National Cancer Registry Ireland

THE INITIAL IMPACT OF COVID-19 ON CANCER IN IRELAND

INCIDENCE, STAGE AT DIAGNOSIS, MORTALITY AND 1-YEAR SURVIVAL

2025

www.ncri.ie

About the National Cancer Registry Ireland

The National Cancer Registry was established by the Minister for Health in 1991. It has been collecting comprehensive cancer information for the population of the Republic of Ireland since 1994. This information is used in research into the causes of cancer, in education and information programmes, and in the planning and management of cancer services to deliver the best cancer care to the whole population.

The mission of the National Cancer Registry of Ireland (NCRI) is to capture data and communicate information on cancer patients nationally to support the improvement of cancer outcomes in Ireland.

We collect information from all hospitals in Ireland on the number of persons diagnosed with cancer and the types of cancer they have. We also follow 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.

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Contents

Glossary

COVID-19	COVID-19/Coronavirus/SARS-CoV-2
ICD-10	International Classification of Diseases and Related Health Problems, 10th edition
IRR	Incidence rate ratio
NCRI	National Cancer Registry Ireland
NMSC	Non melanoma skin cancer
PC	Percent change
Q1/2/3/4	Quarter 1/2/3/4
WHO	World Health Organisation

Plain language summary

NCRI Report 'Understanding the impact of COVID-19 on cancer incidence, stage at diagnosis, mortality and 1-year survival in Ireland'

Report – Assessing the impact of Covid-19 on cancer in Ireland

The COVID-19 pandemic changed almost every part of our health system, and cancer care was no exception. This report from the National Cancer Registry of Ireland (NCRI) describes cancer diagnosis, treatment and survival across the country during the COVID-19 period, and early impact on cancer outcomes.

NCRI Data

The NCRI is the definitive source of cancer data in Ireland, collecting data on every new case of cancer since 1994. We collect information from every hospital and cancer service in the country, public hospitals and private hospitals, and our data is used by government leaders, scientists and healthcare workers to understand and manage how cancer affects our communities and find ways to reduce its impact.

For this study, we examined how many people were diagnosed with cancer during and after the pandemic, the stage at which cancers were found, how many people died from cancer, and how many survived at least one year after diagnosis.

What we found

- The data does not show a consistent rise in cancers diagnosed at late-stage (after the cancer has spread to other areas of the body) following the pandemic.
- Survival rates for all cancer sites in 2020–2021 remained in line with previous years.
- In spring 2020, the number of new cancer diagnoses dropped by 27% compared to previous years.

- Most of the biggest drops were seen in the four most common cancers: breast, colorectal, prostate, and lung.
- The system recovered swiftly, and by 2022, the number of diagnosed cases was back to expected levels.

Early-stage detection dropped temporarily

Fewer cancers were diagnosed in 2020 at early stage (before the cancer has progressed) as people were hesitant to attend appointments, GP visits were now phone calls rather than face to face, and screening services were paused. Most of the reduction was in the four most common sites, breast, colorectal, prostate, and lung.

But cancer services were reconfigured quickly during the pandemic (e.g., the use of the private hospitals) and swiftly returned to normal service after the pandemic. And the data shows that there was no clear rise in late-stage cancers (cancers that have spread to other areas of the body) once services resumed after the pandemic. This suggests that cancer services were protected during the pandemic, and recovered quickly afterwards.

Cancer deaths and survival similar to previous years

When differences in patient age and cancer stage were taken into account, there was no evidence of worse outcomes during or after the pandemic.

The number of deaths from cancer increased slightly in 2020–2022, but this increase was in line with expected trends. Crucially, survival after diagnosis, including the likelihood of living at least one year after cancer is found, remained similar in 2020 and 2021 to previous years.

No clear evidence to date of lasting harm to cancer patients

The pandemic caused temporary disruptions in cancer diagnosis, especially in 2020. However, most services recovered quickly, and there was no clear evidence to date of lasting harm to cancer patients.

While disruptions to diagnostic testing including screening delays did affect early detection (an initial drop in numbers detected in spring 2020) by 2022, most people were being diagnosed and treated as before, and overall cancer outcomes remained stable. This is a testament to the resilience and adaptability of our health system, and to the commitment of healthcare professionals who ensured cancer patients continued to receive care under unprecedented strain.

Continuing to monitor the data and underlying trends

So far, the evidence gives cause for reassurance: Ireland's cancer outcomes stayed strong through one of the most difficult periods in modern healthcare.

The NCRI will continue to monitor cancer trends closely to detect any delayed effects that may emerge over time. By gathering and analysing high-quality national data, the NCRI helps ensure that cancer services in Ireland are prepared, not just for today's challenges, but for those still to come.

The NCRI – one of the leading Registries in Europe

The NCRI is the State Agency responsible for collecting and analysing cancer data, to inform policy, patient care and planning services for Ireland.

The NCRI is the definitive source of cancer data in Ireland. NCRI data informs policy and planning, enabling professionals and services to observe trends and predict future requirements. NCRI data helps to improve cancer care and cancer outcomes in Ireland.

For more detailed information, visit the National Cancer Registry Ireland website www.NCRI.ie.

Introduction

The WHO declared COVID-19 a public health emergency of international concern on 30th of January 2020. By March 2020, it had reached pandemic status (1,2). Since then it has been estimated that at least 20 million people have died worldwide due to COVID-19 (2).

In Ireland, the first case of COVID-19 was reported on 29th of February 2020 (3). Initial control measures (including the closure of schools, colleges and childcare facilities) were introduced in mid-March and a full lock-down was implemented on 27th March 2020 (3).

Healthcare systems faced multiple challenges during the pandemic period. Service providers needed to care for people infected with COVID-19, a new disease with an initially unknown clinical course and no established treatments, while continuing to support patients with other health conditions. Enhanced infection control measures were implemented across the healthcare system to protect both staff and patients from COVID-19. To meet these demands many services were re-organised, and staff redeployed. At the same time, there were increased levels of staff absenteeism due to both COVID-19 infection and quarantine requirements for case contacts (4–6). These pressures affected not only the ongoing care of individuals already diagnosed with cancer, but also disrupted diagnostic pathways for those awaiting diagnosis.

People living with cancer, particularly those who were immunosuppressed, were at risk of developing severe COVID-19 and experienced higher mortality rates from COVID-19 compared to the general population (7–9). Aside from the direct threat posed by COVID-19, the delivery of cancer care had to be modified or re-organised to facilitate the additional demands being placed on the healthcare systems and to minimise the spread of COVID-19 (5).

Individuals who had not yet received a cancer diagnosis prior to the pandemic encountered additional barriers to accessing diagnostic services. Concerns about contracting COVID-19 combined with a reluctance to burden healthcare professionals, led to a decline in primary care consultations, at least initially (5,10,11). There was also a shift towards remote consultations in primary care (5,11,12). All three of the national screening programs (BreastCheck, CervicalCheck and BowelScreen) were paused for several months (5,13–15). These factors are believed to have contributed to a reduction in diagnostic activity, particularly during the first wave of the pandemic (5). The long-term effects of potential delays in diagnosis and/or modifications to treatments and care pathways on cancer patients' outcomes remain uncertain.

Early in the pandemic, it become clear the number of cancer diagnoses was lower than expected (16–18). As the pandemic continued, further reports of decreases in cancer incidence were published around the world. The scale of these reductions varied by cancer site, geographic region, sex, age and other demographic indicators (16–26). However, these

declines did not appear to be sustained over time, with many countries reporting a return to expected levels by 2021 or 2022 (20–22,27).

In Ireland it is estimated that cancer diagnoses were 10% lower than expected in 2020 (28), 4% lower in 2021 (29) and 2% lower in 2022, although the number in 2022 fell within the predicted range (30). The most significant shortfalls were observed in cancers covered by national screening programmes, with reductions of 31% for cervical cancer, 23% for female breast cancer and 18% for colorectal cancer in 2020 compared to projected figures. These declines are largely attributed to the temporary suspension of screening services during parts of 2020 and 2021 (13–15,28).

Several studies have examined the impact of COVID-19 on cancer diagnosis and care in Ireland, primarily focussing on the most common cancer types: breast, colorectal, lung, melanoma and prostate (8,31–36). The aim of this report is to provide a comprehensive overview of how the COVID-19 pandemic affected the incidence, stage at diagnosis, mortality and survival of cancer in Ireland, both for the most common cancer sites and for all invasive cancers combined excluding non-melanoma skin cancer (NMSC).

Methods

Sources of data

This report includes data on all cases of invasive cancer (C00-C96) diagnosed in Ireland 2018-2022. Data were downloaded on 03/07/2025. Data extracted included age group, sex, cancer site (coded using ICD-10), and stage (coded using TNM 7th edition (37)). Stage data are not relevant for brain cancer (ICD-10 C71-72), multiple myeloma (C90) and leukaemia (C91-95) as these sites are not included in the TNM staging classification system. In addition to the previously listed variables data on vital status and survival time (in days) were downloaded on 02/08/2025. Follow up time was censored on 31/12/2022.

Data on the number of deaths per year with an underlying cause of cancer, by age-group at death were downloaded from the CSO website for 2018-2021 (38) and 2022 (39).

Statistical analyses

For the purposes of this report 2020 and 2021 are considered as the pandemic years. While the first case of COVID-19 was diagnosed in Ireland at the end of February 2020, emergency planning had started in January 2020 (3,40). Most restrictions were lifted by January 2022 (41). 2018 and 2019 have been used as the baseline for comparison purposes throughout this report unless otherwise stated.

Cancer sites were defined on the basis of ICD-10 codes as listed in Table 1.

Age-standardised and age specific incidence and mortality rates were calculated using published mid-year population data from the CSO [www.cso.ie, file PEA11] and the 2013 European standard population (42).

For each individual cancer type, incidence rate ratios (IRRs) were estimated using negative binomial regression. Models included case count as the outcome, population as an offset, and the following covariates: age group (<50, 50–69, 70+), sex, and diagnosis period (baseline: 2018–2019; quarters 1–4 for each year from 2020 to 2022).

For each level of cancer type and stage (I-IV, for stageable cancers), IRRs were estimated using negative binomial regression. Models included case count as the outcome, population as an offset, and the following covariates: age group (<50, 50–69, 70+), sex, and diagnosis period (baseline: 2018–2019; and years from 2020 to 2022). Cancer types not subject to TNM staging and unstaged cases were excluded from the analyses and the underlying population offset was adjusted accordingly. Model fit was assessed using Akaike's Information Criterion (AIC) and plots of standardised residuals versus predicted case count.

Percentage change (PC) in IRRs was calculated using the following formula: PC=[IRR-1]*100 and the 95%CIs were converted in a similar manner.

Annual age-specific incidence rates were calculated for years 1994-2022 for all invasive cancers (excl NMSC), colorectal cancer, lung cancer, female breast cancer and prostate cancer. The most recent stable trend in the incidence rate up to 2019 in each age group was identified using Joinpoint regression (43). The most recent stable trend in each age group was then used to estimate the projected incidence, and prediction interval (95% level), for 2020, 2021 and 2022. The percentage difference between the observed incidence rate and the projected incidence rate for 2020, 2021 and 2022 was calculated using the formula: percentage difference = [(registered cases 2022/projected cases 2022)-1]*100.

To compare survival outcomes before and after the COVID-19 pandemic, while accounting for potential differences in the distribution of age and stage at diagnosis, unstandardised, age-standardised, stage-standardised, and age-stage standardised survival estimates were calculated. Age standardisation was performed using the International Cancer Survival Standard (ICSS) weights (44). For stage standardisation, weights were derived from the overall distribution of stage groups in the full dataset (45).

The dataset included five stage categories: stages I to IV, and an "unstaged" group comprising cases for which staging information was not recorded. These unstaged cases were retained in the analysis to avoid substantial data loss and to reflect the possibility that the pandemic may have influenced the likelihood of staging being recorded.

For age-stage standardisation, weights were calculated as the product of the respective age and stage weights (45). All statistical analyses were conducted using the strs command in

Stata, and both observed and net one-year survival estimates (based on the Pohar Perme method) with 95% confidence intervals were reported (46).

Survival estimates were generated by year of diagnosis as the care for patients diagnosed in 2019, particularly those diagnosed towards the end of the year, could have been impacted by the pandemic related healthcare re-organisation in 2020.

Results

Incidence

During the pandemic period, the NCRI registered an average of 23,851 invasive cancer cases annually in Ireland, approximately 2% below the average for the pre-pandemic period (Table 1). In contrast, the post-pandemic period saw a 9% increase compared to the pre-pandemic average. Based on annual trends in case counts for Ireland, the total number of cancer cases typically rise by 2%-3% each year (47), thus this 9% increase between the 2018-2019 baseline and 2022 aligns with expected trends over that timeframe.

Examining case counts, the biggest impact during the pandemic period (2020-2021) was observed in the second quarter (Q2), when the average the number of cancer cases was 11% lower than in the Q2 of the pre-pandemic period (2018-2019) (Table 1).

The age group most affected was those aged 50-64 who experienced a 7% decline in case numbers. Both sexes were similarly impacted, each showing a 2% reduction in cases.

Of the 22 sites examined, 9 showed a decrease in average annual case counts during the pandemic compared to the pre-pandemic period: colorectal, liver, lung, breast, cervix, prostate, kidney, non-Hodgkin lymphoma and leukaemia. The largest proportional declines were seen in kidney and cervical cancers (both -12%), followed by liver (-9%) and colorectal cancer (-7%) (Table 1).

By 2022, only 5 sites showed a decrease in average annual case counts compared to the pre-pandemic period (cervix, ovary, brain, thyroid and leukaemia) (Table 1).

Table 1. Average annual cases counts, 2018-2019, 2020-2021 and 2022					
	Average annual count			Difference relative to 2018-2019 (Number and % change)	
	2018-2019	2020-2021	2022	2020-2021	2022
C00-43, C45-96 all invasive cancers excl. NMSC	24,352	23,851	26,525	-501 (-2%)	2,173 (9%)
Quarter					
Q1	6,010	5,941	6,484	-69 (-1%)	474 (8%)
Q2	6,205	5,498	6,704	-707 (-11%)	499 (8%)
Q3	6,055	6,277	6,731	222 (4%)	676 (11%)
Q4	6,082	6,136	6,606	54 (1%)	524 (9%)
Age group					
00-49 years	3,167	3,193	3,313	26 (1%)	146 (5%)
50-64 years	7,019	6,537	7,601	-482 (-7%)	582 (8%)
65-74 years	7,076	6,925	7,772	-151 (-2%)	697 (10%)
75+ years	7,091	7,196	7,839	106 (1%)	749 (11%)
Sex					
Females	11,340	11,115	12,344	-225 (-2%)	1,004 (9%)
Males	13,012	12,736	14,181	-276 (-2%)	1,169 (9%)
Site					
C00-14, C30-32 all head & neck	773	782	832	9 (1%)	59 (8%)
C15 oesophagus	498	504	553	6 (1%)	55 (11%)
C16 stomach	556	576	623	20 (4%)	67 (12%)
C18-20 colorectal	2,706	2,509	2,830	-197 (-7%)	124 (5%)
C22 liver	363	330	371	-33 (-9%)	8 (2%)
C25 pancreas	627	654	678	27 (4%)	51 (8%)
C34 lung	2,711	2,647	2,883	-64 (-2%)	172 (6%)
C43 melanoma	1,175	1,210	1,485	35 (3%)	310 (26%)
C50 breast (female)	3,553	3,369	4,069	-184 (-5%)	516 (15%)
C53 cervix	287	252	265	-35 (-12%)	-22 (-8%)
C54 corpus uteri	544	569	597	25 (5%)	53 (10%)
C56-57 ovary and other and unspecified	443	514	433	71 (16%)	-10 (-2%)
C61 prostate	4,059	3,890	4,604	-169 (-4%)	545 (13%)
C62 testis	166	168	177	2 (1%)	11 (7%)
C64 kidney	717	628	754	-89 (-12%)	37 (5%)
C67 bladder	466	482	508	16 (3%)	42 (9%)
C71-72 brain	180	191	168	11 (6%)	-12 (-6%)
C73 thyroid	274	297	258	23 (8%)	-16 (-6%)
C81 Hodgkin lymphoma	128	168	135	40 (32%)	7 (6%)
C82-86 non-Hodgkin lymphoma	821	794	873	-27 (-3%)	52 (6%)
C90 multiple myeloma	349	400	368	51 (15%)	19 (6%)
C91-95 leukaemia	593	555	577	-38 (-6%)	-16 (-3%)

Age-standardised quarterly incidence rates of all invasive cancers (excl. NMSC) are shown in Figure 1. A significant 27% decrease can be seen in Q2 of 2020 compared to the pre-pandemic period (PC -27%, 95%CI -42% to -7%).

Figure 1. Percentage change in incidence rate ratios with 95% confidence intervals (pre-pandemic period 2018-2019 as baseline) by quarter and year, all invasive cancers excluding NMSC (adjusted by age and sex)

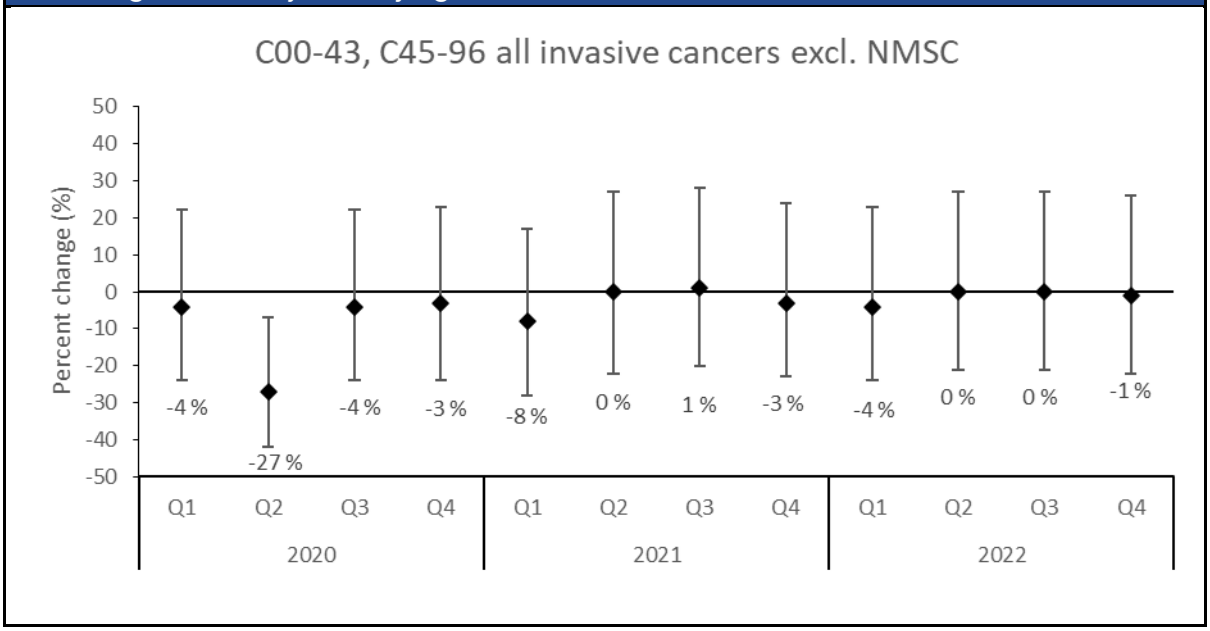


Table 2 presents the percentage change by individual cancer site. In Q2 2020, significant reductions in incidence rates were observed for 15 out of the 22 sites examined. However, these declines were not generally sustained in the subsequent quarters. The cancer sites that showed significant decreases over more than one consecutive quarter were: colorectal, cervical and kidney cancers. Additionally, the first quarter of 2021 showed significant decreases for 6 cancer sites.

Tables and graphs of all IRRs and PC by quarter are provided in Appendix 1 and 2.

Table 2. Percent change (PC) by quarter and site relative to 2018-2019												
	2020				2021				2022			
Site	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
C00-43, C45-96 all invasive cancers excl. NMSC	-4	-27	-4	-3	-8	0	1	-3	-4	0	0	-1
C00-14, C30-32 all head & neck	-15	-27*	4	5	-11	10	-7	6	-12	1	1	-2
C15 oesophagus	-11	-16	4	6	-23	3	-7	-5	-4	-3	0	-1
C16 stomach	-9	-33*	13	4	0	1	4	0	-2	-10	13	-1
C18-20 colorectal	-13	-41*	-12	-10	-14*	0	5	-7	-13	-3	3	-7
C22 liver	-20	-19	-7	-15	-14	-8	-1	-31*	-20	-11	0	-6
C25 pancreas	7	3	8	3	-8	-15	-16	3	-9	-13	4	1
C34 lung	-1	-14*	-10	-10	-13*	-8	0	-11	-2	-4	-5	-10
C43 melanoma	-6	-28	10	2	-25	-3	27	4	11	-2	26	21
C50 breast (female)	-4	-33*	-16	-14	-9	3	6	2	0	5	6	6
C53 cervix	-31	-33*	-42*	-31	-7	16	1	6	-30	-8	-7	-7
C54 corpus uteri	-5	-32*	6	16	11	1	10	-12	-24*	12	0	9
C56-57 ovary and other and unspecified	21	27*	11	23	-9	10	2	-1	-17	-3	-17	-9
C61 prostate	1	-45*	2	-4	-4	-7	-11*	-10*	2	7	-3	0
C62 testis	-10	-34	2	7	18	-3	-10	23	-11	0	-4	29
C64 kidney	-7	-27*	-30*	-12	-22*	-11	-8	-20*	0	-6	-4	-9
C67 bladder	-9	-23	10	-6	-3	-6	14	-4	-10	3	-4	-5
C71-72 brain	-2	9	-1	-8	-22	0	-1	4	-7	-8	-15	-18
C73 thyroid	15	-42*	38	13	-5	3	-8	-4	-17	-17	-2	-27
C81 Hodgkin lymphoma	41	7	59*	4	49	49	-18	33	1	-17	16	1
C82-86 non-Hodgkin lymphoma	-9	-20*	-9	0	-8	-6	-15	-3	-1	-11	-5	-2
C90 multiple myeloma	13	1	0	22	-19	27	14	8	-6	-6	-15	3
C91-95 leukaemia	-13	-29*	-9	-10	-12	-9	-2	-5	1	-10	-18	-21

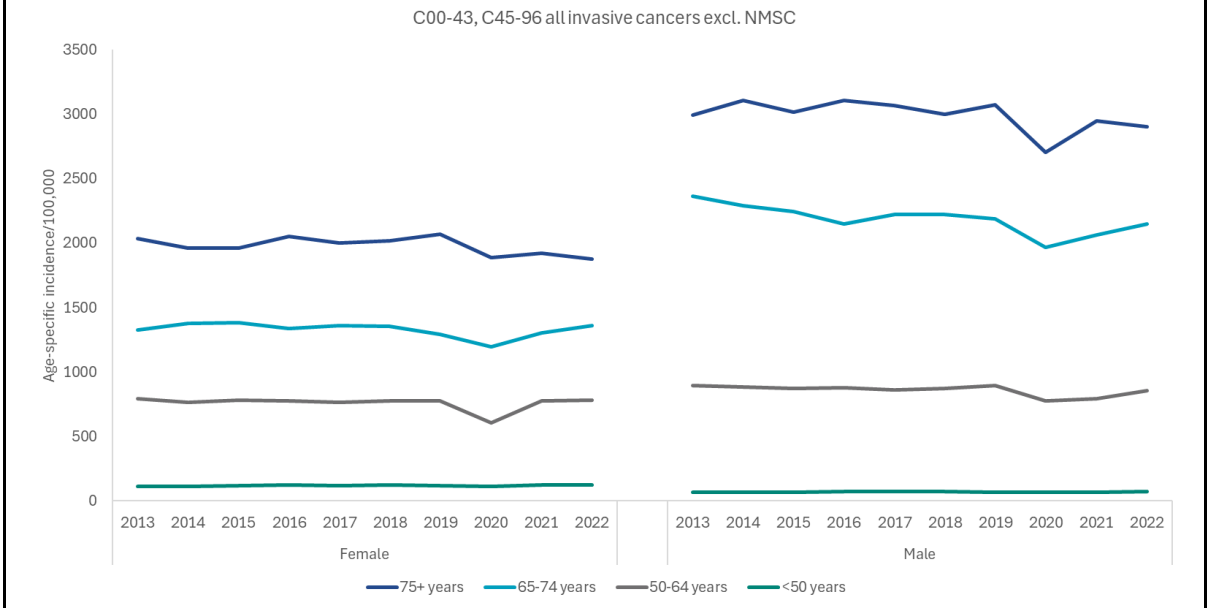
(results highlighted in blue are significantly different at p<0.05, * indicates significantly different at p<0.01, from the baseline rate 2018-2019)

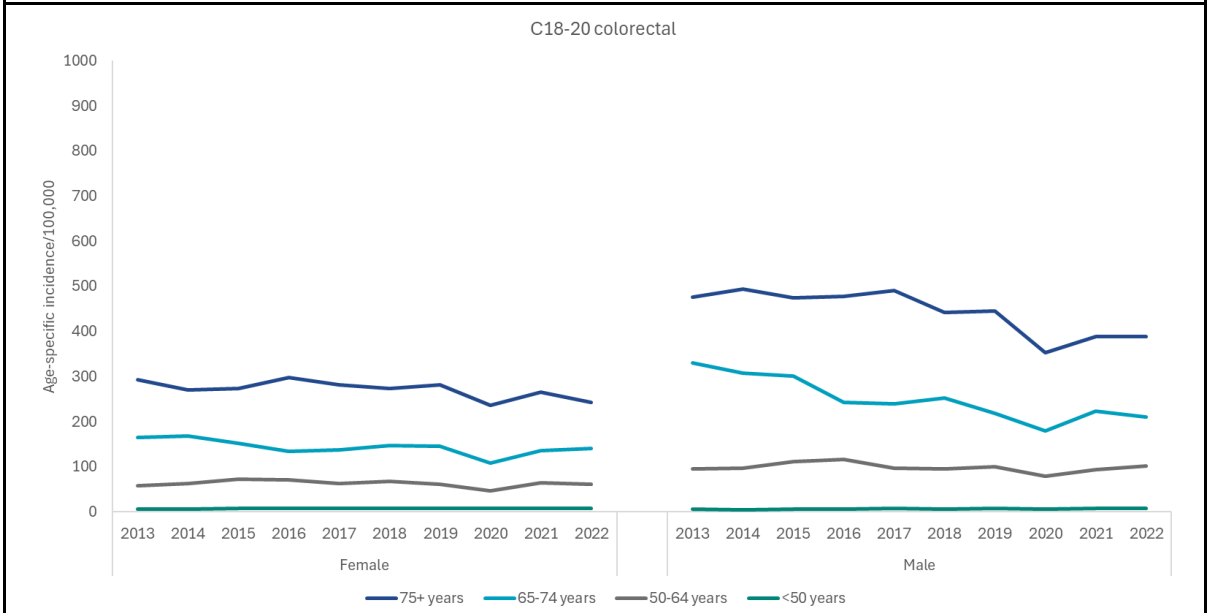
Age specific incidence rates

Figure 2 illustrates annual sex and age-specific incidence rates for all invasive cancers (excl. NMSC) and the four most common cancer sites, broken down by age group. In 2020, there was a noticeable decrease in age-specific incidence rates for all invasive cancers (excl. NMSC) across nearly all age-groups and both sexes. When observed incidence rates were compared to projected incidence rates (based on the last stage trend up to 2019) in 2020 most rates were below projected levels, with the exception of females aged 65-74 years and males aged <50 years (Appendix 3). Most of the age-specific rates returned to within projected levels by 2021, with the exception of males aged 50-64 years and females aged 75+ years. Incidence rates in females aged 75+ years continued to remain lower than projected rates in 2022 (Appendix 3).

Age-specific incidence rates for individual sites were also most impacted in 2020, with the age groups most affected varying by site (Appendix 3). In 2020 the rates of colorectal cancer were below predicted rates for females aged 50-64 (-30%) and 65-74 (-21%) and males aged 50-64 (-23%) and 75+ years (-20%). For lung cancer, only males aged 75+ years had an incidence rate in 2020 that was lower than predicted (-14%). In females breast cancer incidence was below predicted levels for <50 years (-7%) and 50-64 year olds (-37%) in 2020. Prostate cancer was -17% lower than predicted in 75+year old males.

Figure 2. Age-specific incidence rates of all invasive cancers (excl. NMSC), colorectal cancer, lung cancer, female breast cancer and prostate cancer, by sex 2013-2022





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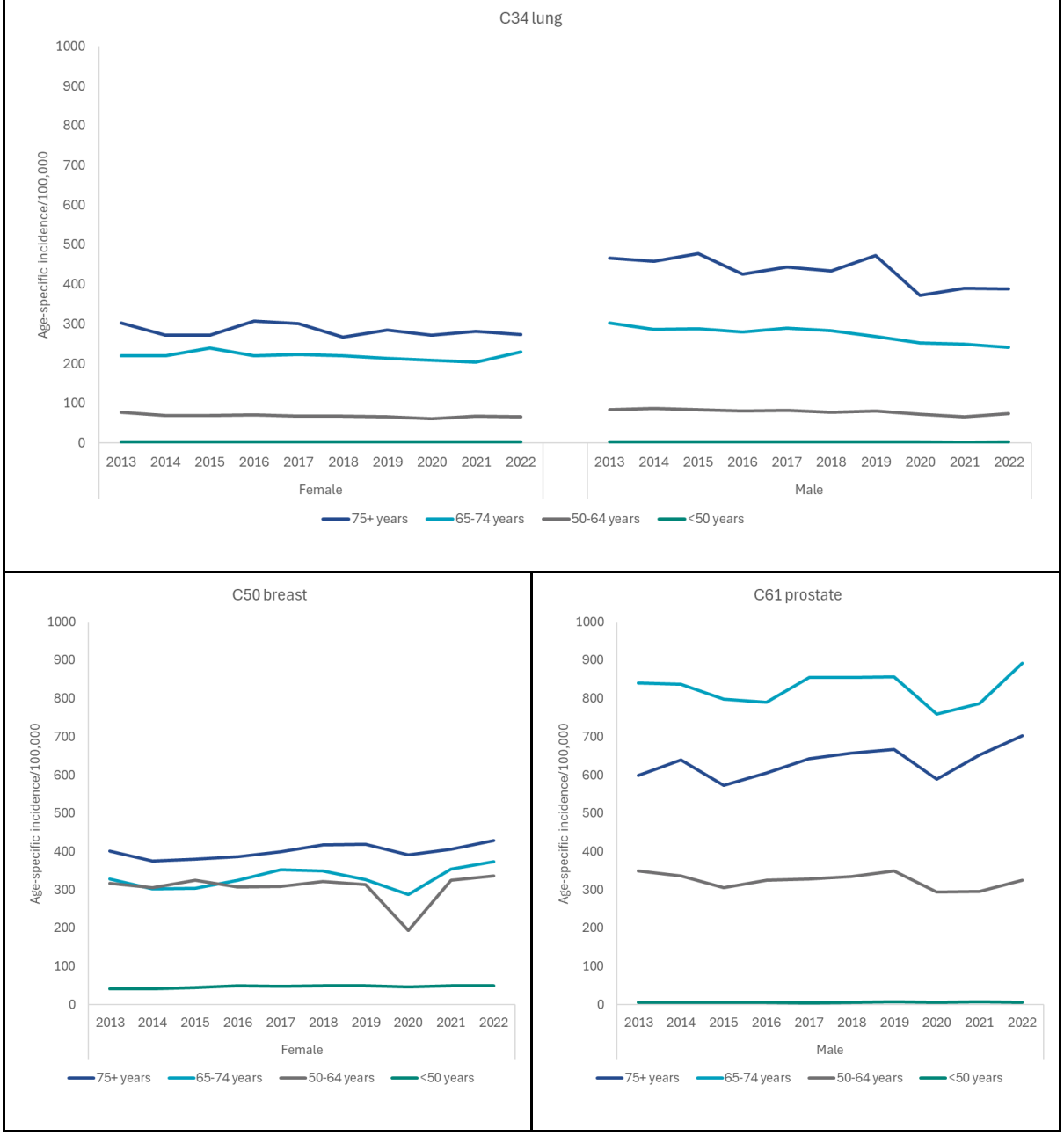


Stage at diagnosis

The relative percent change in the stage-specific incidence rates for 2020, 2021 and 2022 compared to 2018-2019, as well as the stage distribution for each period are shown in Figure 3.

Notable changes can be seen in the stage-specific cancer incidence rates, particularly for cancers covered by national screening programmes. In 2020, compared to the pre-pandemic period, the stage specific incidence rates of breast and colorectal cancers decreased significantly across stage I, II and III – breast cancer rates declined by -2%, -12% and -13% respectively and colorectal cancer rates declined by -25%, -28% and -17%.

Cervical cancer also saw significant decreases in stage I (-43%) and stage III (-36%) incidence rates. No significant changes were observed in stage-specific rates for these three cancers in 2021 (Figure 3 and Appendix 4).

Although prostate cancer is not part of the national population based screening programme, PSA testing is widely used in Ireland (48–50). During 2020, prostate cancer incidence rates decreased significantly across all stages (stage I -10%, stage II -9%, stage III -19% and stage IV -13%). In 2021, declines continued for stage I (-9%) and stage II (-16%).

Lung cancer incidence showed significant reductions in stage II (-27%) and stage III (-17%) in 2020, with the incidence of stage III lung cancer remaining below pre-pandemic levels (by -19%) in 2021.

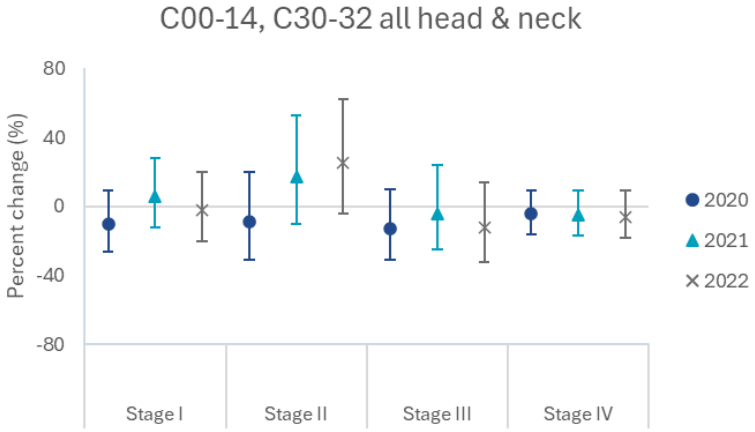
Changes in the stage-specific rates for other sites were generally less consistent. Significant declines were observed in both 2020 and 2021 for several sites: stage III testicular cancer (-56% in 2020, -71% in 2021); stage I kidney cancer (-30% in 2020, -23% in 2021); stage IV bladder cancer (-22% both years); and stage I non-Hodgkin lymphoma (-28% in 2020, -22% in 2021). While significant increases were seen in 2020 and 2021 for stage I testis (27% in 2021), stage IV thyroid (57% in 2020) and stage IV Hodgkin Lymphoma (65% in 2021).

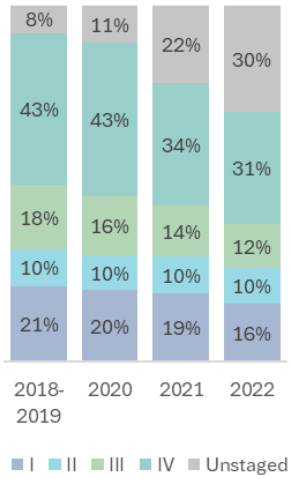
It is important to note that stage data for 2021 and 2022 are less complete than for 2020 (Figure 3). Adjustments have been made to account for missing stage information in incidence rate calculations, but caution is advised when interpreting stage-specific trends, especially where the proportion of unknown stage differs substantially from 2018-2019 and 2020.

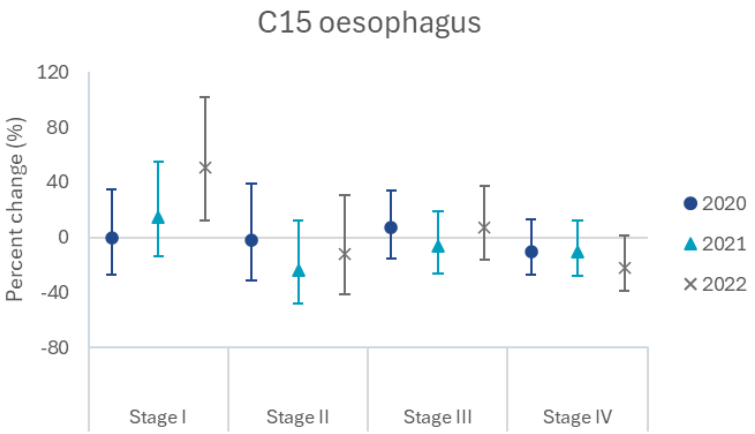
Figure 3. A) Percentage change (and 95% confidence intervals) in IRR by site and stage 2020, 2021 and 2022 compared to 2018-2019 baseline; B) stage distribution 2018-2019, 2020, 2021 and 2022

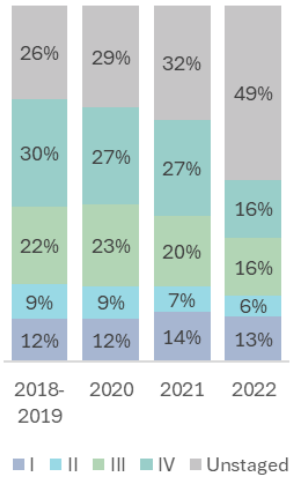
A. Percentage change in IRR

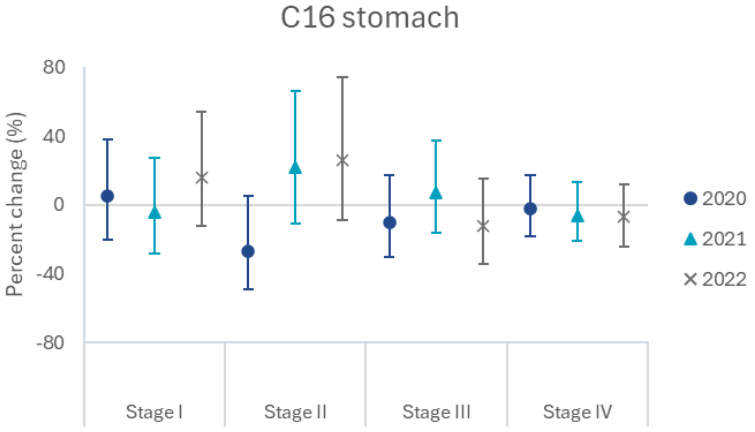
B. Stage distribution











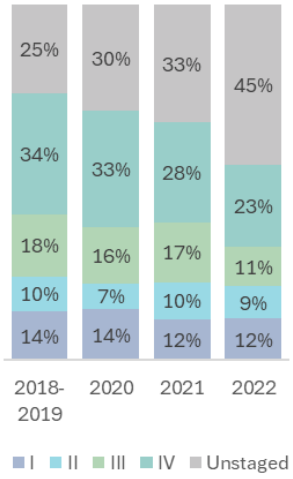
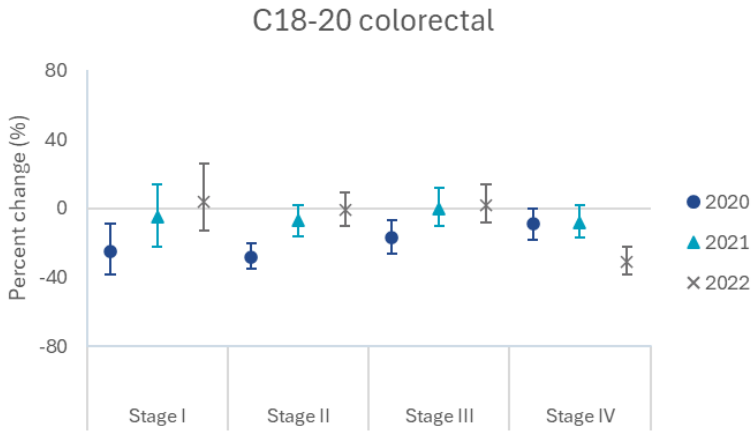
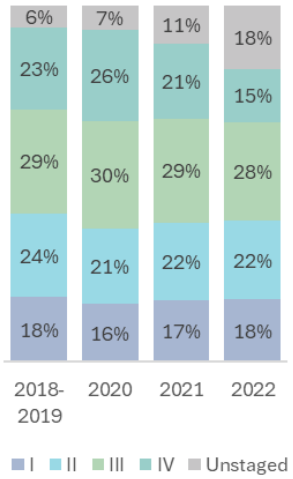
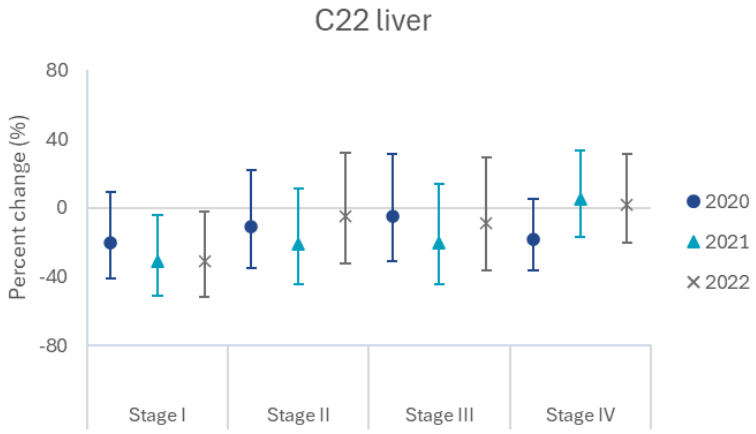
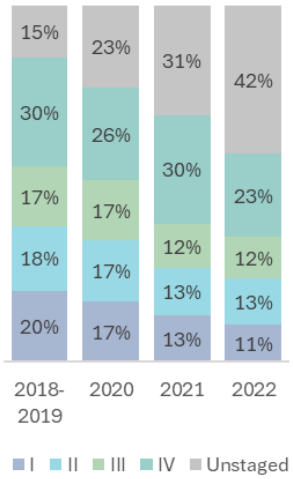
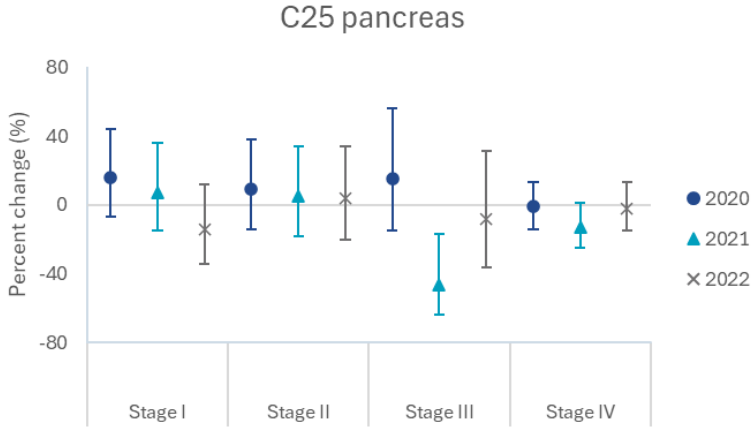
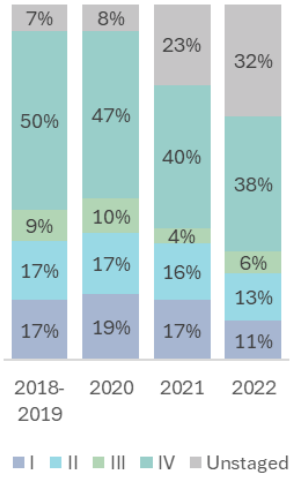


Figure 3. A) Percentage change (and 95% confidence intervals) in IRR by site and stage 2020, 2021 and 2022 compared to 2018-2019 baseline; B) stage distribution 2018-2019, 2020, 2021 and 2022

A. Percentage change in IRR	B. Stage distribution
	
	
	

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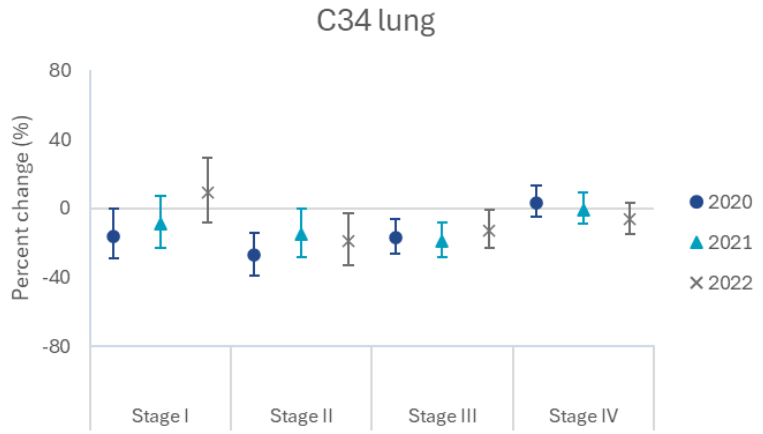
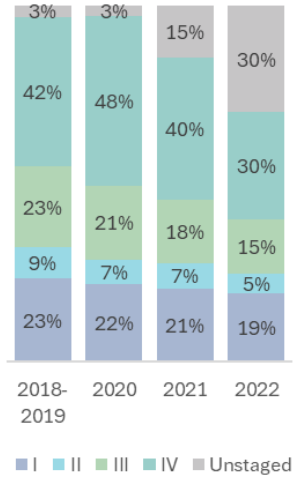
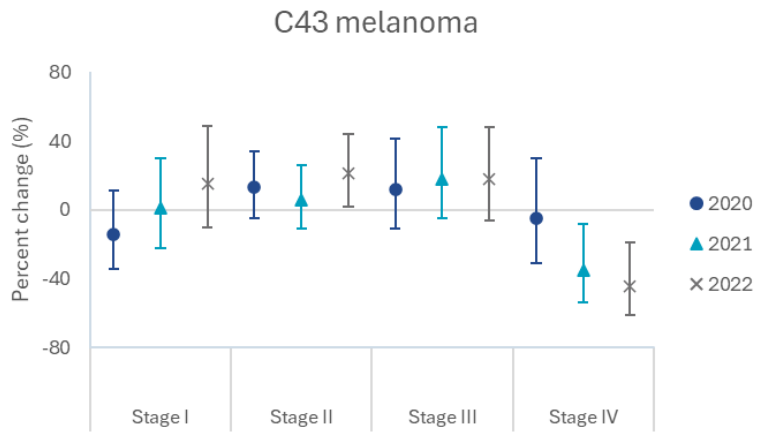
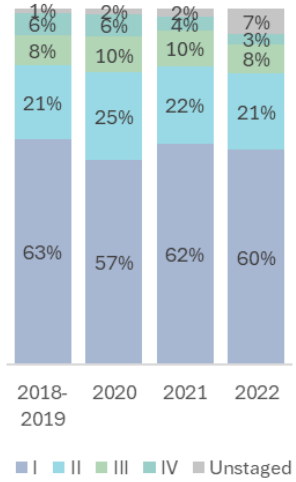
A. Percentage change in IRR

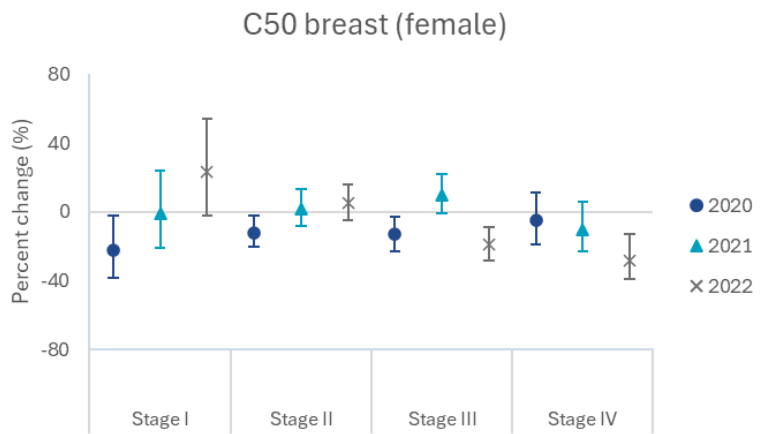


B. Stage distribution









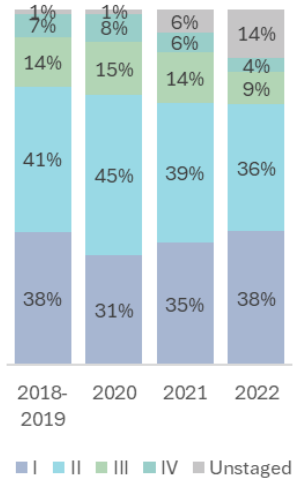


Figure 3. A) Percentage change (and 95% confidence intervals) in IRR by site and stage 2020, 2021 and 2022 compared to 2018-2019 baseline; B) stage distribution 2018-2019, 2020, 2021 and 2022

A. Percentage change in IRR

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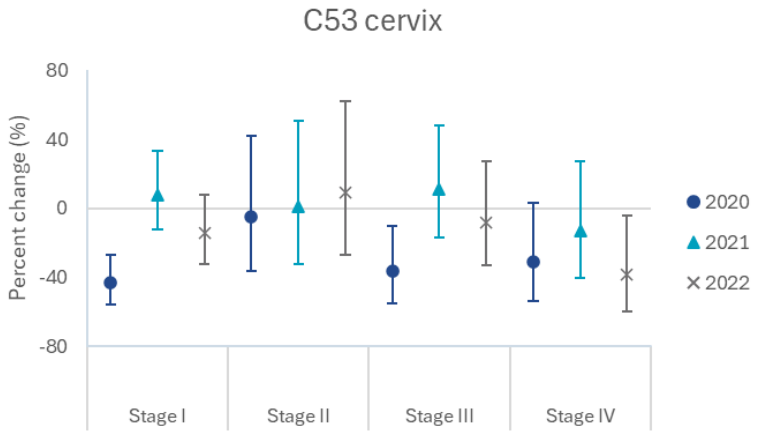

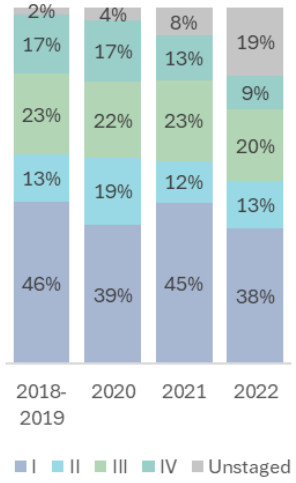

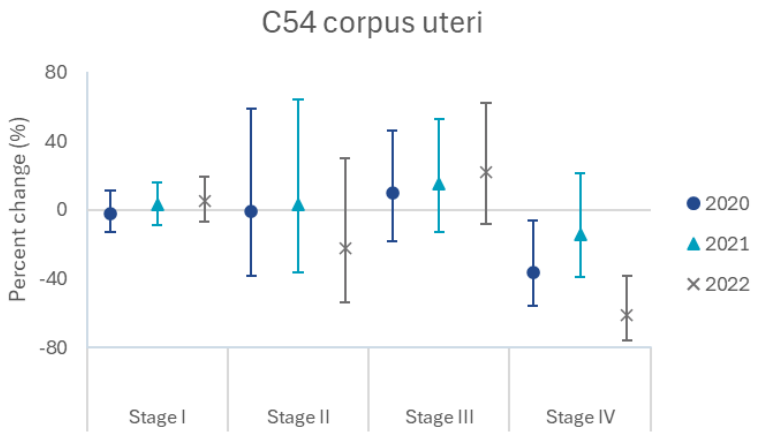

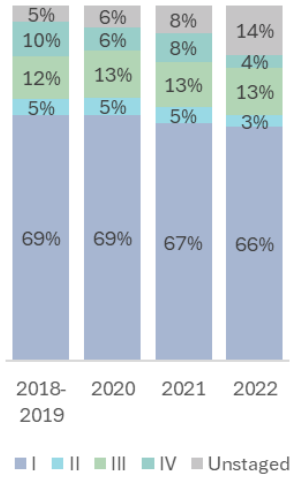

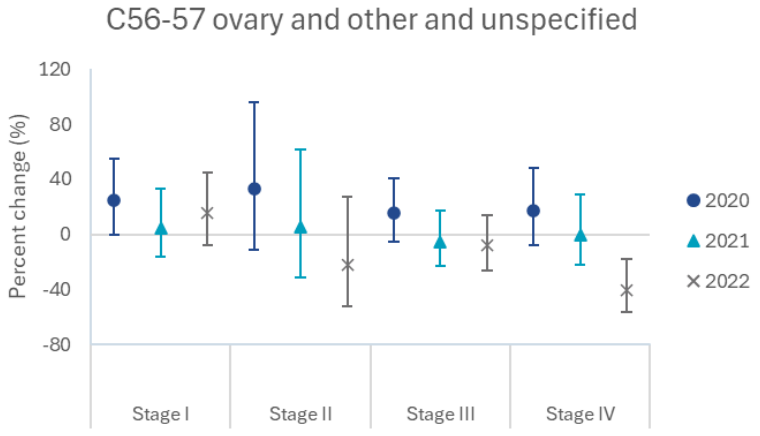

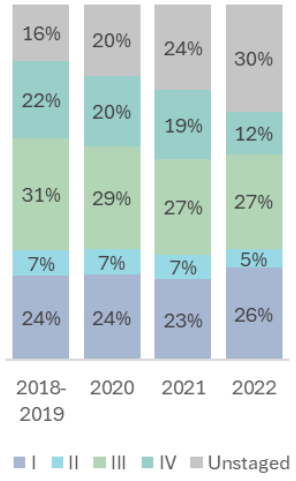

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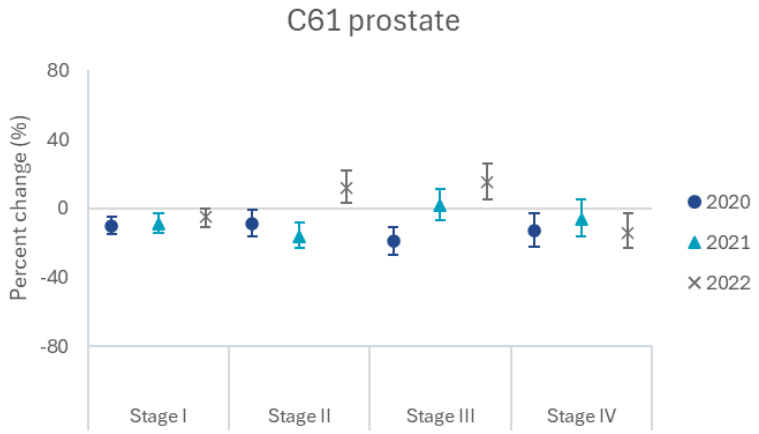
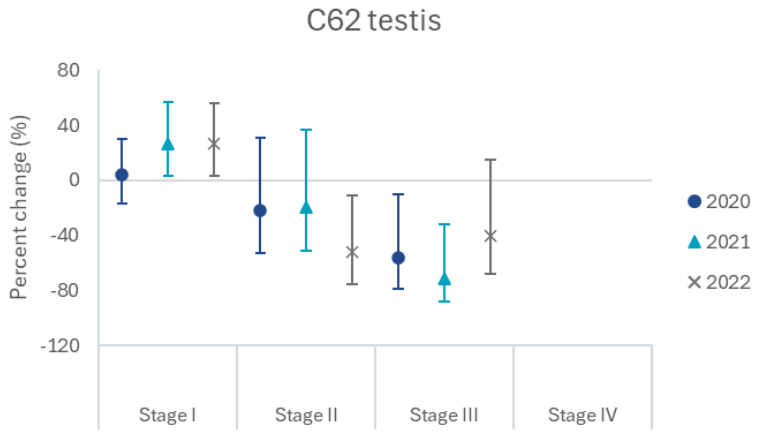
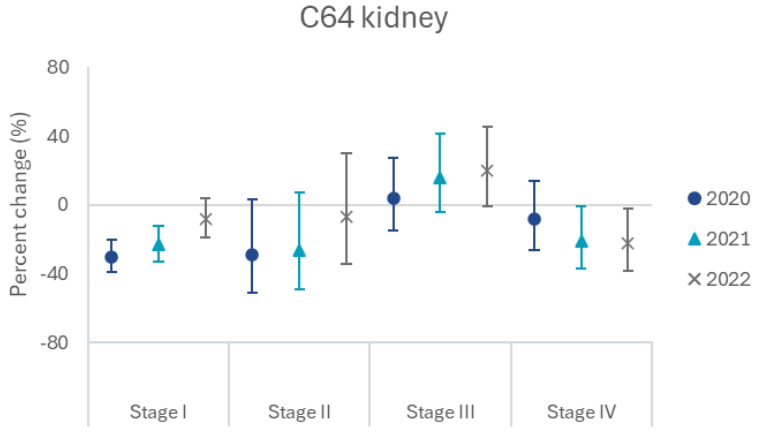
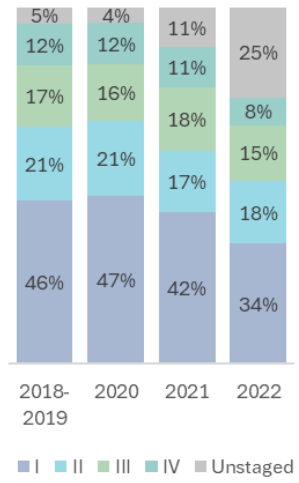
A. Percentage change in IRR

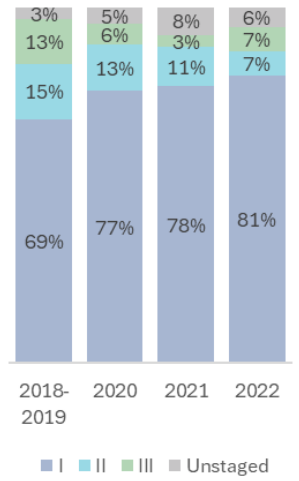


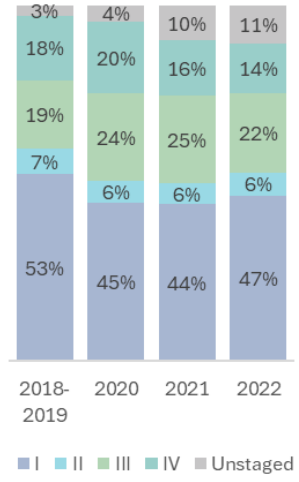




B. Stage distribution







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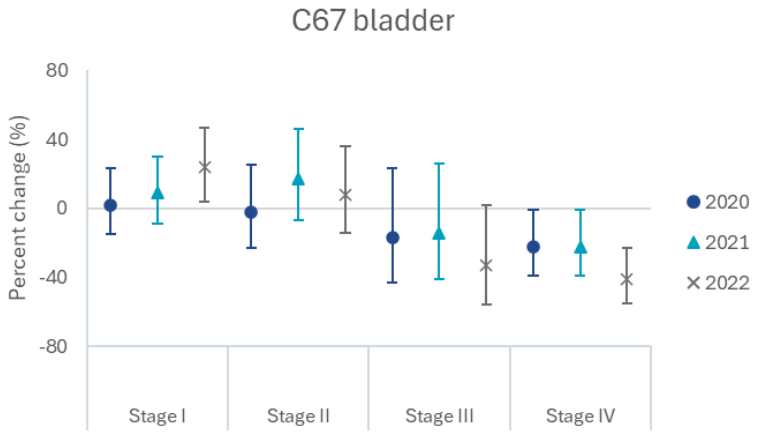
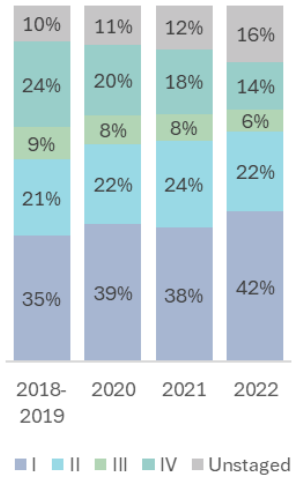
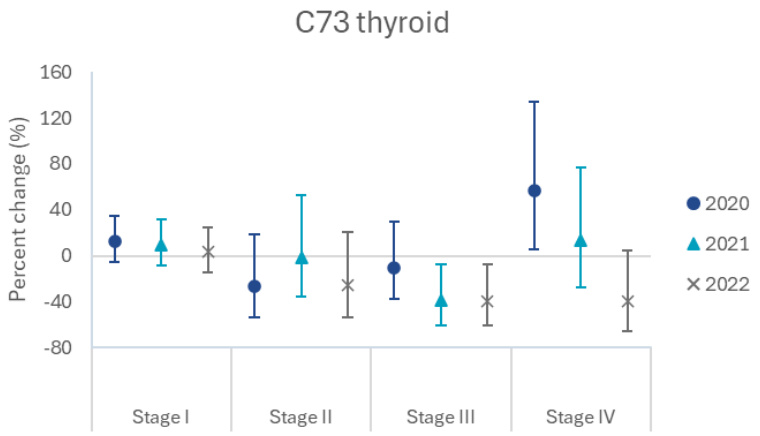
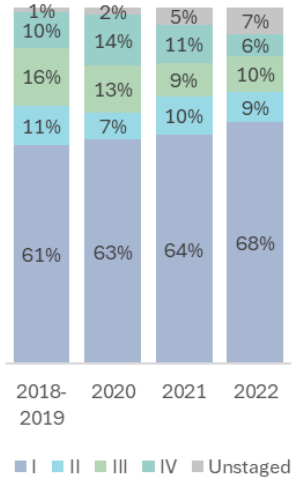
A. Percentage change in IRR

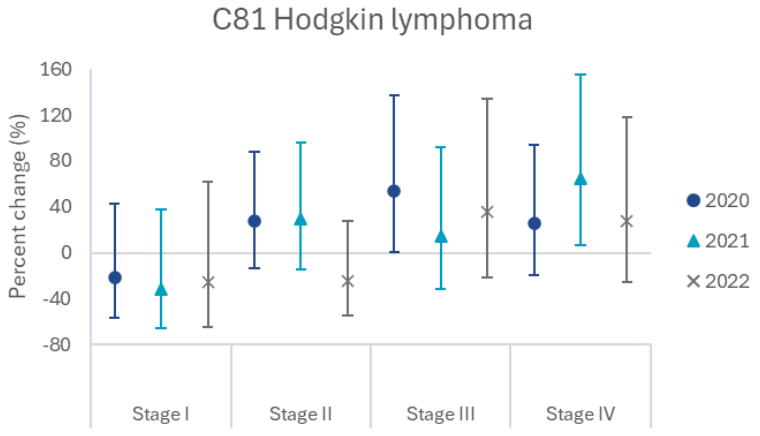
B. Stage distribution

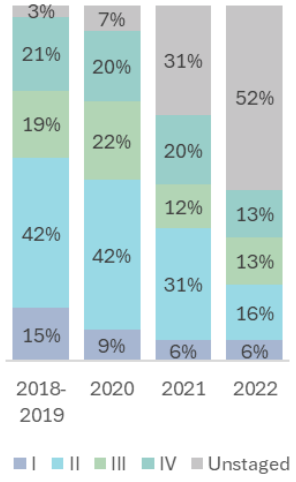












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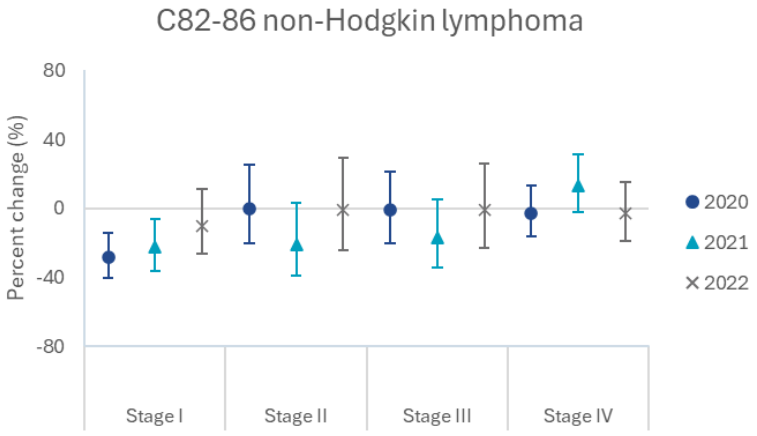
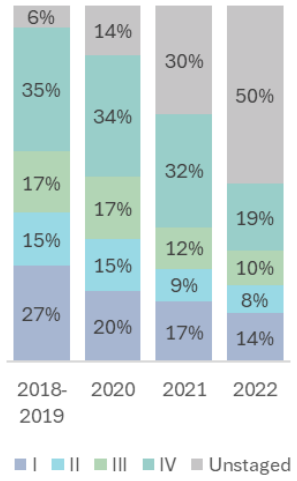
A. Percentage change in IRR



B. Stage distribution



Mortality

Counts of cancer-related deaths in 2020-2021 and 2022, compared to the pre-pandemic period of 2018-2019 are shown in Table 3. While the number of cancer deaths during the pandemic and post-pandemic years was higher than the pre-pandemic period the increase aligns with historical trends. The most recent estimates suggest an annual rise of approximately 1.3% in cancer deaths for both males and females (47).

A small number of sites did show relatively large changes compared to the baseline period. For example cervical cancer deaths decreased by 23%, while thyroid cancer deaths increased by 46% in 2020-2021. These apparently large proportional changes are likely due to normal variation in cancers that typically result in a small number of deaths each year.

Average age-standardised annual mortality rates for the three periods are shown in Figure 4. Mortality rates for all invasive cancers decreased over time, with a significant reduction observed between 2018-2019 and 2020-2021. Cervical cancer also showed a significant drop in mortality during this period. In 2022, several cancer sites had significantly lower mortality rates compared to 2018-2019, including: all invasive cancers, stomach, colorectal, bronchus & lung, ovary, prostate cancers and multiple myeloma (Figure 4 & Appendix 5).

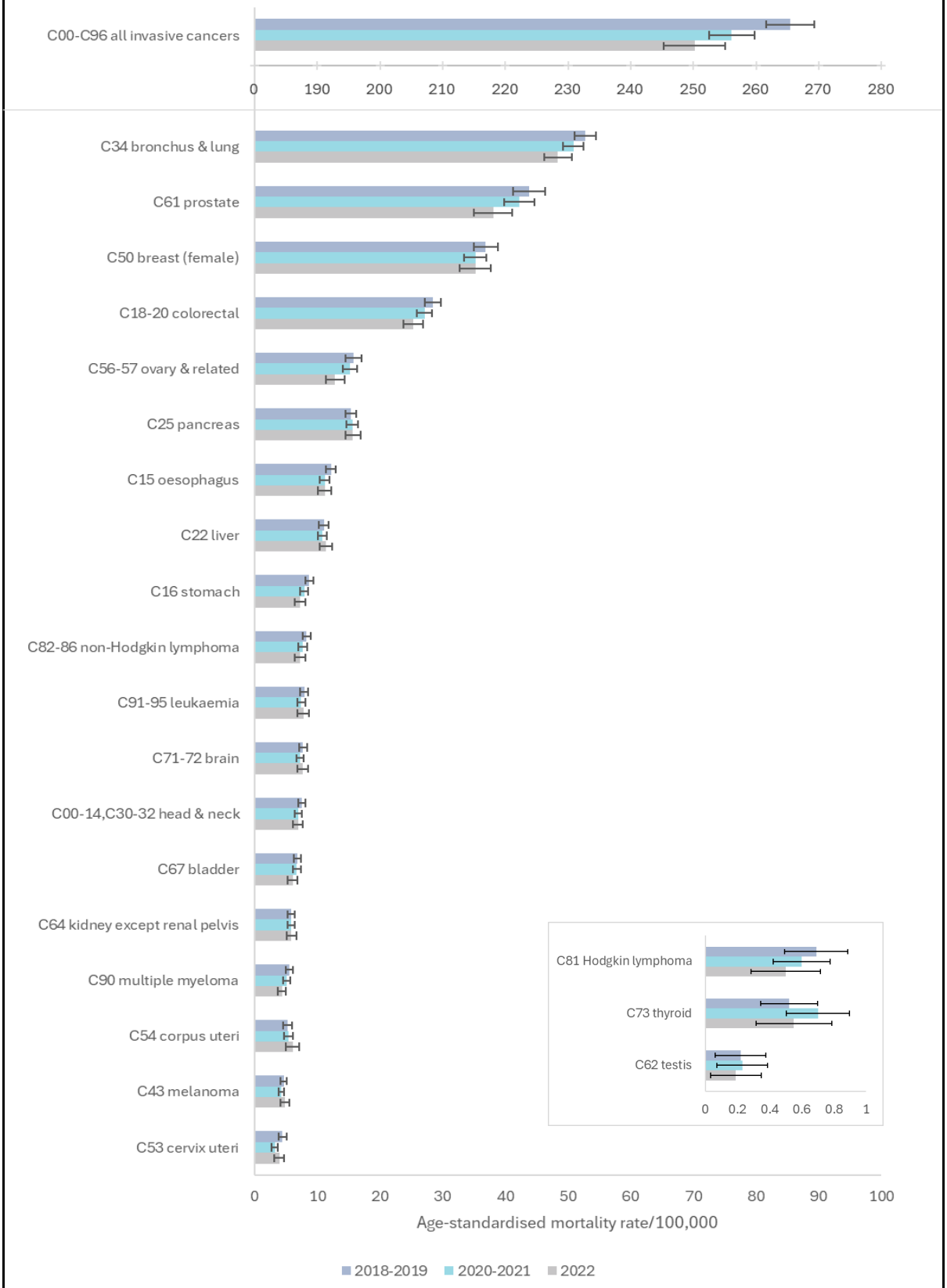
It is important to note that the mortality data used in this report are the revised number of deaths for years 2018-2021 (38). Revised number of deaths have not yet been published for 2022, so unrevised numbers are reported (39) which may affect comparability.

No significant increases in mortality rates were identified in 2020-2021 or 2022.

Table 3. Average annual number of deaths by site, 2018-2019, 2020-2021 and 2022					
	Average annual deaths			Difference relative to 2018-2019 (Number and % change)	
	2018-2019	2020-2021	2022	2020-2021	2022
C00-C96 all invasive cancers	9468	9680	10100	213 (2%)	633 (7%)
C00-D48 all neoplasms	9735	9919	10361	184 (2%)	626 (6%)
Sex*					
Female	4361	4494	4699	133 (3%)	339 (8%)
Male	5107	5187	5401	80 (2%)	294 (6%)
Age group*					
00-49 years	487	460	518	-27 (-6%)	31 (6%)
50-64 years	1756	1730	1790	-26 (-1%)	34 (2%)
65-74 years	2572	2606	2626	34 (1%)	54 (2%)
75+ years	4654	4885	5166	231 (5%)	512 (11%)
Site					
C00-14,C30-32 head & neck	283	275	288	-9 (-3%)	5 (2%)
C15 oesophagus	439	430	456	-9 (-2%)	18 (4%)
C16 stomach	312	301	293	-12 (-4%)	-19 (-6%)
C18-20 colorectal	1005	1015	1016	11 (1%)	12 (1%)
C22 liver	399	411	466	12 (3%)	67 (17%)
C25 pancreas	549	591	630	42 (8%)	81 (15%)
C34 lung	1897	1951	1963	54 (3%)	67 (4%)
C43 melanoma	168	165	193	-3 (-2%)	26 (15%)
C50 breast (female)	737	742	783	5 (1%)	46 (6%)
C53 cervix	97	74	93	-23 (-23%)	-4 (-4%)
C54 corpus uteri	102	111	132	9 (8%)	30 (29%)
C56-57 ovary and other and unspecified	310	316	285	7 (2%)	-25 (-8%)
C61 prostate	605	624	616	19 (3%)	12 (2%)
C62 testis	5	5	5	1 (11%)	1 (11%)
C64 kidney	211	223	237	12 (5%)	26 (12%)
C67 bladder	232	239	232	7 (3%)	1 (0%)
C71-72 brain	305	305	340	0 (0%)	36 (12%)
C73 thyroid	19	27	22	9 (46%)	4 (19%)
C81 Hodgkin lymphoma	24	22	21	-2 (-8%)	-3 (-13%)
C82-86 non-Hodgkin lymphoma	293	282	286	-12 (-4%)	-7 (-2%)
C90 multiple myeloma	188	187	169	-1 (-1%)	-19 (-10%)
C91-95 leukaemia	277	275	308	-2 (-1%)	31 (11%)

*C00-96 all invasive cancers

Figure 4. Age standardised mortality rate, per 100,000 with 95% confidence intervals, by site, 2018-2019, 2020-2021 and 2022

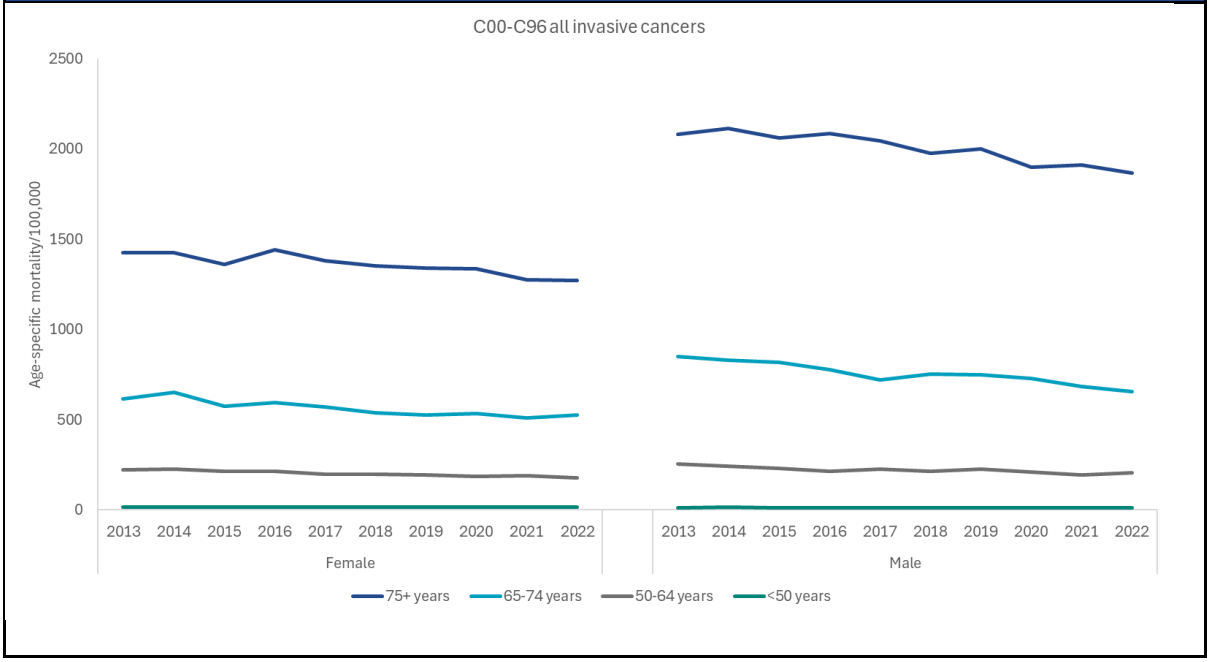


Note: This figure displays mortality rates on 3 different axis ranges: 0-280 for all invasive cancers (top panel), 0-100 for the main body of the graph, and 0-1 for the inset panel showing the 3 lowest mortality cancers

Age-specific mortality

Annual sex and age-specific mortality rates by broad age-groups for all invasive cancers combined are shown in Figure 5. Unlike incidence rates (Figure 2), cancer mortality rates in 2020 appear to be broadly similar to the adjacent years across all age-groups and both sexes (Figure 5).

Figure 5. Age-specific mortality rate of all invasive cancers (C00-C96) by sex 2013-2022



Survival

Figure 6 displays unstandardised 1 year net-survival as well as age- and stage-standardised for cancer sites where stage data are available, broken down by year of diagnosis. This approach accounts for the possibility that patients diagnosed in 2019 may have experienced pandemic-related impacts on their care and outcomes. In addition to unstandardised and age- and stage-standardised, age-standardised and stage-standardised 1 year net-survival estimates are provided for all cancer sites in Appendix 6.

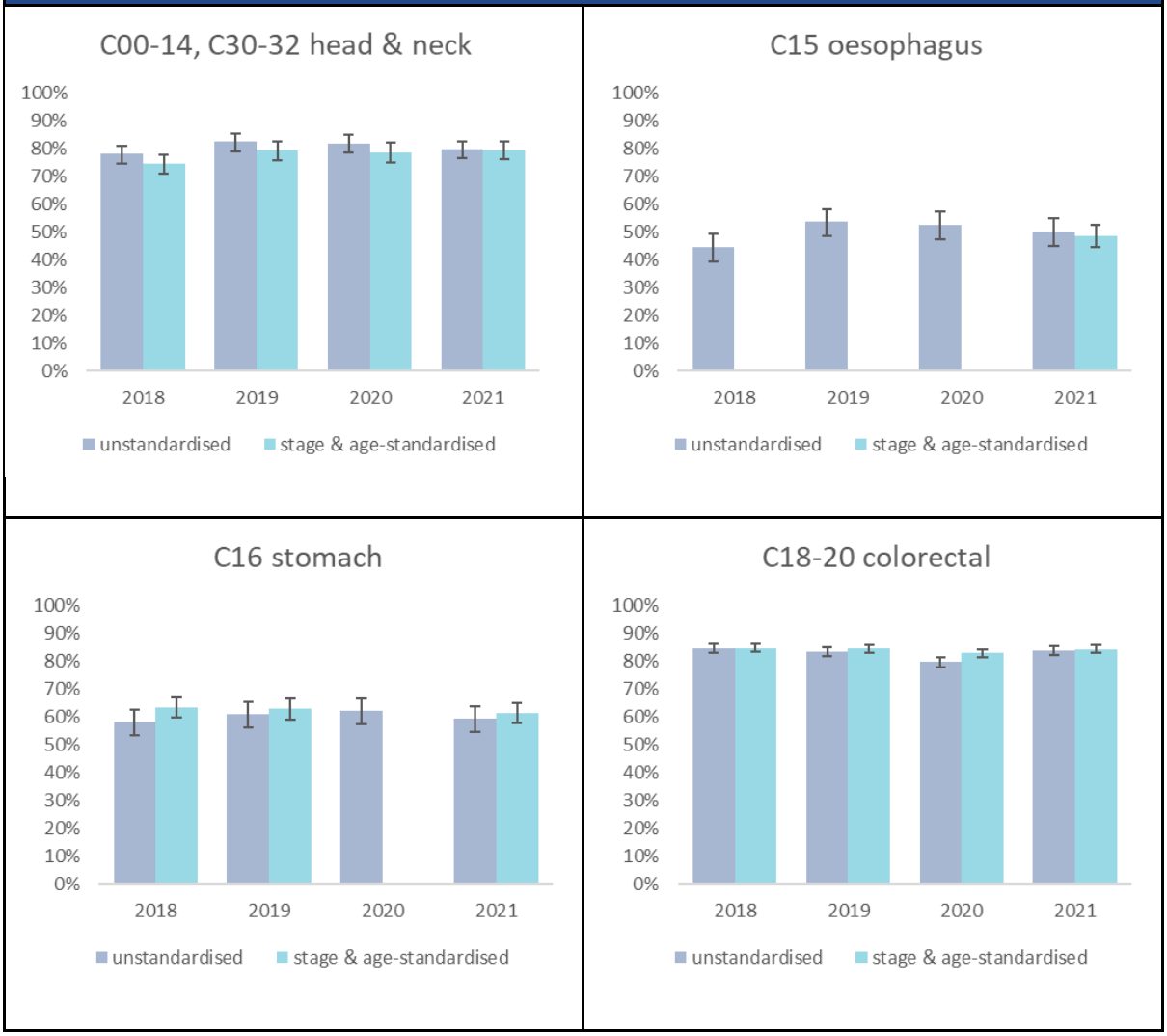
There was little consistent evidence of a decline in 1-year net survival across individual cancer sites during the pandemic, with only two sites, colorectal cancer and lung cancer, showing some evidence of a decrease in unstandardised 1 year net-survival 2020 compared to previous years.

In colorectal cancer, unstandardised survival in 2020 (79.51%, 95% CI 77.5%-81.36%) was lower than 2018 (84.46%, 95% CI 82.78%-86%), 2019 (83.32%, 95% CI 81.59%-84.9%) and 2021 (83.61%, 95% CI 81.91%-85.17%). However, when estimates were adjusted for age and stage, this difference disappeared.

Unstandardised lung cancer survival also showed a decrease in 2020 (43.33%, 95% CI 41.16%-45.49%) compared to 2018 (48.09%, 95% CI 45.92%-50.21%) but no difference when compared to 2019 (44.74%, 95% CI 42.62%-46.83%) or 2021 (44.19%, 95% CI 42.03%-46.32%). The difference between 2018 and 2020 disappeared when estimates were adjusted for age and stage, with the age- and stage adjusted survival in 2018 being 48.6% (46.6%-50.5%) compared to 48.3% (46.4%-50.3%) in 2020.

All 1-year net survival estimates with 95% confidence intervals are available in Appendix 6.

Figure 6. 1-year net-survival 2018, 2019, 2020 and 2021 by site and type of standardisation, with 95% confidence intervals



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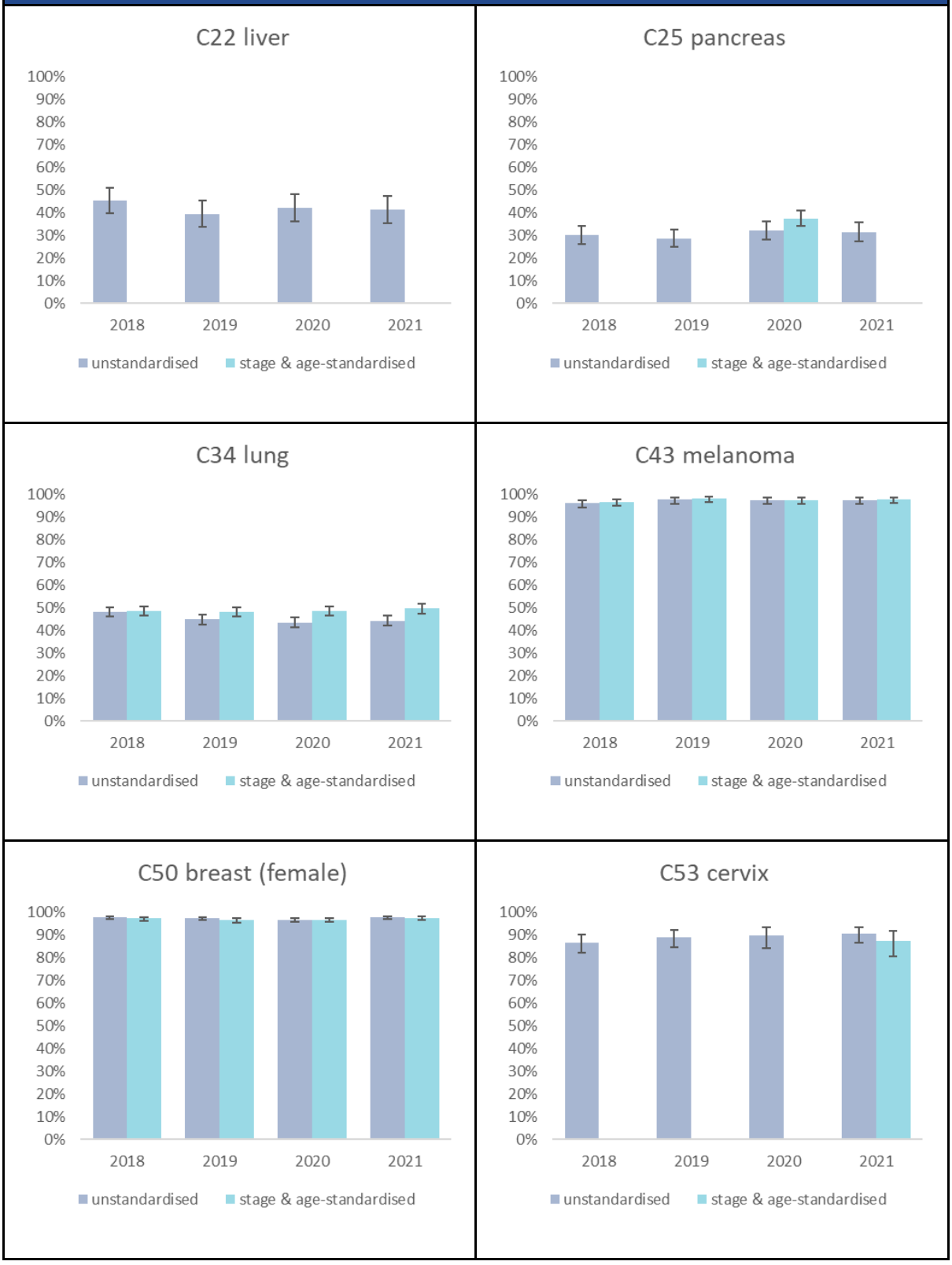
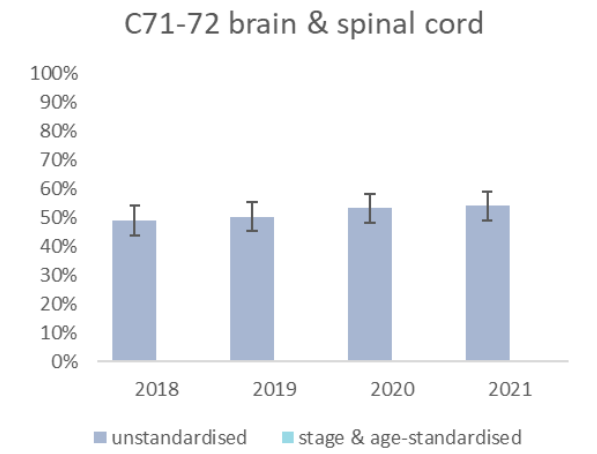
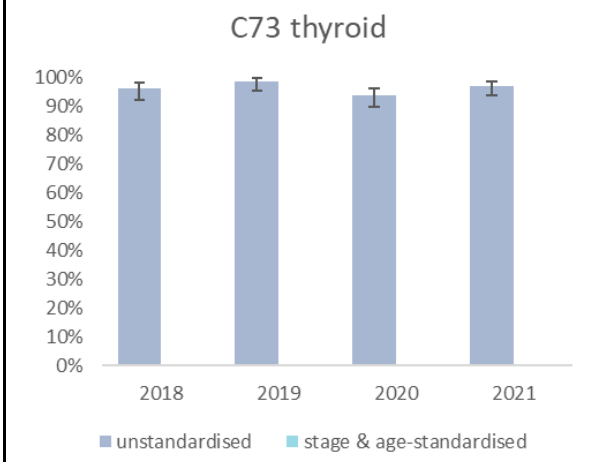
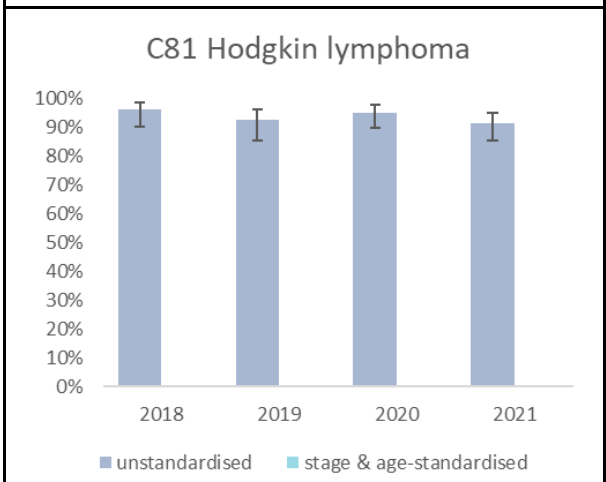


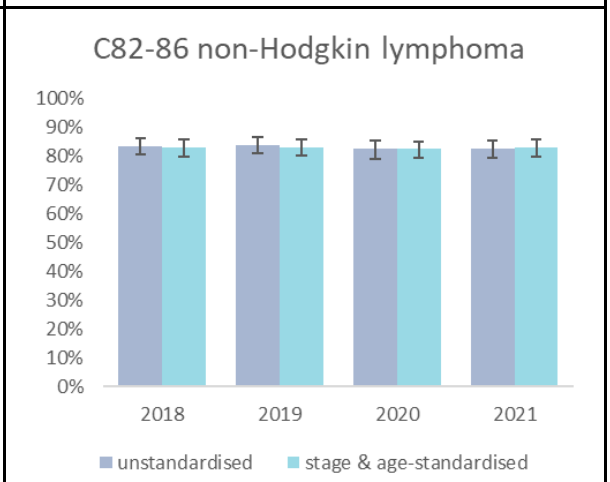
Figure 6. 1-year net-survival 2018, 2019, 2020 and 2021 by site and type of standardisation, with 95% confidence intervals

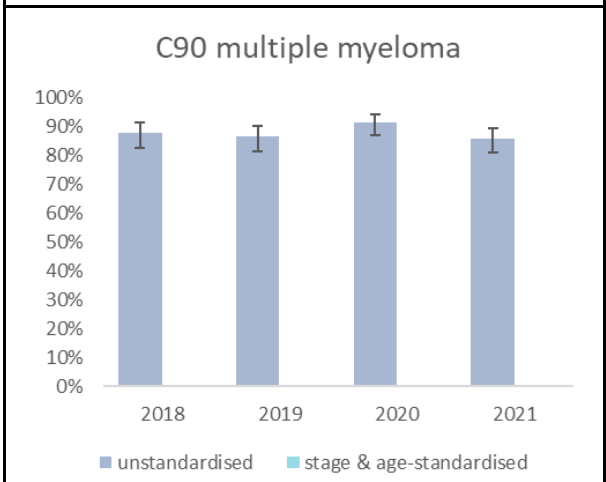
Figure 6. 1-year net-survival 2018, 2019, 2020 and 2021 by site and type of standardisation, with 95% confidence intervals

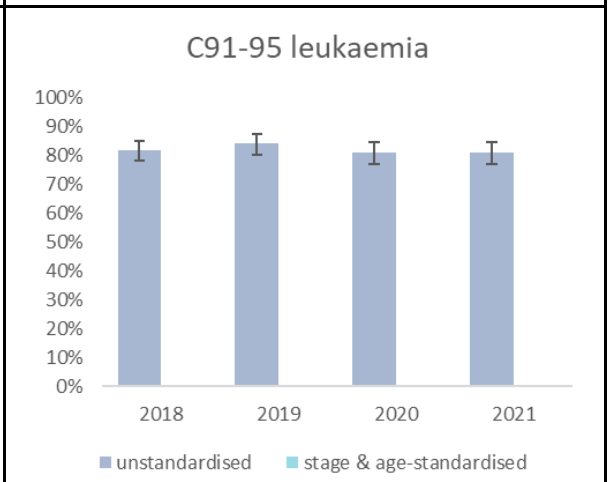












Note: It was not possible to generate stage & age-standardised survival estimate for all cancers sites for all years due to very low/no cases in some combinations of age-stage categories.

Discussion

The report provides an initial examination of the impact of the COVID-19 pandemic on cancer incidence, mortality and 1-year survival in Ireland.

We observed a 27% decrease in the quarterly incidence rate of all invasive cancers (excl NMSC) diagnosed in the Q2 2020, immediately following the onset of the COVID-19 pandemic, compared to the pre-pandemic baseline (2018-2019). This decline was evident across most individual cancer sites during Q2 2020. However, for the majority of sites, incidence rates rebounded quickly, with continued significant decreases in Q3 2020 limited to colorectal, cervical and kidney cancers. Notably, several cancer sites also showed significant changes in incidence during Q1 2021 – a period marked by high COVID-19 case rates and the initial rollout of vaccination in Ireland (3).

Globally, reduced cancer incidence during the COVID-19 pandemic has been widely reported (16–26), with reductions attributed to disruptions in cancer diagnostic pathways and patient hesitancy to seek medical attention – driven by fears of contracting COVID-19 or concern about burdening healthcare providers (5). The magnitude of these reductions varies by cancer site, geographic region and demographic factors (16–26). The most consistent declines have been observed in screen-detected cancers, where interruptions to national screening programmes offer a clear explanation for the drop in incidence (18,19,21,23–25).

If the primary consequence of COVID-19 related changes to healthcare delivery and care seeking behaviour was delayed diagnosis, a subsequent "rebound" in cancer incidence might have been expected, as most tumours would eventually progress and become symptomatic. In Ireland, as in other countries, while the numbers of new diagnoses (and incidence rates) have returned to expected levels across all but the older age groups, no obvious rebound has been observed (19,21,27,28,30).

One possible explanation is that the tumours that did not present during the pandemic period were predominantly indolent tumours, typically detected through screening or incidentally during routine healthcare interactions. With screening programmes paused and overall healthcare utilisation reduced during the pandemic (51), opportunities to detect these slow-growing tumours were limited.

Another contributing factor may be the increased mortality associated with COVID-19, particularly among high-risk populations such as older or immunocompromised individuals and those with chronic conditions like lung disease (7–9). Some individuals who might have developed or been diagnosed with cancer may have died before diagnosis due to COVID-19. This effect could have been compounded by reductions or delays in diagnostic testing, meaning some cancers went undetected before death.

Reductions in incidence could also reflect disruptions in cancer registration processes. Several countries reported limitations in registry operations and data collection during the

pandemic (52). In Ireland, the National Cancer Registry (NCRI) experienced some operational challenges due to the shift to remote working and staff shortages caused by illness and quarantine requirements (5). However, these disruptions mainly affected case completion rather than the initial registration of new tumours, so therefore are unlikely to have impacted incidence rates.

In addition to the observed reduction in the number and rates of cancer diagnoses, a major concern is the long-term impact that delays in diagnosis may have on patient outcomes. The effect of such delays at the individual level depends on both the tumour characteristics and the duration of the delay. Some tumours progress slowly, meaning a delay of several months may have minimal impact on long-term survival. In contrast, rapidly progressing tumours may be significantly affected by even short delays of a few weeks.

While population-level analysis can offer insights into potential delays in cancer diagnoses—such as by examining shifts in the stage at diagnosis—it does not allow for the identification of individuals affected by those delays. Stage at diagnosis reflects how advanced a cancer is when first detected, and changes in its distribution across the population may suggest broader diagnostic disruptions. That said, such changes may not be evident for all cancer types. For fast-growing cancers, delays could result in a noticeable stage shift, whereas for slower-growing cancers, even prolonged delays might not affect the stage at diagnosis. However, this approach cannot pinpoint who would have been diagnosed earlier had circumstances been different.

At the individual level, determining whether a diagnosis was delayed is far more complex. There is no definitive way to know when a person would have sought care or received a diagnosis in the absence of external factors like the pandemic. Tumour biology, patient behaviour, and healthcare access all play roles, making it virtually impossible to retrospectively identify delayed diagnoses on a case-by-case basis.

While missing stage data can pose challenges in assessing potential delays in cancer diagnoses, this issue is largely confined to a few cancer types—such as oesophageal and stomach cancers—which routinely have higher proportions of unknown stage. For most cancers, stage data are nearly complete, enabling robust analysis of diagnostic trends. Research has shown that missing stage information is more common among older patients, patients with more lethal cancers, patients with more severe disease, and patients with co-morbidities (53,54). These patients may be less likely or less able to undergo a full diagnostic workup due to poor health, advanced disease or personal choice.

We examined changes in stage-specific incidence rates in 2020, 2021 and 2022 compared to the baseline period of 2018-2019. At the time of writing, stage data collection for 2022, and to a lesser extent 2021, was incomplete. While we adjusted for the proportion of unstaged tumours when calculating stage-specific rates, results for these years should be interpreted with caution. As data collection is ongoing, some tumours initially recorded with early-stage classifications may be reclassified to more advanced stages over time, as

additional diagnostic information becomes available. This reclassification tends to occur more frequently from stage I or II to stage III or IV.[1]

Of the 19 cancer sites where stage data were reported, significant decreases in incidence rate ratios were identified for one or more stages in 10 sites during 2020 (compared to 2018-2019 baseline). This aligns with the overall decline in incidence rates observed in 2020 across many cancer sites.

All three cancers included in the national screening programmes – breast, colorectal and cervical cancers - showed significant decreases in stage specific incidence rates in 2020. For breast cancer, stage I decreased by 2%, stage II by 12% and stage III by 13%. Colorectal cancer saw a 25% decrease in stage I, a 28% decrease in stage II and a 17% decrease in stage III. Cervical cancer experienced a 43% drop in stage I and a 36% drop in stage III. These declines reflect the temporary suspension of screening programmes in 2020 (13–15). In contrast, no significant changes were observed in stage-specific rates for these three cancers in 2021 compared to baseline.

Prostate cancer also showed significant decreases in stage-specific rates in 2020, which is consistent with the widespread disruptions to primary care services during the pandemic (5).

There was no consistent pattern of increases in late-stage cancer rates in 2021 or 2022. Only two cancer sites showed significant increases in stage III or IV incidence: a 57% increase in stage IV thyroid cancer rates in 2020 and a 65% increase in stage IV Hodgin lymphoma rates in 2021 (Figure 3, Appendix 4). However, given the relatively low number of cases for both cancers, these findings may be attributable to random variation rather than a true trend.

The COVID-19 pandemic is likely to have influenced cancer mortality in several ways. Individuals with cancer – whether diagnosed or undiagnosed – were at increased risk of severe COVID-19 illness and death (8). Additionally, the pandemic may have affected how causes of death were recorded, particularly in the early months. This introduces the possibility of misclassification: a person who died of cancer but tested positive for COVID-19 might be recorded as a COVID-19 death, or vice versa.

The extent and direction of such misclassification in Irish mortality data remains unclear. A study from Sweden found evidence that COVID-19 was coded as the underlying cause of death in official records more frequently than when assessed by clinicians with access to full medical notes (84% vs 29%). If similar patterns occurred in Ireland, it is plausible that cancer

[1] Tumours are staged using the TNM classification (37). T (tumour size), N (regional lymph nodes), M (distant metastasis) values are recorded for each tumour at diagnosis. The overall stage of the tumour is assigned based on the combination of T, N and M values recorded. If N and/or M values are missing these are treated as N0 (no regional lymph node metastases) and M0 (no distant metastases) respectively and a stage can be assigned if a T value has been recorded. However, as data collection continues the addition of N and/or M values and/or updates to T values is more likely to result in a higher stage being assigned (it is also possible that a lower stage may be assigned, however that occurs less frequently).

deaths were underreported during the pandemic, as individuals with cancer who died may have been more likely to be classified as COVID-19 deaths.

We analysed changes in age-standardised mortality rates for all invasive cancers combined, finding 3.5% decrease in 2020-2021 compared to the baseline period of 2018-2019. While similar decreases were observed for several cancer sites in 2022 these findings should be interpreted with caution, as at the time of writing the Central Statistics Office (CSO) had not yet published revised mortality data for that year.

Historically, age-standardised cancer mortality rates for all invasive cancers combined have been decreasing steadily by about 1%-2% annually since 1994 (47). Overall the mortality trends presented in this report appear consistent with what would have been expected in the absence of the COVID-19 pandemic, suggesting that the pandemic did not have a major impact on cancer mortality.

The true impact of COVID-19 will ultimately be measured through cancer survival outcomes. However the pandemic itself has created a number of complications when it comes to estimating and comparing survival estimates, for example, reduced lead time for screen-detected cancers can artificially lower survival estimates (55).

While more time is needed to assess long-term survival, early indicators such as 1-year net survival can offer initial insights. There are some reports that patient outcomes, as indicated by 1-year survival, have been negatively impacted by the pandemic (19,20,56,57).

In this report we present 1-year net survival for the most common cancers. For cancers with generally good prognosis, any pandemic-related effects may not be evident for many years In contrast, for cancers with poorer outcomes, 1-year survival may provide an initial signal of disruption. In fact, we found no strong evidence of significant decreases in 1-year net survival for any site for 2020 or 2021 when adjusted for age and stage.

There are several limitations to the analyses presented. Given the large number of comparisons across multiple time periods and cancer sites, we did not adjust for multiple testing and used the standard 5% significance threshold. As a result, some statistically significant findings may be due to chance. It is important to interpret results in the broader context rather than focussing on isolated statistically significant outcomes.

The increasing proportion of tumours with unknown stage in 2021 and 2022 complicates interpretation of stage-specific trends. The short time that has elapsed since the COVID-19 pandemic and the lengthy process of collecting and validating cancer registry data meant that only short term (1-year) survival estimates could be generated. Longer follow-up will be necessary to fully understand the pandemic's impact, especially for cancers with high survival rates.

Ireland is participating in the International Cancer Benchmarking Partnership (ICBP) which is currently conducting a study comparing observed and predicted cancer incidence rates in 2020 for seven cancers (colon, rectum, lung, melanoma, breast, ovary and prostate) across seven high-income countries (Australia, Canada, Denmark, Ireland, New Zealand, Norway,

and the UK). The findings from this project will provide valuable insights on how Ireland's experience compares internationally (58).

Conclusion

The COVID-19 pandemic had a notable but temporary impact on cancer incidence in 2020, with lesser effect observed in 2021. By 2022, these disruptions had largely resolved, except for a continued decline in cancer incidence among older age groups. Across cancer types, the stage at diagnosis was affected in line with the overall reduction in incidence, with fewer patients presenting with early-stage cancers, particularly in those cancers included in national screening programmes. However, there was no evidence of a significant shift in stage distribution. Similarly, 1-year net survival rates remained stable once differences in age and stage at diagnosis were accounted for. While longer-term effects cannot be entirely ruled out, current evidence suggests that the necessary and strategic compromises made during the pandemic to sustain healthcare system functionality safeguarded cancer patients.

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Appendix 1. Quarterly incidence rate ratios by cancer site (table)

Year	Quarter	IRR (95% CI)	Percent change	p-value
C00-43, C45-96 all invasive cancers excl. NMSC				
2020	Q1	0.96 (0.76-1.22)	-4% (-24% to 22%)	0.75
	Q2	0.73 (0.58-0.93)	-27% (-42% to -7%)	0.01
	Q3	0.96 (0.76-1.22)	-4% (-24% to 22%)	0.74
	Q4	0.97 (0.76-1.23)	-3% (-24% to 23%)	0.80
2021	Q1	0.92 (0.72-1.17)	-8% (-28% to 17%)	0.50
	Q2	1.00 (0.78-1.27)	0% (-22% to 27%)	0.98
	Q3	1.01 (0.80-1.28)	1% (-20% to 28%)	0.93
	Q4	0.97 (0.77-1.24)	-3% (-23% to 24%)	0.83
2022	Q1	0.96 (0.76-1.23)	-4% (-24% to 23%)	0.77
	Q2	1.00 (0.79-1.27)	0% (-21% to 27%)	0.99
	Q3	1.00 (0.79-1.27)	0% (-21% to 27%)	0.98
	Q4	0.99 (0.78-1.26)	-1% (-22% to 26%)	0.93
C00-14, C30-32 all head & neck				
2020	Q1	0.85 (0.73-0.99)	-15% (-27% to -1%)	0.04
	Q2	**0.73 (0.62-0.87)**	**-27% (-38% to -13%)**	**<0.001**
	Q3	1.04 (0.90-1.20)	4% (-10% to 20%)	0.57
	Q4	1.05 (0.91-1.22)	5% (-9% to 22%)	0.48
2021	Q1	0.89 (0.76-1.04)	-11% (-24% to 4%)	0.14
	Q2	1.10 (0.96-1.27)	10% (-4% to 27%)	0.16
	Q3	0.93 (0.80-1.09)	-7% (-20% to 9%)	0.37
	Q4	1.06 (0.92-1.22)	6% (-8% to 22%)	0.46
2022	Q1	0.88 (0.75-1.02)	-12% (-25% to 2%)	0.09
	Q2	1.01 (0.88-1.17)	1% (-12% to 17%)	0.86
	Q3	1.01 (0.87-1.16)	1% (-13% to 16%)	0.91
	Q4	0.98 (0.85-1.14)	-2% (-15% to 14%)	0.84
C15 oesophagus				
2020	Q1	0.89 (0.70-1.13)	-11% (-30% to 13%)	0.33
	Q2	0.84 (0.65-1.07)	-16% (-35% to 7%)	0.15
	Q3	1.04 (0.83-1.30)	4% (-17% to 30%)	0.75
	Q4	1.06 (0.85-1.34)	6% (-15% to 34%)	0.59
2021	Q1	0.77 (0.60-0.99)	-23% (-40% to -1%)	0.04
	Q2	1.03 (0.82-1.30)	3% (-18% to 30%)	0.78
	Q3	0.93 (0.73-1.17)	-7% (-27% to 17%)	0.53
	Q4	0.95 (0.75-1.19)	-5% (-25% to 19%)	0.64
2022	Q1	0.96 (0.76-1.20)	-4% (-24% to 20%)	0.70
	Q2	0.97 (0.78-1.22)	-3% (-22% to 22%)	0.83
	Q3	1.00 (0.80-1.26)	0% (-20% to 26%)	0.97
	Q4	0.99 (0.79-1.24)	-1% (-21% to 24%)	0.91

Year	Quarter	IRR (95% CI)	Percent change	p-value
C16 stomach				
2020	Q1	0.91 (0.76-1.09)	-9% (-24% to 9%)	0.32
	Q2	**0.67 (0.54-0.82)**	**-33% (-46% to -18%)**	**<0.001**
	Q3	1.13 (0.96-1.33)	13% (-4% to 33%)	0.14
	Q4	1.04 (0.87-1.23)	4% (-13% to 23%)	0.68
2021	Q1	1.00 (0.84-1.18)	0% (-16% to 18%)	0.96
	Q2	1.01 (0.85-1.20)	1% (-15% to 20%)	0.92
	Q3	1.04 (0.88-1.23)	4% (-12% to 23%)	0.63
	Q4	1.00 (0.84-1.18)	0% (-16% to 18%)	0.96
2022	Q1	0.98 (0.83-1.16)	-2% (-17% to 16%)	0.82
	Q2	0.90 (0.75-1.07)	-10% (-25% to 7%)	0.23
	Q3	1.13 (0.96-1.32)	13% (-4% to 32%)	0.14
	Q4	0.99 (0.83-1.17)	-1% (-17% to 17%)	0.88
C18-20 colorectal				
2020	Q1	0.87 (0.78-0.97)	-13% (-22% to -3%)	0.02
	Q2	**0.59 (0.52-0.66)**	**-41% (-48% to -34%)**	**<0.001**
	Q3	0.88 (0.79-0.99)	-12% (-21% to -1%)	0.03
	Q4	0.90 (0.80-1.01)	-10% (-20% to 1%)	0.06
2021	Q1	**0.86 (0.77-0.96)**	**-14% (-23% to -4%)**	**0.008**
	Q2	1.00 (0.90-1.12)	0% (-10% to 12%)	0.97
	Q3	1.05 (0.94-1.16)	5% (-6% to 16%)	0.41
	Q4	0.93 (0.83-1.04)	-7% (-17% to 4%)	0.20
2022	Q1	0.87 (0.78-0.97)	-13% (-22% to -3%)	0.01
	Q2	0.97 (0.87-1.08)	-3% (-13% to 8%)	0.54
	Q3	1.03 (0.93-1.15)	3% (-7% to 15%)	0.56
	Q4	0.93 (0.83-1.03)	-7% (-17% to 3%)	0.18
C22 liver				
2020	Q1	0.80 (0.63-1.01)	-20% (-37% to 1%)	0.06
	Q2	0.81 (0.64-1.02)	-19% (-36% to 2%)	0.08
	Q3	0.93 (0.74-1.15)	-7% (-26% to 15%)	0.49
	Q4	0.85 (0.68-1.07)	-15% (-32% to 7%)	0.17
2021	Q1	0.86 (0.69-1.08)	-14% (-31% to 8%)	0.19
	Q2	0.92 (0.74-1.15)	-8% (-26% to 15%)	0.46
	Q3	0.99 (0.80-1.23)	-1% (-20% to 23%)	0.94
	Q4	**0.69 (0.53-0.88)**	**-31% (-47% to -12%)**	**0.003**
2022	Q1	0.80 (0.64-1.01)	-20% (-36% to 1%)	0.06
	Q2	0.89 (0.72-1.11)	-11% (-28% to 11%)	0.31
	Q3	1.00 (0.81-1.23)	0% (-19% to 23%)	1.00
	Q4	0.94 (0.76-1.16)	-6% (-24% to 16%)	0.58

Year	Quarter	IRR (95% CI)	Percent change	p-value
C25 pancreas				
2020	Q1	1.07 (0.91-1.25)	7% (-9% to 25%)	0.40
	Q2	1.03 (0.88-1.21)	3% (-12% to 21%)	0.74
	Q3	1.08 (0.92-1.26)	8% (-8% to 26%)	0.36
	Q4	1.03 (0.88-1.21)	3% (-12% to 21%)	0.68
2021	Q1	0.92 (0.78-1.09)	-8% (-22% to 9%)	0.34
	Q2	0.85 (0.72-1.01)	-15% (-28% to 1%)	0.07
	Q3	0.84 (0.71-1.00)	-16% (-29% to 0%)	0.05
	Q4	1.03 (0.88-1.21)	3% (-12% to 21%)	0.72
2022	Q1	0.91 (0.77-1.07)	-9% (-23% to 7%)	0.27
	Q2	0.87 (0.74-1.03)	-13% (-26% to 3%)	0.11
	Q3	1.04 (0.89-1.22)	4% (-11% to 22%)	0.60
	Q4	1.01 (0.87-1.19)	1% (-13% to 19%)	0.86
C34 lung				
2020	Q1	0.99 (0.89-1.10)	-1% (-11% to 10%)	0.81
	Q2	**0.86 (0.77-0.96)**	**-14% (-23% to -4%)**	**0.008**
	Q3	0.90 (0.81-1.00)	-10% (-19% to 0%)	0.06
	Q4	0.90 (0.81-1.00)	-10% (-19% to 0%)	0.06
2021	Q1	**0.87 (0.78-0.96)**	**-13% (-22% to -4%)**	**0.009**
	Q2	0.92 (0.82-1.02)	-8% (-18% to 2%)	0.11
	Q3	1.00 (0.90-1.11)	0% (-10% to 11%)	0.97
	Q4	0.89 (0.80-0.99)	-11% (-20% to -1%)	0.04
2022	Q1	0.98 (0.88-1.08)	-2% (-12% to 8%)	0.66
	Q2	0.96 (0.86-1.06)	-4% (-14% to 6%)	0.43
	Q3	0.95 (0.86-1.05)	-5% (-14% to 5%)	0.33
	Q4	0.90 (0.81-1.01)	-10% (-19% to 1%)	0.06
C43 melanoma				
2020	Q1	0.94 (0.73-1.20)	-6% (-27% to 20%)	0.60
	Q2	0.72 (0.56-0.94)	-28% (-44% to -6%)	0.02
	Q3	1.10 (0.86-1.41)	10% (-14% to 41%)	0.46
	Q4	1.02 (0.79-1.31)	2% (-21% to 31%)	0.90
2021	Q1	0.75 (0.58-0.97)	-25% (-42% to -3%)	0.03
	Q2	0.97 (0.75-1.25)	-3% (-25% to 25%)	0.81
	Q3	1.27 (1.00-1.63)	27% (0% to 63%)	0.05
	Q4	1.04 (0.81-1.33)	4% (-19% to 33%)	0.78
2022	Q1	1.11 (0.87-1.42)	11% (-13% to 42%)	0.41
	Q2	0.98 (0.77-1.26)	-2% (-23% to 26%)	0.90
	Q3	1.26 (0.99-1.61)	26% (-1% to 61%)	0.06
	Q4	1.21 (0.95-1.55)	21% (-5% to 55%)	0.13

Year	Quarter	IRR (95% CI)	Percent change	p-value
C50 breast (female)				
2020	Q1	0.96 (0.76-1.22)	-4% (-24% to 22%)	0.76
	Q2	**0.67 (0.53-0.86)**	**-33% (-47% to -14%)**	**0.001**
	Q3	0.84 (0.66-1.06)	-16% (-34% to 6%)	0.14
	Q4	0.86 (0.68-1.10)	-14% (-32% to 10%)	0.23
2021	Q1	0.91 (0.72-1.16)	-9% (-28% to 16%)	0.44
	Q2	1.03 (0.82-1.31)	3% (-18% to 31%)	0.79
	Q3	1.06 (0.83-1.34)	6% (-17% to 34%)	0.65
	Q4	1.02 (0.81-1.29)	2% (-19% to 29%)	0.86
2022	Q1	1.00 (0.79-1.27)	0% (-21% to 27%)	0.98
	Q2	1.05 (0.83-1.32)	5% (-17% to 32%)	0.70
	Q3	1.06 (0.84-1.34)	6% (-16% to 34%)	0.62
	Q4	1.06 (0.84-1.34)	6% (-16% to 34%)	0.63
C53 cervix				
2020	Q1	0.69 (0.52-0.92)	-31% (-48% to -8%)	0.01
	Q2	**0.67 (0.50-0.89)**	**-33% (-50% to -11%)**	**0.006**
	Q3	**0.58 (0.43-0.80)**	**-42% (-57% to -20%)**	**0.001**
	Q4	0.69 (0.52-0.92)	-31% (-48% to -8%)	0.01
2021	Q1	0.93 (0.72-1.19)	-7% (-28% to 19%)	0.56
	Q2	1.16 (0.92-1.45)	16% (-8% to 45%)	0.21
	Q3	1.01 (0.79-1.28)	1% (-21% to 28%)	0.94
	Q4	1.06 (0.84-1.34)	6% (-16% to 34%)	0.61
2022	Q1	0.70 (0.52-0.92)	-30% (-48% to -8%)	0.01
	Q2	0.92 (0.72-1.18)	-8% (-28% to 18%)	0.50
	Q3	0.93 (0.73-1.19)	-7% (-27% to 19%)	0.57
	Q4	0.93 (0.73-1.19)	-7% (-27% to 19%)	0.57
C54 corpus uteri				
2020	Q1	0.95 (0.79-1.13)	-5% (-21% to 13%)	0.55
	Q2	**0.68 (0.55-0.84)**	**-32% (-45% to -16%)**	**<0.001**
	Q3	1.06 (0.89-1.26)	6% (-11% to 26%)	0.51
	Q4	1.16 (0.98-1.37)	16% (-2% to 37%)	0.08
2021	Q1	1.11 (0.94-1.31)	11% (-6% to 31%)	0.21
	Q2	1.01 (0.85-1.20)	1% (-15% to 20%)	0.92
	Q3	1.10 (0.93-1.30)	10% (-7% to 30%)	0.27
	Q4	0.88 (0.74-1.06)	-12% (-26% to 6%)	0.19
2022	Q1	**0.76 (0.63-0.92)**	**-24% (-37% to -8%)**	**0.005**
	Q2	1.12 (0.96-1.32)	12% (-4% to 32%)	0.16
	Q3	1.00 (0.84-1.18)	0% (-16% to 18%)	0.98
	Q4	1.09 (0.93-1.29)	9% (-7% to 29%)	0.30

Year	Quarter	IRR (95% CI)	Percent change	p-value
C56-57 ovary and other and unspecified				
2020	Q1	1.21 (1.01-1.44)	21% (1% to 44%)	0.04
	Q2	**1.27 (1.06-1.51)**	**27% (6% to 51%)**	**0.008**
	Q3	1.11 (0.92-1.34)	11% (-8% to 34%)	0.26
	Q4	1.23 (1.03-1.47)	23% (3% to 47%)	0.02
2021	Q1	0.91 (0.74-1.11)	-9% (-26% to 11%)	0.35
	Q2	1.10 (0.91-1.32)	10% (-9% to 32%)	0.33
	Q3	1.02 (0.84-1.23)	2% (-16% to 23%)	0.84
	Q4	0.99 (0.82-1.21)	-1% (-18% to 21%)	0.95
2022	Q1	0.83 (0.68-1.02)	-17% (-32% to 2%)	0.08
	Q2	0.97 (0.80-1.18)	-3% (-20% to 18%)	0.79
	Q3	0.83 (0.67-1.02)	-17% (-33% to 2%)	0.07
	Q4	0.91 (0.75-1.11)	-9% (-25% to 11%)	0.34
C61 prostate				
2020	Q1	1.01 (0.94-1.08)	1% (-6% to 8%)	0.80
	Q2	**0.55 (0.50-0.60)**	**-45% (-50% to -40%)**	**<0.001**
	Q3	1.02 (0.95-1.09)	2% (-5% to 9%)	0.56
	Q4	0.96 (0.90-1.03)	-4% (-10% to 3%)	0.26
2021	Q1	0.96 (0.90-1.03)	-4% (-10% to 3%)	0.26
	Q2	0.93 (0.87-1.00)	-7% (-13% to 0%)	0.05
	Q3	**0.89 (0.83-0.96)**	**-11% (-17% to -4%)**	**0.002**
	Q4	**0.90 (0.84-0.97)**	**-10% (-16% to -3%)**	**0.004**
2022	Q1	1.02 (0.95-1.09)	2% (-5% to 9%)	0.62
	Q2	1.07 (1.00-1.14)	7% (0% to 14%)	0.04
	Q3	0.97 (0.90-1.03)	-3% (-10% to 3%)	0.30
	Q4	1.00 (0.94-1.07)	0% (-6% to 7%)	0.89
C62 testis				
2020	Q1	0.90 (0.64-1.26)	-10% (-36% to 26%)	0.55
	Q2	0.66 (0.45-0.98)	-34% (-55% to -2%)	0.04
	Q3	1.02 (0.74-1.40)	2% (-26% to 40%)	0.90
	Q4	1.07 (0.78-1.46)	7% (-22% to 46%)	0.68
2021	Q1	1.18 (0.88-1.59)	18% (-12% to 59%)	0.27
	Q2	0.97 (0.70-1.34)	-3% (-30% to 34%)	0.86
	Q3	0.90 (0.64-1.26)	-10% (-36% to 26%)	0.54
	Q4	1.23 (0.92-1.65)	23% (-8% to 65%)	0.16
2022	Q1	0.89 (0.63-1.24)	-11% (-37% to 24%)	0.49
	Q2	1.00 (0.73-1.38)	0% (-27% to 38%)	0.98
	Q3	0.96 (0.69-1.33)	-4% (-31% to 33%)	0.80
	Q4	1.29 (0.97-1.71)	29% (-3% to 71%)	0.09

Year	Quarter	IRR (95% CI)	Percent change	p-value
C64 kidney				
2020	Q1	0.93 (0.80-1.09)	-7% (-20% to 9%)	0.38
	Q2	**0.73 (0.62-0.87)**	**-27% (-38% to -13%)**	**0.001**
	Q3	**0.70 (0.59-0.84)**	**-30% (-41% to -16%)**	**<0.001**
	Q4	0.88 (0.75-1.03)	-12% (-25% to 3%)	0.11
2021	Q1	**0.78 (0.66-0.93)**	**-22% (-34% to -7%)**	**0.004**
	Q2	0.89 (0.76-1.04)	-11% (-24% to 4%)	0.14
	Q3	0.92 (0.79-1.07)	-8% (-21% to 7%)	0.29
	Q4	**0.80 (0.68-0.94)**	**-20% (-32% to -6%)**	**0.008**
2022	Q1	1.00 (0.86-1.16)	0% (-14% to 16%)	0.96
	Q2	0.94 (0.80-1.09)	-6% (-20% to 9%)	0.39
	Q3	0.96 (0.82-1.11)	-4% (-18% to 11%)	0.56
	Q4	0.91 (0.78-1.06)	-9% (-22% to 6%)	0.21
C67 bladder				
2020	Q1	0.91 (0.74-1.10)	-9% (-26% to 10%)	0.32
	Q2	0.77 (0.63-0.96)	-23% (-37% to -4%)	0.02
	Q3	1.10 (0.92-1.32)	10% (-8% to 32%)	0.30
	Q4	0.94 (0.77-1.14)	-6% (-23% to 14%)	0.52
2021	Q1	0.97 (0.81-1.18)	-3% (-19% to 18%)	0.78
	Q2	0.94 (0.78-1.14)	-6% (-22% to 14%)	0.54
	Q3	1.14 (0.96-1.36)	14% (-4% to 36%)	0.14
	Q4	0.96 (0.79-1.16)	-4% (-21% to 16%)	0.66
2022	Q1	0.90 (0.74-1.09)	-10% (-26% to 9%)	0.28
	Q2	1.03 (0.86-1.23)	3% (-14% to 23%)	0.75
	Q3	0.96 (0.80-1.16)	-4% (-20% to 16%)	0.68
	Q4	0.95 (0.79-1.15)	-5% (-21% to 15%)	0.62
C71-72 brain				
2020	Q1	0.98 (0.80-1.21)	-2% (-20% to 21%)	0.88
	Q2	1.09 (0.90-1.34)	9% (-10% to 34%)	0.38
	Q3	0.99 (0.81-1.22)	-1% (-19% to 22%)	0.95
	Q4	0.92 (0.74-1.14)	-8% (-26% to 14%)	0.45
2021	Q1	0.78 (0.62-0.98)	-22% (-38% to -2%)	0.03
	Q2	1.00 (0.81-1.23)	0% (-19% to 23%)	1.00
	Q3	0.99 (0.81-1.22)	-1% (-19% to 22%)	0.94
	Q4	1.04 (0.85-1.28)	4% (-15% to 28%)	0.68
2022	Q1	0.93 (0.76-1.15)	-7% (-24% to 15%)	0.51
	Q2	0.92 (0.75-1.14)	-8% (-25% to 14%)	0.46
	Q3	0.85 (0.69-1.06)	-15% (-31% to 6%)	0.16
	Q4	0.82 (0.66-1.02)	-18% (-34% to 2%)	0.08

Year	Quarter	IRR (95% CI)	Percent change	p-value
C73 thyroid				
2020	Q1	1.15 (0.87-1.53)	15% (-13% to 53%)	0.33
	Q2	**0.58 (0.41-0.83)**	**-42% (-59% to -17%)**	**0.003**
	Q3	1.38 (1.05-1.81)	38% (5% to 81%)	0.02
	Q4	1.13 (0.85-1.51)	13% (-15% to 51%)	0.41
2021	Q1	0.95 (0.70-1.28)	-5% (-30% to 28%)	0.73
	Q2	1.03 (0.77-1.39)	3% (-23% to 39%)	0.83
	Q3	0.92 (0.68-1.25)	-8% (-32% to 25%)	0.59
	Q4	0.96 (0.71-1.29)	-4% (-29% to 29%)	0.78
2022	Q1	0.83 (0.61-1.14)	-17% (-39% to 14%)	0.25
	Q2	0.83 (0.61-1.14)	-17% (-39% to 14%)	0.25
	Q3	0.98 (0.73-1.32)	-2% (-27% to 32%)	0.89
	Q4	0.73 (0.53-1.01)	-27% (-47% to 1%)	0.06
C81 Hodgkin lymphoma				
2020	Q1	1.41 (1.03-1.93)	41% (3% to 93%)	0.03
	Q2	1.07 (0.75-1.53)	7% (-25% to 53%)	0.70
	Q3	**1.59 (1.18-2.15)**	**59% (18% to 115%)**	**0.002**
	Q4	1.04 (0.73-1.49)	4% (-27% to 49%)	0.82
2021	Q1	1.49 (1.09-2.02)	49% (9% to 102%)	0.01
	Q2	1.49 (1.09-2.02)	49% (9% to 102%)	0.01
	Q3	0.82 (0.55-1.22)	-18% (-45% to 22%)	0.32
	Q4	1.33 (0.97-1.84)	33% (-3% to 84%)	0.08
2022	Q1	1.01 (0.70-1.44)	1% (-30% to 44%)	0.97
	Q2	0.83 (0.56-1.23)	-17% (-44% to 23%)	0.35
	Q3	1.16 (0.82-1.62)	16% (-18% to 62%)	0.40
	Q4	1.01 (0.70-1.44)	1% (-30% to 44%)	0.97
C82-86 non-Hodgkin lymphoma				
2020	Q1	0.91 (0.78-1.05)	-9% (-22% to 5%)	0.21
	Q2	**0.80 (0.69-0.94)**	**-20% (-31% to -6%)**	**0.006**
	Q3	0.91 (0.78-1.05)	-9% (-22% to 5%)	0.21
	Q4	1.00 (0.87-1.16)	0% (-13% to 16%)	0.97
2021	Q1	0.92 (0.79-1.06)	-8% (-21% to 6%)	0.26
	Q2	0.94 (0.81-1.09)	-6% (-19% to 9%)	0.42
	Q3	0.85 (0.73-0.99)	-15% (-27% to -1%)	0.04
	Q4	0.97 (0.84-1.12)	-3% (-16% to 12%)	0.71
2022	Q1	0.99 (0.86-1.14)	-1% (-14% to 14%)	0.88
	Q2	0.89 (0.77-1.03)	-11% (-23% to 3%)	0.13
	Q3	0.95 (0.83-1.10)	-5% (-17% to 10%)	0.51
	Q4	0.98 (0.86-1.13)	-2% (-14% to 13%)	0.83

Year	Quarter	IRR (95% CI)	Percent change	p-value
C90 multiple myeloma				
2020	Q1	1.13 (0.92-1.39)	13% (-8% to 39%)	0.25
	Q2	1.01 (0.81-1.25)	1% (-19% to 25%)	0.95
	Q3	1.00 (0.80-1.24)	0% (-20% to 24%)	0.97
	Q4	1.22 (0.99-1.48)	22% (-1% to 48%)	0.06
2021	Q1	0.81 (0.64-1.03)	-19% (-36% to 3%)	0.08
	Q2	1.27 (1.04-1.54)	27% (4% to 54%)	0.02
	Q3	1.14 (0.93-1.40)	14% (-7% to 40%)	0.21
	Q4	1.08 (0.87-1.33)	8% (-13% to 33%)	0.49
2022	Q1	0.94 (0.76-1.17)	-6% (-24% to 17%)	0.58
	Q2	0.94 (0.76-1.17)	-6% (-24% to 17%)	0.58
	Q3	0.85 (0.68-1.07)	-15% (-32% to 7%)	0.16
	Q4	1.03 (0.84-1.27)	3% (-16% to 27%)	0.77
C91-95 leukaemia				
2020	Q1	0.87 (0.73-1.04)	-13% (-27% to 4%)	0.12
	Q2	**0.71 (0.58-0.86)**	**-29% (-42% to -14%)**	**0.001**
	Q3	0.91 (0.76-1.08)	-9% (-24% to 8%)	0.27
	Q4	0.90 (0.76-1.07)	-10% (-24% to 7%)	0.24
2021	Q1	0.88 (0.74-1.05)	-12% (-26% to 5%)	0.15
	Q2	0.91 (0.76-1.08)	-9% (-24% to 8%)	0.26
	Q3	0.98 (0.83-1.16)	-2% (-17% to 16%)	0.82
	Q4	0.95 (0.80-1.13)	-5% (-20% to 13%)	0.55
2022	Q1	1.01 (0.86-1.19)	1% (-14% to 19%)	0.88
	Q2	0.90 (0.76-1.07)	-10% (-24% to 7%)	0.24
	Q3	0.82 (0.68-0.98)	-18% (-32% to -2%)	0.03
	Q4	0.79 (0.66-0.94)	-21% (-34% to -6%)	0.01

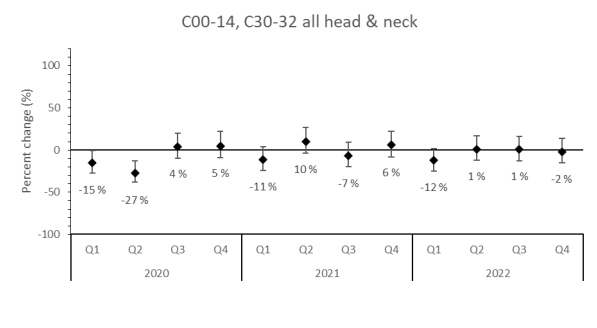
IRRs were calculated using quarterly incidence rates for 2018-2019 as the baseline period.

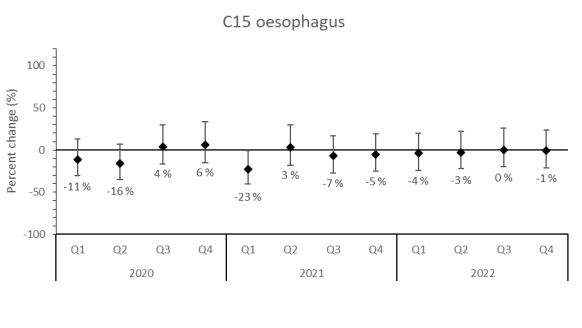
All models were adjusted for age and sex with the exception of breast, cervix, corpus uteri, ovary, prostate and testis, which were adjusted for age only.

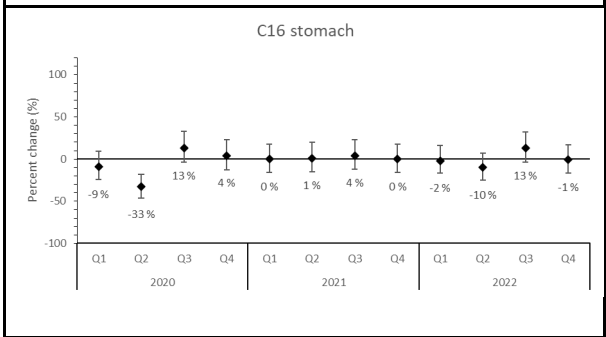
Results highlighted in blue are significantly different, at $p<0.05$, from the baseline rate, results in bold are significantly different, at $p<0.01$, from the baseline rate.

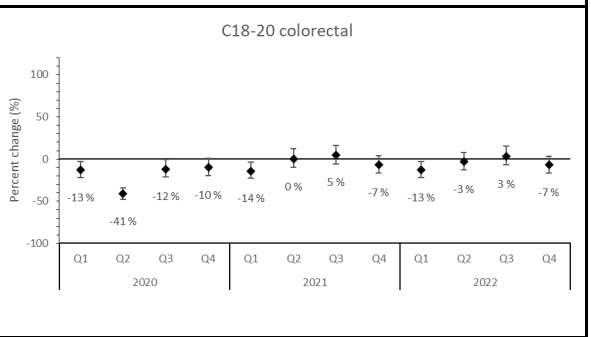
Appendix 2. Quarterly incidence rate ratios by cancer site (graphs)

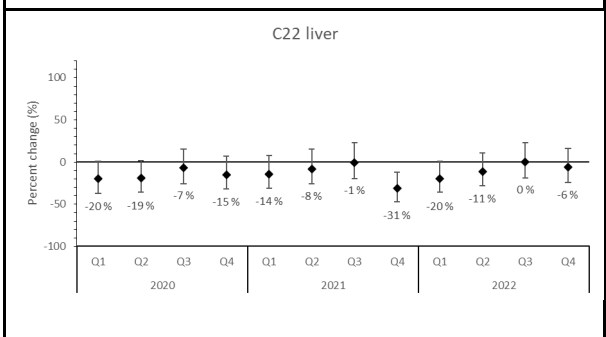
Percentage change in incidence rate ratios (IRRs) with 95% confidence intervals (pre-pandemic period 2018-2019 as baseline) by quarter and year, by site (adjusted by age and sex)

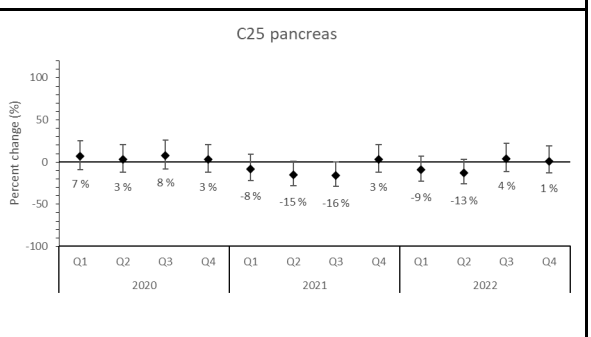


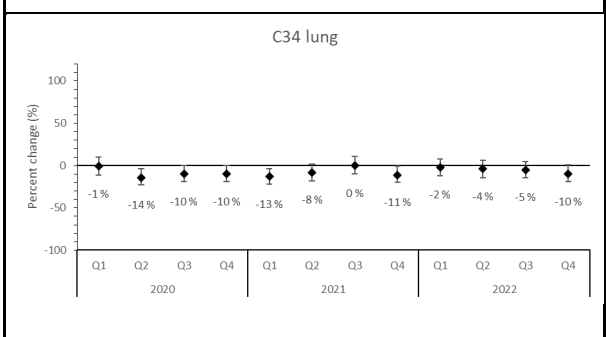


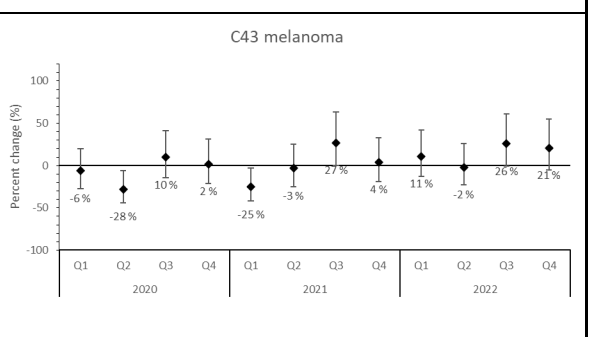


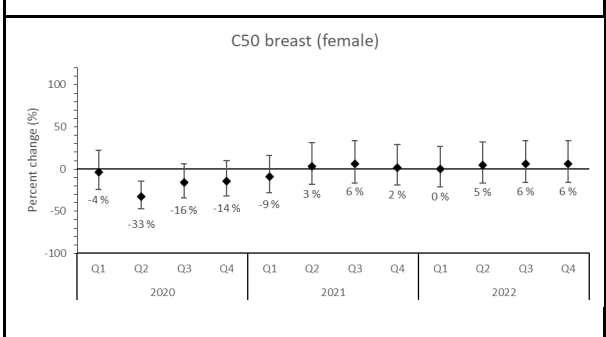


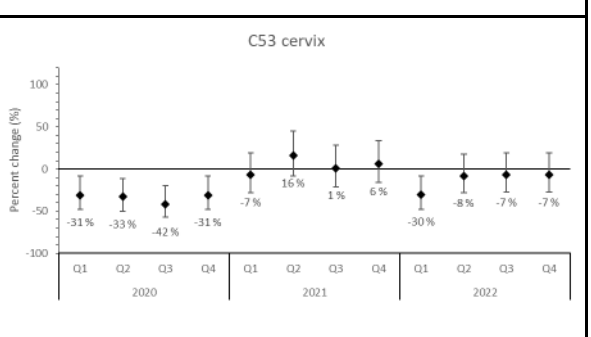




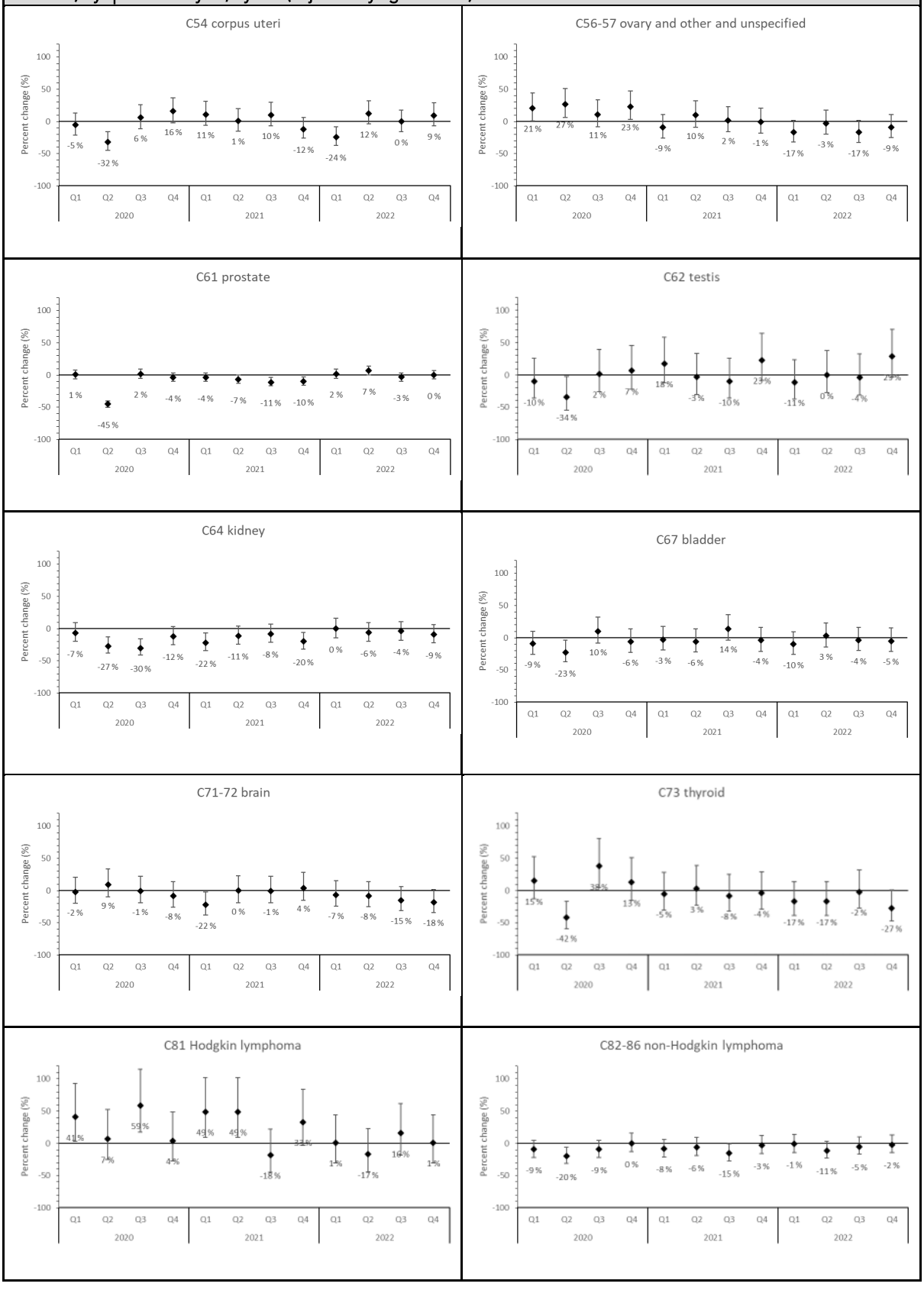




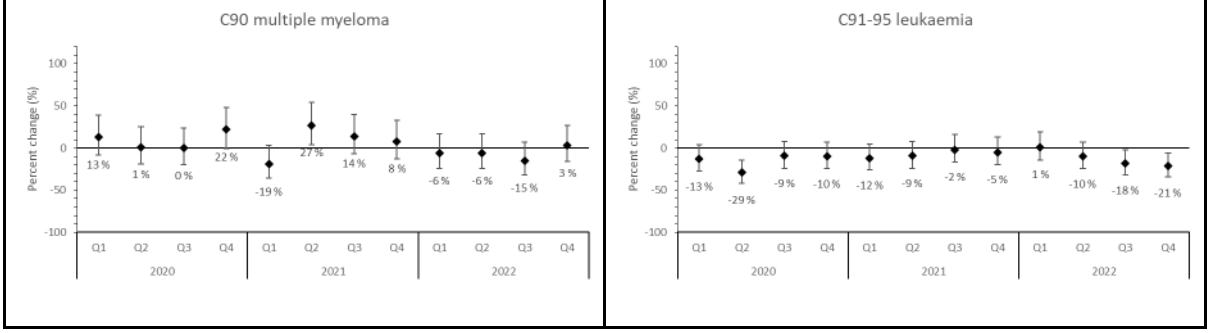




Percentage change in incidence rate ratios (IRRs) with 95% confidence intervals (pre-pandemic period 2018-2019 as baseline) by quarter and year, by site (adjusted by age and sex)



Percentage change in incidence rate ratios (IRRs) with 95% confidence intervals (pre-pandemic period 2018-2019 as baseline) by quarter and year, by site (adjusted by age and sex)



IRRs were calculated using quarterly incidence rates for 2018-2019 as the baseline period.

All models were adjusted for age and sex with the exception of breast, cervix, corpus uteri, ovary, prostate and testis, which were adjusted for age only.

Appendix 3. Age-specific rates and predicted rates (all invasive cancer excl NMSC, colorectal cancer, lung cancer, breast cancer, prostate cancer)

		2020			2021			2022		
Sex	Age group	Observed	Predicted	% difference	Observed	Predicted	% difference	Observed	Predicted	% difference
C00-43, C45-96 all invasive cancers excl. NMSC										
Female	00-49	113.1	127.1 (121.0-133.2)	-11.0%	123.5	129.4 (123.3-135.6)	-4.6%	121.4	131.8 (125.6-138.0)	-7.9%
	50-64	603.0	767.3 (744.2-790.3)	-21.4%	772.9	764.7 (740.5-788.9)	1.1%	781.4	762.1 (736.7-787.5)	2.5%
	65-74	1,194.8	1298.3 (1,186.4-1,410.2)	-8.0%	1,300.2	1282.9 (1,153.7-1,412.2)	1.3%	1,357.3	1267.7 (1,119.2-1,416.3)	7.1%
	75+	1,887.6	2047.4 (1,926.5-2,168.2)	-7.8%	1,923.4	2056.2 (1,930.4-2,182.0)	-6.5%	1,876.4	2065.0 (1,933.8-2,196.3)	-9.1%
Male	00-49	68.0	69.6 (62.4-76.8)	-2.3%	68.1	69.9 (62.1-77.6)	-2.6%	69.2	70.2 (61.9-78.5)	-1.4%
	50-64	776.7	857.7 (805.2-910.1)	-9.4%	790.4	851.4 (795.9-906.9)	-7.2%	856.5	845.1 (786.2-904.0)	1.3%
	65-74	1,966.3	2129.5 (1,995.3-2,263.6)	-7.7%	2,065.9	2101.8 (1,959.8-2,243.8)	-1.7%	2,148.0	2074.5 (1,923.8-2,225.3)	3.5%
	75+	2,701.7	2983.9 (2,779.3-3,188.6)	-9.5%	2,948.8	2961.9 (2,753.9-3,169.9)	-0.4%	2,901.4	2939.9 (2,728.3-3,151.6)	-1.3%
C18-20 colorectal										
Female	00-49	7.3	7.4 (5.8-9.1)	-1.4%	7.4	7.6 (5.9-9.2)	-2.6%	7.8	7.7 (6.0-9.3)	1.3%
	50-64	46.2	65.7 (52.4-78.9)	-29.7%	64.9	65.4 (52.1-78.8)	-0.8%	60.5	65.2 (51.7-78.6)	-7.2%
	65-74	107.5	136.8 (113.6-160.1)	-21.4%	135.6	134.0 (110.0-157.9)	1.2%	140.5	131.2 (106.5-155.9)	7.1%
	75+	236.7	269.4 (230.4-308.5)	-12.1%	265.0	265.8 (225.1-306.4)	-0.3%	242.1	262.1 (219.7-304.6)	-7.6%
Male	00-49	6.4	6.9 (5.3-8.5)	-7.2%	8.0	7.0 (5.4-8.6)	14.3%	7.8	7.1 (5.5-8.7)	9.9%
	50-64	79.2	102.2 (87.9-116.5)	-22.5%	92.7	102.0 (87.6-116.4)	-9.1%	101.4	101.8 (87.2-116.3)	-0.4%
	65-74	179.9	208.9 (151.4-266.4)	-13.9%	222.7	196.4 (133.7-259.0)	13.4%	210.3	184.6 (116.1-253.0)	13.9%
	75+	352.1	441.2 (400.1-482.3)	-20.2%	388.5	433.3 (390.8-475.8)	-10.3%	388.1	425.5 (381.5-469.6)	-8.8%

		2020			2021			2022		
Sex	Age group	Observed	Predicted	% difference	Observed	Predicted	% difference	Observed	Predicted	% difference
C34 lung										
Female	00-49	2.5	n/a	n/a	2.3	n/a	n/a	2.5	n/a	n/a
	50-64	60.9	64.0 (56.7-71.3)	-4.8%	68.3	62.6 (54.6-70.6)	9.1%	66.7	61.3 (52.5-70.0)	8.8%
	65-74	208.5	208.1 (179.7-236.6)	0.2%	204.3	203.3 (170.5-236.1)	0.5%	229.2	198.6 (160.8-236.3)	15.4%
	75+	271.9	280.7 (219.1-342.3)	-3.1%	281.4	279.1 (211.9-346.2)	0.8%	273.7	277.4 (204.1-350.8)	-1.3%
Male	00-49	2.3	n/a	n/a	2.1	n/a	n/a	2.8	n/a	n/a
	50-64	71.9	79.5 (63.7-95.2)	-9.6%	65.2	78.5 (62.6-94.4)	-16.9%	74.2	77.5 (61.5-93.6)	-4.3%
	65-74	252.3	274.9 (250.1-299.6)	-8.2%	249.6	272.8 (247.7-297.9)	-8.5%	240.9	270.7 (245.2-296.2)	-11.0%
	75+	372.9	435.1 (373.4-496.7)	-14.3%	390.7	429.1 (365.3-492.9)	-8.9%	388.1	423.2 (357.0-489.4)	-8.3%
C50 breast										
Female	00-49	46.7	50.3 (46.7-53.9)	-7.2%	48.9	51.3 (47.7-54.9)	-4.7%	48.8	52.3 (48.7-56.0)	-6.7%
	50-64	193.7	309.1 (286.6-331.5)	-37.3%	324.5	307.6 (284.2-331.0)	5.5%	336.9	306.1 (281.7-330.5)	10.1%
	65-74	287.9	333.5 (282.5-384.6)	-13.7%	354.5	334.6 (282.0-387.2)	5.9%	372.8	335.7 (281.4-389.9)	11.1%
	75+	390.6	419.0 (381.5-456.5)	-6.8%	406.5	425.7 (387.9-463.5)	-4.5%	428.0	432.5 (394.4-470.6)	-1.0%
C61 prostate										
Male	00-49	6.3	n/a	n/a	7.1	n/a	n/a	6.2	n/a	n/a
	50-64	294.6	324.7 (271.7-377.8)	-9.3%	295.4	321.8 (265.7-378.0)	-8.2%	324.3	318.9 (259.3-378.5)	1.7%
	65-74	759.3	858.7 (727.8-989.6)	-11.6%	787.4	860.5 (726.9-994.1)	-8.5%	892.8	862.3 (725.8-998.9)	3.5%
	75+	588.3	707.9 (657.8-758.0)	-16.9%	652.5	737.4 (679.6-795.2)	-11.5%	701.9	768.1 (701.7-834.6)	-8.6%

Results highlighted in blue are outside the prediction interval

Appendix 4. Stage- specific incidence rate ratios by cancer site

	2020			2021			2022		
	IRR (95% CI)	PC%	p-value	IRR (95% CI)	PC%	p-value	IRR (95% CI)	PC%	p-value
C00-14, C30-32 all head & neck									
stage I	0.9 (0.74-1.09)	-10%	0.27	1.06 (0.88-1.28)	6%	0.53	0.98 (0.8-1.2)	-2%	0.87
stage II	0.91 (0.69-1.2)	-9%	0.50	1.17 (0.9-1.53)	17%	0.23	1.25 (0.96-1.62)	25%	0.10
stage III	0.87 (0.69-1.1)	-13%	0.25	0.96 (0.75-1.24)	-4%	0.78	0.88 (0.68-1.14)	-12%	0.34
stage IV	0.96 (0.84-1.09)	-4%	0.51	0.95 (0.83-1.09)	-5%	0.47	0.94 (0.82-1.09)	-6%	0.43
% unstaged	11%			22%			30%		
C15 oesophagus									
stage I	1 (0.73-1.35)	0%	0.98	1.15 (0.86-1.55)	15%	0.34	**1.51 (1.12-2.02)**	**51%**	**0.006**
stage II	0.98 (0.69-1.39)	-2%	0.92	0.76 (0.52-1.12)	-24%	0.17	0.88 (0.59-1.31)	-12%	0.52
stage III	1.07 (0.85-1.34)	7%	0.58	0.94 (0.74-1.19)	-6%	0.61	1.07 (0.84-1.37)	7%	0.58
stage IV	0.9 (0.73-1.13)	-10%	0.37	0.9 (0.72-1.12)	-10%	0.33	0.78 (0.61-1.01)	-22%	0.06
% unstaged	29%			32%			49%		
C16 stomach									
stage I	1.05 (0.8-1.38)	5%	0.71	0.96 (0.72-1.27)	-4%	0.76	1.16 (0.88-1.54)	16%	0.29
stage II	0.73 (0.51-1.05)	-27%	0.09	1.22 (0.89-1.66)	22%	0.21	1.26 (0.91-1.74)	26%	0.16
stage III	0.9 (0.7-1.17)	-10%	0.44	1.07 (0.84-1.37)	7%	0.56	0.88 (0.66-1.15)	-12%	0.35
stage IV	0.98 (0.82-1.17)	-2%	0.79	0.94 (0.79-1.13)	-6%	0.54	0.93 (0.76-1.12)	-7%	0.43
% unstaged	30%			33%			45%		
C18-20 colorectal									
stage I	**0.75 (0.62-0.91)**	**-25%**	**0.004**	0.95 (0.78-1.14)	-5%	0.57	1.04 (0.87-1.26)	4%	0.65
stage II	**0.72 (0.65-0.8)**	**-28%**	**<0.001**	0.93 (0.84-1.02)	-7%	0.12	0.99 (0.9-1.09)	-1%	0.88
stage III	**0.83 (0.74-0.93)**	**-17%**	**0.001**	1 (0.9-1.12)	0%	0.97	1.02 (0.92-1.14)	2%	0.71
stage IV	0.91 (0.82-1)	-9%	0.05	0.92 (0.83-1.02)	-8%	0.10	**0.69 (0.62-0.78)**	**-31%**	**<0.001**
% unstaged	7%			11%			18%		
C22 liver									
stage I	0.8 (0.59-1.09)	-20%	0.17	0.69 (0.49-0.96)	-31%	0.03	0.69 (0.48-0.98)	-31%	0.04
stage II	0.89 (0.65-1.22)	-11%	0.47	0.79 (0.56-1.11)	-21%	0.17	0.95 (0.68-1.32)	-5%	0.77
stage III	0.95 (0.69-1.31)	-5%	0.74	0.8 (0.56-1.14)	-20%	0.21	0.91 (0.64-1.29)	-9%	0.58
stage IV	0.82 (0.64-1.05)	-18%	0.12	1.05 (0.83-1.33)	5%	0.66	1.02 (0.8-1.31)	2%	0.85
% unstaged	23%			31%			42%		
C25 pancreas									
stage I	1.16 (0.93-1.44)	16%	0.19	1.07 (0.85-1.36)	7%	0.56	0.86 (0.66-1.12)	-14%	0.26
stage II	1.09 (0.86-1.38)	9%	0.46	1.05 (0.82-1.34)	5%	0.72	1.04 (0.8-1.34)	4%	0.78
stage III	1.15 (0.85-1.56)	15%	0.38	**0.54 (0.36-0.83)**	**-46%**	**0.005**	0.92 (0.64-1.31)	-8%	0.63
stage IV	0.99 (0.86-1.13)	-1%	0.87	0.87 (0.75-1.01)	-13%	0.07	0.98 (0.85-1.13)	-2%	0.80
% unstaged	8%			23%			32%		
C34 lung									
stage I	0.84 (0.71-1)	-16%	0.05	0.91 (0.77-1.07)	-9%	0.27	1.09 (0.92-1.29)	9%	0.33
stage II	**0.73 (0.61-0.86)**	**-27%**	**<0.001**	0.85 (0.72-1)	-15%	0.05	0.81 (0.67-0.97)	-19%	0.02
stage III	**0.83 (0.74-0.94)**	**-17%**	**0.002**	**0.81 (0.72-0.92)**	**-19%**	**0.001**	0.87 (0.77-0.99)	-13%	0.03
stage IV	1.03 (0.95-1.13)	3%	0.47	0.99 (0.91-1.09)	-1%	0.90	0.94 (0.85-1.03)	-6%	0.18
% unstaged	3%			15%			30%		

	2020			2021			2022		
	IRR (95% CI)	PC%	p-value	IRR (95% CI)	PC%	p-value	IRR (95% CI)	PC%	p-value
C43 melanoma									
stage I	0.86 (0.66-1.11)	-14%	0.23	1.01 (0.78-1.3)	1%	0.94	1.15 (0.9-1.49)	15%	0.27
stage II	1.13 (0.95-1.34)	13%	0.18	1.06 (0.89-1.26)	6%	0.53	1.21 (1.02-1.44)	21%	0.03
stage III	1.12 (0.89-1.41)	12%	0.31	1.18 (0.95-1.48)	18%	0.14	1.18 (0.94-1.48)	18%	0.14
stage IV	0.95 (0.69-1.3)	-5%	0.75	0.65 (0.46-0.92)	-35%	0.02	**0.56 (0.39-0.81)**	**-44%**	**0.002**
% unstaged	2%			2%			7%		
C50 breast (female)									
stage I	0.78 (0.62-0.98)	-22%	0.04	0.99 (0.79-1.24)	-1%	0.94	1.23 (0.98-1.54)	23%	0.08
stage II	0.88 (0.8-0.98)	-12%	0.02	1.02 (0.92-1.13)	2%	0.66	1.05 (0.95-1.16)	5%	0.36
stage III	0.87 (0.77-0.97)	-13%	0.01	1.1 (0.99-1.22)	10%	0.09	**0.81 (0.72-0.91)**	**-19%**	**0.001**
stage IV	0.95 (0.81-1.11)	-5%	0.52	0.9 (0.77-1.06)	-10%	0.21	**0.72 (0.61-0.87)**	**-28%**	**<0.001**
% unstaged	1%			6%			14%		
C53 cervix									
stage I	**0.57 (0.44-0.73)**	**-43%**	**<0.001**	1.08 (0.88-1.33)	8%	0.44	0.86 (0.68-1.08)	-14%	0.19
stage II	0.95 (0.64-1.42)	-5%	0.82	1.01 (0.68-1.51)	1%	0.95	1.09 (0.73-1.62)	9%	0.69
stage III	0.64 (0.45-0.9)	-36%	0.01	1.11 (0.83-1.48)	11%	0.48	0.92 (0.67-1.27)	-8%	0.62
stage IV	0.69 (0.46-1.03)	-31%	0.07	0.87 (0.6-1.27)	-13%	0.48	0.62 (0.4-0.96)	-38%	0.03
% unstaged	4%			8%			19%		
C54 corpus uteri									
stage I	0.98 (0.87-1.11)	-2%	0.75	1.03 (0.91-1.16)	3%	0.67	1.05 (0.93-1.19)	5%	0.40
stage II	0.99 (0.62-1.59)	-1%	0.98	1.03 (0.64-1.64)	3%	0.91	0.78 (0.46-1.3)	-22%	0.34
stage III	1.1 (0.82-1.46)	10%	0.53	1.15 (0.87-1.53)	15%	0.33	1.22 (0.92-1.62)	22%	0.16
stage IV	0.64 (0.44-0.94)	-36%	0.02	0.86 (0.61-1.21)	-14%	0.39	**0.39 (0.24-0.62)**	**-61%**	**<0.001**
% unstaged	6%			8%			14%		
C56-57 ovary and other and unspecified									
stage I	1.25 (1-1.55)	25%	0.05	1.05 (0.84-1.33)	5%	0.65	1.16 (0.92-1.45)	16%	0.21
stage II	1.33 (0.89-1.96)	33%	0.16	1.06 (0.69-1.62)	6%	0.79	0.78 (0.48-1.27)	-22%	0.32
stage III	1.16 (0.95-1.41)	16%	0.14	0.95 (0.77-1.17)	-5%	0.61	0.92 (0.74-1.14)	-8%	0.42
stage IV	1.17 (0.92-1.48)	17%	0.20	1 (0.78-1.29)	0%	0.97	**0.6 (0.44-0.82)**	**-40%**	**0.001**
% unstaged	20%			24%			30%		
C61 prostate									
stage I	**0.9 (0.85-0.95)**	**-10%**	**<0.001**	**0.91 (0.86-0.97)**	**-9%**	**0.002**	0.95 (0.89-1)	-5%	0.07
stage II	0.91 (0.84-0.99)	-9%	0.03	**0.84 (0.77-0.92)**	**-16%**	**<0.001**	**1.12 (1.03-1.22)**	**12%**	**0.009**
stage III	**0.81 (0.73-0.89)**	**-19%**	**<0.001**	1.02 (0.93-1.11)	2%	0.73	**1.15 (1.05-1.26)**	**15%**	**0.002**
stage IV	0.87 (0.78-0.97)	-13%	0.01	0.94 (0.84-1.05)	-6%	0.26	0.86 (0.77-0.97)	-14%	0.02
% unstaged	4%			11%			25%		
C62 testis									
stage I	1.04 (0.83-1.3)	4%	0.72	1.27 (1.03-1.57)	27%	0.02	1.27 (1.03-1.56)	27%	0.03
stage II	0.78 (0.47-1.31)	-22%	0.35	0.81 (0.49-1.37)	-19%	0.44	0.48 (0.25-0.89)	-52%	0.02
stage III	0.44 (0.21-0.9)	-56%	0.02	**0.29 (0.12-0.68)**	**-71%**	**0.005**	0.6 (0.32-1.15)	-40%	0.12
% unstaged	5%			8%			6%		

	2020			2021			2022		
	IRR (95% CI)	PC%	p-value	IRR (95% CI)	PC%	p-value	IRR (95% CI)	PC%	p-value
C64 kidney									
stage I	**0.7 (0.61-0.8)**	**-30%**	**<0.001**	**0.77 (0.67-0.88)**	**-23%**	**<0.001**	0.92 (0.81-1.04)	-8%	0.18
stage II	0.71 (0.49-1.03)	-29%	0.07	0.74 (0.51-1.07)	-26%	0.11	0.93 (0.66-1.3)	-7%	0.66
stage III	1.04 (0.85-1.27)	4%	0.69	1.16 (0.96-1.41)	16%	0.13	1.2 (0.99-1.45)	20%	0.06
stage IV	0.92 (0.74-1.14)	-8%	0.44	0.79 (0.63-0.99)	-21%	0.04	0.78 (0.62-0.98)	-22%	0.03
% unstaged	4%			10%			11%		
C67 bladder									
stage I	1.02 (0.85-1.23)	2%	0.83	1.09 (0.91-1.3)	9%	0.36	1.24 (1.04-1.47)	24%	0.02
stage II	0.98 (0.77-1.25)	-2%	0.89	1.17 (0.93-1.46)	17%	0.18	1.08 (0.86-1.36)	8%	0.51
stage III	0.83 (0.57-1.23)	-17%	0.36	0.86 (0.59-1.26)	-14%	0.44	0.67 (0.44-1.02)	-33%	0.06
stage IV	0.78 (0.61-0.99)	-22%	0.04	0.78 (0.61-0.99)	-22%	0.04	**0.59 (0.45-0.77)**	**-41%**	**<0.001**
% unstaged	11%			12%			16%		
C73 thyroid									
stage I	1.13 (0.95-1.35)	13%	0.17	1.1 (0.92-1.32)	10%	0.29	1.04 (0.86-1.25)	4%	0.69
stage II	0.74 (0.46-1.19)	-26%	0.21	0.99 (0.64-1.53)	-1%	0.97	0.75 (0.46-1.21)	-25%	0.24
stage III	0.9 (0.62-1.3)	-10%	0.56	0.61 (0.39-0.93)	-39%	0.02	0.6 (0.39-0.93)	-40%	0.02
stage IV	1.57 (1.06-2.34)	57%	0.03	1.14 (0.73-1.77)	14%	0.56	0.6 (0.34-1.05)	-40%	0.08
% unstaged	2%			5%			7%		
C81 Hodgkin lymphoma									
stage I	0.79 (0.43-1.43)	-21%	0.44	0.69 (0.34-1.38)	-31%	0.29	0.75 (0.35-1.62)	-25%	0.47
stage II	1.28 (0.87-1.88)	28%	0.22	1.3 (0.86-1.96)	30%	0.21	0.76 (0.45-1.28)	-24%	0.30
stage III	1.54 (1.01-2.37)	54%	0.05	1.15 (0.69-1.92)	15%	0.60	1.36 (0.79-2.34)	36%	0.27
stage IV	1.26 (0.81-1.94)	26%	0.30	1.65 (1.07-2.55)	65%	0.02	1.28 (0.75-2.18)	28%	0.37
% unstaged	7%			31%			52%		
C82-86 non-Hodgkin lymphoma									
stage I	**0.72 (0.6-0.86)**	**-28%**	**<0.001**	0.78 (0.64-0.94)	-22%	0.01	0.9 (0.74-1.11)	-10%	0.33
stage II	1 (0.8-1.25)	0%	0.99	0.79 (0.61-1.03)	-21%	0.08	0.99 (0.76-1.29)	-1%	0.92
stage III	0.99 (0.8-1.21)	-1%	0.90	0.83 (0.66-1.05)	-17%	0.12	0.99 (0.77-1.26)	-1%	0.93
stage IV	0.97 (0.84-1.13)	-3%	0.71	1.13 (0.98-1.31)	13%	0.09	0.97 (0.81-1.15)	-3%	0.70
% unstaged	14%			30%			50%		

IRRs were calculated stage specific incidence rates for 2018-2019 as the baseline period.

All models were adjusted for age and sex with the exception of breast, cervix, corpus uteri, ovary, prostate and testis, which were adjusted for age only.

Results highlighted in blue are significantly different, at $p<0.05$, from the baseline rate, results in bold are significantly different, at $p<0.01$, from the baseline rate

Appendix 5. Age-standardised mortality rates by cancer site

	2018-2019	2020-2021			2022		
Site	Age-standardised mortality rate/100,000	Age-standardised mortality rate/100,000	Percent change from 2018-2019	p-value	Age-standardised mortality rate/100,000	Percent change (from 2018-2019)	p-value
C00-C96 all invasive cancers	265.5 (261.7 to 269.3)	**256.1 (252.5 to 259.8)**	**-3.5%**	**0.001**	**250.2 (245.3 to 255.1)**	**-5.7%**	**<0.001**
C00-14,C30-32 head & neck	7.6 (6.9 to 8.2)	7 (6.4 to 7.6)	-7.1%	0.23	6.9 (6.1 to 7.7)	-8.5%	0.22
C15 oesophagus	12.2 (11.4 to 13)	11.2 (10.4 to 12)	-8.3%	0.08	11.2 (10.2 to 12.2)	-8.2%	0.14
C16 stomach	8.8 (8.1 to 9.4)	8 (7.3 to 8.6)	-9.2%	0.10	**7.3 (6.4 to 8.1)**	**-17%**	**0.008**
C18-20 colorectal	28.4 (27.2 to 29.7)	27.1 (25.9 to 28.3)	-4.7%	0.14	**25.3 (23.7 to 26.8)**	**-11.1%**	**0.002**
C22 liver	11 (10.3 to 11.8)	10.8 (10 to 11.5)	-2.2%	0.67	11.4 (10.4 to 12.4)	3.4%	0.59
C25 pancreas	15.4 (14.4 to 16.3)	15.6 (14.7 to 16.5)	1.6%	0.73	15.7 (14.5 to 16.9)	2.1%	0.70
C34 bronchus & lung	52.8 (51.1 to 54.4)	50.9 (49.3 to 52.5)	-3.6%	0.11	**48.4 (46.2 to 50.6)**	**-8.3%**	**0.002**
C43 melanoma	4.6 (4.1 to 5.1)	4.3 (3.8 to 4.8)	-7.6%	0.32	4.8 (4.2 to 5.5)	4.3%	0.66
C50 breast (female)	36.9 (35 to 38.8)	35.2 (33.4 to 37)	-4.5%	0.22	35.2 (32.8 to 37.7)	-4.5%	0.30
C53 cervix uteri	4.5 (3.8 to 5.1)	**3.2 (2.7 to 3.7)**	**-28.1%**	**0.003**	4 (3.2 to 4.8)	-11.4%	0.34
C54 corpus uteri	5.2 (4.5 to 6)	5.4 (4.7 to 6.2)	3.5%	0.74	6.1 (5 to 7.1)	15.6%	0.21
C56-57 ovary & related	15.8 (14.5 to 17)	15.2 (14 to 16.4)	-3.5%	0.54	**12.9 (11.4 to 14.4)**	**-18.4%**	**0.004**
C61 prostate	43.9 (41.3 to 46.4)	42.2 (39.8 to 44.7)	-3.7%	0.37	**38.1 (35 to 41.2)**	**-13.2%**	**0.005**
C62 testis	0.2 (0.1 to 0.4)	0.2 (0.1 to 0.4)	2.2%	0.97	0.2 (0 to 0.3)	-16%	0.77
C64 kidney except renal pelvis	5.9 (5.3 to 6.5)	5.9 (5.3 to 6.4)	-0.8%	0.92	5.9 (5.1 to 6.6)	-0.4%	0.96
C67 bladder	6.9 (6.2 to 7.5)	6.8 (6.1 to 7.4)	-1.5%	0.83	6.1 (5.3 to 6.9)	-11.1%	0.14
C71-72 brain	7.7 (7.1 to 8.4)	7.3 (6.7 to 7.9)	-5.7%	0.32	7.7 (6.9 to 8.5)	-0.7%	0.93
C73 thyroid	0.5 (0.3 to 0.7)	0.7 (0.5 to 0.9)	34.5%	0.17	0.6 (0.3 to 0.8)	4.8%	0.87
C81 Hodgkin lymphoma	0.7 (0.5 to 0.9)	0.6 (0.4 to 0.8)	-12.7%	0.53	0.5 (0.3 to 0.7)	-27.2%	0.21
C82-86 non-Hodgkin lymphoma	8.3 (7.6 to 9)	7.7 (7 to 8.3)	-7.6%	0.19	7.2 (6.4 to 8.1)	-13%	0.05
C90 multiple myeloma	5.5 (4.9 to 6.1)	5.1 (4.6 to 5.6)	-7.2%	0.32	4.4 (3.7 to 5)	-20.6%	0.01
C91-95 leukaemia	7.9 (7.3 to 8.6)	7.4 (6.8 to 8.1)	-6.1%	0.30	7.8 (6.9 to 8.7)	-1.7%	0.83

IRRs were calculated using incidence rates for 2018-2019 as the baseline period.

All models were adjusted for age and sex with the exception of breast, cervix, corpus uteri, ovary, prostate and testis, which were adjusted for age only.

Results highlighted in blue are significantly different, at $p<0.05$, from the baseline rate, results in bold are significantly different, at $p<0.01$, from the baseline rate.

Appendix 6. 1-year net survival by cancer site

Cancer site	year	unstandardised	age-standardised	stage-standardised	stage & age-standardised
C00-14, C30-32 head & neck	2018	77.93% (74.43%-81.01%)	74.69% (70.69%-78.23%)	77.87% (74.5%-80.85%)	74.44% (70.73%-77.75%)
	2019	82.25% (78.9%-85.12%)	80.72% (77.05%-83.87%)	81.89% (78.53%-84.78%)	79.43% (75.82%-82.57%)
	2020	81.83% (78.38%-84.78%)	79.54% (75.67%-82.86%)	82.22% (78.96%-85.02%)	78.59% (74.83%-81.86%)
	2021	79.69% (76.32%-82.63%)	78.23% (74.66%-81.36%)	80.37% (77.13%-83.2%)	79.37% (76.05%-82.28%)
C15 oesophagus	2018	44.36% (39.41%-49.19%)	45.66% (40.53%-50.63%)	46.31% (41.94%-50.56%)	n/a
	2019	53.55% (48.6%-58.24%)	55.82% (50.87%-60.48%)	52.66% (48.19%-56.92%)	n/a
	2020	52.42% (47.41%-57.18%)	52.81% (47.63%-57.71%)	51.58% (47.21%-55.77%)	n/a
	2021	49.92% (44.94%-54.69%)	51.89% (46.79%-56.73%)	49.38% (44.99%-53.61%)	48.64% (44.53%-52.62%)
C16 stomach	2018	58% (53.16%-62.53%)	60.84% (56.25%-65.1%)	58.69% (54.21%-62.89%)	63.27% (59.53%-66.77%)
	2019	60.73% (56.02%-65.1%)	63.09% (58.55%-67.28%)	59.76% (55.66%-63.62%)	62.78% (59.06%-66.26%)
	2020	62.12% (57.21%-66.64%)	62.89% (57.96%-67.42%)	62.22% (58.02%-66.13%)	n/a
	2021	59.15% (54.48%-63.51%)	62.86% (58.42%-66.97%)	58.19% (54.06%-62.08%)	61.38% (57.59%-64.95%)
C18-20 colorectal	2018	84.46% (82.78%-86%)	85.11% (83.52%-86.56%)	83.94% (82.41%-85.35%)	84.57% (83.12%-85.9%)
	2019	83.32% (81.59%-84.9%)	84.28% (82.66%-85.75%)	83.29% (81.73%-84.73%)	84.34% (82.9%-85.66%)
	2020	79.51% (77.5%-81.36%)	80.74% (78.87%-82.47%)	80.98% (79.32%-82.53%)	82.71% (81.14%-84.16%)
	2021	83.61% (81.91%-85.17%)	84.31% (82.7%-85.77%)	83.7% (82.21%-85.08%)	84.17% (82.75%-85.48%)
C22 liver	2018	45.43% (39.69%-50.99%)	48.13% (42.38%-53.63%)	43.23% (37.91%-48.42%)	n/a
	2019	39.43% (33.64%-45.17%)	39.83% (33.86%-45.73%)	40.09% (34.46%-45.65%)	n/a
	2020	42.03% (35.95%-47.99%)	42.8% (36.56%-48.87%)	40.74% (35.11%-46.29%)	n/a
	2021	41.23% (35.22%-47.14%)	41.98% (35.77%-48.07%)	41.74% (36.06%-47.31%)	n/a
C25 pancreas	2018	30.16% (26.17%-34.25%)	35.82% (31.66%-40%)	30.9% (27.2%-34.68%)	n/a
	2019	28.61% (24.75%-32.59%)	33.66% (29.34%-38.03%)	29.17% (25.44%-33%)	n/a
	2020	31.99% (28.12%-35.91%)	36.62% (32.46%-40.78%)	31.05% (27.64%-34.52%)	37.33% (33.9%-40.76%)
	2021	31.35% (27.25%-35.53%)	37.69% (33.25%-42.11%)	29.52% (25.76%-33.36%)	n/a

Cancer site	year	unstandardised	age-standardised	stage-standardised	stage & age-standardised
C34 lung	2018	48.09% (45.92%-50.21%)	49.31% (46.97%-51.6%)	46.55% (44.64%-48.43%)	48.57% (46.58%-50.54%)
	2019	44.74% (42.62%-46.83%)	47.02% (44.71%-49.3%)	44.71% (42.83%-46.57%)	48.01% (46.03%-49.97%)
	2020	43.33% (41.16%-45.49%)	46.66% (44.32%-48.97%)	45.11% (43.18%-47.02%)	48.34% (46.35%-50.3%)
	2021	44.19% (42.03%-46.32%)	47.22% (44.88%-49.52%)	45.79% (43.85%-47.71%)	49.47% (47.38%-51.52%)
C43 melanoma	2018	95.92% (93.99%-97.24%)	95.34% (93.14%-96.84%)	96.04% (94.32%-97.24%)	96.4% (94.75%-97.54%)
	2019	97.46% (95.77%-98.48%)	97.41% (95.47%-98.53%)	97.52% (95.97%-98.48%)	97.92% (96.33%-98.82%)
	2020	97.37% (95.54%-98.45%)	96.96% (94.88%-98.2%)	97.76% (96.17%-98.69%)	97.26% (95.45%-98.35%)
	2021	97.18% (95.45%-98.25%)	96.87% (94.9%-98.08%)	96.84% (95.17%-97.93%)	97.5% (96.03%-98.43%)
C50 breast (female)	2018	97.54% (96.79%-98.12%)	96.79% (95.69%-97.61%)	97.36% (96.64%-97.93%)	97.09% (96.12%-97.83%)
	2019	97.22% (96.45%-97.83%)	96.21% (95.09%-97.07%)	97% (96.17%-97.65%)	96.45% (95.35%-97.29%)
	2020	96.56% (95.64%-97.29%)	95.57% (94.35%-96.53%)	96.89% (96.02%-97.57%)	96.55% (95.53%-97.34%)
	2021	97.6% (96.89%-98.15%)	96.74% (95.69%-97.54%)	97.73% (97.07%-98.25%)	97.43% (96.49%-98.11%)
C53 cervix	2018	86.5% (81.91%-90%)	82.65% (76.27%-87.46%)	87.04% (83.29%-90%)	n/a
	2019	88.89% (84.32%-92.18%)	82.03% (75.88%-86.75%)	89.44% (86.06%-92.04%)	n/a
	2020	89.57% (84.03%-93.26%)	85.97% (78.34%-91.06%)	91.06% (87%-93.9%)	n/a
	2021	90.39% (86.29%-93.31%)	85.1% (78.44%-89.84%)	90.15% (86.66%-92.77%)	87.08% (80.5%-91.56%)
C54 corpus uteri	2018	92.42% (89.31%-94.66%)	91.62% (87.99%-94.19%)	92.54% (89.79%-94.58%)	n/a
	2019	90.18% (86.91%-92.67%)	88.74% (85.06%-91.56%)	90.53% (87.81%-92.66%)	n/a
	2020	91.5% (88.35%-93.83%)	89.96% (86.22%-92.72%)	90.56% (88.02%-92.58%)	89.23% (86.54%-91.41%)
	2021	91.79% (88.79%-94%)	90.07% (86.59%-92.68%)	92.09% (89.67%-93.97%)	92.09% (89.53%-94.04%)
C56-57 ovary and other and unspecified	2018	73.04% (68.23%-77.24%)	71.03% (66.37%-75.18%)	73.59% (69.08%-77.55%)	73.69% (69.02%-77.78%)
	2019	73.76% (68.89%-77.99%)	71.49% (66.9%-75.57%)	73.35% (68.71%-77.42%)	n/a
	2020	73.75% (69.44%-77.55%)	72.2% (68.17%-75.82%)	73.91% (70.01%-77.39%)	75.01% (70.99%-78.57%)
	2021	72.5% (67.75%-76.67%)	71.8% (67.25%-75.83%)	72.03% (67.36%-76.14%)	72.46% (68.06%-76.36%)
C61 prostate	2018	99.36% (98.5%-99.72%)	98.76% (97.68%-99.34%)	99.07% (98.2%-99.52%)	99.83% (93.1%-100%)
	2019	99.05% (98.3%-99.47%)	98.36% (97.35%-98.99%)	99.14% (98.44%-99.52%)	100% (100%-100%)
	2020	98.67% (97.9%-99.17%)	97.43% (96.39%-98.17%)	98.51% (97.74%-99.02%)	99.43% (98.07%-99.83%)
	2021	98.82% (98.05%-99.29%)	97.71% (96.73%-98.4%)	99% (98.27%-99.42%)	97.96% (96.94%-98.65%)

Cancer site	year	unstandardised	age-standardised	stage-standardised	stage & age-standardised
C62 testis	2018	99.13% (94.51%-99.86%)	98% (80.72%-99.81%)	n/a	n/a
	2019	98.15% (93.98%-99.44%)	89.23% (87.7%-90.57%)	n/a	n/a
	2020	98.19% (93.89%-99.47%)	n/a	n/a	n/a
	2021	97.97% (94.18%-99.3%)	99.18% (94.25%-99.88%)	n/a	n/a
C64 kidney	2018	83.42% (79.85%-86.41%)	82.4% (78.66%-85.55%)	81.68% (78.67%-84.3%)	n/a
	2019	86.38% (83.21%-89%)	85.16% (81.75%-87.98%)	84.55% (81.5%-87.14%)	n/a
	2020	83.93% (80.15%-87.05%)	82.46% (78.45%-85.78%)	85.87% (82.96%-88.31%)	85.47% (82.47%-87.99%)
	2021	83.04% (79.32%-86.16%)	81.7% (77.91%-84.9%)	82.86% (79.49%-85.73%)	82.4% (78.84%-85.41%)
C67 bladder	2018	72.76% (67.2%-77.53%)	75.5% (69.82%-80.26%)	73.48% (68.71%-77.65%)	n/a
	2019	66.69% (61.26%-71.54%)	71.6% (66.41%-76.14%)	66.75% (62.02%-71.03%)	n/a
	2020	71.09% (65.6%-75.87%)	75.38% (70.17%-79.81%)	68.81% (63.96%-73.14%)	73.08% (68.85%-76.83%)
	2021	65.84% (60.59%-70.57%)	72.5% (67.6%-76.79%)	64.9% (60.34%-69.08%)	n/a
C71-72 brain	2018	48.88% (43.63%-53.92%)	36.23% (31.67%-40.79%)		
	2019	50.23% (45.08%-55.15%)	42.39% (37.54%-47.14%)		
	2020	53.36% (48.21%-58.23%)	39.93% (35.42%-44.4%)		
	2021	54.18% (49.02%-59.05%)	42.03% (37.35%-46.63%)		
C73 thyroid	2018	96.03% (92.11%-98.02%)	89.98% (79%-95.38%)	95.44% (91.27%-97.65%)	n/a
	2019	98.47% (95.09%-99.53%)	95.02% (85.58%-98.34%)	98.37% (94.94%-99.48%)	n/a
	2020	93.66% (89.76%-96.11%)	85.76% (76.93%-91.4%)	94.13% (90.61%-96.35%)	n/a
	2021	96.88% (93.53%-98.51%)	88.65% (78.08%-94.31%)	96.87% (93.62%-98.48%)	n/a
C81 Hodgkin lymphoma	2018	95.99% (90.11%-98.4%)	96.25% (90.8%-98.5%)	93.11% (85.13%-96.88%)	n/a
	2019	92.42% (85.43%-96.13%)	91.05% (84.93%-94.76%)	89.18% (77.29%-95.04%)	n/a
	2020	94.81% (89.52%-97.47%)	94.8% (90.59%-97.15%)	95.03% (90.15%-97.53%)	n/a
	2021	91.21% (85.4%-94.78%)	89.74% (84.32%-93.36%)	89.68% (82.88%-93.88%)	n/a
C82-86 non-Hodgkin lymphoma	2018	83.41% (80.26%-86.11%)	82.82% (79.66%-85.53%)	82.78% (79.4%-85.66%)	82.86% (79.66%-85.61%)
	2019	83.73% (80.65%-86.36%)	83.6% (80.61%-86.17%)	82.44% (78.96%-85.39%)	82.99% (79.88%-85.66%)
	2020	82.36% (79.04%-85.2%)	82.38% (79.21%-85.11%)	82.4% (79.08%-85.25%)	82.27% (79.05%-85.04%)
	2021	82.6% (79.37%-85.37%)	82.82% (79.75%-85.47%)	82.37% (78.92%-85.31%)	82.77% (79.53%-85.54%)

Cancer site	year	unstandardised	age-standardised	stage-standardised	stage & age-standardised
C90 multiple myeloma	2018	87.5% (82.6%-91.09%)	89.8% (85.94%-92.64%)		
	2019	86.37% (81.38%-90.1%)	88.93% (84.99%-91.88%)		
	2020	91.28% (87.03%-94.19%)	91.63% (87.61%-94.38%)		
	2021	85.5% (80.68%-89.2%)	86.51% (82.15%-89.87%)		
C91-95 leukaemia	2018	81.7% (77.92%-84.89%)	79.39% (75.35%-82.84%)		
	2019	83.94% (80.16%-87.06%)	83.13% (79.25%-86.35%)		
	2020	80.88% (76.69%-84.4%)	79.66% (75.3%-83.33%)		
	2021	81.03% (77.04%-84.4%)	79.7% (75.52%-83.25%)		

n/a: estimate could not be generated.