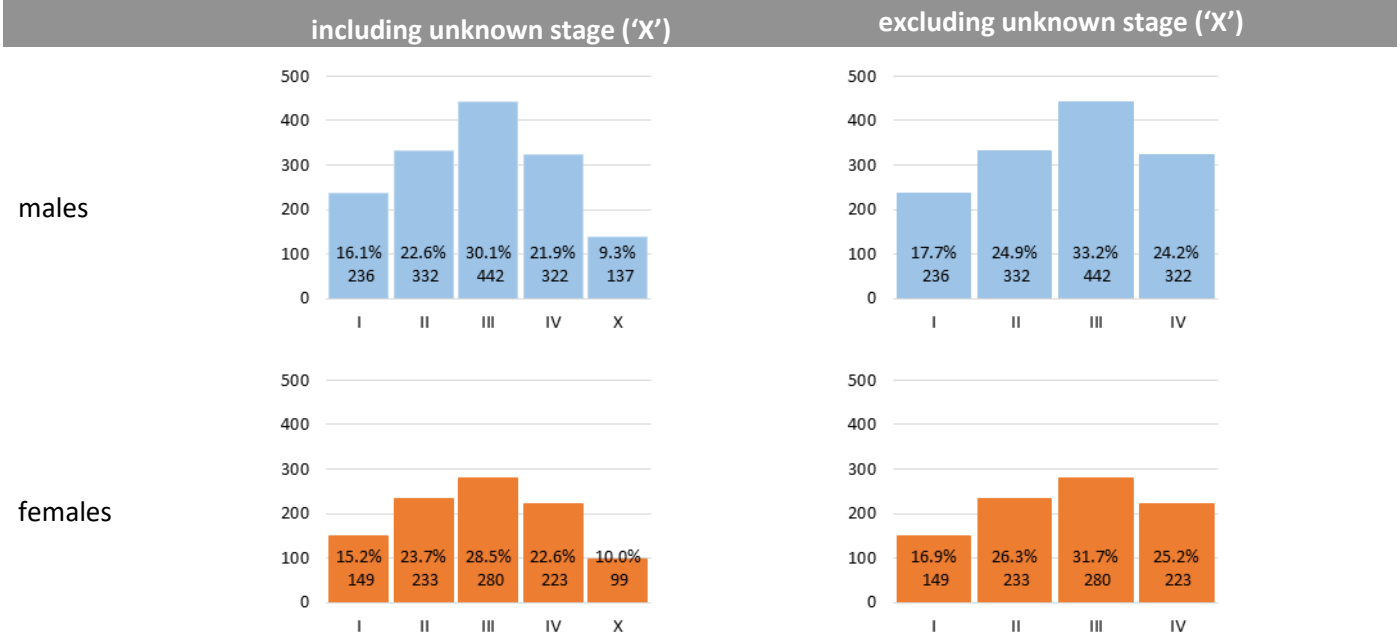
6. CANCER STAGE AT PRESENTATION

Stage at diagnosis during 2014-2016

Stage at diagnosis is an important aspect of assessing the likely prognosis, and the treatment requirements, of cancer patients, and in assessing any patterns of early or late diagnosis across cancer types and over time. For the four most common cancers (other than non-melanomas skin cancer), the stage breakdown of cases is presented below for the period 2014-2016. From 2014 onwards, stage data collected by NCRI have been based on the 7th edition of TNM [7].

Note: Because of changes in TNM criteria, compared with the 5th edition of TNM (used by NCRI for cases diagnosed during 2002-2013), the stage distribution of cases during 2014-2016 may not be directly comparable with that for pre-2014 cases. Of the cancers below, this applies particularly to lung and prostate cancers, and to a lesser extent to breast cancer, but criteria for colorectal cancer (at the level of overall stages I-IV) were unchanged.

FIGURE 6-1
DISTRIBUTION OF STAGE AT DIAGNOSIS: 2014-2016 ANNUAL AVERAGE: COLORECTAL CANCER

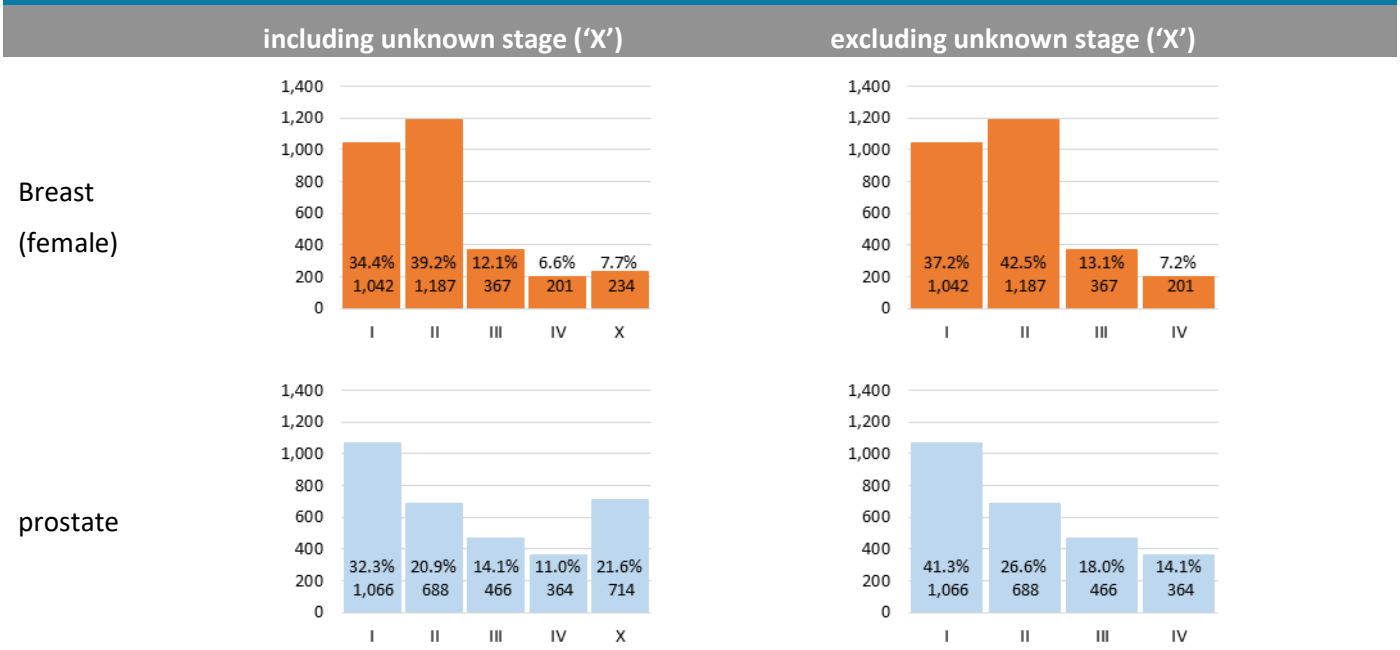


- For colorectal cancers of known stage, c.57% were diagnosed at late stage (stage III/IV), with c.25% diagnosed at the distant metastatic stage (stage IV) (Figure 6-1 right panel). It anticipated that the proportion diagnosed at late stage will begin to fall in the years ahead as result of the initiation of bowel screening in 2015.

FIGURE 6-2
DISTRIBUTION OF STAGE AT DIAGNOSIS: 2014-2016 ANNUAL AVERAGE: LUNG CANCER

- For lung cancers of known stage, c.70% of cases were diagnosed at late stage (stage III/IV), and about 45% were diagnosed at the distant metastatic stage (stage IV) (Figure 6-2 right panel).

FIGURE 6-3
DISTRIBUTION OF STAGE AT DIAGNOSIS: 2014-2016 ANNUAL AVERAGE: BREAST CANCER AND PROSTATE CANCER



- For female breast cancers of known stage, c.20% of cases were diagnosed at late stage (stage III/IV), and c.7% were diagnosed at the distant metastatic stage (stage IV) (Figure 6-3 right panel).

- For prostate cancers of known stage, c.32% of cases were diagnosed at late stage (stage III/IV), and c.14% were diagnosed at stage IV (Figure 6-3 right panel). (For prostate cancer, stage IV includes distant metastatic disease as well as regional nodal involvement and direct extension to some adjacent structures).

Trends in cases with distant metastatic cancer 1994-2016

TNM stage data cannot be directly compared across years for all cancer types, because of changes in TNM criteria over time. However, the proportion of cases identified as having distant metastases (an M-category of M1) is less subject to changes in TNM criteria. For the four most common cancers (colorectal, lung, breast and prostate cancers), longer-term trends in stage breakdown are presented below based on distant metastases ('M1' category), in comparison with trends for all cases.

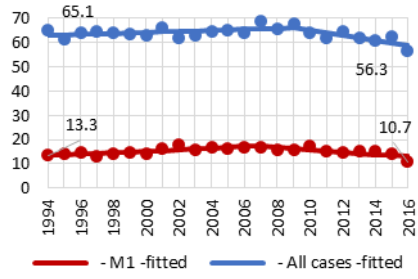
Trends are presented in two ways using Joinpoint regression [8]:

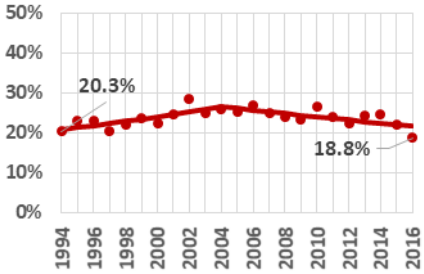
- Age-standardised rates for 'M1' category and all cases.
- 'M1' category as a proportion of all cases.

FIGURE 6-4
TREND IN METASTATIC ('M1') COLORECTAL ADENOCARCINOMA (1994-2016)

SEX	RATE/100,000	M1 cases/all cases proportion (%)

MALE

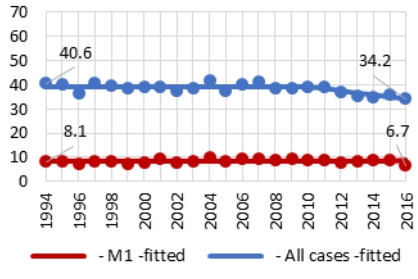


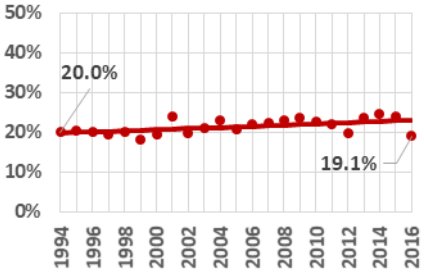


	from_to	APC	CI	trend
all cases	1994-2009	0.3	[-0.1,0.7]	flat
	2009-2016	-1.7	[-2.7,-0.6]	down
M1	1994-2007	2.0	[0.8,3.3]	up
	2007-2016	-3.3	[-5.1,-1.4]	down

	from_to	APC	CI	trend
	1994-2004	2.5	[0.8,4.2]	up
	2004-2016	-1.7	[-2.9,-0.4]	down

FEMALE

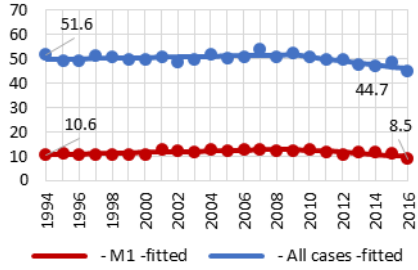


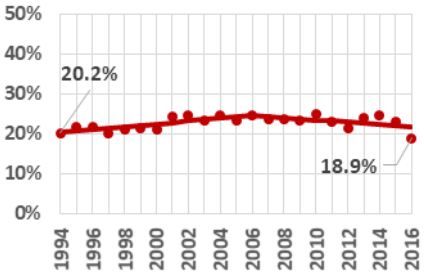


	from_to	APC	CI	trend
all cases	1994-2010	0.0	[-0.4,0.4]	flat
	2010-2016	-2.3	[-3.8,-0.7]	down
M1 rate	1994-2016	0.2	[-0.5,0.8]	flat

	from_to	APC	CI	trend
ratio	1994-2016	0.7	[0.2,1.2]	up

ALL





	from_to	APC	CI	trend
all cases	1994-2009	0.3	[-0.1,0.6]	flat
	2009-2016	-1.7	[-2.6,-0.8]	down
M1	1994-2009	1.4	[0.5,2.3]	up
	2009-2016	-3.6	[-6.0,-1.2]	down

	from_to	APC	CI	trend
	1994-2004	1.6	[0.5,2.8]	up
	2004-2016	-1.3	[-2.7,0.1]	flat

- For males and females combined, the proportion of colorectal adenocarcinomas diagnosed at the distant metastatic stage increased by, on average, 1.6% annually (in relative terms) during 1994-2004. Thereafter, for the period 2004-2016, the metastatic proportion declined by 1.3% annually, a trend that was not quite statistically significant.

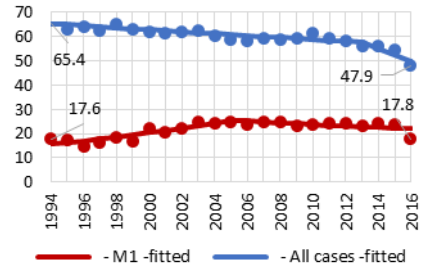
- However, for females there was an overall trend of increase in the M1 proportion across 1994-2016, contrasting with a decline in M1 proportion in males 2004-2016, following an earlier increase.

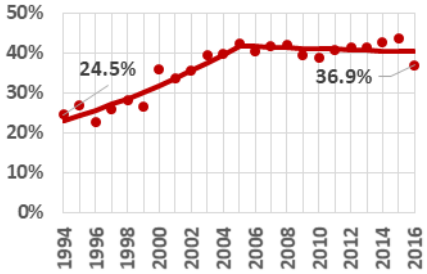
- In males, and males and females combined, the rate of M1 cases showed a recent decline (2007/2009-2016), following an earlier increase, but females showed a flat trend in the M1 rate across 1994-2016.

FIGURE 6-5
TREND IN METASTATIC ('M1') LUNG CANCER (1994-2016)

SEX	RATE/100,000	M1 cases/all cases proportion (%)

MALE

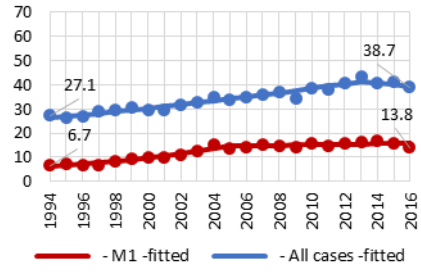


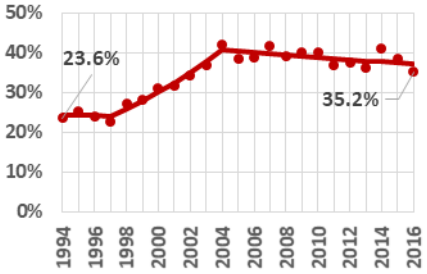


	from_to	APC	CI	trend
all cases	1994-2013	-0.7	[-0.9,-0.4]	down
	2013-2016	-4.8	[-8.5,-1.0]	down
M1	1994-2005	4.6	[2.6,6.6]	up
	2005-2016	-1.3	[-2.8,0.2]	flat

from_to	APC	CI	trend
1994-2005	5.5	[4.1,7.0]	up
2005-2016	-0.3	[-1.7,1.1]	flat

FEMALE

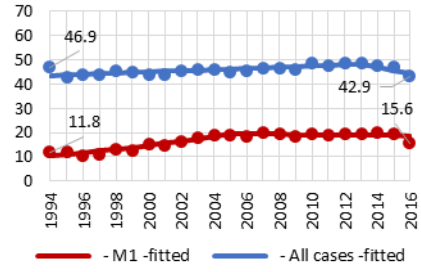


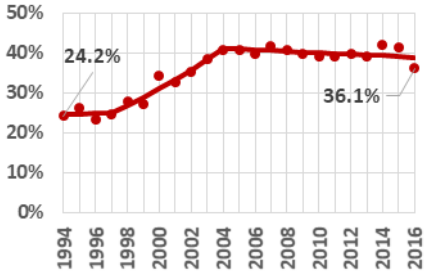


	from_to	APC	CI	trend
all cases	1994-2013	2.4	[2.1,2.7]	up
	2013-2016	-1.6	[-5.2,2.1]	flat
M1	1994-2005	8.1	[6.3,9.9]	up
	2005-2016	0.7	[-0.4,1.9]	flat

from_to	APC	CI	trend
1994-1997	-0.4	[-6.4,6.0]	flat
1997-2004	7.8	[5.5,10.0]	up
2004-2016	-0.7	[-1.5,-0.01]	down

ALL



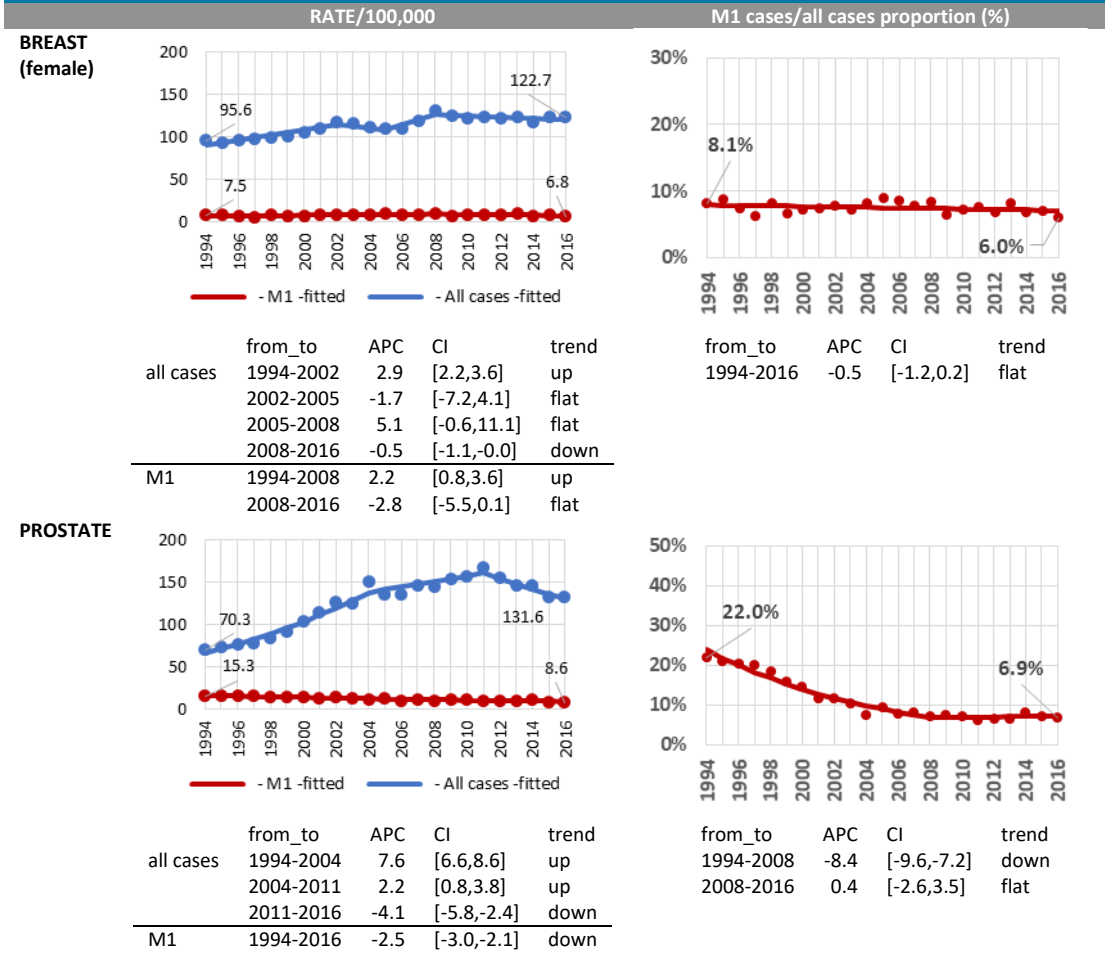


	from_to	APC	CI	trend
all cases	1994-2013	0.6	[0.3,0.8]	up
	2013-2016	-3.0	[-6.2,0.4]	flat
M1	1994-2005	5.8	[4.0,7.6]	up
	2005-2016	-0.4	[-1.7,0.9]	flat

from_to	APC	CI	trend
1994-1997	0.4	[-6.8,8.2]	flat
1997-2004	7.4	[4.7,10.1]	up
2004-2016	-0.5	[-1.3,0.4]	flat

- Even though male lung cancer rates have been declining while female rates have generally been increasing (left graph panels), the proportion of cases presenting with distant metastases followed a similar course in both sexes (right panel graphs).
- The proportion of metastatic cases increased from 24% to c.40% during 1994-2004, followed by a period of relative stability (males and overall) or a slow decline in M1 proportion (females).

FIGURE 6-6
TREND IN METASTATIC ('M1') BREAST AND PROSTATE CANCER (1994-2016)



	from_to	APC	CI	trend
all cases	1994-2002	2.9	[2.2,3.6]	up
	2002-2005	-1.7	[-7.2,4.1]	flat
	2005-2008	5.1	[-0.6,11.1]	flat
	2008-2016	-0.5	[-1.1,-0.0]	down
M1	1994-2008	2.2	[0.8,3.6]	up
	2008-2016	-2.8	[-5.5,0.1]	flat

from_to	APC	CI	trend
1994-2016	-0.5	[-1.2,0.2]	flat

	from_to	APC	CI	trend
all cases	1994-2004	7.6	[6.6,8.6]	up
	2004-2011	2.2	[0.8,3.8]	up
	2011-2016	-4.1	[-5.8,-2.4]	down
M1	1994-2016	-2.5	[-3.0,-2.1]	down

from_to	APC	CI	trend
1994-2008	-8.4	[-9.6,-7.2]	down
2008-2016	0.4	[-2.6,3.5]	flat

- For female breast cancer the proportion presenting at the distant metastatic stage was less than 10% throughout 1994-2016, and decreased marginally across the whole period, by on average 0.5% (in relative terms) annually.

- Age-standardised rates of M1 breast cancer showed a not-quite-significant decline of 2.8% annually during 2008-2016, following an earlier increase.

- For prostate cancer, the proportion presenting at the distant metastatic stage was 22% in 1994. This figure declined by about 8% annually (in relative terms) to just under 7% in 2008, then remained stable up to 2016.

- The rate graphs on the left show that prostate cancer cases as a whole increased dramatically from the mid-1990s, reflecting large-scale PSA testing which increased detection of asymptomatic early-stage cases [9]. While this, to an extent, 'diluted' the proportion of cases presenting with distant metastases, the indication of a sustained decrease in the M1 rates may suggest that some genuine reduction in the risk of being diagnosed with M1 disease has occurred.

In summary:

- Across the four cancer types presented, distant metastatic cases as a proportion of all cases in general showed recent declines or a static trend in the M1 proportion, following earlier increases (lung cancer and male colorectal cancer), a previous more marked decrease (prostate cancer) or as part of a longer-term decrease (breast cancer) in the M1 proportion.

- Only female colorectal cancer showed a trend for a long-term increase in the M1 proportion.

- Interpretation of these trends is not necessarily straightforward, as increases in the M1 proportion in earlier years are likely to have reflected improvements in the quality and completeness of staging investigations (including imaging) over time.

- More recent decreases in M1 proportions could be interpreted as a positive sign, i.e. an indication of a move towards earlier detection of cancer. However, caution is needed, as increased diagnosis of earlier-stage disease could also generate a decrease in the M1 proportion, even without an underlying decrease in M1 diagnosis.

- Trends in age-standardised rates of M1 cases indicate that rates of M1 disease have remained stable in recent years for most of the cancers examined, but have fallen over time (across the period 1994-2016) for prostate cancer.

- For all four cancers examined, trends in M1 rates differed significantly from trends in non-M1 cases (tested within Joinpoint). Interpretation is not straightforward (and may differ by cancer type), but a faster decline or a less steep increase in M1 rates compared with rates of other cases would be suggestive of a move towards earlier detection – this appears to be the case for prostate cancer and perhaps breast cancer.

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APPENDIX I: INCIDENT CANCER CASES

3-year annual average 2014-2016 and estimates for 2017-2019	2014-2016			2017-2019 (estimate)‡			cumulative risk # to age75 (2017-2019) 1 in: ...	
cancer	male	female	all	male	female	all	male	female
C00-96 all invasive cancers*	17,651	14,901	32,552	19,389	16,052	35,441	2	3
C00-43 C45-96 all invasive cancers excl. NMSC	11,660	10,339	21,999	12,769	11,118	23,886	3	4
C00-D48 all registered cancers and related tumours	19,698	20,447	40,145	21,641	21,720	43,361	2	2
D00-48 all non-invasive neoplasms**	2,048	5,546	7,593	2,251	5,669	7,920	16	7
C00 lip	19	2	21	21	3	23	1,743	>10,000
C01 base of tongue	34	10	45	37	11	48	739	2,640
C02 other and unspecified parts of tongue	50	28	78	54	31	84	536	1,011
C03 gum	11	11	21	12	11	23	2,436	4,109
C04 floor of mouth	31	6	37	34	7	40	849	4,012
C05 palate	16	9	25	17	10	27	1,821	3,052
C06 other and unspecified parts of mouth	16	13	30	18	14	32	1,651	2,778
C07 parotid gland	30	12	42	33	13	46	1,402	3,239
C08 other and unspecified major salivary glands	6	3	9	7	3	10	3,697	>10,000
C09 tonsil	52	21	73	56	22	78	495	1,241
C10 oropharynx***	24	5	29	26	5	31	1,080	6,726
C11 nasopharynx	14	5	20	15	6	21	2,062	5,177
C12 pyriform sinus	24	5	29	26	5	31	1,073	5,400
C13 hypopharynx	17	4	21	18	5	23	1,573	8,599
C14 other and ill-defined: lip, oral and pharynx	6	2	8	6	2	8	5,900	>10,000
C01-14 mouth & pharynx	331	134	465	359	144	503	83	226
C00-14 lip oral cavity and pharynx	350	136	486	380	147	527	79	224
C15 oesophagus	282	151	433	310	164	475	110	267
C16 stomach	382	211	592	421	228	649	88	179
C17 small intestine	46	43	89	51	46	97	597	715
C18 colon	973	776	1,748	1,074	838	1,912	35	49
C19 rectosigmoid junction	122	80	202	134	86	220	236	449
C20 rectum	454	227	681	497	244	742	64	146
C21 anus and anal canal	23	34	57	25	37	61	1,505	1,022
C19-20 rectosigmoid junction & rectum	576	306	883	632	330	962	50	111
C19-21 rectum and anus	599	340	939	657	367	1,023	49	100
C18-20 colorectum	1,549	1,082	2,631	1,706	1,168	2,874	21	34
C18-21 colorectum and anus	1,572	1,116	2,688	1,731	1,205	2,935	21	33
C17-21 intestine	1,618	1,159	2,777	1,782	1,251	3,032	20	32
C22 liver and intrahepatic bile ducts	206	85	291	226	92	318	148	424
C23 gallbladder	20	50	69	22	54	76	2,042	886
C24 other and unspecified biliary tract	75	62	137	83	68	151	484	668
C23-24 gallbladder and biliary tract	95	112	207	105	122	227	392	381
C22-24 liver and biliary passages	300	197	497	331	214	545	108	201
C25 pancreas	297	267	564	330	290	619	111	149
C26 other and ill-defined digestive organs	33	31	64	37	34	71	956	1,598
C30 nasal cavity and middle ear	7	7	14	8	7	15	3,932	4,566
C31 accessory sinuses	11	7	17	12	7	19	2,586	3,904
C32 larynx	142	27	170	155	30	185	194	1,089
C00-14 C30-32 all head and neck	510	177	687	555	191	746	55	171
C33 trachea	1	1	2	1	1	2	>10,000	>10,000
C34 bronchus and lung	1,359	1,143	2,502	1,503	1,243	2,747	23	28
C33-34 lung and trachea	1,360	1,143	2,503	1,505	1,244	2,749	23	28
C37 thymus	3	4	8	4	5	8	7,632	7,004
C38 heart, mediastinum and pleura	8	5	13	9	5	15	8,214	8,678
C40 bone and articular cartilage of limbs	10	11	21	11	12	22	2,719	2,818
C41 bone and articular cartilage, other	10	10	19	10	10	20	3,203	3,345
C43 melanoma of skin	531	576	1,107	579	615	1,194	62	57
C44 other neoplasms of skin	5,990	4,562	10,553	6,621	4,934	11,555	6	9
C45 mesothelioma	42	9	50	47	9	56	809	3,536
C46 Kaposi sarcoma	8	0	8	8	0	8	4,743	>10,000
C47 peripheral and autonomic nervous system	3	2	5	3	2	5	>10,000	>10,000
C48 retroperitoneum and peritoneum	8	19	27	9	21	30	4,727	1,680
C49 other connective and soft tissue	88	59	147	96	63	159	422	564
C50 breast	25	3,100	3,125	28	3,323	3,351	1,196	10
C51 vulva		58	58		63	63		635
C52 vagina		12	12		13	13		2,980
C53 cervix uteri		273	273		284	284		119
C54 corpus uteri		492	492		532	532		57
C55 uterus, part unspecified		25	25		27	27		1,406
C56 ovary		409	409		441	441		78
C57 other and unspecified female genital		35	35		38	38		1,044

3-year annual average 2014-2016 and estimates for 2017-2019	2014-2016			2017-2019 (estimate)‡			cumulative risk # to age75 (2017-2019) 1 in: …	
cancer	male	female	all	male	female	all	male	female
C58 placenta		1	1		1	1		>10,000
C51-52 C55 C57 C58 other gynaecological		132	132		143	143		277
C60 penis	39		39	43		43	800	
C61 prostate	3,357		3,357	3,665		3,665	8	
C62 testis	178		178	180		180	183	
C63 other and unspecified male genital	4		4	4		4	8,852	
C64 kidney, except renal pelvis	396	224	620	431	242	673	74	143
C65 renal pelvis	13	8	21	15	9	23	3,108	4,470
C66 ureter	17	10	28	19	11	31	1,947	4,215
C64-66 kidney incl. renal pelvis and ureter	427	242	669	465	262	727	70	134
C67 bladder~	287	112	399	321	121	442	139	443
C68 other and unspecified urinary organs	4	3	7	4	3	8	8,215	8,808
C69 eye and adnexa	31	27	58	34	29	62	981	1,139
C70 meninges	3	7	10	4	7	11	8,923	9,740
C71 brain	215	146	360	231	155	386	139	214
C72 spinal cord, cranial nerves and other CNS	5	5	11	5	5	11	7,328	6,881
C71-72 brain and spinal cord	220	151	371	236	161	397	136	208
C70-72 malignant meninges brain and spinal cord	223	158	381	240	168	407	134	204
C70-72 D32-33 D42-43 meninges, brain & CNS	320	360	681	343	383	726	94	93
C73 thyroid gland	69	198	267	74	207	281	410	152
C74 adrenal gland	10	10	19	10	10	20	2,928	3,175
C75 other endocrine glands	8	6	13	8	6	14	4,468	5,553
C76 other and ill-defined sites	10	22	32	11	24	35	3,585	2,045
C77 secondary and unspecified lymph nodes	2	3	4	2	3	5	>10,000	>10,000
C80 neoplasm without specification of site	189	183	372	211	198	410	212	302
C81 Hodgkin lymphoma	88	68	156	92	70	162	331	458
C82 follicular nodular non-Hodgkin	104	108	213	113	117	230	281	276
C83 diffuse non-Hodgkin lymphoma	224	152	376	245	164	409	147	226
C84 peripheral and cutaneous T-cell lymphoma	40	23	63	43	25	68	726	1,323
C85 other and unspecified non-Hodgkin	93	65	158	103	70	173	366	532
C82-85 all non-Hodgkin lymphoma	462	349	811	504	376	881	70	94
C81-85 lymphoma (total)	550	417	966	597	446	1,043	58	78
C88 immuno-proliferative diseases	10	5	15	11	5	16	2,987	6,932
C90 multiple myeloma	184	142	326	203	154	357	170	247
C91 lymphoid leukaemia	198	112	310	214	119	333	157	307
C911 leukaemia CLL	146	74	219	160	80	240	213	496
C92 myeloid leukaemia	109	86	195	118	92	211	291	379
C93 monocytic leukaemia	4	2	6	4	2	6	7,571	>10,000
C94 other leukaemia of specified cell type	8	3	10	8	3	11	3,660	>10,000
C95 leukaemia of unspecified cell type	23	18	41	26	20	46	2,534	3,576
C91-95 leukaemia (total)	341	221	562	371	236	607	95	158
C96 other and unspecified haematopoietic	220	154	373	242	166	408	164	235
D00 in situ: oral cavity, oesophagus, stomach	17	10	27	18	11	30	1,520	3,175
D01 in situ: other/ unspecified digestive organs	11	7	18	12	8	20	2,778	4,919
D02 in situ of middle ear and respiratory	21	8	29	23	9	31	1,434	3,547
D03 melanoma in situ	296	329	625	324	353	677	102	96
D04 carcinoma in situ of skin	912	1,173	2,086	1,012	1,278	2,291	36	34
D05 carcinoma in situ of breast	2	359	361	2	383	385	>10,000	77
D06 carcinoma in situ of cervix uteri		2,950	2,950		2,874	2,874		12
D07 in situ of other and unspecified genital	102	60	162	110	63	173	235	496
D09 in situ of other and unspecified sites	72	20	93	80	22	102	432	1,546
D12 benign colon, rectum, anus	1	0	1	1	0	1	>10,000	>10,000
D17 benign lipomatous neoplasm	1	0	1	1	0	1	>10,000	>10,000
D18 Haemangioma and lymphangioma	3	3	5	3	3	5	>10,000	>10,000
D32 benign meninges	43	142	185	47	152	199	710	247
D33 benign brain and other parts of CNS	20	25	45	21	27	47	1,401	1,182
D32-33 benign meninges, brain & CNS	63	167	230	68	179	247	472	205
D35 benign other and unspecified endocrine	58	53	111	62	56	118	500	576
D37 uncertain/ unknown behaviour: digestive	35	39	75	38	42	80	831	773
D38 uncertain/ unknown behaviour: middle ear	7	5	12	8	5	12	4,439	8,971
D39 uncertain/unknown female genital		97	97		102	102		300
D40 uncertain/unknown male genital	3		3	3		3	9,187	
D41 uncertain/unknown behaviour of urinary	247	93	340	272	101	372	125	353
D42 uncertain/ unknown behaviour of meninges	8	8	16	8	9	17	3,875	4,400
D43 uncertain/unknown: brain and CNS	26	27	53	27	28	55	1,187	1,247
D42-43 uncertain meninges, brain and CNS	34	35	69	35	36	72	909	972
D44 uncertain/unknown of endocrine	9	16	25	10	17	27	3,255	1,855
D47 other uncertain haematopoietic	82	66	148	91	71	162	441	507
D48 uncertain/unknown, unspecified	72	53	125	80	55	135	578	623
HAEMACARE classification of tumours of lymphatic and haematopoietic tissue								
H01 Lymphoma NOS	23	16	40	26	18	44	1,524	2,021
H02 NH lymphoma NOS	68	48	116	75	52	127	493	732
H04 Hodgkin, nodular lympho-predominance	8	5	13	8	5	13	3,644	5,767
H05 Classical HL	80	63	143	84	65	149	364	497

3-year annual average 2014-2016 and estimates for 2017-2019	2014-2016			2017-2019 (estimate)‡			cumulative risk # to age75 (2017-2019) 1 in: …	
cancer	male	female	all	male	female	all	male	female
H06 Chronic leukaemia/small lymphocytic	160	84	244	176	91	267	194	429
H07 Immuno-proliferative diseases	16	9	24	17	9	27	1,917	3,915
H08 Mantle cell/centrocytic lymphoma	28	10	37	30	10	41	1,464	3,915
H09 Follicular B lymphoma	89	85	173	96	91	187	330	342
H10 Diffuse B lymphoma	159	121	280	174	131	305	201	282
H11 Burkitt lymphoma	14	4	18	14	5	19	2,310	6,634
H12 Marginal zone lymphoma	18	25	43	20	27	47	1,627	1,333
H13 T lymphoma cutaneous	15	11	26	16	12	28	2,133	3,198
H14 Other T cell lymphomas	28	16	44	30	17	48	955	1,647
H15 Lymphoblastic / acute(precursor cell)	39	33	72	39	33	73	881	1,003
H16 Plasma cell neoplasms	186	142	328	206	154	360	168	247
H18 Mature B cell leukaemia hairy cell	10	2	12	10	3	13	2,784	>10,000
H19 Lymphatic leukaemia NOS	0	1	1	0	1	1	>10,000	>10,000
H20 Leukaemia NOS	23	18	41	26	20	46	2,534	3,576
H21 Myeloid leukaemia NOS	2	2	5	2	2	5	>10,000	>10,000
H22 Acute myeloid leukaemia	84	64	149	92	69	161	370	498
H23 Myeloproliferative neoplasms	116	97	213	125	104	230	277	330
H24 Myelodysplastic syndrome	112	67	179	126	73	198	353	638
H25 Myelodysplastic/Myeloproliferative	20	9	29	22	10	32	1,804	3,930

*Incidence figures for C00-C96 where C96 presented in this report include polycythaemia vera, myelodysplastic syndromes and chronic myeloproliferative disease, considered malignant in ICDO3 but previously classed as uncertain behaviour (and previously coded under ICD10 codes D45-D47).
** D00-D48 tumours in this report exclude polycythaemia vera, myelodysplastic syndromes and chronic myeloproliferative disease (see note above).
*** The ICD-10 definition C10 "Malignant neoplasm of oropharynx" is not equivalent to (and is narrower than) the definition of "oropharyngeal" used to categorise sites/subsites for purposes of identifying cancers where HPV-associated cancers may be involved. The broader, HPV-relevant definition includes the whole of C01 (base of tongue), C09 (tonsil) and C10 (oropharynx *sensu stricto*) and selected subsites within C02 (other/unspecified parts of tongue), C05 (palate) and C14 (other/ill-defined sites of lip, oral cavity & pharynx), further characterized by cell-type (squamous cell carcinoma).
~ Bladder cancer figures in this report have been revised to exclude some in situ tumours & tumours of uncertain behaviour misclassified as invasive in previous reports.
‡ Average age-specific rates for 2014-2016 were calculated and applied to population estimates for 2017, 2018 and 2019, to allow estimation of average annual counts for 2017-2019 presented in the table.
Average annual counts for males and females, and M+F (all) are subject to rounding.
Cumulative risk of developing a type of cancer before age 75 for the years 2017-2019, expressed as 1 in […], e.g. 1 in 3

APPENDIX II: INCIDENT CANCER RATES

Age-standardised rate (ASR, per 100,000): annual average for 2017-2019. Average age-specific rates for 2014-2016 were applied to Irish population estimates for 2017, 2018 and 2019, to allow estimation of average annual age-standardised rates for 2017-2019 presented in the table. Incidence rate was calculated using two different age weights: 1976 and 2013 European standard populations (ESP) [10].

3- year annual average	2017-2019 ASR per 100,000 (estimate) male		female	
	ESP 1976	ESP 2013	ESP 1976	ESP 2013
C00-96 all invasive cancers	719.4	1,123.6	553.4	802.6
C00-43 C45-96 all invasive cancers excl. NMSC	478.3	726.8	390.9	549.9
C00-D48 all registered cancers and related tumours	802.5	1,254.0	771.9	1,054.5
D00-48 all non-invasive neoplasms	83.0	130.4	218.5	251.9
C00 lip	0.8	1.2	0.1	0.1
C01 base of tongue	1.5	1.9	0.4	0.5
C02 other and unspecified parts of tongue	2.1	2.8	1.1	1.5
C03 gum	0.4	0.6	0.4	0.6
C04 floor of mouth	1.3	1.8	0.2	0.3
C05 palate	0.7	0.9	0.4	0.5
C06 other and unspecified parts of mouth	0.7	1.0	0.5	0.7
C07 parotid gland	1.2	2.3	0.4	0.6
C08 other and unspecified major salivary glands	0.3	0.4	0.1	0.1
C09 tonsil	2.2	2.7	0.9	1.1
C10 oropharynx	1.0	1.4	0.2	0.2
C11 nasopharynx	0.6	0.7	0.2	0.3
C12 pyriform sinus	1.0	1.4	0.2	0.3
C13 hypopharynx	0.7	1.0	0.1	0.2
C14 other and ill-defined sites: lip, oral cavity and pharynx	0.2	0.4	0.1	0.1
C01-14 mouth & pharynx	14	19.3	5.2	7.0
C00-14 lip oral cavity and pharynx	14.7	20.5	5.3	7.2
C15 oesophagus	11.5	18.2	5.1	8.6
C16 stomach	15.4	25.1	7.4	11.8
C17 small intestine	1.9	2.9	1.6	2.3
C18 colon	39.3	64.6	27.5	43.1
C19 rectosigmoid junction	5.0	7.7	2.9	4.4
C20 rectum	18.7	28	8.5	12.3
C21 anus and anal canal	0.9	1.4	1.3	1.8
C19-20 rectosigmoid junction and rectum	23.6	35.7	11.4	16.7
C19-21 rectum and anus	24.6	37.1	12.7	18.5
C18-20 colorectum	62.9	100.3	38.9	59.8
C18-21 colorectum and anus	63.8	101.7	40.2	61.6
C17-21 intestine	65.8	104.7	41.8	63.9
C22 liver and intrahepatic bile ducts	8.4	13.2	3.0	4.8
C23 gallbladder	0.8	1.4	1.7	2.9
C24 other and unspecified parts of biliary tract	3.0	5.1	2.1	3.6
C23-24 gallbladder and biliary tract	3.7	6.5	3.8	6.5
C22-24 liver and biliary passages	12.2	19.7	6.8	11.2
C25 pancreas	12.1	20.0	9.2	15.2
C26 other and ill-defined digestive organs	1.4	2.5	1.0	1.8
C30 nasal cavity and middle ear	0.3	0.4	0.2	0.4
C31 accessory sinuses	0.5	0.6	0.3	0.3
C32 larynx	5.9	8.5	1.1	1.5
C00-14 C30-32 all head and neck	21.4	30.1	6.9	9.4
C33 trachea	<0.1	0.1	<0.1	<0.1
C34 bronchus and lung	54.8	89.7	41.4	65.2
C33-34 lung and trachea	54.8	89.8	41.5	65.2
C37 thymus	0.1	0.2	0.2	0.2
C38 heart, mediastinum and pleura	0.3	0.6	0.2	0.3
C40 bone and articular cartilage of limbs	0.4	0.5	0.5	0.5
C41 bone and articular cartilage of other unspecified	0.4	0.5	0.4	0.4
C43 melanoma of skin	21.8	32.4	22.2	29.4
C44 other neoplasms of skin	241.2	396.8	162.5	252.6
C45 mesothelioma	1.6	2.9	0.3	0.5

3- year annual average	2017-2019 ASR per 100,000 (estimate) male		female	
	ESP 1976	ESP 2013	ESP 1976	ESP 2013
C46 Kaposi sarcoma	0.3	0.4	<0.1	<0.1
C47 peripheral nerves and autonomic nervous system	0.2	0.2	0.1	0.1
C48 retroperitoneum and peritoneum	0.3	0.5	0.7	1.1
C49 other connective and soft tissue	3.6	5.5	2.3	3
C50 breast	1.0	1.6	123.5	158.4
C51 vulva			2.1	3.1
C52 vagina			0.4	0.6
C53 cervix uteri			11.0	12.0
C54 corpus uteri			19.4	26.6
C55 uterus, part unspecified			0.9	1.4
C56 ovary			15.6	21.9
C57 other and unspecified female genital organs			1.3	2.0
C58 placenta			0.1	<0.1
C51-52 C55 C57 C58 other malignant gynaecological			4.8	7.1
C60 penis	1.6	2.5		
C61 prostate	139.3	202		
C62 testis	7.6	7.3		
C63 other and unspecified male genital	0.2	0.2		
C64 kidney, except renal pelvis	16.4	23.3	8.4	12.1
C65 renal pelvis	0.5	0.9	0.3	0.5
C66 ureter	0.7	1.2	0.3	0.6
C64-66 kidney incl. renal pelvis and ureter	17.7	25.5	9.0	13.2
C67 bladder~	11.4	20.7	3.7	6.5
C68 other and unspecified urinary organs	0.2	0.3	0.1	0.2
C69 eye and adnexa	1.3	1.8	1.1	1.3
C70 meninges	0.1	0.2	0.2	0.4
C71 brain	8.9	11.8	5.7	7.4
C72 spinal cord, cranial nerves and other parts of CNS	0.2	0.2	0.2	0.2
C71-72 brain and spinal cord	9.2	12.1	5.9	7.6
C70-72 malignant meninges brain and spinal cord	9.3	12.3	6.1	8.0
C70-72 D32-33 D42-43 all meninges brain and CNS	13.3	17.3	14.0	18.0
C73 thyroid gland	2.9	3.6	8.1	9.1
C74 adrenal gland	0.4	0.5	0.4	0.4
C75 other endocrine glands and related structures	0.3	0.4	0.2	0.3
C76 other and ill-defined sites	0.4	0.7	0.8	1.2
C77 secondary and unspecified lymph nodes	0.1	0.2	0.1	0.1
C80 neoplasm without specification of site	7.6	13.7	5.8	10.6
C81 Hodgkin lymphoma	3.8	4.2	2.9	3.0
C82 follicular nodular non-Hodgkin lymphoma	4.3	6.0	4.2	5.9
C83 diffuse non-Hodgkin lymphoma	9.2	13.8	5.5	8.3
C84 peripheral and cutaneous T-cell lymphomas	1.7	2.3	0.9	1.2
C85 other and unspecified types of non-Hodgkin	3.8	6.2	2.3	3.7
C82-85 all non-Hodgkin lymphoma	18.9	28.3	12.9	19.1
C81-85 lymphoma (total)	22.7	32.5	15.8	22.1
C88 immuno-proliferative diseases	0.4	0.6	0.2	0.3
C90 multiple myeloma and plasma cell neoplasms	7.5	11.7	5.1	8.0
C91 lymphoid leukaemia	8.2	11.6	4.3	5.7
C911 leukaemia CLL	6.0	9.3	2.6	4.2
C92 myeloid leukaemia	4.4	6.5	3.3	4.5
C93 monocytic leukaemia	0.1	0.2	0.1	0.1
C94 other leukaemias of specified cell type	0.3	0.4	0.1	0.1
C95 leukaemia of unspecified cell type	0.9	1.9	0.5	1.1
C91-95 leukaemia (total)	14.0	20.6	8.2	11.5
C96 other and unspecified haematopoietic	8.8	14.4	5.5	8.4
D00 carcinoma in situ: oral, oesophagus and stomach	0.7	1.0	0.4	0.6
D01 carcinoma in situ of other and unspecified digestive	0.5	0.6	0.3	0.4
D02 carcinoma in situ: middle ear and respiratory	0.8	1.3	0.3	0.4
D03 melanoma in situ	12.1	18.2	12.6	17.3
D04 carcinoma in situ of skin	36.6	61.2	40.0	68.3
D05 carcinoma in situ of breast	0.1	0.1	15.4	17.7
D06 carcinoma in situ of cervix uteri			121.6	111.9
D07 carcinoma in situ of other and unspecified genital	4.3	5.6	2.4	2.8
D09 carcinoma in situ of other and unspecified sites	2.9	4.8	0.8	1.1
D12 benign colon, rectum, anus and anal canal	<0.1	<0.1	<0.1	<0.1
D17 benign lipomatous neoplasm	<0.1	<0.1	<0.1	<0.1

3- year annual average	2017-2019 ASR per 100,000 (estimate) male		female	
	ESP 1976	ESP 2013	ESP 1976	ESP 2013
D18 Haemangioma and lymphangioma, any site	0.1	0.1	0.1	0.1
D32 benign meninges	1.8	2.6	5.4	7.3
D33 benign brain and other parts of CNS	0.8	0.9	1.0	1.2
D32-33 benign meninges, brain & CNS	2.6	3.5	6.4	8.5
D35 benign other and unspecified endocrine glands	2.4	3.1	2.2	2.5
D37 uncertain or unknown behaviour of oral and digestive	1.4	2.0	1.5	2.1
D38 uncertain or unknown behaviour: middle ear	0.3	0.4	0.2	0.2
D39 uncertain or unknown behaviour of female genital			4.1	4.5
D40 uncertain or unknown behaviour of male genital	0.1	0.1		
D41 uncertain or unknown behaviour of urinary organs	10.0	15.8	3.5	5.2
D42 uncertain or unknown behaviour of meninges	0.3	0.4	0.3	0.4
D43 uncertain or unknown behaviour of brain and CNS	1.1	1.1	1.2	1.1
D42-43 uncertain meninges, brain & CNS	1.4	1.5	1.5	1.5
D44 uncertain or unknown behaviour of endocrine glands	0.4	0.5	0.6	0.8
D47 other uncertain/unknown behaviour of haematopoietic	3.3	5.5	2.4	3.7
D48 uncertain/ unknown behaviour of unspecified sites	2.9	4.9	2.1	2.5
HAEMACARE classification of tumours of lymphatic and haematopoietic tissue				
H01 Lymphoma NOS	1.0	1.7	0.6	0.9
H02 NH lymphoma NOS	2.8	4.5	1.7	2.7
H04 Hodgkin lymphoma nodular lymphocyte predominance	0.3	0.3	0.2	0.2
H05 Classical HL	3.5	3.9	2.7	2.8
H06 Chronic lymphocytic leukaemia/Small lymphocytic lymphoma	6.5	10.3	3.0	4.8
H07 Immuno-proliferative diseases	0.6	1.0	0.3	0.5
H08 Mantle cell/centrocytic lymphoma	1.1	1.8	0.3	0.5
H09 Follicular B lymphoma	3.7	5.0	3.3	4.6
H10 Diffuse B lymphoma	6.5	9.8	4.4	6.6
H11 Burkitt lymphoma	0.6	0.6	0.2	0.2
H12 Marginal zone lymphoma	0.7	1.1	0.9	1.4
H13 T lymphoma cutaneous	0.6	0.9	0.4	0.6
H14 Other T cell lymphomas	1.2	1.6	0.6	0.8
H15 Lymphoblastic lymphoma/Acute(precursor) lymphatic lymphoma	1.7	1.5	1.5	1.2
H16 Plasma cell neoplasms	7.6	11.9	5.1	8.0
H18 Mature B cell leukaemia hairy cell	0.4	0.5	0.1	0.1
H19 Lymphatic leukaemia NOS	<0.1	<0.1	<0.1	0.1
H20 Leukaemia NOS	0.9	1.9	0.5	1.1
H21 Myeloid leukaemia NOS	0.1	0.1	0.1	0.1
H22 Acute myeloid leukaemia	3.4	5.1	2.4	3.4
H23 Myeloproliferative neoplasms	4.7	6.8	3.7	5.1
H24 Myelodysplastic syndrome	4.4	8.1	2.3	3.9
H25 Myelodysplastic/Myeloproliferative neoplasm	0.8	1.4	0.3	0.5

~ Bladder cancer figures in this report have been revised to exclude some in situ tumours & tumours of uncertain behaviour misclassified as invasive in previous reports.

APPENDIX III: MORTALITY

Mortality: Annual average over 3 years 2014-2016	DEATHS			RATE*/100,000				Cumulative risk# of death to age 75 1 in: …	
ICD10 cancer sites	males	females	all	male ESP 1976	male ESP 2013	male ESP 1976	male ESP 2013	males	females
C00-96, D00-48 all neoplasms	4,871	4,362	9,233	195.8	350.9	148.0	247.4	8	10
C00-96 all invasive cancers	4,756	4,268	9,023	191.2	341.4	145.3	242.0	8	10
C00-14 lip, oral cavity and pharynx	127	53	180	5.2	8.2	1.8	3.0	239	729
C00-14, C30-32 all head and neck	188	64	252	7.7	12.3	2.2	3.6	163	574
C00-15, C32 oral cavity, larynx, oesophagus	458	193	651	18.7	30.4	6.3	11.0	70	220
C15 oesophagus	277	129	406	11.3	18.6	4.2	7.4	118	352
C16 stomach	205	137	342	8.2	14.2	4.5	7.8	181	391
C17 small intestine	13	15	27	0.5	0.8	0.5	0.8	2,290	2,454
C18 colon	279	216	495	11.2	21.4	6.7	12.6	156	256
C19-21 rectum and anus	310	207	517	12.5	21.7	7.0	11.8	118	207
C18-21 colorectum and anus	589	423	1,012	23.6	43.1	13.7	24.3	67	115
C17-21 intestine	601	438	1,039	24.1	44.0	14.2	25.1	65	110
C22 liver	195	121	316	7.8	13.5	4.1	7.0	174	368
C23-24 gallbladder and biliary tract	20	42	61	0.8	1.5	1.3	2.4	2,198	1,280
C22-24 liver and biliary passages	215	163	377	8.6	14.9	5.4	9.4	161	286
C25 pancreas	279	248	526	11.2	19.6	8.2	14.4	125	175
C32 larynx	54	10	64	2.2	3.7	0.4	0.6	583	2,978
C33-34 lung	1,050	841	1,891	42.2	71.9	29.3	48.3	32	43
C43 melanoma of skin	89	68	156	3.5	5.9	2.2	3.7	411	729
C45 mesothelioma	29	4	33	1.1	2.0	0.2	0.2	1,315	9,509
C50 breast	5	723	728	0.2	0.4	25.9	39.9	6,735	54
C53 cervix		87	87			3.4	4.4		366
C54 corpus uteri		100	100			3.4	5.8		364
C56 ovary		279	279			10.0	15.7		126
C61 prostate	525		525	20.8	45.8			132	
C62 testis	6		6	0.2	0.3			5,678	
C64 kidney	148	79	227	6.0	9.9	2.6	4.6	234	568
C64-66 kidney, incl. renal pelvis and ureter	157	84	241	6.4	10.7	2.7	4.8	222	538
C67 bladder	154	77	231	6.1	12.5	2.3	4.5	392	817
C70-72 malignant meninges, brain & CNS	187	128	316	7.8	10.8	4.9	6.8	157	235
D32-33 benign brain & CNS	10	13	23	0.4	0.7	0.4	0.7	3,876	6,634
D42-43 uncertain brain & CNS	6	7	13	0.2	0.4	0.2	0.4	7,161	7,983
C70-72, D32-33, D42-43 all brain & CNS	203	149	352	8.4	11.9	5.5	7.9	148	221

Mortality: Annual average over 3 years 2014-2016	DEATHS			RATE*/100,000				Cumulative risk# of death to age 75 1 in: …	
ICD10 cancer sites	males	females	all	male ESP 1976	male ESP 2013	male ESP 1976	male ESP 2013	males	females
C73 thyroid	13	17	30	0.5	0.9	0.6	1.0	1,879	2,761
C81 Hodgkin lymphoma	12	8	20	0.5	0.8	0.3	0.4	2,809	4,443
C82-85 non-Hodgkin lymphoma	164	120	284	6.5	11.4	3.8	6.9	237	416
C88-90 multiple myeloma	95	78	174	3.8	7.3	2.5	4.6	432	690
C91-95 leukaemia	153	97	250	6.1	11.0	3.1	5.5	259	470

Source of data: Central Statistics Office, Ireland

* Rates are standardised to the 1976 and 2013 European Standard Population (ESP) [10]

cumulative risk of dying of cancer, expressed as 1 in […], e.g. 1 in 10

APPENDIX IV: PREVALENCE

Complete prevalence by cancer type, gender and age: number of cancer survivors on 31/12/2017

site	age‡	females	%	males	%	all	%
mouth & pharynx	<50	184	16.5%	251	12.7%	435	14.1%
	50+	931	83.5%	1,720	87.3%	2,652	85.9%
		1,115	100.0%	1,972	100.0%	3,087	100.0%
oesophagus	<50	20	4.2%	36	4.2%	56	4.2%
	50+	453	95.8%	826	95.8%	1,279	95.8%
		473	100.0%	862	100.0%	1,335	100.0%
stomach	<50	79	9.8%	92	6.9%	171	7.9%
	50+	726	90.2%	1,253	93.1%	1,979	92.1%
		804	100.0%	1,345	100.0%	2,150	100.0%
colorectum	<50	614	6.5%	516	4.4%	1,130	5.3%
	50+	8,847	93.5%	11,294	95.6%	20,141	94.7%
		9,462	100.0%	11,809	100.0%	21,271	100.0%
liver	<50	36	19.1%	71	14.8%	106	16.0%
	50+	151	80.9%	407	85.2%	558	84.0%
		186	100.0%	478	100.0%	665	100.0%
pancreas	<50	41	10.6%	31	7.9%	73	9.3%
	50+	349	89.4%	361	92.1%	709	90.7%
		390	100.0%	392	100.0%	782	100.0%
lung	<50	157	5.1%	131	4.3%	288	4.7%
	50+	2,947	94.9%	2,900	95.7%	5,847	95.3%
		3,105	100.0%	3,031	100.0%	6,135	100.0%
melanoma of skin	<50	1,774	22.2%	859	17.1%	2,633	20.2%
	50+	6,228	77.8%	4,164	82.9%	10,392	79.8%
		8,002	100.0%	5,023	100.0%	13,025	100.0%
breast	<50	4,525	10.9%	17	6.7%	4,542	10.9%
	50+	36,947	89.1%	236	93.3%	37,183	89.1%
		41,472	100.0%	253	100.0%	41,725	100.0%
other malignant gynaecological†	<50	150	14.6%			150	14.6%
	50+	877	85.4%			877	85.4%
		1,027	100.0%			1,027	100.0%
cervix	<50	1,702	37.7%			1,702	37.7%
	50+	2,812	62.3%			2,812	62.3%
		4,514	100.0%			4,514	100.0%
corpus uteri	<50	228	4.0%			228	4.0%
	50+	5,449	96.0%			5,449	96.0%
		5,676	100.0%			5,676	100.0%
ovary	<50	479	15.7%			479	15.7%
	50+	2,563	84.3%			2,563	84.3%
		3,041	100.0%			3,041	100.0%
prostate	<50			264	0.7%	264	0.7%
	50+			37,127	99.3%	37,127	99.3%
				37,391	100.0%	37,391	100.0%
testis	<50			2,413	52.6%	2,413	52.6%
	50+			2,174	47.4%	2,174	47.4%
				4,588	100.0%	4,588	100.0%
kidney	<50	306	15.6%	426	13.8%	732	14.5%
	50+	1,652	84.4%	2,671	86.2%	4,323	85.5%
		1,958	100.0%	3,097	100.0%	5,055	100.0%
bladder	<50	31	2.1%	67	2.2%	98	2.2%
	50+	1,403	97.9%	3,052	97.8%	4,455	97.8%
		1,434	100.0%	3,120	100.0%	4,553	100.0%

Complete prevalence by cancer type, gender and age: number of cancer survivors on 31/12/2017

site	age‡	females	%	males	%	all	%
brain and CNS	<50	501	51.4%	570	52.3%	1,071	51.9%
	50+	475	48.6%	519	47.7%	993	48.1%
		976	100.0%	1,088	100.0%	2,064	100.0%
thyroid	<50	1,068	46.0%	231	33.3%	1,298	43.1%
	50+	1,255	54.0%	461	66.7%	1,716	56.9%
		2,323	100.0%	692	100.0%	3,015	100.0%
Hodgkin lymphoma	<50	726	55.9%	768	50.9%	1,495	53.2%
	50+	573	44.1%	742	49.1%	1,315	46.8%
		1,300	100.0%	1,510	100.0%	2,810	100.0%
non-Hodgkin lymphoma	<50	500	13.6%	741	18.1%	1,240	16.0%
	50+	3,167	86.4%	3,356	81.9%	6,523	84.0%
		3,667	100.0%	4,097	100.0%	7,763	100.0%
multiple myeloma	<50	35	4.9%	61	5.9%	96	5.5%
	50+	676	95.1%	966	94.1%	1,642	94.5%
		711	100.0%	1,027	100.0%	1,738	100.0%
leukaemia	<50	779	35.1%	853	27.1%	1,632	30.4%
	50+	1,443	64.9%	2,298	72.9%	3,741	69.6%
		2,222	100.0%	3,152	100.0%	5,373	100.0%

‡age on 31/12/2017

†other gynaecological malignancies: vulva, vagina, uterus (NOS) and placenta: