

CANCER IN IRELAND 1994-2019

ANNUAL REPORT OF THE NATIONAL CANCER REGISTRY



National
Cancer
Registry
Ireland

2021 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
HPV	Human papillomavirus
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 (stage)
WHO	World Health Organisation

Published by:

National Cancer Registry
 Building 6800,
 Cork Airport Business Park,
 Kinsale Road, Cork, Ireland.
 T12 CDF7

Telephone: +353 21 4318014

Fax: +353 21 4318016

Email: info@ncri.ie

Website: www.ncri.ie

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- Earlier drafts of this report were circulated to (and comments collated from): the Department of Health's Cancer, Blood & Organs Policy Unit; the Irish Cancer Society; the Health Service Executive's National Cancer Control Programme and National Screening Service; and the Board and Senior Management Team of the National Cancer Registry.

FOREWORD

I am delighted to introduce the 2021 Annual Report of the National Cancer Registry of Ireland in its 28th year of data collection and my first year as its Director. As ever, the NCRI Annual Report is a valuable source of data and insights into cancer incidence, mortality, prevalence and survival in Ireland. Definitive statistics (including trends) are presented for the years up to 2019. In addition, this year, in response to the COVID-19 pandemic and concerns about its impacts on cancer services, some preliminary data for 2020 are presented.

Highlights this year include:

- Five-year net survival averaging 65% for patients diagnosed between 2014 and 2018, a substantial increase from twenty years previously when 42% was the average.
- The number of cancer survivors living through or after cancer treatment in Ireland continuing to increase, year on year. At the end of 2019, there were nearly 200,000 patients living after a cancer diagnosis.
- Indications of substantial inroads being made in the progress to control the four commonest cancers (prostate, breast, lung and colorectal), which comprise over half of all invasive tumours (other than non-melanoma skin cancers).
- Mortality rates falling for these four major cancers (or stabilising for lung cancer in females), and incidence rates falling for both lung and colorectal cancers, in both sexes, though relatively recently for lung cancer in females.

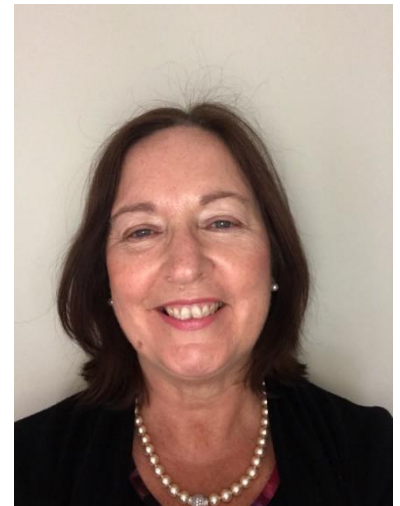
Earlier detection (including through screening) and better treatments are most likely contributing to the fall in cancer mortality while the sustained efforts of those involved in primary cancer prevention, in particular tobacco control, are key factors in the reduction in cancer incidence rates. However, the incidence of breast cancer in females is rising significantly since 2014, and prostate cancer in males is also increasing marginally since 2015. Improved detection methods and many aspects of our daily life such as diet, overweight and obesity, alcohol and exercise, are likely influences on the increase in these cancers.

The report also draws attention to other opportunities to improve our health. The incidence and mortality rates of melanoma skin cancer continue to increase in females, pointing to the importance of sun safety. Incidence rates for oropharyngeal and liver cancers are increasing, as are mortality rates for liver cancer in both sexes. This report is a timely reminder that HPV vaccination and adopting a healthy lifestyle can reduce the risk of developing these cancers. The incidence rate of cervical cancer continues to fall, reflecting the impact of the screening programme. It must be remembered from a service planning perspective, that despite the successes in reducing cancer incidence and mortality rates, the number of patients diagnosed with cancer every year is rising and will continue to rise in future decades as the Irish population continues to grow and the average age increases.

Finally, 2020 brought the COVID-19 crisis, which, particularly in the first wave in spring 2020, meant that patients postponed doctors' visits, screening programmes were paused and acute services were reconfigured to reduce footfall in hospitals. A number of cancer registries have already reported that fewer cancer diagnoses were made during the first wave in 2020 (Northern Ireland [1], Belgium [2] and Netherlands [3]). There are clear signals that, as expected in Ireland, the number of cancer diagnoses in 2020 will be lower than in previous years. The definitive percentage is as yet unknown, but the analysis presented here and a related analysis of NCRI data on microscopically verified cancers diagnosed in 2020 suggest that the overall shortfall may be between 10% and 14% [4]. The key question that remains outstanding is how COVID-19 has impacted on patient outcomes, and this will be a focus for the NCRI in future reports.

Professor Deirdre Murray
Director,
National Cancer Registry

Deirdre Murray



CONTENTS

FOREWORD	3
1. REPORT AT A GLANCE	6
2. CANCER INCIDENCE 2017-2019	13
Cancer incidence trends	16
Cancer incidence trends in males	17
Cancer incidence trends in females	27
3. CANCER MORTALITY 2016-2018	38
Cancer mortality trends	40
Cancer mortality trends in males	40
Cancer mortality trends in females	50
Trends in incidence and mortality: summary	60
4. PREVALENCE	62
5. CANCER SURVIVAL	65
Five-year net survival for patients diagnosed during 1994-2018	65
Ranking of cancer type in Ireland for five-year net survival	69
REFERENCES	70
APPENDIX I: INCIDENT CANCER CASES	71
APPENDIX II: INCIDENT CANCER RATES	71
APPENDIX III: MORTALITY	71
APPENDIX IV: MORTALITY RATES	71
APPENDIX V: PREVALENCE	71
APPENDIX VI: OBSERVED <i>vs.</i> PROJECTED CANCER INCIDENCE, 2020	71

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?

Collecting and checking all of this information is performed by a combination of manual and electronic processes. 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, the annual cancer report is published following analysis of de-identified data.

What have we found?

Over the years 2017-2019 the average number of 'registered tumours' in males and females is estimated at almost 44,000 per year. Just over 1 in 2 (c.24, 000 excluding non-invasive tumours and non-melanoma skin cancers) are life-changing invasive cancers which often require extensive treatment.

ALL	all registered tumours	43,638	100%
	all invasive cancers	35,910	82%
	all invasive cancers excl. NMSC	24,146	55%
	non-melanoma skin cancer (NMSC)	11,763	27%
	all non-invasive tumours	7,728	18%
FEMALE	all registered tumours	21,545	100%
	all invasive cancers	16,272	76%
	all invasive cancers excl. NMSC	11,298	52%
	non-melanoma skin cancer (NMSC)	4,974	23%
	all non-invasive tumours	5,274	24%
MALE	all registered tumours	22,093	100%
	all invasive cancers	19,638	89%
	all invasive cancers excl. NMSC	12,849	58%
	non-melanoma skin cancer (NMSC)	6,789	31%
	all non-invasive tumours	2,455	11%

Cancer cases: Annual average 2017-2019

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

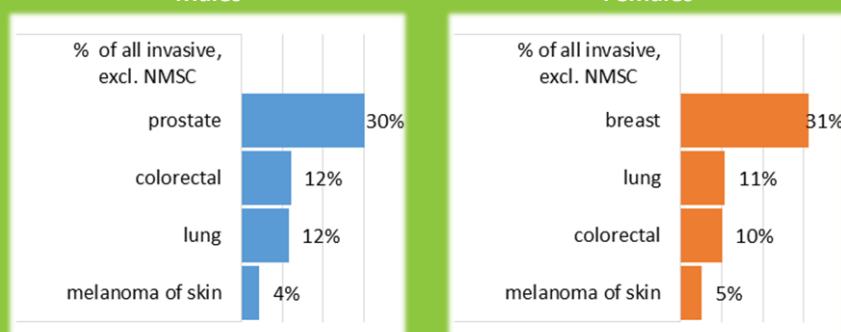
How many people were diagnosed with cancer?

- On average, 43,638 cancers or related tumours were diagnosed each year during 2017-2019.
- 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) averaged 35,910 cases per year during 2017-2019.
- The figure most often quoted in international comparisons (*'all invasive cancer, excluding NMSC'*) averaged 24,146 cases (12,849 males and 11,298 females) diagnosed annually during 2017-2019, 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 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



How many people die of cancer?

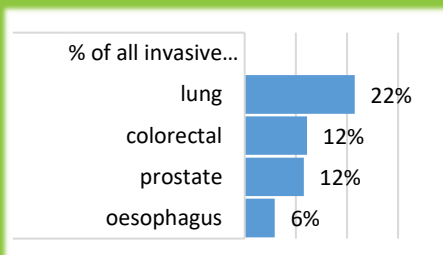
- Of all deaths occurring in 2018 in Ireland, 31% (almost 1 in 3) were attributable to cancer. Another 29% and 13% were attributable to diseases of the circulatory and respiratory systems respectively.
- On average there were 9,190 deaths per year from invasive cancer (4,864 in males, 4,326 in females) during the period 2016-2018, or 9,423 deaths per year from any tumour type.

What are the most common cancer deaths?

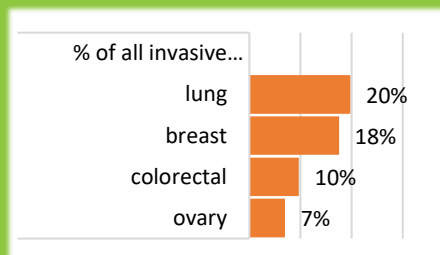
- Lung cancer was the leading cause of cancer death in both sexes during 2016-2018.
- In males, cancer of the bowel, prostate and oesophagus were the 2nd, 3rd, and 4th most common categories of cancer deaths, respectively.
- In females, cancer of the breast, bowel and ovary were the 2nd, 3rd and 4th most common categories of cancer deaths, respectively.

Top four most common causes of cancer death during 2016-2018

Males



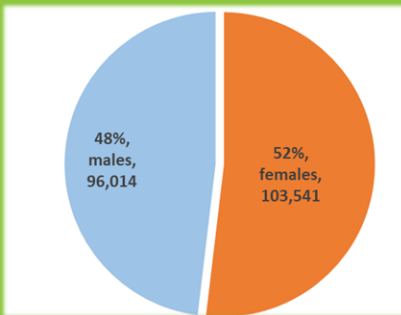
Females



How many previously diagnosed cancer patients are still alive?

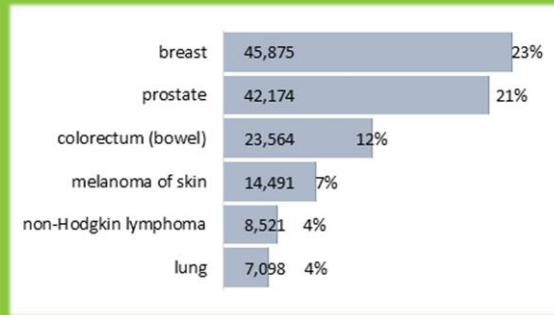
- Almost 200,000 cancer patients or former cancer patients were alive in Ireland at the end of 2019 (about 4% or 1 in 25 of the Irish population).
- The top six most common cancers among survivors were: breast cancer (23% of all cancer survivors), prostate cancer (21%), colorectal cancer (12%) and skin melanoma (7%), non-Hodgkin lymphoma (4%) and lung cancer (4%) which together account for 71% of all cancer survivors.
- These figures exclude non-melanoma skin cancers.

Number of cancer survivors



Total number =199,554 (100%)

The six most common cancers among cancer survivors



Are the numbers of people getting cancer decreasing?

Are the numbers of people dying of cancer decreasing?

- Cancer is more than one disease. Cancer is very common. About 1 in 2 people will be diagnosed with some form of invasive cancer (excluding non-melanoma skin cancer) in their lifetime.
- The number of people developing cancer has increased as Ireland's population has grown. In general, cancer occurs more often in older people, and the proportion of older people (>65 years) has also expanded in Ireland over the last few decades.
- Rather than just looking at numbers of cancer cases (or deaths) over time, a better way to understand trends in cancer is to look at **rates** (i.e. cases/deaths per 100,000) while adjusting for age differences in the population from year to year.

TRENDS IN INCIDENCE AND MORTALITY RATES (ADJUSTED FOR POPULATION SIZE & AGE) 1994-2019

MALE RATES			FEMALE RATES		
CANCER SITE (& INCIDENCE RANK)	INCIDENCE	MORTALITY	CANCER SITE (& INCIDENCE RANK)	INCIDENCE	MORTALITY
all invasive cancers excl. NMSC	↓2010-2019	↓	all invasive cancers excl. NMSC	↑2008-2019*	↓
INCIDENCE RATE DECREASE			INCIDENCE RATE DECREASE		
stomach	↓2014-2019	↓	oesophagus	↓	↓
colorectum (2nd)	↓2012-2019	↓	stomach	↓	↓
lung (3rd)	↓	↓2013-2018	colorectum (3rd)	↓	↓
leukaemia	↓2004-2019	↓1999-2018	lung (2nd)	↓2016-2019	↔
INCIDENCE RATE STATIC			cervix	↓2009-2019	↓
oesophagus	↔	↓	ovary	↓	↓
liver	↔2013-2019	↑	leukaemia	↓2010-2019	↓1999-2018
pancreas	↔	↔	INCIDENCE RATE STATIC		
melanoma of skin	↔2014-2019	↔2010-2018	pancreas	↔	↔
C61 prostate (1st)	↔2015-2019	↓2001-2018	brain & spinal cord	↔	↓
testis	↔2007-2019	↓	thyroid	↔2011-2019	↓2012-2018
kidney	↔2012-2019	↓2002-2018	non-Hodgkin lymphoma	↔2013-2019	↓
brain & spinal cord	↔	↔	multiple myeloma	↔	↓
non-Hodgkin lymphoma	↔2014-2019	↓	INCIDENCE RATE INCREASE		
INCIDENCE RATE INCREASE			mouth & pharynx	↑	↔
mouth & pharynx	↑2001-2019	↑2007-2018	liver	↑	↑
thyroid	↑	↔	melanoma of skin	↑	↑
Hodgkin lymphoma	↑	↓	breast (1st)	↑2014-2019	↓
multiple myeloma	↑	↓	uterine	↑	↑
			kidney	↑2007-2019	↔
			Hodgkin lymphoma	↑	↔

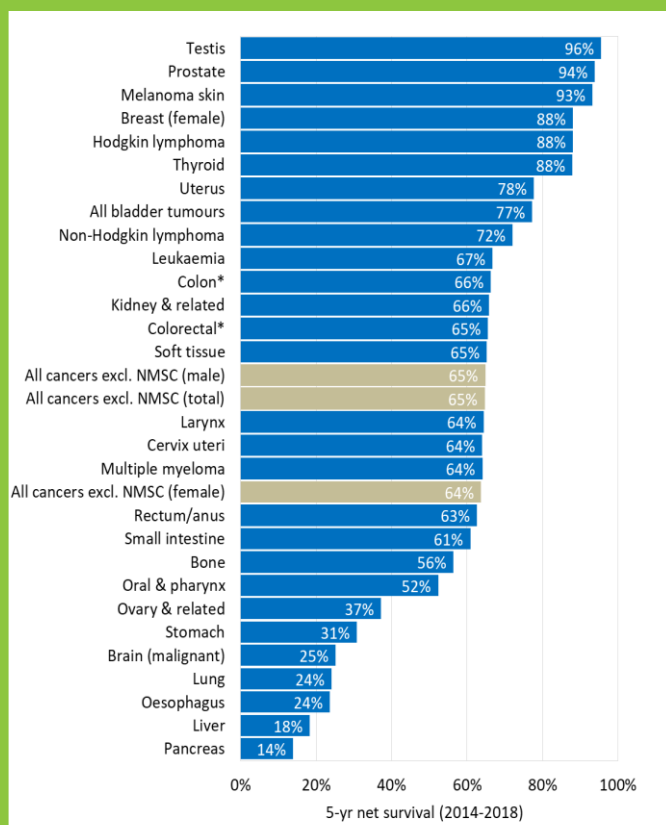
Trend: ↑=significant increase, ↓=significant decrease, ↔=no change (static). The top three most common invasive cancers are shown in bold type. Incidence period 1994-2019 (26 years); mortality period 1994-2018 (25 years). Where more than one discrete trend interval was observed over the full 25/26 year period, only the most recent trend is shown. * If breast cancer is excluded the trend in all invasive cancers in females reduces from 0.2% (↑, increase) to 0.0% (↔, static)

- Most cancers show static or declining trends in both incidence and mortality rates.
- Recent or ongoing increases in mortality rates are seen for only a small number of cancer types (liver cancer in both sexes, mouth and pharynx cancer in males, and uterine cancer and melanoma of skin in females), broadly in line with upward incidence trends for these cancers.
- Other cancers with increasing incidence rates show stable or declining mortality rates (i.e. Hodgkin lymphoma in both sexes, thyroid cancer in males, breast and kidney cancer in females).

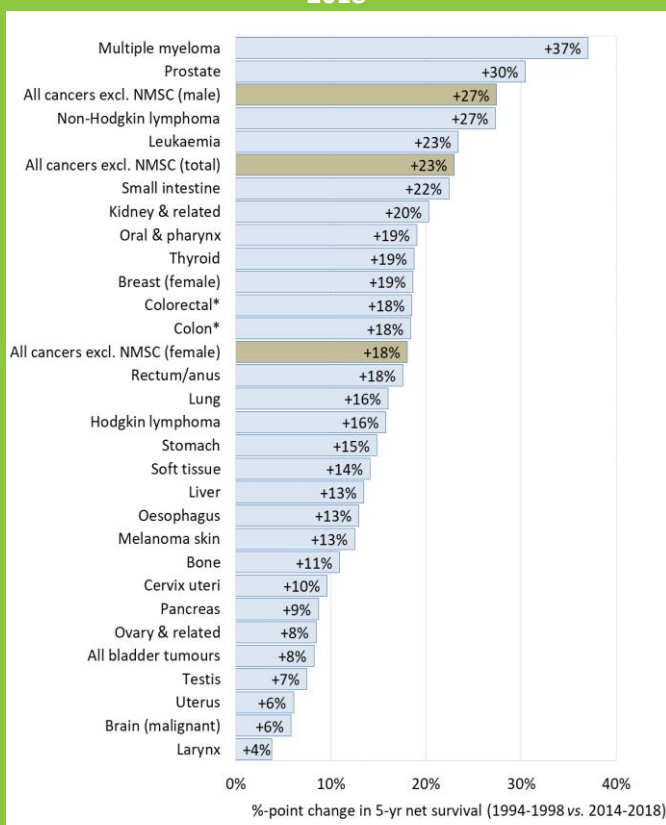
Is cancer survival improving?

- For invasive cancers as a whole (excluding non-melanoma skin cancers), five-year net survival averaged 65% for patients diagnosed during 2014-2018, compared with only 42% for those diagnosed during 1994-1998: a very substantial increase.
- Major improvements in survival have also been seen for most major cancer types, though survival still varies markedly by cancer type (see below).
- Although the cancers with the poorest average prognosis may not have shown 'absolute' increases in survival as high as seen for some cancers, relative increases in survival have still been substantial, including more than a doubling of survival for oesophageal, pancreatic, liver and lung cancer since the 1990s.

5-year net survival: 2014-2018



Change (%) in 5-year net survival: 1994-1998 vs. 2014-2018

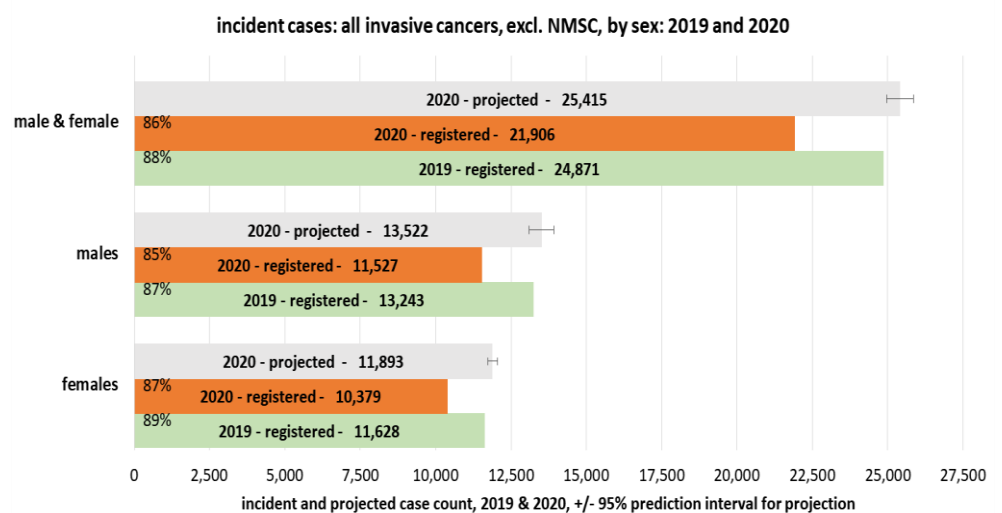


Net survival is based on the observed survival of patients compared with survival in the general population of the same age and sex (expressed as a percentage), e.g. for breast cancer, 5-year net survival was 88% of that expected for the general population of females of the same age during 2014-2018.

What are the cancer figures for the most recent full year, 2020?

- This report presents complete cancer information up to the end of 2019.
- We employ cancer data registrars embedded in the hospital system. Using active case-finding and electronic records, it normally takes up to two years before complete details of a case are registered.
- Based on recent trends we are able to project what cancer figures might be for more recent years.
- Using such projections we are able to estimate the numbers of cases that would be expected for 2020 if recent trends still applied.

- The figure on the right shows the registered and projected cases in 2020 for males and females.
- Overall, 86% of the cases that were projected for 2020 have been registered to date (Sept 2021).
- This is equivalent to 88% of the numbers registered for 2019.



- Given the COVID-19 pandemic in 2020, and its impact on health services, important questions have been raised (in Ireland and internationally) as to whether the pandemic has led to any reduction in the numbers of cancers diagnosed in 2020 or will have an impact on survival outcomes of cancer patients.
- It is still too early to provide definitive answers to these questions for Ireland, and the shortfall of 14% of cases seen in NCRI data for 2020 (or 12% compared with 2019) could, in part, be accounted for by incomplete registration of cases already diagnosed.
- The preliminary figures presented here provide some indication of the potential scale (or upper limit) of reductions in cancer diagnoses, though the true impact of the pandemic on numbers of cases diagnosed may prove to be less. A related analysis of NCRI data on microscopically verified cancers diagnosed in 2020 suggests a broadly similar reduction, by between 10% and 13% [4].

2. CANCER INCIDENCE 2017-2019

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

	case count			rate* per 100,00		risk # 1 in... to age 75		risk # 1 in... lifetime	
	males	females	all●	males	females	males	females	males	females
C00-96 all invasive cancers**	19,638	16,272	35,910	728.7	560.5				
C00-43, C45-96 all invasive excl. NMSC	12,849	11,298	24,146	481.0	396.6	3 (31%)	4 (27%)	2 (52%)	2 (46%)
C00-D48 all registered tumours	22,093	21,545	43,638	819.1	761.3				
D00-48 all non-invasive tumours	2,455	5,274	7,728	90.5	200.9				
C01-14 mouth & pharynx	359	157	516	13.9	5.7	96	228	67	149
C15 oesophagus	336	165	501	12.7	5.1	110	293	63	108
C16 stomach	349	195	544	12.7	6.3	130	245	56	98
C18-20 colorectum	1,552	1,138	2,690	57.3	37.7	27	39	13	18
C22 liver	242	111	353	8.9	3.5	162	438	83	162
C25 pancreas	304	284	588	11.1	8.9	133	173	64	64
C34 lung	1,478	1,212	2,690	53.7	40.4	28	33	14	17
C43 melanoma of skin	569	587	1,156	21.3	20.9	71	66	37	39
C44 other skin	6,789	4,974	11,763	247.7	163.9	7	9	3	4
C50 breast	34	3,507	3,542	1.3	130.0	1,199	10 (10%)	565	7 (14%)
C53 cervix uteri		292	292		11.3		121		103
C54 corpus uteri		540	540		19.8		61		43
C56 ovary		385	385		13.6		97		57
C51-52,C55,C57,C58 other gynaecological cancers†		181	181		6.2		223		117
C61 prostate	3,869		3,869	146.5		8 (12%)		6 (17%)	
C62 testis	164		164	6.9		207		197	
C64 kidney	446	244	690	17.0	8.5	83	156	51	89
C67 bladder	347	143	491	12.4	4.5	145	370	51	127
C70-72,D32-33,D42-43 all meninges, brain & CNS	373	404	777	14.6	14.7				
C71-72 brain & CNS	247	189	436	9.6	6.9	141	196	97	120
C70-72 meninges, brain & CNS	252	200	451	9.8	7.2	138	188	95	114
D32-33 benign brain & CNS	76	161	238	3.0	5.8				
D42-43 uncertain brain & CNS	45	43	88	1.8	1.7				
C73 thyroid gland	77	191	268	3.1	7.4	432	179	351	150
C81 Hodgkin lymphoma	79	67	145	3.2	2.6	446	524	339	392
C82-85 all non-Hodgkin lymphoma	482	376	857	18.1	12.9	81	106	45	56
C90 multiple myeloma	214	138	352	7.9	4.5	203	325	94	143
C91-95 leukaemia	357	200	557	13.5	7.0	114	203	59	105

‡ Average age-standardised rates for 2017-2019, the most recent years for which case registration is complete.

● male + female case counts ('all') are subject to rounding.

* Rates are standardised to the 1976 European standard population; see Appendix II for rates standardised to the 2013 ESP.

** Invasive cancers included all tumours classified as behaviour 3 in ICD-O-3 classification, including some neoplasms previously classified as uncertain behaviour, e.g. polycythaemia vera.

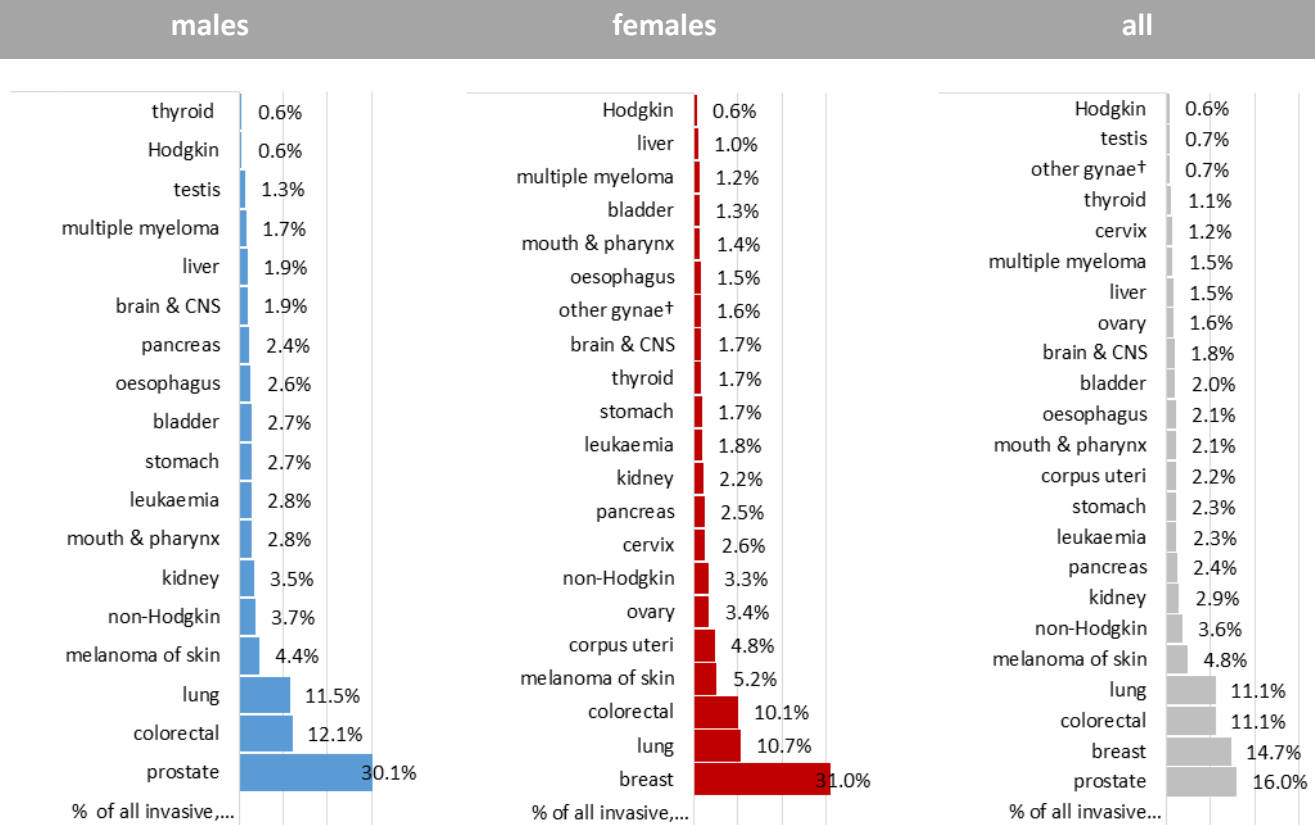
Cumulative risk of developing a type of cancer before age 75 and lifetime risk (both adjusted for population mortality), expressed as a proportion, e.g. lifetime risk of developing an invasive cancer (excluding NMSC) was approximately 1 in 2 in men (probability=52%) and 1 in 2 in women (probability=46%), applying current probability method [2] [3].

† Vulva, vagina, uterus (NOS) and placenta.

- On average, 43,638 cancers or other (non-invasive) tumours were diagnosed annually during the period 2017-2019, representing an age-standardised incidence rate of 761 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 11,763 cases per year) (Table 2-1).

- Invasive cancers (incl. NMSC) were averaged 35,910 cases per year during 2017-2019, or an age-standardised rate of 561 female and 729 male cases per 100,000 per year.
- For all invasive cancers excluding NMSC, the figures most often quoted in international comparisons, 24,146 cases (12,849 males and 11,298 females) were diagnosed annually during 2017-2019, or 55% of all invasive cases.
- This is equivalent to an incidence rate of 397 cases per 100,000 females and 481 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 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 for 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.
- These rate and risk statistics are based on the Irish population estimates/projections available at the time of writing [7].

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.

Cancer incidence trends

Trends 1994-2019

Using case counts and rates from NCRI registration data, trends in incidence of cancer have been assessed over the period 1994-2019 in Figures 2-2 to 2-37 below. These provide an update to trend estimates for 1994-2015 published by NCRI in 2017 [8].

In interpreting the trends up to 2019 reported in this section, possible changes in diagnostic activity (e.g. introduction or expansion of screening) or coding practices should be borne in mind, as well as possible changes in the true underlying risk of the cancers involved.

In some of the graphs presented (e.g. Figure 2-2), numbers of cases tend to increase over time, due to natural population increase and ageing, while the age-standardised rate (ASR) may actually decrease over the same time interval after adjustment for changes in age structure and population.

Preliminary assessment of COVID-19 impacts on cancer case numbers diagnosed in 2020

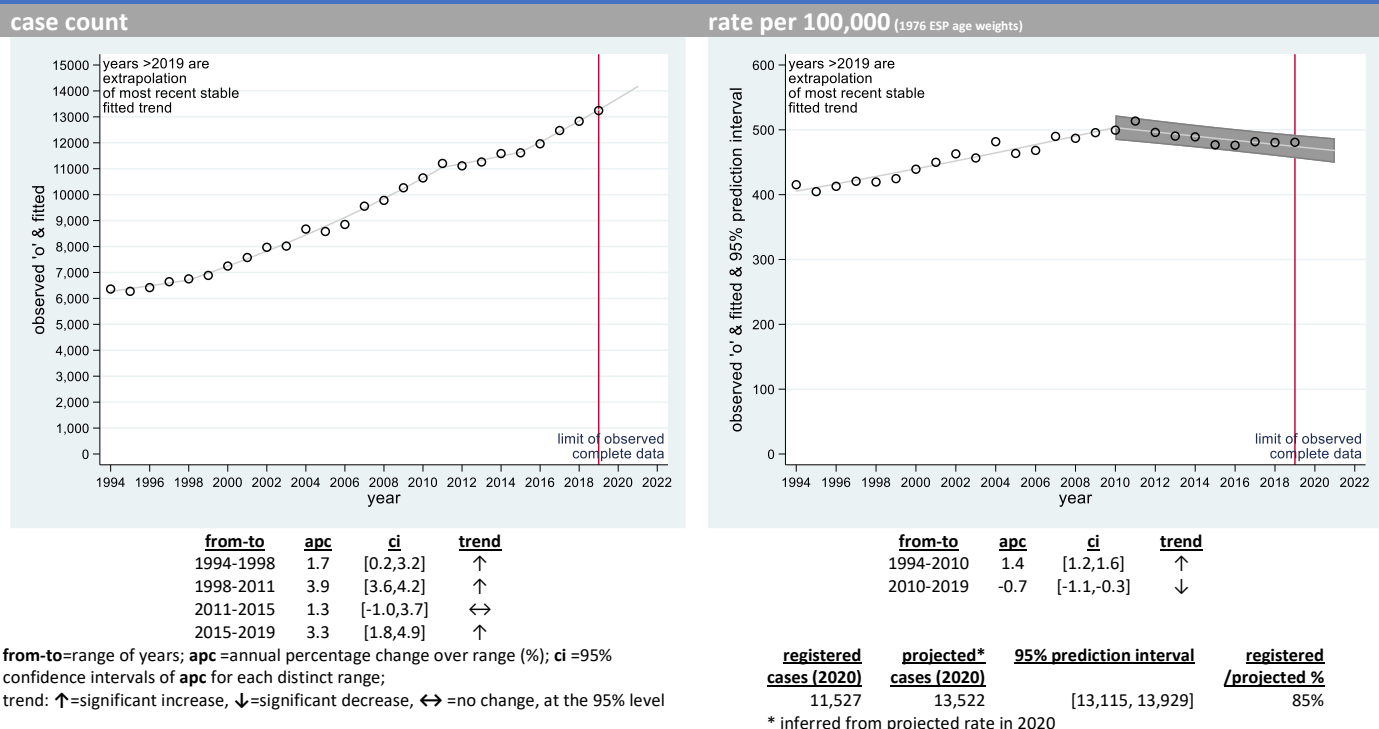
To help provide a baseline for assessment of possible COVID-19 impacts on numbers of cancers diagnosed in Ireland in 2020, the most recent stable trend for rates over the period 1994-2019 was projected to 2020 using Joinpoint regression [9]. 95% prediction intervals were also calculated over the most recent stable trend (see Appendix VI for further details on methods). The lower limit of the prediction interval for case numbers (back-calculated from rates) provides a marker below which observed case numbers in 2020 might be considered to represent a fall-off, compared with numbers projected. This provides an indication of how the preliminary numbers and rates for 2020 compare with those expected based on more complete data for years before 2020. Observed data for 2020 were excluded from the trend calculations.

For cancers as a whole, and most specific cancer types (Appendix VI), numbers of cases registered for 2020, up to September 2021, fall below the lower limit of the prediction interval. Overall, 86% of the cases that were projected for 2020 have been registered to date, or 85% for male cases, 87% for female cases. This is equivalent to 88% of the numbers registered for 2019 (87% for males, 89% for females). The shortfall of 14% of cases seen in NCRI data for 2020 (or 12% compared with 2019) could, in part, be accounted for by incomplete registration of cases already diagnosed. However, the preliminary figures presented here provide some indication of the potential scale (or upper limit) of reductions in cancer diagnoses, though the true impact of the pandemic on numbers of cases diagnosed may prove to be less. A related analysis of NCRI data on microscopically verified cancers diagnosed in 2020 suggests a broadly similar reduction, by between 10% and 13% [4].

As more complete data are compiled over the coming months and compared with expected case numbers, NCRI will be in a better position to describe the extent of the impact of health services disruption by COVID-19 on the numbers of cancers diagnosed in 2020 (and 2021). NCRI will also be participating in a number of wider national and international studies to assess potential COVID-19 impacts on cancer diagnosis and outcomes.

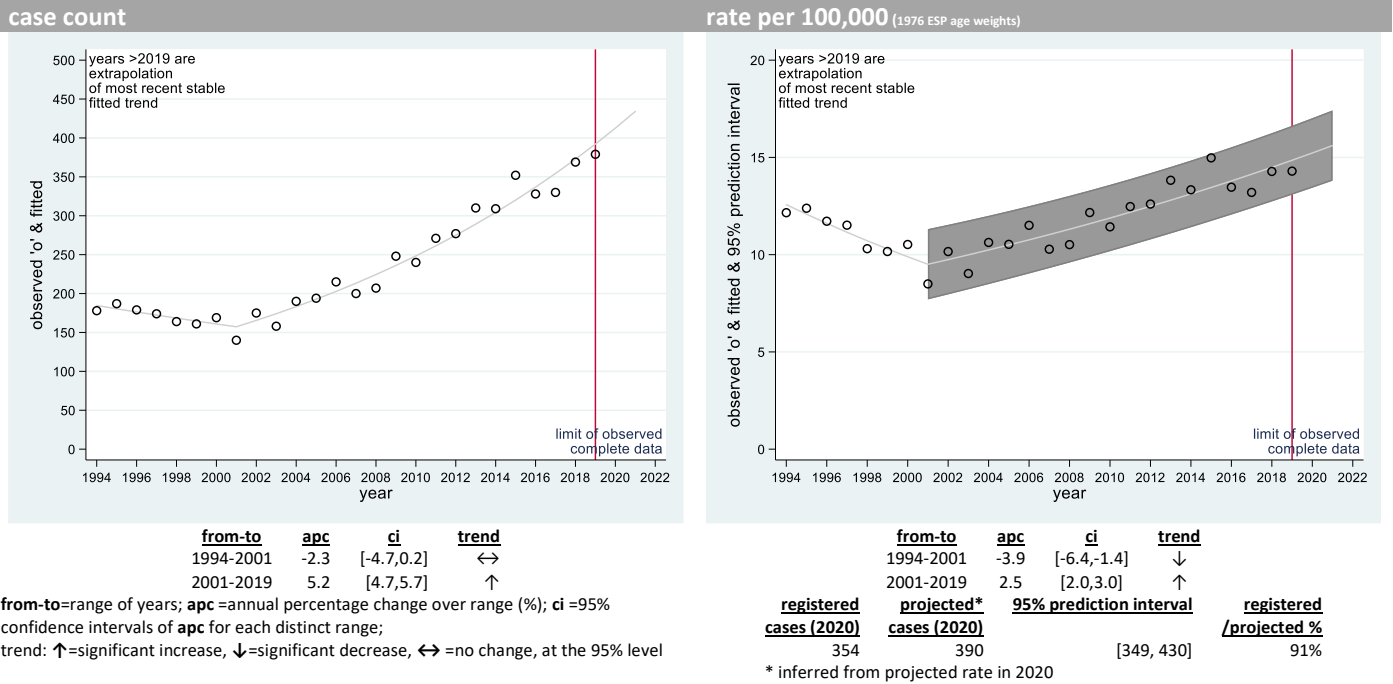
Cancer incidence trends in males

FIGURE 2-2. C00-43 C45-96 all invasive cancers excl. NMSC: MALES: TREND DURING 1994-2019



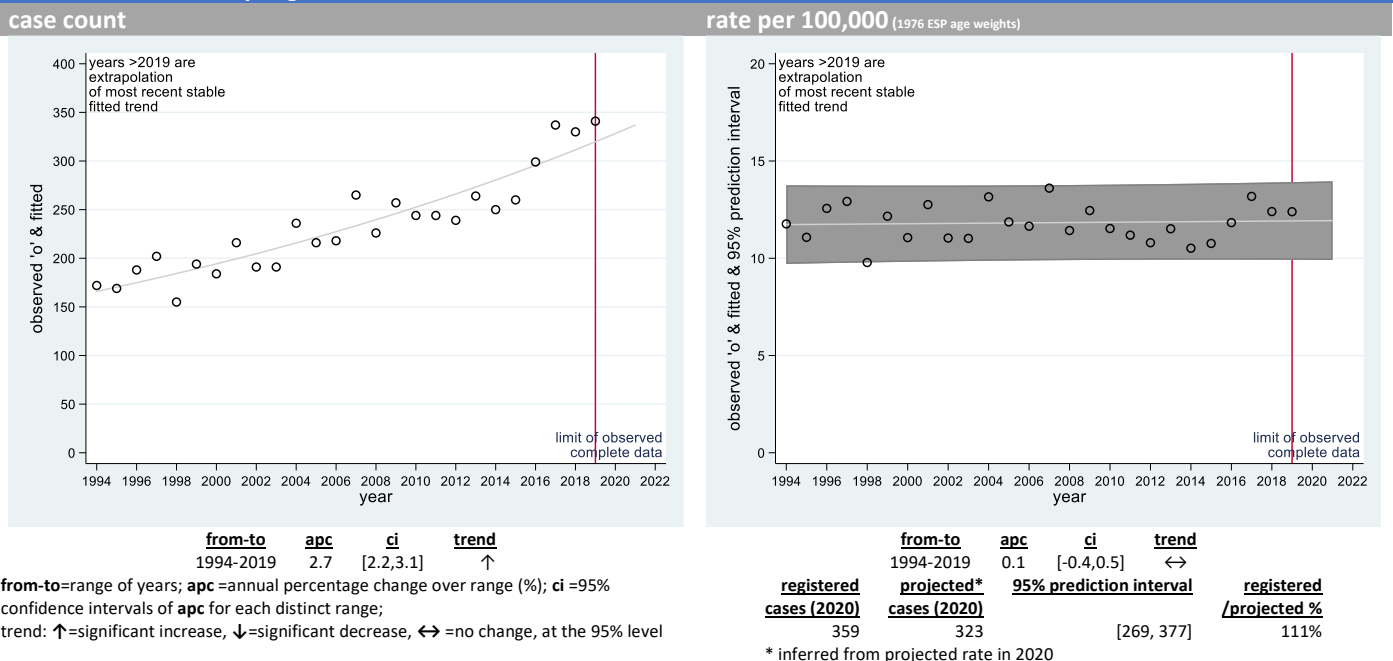
- The incidence rate of all invasive cancer (excl. NMSC) in males declined significantly by, on average, 0.7% annually during the period 2010-2019 after a prolonged and steady increase before 2010 (Fig. 2-2).
- If the most common cancer, prostate cancer, is excluded, the downward trend is attenuated, but a significant downward trend still remains (on average, -0.3% annually during 2008-2019) (Table 3-2). The overall downward trend in male cancer rates was also influenced by the declining rate of lung cancer during 1994-2019 (Table 3-2).
- From a healthcare provision perspective, trends in case numbers are also important. The actual number of male cancer cases increased almost year-on-year during 1994-2019, largely due to population increase and ageing.
- Based on the rate trend during 2010-2019, the projected case count for males in 2020 was 13,552 (ignoring the potential impact of the COVID-19 pandemic on numbers of cancers diagnosed in 2020). At the time of writing the number of registered male cancer cases for 2020 was 11,527 or 85% of projected numbers; this was equivalent to 87% of the numbers registered for 2019.
- Similar comparisons of (preliminary) observed cases for 2020 with those projected from the most recent, pre-2020 trends, are provided for each major cancer type below and in Appendix VI.

FIGURE 2-3. C01-14 mouth & pharynx: MALES: TREND DURING 1994-2019



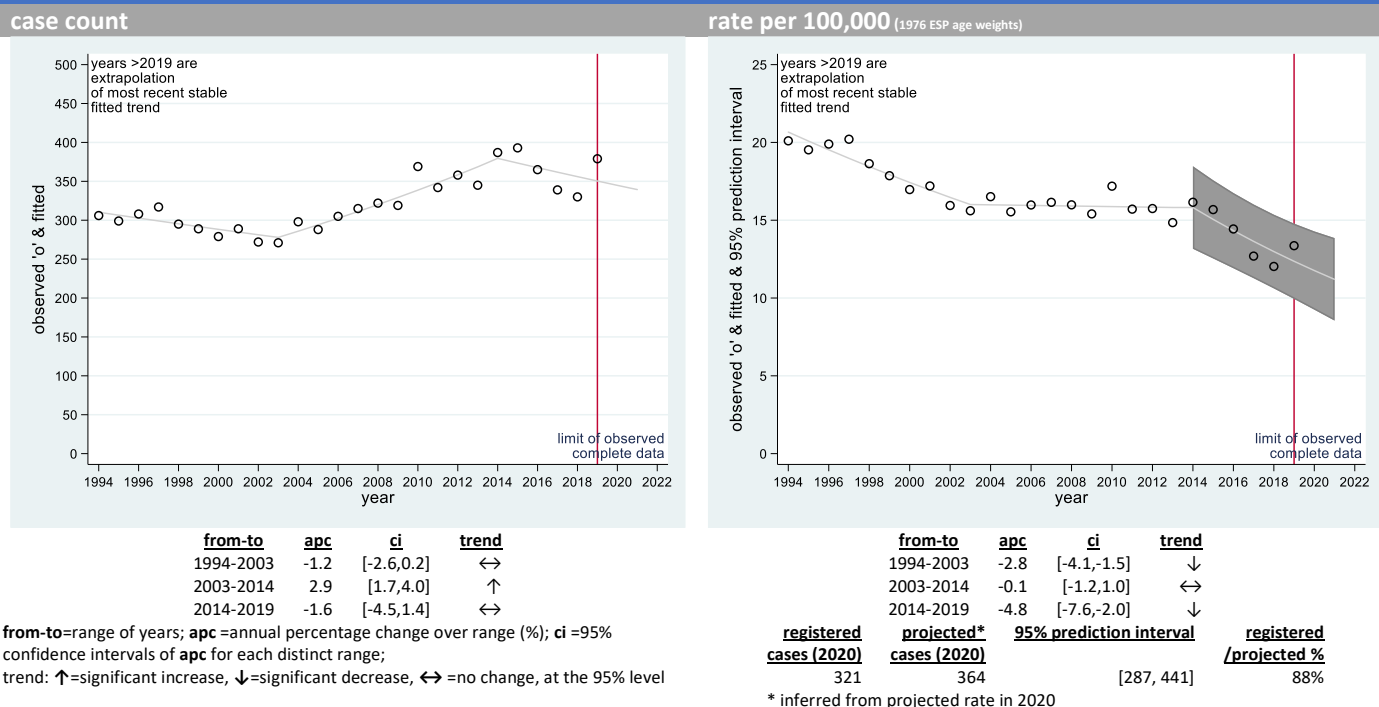
- After a period of significant decline from 1994, cases and rates increased sharply and significantly during 2001-2019 (Fig. 2-3).
- These trends may reflect, at least in part, exposure to oncogenic (tumour-causing) strains of human papillomavirus (HPV), an important risk factor for squamous cell carcinomas of the oropharynx.

FIGURE 2-4. C15 oesophagus: MALES: TREND DURING 1994-2019



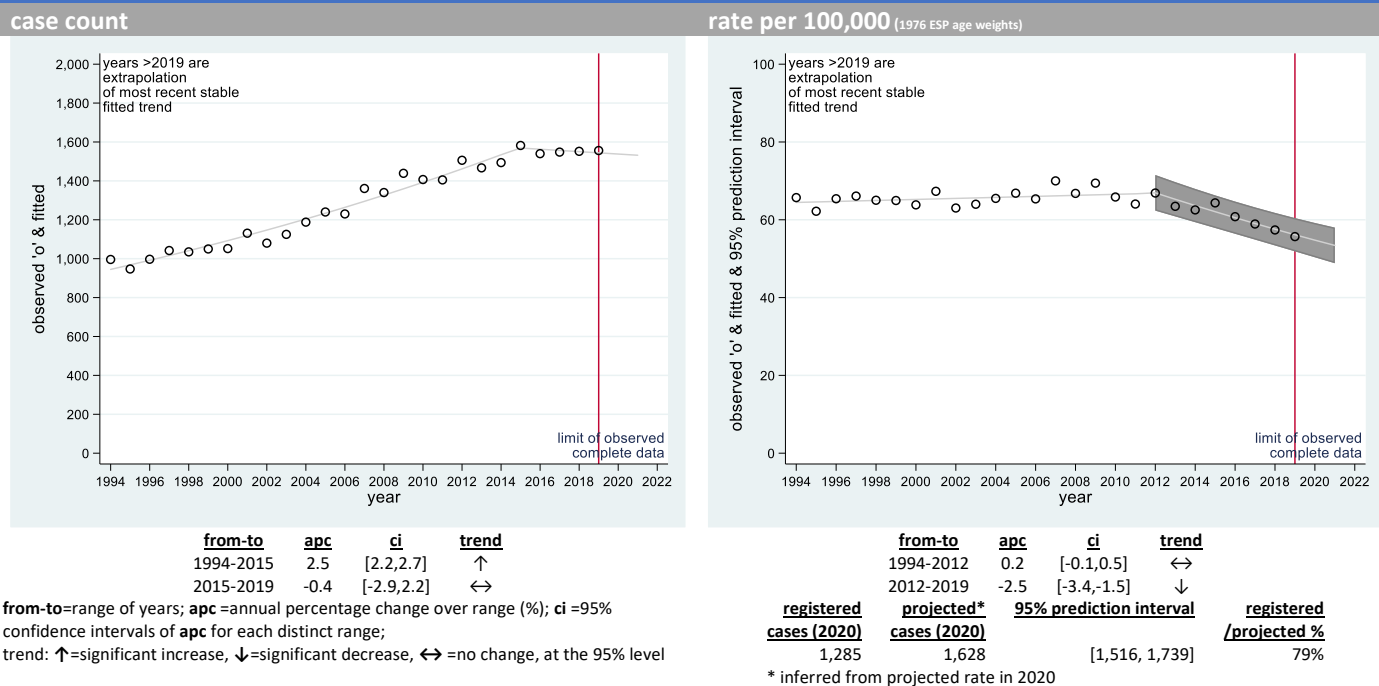
- Cases of oesophageal cancer in males increased steadily and significantly during 1994-2019, but the incidence rate was static over the same period (Fig. 2-4).

FIGURE 2-5. C16 stomach: MALES: TREND DURING 1994-2019



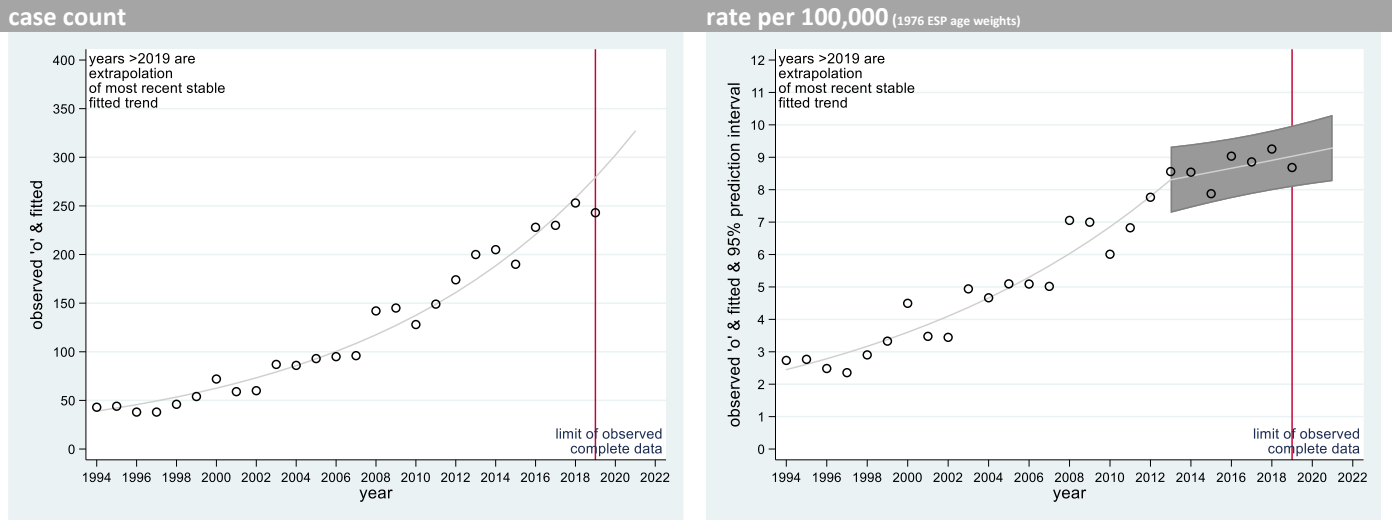
- After a period of decline during 1994-2003, cases of stomach cancer in males increased significantly during 2003-2014 before entering a marginal decline during 2014-2019. The incidence rate declined significantly during 2014-2019 (Fig. 2-5).

FIGURE 2-6. C18-20 colorectum: MALES: TREND DURING 1994-2019



- Colorectal cancer cases in males increased significantly and steadily during the period 1994-2015 followed by a plateau during 2015-2019. After a static trend from 1994 to 2012, the incidence rate declined significantly during the period 2012-2019 (Fig. 2-6).
- It is not yet clear to what extent the national bowel screening programme (BowelScreen), introduced in late 2012, may have influenced these trends.

FIGURE 2-7. C22 liver: MALES: TREND DURING 1994-2019



• observed case count and rate in 2020 (incomplete registration; excluded from trends)

from-to	apc	ci	trend
1994-2019	8.2	[7.5,8.9]	↑

from-to	apc	ci	trend
1994-2013	6.6	[5.6,7.7]	↑
2013-2019	1.4	[-2.0,4.9]	↔

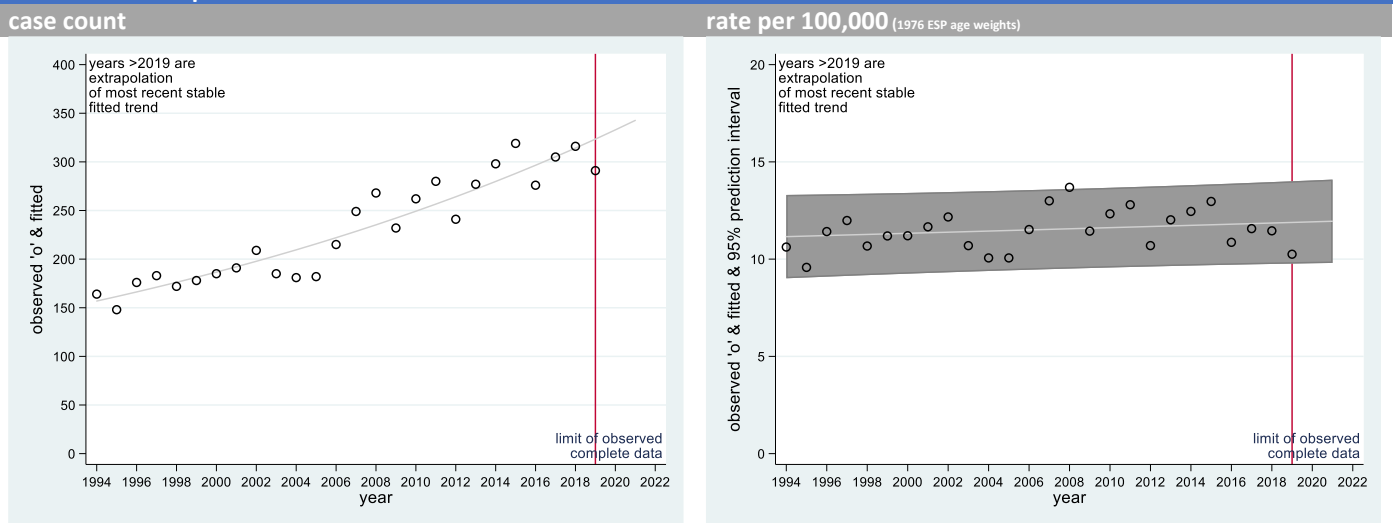
from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

registered cases (2020)	projected* cases (2020)	95% prediction interval	registered /projected %
184	259	[227, 291]	71%

* inferred from projected rate in 2020

- Cases of liver cancer in males increased significantly during the full period 1994-2019. The incidence rate also increased significantly during 1994-2013 followed by a more marginal increase or static period (2013-2019) (Fig. 2-7).

FIGURE 2-8. C25 pancreas: MALES: TREND DURING 1994-2019



from-to	apc	ci	trend
1994-2019	2.9	[2.5,3.4]	↑

from-to	apc	ci	trend
1994-2019	0.3	[-0.2,0.7]	↔

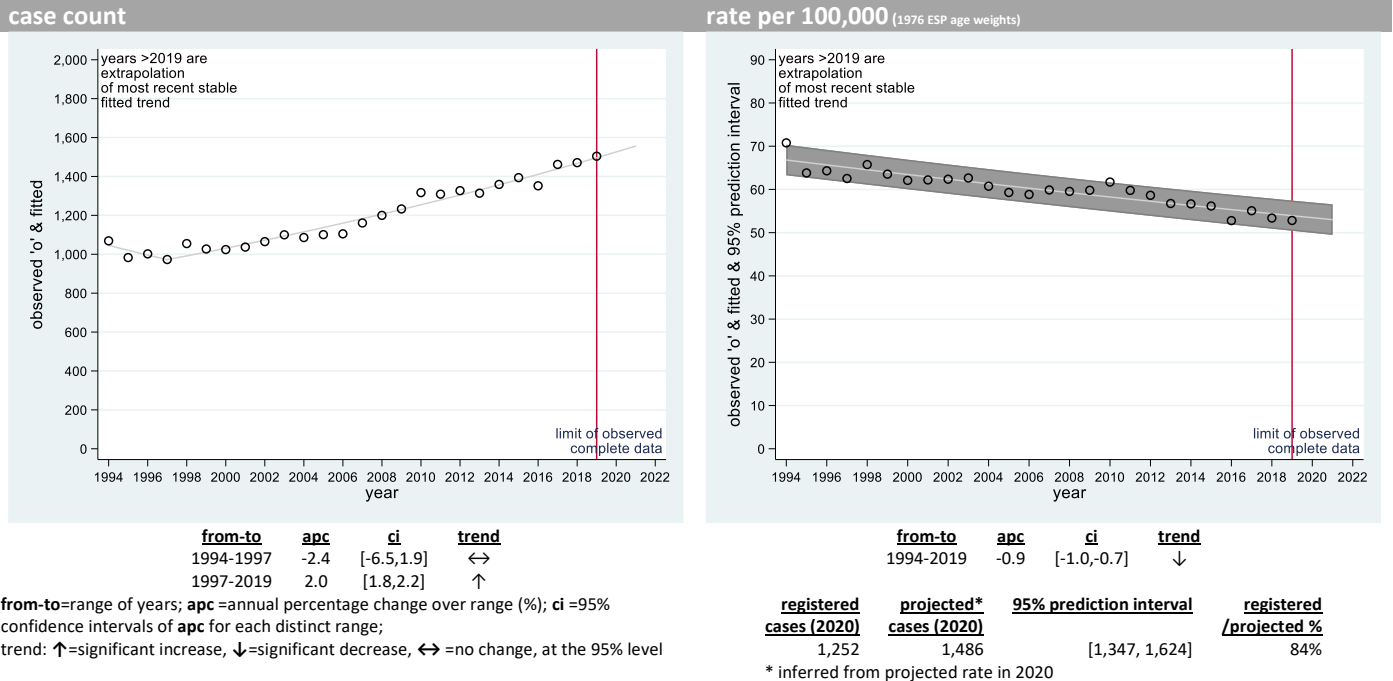
from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

registered cases (2020)	projected* cases (2020)	95% prediction interval	registered /projected %
270	322	[278, 367]	84%

* inferred from projected rate in 2020

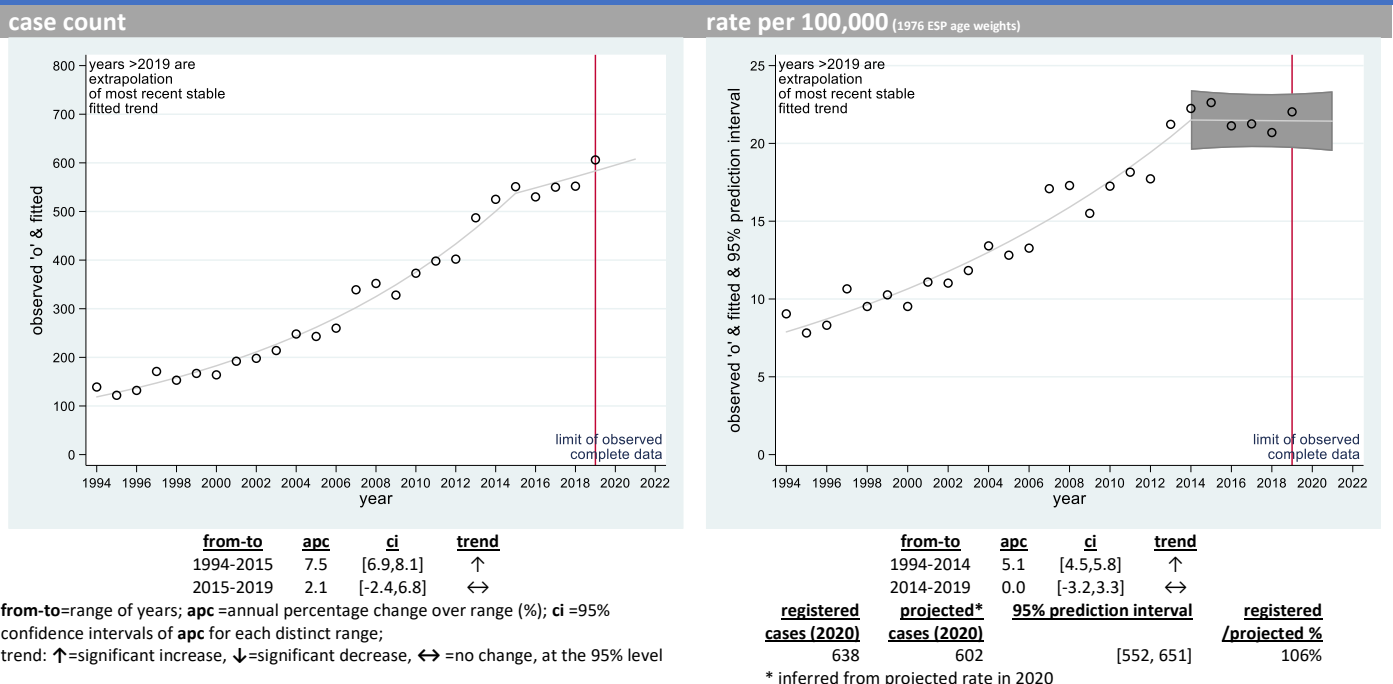
- Cases of pancreatic cancer in males increased significantly during the full period 1994-2019. The incidence rate was static over the same period (Fig. 2-8).

FIGURE 2-9. C33-34 lung: MALES: TREND DURING 1994-2019



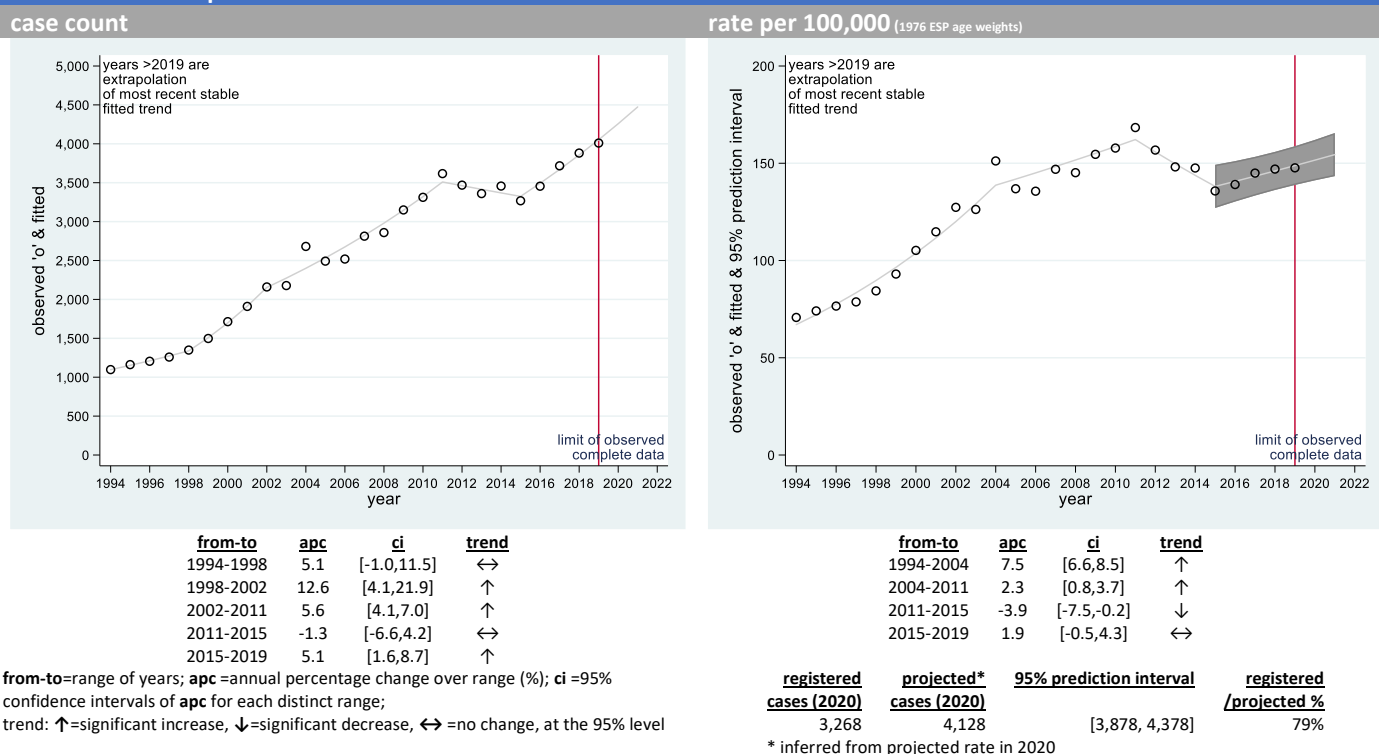
- Cases of lung cancer in males increased significantly during 1997-2019. The incidence rate declined significantly during the full period 1994-2019 (Fig 2-9).
- The pattern of lung cancer incidence is markedly different in males and females. Incidence rates declined in males but increased steadily in females during 1994-2016, with a recent significant decline during 2016-2019 (Fig. 2-26). Lung cancer rates track smoking prevalence from decades earlier. It is likely that peak smoking prevalence in Irish females occurred somewhat later than in males, as seen in other countries [10], and that this accounts for the contrasting trends in male and female incidence rates for lung cancer.

FIGURE 2-10. C43 melanoma of skin: MALES: TREND DURING 1994-2019



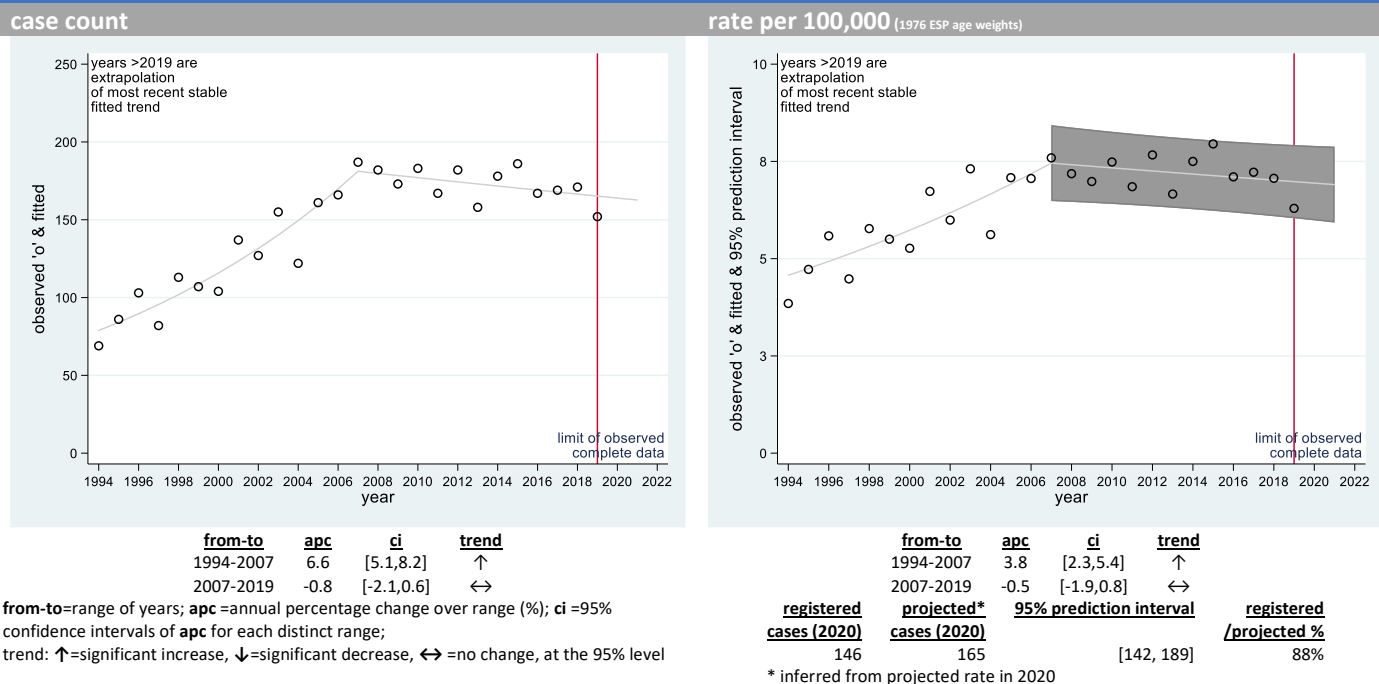
- Cases of melanoma in males increased steadily and significantly during 1994-2015, followed by a less steep or static period during 2015-2019. The incidence rate increased significantly during 1994-2014 followed by a static period during 2014-2019 (Fig. 2-10).

FIGURE 2-11. C61 prostate: MALES: TREND DURING 1994-2019



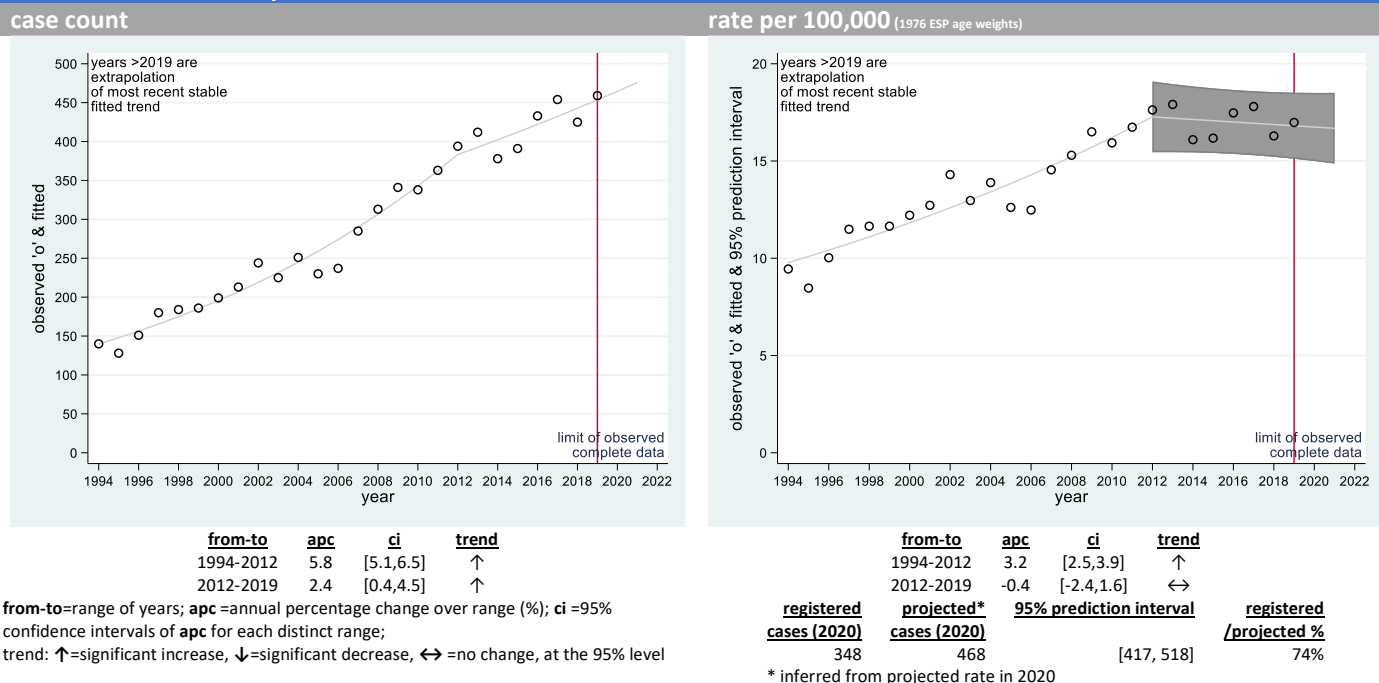
- Cases of prostate cancer increased significantly during 1998-2019 except for a brief marginal decline during 2011-2015. More recently, the annual case count increased again during 2015-2019 (Fig. 2-11).
- The incidence rate increased significantly and steeply during 1994-2004, followed by a lesser though significant increase during 2004-2011. Thereafter, the rate declined briefly though significantly during 2011-2015, but mirroring case counts, the rate has re-commenced an upward trajectory during 2015-2019.
- Increasing incidence up to 2011 probably reflected large-scale PSA testing of asymptomatic men. The number of PSA tests carried out in Ireland increased five-fold between 1995 and 2004 [11].

FIGURE 2-12. C62 testis: MALES: TREND DURING 1994-2019



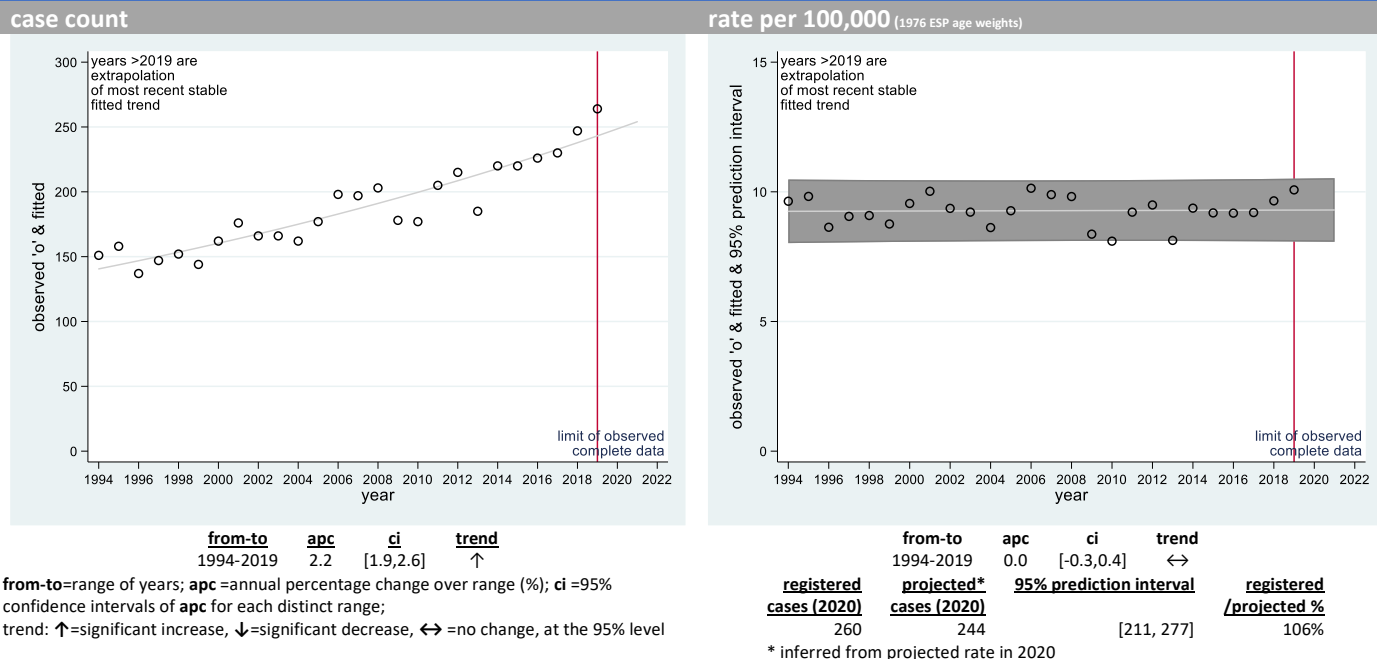
- Cases of testicular cancer increased significantly during 1994-2007 followed by a static period during 2007-2019. The rate trend closely mirrored the case trend for this cancer with a marginal though non-significant decline in rate during 2007-2019.

FIGURE 2-13. C64 kidney: MALES: TREND DURING 1994-2019



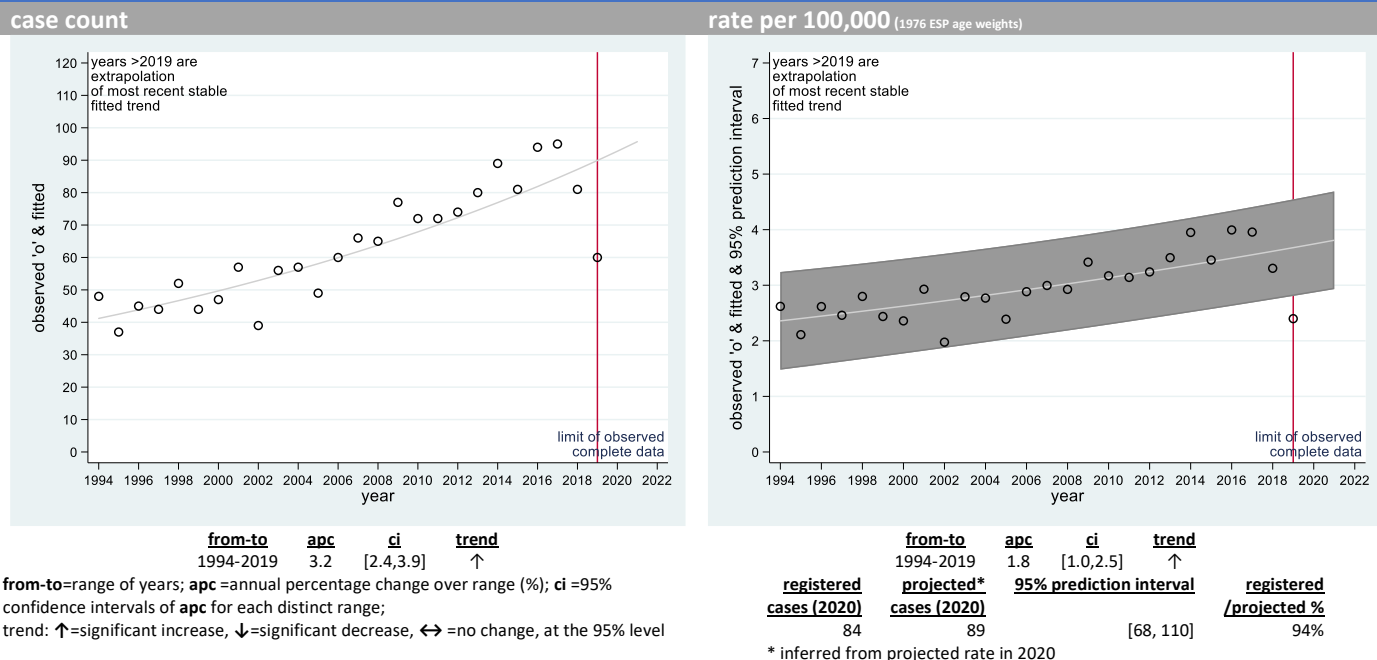
- Cases of kidney cancer in males increased significantly during the period 1994-2012, followed by a less steep increase during 2012-2019. The incidence rate trend mirrored the case trend; increasing significantly during 1994-2012, followed by a marginal non-significant decline during 2012-2019 (Fig 2-13).

FIGURE 2-14. C71-72 brain and CNS: MALES: TREND DURING 1994-2019



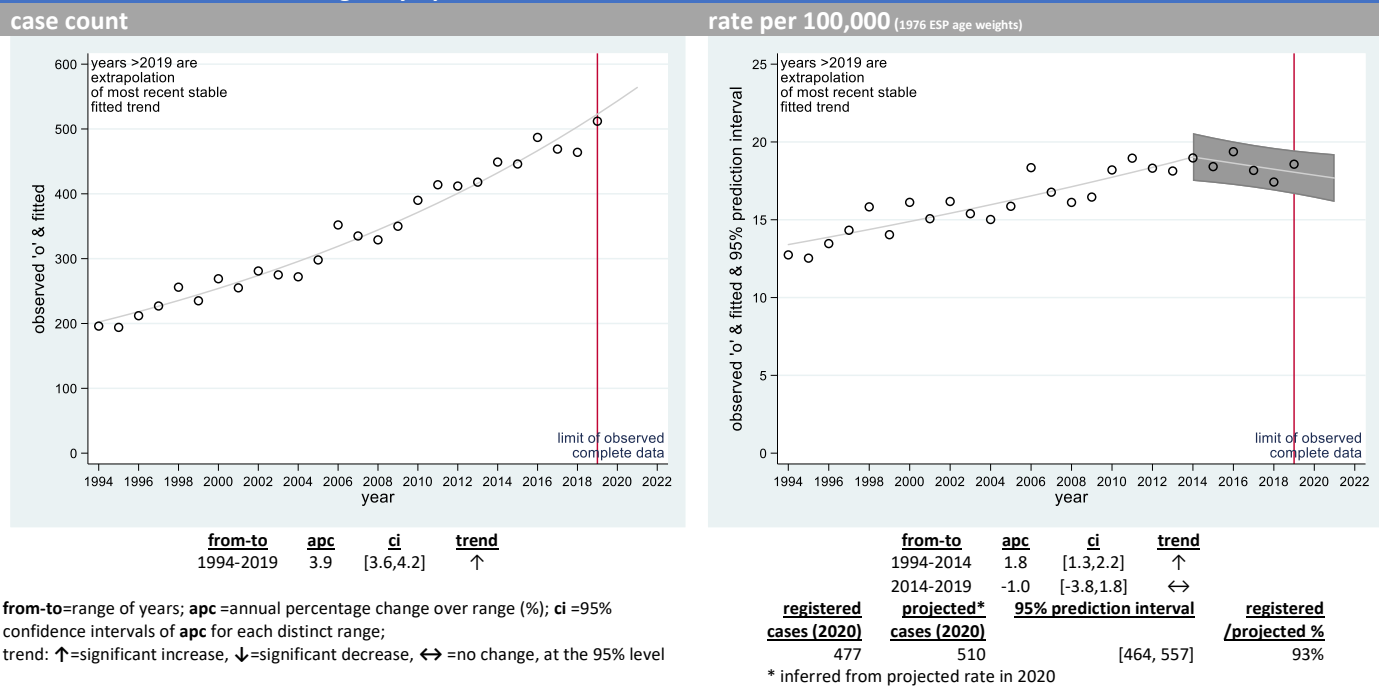
- Cases of invasive brain & central nervous system cancer in males increased significantly during the full period 1994-2019. The incidence rate was static over the same period (Fig. 2-14).

FIGURE 2-15. C81 Hodgkin lymphoma: MALES: TREND DURING 1994-2019



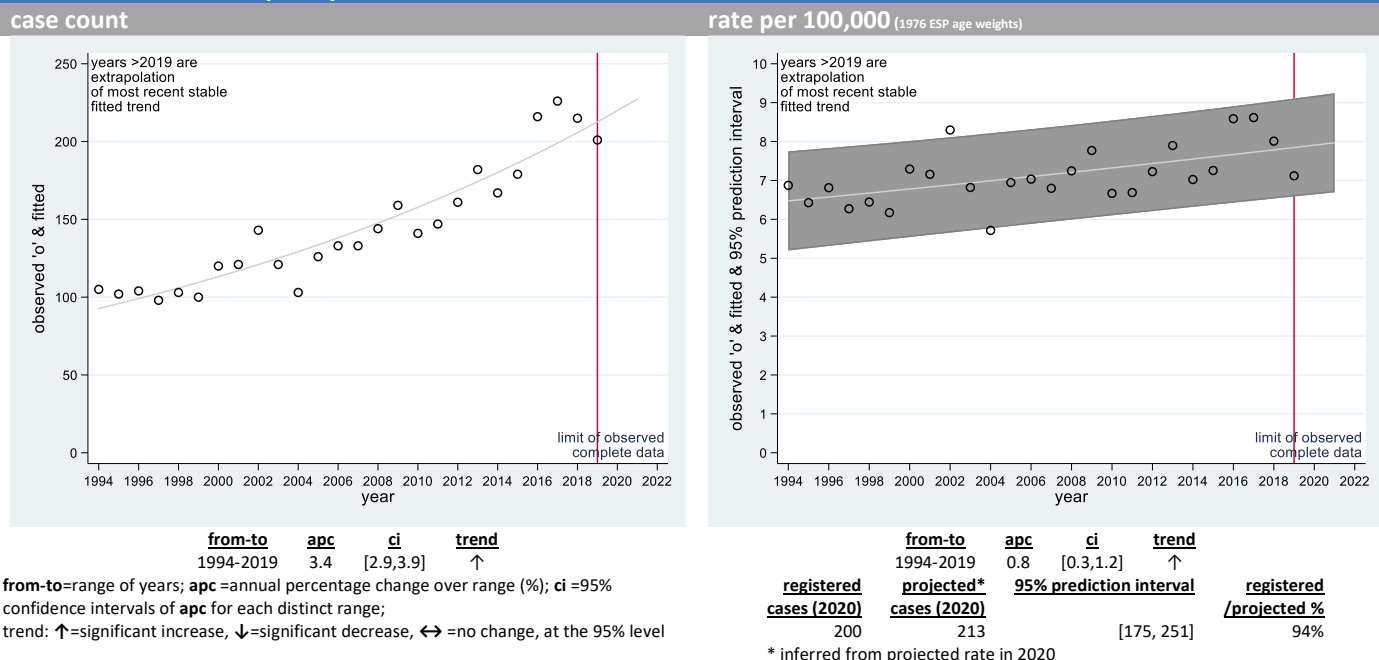
- Cases of Hodgkin lymphoma in males increased significantly during the full period 1994-2019 (Fig. 2-15). The incidence rate also increased significantly over the same period.

FIGURE 2-16. C82-85 non-Hodgkin lymphoma: MALES: TREND DURING 1994-2019



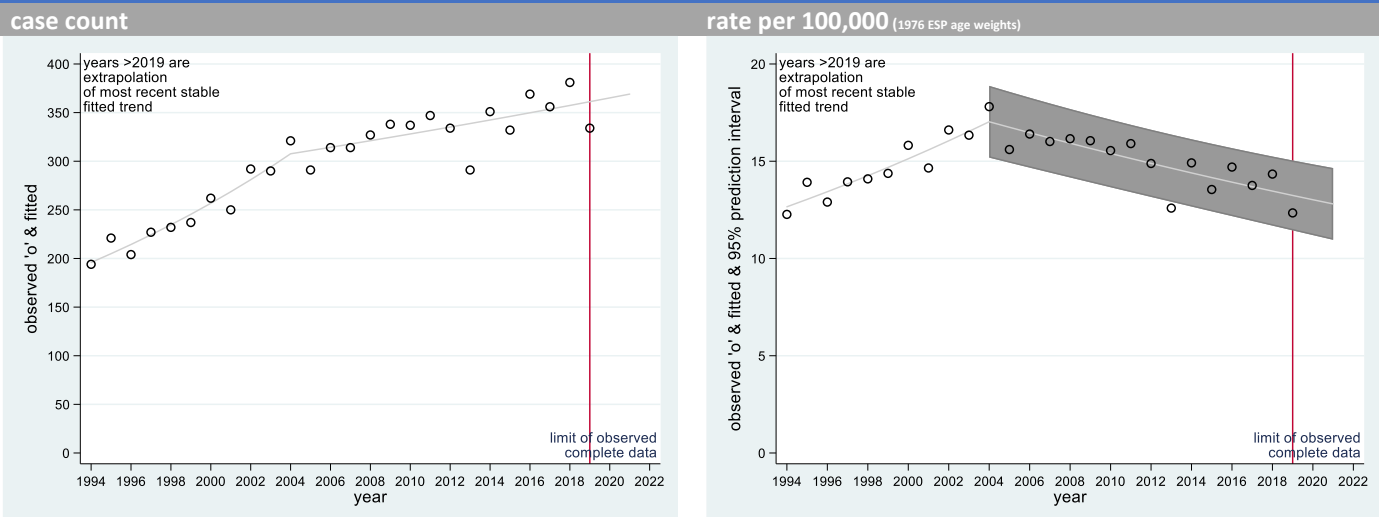
- Cases of non-Hodgkin lymphoma in males increased significantly during the full period 1994-2019. The incidence rate increased significantly during 1994-2014, followed by a marginal decline during 2014-2019 (Fig. 2-16).

FIGURE 2-17. C90 multiple myeloma: MALES: TREND DURING 1994-2019



- Cases of multiple myeloma increased significantly during the full period 1994-2019 (Fig.2-17). The incidence rate increased significantly over the same period.

FIGURE 2-18. C91-95 leukaemia: MALES: TREND DURING 1994-2019



from-to	apc	ci	trend
1994-2004	4.6	[3.2,6.1]	↑
2004-2019	1.1	[0.4,1.7]	↑

from-to=range of years; apc =annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔ =no change, at the 95% level

from-to	apc	ci	trend
1994-2004	3.0	[1.6,4.4]	↑
2004-2019	-1.7	[-2.3,-1.0]	↓

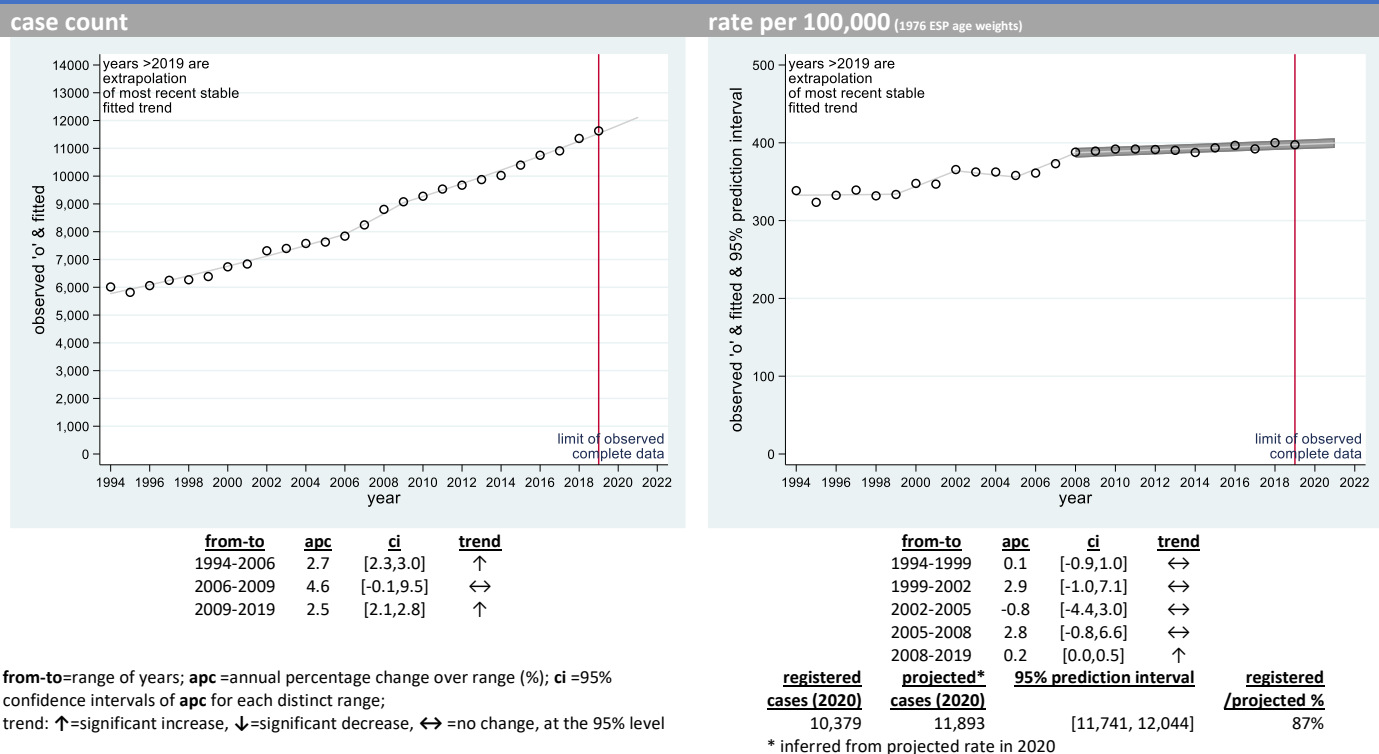
registered cases (2020)	projected* cases (2020)	95% prediction interval	registered /projected %
256	367	[319, 416]	70%

* inferred from projected rate in 2020

- The leukaemia case count in males increased significantly during 1994-2004, thereafter it increased less steeply though still significantly during 2004-2019. The incidence rate trend mirrored the case trend and increased during 1994-2004 and then declined significantly during 2004-2019 (Fig. 2-18).

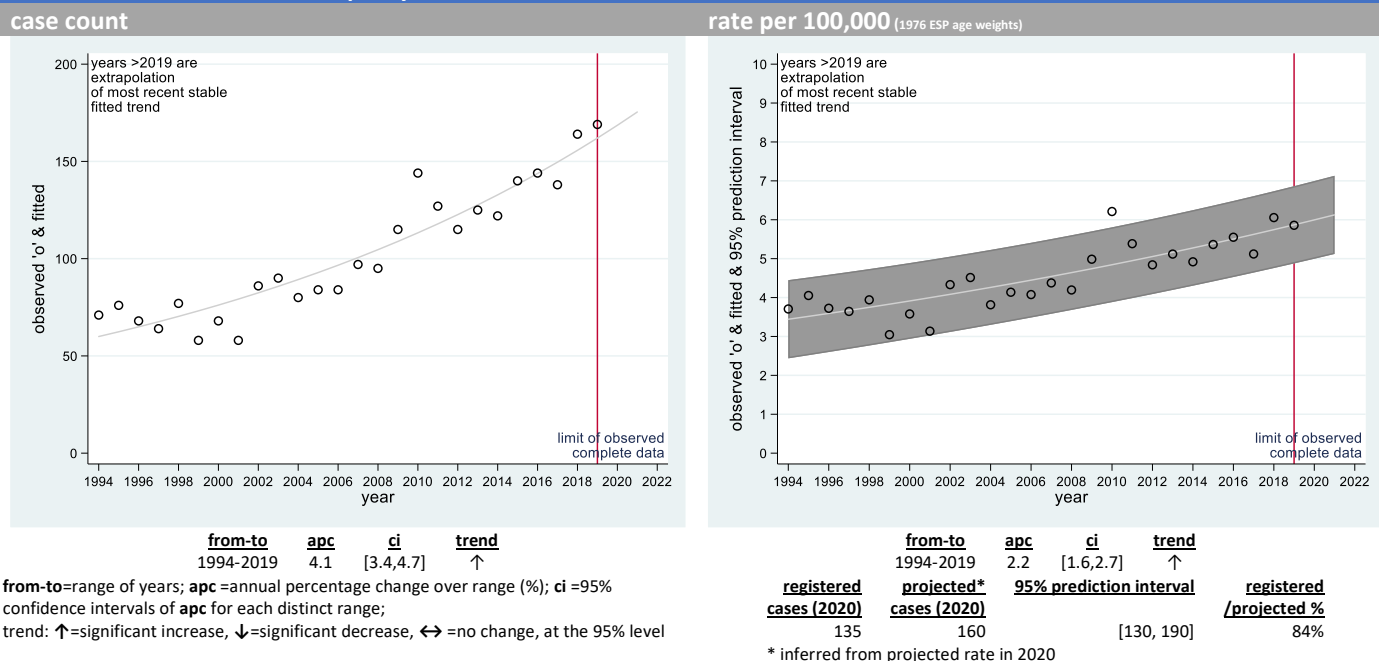
Cancer incidence trends in females

FIGURE 2-19. C00-43 C45-96 all invasive cancers excl. NMSC: FEMALES: TREND DURING 1994-2019



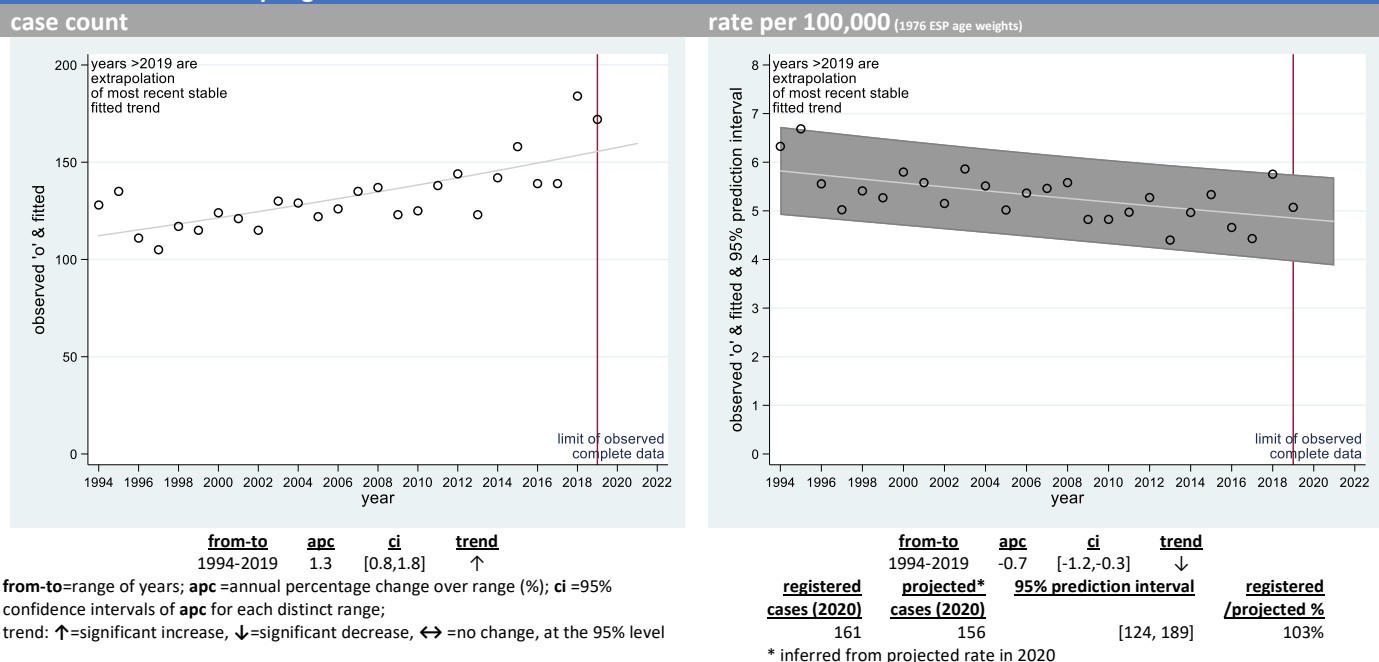
- Cases of invasive cancer (excl. NMSC) in females increased during 1994-2006 followed by one brief steeper increase during 2006-2009. Thereafter, cases increased less steeply though significantly during 2009-2019, by on average 2.5% per year (Fig. 2-19).
- No clear rate trends were evident during 1994-2008, although there was a net increase to a higher rate post-2008 onwards, with a fairly consistent but low significant rate of increase, averaging 0.2% per annum during 2008-2019. If breast cancer is excluded from the dataset the underlying rate trend is static (0.0%, during 2011-2019, Table 3-3).
- Based on the rate trend during 2008-2019, the projected case count for females in 2020 was 11,893 (ignoring the potential effect of the COVID-19 pandemic on numbers of cancers diagnosed). At the time of writing the number of registered female cancer cases for 2020 was 10,379: 87% of projected numbers (or 89% of the numbers registered for 2019).
- Similar comparisons of (preliminary) observed cases for 2020 with those projected from the most recent, pre-2020 trends, are provided for each cancer major cancer type below and in Appendix VI.

FIGURE 2-20. C01-14 mouth & pharynx: FEMALES: TREND DURING 1994-2019



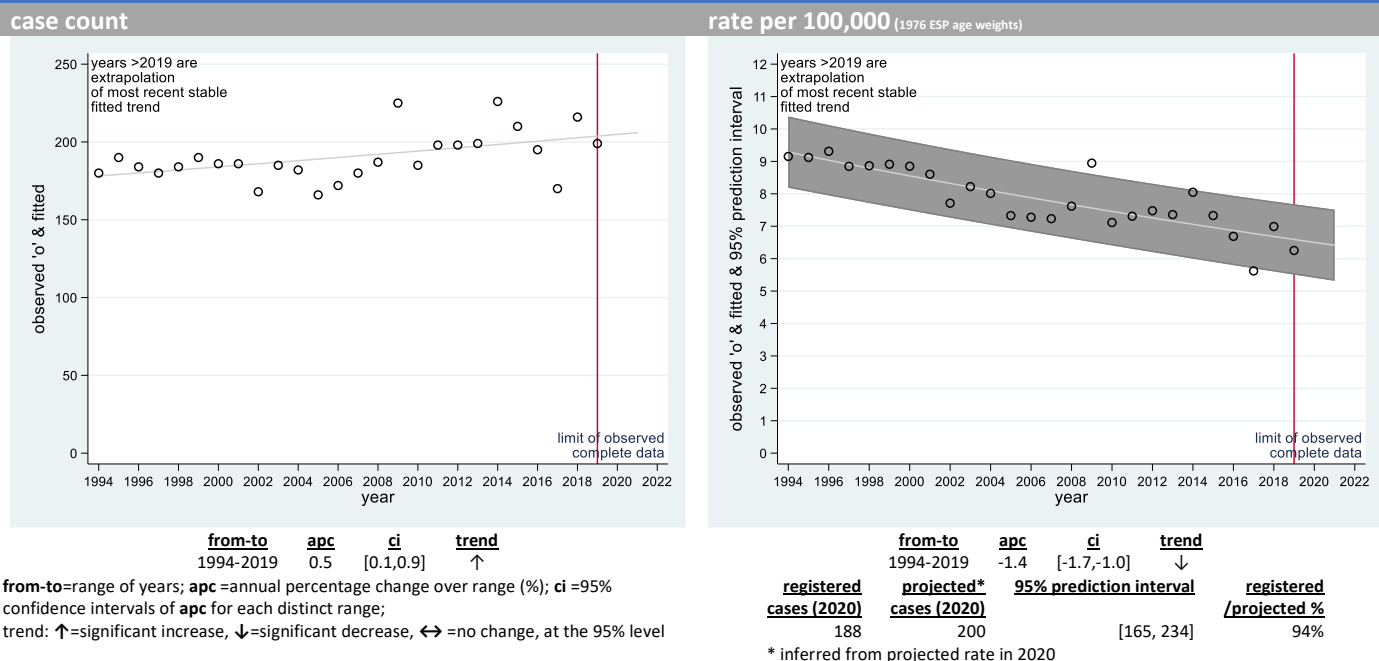
- Cases of mouth and pharyngeal cancer in females increased over the full period 1994-2019 (Fig. 2-20).
- The incidence rate also increased steadily and significantly over the full period 1994-2019.

FIGURE 2-21. C15 oesophagus: FEMALES: TREND DURING 1994-2019



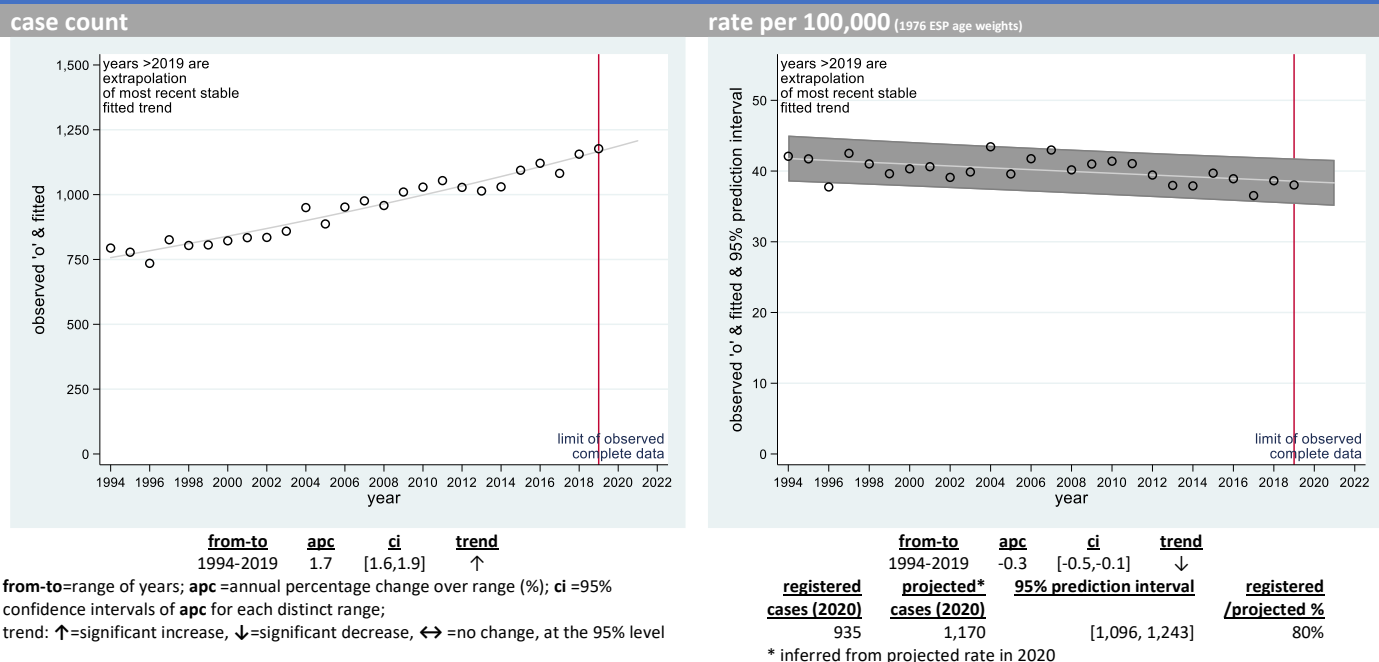
- Cases of oesophageal cancer in females increased significantly during 1994-2019 (Fig. 2-21)
- The incidence rate declined significantly over the same period.

FIGURE 2-22. C16 stomach: FEMALES: TREND DURING 1994-2019



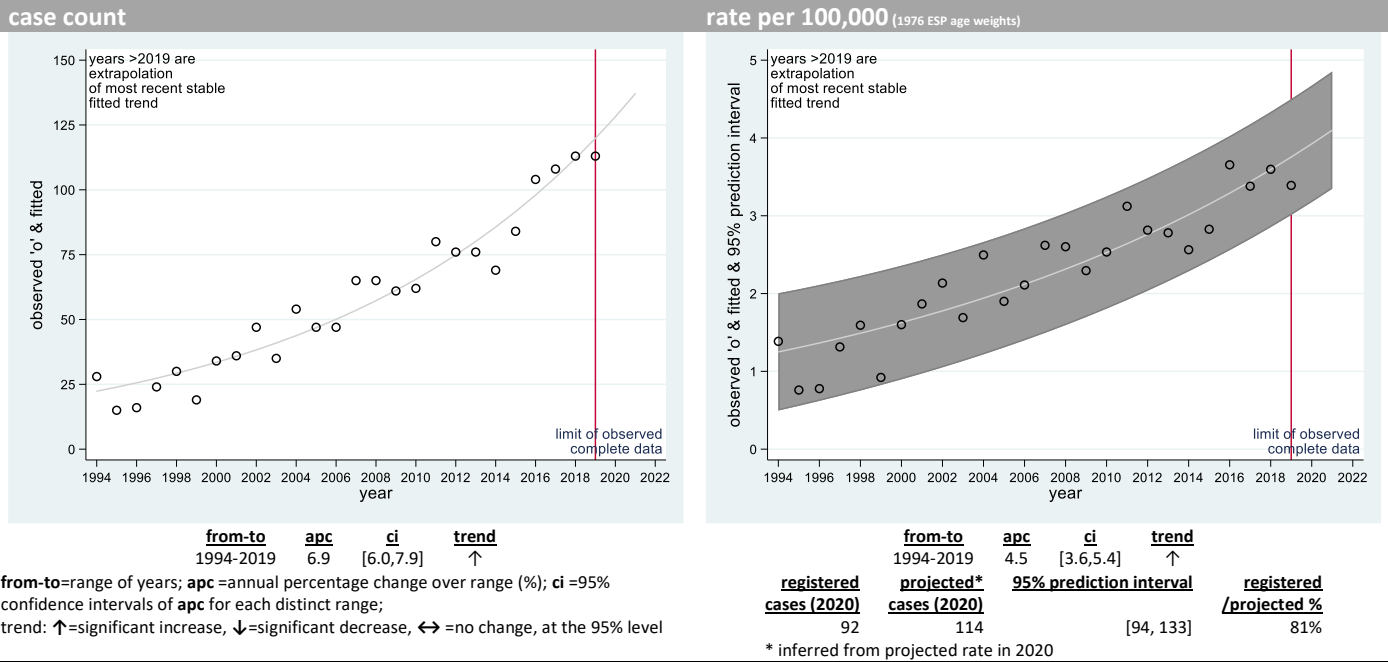
- Cases of stomach cancer in females increased marginally during the full period 1994-2019 (Fig 2-22).
- The incidence rate declined significantly over the same period.

FIGURE 2-23. C18-20 colorectum: FEMALES: TREND DURING 1994-2019



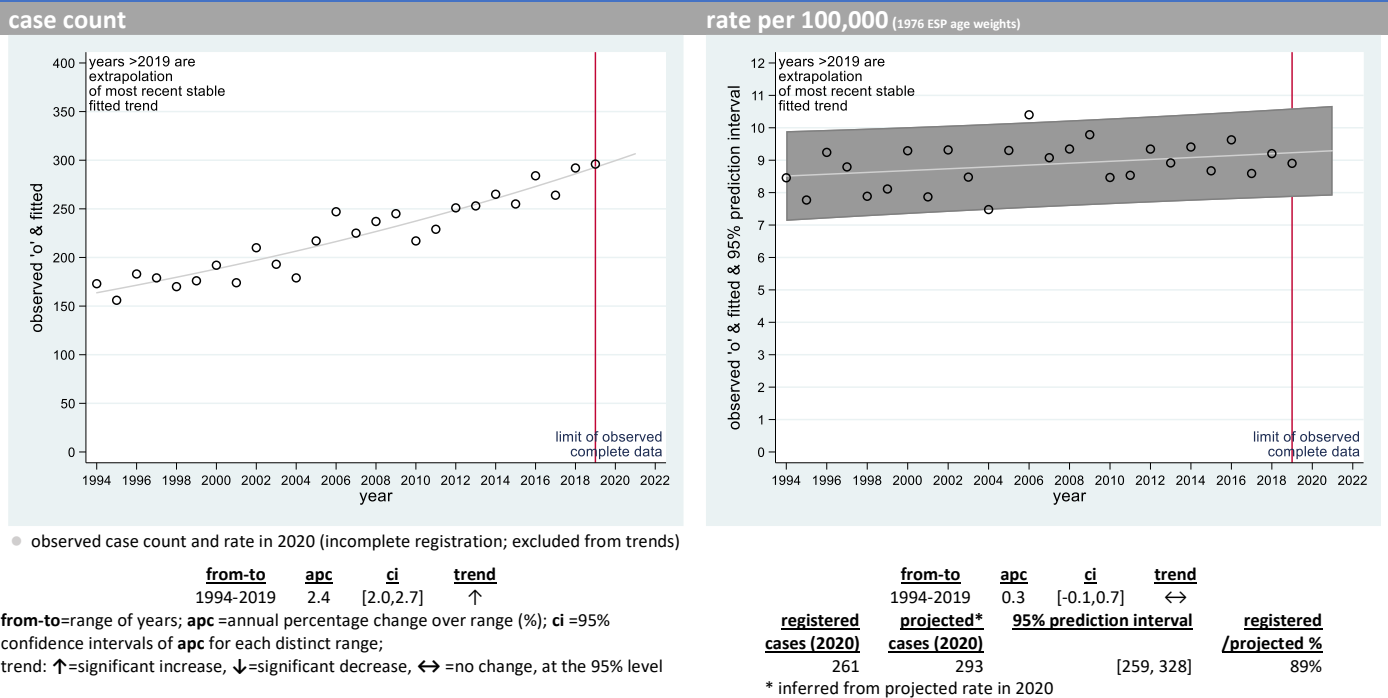
- Cases of colorectal cancer in females increased significantly during the full period 1994-2019 (Fig 2-23).
- The incidence rate declined marginally, though significantly over the same period.
- It is not yet clear to what extent the national bowel screening programme (BowelScreen), introduced in late 2012, may have influenced these trends.

FIGURE 2-24. C22 liver: FEMALES: TREND DURING 1994-2019



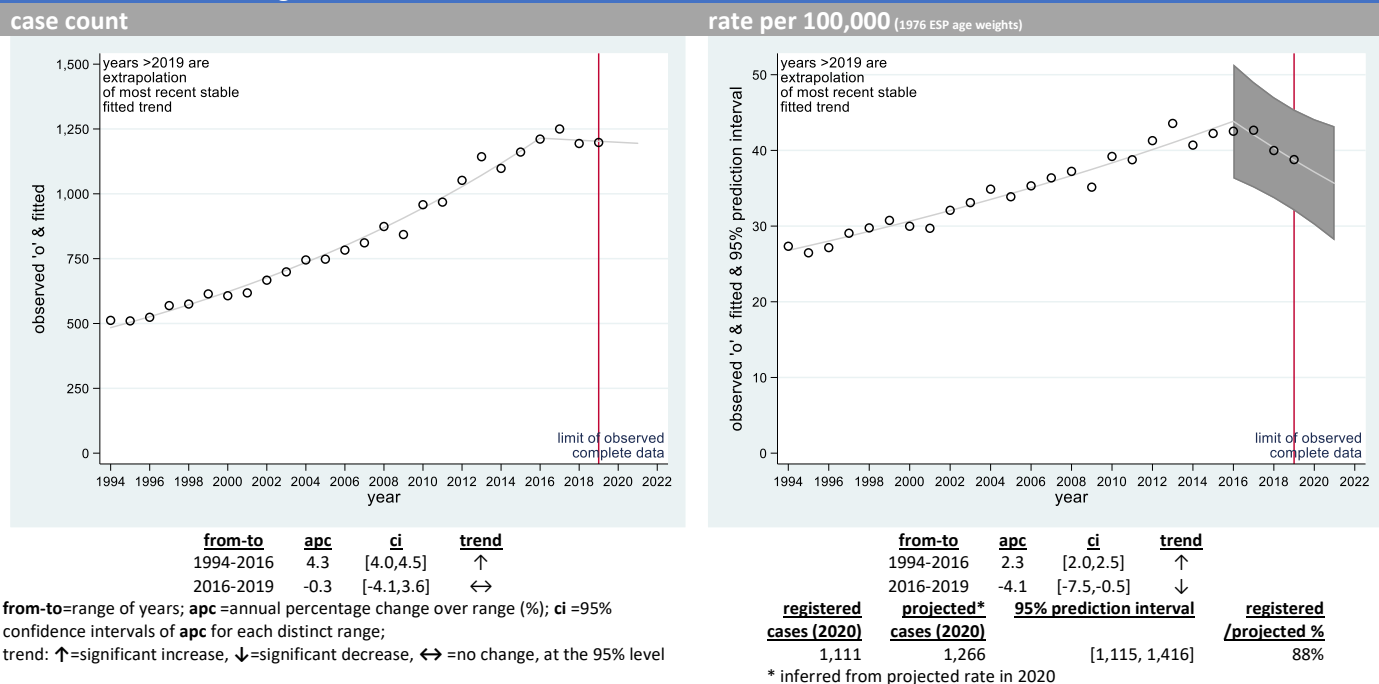
- Cases of liver cancer in females increased significantly during the full period 1994-2019 (Fig. 2-24).
- The incidence rate increased significantly over the same period.

FIGURE 2-25. C25 pancreas: FEMALES: TREND DURING 1994-2019



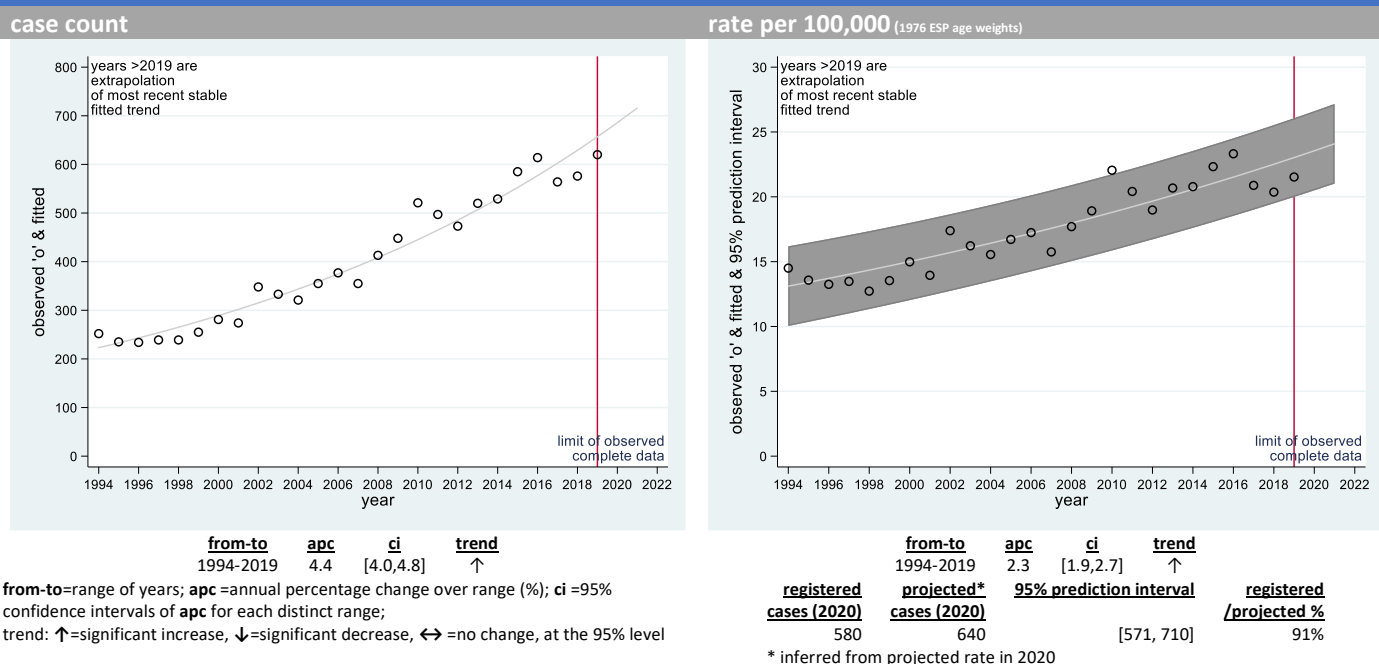
- Cases of pancreatic cancer in females increased significantly during the full period 1994-2019 (Fig 2-25).
- The incidence rate increased marginally though non-significantly over the same period.

FIGURE 2-26. C33-34 lung: FEMALES: TREND DURING 1994-2019



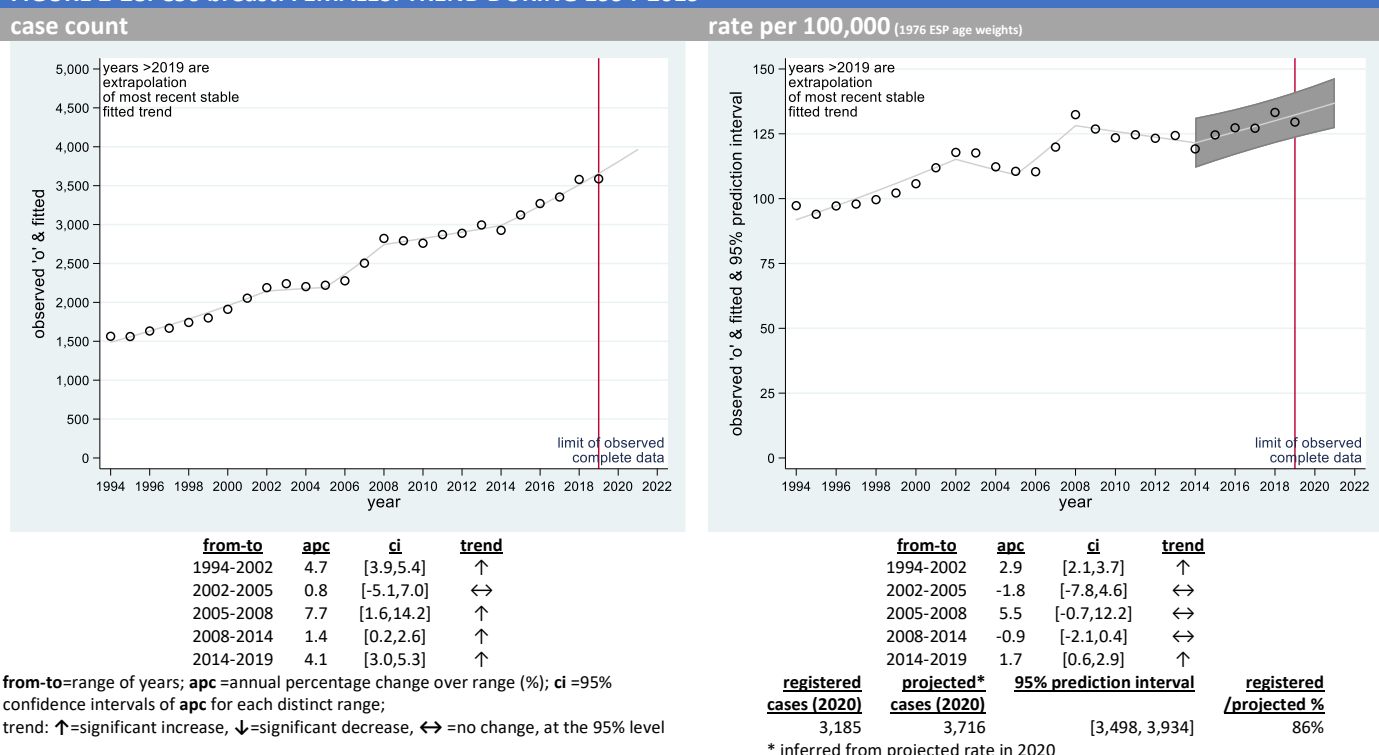
- Cases of lung cancer in females increased steadily and significantly during the period 1994-2016, followed by a short static period or marginal decline during 2016-2019 (Fig. 2-26).
- The incidence rate trend mirrored the case trend; it increased steadily during 1994-2016 followed by a recent significant decline during 2016-2019.
- The pattern of lung cancer incidence is markedly different in males and females. Incidence rates declined in males over the full period (Fig 2-9), but increased steadily in females during 1994-2016. It is probably too early to determine if the recent downward trend (2016-2019) in female lung cancer rate will be sustained. Lung cancer rates track smoking prevalence from decades earlier. It is likely that peak smoking prevalence in Irish females occurred somewhat later than in males, as seen in other countries [10], and that this may account for the contrasting trends in male and female incidence rates for lung cancer.

FIGURE 2-27. C43 melanoma of skin: FEMALES: TREND DURING 1994-2019



- Cases of melanoma in females increased steadily and significantly during the full period 1994-2019 (Fig. 2-27).
- The incidence rate also change increased significantly over the same period.

FIGURE 2-28. C50 breast: FEMALES: TREND DURING 1994-2019

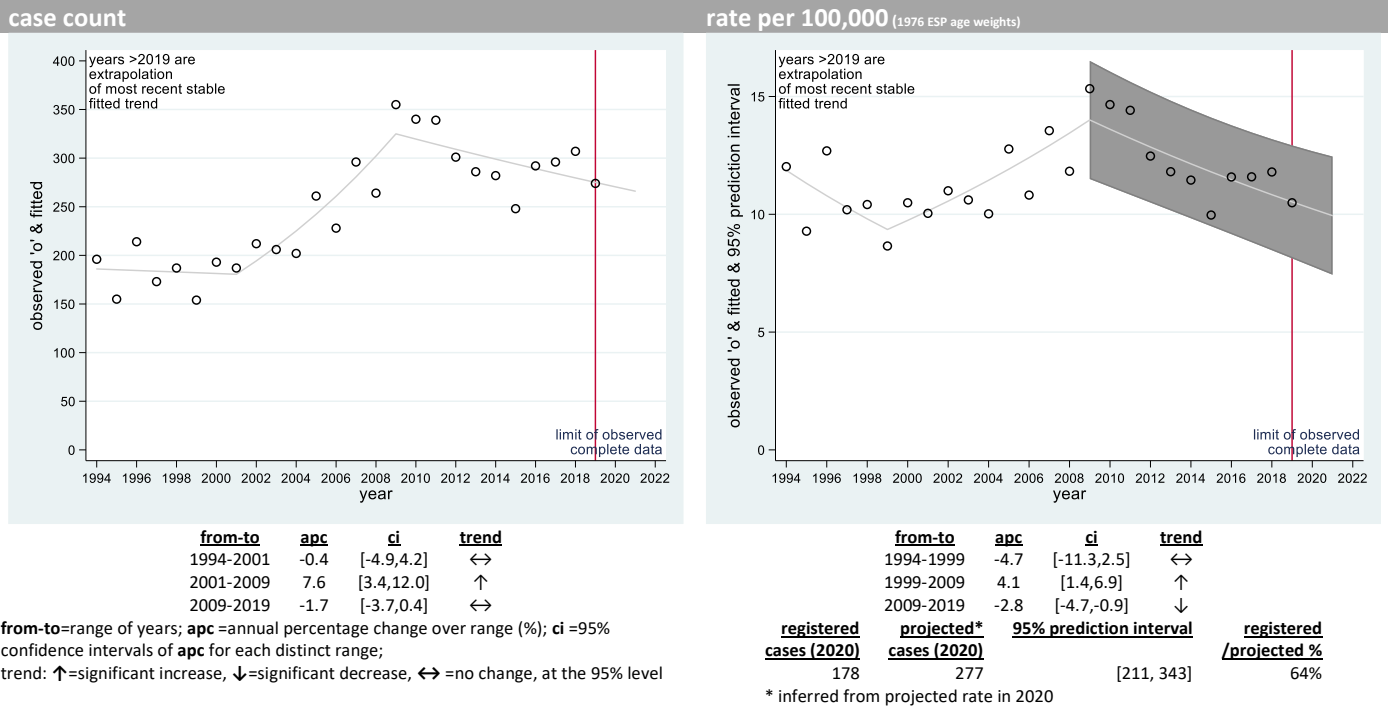


- Cases of invasive breast cancer in females increased significantly in step-wise fashion during 1994-2019, with a more significant annual increase during 2014-2019 (Fig. 2-28).
- The incidence rate trend shows a sustained increase during 1994-2002, followed by a period of stasis during 2002-2005. Another marked though non-significant increase occurred during 2005-2008, followed by a non-

significant decrease over the period 2008-2014. Mirroring the case trend, there followed a more recent and significant rate increase during 2014-2019.

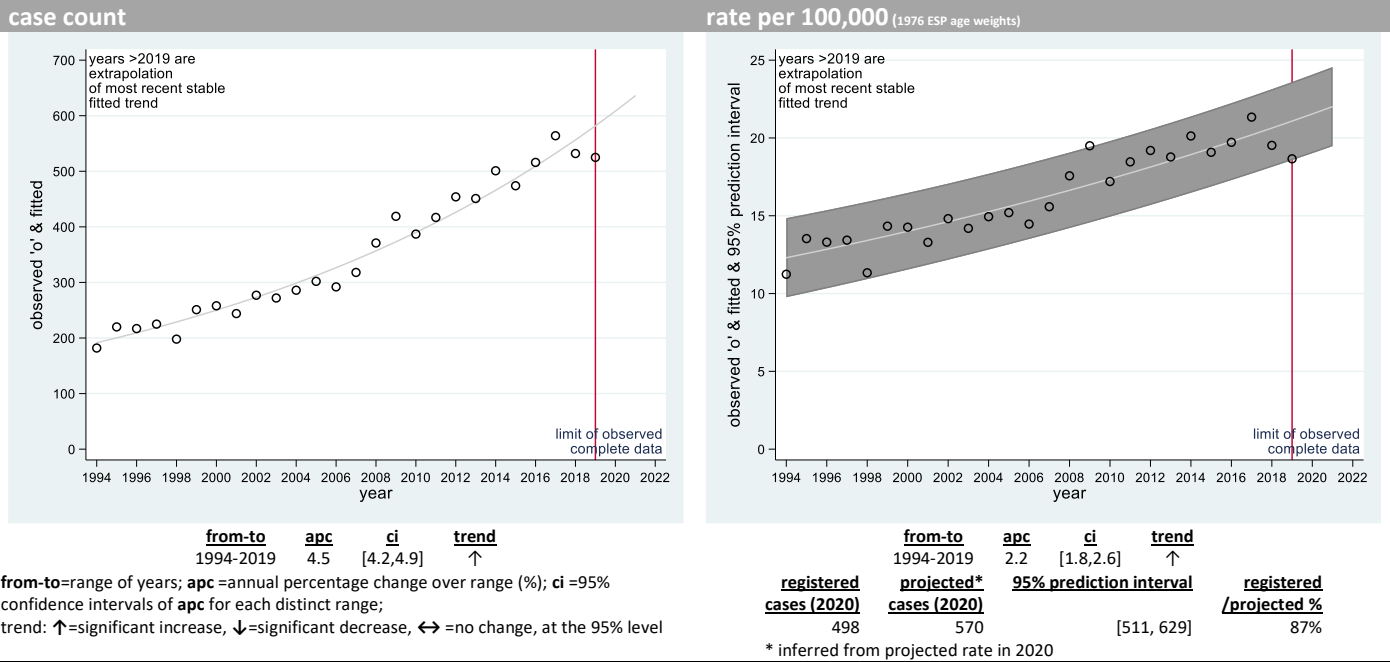
- The pattern of overall incidence trends for invasive breast cancer has been strongly influenced by the national breast screening program (BreastCheck), initially covering ages 50-64, in the eastern half of the country from 2000 and the rest of the country by 2007. This is evident from the two mid-range peaks in incidence rates which followed the two roll-out phases. Phased extension of BreastCheck to age 69 began in late 2015, but it is not yet clear to what extent this may have influenced the most recent trends.

FIGURE 2-29. C53 cervix: FEMALES: TREND DURING 1994-2019



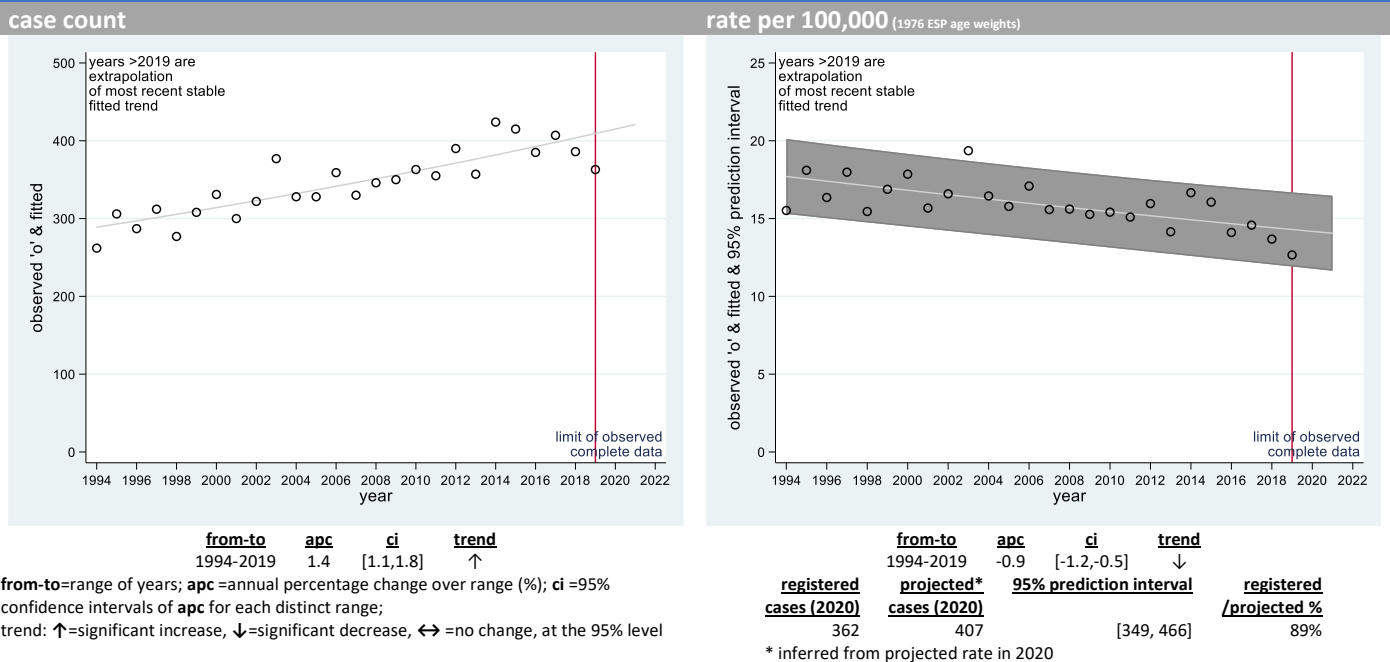
- The case count for cervical cancer declined marginally and non-significantly during 1994-2001, followed by a steep and significant increase during 2001-2009; thereafter, the case count declined non-significantly during 2009-2019 (Fig. 2-29).
- The incidence rate declined non-significantly from 1994 to 1999, followed by a significant increase during 1999-2009, followed by a significant decline during 2009-2019.
- The trends seen are likely to have reflected, in large part, screening for this cancer, most notably the introduction of the organised Cervical Check program from 2008 onwards for women aged 25-65.

FIGURE 2-30. C54 corpus uteri: FEMALES: TREND DURING 1994-2019



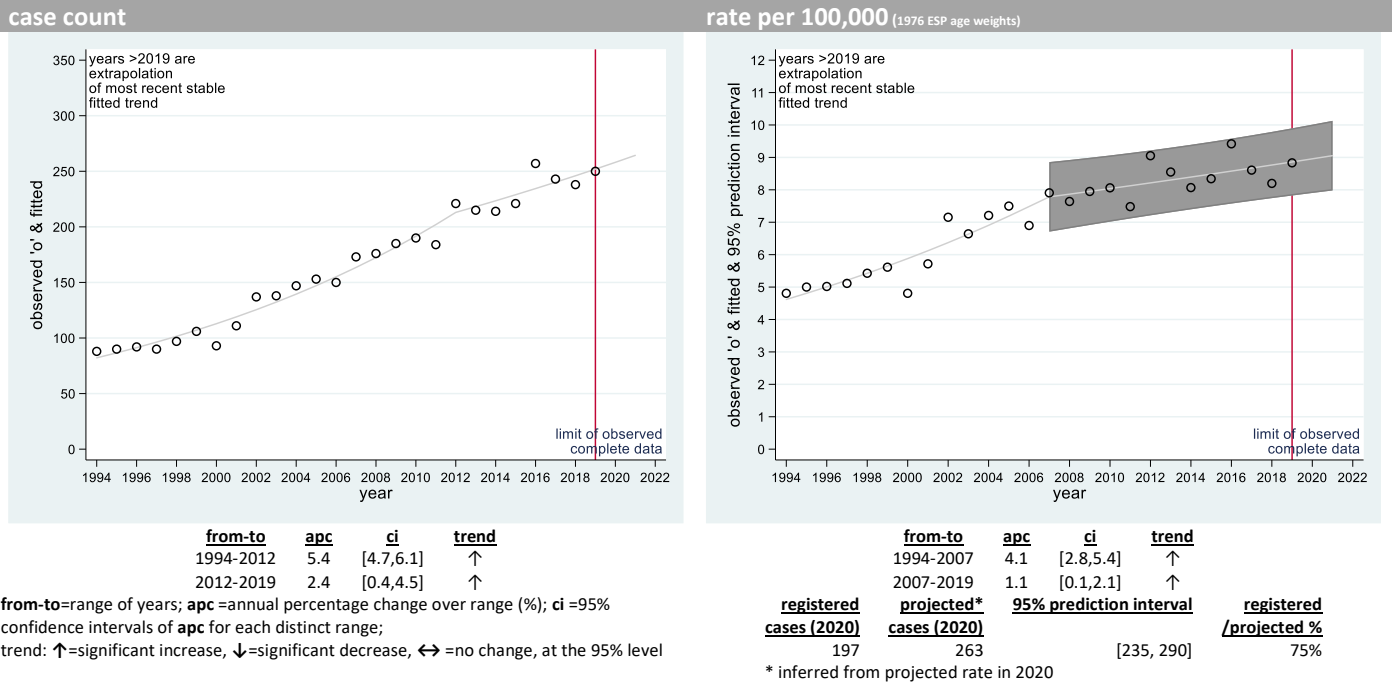
- The case count for uterine cancer increased steeply and significantly during the full period 1994-2019. The incidence rate increased significantly over the same period (Fig. 2-30).

FIGURE 2-31. C56 ovary: FEMALES: TREND DURING 1994-2019



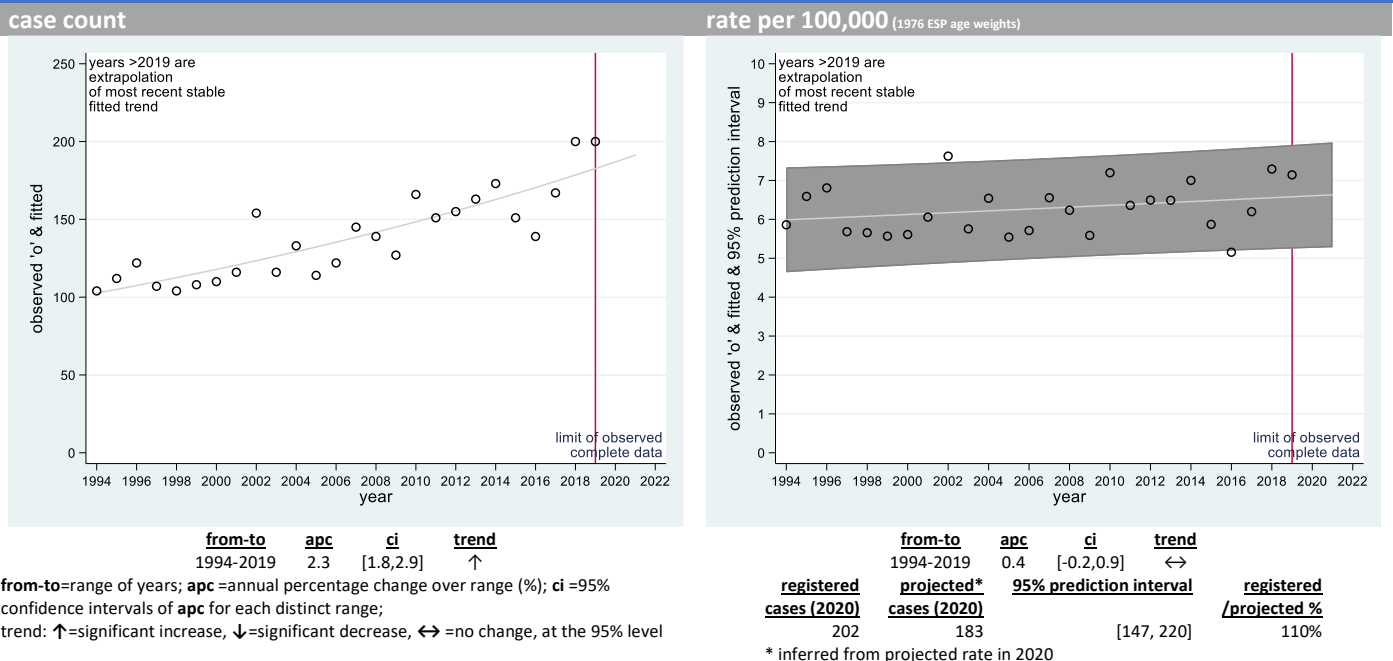
- The case count for ovarian cancer increased significantly during the full period 1994-2019 (Fig. 2-31).
- The incidence rate decreased significantly over the same period.

FIGURE 2-32. C64 kidney: FEMALES: TREND DURING 1994-2019



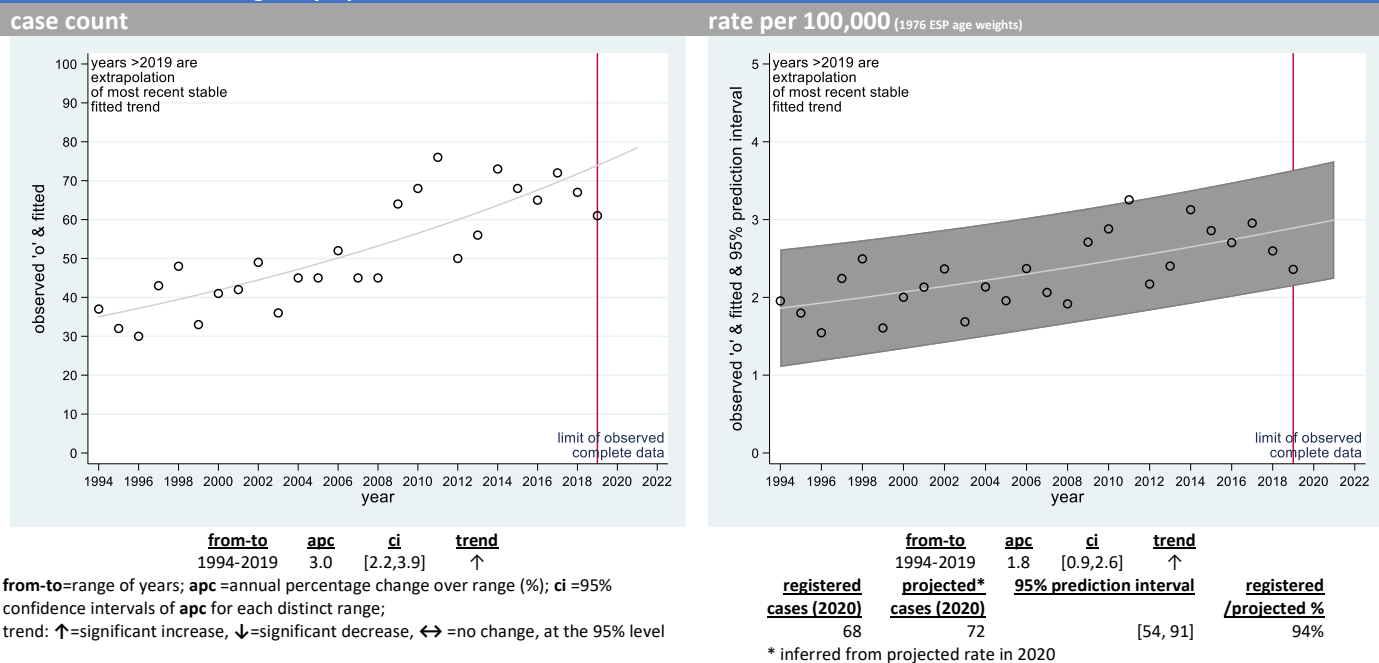
- Cases of kidney cancer in females increased significantly during the period 1994-2012, followed by a less steep increase during 2012-2019 (Fig 2-32).
- The incidence rate increased significantly during 1994-2007, followed by a less steep though significant increase during 2007-2019.

FIGURE 2-33. C71-72 brain and CNS: FEMALES: TREND DURING 1994-2019



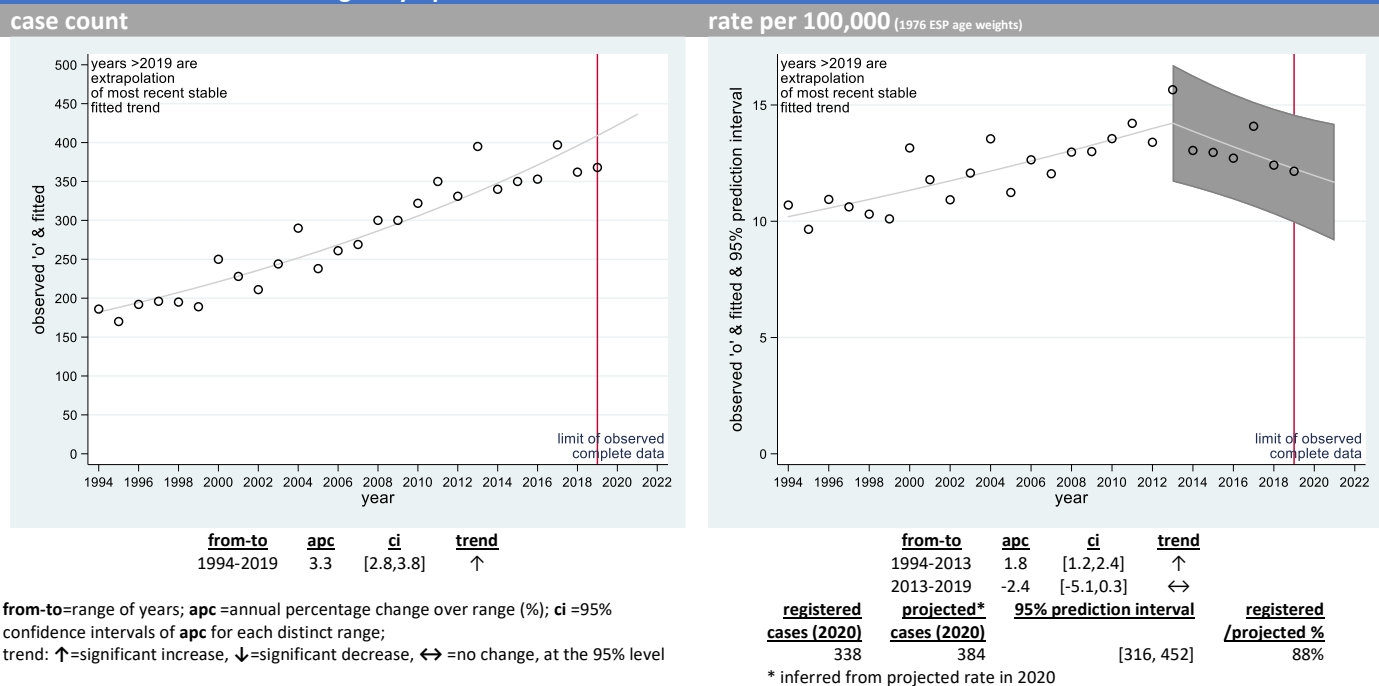
- Cases of brain and central nervous system cancers in females increased significantly during the full period 1994-2019 (Fig. 2-33).
- The incidence rate increased marginally though non-significantly over the same period.

FIGURE 2-34. C81 Hodgkin lymphoma: FEMALES: TREND DURING 1994-2019



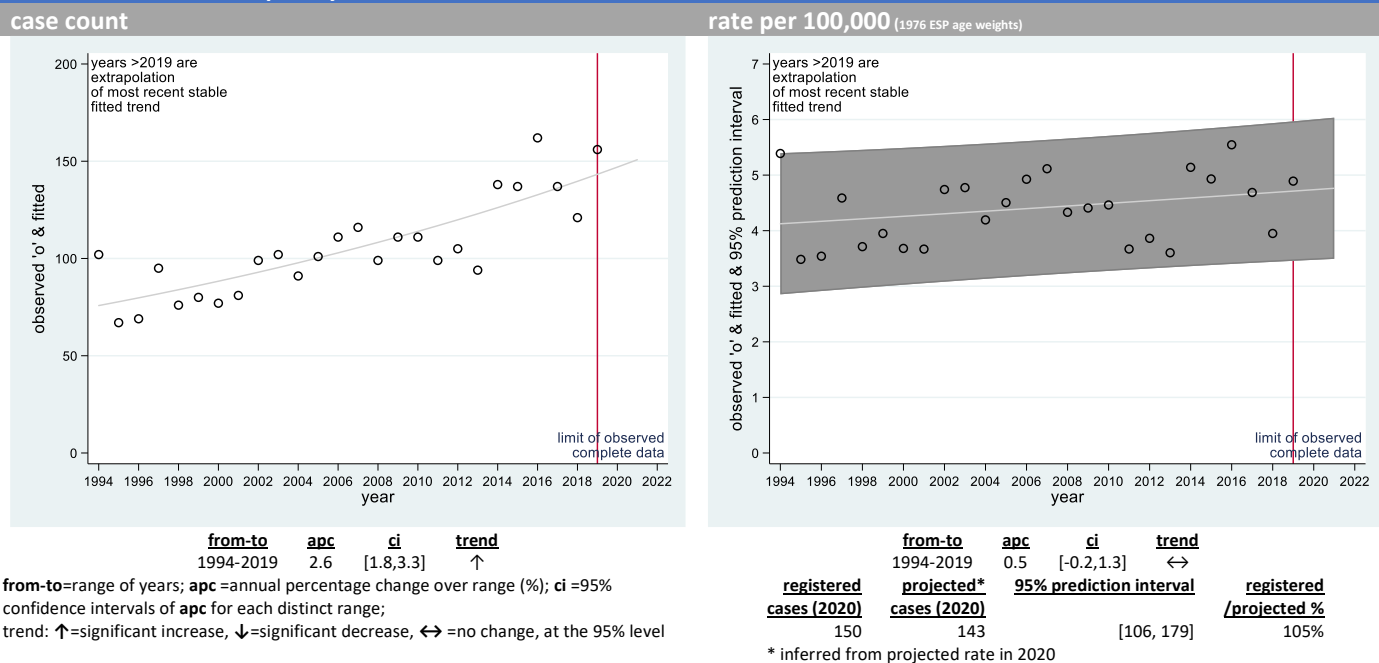
- Cases of Hodgkin lymphoma in females increased significantly during the full period 1994-2019 (Fig 2-34).
- The incidence rate increased significantly over the same period.

FIGURE 2-35. C82-85 non-Hodgkin lymphoma: FEMALES: TREND DURING 1994-2019



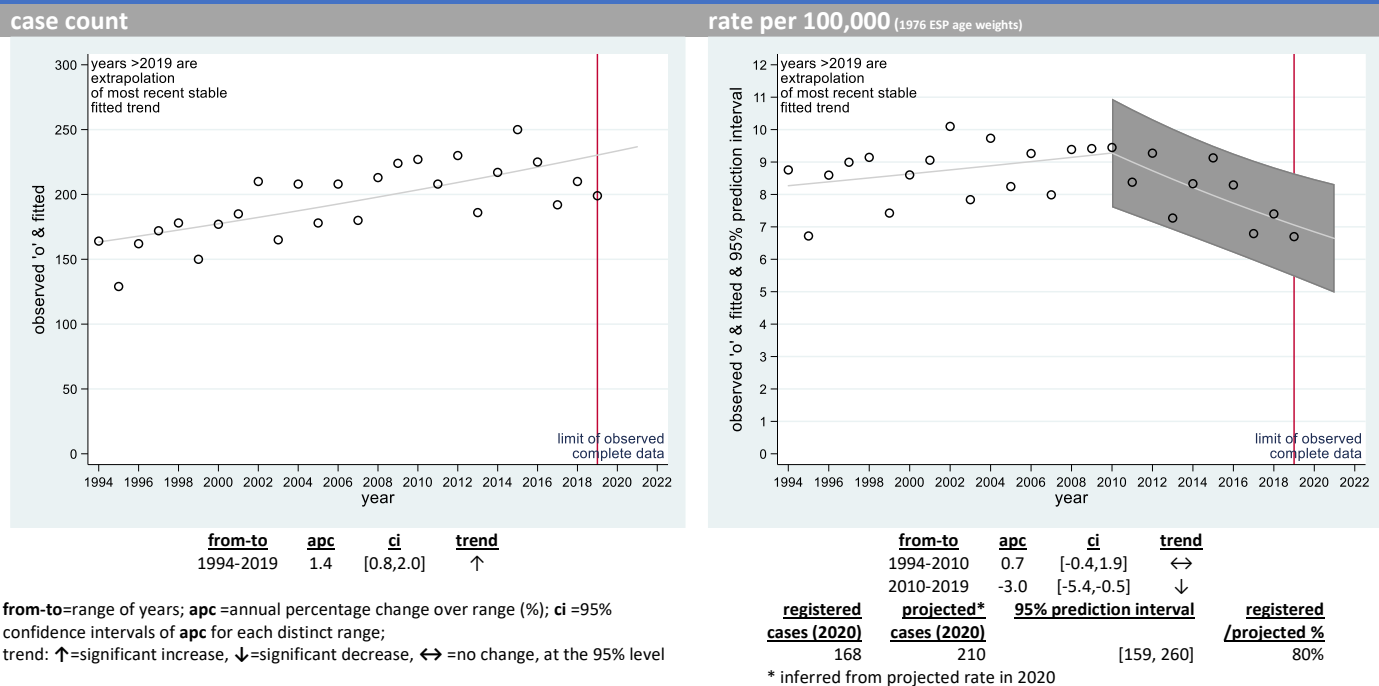
- Cases of non-Hodgkin lymphoma in females increased significantly during the full period 1994-2019 (Fig 2-35).
- The incidence rate increased significantly during 1994-2013 followed by a recent though non-significant decline.

FIGURE 2-36. C90 multiple myeloma: FEMALES: TREND DURING 1994-2019



- Cases of multiple myeloma in females increased significantly during the full period 1994-2019 (Fig. 2-36).
- The incidence rate increased marginally though non-significantly over the same period.

FIGURE 2-37. C91-95 leukaemia: FEMALES: TREND DURING 1994-2019



- Cases of leukaemia in females increased significantly during the full period 1994-2019 (Fig. 2-37).
- The incidence rate increased marginally over the period 1994-2010, followed by a significant decline during 2010-2019.

3. CANCER MORTALITY 2016-2018

- Of deaths occurring in 2018, 72.7% were attributed to three main chapters in the ICD-10 classification: II (C00-D48) neoplasms (30.5%), IX (I00-I99) diseases of the circulatory system (29.2%), and X (J00-J99) diseases of the respiratory system (13.0%) [12].
- An annual average of 9,190 deaths from invasive cancer (4,864 in males, 4,326 in females) occurred during the period 2016-2018, or 9,423 deaths from any neoplasm (Table 3-1).
- This represents an estimated age-standardised mortality rate of 139 invasive cancer deaths per 100,000 females and 182 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: 2016-2018

	DEATHS			Rate*/100,000		risk # 1 in... to age 75	
	males	females	all●	males	females	males	female
All neoplasms	4,995	4,428	9,423	186.6	142.0	9	11
C00-96 all invasive cancers	4,864	4,326	9,190	181.8	139.2	9	11
C01-14 mouth & pharynx	134	54	188	5.2	1.8	221	645
C15 oesophagus	283	138	421	10.7	4.2	126	373
C16 stomach	206	115	321	7.7	3.6	202	463
C18-20 colorectum	587	416	1,002	21.8	13.0	73	117
C22 liver	218	144	362	8.2	4.5	170	321
C25 pancreas	276	257	533	10.3	8.2	138	173
C34 lung	1,034	847	1,880	38.7	27.7	35	47
C43 melanoma of skin	100	67	166	3.7	2.2	421	689
C50 breast	7	753	760	0.3	25.3	4,038	57
C53 cervix		86	86		3.2		391
C54 corpus uteri		92	92		3.0		426
C56 ovary		298	298		10.1		126
C61 prostate	554		554	20.2		133	
C62 testis	7		7	0.3		5,456	
C64 kidney	140	71	211	5.3	2.2	259	779
C67 bladder	150	67	218	5.5	1.9	445	1,203
C71-72 brain & CNS	181	109	290	7.1	3.9	169	315
C73 thyroid	12	13	24	0.5	0.4	2,599	3,345
C81 Hodgkin lymphoma	13	8	22	0.5	0.3	3,322	6,741
C82-85 non-Hodgkin lymphoma	159	122	281	5.83	3.6	280	451
C90 multiple myeloma	96	76	172	3.51	2.2	545	801
C91-95 leukaemia	166	101	267	6.13	3.0	295	571

Source of data: Central Statistics Office, Ireland. ●male and female total are subject to rounding

*Rates are standardised to the 1976 European standard population.

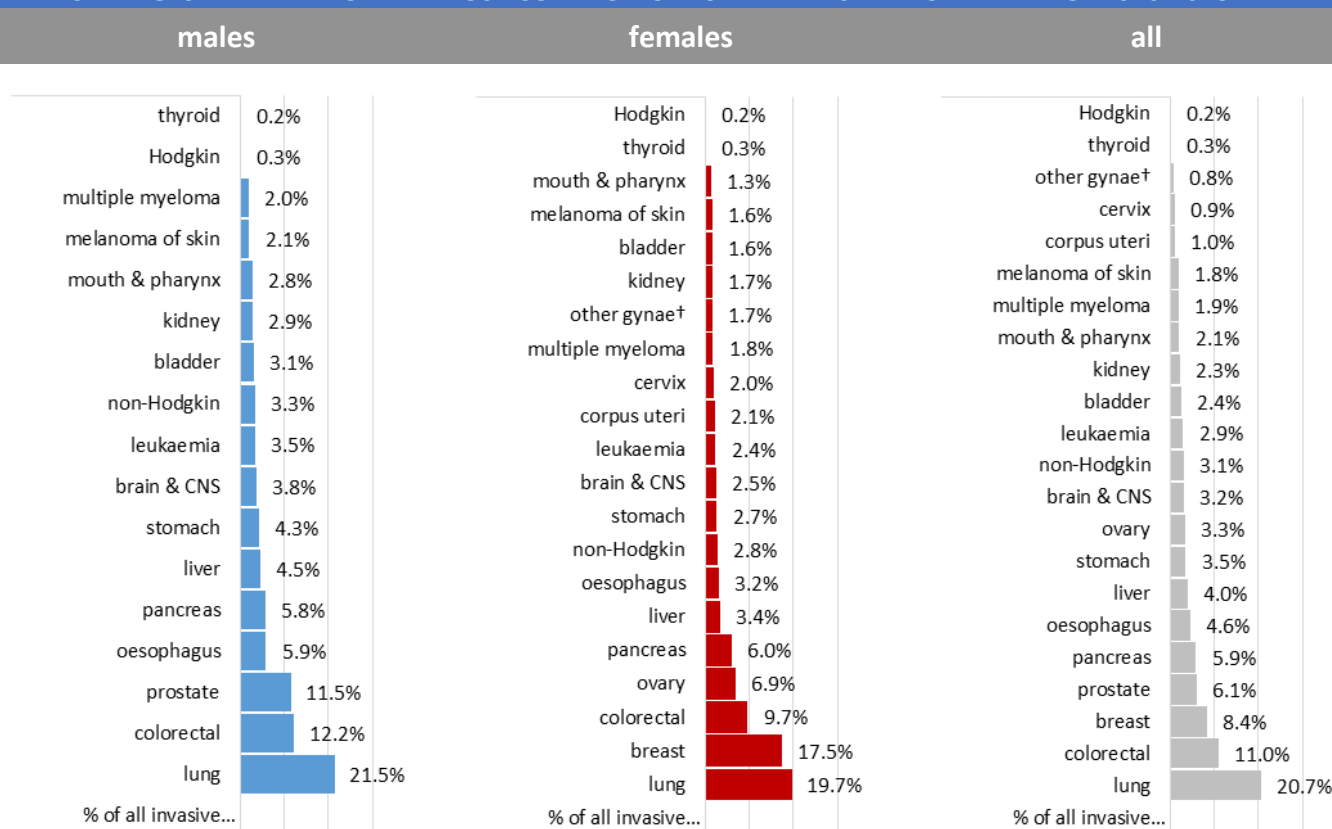
Cumulative risk of dying of cancer before 75th birthday using method as described [13], expressed as a proportion, e.g. 1 in 9.

See Appendix III for mortality statistics of other cancers.

- Lung cancer was the leading cause of cancer death in both sexes, with an average of 1,880 deaths per year or 20% of cancer deaths in women and 22% of cancer deaths in men during the period 2016-2018 (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 1,002 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
PERCENTAGES AND RANK OF THE MOST COMMON CANCER DEATHS: ANNUAL AVERAGE 2016-2018



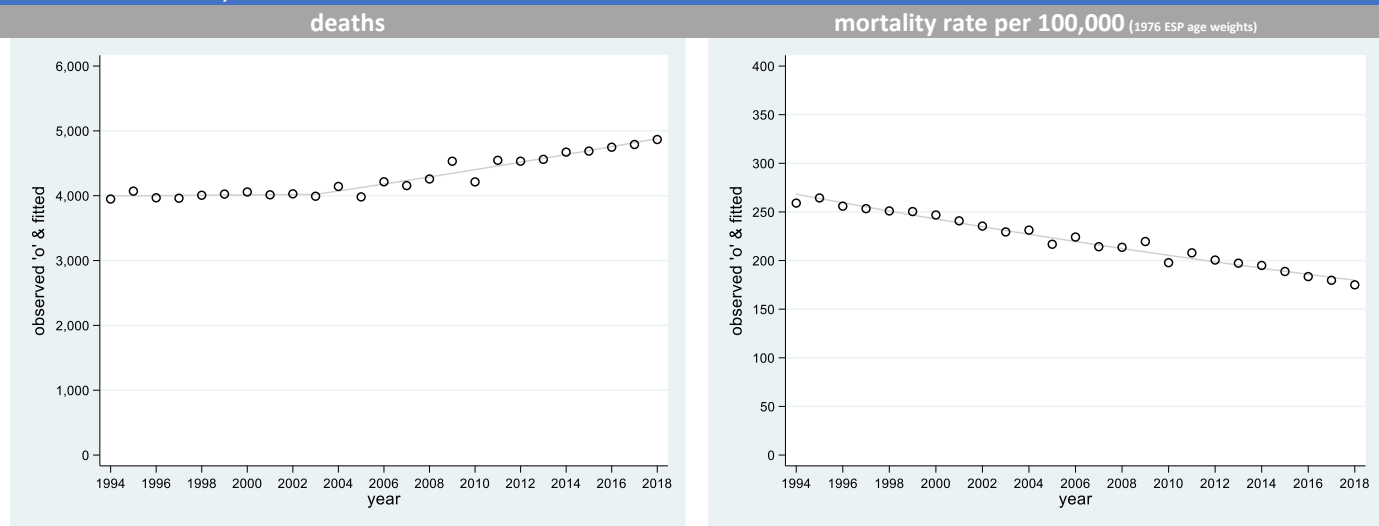
Cancers accounting for smaller percentages of cancer deaths (c.10% in total) are not shown, therefore percentages do not sum to 100%. Mortality data were provided by the Central Statistics Office (CSO).

Cancer mortality trends

Using the most recent data available from the CSO at the time of writing, cancer mortality was plotted over the period 1994-2018 using Joinpoint regression [9].

Cancer mortality trends in males

FIGURE 3-2. C00-43, C45-96 all invasive cancers excl. NMSC: MALES: TREND DURING 1994-2018



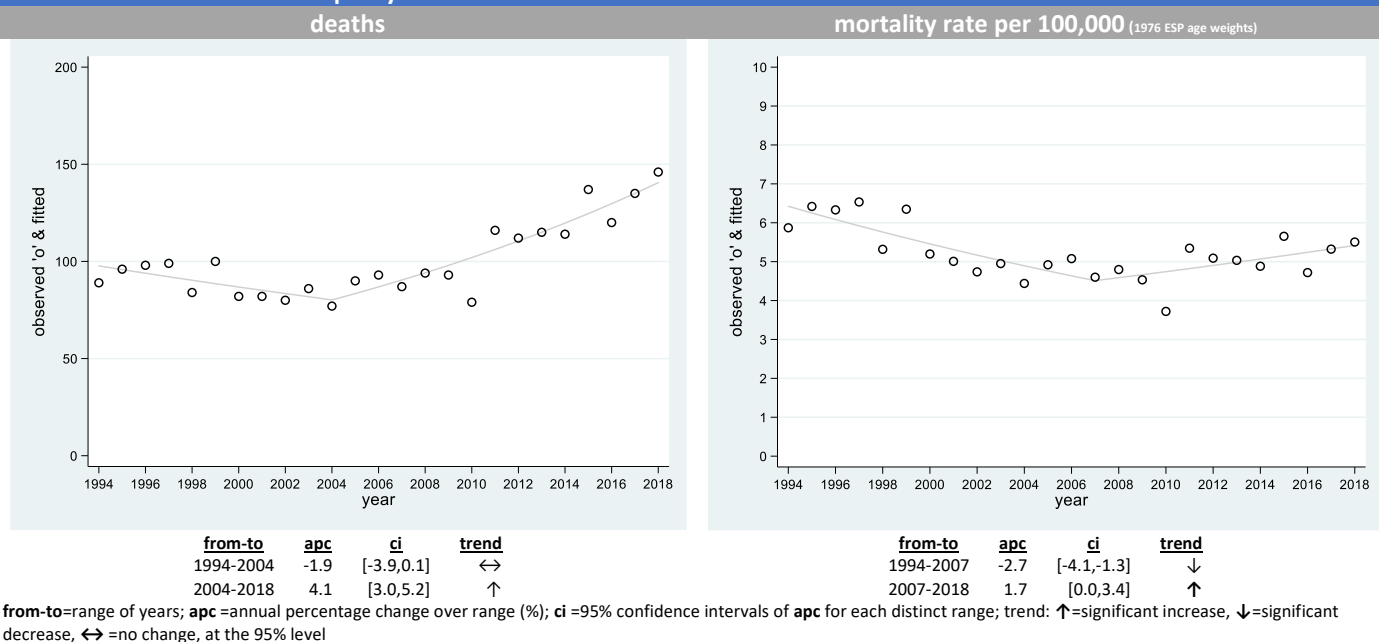
from-to	apc	ci	trend
1994-2003	0.1	[-0.4,0.6]	↔
2003-2018	1.3	[1.1,1.5]	↑

from-to	apc	ci	trend
1994-2018	-1.7	[-1.8,-1.5]	↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

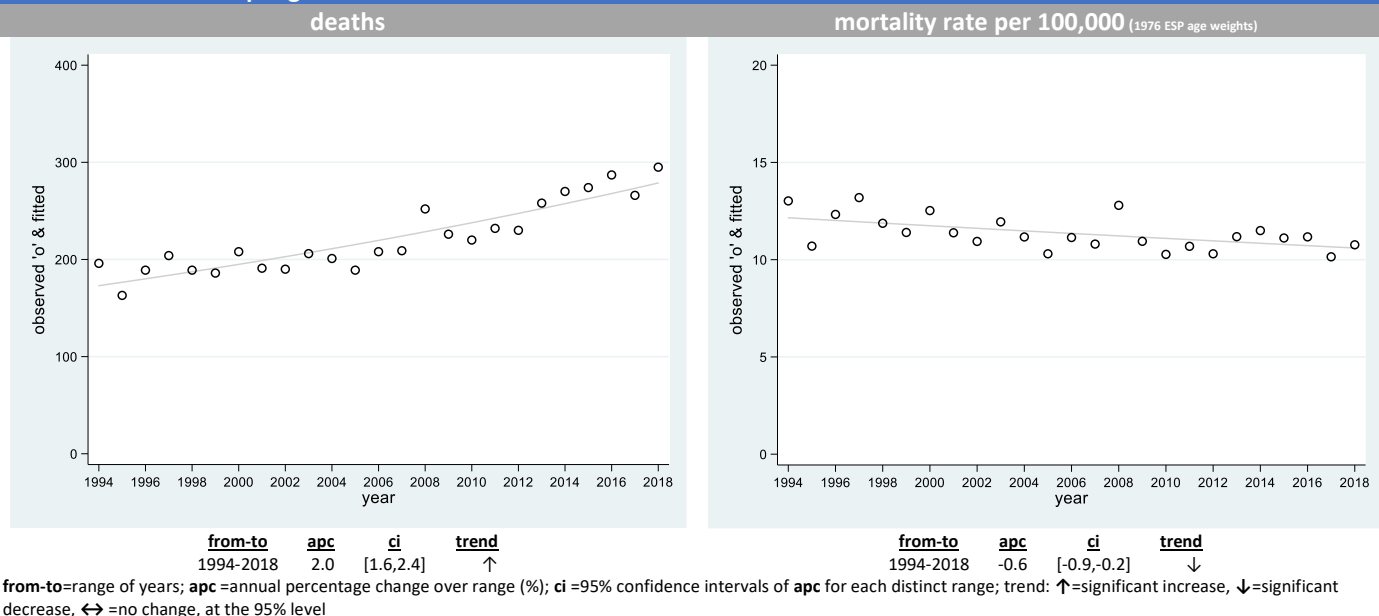
- The number of male cancer deaths was static over the period 1994-2003, and then increased significantly during 2003-2018, (Fig. 3-2).
- However, after adjusting for population increase and ageing, the mortality rate declined steadily and significantly during 1994-2018.

FIGURE 3-3. C01-14 mouth & pharynx: MALES: TREND DURING 1994-2018



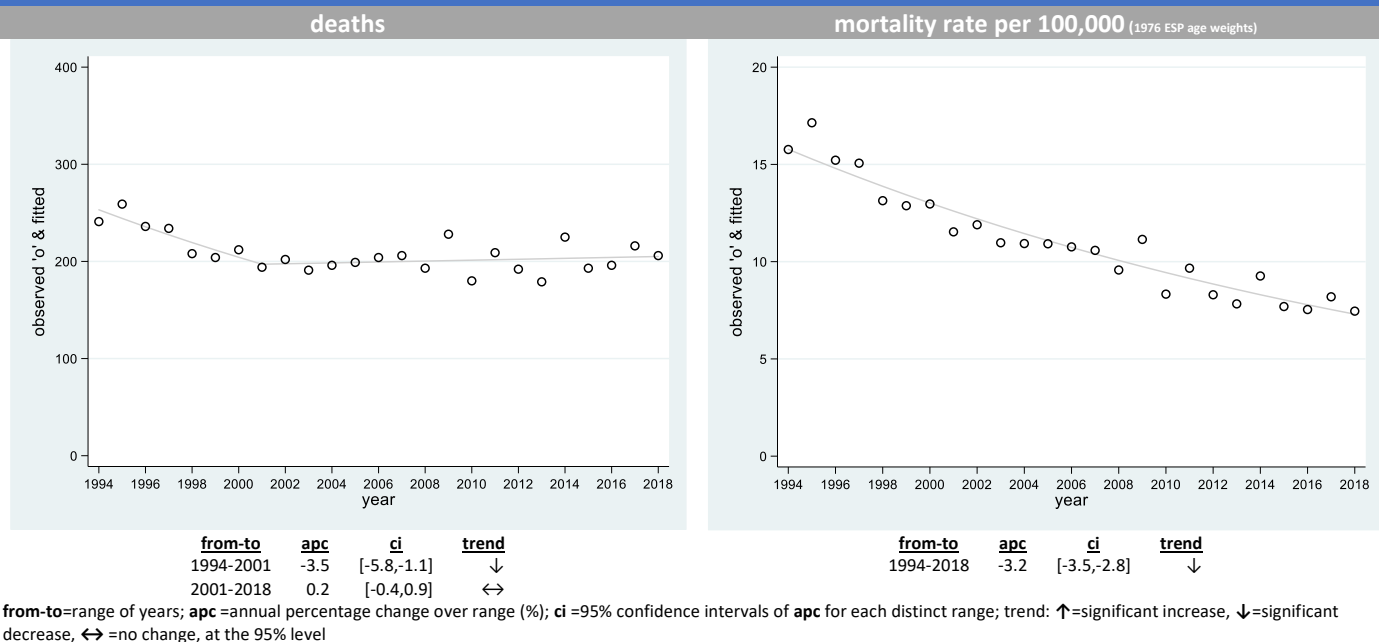
- Deaths due to cancer of the mouth and pharynx in males declined marginally during 1994-2004, followed by a significant increase during 2004-2018 (Fig 3-3).
- Following an earlier period of significant decline during 1994-2007, the mortality rate increased significantly during 2007-2018.

FIGURE 3-4. C15 oesophagus: MALES: TREND DURING 1994-2018



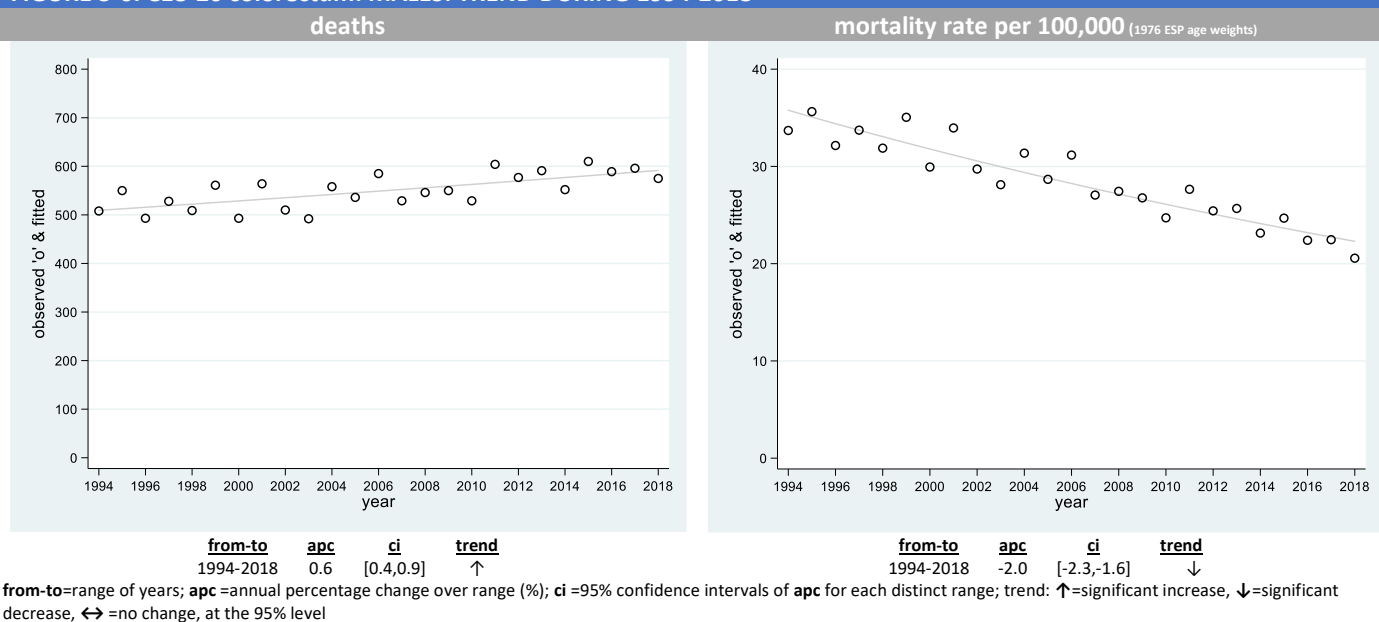
- Deaths due to cancer of the oesophagus in males increased significantly during 1994-2018 (Fig. 3-4).
- The mortality rate declined significantly during the same full period.

FIGURE 3-5. C16 stomach: MALES: TREND DURING 1994-2018



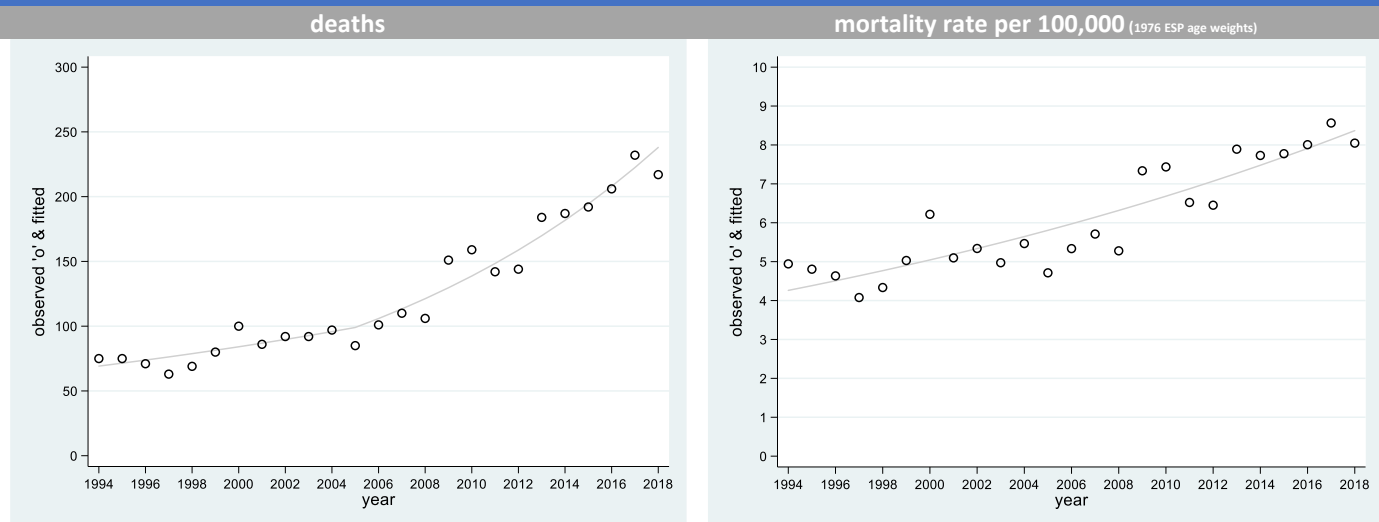
- Deaths due to cancer of the stomach in males declined significantly during 1994-2001, followed by a static period thereafter up to 2018 (Fig 3-5).
- The mortality rate declined significantly during the full period 1994-2018.

FIGURE 3-6. C18-20 colorectum: MALES: TREND DURING 1994-2018



- Deaths due to colorectal cancer in males increased marginally, though significantly during 1994-2018.
- The mortality rate declined significantly during 1994-2018 (Fig 3-6).
- It is probably too early to assess the influence of the introduction of the national bowel screening programme (BowelScreen) in late 2012 on these trends.

FIGURE 3-7. C22 liver: MALES: TREND DURING 1994-2018

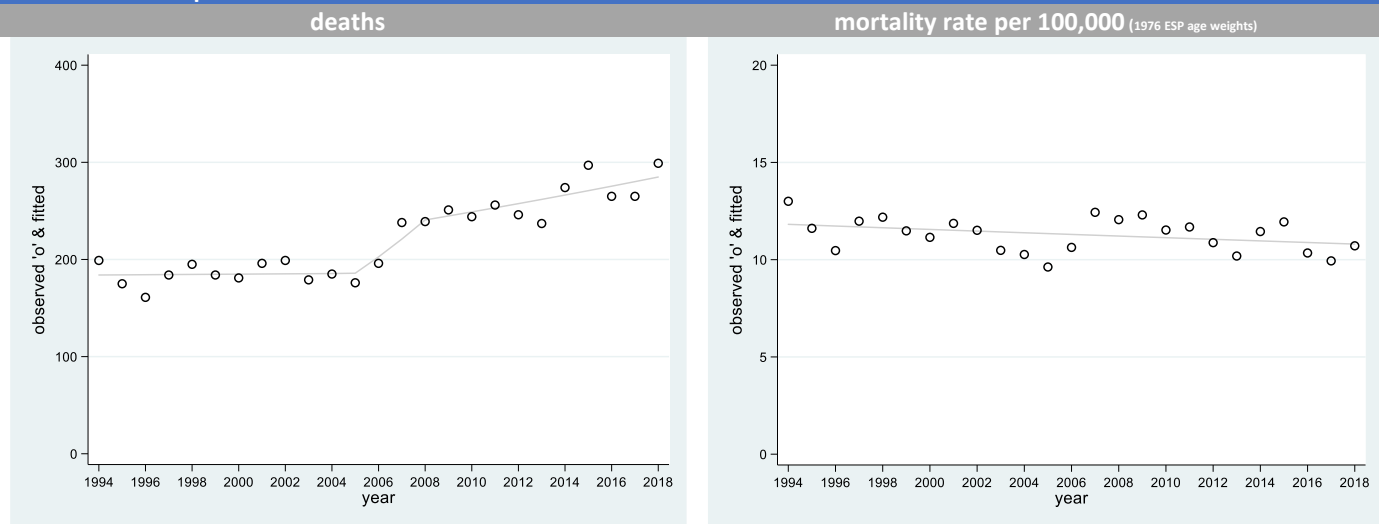


from-to	apc	ci	trend
1994-2005	3.3	[1.0,5.7]	↑
2005-2018	7.0	[5.6,8.4]	↑

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to liver cancer in males increased significantly during 1994-2005, followed by steeper increase during 2005-2018 (Fig 3-7).
- The mortality rate increased significantly over the full period 1994-2018, broadly consistent with the upward incidence trend seen for this cancer.

FIGURE 3-8. C25 pancreas: MALES: TREND DURING 1994-2018

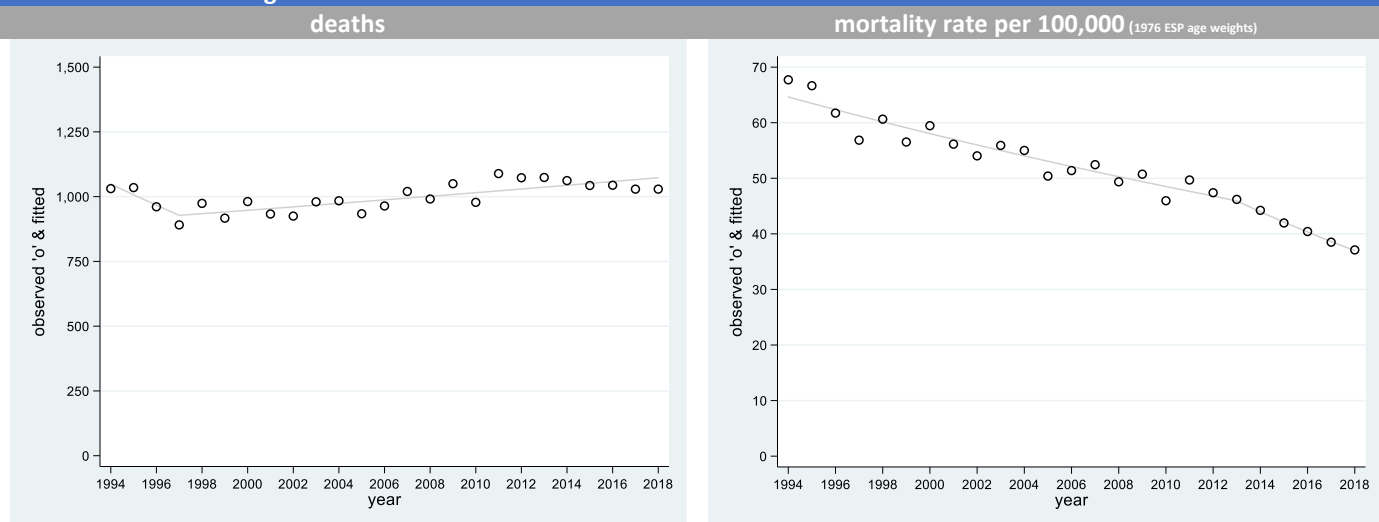


from-to	apc	ci	trend
1994-2005	0.1	[-1.3,1.5]	↔
2005-2008	9.0	[-9.8,31.8]	↔
2008-2018	1.7	[0.4,3.1]	↑

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to pancreatic cancer in males increased, with one steep period of increase during 2005-2008, thereafter, the number of deaths increased significantly and steadily during 2008-2018 (Fig. 3-8).
- After adjusting for population and age, the fitted mortality rate trend was broadly static or showed a slight decline.

FIGURE 3-9. C33-34 lung: MALES: TREND DURING 1994-2018



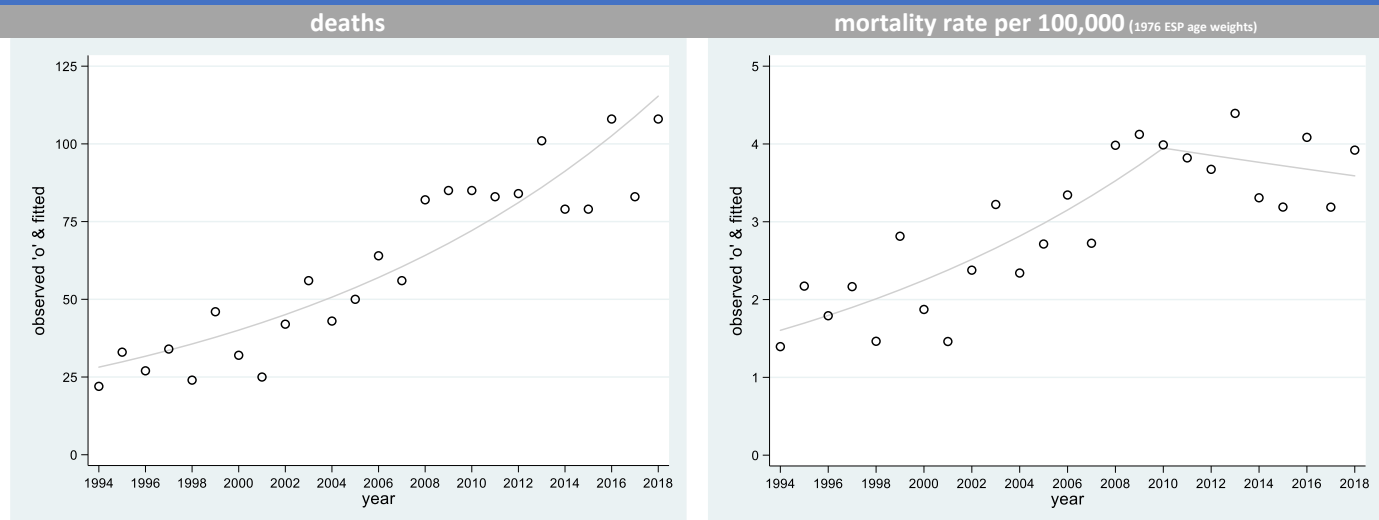
from-to	apc	ci	trend
1994-1997	-4	[-8.8,1.1]	↔
1997-2018	0.7	[0.4,1.0]	↑

from-to	apc	ci	trend
1994-2013	-1.8	[-2.1,-1.5]	↓
2013-2018	-4.2	[-6.3,-2.1]	↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to lung cancer in males increased significantly during 1997-2018 (Fig 3-9).
- The mortality rate declined steadily and significantly during 1994-2013, followed by period of steeper decline during 2013-2018.

FIGURE 3-10. C43 melanoma of skin: MALES: TREND DURING 1994-2018



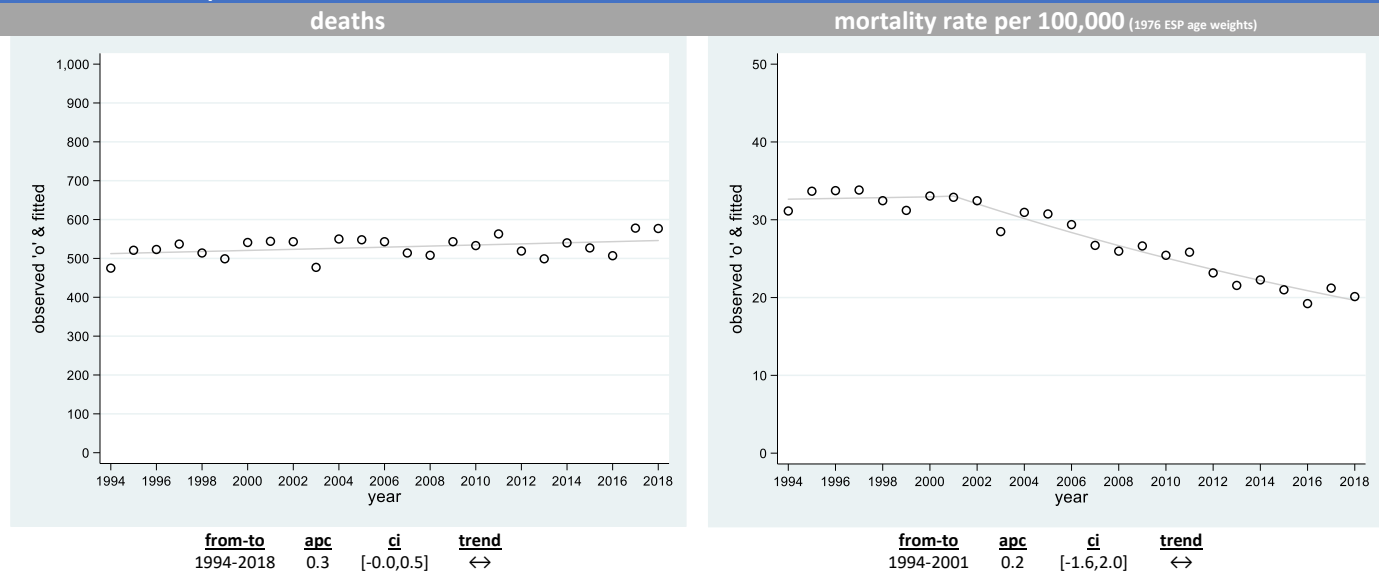
from-to	apc	ci	trend
1994-2018	6.0	[4.8,7.3]	↑

from-to	apc	ci	trend
1994-2010	5.8	[3.5,8.1]	↑
2010-2018	-1.2	[-5.4,3.2]	↔

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to melanoma of the skin in males increased significantly over the full period 1994-2018 (Fig 3-10).
- The mortality rate increased significantly during 1994-2010 before reaching a plateau or marginal decline during 2010-2018.

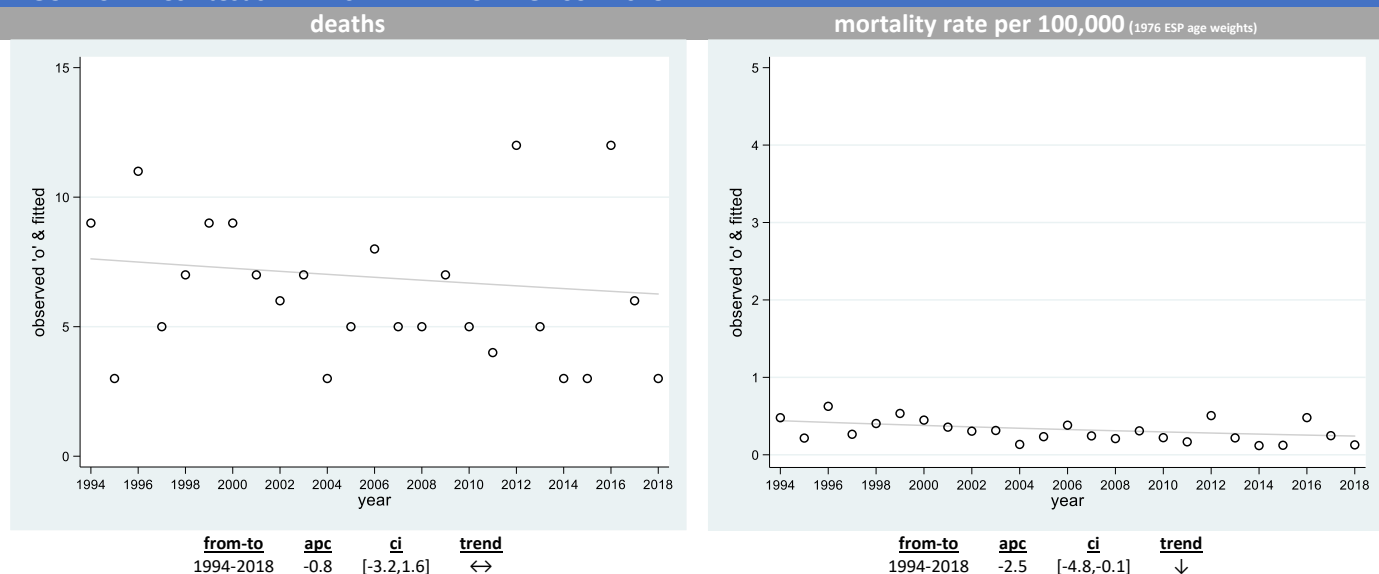
FIGURE 3-11. C61 prostate: MALES: TREND DURING 1994-2018



from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to prostate cancer was static during the full period 1994-2018 (Fig 3-11).
- The mortality rate was static during 1994-2001, followed by a longer significant decline during 2001-2018.

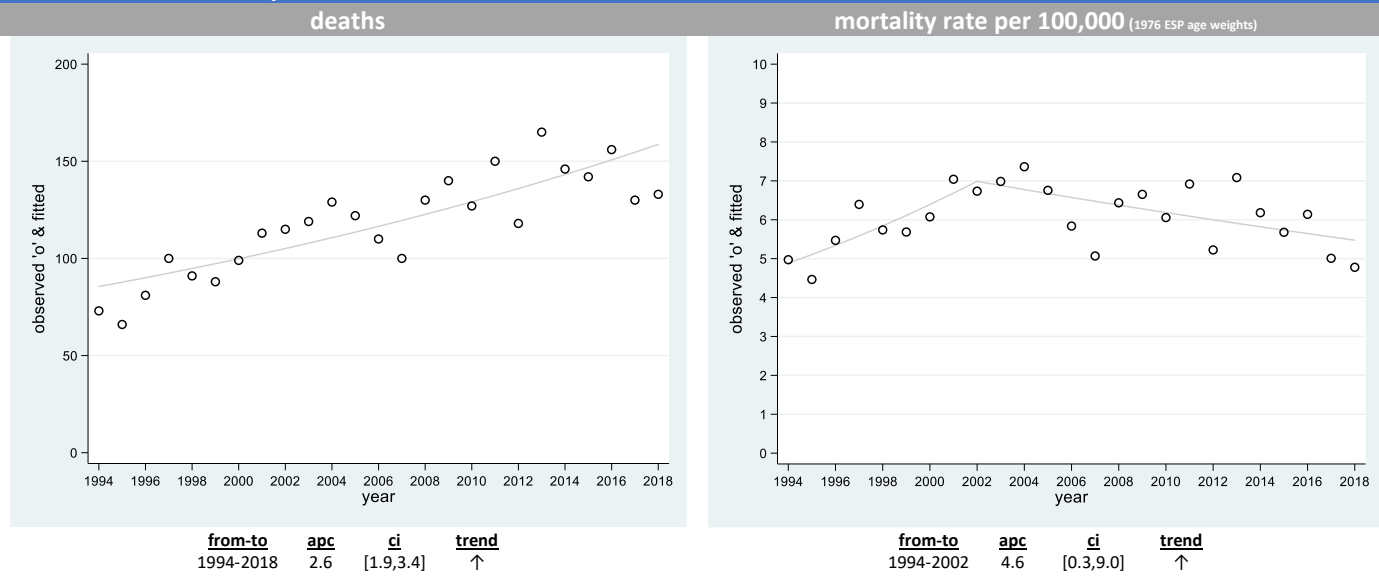
FIGURE 3-12. C62 testis: MALES: TREND DURING 1994-2018



from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to testicular cancer was static or declined marginally during the full period 1994-2018 (Fig 3-11).
- The mortality rate declined significantly during 1994-2018.

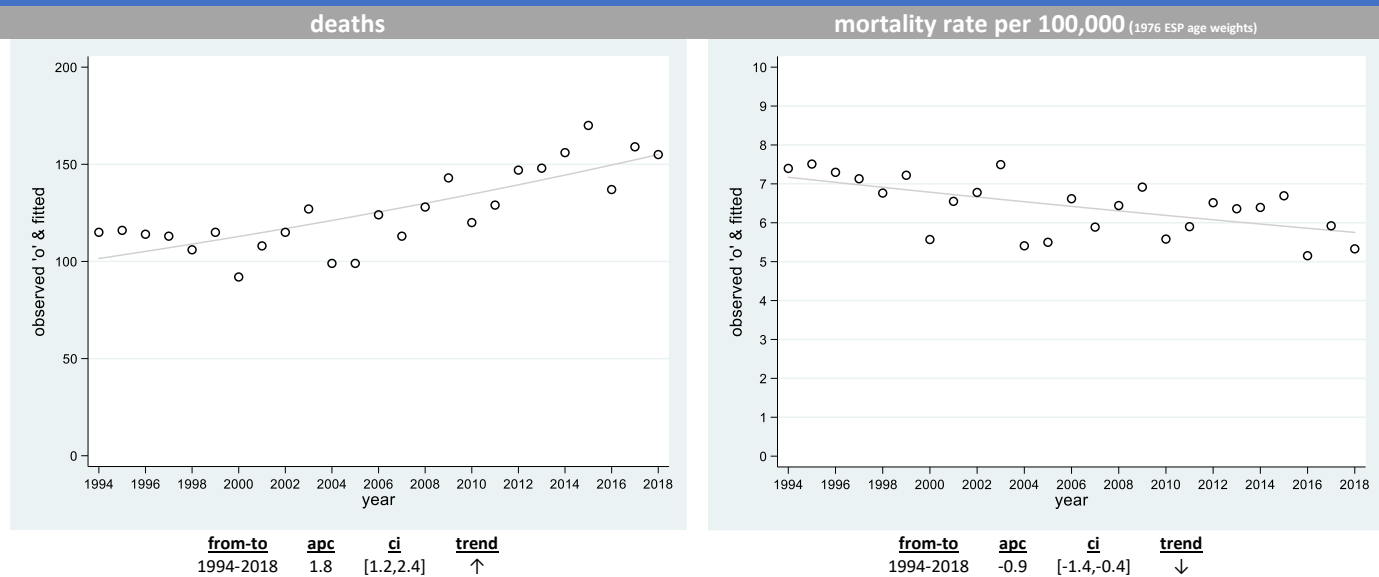
FIGURE 3-13. C64 kidney: MALES: TREND DURING 1994-2018



from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to cancer of the kidney in males increased significantly over the full period 1994-2018 (Fig 3-13).
- The mortality rate increased during 1994-2002, followed by a significant decline during 2002-2018.

FIGURE 3-14. C67 bladder: MALES: TREND DURING 1994-2018



from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to bladder cancer in males increased significantly over the full period 2005-2018 (Fig 3-14).
- The mortality rate declined significantly over the full period 1994-2018.

FIGURE 3-15. C71-72 brain and CNS: MALES: TREND DURING 1994-2018



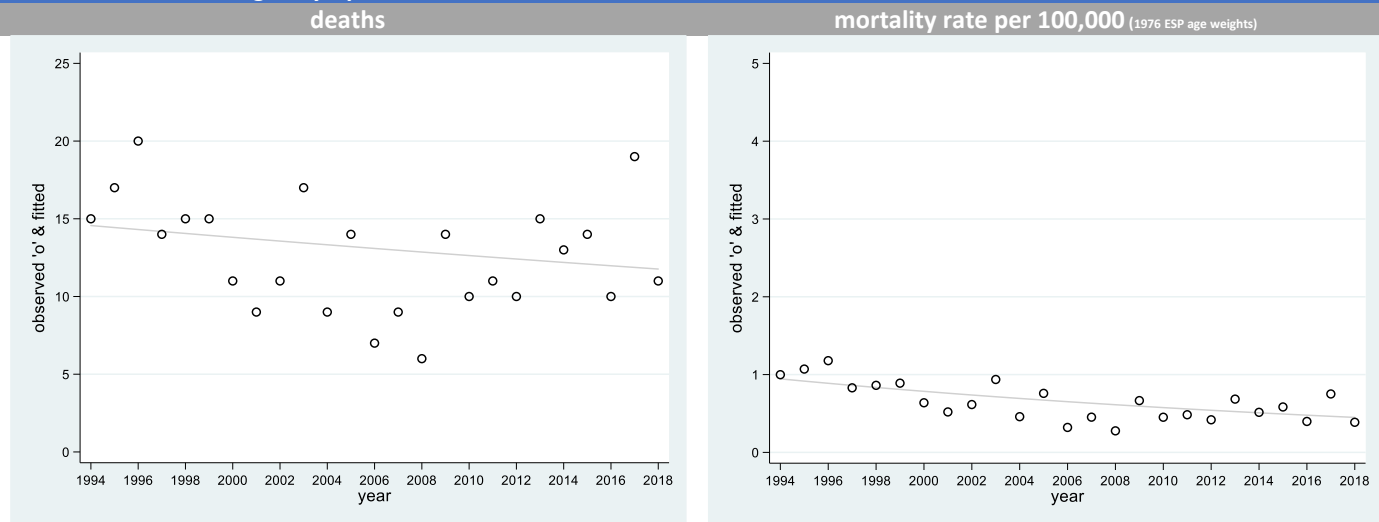
from-to **apc** **ci** **trend**
 1994-2018 1.9 [1.3,2.5] ↑

from-to **apc** **ci** **trend**
 1994-2018 -0.5 [-1.1,0.1] ↔

from-to=range of years; **apc**=annual percentage change over range (%); **ci**=95% confidence intervals of **apc** for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to brain & central nervous system cancer in males increased significantly over the full period 1994-2018 (Fig 3-15).
- The mortality rate was static, or declined marginally over the same period.

FIGURE 3-16. C81 Hodgkin lymphoma: MALES: TREND DURING 1994-2018



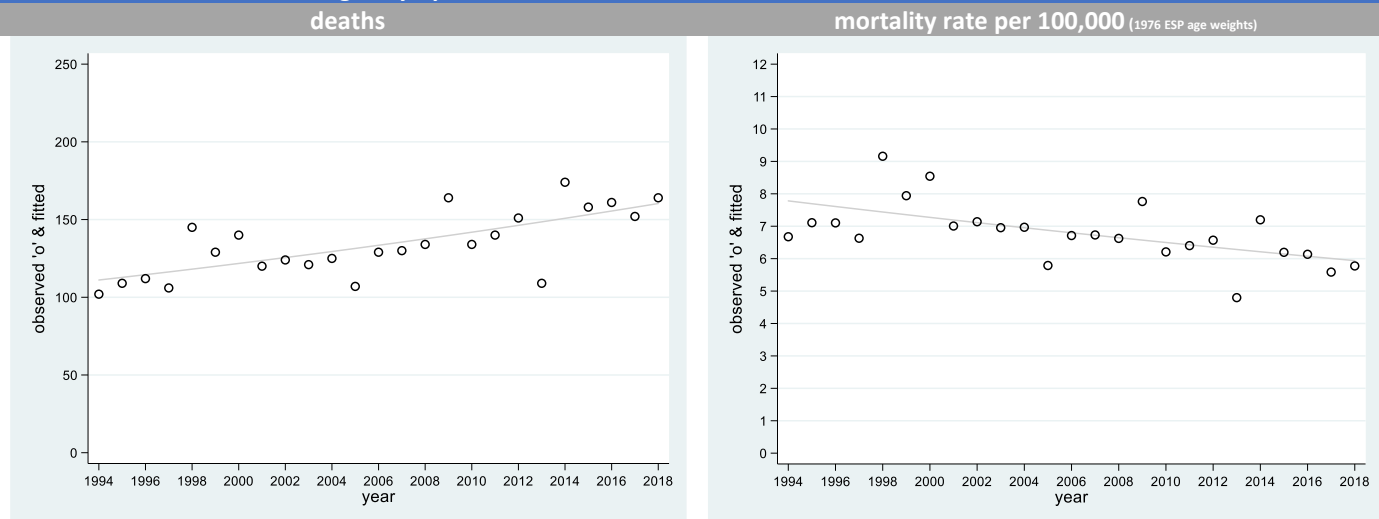
from-to **apc** **ci** **trend**
 1994-2018 -0.9 [-2.4,0.6] ↔

from-to **apc** **ci** **trend**
 1994-2018 -3.0 [-4.5,-1.5] ↓

from-to=range of years; **apc**=annual percentage change over range (%); **ci**=95% confidence intervals of **apc** for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due Hodgkin lymphoma in males declined marginally during 1994-2018 from a low base of only 15 in 1994 (Fig 3-16).
- The mortality rate decreased significantly over the full period 1994-2018.

FIGURE 3-17. C82-85 non-Hodgkin lymphoma: MALES: TREND DURING 1994-2018

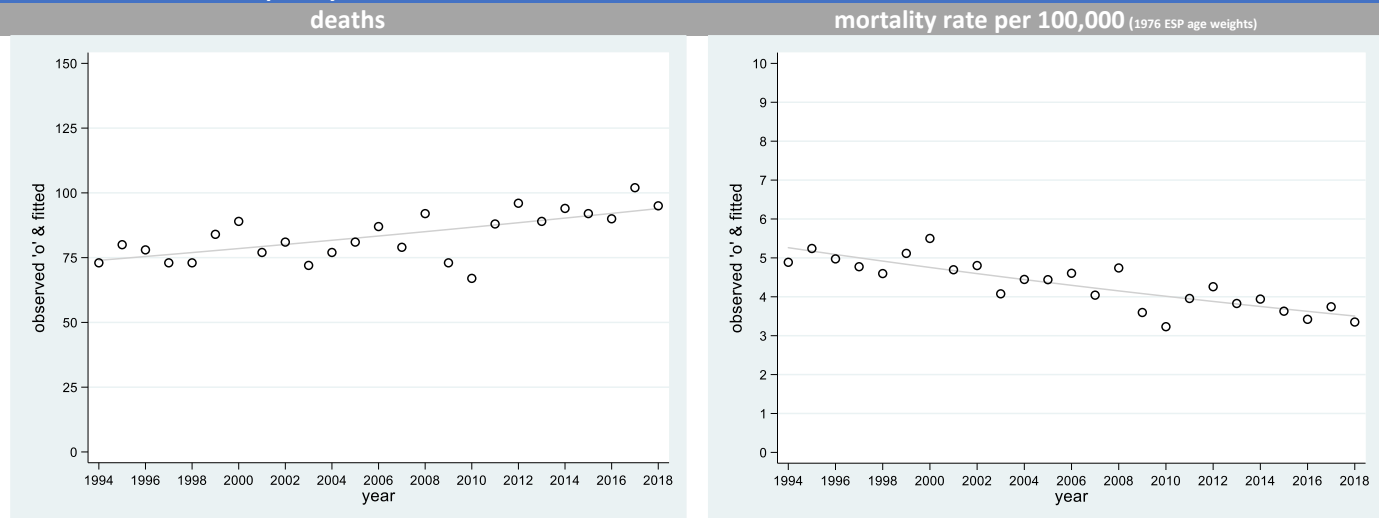


from-to	apc	ci	trend
1994-2018	1.5	[0.9,2.2]	↑
1994-2018	-1.1	[-1.7,-0.5]	↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to non-Hodgkin lymphoma in males increased significantly during the full period 1994-2018 (Fig 3-17).
- The mortality rate declined significantly over the same full period.

FIGURE 3-18. C90 multiple myeloma: MALES: TREND DURING 1994-2018



from-to	apc	ci	trend
1994-2018	1.0	[0.5,1.5]	↑
1994-2018	-1.7	[-2.1,-1.2]	↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to multiple myeloma in males increased significantly during the full period 1994-2018 (Fig 3-18).
- The mortality rate declined significantly over the same full period.

FIGURE 3-19. C91-95 leukaemia: MALES: TREND DURING 1994-2018



from-to	apc	ci	trend
1994-1999	7.7	[0.1,16.0]	↑
1999-2018	0.4	[-0.5,1.3]	↔

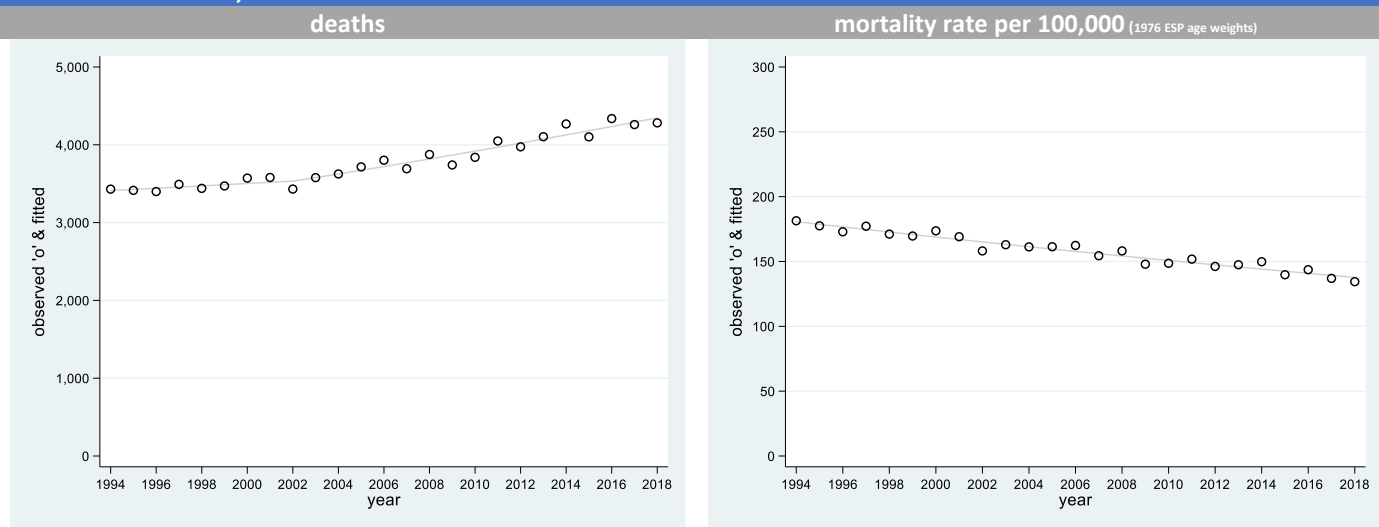
from-to	apc	ci	trend
1994-1999	7.5	[0.0,15.5]	↑
1999-2018	-2.5	[-3.3,-1.7]	↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- Deaths due to leukaemia in males showed a significant increase during 1994-1999 followed by a static period or marginal increase during 1999-2018 (Fig 3-19).
- The mortality rate increased significantly during 1994-1999, followed by a significant and sustained decline during 1999-2018.

Cancer mortality trends in females

FIGURE 3-20. C00-43, C45-96 all invasive cancers excl. NMSC: FEMALES: TREND DURING 1994-2018



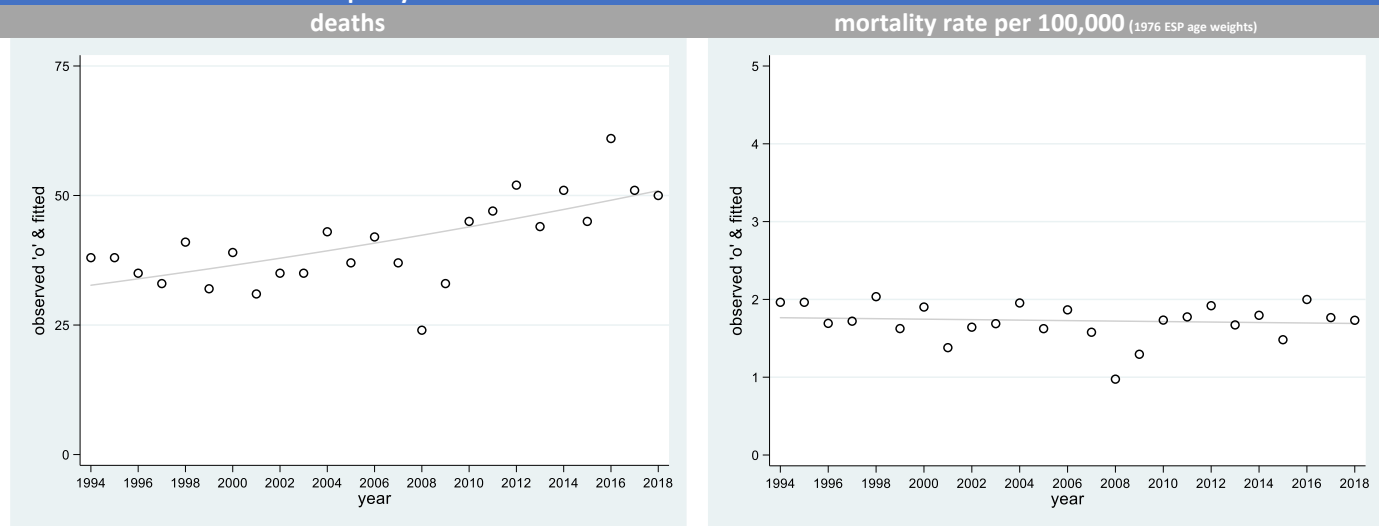
from-to	apc	ci	trend
1994-2002	0.4	[-0.2,1.1]	↔
2002-2018	1.3	[1.1,1.5]	↑

from-to	apc	ci	trend
1994-2018	-1.1	[-1.2,-1.0]	↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to cancer in females increased marginally during 1994-2002, followed by a significant increase during 2002-2018 (Fig 3-20)
- The overall mortality rate declined over the same period after adjusting for population increase and ageing.

FIGURE 3-21. C01-14 mouth & pharynx: FEMALES: TREND DURING 1994-2018



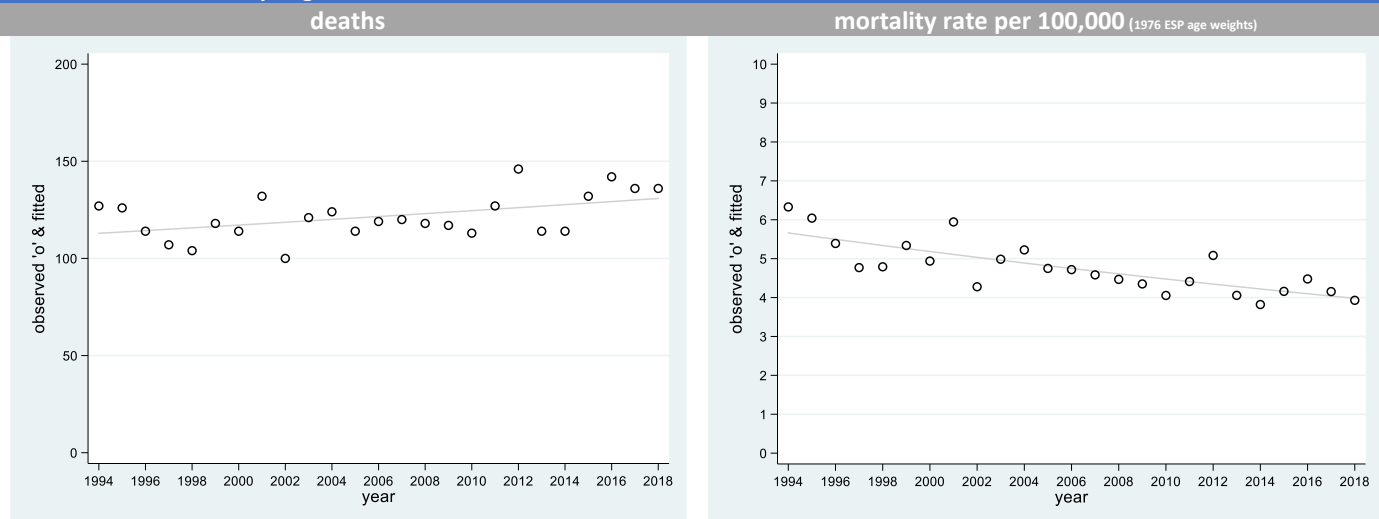
from-to	apc	ci	trend
1994-2018	1.9	[1.0,2.7]	↑

from-to	apc	ci	trend
1994-2018	-0.2	[-1.0,0.6]	↔

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to cancer of the mouth and pharynx in females increased steadily over the full period 1994-2018 (Fig 3-21).
- The mortality rate was static or declined marginally over the same period.

FIGURE 3-22. C15 oesophagus: FEMALES: TREND DURING 1994-2018



from-to
1994-2018

apc
0.6

ci
[0.1,1.1]

trend
↑

from-to
1994-2018

apc
-1.5

ci
[-1.9,-1.0]

trend
↓

from-to=range of years; **apc**=annual percentage change over range (%); **ci**=95% confidence intervals of **apc** for each distinct range; **trend**: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to oesophageal cancer in females increased significantly during the full period 1994-2018 (Fig 3-22).
- The mortality rate declined significantly over the same full period.

FIGURE 3-23. C16 stomach: FEMALES: TREND DURING 1994-2018



from-to
1994-2018

apc
-1.2

ci
[-1.7,-0.7]

trend
↓

from-to
1994-2018

apc
-3.2

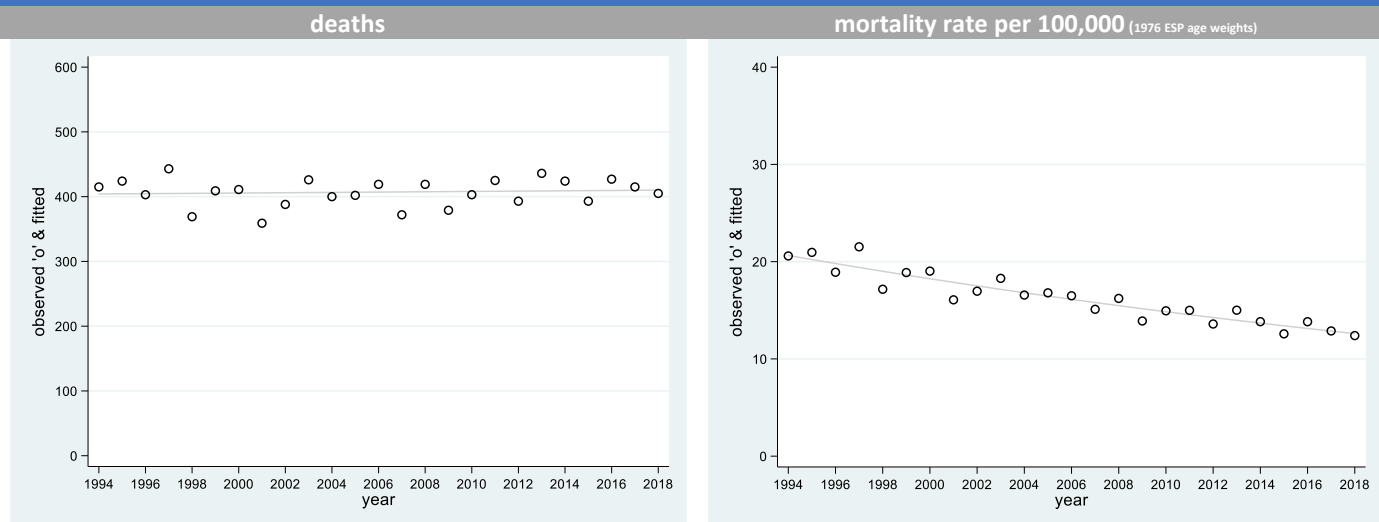
ci
[-3.7,-2.7]

trend
↓

from-to=range of years; **apc**=annual percentage change over range (%); **ci**=95% confidence intervals of **apc** for each distinct range; **trend**: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to stomach cancer in females declined significantly during 1994-2018 (Fig 3-23).
- The mortality rate declined significantly over the same full period.

FIGURE 3-24. C18-20 colorectum: FEMALES: TREND DURING 1994-2018

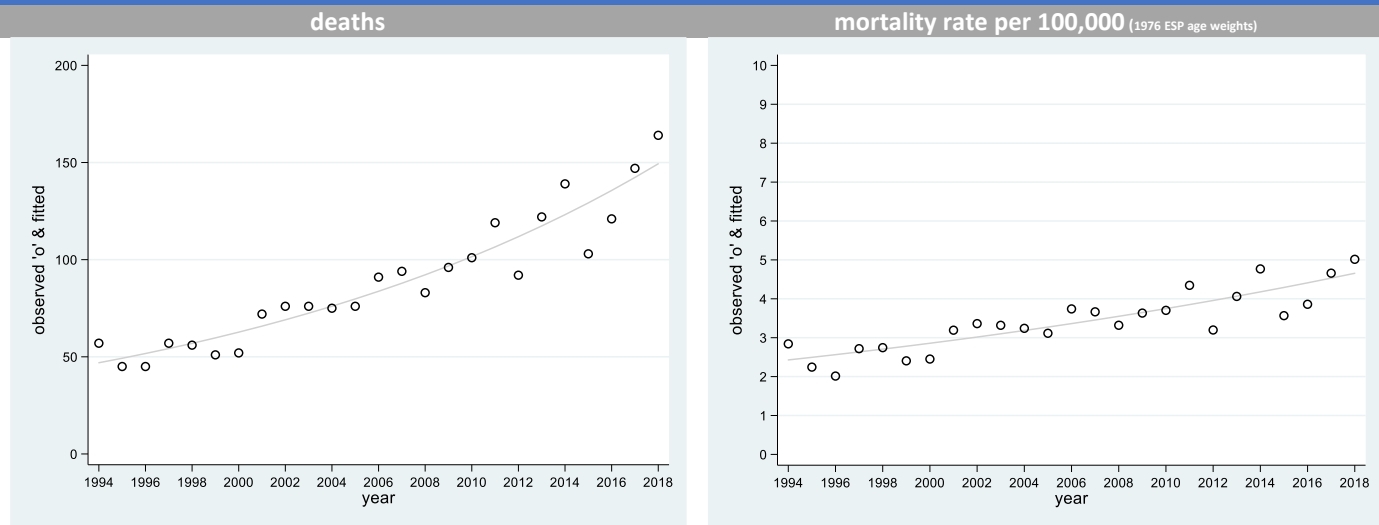


from-to	apc	ci	trend
1994-2018	0.1	[-0.2,0.4]	↔
1994-2018	-2.0	[-2.3,-1.7]	↓

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔ =no change, at the 95% level

- The number of deaths due to colorectal cancer in females was static during the full period 1994-2018.
- The mortality rate declined significantly over the same full period (Fig 3-24).
- It is probably too early to assess the influence of the introduction of the national bowel screening programme (BowelScreen) in late 2012 on these trends.

FIGURE 3-25. C22 liver: FEMALES: TREND DURING 1994-2018

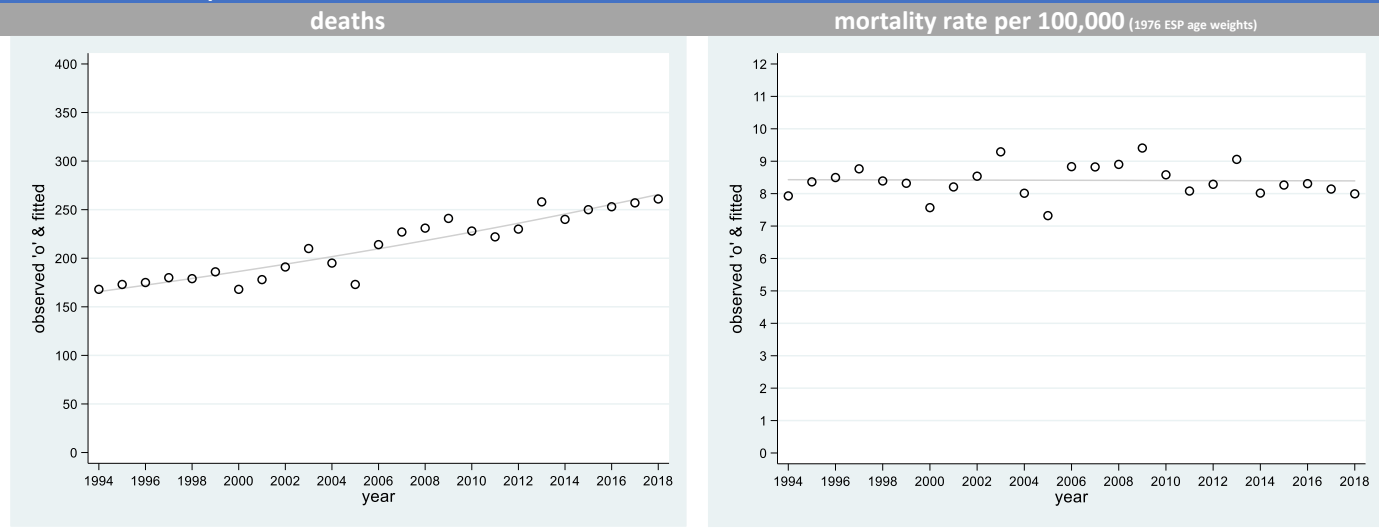


from-to	apc	ci	trend
1994-2018	4.9	[4.2,5.6]	↑
1994-2018	2.7	[2.1,3.4]	↑

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔ =no change, at the 95% level

- The number of deaths due to liver cancer in females increased significantly during the period 1994-2018.
- The mortality rate also increased steeply and significantly over the same full period (Fig. 3-25).

FIGURE 3-26. C25 pancreas: FEMALES: TREND DURING 1994-2018

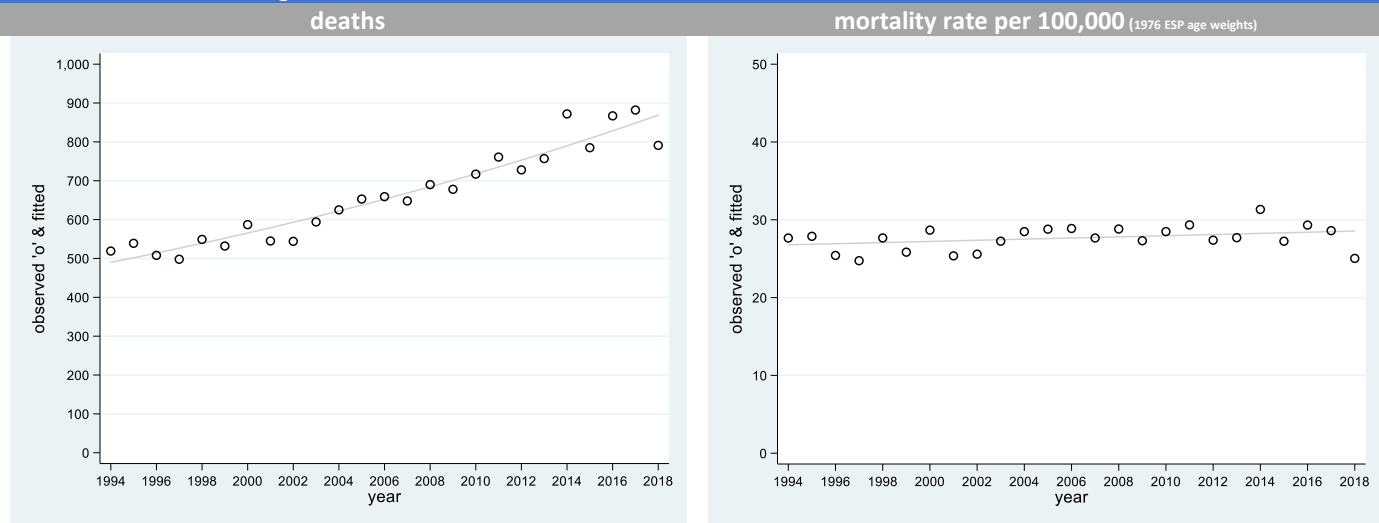


from-to	apc	ci	trend
1994-2018	2	[1.7,2.3]	↑
1994-2018	0.0	[-0.4,0.3]	↔

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to pancreatic cancer in females increased significantly during 1994-2018.
- The mortality rate was static over the same full period.

FIGURE 3-27. C33-34 lung: FEMALES: TREND DURING 1994-2018

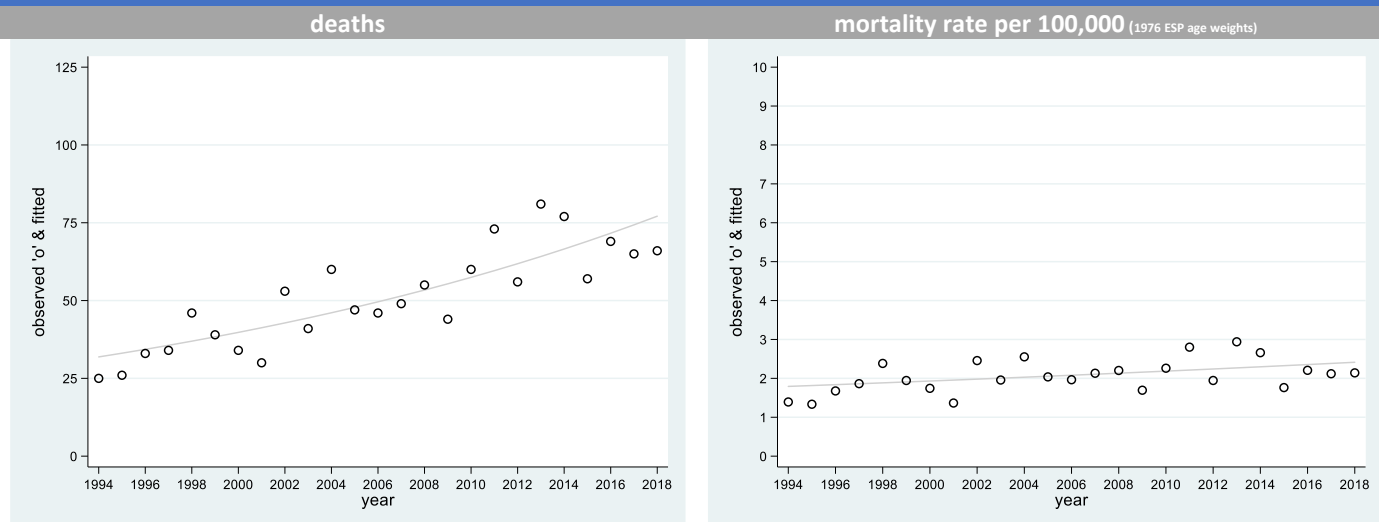


from-to	apc	ci	trend
1994-2018	2.4	[2.1,2.7]	↑
1994-2018	0.3	[-0.1,0.6]	↔

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to lung cancer in females increased significantly during the full period 1994-2018.
- The mortality rate was static or increased marginally over the same period (Fig 3-27).

FIGURE 3-28. C43 melanoma of skin: FEMALES: TREND DURING 1994-2018

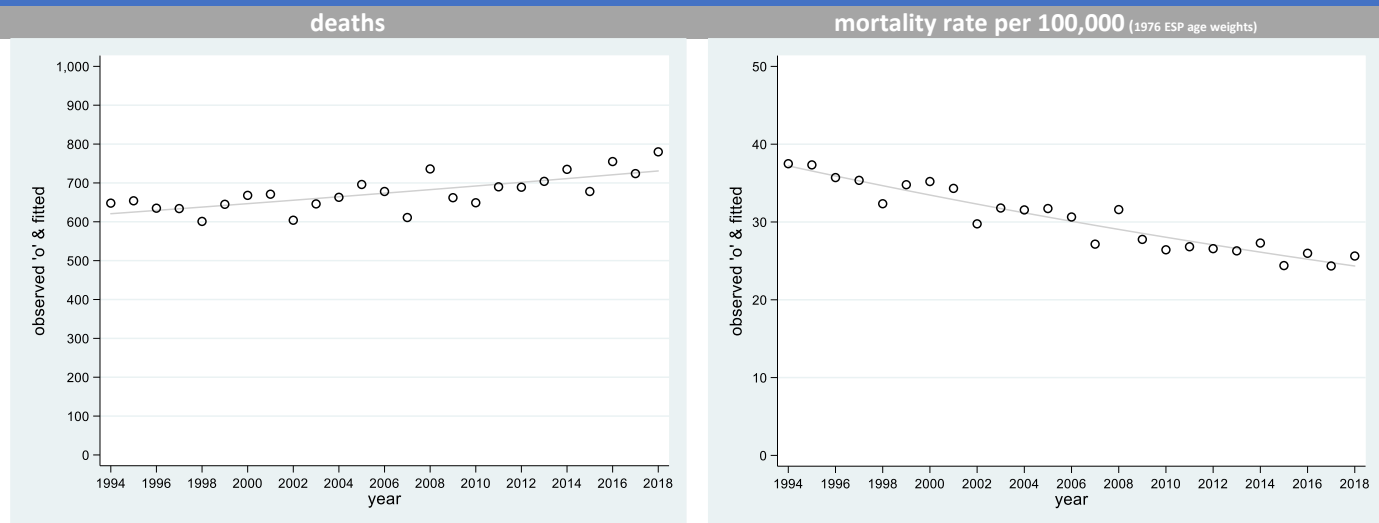


from-to	apc	ci	trend
1994-2018	3.7	[2.7,4.8]	↑
1994-2018	1.2	[0.1,2.4]	↑

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to melanoma of the skin in females increased significantly over the full period 1994-2018 (Fig. 3-28).
- The mortality rate increased significantly over the same period.

FIGURE 3-29. C50 breast: FEMALES: TREND DURING 1994-2018

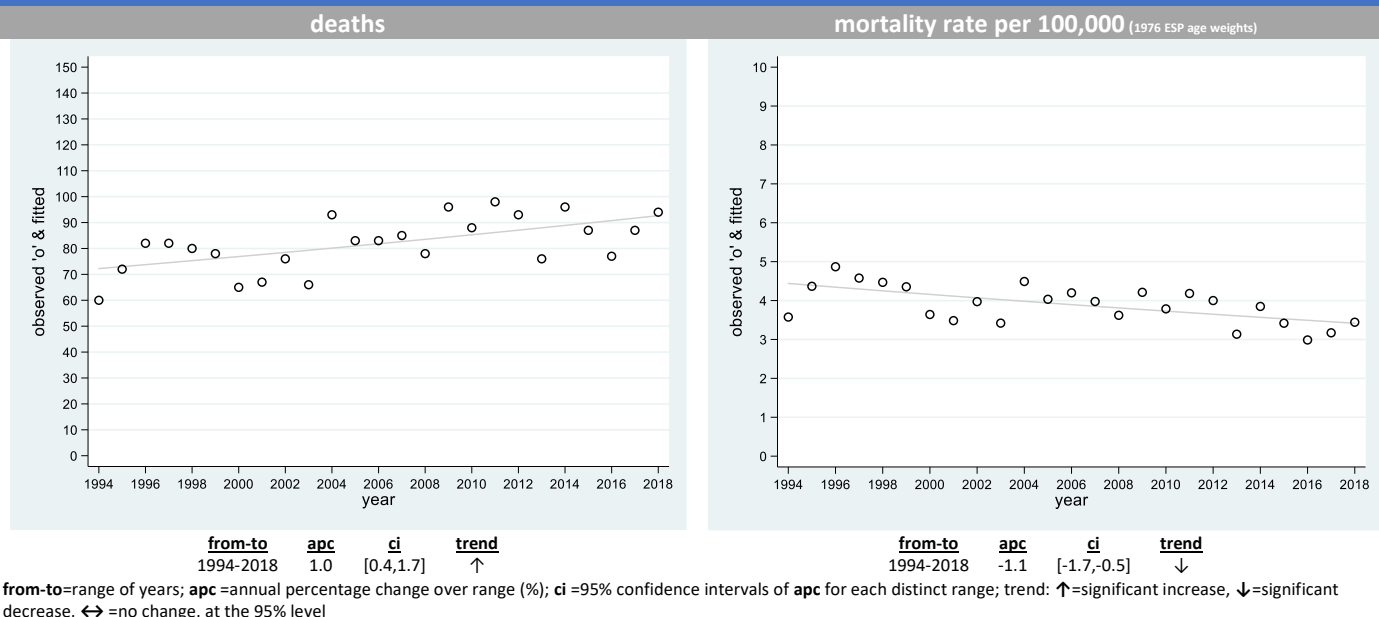


from-to	apc	ci	trend
1994-2018	0.7	[0.4,1.0]	↑
1994-2018	-1.8	[-2.0,-1.5]	↓

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

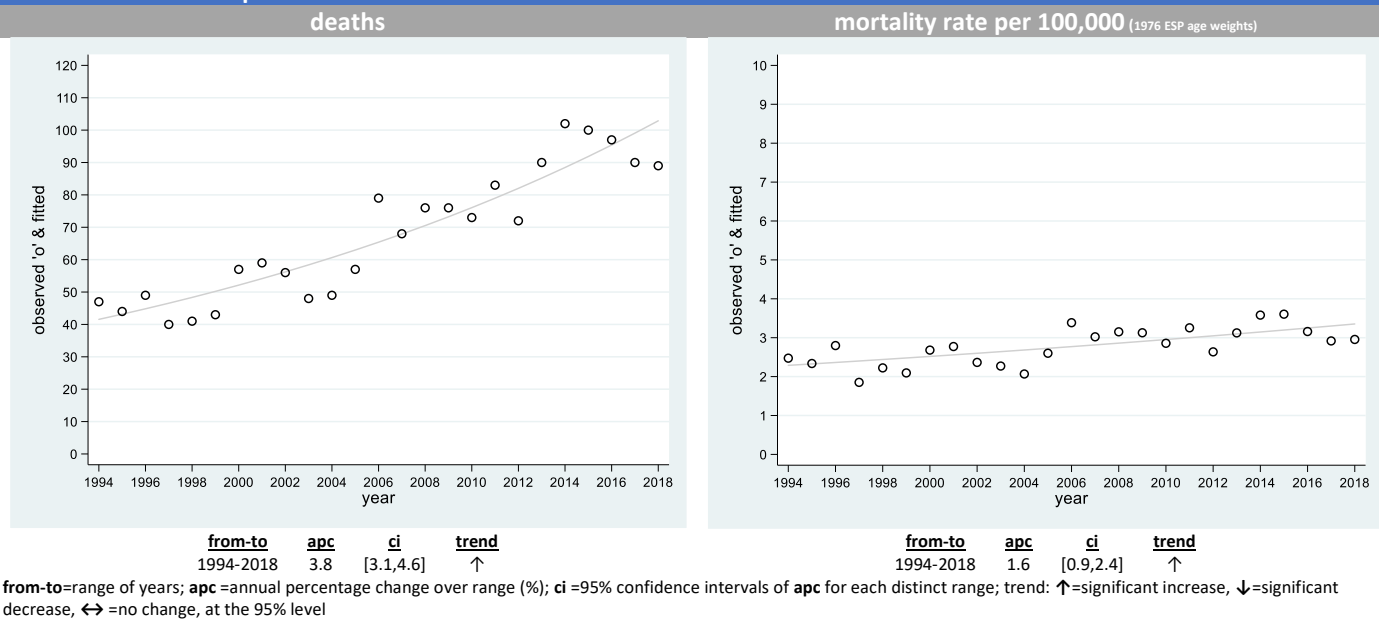
- The number of deaths due to breast cancer in females increased slowly but significantly during 1994-2018.
- The mortality rate declined significantly over the same period (Fig 3-29).
- These trends, in themselves, provide only limited evidence for an influence of the BreastCheck screening programme which began in 2002. However, more detailed analyses of Irish data provide stronger support that screening has contributed to mortality reduction alongside improvements in treatment [14].

FIGURE 3-30. C53 cervix: FEMALES: TREND DURING 1994-2018



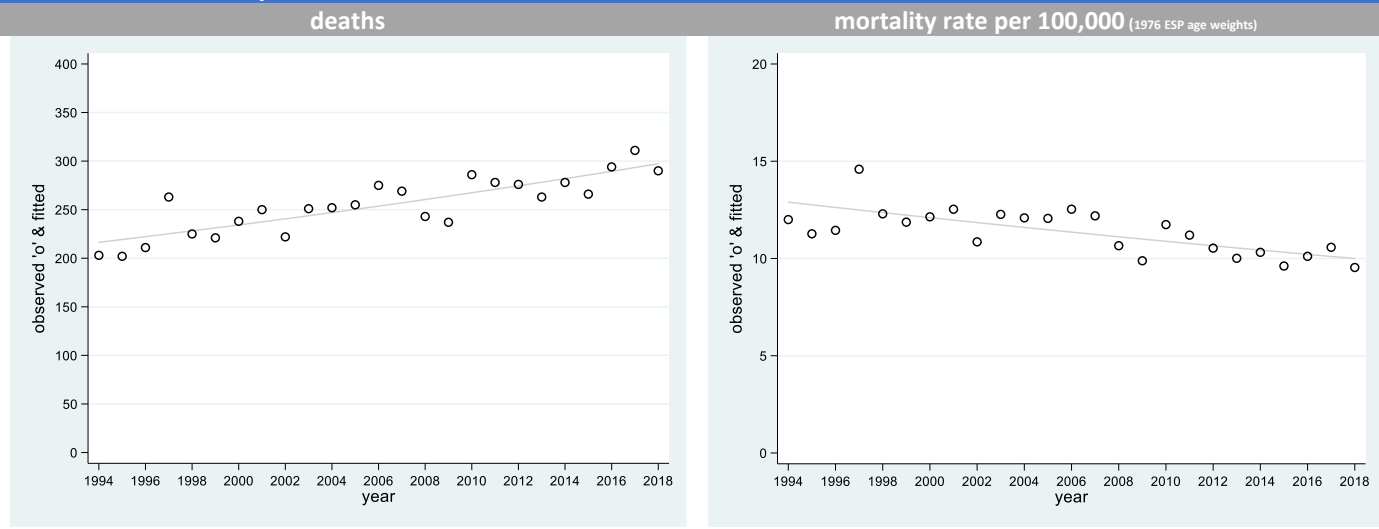
- The number of deaths due to cervical cancer increased significantly during 1994-2018 (Fig 3-30).
- The mortality rate declined significantly during the full period 1994-2018.
- It is likely that screening (in particular the introduction of the CervicalCheck programme in 2008 for women aged 25-65) has contributed to reductions in mortality from this cancer.

FIGURE 3-31. C54 corpus uteri: FEMALES: TREND DURING 1994-2018



- The number of deaths due to uterine cancer increased significantly during the full period 1994-2018.
- The mortality rate also increased significantly over the same period (Fig. 3-31).

FIGURE 3-32. C56 ovary: FEMALES: TREND DURING 1994-2018

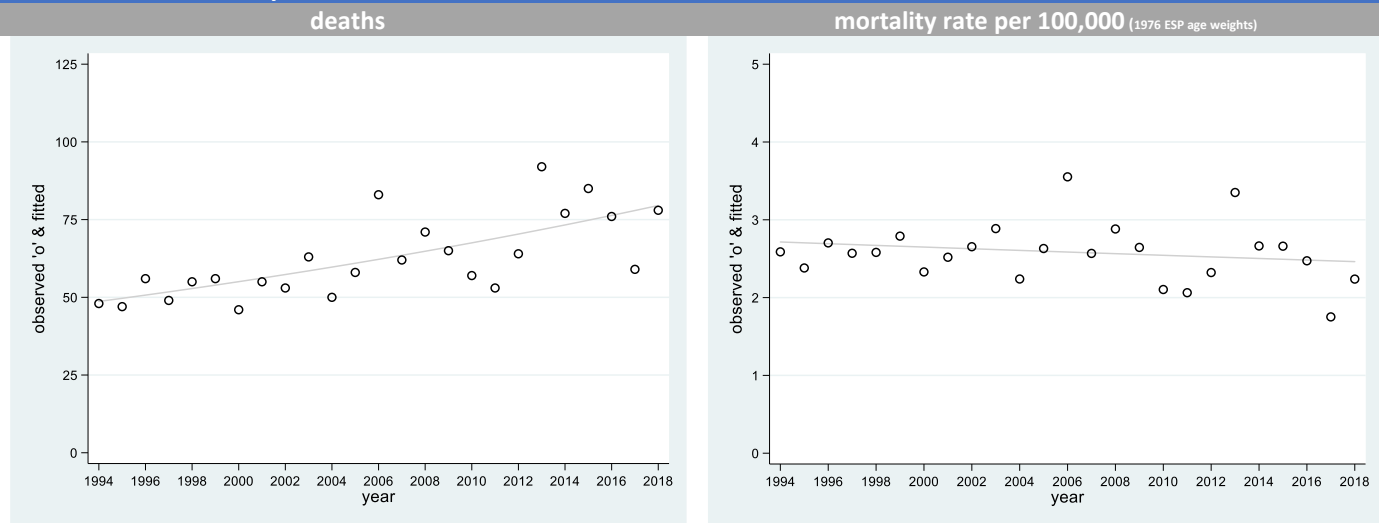


from-to	apc	ci	trend
1994-2018	1.3	[1.0,1.7]	↑
1994-2018	-1.1	[-1.5,-0.6]	↓

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to ovarian cancer increased significantly during 1994-2018.
- The mortality rate declined significantly during the same full period (Fig. 3-32).

FIGURE 3-33. C64 kidney: FEMALES: TREND DURING 1994-2018

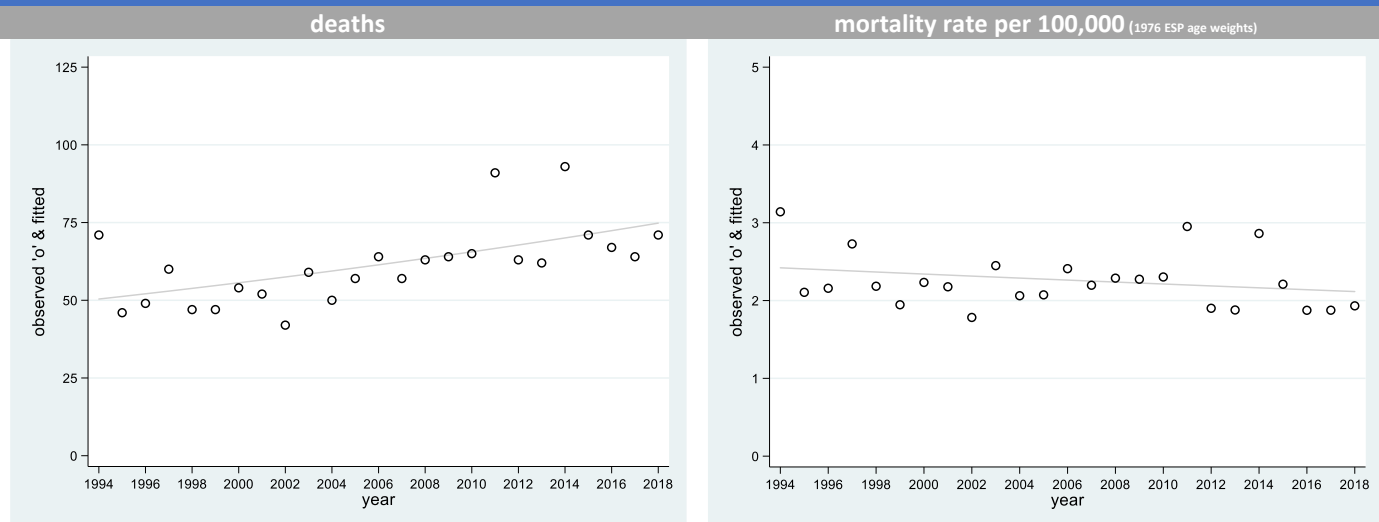


from-to	apc	ci	trend
1994-2018	2.1	[1.2,2.9]	↑
1994-2018	-0.4	[-1.3,0.5]	↔

from-to=range of years; apc=annual percentage change over range (%); ci =95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to kidney cancer in females increased significantly during 1994-2018.
- The mortality rate was static or declined marginally during the same full period (Fig. 3-33).

FIGURE 3-34. C67 bladder: FEMALES: TREND DURING 1994-2018



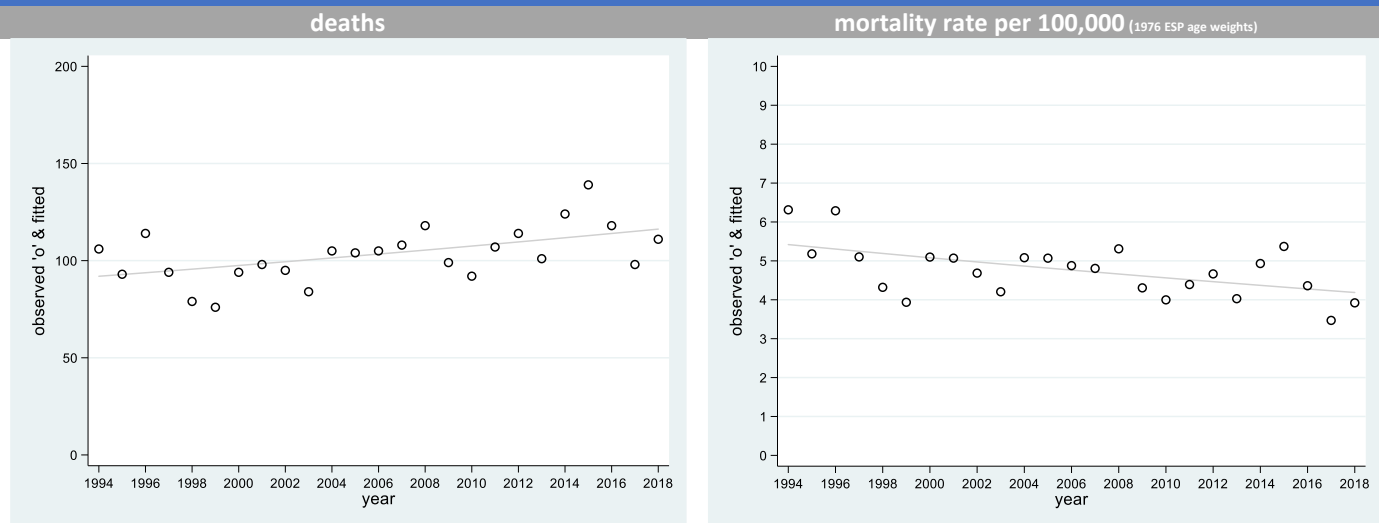
from-to apc ci trend
1994-2018 1.7 [0.7,2.6] ↑

from-to apc ci trend
1994-2018 -0.6 [-1.4,0.3] ↔

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to bladder cancer in females increased significantly during 1994-2018.
- The mortality rate was static or declined marginally during the same full period (Fig. 3-34).

FIGURE 3-35. C71-72 brain and CNS: FEMALES: TREND DURING 1994-2018



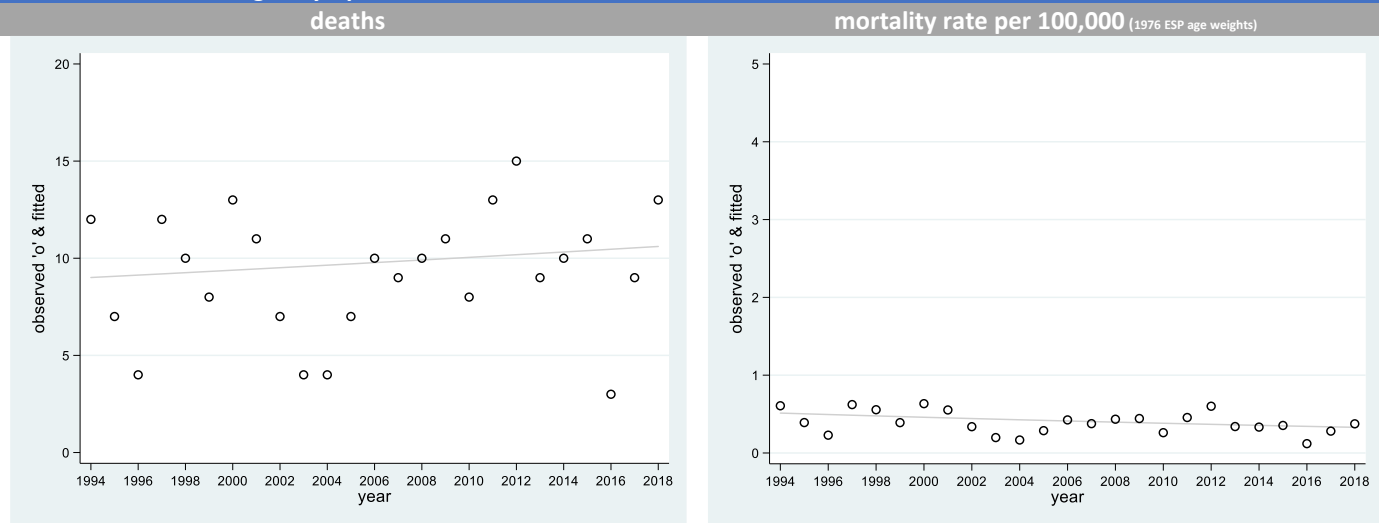
from-to apc ci trend
1994-2018 1.0 [0.3,1.7] ↑

from-to apc ci trend
1994-2018 -1.1 [-1.8,-0.4] ↓

from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to brain & central nervous system cancer in females increased significantly during 1994-2018.
- The mortality rate declined significantly during the same full period (Fig. 3-35).

FIGURE 3-36. C81 Hodgkin lymphoma: FEMALES: TREND DURING 1994-2018



from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

- The number of deaths due to Hodgkin lymphoma in females was static or increased marginally during 1994-2018.
- The mortality rate was static or declined marginally during the same full period (Fig. 3-36).

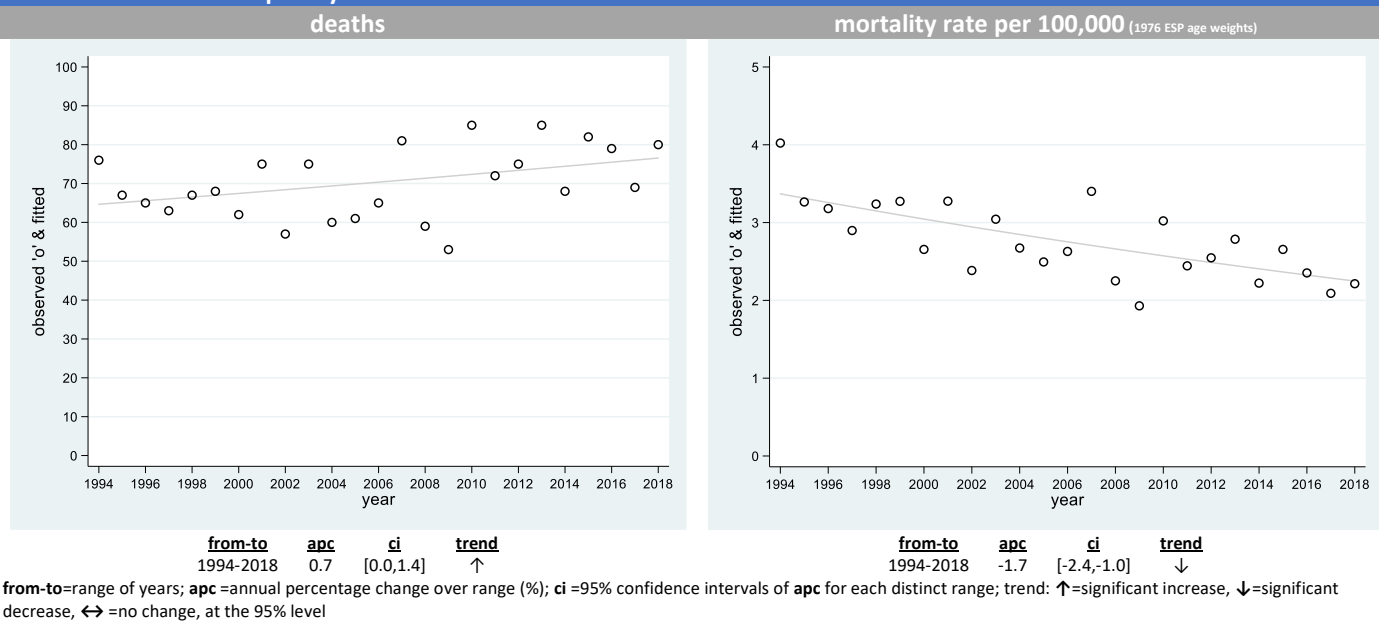
FIGURE 3-37. C82-85 non-Hodgkin lymphoma: FEMALES: TREND DURING 1994-2018



from-to=range of years; apc=annual percentage change over range (%); ci=95% confidence intervals of apc for each distinct range; trend: ↑=significant increase, ↓=significant decrease, ↔=no change, at the 95% level

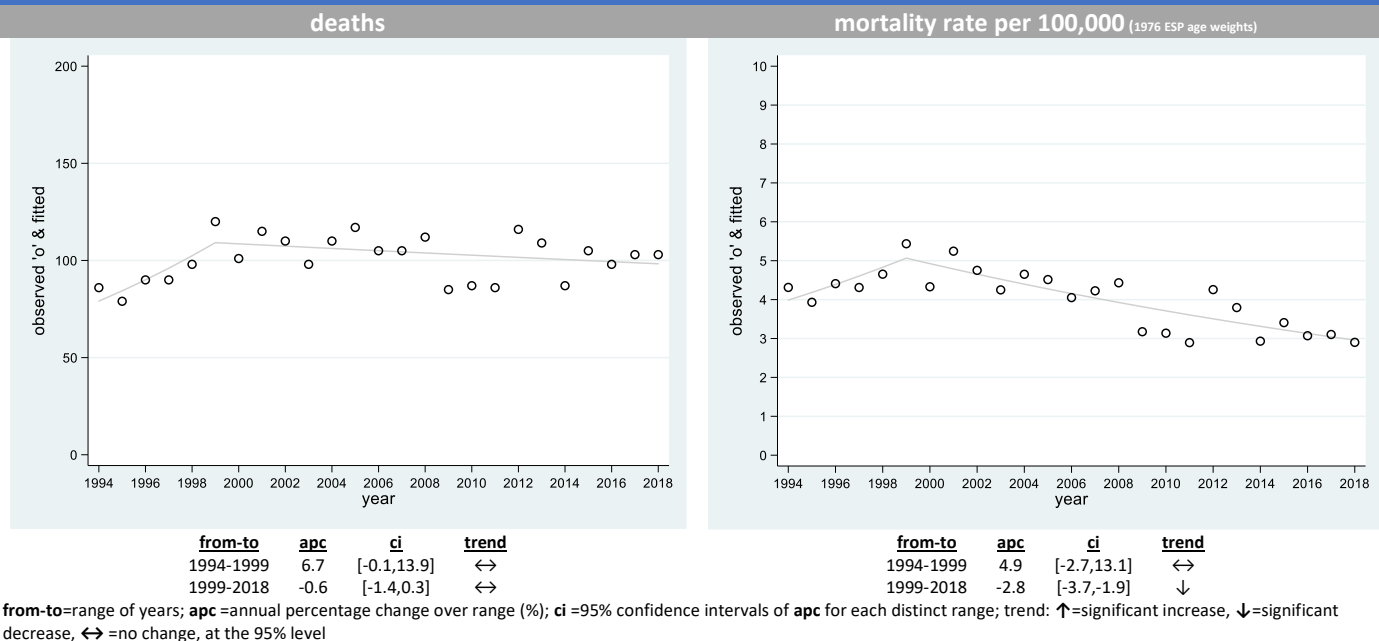
- The number of deaths due to non-Hodgkin lymphoma cancer in females increased significantly during 1994-2018.
- The mortality rate declined significantly during the same full period (Fig. 3-37).

FIGURE 3-38. C90 multiple myeloma: FEMALES: TREND DURING 1994-2018



- The number of deaths due to multiple myeloma in females increased significantly during 1994-2018.
- The mortality rate declined significantly during the same full period (Fig. 3-38).

FIGURE 3-39. C91-95 leukaemia: FEMALES: TREND DURING 1994-2018



- The number of deaths due to leukaemia in females increased marginally during 1994-1999 followed by a marginal decline during 1999-2018.
- The mortality rate increased marginally during 1994-1999, followed by a significant decline during 1999-2018 (Fig 3-39).

Trends in incidence and mortality: summary

Table 3-2
SUMMARY OF TRENDS IN AGE-STANDARDISED INCIDENCE AND MORTALITY RATES
FOR CANCERS IN MALES 1994-2019

CANCER SITE (& INCIDENCE RANK)	INCIDENCE				MORTALITY			
	period	APC	95%CI	trend	period	APC	95%CI	trend
all invasive cancers excl. NMSC	2010-2019	-0.7	[-1.1,-0.3]	↓	1994-2018	-1.7	[-1.8,-1.5]	↓
all invasive cancers excl. NMSC & prostate	2008-2019	-0.3	[-0.4,-0.1]	↓	1994-2018	-1.6	[-1.7,-1.4]	↓
INCIDENCE RATE DECREASE								
C16 stomach (9 th)	2014-2019	-4.8	[-7.6,-2.0]	↓	1994-2018	-3.2	[-3.5,-2.8]	↓
C18-20 colorectum (2nd)	2012-2019	-2.5	[-3.4,-1.5]	↓	1994-2018	-2.0	[-2.3,-1.6]	↓
C33-34 lung (3rd)	1994-2019	-0.9	[-1.0,-0.7]	↓	2013-2018	-4.2	[-6.3,-2.1]	↓
C91-95 leukaemia (8 th)	2004-2019	-1.7	[-2.3,-1.0]	↓	1999-2018	-2.5	[-3.3,-1.7]	↓
INCIDENCE RATE STATIC								
C15 oesophagus (11 th)	1994-2019	0.1	[-0.4,0.5]	↔	1994-2018	-0.6	[-0.9,-0.2]	↓
C22 liver (14 th)	2013-2019	1.4	[-2.0,4.9]	↔	1994-2018	2.9	[2.3,3.4]	↑
C25 pancreas (12 th)	1994-2019	0.3	[-0.2,0.7]	↔	1994-2018	-0.4	[-0.8,0.0]	↔
C43 melanoma of skin (4th)	2014-2019	0.0	[-3.2,3.3]	↔	2010-2018	-1.2	[-5.4,3.2]	↔
C61 prostate (1st)	2015-2019	1.9	[-0.5,4.3]	↔	2001-2018	-3.0	[-3.5,-2.6]	↓
C62 testis (16 th)	2007-2019	-0.5	[-1.9,0.8]	↔	1994-2018	-2.5	[-4.8,-0.1]	↓
C64 kidney (6 th)	2012-2019	-0.4	[-2.4,1.6]	↔	2002-2018	-1.5	[-2.7,-0.3]	↓
C71-72 brain & spinal cord (12 th)	1994-2019	0.0	[-0.3,0.4]	↔	1994-2018	-0.5	[-1.1,0.1]	↔
C82-85 non-Hodgkin lymphoma (5th)	2014-2019	-1.0	[-3.8,1.8]	↔	1994-2018	-1.1	[-1.7,-0.5]	↓
INCIDENCE RATE INCREASE								
C01-14 mouth & pharynx (7 th)	2001-2019	2.5	[2.0,3.0]	↑	2007-2018	1.7	[0.0,3.4]	↑
C73 thyroid gland (18 th)	1994-2019	4.9	[3.6,6.2]	↑	1994-2018	-0.1	[-1.3,1.2]	↔
C81 Hodgkin lymphoma (17 th)	1994-2019	1.8	[1.0,2.5]	↑	1994-2018	-3.0	[-4.5,-1.5]	↓
C90 multiple myeloma (15 th)	1994-2019	0.8	[0.3,1.2]	↑	1994-2018	-1.7	[-2.1,-1.2]	↓

APC: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression. Trend: ↑=significant increase, ↓=significant decrease, ↔=no change (static), at the 95% level. The top five most common invasive cancers are shown in bold type. Incidence data covered the period 1994 to 2019 (26 years). Mortality data covered the period 1994-2018 (25 years); Where more than one discrete trend interval was observed over the full 25/26 year period, only the most recent trend is shown. See Figures 2-2 to 2-18 & 3-2 to 3-19 for a full visual representation of each individual cancer trend.

Bladder cancer is excluded from this table as incidence trends are unclear because of coding variation over time.

- Of the cancers tabulated above, only mouth/pharynx and liver cancers showed significant recent or ongoing increases in mortality rates. Cancers of the mouth and pharynx also showed an increase in incidence, while the incidence trend for liver cancer (non-significant but marginally upward) was also consistent with the increasing mortality trend.

Table 3-3
SUMMARY OF TRENDS IN AGE-STANDARDISED INCIDENCE AND MORTALITY RATES
FOR CANCERS IN FEMALES 1994-2019

CANCER SITE (& INCIDENCE RANK)	INCIDENCE				MORTALITY			
	period	APC	95%CI	trend	period	APC	95%CI	trend
all invasive cancers excl. NMSC	2008-2019	0.2	[0.0,0.5]	↑	1994-2018	-1.1	[-1.2,-1.0]	↓
all invasive cancers excl. NMSC & breast	2011-2019	0.0	[-0.4,0.4]	↔	1994-2018	-1.0	[-1.1,-0.9]	↓
INCIDENCE RATE DECREASE								
C15 oesophagus (16 th)	1994-2019	-0.7	[-1.2,-0.3]	↓	1994-2018	-1.5	[-1.9,-1.0]	↓
C16 stomach (12 th)	1994-2019	-1.4	[-1.7,-1.0]	↓	1994-2018	-3.2	[-3.7,-2.7]	↓
C18-20 colorectum (3rd)	1994-2019	-0.3	[-0.5,-0.1]	↓	1994-2018	-2.0	[-2.3,-1.7]	↓
C33-34 lung and trachea (2nd)	2016-2019	-4.1	[-7.5,-0.5]	↓	1994-2018	0.3	[-0.1,0.6]	↔
C53 cervix uteri (8 th)	2009-2019	-2.8	[-4.7,-0.9]	↓	1994-2018	-1.1	[-1.7,-0.5]	↓
C56 ovary (6 th)	1994-2019	-0.9	[-1.2,-0.5]	↓	1994-2018	-1.1	[-1.5,-0.6]	↓
C91-95 leukaemia (11 th)	2010-2019	-3.0	[-5.4,-0.5]	↓	1999-2018	-2.8	[-3.7,-1.9]	↓
INCIDENCE RATE STATIC								
C25 pancreas (9 th)	1994-2019	0.3	[-0.1,0.7]	↔	1994-2018	0.0	[-0.4,0.3]	↔
C71-72 brain & spinal cord (14 th)	1994-2019	0.4	[-0.2,0.9]	↔	1994-2018	-1.1	[-1.8,-0.4]	↓
C73 thyroid gland (13 th)	2011-2019	-2.0	[-4.8,0.9]	↔	2012-2018	-10.9	[-19.2,-1.8]	↓
C82-85 non-Hodgkin lymphoma (7 th)	2013-2019	-2.4	[-5.1,0.3]	↔	1994-2018	-1.5	[-2.2,-0.8]	↓
C90 multiple myeloma (19 th)	1994-2019	0.5	[-0.2,1.3]	↔	1994-2018	-1.7	[-2.4,-1.0]	↓
INCIDENCE RATE INCREASE								
C01-14 mouth & pharynx (17 th)	1994-2019	2.2	[1.6,2.7]	↑	1994-2018	-0.2	[-1.0,0.6]	↔
C22 liver (20 th)	1994-2019	4.5	[3.6,5.4]	↑	1994-2018	2.7	[2.1,3.4]	↑
C43 melanoma of skin (4th)	1994-2019	2.3	[1.9,2.7]	↑	1994-2018	1.2	[0.1,2.4]	↑
C50 breast (1st)	2014-2019	1.7	[0.6,2.9]	↑	1994-2018	-1.8	[-2.0,-1.5]	↓
C54 corpus uteri (5th)	1994-2019	2.2	[1.8,2.6]	↑	1994-2018	1.6	[0.9,2.4]	↑
C64 kidney (10 th)	2007-2019	1.1	[0.1,2.1]	↑	1994-2018	-0.4	[-1.3,0.5]	↔
C81 Hodgkin lymphoma (20 th)	1994-2019	1.8	[0.9,2.6]	↑	1994-2018	-1.8	[-3.7,0.1]	↔

APC: average annual percentage change in rate over period and 95% confidence interval (95%CI) based on annual data points fitted with Joinpoint regression. Trend: ↑=significant increase, ↓=significant decrease, ↔=no change (static), at the 95% level. The top five most common invasive cancers are shown in bold type. Incidence data covered the period 1994 to 2019 (26 years). Mortality data covered the period 1994-2018 (25 years); Where more than one discrete trend interval was observed over the full 25/26 year period, only the most recent trend is shown. See Figures 2-19 to 2-37 & 3-20 to 3-39 for a full visual representation of each individual cancer trend.

Bladder cancer is excluded from this table as incidence trends are unclear because of coding variation over time.

- Of the cancers tabulated above, only cancers of the liver and corpus uteri, and melanoma of skin, showed significant increases in mortality rates. Incidence rates for these cancers also showed significant ongoing or recent increases.

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 26 years of complete or near-complete incidence and follow-up information on cancer cases, up to the end of 2019. However, there remains a subset of cancer patients alive at the end of 2019 who are not included in NCRI data because they were diagnosed before 1994. The size of this hidden subset was estimated [15]. The sum of the fixed-duration cancer survivor population (1994-2019) 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 2019.							
sex	age‡	Fixed duration (1994-2019)	%	%	Complete prevalence	%	%
all		184,784	100.0%	100.0%	199,554	100.0%	100.0%
	<50	25,711	13.9%		26,276	13.2%	
	50+	159,073	86.1%		173,278	86.8%	
males		90,977	100.0%	49.2%	96,014	100.0%	48.1%
	<50	9,976	11.0%		10,217	10.6%	
	50+	81,001	89.0%		85,796	89.4%	
females		93,807	100.0%	50.8%	103,541	100.0%	51.9%
	<50	15,735	16.8%		16,059	15.5%	
	50+	78,072	83.2%		87,482	84.5%	

*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 31/12/2019.

- The figure reported for complete cancer prevalence (up to 31/12/2018) in last year's annual report was 190,309 [16]. For this report (up to 31/12/2019) the same figure was estimated at 199,504 (Table 4-1) which comprised c.4.0% of the Irish population in 2019.
- These figures include patients still undergoing active treatment or palliative treatment at the end of 2019, 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 SURVIVORS AT THE END OF 2019			
	Fixed duration (1994-2019)	Complete to end of 2019	%*
C50 breast	42,067	45,875	23.0%
C61 prostate	41,647	42,174	21.1%
C18-20 colorectum	21,971	23,564	11.8%
C43 melanoma of skin	13,174	14,491	7.3%
C82-85 non-Hodgkin lymphoma	7,882	8,521	4.3%
C33-34 lung	6,993	7,098	3.6%
C54 corpus uteri	5,648	6,190	3.1%
C64 kidney	5,530	5,777	2.9%
C91-95 leukaemia	5,343	5,986	3.0%
C53 cervix uteri	3,993	4,926	2.5%
C62 testis	3,518	5,001	2.5%
C67 bladder	3,430	4,355	2.2%
C01-14 mouth & pharynx	3,360	3,489	1.7%
C73 thyroid	3,347	3,490	1.7%
C56 ovary	2,672	3,193	1.6%
C81 Hodgkin lymphoma	2,276	2,963	1.5%
C16 stomach	2,263	2,358	1.2%
C90 multiple myeloma	1,976	1,994	1.0%
C71-72 brain and spinal cord	1,771	2,275	1.1%
C15 oesophagus	1,460	1,496	0.7%
C51-52, C55, C57, C58 other gynaecological†	1,083	1,174	0.6%
C25 pancreas	934	953	0.5%
C22 liver	746	753	0.4%

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

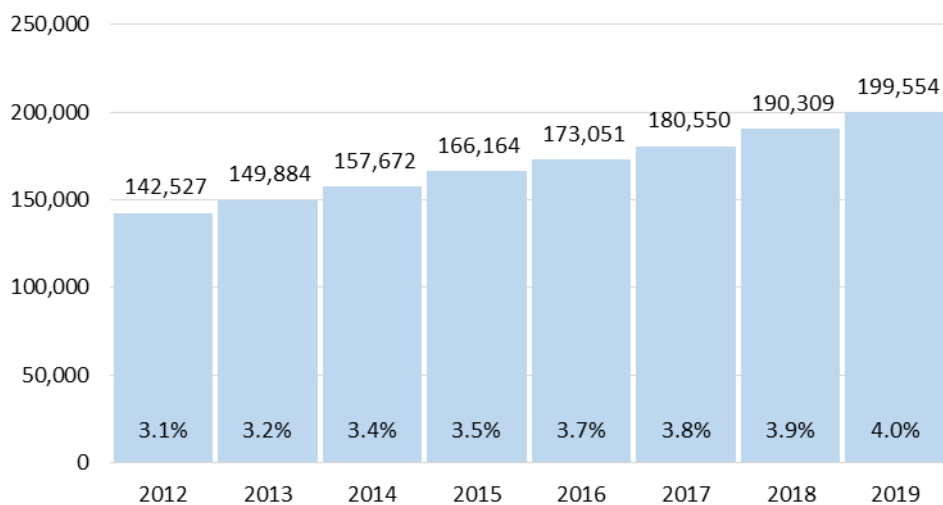
*Percentage of all cancer survivors (complete prevalent cancers, C00-43, C45-96)

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 2019



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 2019 are based on the latest available complete data at the time of writing this report.

For each year since the establishment of the cancer registry, the number of cancers diagnosed has increased due to the growth of our population which increased by over 1 million between 1996 and 2016 [7]. 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 growing numbers of cancer survivors in the general population.

In summary, it is estimated that there were almost 200,000 cancer survivors at the end of 2019 (Figure 4-1).

5. CANCER SURVIVAL

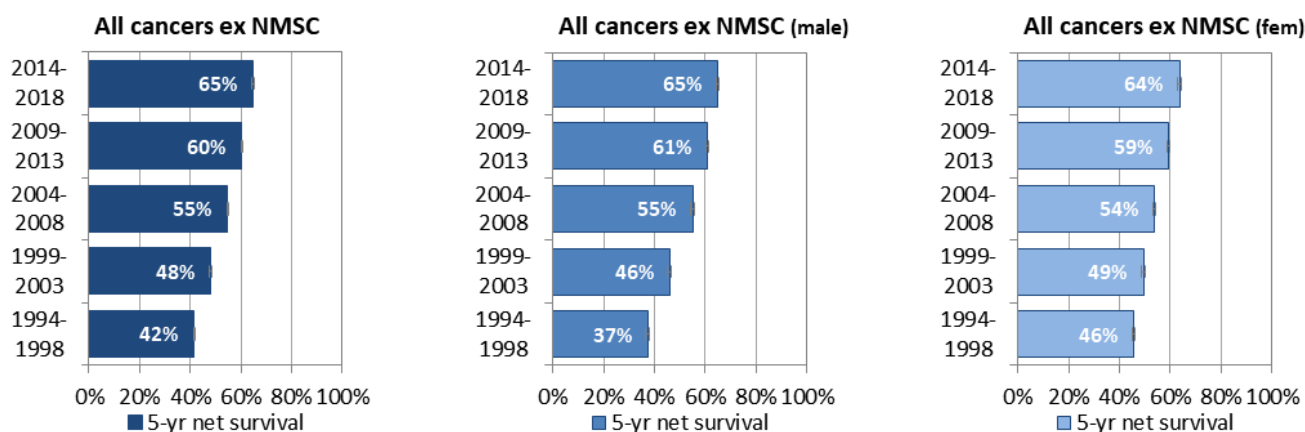
Five-year net survival for patients diagnosed during 1994-2018

Updated five-year net survival statistics are presented below for the most commonly diagnosed cancers, comparing survival of Irish cancer patients across five diagnosis periods from 1994-1998 to 2014-2018 (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 EURO CARE 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 [17]. 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 [18].

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 (Figure 5-1), reflecting improvements in survival for specific cancers but also, to some extent, increased predominance of cancers with more favourable prognoses.
- 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

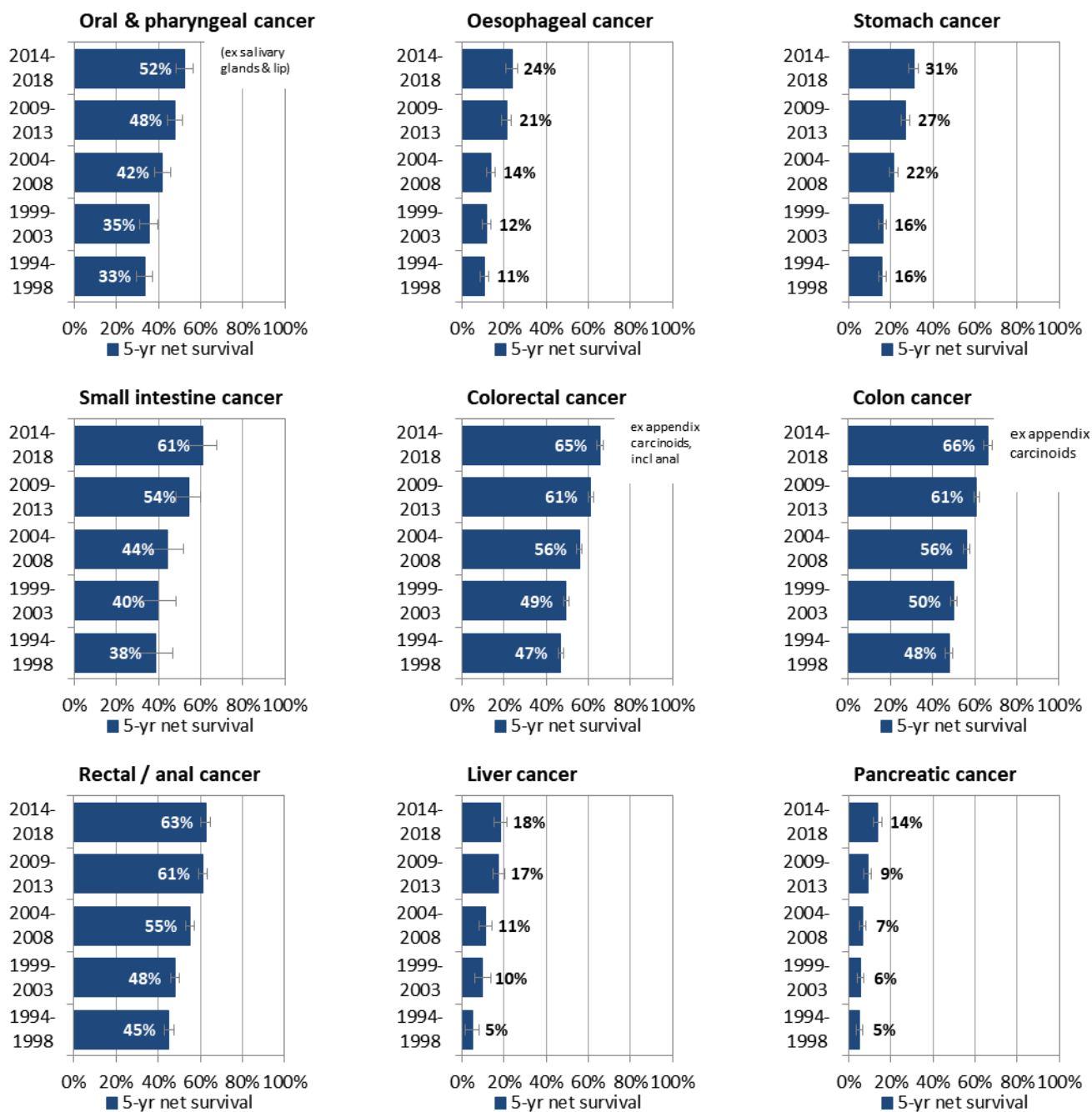


FIGURE 5-2
AGE-STANDARDISED 5-YEAR NET SURVIVAL OF IRISH CANCER PATIENTS, BY DIAGNOSIS PERIOD AND CANCER TYPE

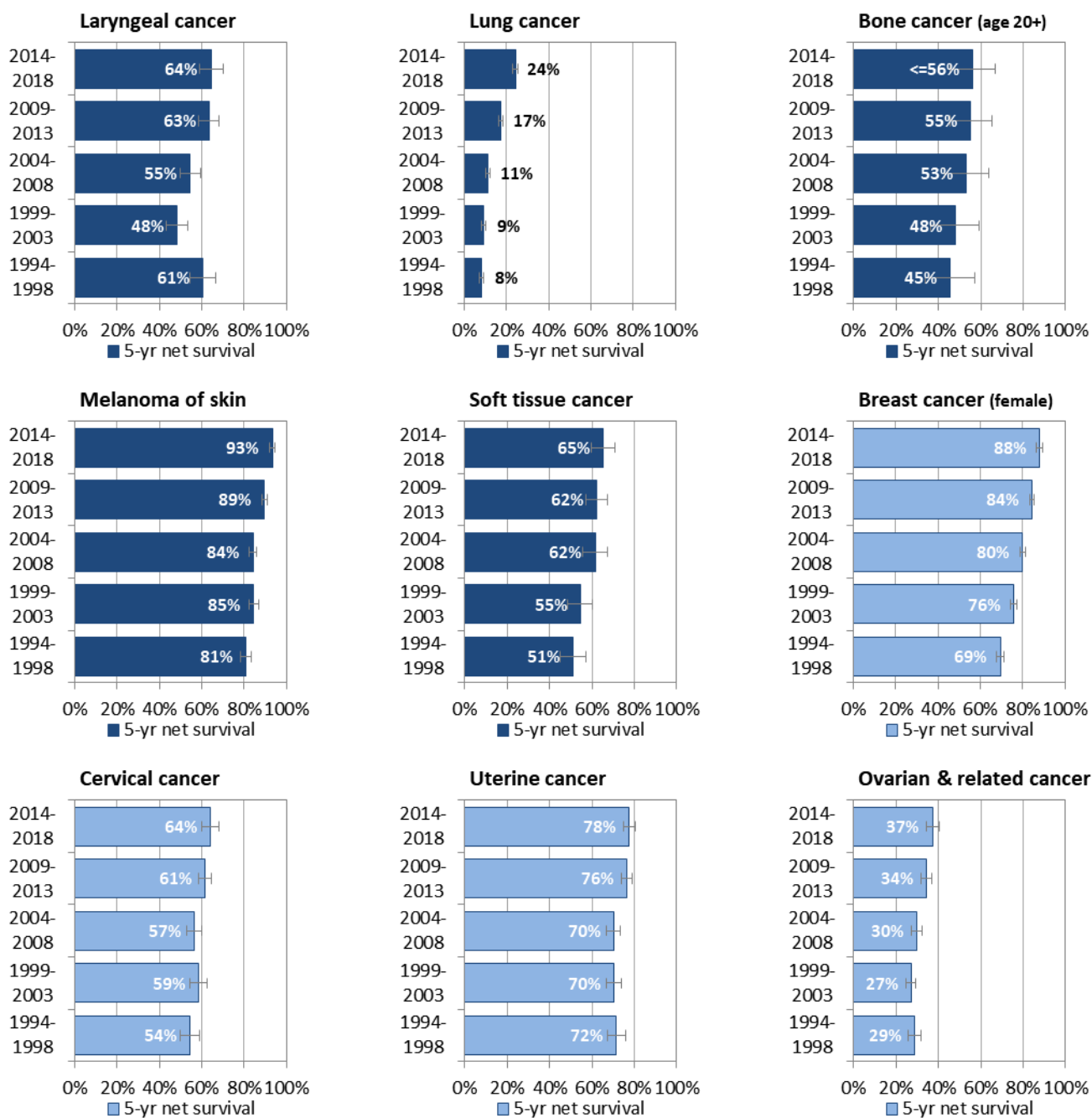
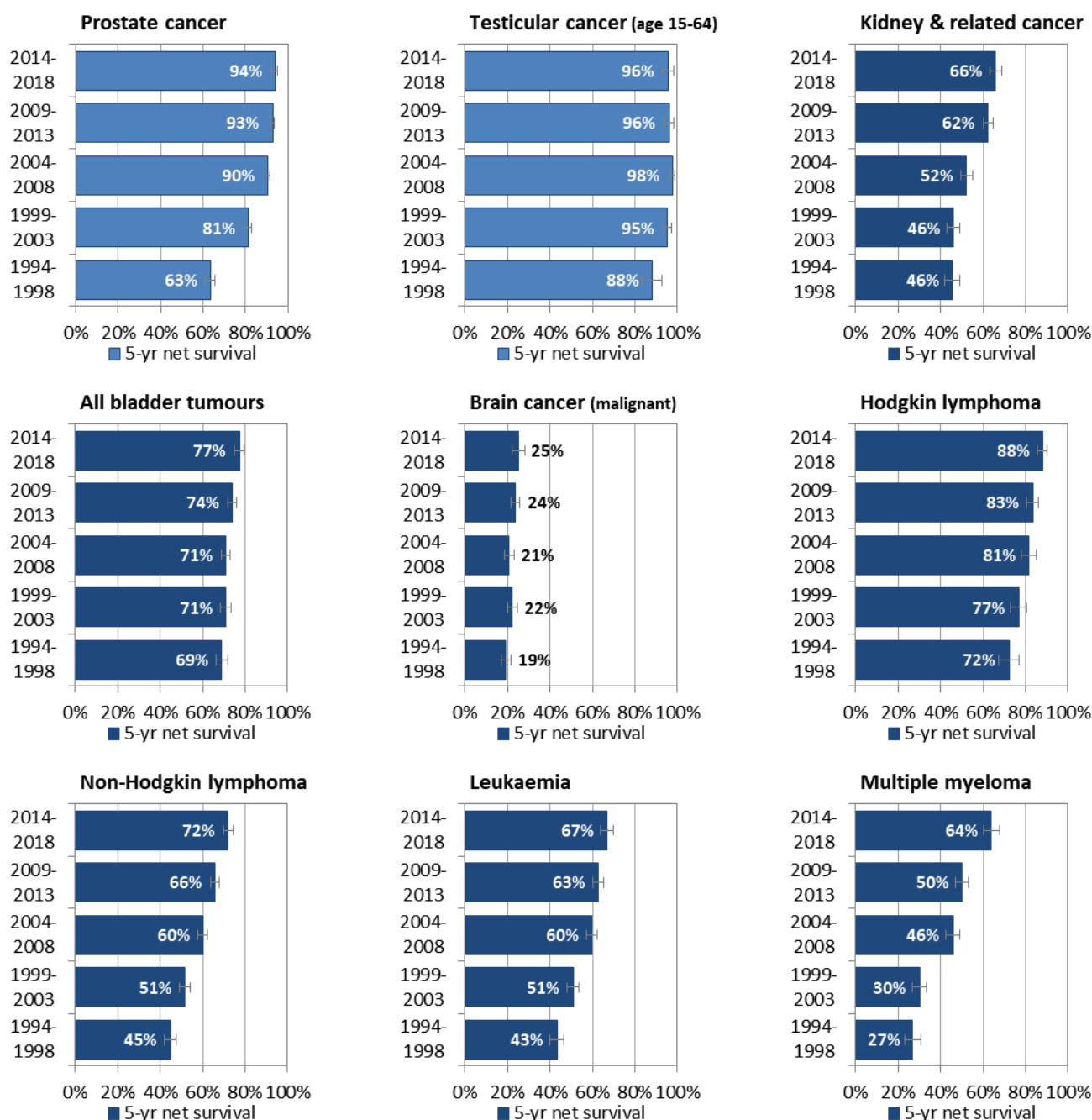


FIGURE 5-2
AGE-STANDARDISED 5-YEAR NET SURVIVAL OF IRISH CANCER PATIENTS, BY DIAGNOSIS PERIOD AND CANCER TYPE



‡Survival for all ages 15-99 (15-64 for testicular cancer, 20-99 for bone cancer) is standardised to the standard populations recommended by Corazziari et al. (2004) [17]. 95% confidence intervals are shown.

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

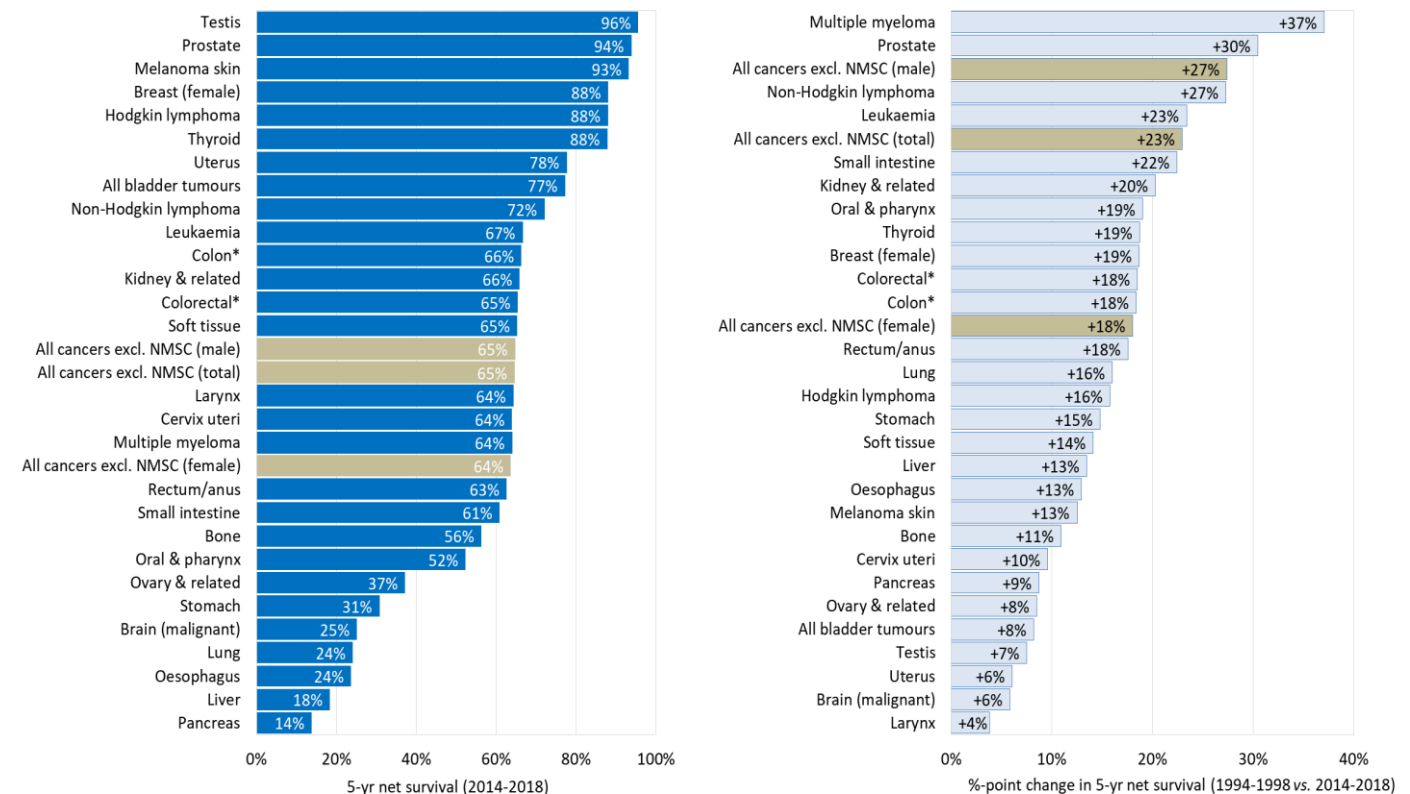
- Almost all cancer types examined showed good evidence of improvements in survival over time, but the magnitude and timing of these improvements varied quite substantially by cancer type (Figure 5-2).
- Rankings of cancer type by average recent survival, and by the extent of survival improvements over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

Age-standardised 5-year net survival, 2014-2018 diagnosis period

Change in 5-year net survival: 1994-1998 to 2014-2018



*excluding carcinoid tumours of appendix

- Five-year net survival of patients diagnosed during 2014-2018 varied widely by cancer type, from only 14% for pancreatic cancer, 18% for liver, 24% for oesophageal and lung, and 25% for brain cancer, to 88% for thyroid and female breast cancer and for Hodgkin lymphoma, 93% for melanoma of skin, 94% for prostate and 96% for testicular cancer (Figure 5-3A).
- Improvements in average five-year net survival, expressed as absolute (percentage-point) gains comparing diagnosis period 1994-1998 with 2014-2018, were highest for multiple myeloma (+37 % points), prostate cancer (+30%), non-Hodgkin lymphoma (+27%), leukaemia (+23%) and small intestinal cancer (+22%); and lowest for laryngeal (+4%), brain (+6%), uterine (+6%) and testicular cancers (+7%), bladder tumours (+8%) and ovarian and related cancers (+9%) (Figure 5-3B).
- Absolute changes in survival since 1994-1998 do not convey the full picture, however, as modest percentage-point improvements for high-fatality cancers may also represent substantial improvements in relative terms: most notably, more than a doubling of survival seen for cancers of the oesophagus (from 11% to 24%), pancreas (from 5% to 14%), liver (from 5% to 18%) and lung (from 8% to 24%).

REFERENCES

- [1] A. C. Hamilton *et al.*, 'Inequalities in the decline and recovery of pathological cancer diagnoses during the first six months of the COVID-19 pandemic: a population-based study', *Br. J. Cancer*, vol. 125, no. 6, pp. 798–805, Sep. 2021, doi: 10.1038/s41416-021-01472-0.
- [2] H. M. Peacock *et al.*, 'Decline and incomplete recovery in cancer diagnoses during the COVID-19 pandemic in Belgium: a year-long, population-level analysis', *ESMO Open*, vol. 6, no. 4, p. 100197, Aug. 2021, doi: 10.1016/j.esmoop.2021.100197.
- [3] C. A. Uyl-de Groot, M. S. Schuurman, P. C. Huijgens, and J. Praagman, '[Fewer cancer diagnoses during the COVID-19 epidemic according to diagnosis, age and region]', *TSG*, pp. 1–8, 2020.
- [4] L. Burke *et al.*, '*Cancer care in Ireland in 2020 – The impact of the COVID-19 pandemic*', Faculty of Pathology, Royal College of Physicians of Ireland (RCPI) / National Cancer Control Programme (NCCP) / National Histopathology Quality Improvement (NHQI) Programme / National GI Endoscopy Quality Improvement (NEQI) Programme / National Radiology Quality Improvement (NRQI) Programme / DATA-CAN, the UK's Health Data Research Hub for Cancer / Queen's University Belfast / Northern Ireland Cancer Registry (NICR) / National Cancer Registry Ireland (NCRI), Dec. 2021.
- [5] CRUK, '*Lifetime risk of cancer calculator tool*', Cancer Research UK, May 15, 2015. <https://www.cancerresearchuk.org/health-professional/cancer-statistics/cancer-stats-explained/our-calculations-explained> (accessed Oct. 16, 2020).
- [6] P. D. Sasieni, J. Shelton, N. Ormiston-Smith, C. S. Thomson, and P. B. Silcocks, 'What is the lifetime risk of developing cancer?: the effect of adjusting for multiple primaries', *Br. J. Cancer*, vol. 105, no. 3, pp. 460–465, Jul. 2011, doi: 10.1038/bjc.2011.250.
- [7] '*Population estimates 1926-2021: PEA11.*' Central Statistics Office, Ireland (2021). www.cso.ie.
- [8] '*Cancer in Ireland 1994-2015 with estimates for 2015-2017: Annual report of the National Cancer Registry*', NCRI, Cork, Ireland, 2017. [Online]. Available: www.ncri.ie
- [9] SEER, '*Joinpoint Regression Program - Surveillance Research Program*'. <http://surveillance.cancer.gov/joinpoint/> (accessed Nov. 19, 2013).
- [10] J. Lortet-Tieulent *et al.*, 'Convergence of decreasing male and increasing female incidence rates in major tobacco-related cancers in Europe in 1988–2010', *Eur. J. Cancer*, Nov. 2013, doi: 10.1016/j.ejca.2013.10.014.
- [11] A.-E. Carsin *et al.*, 'Impact of PSA testing and prostatic biopsy on cancer incidence and mortality: comparative study between the Republic of Ireland and Northern Ireland', *Cancer Causes Control CCC*, vol. 21, no. 9, pp. 1523–1531, Sep. 2010, doi: 10.1007/s10552-010-9581-y.
- [12] '*Vital Statistics Annual Report 2018*', Central Statistics Office, Ireland. www.cso.ie. [Online]. Available: <https://www.cso.ie/en/releasesandpublications/ep/p-vsar/vitalstatisticsannualreport2018/deaths2018/>
- [13] Day NE, 'Cumulative rates and cumulative risk', in Muir C, Waterhouse J, Mack T, Powell J, Whelan S (eds) '*Cancer in Five Continents: vol. V*', 787–789. International Agency for Research on Cancer. (IARC Scientific Publications No. 88), Lyon, France, 1987.
- [14] J. A. Hanley, A. Hannigan, and K. M. O'Brien, 'Mortality reductions due to mammography screening: Contemporary population-based data', *PLOS One*, vol. 12, no. 12, p. e0188947, 2017, doi: 10.1371/journal.pone.0188947.
- [15] United Kingdom and Ireland Association of Cancer Registries, '*Standard operating procedure: Guidelines for calculation of cancer prevalence*', UKIACR, Apr. 2018. [Online]. Available: <http://www.ukiacr.org/content/links>
- [16] '*Cancer in Ireland 1994-2018 with estimates for 2018-2020: Annual report of the National Cancer Registry*', 2020. www.ncri.ie [Online]. Available: <https://www.ncri.ie/publications/statistical-reports/cancer-ireland-1994-2018-estimates-2018-2020-annual-report-national>
- [17] I. Corazzari, M. Quinn, and R. Capocaccia, 'Standard cancer patient population for age standardising survival ratios', *Eur. J. Cancer Oxf. Engl.* 1990, vol. 40, no. 15, pp. 2307–2316, Oct. 2004, doi: 10.1016/j.ejca.2004.07.002.

- [18] 'Childhood cancer: Cancer Trends No 32', National Cancer Registry, Cork, Ireland, Feb. 2017. [Online]. Available: <https://www.ncri.ie/sites/ncri/files/pubs/Childhood%20Cancer%20Trends%20Report%20February%202017%20Final.pdf>
- [19] A. S. Ahmad, N. Ormiston-Smith, and P. D. Sasieni, 'Trends in the lifetime risk of developing cancer in Great Britain: comparison of risk for those born from 1930 to 1960', *Br. J. Cancer*, vol. 112, no. 5, pp. 943–947, Mar. 2015, doi: 10.1038/bjc.2014.606.
- [20] EUROSTAT, 'Revision of the European Standard Population — Report of Eurostat's task force', Luxembourg: Publications Office of the European Union, 2013.

APPENDIX I: INCIDENT CANCER CASES

3-year annual average 2017-2019: cases, risk[#] of developing cancer before 75th birthday and lifetime risk

cancer	case count			risk [#] to age 75 1 in ...		lifetime risk [#] 1 in ...	
	males	females	all ●	males	females	males	females
C00-96 all invasive cancers *	19,638	16,272	35,910				
C00-43, C45-96 all invasive cancers excl. NMSC	12,849	11,298	24,146	3	4	2	2
C00-96, D00-48 all registered tumours	22,093	21,545	43,638				
D00-48 all non-invasive tumours**	2,455	5,274	7,728				
C00 lip	16	4	20	2,357	8,991	1,309	5,643
C01 base of tongue	31	9	40	940	3,222	819	2,816
C02 other and unspecified parts of tongue	60	31	91	560	1,263	396	693
C03 gum	13	10	23	3,800	4,510	1,534	1,901
C04 floor of mouth	28	9	37	1,098	3,652	915	2,472
C05 palate	16	10	26	2,067	2,932	1,557	2,557
C06 other and unspecified parts of mouth	24	15	39	1,266	2,615	1,009	1,336
C07 parotid gland	30	18	48	1,736	2,132	593	1,251
C08 other and unspecified major salivary glands	8	4	12	5,456	8,715	2,543	5,481
C09 tonsil	66	24	90	460	1,258	407	1,069
C10 oropharynx ***	23	8	31	1,322	3,755	1,086	3,176
C11 nasopharynx	14	6	20	2,525	5,628	1,711	4,028
C12 pyriform sinus	16	3	18	1,903	10,343	1,556	8,501
C13 hypopharynx	23	5	28	1,738	5,993	988	3,754
C14 other and ill-defined sites in the lip, oral cavity and pharynx	8	4	13	3,885	7,263	2,588	5,084
C01-14 mouth & pharynx	359	157	516	96	228	67	149
C00-14 lip oral cavity and pharynx	376	161	537	92	222	64	145
C15 oesophagus	336	165	501	110	293	63	108
C16 stomach	349	195	544	130	245	56	98
C17 small intestine	68	51	119	515	727	321	414
C18 colon	983	811	1,794	45	55	20	24
C19 rectosigmoid junction	91	68	159	457	657	220	287
C20 rectum	478	260	738	79	150	45	81
C21 anus	31	47	78	1,120	785	751	480
C19-20 rectosigmoid junction and rectum	569	328	897	67	122	37	63
C19-21 rectum and anus	600	375	975	63	106	36	56
C18-20 colorectum	1,552	1,138	2,690	27	39	13	18
C18-21 colorectum and anus	1,583	1,185	2,768	27	37	13	17
C17-21 intestine	1,651	1,236	2,887	25	35	13	16
C22 liver and intrahepatic bile ducts	242	111	353	162	438	83	162
C23 gallbladder	15	45	60	2,730	1,013	1,280	400
C24 other and unspecified parts of biliary tract	91	78	169	466	632	216	231
C23-24 gallbladder and biliary tract	105	123	229	398	389	185	146
C22-24 liver gall bladder and biliary tract	347	235	582	115	207	57	77
C25 pancreas	304	284	588	133	173	64	64
C26 other and ill-defined digestive organs	41	47	88	1,297	1,120	417	370
C30 nasal cavity and middle ear	8	9	17	4,792	3,610	2,989	2,549
C31 accessory sinuses	8	5	13	4,176	9,533	2,736	4,114
C32 larynx	159	35	194	206	982	141	647
C00-14 C30-32 all head and neck	551	211	762	63	171	43	111
C00-15 C32 lip oral pharynx larynx oesophagus	871	361	1,232	41	114	27	57
C33 trachea	1	2	3				
C34 bronchus and lung	1,478	1,212	2,690	28	33	14	17
C33-34 lung and trachea	1,479	1,214	2,693	28	33	14	17
C37 thymus	6	4	11	5,155	7,815	3,995	5,970
C38 heart, mediastinum and pleura	8	5	14	8,126	12,505	2,091	3,375
C40 bone and articular cartilage of limbs	16	8	24	2,442	4,127	1,702	3,213
C41 bone and articular cartilage of other and unspecified	22	13	35	1,458	3,207	1,182	1,851
C40-41 bone and articular and unspecified	16	8	24	2,442	4,127	1,702	3,213
C43 melanoma of skin	569	587	1,156	71	66	37	39
C44 other skin	6,789	4,974	11,763	7	9	3	4
C45 mesothelioma	36	8	44	1,692	4,506	489	2,598
C46 Kaposi sarcoma	7		7	4,523		4,088	
C47 peripheral nerves and autonomic nervous system	2	3	5	14,085	12,399	14,085	9,842
C48 retroperitoneum and peritoneum	11	20	31	3,880	2,414	1,769	973
C49 other connective and soft tissue	108	65	173	400	585	198	351
C50 breast	34	3,507	3,542	1,199	10	565	7
C51 vulva		65	65		693		316
C52 vagina		11	11		3,637		1,984
C53 cervix uteri		292	292		121		103
C54 corpus uteri		540	540		61		43
C55 uterus, part unspecified		37	37		964		608
C56 ovary		385	385		97		57

3-year annual average 2017-2019: cases, risk[#] of developing cancer before 75th birthday and lifetime risk

cancer	case count			risk [#] to age 75 1 in ...		lifetime risk [#] 1 in ...	
	males	females	all ●	males	females	males	females
C57 other and unspecified female genital organs		66	66		588		311
C58 placenta		1	1				
C51-52, C55, C57, C58 other malignant gynaecological neoplasms		181	181		223		117
C60 penis	46		46	833		474	
C61 prostate	3,869		3,869	8		6	
C62 testis	164		164	207		197	
C63 other and unspecified male genital organs	5		5	8,479		4,030	
C64 kidney, except renal pelvis	446	244	690	83	156	51	89
C65 renal pelvis	16	12	28	2,576	4,049	1,198	1,625
C66 ureter	24	11	35	2,432	3,390	720	1,876
C64-66 kidney incl. renal pelvis and ureter	486	266	752	78	144	46	81
C67 bladder	347	143	491	145	370	51	127
C68 other and unspecified urinary organs	12	5	17	4,204	13,700	1,411	3,491
C69 eye and adnexa	29	22	50	1,170	1,480	895	1,148
C70 meninges	5	11	15	7,674	3,960	4,631	2,078
C71 brain	237	178	416	146	210	100	126
C72 spinal cord, cranial nerves and other parts of CNS	10	11	20	3,531	3,055	2,939	2,545
C71-72 brain and spinal cord	247	189	436	141	196	97	120
C70-72 malignant meninges brain and spinal cord	252	200	451	138	188	95	114
C70-72 D32-33 D42-43 all meninges brain and CNS	373	404	777				
C73 thyroid gland	77	191	268	432	179	351	150
C74 adrenal gland	10	9	18	4,161	4,179	2,538	2,889
C75 other endocrine glands and related structures	9	8	17	3,795	4,550	3,042	2,856
C76 other and ill-defined sites	17	20	37	2,160	3,566	1,199	869
C77 secondary and unspecified lymph nodes	7	5	13	6,637	8,782	2,673	3,721
C80 neoplasm without specification of site	260	229	489	191	252	70	76
C81 Hodgkin lymphoma	79	67	145	446	524	339	392
C82 follicular nodular non-Hodgkin lymphoma	97	98	195	355	359	246	233
C83 diffuse non-Hodgkin lymphoma	244	175	419	163	231	86	117
C84 peripheral and cutaneous T-cell lymphomas	46	28	74	824	1,396	486	780
C85 other and unspecified types of non-Hodgkin lymphoma	94	75	169	434	578	217	260
C82-85 all non-Hodgkin lymphoma	482	376	857	81	106	45	56
C81-85 lymphoma (total)	560	442	1,003	69	88	40	49
C88 immunoproliferative diseases	14	5	19	3,425	8,141	1,385	3,838
C90 multiple myeloma	214	138	352	203	325	94	143
C88-90 multiple myeloma and immunoproliferative	228	143	371	192	313	88	138
C91 lymphoid leukaemia	203	108	312	189	350	108	196
C92 myeloid leukaemia	120	72	192	352	574	172	307
C93 monocytic leukaemia	2	1	3				
C94 other leukaemias of specified cell type	4	2	6	7,508	25,124	5,697	9,885
C95 leukaemia of unspecified cell type	27	17	45	1,983	3,870	608	976
C91-95 leukaemia	357	200	557	114	203	59	105
C96 other and unspecified lymphoid haematopoietic	235	208	443	189	204	84	99
D00 carcinoma in situ of oral cavity, oesophagus and stomach	15	18	33				
D01 carcinoma in situ of other and unspecified digestive organs	16	14	30				
D02 carcinoma in situ of middle ear and respiratory system	22	12	34				
D03 melanoma in situ	421	421	842				
D04 carcinoma in situ of skin	1,060	1,226	2,286				
D05 carcinoma in situ of breast	2	399	401				
D06 carcinoma in situ of cervix uteri		2,383	2,383				
D07 carcinoma in situ of other and unspecified genital organs	90	55	145				
D09 carcinoma in situ of other and unspecified sites	91	25	116				
D32 benign meninges	47	132	179				
D33 benign brain and other parts of CNS	29	30	59				
D32-33 benign meninges, brain & CNS	76	161	238				
D35 benign other and unspecified endocrine glands (intracranial only)	61	50	111				
D37 uncertain or unknown of oral cavity and digestive organs	47	59	106				
D38 uncertain or unknown of middle ear and respiratory intrathoracic	10	7	17				
D39 uncertain or unknown of female genital organs		91	91				
D40 uncertain or unknown of male genital organs	4		4				
D41 uncertain or unknown of urinary organs	258	104	361				
D42 uncertain or unknown of meninges	12	16	28				
D43 uncertain or unknown of brain and CNS	33	27	61				
D42-43 uncertain meninges, brain & CNS	45	43	88				
D44 uncertain or unknown of endocrine glands	17	26	43				
D47 other uncertain or unknown of lymphoid and haematopoietic	79	70	150				
D48 uncertain or unknown of other and unspecified sites	139	107	246				
HAEMACARE classification of tumours of lymphatic and haematopoietic tissue							
H01 lymphoma NOS	29	21	50	1,360	2,076	706	994
H02 non-Hodgkin lymphoma NOS	62	52	114	673	858	325	366
H03 composite Hodgkin and Non-Hodgkin	1	0	1				
H04 Hodgkin lymphoma nodular lymphocyte predominance	6	1	7	4,869	25,145	4,869	25,145
H05 classical Hodgkin lymphoma	73	65	138	492	535	364	398
H06 chronic lymphocytic leukaemia/small lymphocytic lymphoma	154	80	234	262	489	130	246
H07 immunoproliferative diseases	20	10	30	2,571	4,068	976	1,947

3-year annual average 2017-2019: cases, risk[#] of developing cancer before 75th birthday and lifetime risk

cancer	case count			risk [#] to age 75 1 in ...		lifetime risk [#] 1 in ...	
	males	females	all ●	males	females	males	females
H08 mantle cell/centrocytic lymphoma	32	10	42	1,317	4,119	626	1,804
H09 follicular B-cell lymphoma	80	80	160	434	433	300	287
H10 diffuse B-cell lymphoma	180	149	328	220	270	117	138
H11 Burkitt lymphoma	11	3	15	3,146	10,508	2,605	7,112
H12 marginal zone lymphoma	18	21	39	1,806	1,727	1,292	1,066
H13 T-cell lymphoma cutaneous	19	11	30	1,849	3,420	1,179	1,997
H14 other T cell lymphomas	32	21	53	1,236	1,797	699	989
H15 lymphoblastic lymphoma/acute precursor cell lymphatic lymphoma	40	24	64	865	1,364	745	1,288
H16 plasma cell neoplasms	217	139	356	199	324	93	142
H18 mature B-cell leukaemia, hairy cell	17	3	20	1,937	14,807	1,539	6,350
H19 lymphatic leukaemia NOS	1	2	3				
H20 leukaemia NOS	27	17	45	1,983	3,870	608	976
H21 myeloid leukaemia NOS	3	1	4				
H22 acute myeloid leukaemia	88	56	144	464	752	235	382
H23 myeloproliferative neoplasms	142	142	284	271	275	160	157
H24 myelodysplastic syndrome	105	70	176	539	748	161	256
H25 myelodysplastic, myeloproliferative neoplasm	19	7	27	2,169	5,666	967	2,634
C910 acute lymphoblastic leukaemia (ALL)	40	23	63	893	1,368	752	1,327
C911 chronic lymphocytic leukaemia (CLL)	141	75	216	284	523	143	260
C920 acute myeloid leukaemia (AML)	72	48	120	588	886	278	445
C921 chronic myeloid leukaemia (CML)	35	18	53	1,236	2,067	591	1,273

*Incidence figures for C00-C96 where C96 presented in this report include polycythaemia vera, myelodysplastic syndromes and chronic myeloproliferative disease, considered malignant in ICD03 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).

● 3-year annual averages: male and female totals are subject to rounding.

Cumulative risk of developing cancer was calculated using the *current probability* method [2][3]. The lifetime risk (and risk to age 75) probabilities in this report were obtained by applying the cancer incidence and the all-cause mortality rates at different ages in a particular year as if they were to apply to a cohort as they aged. Calculating the lifetime risk for an actual cohort requires an estimate of incidence and mortality for the whole lifetime of individuals in a birth cohort using age-period-cohort modelling [19]. The risk figures (e.g. 1 in 10) presented here should be viewed as approximations; they assume that age-specific cancer rates and all-cause mortality rates were stable over the short-term (which is not the case over the long-term).

Where case count was <5 for M&F combined, risk (to age 75 and lifetime) is not reliably calculable and is not shown.

APPENDIX II: INCIDENT CANCER RATES

Age-standardised rate (ASR, per 100,000): annual average for 2017-2019. Incidence rate was calculated using two different age weights: 1976 and 2013 European standard populations (ESP) [20].

Age-standardised rate (ASR, per 100,000): annual average for 2017-2019.						
cancer	ESP 1976			ESP2013		
	male	female	all	male	female	all
C00-96 all invasive cancers	728.7	560.5	638.6	1,134.8	813.6	960.8
C00-43 C45-96 all invasive cancers excl. NMSC	481.0	396.6	435.9	728.8	558.5	637.0
C00-D48 all registered tumours	819.1	761.3	784.7	1,276.4	1,050.6	1,150.1
D00-48 all non-invasive tumours	90.5	200.9	146.1	141.6	236.9	189.3
C00 lip	0.6	0.1	0.4	0.9	0.2	0.5
C01 base of tongue	1.2	0.3	0.8	1.6	0.4	1.0
C02 other and unspecified parts of tongue	2.3	1.1	1.7	3.2	1.5	2.3
C03 gum	0.5	0.3	0.4	0.8	0.5	0.6
C04 floor of mouth	1.1	0.3	0.7	1.4	0.5	0.9
C05 palate	0.6	0.4	0.5	0.8	0.5	0.6
C06 other and unspecified parts of mouth	0.9	0.5	0.7	1.3	0.7	1.0
C07 parotid gland	1.1	0.7	0.8	1.9	0.9	1.3
C08 other and unspecified major salivary glands	0.3	0.2	0.2	0.4	0.2	0.3
C09 tonsil	2.6	0.9	1.8	3.3	1.2	2.2
C10 oropharynx	0.9	0.3	0.6	1.2	0.4	0.8
C11 nasopharynx	0.5	0.2	0.4	0.7	0.3	0.5
C12 pyriform sinus	0.6	0.1	0.3	0.8	0.1	0.5
C13 hypopharynx	0.9	0.2	0.5	1.3	0.3	0.8
C14 other and ill-defined sites in the lip, oral cavity and pharynx	0.3	0.2	0.2	0.5	0.2	0.3
C01-14 mouth & pharynx	13.9	5.7	9.7	19.1	7.7	13.2
C00-14 lip oral cavity and pharynx	14.5	5.8	10.1	20.0	7.9	13.7
C15 oesophagus	12.7	5.1	8.8	19.1	8.7	13.8
C16 stomach	12.7	6.3	9.3	21.0	10.1	15.1
C17 small intestine	2.6	1.7	2.1	3.8	2.6	3.1
C18 colon	36.0	26.5	30.9	58.6	41.7	49.5
C19 rectosigmoid junction	3.4	2.2	2.8	5.4	3.4	4.3
C20 rectum	18.0	9.0	13.3	26.8	13.0	19.6
C21 anus	1.2	1.7	1.4	1.6	2.3	2.0
C19-20 rectosigmoid junction and rectum	21.3	11.2	16.1	32.2	16.5	23.9
C19-21 rectum and anus	22.5	12.9	17.5	33.8	18.7	25.9
C18-20 colorectum	57.3	37.7	47.0	90.8	58.2	73.4
C18-21 colorectum and anus	58.5	39.4	48.4	92.4	60.5	75.4
C17-21 intestine	61.1	41.1	50.6	96.2	63.0	78.5
C22 liver and intrahepatic bile ducts	8.9	3.5	6.1	14.1	5.8	9.8
C23 gallbladder	0.5	1.4	1.0	0.9	2.4	1.7
C24 other and unspecified parts of biliary tract	3.3	2.4	2.9	5.4	4.1	4.7
C23-24 gallbladder and biliary tract	3.9	3.8	3.9	6.3	6.5	6.4
C22-24 liver gall bladder and biliary	12.8	7.3	9.9	20.4	12.3	16.2
C25 pancreas	11.1	8.9	10.0	18.2	14.8	16.5
C26 other and ill-defined digestive organs	1.5	1.4	1.4	2.7	2.4	2.5
C30 nasal cavity and middle ear	0.3	0.3	0.3	0.4	0.5	0.4
C31 accessory sinuses	0.3	0.2	0.2	0.5	0.3	0.3
C32 larynx	6.0	1.3	3.6	8.7	1.8	5.1
C00-14 C30-32 all head and neck	21.2	7.6	14.2	29.7	10.4	19.6
C00-15 C32 lip oral pharynx larynx oesophagus	33.2	12.2	22.4	47.9	18.4	32.6
C33 trachea	0.0	0.1	0.1	0.0	0.1	0.1
C34 bronchus and lung	53.7	40.4	46.5	88.2	63.7	74.8
C33-34 lung and trachea	53.8	40.5	46.6	88.3	63.8	74.8
C37 thymus	0.2	0.2	0.2	0.3	0.2	0.3
C38 heart, mediastinum and pleura	0.3	0.2	0.2	0.5	0.3	0.4

Age-standardised rate (ASR, per 100,000): annual average for 2017-2019.						
cancer	ESP 1976			ESP2013		
	male	female	all	male	female	all
C40 bone and articular cartilage of limbs	0.6	0.3	0.5	0.7	0.3	0.5
C41 bone and articular cartilage of other and unspecified	0.9	0.5	0.7	1.1	0.6	0.8
C40-41 bone and articular and unspecified	0.6	0.3	0.5	0.7	0.3	0.5
C43 melanoma of skin	21.3	20.9	21.0	32.3	28.1	29.7
C44 other skin	247.7	163.9	202.7	406.1	255.1	323.8
C45 mesothelioma	1.3	0.3	0.7	2.3	0.4	1.3
C46 Kaposi sarcoma	0.3	-	0.1	0.3	-	0.2
C47 peripheral nerves and autonomic nervous system	0.1	0.1	0.1	0.1	0.1	0.1
C48 retroperitoneum and peritoneum	0.4	0.7	0.5	0.6	1.0	0.8
C49 other connective and soft tissue	4.0	2.4	3.1	6.0	3.1	4.4
C50 breast	1.3	130.0	67.2	2.1	167.5	87.8
C51 vulva		2.2	1.1		3.3	1.7
C52 vagina		0.4	0.2		0.6	0.3
C53 cervix uteri		11.3	5.8		12.4	6.4
C54 corpus uteri		19.8	10.2		27.0	14.0
C55 uterus, part unspecified		1.3	0.7		1.8	0.9
C56 ovary		13.6	7.0		19.1	10.0
C57 other and unspecified female genital organs		2.2	1.2		3.4	1.8
C58 placenta		0.0	0.0		0.0	0.0
C51-52, C55, C57, C58 other malignant gynaecological neoplasms		6.2	3.2		9.0	4.8
C60 penis	1.7		0.8	2.6		1.2
C61 prostate	146.5		71.3	213.3		102.5
C62 testis	6.9		3.4	6.7		3.3
C63 other and unspecified male genital organs	0.2		0.1	0.3		0.1
C64 kidney, except renal pelvis	17.0	8.5	12.6	24.5	12.2	18.0
C65 renal pelvis	0.6	0.4	0.5	1.0	0.6	0.8
C66 ureter	0.8	0.3	0.6	1.5	0.6	1.0
C64-66 kidney incl. renal pelvis and ureter	18.4	9.3	13.7	27.0	13.4	19.8
C67 bladder	12.4	4.5	8.1	22.1	7.5	14.1
C68 other and unspecified urinary organs	0.5	0.2	0.3	0.8	0.3	0.5
C69 eye and adnexa	1.2	0.8	1.0	1.4	1.0	1.2
C70 meninges	0.2	0.4	0.3	0.3	0.5	0.4
C71 brain	9.3	6.4	7.8	12.4	8.5	10.4
C72 spinal cord, cranial nerves and other parts of CNS	0.4	0.4	0.4	0.4	0.5	0.4
C71-72 brain and spinal cord	9.6	6.9	8.2	12.8	9.0	10.8
C70-72 malignant meninges brain and spinal cord	9.8	7.2	8.5	13.1	9.5	11.2
C70-72 D32-33 D42-43 all meninges brain and CNS	14.6	14.7	14.7	19.2	19.1	19.1
C73 thyroid gland	3.1	7.4	5.3	3.7	8.3	6.1
C74 adrenal gland	0.4	0.3	0.4	0.5	0.4	0.4
C75 other endocrine glands and related structures	0.4	0.3	0.3	0.4	0.4	0.4
C76 other and ill-defined sites	0.7	0.6	0.6	1.0	1.0	1.0
C77 secondary and unspecified lymph nodes	0.3	0.2	0.2	0.4	0.3	0.3
C80 neoplasm without specification of site	9.3	6.9	8.0	16.2	11.9	13.9
C81 Hodgkin lymphoma	3.2	2.6	2.9	3.6	2.9	3.2
C82 follicular nodular non-Hodgkin lymphoma	3.8	3.6	3.7	5.1	4.9	5.0
C83 diffuse non-Hodgkin lymphoma	9.1	5.9	7.4	13.7	8.9	11.2
C84 peripheral and cutaneous T-cell lymphomas	1.8	1.0	1.3	2.4	1.4	1.9
C85 other and unspecified types of non-Hodgkin lymphoma	3.5	2.5	2.9	5.4	3.9	4.6
C82-85 all non-Hodgkin lymphoma	18.1	12.9	15.3	26.6	19.1	22.6
C81-85 lymphoma (total)	21.3	15.5	18.3	30.2	22.0	25.9
C88 immunoproliferative diseases	0.5	0.2	0.3	0.8	0.3	0.5
C90 multiple myeloma	7.9	4.5	6.1	12.7	7.2	9.8
C88-90 multiple myeloma and immunoproliferative	8.4	4.7	6.4	13.5	7.5	10.3
C91 lymphoid leukaemia	7.8	3.8	5.8	11.1	5.3	8.0
C92 myeloid leukaemia	4.4	2.5	3.4	6.8	3.5	5.0
C93 monocytic leukaemia	0.1	0.0	0.0	0.1	0.1	0.1
C94 other leukaemias of specified cell type	0.2	0.1	0.1	0.2	0.1	0.2
C95 leukaemia of unspecified cell type	1.0	0.5	0.7	1.8	0.9	1.3

Age-standardised rate (ASR, per 100,000): annual average for 2017-2019.						
cancer	ESP 1976			ESP2013		
	male	female	all	male	female	all
C91-95 leukaemia	13.5	7.0	10.1	20.0	9.8	14.5
C96 other and unspecified lymphoid haematopoietic	8.7	7.1	7.8	13.8	10.5	11.9
D00 carcinoma in situ of oral cavity, oesophagus and stomach	0.6	0.6	0.6	0.9	0.9	0.9
D01 carcinoma in situ of other and unspecified digestive organs	0.6	0.5	0.6	0.8	0.6	0.7
D02 carcinoma in situ of middle ear and respiratory system	0.8	0.4	0.6	1.2	0.6	0.9
D03 melanoma in situ	15.8	15.2	15.4	23.3	20.5	21.7
D04 carcinoma in situ of skin	38.0	38.2	38.1	64.4	65.5	65.0
D05 carcinoma in situ of breast	0.1	16.0	8.1	0.1	18.4	9.4
D06 carcinoma in situ of cervix uteri		100.6	51.1		92.6	47.1
D07 carcinoma in situ of other and unspecified genital organs	3.6	2.1	2.8	4.5	2.4	3.5
D09 carcinoma in situ of other and unspecified sites	3.3	0.8	2.0	5.3	1.3	3.2
D32 benign meninges	1.8	4.6	3.2	2.6	6.5	4.7
D33 benign brain and other parts of CNS	1.2	1.2	1.2	1.4	1.3	1.3
D32-33 benign meninges, brain & CNS	3.0	5.8	4.4	4.1	7.8	6.0
D35 benign other and unspecified endocrine glands (intracranial only)	2.4	2.0	2.2	3.0	2.2	2.6
D37 uncertain or unknown of oral cavity and digestive organs	1.8	2.1	2.0	2.5	2.8	2.7
D38 uncertain or unknown of middle ear and respiratory intrathoracic	0.4	0.3	0.3	0.5	0.4	0.4
D39 uncertain or unknown of female genital organs		3.6	1.8		4.0	2.0
D40 uncertain or unknown of male genital organs	0.1		0.1	0.2		0.1
D41 uncertain or unknown of urinary organs	9.4	3.5	6.3	15.0	5.3	9.8
D42 uncertain or unknown of meninges	0.4	0.6	0.5	0.6	0.8	0.7
D43 uncertain or unknown of brain and CNS	1.4	1.1	1.2	1.4	1.1	1.2
D42-43 uncertain meninges, brain & CNS	1.8	1.7	1.8	2.0	1.9	1.9
D44 uncertain or unknown of endocrine glands	0.7	1.0	0.8	0.8	1.2	1.0
D47 other uncertain or unknown of lymphoid and haematopoietic	2.9	2.3	2.6	4.7	3.6	4.1
D48 uncertain or unknown of other and unspecified sites	5.2	4.0	4.5	8.2	4.8	6.2
HAEMACARE classification of tumours of lymphatic and haematopoietic tissue						
H01 lymphoma NOS	1.1	0.7	0.9	1.7	1.1	1.3
H02 non-Hodgkin lymphoma NOS	2.3	1.7	2.0	3.6	2.7	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	0.2	0.1	0.2	0.3	0.0	0.2
H05 classical Hodgkin lymphoma	3.0	2.6	2.8	3.3	2.9	3.1
H06 chronic lymphocytic leukaemia/small lymphocytic lymphoma	5.7	2.6	4.1	9.2	4.2	6.5
H07 immunoproliferative diseases	0.7	0.3	0.5	1.2	0.5	0.8
H08 mantle cell/centrocytic lymphoma	1.1	0.3	0.7	1.9	0.5	1.2
H09 follicular B-cell lymphoma	3.1	2.9	3.0	4.2	3.9	4.1
H10 diffuse B-cell lymphoma	6.7	5.0	5.8	10.1	7.6	8.8
H11 Burkitt lymphoma	0.5	0.1	0.3	0.5	0.1	0.3
H12 marginal zone lymphoma	0.7	0.8	0.7	1.0	1.1	1.0
H13 T-cell lymphoma cutaneous	0.8	0.4	0.6	1.0	0.5	0.8
H14 other T cell lymphomas	1.2	0.7	1.0	1.7	1.1	1.4
H15 lymphoblastic lymphoma/acute precursor cell lymphatic lymphoma	1.7	1.1	1.4	1.5	0.9	1.2
H16 plasma cell neoplasms	8.0	4.5	6.2	12.8	7.3	9.8
H18 mature B-cell leukaemia, hairy cell	0.7	0.1	0.4	0.9	0.2	0.5
H19 lymphatic leukaemia NOS	0.0	0.1	0.1	0.1	0.1	0.1
H20 leukaemia NOS	1.0	0.5	0.7	1.8	0.9	1.3
H21 myeloid leukaemia NOS	0.1	0.0	0.1	0.2	0.1	0.1
H22 acute myeloid leukaemia	3.3	2.0	2.6	5.0	2.8	3.8
H23 myeloproliferative neoplasms	5.5	5.0	5.2	7.6	7.0	7.2
H24 myelodysplastic syndrome	3.7	2.2	2.9	6.8	3.7	5.1
H25 myelodysplastic, myeloproliferative neoplasm	0.7	0.2	0.5	1.2	0.4	0.8
C910 acute lymphoblastic leukaemia (ALL)	1.7	1.0	1.4	1.5	0.8	1.2
C911 chronic lymphocytic leukaemia (CLL)	5.2	2.5	3.8	8.4	3.9	6.0
C920 acute myeloid leukaemia (AML)	2.7	1.7	2.1	4.2	2.3	3.2
C921 chronic myeloid leukaemia (CML)	1.3	0.7	1.0	2.0	0.9	1.4

APPENDIX III: MORTALITY

3-year annual average deaths (2016-2018) and risk[#] of dying of cancer before 75th birthday

	DEATHS			risk [#] to age 75	
	males	females	all●	males	females
C00-D48 all registered tumours	4,995	4,428	9,423	9	11
C00-96 all invasive cancers	4,864	4,326	9,190	9	11
C00-14 lip, oral cavity and pharynx	137	55	192	220	645
C00-14 C30-32 all head and neck	202	69	271	154	537
C00-15 C32 lip, oral cavity, pharynx, larynx and oesophagus	479	204	683	70	222
C15 oesophagus	283	138	421	126	373
C16 stomach	206	115	321	202	463
C17 small intestine	13	13	26	2,517	3,822
C18 colon	257	204	461	180	262
C19-21 rectum and anus	336	218	554	119	202
C18-21 colorectum and anus	593	422	1,016	72	114
C17-21 intestine	606	435	1,041	70	111
C22 liver and intrahepatic bile ducts	218	144	362	170	321
C23-24 gallbladder and biliary tract	21	36	57	2,469	1,375
C22-24 liver gall bladder and biliary tract	239	180	419	159	261
C25 pancreas	276	257	533	138	173
C32 larynx	59	11	71	565	3,527
C34 lung	1,034	847	1,880	35	47
C43 melanoma of skin	100	67	166	421	689
C45 mesothelioma	37	7	44	1,297	6,510
C50 breast	7	753	760	4,038	57
C53 cervix uteri		86	86		391
C54 corpus uteri		92	92		426
C56 ovary		298	298		126
C61 prostate	554		554	133	
C62 testis	7		7	5,456	
C64-66 kidney incl. renal pelvis and ureter	146	74	220	250	760
C67 bladder	150	67	218	445	1,203
C70-72 malignant meninges brain and spinal cord	182	111	293	168	311
D32-33 benign meninges, brain & CNS	6	11	17	7,306	5,066
D42-43 uncertain meninges, brain & CNS	12	12	24	4,029	5,706
C70-72, D32-33, D42-43 all meninges brain and CNS	201	133	334	158	279
C73 thyroid gland	12	13	24	2,599	3,345
C81 Hodgkin lymphoma	13	8	22	3,322	6,741
C82-85 non-Hodgkin lymphoma	159	122	281	280	451
C88-90 multiple myeloma and immunoproliferative	100	80	180	539	767
C91-95 leukaemia	166	101	267	295	571

Source of data: Central Statistics Office, Ireland

● 3-year annual averages: (i.e. male + females) deaths are subject to rounding

risk of dying of cancer before 75th birthday calculated using the cumulative risk method [13]: 1 in [...], e.g. 1 in 10

APPENDIX IV: MORTALITY RATES

Mortality rate per 100,000: Annual average over 3 years 2016-2018: two age weights (ESP 1976 & 2013)				
cancers	ESP 1976		ESP 2013	
	males	females	males	females
C00-D48 all registered cancers	186.6	142.0	334.7	239.2
C00-96 all invasive cancers	181.8	139.2	324.5	233.6
C00-14 lip oral cavity and pharynx	5.3	1.9	8.1	2.9
C00-14 C30-32 all head and neck	7.8	2.3	12.1	3.7
C00-15 C32 lip oral pharynx larynx oesophagus	18.3	6.4	29.4	11.2
C15 oesophagus	10.7	4.2	17.7	7.6
C16 stomach	7.7	3.6	13.4	6.3
C17 small intestine	0.5	0.4	0.8	0.7
C18 colon	9.6	6.2	17.9	11.3
C19-21 rectum and anus	12.5	7.1	22.0	11.7
C18-21 colorectum and anus	22.1	13.3	39.9	23.0
C17-21 intestine	22.5	13.7	40.7	23.7
C22 liver and intrahepatic bile ducts	8.2	4.5	13.9	7.9
C23-24 gallbladder and biliary tract	0.8	1.1	1.5	2.0
C22-24 liver gall bladder and biliary	9.0	5.6	15.4	9.9
C25 pancreas	10.3	8.1	17.6	14.0
C32 larynx	2.3	0.4	3.6	0.6
C34 bronchus and lung	38.7	27.7	66.0	46.5
C43 melanoma of skin	3.7	2.2	6.4	3.5
C45 mesothelioma	1.3	0.2	2.4	0.4
C50 breast	0.3	25.3	0.4	39.4
C53 cervix uteri		3.2		4.2
C54 corpus uteri		3.0		5.1
C56 ovary		10.1		16.1
C61 prostate	20.2		43.9	
C62 testis	0.3		0.4	
C64-66 kidney incl. renal pelvis and ureter	5.6	2.2	9.3	4.0
C67 bladder	5.5	1.9	11.2	3.7
C70-72 malignant meninges brain and spinal cord	7.2	4.0	10.2	5.6
D32-33 benign meninges, brain & CNS	0.2	0.3	0.4	0.6
D42-43 uncertain meninges, brain & CNS	0.5	0.3	0.9	0.6
C70-72 D32-33 D42-43 all meninges brain and CNS	7.8	4.6	11.6	6.8
C73 thyroid gland	0.5	0.4	0.7	0.7
C81 Hodgkin lymphoma	0.5	0.3	0.9	0.4
C82-85 all non-Hodgkin lymphoma	5.8	3.6	10.5	6.7
C88-90 multiple myeloma and immunoproliferative	3.6	2.3	7.0	4.5
C91-95 leukaemia	6.1	3.0	11.5	5.5

Source of data: Central Statistics Office, Ireland (by year of death)

* Rates are age-standardised to the 1976 and 2013 European Standard Population (ESP) [20]

APPENDIX V: PREVALENCE

COMPLETE PREVALENCE BY CANCER SITE, SEX AND AGE: NUMBER OF CANCER SURVIVORS ON 31/12/2019							
cancer	age‡	females	%	males	%	all●	%
C01-14 mouth & pharynx	<50	183	15%	274	12%	458	13%
	50+	1,072	85%	1,960	88%	3,031	87%
		1,255	100%	2,234	100%	3,489	100%
C15 oesophagus	<50	18	4%	49	5%	67	4%
	50+	494	96%	935	95%	1,429	96%
		512	100%	984	100%	1,496	100%
C16 stomach	<50	93	10%	85	6%	179	8%
	50+	809	90%	1,370	94%	2,179	92%
		903	100%	1,455	100%	2,358	100%
C18-20 colorectum	<50	942	9%	727	6%	1,669	7%
	50+	9,748	91%	12,147	94%	21,895	93%
		10,690	100%	12,874	100%	23,564	100%
C22 liver	<50	43	21%	77	14%	120	16%
	50+	159	79%	475	86%	634	84%
		202	100%	552	100%	753	100%
C25 pancreas	<50	58	12%	41	9%	99	10%
	50+	425	88%	428	91%	853	90%
		483	100%	469	100%	953	100%
C33-34 lung	<50	196	5%	145	4%	340	5%
	50+	3,436	95%	3,321	96%	6,757	95%
		3,632	100%	3,466	100%	7,098	100%
C43 melanoma of skin	<50	1,849	21%	912	16%	2,762	19%
	50+	6,895	79%	4,835	84%	11,730	81%
		8,744	100%	5,747	100%	14,491	100%
C50 breast	<50	4,886	11%	15	5%	4,901	11%
	50+	40,701	89%	273	95%	40,974	89%
		45,587	100%	288	100%	45,875	100%
C51-52 C55 C57 C58 other gynaecological†	<50	181	15%			181	15%
	50+	993	85%			993	85%
		1,174	100%			1,174	100%
C53 cervix	<50	1,774	36%			1,774	36%
	50+	3,152	64%			3,152	64%
		4,926	100%			4,926	100%
C54 corpus uteri	<50	265	4%			265	4%
	50+	5,926	96%			5,926	96%
		6,190	100%			6,190	100%
C56 ovary	<50	488	15%			488	15%
	50+	2,705	85%			2,705	85%
		3,193	100%			3,193	100%
C61 prostate	<50			303	1%	303	1%
	50+			41,871	99%	41,871	99%
				42,174	100%	42,174	100%
C62 testis	<50			2,477	50%	2,477	50%
	50+			2,524	50%	2,524	50%
				5,001	100%	5,001	100%
C64 kidney	<50	333	15%	449	13%	782	14%
	50+	1,896	85%	3,099	87%	4,995	86%

COMPLETE PREVALENCE BY CANCER SITE, SEX AND AGE: NUMBER OF CANCER SURVIVORS ON 31/12/2019							
cancer	age‡	females	%	males	%	all●	%
		2,229	100%	3,548	100%	5,777	100%
C67 bladder	<50	30	2%	59	2%	89	2%
	50+	1,280	98%	2,986	98%	4,266	98%
		1,310	100%	3,045	100%	4,355	100%
C71-72 brain & CNS	<50	542	51%	612	50%	1,155	51%
	50+	513	49%	607	50%	1,120	49%
		1,055	100%	1,219	100%	2,275	100%
C73 thyroid	<50	1,177	44%	262	32%	1,439	41%
	50+	1,498	56%	553	68%	2,051	59%
		2,675	100%	815	100%	3,490	100%
C81 Hodgkin lymphoma	<50	766	56%	783	49%	1,548	52%
	50+	613	44%	801	51%	1,414	48%
		1,379	100%	1,583	100%	2,963	100%
C82-85 non-Hodgkin lymphoma	<50	513	13%	787	17%	1,300	15%
	50+	3,460	87%	3,761	83%	7,221	85%
		3,973	100%	4,548	100%	8,521	100%
C90 multiple myeloma	<50	41	5%	64	5%	105	5%
	50+	773	95%	1,116	95%	1,889	95%
		814	100%	1,180	100%	1,994	100%
C91-95 leukaemia	<50	840	34%	933	27%	1,773	30%
	50+	1,628	66%	2,585	73%	4,214	70%
		2,468	100%	3,518	100%	5,986	100%

‡age on 31/12/2019

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

● male + female totals are subject to rounding

APPENDIX VI: OBSERVED VS. PROJECTED CANCER INCIDENCE, 2020

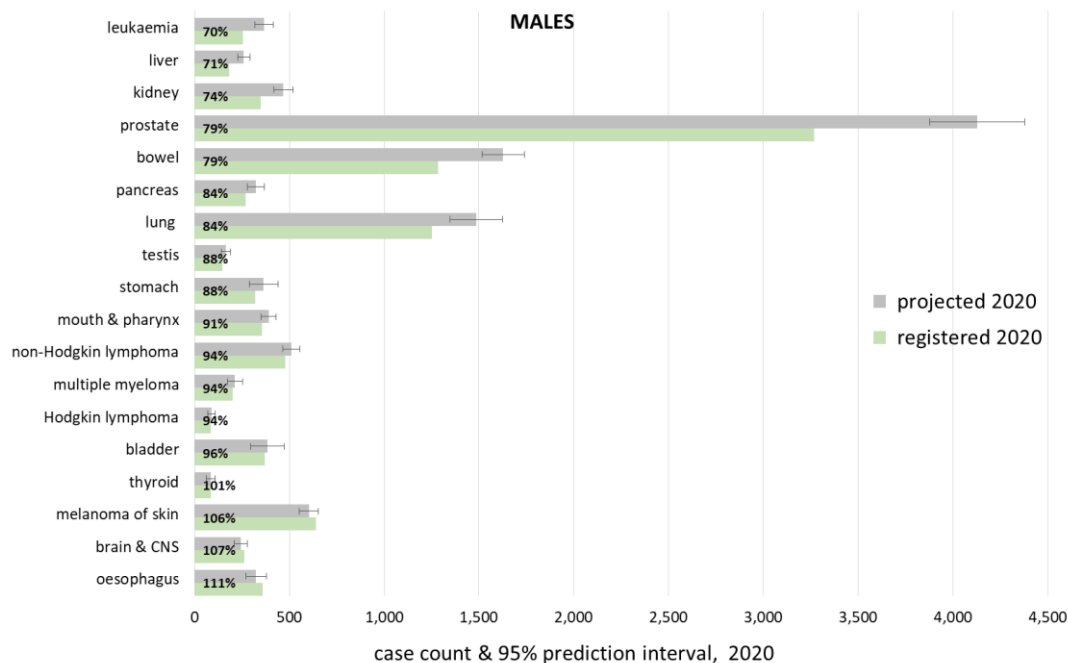
sex	cancer	observed 2019	observed 2020	projected 2020	95% prediction interval	obs. 2020 / obs. 2019 %	obs. 2020 / projected %
M	C00-43 C45-96 all invasive cancers excl. NMSC	13,243	11,527	13,522	[13,115, 13,929]	87%	85%
M	C91-95 leukaemia	334	256	367	[319, 416]	77%	70%
M	C22 liver	243	184	259	[227, 291]	76%	71%
M	C64 kidney	459	348	468	[417, 518]	76%	74%
M	C18-20 colorectum	1,556	1,285	1,628	[1,516, 1,739]	83%	79%
M	C61 prostate	4,010	3,268	4,128	[3,878, 4,378]	81%	79%
M	C25 pancreas	291	270	322	[278, 367]	93%	84%
M	C33-34 lung	1,504	1,252	1,486	[1,347, 1,624]	83%	84%
M	C16 stomach	379	321	364	[287, 441]	85%	88%
M	C62 testis	152	146	165	[142, 189]	96%	88%
M	C01-14 mouth & pharynx	379	354	390	[349, 430]	93%	91%
M	C82-85 non-Hodgkin lymphoma	512	477	510	[464, 557]	93%	94%
M	C90 multiple myeloma	201	200	213	[175, 251]	100%	94%
M	C81 Hodgkin lymphoma	60	84	89	[68, 110]	140%	94%
M	C67 bladder	401	368	385	[297, 473]	92%	96%
M	C73 thyroid	84	86	85	[61, 109]	102%	101%
M	C43 melanoma of skin	606	638	602	[552, 651]	105%	106%
M	C71-72 brain and CNS	264	260	244	[211, 277]	98%	107%
M	C15 oesophagus	341	359	323	[269, 377]	105%	111%
sex	cancer	observed 2019	observed 2020	projected 2020	95% prediction interval	obs. 2020 / obs. 2019 %	obs. 2020 / projected %
F	C00-43 C45-96 all invasive cancers excl. NMSC	11,628	10,379	11,893	[11,741, 12,044]	89%	87%
F	C53 cervix	274	178	277	[211, 343]	65%	64%
F	C64 kidney	250	197	263	[235, 290]	79%	75%
F	C18-20 colorectum	1,177	935	1,170	[1,096, 1,243]	79%	80%
F	C91-95 leukaemia	199	168	210	[159, 260]	84%	80%
F	C22 liver	113	92	114	[94, 133]	81%	81%
F	C67 bladder	159	127	157	[115, 199]	80%	81%
F	C01-14 mouth & pharynx	169	135	160	[130, 190]	80%	84%
F	C50 breast	3,588	3,185	3,716	[3,498, 3,934]	89%	86%
F	C54 corpus uteri	525	498	570	[511, 629]	95%	87%
F	C33-34 lung	1,198	1,111	1,266	[1,115, 1,416]	93%	88%
F	C82-85 non-Hodgkin lymphoma	368	338	384	[316, 452]	92%	88%
F	C56 ovary	363	362	407	[349, 466]	100%	89%
F	C25 pancreas	296	261	293	[259, 328]	88%	89%
F	C43 melanoma of skin	620	580	640	[571, 710]	94%	91%
F	C16 stomach	199	188	200	[165, 234]	94%	94%
F	C81 Hodgkin lymphoma	61	68	72	[54, 91]	111%	94%
F	C15 oesophagus	172	161	156	[124, 189]	94%	103%
F	C90 multiple myeloma	156	150	143	[106, 179]	96%	105%
F	C71-72 brain and CNS	200	202	183	[147, 220]	101%	110%
F	C73 thyroid	221	219	193	[145, 241]	99%	113%
sex	cancer	observed 2019	observed 2020	projected 2020	95% prediction interval	obs. 2020 / obs. 2019 %	obs. 2020 / projected %
all	C00-43 C45-96 all invasive cancers excl. NMSC	24,871	21,906	25,415	[24,973, 25,849]	88%	86%
all	C91-95 leukaemia	533	424	577	[503, 662]	80%	73%
all	C22 liver	356	276	373	[340, 426]	78%	74%
all	C64 kidney	709	545	731	[653, 797]	77%	75%
all	C18-20 colorectum	2,733	2,220	2,798	[2,709, 2,946]	81%	79%
all	C25 pancreas	587	531	615	[558, 674]	90%	86%
all	C33-34 lung	2,702	2,363	2,752	[2,651, 3,016]	87%	86%
all	C01-14 mouth & pharynx	548	489	550	[506, 607]	89%	89%
all	C16 stomach	578	509	564	[451, 676]	88%	90%
all	C67 bladder	560	495	542	[419, 661]	88%	91%
all	C82-85 non-Hodgkin lymphoma	880	815	894	[833, 960]	93%	91%
all	C81 Hodgkin lymphoma	121	152	161	[129, 194]	126%	94%
all	C43 melanoma of skin	1,226	1,218	1,242	[1,108, 1,321]	99%	98%
all	C90 multiple myeloma	357	350	356	[297, 414]	98%	98%
all	C71-72 brain and spinal cord	464	462	427	[375, 481]	100%	108%
all	C15 oesophagus	513	520	479	[411, 549]	101%	109%
all	C73 thyroid	305	305	278	[191, 346]	100%	110%

Interpretation of appendix VI table (above): Based on the last stable trend in incidence rate for each cancer type (Fig. 2-2 to 2-39), the projected number of cases was calculated for 2020 (ignoring the effect of the COVID-19 pandemic). In the last two columns, numbers of

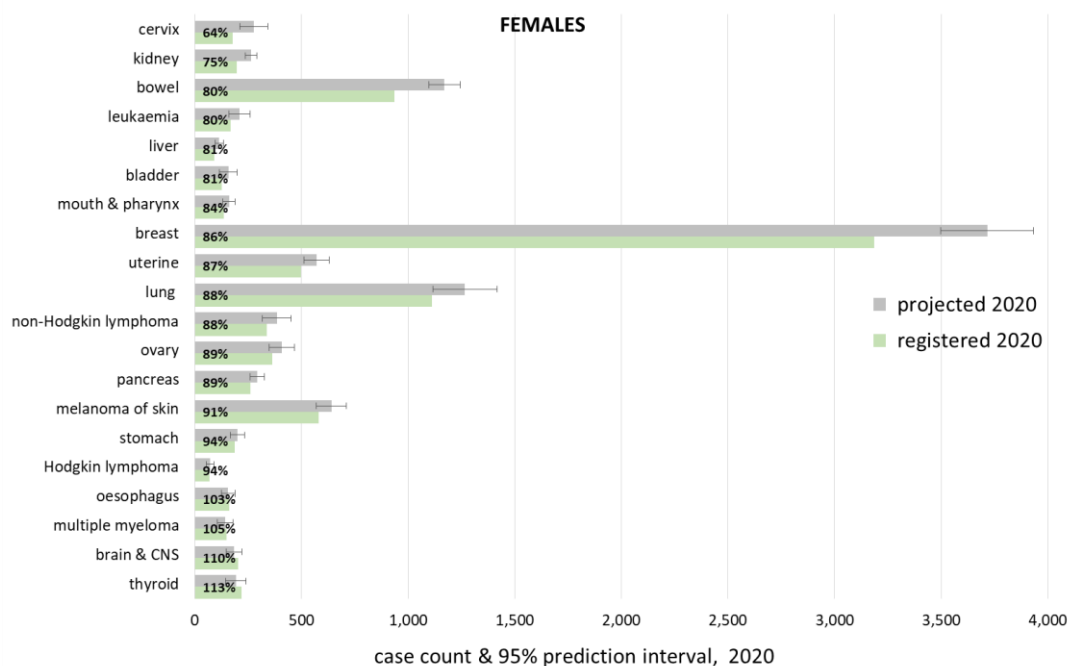
observed cases in 2020 are expressed as a percentage of observed cases in 2019 and, taking trends in to account, as a percentage of projected number of cases for 2020.

For example, for pancreatic cancers (sexes combined) at the time of this analysis, there were 531 cases observed (registered) for 2020, representing 90% (a 10% shortfall) compared with 587 in 2019, or 86% (a 14% shortfall) compared with 615 cases projected or 'expected' for 2020.

Graphical display of observed (registered) case count in vs. projected case count for 2020: sorted on percentage registered 2020/projected 2020

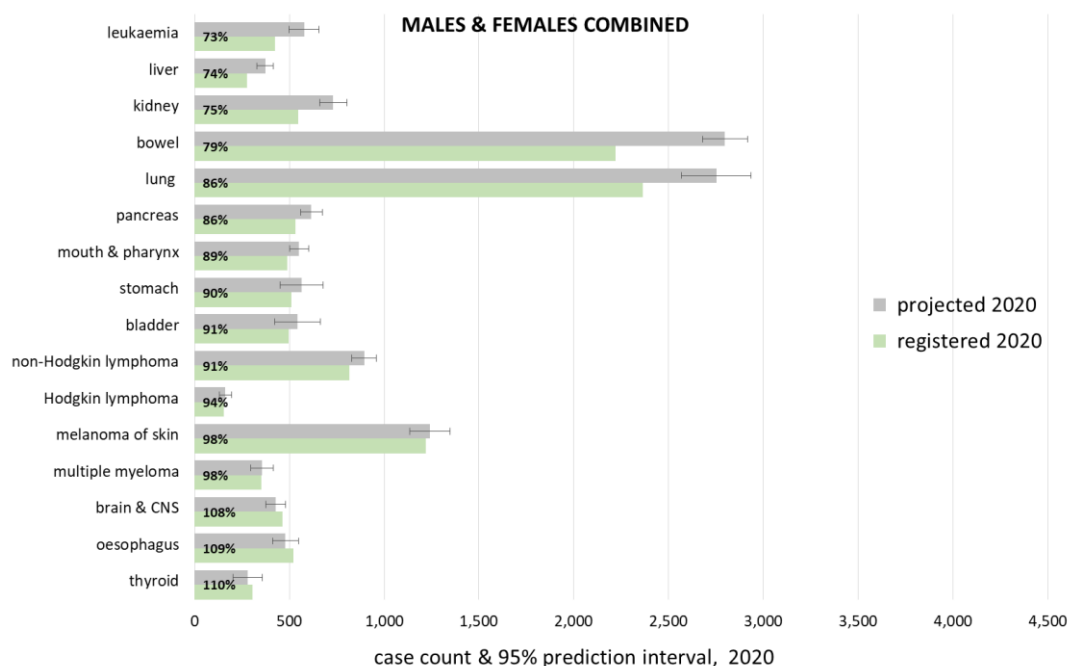


- In males, in 2020, about 4,128 prostate cancer cases were projected, compared with 3,268 registered (79% of cases projected).
- About 1,628 male cases of bowel cancer were projected, compared with 1,285 (79%) registered.
- About 1,486 male cases of lung cancer were projected, compared with 1,252 (84%) registered.



- In females, in 2020, about 3,716 cases of breast cancer were projected, compared with 3,185 registered (86%).
- About 1,170 female cases of bowel cancer were projected, compared with 935 (80%) registered.
- About 1,266 female cases of lung cancer were projected, compared with 1,111 (88%) registered.

Graphical display of observed (registered) case count in vs. projected case count for 2020: sorted on percentage registered 2020/projected 2020



For example, for pancreatic cancers (sexes combined) at the time of this analysis, there were 531 cases registered for 2020 compared with 615 cases projected or 'expected' for 2020 representing 86% of projected (or a 14% shortfall).

Note on graphical display:

For each cancer in males and females (and males and females combined), the most recent stable trend for age-standardised rates (ASR) over the period 1994-2019 was extrapolated by one year (to 2020) using Joinpoint regression to provide a projected rate for 2020 [8]. The relevant recent trends for each cancer, with extrapolations to 2020, are shown in Figures 2-2 to 2-18 (for males) and Figures 2-19 to 2-37 (for females). These extrapolations assume that registration of basic diagnosis information is complete for years before 2020, and that data will not change substantially as further information may become available.

Projected case numbers for each cancer were derived using the same baseline period as for the stable ASR trend up to 2019, but extrapolating crude rates to 2020 and calculating 95% prediction intervals for 2020. Using the estimated population figures for males and females in 2020 (www.cso.ie), the projected crude rate for 2020 was transformed to projected case count for 2020 using the formula:
 $projected\ case\ count\ (2020) = crude\ rate\ (2020) * population\ (2020) / 100,000$.

Similarly, the lower and upper 95% prediction limits of the projected case counts were calculated using the formulae
 $lower\ limit\ of\ projected\ case\ count\ (2020) = lower\ limit\ of\ crude\ rate\ (2020) * population\ (2020) / 100,000$.
 $upper\ limit\ of\ projected\ case\ count\ (2020) = upper\ limit\ of\ crude\ rate\ (2020) * population\ (2020) / 100,000$.