CANCER IN IRELAND 1994-2018
WITH ESTIMATES FOR 2018-2020:

ANNUAL REPORT OF THE NATIONAL CANCER REGISTRY

National Cancer Registry Ireland

2020 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
ICD	International Statistical Classification of Diseases and Related Health Problems
NCCP	National Cancer Control Programme
NCRI	National Cancer Registry, Ireland
NHL	Non-Hodgkin Lymphoma
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 27th year of data-collection and, for the years 1994 onwards, has provided surveillance of trends in cancer incidence, mortality, treatment, survival, and prevalence, along with associated clinical and demographic aspects of the patient population. Although statistics for the most recent years are not yet finalised, estimates of case numbers are provided for the most recent three-year period (2018-2020) based on a combination of data up to 2018 and population updates for years up to 2020.

This year's report estimates that numbers of invasive cancers (excluding non-melanoma skin cancer) have risen to about 24,753 cases diagnosed annually during 2018-2020 (13,152 males and 11,641 females), or 36,907 cases including all invasive cancers. These figures represent a doubling of case-numbers since the registry's early years (1994-1996). However, previous reports have shown that rates of cancer, corrected for population and age, have begun to level off or even decline for many cancer types, thus increases in case numbers in more recent years largely reflect population growth and ageing.

Just over 9,000 deaths from cancer occurred per year during 2015-2017, or about 1 death for every 3 cancers diagnosed (excluding non-melanoma skin cancers). Based on the international CONCORD-3 study (some results of which are summarised in this report), survival of Irish cancer patients ranks in the top half of EU countries surveyed for most cancer types. Ireland's ranking within Europe has improved over time, but there is still room for improvement.

Improvements in survival have contributed to ongoing increases in the numbers of cancer survivors, and we estimate that over 190,000 cancer survivors previously diagnosed with an invasive cancer (other than non-melanoma skin cancer) were alive at the end of 2018. This figure is equivalent to almost 4% (1 in 25) of the Irish population, and is likely to exceed 200,000 by the end of 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, although the population-level burden of cancer is strongly influenced by population changes. As the cancer projections report published by NCRI last year highlighted, there is uncertainty as to the magnitude of further increases in the annual number of cases diagnosed. A further analysis was published by the NCRI this year, funded by the Irish Cancer Society [1], to assess the proportions of cancer attributable to established risk factors with a view to mitigation of future increases in cancer through action on modifiable risk factors.

As noted in last year's report, the National Cancer Registry's new Strategy aims to build on the decades of cancer surveillance already undertaken, to further strengthen the registry's role in supporting cancer control initiatives in Ireland. This will of course depend on the ongoing efforts of our staff, in collaboration with hospitals and other components of the health services in Ireland, and further improvements in efficiencies (especially in terms of use of electronic data) will be needed to match the ever-increasing volume and complexity of cancer control measures and associated data collection.

Professor Kerri Clough-Gorr
Director, National Cancer Registry

CONTENTS

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 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.

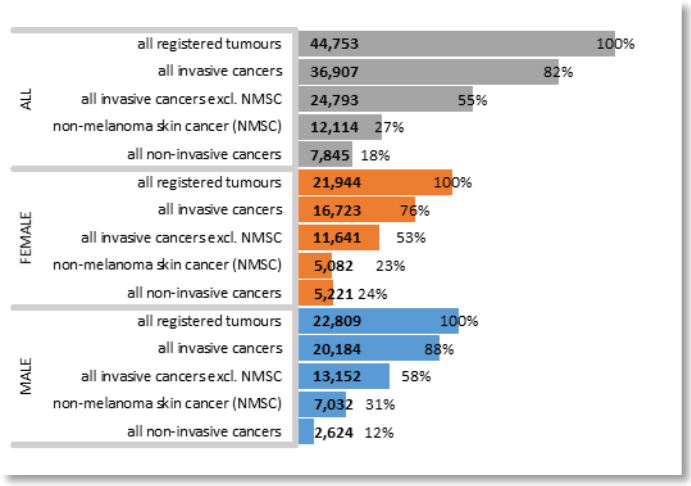
How are the numbers reported?

The process of collecting and checking all of this information is performed largely by hand, 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 assigning it to the correct person followed by anonymisation, the annual cancer report is published.

What have we found?

Over the years 2018-2020 the average number of 'registered tumours' in males and females is estimated at almost 45,000 per year. Just over 1 in 2 (c.25, 000 excluding non-invasive tumours and non-melanoma skin cancers) are life-changing invasive cancers which often require extensive treatment.



Cancer cases:
Annual average 2018-2020

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

For example, non-melanoma skin cancer made up 23% (almost 1 in 4) of all registered tumours in females and 31% (almost 1 in 3) in males

How many people were diagnosed with cancer?

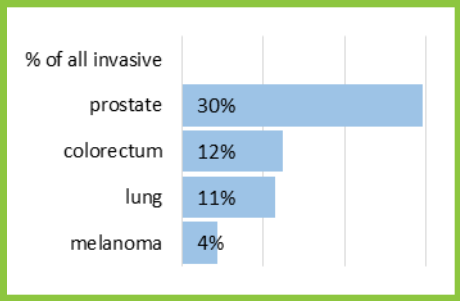
- On average, 45,753 cancers or related tumours were diagnosed each year during 2018-2020.
- Approximately 18% (almost 1 in 5) of these were non-invasive neoplasms (in situ carcinomas, tumours of uncertain behaviour and benign brain and CNS tumours).
- 27% (just over 1 in 4) were non-melanoma skin cancers.
- Invasive cancers (including NMSC) were estimated to average 36,907 cases per year during 2018-2020.
- The figure most often quoted in international comparisons (*"all invasive cancer, excluding NMSC"*) was estimated at 24,793 cases (13,152 male and 11,641 female) diagnosed annually during 2018-2020, or 55% (about 1 in 2) of all registered tumours.

What are the most common cancers?

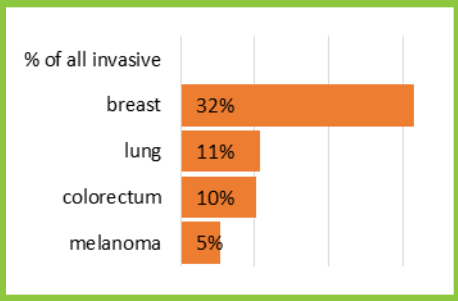
- Excluding NMSC, prostate and female breast cancer were the most commonly diagnosed invasive cancers overall, and each comprised almost one-third of all invasive cancers in men and women respectively during the period 2018-2020.
- Colorectal (bowel) cancer, lung cancer, melanoma of skin and NHL were 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 2018-2020

Males



Females



How many people die of cancer?

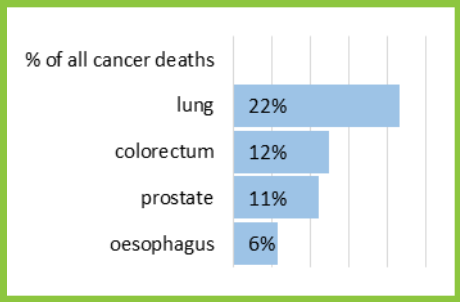
- Of all deaths occurring in 2017, 31% (almost 1 in 3) were attributable to cancer. Another 30% and 13% were attributable to diseases of the circulatory and respiratory systems respectively.
- On average there were 9,063 deaths per year from invasive cancer (4,799 in males, 4,264 in females) during the period 2015-2017, or 9,281 deaths per year from any tumour type.

What are the most common cancer deaths?

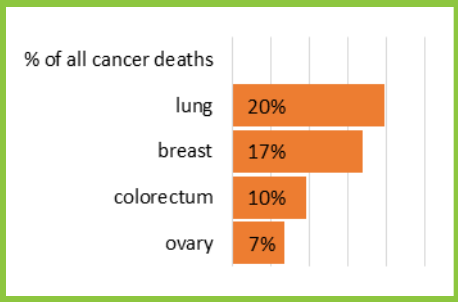
- Lung cancer was the leading cause of cancer death in both sexes during 2015-2017.
- In males, cancer of the bowel, prostate and oesophagus were the 2nd, 3rd, and 4th most common categories of cancer deaths, respectively.
- In females, cancer of the breast, bowel and ovary were the 2nd, 3rd and 4th most common categories of cancer deaths, respectively.

Top four most common causes of cancer death during 2015-2017

Males



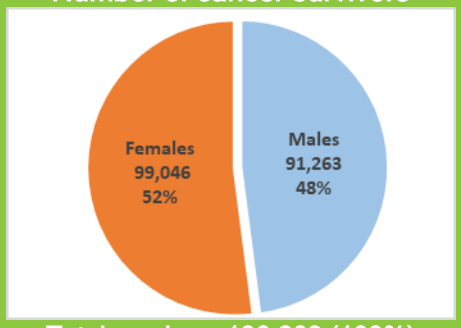
Females



How many previously diagnosed cancer patients are still alive?

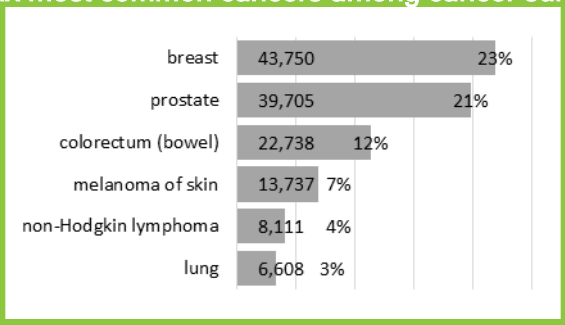
- Over 190,000 cancer patients or former cancer patients were alive in Ireland at the end of 2018 (about 3.9% or 1 in 25 of the Irish population) and this is likely to exceed 200,000 by the end of 2020.
- The top six most common cancers among survivors were: breast cancer (23% of all cancer survivors), 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.
- These figures exclude non-melanoma skin cancers.

Number of cancer survivors



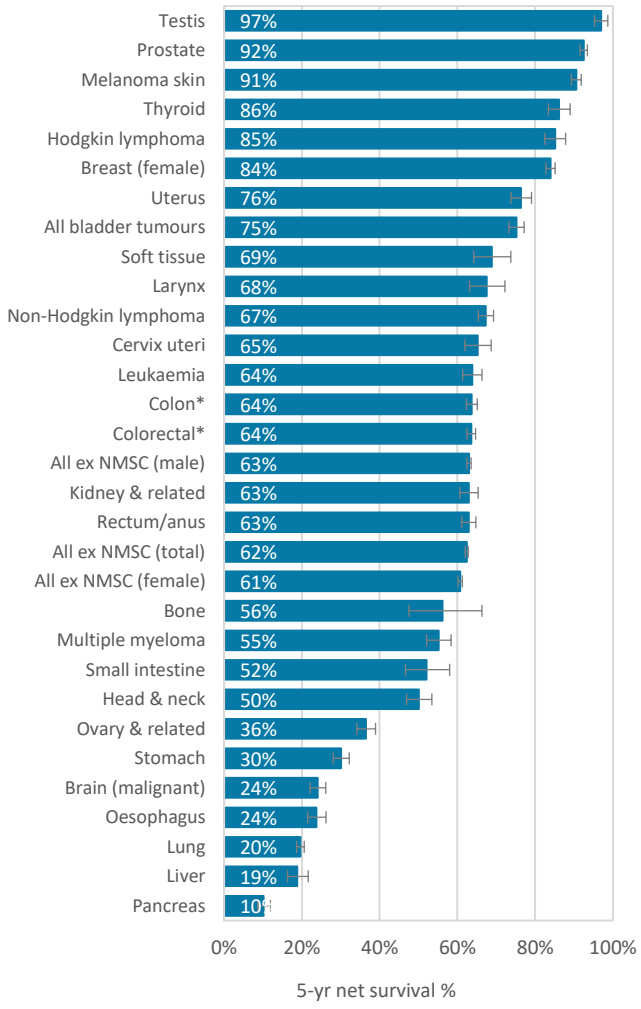
Total number =190,309 (100%)

The six most common cancers among cancer survivors



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

5 -year net survival for the period 2012-2016



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

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

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

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

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

*Colon & colorectral cancer survival excludes carcinoids of the appendix.

See Figure 5-1 for 10-year net survival

How does cancer survival in Ireland compare with other countries?

The CONCORD-3 project is a global international survey of 5-year cancer survival. A summary of trend in ranking for various cancers in Ireland relative to other EU countries is shown below for three diagnosis periods

IRELAND'S RANK WITHIN THE EUROPEAN UNION FOR 5-YEAR NET SURVIVAL: BY CANCER TYPE AND PERIOD (CONCORD-3)

	2000-2004	2005-2009	2010-2014	top half 2010-2014?	rank comparison 2010-2014 vs. 2000-2004
oesophagus	5th of 22	3rd of 23	4th of 22	yes✓	↑
stomach	19th of 23	16th of 24	9th of 24	yes✓	↑
rectum	14th of 23	13th of 24	9th of 24	yes✓	↑
pancreas	12th of 22	12th of 23	8th of 23	yes✓	↑
lung	15th of 23	12th of 24	6th of 24	yes✓	↑
melanoma skin	9th of 23	10th of 24	8th of 24	yes✓	↑
cervix	18th of 23	21st of 24	16th of 24		↑
prostate	10th of 23	10th of 24	6th of 24	yes✓	↑
brain-adults	6th of 22	5th of 23	4th of 23	yes✓	↑
brain-children	11th of 21	12th of 20	7th of 22	yes✓	↑
lymphoid-adults	11th of 23	6th of 24	6th of 24	yes✓	↑
acute lymphoblastic leukaemia-children	11th of 23	11th of 23	10th of 23	yes✓	↑
colon	13th of 23	11th of 24	13th of 24		↔
breast	16th of 23	15th of 24	16th of 24		↔
ovary	23rd of 23	22nd of 24	23rd of 24		↔
liver	8th of 23	10th of 23	9th of 23	yes✓	↓
myeloid-adults	3rd of 23	4th of 24	5th of 24	yes✓	↓
lymphoma-children	1st of 21	2nd of 21	4th of 21	yes✓	↓

The figures in the table show Ireland's survival rank within the number of EU28 countries surveyed. For example, Ireland had the 4th highest survival for cancer of the oesophagus out of 22 countries surveyed during the period 2010-2014; Ireland ranked in the top half of countries surveyed for cancer of the oesophagus during the period 2010-2014 and there was an improvement in survival rank (↑) between the periods 2000-2004 and 2010-2014. Figures derived from Allemani *et al* (CONCORD-3, 2018) [2]

2. CANCER INCIDENCE 2018-2020

TABLE 2-1
ESTIMATED ANNUAL AVERAGE INCIDENCE, RATE AND CUMULATIVE RISK OF THE MOST COMMON CANCERS: 2018-2020‡

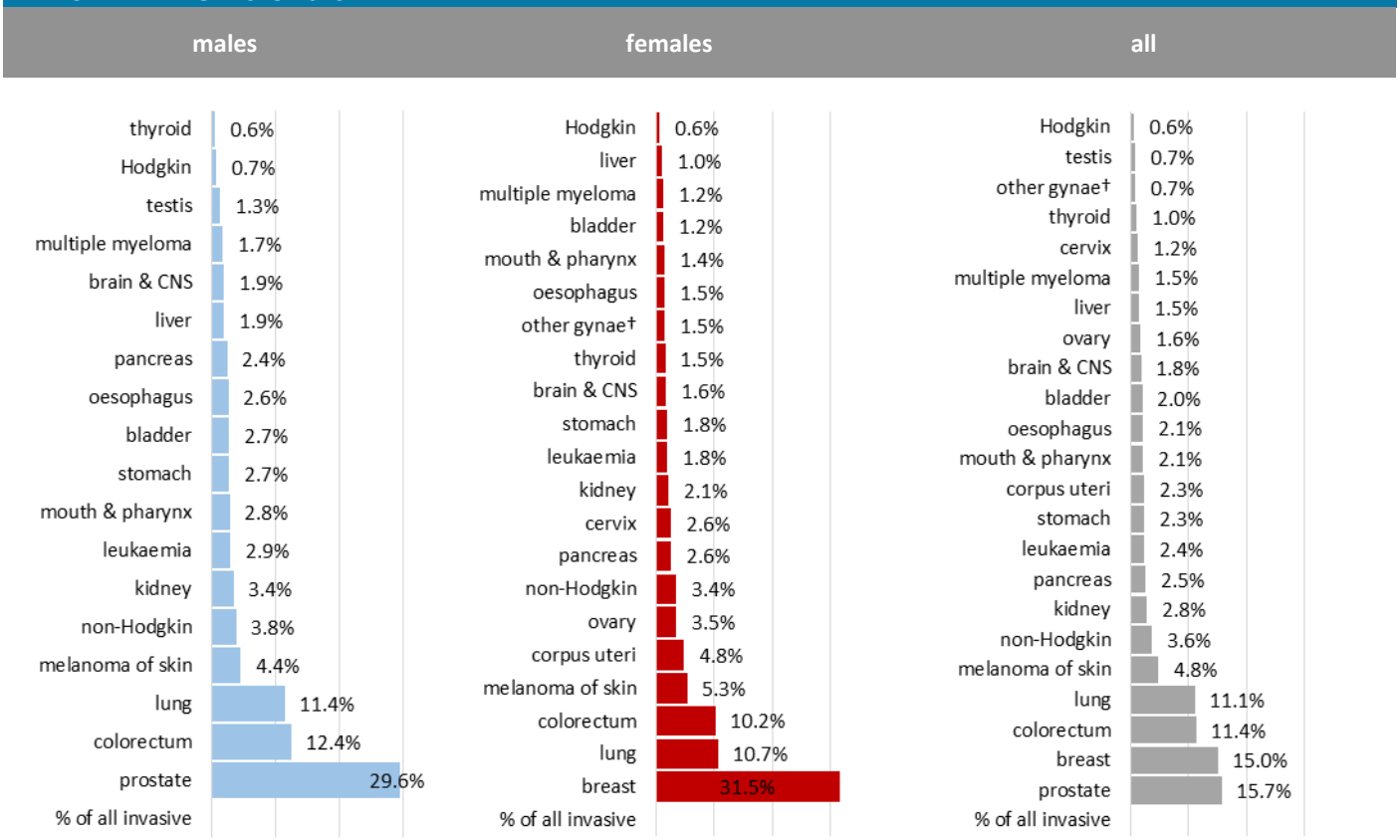
cancers	Case count			Rate*/100,00		risk#1in_ to age 75	risk# 1 in_ lifetime	risk# 1 in_ to age 75	risk# 1 in_ lifetime
ICD cancer site**	male	female	all	male	female	male	male	female	female
C00-96 all invasive cancers	20,184	16,723	36,907	725.6	562.2				
C00-43, C45-96 all invasive cancers excl. NMSC	13,152	11,641	24,793	477.8	399.1	3 (32.7%)	2 (51.3%)	4 (27.3%)	2 (45.3%)
C00-D48 all registered tumours	22,809	21,944	44,753	819.1	757.1				
D00-48 non-invasive tumour	2,624	5,221	7,845	93.5	195.0				
C01-14 mouth & pharynx	372	160	532	14.0	5.7	84	60	220	156
C15 oesophagus	345	171	516	12.5	5.2	123	68	327	127
C16 stomach	361	209	570	12.7	6.6	119	51	229	101
C18-20 colorectal cancer	1,633	1,186	2,819	58.3	38.3	26	13	41	18
C22 liver	253	115	368	9.0	3.6	144	73	407	184
C25 pancreas	314	303	617	11.0	9.3	135	61	168	66
C33-34 lung and trachea	1,503	1,250	2,753	52.8	40.4	27	13	29	15
C43 melanoma of skin	583	614	1,197	21.2	21.4	62	32	55	35
C44 other skin	7,032	5,082	12,114	247.9	163.1	7	3	9	4
C50 breast	37	3,667	3,704	1.3	132.8	1,002	529	11	7
C53 cervix		302	302		11.5			132	112
C54 corpus uteri		557	557		19.9			56	39
C56 ovary		407	407		13.9			90	51
C51-52, C55, C57-58 other malignant gynaecological		173	173		5.8			264	133
C61 prostate	3,890		3,890	143.4		8	6		
C62 testis	173		173	7.2		192	186		
C64 kidney	448	250	698	16.7	8.4	77	48	147	83
C67 bladder	349	141	490	12.0	4.3	176	57	527	152
C70-72, D32-33, D42-43 all brain & CNS	374	396	770	14.3	14.1	100	67	95	57
C71-72 malignant brain & CNS	253	188	441	9.7	6.7	155	104	226	141
C70-72 malignant meninges brain & CNS	256	199	455	9.8	7.1	153	103	222	136
D32-33 benign brain & CNS	77	153	230	2.9	5.4	442	279	207	119
D42-43 uncertain brain & CNS	41	43	84	1.6	1.7	626	500	731	491
C73 thyroid gland	73	179	252	2.9	6.9	358	277	125	109
C81 Hodgkin lymphoma	88	67	155	3.5	2.6	344	262	417	333
C82-85 non-Hodgkin lymphoma	499	390	889	18.2	13.0	75	40	93	51
C90 multiple myeloma	222	139	361	7.9	4.4	188	89	305	136
C91-95 leukaemia	378	212	590	13.8	7.2	119	59	195	98

‡ Average age-standardised rates for 2016-2018 period were projected onto populations for 2019-2020.
Estimated average annual case counts and rates for 2018-2020 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 and lifetime risk (adjusted for population mortality), expressed as a proportion, e.g. lifetime risk of developing an invasive cancer (other than NMSC) was approximately 1 in 2 in men (probability=51%) and 1 in 2 in women (probability=45%) (current probability method [3]. See Appendix V for further details.)
† Vulva, vagina, uterus (NOS) and placenta.

- Taking known cancer incidence rates during 2016-2018, and applying these rates to population estimates for 2019-2020, an average of 44,753 cancers or other (non-invasive) tumours diagnosed annually was estimated for the period 2018-2020, representing an age-standardised incidence rate of 757 female cases and 819 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 12,114 cases per year) (Table 2-1).
- Invasive cancers (incl. NMSC) were estimated to average 36,907 cases per year during 2018-2020, or an age-standardised rate of 562 female and 726 male cases per 100,000 per year.
- For all invasive cancers excluding NMSC, the figures most often quoted in international comparisons, an estimated 24,793 cases (13,152 males and 11,641 females) were diagnosed annually during 2018-2020, or 55% of all invasive cases.
- This is equivalent to an incidence rate of 399 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 2018-2020 was double the average during 1994-1996 (12,270 – 6,350 male and 5,920 female).
- The cumulative risk (to age 75 years) of being diagnosed with an invasive cancer other than NMSC was approximately 1 in 3 in men and 1 in 4 for women
- The cumulative lifetime risk of being diagnosed with an invasive cancer other than NMSC was approximately 1 in 2 for both men and women.
- There figures assume that average annual cancer incidence rates did not change between the period 2016-2018 and 2019-2020, and that the Irish population estimates or projections available at the time of writing are accurate [4].

FIGURE 2-1:
ESTIMATED PERCENTAGES AND RANK OF THE MOST COMMONLY DIAGNOSED INVASIVE CANCER (EXCLUDING NMSC): ANNUAL AVERAGE 2018-2020



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 2018-2020 (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 2015-2017

- Of deaths occurring in 2017, 73.3% were attributed to 3 main chapters in the ICD-10 classification: IX (I00-I99) diseases of the circulatory system (29.2%), II (C00-D48) neoplasms (30.8%), and X (J00-J99) diseases of the respiratory system (13.3%) [5].
- An annual average of 9,063 deaths from invasive cancer (4,799 in males, 4,264 in females) occurred during the period 2015-2017, or 9,281 deaths from any neoplasm (Table 3-1).
- This represents an estimated age-standardised mortality rate of 141 invasive cancer deaths per 100,000 females and 186 deaths per 100,000 males per year (Table 3-1) — 32% higher for men than for women. The estimated cumulative risk (to age 75 year) of dying from invasive cancer was approximately 1 in 11 for women and 1 in 9 for men.

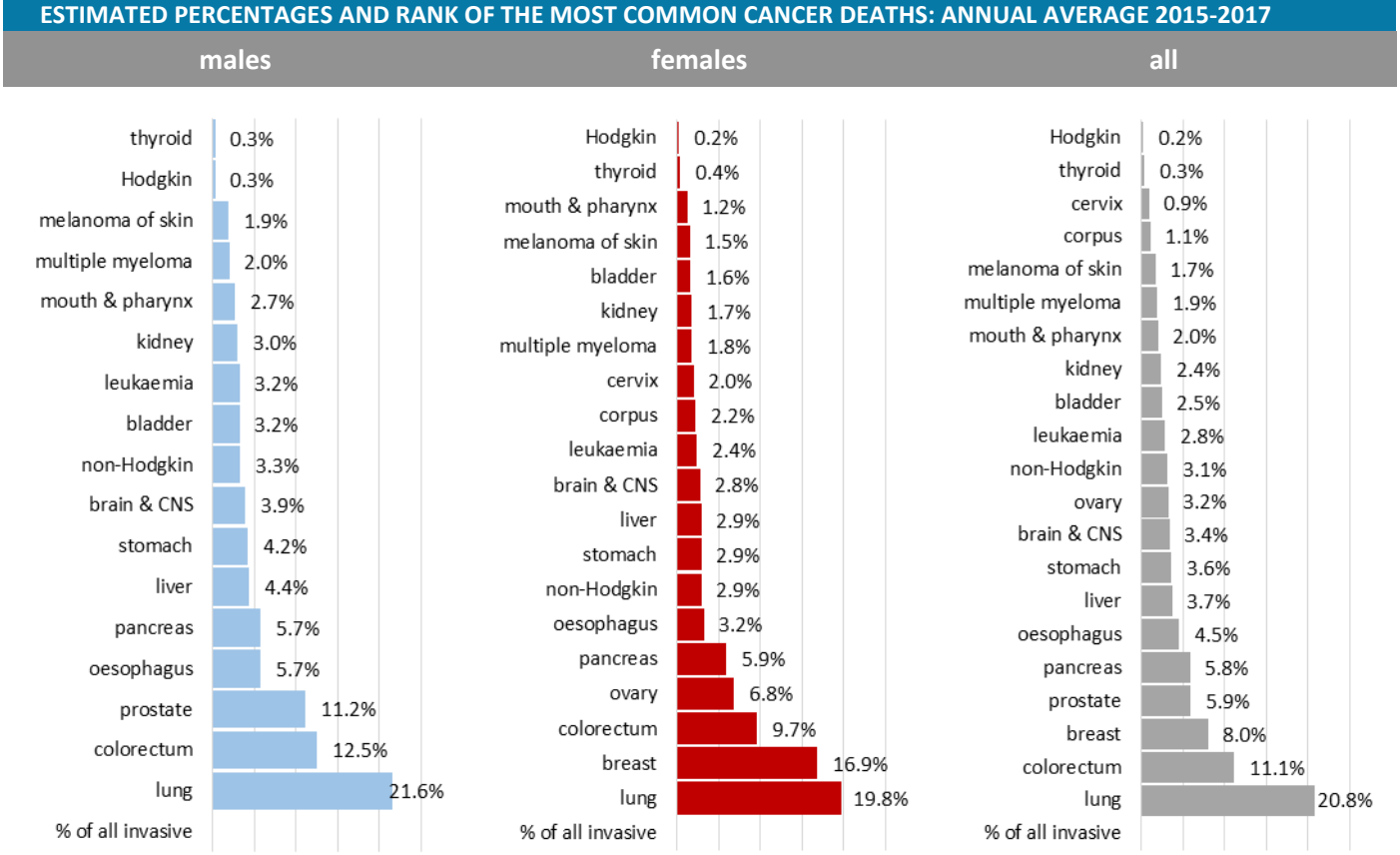
TABLE 3-1:
ANNUAL AVERAGE MORTALITY ATTRIBUTABLE TO CANCER: 2015-2017

	DEATHS			Rate*/100,000		Risk # to age 75 1 in: …	
	male	female	all	male	female	male	female
All neoplasms	4,918	4,363	9,281	190.8	143.7	9	10
C00-96 all invasive cancers	4,799	4,264	9,063	186.2	140.9	9	11
C01-14 mouth & pharynx	131	52	183	5.2	1.7	235	732
C15 oesophagus	276	137	413	10.8	4.3	125	348
C16 stomach	202	124	326	7.8	3.9	188	452
C18-20 colorectum	598	412	1,010	23.2	13.1	70	120
C22 liver	210	124	334	8.1	4.0	170	343
C25 pancreas	276	253	529	10.7	8.2	133	173
C33-34 lung and trachea	1,039	845	1,884	40.3	28.4	34	46
C43 melanoma of skin	90	64	154	3.5	2.0	436	825
C50 breast	5	719	724	0.2	24.9	4,193	56
C53 cervix		84	84		3.2		411
C54 corpus uteri		96	96		3.2		389
C56 ovary		290	290		10.1		125
C61 prostate	537		537	20.5		128	
C62 testis	7		7	0.3		5,282	
C64 kidney	143	73	216	5.6	2.3	249	672
C67 bladder	155	67	222	5.9	2.0	411	968
C71-72 brain & CNS	187	118	305	7.6	4.4	161	273
C73 thyroid	13	17	30	0.5	0.6	1,987	2,549
C81 Hodgkin lymphoma	14	8	22	0.6	0.3	2,212	5,328
C82-85 non-Hodgkin lymphoma	157	125	282	6.0	3.8	274	435
C90 multiple myeloma	95	77	172	3.6	2.4	468	733
C91-95 leukaemia	155	102	257	6.0	3.2	285	491

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 using method as described in [6] 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 1,884 deaths per year or 20% of cancer deaths in women and 22% of cancer deaths in men during the period 2015-2017 (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 1,010 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 oesophagus, pancreas and liver 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 13% 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 2015-2017



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 25 years of complete or near-complete incidence and follow-up information on cancer cases, up to the end of 2018. However, there remains a subset of cancer patients alive at the end of 2018 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 (1994-2018) 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 2018.

sex	age‡	Fixed duration (1994-2017)	%	%	Complete prevalence	%	%
all		**174,813**	**100.0%**	**100.0%**	**190,309**	**100.0%**	**100.0%**
	<50	24,770	14.2%		25,387	13.3%	
	50+	150,043	85.8%		164,922	86.7%	
males		**86,013**	**100.0%**	**49.2%**	**91,263**	**100.0%**	**48.0%**
	<50	9,654	11.2%		9,916	10.9%	
	50+	76,359	88.8%		81,347	89.1%	
females		**88,800**	**100.0%**	**50.8%**	**99,046**	**100.0%**	**52.0%**
	<50	15,116	17.0%		15,471	15.6%	
	50+	73,684	83.0%		83,575	84.4%	

*survivors of any invasive cancer other than non-melanoma skin cancer (ICD-10 C00-96 excluding C44); Only the first invasive cancer was counted per patient ignoring any subsequent cancers in other body sites.
‡ Age category on 31/12/2018.

- The figure reported for complete cancer prevalence (up to 31/12/2017) in last year's annual report was 180,550 [7]. For this report (up to 31/12/2018) the same figure was estimated at 190,309 (Table 4-1) which comprised c.3.9% of the Irish population in 2018.

- These figures include patients still undergoing active treatment or palliative treatment at the end of 2018, 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 2018

	Fixed duration (1994-2018)	Complete to end of 2018	%*
C50 breast	39,769	43,750	23.0%
C61 prostate	39,165	39,705	20.9%
C18-20 colorectum	21,035	22,738	11.9%
C43 melanoma of skin	12,354	13,737	7.2%
C82-85 non-Hodgkin lymphoma	7,451	8,111	4.3%
C33-34 lung	6,491	6,608	3.5%
C54 corpus uteri	5,368	5,962	3.1%
C91-95 leukaemia	5,102	5,765	3.0%
C64 kidney	5,116	5,352	2.8%
C62 testis	3,384	4,863	2.6%
C53 cervix	3,847	4,738	2.5%
C67 bladder	3,324	4,384	2.3%
C01-14 mouth & pharynx	3,148	3,283	1.7%
C73 thyroid	3,088	3,227	1.7%
C56 ovary	2,590	3,187	1.7%
C81 Hodgkin lymphoma	2,189	2,925	1.5%
C16 stomach	2,117	2,227	1.2%
C71-72 brain and spinal cord	1,697	2,186	1.1%
C90 multiple myeloma	1,856	1,879	1.0%
C15 oesophagus	1,375	1,415	0.7%
C51-52, C55, C57, C58 other gynaecological†	989	1,087	0.6%
C25 pancreas	837	860	0.5%
C22 liver	709	716	0.4%

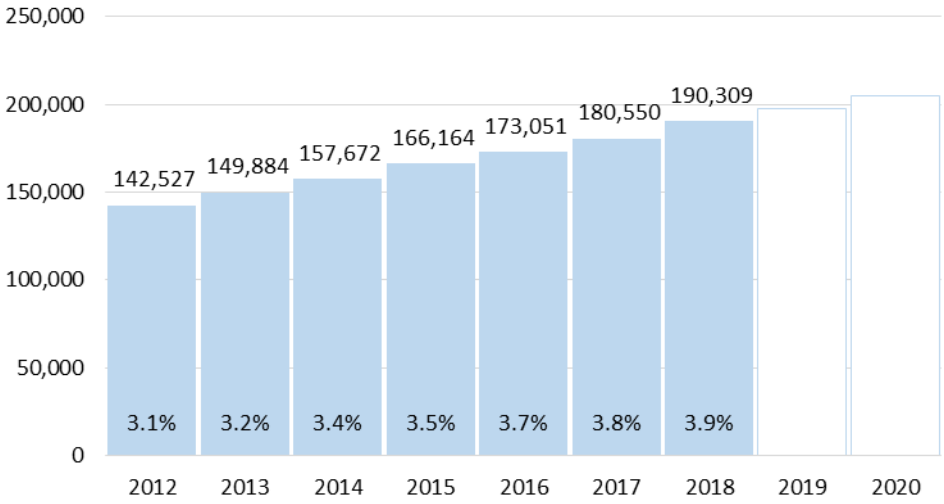
†Other gynaecological malignancies: vulva, vagina, uterus (NOS) and placenta
*Percentage of all cancer survivors (complete prevalent cancers, C00-43, C45-96)

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 <4% of survivors, and less common, high-fatality cancers such as liver, pancreatic, oesophageal cancers and multiple myeloma comprised <3% of cancer survivors combined.

FIGURE 4-1
ESTIMATED COMPLETE CANCER PREVALENCE IN IRELAND UP TO END OF 2018



The numbers above 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 2018 are based on the latest available data at the time of writing this report, and projections are provided for years 2019 and 2020.

For each year since the establishment of the cancer registry, the numbers of cancers diagnosed has increased 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 190,000 cancer survivors at the end of 2018, and this number is likely to exceed 200,000 by the end of 2020 (Figure 4-1).

5. CANCER SURVIVAL

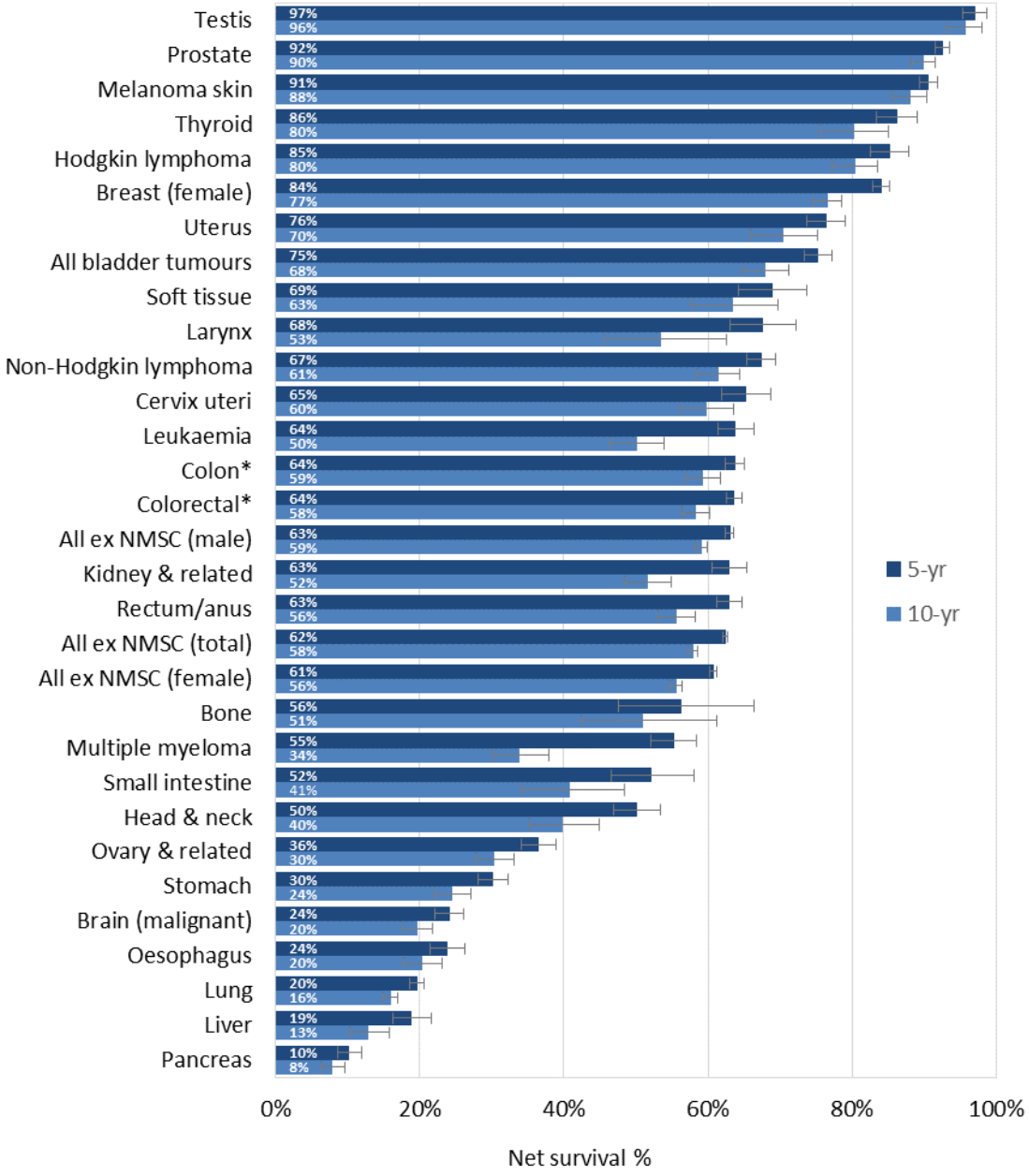
Ranked five-year and ten-year net survival for patients during 2012-2016

Net survival estimates to five years and ten years post-diagnosis are presented here for cancer as a whole (excluding non-melanoma skin cancer) and for the most frequent cancers, based on follow-up of patients during 2012-2016 (Figure 5-1). Net survival is calculated by comparing the observed survival of patients with the expected survival of persons of the same age and sex in the general population. It represents the cumulative probability of a patient surviving a given time in the hypothetical situation in which the disease of interest is the only possible cause of death, i.e. survival having controlled for other possible cause of death [8]. Actual (observed) survival will generally be lower than net survival, especially in older age-groups, reflecting deaths from other causes, although for high-fatality cancers and in younger age-groups most deaths among cancer patients will be related to the cancer. 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 [9]. 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 [10].

- Of the major cancers types (Figure 5-1), those with the highest average net survival were those of the testis (97% 5-year/96% 10-year), prostate (92% 5-year/90% 10-year), and melanoma of skin (91% 5-year/88% 10-year).
- Cancers with the lowest average net survival were those of the pancreas (10% 5-year/8% 10-year), liver (19% 5-year/13% 10-year), and lung (20% 5-year/16% 10-year).
- For all invasive cancers (excl. NMSC) during the period 2012-2016 (males and females combined), 5-year net survival reached 62% (Figure 5-1) representing an ongoing and substantial improvement compared with earlier periods: 1994-1999 (42%); 2005-2005 (51%); 2006-2010 (58%) [7].
- For all invasive cancers (excl. NMSC) during the period 2012-2016 (males), 5-year net survival reached 63% (Figure 5-1): comparative earlier figures were 1994-1999 (39%); 2005-2005 (50%); 2006-2010 (58%) [7].
- For all invasive cancers (excl. NMSC) during the period 2012-2016 (females), 5-year net survival reached 61% (Figure 5-1): comparative earlier figures were 1994-1999 (46%); 2005-2005 (51%); 2006-2010 (57%) [7].
- For most individual cancer types, the annual report of 2019 [7] highlighted ongoing improvements in 5-year net survival from 1994-1999 up to 2011-2015. In this report, a summary of the recent CONCORD-3 results [2] is presented below. This section shows how cancer survival in Ireland has fared over time relative to other countries in the European Union (Figures 5-2 to 5-19).

FIGURE 5-1
AGE-STANDARDIZED‡ ESTIMATES OF 5-YEAR AND 10-YEAR NET SURVIVAL FOR INVASIVE CANCERS IN IRELAND: 2012-2016



'Hybrid' estimates are presented above for the follow-up period 2012-2016 [11], representing one-year to five-year survival for cases diagnosed during 2011-2015 supplemented by longer-term follow-up of patients diagnosed pre-2011.
‡Survival for all ages 15-99 is standardised to the standard populations recommended by Corazziari et al. (2004) [9]. 95% confidence intervals are shown.
*Colon & colorectal cancer survival excludes carcinoids of the appendix.

International comparisons of cancer survival: CONCORD-3 project

In this section, we present a selection of results from the most recent round of CONCORD global surveillance of cancer survival. The NCRI has contributed cancer survival data to this ongoing project since 1995. 5-year net survival is the parameter measured, which can inform on timely diagnosis and access to optimal treatment. Most registries submitted data for patients diagnosed between 2000 and 2014, with follow-up to end of 2014.

Survival trends were examined among patients diagnosed in three consecutive 5-year calendar periods. The 'cohort' approach was used to estimate survival for patients diagnosed during 2000-2004 and 2005-2009 and the 'period' approach for patients diagnosed during 2010-14. The 'cohort' approach is considered the gold standard [12] because it provides a survival estimate for a group of patients who were diagnosed during the same year or period, are likely to have been treated in similar fashion, and who have all been followed up for at least the duration of survival required, such as 5 years. This approach to the estimation of survival is easy to interpret, but other approaches are required when some patients have been followed up for less than 5 years. The 'period' approach [13] was used for patients diagnosed during 2010-14 because 5 years of follow-up data were not available for all patients. This combination of 'cohort' and 'period' approaches facilitates monitoring of cancer survival trends over an extended time span, from the earliest to the most recent years of cancer registration for which follow-up data are available [14].

The CONCORD-3 project calculated 'net survival', the cumulative probability of surviving up to a given time since diagnosis (5 years) after correcting for other causes of death (background mortality), as also reported in NCRI's own survival statistics. To control for the wide differences in background mortality between participating jurisdictions and to allow comparisons over time and between countries, the CONCORD-3 researchers compiled life tables of all-cause mortality for each calendar year during 2000-2014 for the general population of each country.

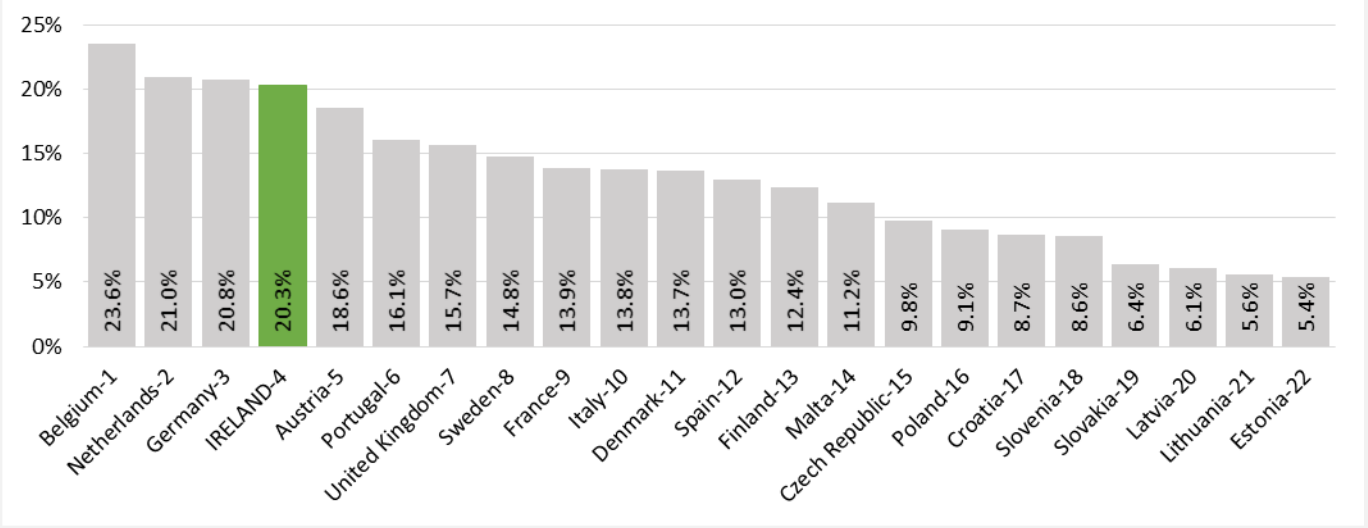
The 18 cancers surveyed were: oesophagus, stomach, colon, rectum, liver, pancreas, lung, breast (women), cervix, ovary, prostate, and melanoma of the skin in adults, together with brain tumours, leukaemias, and lymphomas in both adults and children. The selection criteria and description of these cancers is presented in Table 5-1. While CONCORD-3 is a global project involving 67 countries, only the results for the EU28 member states (as of 2018) are presented below [2].

Table 5-1
CONCORD-3: definition of selected malignancies (ICD-O-3)

	Topography or morphology codes [15]	Description
Oesophagus	C15.0–C15.5, C15.8–C15.9	Oesophagus
Stomach	C16.0–C16.6, C16.8–C16.9	Stomach
Colon	C18.0–C18.9, C19.9	Colon and rectosigmoid junction
Rectum	C20.9, C21.0–C21.2, C21.8	Rectum, anus, and anal canal
Liver	C22.0–C22.1	Liver and intrahepatic bile ducts
Pancreas	C25.0–C25.4, C25.7–C25.9	Pancreas
lung	C34.0–C34.3, C34.8–C34.9	Lung and bronchus
Melanoma of skin	8720–8790 provided topography was C44.0–C44.9, C51.0, C51.9, C60.9, or C63.2	Melanoma of the skin, including skin of labia majora, vulva, penis, and scrotum
Breast (female)	C50.0–C50.6, C50.8–C50.9	Breast
Cervix	C53.0–C53.1, C53.8–C53.9	Cervix uteri
Ovary	C48.0–C48.2, C56.9, C57.0–C57.4, C57.7–C57.9	Ovary, fallopian tube and uterine ligaments, other and unspecified female genital organs, peritoneum, and retroperitoneum
Prostate	C61.9	Prostate gland
Brain (adults)	C71.0–C71.9	Brain (adults)
Myeloid (adults)	9740, 9741, 9742, 9800, 9801, 9805, 9806,9807, 9808, 9809, 9840, 9860, 9861, 9863,9865, 9866, 9867, 9869, 9870, 9871, 9872, 9873, 9874, 9875, 9876, 9891, 9895, 9896, 9897, 9898, 9910, 9911, 9920, 9930, 9931, 9945, 9946, 9950, 9960, 9961, 9962, 9963, 9964, 9975, 9980, 9982, 9983, 9984, 9985, 9986, 9987, 9989, 9991, 9992	All myeloid malignancies HAEMACARE groups 20-25 [16]
Lymphoid (adults)	9590, 9591, 9596, 9597, 9650–9655, 9659, 9661–9665, 9667, 9670, 9671, 9673, 9675, 9678, 9679, 9680, 9684, 9687–9691, 9695, 9698, 9699, 9700–9702, 9705, 9708, 9709, 9712, 9714, 9716–9719, 9725–9729, 9731–9735, 9737, 9738, 9760–9762, 9764, 9811–9818, 9820, 9823, 9826, 9827,9831–9837, 9940, 9948	All lymphoid malignancies, HAEMACARE groups 1–19
Brain (children)	C71.0–C71.9	Brain (children)
Acute lymphoblastic leukaemia (children)	9835–9837; plus 9811–9818 provided topography was C42.0, C42.1, C42.3, C42.4 or C80.9	Precursor-cell acute lymphoblastic leukaemia, The International Classification of Childhood Cancer (3rd ed.) [17] incorporating morphology codes from the first revision of ICD-O-3 was used to define childhood acute lymphoblastic leukaemia (group Ia1)
Lymphoma (children)	9590, 9591, 9596, 9597, 9650–9655, 9659, 9661–9665, 9667, 9670, 9671, 9673,9675, 9678–9680, 9684, 9687–9691, 9695, 9698–9702, 9705, 9708, 9709, 9712, 9714,9716–9719, 9725–9729, 9731–9735, 9737, 9738, 9740–9742, 9750–9762, 9764–9769, 9970, 9971; plus 9811–9818 provided topography was not C42.0, C42.1, C42.3, C42.4, or C80.9	All lymphomas, The International Classification of Childhood Cancer (3rd ed.) [17] Incorporating morphology codes from the first revision of ICD-O-3 was used to define lymphoma in children (group II).

CONCORD-3: Allemani et al, 2018 [2]

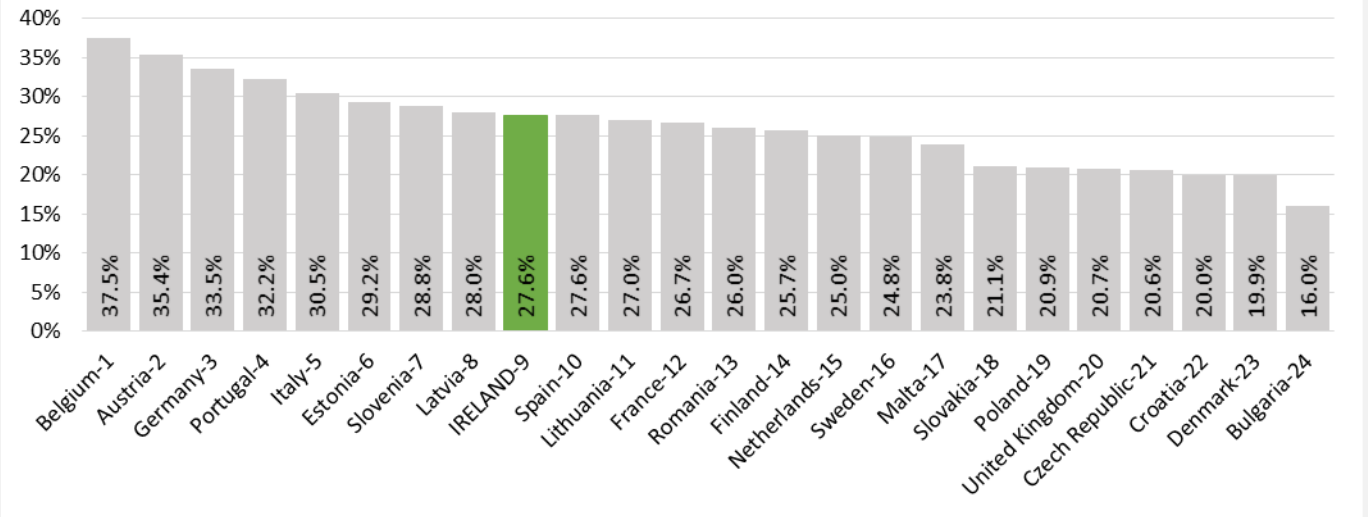
FIGURE 5-2
CANCER OF THE OESOPHAGUS: EU-28: 5-YEAR NET SURVIVAL (%) AND RANK: 2010-2014



Excluding Bulgaria, Greece , Romania, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for oesophageal cancer ranged from 5% to 24% during the period 2010-2014 among 22 EU countries surveyed. Net survival in Ireland, increased from 13% (2000-2004) to 17% (2005-2009) to 20% during the period 2010-2014. Ireland ranked 4th of 22 EU countries surveyed for the period 2010-2014.

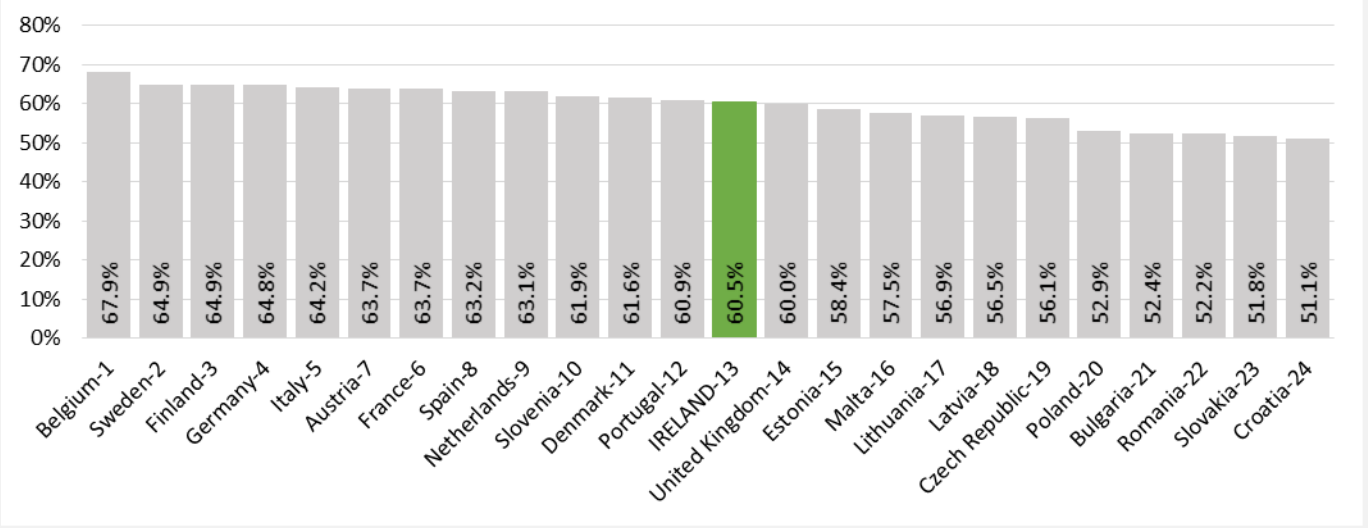
FIGURE 5-3
CANCER OF THE STOMACH: EU-28: 5-YEAR NET SURVIVAL (%) AND RANK: 2010-2014



Excluding Greece , Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for stomach cancer ranged from 16% to 38% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 19% (2000-2004) to 22% (2005-2009) to 28% during the period 2010-2014. Ireland ranked 9th of 24 EU countries surveyed for the period 2010-2014.

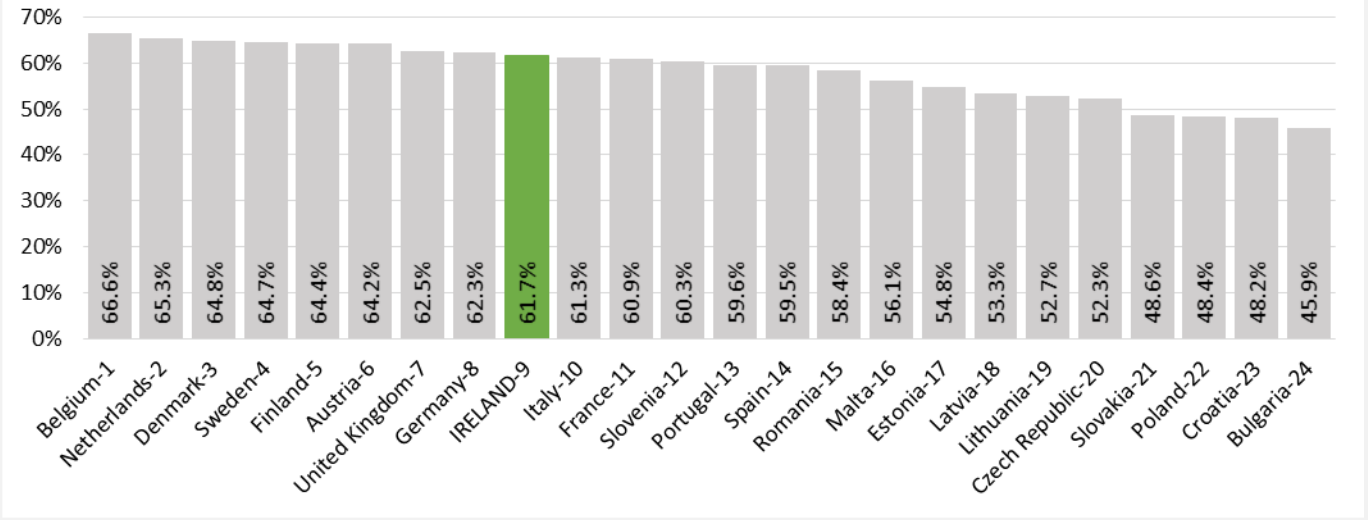
FIGURE 5-4
CANCER OF THE COLON : EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the colon ranged from 51% to 68% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 53% (2000-2004) to 58% (2005-2009) to 61% during the period 2010-2014. Ireland ranked 13th of 24 EU countries surveyed for the period 2010-2014.

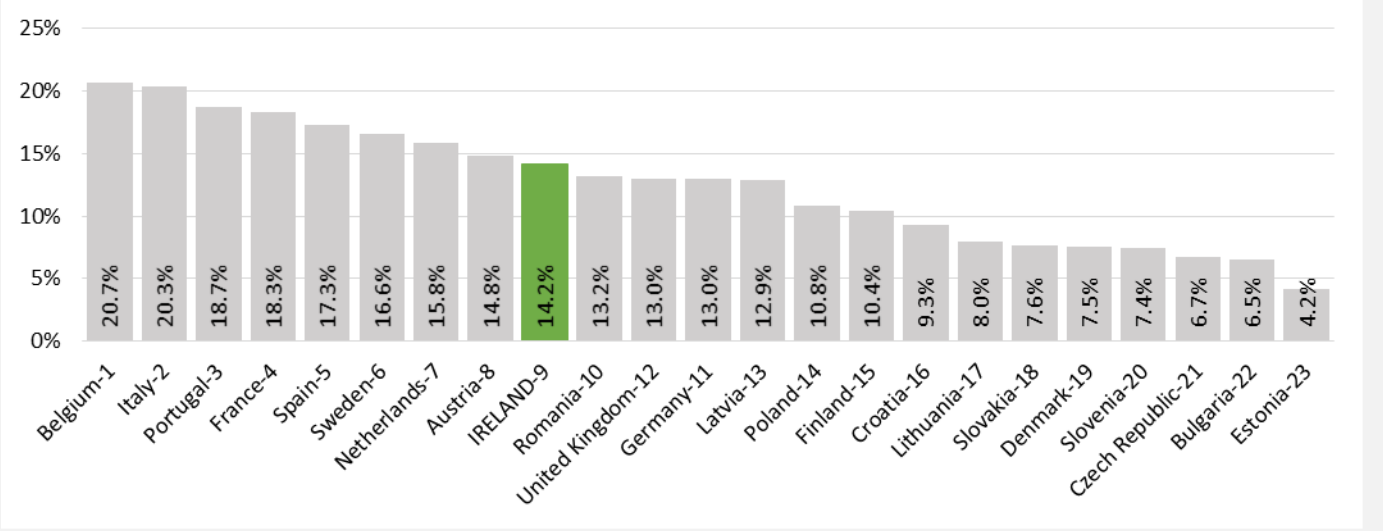
FIGURE 5-5
CANCER OF THE RECTUM : EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding , Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the rectum ranged from 46% to 67% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 51% (2000-2004) to 57% (2005-2009) to 62% during the period 2010-2014. Ireland ranked 9th of 24 EU countries surveyed for the period 2010-2014.

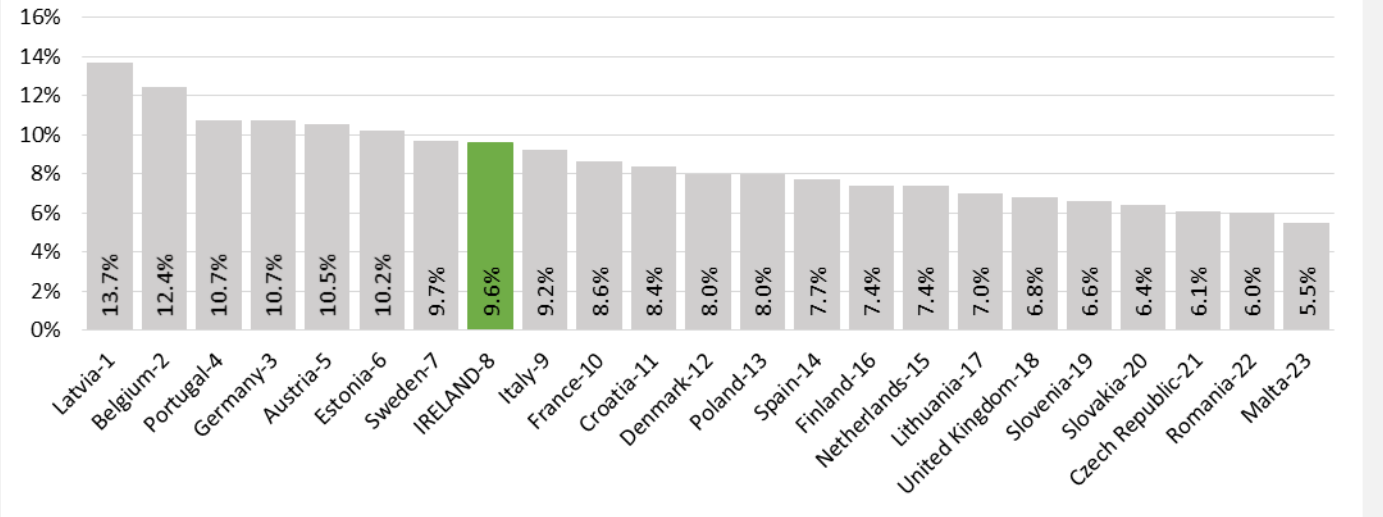
FIGURE 5-6
CANCER OF THE LIVER: EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding, Greece , Romania, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the liver ranged from 4% to 21% during the period 2010-2014 among 23 EU countries surveyed. Net survival in Ireland, ranged from 12% (2000-2004) to 12% (2005-2009) to 14% during the period 2010-2014. Ireland ranked 9th of 23 EU countries surveyed for the period 2010-2014.

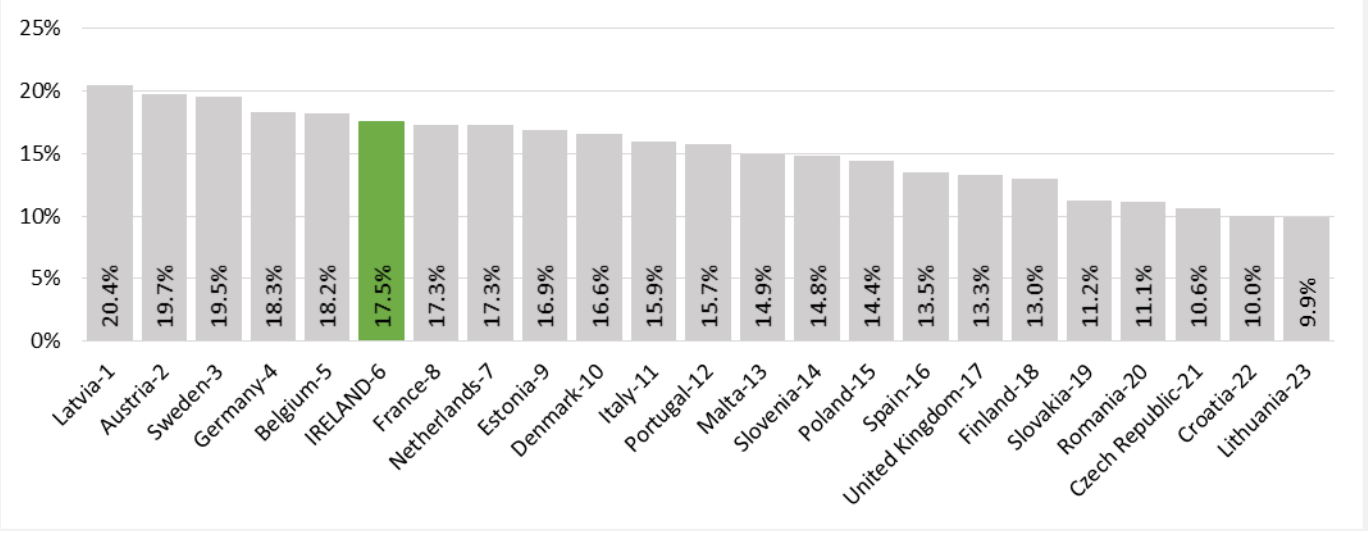
FIGURE 5-7
CANCER OF THE PANCREAS: EU-28: 5-YEAR NET SURVIVAL (%): 2010-2014



Excluding Greece, Bulgaria, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the pancreas ranged from 6% to 14% during the period 2010-2014 among 23 EU countries surveyed. Net survival in Ireland, increased from 6% (2000-2004) to 7% (2005-2009) to 10% during the period 2010-2014. Ireland ranked 8th of 23 EU countries surveyed for the period 2010-2014.

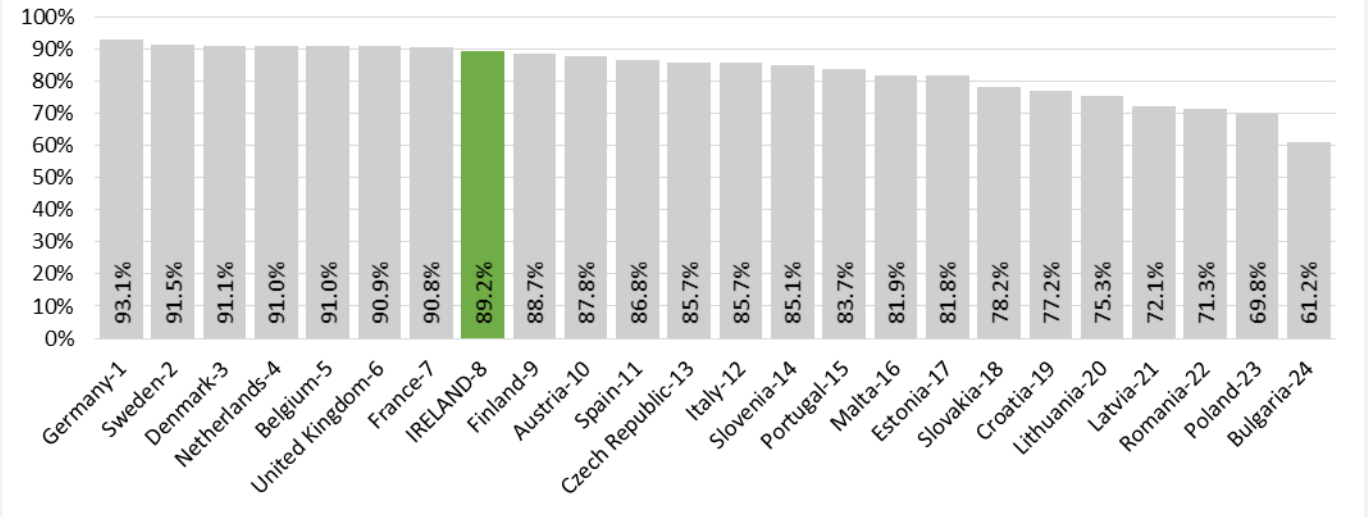
FIGURE 5-8
CANCER OF THE LUNG: EU-28: 5-YEAR NET SURVIVAL (%): 2010-2014



Excluding Greece, Bulgaria, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the lung ranged from 10% to 20% during the period 2010-2014 among 23 EU countries surveyed. Net survival in Ireland, increased from 10% (2000-2004) to 14% (2005-2009) to 18% during the period 2010-2014. Ireland ranked 6th of 23 EU countries surveyed for the period 2010-2014.

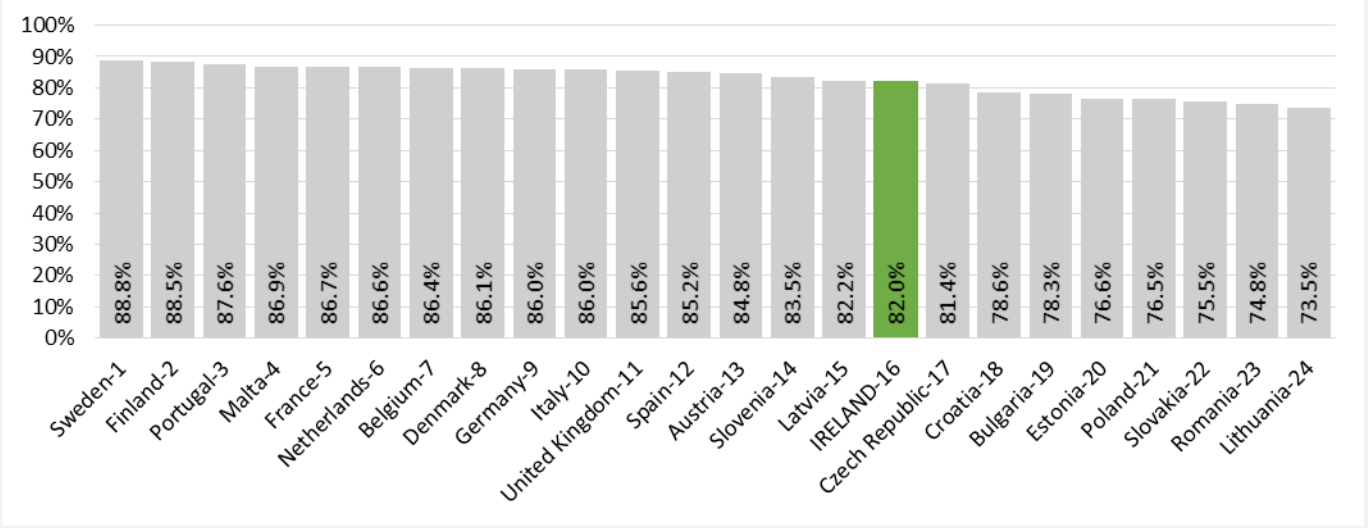
FIGURE 5-9
MELANOMA OF THE SKIN: EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Greece , Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for melanoma ranged from 61% to 93% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 86% (2000-2004) to 87% (2005-2009) to 89% during the period 2010-2014. Ireland ranked 8th of 24 EU countries surveyed for the period 2010-2014.

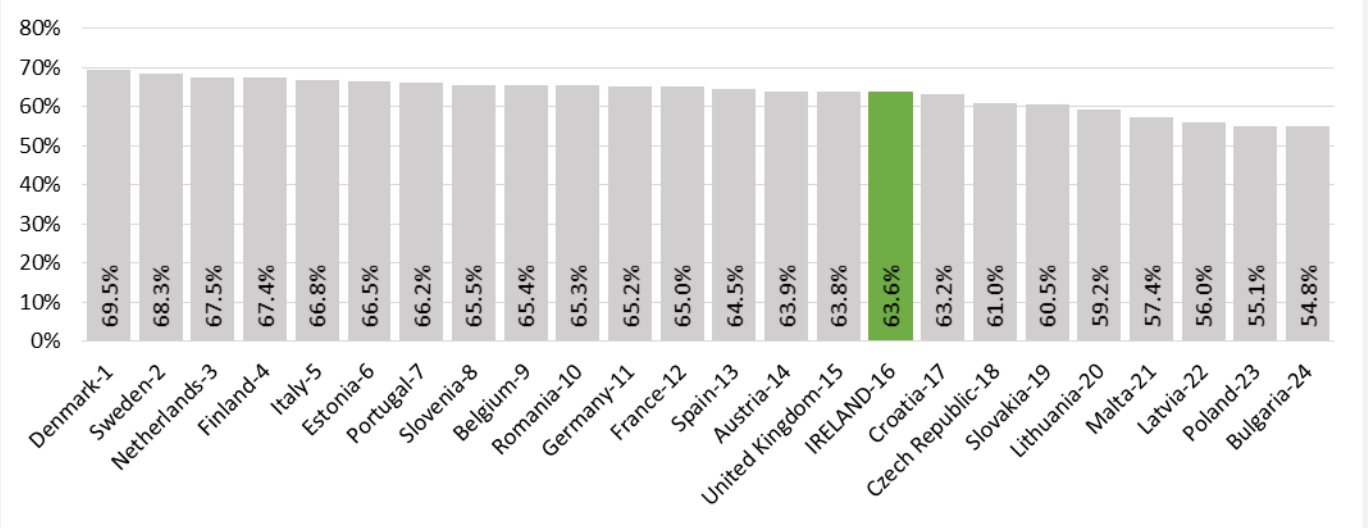
FIGURE 5-10
CANCER OF THE BREAST (FEMALES): EU-28: 5-YEAR NET SURVIVAL (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for breast cancer ranged from 74% to 89% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 77% (2000-2004) to 81% (2005-2009) to 82% during the period 2010-2014. Ireland ranked 16th of 24 EU countries surveyed for the period 2010-2014.

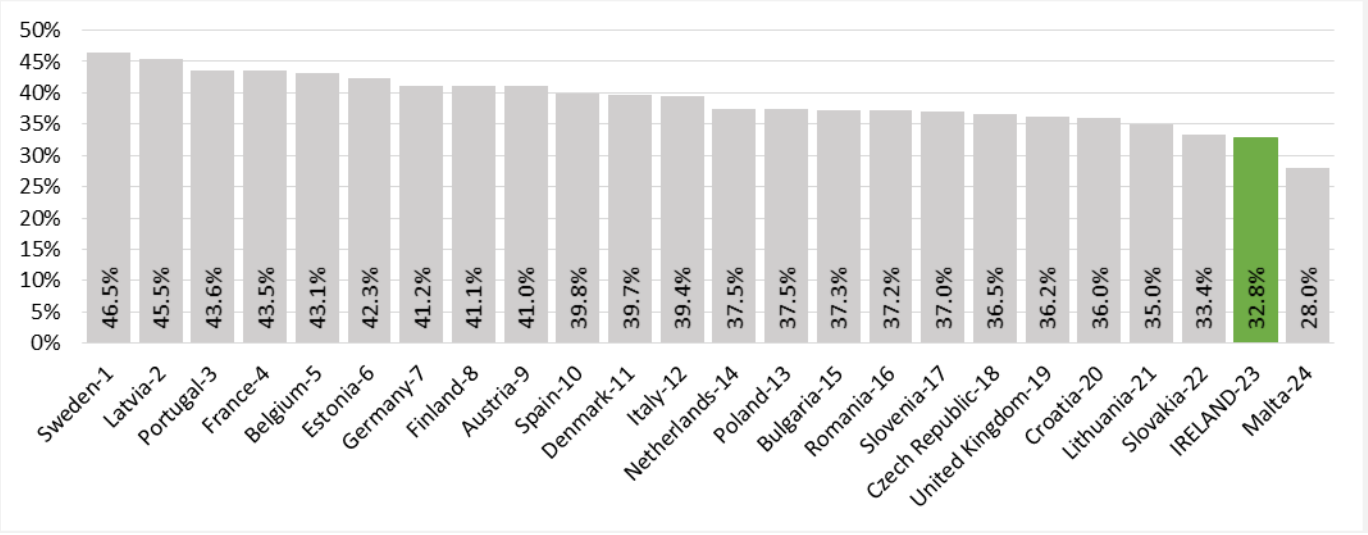
FIGURE 5-11
CANCER OF THE CERVIX: EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the cervix ranged from 55% to 70% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 58% (2000-2004) to 59% (2005-2009) to 64% during the period 2010-2014. Ireland ranked 16th of 24 EU countries surveyed for the period 2010-2014.

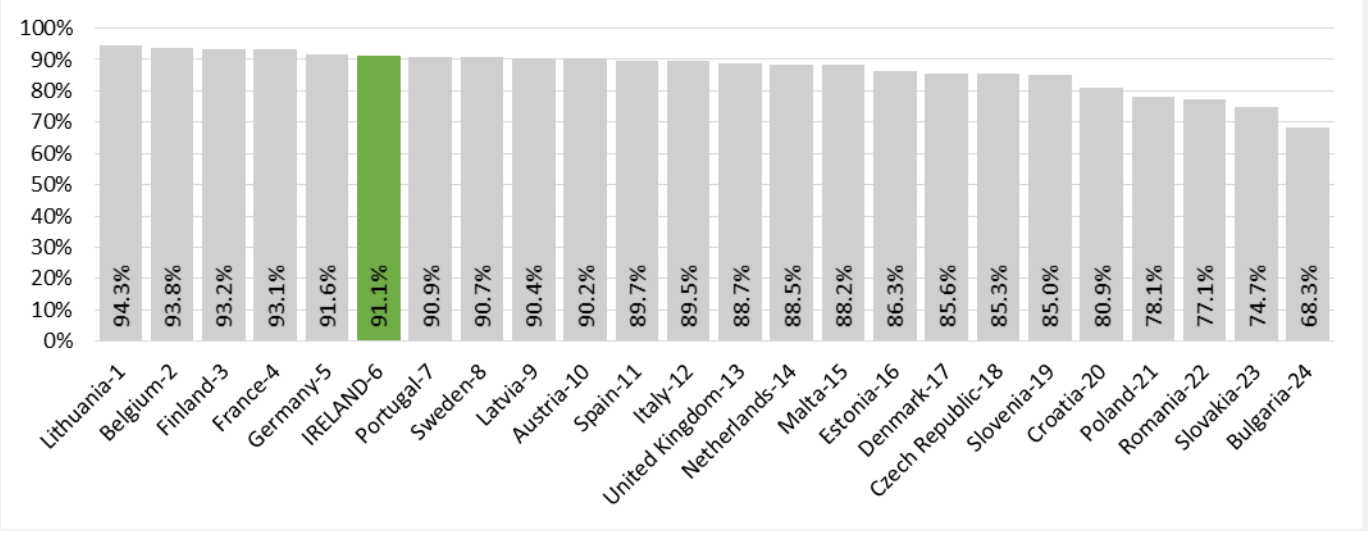
FIGURE 5-12
CANCER OF THE OVARY: EU-28: 5-YEAR NET SURVIVAL (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the ovary ranged from 28% to 47% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 29% (2000-2004) to 31% (2005-2009) to 33% during the period 2010-2014. Ireland ranked 23rd of 24 EU countries surveyed for the period 2010-2014.

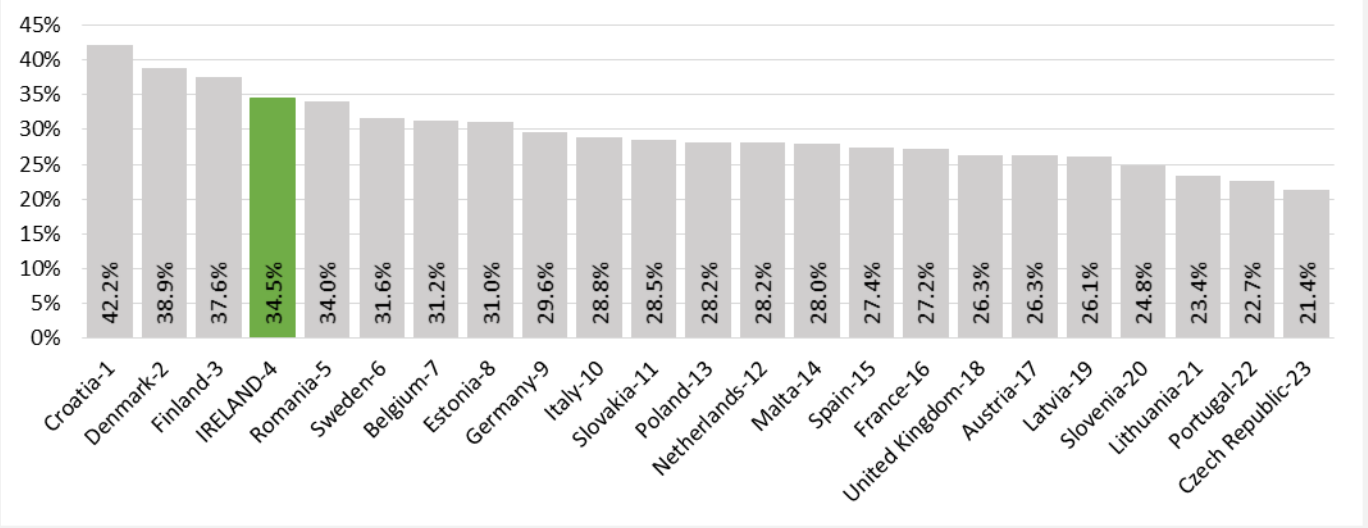
FIGURE 5-13
CANCER OF THE PROSTATE: EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for prostate cancer ranged from 68% to 94% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 84% (2000-2004) to 90% (2005-2009) to 91% during the period 2010-2014. Ireland ranked 6th of 24 EU countries surveyed for the period 2010-2014.

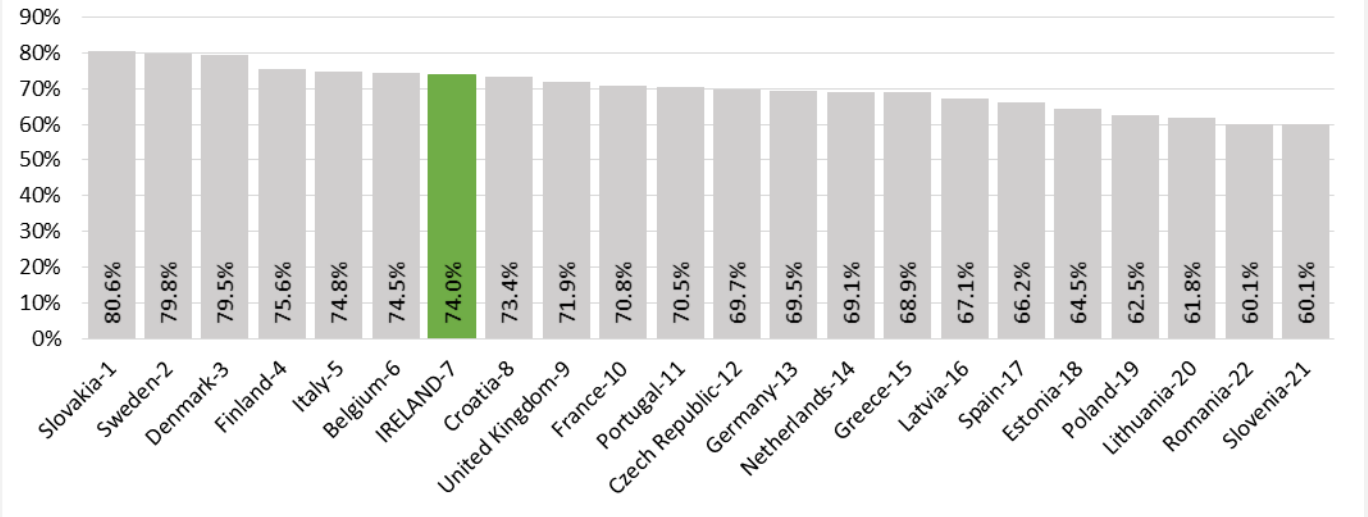
FIGURE 5-14
CANCER OF THE BRAIN (ADULTS) : EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Bulgaria, Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the brain (adults) ranged from 21% to 42% during the period 2010-2014 among 23 EU countries surveyed. Net survival in Ireland, increased from 27% (2000-2004) to 31% (2005-2009) to 35% during the period 2010-2014. Ireland ranked 4th of 23 EU countries surveyed for the period 2010-2014.

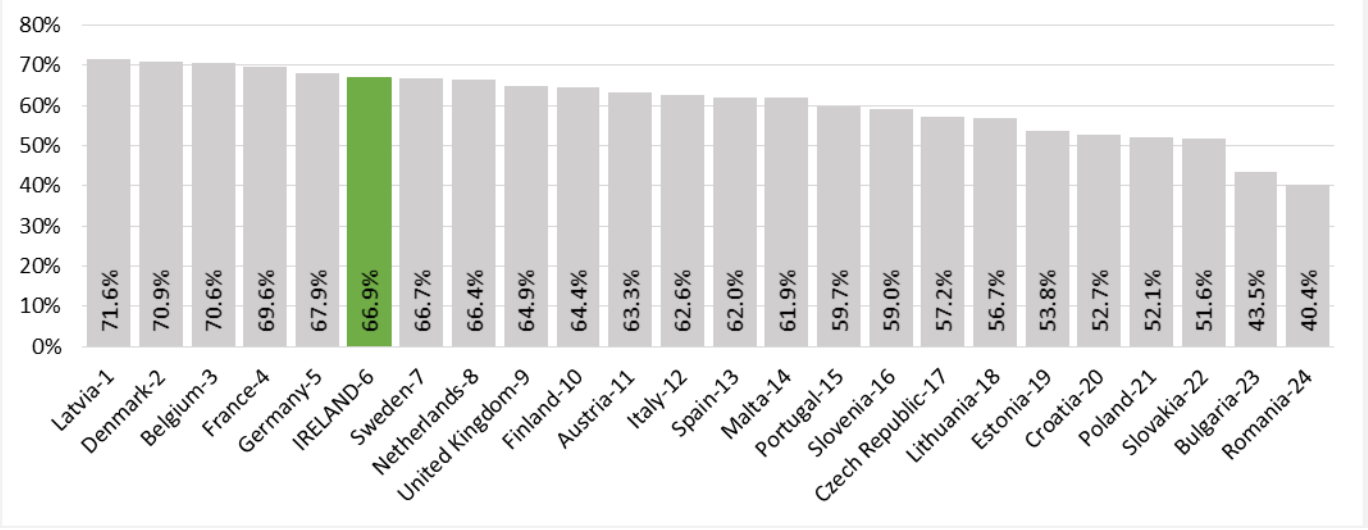
FIGURE 5-15
CANCER OF THE BRAIN (CHILDREN) : EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Austria, Bulgaria, Luxembourg, Cyprus, Malta and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for cancer of the brain (children) ranged from 60% to 81% during the period 2010-2014 among 21 EU countries surveyed. Net survival in Ireland, increased from 68% (2000-2004) to 69% (2005-2009) to 74% during the period 2010-2014. Ireland ranked 7th of 21 EU countries surveyed for the period 2010-2014.

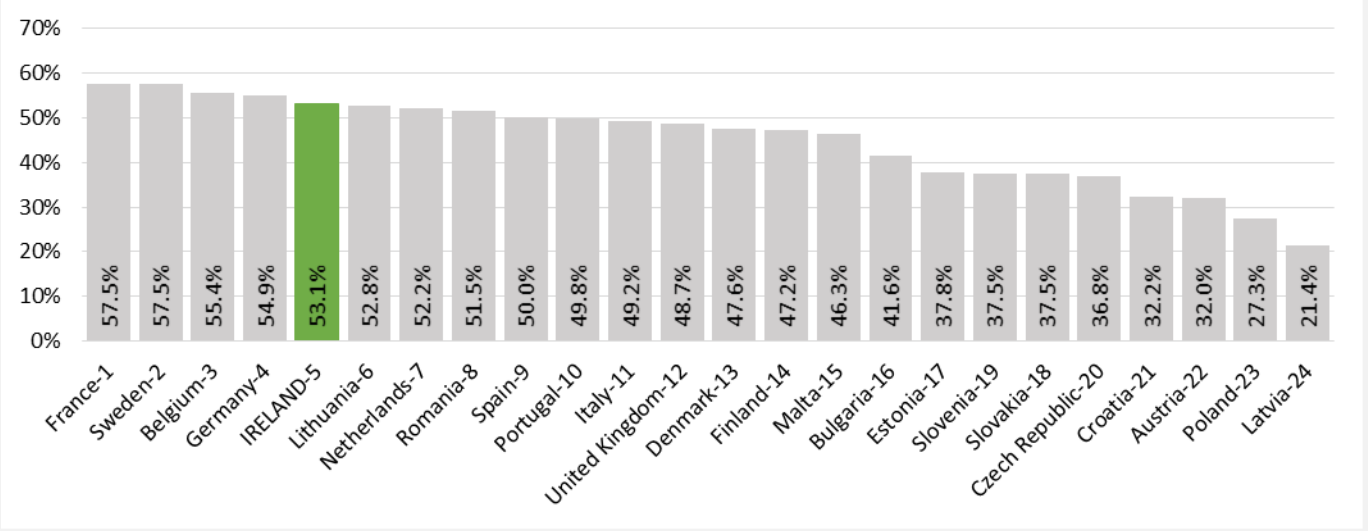
FIGURE 5-16
LYMPHOID TUMOURS (ADULTS) : EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for lymphoid tumours in adults ranged from 40% to 72% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, increased from 55% (2000-2004) to 64% (2005-2009) to 67% during the period 2010-2014. Ireland ranked 6th of 24 EU countries surveyed for the period 2010-2014.

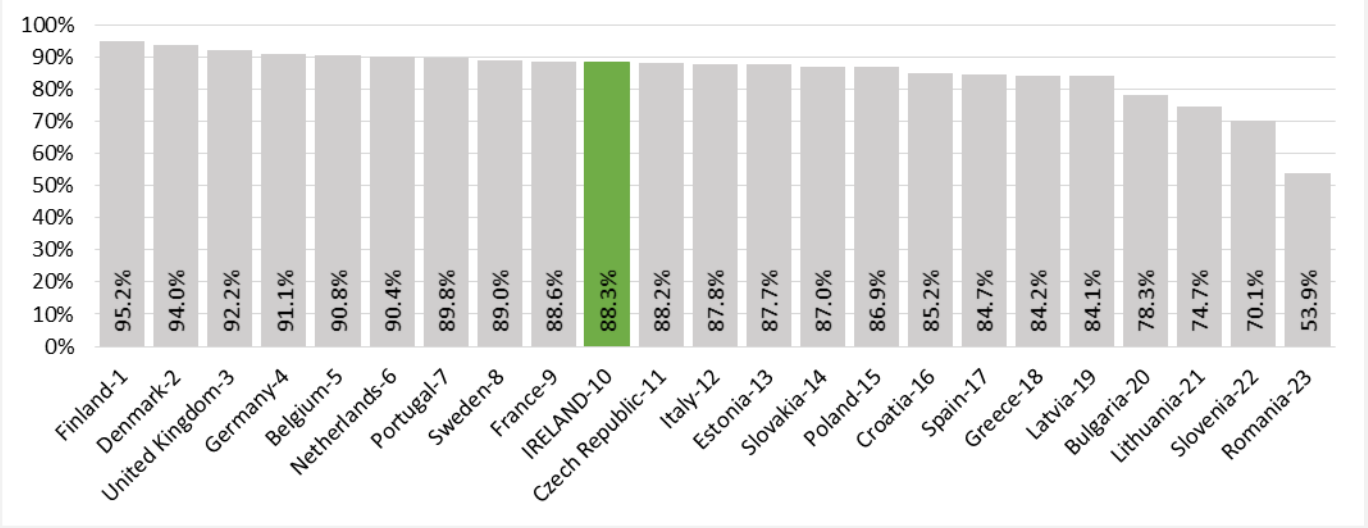
FIGURE 5-17
MYELOID TUMOURS (ADULTS) : EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Greece, Luxembourg, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for myeloid tumours in adults ranged from 21% to 58% during the period 2010-2014 among 24 EU countries surveyed. Net survival in Ireland, ranged from 48% (2000-2004) to 53% (2005-2009) to 53% during the period 2010-2014. Ireland ranked 5th of 24 EU countries surveyed for the period 2010-2014.

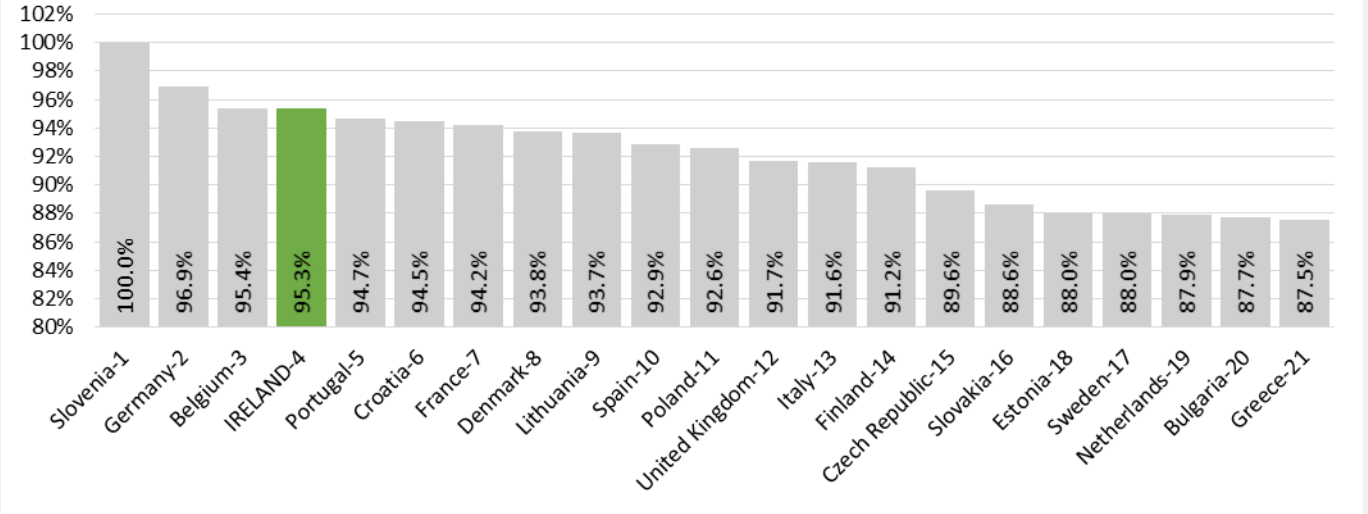
FIGURE 5-18
ACUTE LYMPHOBLASTIC LEUKAEMIA (CHILDREN) : EU-28: 5-YEAR NET SURVIVAL (%): 2010-2014



Excluding Austria, Luxembourg, Malta, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for acute lymphoblastic leukaemia in children ranged from 54% to 95% during the period 2010-2014 among 23 EU countries surveyed. Net survival in Ireland, increased from 83% (2000-2004) to 87% (2005-2009) to 88% during the period 2010-2014. Ireland ranked 10th of 23 EU countries surveyed for the period 2010-2014.

FIGURE 5-19
LYMPHOMA (CHILDREN): EU-28: 5-YEAR NET SURVIVAL AND RANK (%): 2010-2014



Excluding Austria , Latvia, Romania, Luxembourg, Malta, Cyprus and Hungary; data from Allemani et al. 2018 [2]

5-year net survival for lymphoma in children ranged from 88% to 100% during the period 2010-2014 among 21 EU countries surveyed. Net survival in Ireland, ranged from 97% (2000-2004) to 96% (2005-2009) to 95% during the period 2010-2014. Ireland ranked 4th of 21 EU countries surveyed for the period 2010-2014.

Trend in Ireland's cancer survival relative to other countries in the EU

TABLE 5-2
IRELAND'S RANK WITHIN THE EUROPEAN UNION FOR 5-YEAR NET SURVIVAL: BY CANCER TYPE AND PERIOD

	2000-2004	2005-2009	2010-2014	top half 2010-2014?	rank comparison 2010-2014 *vs.* 2000-2004
oesophagus	5 of 22	3 of 23	4 of 22	yes✓	↑
stomach	19 of 23	16 of 24	9 of 24	yes✓	↑
rectum	14 of 23	13 of 24	9 of 24	yes✓	↑
pancreas	12 of 22	12 of 23	8 of 23	yes✓	↑
lung	15 of 23	12 of 24	6 of 24	yes✓	↑
melanoma skin	9 of 23	10 of 24	8 of 24	yes✓	↑
cervix	18 of 23	21 of 24	16 of 24		↑
prostate	10 of 23	10 of 24	6 of 24	yes✓	↑
brain-adults	6 of 22	5 of 23	4 of 23	yes✓	↑
brain-children	11 of 21	12 of 20	7 of 22	yes✓	↑
lymphoid-adults	11 of 23	6 of 24	6 of 24	yes✓	↑
Acute lymphoblastic leukaemia - children	11 of 23	11 of 23	10 of 23	yes✓	↑
colon	13 of 23	11 of 24	13 of 24		↔
breast	16 of 23	15 of 24	16 of 24		↔
ovary	23 of 23	22 of 24	23 of 24		↔
liver	8 of 23	10 of 23	9 of 23	yes✓	↓
myeloid-adults	3 of 23	4 of 24	5 of 24	yes✓	↓
lymphoma-children	1 of 21	2 of 21	4 of 21	yes✓	↓

Data derived from CONCORD-3, Allemani et al. 2018 [2]
The figures in the table show Ireland's survival rank within number of EU28 countries surveyed.
For example, Ireland had the 4th highest survival for cancer of the oesophagus out of 22 countries surveyed during the period 2010-2014; Ireland ranked in the top half of countries surveyed for cancer of the oesophagus during 2010-2014 and there was an improvement in survival rank (↑) between the periods 2000-2004 and 2010-2014

- Of the 18 cancer types considered for five-year survival during the period 2010-2014, Ireland was placed in the top half of countries surveyed for 14 of these cancers. For the period 2010-2014, Ireland's ranking among EU countries was highest for cancers of the oesophagus (4th), pancreas (8th), lung (6th), melanoma skin (8th), prostate (6th), brain (adults 4th and children 7th), myeloid and lymphoid cancers in adults (5th and 6th respectively) and lymphoma in children (4th).

- Ireland ranked in the lower half of countries surveyed for cancer of the cervix (64%, 16th of 24), but of the other countries, only three countries approached 70% survival (Denmark 70%, Sweden 68% and the Netherlands 68%) and five countries had survival below 60%.

- Ireland also ranked in the lower half of countries for cancer of the colon (61%, 13th of 24) where only 4 countries exceeded 65%. It is anticipated that Ireland should fare better in the future for colon cancer survival once the effect of bowel screening is fully realised after implementation in 2015.

- Ireland ranked in the lower half of countries surveyed for breast cancer (82%, 16th of 24 countries), but 7 countries showed survival below 80% and only three countries showed survival above 88%.

- Ireland's survival ranking for ovarian cancer was poor (33%, 23rd of 24 countries surveyed) where the best EU country was Sweden (47%).

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APPENDIX I: INCIDENT CANCER CASES

3-year annual average 2015-2017 and estimates for 2018-2020

	2015-2017			2018-2020 (estimate)‡		
cancer	male	female	all	male	female	all
C00-96 all invasive cancers*	18,205	15,256	33,461	20,184	16,723	36,907
C00-43, C45-96 all invasive cancers excl. NMSC	11,926	10,624	22,550	13,152	11,641	24,793
C00-96, D00-D48 all registered tumours	20,393	20,891	41,284	22,809	21,944	44,753
D00-48 non-invasive tumours**	2,188	5,635	7,823	2,624	5,221	7,845
C00 lip	18	3	21	17	5	22
C01 base of tongue	35	9	44	35	11	46
C02 other and unspecified parts of tongue	51	29	80	68	29	97
C03 gum	10	13	23	13	8	21
C04 floor of mouth	32	7	39	29	11	40
C05 palate	15	8	23	18	9	27
C06 other and unspecified parts of mouth	19	13	32	22	20	42
C07 parotid gland	28	14	42	32	15	47
C08 other and unspecified major salivary glands	7	2	9	7	4	11
C09 tonsil	58	24	82	64	26	90
C10 oropharynx***	25	3	28	23	6	29
C11 nasopharynx	16	7	23	14	6	20
C12 pyriform sinus	19	4	23	18	4	22
C13 hypopharynx	19	5	24	23	7	30
C14 other and ill-defined sites in the lip, oral cavity and pharynx	4	2	6	7	4	11
C01-14 mouth & pharynx	337	140	477	372	160	532
C00-14 lip oral cavity and pharynx	354	144	498	389	165	554
C15 oesophagus	299	145	444	345	171	516
C16 stomach	363	189	552	361	209	570
C17 small intestine	55	46	101	71	56	127
C18 colon	983	796	1,779	1,038	853	1,891
C19 rectosigmoid junction	109	69	178	108	79	187
C20 rectum	461	231	692	487	253	740
C21 anus	26	35	61	30	48	78
C19-20 rectosigmoid junction and rectum	571	300	871	595	333	928
C19-21 rectum and anus	597	335	932	624	381	1,005
C18-20 colorectum	1,554	1,096	2,650	1,633	1,186	2,819
C18-21 colorectum and anus	1,580	1,131	2,711	1,662	1,234	2,896
C17-21 intestine	1,635	1,177	2,812	1,733	1,290	3,023
C22 liver and intrahepatic bile ducts	212	95	307	253	115	368
C23 gallbladder	18	50	68	18	50	68
C24 other and unspecified parts of biliary tract	76	64	140	89	70	159
C23-24 gallbladder and biliary tract	94	114	208	108	121	229
C22-24 liver gall bladder and biliary	306	209	515	361	236	597
C25 pancreas	298	265	563	314	303	617
C26 other and ill-defined digestive organs	33	33	66	42	40	82
C30 nasal cavity and middle ear	7	6	13	6	7	13
C31 accessory sinuses	10	6	16	11	8	19
C32 larynx	146	33	179	156	34	190
C00-14, C30-32 all head and neck	518	189	707	562	214	776
C00-15, C32 lip oral pharynx larynx oesophagus	799	321	1,120	890	370	1,260
C33 trachea	1	1	2	0	1	1
C34 bronchus and lung	1,392	1,196	2,588	1,502	1,248	2,750
C33-34 lung and trachea	1,392	1,197	2,589	1,503	1,250	2,753
C37 thymus	5	4	9	4	4	8
C38 heart, mediastinum and pleura	9	5	14	13	5	18
C39 other and ill-defined respiratory and intrathoracic	0	0	0	1	0	1
C40 bone and articular cartilage of limbs	13	10	23	16	10	26
C41 bone and articular cartilage of other and unspecified	16	11	27	23	11	34
C40-41 bone and articular and unspecified	13	10	23	16	10	26
C43 melanoma of skin	544	587	1,131	583	614	1,197
C44 other skin	6,279	4,632	10,911	7,032	5,082	12,114
C45 mesothelioma	44	9	53	39	8	47
C46 Kaposi sarcoma	6	0	6	9	0	9
C47 peripheral nerves and autonomic nervous system	2	3	5	4	5	9
C48 retroperitoneum and peritoneum	8	18	26	10	21	31
C49 other connective and soft tissue	93	56	149	121	69	190
C50 breast	29	3,256	3,285	37	3,667	3,704
C51 vulva		61	61		67	67

3-year annual average 2015-2017 and estimates for 2018-2020

	2015-2017			2018-2020 (estimate)‡		
cancer	male	female	all	male	female	all
C52 vagina		9	9		17	17
C53 cervix uteri		275	275		302	302
C54 corpus uteri		512	512		557	557
C55 uterus, part unspecified		28	28		31	31
C56 ovary		400	400		407	407
C57 other and unspecified female genital organs		49	49		56	56
C58 placenta		1	1		2	2
C51-52, C55, C57-58 other malignant gynaecological neoplasms		148	148		173	173
C60 penis	38		38	46		46
C61 prostate	3,447		3,447	3,890		3,890
C62 testis	175		175	173		173
C63 other and unspecified male genital organs	4		4	4		4
C64 kidney, except renal pelvis	419	235	654	448	250	698
C65 renal pelvis	16	8	24	15	12	27
C66 ureter	19	9	28	23	10	33
C64-66 kidney incl. renal pelvis and ureter	454	252	706	486	272	758
C67 bladder	294	111	405	349	141	490
C68 other and unspecified urinary organs	5	4	9	12	5	17
C69 eye and adnexa	34	28	62	34	29	63
C70 meninges	3	5	8	3	11	14
C71 brain	216	144	360	244	175	419
C72 spinal cord, cranial nerves and other parts of CNS	6	7	13	9	13	22
C71-72 brain and spinal cord	222	151	373	253	188	441
C70-72 malignant meninges brain and spinal cord	225	157	382	256	199	455
C70-72, D32-33, D42-43 all meninges brain and CNS	327	360	687	374	396	770
C73 thyroid gland	68	185	253	73	179	252
C74 adrenal gland	9	10	19	9	7	16
C75 other endocrine glands and related structures	8	5	13	12	10	22
C76 other and ill-defined sites	12	22	34	21	25	46
C77 secondary and unspecified lymph nodes	4	3	7	9	8	17
C80 neoplasm without specification of site	192	181	373	260	215	475
C81 Hodgkin lymphoma	89	68	157	88	67	155
C82 follicular nodular non-Hodgkin lymphoma	103	111	214	107	101	208
C83 diffuse non-Hodgkin lymphoma	237	166	403	238	174	412
C84 peripheral and cutaneous T-cell lymphomas	38	26	64	47	27	74
C85 other and unspecified types of non-Hodgkin lymphoma	85	62	147	107	88	195
C82-85 all non-Hodgkin lymphoma	463	365	828	499	390	889
C81-85 lymphoma (total)	552	433	985	587	458	1,045
C88 immunoproliferative diseases	11	7	18	15	5	20
C90 multiple myeloma	205	143	348	222	139	361
C88-90 multiple myeloma and immunoproliferative	216	150	366	237	144	381
C911 leukaemia CLL	158	80	238	153	74	227
C91 lymphoid leukaemia	209	113	322	217	107	324
C92 myeloid leukaemia	114	88	202	127	81	208
C93 monocytic leukaemia	4	2	6	2	2	4
C94 other leukaemia of specified cell type	5	1	6	5	2	7
C95 leukaemia of unspecified cell type	17	14	31	27	19	46
C91-95 leukaemia (total)	349	219	568	378	212	590
C96 other and unspecified lymphoid haematopoietic	224	169	393	232	172	404
D00 carcinoma in situ of oral cavity, oesophagus and stomach	17	13	30	17	15	32
D01 carcinoma in situ of other and unspecified digestive organs	10	10	20	16	12	28
D02 carcinoma in situ of middle ear and respiratory system	19	8	27	25	13	38
D03 melanoma in situ	341	351	692	456	455	911
D04 carcinoma in situ of skin	999	1,215	2,214	1,214	1,366	2,580
D05 carcinoma in situ of breast	2	370	372	2	436	438
D06 carcinoma in situ of cervix uteri		2,952	2,952		2,190	2,190
D07 carcinoma in situ of other and unspecified genital organs	102	62	164	101	58	159
D09 carcinoma in situ of other and unspecified sites	81	20	101	100	31	131
D32 benign meninges	46	141	187	48	127	175
D33 benign brain and other parts of CNS	20	25	45	29	27	56
D32-33 benign meninges, brain & CNS	66	166	232	77	153	230
D35 benign other and unspecified endocrine glands [intracranial only]	62	50	112	54	42	96
D37 uncertain or unknown of oral cavity and digestive organs	33	44	77	42	48	90
D38 uncertain or unknown of middle ear and respiratory intrathoracic	6	5	11	7	5	12
D39 uncertain or unknown of female genital organs		93	93		95	95
D40 uncertain or unknown of male genital organs	3		3	3		3
D41 uncertain or unknown of urinary organs	240	99	339	271	97	368
D42 uncertain or unknown of meninges	8	11	19	9	14	23
D43 uncertain or unknown of brain and CNS	27	26	53	31	30	61
D42-43 uncertain meninges, brain & CNS	36	37	73	41	43	84

3-year annual average 2015-2017 and estimates for 2018-2020						
	2015-2017			2018-2020 (estimate)‡		
cancer	male	female	all	male	female	all
D44 uncertain or unknown of endocrine glands	12	16	28	15	24	39
D47 other uncertain or unknown of lymphoid and haematopoietic	77	68	145	76	62	138
D48 uncertain or unknown of other and unspecified sites	81	53	134	106	73	179
HAEMACARE classification of tumours of lymphatic and haematopoietic tissue						
H01 Lymphoma NOS	26	23	49	35	35	70
H02 NH lymphoma NOS	57	37	94	69	50	119
H03 Composite Hodgkin and Non-Hodgkin	0	0	0	1	1	2
H04 Hodgkin lymphoma nodular lymphocyte predominance	7	3	10	7	3	10
H05 Classical HL	82	65	147	81	65	146
H06 Chronic lymphocytic leukaemia/Small lymphocytic lymphoma	172	89	261	167	80	247
H07 Immunoproliferative diseases	18	11	29	21	9	30
H08 Mantle cell/centrocytic lymphoma	28	9	37	31	10	41
H09 Follicular B lymphoma	85	89	174	88	82	170
H10 Diffuse B lymphoma	173	136	309	174	149	323
H11 Burkitt lymphoma	12	6	18	12	3	15
H12 Marginal zone lymphoma	20	25	45	21	22	43
H13 T lymphoma cutaneous	15	10	25	20	12	32
H14 Other T cell lymphomas	26	18	44	32	19	51
H15 Lymphoblastic lymphoma,/Acute precursor cell lymphatic lymphoma	36	28	64	44	27	71
H16 Plasma cell neoplasms	208	143	351	223	140	363
H18 Mature B cell leukaemia hairy cell	12	2	14	15	3	18
H19 Lymphatic leukaemia NOS	1	1	2	0	1	1
H20 Leukaemia NOS	17	14	31	27	19	46
H21 Myeloid leukaemia NOS	2	1	3	3	2	5
H22 Acute myeloid leukaemia	85	66	151	98	62	160
H23 Myeloproliferative neoplasms	127	115	242	149	122	271
H24 Myelodysplastic syndrome	105	65	170	95	58	153
H25 Myelodysplastic, Myeloproliferative neoplasm	22	9	31	20	8	28
C00-96 all cancers excl. NMSC & lung	10,534	9,427	19,961	11,650	10,391	22,041
C00-96 all cancers excl. NMSC & prostate	8,479	10,624	19,103	9,262	11,641	20,903
C00-96 all cancers excl. NMSC & breast	11,897	7,368	19,265	13,115	7,973	21,088
C00-96 all cancers excl. NMSC & breast & prostate	8,450	7,368	15,818	9,225	7,973	17,198
C91-95 leukaemia (total) excl. C911 leukaemia CLL	192	139	331	225	138	363

*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).
‡ Average age-specific rates for 2016-2018 were calculated and applied to population estimates for 2019 and 2020 to allow estimation of average annual counts for 2018-2020 presented in the table. Of the estimated average annual counts for 2018-2020, counts for the year 2018 were observed, not estimated.

APPENDIX II: INCIDENT CANCER RATES

Age-standardised rate (ASR, per 100,000): annual average for 2018-2020 (assumed to be unchanged from 2016-2018). Incidence rate was calculated using two different age weights: 1976 and 2013 European standard populations (ESP) [18].

Age-standardised rate (ASR) per 100,000 (estimate) Estimated 3-year annual average: 2018-2020	ESP 1976			ESP 2013		
cancer	male	female	all	male	female	all
C00-96 all invasive cancers	725.6	562.2	637.9	1,127.9	814.2	957.5
C00-43, C45-96 all invasive cancers excl. NMSC	477.8	399.1	435.6	721.6	560.8	634.9
C00-96, D00-D48 all registered tumours	819.1	757.1	782.6	1,276.0	1,047.6	1,148.1
D00-48 non-invasive tumours	93.5	195.0	144.7	148.0	233.5	190.6
C00 lip	0.6	0.2	0.4	0.9	0.3	0.6
C01 base of tongue	1.3	0.4	0.9	1.8	0.5	1.1
C02 other and unspecified parts of tongue	2.6	1.0	1.8	3.5	1.4	2.4
C03 gum	0.5	0.3	0.3	0.8	0.4	0.6
C04 floor of mouth	1.1	0.4	0.7	1.4	0.5	1.0
C05 palate	0.7	0.3	0.5	0.9	0.4	0.7
C06 other and unspecified parts of mouth	0.8	0.7	0.8	1.2	1.0	1.1
C07 parotid gland	1.1	0.5	0.8	2.1	0.7	1.3
C08 other and unspecified major salivary glands	0.3	0.1	0.2	0.4	0.2	0.3
C09 tonsil	2.5	1.0	1.8	3.1	1.2	2.1
C10 oropharynx	0.9	0.2	0.5	1.1	0.3	0.7
C11 nasopharynx	0.5	0.2	0.4	0.7	0.3	0.5
C12 pyriform sinus	0.7	0.1	0.4	0.9	0.2	0.6
C13 hypopharynx	0.8	0.2	0.5	1.2	0.4	0.8
C14 other and ill-defined sites in the lip, oral cavity and pharynx	0.3	0.1	0.2	0.4	0.2	0.3
C01-14 mouth & pharynx	14.0	5.7	9.7	19.4	7.6	13.2
C00-14 lip oral cavity and pharynx	14.6	5.9	10.1	20.3	7.9	13.8
C15 oesophagus	12.5	5.2	8.7	19.3	8.8	13.8
C16 stomach	12.7	6.6	9.4	20.8	10.6	15.3
C17 small intestine	2.6	1.8	2.2	3.9	2.8	3.3
C18 colon	36.7	27.1	31.6	59.9	42.6	50.5
C19 rectosigmoid junction	3.9	2.6	3.2	5.9	3.9	4.9
C20 rectum	17.7	8.6	12.9	26.7	12.3	19.1
C21 anus	1.1	1.7	1.4	1.6	2.3	1.9
C19-20 rectosigmoid junction and rectum	21.6	11.3	16.2	32.6	16.3	24.0
C19-21 rectum and anus	22.7	13.0	17.6	34.2	18.5	25.9
C18-20 colorectum	58.3	38.3	47.7	92.5	58.9	74.5
C18-21 colorectum and anus	59.4	40.0	49.1	94.0	61.1	76.4
C17-21 intestine	62.0	41.8	51.3	97.9	63.9	79.7
C22 liver and intrahepatic bile ducts	9.0	3.6	6.2	14.5	5.8	9.9
C23 gallbladder	0.6	1.5	1.1	1.1	2.6	1.9
C24 other and unspecified parts of biliary tract	3.1	2.2	2.6	5.1	3.6	4.3
C23-24 gallbladder and biliary tract	3.8	3.7	3.7	6.2	6.2	6.2
C22-24 liver gall bladder and biliary	12.8	7.3	9.9	20.6	12.0	16.0
C25 pancreas	11.0	9.3	10.2	18.1	15.3	16.8
C26 other and ill-defined digestive organs	1.5	1.2	1.3	2.6	2.0	2.3
C30 nasal cavity and middle ear	0.2	0.3	0.2	0.3	0.4	0.3
C31 accessory sinuses	0.4	0.2	0.3	0.6	0.4	0.5
C32 larynx	5.8	1.2	3.4	8.3	1.7	4.8
C00-14 C30-32 all head and neck	21.0	7.6	14.1	29.5	10.2	19.4
C00-15 C32 lip oral pharynx larynx oesophagus	32.9	12.3	22.3	47.8	18.3	32.3
C33 trachea	0.0	0.1	0.0	0.0	0.1	0.0
C34 bronchus and lung	52.8	40.4	46.1	86.3	63.5	73.8
C33-34 lung and trachea	52.8	40.4	46.1	86.3	63.6	73.9
C37 thymus	0.2	0.2	0.2	0.2	0.2	0.2
C38 heart, mediastinum and pleura	0.5	0.2	0.3	0.8	0.3	0.5
C39 other and ill-defined respiratory and intrathoracic	0.0	-	0.0	0.0	-	0.0
C40 bone and articular cartilage of limbs	0.6	0.4	0.5	0.7	0.4	0.5
C41 bone and articular cartilage of other and unspecified	0.9	0.4	0.7	1.1	0.5	0.8
C40-41 bone and articular and unspecified	0.6	0.4	0.5	0.7	0.4	0.5
C43 melanoma of skin	21.2	21.4	21.1	31.9	28.8	29.9
C44 other skin	247.9	163.1	202.3	406.3	253.3	322.6
C45 mesothelioma	1.3	0.3	0.8	2.4	0.4	1.3
C46 Kaposi sarcoma	0.4	0.0	0.2	0.4	0.0	0.2
C47 peripheral nerves and autonomic nervous system	0.2	0.2	0.2	0.2	0.2	0.2
C48 retroperitoneum and peritoneum	0.4	0.7	0.5	0.6	1.1	0.8
C49 other connective and soft tissue	4.4	2.4	3.4	6.5	3.2	4.7
C50 breast	1.3	132.8	68.7	2.1	171.1	89.8

Age-standardised rate (ASR) per 100,000 (estimate) Estimated 3-year annual average: 2018-2020	ESP 1976			ESP 2013		
cancer	male	female	all	male	female	all
C51 vulva		2.2	1.1		3.2	1.7
C52 vagina		0.6	0.3		0.8	0.4
C53 cervix uteri		11.5	5.9		12.6	6.4
C54 corpus uteri		19.9	10.2		27.1	14.0
C55 uterus, part unspecified		1.0	0.5		1.5	0.8
C56 ovary		13.9	7.2		19.6	10.3
C57 other and unspecified female genital organs		1.9	1.0		2.8	1.5
C58 placenta		0.1	0.0		0.1	0.0
C51-52, C55, C57-58 other malignant gynaecological neoplasms		5.8	3.0		8.5	4.5
C60 penis	1.7		0.8	2.6		1.2
C61 prostate	143.4		69.8	208.0		100.0
C62 testis	7.2		3.5	7.0		3.4
C63 other and unspecified male genital organs	0.1		0.1	0.2		0.1
C64 kidney, except renal pelvis	16.7	8.4	12.4	23.6	12.2	17.7
C65 renal pelvis	0.5	0.4	0.5	0.8	0.6	0.7
C66 ureter	0.8	0.3	0.5	1.4	0.5	0.9
C64-66 kidney incl. renal pelvis and ureter	18.0	9.1	13.4	25.8	13.4	19.3
C67 bladder	12.0	4.3	7.8	21.1	7.2	13.5
C68 other and unspecified urinary organs	0.4	0.1	0.3	0.8	0.2	0.5
C69 eye and adnexa	1.3	1.1	1.2	1.6	1.3	1.5
C70 meninges	0.1	0.3	0.2	0.1	0.6	0.4
C71 brain	9.3	6.2	7.7	12.4	8.1	10.2
C72 spinal cord, cranial nerves and other parts of CNS	0.4	0.5	0.5	0.4	0.5	0.5
C71-72 brain and spinal cord	9.7	6.7	8.2	12.8	8.7	10.6
C70-72 malignant meninges brain and spinal cord	9.8	7.1	8.4	13.0	9.2	11.0
C70-72, D32-33, D42-43, all meninges brain and CNS	14.3	14.1	14.2	18.7	18.2	18.4
C73 thyroid gland	2.9	6.9	4.9	3.5	7.7	5.6
C74 adrenal gland	0.4	0.3	0.3	0.4	0.3	0.4
C75 other endocrine glands and related structures	0.5	0.4	0.4	0.6	0.4	0.5
C76 other and ill-defined sites	0.8	0.8	0.8	1.3	1.2	1.2
C77 secondary and unspecified lymph nodes	0.3	0.3	0.3	0.5	0.4	0.4
C80 neoplasm without specification of site	9.1	6.2	7.6	15.8	11.0	13.2
C81 Hodgkin lymphoma	3.5	2.6	3.1	4.0	2.9	3.4
C82 follicular nodular non-Hodgkin lymphoma	4.0	3.5	3.8	5.5	4.9	5.2
C83 diffuse non-Hodgkin lymphoma	8.6	5.7	7.1	12.9	8.7	10.7
C84 peripheral and cutaneous T-cell lymphomas	1.8	1.0	1.3	2.5	1.3	1.9
C85 other and unspecified types of non-Hodgkin lymphoma	3.8	2.9	3.3	5.9	4.4	5.1
C82-85 all non-Hodgkin lymphoma	18.2	13.0	15.5	26.7	19.4	22.8
C81-85 lymphoma (total)	21.8	15.7	18.6	30.7	22.3	26.3
C88 immunoproliferative diseases	0.5	0.2	0.3	0.8	0.3	0.5
C90 multiple myeloma	7.9	4.4	6.1	12.7	7.1	9.6
C88-90 multiple myeloma and immunoproliferative	8.5	4.6	6.4	13.5	7.3	10.1
C911 leukaemia CLL	5.4	2.3	3.8	8.8	3.8	6.1
C91 lymphoid leukaemia	8.1	3.7	5.8	11.4	5.1	8.0
C92 myeloid leukaemia	4.5	2.8	3.6	7.0	3.8	5.3
C93 monocytic leukaemia	0.1	0.1	0.1	0.1	0.1	0.1
C94 other leukaemia of specified cell type	0.2	0.1	0.1	0.3	0.1	0.2
C95 leukaemia of unspecified cell type	0.9	0.5	0.7	1.8	1.0	1.3
C91-95 leukaemia (total)	13.8	7.2	10.3	20.5	10.1	14.9
C96 other and unspecified lymphoid haematopoietic	8.3	5.7	6.9	12.9	8.4	10.5
D00 carcinoma in situ of oral cavity, oesophagus and stomach	0.6	0.5	0.5	1.0	0.7	0.8
D01 carcinoma in situ of other and unspecified digestive organs	0.6	0.4	0.5	0.8	0.5	0.7
D02 carcinoma in situ of middle ear and respiratory system	0.9	0.4	0.7	1.4	0.6	1.0
D03 melanoma in situ	16.6	16.0	16.2	24.8	21.8	23.0
D04 carcinoma in situ of skin	42.0	40.8	41.4	71.7	70.6	71.2
D05 carcinoma in situ of breast	0.1	17.2	8.7	0.1	19.6	10.0
D06 carcinoma in situ of cervix uteri		93.1	47.4		85.7	43.7
D07 carcinoma in situ of other and unspecified genital organs	3.9	2.2	3.1	4.9	2.6	3.7
D09 carcinoma in situ of other and unspecified sites	3.5	1.0	2.2	5.8	1.6	3.5
D32 benign meninges	1.8	4.3	3.1	2.5	6.1	4.4
D33 benign brain and other parts of CNS	1.2	1.1	1.1	1.4	1.1	1.2
D32-33 benign meninges, brain & CNS	2.9	5.4	4.2	3.9	7.2	5.6
D35 benign other and unspecified endocrine glands [intracranial only]	2.1	1.6	1.9	2.5	1.9	2.2
D37 uncertain or unknown behaviour of oral cavity and digestive organs	1.5	1.6	1.6	2.2	2.3	2.3
D38 uncertain or unknown of middle ear and respiratory intrathoracic	0.3	0.2	0.2	0.3	0.2	0.3
D39 uncertain or unknown of female genital organs		3.7	1.9		4.0	2.1
D40 uncertain or unknown of male genital organs	0.1		0.1	0.1		0.0
D41 uncertain or unknown of urinary organs	9.6	3.3	6.3	15.3	4.8	9.7
D42 uncertain or unknown of meninges	0.4	0.5	0.4	0.5	0.6	0.6
D43 uncertain or unknown of brain and CNS	1.2	1.2	1.2	1.3	1.2	1.2
D42-43 uncertain meninges, brain & CNS	1.6	1.7	1.6	1.8	1.8	1.8
D44 uncertain or unknown of endocrine glands	0.6	1.0	0.8	0.7	1.1	0.9

Age-standardised rate (ASR) per 100,000 (estimate) Estimated 3-year annual average: 2018-2020	ESP 1976			ESP 2013		
cancer	male	female	all	male	female	all
D47 other uncertain or unknown of lymphoid and haematopoietic	2.7	2.0	2.3	4.4	3.1	3.7
D48 uncertain or unknown of other and unspecified sites	3.8	2.8	3.2	6.3	3.2	4.4
HAEMACARE classification of tumours of lymphatic and haematopoietic tissue						
H01 Lymphoma NOS	1.3	1.2	1.2	1.9	1.7	1.8
H02 NH lymphoma NOS	2.5	1.6	2.0	3.8	2.5	3.1
H03 Composite Hodgkin and Non-Hodgkin	0.0	0.0	0.0	0.0	0.0	0.0
H04 Hodgkin lymphoma nodular lymphocyte predominance	0.3	0.1	0.2	0.3	0.1	0.2
H05 Classical HL	3.3	2.5	2.9	3.7	2.8	3.2
H06 Chronic lymphocytic leukaemia/Small lymphocytic lymphoma	5.9	2.5	4.1	9.5	4.1	6.6
H07 Immunoproliferative diseases	0.8	0.3	0.5	1.2	0.5	0.8
H08 Mantle cell/centrocytic lymphoma	1.1	0.3	0.7	1.8	0.5	1.1
H09 Follicular B lymphoma	3.3	2.8	3.1	4.5	4.0	4.2
H10 Diffuse B lymphoma	6.3	4.9	5.5	9.5	7.5	8.4
H11 Burkitt lymphoma	0.5	0.1	0.3	0.5	0.2	0.3
H12 Marginal zone lymphoma	0.8	0.8	0.8	1.1	1.1	1.1
H13 T lymphoma cutaneous	0.8	0.4	0.6	1.0	0.6	0.8
H14 Other T cell lymphomas	1.2	0.6	0.9	1.7	0.9	1.3
H15 Lymphoblastic lymphoma/Acute precursor cell lymphatic lymphoma	1.9	1.2	1.5	1.6	1.0	1.3
H16 Plasma cell neoplasms	8.0	4.5	6.1	12.8	7.1	9.7
H18 Mature B cell leukaemia hairy cell	0.6	0.1	0.3	0.7	0.1	0.4
H19 Lymphatic leukaemia NOS	0.0	0.0	0.0	0.0	0.1	0.0
H20 Leukaemia NOS	0.9	0.5	0.7	1.8	1.0	1.3
H21 Myeloid leukaemia NOS	0.1	0.1	0.1	0.2	0.1	0.1
H22 Acute myeloid leukaemia	3.5	2.2	2.8	5.4	2.9	4.0
H23 Myeloproliferative neoplasms	5.6	4.2	4.9	7.8	5.9	6.7
H24 Myelodysplastic syndrome	3.2	1.7	2.4	5.7	2.9	4.2
H25 Myelodysplastic, Myeloproliferative neoplasm	0.7	0.3	0.5	1.2	0.4	0.7
C00-96 all cancers excl. NMSC & lung	425.0	358.6	389.5	635.3	497.3	561.0
C00-96 all cancers excl. NMSC & prostate	334.4	399.1	365.9	513.6	560.8	534.9
C00-96 all cancers excl. NMSC & breast	476.4	266.2	366.9	719.5	389.7	545.0
C00-96 all cancers excl. NMSC & breast & prostate	333.1	266.2	297.2	511.6	389.7	445.0
C91-95 leukaemia (total) excl. C911 leukaemia CLL	8.4	4.9	6.5	11.8	6.3	8.8

APPENDIX III: MORTALITY

Mortality: Annual average over 3 years 2015-2017	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	female ESP 1976	female ESP 2013	males	females
C00-96, D00-48 all neoplasms	4,918	4,363	9,280	190.8	342.0	143.7	241.4	9	10
C00-96 all invasive cancers	4,799	4,264	9,063	186.2	332.4	140.9	235.8	9	11
C00-14 lip, oral cavity and pharynx	134	54	188	5.4	8.4	1.8	2.9	233	732
C00-14, C30-32 all head and neck	195	65	260	7.8	12.2	2.2	3.5	161	594
C00-15, C32 oral cavity, larynx, oesophagus	464	201	665	18.3	29.5	6.4	11.2	72	220
C15 oesophagus	276	137	412	10.8	17.8	4.3	7.7	125	348
C16 stomach	202	124	326	7.8	13.6	3.9	7.0	188	452
C17 small intestine	13	13	26	0.5	0.8	0.4	0.7	2,401	3,135
C18 colon	272	214	486	10.5	20.0	6.6	12.1	167	260
C19-21 rectum and anus	334	205	539	12.9	22.7	6.8	11.4	118	209
C18-21 colorectum and anus	605	420	1,025	23.5	42.6	13.4	23.4	69	116
C17-21 intestine	618	433	1,051	23.9	43.4	13.8	24.2	67	112
C22 liver	210	124	334	8.1	13.8	4.0	6.9	170	343
C23-24 gallbladder and biliary tract	18	38	56	0.7	1.3	1.2	2.2	2,636	1,371
C22-24 liver and biliary passages	228	162	390	8.8	15.2	5.2	9.1	160	274
C25 pancreas	276	253	529	10.7	18.7	8.2	14.3	133	173
C32 larynx	54	11	65	2.1	3.4	0.4	0.6	584	3,270
C33-34 lung	1,039	845	1,883	40.3	69.0	28.4	47.4	34	46
C43 melanoma of skin	90	64	154	3.5	5.9	2.0	3.5	436	825
C45 mesothelioma	34	6	40	1.3	2.2	0.2	0.3	1,174	6,955
C50 breast	5	719	724	0.2	0.3	24.9	38.6	4,193	56
C53 cervix		84	84			3.2	4.2		411
C54 corpus uteri		96	96			3.2	5.4		389
C56 ovary		290	290			10.1	16.0		125
C61 prostate	537		537	20.5	44.5			128	
C62 testis	7		7	0.3	0.4			5,282	
C64 kidney	143	73	216	5.6	9.3	2.3	4.1	249	672
C64-66 kidney, incl. renal pelvis and ureter	151	76	227	5.9	10.0	2.4	4.3	239	650
C67 bladder	155	67	223	5.9	12.1	2.0	3.8	411	968
C70-72 malignant meninges, brain & CNS	188	120	308	7.6	10.6	4.5	6.2	160	272
D32-33 benign brain & CNS	9	13	22	0.4	0.6	0.4	0.7	5,604	5,021
D42-43 uncertain brain & CNS	8	8	16	0.3	0.6	0.2	0.4	7,801	8,796

Mortality: Annual average over 3 years 2015-2017	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	female ESP 1976	female ESP 2013	males	females
C70-72, D32-33, D42-43 all brain & CNS	205	141	346	8.3	11.8	5.1	7.3	152	250
C73 thyroid	13	17	30	0.5	0.8	0.6	0.9	1,987	2,549
C81 Hodgkin lymphoma	14	8	22	0.6	0.9	0.3	0.4	2,212	5,328
C82-85 non-Hodgkin lymphoma	157	125	282	6.0	10.7	3.8	7.0	274	435
C88-90 multiple myeloma	98	78	176	3.7	7.1	2.4	4.5	463	724
C91-95 leukaemia	155	102	257	6.0	10.9	3.2	5.7	285	491

Source of data: Central Statistics Office, Ireland

* Rates are age-standardised to the 1976 and 2013 European Standard Population (ESP) [18]

cumulative risk of dying of cancer using method as described [6], expressed as 1 in […], e.g. 1 in 10

APPENDIX IV: PREVALENCE

Table IV-I
Complete prevalence by cancer type, sex and age: number of cancer survivors on 31/12/2018

site	age‡	females	%	males	%	all	%
C01-14 mouth and pharynx	<50	189	16%	254	12%	443	13%
	50+	1,000	84%	1,840	88%	2,840	87%
		1,188	100%	2,094	100%	3,283	100%
C15 oesophagus	<50	17	3%	49	5%	66	5%
	50+	490	97%	859	95%	1,349	95%
		507	100%	908	100%	1,415	100%
C16 stomach	<50	87	10%	85	6%	173	8%
	50+	771	90%	1,283	94%	2,054	92%
		859	100%	1,368	100%	2,227	100%
C18-20 colorectum	<50	894	9%	677	5%	1,570	7%
	50+	9,417	91%	11,751	95%	21,167	93%
		10,310	100%	12,427	100%	22,738	100%
C22 liver	<50	39	21%	74	14%	113	16%
	50+	150	79%	453	86%	603	84%
		189	100%	527	100%	716	100%
C25 pancreas	<50	55	13%	31	7%	86	10%
	50+	375	87%	399	93%	773	90%
		430	100%	430	100%	860	100%
C33-34 lung and trachea	<50	169	5%	143	4%	312	5%
	50+	3,193	95%	3,103	96%	6,296	95%
		3,362	100%	3,246	100%	6,608	100%
C43 melanoma of skin	<50	1,798	22%	896	17%	2,694	20%
	50+	6,558	78%	4,485	83%	11,043	80%
		8,356	100%	5,381	100%	13,737	100%
C50 breast	<50	4,691	11%	18	7%	4,709	11%
	50+	38,787	89%	253	93%	39,041	89%
		43,479	100%	271	100%	43,750	100%
C51-52,C55,C57-58 gynae†	<50	159	15%			159	15%
	50+	929	85%			929	85%
		1,087	100%			1,087	100%
C53 cervix	<50	1,762	37%			1,762	37%
	50+	2,976	63%			2,976	63%
		4,738	100%			4,738	100%
C54 corpus uteri	<50	237	4%			237	4%
	50+	5,725	96%			5,725	96%
		5,962	100%			5,962	100%
C56 ovary	<50	506	16%			506	16%
	50+	2,681	84%			2,681	84%
		3,187	100%			3,187	100%
C61 prostate	<50			274	1%	274	1%
	50+			39,431	99%	39,431	99%
				39,705	100%	39,705	100%
C62 testis	<50			2,438	50%	2,438	50%
	50+			2,425	50%	2,425	50%
				4,863	100%	4,863	100%
C64 kidney	<50	321	16%	439	13%	760	14%
	50+	1,740	84%	2,853	87%	4,592	86%
		2,060	100%	3,292	100%	5,352	100%

Table IV-I
Complete prevalence by cancer type, sex and age: number of cancer survivors on 31/12/2018

site	age‡	females	%	males	%	all	%
C67 bladder	<50	31	2%	69	2%	100	2%
	50+	1,309	98%	2,975	98%	4,284	98%
		1,341	100%	3,044	100%	4,384	100%
C71-72 brain and CNS	<50	531	52%	603	52%	1,133	52%
	50+	491	48%	562	48%	1,053	48%
		1,021	100%	1,164	100%	2,186	100%
C73 thyroid	<50	1,117	45%	243	33%	1,361	42%
	50+	1,361	55%	505	67%	1,866	58%
		2,479	100%	748	100%	3,227	100%
C81 Hodgkin lymphoma	<50	740	55%	779	50%	1,519	52%
	50+	618	45%	788	50%	1,406	48%
		1,358	100%	1,567	100%	2,925	100%
C82-85 non-Hodgkin	<50	500	13%	769	18%	1,269	16%
	50+	3,304	87%	3,538	82%	6,842	84%
		3,804	100%	4,308	100%	8,111	100%
C90 multiple myeloma	<50	35	5%	63	6%	98	5%
	50+	719	95%	1,061	94%	1,781	95%
		754	100%	1,124	100%	1,879	100%
C91-95 leukaemia	<50	818	35%	899	26%	1,717	30%
	50+	1,552	65%	2,496	74%	4,048	70%
		2,370	100%	3,395	100%	5,765	100%

‡age on 31/12/2018

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

APPENDIX V: LIFETIME RISK OF CANCER

Current probability method for lifetime risk of developing cancer

In previous reports the registry used the 'cumulative risk' method to estimate the risk of developing (and dying of) any particular cancer up to age 75 [6]. The 'cumulative risk' method uses the number of cases of cancer (or cancer deaths) and the population estimates for each age band. The 'cumulative rate' of developing cancer up to age 75 is calculated as sum of the age-specific rates for the first 15 five-year age bands, and the 'cumulative risk%'= 100*(1-$e^{-\text{cumulative rate}}$).

When average life expectancy exceeds 75 years, as it does now in Ireland (79.6 years for males and 83.4 for females during 2015-2017) [19] this method may under-estimate the true risk of developing cancer during one's lifetime. On the other hand, it may actually over-estimate the risk to age 75 as it does not take into account the attrition with increasing age of the 'at risk' population as people die. If extended to include all older age-groups, the method would over-estimate lifetime risk of cancer for the same reason.

The 'current probability' method is considered to be the gold standard of estimating lifetime risk of developing cancer [3]. It takes into account the competing risk of dying of non-cancer causes with increasing age and gives a better estimate of the lifetime risk of cancer than the 'cumulative risk' method. But it still overestimates the lifetime risk if the data includes multiple primary cancers; these cases must be excluded from the data.

In this report, the current probability method was used to estimate the lifetime risk of developing cancer, using incidence of cancer and risk of death within each 5-year age band (e.g. 0-4, 5-9, 10-14, …, 85-89, 90-94, 95+). For each age-band, adjusting for incremental deaths with increasing age, the risk of developing cancer was calculated. The lifetime risk (in %) was computed for men and women for each year (2007-2017) by summing the age-band risks up to age 95+.

A *lifetime risk of cancer* calculator tool was made available by Cancer Research UK [20]. It allows the estimation of lifetime risk for any cancer using the 'current probability' method with the proviso that the cancer registration data excludes multiple primary tumours, and also only the first invasive tumour (per patient) is considered for the composite group *'C00-43 C45-96 all invasive cancers excl. NMSC'.*

In summary the Cancer Research UK calculator tool [20] requires three inputs:

Input	1) population	2) all cause deaths	3) cancer incidence
source of data	CSO	CSO	NCRI
abbreviation	**pop**	**all_d**	**inc**
age band i_{1-20}			
1. 0-4			
2. 5-9			
Not shown			
19. 90-94			
20. 95+			

The three inputs allow calculation of the following output, for each age band i $_{1\text{-}20}$

output	probability of dying %	proportion alive%	person years%	age specific rate%	current probability
abbreviation	p_dying	alive	pers_ yrs	agesp_rate	
age band i $_{1\text{-}20}$					
1. 0-4	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	100.0%	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
2. 5-9	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
not shown					
15. 70-74	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
16. 75-79	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
17. 80-84	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
18. 85-89	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
19. 90-94	$1\text{-}e^{(\text{-}5*\text{all\_d/pop})}$	$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	$5*(\text{alive}+\text{alive}_{i+1})/2$	inc/pop	pers_yrs*agesp_rate/100
20. 95+		$\text{alive}_{i-1}\text{-}[\text{alive}_{i-1}*\text{p\_dying}_{i-1}]$	alive/(all_d/pop)	inc/pop	pers_yrs*agesp_rate/100

Lifetime risk of developing cancer $= \Sigma^{20}_{i=1}$ current probability

Risk up to age 75 (75th birthday) of developing cancer $= \Sigma^{15}_{i=1}$ current probability

Using data from 2017, the most recent year (at the time of writing) for which both cancer incidence and population all-cause mortality data is available from the NCRI and CSO respectively, a comparison of the cumulative risk and current probability methods is presented below for the most common cancers.

Table V-I
Risk of developing cancer up to age 75 and over full lifetime using two methods: data from cases registered in 2017

		cumulative risk to age 75		current probability method to age 75		lifetime	
		%	1 in _	%	1 in _	%	1 in _
sex	cancer						
M	C00-43 C45-96 all invasive cancers excl. NMSC	32.5	3	30.7	3	51.3	2
M	C01-14 mouth & pharynx	1.2	84	1.0	97	1.4	72
M	C15 oesophagus	1.1	92	1.0	105	1.6	62
M	C16 stomach	0.8	120	0.7	137	1.8	56
M	C18-20 colorectum	4.2	24	3.6	28	7.7	13
M	C22 liver	0.7	151	0.6	173	1.2	86
M	C25 pancreas	0.9	108	0.8	126	1.6	62
M	C33-34 lung	4.4	23	3.7	27	7.4	14
M	C43 melanoma of skin	1.6	62	1.4	71	2.7	37
M	C61 prostate	12.8	8	11.9	8	16.8	6
M	C62 testis	0.5	193	0.5	197	0.5	186
M	C64 kidney	1.4	73	1.2	83	2.0	49
M	C67 bladder	0.7	144	0.6	168	1.8	56
M	C71-72 brain & CNS	0.8	132	0.7	146	0.9	108
M	C81 Hodgkin lymphoma	0.3	361	0.3	386	0.4	272
M	C82-85 non-Hodgkin lymphoma	1.4	71	1.2	81	2.2	47
M	C90 multiple myeloma	0.6	162	0.5	197	1.1	89
M	C91-95 leukaemia	1.0	98	0.9	113	1.7	59
		%	1 in _	%	1 in _	%	1 in _
F	C00-43 C45-96 all invasive cancers excl. NMSC	26.9	4	25.9	4	44.6	2
F	C01-14 mouth & pharynx	0.5	209	0.4	236	0.6	162
F	C15 oesophagus	0.3	306	0.3	336	0.8	128
F	C16 stomach	0.4	249	0.4	272	0.9	111
F	C18-20 colorectum	2.7	38	2.4	41	5.6	18
F	C22 liver	0.3	407	0.2	449	0.6	170
F	C25 pancreas	0.6	158	0.6	174	1.5	69
F	C33-34 lung	3.5	28	3.2	32	6.2	16
F	C43 melanoma of skin	1.7	60	1.6	64	2.4	41
F	C50 breast	10.0	10	9.7	10	14.0	7
F	C53 cervix uteri	0.9	118	0.8	123	1.0	104
F	C54 corpus uteri	1.9	53	1.7	58	2.4	41
F	C56 ovary	1.2	84	1.1	90	1.9	53
F	C64 kidney	0.7	152	0.6	164	1.1	88
F	C67 bladder	0.3	384	0.2	421	0.7	146
F	C71-72 brain and spinal cord	0.5	203	0.5	215	0.8	132
F	C81 Hodgkin lymphoma	0.2	444	0.2	461	0.3	365
F	C82-85 non-Hodgkin lymphoma	1.2	86	1.1	93	1.9	53
F	C90 multiple myeloma	0.4	288	0.3	321	0.7	148
F	C91-95 leukaemia	0.5	211	0.4	225	0.9	107