Australian Government
Australian Institute of Health and Welfare

Cancer data in Australia

Web report | Last updated: **31 Aug 2023** | Topic: Cancer

About

This report provides cancer statistics and data visualisations to inform understandings of cancer in Australia and how rates have been changing over time. The report includes statistics on cancer prevalence, survival, incidence, mortality and risk for many different cancers.

Cat. no: CAN 122

- Cancer summary data visualisation
- Cancer data commentaries
- Data

Findings from this report:

- It is estimated there will be around 165,000 cases of cancer diagnosed in 2023
- It is estimated that around 51,000 people will die from cancer in 2023
- For 2015–2019, 71% of people diagnosed with cancer survived 5 years after diagnosis
- In 2023, around 3 of every 10 deaths are estimated to be due to cancer

Summary

Cancer data in Australia (CdiA) provides a wide range of statistics on many cancers. CdiA also includes some cancer data commentaries. Some of these commentaries are targeted articles focussed on specific cancers while others explain how to use CdiA's data.

Most of the statistics within CdiA are presented through interactive data visualisations. Data for all visualisations, except cancer rankings, are also available in Excel. Data includes projections for more recent years while the majority of data are actuals. This year's CdiA includes updated data for existing reports but also a large range of additional cancer statistics.

Contents - new types of data and reports available

Cancer overview, 2023

Accompanying the CdiA this year is a written summary providing an overview of cancer in Australia for 2023.

Blood cancer by histology (experimental incidence and survival data)

By using histological information from the Australian Cancer Database (ACD), a finer level of blood cancer incidence and survival rates are now available. The new data and visualisations, while experimental, provide survival statistics more relevant to specific diagnoses and the incidence rates for these cancers.

This cancer commentary helps understand the blood cancer by histology reporting.

Cancer by subsite (incidence and survival data - excludes blood cancers)

Through using ICD-10 3- and 4-character coding, cancer incidence and survival rates by subsite are provided within this report. For example, melanoma of the skin incidence and survival data are now available by subsites such as melanoma of the eyelid, ear, other parts of the face, of the scalp and neck, of the trunk, of the upper limb including shoulders and of the lower limb including hips.

Selected cancers by histology (experimental incidence and survival data)

Survival and incidence data by histology is available for appendiceal cancer, brain cancer, breast cancer, prostate cancer, colorectal cancer, colon cancer, rectal cancer, rectosigmoid junction cancer, cervical cancer, lung cancer, liver cancer, mesothelioma, melanoma of the skin, kidney cancer and pancreatic cancer. Histology describes the type of cells or tissue in which cancer originates. The survival rates will be more relevant to specific diagnosis, and incidence rates are provided for these cancers. For example, the histology visualisations provide breast cancer incidence and survival rates for many different types of breast cancer such as inflammatory carcinoma, tubular adenocarcinoma and neuroendocrine neoplasms.

Incidence projections – 2024 to 2033

Cancer incidence projections from 2024 to 2033 are available in Excel worksheets. The projections are developed through the Nordpred software package. This link provides more information about the projections.

Contents - CdiA core statistics – data updated August 2023

The following statistics form the core CdiA content and are updated annually. The new visualisations and data mentioned above will be added to the CdiA core statistics.

What do the interactive data visualisations contain?

Cancer summary data visualisation – this visualisation contains incidence counts and rates, survival rates and prevalence data. Time series are provided for this data except for prevalence.

Cancer incidence rankings data visualisation – this visualisation lists the leading 20 cancers in Australia for incidence and mortality over time (from 1982 for incidence and from 2007 for mortality)

Cancer incidence by age groups data visualisation – this visualisation contains time series for cancer cases and rates by a wide range of different age groups and also includes the median age at diagnosis.

Cancer mortality by age group data visualisation – this visualisation contains the number of cancer deaths and mortality rates by a wide range of different age groups. Median age at death is only available through Excel.

Cancer survival data visualisation – this visualisation contains observed, relative and conditional survival rates over time. Observed and relative survival for the most recent period by 5-year age group are also provided.

Cancer survival by age data visualisation – this visualisation contains observed and relative survival and by 20-year age groups over time. Age-adjusted survival rates over time are also available on this page.

Cancer by state and territory data visualisation – this visualisation contains state and territory cancer incidence time series data.

Cancer risk data visualisation – this visualisation contains the risk of being diagnosed and the risk of death from cancer time series. Data is presented by age. Risk data is available where it is adjusted for competing mortality and not adjusted for competing mortality.

All interactive data visualisations contain information by sex.

Pivot tables that provide cancer incidence counts by 3 character ICD-10 codes are located in the Data section. Rates by age are available within the raw data but do not appear in the pivot table.

CdiA core statistics part 2, cancer by stage - data updated December 2018

The latest national data are provided on cancer survival, and incidence, by stage of cancer at diagnosis for the 5 most commonly diagnosed cancers (melanoma of the skin, and breast, prostate, lung and colorectal cancers) in 2011. The **Cancer incidence and survival by stage** data visualisation remains available within this report; information remains unchanged from the previous release of this report because more recent cancer incidence and survival by stage data are not available.

Cancer data available as supplementary tables

Supplementary tables are available containing the data used to inform the above-mentioned statistical reports.

Overview of cancer in Australia, 2023

The following provides a brief summary of some notable trends in the latest cancer data. More comprehensive data is available throughout the Cancer data in Australia report for the cancers summarised as well as many other cancers.

Please note that when survival rates are discussed in the summary that these are relative survival rates. Age-standardised incidence and mortality rates are standardised to the 2023 Australian population. All cancers combined incidence data excludes basal and squamous cell carcinomas of the skin. When discussing histology types, NOS is the abbreviation for 'not otherwise specified'. The presence of NOS after a term generally indicates that a diagnosis is not as specific as it could theoretically be. For example, there are many kinds of adenocarcinoma but often the diagnosis is simply "adenocarcinoma". This is referred to as "adenocarcinoma NOS".

All cancers combined

The annual number of cancer cases diagnosed may surpass 200,000 by 2033

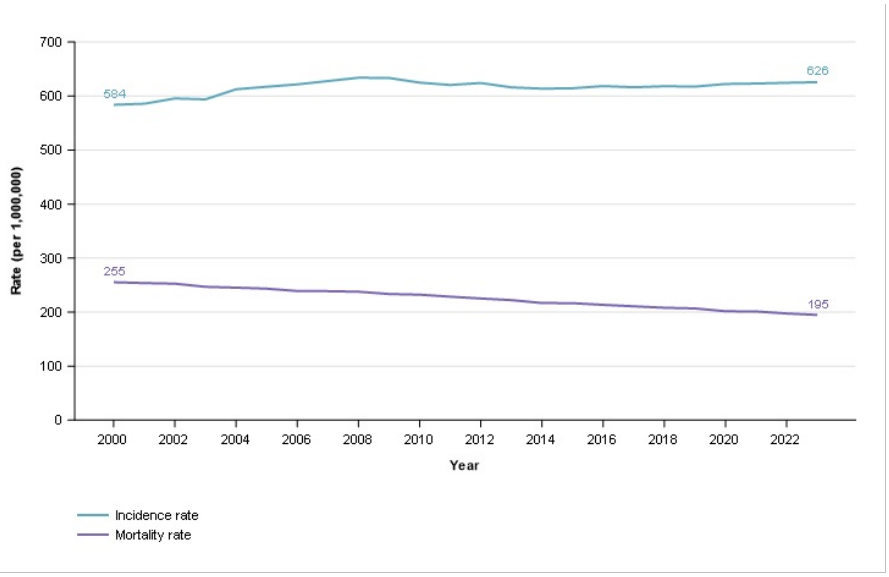
In 2000, there were around 88,000 cases of cancer diagnosed in Australia. By 2023, it is estimated there will be around 165,000 cases of cancer diagnosed in Australia. This 88% increase in the span of just over 20 years is mainly due to increases in population size and increasing numbers of people reaching older ages for which cancer rates are higher.

Had the cancer incidence rates from 2000 for the various age groups remained constant between 2000 and 2023 there would be around 154,000 cases of cancer diagnosed in Australia in 2023 – an increase of around 66,000 cases. This number is reflective of increases due to population size and the ageing population alone. The additional 11,000 cases to arrive at the estimated 165,000 cases is indicative of the increase due to increasing cancer rates. Overall, around 86% of the estimated increase of cancer incidence increase between 2000 and 2023 levels is attributable to population increase and the ageing population alone.

By 2033, with increasing population and estimated increasing rates of cancer, it is estimated there will be over 200,000 cases of cancer diagnosed in Australia.

The age-adjusted cancer incidence rate increased from 584 cases per 100,000 people in 2000 to an estimated 626 cases per 100,000 people in 2023. Over the corresponding period, age-adjusted cancer mortality rates decreased from 255 deaths per 100,000 people to an estimated 195 deaths per 100,000 people (Figure 1). Increasing cancer survival rates increase the gap between incidence and mortality rates.

Figure 1: Age-standardised cancer incidence and mortality rates, persons, 2000–2023



Notes
1. Rates are standardised to the 2023 Australian population.
2. 2022 and 2023 are projections for mortality and 2020 to 2023 are projections for incidence.

Source: AIHW Australian Cancer Database 2019 and National Mortality Database

Cancer survival rates continue to increase

The 5-year survival for cancer in 1990–1994 was 53% and by 2015–2019, the rate had increased to 71%.

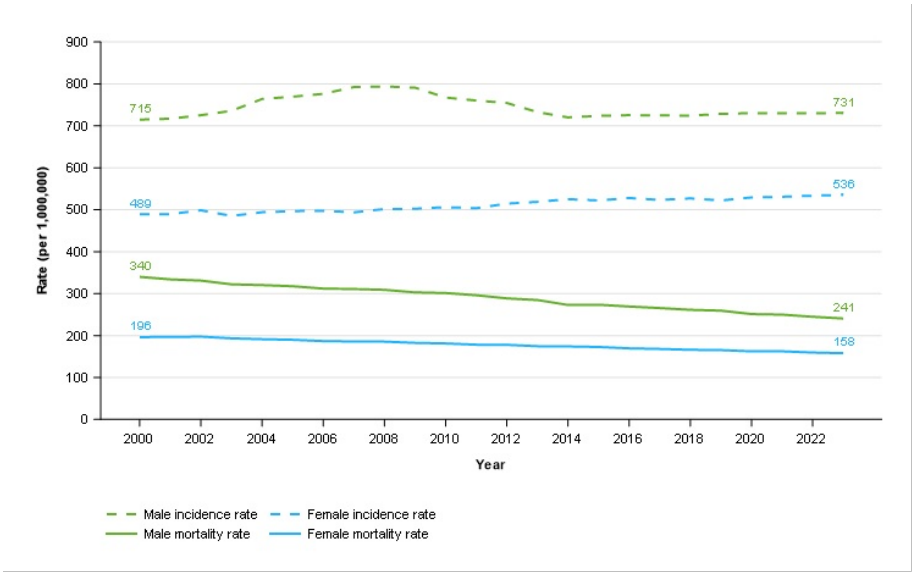
Even with decreasing mortality rates and increasing survival, the number of deaths from cancer has been increasing. In 2000, there were 36,000 deaths from cancer and by 2023 the number of deaths from cancer is estimated to have increased by 41% to 51,000 people. Had mortality rates from 2000 not improved and remained constant, there would have been around 67,000 deaths from cancer.

Males remain more likely to be diagnosed with cancer

Males continue to be more likely to be diagnosed with cancer although the difference in age-adjusted incidence rates between the sexes in 2023 is less than it was in 2000. In 2023, the age-adjusted cancer incidence rate for males is estimated to be 731 cases per 100,000 males and increased from 715 cases per 100,000 males in 2000. For the same period, the equivalent rate for females increased from 489 cases per 100,000 females to 536 cases per 100,000 females.

Age-adjusted cancer mortality rates for males and females have decreased between 2000 and 2023. The age-adjusted mortality rates for males decreased from 340 deaths per 100,000 males to an estimated 241 deaths per 100,000 males. The decrease in the age-adjusted mortality rate for females over the same period was 196 deaths per 100,000 females to 158 deaths per 100,000 females. Similar to cancer incidence, the difference in cancer mortality rates between the sexes remains high in 2023 but is less than it was in 2000 (Figure 2).

Figure 2: Age-standardised cancer incidence and mortality rates, by sex, 2000–2023



Notes
1. Rates are standardised to the 2023 Australian population.
2. 2022 and 2023 are projections for mortality and 2020 to 2023 are projections for incidence.
3. Prostate cancer incidence rates increased in the early 2000s before decreasing. The rate changes strongly influenced all cancers combined rates for males. More information about prostate cancer incidence is available in Cancer data commentary 9.

Source: AIHW Australian Cancer Database 2019 and National Mortality Database

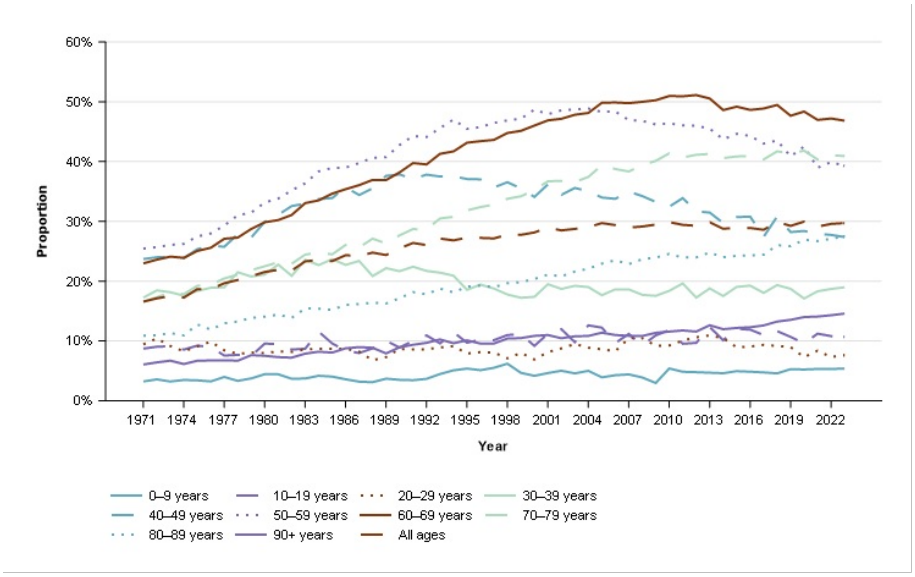
Between 1990–1994 and 2015–2019, the 5-year survival rate for females increased from 58% to 72%. The corresponding survival rates for males improved from 49% to 69%. The greater improvements in survival for males and small increases in incidence rates leads to decreases in the gap between male and female mortality rates.

Cancer accounts for around 3 of every 10 deaths in Australia

In 2023, it is estimated that cancer will be responsible for around 3 of every 10 deaths in Australia. The percentage has increased gradually from 17% in 1971 but has been relatively stable between 28% and 30% from the turn of the century.

The rate of deaths from cancer varies considerably by age (Figure 3). In 2023, it is estimated to be responsible for around 47% of deaths in the population aged 60 to 69. The 0 to 9 age group has the smallest percentage of deaths from cancer and is estimated to be responsible for 5.4% of all death for the age group in 2023. In the 1970's the proportion of deaths for this age group did not exceed 4%.

Figure 3: Percentage of deaths from cancer, by age group, 1971–2023



Note
1. 2022 and 2023 are projections.

Source: National Mortality Database

Prostate cancer

In 2023, prostate cancer is estimated to be the most commonly diagnosed cancer for males and for Australia overall. With an estimated 25,500 cases diagnosed in 2023, prostate cancer is estimated to account for 28% of the cancers to be diagnosed in males for the year.

Since 2000, prostate cancer incidence rates have been more volatile than any other cancer (see Cancer commentary 9). Prostate cancer incidence projections have more uncertainty than other cancers but, if the most recent prostate cancer incidence rates were to remain the same, there would be around 30,900 cases of prostate cancer diagnosed in 2033.

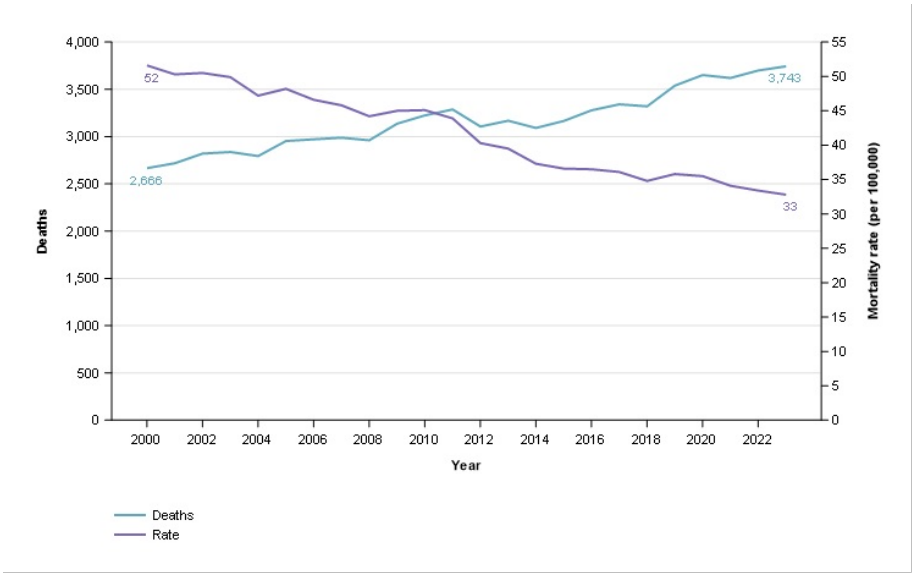
In 2019, over 95% of prostate cancers diagnosed were adenocarcinomas. The 5-year survival rate for this type of prostate cancer in 2015–2019 was 98% and strongly influenced the overall prostate cancer 5-year survival rates of 96% for the period.

While prostate cancer survival rates are high, exceptions exist such as neuroendocrine neoplasms. Between 2015 and 2019, around 0.2% of prostate cancers diagnosed were neuroendocrine neoplasms. The 5-year survival rates for these prostate cancers in 2015–2019 was 12%.

Prostate cancer mortality rates have been decreasing this century. Prostate cancer mortality rate reductions began in the early to mid 1990s, several years after the introduction of prostate specific antigen testing. In 1994, prostate cancer mortality rates were 62 deaths per 100,000 males. In 2023, it is estimated that prostate cancer mortality rates will be 33 deaths per 100,000 males, almost half of the rate from the peak mortality rate.

While the mortality rates have been decreasing, the number of deaths from prostate cancer continue to rise (Figure 4). In 2000, there were 2,666 deaths from prostate cancer and in 2023 it is estimated there will be 3,743. Population growth in combination with an ageing population exceeds reductions in age-adjusted mortality rates to result in increasing numbers of deaths from prostate cancer.

Figure 4: Prostate cancer deaths and age-standardised mortality rate, 2000–2023



Notes
1. Rates are standardised to the 2023 Australian population.
2. 2022 and 2023 are projections.

Source: National Mortality Database

Breast cancer

Breast cancer is the most commonly diagnosed cancer for females in Australia.

It is estimated there will be around 20,500 breast cancer cases diagnosed in females in 2023. This is around 28% of the estimated cancers diagnosed in females. It is the second most commonly diagnosed cancer in Australia for persons aged 20 to 39 and 60 to 79, and the most commonly diagnosed cancer for persons aged 40 to 59.

Breast cancer incidence has increased from 136 cases per 100,000 females in 2000 to an estimated 150 cases per 100,000 females in 2023. A large portion of the increase occurred around 2013 when breast screening was expanded to include women aged 70 to 74. Prior to this, breast cancer incidence rates were around 140 cases per 100,000 females in 2012.

Breast cancer 5-year survival improved from 78% in 1990–1994 to 92% in 2015–2019.

While survival rates for breast cancer overall are high, there is substantial variation in survival for different types of breast cancer. For females, carcinomas were the most common type of breast cancer accounting for 99% of all breast cancer cases in 2019. The main types of breast carcinoma were ductal carcinomas (84% of all breast cancer cases) followed by lobular carcinomas (13%). There are different types of ductal carcinomas which have varied survival rates. The most common type of ductal carcinoma, the infiltrating duct carcinoma (NOS) (73% of all breast cancers), had a 5-year survival of 93% in 2015–2019. For the same period, other less common ductal carcinomas had much lower 5-year survival rates (for example, inflammatory carcinomas (61%) and metaplastic carcinomas (74%)).

In 2023, it is estimated that nearly 3,300 females will die from breast cancer; in 2000, around 2,500 females died from breast cancer. Like many other cancers, the increasing number of deaths is attributable to increasing population size and the ageing population. Age-adjusted breast cancer mortality rates have been decreasing for females and were around 31 deaths per 100,000 females in 2000 compared to an estimated 23 deaths per 100,000 females in 2023.

Melanoma of the skin

Melanoma of the skin incidence rates have increased from 54 cases per 100,000 people in 2000 to an estimated 69 cases per 100,000 people in 2023. In 2023, it is estimated that 35% of melanoma of the skin cancer cases are diagnosed on the trunk of the body, 26% on the upper limbs (including shoulder), 18% on the lower limbs (including hip) and 7.6% on the scalp and neck.

The proportion of melanoma of the skin diagnosed by site varies by sex. For example, in 2023 it is estimated that 25% of melanoma of the skin cases are diagnosed on the lower limbs (including hip) for females while for males it is 13%. Conversely, the trunk accounts for 41% of the cases for males and 27% for females.

Melanoma of the skin incidence rates for females are estimated to be 56 cases per 100,000 females in 2023 while male rates are 85 cases per 100,000 males.

Melanoma of the skin incidence rates have been decreasing for people under 40 since the late-1990s. Incidence rates for people aged 40 to 49 ranged between 44 and 53 cases per 100,000 people since the mid-1990s. Rates for people aged 50 and over continue to rise.

The ‘Slip Slop Slap’ campaign was a very large skin cancer awareness and prevention campaign commencing from the early 1980s. In 2023, the population aged under 40 were born after or around the ‘Slip Slop Slap’ campaign and have spent their lives in an environment where skin cancer awareness has been greater. Skin cancer awareness and prevention advice continues today. While populations over 40 have increasing incidence rates, the rate increases are greater for the oldest populations who are likely to have spent more of their lives in times when there was less skin cancer awareness.

After many years of increasing, melanoma of the skin mortality age-adjusted rates peaked at 8 deaths per 100,000 people in 2013. In 2023, the estimated age-adjusted mortality rate is 5 deaths per 100,000 people. The reduction in mortality rates is accompanied by reductions in the number of deaths (1,625 deaths in 2013 and an estimated 1,300 in 2023).

Since 1995–1999, 5-year melanoma of the skin survival rates have been a little over 90%. The melanoma of the skin 5-year survival rate for 2015–2019 was 94% and is the highest rate recorded for melanoma of the skin.

Colorectal cancer

With around 15,400 cases estimated, colorectal cancer is estimated to be the fourth most commonly diagnosed cancer in Australia in 2023. At the beginning of the century, it was the most diagnosed cancer in Australia.

Since 2000, colorectal cancer incidence rates have decreased more than any other cancer. Age-standardised incidence rates peaked in 2001 at 86 cases per 100,000 people and are estimated to have decreased to an estimated age-standardised rate of 58 cases per 100,000 people in 2023.

Five-year survival for colorectal cancer increased from 55% in 1990–1994 to 71% in 2015–2019. Decreasing incidence combined with improvements in survival have led to reducing mortality rates. The age-standardised mortality rate for colorectal cancer decreased from 35 deaths per 100,000 people in 2000 to an estimated 20 deaths per 100,000 people in 2023.

Colorectal cancer is far more common in the older population than the young. In 2023, around 6% of colorectal cancers are estimated to be diagnosed in people aged under 40. In 2000, only around 2% of colorectal cancers were diagnosed in people aged under 40. The increasing proportion occurred because, while colorectal cancer is decreasing overall and for older populations, colorectal cancer incidence is increasing for the young.

Incidence rates for younger populations remain much lower than older but the trends are very different. Age groups under 40 years old have seen increases in incidence rates of colorectal cancer, particularly since around 2005. Incidence rates for 40–49 year olds increased from 22 cases per 100,000 people in 2005 to an estimated 29 cases in 2023. Over the same period, incidence rates decreased from 201 cases per 100,000 people to 145 cases per 100,000 people for the population aged 50 and over.

Some portion of the increasing rates for the younger population is attributable to neuroendocrine neoplasms but increases also occur for adenocarcinomas in the 20–39 age group. The increase for neuroendocrine neoplasms more generally may be explained by various factors such as increasing incidence of this malignancy, improvements in imaging technologies, increased use of endoscopy and colonoscopy, increased awareness in clinical practice and the introduction of the 2010 World Health Organisation classification for neuroendocrine tumours (Wyld D et al. 2019).

Cancer survival rates are higher for younger populations than older. In 2015–2019, survival was 98% for 0–19 year olds, between 70–80% for age groups 20–39, 40–59 and 60–79 years old, and then 61% for 80 years and older.

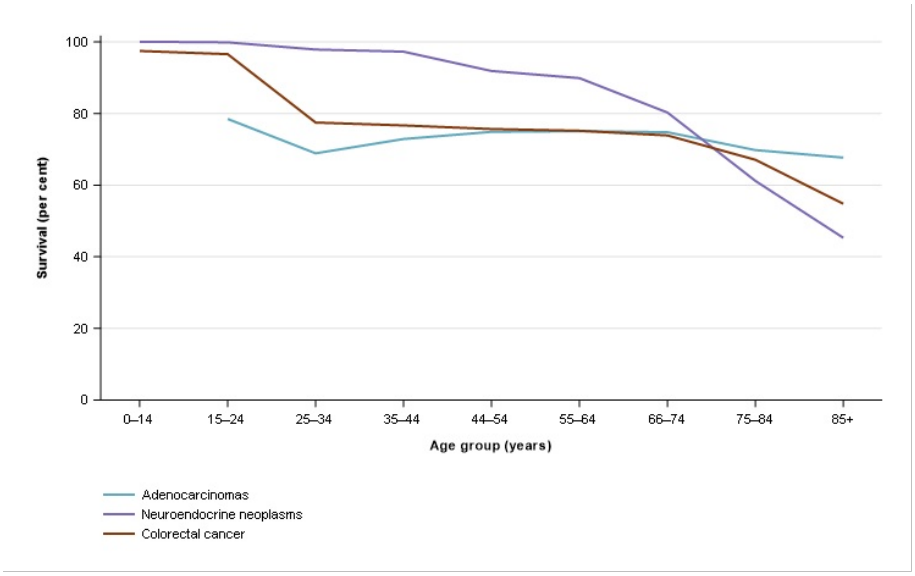
Colorectal cancer sites and types diagnosed differ by age. Some of these differences are discussed below but much more comprehensive information is available in the cancer by histology and cancer by subsite data visualisations and spreadsheets.

Colorectal cancer can originate in the broad areas of the colon, rectum or the rectosigmoid junction (which is the limit separating the sigmoid colon and the rectum). In 2023, it is estimated that most cases of colorectal cancer will be in the colon (70% of all colorectal cancer cases), followed by the rectum (23%) and lastly the rectosigmoid junction (7%). The appendix, which is part of the colon, is not a common site of colorectal cancer in the overall population (estimated 5% of cases in 2023). However, the majority of colorectal cancer cases in the youngest age groups are located in the appendix (estimated 100% of cases in 0–14 year olds and an estimated 88% of cases in 15–24 year olds in 2023).

The majority of colorectal cancers diagnosed were carcinomas (96% of all colorectal cancers in 2019). In the general population, the most common type of colorectal carcinoma diagnosed was adenocarcinomas (88%) followed by neuroendocrine neoplasms (5%). However, neuroendocrine neoplasms were very common in younger age groups accounting for 100% and 89% of colorectal cancer cases in 0–14 and 15–24 year olds respectively.

Colorectal survival outcomes differ by age and type. Figure 5 provides a small selection of these for 2015–2019. Adenocarcinomas had a 5-year survival of 73% in 2015–2019 while neuroendocrine neoplasms had 89% survival. However, the difference in survival for neuroendocrine neoplasms is partly due to greater proportions of cases of this cancer being in younger age groups, who tend to have higher survival than older age groups. More extensive statistics are available in the cancer by histology data visualisation and Excel data.

Figure 5: Colorectal cancer 5-year relative survival by specified histologies, by age group, 2015–2019



Source: AIHW Australian Cancer Database 2019

Lung cancer

With around 14,800 cases estimated, lung cancer is estimated to be the fifth most commonly diagnosed cancer in Australia in 2023. Of the 5 most common cancers in Australia, its survival rates are the lowest (5-year survival of 24% in 2015–2019 for lung cancer with colorectal cancer survival the next lowest at 71%).

While lung cancer is a low survival cancer, 5-year survival rates have improved over time. Survival increased from 10% in 1990–1994 to 20% in 2015–2019 for males and from 12% to 29% for females. Survival differs by age with 5-year survival for 20–24-year-olds at 94%, 77% for 25–29, 56% for 30–34, between 25% and 32% for age groups between 40 and 74, and only 7% for those aged 85 and over in 2015–2019.

Lung cancer age-standardised incidence rates have been fairly stable at 58 cases per 100,000 people in 2000 and an estimated 56 cases in 2023. National rates are however comprised of very different trends for males and females. Males have seen strong and enduring decreases from 85 cases per 100,000 males in 2000 to an estimated 62 cases per 100,000 males in 2023. In contrast, females have seen an increase from 36 cases per 100,000 females in 2000 to an estimated 51 cases per 100,000 females in 2023.

The increasing incidence rates of this low survival cancer have seen lung cancer account for increasing proportions of cancer deaths for females. In 2000, lung cancer accounted for around 15% of cancer deaths in females and is estimated to be 17% in 2023. Conversely, lung cancer represented 22% of all cancer deaths for males in 2000 and this has reduced to 17% in 2023.

In 2023, it is estimated that around 8,700 people will die of lung cancer in Australia. This is the most common cause of cancer-related death. Age-standardised mortality rates for males have decreased substantially from 74 deaths per 100,000 males in 2000 to an estimated 40 deaths per 100,000 males in 2023. Female lung cancer mortality rates remain lower than males, but in contrast to males have increased from 30 deaths per 100,000 females in 2000 to a peak of 32 deaths in 2010 before decreasing to an estimated 27 deaths per 100,000 females in 2023.

Blood cancers

All blood cancers combined is the aggregate of many different types of blood cancer. While useful for detailing the overall number of cases and general survival of these cancers in Australia, different types of blood cancer often have different incidence and mortality trends and survival rates.

In 2023, it is estimated that around 19,500 people will be diagnosed with a blood cancer (59% in males). The most common type of blood cancer in 2023 is estimated to be non-Hodgkin lymphoma followed by multiple myeloma and then chronic lymphocytic leukaemia.

Blood cancers accounted for an estimated 12% of all cancer cases in 2023. However, blood cancers were particularly common in the 0–19 year old age group accounting for an estimated 38% of all cancer cases. While not a common cancer in the general population, acute lymphoblastic leukaemia was the most common cancer diagnosed in 0–19 year olds (estimated 17% in 2023).

Age-standardised incidence rates for blood cancer increased from 66 cases per 100,000 in 2003 to an estimated 74 cases in 2023. Males have had consistently higher rates of all blood cancers combined than females (estimated 92 compared to 58 cases per 100,000 males and females respectively in 2023).

Five-year survival increased slightly from 66% in 2010–2014 to 69% in 2015–2019. In 2015–2019, survival was over 90% for age groups 0–19 and 20–39, and then decreased with age from 84% in 40–59 year olds to 69% in 60–79 year olds to 42% for those aged 80 years older. There is substantial variation in survival between different types of blood cancer. Blood cancers with comparatively higher 5-year survival in 2015–2019 were Hodgkin lymphoma (89%), and chronic lymphocytic leukaemia (86%). Lower survival blood cancers included acute myeloid leukaemia (27%) and myelodysplastic syndromes (39%).

Age-standardised blood cancer mortality decreased from 30 deaths per 100,000 in 2000 to an estimated 23 deaths in 2023. This decrease was seen in both males and females although males had consistently higher mortality rates.

The Cancer data in Australia report now contains a considerable amount of new data on blood cancers. More specifically, it provides a greater depth of incidence and survival rates. For example, Hodgkin lymphoma incidence and survival statistics are accompanied by statistics on types of Hodgkin lymphoma such as nodular lymphocyte predominant Hodgkin, classic Hodgkin lymphoma and the subtypes nodular sclerosis classic Hodgkin lymphoma, lymphocyte-rich classic Hodgkin lymphoma, mixed cellularity classic Hodgkin lymphoma and lymphocyte-depleted classic Hodgkin lymphoma. The Blood cancers by types and subtypes data visualisations provide the new and more detailed blood cancer statistics.

Gynaecological cancers

Gynaecological cancers include cervical cancer, ovarian cancer, placental cancer, uterine cancer, vaginal cancer, vulvar cancer, and cancer of other female genital organs. Gynaecological cancer is estimated to account for around 9% of cancers diagnosed in females in 2023 and around 10% of female deaths from cancer.

In the following paragraphs, ovarian cancer and serous carcinomas of the fallopian tube are discussed rather than ovarian cancer. This is because the time series for this cancer appears to better reflect ovarian cancer as it is more traditionally understood while ovarian cancer trends are complicated by the changed understanding of where many serous carcinomas originate (see Cancer data commentary 5 for more information).

Gynaecological cancer incidence rates ranged between 49 and 53 cases per 100,000 females between 1982 and 1994 before decreasing to a low of 45 cases per 100,000 females in 2003. Decreases in cervical cancer incidence drove the reduction where rates decreased from 14 to 7.7 cases per 100,000 females between 1994 and 2003. The National Cervical Cancer Screening program was introduced in 1991 and led to falls in cervical cancer incidence and mortality due to the program's ability to detect pre-cancerous abnormalities that may, if left, progress to cancer.

Since 2003, gynaecological cancer incidence has gradually increased to an estimated 49 cases per 100,000 females in 2023. Uterine cancer has largely influenced this change and increased from 20 to an estimated 24 cases per 100,000 females between 2003 and 2023. Uterine cancer incidence had been increasing before this time and has been steadily and gradually increasing since 1989 (16 cases per 100,000

females).

Five-year survival for gynaecological cancers has improved from 64% in 1990–1994 to 71% in 2015–2019. There is substantial variation in survival between different types of gynaecological cancers. The gynaecological cancers with the highest survival in 2015–2019 were placental (85%), and uterine (83%). Lower survival gynaecological cancers include ovarian cancer and serous carcinomas of the fallopian tube (49%) and vaginal cancer (55%). Ovarian cancer and serous carcinomas of the fallopian tube 5-year survival rates have been improving over time, increasing from 39% in 1990–1994. Vaginal cancer 5-year survival rates have also improved from the 2005–2009 survival rate of 43%.

The mortality rate for gynaecological cancer has declined from 18 deaths per 100,000 females in 2000 to an estimated 16 deaths in 2023. Mortality rates for cervical cancer decreased from 3.2 deaths per 100,000 females in 2000 to an estimated 1.6 deaths in 2023. Mortality for uterine cancer increased from 3.3 deaths per 100,000 females in 2000 to an estimated 4.8 deaths in 2023.

In 2023, ovarian cancer and serous carcinomas of the fallopian tube are estimated to account for around 26% of the gynaecological cancers diagnosed. With survival lower than other gynaecological cancers, and an estimated 1,050 deaths in 2023, ovarian cancer and serous carcinomas of the fallopian tube are estimated to account for 48% of the 2,180 deaths from gynaecological cancer in 2023.

Brain cancer

Brain cancer incidence rates from 2000 to 2023 ranged between 7 and 9 cases per 100,000 people. Males had higher incidence rates than females throughout this period. In 2023, the incidence rate for males is estimated to be 9.4 cases per 100,000 males and the rate for females is estimated to be 5.4 cases per 100,000 females.

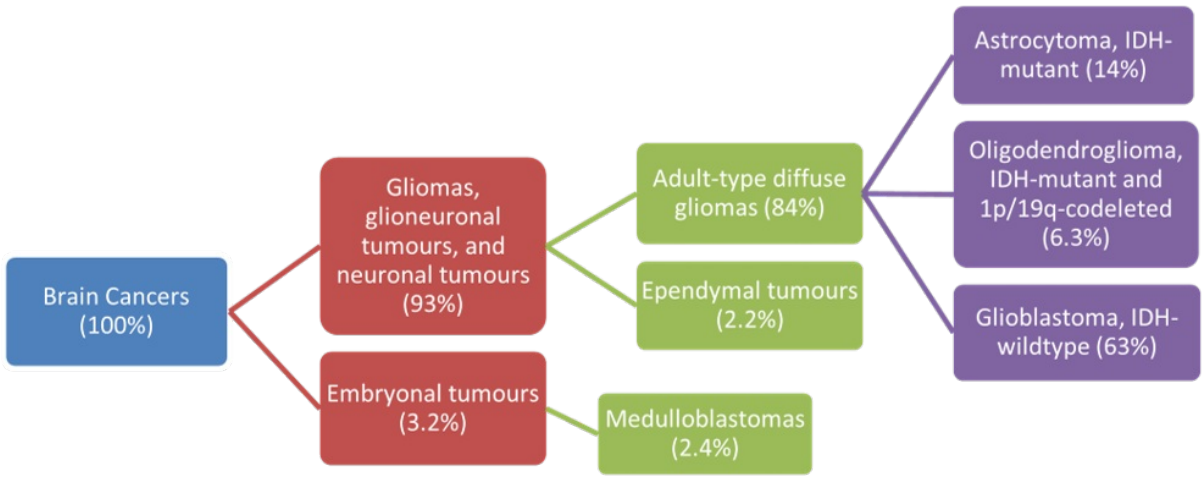
Survival vastly differs by age; in 2015–2019, 5-year survival for brain cancer was 64% for 0–19 year olds, 67% for 20–39 year olds, 27% for 40–59 year olds, 8.5% for 60–79 year olds and 1.7% for 80 years and over.

Overall, brain cancer survival has improved from 19% in 1990–1994 to 23% in 2015–2019. Brain cancer survival rates over time are often impacted by changes in the age composition of those diagnosed with brain cancer. In particular, greater proportions of older people are diagnosed and older people have lower survival rates. When adjusted for age, brain cancer 5-year survival has more than doubled from 11% in 1990–1994 to 23% in 2015–2019.

The mortality rate for brain cancer ranged from 6 to 7 deaths per 100,000 people between 2000 and 2023.

The most common types of brain cancer were gliomas, glioneuronal tumours and neuronal tumours, which accounted for 93% of brain cancers diagnosed in 2019. Embryonal tumours only accounted for 3% of brain cancers in the general population but 39% of brain cancers in 0–19 year olds. Survival varies considerably for different types of brain cancer. Glioblastomas, IDH-wildtype accounted for 63% of all brain cancers in 2019 and had a 5-year relative survival of only 5.7% in 2015–2019.Oligodendroglioma, IDH-mutant and 1p/19q-codeleted accounted for 6% of brain cancer cases and had 84% survival.

Figure 6: Brain cancer incidence, selected types, persons, 2019



Source: AIHW Australian Cancer Database 2019

Thyroid cancer

Thyroid cancer is a common cancer, particularly in females. In 2023, it is estimated that around 4,100 cases will be diagnosed, approximately 70% of which will be in females.

The incidence of thyroid cancer increased from 8.5 cases per 100,000 females in 2000 to an estimated 21 cases in 2023. While lower, the incidence rates for males have also increased from 3.3 cases to an estimated 9.6 cases per 100,000 males over the same period. The increase in thyroid cancer may be due to an increase in medical surveillance and the introduction of new diagnostic techniques such as neck ultrasonography (Vaccarella et al. 2016).

While thyroid cancer is common, it is a high survival cancer resulting in relatively few deaths. Five-year survival is higher for females than males (98% and 93% in 2015–2019 respectively).

Despite an increase in the incidence rate, the mortality rate for thyroid cancer has been broadly stable since 2000, between 0.5 and 0.7 cases per 100,000 people. However, males are overrepresented in deaths from thyroid cancer. While it is estimated that only around 30% of thyroid cancer cases in 2023 will be in males, almost half the deaths are estimated to be males (71 of the 146 deaths in 2023).

Rare cancers

Rare Cancers Australia defines a cancer to be 'rare' if it has an incidence rate of less than 6 cases per 100,000 people per year. If the incidence rate is greater than or equal to 6 cases per 100,000 people per year but less than 12 cases per 100,000 people per year, the cancer is 'less common'. 'Common' cancers are defined as those with an incidence rate of 12 or more cases per 100,000 people per year.

Cancers that changed from rare to less common between 2000 and 2019 were chronic lymphocytic leukaemia, liver cancer, multiple myeloma and oesophageal cancer. Cancers that changed from less common to common were kidney cancer and pancreatic cancer. Thyroid cancer was the only cancer to go from rare to common between 2000 and 2019. Cancer of unknown primary site was the only cancer to change from common to less common between 2000 and 2019.

Rare cancers are individually rare, but collectively account for 13% of cases diagnosed in 2019. Less common cancers accounted for around 14% of cancer cases in 2019 and common cancers for around 73% of cases. While rare and less common cancers are estimated to collectively account for 27% of cases, they are estimated to account for 38% of all cancer deaths in 2019 (Table 1).

Table 1: Estimated incidence and mortality rates by cancer rarity, 2019

Type	Number of cases	Percent of all cancer cases	Number of deaths	Percent of all deaths
Rare cancers	18,645	13%	6,738	14%
Less common cancers	21,384	14%	10,908	23%
Common cancers	107,562	73%	29,288	62%

Notes:

1. Rare cancers are those with incidence rates of less than 6 cases per 100,000 people. Less common cancers are those with incidence rates of at least 6 and less than 12 cases per 100,000 people. Common cancers are those with incidence rates of 12 or more cases per 100,000 people (with rarity based on estimated rates from 2019).
2. Individual cancers were grouped based on rarity and the numbers of new cases were summed accordingly.
3. The sum of cancers by rarity for mortality will not equal all cancers combined estimated as stated from either the NMD or ACD as the individual cancers in the cancer rarity estimates were sourced from whichever of the NMD or ACD are recommended for use.
4. Non-melanoma skin cancer rarity classification is derived from cancer incidence rates that exclude basal and squamous cell carcinomas of the skin. For consistency, non-melanoma skin cancer mortality also excludes basal and squamous cell carcinomas of the skin.
5. The sum of cancers by rarity will not equal all cancers combined incidence totals from the ACD as the small number of bone cancers outside of C40-C41 ICD-10 coding are coded to bone cancer as well as the relevant ICD-10 site.
6. Cancer incidence and mortality counts and proportions may change depending on the cancers included within analysis.

Source: AIHW Australian Cancer Database 2019 and National Mortality Database

Survival differs by cancer rarity, in 2015–2019, collectively rare cancers had 62% 5-year relative survival, less common cancers had 45% and common cancers had 77% (Table 2). Since the 1990's, 5-year relative survival for the common cancer group has improved more than the rare or less common cancer groups.

Table 2: Five-year survival by cancer rarity, 1990–1994 and 2015–2019

Type	Survival 1990-1994	Survival 2015-2019
Rare cancers	52%	62%
Less common cancers	35%	45%
Common cancers	58%	77%

Notes:
1. Rare cancers are those with incidence rates of less than 6 cases per 100,000 people. Less common cancers are those with incidence rates of at least 6 and less than 12 cases per 100,000 people. Common cancers are those with incidence rates of 12 or more cases per 100,000 people (with rarity based on estimated rates from 2023).
2. Individual cancers were grouped based on rarity and the numbers of new cases were summed accordingly.
3. Non-melanoma skin cancer rarity classification is derived from cancer incidence rates that exclude basal and squamous cell carcinomas of the skin.

Source: AIHW Australian Cancer Database 2019

Cancer summary data visualisation

For many different cancers, this data visualisation provides a wide range of cancer-related statistics that, together, present a summary of national cancer data and trends over time. Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page. Please note that cancer mortality data has in the past been included within this visualisation but is only included within the Cancer mortality by age groups visualisation and Cancer risk data visualisation for this year's report due to complexities in reporting.
This cancer summary visualisation contains four figures and one table. The visualisation presents statistics for the selected cancer and provides statistics by sex.

Figure 1 is a line graph that contains information on the number of cancer cases and age-standardised rates of cancer diagnosis from 1982 to the most recent year available for reporting at the time of release.

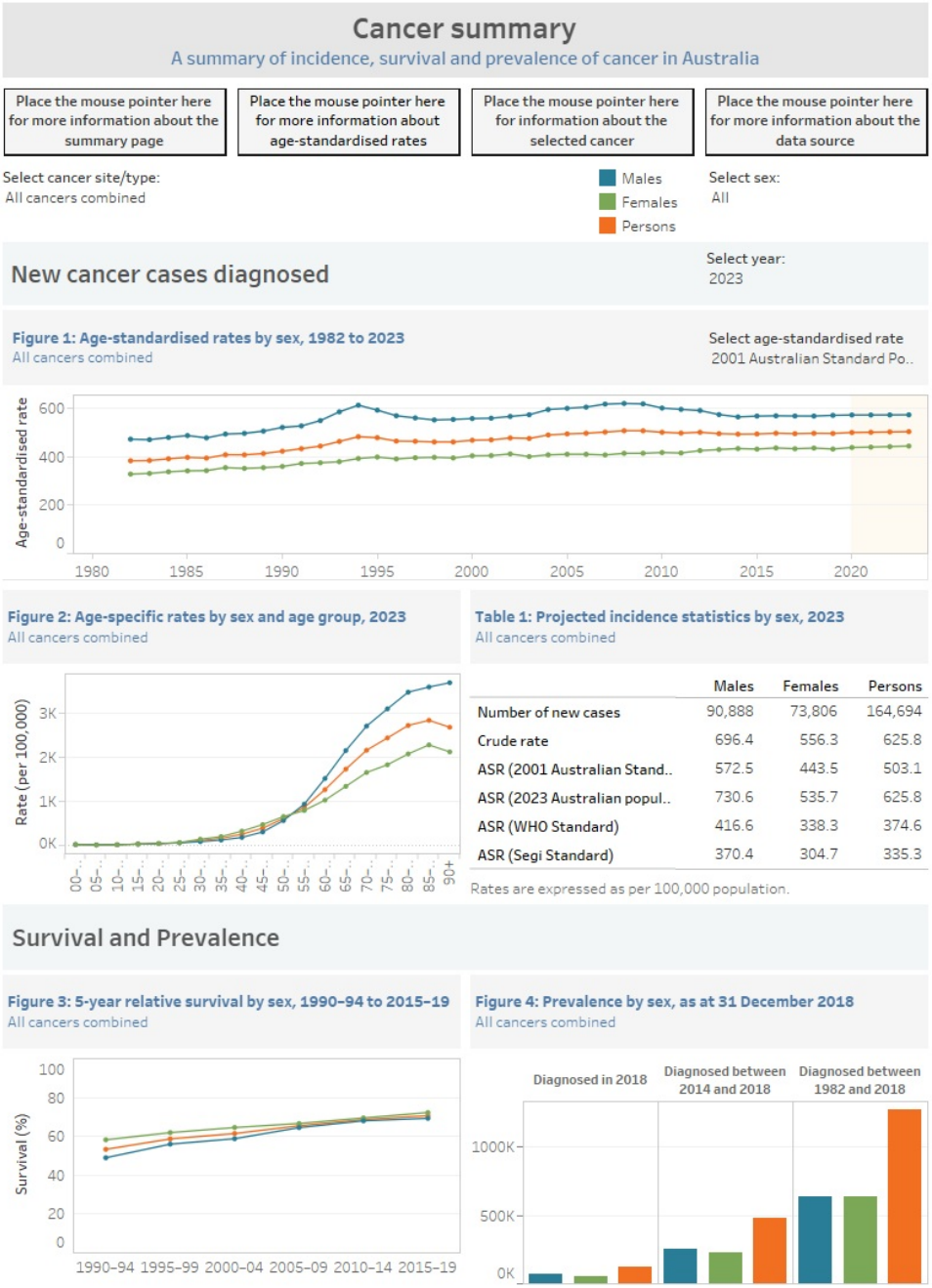
Figure 2 is a line graph that contains information on the crude rate of cancer diagnosis for various 5-year age groups from 0–4, 5–9, etc. up to 90+ for a selected year between 1982 and the most recent year available for reporting at the time of release.

Table 1 contains cancer diagnosis-related summary statistics such as the number of cases, crude and age-standardised rate of diagnosis and mean and median ages at diagnosis.

Figure 3 is a line graph that contains 5-year relative survival rates for the selected cancer in 5-year periods.

Figure 4 is a column graph that contains information on cancer prevalence (that is, the number of people alive at specified point in time who have been diagnosed with the selected cancer previously).

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



Please note that cancer incidence statistics from 2020 to 2023 are projections; all other statistics are derived from actual data.

Data informing the summary dashboard is available as supplementary tables.

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AIHW (Australian Institute of Health and Welfare) 2019. BreastScreen Australia monitoring report 2018. Cancer series no.127. Cat no. CAN 128. Canberra: AIHW

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Qaseem A, Usman N, Jayaraj J S, et al. (September 02, 2019) Cancer of Unknown Primary: A Review on Clinical Guidelines in the Development and Targeted Management of Patients with the Unknown Primary Site. Cureus 11(9): e5552. doi:10.7759/cureus.5552

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Vaccarella S, Franceschi S, Bray F, Wild C, Plummer M and Dal Maso L 2016. The increase in thyroid cancer may be due to an increase in medical surveillance and the introduction of new diagnostic techniques, such as neck ultrasonography. The New England Journal of Medicine 375: 614–17.

 

Cancer rankings data visualisation

The cancer rankings data visualisation provides the top 20 cancers diagnosed between 1982 and 2023. The visualisation also includes the leading 20 cancers causing death between 2007 and 2023. The rankings are available by sex and age group (including all ages) and can be presented as counts or rates. Age-standardised rates are standardised to the 2023 Australian population but the equivalent rates standardised to the 2001 Australian Standard Population are available in the cancer incidence and cancer mortality, by age visualisations.

Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page. This visualisation contains tabulated rankings of the top 20 cancers most commonly diagnosed from 1982 to the most recent year available for reporting at the time of release. Data is available for all ages combined and by 20-year age groups from 0–19, 20–39, 40–59, 60–79 and 80 and over.

Australia's leading cancers

Cancer incidence and mortality ranking tables
by sex and age groups, 1982 to 2023 (incidence) 2007 to 2023 (mortality)

Place mouse pointer here for more information about the rankings tables | Place mouse pointer here for data sources, terms and methods | Place mouse pointer here for information about which cancers are in the rankings

Cancer incidence rankings	*Please select*	Cancer mortality rankings
2023	*year*	2023
Persons	*sex*	Persons
all ages	*age group*	all ages
Rates	*counts or rates*	Rates

Table 1 - Australia's most commonly diagnosed cancers in 2023, persons, all ages,
Age-standardised incidence rates (cases per 100,000 persons)- projections data

Age-standardised rates are standardised to the 2023 Australian population.

Rank	Cancer type	Age-standardised rate
1	Prostate cancer	96.8
2	Breast cancer	78.6
3	Melanoma of the skin	69.4
4	Colorectal cancer	58.4
5	Lung cancer	56.2
6	Non-Hodgkin lymphoma	25.3
7	Kidney cancer	17.8
8	Pancreatic cancer	17.1
9	Thyroid cancer	15.5
10	Uterine cancer	12.7
11	Bladder cancer	11.9
12	Liver cancer	11.6
13	Multiple myeloma	10.1
14	Unknown primary site (cancer of)	10.1
15	Stomach cancer	9.8
16	Chronic lymphocytic leukaemia	9.2
17	Brain cancer	7.3
18	Myeloproliferative neoplasms (excluding CML)	7.3
19	Ovarian cancer and serous carcinomas of the f..	6.8
20	Oesophageal cancer	6.6
Total	All cancers combined	625.8

Table 2 - Australia's most common causes of cancer-related death in 2023, persons, all ages
Age-standardised mortality rates (deaths per 100,000 persons) - projections data

Age-standardised rates are standardised to the 2023 Australian population.

Rank	Cancer type	Age-standardised rate
1	Lung cancer	33.0
2	Colorectal cancer	20.2
3	Prostate cancer	14.2
4	Pancreatic cancer	13.9
5	Breast cancer	12.5
6	Liver cancer	7.6
7	Unknown primary site (cancer of)	7.2
8	Non-Hodgkin lymphoma	6.6
9	Brain cancer	6.0
10	Stomach cancer	5.1
11	Melanoma of the skin	5.0
12	Multiple myeloma	4.5
13	Oesophageal cancer	4.5
14	Bladder cancer	4.0
15	Ovarian cancer and serous carcinomas..	4.0
16	Acute myeloid leukaemia	3.4
17	Myelodysplastic syndromes	3.3
18	Kidney cancer	3.0
19	Non-melanoma skin cancer (all types)	3.0
20	Mesothelioma	2.8
Total	All cancers combined	194.8

Cancer specific information: please select cancer type and place the mouse pointer over icon to the right for selected cancer ICD10 codes and 'events' that may impact on rankings:
All cancers combined

References

ABS (Australian Bureau of Statistics) 2018. Population projections, Australia, 2017 (base) – 2066. ABS cat. no. 3222.0. Canberra: ABS.

AIHW (Australian Institute of Health and Welfare) 2019. BreastScreen Australia monitoring report 2018. Cancer series no.127. Cat no. CAN128. Canberra: AIHW

Al-Marhoon M, Osman A, Kamal M and Shokier A 2011. Incidental vs symptomatic renal tumours: Survival outcomes. Arab Journal of Urology 9(1): 17–21.

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Luke C, Tracey E, Stapleton A and Roder D 2010. Exploring contrary trends in bladder cancer incidence, mortality and survival: implications for cancer research and cancer control. Internal Medicine Journal 40:357–62.

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Vaccarella S, Franceschi S, Bray F, Wild C, Plummer M and Dal Maso L 2016. The increase in thyroid cancer may be due to an increase in medical surveillance and the introduction of new diagnostic techniques, such as neck ultrasonography. The New England Journal of Medicine 375: 614–17.

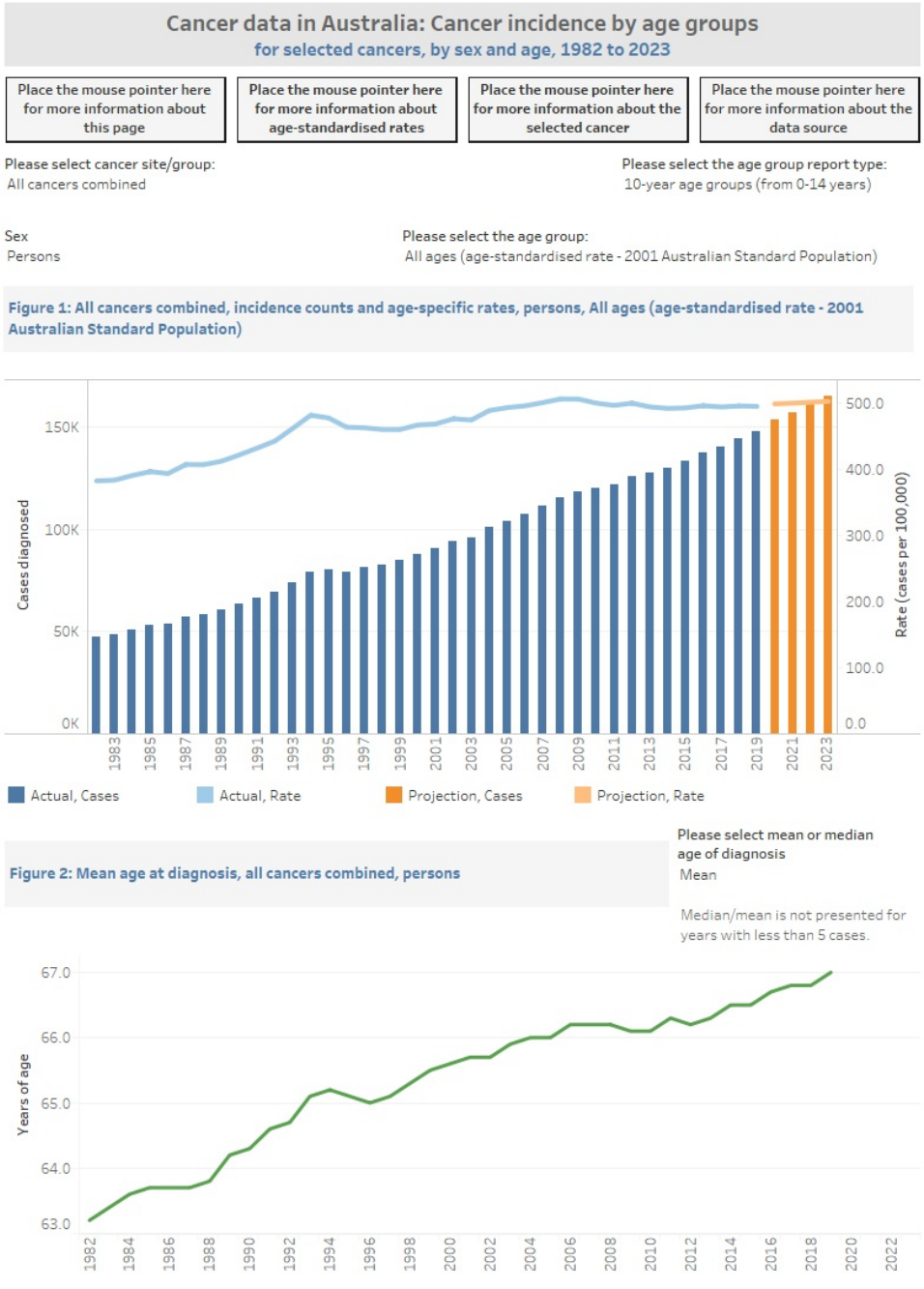
Cancer incidence by age visualisation

For many different cancers, this data visualisation provides cancer incidence data by age for a wide range of age groups. Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page.
This cancer incidence visualisation contains two figures. The visualisation presents statistics for the selected cancer and provides information by sex.

Figure 1 is a line and bar graph that contains information on the number of cancer cases diagnosed (bar chart) and the rate of diagnosis (line graph) from 1982 to the most recent year available for reporting at the time of release. For a selected age group (other than all ages), the line graph represents the age-specific rate. The crude rate or age-standardised rate can be selected for all ages. Age-group reporting can be selected by 5-, 10-, 15-, 20-, 25-, 30-, 35-, 40-, 45- and 50-year age groups.

Figure 2 is a line graph that contains mean or median age (in years) at cancer diagnosis from 1982 to most recent year available for reporting at the time of release.

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



Cancer incidence by age data are available as supplementary tables.

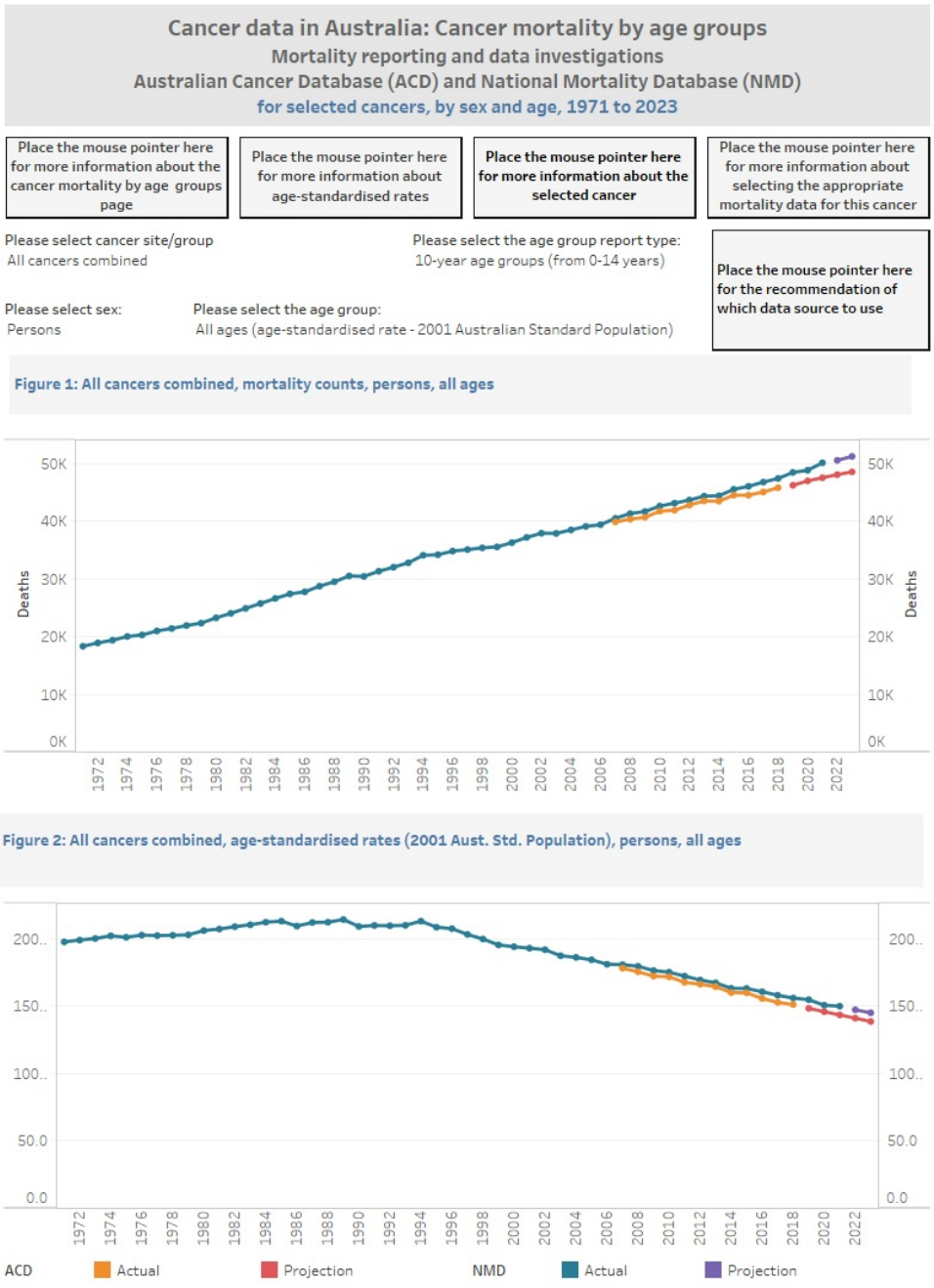
Cancer mortality by age visualisation

For many different cancers, this data visualisation provides cancer mortality data by age for a wide range of age groups. For this year and as part of the cancer mortality data investigations, two sources of mortality data are used for cancer mortality reporting (the sources are the National Mortality Database (NMD) and the Australian Cancer Database (ACD)). More information about the cancer mortality investigations is in Cancer data commentary number 8 and Cancer data commentary 8b. General assistance of how to choose which source to use for reporting on selected cancers is found within the data visualisation. Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page.
This cancer mortality visualisation contains two figures. The visualisation presents statistics for the selected cancer and provides information by sex.

Figure 1 is a line graph that contains information on the number of cancer deaths historically up to the most recent year available for reporting at the time of release. Two series are presented in the graph: a line graph for each of National Mortality Database (NMD)-based and Australian Cancer Database (ACD)-based cancer death counts. Age-group reporting can be selected by 5-, 10-, 15-, 20-, 25-, 30-, 35-, 40-, 45- and 50-year age groups.

Figure 2 is a line graph that contains information on the rate of cancer death historically up to the most recent year available for reporting at the time of release. For a selected age group (other than all ages), the line graph represents the age-specific rate. The crude rate or age-standardised rate can be selected for all ages. Age-group reporting can be selected by 5-, 10-, 15-, 20-, 25-, 30-, 35-, 40-, 45- and 50-year age groups. Two series are presented in the graph: a line graph for each of NMD-based and ACD-based cancer death rates.

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



Cancer mortality by age data are available as supplementary tables.

Cancer survival data visualisation

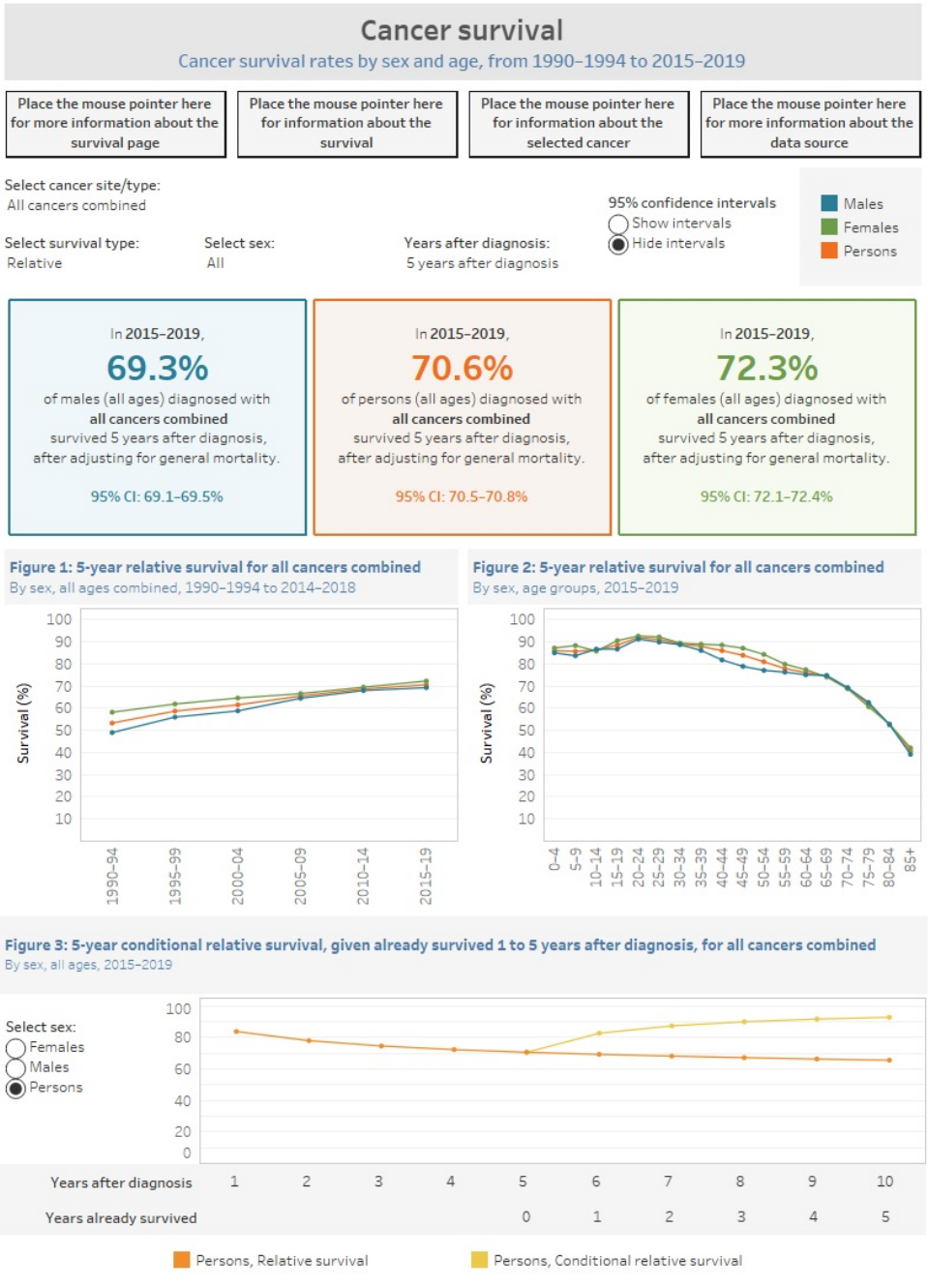
For many different cancers, this data visualisation provides a range of cancer survival statistics. Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page.
This cancer survival visualisation contains three figures. The visualisation presents statistics for the selected cancer and provides statistics by sex.

Figure 1 is a line graph that contains time series information on 1 to 5-year observed or relative survival rates for the selected cancer in 5-year periods.

Figure 2 is a line graph that contains information on 1 to 5-year observed or relative survival rates for the selected cancer in order of increasing age group (0–4, 5–9, etc. up to 85+) for the most recent 5-year period available for reporting.

Figure 3 is a line graph that contains 5-year conditional observed or relative survival, given the person has already survived 1 to 5 years after diagnosis, for the selected cancer for the most recent 5-year period available for reporting.

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



Cancer survival data is available as supplementary tables.

References

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Vaccarella S, Franceschi S, Bray F, Wild C, Plummer M and Dal Maso L 2016. The increase in thyroid cancer may be due to an increase in medical surveillance and the introduction of new diagnostic techniques, such as neck ultrasonography. The New England Journal of Medicine 375: 614–17.

Cancer survival by age visualisation

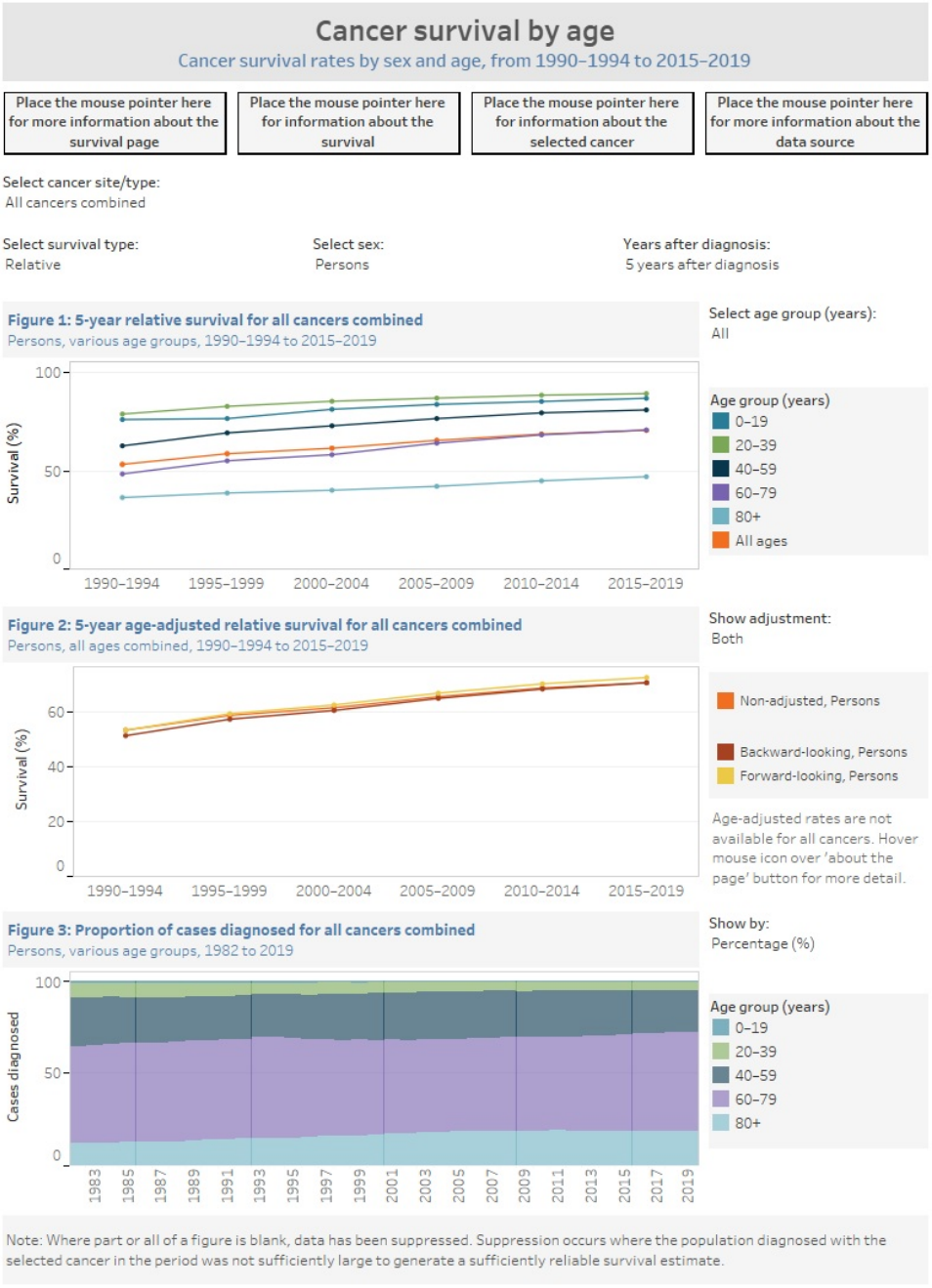
For many different cancers, this data visualisation provides cancer survival data by age, age adjusted survival rates and changes in the age characteristics of people diagnosed. Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page. Additional guidance about using this data is located in the data commentary 6 About age adjusted survival.
This cancer survival visualisation contains three figures. The visualisation presents statistics for the selected cancer and provides statistics by sex.

Figure 1 is a line graph that contains time series information on 1 to 5-year observed or relative survival rates for the selected cancer in 5-year periods for selected age groups (0–19, 20–39, 40–59, 60–79, 80+) and all ages.

Figure 2 is a line graph that contains information on 1 to 5-year observed or relative age-adjusted survival rates for the selected cancer in 5-year periods. Age-adjusted rates are shown for backward-looking and forward-looking adjustments. Please read Cancer data commentary C6 for more information about age-adjusted survival and the backward-looking and forward-looking survival data.

Figure 3 is a stacked bar chart that contains the number of cases diagnosed for the selected cancer from 1982 to the most recent year available for reporting, at the time of release, for the age groups: 0–19, 20–39, 40–59, 60–79, 80+. The chart can be shown as the number of cases diagnosed or as a percentage for each age group of the total cases diagnosed.

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



Cancer survival by age data are available as supplementary tables.

Cancer by state and territory data visualisation

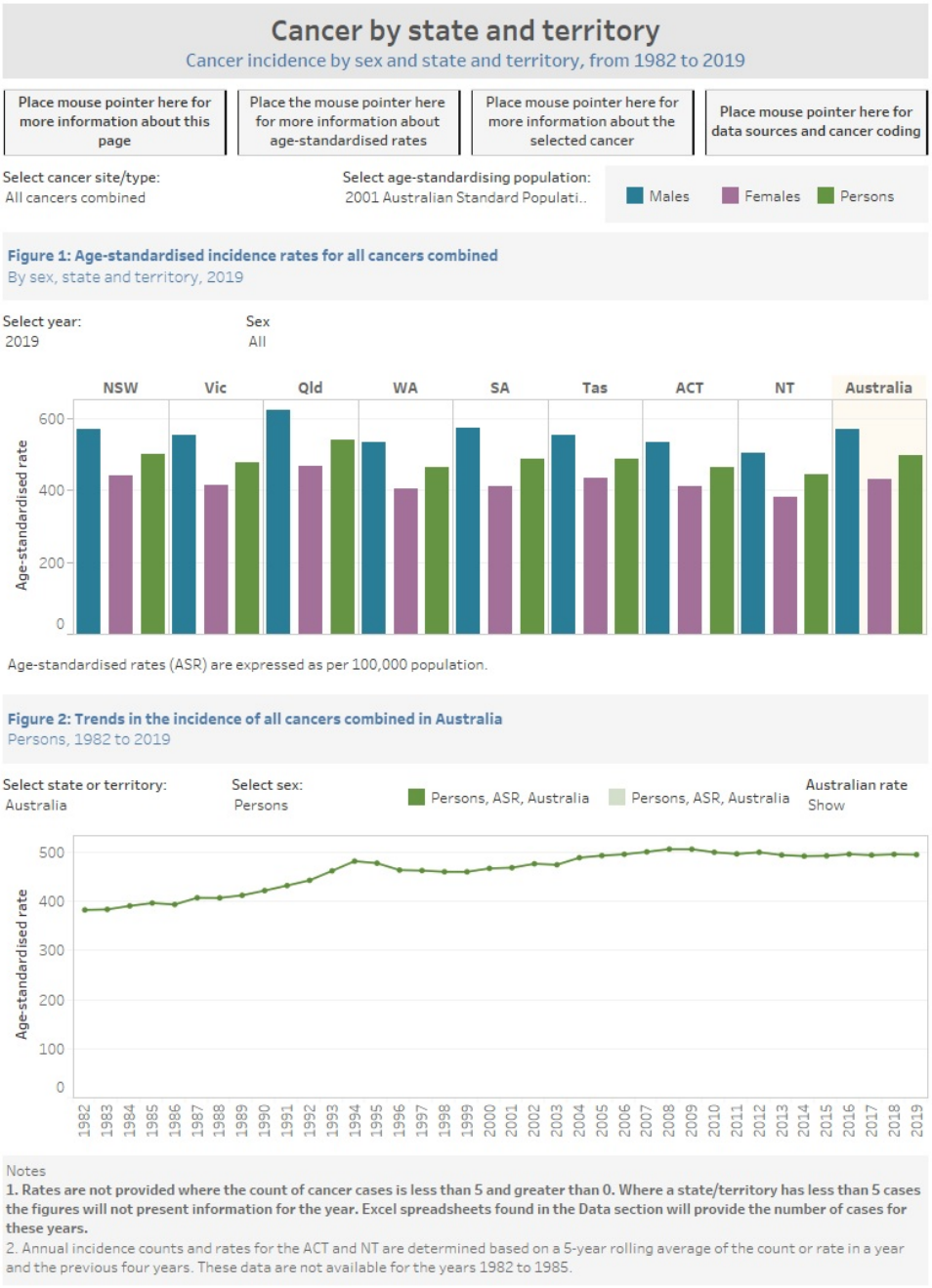
For many different cancers, this data visualisation provides cancer incidence data for each state and territory. Cancer mortality data are excluded from this visualisation this year but are expected to be included after cancer mortality data investigations are complete.

Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page. This cancer incidence by state and territory visualisation contains two figures. The visualisation presents statistics for the selected cancer and provides statistics by sex..

Figure 1 is a column graph that contains information on the number of cases diagnosed and the age-standardised rates of diagnosis from the selected cancer by sex for each state and territory and Australia for a selected year from 1982 to the most recent year available for reporting at the time of release.

Figure 2 is a line graph that contains information the number of cases diagnosed and the age-standardised rates of diagnosis from the selected cancer for a selected sex and state or territory from 1982 to the most recent year available for reporting at the time of release.

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



State and territory incidence data are available as supplementary tables.

Cancer risk data visualisation

For many different cancers, this data visualisation provides cancer incidence and mortality risk data by age. Help with terms, and information about the data, is available by placing the mouse pointer over the icons found near the top of the page. Additional guidance about the risk adjusted for competing mortality and risk unadjusted for competing mortality is located in cancer data commentary number 1 and the methods section.

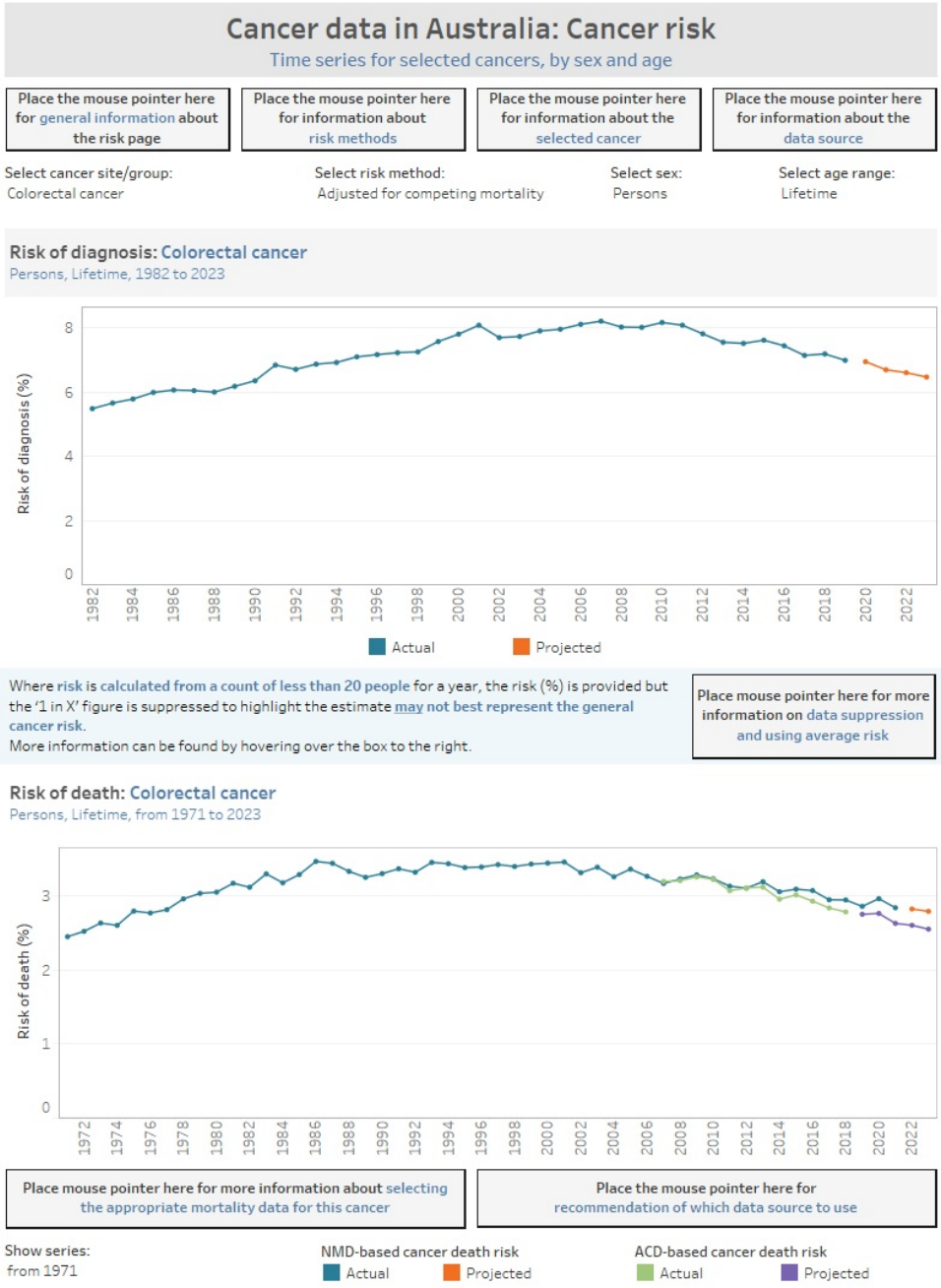
In this year's release, cancer mortality statistics from the Australian Cancer Database accompany the mortality data from the National Mortality Database. Please read cancer data commentary number 8 for more information about cancer mortality data investigations. General assistance of how to choose which source to use for reporting on selected cancers is found within the data visualisation. Recommendations of which data source to use are also available within the data visualisation, and Cancer data commentary 8b provides information about how these recommendations were made and associated complexities of mortality reporting with two data sources available.

Advice about using the mortality data is also available by hovering the cursor above the "please read here for more information about using mortality data" box.
This cancer risk visualisation contains two figures. The visualisation presents statistics for the selected cancer and provides statistics by sex.

Figure 1 is a line graph that contains information on the risk of cancer diagnosis (adjusted or unadjusted for competing mortality) for the selected cancer and age range from 1982 to the most recent year available for reporting at the time of release. Please read cancer data commentary C1 for more information about cancer risk and the adjusted and unadjusted for competing mortality concepts.

Figure 2 is a line graph that contains information on the risk of death from cancer (adjusted or unadjusted for competing mortality) for the selected cancer and age range historically up to the most recent year available for reporting at the time of release. Two series are presented in the graph: a line graph for each of risk estimates using NMD-based and ACD-based cancer death counts.

The visualisation includes information about many different cancers and the statistics within this visualisation are available in Excel format within the Data section of this report.



Cancer risk data are available as supplementary tables.

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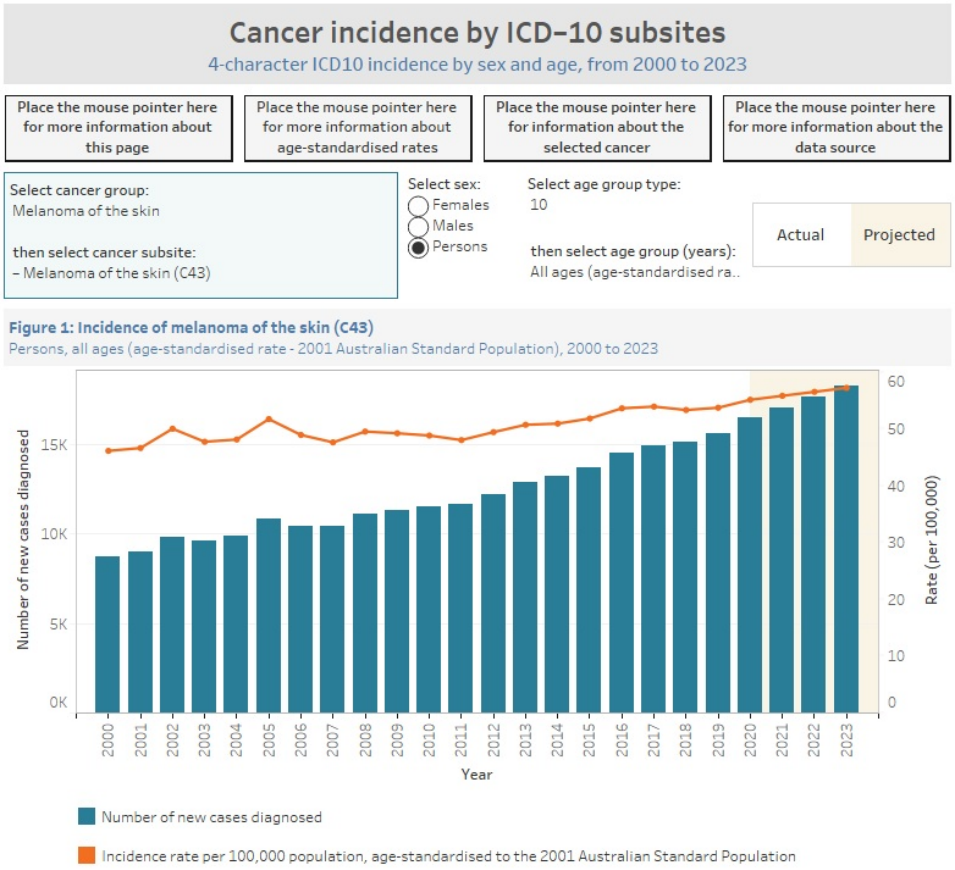
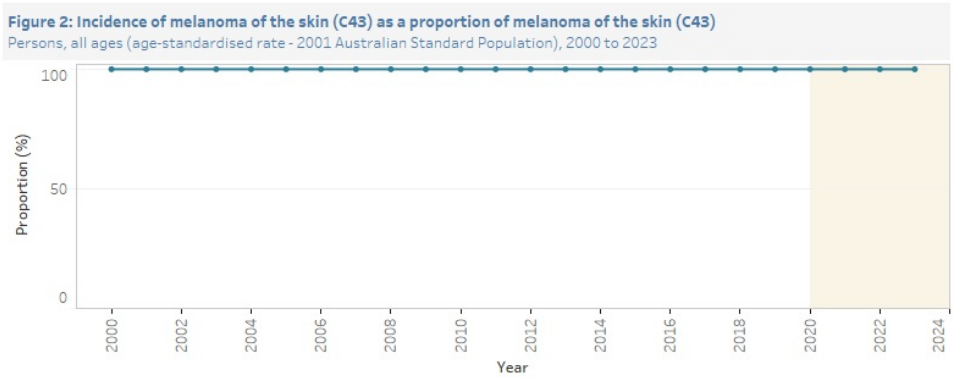
Cancer incidence and survival by subsite

Cancer groups within the Cancer data in Australia report are generally defined using the International Classification of Diseases 10th Revision. In many instances, the cancer sites reported have subsite information. The following incidence and survival data visualisations provide the subsite information for each of the cancers.

Not all cancers more commonly reported on within this report have subsite information. For example rectal cancer, identifiable with ICD-10 code C20, has no more detailed subsite information. Colon cancer, identifiable with ICD-10 code C18 has subsite data including the caecum (C18.0), appendix (C18.1), ascending colon (C18.2), hepatic flexure (C18.3), transverse colon (C18.4), splenic flexure (C18.5), descending colon (C18.6), sigmoid colon (C18.7) and overlapping lesion of colon and colon unspecified (C18.8 and C18.9).
Figure 1 of this visualisation shows incidence rates by age time series for the selected cancer subsite. Figure 2 shows the time series of percentages that the subsite is of the selected cancer. Rates and percentages are available for different age groups and overall. The visualisation contains information on many different cancers and subsites. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.





Note: In Figure 2, when there are zero total cases for the selected cancer group in a year, the selected cancer subsite as a proportion of the cancer group is undefined and not 0% as stated in the text within the figure.

Cancer incidence by subsite data are available as supplementary tables.

Cancer survival by subsite

The number of subsites available within the cancer by subsite survival visualisation is less than incidence. Incidence data is provided if there is at least one case in the years reported while survival rates are provided if there is a survival rate for at least one of the reporting periods. Reliable survival rates require considerably more cases.

In addition to the 5-year reporting periods, a 15-year reporting period (2005–2019) has been created to increase the likelihood of at least a limited range of survival statistics being available for rarer cancers. This period provides only a limited understanding of survival. A limitation of this period is that the rates may be more predominantly derived from earlier years where survival may differ compared to more recent periods.

Figure 1 show the survival for the selected subsite over time. Figure 2 shows the survival rates by age for the selected subsite for a selected period. Figure 3 shows the number of cases by age for the selected subsite. Survival rates include either relative or observed. Survival rates include 1, 2-, 3-, 4- or 5-year survival. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Cancer survival by subsite data are available as supplementary tables.

Blood cancer incidence and survival by histology (experimental data)

The blood cancer incidence and survival and histology data survival and incidence visualisations have been broken into 2 separate reports. The first set of visualisations, referred to as the main reporting framework, represents the blood cancer reporting framework that has been mapped with the knowledge and assistance of the Leukaemia Foundation Blood Cancer Taskforce. The second set of visualisations, referred to as ICD-10, uses the structure of blood cancers from the main reporting framework and applies it to the ICD-10 based reporting which is more commonly used elsewhere within the CdiA.

The primary reason for applying the blood cancer by histology to the ICD-10 structure is to allow finer level understandings and reporting of the blood cancers reported elsewhere within the Cancer data in Australia report. Cancer data commentary 10 provides more information about the blood cancer by histology reporting, including why the data is experimental. The ICD-10 blood cancer by histology visualisations follow the main reporting.

The following cancer incidence and survival data visualisations have been developed with the assistance of the Leukaemia Foundation Blood Cancer Taskforce. We thank the taskforce for their time and expert knowledge, without which, the blood cancer histology reporting used below would not be available.
Figure 1 of this visualisation shows incidence rates by age time series for the selected blood cancer. Figure 2 shows the time series of percentages that the blood cancer type is of the selected blood cancer group. Rates and percentages are available for different age groups and overall. The visualisation contains information on many different blood cancers. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Blood cancer incidence by histology data are available as supplementary tables.

Blood cancer survival by histology (main)

The number of blood cancer types available within the survival visualisation is less than incidence. Incidence data is provided if there is at least one case in the years reported while survival rates are provided if there is a survival rate for at least one of the reporting periods. Reliable survival rates require considerably more cases.

In addition to the 5-year reporting periods, a 15-year reporting period (2005–2019) has been created to increase the likelihood of at least a limited range of survival statistics being available for rarer cancers. This period provides only a limited understanding of survival. A limitation of this period is that the rates may be more predominantly derived from earlier years where survival may differ compared to more recent periods.
Figure 1 of this visualisation shows the survival rates for the selected blood cancer over time. Figure 2 shows the survival rates by age for the selected type for the most recent 15-year period. Figure 3 shows the proportion of cases by age for the selected blood cancer. Survival rates include either relative or observed. Survival rates include 1, 2-, 3-, 4- or 5-year survival. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Blood cancer incidence by histology data are available as supplementary tables.

Visualisation not available for printing

Cancer sites within the Cancer data in Australia report are generally derived using the International Classification of Diseases 10th Revision (ICD-10). The blood cancer by histology reporting (ICD-10) uses the main blood cancer reporting structure and applies it to the blood cancer reporting used within the ICD-10. It is provided primarily for those using the blood cancer reporting structure used elsewhere in this report of the composition of these cancers and how survival rates may vary depending on histological differences.

Blood cancer incidence by histology (ICD-10)

Figure 1 of this visualisation shows incidence rates by age time series for the selected blood cancer. Figure 2 shows the time series of percentages that the blood cancer type is of the selected ICD-10 derived blood cancer group. Rates and percentages are available for different age groups and overall. The visualisation contains information on many different blood cancers. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Blood cancer incidence by histology data are available as supplementary tables.

Blood cancer survival by histology (ICD-10)

The number of blood cancers available within the blood cancer survival by histology survival visualisation is less than incidence. Incidence data is provided if there is at least one case in the years reported while survival rates are provided if there is a survival rate for at least one of the reporting periods. Reliable survival rates require considerably more cases.

In addition to the 5-year reporting periods, a 15-year reporting period (2005–2019) has been created to increase the likelihood of at least a limited range of survival statistics being available for rarer cancers. This period provides only a limited understanding of survival. A limitation of this period is that the rates may be more predominantly derived from earlier years where survival may differ compared to more recent periods.

Figure 1 of this visualisation shows the survival rates for the selected blood cancer over time. Figure 2 shows the survival rates by age for the selected type for the most recent 15-year period. Figure 3 shows the proportion of cases by age for the selected blood cancer. Survival rates include either relative or observed. Survival rates include 1, 2-, 3-, 4- or 5-year survival. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Blood cancer survival by histology data are available as supplementary tables.

Cancer incidence and survival by histology (selected cancers)

Incidence by histology (for selected cancers) - experimental data

The data visualisation below provides cancer incidence by histology and, below that, the corresponding survival information is provided in a separate visualisation. Histology describes the type of cells in which the cancer originates. The selected cancers reported on are brain, breast, cervical, colorectal, kidney, liver, lung, pancreatic, prostate, mesothelioma and melanoma of the skin. More cancers may be added to this list in future Cancer data in Australia reports.

The visualisations include prefixes to help identify the relationships between cancers. For example, for colorectal cancer C1.01 is the prefix ID for carcinomas, C1.01.01 is the prefix ID for squamous cell carcinoma - a type of carcinoma. The prefixes are provided for assistance only within this report and have nothing to do with the respective cancers outside of this specific assistance.

Information about why the data is experimental is provided below the visualisations and this information should help understanding potential data limitations.

To use the visualisation, please select the cancer and then the cancer type.
Figure 1 of this visualisation shows incidence rates by age time series for the selected cancer type. Figure 2 shows the time series of percentages that the cancer type is of the selected cancer. Rates and percentages are available for different age groups and overall. The visualisation contains information on many different types of cancer. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Cancer incidence by histology data are available as supplementary tables.

Survival by histology (for selected cancers) - experimental data

The below data visualisation provides cancer survival by histology for selected cancers (brain, breast, cervical, colorectal, kidney, liver, lung, pancreatic, prostate, mesothelioma and melanoma of the skin).

The number of cancers available within the survival visualisation is less than incidence. Incidence data is provided if there is at least one case in any of the reporting years while survival rates are provided if there is a survival rate for at least one of the reporting periods. Reliable survival rates require considerably more cases.

In addition to the 5-year reporting periods, a 15-year reporting period (2005–2019) has been created to increase the likelihood of at least a limited range of survival statistics being available for rarer cancers. This period provides only a limited understanding of survival. A limitation of this period is that the rates may be more predominantly derived from earlier years where survival may differ compared to more recent periods.
Figure 1 of this visualisation shows the survival rates for the selected cancer type over time. Figure 2 shows the survival rates by age for the for the selected cancer for the selected period. Figure 3 shows the proportion of cases by age for the selected cancer type. Survival rates include either relative or observed. Survival rates include 1, 2-, 3-, 4- or 5-year survival. Data is available by sex. The data for this visualisation is available in Excel workbooks in the Data section of the Cancer data in Australia report.

Visualisation not available for printing

Cancer survival by histology data are available as supplementary tables.

Why is the histology data experimental?

Over time, diagnostic capabilities for cancer continue to improve. These improvements can lead to changes from more a general diagnosis of cancer type to more specific diagnosis. Accordingly, some incidence rates for cancers by histology may be increasing due to improvements in cancer diagnostic capabilities rather than a genuine increase of the cancer. Cancer data commentary 10 discusses why blood cancer by histology data is experimental and the principles discussed generally apply to the histology reporting for the above visualisations too.

The rates for the lead cancers (for example breast cancer or pancreatic cancer) are not experimental; these require the site of the body where the cancer originates whereas histology requires the cell types.

Cancer incidence projections (long-term)

This page provides information about the cancer incidence projections for 2024 to 2033. The data are not accompanied by a data visualisation and are not included within this information page but can be found within the Data section of the report.

Within this section, the 2020 to 2023 incidence projections are referred to as short-term projections and the 2024 to 2033 as the long-term projections. The two sets of projections are derived by different methods. Because of this, on occasion the 2023 to 2024 incidence rate series may disconnect to some degree.

Both methods derive projections using historical trends in actual data. To that end, the reliability of projections reduces where new trends are yet to emerge, or haven't emerged to the extent to fully influence projections.

Population projections from the Centre for Population are used for incidence rates from 2023 to 2033; the estimated resident population from the Australian Bureau of Statistics is used for earlier years. Cancer incidence projections are influenced by the estimated change in cancer rates and the change in the population size and composition. Population change often accounts for a considerable proportion of the increase in cases diagnosed and projected, particularly with the Australian population ageing, and cancer incidence being higher in older age groups. The reliability of projections is dependent on the accuracy of cancer rates projected and populations projected.

Given the uncertainties surrounding projections, they are provided as estimates rather than predictions. Projection time series are primarily provided as estimates of counts and rates for each given year, rather than estimates from which detailed time-series analysis can be undertaken.

The actual cancer incidence rates over time often have a degree of volatility. Accordingly, single years may on occasion vary from the overall trend. Projections do not have such volatility and instead project individual years as part of an overall trend.

Covid-19 may have some impact on the timing of diagnosis for some cancers. A possible impact may be that years where Covid-19 was at its height may result in fewer cases diagnosed for some cancers and a corresponding increase in later years where delayed diagnosis occurs. The CdiA projections do not attempt to adjust for Covid-19.

Short-term projections are derived from linear regressions. More information about the method can be found in the Methods section of CdiA. The short-term projections were not considered as suitable for longer-term as the single linear trend rarely continues for extended periods of time. The longer-term projections are derived from the Nordpred program, a software package developed by Harald Fekjær and Bjørn Møller at the Cancer Registry of Norway for predicting trends in cancer incidence using a modified age-period-cohort model based on existing incidence trends.

Prostate cancer projections are not derived using the short-term or long-term projection methods. Instead, these projections use the most recent actual incidence rates and apply these to the population projections. More information about prostate cancer incidence projections are available in Cancer data commentary number 9 (please note that the data in this commentary have been superseded by the new projections but the paper helps explain difficulties in projecting prostate cancer incidence).

Cancer incidence and survival by stage data visualisation

Cancer stage at diagnosis refers to the extent of spread of cancer at the time of diagnosis–the higher the number (between I and IV), the further the cancer has spread. The stage at diagnosis is an important determinant of cancer survival.

National cancer incidence and survival by stage data were first released in the Cancer data in Australia December 2018 release. While almost all other data are updated annually, more recent cancer incidence and survival by stage data is not available so it has not been possible to update it. As it is a unique source of national data, the following cancer incidence and survival by stage data visualisation remains available within this *Cancer data in Australia* report.
This visualisation contains cancer survival and incidence, by stage of cancer at diagnosis for the 5 most commonly diagnosed cancers (melanoma of the skin, and breast, prostate, lung and colorectal cancers) in 2011.

Visualisation not available for printing

Cancer stage data is available as supplementary tables.

Cancer mortality project update

In the 2022 release of Cancer data in Australia (CdiA), two sets of mortality data were published. One set was sourced from the National Mortality Database (NMD) while the other was derived from the Australian Cancer Database (ACD). Prior to 2022, only the NMD was used to report cancer mortality.

Cancer data commentary 8 was released to help understand why two sources of data were used and Cancer data commentary 8b provides guidance on which data source to use for each type of cancer and analysis.

The release of the two data sources highlights uncertainties in mortality reporting for some cancers. The cancer mortality project is being undertaken within existing resources and aims to help progress mortality reporting and reduce uncertainties.

At present, the cancer mortality project is examining unit record differences between the ACD and NMD for liver cancer. As a cancer with more substantial differences between the NMD and ACD mortality counts, liver cancer has been selected as the cancer to trial investigations on. The differences between the cause of death according to the two sources have been considered at unit record level by comparing the cause of death data from the two data sources for each individual record. While the specific results of these investigations are not yet ready for release, the general findings to date indicate that:

- where there is inconsistency between the two data sources cause of death, the differences may be mainly driven by a small number of common inconsistencies.
- differences can impact one sex more than the other to the extent that the consistency of the cause of death information according to the NMD and ACD can be considerably greater for one sex.
- unit record investigations for liver cancer and other cancer types could provide information of benefit to both data sources.

The investigations to date suggest that examining differences in the cause of death at a unit record level will lead to improved understandings of the nature of issues. Issues are likely to be specific to each type of cancer and therefore each cancer where the ACD and NMD differ substantially will need to be investigated individually.

At a minimum, investigations should inform decisions about which data source to use for specific purposes and improve understandings of where and why differences occur. The potential beyond that is difficult to determine at this stage of the project.

It is envisaged that the cancer mortality project will continue to progress in the latter half of 2023 and the results of investigations are likely to be published in 2024.

List of cancers available within this report

The list of cancers available in this report can be broken into 4 different types. These are, the core list of cancers generally reported on within the report, cancer by subsite, blood cancer by histology and selected other cancers by histology.

Core list of cancers

The core list of cancers available within the majority of CdiA reports are provided in the table below. On occasion and for various reasons, some cancers may not be available for some reports.

Cancers and cancer groupings reported on within the Cancer data in Australia report

Cancer group/site	ICD-10 code/s
Lip cancer	C00
Tongue cancer	C01–C02
Mouth cancer	C03–C06
Parotid gland cancer	C07
Submandibular gland cancer	C08.0
Sublingual gland cancer	C08.1
Cancer overlapping and unspecified sites in major salivary glands	C08.8–C08.9
Cancer of the major salivary glands	C07–C08
Oropharyngeal cancer	C09–C10
Oral cancer	C00–C10
Nasopharyngeal cancer	C11
Hypopharyngeal cancer	C12–C13
Cancer of other and ill-defined sites in the lip, oral cavity and pharynx	C14
Head and neck cancer (including lip)	C00–C14, C30–C32
Head and neck cancer (excluding lip)	C01–C14, C30–C32
Oesophageal cancer	C15
Stomach cancer	C16
Small intestine cancer	C17
Appendiceal cancer	C18.0

Colon cancer	C18
Rectosigmoid junction cancer	C19
Rectal cancer (excluding rectosigmoid junction)	C20
Rectal cancer (including rectosigmoid junction)	C19–C20
Colorectal cancer	C18–C20 (NMD mortality data includes C26.0)
Anal cancer	C21
Liver cancer	C22
Gallbladder cancer	C23
Extrahepatic bile duct cancer	C24.0
Ampullary cancer	C24.1
Cancer of overlapping and unspecified sites in biliary tract	C24.8–C24.9
Gallbladder and extrahepatic bile duct cancer	C23–C24
Pancreatic cancer	C25
Cancer of other and ill-defined digestive organs	C26 (NMD mortality data excludes C26.0)
Nasal cavity cancer	C30.0
Middle ear cancer	C30.1
Sinuses cancer	C31
Laryngeal cancer	C32
Lung cancer	C33–C34
Cancer of other thoracic and respiratory organs	C37–C39
Bone cancer	C40–C41 (ACD data includes selected histologies)
Melanoma of the skin	C43
Non-melanoma skin cancer	C44 (ACD data excludes basal and squamous cell carcinomas of the skin. These are the most common types of non-melanoma skin cancer and accordingly ACD based statistics for this cancer are described within this report as 'Non-melanoma skin cancer (rare types)'. The NMD includes basal and squamous cell carcinomas of the skin and is described within this report as 'Non-melanoma skin cancer (all types)'.
Mesothelioma	C45
Kaposi sarcoma	C46

Cancer of peripheral nerves and autonomic nervous system	C47
Peritoneal cancer	C48
Cancer of connective, subcutaneous and other soft tissues	C49
Breast cancer	C50
Vulvar cancer	C51
Vaginal cancer	C52
Cervical cancer	C53
Endometrial cancer	C54.1
Uterine cancer	C54–C55
Ovarian cancer	C56
Ovarian cancer and serous carcinomas of the fallopian tube	C56 (all histologies) and C57.0, C57.8 (with histologies 8441, 8460, 8461)
Cancer of other female genital organs	C57
Cancer of other female genital organs excluding serous carcinomas of the fallopian tube	C57 excluding C57.0, C57.8 (with histologies 8441, 8460, 8461)
Placenta cancer	C58
Gynaecological cancers	C51–C58
Penile cancer	C60
Prostate cancer	C61
Testicular cancer	C62
Cancer of other male genital organs	C63
Kidney cancer	C64
Renal pelvis cancer	C65
Ureteral cancer	C66
Bladder cancer	C67
Urethral cancer	C68.0
Cancer of overlapping and unspecified sites in urinary tract	C68.8–C68.9
Eye cancer	C69

Other central nervous system cancers	C70, C72, C75.1–C75.3
Brain cancer	C71
Brain and other central nervous system cancers	C70–C72, C75.1–C75.3
Thyroid cancer	C73
Cancer of other endocrine glands	C74–C75 (excluding C75.1–C75.3)
Cancer of other and ill-defined sites	C76
Cancer of unknown primary site	C80 (NMD mortality data includes C77–C79, C97)
Hodgkin lymphoma	C81
Non-Hodgkin lymphoma	C82–C86
Lymphoma	C81–C86
Immunoproliferative cancers	C88
Multiple myeloma	C90.0
Other plasma cell cancers	C90.1–C90.9
Acute lymphoblastic leukaemia	C91.0
Chronic lymphocytic leukaemia	C91.1
Other and unspecified lymphoid leukaemia	C91.2–C91.9, C94.7
Acute myeloid leukaemia	C92.0, C92.3–C92.8, C93.0, C94.0, C94.2, C94.4–C94.5
Chronic myeloid leukaemia (CML)	C92.1
Other and unspecified myeloid leukaemia	C92.2, C92.9, C93.2, C93.7, C93.9, C94.6
Chronic myelomonocytic leukaemia (including juvenile)	C93.1, C93.3
Myeloproliferative neoplasms (excluding CML)	C94.1, D45, D47.1, D47.3–D47.5 (NMD mortality data excludes C94.1)
Myeloproliferative neoplasms	C92.1,C94.1, D45, D47.1, D47.3–D47.5 (NMD mortality data excludes C94.1)
Other and unspecified leukaemias	C95

Leukaemia	C91–C95 (NMD mortality data excludes C94.1)
Other blood cancers	C94.3, C96
Myelodysplastic syndromes	D46
All blood cancers combined	C81–C96, D45–D46, D47.1, D47.3–D47.5 (NMD mortality data excludes C94.1)
All cancers combined	**C00–C96, D45–D46, D47.1, D47.3–D47.5 (NMD mortality data includes C97)**

Please note there are no deaths reported for C94.1 within the NMD. For simplicity, when ICD-10 coding for myeloproliferative neoplasms (excluding CML), leukaemia and all blood cancers combined is mentioned elsewhere in the report, the ACD ICD-10 coding alone may be cited.

Histology-based cancer reporting within the Cancer data in Australia report

Cancer group	**Histology codes**
Neuroendocrine tumours	Histology including 8013, 8040-8045, 8150-8156, 8158, 8240-8249, 8345-8347, 8680-8683, 8690-8693, 8700, 9091 and also topography C73 with a histology of 8510
Soft tissue sarcoma	Histology 8800-8936, 8990-8992, 9040-9045, 9120-9262, 9540-9582 for all topography codes except C40–C41 Histology 8936, 9140 for all topography codes Histology 9045 for all topography codes except C30, C32.3, C33, C34.0, C40–C41
All sarcomas combined	All sarcomas combined is the aggregate of bone cancer and soft tissue sarcoma

Note: Please refer to Cancer data commentary no. 7 'Updating sarcoma reporting' for more information on the coding of all sarcomas combined and bone cancer from the Australian Cancer Database.

Cancer list by subsite

The following cancers have incidence data available within the cancer by subsite data visualisation. Subsite refers to the 4-character and sometimes 3-character ICD-10 codes for the selected cancers. Survival data are available only where there are sufficient cases to derive a sufficiently reliable survival rate.

Cancer	**Cancer subsite**
Anal cancer	anal cancer (C21) cancer of the anus, unspecified (C21.0) cancer of the anal canal (C21.1) cancer of the cloacogenic zone (C21.2) cancer of overlapping lesion of rectum, anus and anal canal (C21.8)
Bladder cancer	bladder cancer (C67) cancer of the trigone of bladder (C67.0) cancer of the dome of bladder (C67.1) cancer of the lateral wall of bladder (C67.2) cancer of the anterior wall of bladder (C67.3) cancer of the posterior wall of bladder (C67.4) cancer of the bladder neck (C67.5) cancer of the ureteric orifice (C67.6) cancer of the urachus (C67.7) cancer of overlapping lesion of bladder and bladder, unspecified (C67.8–C67.9)

Bone cancer	bone cancer ((C40–C41) and selected histologies) cancer of the bone and articular cartilage of limbs (C40) cancer of the scapula and long bones of upper limb (C40.0) cancer of the short bones of upper limb (C40.1) cancer of the long bones of lower limb (C40.2) cancer of the short bones of lower limb (C40.3) cancer of overlapping lesion of bone and articular cartilage of limbs and bone and articular cartilage of limb, unspecified (C40.8–C40.9) cancer of the bone and articular cartilage of other and unspecified sites (C41) cancer of the bones of skull and face (C41.0) cancer of the mandible (C41.1) cancer of the vertebral column (C41.2) cancer of the ribs, sternum and clavicle (C41.3) cancer of the pelvic bones, sacrum and coccyx (C41.4) cancer of overlapping lesion of bone and articular cartilage and bone and articular cartilage, unspecified (C41.8–C41.9) bone cancer (selected histologies in sites other than C40–C41)bone cancer (selected histologies in sites other than C40–C41)

Brain and other central nervous system (cancer of the)	cancer of the brain and other central nervous system (C70–C72, C75.1–C75.3) cancer of the meninges (C70) cancer of the cerebral meninges (C70.0) cancer of the spinal meninges (C70.1) cancer of the meninges, unspecified (C70.9) cancer of the brain (C71) cancer of the cerebrum, except lobes and ventricles (C71.0) cancer of the frontal lobe (C71.1) cancer of the temporal lobe (C71.2) cancer of the parietal lobe (C71.3) cancer of the occipital lobe (C71.4) cancer of the cerebral ventricle (C71.5) cancer of the cerebellum (C71.6) cancer of the brain stem (C71.7) cancer of overlapping lesion of brain and brain, unspecified (C71.8–C71.9) cancer of the spinal cord, cranial nerves and other parts of central nervous system (C72) cancer of the spinal cord (C72.0) cancer of the cauda equina (C72.1) cancer of the olfactory nerve (C72.2) cancer of the optic nerve (C72.3) cancer of the acoustic nerve (C72.4) cancer of other and unspecified cranial nerves (C72.5) cancer of overlapping lesion of brain and other parts of central nervous system and central nervous system, unspecified (C72.8–C72.9) cancer of the pituitary gland (C75.1) cancer of the pineal gland (C75.3)
Brain cancer	brain cancer (C71) cancer of the cerebrum, except lobes and ventricles (C71.0) cancer of the frontal lobe (C71.1) cancer of the temporal lobe (C71.2) cancer of the parietal lobe (C71.3) cancer of the occipital lobe (C71.4) cancer of the cerebral ventricle (C71.5) cancer of the cerebellum (C71.6) cancer of the brain stem (C71.7) cancer of overlapping lesion of brain and brain, unspecified (C71.8–C71.9)

Breast cancer	breast cancer (C50) cancer of the nipple and areola (C50.0) cancer of the central portion of breast (C50.1) cancer of the upper-inner quadrant of breast (C50.2) cancer of the lower-inner quadrant of breast (C50.3) cancer of the upper-outer quadrant of breast (C50.4) cancer of the lower-outer quadrant of breast (C50.5) cancer of the axillary tail of breast (C50.6) cancer of overlapping lesion of breast and breast, unspecified (C50.8–C50.9)
Cervical cancer	cervical cancer (C53) cancer of the endocervix (C53.0) cancer of the exocervix (C53.1) cancer of overlapping lesion of cervix uteri and cervix uteri, unspecified (C53.8–C53.9)
Colon cancer	colon cancer (C18) cancer of the caecum (C18.0) cancer of the appendix (C18.1) cancer of the ascending colon (C18.2) cancer of the hepatic flexure (C18.3) cancer of the transverse colon (C18.4) cancer of the splenic flexure (C18.5) cancer of the descending colon (C18.6) cancer of the sigmoid colon (C18.7) cancer of overlapping lesion of colon and colon, part unspecified (C18.8–C18.9)
Colorectal cancer	colorectal cancer (C18–C20) cancer of the colon (C18) cancer of the caecum (C18.0) cancer of the appendix (C18.1) cancer of the ascending colon (C18.2) cancer of the hepatic flexure (C18.3) cancer of the transverse colon (C18.4) cancer of the splenic flexure (C18.5) cancer of the descending colon (C18.6) cancer of the sigmoid colon (C18.7) cancer of overlapping lesion of colon and colon, part unspecified (C18.8–C18.9) cancer of the rectosigmoid junction (C19) cancer of the rectum (C20)

Connective, subcutaneous and other soft tissues (cancer of)	cancer of connective, subcutaneous and other soft tissues (C49) cancer of connective and soft tissue of head, face and neck (C49.0) cancer of connective and soft tissue of upper limb, including shoulder (C49.1) cancer of connective and soft tissue of lower limb, including hip (C49.2) cancer of connective and soft tissue of thorax (C49.3) cancer of connective and soft tissue of abdomen (C49.4) cancer of connective and soft tissue of pelvis (C49.5) cancer of connective and soft tissue of trunk, unspecified (C49.6) cancer of overlapping lesion of connective and soft tissue and connective and soft tissue, unspecified (C49.8–C49.9)
Eye cancer	eye cancer (C69) cancer of the conjunctiva (C69.0) cancer of the cornea (C69.1) cancer of the retina (C69.2) cancer of the choroid (C69.3) cancer of the ciliary body (C69.4) cancer of the lacrimal gland and duct (C69.5) cancer of the orbit (C69.6) cancer of overlapping lesion of eye and adnexa and eye, unspecified (C69.8–C69.9)
Gallbladder and extrahepatic bile ducts cancer	gallbladder and extrahepatic bile ducts cancer (C23–C24) cancer of the gallbladder (C23) cancer of other and unspecified parts of biliary tract (C24) cancer of the extrahepatic bile duct (C24.0) cancer of the ampulla of Vater (C24.1) cancer of overlapping lesion of biliary tract and biliary tract, unspecified (C24.8–C24.9)

Gynaecological cancers	gynaecological cancers (C51–C58) cancer of the vulva (C51) cancer of the labium majus (C51.0) cancer of the labium minus (C51.1) cancer of the clitoris (C51.2) cancer of overlapping lesion of vulva and vulva, unspecified (C51.8–C51.9) cancer of the vagina (C52) cancer of the cervix uteri (C53) cancer of the endocervix (C53.0) cancer of the exocervix (C53.1) cancer of overlapping lesion of cervix uteri and cervix uteri, unspecified (C53.8–C53.9) cancer of the corpus uteri (C54) cancer of the isthmus uteri (C54.0) cancer of the endometrium (C54.1) cancer of the myometrium (C54.2) cancer of the fundus uteri (C54.3) cancer of overlapping lesion of corpus uteri and corpus uteri, unspecified (C54.8–C54.9) cancer of the uterus, part unspecified (C55) cancer of the ovary (C56) placenta cancer (C58) ovarian cancer and serous carcinomas of the fallopian tube (C56 (all histologies) and C57.0, C57.8 (with histologies 8441, 8460, 8461)) cancer of the fallopian tube (C57.0 with selected histologies) cancer of overlapping lesion of female genital organs (C57.8 with selected histologies) cancer of other female genital organs excluding serous carcinomas of the fallopian tube (C57 excluding C57.0, C57.8 (with histologies 8441, 8460, 8461)) cancer of the fallopian tube (C57.0 excluding selected histologies) cancer of the broad ligament (C57.1) cancer of the parametrium (C57.3) cancer of the uterine adnexa, unspecified (C57.4) cancer of other specified female genital organs (C57.7) cancer of overlapping lesion of female genital organs and female genital organ, unspecified (C57.8–C57.9, excluding selected histologies in C57.8)
	head and neck cancer (including lip) (C00–C14, C30–C32) cancer of the lip (C00) cancer of the external upper lip (C00.0) cancer of the external lower lip (C00.1) cancer of the external lip, unspecified (C00.2) cancer of the upper lip, inner aspect (C00.3) cancer of the lower lip, inner aspect (C00.4)

	cancer of the lip, unspecified, inner aspect (C00.5)
	cancer of the commissure of lip (C00.6)
	cancer of overlapping lesion of lip and lip, unspecified (C00.8–C00.9)
	cancer of the base of tongue (C01)
	cancer of other and unspecified parts of tongue (C02)
	cancer of the dorsal surface of tongue (C02.0)
	cancer of the border of tongue (C02.1)
	cancer of the ventral surface of tongue (C02.2)
	cancer of the anterior two-thirds of tongue, part unspecified (C02.3)
	cancer of the lingual tonsil (C02.4)
	cancer of overlapping lesion of tongue and tongue unspecified (C02.8–C02.9)
	cancer of the gum (C03)
	cancer of the upper gum (C03.0)
	cancer of the lower gum (C03.1)
	cancer of the gum, unspecified (C03.9)
	cancer of the floor of mouth (C04)
	cancer of the anterior floor of mouth (C04.0)
	cancer of the lateral floor of mouth (C04.1)
	cancer of overlapping lesion of floor of mouth and floor of mouth, unspecified (C04.8–C04.9)
	cancer of the palate (C05)
	cancer of the hard palate (C05.0)
	cancer of the soft palate (C05.1)
	cancer of the uvula (C05.2)
	cancer of overlapping lesion of palate and palate, unspecified (C05.8–C05.9)
	cancer of the other and unspecified parts of mouth (C06)
	cancer of the cheek mucosa (C06.0)
	cancer of the vestibule of mouth (C06.1)
	cancer of the retromolar area (C06.2)
	cancer of overlapping lesion of other and unspecified parts of mouth and mouth, unspecified (C06.8–C06.9)
	cancer of the parotid gland (C07)
	cancer of other and unspecified major salivary glands (C08)
	cancer of the submandibular gland (C08.0)
	cancer of the sublingual gland (C08.1)
	cancer of overlapping lesion of major salivary glands and major salivary gland, unspecified (C08.8–C08.9)
Head and neck cancer (including lip)	cancer of the tonsils (C09)
	cancer of the tonsillar fossa (C09.0)
	cancer of the tonsillar pillar (anterior)(posterior) (C09.1)
	cancer of overlapping lesion of tonsil and tonsil, unspecified (C09.8–C09.9)
	cancer of the oropharynx (C10)

	cancer of the vallecula (C10.0) cancer of the anterior surface of epiglottis (C10.1) cancer of the lateral wall of oropharynx (C10.2) cancer of the posterior wall of oropharynx (C10.3) cancer of the branchial cleft (C10.4) cancer of overlapping lesion of oropharynx and oropharynx, unspecified (C10.8–C10.9) cancer of the nasopharynx (C11) cancer of the superior wall of nasopharynx (C11.0) cancer of the posterior wall of nasopharynx (C11.1) cancer of the lateral wall of nasopharynx (C11.2) cancer of the anterior wall of nasopharynx (C11.3) cancer of overlapping lesion of nasopharynx and nasopharynx, unspecified (C11.8–C11.9) cancer of the pyriform sinus (C12) cancer of the hypopharynx (C13) cancer of the postcricoid region (C13.0) cancer of the aryepiglottic fold, hypopharyngeal aspect (C13.1) cancer of the posterior wall of hypopharynx (C13.2) cancer of overlapping lesion of hypopharynx and hyphopharynx, unspecified (C13.8–C13.9) cancer of other and ill-defined sites in the lip, oral cavity and pharynx (C14) cancer of the pharynx, unspecified (C14.0) cancer of overlapping lesion of lip, oral cavity and pharynx (C14.8) cancer of the nasal cavity and middle ear (C30) cancer of the nasal cavity (C30.0) cancer of the middle ear (C30.1) cancer of the accessory sinuses (C31) cancer of the maxillary sinus (C31.0) cancer of the ethmoidal sinus (C31.1) cancer of the frontal sinus (C31.2) cancer of the sphenoidal sinus (C31.3) cancer of overlapping lesion of accessory sinuses and accessory sinus, unspecified (C31.8–C31.9) cancer of the larynx (C32) cancer of the glottis (C32.0) cancer of the supraglottis (C32.1) cancer of the subglottis (C32.2) cancer of the laryngeal cartilage (C32.3) cancer of overlapping lesion of larynx and larynx, unspecified (C32.8–C32.9)

Hypopharyngeal cancer	hypopharyngeal cancer (C12–C13) cancer of the pyriform sinus (C12) cancer of the hypopharynx (C13) cancer of the postcricoid region (C13.0) cancer of the aryepiglottic fold, hypopharyngeal aspect (C13.1) cancer of the posterior wall of hypopharynx (C13.2) cancer of overlapping lesion of hypopharynx and hyphopharynx, unspecified (C13.8–C13.9)
Kaposi sarcoma	Kaposi sarcoma (C46) Kaposi sarcoma of the skin (C46.0) Kaposi sarcoma of soft tissue (C46.1) Kaposi sarcoma of the palate (C46.2) Kaposi sarcoma of the lymph nodes (C46.3) Kaposi sarcoma of other sites (C46.7) Kaposi sarcoma of multiple organs and Kaposi sarcoma, unspecified (C46.8–C46.9)
Laryngeal cancer	laryngeal cancer (C32) cancer of the glottis (C32.0) cancer of the supraglottis (C32.1) cancer of the subglottis (C32.2) cancer of the laryngeal cartilage (C32.3) cancer of overlapping lesion of larynx and larynx, unspecified (C32.8–C32.9)
Lip cancer	lip cancer (C00) cancer of the external upper lip (C00.0) cancer of the external lower lip (C00.1) cancer of the external lip, unspecified (C00.2) cancer of the upper lip, inner aspect (C00.3) cancer of the lower lip, inner aspect (C00.4) cancer of the lip, unspecified, inner aspect (C00.5) cancer of the commissure of lip (C00.6) cancer of overlapping lesion of lip and lip, unspecified (C00.8–C00.9)
Liver cancer	liver cancer (C22) liver cell carcinoma (C22.0) intrahepatic bile duct carcinoma (C22.1) hepatoblastoma (C22.2) angiosarcoma of the liver (C22.3) other sarcomas of the liver (C22.4) other specified carcinomas of the liver (C22.7) cancer of the liver, unspecified (C22.9)

Lung cancer	lung cancer (C33–C34) cancer of the trachea (C33) cancer of the bronchus and lung (C34) cancer of the main bronchus (C34.0) cancer of the upper lobe, bronchus or lung (C34.1) cancer of the middle lobe, bronchus or lung (C34.2) cancer of the lower lobe, bronchus or lung (C34.3) cancer of overlapping lesion of bronchus and lung and bronchus or lung, unspecified (C34.8–C34.9)
Major salivary glands (cancer of the)	cancer of the major salivary glands (C07–C08) cancer of the parotid gland (C07) cancer of other and unspecified major salivary glands (C08) cancer of the submandibular gland (C08.0) cancer of the sublingual gland (C08.1) cancer of overlapping lesion of major salivary glands and major salivary gland, unspecified (C08.8–C08.9)
Melanoma of the skin	melanoma of the skin (C43) melanoma of the lip (C43.0) melanoma of the eyelid, including canthus (C43.1) melanoma of the ear and external auricular canal (C43.2) melanoma of other and unspecified parts of face (C43.3) melanoma of the scalp and neck (C43.4) melanoma of the trunk (C43.5) melanoma of the upper limb, including shoulder (C43.6) melanoma of the lower limb, including hip (C43.7) overlapping melanoma of the skin and melanoma of the skin, unspecified (C43.8–C43.9)
Mesothelioma	mesothelioma (C45) mesothelioma of the pleura (C45.0) mesothelioma of the peritoneum (C45.1) mesothelioma of the pericardium (C45.2) mesothelioma of other sites (C45.7) mesothelioma, unspecified (C45.9)

Mouth cancer	mouth cancer (C03–C06) cancer of the gum (C03) cancer of the upper gum (C03.0) cancer of the lower gum (C03.1) cancer of the gum, unspecified (C03.9) cancer of the floor of mouth (C04) cancer of the anterior floor of mouth (C04.0) cancer of the lateral floor of mouth (C04.1) cancer of overlapping lesion of floor of mouth and floor of mouth, unspecified (C04.8–C04.9) cancer of the palate (C05) cancer of the hard palate (C05.0) cancer of the soft palate (C05.1) cancer of the uvula (C05.2) cancer of overlapping lesion of palate and palate, unspecified (C05.8–C05.9) cancer of the other and unspecified parts of mouth (C06) cancer of the cheek mucosa (C06.0) cancer of the vestibule of mouth (C06.1) cancer of the retromolar area (C06.2) cancer of overlapping lesion of other and unspecified parts of mouth and mouth, unspecified (C06.8–C06.9)
Nasal cavity and middle ear cancer	nasal cavity and middle ear cancer (C30) cancer of the nasal cavity (C30.0) cancer of the middle ear (C30.1)
Nasopharyngeal cancer	nasopharyngeal cancer (C11) cancer of the superior wall of nasopharynx (C11.0) cancer of the posterior wall of nasopharynx (C11.1) cancer of the lateral wall of nasopharynx (C11.2) cancer of the anterior wall of nasopharynx (C11.3) cancer of overlapping lesion of nasopharynx and nasopharynx, unspecified (C11.8–C11.9)
Non-melanoma skin cancer (rare types)	non-melanoma skin cancer (rare types) (C44) non-melanoma skin cancer (rare types) of the lip (C44.0) non-melanoma skin cancer (rare types) of the eyelid, including canthus (C44.1) non-melanoma skin cancer (rare types) of the ear and external auricular canal (C44.2) non-melanoma skin cancer (rare types) of other and unspecified parts of face (C44.3) non-melanoma skin cancer (rare types) of the scalp and neck (C44.4) non-melanoma skin cancer (rare types) of the trunk (C44.5) non-melanoma skin cancer (rare types) of the upper limb, including shoulder (C44.6) non-melanoma skin cancer (rare types) of the lower limb, including hip (C44.7) overlapping lesion of non-melanoma skin cancer and non-melanoma skin cancer, unspecified (C44.8–C44.9) (rare types)

Oesophageal cancer	oesophageal cancer (C15) cancer of the cervical part of oesophagus (C15.0) cancer of the thoracic part of oesophagus (C15.1) cancer of the abdominal part of oesophagus (C15.2) cancer of the upper third of oesophagus (C15.3) cancer of the middle third of oesophagus (C15.4) cancer of the lower third of oesophagus (C15.5) cancer of overlapping lesion of oesophagus and oesophagus, unspecified (C15.8–C15.9)
Oral cancer	oral cancer (C00–C10) cancer of the lip (C00) cancer of the external upper lip (C00.0) cancer of the external lower lip (C00.1) cancer of the external lip, unspecified (C00.2) cancer of the upper lip, inner aspect (C00.3) cancer of the lower lip, inner aspect (C00.4) cancer of the lip, unspecified, inner aspect (C00.5) cancer of the commissure of lip (C00.6) cancer of overlapping lesion of lip and lip, unspecified (C00.8–C00.9) cancer of the base of tongue (C01) cancer of other and unspecified parts of tongue (C02) cancer of the dorsal surface of tongue (C02.0) cancer of other and unspecified parts of tongue (C02) cancer of the dorsal surface of tongue (C02.0) cancer of the border of tongue (C02.1) cancer of the ventral surface of tongue (C02.2) cancer of the anterior two-thirds of tongue, part unspecified (C02.3) cancer of the lingual tonsil (C02.4) cancer of overlapping lesion of tongue and tongue unspecified (C02.8–C02.9) cancer of the gum (C03) cancer of the upper gum (C03.0) cancer of the lower gum (C03.1) cancer of the gum, unspecified (C03.9) cancer of the floor of mouth (C04) cancer of the anterior floor of mouth (C04.0) cancer of the lateral floor of mouth (C04.1) cancer of overlapping lesion of floor of mouth and floor of mouth, unspecified (C04.8–C04.9) cancer of the palate (C05) cancer of the hard palate (C05.0) cancer of the soft palate (C05.1) cancer of the uvula (C05.2)

	cancer of overlapping lesion of palate and palate, unspecified (C05.8–C05.9) cancer of the other and unspecified parts of mouth (C06) cancer of the cheek mucosa (C06.0) cancer of the vestibule of mouth (C06.1) cancer of the retromolar area (C06.2) cancer of overlapping lesion of other and unspecified parts of mouth and mouth, unspecified (C06.8–C06.9) cancer of the parotid gland (C07) cancer of other and unspecified major salivary glands (C08) cancer of the submandibular gland (C08.0) cancer of the sublingual gland (C08.1) cancer of overlapping lesion of major salivary glands and major salivary gland, unspecified (C08.8–C08.9) cancer of the tonsils (C09) cancer of the tonsillar fossa (C09.0) cancer of the tonsillar pillar (anterior)(posterior) (C09.1) cancer of overlapping lesion of tonsil and tonsil, unspecified (C09.8–C09.9) cancer of the oropharynx (C10) cancer of the vallecula (C10.0) cancer of the anterior surface of epiglottis (C10.1) cancer of the lateral wall of oropharynx (C10.2) cancer of the posterior wall of oropharynx (C10.3) cancer of the branchial cleft (C10.4) cancer of overlapping lesion of oropharynx and oropharynx, unspecified (C10.8–C10.9)
Oropharyngeal cancer	oropharyngeal cancer (C09–C10) cancer of the tonsils (C09) cancer of the tonsillar fossa (C09.0) cancer of the tonsillar pillar (anterior)(posterior) (C09.1) cancer of overlapping lesion of tonsil and tonsil, unspecified (C09.8–C09.9) cancer of the oropharynx (C10) cancer of the vallecula (C10.0) cancer of the anterior surface of epiglottis (C10.1) cancer of the lateral wall of oropharynx (C10.2) cancer of the posterior wall of oropharynx (C10.3) cancer of the branchial cleft (C10.4) cancer of overlapping lesion of oropharynx and oropharynx, unspecified (C10.8–C10.9)
Other and ill-defined digestive organs (cancer of)	cancer of other and ill-defined digestive organs (C26) cancer of the intestinal tract, part unspecified (C26.0) cancer of the spleen (C26.1) cancer of overlapping lesion of digestive system and ill-defined sites within the digestive system (C26.8–C26.9)

Other and ill-defined sites (cancer of)	cancer of other and ill-defined sites (C76) cancer of the head, face and neck (C76.0) cancer of the thorax (C76.1) cancer of the abdomen (C76.2) cancer of the pelvis (C76.3) cancer of the upper limb (C76.4) cancer of the lower limb (C76.5) cancer of other ill-defined sites (C76.7) cancer of overlapping lesion of other and ill-defined sites (C76.8)
Other and ill-defined sites in the lip, oral cavity and pharynx (cancer of)	cancer of other and ill-defined sites in the lip, oral cavity and pharynx (C14) cancer of the pharynx, unspecified (C14.0) cancer of overlapping lesion of lip, oral cavity and pharynx (C14.8)
Other and unspecified parts of biliary tract (cancer of)	cancer of other and unspecified parts of biliary tract (C24) cancer of the extrahepatic bile duct (C24.0) cancer of the ampulla of Vater (C24.1) cancer of overlapping lesion of biliary tract and biliary tract, unspecified (C24.8–C24.9)
Other and unspecified urinary organs (cancer of)	cancer of other and unspecified urinary organs (C68) cancer of the urethra (C68.0) cancer of the paraurethral gland (C68.1) cancer of overlapping lesion of urinary organs and urinary organ, unspecified (C68.8–C68.9)
Other central nervous system cancers	other central nervous system cancers (C70, C72, C75.1–C75.3) cancer of the meninges (C70) cancer of the cerebral meninges (C70.0) cancer of the spinal meninges (C70.1) cancer of the meninges, unspecified (C70.9) cancer of the spinal cord, cranial nerves and other parts of central nervous system (C72) cancer of the spinal cord (C72.0) cancer of the cauda equina (C72.1) cancer of the olfactory nerve (C72.2) cancer of the optic nerve (C72.3) cancer of the acoustic nerve (C72.4) cancer of other and unspecified cranial nerves (C72.5) cancer of overlapping lesion of brain and other parts of central nervous system and central nervous system, unspecified (C72.8–C72.9) cancer of the pituitary gland (C75.1) cancer of the pineal gland (C75.3)

Other endocrine glands (cancer of)	cancer of other endocrine glands (C74–C75, excluding C75.1–C75.3) cancer of the adrenal gland (C74) cancer of the cortex of adrenal gland (C74.0) cancer of the medulla of adrenal gland (C74.1) cancer of the adrenal gland, unspecified (C74.9) cancer of the parathyroid gland (C75.0) cancer of the carotid body (C75.4) cancer of the aortic body and other paraganglia (C75.5) cancer of the pluriglandular involvement, unspecified and endocrine gland, unspecified (C75.8–C75.9)
Other female genital organs excluding serous carcinomas of the fallopian tube (cancer of)	cancer of other female genital organs excluding serous carcinomas of the fallopian tube (C57 excluding C57.0, C57.8 (with histologies 8441, 8460, 8461)) cancer of the fallopian tube (C57.0 excluding selected histologies) cancer of the broad ligament (C57.1) cancer of the parametrium (C57.3) cancer of the uterine adnexa, unspecified (C57.4) cancer of other specified female genital organs (C57.7) cancer of overlapping lesion of female genital organs and female genital organ, unspecified (C57.8–C57.9, excluding selected histologies in C57.8)
Other male genital organs (cancer of)	cancer of other male genital organs (C63) cancer of the epididymis (C63.0) cancer of the spermatic cord (C63.1) cancer of the scrotum (C63.2) cancer of other specified male genital organs (C63.7) cancer of overlapping lesion of male genital organs and male genital organ, unspecified (C63.8–C63.9)
Other thoracic and respiratory organs (cancer of)	cancer of other thoracic and respiratory organs (C37–C39) cancer of the thymus (C37) cancer of the heart, mediastinum and pleura (C38) cancer of the heart (C38.0) cancer of the anterior mediastinum (C38.1) cancer of the posterior mediastinum (C38.2) cancer of the mediastinum, part unspecified (C38.3) cancer of the pleura (C38.4) cancer of overlapping lesion of heart, mediastinum and pleura (C38.8) cancer of other and ill-defined sites in the respiratory system and intrathoracic organs (C39) cancer of the upper respiratory tract, part unspecified (C39.0) cancer of overlapping lesion of respiratory and intrathoracic organs and ill-defined sites within the respiratory system (C39.8–C39.9)

Ovarian cancer and serous carcinomas of the fallopian tube	ovarian cancer and serous carcinomas of the fallopian tube (C56 (all histologies) and C57.0, C57.8 (with histologies 8441, 8460, 8461)) cancer of the fallopian tube (C57.0 with selected histologies) cancer of overlapping lesion of female genital organs (C57.8 with selected histologies)
Pancreatic cancer	pancreatic cancer (C25) cancer of the head of pancreas (C25.0) cancer of the body of pancreas (C25.1) cancer of the tail of pancreas (C25.2) cancer of the pancreatic duct (C25.3) cancer of the endocrine pancreas (C25.4) cancer of other parts of pancreas (C25.7) cancer of overlapping lesion of pancreas and pancreas, part unspecified (C25.8–C25.9)
Penile cancer	penile cancer (C60) cancer of the prepuce (C60.0) cancer of the glans penis (C60.1) cancer of the body of penis (C60.2) cancer of overlapping lesion of penis and penis, unspecified (C60.8–C60.9)
Peripheral nerves and autonomic nervous system (cancer of)	cancer of peripheral nerves and autonomic nervous system (C47) cancer of peripheral nerves of head, face and neck (C47.0) cancer of peripheral nerves of upper limb, including shoulder (C47.1) cancer of peripheral nerves of lower limb, including hip (C47.2) cancer of peripheral nerves of thorax (C47.3) cancer of peripheral nerves of abdomen (C47.4) cancer of peripheral nerves of pelvis (C47.5) cancer of peripheral nerves of trunk, unspecified (C47.6) cancer of overlapping lesion of peripheral nerves and autonomic nervous system and peripheral nerves and autonomic nervous system, unspecified (C47.8–C47.9)
Retroperitoneal and peritoneal cancer	retroperitoneal and peritoneal cancer (C48) cancer of the retroperitoneum (C48.0) cancer of specified parts of peritoneum (C48.1) cancer of the peritoneum, unspecified (C48.2) cancer of overlapping lesion of retroperitoneum and peritoneum (C48.8)
Sinuses cancer	sinuses cancer (C31) cancer of the maxillary sinus (C31.0) cancer of the ethmoidal sinus (C31.1) cancer of the frontal sinus (C31.2) cancer of the sphenoidal sinus (C31.3) cancer of overlapping lesion of accessory sinuses and accessory sinus, unspecified (C31.8–C31.9)

Small intestine cancer	small intestine cancer (C17) cancer of the duodenum (C17.0) cancer of the jejunum (C17.1) cancer of the ileum (C17.2) cancer of Meckel's diverticulum (C17.3) cancer of overlapping lesion of small intestine and small intestine, unspecified (C17.8–C17.9)
Stomach cancer	stomach cancer (C16) cancer of the cardia (C16.0) cancer of the fundus of stomach (C16.1) cancer of the body of stomach (C16.2) cancer of the pyloric antrum (C16.3) cancer of the pylorus (C16.4) cancer of the lesser curvature of stomach, unspecified (C16.5) cancer of the greater curvature of stomach, unspecified (C16.6) cancer of overlapping lesion of stomach and stomach, unspecified (C16.8–C16.9)
Testicular cancer	testicular cancer (C62) cancer of the undescended testis (C62.0) cancer of the descended testis (C62.1) cancer of the testis, unspecified (C62.9)
Tongue cancer	tongue cancer (C01–C02) cancer of the base of tongue (C01) cancer of other and unspecified parts of tongue (C02) cancer of the dorsal surface of tongue (C02.0) cancer of the border of tongue (C02.1) cancer of the ventral surface of tongue (C02.2) cancer of the anterior two-thirds of tongue, part unspecified (C02.3) cancer of the lingual tonsil (C02.4) cancer of overlapping lesion of tongue and tongue unspecified (C02.8–C02.9)
Uterine cancer	uterine cancer (C54–C55) cancer of the corpus uteri (C54) cancer of the isthmus uteri (C54.0) cancer of the endometrium (C54.1) cancer of the myometrium (C54.2) cancer of the fundus uteri (C54.3) cancer of overlapping lesion of corpus uteri and corpus uteri, unspecified (C54.8–C54.9) cancer of the uterus, part unspecified (C55)
Vulvar cancer	vulvar cancer (C51) cancer of the labium majus (C51.0) cancer of the labium minus (C51.1) cancer of the clitoris (C51.2) cancer of overlapping lesion of vulva and vulva, unspecified (C51.8–C51.9)

Head and neck cancer (excluding lip) is also provided within the report and is the same as head and neck cancer (including lip) with the exception that lip cancer and its subsites are excluded. While the report is described as cancer by subsite, for a few cancers, cancer by type would be a more accurate description.

Cancer list for blood cancers by histology

The following cancers have incidence data available within the blood cancer by histology reports. Histology describes the type of cells in which cancer originates. Survival data are available only where there are enough cases to derive a sufficiently reliable survival rate.

The cancer list is accompanied by prefixes to help identify the relationships between cancers. For example, B1 is the prefix ID for acute blood cancers, B1.01 is the prefix ID for acute lymphoblastic leukemia/lymphoma and is a type of acute blood cancer. The prefixes are provided for assistance only within this report and has nothing to do with the cancer outside of this specific assistance.

Blood cancer type (with prefix)

B1 Acute blood cancers

B1.01 Acute lymphoblastic leukaemia/lymphoma

B1.01.01 B lymphoblastic leukaemia/lymphoma

B1.01.01.01 B lymphoblastic leukaemia/lymphoma, NOS

B1.01.01.02 B lymphoblastic leukaemia/lymphoma with t(9;22)(q34;q11.2); BCR-ABL1

B1.01.01.03 B lymphoblastic leukaemia/lymphoma with t(v;11q23); MLL rearranged

B1.01.01.04 B lymphoblastic leukaemia/lymphoma with t(12;21)(p13;q22); TEL-AML1 (ETV6-RUNX1)

B1.01.01.05 B lymphoblastic leukaemia/lymphoma with hyperdiploidy

B1.01.01.06 B lymphoblastic leukaemia/lymphoma with hypodiploidy

B1.01.01.08 B lymphoblastic leukaemia/lymphoma with t(1;19)(q23;p13.3); E2A-PBX1 (TCF3-PBX1)

B1.01.01.09 B lymphoblastic leukaemia/lymphoma, BCR-ABL1-like

B1.01.02 T lymphoblastic leukaemia/lymphoma

B1.01.03 Lymphoblastic leukaemia/lymphoma, NOS

B1.02 Acute myeloid leukaemia

B1.02.01 Acute myeloid leukaemia with recurrent genetic abnormalities

B1.02.01.01 Acute myeloid leukaemia with t(8;21)(q22;q22.1); RUNX1-RUNX1T1

B1.02.01.02 Acute myeloid leukaemia with inv(16)(p13.1;q22) or t(16;16)(p13.1;q22); CBFB-MYH11

B1.02.01.03 Acute promyelocytic leukaemia with PML-RARA

B1.02.01.04 Acute myeloid leukaemia with t(9;11)(p21.3;q23.3); KMT2A-MLLT3

B1.02.01.05 Acute myeloid leukaemia with t(6;9)(p23;q34.1); DEK-NUP214

B1.02.01.06 Acute myeloid leukaemia with inv(3)(q21.3;q26.2) or t(3;3)(q21.3;q26.2); GATA2, MECOM

B1.02.01.07 Acute myeloid leukaemia (megakaryoblastic) with t(1;22)(p13.3;q13.1); RBM15-MKL1

B1.02.01.08 Acute myeloid leukaemia with BCR-ABL1

B1.02.01.09 Acute myeloid leukaemia with mutated NPM1

B1.02.01.10 Acute myeloid leukaemia with biallelic mutation of CEBPA

B1.02.01.11 Acute myeloid leukaemia with mutated RUNX1

B1.02.02 Acute myeloid leukaemia, defined by differentiation

B1.02.02.01 Acute myeloid leukaemia, minimal differentiation

B1.02.02.02 Acute myeloid leukaemia without maturation

B1.02.02.03 Acute myeloid leukaemia with maturation

B1.02.02.04 Acute basophilic leukaemia

B1.02.02.05 Acute myelomonocytic leukaemia

B1.02.02.06 Acute monocytic leukaemia

B1.02.02.07 Pure erythroid leukaemia

B1.02.02.08 Acute megakaryoblastic leukaemia

B1.02.02.09 Acute myeloid leukaemia with myelodysplasia-related changes

B1.02.02.10 Acute panmyelosis with myelofibrosis

B1.02.03 Acute myeloid leukaemia, secondary

B1.02.03.01 Therapy-related acute myeloid leukaemia

B1.02.03.02 Myeloid leukaemia associated with Down syndrome

B1.02.04 Acute myeloid leukaemia, other

B1.02.04.01 Myeloid sarcoma

B1.02.04.02 Blastic plasmacytoid dendritic cell neoplasm

B1.02.05 Acute myeloid leukaemia, NOS

B1.03 Acute leukaemias of ambiguous lineage

B1.03.01 Acute undifferentiated leukaemia

B1.03.02 Mixed phenotype acute leukaemia with t(9;22)(q34;q11.2); BCR-ABL1

B1.03.03 Mixed phenotype acute leukaemia with t(v;11q23); MLL rearranged

B1.03.04 Mixed phenotype acute leukaemia, B/myeloid, NOS

B1.03.05 Mixed phenotype acute leukaemia, T/myeloid, NOS

B1.03.06 Acute biphenotypic leukaemia

B2 Chronic/mature blood cancers

B2.01 Chronic myeloid neoplasms

B2.01.01 Myeloproliferative neoplasms

B2.01.01.01 Chronic myeloid leukaemia, BCR-ABL1 positive

B2.01.01.02 Chronic neutrophilic leukaemia

B2.01.01.03 Polycythaemia vera

B2.02.01.04 Lymphoplasmacytic lymphoma

B2.02.01.04.01 Waldenstrom macroglobulinaemia

B2.02.01.04.02 Lymphoplasmacytic lymphoma, NOS

B2.02.01.05 Plasma cell neoplasms

B2.02.01.05.01 Multiple myeloma

B2.02.01.05.02 Plasma cell leukaemia

B2.02.01.05.03 Solitary plasmacytoma of bone

B2.02.01.05.04 Extraosseous plasmacytoma

B2.02.01.05.05 Heavy chain disease

B2.02.01.06 Marginal zone lymphoma

B2.02.01.06.01 Splenic marginal zone lymphoma

B2.02.01.06.02 Extranodal marginal zone lymphoma (MALT lymphoma)

B2.02.01.06.03 Nodal marginal zone lymphoma

B2.02.01.07 Follicular lymphoma

B2.02.01.07.01 Follicular lymphoma, NOS

B2.02.01.07.02 Primary cutaneous follicle centre lymphoma

B2.02.01.08 Mantle cell lymphoma

B2.02.01.09 Diffuse large B-cell lymphoma (DLBCL)

B2.02.01.09.01 Diffuse large B-cell lymphoma, NOS

B2.02.01.09.02 Immunoblastic DLBCL

B2.02.01.09.03 HHV8 positive DLBCL, NOS

B2.02.01.10 T-cell/histiocyte-rich large B-cell lymphoma

B2.02.01.11 Lymphomatoid granulomatosis, grade 3

B2.02.01.12 Primary mediastinal large B-cell lymphoma

B2.02.01.13 Intravascular large B-cell lymphoma

B2.02.01.14 ALK positive large B-cell lymphoma

B2.02.01.15 Plasmablastic lymphoma

B2.02.01.16 Primary effusion lymphoma

B2.02.01.17 Burkitt lymphoma

B2.02.01.18 B-cell lymphoma, unclassifiable, with features intermediate between DLBCL and classic Hodgkin lymphoma

B2.02.01.19 Immunoproliferative disease, NOS

B2.02.02 Mature T- and NK-cell neoplasms

B2.02.02.01 T-cell prolymphocytic leukaemia

B2.02.02.02 T-cell large granular lymphocytic leukaemia

B2.02.02.03 Aggressive NK-cell leukaemia

B2.02.02.04 Systemic EBV positive T-cell lymphoma of childhood

B2.02.02.05 Adult T-cell leukaemia/lymphoma

B2.02.02.06 Extranodal NK/T-cell lymphoma, nasal type

B2.02.02.07 Intestinal T-cell lymphoma, NOS

B2.02.02.08 Hepatosplenic T-cell lymphoma

B2.02.02.09 Cutaneous T-cell lymphoma

B2.02.02.09.01 Mycosis fungoides

B2.02.02.09.02 Sezary syndrome

B2.02.02.09.03 Primary cutaneous anaplastic large cell lymphoma

B2.02.02.09.04 Subcutaneous panniculitis-like T-cell lymphoma

B2.02.02.09.05 Primary cutaneous gamma-delta T-cell lymphoma

B2.02.02.09.06 Cutaneous T-cell lymphoma, NOS

B2.02.02.10 Peripheral T-cell lymphoma, NOS

B2.02.02.11 Angioimmunoblastic T-cell lymphoma

B2.02.02.12 Anaplastic large cell lymphoma

B2.02.02.12.01 Anaplastic large cell lymphoma, ALK positive

B2.02.02.12.02 Anaplastic large cell lymphoma, ALK negative

B2.02.03 Hodgkin lymphoma

B2.02.03.01 Nodular lymphocyte predominant Hodgkin lymphoma

B2.02.03.02 Classic Hodgkin lymphoma

B2.02.03.02.01 Nodular sclerosis classic Hodgkin lymphoma

B2.02.03.02.02 Lymphocyte-rich classic Hodgkin lymphoma

B2.02.03.02.03 Mixed cellularity classic Hodgkin lymphoma

B2.02.03.02.04 Lymphocyte-depleted classic Hodgkin lymphoma

B2.02.03.03 Hodgkin lymphoma, NOS

B2.02.04 Unclassifiable mature lymphoid neoplasms

B2.03 Histiocytic and dendritic cell neoplasms

B2.03.01 Langerhans cell histiocytosis

B2.03.02 Langerhans cell sarcoma

B2.03.03 Erdheim-Chester disease

B2.03.04 Histiocytic sarcoma

B2.03.05 Interdigitating reticulum cell sarcoma

B2.03.06 Follicular dendritic cell sarcoma

B2.03.08 Malignant histiocytosis

B3 Unclassifiable blood cancers

B3.01 Lymphoma, NOS

B3.02 Non-Hodgkin lymphoma, NOS

B3.03 Leukaemia, NOS

B3.04 Lymphoid leukaemia, NOS

B3.05 Myeloid leukaemia, NOS

Cancer list for selected cancers by histology

The following cancers have incidence data available within the (selected) cancer by histology reports. Histology describes the type of cells or tissue in which cancer originates. Survival data are available only where there are enough cases to derive a sufficiently reliable survival rate.

The cancer list is accompanied by prefixes to help identify the relationships between cancers. For example, C1.01 is the prefix ID for carcinomas, C1.01.01 is the prefix ID for squamous cell carcinoma and is a type of carcinoma. The prefixes are provided for assistance only within this report and has nothing to do with the cancer outside of this specific assistance.

Cancer	Cancer type (hy histology)
	B1.01 Gliomas, glioneuronal tumours, and neuronal tumours
	B1.01.01 Adult-type diffuse gliomas
	B1.01.01.01 Astrocytoma, IDH-mutant
	B1.01.01.01.01 Astrocytoma, IDH-mutant grade 2 & Astrocytoma, NOS
	B1.01.01.01.02 Astrocytoma, IDH-mutant, grade 3
	B1.01.01.01.03 Astrocytoma, IDH-mutant, grade 4
	B1.01.01.02 Oligodendroglioma, IDH-mutant and 1p/19q-codeleted
	B1.01.01.02.01 Oligodendroglioma, IDH-mutant and 1p/19q-codeleted, grade 2 & Oligodendroglioma NOS
	B1.01.01.02.02 Oligodendroglioma, IDH-mutant and 1p/19q-codeleted, grade 3
	B1.01.01.02.03 Oligodendroblastoma [obs]
	B1.01.01.03 Glioblastoma, IDH-wildtype
	B1.01.01.03.01 Glioblastoma, IDH-wildtype & Epithelioid glioblastoma & Glioblastoma, NOS
	B1.01.01.03.02 Giant cell glioblastoma
	B1.01.01.03.03 Gliosarcoma
	B1.01.01.04 Gliomatosis cerebri
	B1.01.01.05 Oligoastrocytoma

Brain cancer	B1.01.01.06 Protoplasmic astrocytoma [obs]
	B1.01.01.07 Gemistocytic astrocytoma
	B1.01.01.08 Fibrillary astrocytoma
	B1.01.02 Paediatric-type diffuse high-grade gliomas
	B1.01.02.01 Diffuse midline glioma, H3 K27-altered & Diffuse hemispheric glioma, H3 G34-mutant & Diffuse paediatric-type high-grade glioma, H3-wildtype and IDH-wildtype & Infant-type hemispheric glioma
	B1.01.03 Circumscribed astrocytic gliomas
	B1.01.03.01 Pilomyxoid astrocytoma
	B1.01.03.02 High-grade astrocytoma with piloid features
	B1.01.03.03 Pleomorphic xanthoastrocytoma
	B1.01.03.04 Astroblastoma, MN1-altered & Astroblastoma, NOS
	B1.01.04 Glioneuronal and neuronal tumours
	B1.01.04.01 Ganglioglioma, anaplastic
	B1.01.04.02 Ganglioneuroblastoma
	B1.01.04.03 Neuroepithelioma, NOS
	B1.01.05 Ependymal tumours
	B1.01.05.01 Supratentorial ependymoma, NOS & Posterior fossa ependymoma, NOS & Ependymoma, NOS
	B1.01.05.02 Supratentorial ependymoma, ZFTA fusion-positive & Supratentorial ependymoma, YAP1 fusion-positive & Posterior fossa group A (PFA) ependymoma & Posterior fossa group B (PFB) ependymoma
	B1.01.05.03 Ependymoma, anaplastic
	B1.01.05.04 Papillary ependymoma
	B1.01.06 Unclassifiable gliomas
	B1.01.06.01 Glioma, malignant, NOS
	B1.02 Choroid plexus tumours
	B1.02.01 Choroid plexus carcinoma
	B1.03 Embryonal tumours
	B1.03.01 Medulloblastomas
	B1.03.01.01 Medulloblastoma, SHH-activated and TP53-wildtype & Desmoplastic/nodular medulloblastoma & Medulloblastoma with extensive nodularity
	B1.03.01.02 Medulloblastoma, SHH-activated and TP53 mutant
	B1.03.01.03 Medulloblastoma, non-WNT/non-SHH
	B1.03.01.04 Classic meduloblastoma & Medulloblastoma, NOS
	B1.03.01.05 Large cell / anaplastic medulloblastoma
	B1.03.01.06 Medullomyoblastoma [obs]
	B1.03.02 Other embryonal tumours
	B1.03.02.01 Atypical teratoid/rhabdoid tumour
	B1.03.02.02 Embryonal tumour with multilayered rosettes
	B1.03.02.03 CNS neuroblastoma, FOXR2-activated & CNS tumour with BCOR internal tandem duplication & Neuroblastoma, NOS
	B1.03.02.04 CNS embryonal tumour, NEC/NOS
	B1.04 Germ cell tumours
	B1.04.01 Immature teratoma
	B1.04.02 Germinoma

	B1.04.03 Embryonal carcinoma
	B1.04.04 Mixed germ cell tumour
	B1.04.05 Dysgerminoma
	B1.05 Other cancers
	B1.05.01 Squamous cell carcinoma, NOS
	B1.05.02 Malignant melanoma, NOS
	B1.01 Carcinomas
	B1.01.01 Ductal carcinomas
	B1.01.01.01 Pleomorphic carcinoma
	B1.01.01.02 Lymphoepithelial carcinoma
	B1.01.01.03 Adenocarcinoma, NOS
	B1.01.01.04 Scirrhous adenocarcinoma [obs]
	B1.01.01.05 Superficial spreading adenocarcinoma
	B1.01.01.06 Basal cell carcinoma
	B1.01.01.07 Cribriform carcinoma, NOS
	B1.01.01.08 Tubular adenocarcinoma
	B1.01.01.09 Solid carcinoma, NOS
	B1.01.01.10 Adenocarcinoma with mixed subtypes
	B1.01.01.11 Oncocytic carcinoma
	B1.01.01.12 Clear cell adenocarcinoma, NOS
	B1.01.01.13 Lipid-rich carcinoma
	B1.01.01.14 Glycogen-rich carcinoma
	B1.01.01.15 Granular cell carcinoma
	B1.01.01.16 Mixed cell adenocarcinoma
	B1.01.01.17 Apocrine adenocarcinoma
	B1.01.01.18 Sebaceous carcinoma
	B1.01.01.19 Mucinous adenocarcinoma, NOS
	B1.01.01.20 Mucin-producing adenocarcinoma
	B1.01.01.21 Signet ring cell carcinoma
	B1.01.01.22 Infiltrating duct carcinoma, NOS
	B1.01.01.23 Comedocarcinoma, NOS
	B1.01.01.24 Invasive micropapillary carcinoma of breast
	B1.01.01.25 Cystic hypersecretory carcinoma [obs]
	B1.01.01.26 Medullary carcinoma, NOS
	B1.01.01.27 Medullary carcinoma with lymphoid stroma [obs]
	B1.01.01.28 Atypical medullary carcinoma
	B1.01.01.29 Duct carcinoma, desmoplastic type
	B1.01.01.30 Infiltrating ductular carcinoma
	B1.01.01.31 Infiltrating duct and lobular carcinoma
	B1.01.01.32 Infiltrating duct mixed with other types of carcinoma
	B1.01.01.33 Inflammatory carcinoma

Breast cancer	B1.01.01.34 Paget disease, mammary
	B1.01.01.35 Paget disease and infiltrating duct carcinoma of breast
	B1.01.01.36 Paget disease and intraductal carcinoma of breast
	B1.01.01.37 Adenocarcinoma with squamous metaplasia
	B1.01.01.38 Adenocarcinoma with cartilaginous and osseous metaplasia
	B1.01.01.39 Adenocarcinoma with spindle cell metaplasia
	B1.01.01.40 Adenocarcinoma with apocrine metaplasia
	B1.01.01.41 Adenocarcinoma with neuroendocrine differentiation
	B1.01.01.42 Metaplastic carcinomas
	B1.01.01.42.01 Spindle cell carcinoma, NOS
	B1.01.01.42.02 Pseudosarcomatous carcinoma
	B1.01.01.42.03 Carcinoma with osteoclast-like giant cells
	B1.01.01.42.04 Squamous cell carcinoma
	B1.01.01.42.05 Squamous cell carcinoma, keratinising, NOS
	B1.01.01.42.06 Squamous cell carcinoma, large cell, nonkeratinising, NOS
	B1.01.01.42.07 Squamous cell carcinoma, spindle cell
	B1.01.01.42.08 Adenosquamous carcinoma
	B1.01.01.42.09 Metaplastic carcinoma, NOS
	B1.01.01.42.10 Carcinosarcoma, NOS
	B1.01.02 Lobular carcinomas
	B1.01.02.01 Lobular carcinoma, pleomorphic
	B1.01.02.02 Lobular carcinoma, NOS
	B1.01.02.03 Infiltrating lobular mixed with other types of carcinoma
	B1.01.03 Papillary carcinomas
	B1.01.03.01 Papillary carcinoma, NOS
	B1.01.03.02 Papillary adenocarcinoma
	B1.01.03.03 Intraductal papillary adenocarcinoma with invasion
	B1.01.03.04 Encapsulated papillary carcinoma with invasion
	B1.01.03.05 Solid papillary carcinoma with invasion
	B1.01.04 Salivary gland-type carcinomas
	B1.01.04.01 Adenoid cystic carcinoma
	B1.01.04.02 Mucoepidermoid carcinoma
	B1.01.04.03 Secretory carcinoma
	B1.01.04.04 Acinar cell carcinoma
	B1.01.05 Neuroendocrine neoplasms
	B1.01.05.01 Neuroendocrine tumours
	B1.01.05.01.01 Neuroendocrine tumour, grade 1 and NOS
	B1.01.05.01.02 Neuroendocrine tumour, grade 2
	B1.01.05.02 Neuroendocrine carcinomas
	B1.01.05.02.01 Large cell neuroendocrine carcinoma
	B1.01.05.02.02 Small cell carcinoma

B1.01.05.02.03 Combined small cell carcinoma

B1.01.05.02.04 Neuroendocrine carcinoma, NOS

B1.01.06 Epithelial-myoepithelial carcinoma

B1.01.06.01 Epithelial-myoepithelial carcinoma

B1.01.06.02 Carcinoma ex pleomorphic adenoma

B1.01.06.03 Myoepithelial carcinoma

B1.01.06.04 Adenomyoepithelioma with carcinoma

B1.01.07 Unclassifiable carcinomas

B1.01.07.01 Carcinoma, NOS

B1.01.07.02 Large cell carcinoma, NOS

B1.01.07.03 Carcinoma, undifferentiated, NOS

B1.01.07.04 Carcinoma, anaplastic, NOS

B1.01.07.05 Non-small cell carcinoma

B1.02 Sarcomas

B1.02.01 Liposarcomas

B1.02.01.01 Liposarcoma, NOS

B1.02.01.02 Liposarcoma, well differentiated, NOS

B1.02.01.03 Myxoid liposarcoma

B1.02.01.04 Pleomorphic liposarcoma

B1.02.02 Fibroblastic and myofibroblastic sarcomas

B1.02.02.01 Fibrosarcoma, NOS

B1.02.02.02 Myxofibrosarcoma

B1.02.02.03 Solitary fibrous tumour, malignant

B1.02.02.04 Myofibroblastic sarcoma

B1.02.03 Vascular sarcomas

B1.02.03.01 Haemangiosarcoma

B1.02.03.02 Lymphangiosarcoma

B1.02.04 Smooth muscle sarcomas

B1.02.04.01 Leiomyosarcoma, NOS

B1.02.04.02 Angiomyosarcoma

B1.02.04.03 Myosarcoma

B1.02.05 Skeletal muscle sarcomas

B1.02.05.01 Rhabdomyosarcoma, NOS

B1.02.05.02 Spindle cell rhabdomyosarcoma

B1.02.06 Stromal sarcomas

B1.02.06.01 Stromal sarcoma, NOS

B1.02.07 Bone and cartilage type sarcomas

B1.02.07.01 Extraskeletal osteosarcoma

B1.02.08 Malignant peripheral nerve sheath tumours

B1.02.08.01 Malignant peripheral nerve sheath tumour, NOS

B1.02.08.02 Granular cell tumour, malignant

	B1.02.09 Undifferentiated small round cell sarcomas of soft tissue B1.02.09.01 Ewing sarcoma B1.02.10 Sarcomas of uncertain differentiation B1.02.10.01 Undifferentiated pleomorphic sarcoma B1.02.10.02 Synovial sarcoma, NOS B1.02.11 Unclassifiable saromas B1.02.11.01 Sarcoma, NOS B1.02.11.02 Spindle cell sarcoma B1.02.11.03 Giant cell sarcoma B1.02.11.04 Undifferentiated sarcoma B1.03 Other breast cancers B1.03.01 Mixed tumour, malignant, NOS B1.03.02 Phyllodes tumour, malignant B1.04 Unclassifiable breast cancers B1.04.01 Neoplasm, malignant B1.04.02 Tumour cells, malignant B1.04.03 Malignant tumour, spindle cell type
	C1.01 Epithelial cancers (carcinomas) C1.01.01 Squamous cell carcinomas C1.01.01.01 Verrucous carcinoma, NOS C1.01.01.02 Papillary squamous cell carcinoma, NOS C1.01.01.03 Squamous cell carcinoma, NOS C1.01.01.04 Squamous cell carcinoma, keratinising, NOS C1.01.01.05 Squamous cell carcinoma, large cell, nonkeratinising, NOS C1.01.01.06 Squamous cell carcinoma, nonkeratinising, NOS C1.01.01.07 Squamous cell carcinoma, spindle cell C1.01.01.08 Squamous cell carcinoma, adenoid C1.01.01.09 Squamous cell carcinoma, microinvasive C1.01.01.10 Lymphoepithelial carcinoma C1.01.01.11 Basaloid squamous cell carcinoma C1.01.01.12 Squamous cell carcinoma, clear cell type C1.01.01.13 Squamous cell carcinoma, HPV-associated C1.01.01.14 Squamous cell carcinoma, HPV-independent C1.01.01.15 Basaloid carcinoma C1.01.02 Adenocarcinomas C1.01.02.01 Adenocarcinoma, NOS C1.01.02.02 Scirrhous adenocarcinoma [obs] C1.01.02.03 Superficial spreading adenocarcinoma C1.01.02.04 Adenocarcinoma, intestinal type C1.01.02.05 Adenoid cystic carcinoma C1.01.02.06 Solid carcinoma, NOS

Cervical cancer	C1.01.02.07 Adenocarcinoma with mixed subtypes
	C1.01.02.08 Papillary adenocarcinoma, NOS
	C1.01.02.09 Villous adenocarcinoma
	C1.01.02.10 Adenocarcinoma in tubulovillous adenoma
	C1.01.02.11 Adenocarcinoma, HPV-independent, clear cell type
	C1.01.02.12 Clear cell adenocarcinofibroma
	C1.01.02.13 Mixed cell adenocarcinoma
	C1.01.02.14 Endometrioid adenocarcinoma, NOS
	C1.01.02.15 Adenocarcinoma, endocervical type, NOS
	C1.01.02.16 Serous carcinoma, NOS
	C1.01.02.17 Low grade serous carcinoma
	C1.01.02.18 High grade serous carcinoma
	C1.01.02.19 Seromucinous carcinoma
	C1.01.02.20 Mucinous adenocarcinoma, NOS
	C1.01.02.21 Mucin-producing adenocarcinoma
	C1.01.02.22 Adenocarcinoma, HPV-independent, gastric type
	C1.01.02.23 Signet ring cell carcinoma
	C1.01.02.24 Adenocarcinoma with squamous metaplasia
	C1.01.02.25 Adenocarcinoma with neuroendocrine differentiation
	C1.01.02.26 Adenocarcinoma, HPV-independent, mesonephric type
	C1.01.03 Neuroendocrine neoplasms
	C1.01.03.01 Neuroendocrine tumours
	C1.01.03.01.01 Neuroendocrine tumour, grade 1 and NOS
	C1.01.03.01.02 Neuroendocrine tumour, grade 2
	C1.01.03.02 Neuroendocrine carcinomas
	C1.01.03.02.01 Large cell neuroendocrine carcinoma
	C1.01.03.02.02 Small cell carcinoma, NOS
	C1.01.03.02.03 Combined small cell carcinoma
	C1.01.03.02.04 Mixed adenoneuroendocrine carcinoma
	C1.01.03.02.05 Neuroendocrine carcinoma, NOS
	C1.01.04 Other carcinomas
	C1.01.04.01 Giant cell and spindle cell carcinoma
	C1.01.04.02 Pseudosarcomatous carcinoma
	C1.01.04.03 Adenoid basal carcinoma
	C1.01.04.04 Mucoepidermoid carcinoma
	C1.01.04.05 Adenosquamous carcinoma
	C1.01.05 Unclassifiable carcinomas
	C1.01.05.01 Carcinoma, NOS
	C1.01.05.02 Large cell carcinoma, NOS
	C1.01.05.03 Glassy cell carcinoma
	C1.01.05.04 Carcinoma, undifferentiated, NOS

	C1.01.05.05 Carcinoma, anaplastic, NOS
	C1.01.05.06 Pleomorphic carcinoma
	C1.01.05.07 Papillary carcinoma, NOS
	C1.02 Mesenchymal cancers (sarcomas)
	C1.02.01 Vascular sarcomas
	C1.02.01.01 Epithelioid haemangioendothelioma, NOS
	C1.02.02 Smooth muscle sarcomas
	C1.02.02.01 Leiomyosarcoma, NOS
	C1.02.02.02 Epithelioid leiomyosarcoma
	C1.02.02.03 Myxoid leiomyosarcoma
	C1.02.03 Skeletal muscle sarcomas
	C1.02.03.01 Rhabdomyosarcoma, NOS
	C1.02.03.02 Embryonal rhabdomyosarcoma, NOS
	C1.02.04 Stromal sarcomas
	C1.02.04.01 Stromal sarcoma, NOS
	C1.02.05 Malignant peripheral nerve sheath tumours
	C1.02.05.01 Malignant peripheral nerve sheath tumour, NOS
	C1.02.06 Sarcomas of uncertain differentiation
	C1.02.06.01 Alveolar soft part sarcoma
	C1.02.07 Unclassifiable sarcomas
	C1.02.07.01 Sarcoma, NOS
	C1.02.07.02 Spindle cell sarcoma
	C1.02.07.03 Undifferentiated sarcoma
	C1.03 Mixed epithelial and mesenchymal cancers
	C1.03.01 Adenosarcoma
	C1.03.02 Mixed tumour, malignant, NOS
	C1.03.03 Mullerian mixed tumour
	C1.03.04 Mesodermal mixed tumour
	C1.03.05 Carcinosarcoma, NOS
	C1.04 Other cervical cancers
	C1.04.01 Melanomas
	C1.04.01.01 Malignant melanoma, NOS
	C1.04.01.02 Amelanotic melanoma
	C1.04.01.03 Mucosal lentiginous melanoma
	C1.04.01.04 Spindle cell melanoma, NOS
	C1.04.02 Trophoblastic tumour, epithelioid
	C1.05 Unclassifiable cervical cancers
	C1.05.01 Malignant tumour, NOS
	C1.05.02 Tumour cells, malignant
	C1.05.03 Malignant tumour, small cell type
	C1.01 Carcinomas

C1.01.01 Squamous cell carcinomas

C1.01.01.01 Verrucous carcinoma, NOS

C1.01.01.02 Squamous cell carcinoma, NOS

C1.01.01.03 Squamous cell carcinoma, keratinising, NOS

C1.01.01.04 Squamous cell carcinoma, large cell, nonkeratinising, NOS

C1.01.01.05 Squamous cell carcinoma, microinvasive

C1.01.01.06 Lymphoepithelial carcinoma

C1.01.01.07 Basaloid squamous cell carcinoma

C1.01.01.08 Squamous cell carcinoma, HPV positive

C1.01.01.09 Basaloid carcinoma

C1.01.01.10 Cloacogenic carcinoma [obs]

C1.01.02 Adenocarcinomas

C1.01.02.01 Adenocarcinoma, NOS

C1.01.02.02 Scirrhous adenocarcinoma [obs]

C1.01.02.03 Superficial spreading adenocarcinoma

C1.01.02.04 Adenocarcinoma, intestinal type

C1.01.02.05 Carcinoma, diffuse type

C1.01.02.06 Cribriform carcinoma, NOS

C1.01.02.07 Adenocarcinoma in adenomatous polyp

C1.01.02.08 Tubular adenocarcinoma

C1.01.02.09 Serrated adenocarcinoma

C1.01.02.10 Adenocarcinoma in adenomatous polyposis coli

C1.01.02.11 Adenocarcinoma in multiple adenomatous polyps

C1.01.02.12 Goblet cell adenocarcinoma

C1.01.02.13 Adenocarcinoma with mixed subtypes

C1.01.02.14 Papillary adenocarcinoma, NOS

C1.01.02.15 Adenocarcinoma in villous adenoma

C1.01.02.16 Adenoma-like adenocarcinoma

C1.01.02.17 Adenocarcinoma in tubulovillous adenoma

C1.01.02.18 Micropapillary adenocarcinoma

C1.01.02.19 Clear cell adenocarcinoma, NOS

C1.01.02.20 Mixed cell adenocarcinoma

C1.01.02.21 Endometrioid adenocarcinoma, NOS

C1.01.02.22 Cystadenocarcinoma, NOS [obs]

C1.01.02.23 Mucinous cystadenocarcinoma, NOS

C1.01.02.24 Mucinous adenocarcinoma

C1.01.02.25 Mucin-producing adenocarcinoma

C1.01.02.26 Signet ring cell carcinoma

C1.01.02.27 Medullary adenocarcinoma

C1.01.02.28 Acinar cell carcinoma

C1.01.02.29 Adenosquamous carcinoma

	C1.01.02.30 Adenocarcinoma with apocrine metaplasia
	C1.01.02.31 Adenocarcinoma with neuroendocrine differentiation
	C1.01.02.32 Metaplastic carcinoma, NOS
	C1.01.02.33 Carcinoma, undifferentiated, NOS
	C1.01.02.34 Carcinoma with sarcomatoid component
	C1.01.03 Neuroendocrine neoplasms
	C1.01.03.01 Neuroendocrine tumours
	C1.01.03.01.01 Neuroendocrine tumour, grade 1 or NOS
	C1.01.03.01.02 Enterochromaffin cell carcinoid
	C1.01.03.01.03 Enterochromaffin-like cell tumour
	C1.01.03.01.04 Neuroendocrine tumour, grade 2 or grade 3
	C1.01.03.02 Neuroendocrine carcinomas
	C1.01.03.02.01 Large cell neuroendocrine carcinoma
	C1.01.03.02.02 Small cell carcinoma, NOS
	C1.01.03.02.03 Small cell carcinoma, intermediate cell
	C1.01.03.02.04 Neuroendocrine carcinoma, NOS
	C1.01.03.03 Mixed neuroendocrine and non-neuroendocrine neoplasms
	C1.01.03.03.01 Combined small cell carcinoma
	C1.01.03.03.02 Mixed neuroendocrine non-neuroendocrine neoplasm
	C1.01.03.03.03 Mixed adenoneuroendocrine carcinoma
	C1.01.03.03.04 Adenocarcinoid tumour [obs]
Colorectal cancer	C1.01.04 Other carcinomas
	C1.01.04.01 Giant cell and spindle cell carcinoma
	C1.01.04.02 Giant cell carcinoma
	C1.01.04.03 Spindle cell carcinoma, NOS
	C1.01.04.04 Epithelial-myoepithelial carcinoma
	C1.01.05 Unclassifiable carcinomas
	C1.01.05.01 Carcinoma, NOS
	C1.01.05.02 Large cell carcinoma, NOS
	C1.01.05.03 Large cell carcinoma with rhabdoid phenotype
	C1.01.05.04 Carcinoma, anaplastic, NOS
	C1.01.05.05 Pleomorphic carcinoma
	C1.01.05.06 Non-small cell carcinoma
	C1.02 Sarcomas
	C1.02.01 Liposarcomas
	C1.02.01.01 Liposarcoma, NOS
	C1.02.01.02 Liposarcoma, well differentiated, NOS
	C1.02.01.03 Dedifferentiated liposarcoma
	C1.02.02 Fibroblastic and myofibroblastic sarcomas
	C1.02.02.01 Myxofibrosarcoma
	C1.02.02.02 Solitary fibrous tumour, malignant

C1.02.02.03 Myofibroblastic sarcoma

C1.02.03 Vascular sarcomas

C1.02.03.01 Haemangiosarcoma

C1.02.04 Smooth muscle sarcomas

C1.02.04.01 Leiomyosarcoma, NOS

C1.02.04.02 Epithelioid leiomyosarcoma

C1.02.06 Stromal sarcomas

C1.02.06.01 Gastrointestinal stromal tumour

C1.02.07 Malignant peripheral nerve sheath tumours

C1.02.07.01 Granular cell tumour, malignant

C1.02.08 Sarcomas of uncertain differentiation

C1.02.08.01 Synovial sarcomas

C1.02.08.01.01 Synovial sarcoma, NOS

C1.02.08.01.02 Synovial sarcoma, spindle cell

C1.02.08.02 Desmoplastic small round cell tumour

C1.02.08.03 Rhabdoid tumour, NOS

C1.02.08.04 Perivascular epithelioid tumour, malignant

C1.02.08.05 Undifferentiated sarcomas

C1.02.08.05.01 Undifferentiated sarcoma

C1.02.08.05.02 Spindle cell sarcoma, undifferentiated

C1.02.08.05.03 Pleomorphic sarcoma, undifferentiated

C1.02.08.05.04 Malignant fibrous histiocytoma [obs]

C1.02.09 Undifferentiated small round cell sarcomas

C1.02.09.01 Ewing sarcoma

C1.02.10 Unclassifiable sarcomas

C1.02.10.01 Sarcoma, NOS

C1.03 Other cancers

C1.03.01 Paraganglioma, NOS

C1.03.02 Melanomas

C1.03.02.01 Malignant melanoma, NOS

C1.03.02.02 Nodular melanoma

C1.03.02.03 Amelanotic melanoma

C1.03.02.04 Mucosal lentiginous melanoma

C1.03.02.05 Spindle cell melanoma, NOS

C1.03.03 Carcinosarcoma, NOS

C1.03.04 Germ cell and trophoblastic cancers

C1.03.04.01 Yolk sac tumour, NOS

C1.03.04.02 Choriocarcinoma, NOS

C1.03.05 Ganglioneuroblastoma

C1.04 Unclassifiable cancers

C1.04.01 Neoplasm, malignant

	C1.04.02 Tumour cells, malignant C1.04.03 Malignant tumour, small cell type C1.04.04 Malignant tumour, giant cell type C1.04.05 Malignant tumour, spindle cell type
	K1.01 Carcinomas K1.01.01 Adenocarcinomas K1.01.01.01 Adenocarcinoma, NOS K1.01.01.02 Tubular adenocarcinoma K1.01.01.03 Adenocarcinoma with mixed subtypes K1.01.01.04 Papillary adenocarcinoma K1.01.01.05 Adenocarcinoma in tubulovillous adenoma K1.01.01.06 Oncocytic carcinoma K1.01.01.07 Clear cell adenocarcinoma K1.01.01.08 Eosinophilic solid and cystic renal cell carcinoma & TFE3-rearranged renal cell carcinoma & TFEB-altered renal cell carcinoma & ELOC (formerly TCEB1)-mutated renal cell carcinoma & Fumarate hydratase-deficient renal cell carcinoma & Hereditary leiomy K1.01.01.09 Renal cell carcinoma, NOS K1.01.01.10 Clear cell adenocarcinofibroma K1.01.01.11 Tubulocystic renal cell carcinoma & Acquired cystic disease-associated renal cell carcinoma K1.01.01.12 Chromophobe renal cell carcinoma K1.01.01.13 Renal cell carcinoma, sarcomatoid K1.01.01.14 Collecting duct carcinoma K1.01.01.15 Granular cell carcinoma K1.01.01.16 Mixed cell adenocarcinoma K1.01.01.17 Mucinous tubular and spindle cell carcinoma K1.01.01.18 Mucin-producing adenocarcinoma K1.01.01.19 Medullary carcinoma, NOS K1.01.01.20 Adenosquamous carcinoma K1.01.01.21 Adenocarcinoma with neuroendocrine differentiation K1.01.02 Neuroendocrine neoplasms K1.01.02.01 Neuroendocrine tumours K1.01.02.01.01 Neuroendocrine tumour, grade 1 or NOS K1.01.02.02 Neuroendocrine carcinomas K1.01.02.02.01 Large cell neuroendocrine carcinoma K1.01.02.02.02 Small cell carcinoma K1.01.02.02.03 Neuroendocrine carcinoma, NOS K1.01.03 Other carcinomas K1.01.03.01 Giant cell carcinoma K1.01.03.02 Spindle cell carcinoma K1.01.03.03 Pseudosarcomatous carcinoma K1.01.03.04 Carcinosarcoma K1.01.04 Unclassifiable carcinomas

Kidney cancer	K1.01.04.01 Carcinoma, NOS
	K1.01.04.02 Large cell carcinoma, NOS
	K1.01.04.03 Carcinoma, undifferentiated, NOS
	K1.01.04.04 Carcinoma, anaplastic, NOS
	K1.01.04.05 Pleomorphic carcinoma
	K1.02 Sarcomas
	K1.02.01 Liposarcomas
	K1.02.01.01 Angiomyolipoma, epithelioid, malignant
	K1.02.02 Fibroblastic and myofibroblastic sarcomas
	K1.02.02.01 Solitary fibrous tumour, malignant
	K1.02.03 Vascular sarcomas
	K1.02.03.01 Haemangiosarcoma
	K1.02.04 Smooth muscle sarcomas
	K1.02.04.01 Leiomyosarcoma, NOS
	K1.02.04.02 Angiomyosarcoma
	K1.02.04.03 Myxoid leiomyosarcoma
	K1.02.05 Skeletal muscle sarcomas
	K1.02.05.01 Rhabdomyosarcoma, NOS
	K1.02.05.02 Embryonal rhabdomyosarcoma, NOS
	K1.02.06 Bone and cartilage type sarcomas of soft tissue
	K1.02.06.01 Extraskeletal osteosarcoma
	K1.02.07 Sarcomas of uncertain differentiation
	K1.02.07.01 Synovial sarcomas
	K1.02.07.01.01 Synovial sarcoma, NOS
	K1.02.07.01.02 Synovial sarcoma, spindle cell
	K1.02.07.02 Rhabdoid tumour, NOS
	K1.02.07.03 Perivascular epithelioid tumour, malignant
	K1.02.07.04 Undifferentiated sarcomas
	K1.02.07.04.01 Undifferentiated sarcoma
	K1.02.07.04.02 Spindle cell sarcoma
	K1.02.07.04.03 Giant cell sarcoma
	K1.02.07.04.04 Malignant fibrous histiocytoma [obs]
	K1.02.08 Undifferentiated small round cell sarcomas
	K1.02.08.01 Ewing sarcoma
	K1.02.09 Other sarcomas
	K1.02.09.01 Clear cell sarcoma of kidney
	K1.02.10 Unclassifiable sarcomas
	K1.02.10.01 Sarcoma, NOS
	K1.03 Other cancers
	K1.03.01 Malignant cystic nephroma
	K1.03.02 Nephroblastoma

	K1.03.03 Germ cell cancers K1.03.03.01 Yolk sac tumour, NOS K1.03.03.02 Mixed germ cell tumour K1.03.03.03 Choriocarcinoma, NOS K1.03.04 Primitive neuroectodermal tumour, NOS K1.03.05 Neuroblastoma, NOS K1.04 Unclassifiable cancers K1.04.01 Malignant tumour, NOS K1.04.02 Tumour cells, malignant K1.04.03 Malignant tumour, giant cell type K1.04.04 Malignant tumout, spindle cell type K1.04.05 Malignant tumour, clear cell type
	L1.01 Carcinomas L1.01.01 Hepatocellular carcinomas L1.01.01.01 Hepatocellular carcinoma, NOS L1.01.01.02 Hepatocellular carcinoma, fibrolamellar L1.01.01.03 Hepatocellular carcinoma, scirrhous L1.01.01.04 Hepatocellular carcinoma, spindle cell variant L1.01.01.05 Hepatocellular carcinoma, clear cell type L1.01.01.06 Hepatocellular carcinoma, pleomorphic type L1.01.02 Cholangiocarcinomas L1.01.02.01 Cholangiocarcinoma L1.01.02.02 Bile duct cystadenocarcinoma L1.01.02.03 Perihilar cholangiocarcinoma L1.01.03 Combined hepatocellular carcinoma and cholangiocarcinoma L1.01.04 Other and unspecified adenocarcinomas L1.01.04.01 Adenocarcinoma, NOS L1.01.04.02 Scirrhous adenocarcinoma [obs] L1.01.04.03 Adenocarcinoma with mixed subtypes L1.01.04.04 Papillary adenocarcinoma, NOS L1.01.04.05 Clear cell adenocarcinoma, NOS L1.01.04.06 Cystadenocarcinoma, NOS [obs] L1.01.04.07 Papillary cystadenocarcinoma, NOS [obs] L1.01.04.08 Mucinous cystadenocarcinoma, NOS L1.01.04.09 Mucinous adenocarcinoma, NOS L1.01.04.10 Mucin-producing adenocarcinoma L1.01.04.11 Signet ring cell carcinoma L1.01.04.12 Infiltrating duct carcinoma, NOS L1.01.04.13 Intraductal papillary adenocarcinoma with invasion L1.01.04.14 Acinar cell carcinoma L1.01.04.15 Adenosquamous carcinoma

Liver cancer	L1.01.04.16 Adenocarcinoma with neuroendocrine differentiation
	L1.01.05 Neuroendocrine neoplasms
	L1.01.05.01 Neuroendocrine tumours
	L1.01.05.01.01 Neuroendocrine tumour, grade 1 or NOS
	L1.01.05.01.02 Neuroendocrine tumour, grade 2 or grade 3
	L1.01.05.02 Neuroendocrine carcinomas
	L1.01.05.02.01 Large cell neuroendocrine carcinoma
	L1.01.05.02.02 Small cell carcinoma
	L1.01.05.02.03 Neuroendocrine carcinoma, NOS
	L1.01.05.03 Mixed neuroendocrine and non-neuroendocrine neoplasms
	L1.01.05.03.01 Mixed neuroendocrine and non-neuroendocrine neoplasm
	L1.01.06 Other carcinomas
	L1.01.06.01 Giant cell carcinoma
	L1.01.06.02 Spindle cell carcinoma, NOS
	L1.01.06.03 Pseudosarcomatous carcinoma
	L1.01.06.04 Carcinosarcoma
	L1.01.07 Unclassifiable carcinomas
	L1.01.07.01 Carcinoma, NOS
	L1.01.07.02 Large cell carcinoma, NOS
	L1.01.07.03 Carcinoma, undifferentiated, NOS
	L1.01.07.04 Carcinoma, anaplastic, NOS
	L1.02 Sarcomas
	L1.02.01 Liposarcomas
	L1.02.01.01 Liposarcoma, NOS
	L1.02.02 Fibroblastic and myofibroblastic sarcomas
	L1.02.02.01 Solitary fibrous tumour, malignant
	L1.02.02.02 Myofibroblastic sarcoma
	L1.02.02.03 Myxosarcoma
	L1.02.03 Vascular sarcomas
	L1.02.03.01 Haemangiosarcoma
	L1.02.03.02 Haemangioendothelioma, malignant
	L1.02.03.03 Epithelioid haemangioendothelioma, NOS
	L1.02.04 Smooth muscle sarcomas
	L1.02.04.01 Leiomyosarcoma, NOS
	L1.02.04.02 Angiomyosarcoma
	L1.02.05 Skeletal muscle sarcomas
	L1.02.05.01 Rhabdomyosarcoma, NOS
	L1.02.05.02 Embryonal rhabdomyosarcoma, NOS
	L1.02.06 Sarcomas of uncertain differentiation
	L1.02.06.01 Perivascular epithelioid tumour, malignant
	L1.02.06.02 Desmoplastic small round cell tumour

	L1.02.06.03 Rhabdoid tumour, NOS L1.02.06.04 Undifferentiated sarcomas L1.02.06.04.02 Pleomorphic sarcoma, undifferentiated L1.02.06.04.03 Undifferentiated sarcoma L1.02.06.04.04 Malignant fibrous histiocytoma [obs] L1.02.06.04.05 Embryonal sarcoma L1.02.07 Unclassifiable sarcomas L1.02.07.01 Sarcoma, NOS L1.03 Other cancers L1.03.01 Hepatoblastoma, NOS L1.03.02 Yolk sac tumour, NOS L1.04 Unclassifiable cancers L1.04.01 Malignant tumour, NOS L1.04.02 Malignant tumour, giant cell type L1.04.03 Malignant tumour, spindle cell type
	L1.01 Carcinomas L1.01.01 Adenocarcinomas L1.01.01.01 Invasive non-mucinous adenocarcinoma or Adenocarcinoma, NOS L1.01.01.02 Scirrhous adenocarcinoma [obs] L1.01.01.03 Superficial spreading adenocarcinoma L1.01.01.04 Enteric-type adenocarcinoma L1.01.01.05 Cribriform carcinoma, NOS L1.01.01.06 Tubular adenocarcinoma L1.01.01.07 Solid adenocarcinoma, NOS L1.01.01.08 Lepidic adenocarcinoma L1.01.01.09 Alveolar adenocarcinoma [obs] L1.01.01.10 Bronchiolo-alveolar carcinoma, non-mucinous [obs] L1.01.01.11 Invasive mucinous adenocarcinoma L1.01.01.12 Mixed invasive mucinous and non-mucinous adenocarcinoma L1.01.01.13 Adenocarcinoma with mixed subtypes L1.01.01.14 Minimally invasive adenocarcinoma, non-mucinous L1.01.01.15 Minimally invasive adenocarcinoma, mucinous L1.01.01.16 Papillary adenocarcinoma, NOS L1.01.01.17 Micropapillary adenocarcinoma, NOS L1.01.01.18 Oxyphilic adenocarcinoma L1.01.01.19 Mixed cell adenocarcinoma L1.01.01.20 Fetal adenocarcinoma L1.01.01.21 Sebaceous carcinoma L1.01.01.22 Mucinous cystadenocarcinoma, NOS L1.01.01.23 Colloid adenocarcinoma

L1.01.01.24 Mucin-producing adenocarcinoma

L1.01.01.25 Signet ring cell carcinoma

L1.01.01.26 Acinar cell carcinoma

L1.01.01.27 Acinar cell cystadenocarcinoma

L1.01.01.28 Adenocarcinoma with squamous metaplasia

L1.01.01.29 Adenocarcinoma with spindle cell metaplasia

L1.01.01.30 Adenocarcinoma with neuroendocrine differentiation

L1.01.01.31 Hepatoid adenocarcinoma

L1.01.02 Squamous cell carcinomas

L1.01.02.01 Verrucous carcinoma, NOS

L1.01.02.02 Papillary squamous cell carcinoma

L1.01.02.03 Squamous cell carcinoma, NOS

L1.01.02.04 Squamous cell carcinoma, keratinising, NOS

L1.01.02.05 Squamous cell carcinoma, large cell, nonkeratinising, NOS

L1.01.02.06 Squamous cell carcinoma, small cell, nonkeratinising

L1.01.02.07 Squamous cell carcinoma, spindle cell

L1.01.02.08 Squamous cell carcinoma, adenoid

L1.01.02.09 Squamous cell carcinoma, microinvasive

L1.01.02.10 Lymphoepithelial carcinoma

L1.01.02.11 Basaloid squamous cell carcinoma

L1.01.02.12 Squamous cell carcinoma, clear cell type

L1.01.02.13 Squamous cell carcinoma, HPV-associated

L1.01.03 Large cell carcinoma, NOS

L1.01.04 Adenosquamous carcinoma

L1.01.05 Sarcomatoid carcinomas

L1.01.05.01 Pleomorphic carcinoma

L1.01.05.02 Giant cell and spindle cell carcinoma

L1.01.05.03 Giant cell carcinoma

L1.01.05.04 Spindle cell carcinoma, NOS

L1.01.05.05 Pseudosarcomatous carcinoma

L1.01.05.06 Metaplastic carcinoma

L1.01.05.07 Pulmonary blastoma

L1.01.05.08 Carcinosarcoma

L1.01.06 Salivary gland-type carcinomas

L1.01.06.01 Adenoid cystic carcinoma

L1.01.06.02 Hyalinising clear cell carcinoma

L1.01.06.03 Mucoepidermoid carcinoma

L1.01.06.04 Epithelial-myoepithelial carcinoma

L1.01.06.05 Myoepithelial carcinoma

L1.01.07 Neuroendocrine neoplasms

L1.01.07.01 Neuroendocrine tumours

Lung cancer	L1.01.07.01.01 Neuroendocrine tumour, grade 1 or NOS
	L1.01.07.01.02 Neuroendocrine tumour, grade 2 or 3
	L1.01.07.01.03 Enterochromaffin cell carcinoid
	L1.01.07.02 Neuroendocrine carcinomas
	L1.01.07.02.01 Large cell neuroendocrine carcinoma
	L1.01.07.02.02 Small cell carcinoma
	L1.01.07.02.03 Oat cell carcinoma [obs]
	L1.01.07.02.04 Small cell carcinoma, fusiform cell
	L1.01.07.02.05 Small cell carcinoma, intermediate cell [obs]
	L1.01.07.02.06 Neuroendocrine carcinoma, NOS
	L1.01.07.03 Mixed neuroendocrine and non-neuroendocrine neoplasms
	L1.01.07.03.01 Combined small cell carcinoma
	L1.01.07.03.02 Mixed adenoneuroendocrine carcinoma
	L1.01.07.03.03 Adenocarcinoid tumour [obs]
	L1.01.08 Other carcinomas
	L1.01.08.01 NUT carcinomas
	L1.01.08.02 Thoracic SMARCA4-deficient undifferentiated tumour
	L1.01.08.03 Basal cell carcinoma
	L1.01.08.04 Basaloid carcinoma
	L1.01.09 Unclassifiable carcinomas
	L1.01.09.01 Carcinoma, NOS
	L1.01.09.02 Large cell carcinoma with rhabdoid phenotype
	L1.01.09.03 Carcinoma, undifferentiated, NOS
	L1.01.09.04 Carcinoma, anaplastic, NOS
	L1.01.09.05 Non-small cell carcinoma
	L1.01.09.06 Papillary carcinoma, NOS
	L1.02 Sarcomas
	L1.02.01 Liposarcomas
	L1.02.01.01 Liposarcoma, NOS
	L1.02.02 Fibroblastic and myofibroblastic sarcomas
	L1.02.02.01 Fibrosarcoma, NOS
	L1.02.02.02 Myxofibrosarcoma
	L1.02.02.03 Solitary fibrous tumour, malignant
	L1.02.02.04 Myofibroblastic sarcoma
	L1.02.02.05 Myxosarcoma
	L1.02.03 Vascular sarcomas
	L1.02.03.01 Haemangiosarcoma
	L1.02.03.02 Haemangioendothelioma, malignant
	L1.02.03.03 Epithelioid haemangioendothelioma
	L1.02.04 Pericytic (perivascular) sarcomas
	L1.02.04.01 Glomus tumour, malignant

L1.02.05 Smooth muscle sarcomas

L1.02.05.01 Leiomyosarcoma, NOS

L1.02.05.02 Epithelioid leiomyosarcoma

L1.02.06 Bone and cartilage type sarcomas

L1.02.06.01 Osteosarcoma, NOS

L1.02.06.02 Chondrosarcoma, NOS

L1.02.06.03 Mesenchymal chondrosarcoma

L1.02.07 Malignant peripheral nerve sheath tumours

L1.02.07.01 Malignant peripheral nerve sheath tumour, NOS

L1.02.07.02 Neurilemoma, malignant [obs]

L1.02.08 Sarcomas of uncertain differentiation

L1.02.08.01 Spindle cell sarcoma

L1.02.08.02 Giant cell sarcoma

L1.02.08.03 Small cell sarcoma

L1.02.08.04 Epithelioid sarcoma, NOS

L1.02.08.05 Undifferentiated sarcoma

L1.02.08.06 Malignant fibrous histiocytoma [obs]

L1.02.08.08 Synovial sarcomas

L1.02.08.08.01 Synovial sarcoma, NOS

L1.02.08.08.02 Synovial sarcoma, spindle cell

L1.02.08.08.03 Synovial sarcoma, biphasic

L1.02.09 Undifferentiated small round cell sarcoma

L1.02.09.01 Ewing sarcoma

L1.02.10 Other sarcomas

L1.02.10.01 Pleuropulmonary blastoma

L1.02.11 Unclassifiable sarcomas

L1.02.11.01 Sarcoma, NOS

L1.03 Other cancers

L1.03.01 Paraganglioma, NOS

L1.03.02 Malignant melanoma, NOS

L1.03.03 Germ cell tumours

L1.03.03.01 Germ cell tumour, nonseminomatous

L1.03.03.02 Teratoma with malignant transformation

L1.04 Unclassifiable cancers

L1.04.01 Malignant tumour, NOS

L1.04.02 Tumour cells, malignant

L1.04.03 Malignant tumour, small cell type

L1.04.04 Malignant tumour, giant cell type

L1.04.05 Malignant tumour, spindle cell type

L1.04.06 Malignant tumour, clear cell type

Melanoma of the skin	S1.01 Malignant melanoma, NOS S1.02 Nodular melanoma S1.03 Balloon cell melanoma S1.04 Malignant melanoma, regressing S1.05 Amelanotic melanoma S1.06 Malignant melanoma in junctional naevus S1.07 Lentigo maligna melanoma S1.08 Low cumulative sun damage melanoma S1.09 Acral melanoma S1.10 Desmopastic melanoma S1.11 Malignant melanoma arising in giant congenital naevus S1.12 Malignant Spitz tumour S1.13 Epithelioid cell melanoma S1.14 Spindle cell melanoma, NOS S1.15 Spindle cell melanoma, type B S1.16 Blue naevus, malignant [obs]
Mesothelioma	M1.01 Mesothelioma, all histological types M1.01.01 Mesothelioma of pleura and pericardium M1.01.02 Mesothelioma of peritoneum and tunica vaginalis M1.01.03 Mesothelioma of unknown primary site M1.02 Epithelioid mesothelioma M1.02.01 Epithelioid mesothelioma of pleura and pericardium M1.02.02 Epithelioid mesothelioma of peritoneum and tunica vaginalis M1.02.03 Epithelioid mesothelioma of unknown primary site M1.03 Sarcomatoid mesothelioma M1.03.01 Sarcomatoid mesothelioma of pleura and pericardium M1.03.02 Sarcomatoid mesothelioma of peritoneum and tunica vaginalis M1.04 Biphasic mesothelioma M1.04.01 Biphasic mesothelioma of pleura and pericardium M1.04.02 Biphasic mesothelioma of peritoneum and tunica vaginalis M1.05 Mesothelioma, NOS M1.05.01 Mesothelioma, NOS of pleura and pericardium M1.05.02 Mesothelioma, NOS of peritoneum and tunica vaginalis M1.05.03 Mesothelioma, NOS of unknown primary site
	P1.01 Carcinomas P1.01.01 Adenocarcinomas P1.01.01.01 Adenocarcinoma, NOS P1.01.01.02 Scirrhous adenocarcinoma [obs] P1.01.01.03 Superficial spreading adenocarcinoma

P1.01.01.04 Adenocarcinoma, intestinal type

P1.01.01.05 Pancreatobiliary type carcinoma

P1.01.01.06 Adenocarcinoma in adenomatous polyp

P1.01.01.07 Tubular adenocarcinoma

P1.01.01.08 Solid carcinoma, NOS

P1.01.01.09 Goblet cell adenocarcinoma

P1.01.01.10 Adenocarcinoma with mixed subtypes

P1.01.01.11 Papillary adenocarcinoma, NOS

P1.01.01.12 Adenocarcinoma in villous adenoma

P1.01.01.13 Villous adenocarcinoma

P1.01.01.14 Adenocarcinoma in tubulovillous adenoma

P1.01.01.15 Micropapillary carcinoma, NOS

P1.01.01.16 Oxyphillic adenocarcinoma

P1.01.01.17 Clear cell adenocarcinoma, NOS

P1.01.01.18 Mixed cell adenocarcinoma

P1.01.01.19 Mucoepidermoid carcinoma

P1.01.01.20 Cystadenocarcinoma, NOS [obs]

P1.01.01.21 Serous cystadenocarcinoma, NOS

P1.01.01.22 Papillary cystadenocarcinoma, NOS [obs]

P1.01.01.23 Solid pseudopapillary neoplasm of the pancreas

P1.01.01.24 Intraductal papillary mucinous neoplasm with an associated invasive carcinoma

P1.01.01.25 Intraductal oncocytic papillary neoplasm with an associated invasive carcinoma

P1.01.01.26 Low grade serous carcinoma

P1.01.01.27 Mucinous cystic neoplasm with an associated invasive carcinoma

P1.01.01.28 Colloid carcinoma

P1.01.01.29 Mucin-producing adenocarcinoma

P1.01.01.30 Poorly cohesive carcinoma & Signet-ring cell carcinoma

P1.01.01.31 Duct adenocarcinoma, NOS

P1.01.01.32 Intraductal tubulopapillary neoplasm with an associated invasive carcinoma

P1.01.01.33 Encapsulated papillary carcinoma with invasion

P1.01.01.34 Cystic hypersecretory carcinoma [obs]

P1.01.01.35 Infiltrating ductular carcinoma

P1.01.01.36 Infiltrating duct mixed with other types of carcinoma

P1.01.01.37 Acinar cell carcinoma

P1.01.01.38 Adenosquamous carcinoma

P1.01.01.39 Adenocarcinoma with squamous metaplasia

P1.01.01.40 Adenocarcinoma with apocrine metaplasia

P1.01.01.41 Adenocarcinoma with neuroendocrine differentiation

P1.01.01.42 Metaplastic carcinoma, NOS

P1.01.01.43 Hepatoid carcinoma

P1.01.02 Squamous cell carcinomas

Pancreatic cancer	P1.01.02.01 Squamous cell carcinoma, NOS
	P1.01.02.02 Squamous cell carcinoma, keratinising, NOS
	P1.01.03 Neuroendocrine neoplasms
	P1.01.03.01 Neuroendocrine tumours
	P1.01.03.01.01 Non-functioning neuroendocrine tumours
	P1.01.03.01.01.01 Pancreatic neuroendocrine tumour, non-functioning
	P1.01.03.01.01.02 Neuroendocrine tumour, grade 1 or NOS
	P1.01.03.01.01.03 Neuroendocrine tumour, grade 2 or 3
	P1.01.03.01.02 Functioning neuroendocrine tumours
	P1.01.03.01.02.01 Insulinoma
	P1.01.03.01.02.02 Glucagonoma
	P1.01.03.01.02.03 Gastrinoma
	P1.01.03.01.02.04 VIPoma
	P1.01.03.01.02.05 Somatostatinoma
	P1.01.03.01.02.06 ACTH-producing tumour
	P1.01.03.01.02.07 Enterochromaffin cell carcinoid
	P1.01.03.02 Neuroendocrine carcinomas
	P1.01.03.02.01 Large cell neuroendocrine carcinoma
	P1.01.03.02.02 Small cell carcinoma
	P1.01.03.02.03 Neuroendocrine carcinoma, NOS
	P1.01.03.03 Mixed neuroendocrine and non-neuroendocrine neoplasms
	P1.01.03.03.01 Mixed neuroendocrine-non-neuroendocrine neoplasm
	P1.01.03.03.02 Mixed adenoneurocrine carcinoma
	P1.01.03.03.03 Adenocarcinoid tumour [obs]
	P1.01.04 Other carcinomas
	P1.01.04.01 Giant cell carcinoma
	P1.01.04.02 Spindle cell carcinoma, NOS
	P1.01.04.03 Pseudosarcomatous carcinoma
	P1.01.04.04 Undifferentiated carcinoma with osteoclast-like giant cells
	P1.01.04.05 Pancreatoblastoma
	P1.01.04.06 Carcinosarcoma
	P1.01.05 Unclassifiable carcinomas
	P1.01.05.01 Carcinoma, NOS
	P1.01.05.02 Large cell carcinoma, NOS
	P1.01.05.03 Carcinoma, undifferentiated, NOS
	P1.01.05.04 Carcinoma, anaplastic, NOS
	P1.01.05.05 Pleomorphic carcinoma
	P1.01.05.06 Non-small cell carcinoma
	P1.01.05.07 Papillary carcinoma, NOS
	P1.02 Sarcomas
	P1.02.01 Fibroblastic and myofibroblastic sarcomas

	P1.02.01.01 Myofibroblastic sarcomas
	P1.02.02 Vascular sarcomas
	P1.02.02.01 Epithelioid haemangioendothelioma, NOS
	P1.02.03 Smooth muscle sarcomas
	P1.02.03.01 Leiomyosarcoma, NOS
	P1.02.03.02 Epithelioid leiomyosarcoma
	P1.02.04 Stromal sarcomas
	P1.02.04.01 Gastrointestinal stromal tumour
	P1.02.05 Sarcomas of uncertain differentiation
	P1.02.05.01 Desmoplastic small round cell tumour
	P1.02.05.02 Undifferentiated sarcomas
	P1.02.05.02.01 Undifferentiated sarcoma
	P1.02.05.02.02 Spindle cell sarcoma, undifferentiated
	P1.02.05.02.03 Pleomorphic sarcoma, undifferentiated
	P1.02.05.02.04 Malignant fibrous histiocytoma [obs]
	P1.02.06 Undifferentiated small round cell sarcomas
	P1.02.06.01 Ewing sarcoma
	P1.02.07 Unclassifiable sarcomas
	P1.02.07.01 Sarcoma, NOS
	P1.03 Unclassifiable cancers
	P1.03.01 Malignant tumour, NOS
	P1.03.02 Tumour cells, malignant
	P1.03.03 Malignant tumour, giant cell type
	P1.03.04 Malignant tumour, spindle cell type
	P1.01 Carcinomas
	P1.01.01 Adenocarcinomas
	P1.01.01.01 Acinar adenocarcinoma and adenocarcinoma, NOS
	P1.01.01.02 Adenocarcinoma, intestinal type
	P1.01.01.03 Cribriform carcinoma
	P1.01.01.04 Adenocarcinoma with mixed subtypes
	P1.01.01.05 Papillary adenocarcinoma, NOS
	P1.01.01.06 Clear cell adenocarcinoma, NOS
	P1.01.01.07 Mixed cell adenocarcinoma
	P1.01.01.08 Endometrioid adenocarcinoma, NOS
	P1.01.01.09 Mucinous adenocarcinoma
	P1.01.01.10 Mucin-producing adenocarcinoma
	P1.01.01.11 Signet ring cell carcinoma
	P1.01.01.12 Infiltrating duct carcinoma, NOS
	P1.01.01.13 Medullary carcinoma, NOS
	P1.01.01.14 Infiltrating duct mixed with other types of carcinoma
	P1.01.01.15 Mixed acinar-ductal carcinoma

Prostate cancer	P1.01.01.16 Adenocarcinoma with squamous metaplasia
	P1.01.01.17 Acinar adenocarcinoma, sarcomatoid
	P1.01.01.18 Adenocarcinoma with neuroendocrine differentiation
	P1.01.01.19 Metaplastic carcinoma, NOS
	P1.01.01.20 Carcinosarcoma, NOS
	P1.01.02 Squamous carcinomas
	P1.01.02.01 Squamous cell carcinoma
	P1.01.02.01.01 Squamous cell carcinoma, NOS
	P1.01.02.01.02 Squamous cell carcinoma, keratinizing, NOS
	P1.01.02.02 Adenoid cystic (basal cell) carcinoma
	P1.01.02.03 Adenosquamous carcinoma
	P1.01.03 Urothelial carcinomas
	P1.01.03.01 Transitional cell carcinoma, NOS
	P1.01.03.02 Basaloid carcinoma
	P1.01.03.03 Papillary urothelial carcinoma
	P1.01.04 Neuroendocrine neoplasms
	P1.01.04.01 Neuroendocrine tumours
	P1.01.04.01.01 Neuroendocrine tumour, grade 1 and NOS
	P1.01.04.02 Neuroendocrine carcinomas
	P1.01.04.02.01 Large cell neuroendocrine carcinoma
	P1.01.04.02.02 Small cell carcinoma
	P1.01.04.02.03 Mixed small cell carcinoma
	P1.01.04.02.04 Neuroendocrine carcinoma, NOS
	P1.01.05 Other carcinomas
	P1.01.05.01 Giant cell and spindle cell carcinoma
	P1.01.05.02 Pseudosarcomatous carcinoma
	P1.01.06 Unclassifiable carcinomas
	P1.01.06.01 Carcinoma, NOS
	P1.01.06.02 Large cell carcinoma, NOS
	P1.01.06.03 Carcinoma, undifferentiated, NOS
	P1.01.06.04 Carcinoma, anaplastic, NOS
	P1.01.06.05 Pleomorphic carcinoma
	P1.01.06.06 Non-small cell carcinoma
	P1.01.06.07 Papillary carcinoma, NOS
	P1.02 Sarcomas
	P1.02.01 Fibroblastic and myofibroblastic sarcomas
	P1.02.01.01 Solitary fibrous tumour, malignant
	P1.02.02 Vascular sarcomas
	P1.02.02.01 Haemangiosarcoma
	P1.02.03 Smooth muscle sarcomas
	P1.02.03.01 Leiomyosarcoma, NOS

	P1.02.04 Skeletal muscle sarcomas
	P1.02.04.01 Rhabdomyosarcoma, NOS
	P1.02.04.02 Pleomorphic rhabdomyosarcoma, adult type
	P1.02.04.03 Embryonal rhabdomyosarcoma, NOS
	P1.02.04.04 Alveolar rhabdomyosarcoma
	P1.02.05 Stromal sarcomas
	P1.02.05.01 Stromal sarcoma, NOS
	P1.02.05.02 Gastrointestinal stromal tumour
	P1.02.06 Sarcomas of uncertain differentiation
	P1.02.06.01 Undifferentiated pleomorphic sarcoma
	P1.02.07 Unclassifiable sarcomas
	P1.02.07.01 Sarcoma, NOS
	P1.02.07.02 Spindle cell sarcoma
	P1.03 Other prostate cancers
	P1.03.01 Phyllodes tumour, malignant
	P1.04 Unclassifiable prostate cancers
	P1.04.01 Neoplasm, malignant
	P1.04.02 Malignant tumour, giant cell type
	P1.04.03 Malignant tumour, spindle cell type

Need help locating data?

Data that informs the data visualisations can be found in the Data section of *Cancer data in Australia* (CdiA). The following table outlines the range of data provided within CdiA and can be used to assist in navigating through the various Excel workbooks of this report.

The table contains links to the various data and the respective visualisations the data informs. The Excel workbooks provide data for the many different cancers presented within each visualisation. Please note that estimates based on projections were made for the following: incidence data from 2020 to 2023, National Mortality Database mortality data from 2022 to 2023 and Australian Cancer Database mortality data from 2019 to 2023.

Book no.	Broad category (and period)	Contents	Relevant visualisations
1a	Cancer incidence 1982 to 2023	Cancer incidence age-standardised rates (ASR) Crude cancer incidence rates Segi and WHO cancer incidence ASR Age specific cancer incidence rates by 5-year age groups Cases diagnosed by 5-year age groups	Summary Incidence by age
1b	Cancer incidence 1982 to 2023	Age-specific cancer incidence rates and counts of cancers diagnosed by 10-year age groups	Incidence by age
1c	Cancer incidence 1982 to 2023	Age-specific cancer incidence rates and counts of cancers diagnosed by 15-, 20-, 25- and 30-year age groups	Incidence by age
1d	Cancer incidence 1982 to 2023	Age-specific cancer incidence rates and counts of cancers diagnosed by 35-, 40-, 45- and 50-year age groups	Incidence by age
2a	Cancer mortality 1971 to 2023	Cancer mortality data based on the National Mortality Database: Cancer mortality ASR Crude cancer mortality rates Segi and WHO cancer mortality ASR Age-specific cancer mortality rates by 5-year age groups Deaths from cancer by 5-year age groups	Mortality by age
2b	Cancer mortality 1971 to 2023	Cancer mortality data based on the National Mortality Database: Age-specific cancer mortality rates and deaths from cancer (by 10-year age groups)	Mortality by age
2c	Cancer mortality 1971 to 2023	Cancer mortality data based on the National Mortality Database: Age-specific cancer mortality rates and deaths from cancer (by 15, 20, 25 and 30-year age groups)	Mortality by age
2d	Cancer mortality 1971 to 2023	Cancer mortality data based on the National Mortality Database: Age-specific cancer mortality rates and deaths from cancer by 35, 40, 45 and 50-year age groups	Mortality by age
2e	Cancer mortality 2007 to 2023	Cancer mortality data based on the Australian Cancer Database: Cancer mortality ASR Crude cancer mortality rates Age-specific cancer mortality rates and deaths by 5, 10, 15, 20, 25, 30, 35, 40, 45 and 50-year age groups.	Mortality by age
3a	Cancer survival 1990–1994 to 2015–2019 periods	Cancer survival rates Cancer survival rates by 5-year age groups (2015–2019 only) Conditional cancer survival rates	Summary survival
3b	Cancer survival 1990–1994 to 2015–2019 periods	Cancer survival rates Cancer survival rates by 20-year age groups Age-adjusted cancer survival rates	Survival by age

4a	Cancer risk Incidence: 1982 to 2023 Mortality: 1971 for 2023	Cancer risk adjusted for competing mortality, including: Risk of death from cancer by age Risk of cancer diagnosis by age Note: estimates for risk of death in this book are based on cancer deaths from the National Mortality Database.	Risk
4b	Cancer risk Incidence: 1982 to 2023 Mortality: 1971 for 2023	Cancer risk unadjusted for competing mortality, including: Risk of death from cancer by age Risk of cancer diagnosis by age Note: estimates for risk of death in this book are based on cancer deaths from the National Mortality Database.	Risk
4c	Cancer risk Mortality: 2007 to 2023	Cancer risk adjusted and unadjusted for competing mortality, including: Risk of death from cancer by age Note: estimates for risk of death in this book are based on cancer deaths from the Australian Cancer Database.	Risk
5	Age at diagnosis/death Incidence: 1982 to 2019 Mortality: 1971 to 2021	Median and mean age at cancer diagnosis Median and mean age at death from cancer Note: estimates for risk of death in this book are based on cancer deaths from the National Mortality Database.	Incidence by age Mortality by age
6	Cancer prevalence as at 31 December 2018	Number of people alive and diagnosed with cancer: within the last year within the last 5 years within the last 37 years	Summary
7	State and territory incidence data 1982 to 2019	State and territory cancer incidence ASR State and territory number of cancer cases diagnosed	State and territory
8	Cancer incidence and survival by stage 2011	Proportion of cases diagnosed by stage at diagnosis Cancer survival by stage at diagnosis Stage data is only available for melanoma of the skin, breast cancer in females, lung cancer, prostate cancer and colorectal cancer.	Stage
9a	Cancer incidence by subsite 2000 to 2023	Cancer incidence counts and rates by ICD-10 4-character subsite (crude and age-standardised rates and age-specific rates by 10-year age groups). Proportion of cancer by subsite (by 10-year age groups).	Cancer incidence by subsite
9b	Cancer incidence by subsite 2000 to 2023	Cancer incidence counts and rates by ICD-10 4-character subsite (crude and age-standardised rates and age-specific rates by 20-year age groups). Proportion of cancer by subsite (by 20-year age groups).	Cancer incidence by subsite
9c	Cancer survival by subsite, 2000–2004 to 2015–2019 periods	Observed and relative survival rates by ICD-10 4-character (by 10-year age groups) 10-year age group proportions of cases diagnosed by ICD-10 4-character subsite	Cancer survival by subsite
9d	Cancer survival by subsite, 2000–2004 to 2015–2019 periods	Observed and relative survival rates by ICD-10 4-character (by 20-year age groups) 20-year age group proportions of cases diagnosed by ICD-10 4-character subsite	Cancer survival by subsite

10a to 10f	Incidence of selected cancers by histology 2001 to 2019	Incidence counts and rates for selected cancers by histology (crude and age-standardised rates and age-specific rates by 10-year and 20-year age groups). Histology proportions for the selected cancers, by 10-year and 20-year age groups). Book 10a: Appendiceal cancer, breast cancer, brain cancer Book 10b: Colon cancer and colorectal cancer groups Book 10c: Cervical cancer, kidney cancer, liver cancer Book 10d: Lung cancer, melanoma of the skin, mesothelioma Book 10e: Pancreatic cancer, prostate cancer Book 10f: Rectosigmoid junction cancer and rectal cancer groups	Cancer incidence by histology
10g to 10h	Survival for selected cancers by histology 2005–2009 to 2015–2019	Observed and relative survival rates for selected cancers by histology Book 10g: by 10-year age groups Book 10h: by 20-year age groups	Cancer survival by histology
10j	Histology frameworks for the selected cancers	Histology codes for the reported groups within each selected cancer	n.a.
11a	Blood cancer incidence by histology (main reporting)	Finer level blood cancer incidence and rates for various blood cancers using the main blood cancer reporting framework (crude and age-standardised rates and age-specific rates by 10 and 20-year age groups)	Blood cancer incidence by histology (main reporting)
11b	Blood cancer incidence by histology (main reporting)	Incidence proportions of blood cancers by type using the main blood cancer reporting framework (by 10 and 20-year age groups).	Blood cancer incidence by histology (main reporting)
11c	Blood cancer incidence by histology (ICD-10 reporting)	Finer level blood cancer incidence and rates for various blood cancers using the ICD-10 blood cancer reporting framework (crude and age-standardised rates and age-specific rates by 10 and 20-year age groups)	Blood cancer incidence by histology (ICD-10)
11d	Blood cancer incidence by histology (ICD-10 reporting)	Incidence proportions of blood cancers by type using the ICD-10 blood cancer reporting framework (by 10 and 20-year age groups).	Blood cancer incidence by histology (ICD-10)
11e	Blood cancer survival by histology (main reporting)	Observed and relative survival rates for blood cancers using the main blood cancer reporting framework (by 10 and 20 year age groups)	Blood cancer survival by histology (main reporting)
11f to 11g	Blood cancer survival by histology (ICD-10 by histology)	Observed and relative survival rates for blood cancers using the ICD-10 blood cancer reporting framework Book 10f: by 10-year age groups Book 10g: by 20-year age groups	Blood cancer survival by histology (ICD-10 reporting)
11h	Main blood cancer reporting framework	Histology codes for the reported blood cancer groups	n.a.
1e	Cancer incidence projections (2024 to 2033)	Cancer incidence projections (cases, age-standardised rates and crude rates)	n.a.
Pivot	Cancer incidence by 3 character ICD-10 code (1982 to 2019)	Counts of cases diagnosed Age-specific and crude incidence rates	n.a.

Cancer data commentaries

The Cancer data commentaries series has been created within *Cancer data in Australia* to communicate key findings within the data, to help increase cancer awareness and to improve the understanding of cancer trends in Australia.

The Cancer data commentaries released in 2023 are listed below (noting commentary 8b is an update of a 2022 release).

Cancer data commentaries released in 2023

Commentary no.	Title and content overview	Release date
C10	Expanded blood cancer reporting and the blood cancer reporting framework This commentary introduces the expanded blood cancer reporting now available within CdiA and also discusses why the data is experimental.	31/8/2023
C8b	Interim guidelines – choosing which mortality data source to use (2023 update) This commentary updates the recommended mortality data source (either the Australian Cancer Database or the National Mortality Database) for the various cancers reported on within this report. The recommendations are not prescriptive and are provided for those who wish assistance. Some further general advice to help address possible cancer mortality reporting issues is also discussed.	31/8/2023 (update) 04/10/2022 (original)

Cancer data commentaries released prior to 2023 contain data that was up-to-date at the time but may change as CdiA is updated.

The Cancer data commentaries released prior to 2023 are listed below.

The Cancer data commentaries released prior to 2023

Commentary no.	Title and content overview	Release date
C9	Prostate cancer – projection method changes, updated long-term prostate cancer incidence projections This commentary provides greater detail of the prostate cancer incidence projection method change that occurred in 2023. The commentary notes limitations and difficulties projecting incidence for this cancer. The ageing population's impact on prostate cancer incidence and mortality is discussed within the commentary.	04/10/2022
C8	Cancer mortality data investigations (preliminary investigations) Using National Mortality Database (NMD) and Australian Cancer Database mortality data comparisons, this commentary explores potential limitations in using the NMD to report on mortality for some cancers. It discusses the complexity of establishing the underlying cause of death and the corresponding issues these may have on mortality reporting for some cancers.	01/07/2022
C7	Updating sarcoma reporting A commentary introducing the new reporting category 'all sarcomas combined' and outlining changes to soft tissue sarcoma and bone cancer reporting within CdiA.	08/06/2021
C6	About age-adjusted survival A commentary outlining how to use age-adjusted survival rates and data within the cancer survival by age data visualisation.	08/06/2021
C5	Improving the understanding of ovarian cancer statistics A commentary discussing issues that are impacting on the reliable interpretation of ovarian cancer rate changes over time.	08/06/2021
C4	A different view of how brain cancer rates are changing over time A commentary aiming to provide a clearer picture of how brain cancer rates may be changing over time	08/06/2021

C3	How are pancreatic cancer rates changing? A commentary about how pancreatic cancer incidence, mortality, risk and survival rates have been changing over the last 20 years.	13/11/2020
C2	Risk of melanoma of the skin by age and over time An overview of the changing risk of being diagnosed with, or dying from, melanoma of the skin; risk is considered by different ages.	30/10/2020
C1	Changes to the cancer risk data and guidance using the risk methods An overview of the expanded range of cancer risk data, including assistance in understanding risk adjusted for competing mortality.	30/10/2020

The data presented in the Cancer data commentaries are available in the supplementary tables.

Cancer data commentaries

Cancer data commentary number 10

The 2023 release of the Cancer data in Australia report (CdiA) includes more detailed blood cancer reporting than available in previous releases of the report. The greater range of data allows an increased depth of understanding of blood cancer statistics within Australia and provides survival and incidence information about types of blood cancer which have not been reported within CdiA in the past. This commentary helps users understand the expanded range of blood cancer statistics and complexities that may need to be considered when using this finer level data.

Blood cancer reporting used in the 2022 Cancer data in Australia report

Table 1 shows the blood cancers that were reported within the 2022 release of the CdiA. The blood cancer reporting used the International Classification of Diseases 10th Revision (ICD-10) codes to define the cancers and cancer groups.

Table 1: Blood cancers reported in the 2022 Cancer data in Australia report

Cancer	ICD-10
Lymphoma	C81 to C86
Hodgkin lymphoma	C81
Non-Hodgkin lymphoma	C82 to C86
Immunoproliferative cancers	C88
Multiple myeloma	C90.0
Other plasma cell cancers	C90.1 to C90.9
Leukaemia	C91 to C95
Acute lymphoblastic leukaemia	C91.0
Chronic lymphocytic leukaemia	C91.1
Other and unspecified lymphoid leukaemia	C91.2 to C91.9, C94.7
Acute myeloid leukaemia	C92.0, C92.3 to C92.8, C93.0, C94.0, C94.2, C94.4 to C94.5
Chronic myeloid leukaemia (CML)	C92.1
Other and unspecified myeloid leukaemia	C92.2, C92.9, C93.2, C93.7, C93.9 and C94.6
Chronic myelomonocytic leukaemia (incl. juvenile)	C93.1 and C93.3
Myeloproliferative neoplasms (excl. CML)	C94.1, D45, D47.1, D47.3 to D47.5
Other blood cancers	C94.3 and C96
Other and unspecified leukaemia	C95
Myelodysplastic syndromes	D46
All blood cancers combined	C81 to C96, D45, D46, D47.1, D47.3 to D47.5

The above list of blood cancers for 2022 includes the ICD-10 reporting for 2023.

Cancer data in Australia 2023 release - histology-based blood cancer reporting framework

In addition to the existing reporting, more detailed blood cancer statistics are also reported in this release. The cancers in the framework are defined in terms of histology codes from the second update of the third edition of the International Classification of Diseases for Oncology (ICD-O-3.2). The new blood cancer reporting framework has been developed in consultation with the Leukaemia Foundation's Blood Cancer Taskforce. The AIHW thanks the Leukaemia Foundation and its Blood Cancer Taskforce for their significant assistance and knowledge, without which the blood cancer reporting structure would not be available. The blood cancer reporting using the framework is available in the Blood cancer by histology data visualisation as well as Excel data.

Note that some of the cancers within the framework are also included in the ICD-10 reporting. Also, where incidence data are not provided for a cancer, there were no cases diagnosed in the reporting period. Where survival data for a cancer are not provided, there were insufficient case numbers to derive a reliable survival rate.

Experimental data

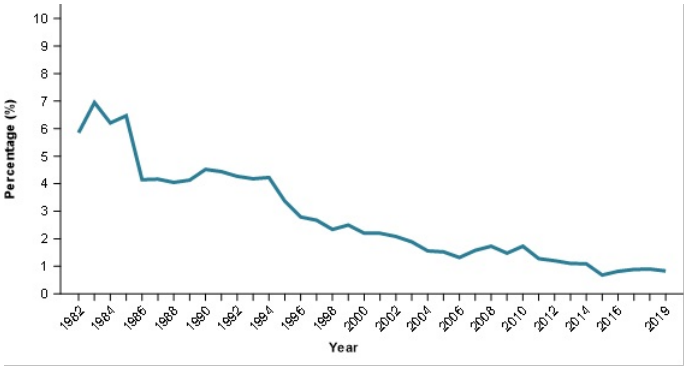
The statistics from the new framework are being released as experimental data. The methods to derive the incidence and survival statistics are not experimental. Rather, the 'experimental' description is used to denote the complexity of reporting data at very fine levels in conjunction with the potential for statistics to be impacted by the data environment at these fine levels, which is discussed below.

Improvements in diagnostic capabilities, the continuing evolution of blood cancer understandings, and differences in coding practices between jurisdictions all have the potential to impact on the precision of reporting and the interpretation of time series. These are complexities that have the potential to impact on the precision of incidence rates and counts and, to a lesser extent, survival rates.

Improvements in diagnostic capabilities

The technological ability to precisely identify types of cancer has improved over time. Improvements in precision of diagnosis of blood cancer can be seen by considering the use of histology codes for 'vague' diagnostic terms over time. For example, the graph below shows how the use of the code for the very vague term 'lymphoma, not otherwise specified' has changed since 1982. The graph shows the percentage of blood cancer cases that have been coded to this term over the period 1982–2019. In the earliest years this proportion was 6–7% whereas in the latest years it is around 1%.

Figure 1 Percentage of blood cancer cases coded to 'lymphoma NOS'



Source: AIHW 2019 Australian Cancer Database

As the use of histology codes for vague diagnostic terms decreases there is a corresponding increase in the use of codes for more specific diagnoses. Accordingly, increasing incidence rates for some cancers may be partly explained by this effect; that is, part of the increase may be due to improvements in the precision of the underlying data rather than being genuine increases in rates of that cancer in the community.

Histology based reporting involves diagnosis of the cell type, a finer level than cancer site. The new blood cancer framework reports on many cancers, many of which have comparatively small case numbers. Incidence rates for cancers with few cases may be subject to even greater uncertainty as small improvements in diagnostic capabilities may have proportionally large increases in incidence rates and counts. Broad groups such as 'acute blood cancers' and 'chronic/mature blood cancers' should have more reliable incidence and survival rates. These are less sensitive to improvements in diagnostic capabilities and are a more general level of diagnosis than most of the blood cancers already reported on.

While data from the Australian Cancer Database extends back to 1982, the blood cancer reporting in the new framework has only been undertaken for 2003 onwards. Improvements in diagnostic capability are likely to be much more apparent within an extended time series, noting that diagnostic capabilities in the 1980s are likely to be considerably lower than post 2000. The shorter time series released should be less influenced by improvements in diagnosis impacting on incidence rate change over time than would be the case for a longer time series.

Continuing evolution of blood cancer understanding

As the biological and medical understanding of blood cancer continues to improve, new cancer codes are introduced. When a new cancer type and code are introduced, some pathologists may start using the new terminology before others and some cancer registries may start using the code before others. What may appear in the data as the sudden emergence of a new cancer with increasing rates can be interpreted as the gradual uptake of the terminology by pathologists and use of the code by cancer registries.

In some cases when a cancer code is introduced some historical records may be updated to reflect the more precise and up-to-date diagnosis. This improves the information at a case level but impacts the comparability of time series both for the new cancer code and the code it was previously assigned.

Differences in coding practices between jurisdictions and complexity of the subject matter

State and territory cancer registries receive notifications of all blood cancers diagnosed in Australia. Coding practices between jurisdictions are fundamentally consistent but small differences may exist. For example, when a new code is introduced, jurisdictions may implement it at different times and practices about updating historical records may differ.

Using experimental data

The new blood cancer reporting framework uses a tiered structure. The tiers are used to group related cancers. Tier 1 is all blood cancers combined. Tier 2 comprises ‘acute blood cancers’, ‘chronic/mature blood cancers’ and ‘unclassifiable cancers’. Statistics for higher tier cancers (for example tiers 1 and 2) are more reliable. This is primarily due to the more general level of diagnosis required to classify these cancers and the generally greater number of cases where improvements in diagnosis have a minimal impact on the interpretation of incidence rates. The unclassifiable cancers group is an exception to this as decreasing incidence rates may be due to improvements in the precision of diagnosis.

Lower tier groups often have relatively few cases. A considerable risk in the interpretation of statistics is that a rare cancer may seem to be becoming more common within the Australian population whereas it may be more that diagnosis of the cancer has improved, or the cancer is newly recognised and rates are increasing as it is being recognised nationally.

The tiered structure can be used to identify whether general diagnosis (such as those terms ending with ‘NOS’ – not otherwise specified) could potentially materially contribute towards changing incidence rates. For example, declining incidence rates in one group may indicate increasing precision of diagnosis for other related cancers.

Some cancers have been introduced into reporting after 2003. The time series of incidence rates of these cancers are more likely to exhibit an increase in the several years after introduction due to the gradual take-up nationally of the cancer code in reporting.

Although incidence rates can be sensitive to factors like those discussed above, survival rates should be more robust. Even though not all cases of a particular cancer might be being assigned to a specific histology code, those which are being assigned to it are likely to be representative of all cases and therefore the survival rates for these will also be representative.

A key objective for the release of fine level cancer data is the provision of survival information for blood cancers that have previously not been reported on. Many of these have relatively few cases. Survival calculations depend on there being enough cases to derive a reliable survival statistic. To help achieve this, survival for a single 15-year period is available in addition to the three 5-year reporting periods. Using a 15-year period increases the number of cases that can be used in the calculations and increases the likelihood of a survival statistic being published.

When survival rates for 5-year periods are not available due to there being too few cases, the survival rate for the 15-year period provides at least some general understanding of survival for the cancer. However, it should be kept in mind that the latter is the composite of survival over a long period during which survival rates may have been changing. The survival rates for the 5-year periods are not comparable with the survival for the 15-year period. Instead, the 15-year period survival rates aim to provide some level of survival information about cancers where 5-year periods are not able to, and to provide some level of survival information for rare cancers.

Alignment of the blood cancer reporting framework with existing ICD-10 reporting

The new framework includes types of cancers which may be unfamiliar to those who predominantly use ICD-10 reporting structures. An incidence and survival data visualisation has been created which integrates the ICD-10 based reporting structure with the new ICD-O-3 based reporting structure. This visualisation helps display the relationships between the two structures and may help users understand the cancers at a more detailed level.

Cancer data commentaries

Cancer data commentary number 9

The 2022 release of Cancer data in Australia (CdiA) included a change of methodology for calculating prostate cancer incidence projections. The impact of the change was that it greatly increased the estimated number of prostate cancers and correspondingly increased the estimated number of all cancers combined. This commentary provides more information about the method change, updates long-term prostate cancer incidence projections, and discusses the impacts of the ageing population on prostate cancer.

How prostate cancer incidence has been changing this century (based on actual data only)

Figure 1 provides age-standardised prostate cancer incidence rates and prostate cancer cases diagnosed between 2000 and 2018. The following excerpt is taken from the Cancer in Australia 2021 report and sheds light on prostate cancer incidence trends for the majority of this century:

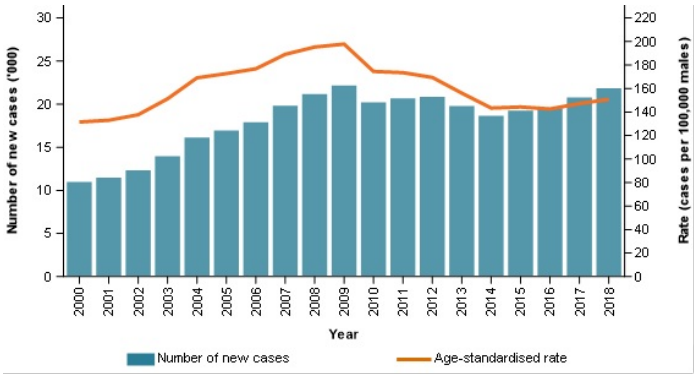
The prostate-specific antigen (PSA) threshold at which males were referred for a prostate biopsy was lowered in 2002 and this might have contributed to the peak incidence during the mid to late 2000s (Smith et al. 2008).

The increasing prostate cancer incidence rates observed in the early 2000s may, to some extent, be a consequence of bringing forward the diagnosis of some prostate cancer cases as well as diagnosing some prostate cancers that may not otherwise have ever been diagnosed (as symptoms may not have become apparent). The reduction in rates following the peak in 2009 may be at least partly due to rates re-adjusting after the initial spike.

In many countries, changes in prostate cancer diagnosis have been associated with changes in PSA testing (Zhou et al 2015), and in the US, decreasing prostate cancer incidence has been linked, in part, to previous early diagnosis of prostate cancer through widespread use of PSA testing (Downer et al 2017).

The prostate cancer trends may not accurately reflect whether prostate cancer is actually becoming more or less common in the population. Rather, much of the post-2000 rate trends may suggest only that prostate cancer remains very common in Australia; that many men are having PSA levels monitored; and that incidence rates are strongly influenced by the threshold at which prostate biopsies are recommended.

Figure 1: Prostate cancer, cases diagnosed and age-standardised incidence rates, males, 2000 to 2018



Note: Rates are age-standardised to the 2001 Australian Standard population.

Source: AIHW Australian Cancer Database 2018.

Why was the prostate cancer incidence projection method changed?

The prostate cancer incidence projection method was revised for the 2022 release of CdiA. Figure 2 provides the prostate cancer incidence data from the 2021 release of CdiA.

The 2021 release used the same projection method for prostate cancer as for all other cancers in CdiA. In general terms, the projection method uses trends from the last 10 years of actual data to generate projections. In the 2021 release, the 10-year trend is tending to decrease, and the projections also follow this general trend. The 10-year trend is strongly influenced by the large decreases that occurred from around 2009.

Figure 2: Prostate cancer, cases diagnosed and age-standardised incidence rates, males, 2000 to 2021 (from the 2021 release of Cancer data in Australia)

Note: Rates are age-standardised to the 2001 Australian Standard population.

Source: AIHW Australian Cancer Database 2018.

Figure 3 provides the prostate cancer incidence data from the 2022 release of the CdiA. Here, the age-standardised prostate cancer incidence rate projections remain quite constant, and the number of cases increases. In the 2022 release of CdiA, AIHW excluded prostate cancer from the usual projection method and instead held the most recent rates (by age group) steady and applied population growth estimates for those age groups to arrive at the new projected case counts. AIHW determined that the projected decreases in the 2021 release, and those that the usual method would have again forecast, were unlikely given there were now several years to suggest prostate cancer rates had stabilised and may have even started to increase slightly.

Figure 3: Prostate cancer, cases diagnosed and age-standardised incidence rates, males, 2000 to 2022 (from the 2022 release of Cancer data in Australia)

Note: Rates are age-standardised to the 2001 Australian Standard population.

Source: AIHW Australian Cancer Database 2018.

Revising long-term prostate cancer incidence projections

Long-term prostate cancer incidence projections to 2031 were released in the Cancer in Australia 2021 report. While the method to project long-term incidence projections is different to the short-term projection method, it also relied on the premise that historical trends may be reliably used to inform future projections. Like the short-term projection method, this method's results were considered likely to be overly influenced by the decreasing incidence rates of prostate cancer. For similar reasons, and like the revision in short-term projections, the long-term projections of prostate cancer have also been revised.

The long-term prostate cancer incidence projections now use the same methodology as the short-term prostate cancer incidence projections. This method does not attempt to determine whether a cancer is becoming more common in various age groups, instead it simply uses the most recent actual incidence rates and applies these to the projected populations of the future. In other words, it only factors in population growth.

Table 1 provides the original and revised long-term prostate cancer incidence projections. The majority of the difference is due to method change but some of the difference is also due to the use of different population projections.

Table 1: Projected prostate cancer cases and age-standardised rates, original and revised projections method results, males

Year	Cases (original method)	ASR (original method)	Cases (revised method)	ASR (revised method)
2023	18,036	111.6	24,778	150.8
2024	17,955	109.0	25,321	150.8
2025	17,840	106.4	25,852	150.8
2026	18,058	105.7	26,397	150.8

2027	18,236	105.0	26,902	150.8
2028	18,399	104.3	27,404	150.8
2029	18,546	103.6	27,898	150.8
2030	18,668	103.0	28,352	150.8
2031	19,087	103.8	28,823	150.8
2032	not available	not available	29,260	150.8

Notes

1. Age-standardised rates (ASR) are standardised to the 2001 Australian Standard population.
2. The revised method ASRs are based on unrounded case projections.

Sources: AIHW Australian Cancer Database 2017, AIHW Australian Cancer Database 2018.

Closing note about prostate cancer incidence projection methodology

To derive short-term cancer incidence projections for cancers other than prostate cancer, the incidence trends for the most recent 10-year period for which actual data are available are used to estimate a projected incidence rate for each 5-year age group (from 0 to 4 years up to 85 to 89 and finally a group for those aged over 90). The projected rate of cancer for each age group is then applied to the estimated future population of each age group to arrive at the estimated number of cases for each age group. The aggregate of all the cases by age group is the projected total of cases for that cancer.

For prostate cancer, sharp incidence trends may occur for several years and end quite abruptly, and this is not a usual characteristic for most cancers. For context, the age-standardised incidence rate for lung cancer reduced from around 85 cases per 100,000 males in 1982 to 51 cases per 100,000 males in 2018. This reduction of 34 cases per 100,000 males has occurred over 36 years and is one of the largest and most enduring cancer incidence trends of all Australian cancers. Conversely, prostate cancer age-standardised incidence rates rose from 138 cases per 100,000 males in 2002 to 198 cases per 100,000 males in 2009 before decreasing to 143 cases per 100,000 males in 2014. The movements were sharp when compared to other cancers and greater than the total incidence of most types of cancer.

Whether prostate cancer will become more or less commonly diagnosed in some age groups and not others or be relatively stable is difficult to know. The revised prostate cancer incidence projection model acknowledges this through using stable incidence rates by age and has been adopted to remove the risk of a projection moving very sharply in a direction which may be improbable.

The revised model is a very simplistic and general projection model but still factors in the key element of population growth. The impact of the ageing population for prostate cancer is discussed in the following sections.

More men will be reaching ages where prostate cancer incidence is highest

It is estimated that the male Australian population will increase by around 13% between 2022 and 2032. Over the same time period, prostate cancer case numbers are projected to increase by around 21%. The reason for the greater increase is because population growth is not consistent across different ages and prostate cancer is more commonly diagnosed in older populations where growth is projected to be greatest.

Table 2 provides the estimated increase in prostate cancer case numbers from 2022 to 2032 by age. The increase in case numbers for each age group is due only to population growth because the rates of cancer within each age group are held constant. The increasing crude prostate cancer incidence rate from 189 cases per 100,000 males in 2022 to 201 cases per 100,000 males in 2032 occurs because the older age groups with higher incidence rates of prostate cancer are increasing more than other age groups.

There is considerable uncertainty in the precision of long-term cancer projections, even more so for prostate cancer where the extent of PSA testing and prostate biopsy referral practices can lead to substantial changes. However, what appears much more certain is that greater numbers of men will be reaching the ages where prostate cancer incidence rates are highest.

Table 2: Projected prostate cancer cases, age-specific and crude rates, males, 2022 and 2032

Age group (years)	Age-specific rate*	Cases 2022	Cases 2032	% change in cases
Under 60	35.3**#	3,546	3,770	6%
60 to 64	512.8	3,694	3,917	6%
65 to 69	827.7	5,196	5,771	11%
70 to 74	878.7	4,852	5,778	19%
75 to 79	882.3	3,719	4,770	28%

80 to 84	729.5	1,912	3,069	61%
85 to 89	605.8	862	1,519	76%
90 and over	563.3	436	665	53%
All ages combined	188.6 (2022) and 201.1 (2032)	24,217	29,260	21%

Notes

1. Rates are expressed per 100,000 males.
2. * The rate for 'All ages' is the crude rate for the population, all rates for other age-groups are age-specific rates.
3. ** The age-specific rate for under 60 is the rate for 2022. The equivalent rate for 2032 is 34.0 cases. The age-specific rates for each 5-year age group remain the same.
4. # The age-specific rates for the male population under 60 are heavily influenced by the rarity of cancer in the younger population. The age-specific rates for the male populations aged 50 to 54 is 117 cases per 100,000 males and for the 55 to 59 it is 295.7 cases per 100,000 males.
5. The age-specific rates cited in the above table are based on 2022 published data and may not precisely equal the 2018 incidence rates (from which projections are derived) due to rounding.

Source: AIHW Australian Cancer Database 2018.

Prostate cancer mortality and impacts of the ageing population

The prostate cancer mortality rate for the male population aged over 70 was 303 deaths per 100,000 males in 2010. By 2020 (the most recent year of actual mortality data), the mortality rate had decreased to 232 deaths per 100,000 males. This represents a substantial reduction in mortality rates. However, over the same time where mortality rates had been reducing, the number of deaths from prostate cancer for men aged over 70 increased from 2,771 men to 3,138 men. The increase occurred because the male population over 70 increased more than the associated reductions in mortality rates.

In 2020, around 88% of prostate cancer deaths occurred in the male population aged over 70. The number of deaths from prostate cancer (all ages) reached its highest recorded level in 2020 (3,138 deaths for males aged over 70 and 3,568 deaths overall). Note that this is the most recent year where actual data is available. While AIHW does not produce long-term cancer mortality projections, the impact of an ageing population is already evident within prostate cancer mortality statistics. Into the future, the increasing number of men reaching higher risk ages for prostate cancer is likely to lead to an increasing number of deaths from prostate cancer.

Cancer data commentaries

This cancer commentary is the same as that which was released in 2022, with the exception that:

- the recommended data source for cancers new to Cancer data in Australia report (CdiA) have been added to Appendix A.
- the recommended data source for some cancers has changed for several cancers (Appendix A).

The recommended data source may change between releases of the CdiA as new data may change Australian Cancer Database and National Mortality Database comparability. Please note that the 2023 release of CdiA includes a page dedicated to describing work being undertaken related to the cancer mortality project.

Cancer data commentary 8b

Previous releases of the *Cancer data in Australia report* (CdiA) utilised cancer mortality statistics sourced from the National Mortality Database (NMD). The 2022 release of CdiA provides users with two different sources of cancer mortality statistics (the Australian Cancer Database (ACD) and the NMD). Please read cancer data commentary number 8 for more information about the different cancer mortality sources and why the respective statistics may differ.

General advice to help people select which data source that would best meet their needs was provided within the initial release of the 2022 CdiA. This commentary provides users with more direct assistance selecting the most appropriate data source and outlines which data source AIHW would generally recommend for each specific cancer and reporting period.

Why is AIHW recommending which mortality data source to use?

AIHW's recommendations of which mortality data source to use are provided to help users who may want more direct advice on which cancer mortality data source to choose for each cancer. However, the recommendations in this commentary should not be taken to be prescriptive or definitive. Different analysis may lead to different recommendations of which mortality data source to use. Ultimately, users of the data will need to decide which mortality data source to use taking into consideration their specific investigations or reporting needs.

Why are these guidelines interim?

At the time of the 2022 release of the CdiA, AIHW's cancer mortality investigations were in a preliminary stage. Given that the preliminary findings indicated that the NMD may not be as appropriate for reporting mortality for certain cancers, the 2022 release of the CdiA mortality data also included ACD mortality data so users could consider the suitability of the NMD for their specific reporting needs and offer alternative data where these needs are not met.

It is anticipated that cancer mortality investigations will have progressed much further by the time the 2023 CdiA is released. These guidelines are provided to help users while cancer mortality investigations remain ongoing; it is possible that these guidelines will change or no longer be required after cancer mortality investigations have been completed.

Recommendation 1 – reporting cancer mortality between the years 2007 and 2017

Where the user is focusing on cancer mortality solely for the periods where ACD mortality data is available (currently 2007 to 2017), AIHW recommends using mortality data from the ACD.

AIHW considers that in general, mortality data from the ACD will generally be based on access to a greater depth of information which is likely to lead to more precise cancer mortality reporting. Accordingly, where ACD actual mortality data is available (2007 to 2017) and these time periods meet the user's analysis or reporting needs, the ACD is recommended.

An exception to this is all cancers combined where the NMD is more complete and includes deaths from basal and squamous non-melanoma skin cancer (which are excluded from the ACD).

Recommendation 2 – reporting cancer mortality for periods including 2018 to 2022

Where the user is focused on reporting that includes more recent years, mortality data from the NMD is recommended for cancers where the NMD is sufficiently close to the ACD and the ACD is recommended in most other instances. Appendix A provides a full list of cancers reported within CdiA and which data source is recommended in each case.

While AIHW considers the ACD to generally provide more precise cancer mortality reporting, the ACD currently has a relatively limited time series and the NMD has more recent mortality data. The recency of NMD data means the 2018, 2019 and 2020 years are actual data within the NMD where as only projected data is possible from the ACD for these years. In general, actual data are recommended over projections if both are available.

The ACD and NMD mortality data for 2021 and 2022 are both projected. The more distant a projection is from the last year of actual data, the less reliable a projection will generally be (where both use the same method, and that method uses cancer mortality trend information as its basis to derive mortality rates and counts).

With its recency and extended time series, the NMD cancer statistics will offer stronger reporting for 2018 to 2022 where the NMD actual mortality statistics appears sufficiently representative for the selected cancer. The key consideration is 'does the ACD mortality time series provide sufficient confidence that the NMD is providing appropriate mortality statistics for the selected cancer?'.

The Cancer Data and Monitoring Unit (CDMU) of AIHW has considered which cancers within the NMD it believes are sufficiently close to be recommended for continued use for cancer mortality reporting, as well as those where the ACD may be recommended or preferred (Appendix A provides the specific recommendations for each cancer).

Methods used to consider whether NMD mortality data is sufficiently close to the ACD mortality data are described later in this commentary.

Recommendation 3 – longer term reporting (including data prior to 2007)

Where the user is focussing on longer term cancer mortality reporting, the NMD is recommended if it is sufficiently representative of mortality counts and rates for the selected cancer. The recommendations in Appendix A help identify these cancers.

Unlike recommendation 2 where the user has a choice of which mortality source to use, at present there is no pre-2007 mortality data using the ACD. Where the NMD is recommended for continued use for a particular cancer, the NMD data may be more comfortably used for pre-2007 cancer mortality reporting.

For cancers where the ACD is preferred or recommended for a specific cancer, users will need to consider whether the NMD longer-term reporting data can be reliably used.

Recommendation 4 – the NMD is recommended for the 'all cancers combined' reporting group

As mentioned in Recommendation 1, the NMD is recommended for reporting of the 'all cancers combined' reporting group. The recommendation is primarily based on the completeness of the data but there are tangential benefits of note when the NMD's broader use is considered.

While the Cancer data in Australia report uses NMD to report on cancer deaths, the NMD contains coded causes for all deaths. Where a study is interested in cancer mortality rates (that is, for all cancers combined) compared to other causes of death as recorded in the NMD, the NMD will be more appropriate not only as the recommended source but also because the comparable mortality data is obtained from the same source and will therefore have a greater level of coherence than if ACD was used.

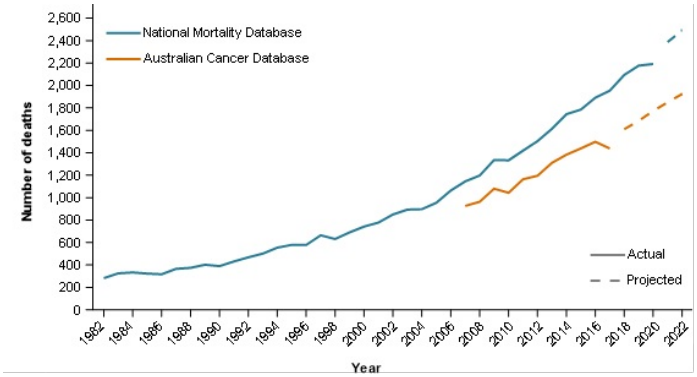
Using the best source of data available - data may have issues but may still generally inform

As discussed earlier, these interim guidelines are provided to assist data users. However, these guidelines cannot take the specific needs of individual users into account. For instance, consider an investigation about liver cancer mortality over the last 40 years in Australia. For liver cancer mortality reporting, the ACD is recommended (ACD and NMD mortality counts and trends are shown in Figure 1).

The CdiA reports that liver cancer incidence rates continue to rise over time and 5-year survival remains relatively low. The NMD provides the only source of longer-term national historical mortality reporting for this cancer. Given these trends, the increasing mortality rates reported from the NMD are to be expected. The general trend of ACD liver cancer mortality also supports the general trend of NMD liver cancer mortality.

Even though the ACD is recommended, the NMD could be considered the best data source for the reporting of liver cancer mortality over time. However, in using this data, it would be important to note that the liver cancer mortality rates presented may be overstated to some degree (approximately 25% higher than the ACD between 2007 and 2017).

Figure 1: Liver cancer deaths by mortality data source, persons, 1982 to 2022



Notes

1. Actual data from the NMD is provided from 1982 to 2020 and projected data is from 2021 to 2022.
2. Actual data from the ACD is provided from 2007 to 2017 and projected data is from 2018 to 2022.

Source: AIHW Australian Cancer Database 2018, AIHW National Mortality Database.

Limitation of recommendations

Reliability over consistency

Where an organisation undertakes many cancer mortality investigations, it may not be possible to report cancer mortality using a consistent data source. As a simple example, an organisation reports on a cancer for the 2015 year and uses the ACD as recommended. That same organisation needs to report on the same cancer using a longer time series in a different series of investigations and uses the NMD as it is sufficiently close to the ACD (which cannot be used because the ACD does not have a long enough time series). The cancer mortality information released by the organisation will therefore be inconsistent for the 2015 year. However, both sets of information released aim to provide the most informative and reliable cancer mortality information currently available.

Recommendations apply to all ages and persons

The analysis of which data source to use for the various cancers was based largely on how closely the mortality statistics align between the ACD and the NMD for each of the selected cancers. For simplicity, the recommendation of which data source to use does not change with age or sex. For cancers that occur in only one sex, the analysis for persons produces the same results as it would for the sex in which the cancer occurs.

It should be noted that it is possible that a cancer may be categorised as ACD preferred or ACD recommended when reporting total mortality for a cancer, but for some age groups (most likely younger), the NMD data and ACD data closely align. Kidney cancer mortality provides a useful example where the comparability of the NMD and ACD reduces with age (this data may be viewed in the Cancer mortality by age data visualisation).

Reporting mortality for multiple cancers

This commentary offers recommendations on which data source to choose for selected cancers. Complexities increase where data users wish to report on numerous cancers and the recommended sources differ. Colorectal cancer mortality by data source is used below to illustrate and discuss the complexities.

Table 1: Colorectal cancer deaths, by site, persons, 2022

Cancer site	National Mortality Database deaths	Australian Cancer Database deaths	Recommended data source
Colon cancer	1,175	3,450	3,450 (ACD)
Rectal cancer	3,146	1,704	1,704 (ACD)
Colorectal cancer	5,326	5,154	5,326 (NMD)

Notes

1. Data are projections.
2. Colon and rectal cancer are coded under the ICD10 as C18 and C19–C20, respectively. Colorectal cancer (C18–C20) deaths from the National Mortality Database includes C26.0.

Sources: AIHW Australian Cancer Database 2018, AIHW National Mortality Database.

In general, it would be better to use the mortality data source that is recommended for each specific cancer type when reporting on multiple cancers within a report. Here the data source selection will either be ACD, or NMD data that appears sufficiently consistent with the ACD. As illustrated above, an issue arises in that the colon cancer deaths and rectal cancer deaths sourced from the ACD do not equal the total colorectal cancer deaths sourced from the NMD. This can be addressed through including notes such as ‘Colorectal cancer projected deaths is not equal to colon cancer projected deaths plus rectal cancer deaths as it is obtained from a different data source’.

Alternatively, the data user could choose to use the ACD only. However, the additional years of mortality data available in the NMD are likely to enable a more informed projection to be produced for the number of deaths due to colorectal cancer.

There are many different scenarios for reporting mortality for multiple cancers. This commentary only touches on the issue and offers some general guidance on which data source, at present, appears to best represent mortality in various cases.

Methods and reporting category

Method Part A – ACD recommended cancers

When deciding which data source to use when reporting for a selected cancer, it is important for the user to consider whether the actual ACD and NMD counts and rates are sufficiently close. Where they are close, the ACD supports the NMD’s continued use. Methods A and B are used in determining the CDMU’s assessment of whether the two data sources are ‘sufficiently close'.

For method A, lines of best fit are created separately for the ACD and NMD trends between 2007 and 2017. Where the confidence intervals of these lines do not intersect for the majority of data points (that is, 6 or more of the 11 data points between 2007 and 2017), the two series are considered to differ. Where the majority of points in the time series are significantly different, the ACD is recommended. Appendix B provides greater detail of this method.

Method Part B – ACD preferred cancer

For the remaining cancers, heuristic models were generated to identify which of the NMD selected cancers were considered to be, on average, too far from the ACD to be preferred for use. These cancers are classified as 'ACD preferred'. This additional and subjective process identified the cancers that were considered to not be sufficiently close to ACD actual results. These cancers were categorised as 'ACD preferred' while the remaining assessed cancers were classified as 'NMD continued use.

NMD continued use

The NMD has been the source of cancer mortality within the CdiA since its initial release. 'NMD continued use' is the category used for the cancers where the NMD is sufficiently similar to the ACD and the NMD is recommended to continue to be used to report mortality for that cancer.

Not assessed

The CdiA includes statistics on several general and relatively unspecific reporting groups. An example of these is 'Cancer of overlapping and unspecified sites of the biliary tract'. This cancer reporting group consists of ICD-10 codes C24.8 (malignant neoplasm of overlapping sites of biliary tract) and C24.9 (malignant neoplasm of biliary tract unspecified). For this and other similar types of cancer reporting groups, it was not assessed whether the NMD is sufficiently close to the ACD to recommend its continued used; these are only categorised as 'Not assessed'.

The rationale for not assessing these is that there is very little expectation for the two sources to align. Unlike other cancers such as kidney or liver cancer where the purpose of the datasets is to measure the number of deaths for the respective cancers, these quantify the number of cancers which were more not able to be precisely coded to a specific cancer.

In general, these groups are more likely to be complementary data. For example, the overlapping and unspecified sites of the biliary tract mortality counts within the ACD effectively provides the number of deaths within the biliary tract that could not be coded to a more specific site when using the ACD. When this cancer reporting group is considered in conjunction with other cancers of the biliary tract such as the gallbladder, extrahepatic bile ducts and ampullary cancers, it provides a more complete picture of the total biliary tract cancer mortality. As a complementary cancer reporting item, it is most appropriately used with other reporting information from the same mortality data source.

Similarly, cancer of unknown primary site does not measure a specific cancer. It is expected that, with the additional information available to cancer registries for coding cause of death, the ACD is likely to have fewer deaths where the primary site is unknown. Similar to the non-specific cancer reporting sites, cancer of unknown primary site is likely to be of most use when used with data from the same source.

ACD and NMD only cancers

Histology based cancer reporting groups

Ovarian cancer and serous carcinomas of the fallopian tube, other female genital organs excluding serous carcinomas of the fallopian tube, soft tissue sarcoma, all sarcomas combined and neuroendocrine tumours are all cancers which are derived through histology data. The ACD contains histology data while the NMD does not. Accordingly, for these cancers the ACD is the sole source for mortality reporting.

The ACD does not include cause of death by histology. Therefore, to obtain mortality data for these cancers, it is assumed that if the site of the cancer identified as the cause of death is the same as the site where the relevant cancer was diagnosed, it was the cause of death (for example, if a neuroendocrine tumour was diagnosed in topography C20, and C20 was the underlying cause of death, then the neuroendocrine cancer was the cause of death). However, it is possible that another type of cancer was also diagnosed in C20 and it was the cause of death. Accordingly, it is possible that the above-mentioned cancers are overstated to some degree. The 2022 release of the CdiA is the first occasion where these cancers have mortality figures released. It is expected that the method to derive cause of death for these cancers will be investigated further in the future with the aim to minimise any possible overstatement of deaths for these cancers.

Non-melanoma skin cancer

Non-melanoma skin cancer mortality statistics from the ACD exclude basal and squamous cell carcinomas of the skin (as these are not notifiable diseases). The basal and squamous cell carcinomas of the skin are the most common type of cancer in Australia and accordingly the ACD based cancer is named 'non-melanoma skin cancer (rare types)'. As the sole data source for non-melanoma skin cancer (rare types), the ACD is recommended for reporting mortality for non-melanoma skin cancer excluding basal and squamous cell carcinomas.

The non-melanoma skin cancer mortality from the NMD includes basal and squamous cell carcinomas of the skin. Within the CdiA, it is known as 'non-melanoma skin cancer (all types)'. The NMD is recommended for reporting of non-melanoma skin cancer mortality.

Differences between the ACD and NMD for non-melanoma of the skin are conceptually due to the NMD including deaths from basal and squamous cell carcinomas of the skin. Further work will be done in the cancer mortality investigations to confirm whether it is likely that the NMD mortality less the ACD mortality for this cancer reliably estimates deaths from basal and squamous cell carcinoma of the skin.

Appendix A

Table A1: Categories of which mortality data source to use

Australian Cancer Database recommended	Australian Cancer Database preferred	National Mortality Database continued use
Acute myeloid leukaemia	Appendiceal cancer	Acute lymphoblastic leukaemia
Ampullary cancer	Bone cancer	All blood cancers combined
Anal cancer	Immunoproliferative cancers	All cancers combined
Chronic myeloid leukaemia (CML)	Kidney cancer	Bladder cancer
Chronic myelomonocytic leukaemia (including juvenile)	Major salivary glands (cancer of the)	Brain and other central nervous system (cancer of the)
Colon cancer	Myelodysplastic syndromes	Brain cancer
Connective, subcutaneous and other soft tissues (cancer of)	Myeloproliferative neoplasms	Breast cancer
Endometrial cancer	Other central nervous system cancers	Cervical cancer
Extrahepatic bile duct cancer	Other plasma cell cancers	Chronic lymphocytic leukaemia
Eye cancer	Sinuses cancer	Colorectal cancer
Gallbladder cancer and extrahepatic bile duct cancer	Submandibular gland cancer	Gynaecological cancers
Gallbladder cancer	Tongue cancer	Hodgkin lymphoma
Head and neck cancer (excluding lip)	Urethral cancer	Kaposi sarcoma
Head and neck cancer (including lip)		Laryngeal cancer
Hypopharyngeal cancer		Lung cancer
Leukaemia		Lymphoma
Lip cancer		Melanoma of the skin
Liver cancer		Mesothelioma
Mouth cancer		Middle ear cancer
Nasal cavity cancer		Multiple myeloma
Oesophageal cancer		Myeloproliferative neoplasms (excluding CML)
Oral cancer		Nasopharyngeal cancer
Other female genital organs (cancer of)		Non-Hodgkin lymphoma
Parotid gland cancer		Oropharyngeal cancer
Rectal cancer (excluding rectosigmoid junction)		Other blood cancers
Rectal cancer (including rectosigmoid junction)		Other endocrine glands (cancer of)
Rectosigmoid junction cancer		Other male genital organs (cancer of)
Renal pelvis cancer		Other thoracic and respiratory organs (cancer of)
Retroperitoneal and peritoneal cancer		Ovarian cancer
Small intestine cancer		Pancreatic cancer
Stomach cancer		Penile cancer
Ureteral cancer		Peripheral nerves and autonomic nervous system (cancer of the)
		Placenta cancer

		Prostate cancer
		Sublingual gland cancer
		Testicular cancer
		Thyroid cancer
		Uterine cancer
		Vaginal cancer
		Vulvar cancer

Notes

1. Table excludes 'Not assessed' cancers: unknown primary site (cancer of), other and ill-defined digestive organs (cancer of), other and ill-defined sites (cancer of), other and ill-defined sites in the lip, oral cavity and pharynx (cancer of), other and unspecified leukaemia, other and unspecified lymphoid leukaemia, other and unspecified myeloid leukaemia, overlapping and unspecified sites in biliary tract (cancer of), overlapping and unspecified sites in major salivary glands (cancer of) and overlapping and unspecified sites in urinary tract (cancer of).
2. Table excludes Australian Cancer Database only cancers: all sarcomas combined, neuroendocrine tumours, non-melanoma skin cancer (rare types), other female genital organs excluding serous carcinomas of the fallopian tube (cancer of), ovarian cancer and serous carcinomas of the fallopian tube and soft tissue sarcoma and National Mortality Database only cancer non-melanoma skin cancer (all types).
3. Between the 2022 and 2023 releases of CdiA, cancers that changed recommended data source were kidney cancer (ACD recommended to ACD preferred), parotid gland cancer (ACD preferred to ACD recommended), immunoproliferative cancers (NMD continued use to ACD preferred) and vaginal cancer (ACD preferred to NMD continued use).

Appendix B

Significance testing for the difference between mortality rates of the National Mortality Database and Australian Cancer Database (2007 to 2017)

As part of CdiA 2022, two mortality data sources were considered for reporting. The continued use of mortality data from the National Mortality Database (NMD) was compared to the data available from the 2018 Australian Cancer Database (ACD). Both data sources can be used to extract the number of cancer deaths but the information available for each source, from which a cause of death is determined, is different between the ACD and NMD. For this reason, death reporting is likely to be different, but the extent of variation may vary across cancer groups. The purpose of this investigation was to quantify the level of difference in the observed number of cancer deaths from the ACD and the NMD for various cancer groups across time.

Data from the ACD were available for reporting from 2007 to 2017 and, hence, the same observation window was used for data from the NMD. Annual crude cancer death rates for persons and all ages combined were extracted and least-squares linear regression was used to find the straight line of best-fit through the data series for each source.

The basis of this investigation is to test if the difference in the fitted rates is significantly different from zero for the two data sources.

For year t, between 2007 to 2017, inclusive, let:

$R_1(t)$ = fitted rate for the model based on ACD source of death

$R_2(t)$ = fitted rate for the model based on NMD source of death

$s_1(t)$ = standard error for fitted rate $R_1(t)$

$s_2(t)$ = standard error for fitted rate $R_2(t)$

A 95% confidence interval for the quantity $R_1(t) - R_2(t)$ was created under the assumption that these two fitted rates are uncorrelated. Note that this is a slightly conservative confidence interval as the mortality rates are very likely to be positively correlated as they are measuring the same quantity. i.e. both data sources are capturing cancer deaths over the same period. That is, we consider the interval

$$R_1(t) - R_2(t) \pm t_{9,0.025} \times \sqrt{s_1^2(t) + s_2^2(t)}$$

where $t_{9,\ 0.025}$ is the upper 2.5 percentile of the t-distribution with 9 degrees of freedom. There are 11 values of t, namely one for each year from 2007 to 2017. $R_1(t)$ and $R_2(t)$ are significantly different for a given value of t if and only if the confidence interval given by equation above does not contain zero. If we define N to be the number of times that $R_1(t)$ and $R_2(t)$ are significantly different then N takes a value between 0 and 11. The higher the value of N, the more evidence there is that $R_1(t)$ and $R_2(t)$ are significantly different overall. When N was 6 or more (more than half) it was concluded that $R_1(t)$ and $R_2(t)$ were significantly different and we assigned the term 'ACD recommended'. When N was less than 6 the series were assessed using other methods as highlighted in Part B of the methods section.

Cancer data commentaries

Cancer data commentary no. 8

At the time of releasing the 2022 Cancer data in Australia (CdiA) report, AIHW remains in the process of investigating cancer mortality reporting. This commentary discusses preliminary investigations undertaken into differences between cancer mortality information according to the National Mortality Database (NMD) and the Australian Cancer Database (ACD) and the commentary also outlines planned work to improve cancer mortality reporting.

Underlying cause of death

The number of deaths from cancer is based on the number of deaths for which cancer is determined to be the underlying cause of death. The underlying cause of death is defined by the World Health Organization as 'the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury'.

Cause of death coding in the National Mortality Database

The National Mortality Database (NMD) obtains cause of death information from death registrations; these must be certified by a doctor using the Medical Certificate of Cause of Death or by a coroner. The doctor is asked to provide their best medical opinion on the cause of death and outlines all diseases and conditions that caused and contributed to death.

The cause of death information on the death registration is sent to the Australian Bureau of Statistics (ABS) for coding and analysis. No further information or additional detail is available for doctor-certified deaths. For any coroner-referred cancer-related deaths, the ABS accesses information from the National Coronial Information System which includes the police report, toxicology, forensic pathology and coronial finding. The ABS codes these certificates according to WHO guidelines applying the International Classification of Diseases 10th Revision (ICD-10). There are numerous complex rules related to cancer that must be applied. Data is disseminated for statistical purposes and used to create unit record datasets, such as is used in the NMD.

Cause of death coding in the Australian Cancer Database

Cause of death information is also compiled by the various state and territory cancer registries for people diagnosed with cancer. Medical coders refer to rules and guidelines described in the ICD-10 to assist in determining the cause of death. Cancer registries determine cause of death by considering what is stated on the death certificate as well as any additional information the registry has available to them, potentially including sources such as hospital admissions and pathology information. This additional information can result in a different cause of death being assigned than can be ascertained from the death certificate information alone (which is the only information available to code cause of death information in the NMD). State and territory cancer registries provide this coded cause of death information to the AIHW to include in the Australian Cancer Database (ACD). It should be noted that state and territory registry processes and information available can vary across jurisdictions to some degree.

Cancer mortality reporting

Previously, the National Mortality Database (NMD) has been used by the AIHW as the sole basis for reporting deaths from cancer. However, as AIHW has started analysing and reporting mortality for more detailed cancer types, it has become apparent that the NMD may not be as suitable for reporting on certain cancer types. The AIHW has developed a new cancer mortality series using the ACD, which makes it possible to assess the suitability of NMD data for reporting on different cancers.

At the time of releasing the 2022 update of Cancer data in Australia, these cancer mortality investigations remain a work in progress. More information about cancer mortality data is expected to be released prior to the 2023 release of CdiA. The cancer mortality figures published in the initial release of the CdiA 2022 report are unlikely to be revised as a result of the investigations, with planned work more likely to provide greater depth of understanding of cancer mortality data.

With often finer level cancer information available, the cancer registry-derived cause of death is more likely to be able to be coded to finer level causes of death for cancer. However, as the ACD cause of death is often reliant on probabilistic data linkage, some deaths may not be recorded within the ACD because a link could not be successfully made.

Determining cause of death can be complex and may depend on the information available. While the ACD is likely to be more precise than the NMD (for the reasons mentioned previously), some issues may still exist. For example, there are instances where a person may be diagnosed with a cancer in different states and territories at different points in time. In this case both cancer registries will register the cancer incidence that occurred within their jurisdiction and when deriving a cause of death may have access to different information and therefore could potentially arrive at a different cause of death. For these records, when AIHW receives the data, it uses an algorithm to derive a consistent cause of death for the person in the ACD.

It is expected that the combination of ACD and NMD mortality data will lead to more informed cancer mortality reporting. This paper looks to provide some understanding of how and why the data sources can differ. The 2022 release of the Cancer mortality by age data visualisations illustrates how the two sources compare for many different types of cancer.

Cancer cause of death

When compared with the ACD, the NMD routinely reports more deaths from all cancers combined than the ACD (Table 1). Please note that these comparisons exclude non-melanoma skin cancer (NMSC) deaths because, for NMSC, the ACD only collects mortality information on the rare types of these cancers while the NMD also includes deaths from common NMSCs - basal and squamous cell carcinomas. This difference in scope influences comparisons between ACD and NMD deaths from cancer so deaths from this cancer are accordingly excluded in Table 1.

A death from cancer in the NMD but not the ACD will either be because a death is recorded in the NMD but not in the ACD or because the death is recorded in both databases but the ACD records the death as a non-cancer death. It is also possible for a death to be considered as a cancer-related death within the ACD but not within the NMD. It is unlikely for a death to be recorded in the ACD but not in the NMD because the NMD includes all deaths in Australia whereas the ACD only includes a subset of all deaths (for people who have been diagnosed with cancer since 1982).

The AIHW aims to get a better understanding of the differences between the databases at the unit record level during the remainder of this year. Until this work has been completed, it is not possible to provide certainty regarding the nature of differences. It is possible that the larger difference observed between the ACD and NMD in 2017 may be due to the ACD not yet receiving the notification of deaths for some records.

At this preliminary stage of investigation, there appear to be relatively small differences between the count of deaths from all cancers combined according to the NMD and the ACD, suggesting that NMD data is likely to be suitable to use for reporting on deaths from all cancers combined.

Table 1: Deaths from all cancers combined (excluding non-melanoma of the skin) based on the Australian Cancer Database and National Mortality Database, 2007 to 2017

Year	Deaths from the ACD	Deaths from the NMD	Difference	Difference (%)
2007	39,837	40,079	242	0.6%
2008	40,295	40,954	659	1.6%
2009	40,454	41,249	795	2.0%
2010	41,790	42,214	424	1.0%
2011	41,937	42,634	697	1.7%
2012	42,814	43,147	333	0.8%
2013	43,545	43,610	65	0.1%
2014	43,480	43,729	249	0.6%
2015	44,635	44,880	245	0.5%
2016	44,625	45,228	603	1.4%
2017	45,173	46,104	931	2.1%

Note: the difference is calculated as the number of deaths from the NMD minus the number of deaths from the ACD and this difference is also presented as a proportion of the ACD.

Source: National Mortality Database and Australian Cancer Database 2018

Cancer cause of death by age group

Tables 2 and 3 highlight that the comparability of the ACD and NMD deaths from cancer reduces as age increases. This is likely because the underlying cause of death by age may be more complex at older ages and the number of possible underlying causes of death for an individual are more likely to be greater. Table 2 shows that there is a relatively high level of agreement between the ACD and NMD for the age groups from 0 to 60 years old. However, there are greater differences for people aged 80 years and over and a large number of deaths occur in this age group.

Table 2: Deaths from all cancers combined (excluding non-melanoma of the skin) based on the Australian Cancer Database and the National Mortality Database, by age group, 2013

Age group	Deaths from the ACD	Deaths from the NMD	Difference	Difference (%)
0 to 19 years	145	142	-3	-2.1%
20 to 39 years	597	599	2	0.3%
40 to 59 years	5,949	5,914	-35	-0.6%

60 to 79 years	21,080	20,957	-123	-0.6%
80 years and over	15,774	15,995	221	1.4%
All ages combined	43,545	43,610	65	0.1%

Note: the difference is calculated as the number of deaths from the NMD minus the number of deaths from the ACD.

Source: National Mortality Database and Australian Cancer Database 2018

The comparison of cancer-related deaths in 2016 examines a year where the overall difference between the ACD and NMD is greater than in 2013. Similar to 2013 data, the 2016 mortality data confirms that the overall difference between the ACD and NMD is likely to be most strongly influenced by differences in the oldest age groups.

Table 3: Deaths from all cancers combined (excluding non-melanoma of the skin) based on the Australian Cancer Database and the National Mortality Database, by age group, 2016

Age group	Deaths from the ACD	Deaths from the NMD	Difference	Difference (%)
0 to 19 years	129	125	-4	-3.1%
20 to 39 years	610	623	13	2.1%
40 to 59 years	5,917	5,947	30	0.5%
60 to 79 years	21,824	21,870	46	0.2%
80 years and over	16,145	16,662	517	3.2%
All ages combined	44,625	45,228	603	1.4%

Note: the difference is calculated as the number of deaths from the NMD minus the number of deaths from the ACD and this difference is also presented as a proportion of the ACD.

Source: National Mortality Database and Australian Cancer Database 2018

Cause of death by cancer site

In general, cancer mortality reporting from the NMD is likely to be more similar to the ACD for broader cancer sites and for more common cancer types. As cancer site information reaches a greater level of detail, it becomes more likely that the additional information available in the ACD enables the underlying cause of death to be recorded as more specific cancer sites.

Urinary tract cancer mortality provides a useful example to demonstrate this. In 2016, the NMD recorded 2,335 deaths from cancers of the urinary tract while the ACD recorded 2,240. Overall, in 2016 the different sources recorded a 4% difference in the number of deaths from cancer in this area of the body (Table 4).

When finer levels of reporting are considered, the differences between the mortality data according to the ACD and NMD increase. When 2016 deaths from the NMD are compared with the ACD, the number of deaths from bladder cancer, kidney cancer and cancer of other urinary organs were respectively 9% understated, 14% overstated and 29% overstated (Table 4).

The 2021 release of CdiA included cancer of other urinary organs for the first time. The release of this and other general groups was done to provide more complete cancer reporting information within the public domain. With the release, it was noted that these ‘other’ groups highlighted inconsistencies between ACD and NMD reporting (for example, incidence of ‘other urinary organs’ was relatively stable, survival was decreasing marginally but the mortality data indicated rapid increases – the rapidly increasing mortality was not consistent with these incidence and survival trends so the inconsistency between ACD and NMD coding becomes more apparent).

The 2022 release of CdiA provides more detail in reporting such as separating cancer of other urinary organs into its component parts of renal pelvis cancer, ureteral cancer, urethral cancer and cancer of overlapping and unspecified urinary organs (paraurethral cancer is part of the urinary tract but is excluded from CdiA reporting and the following analysis because there are most commonly zero cases and deaths reported). For the reasons outlined above, when compared with the ACD, the NMD respectively under-counts deaths for these more specific cancer types by 96%, 63% and 71%, and overstates deaths by 1,600% for cancer of overlapping and unspecified urinary organs (noting the 1,600% is of a small number) (Table 4).

The NMD likely over-states deaths in cancer in overlapping and unspecified urinary organs because there is only sufficient information to identify this broader cancer site rather than a more-specific cancer site. This is because, most commonly, only the term “transitional cell carcinoma” is provided on the death certificates.

Table 4: Urinary tract cancer deaths based on the Australian Cancer Database and the National Mortality Database, by age group, 2016

Cancer group/site	Deaths from the ACD	Deaths from the NMD	Difference	Difference (%)

Renal pelvis cancer (C65)	168	7	-161	-96%
Ureteral cancer (C66)	82	30	-52	-63%
Urethral cancer (C68.0)	14	4	-10	-71%
Cancer of overlapping and unspecified urinary organs (C68.8–C68.9)	19	323	304	1,600%
Other urinary organs (C65–C66, C68)	*283*	*364*	*81*	*29%*
Kidney cancer (C64)	843	957	114	14%
Bladder cancer (C67)	1,114	1,014	-100	-9%
Urinary tract cancer	**2,240**	**2,335**	**95**	**4%**

Note: the difference is calculated as the number of deaths from the NMD minus the number of deaths from the ACD and this difference is also presented as a proportion of the ACD.

Source: National Mortality Database and Australian Cancer Database 2018

In regards to the cancer of overlapping and unspecified sites in the urinary tract, the difference between the ACD and NMD has become greater in more recent years. It should be noted that not all 'other and unspecified' cancer sites within the NMD are overstated when compared with the ACD. However, these groups may be more prone to being over-stated in the NMD.

Colorectal cancer mortality

The reporting of colorectal cancer deaths through the NMD has historically been challenging. Previously, colorectal cancer reporting was under-reported because many deaths were recorded as cancer of the intestinal tract, part unspecified (ICD-10 code of C26.0). To address this, the Australian Bureau of Statistics recommended that colorectal cancer include C26.0 when reporting deaths from colorectal cancer (ABS advice discussing the issue). When C26.0 is included to arrive at an NMD count for colorectal cancer deaths, it is much closer to the count according to ACD data (see Table 5).

When compared with the ACD, the number of colon cancer (C18) and rectal cancer (C20) deaths are lower in the NMD. Cancer of the rectosigmoid junction (C19) is currently not reported on separately within the CdiA but, when compared with the ACD, is considerably greater within the NMD. Within CdiA reporting, C19 and C20 are both included within rectal cancer and when combined, rectal cancer deaths are greater in the NMD compared to the ACD.

Some likely reasons for the differences between colorectal cancer mortality data in the NMD and ACD include:

- The term bowel cancer is commonly used in Australia by doctors as an interchangeable term for colon cancer. The term bowel cancer is coded to C26.0 (Cancer of the intestinal tract, part unspecified) and colon cancer to C18.9 (Colon, unspecified). For statistical analysis it is recommended that these two codes are combined.
- C19 – the term colorectal cancer is often used on death certificates and the term is coded to C19 (Cancer of the rectosigmoid junction).

In future, it is unlikely that AIHW will publish colon or rectal cancer deaths separately using the NMD because of the relatively large differences between the NMD and ACD. As noted above, the information received on death certificates is unlikely to enable finer level reporting such as colon or rectal cancer from the NMD but it is suitable for reporting at the broader level of colorectal cancer. However, rectal and colon cancer mortality from the NMD has continued to be published in this edition as part of the mortality data investigations. Like many of the broader cancer sites and groups, colorectal cancer reporting within the NMD aligns much more closely to the ACD.

Table 5: Colorectal cancer deaths based on the Australian Cancer Database and the National Mortality Database, 2016

Cancer group/site	Deaths from the ACD	Deaths from the NMD	Difference	Difference (%)
Colon cancer (C18)	3,520	1,758	-1,762	-50%
Cancer of rectosigmoid junction (C19)	461	1,933	1,472	319%
Rectal cancer (C20)	1,267	665	-602	-48%
Cancer of the intestinal tract, part unspecified (C26.0)		1,048	n.a.	n.a.
Colorectal cancer	**5,248**	**5,404**	**156**	**3%**

Notes:

1. C26.0 forms part of the ICD-10 codes to generate colorectal cancer when using the National Mortality Database (discussed in above paragraphs).
2. The difference is calculated as the number of deaths from the NMD minus the number of deaths from the ACD and this difference is also presented as a proportion of the ACD.

Source: National Mortality Database and Australian Cancer Database 2018

Future work and reporting of cancer mortality

Future work

At the time of this CdiA release, AIHW had not completed the full range of mortality data investigations. This is a large body of work, which is likely to be complex and time consuming. The future work and reporting discussed in the following paragraphs are likely directions but may be refined as the project continues.

The next stage of investigations is to compare underlying cause of death information in the ACD with the NMD at the unit record level. The results should enable more definitive advice to be provided and improved understandings of cancer mortality information.

By examining cause of death at the unit record level for cancers such as liver cancer, it may be possible to determine whether the cause of death information on liver cancer within the NMD may include some metastatic cancers. For example, this could occur where liver cancer deaths reported in the NMD have no corresponding record of the person being diagnosed with liver cancer (noting the ACD only includes primary cancers, not secondary (metastatic) cancers).

While the NMD may have access to less information from which to identify underlying causes of death for cancer than the ACD does, it has a longer historical time-series and is more up-to-date. At the time of releasing the CdiA, mortality data in the NMD was sufficiently complete for reporting up to 2020, while the ACD incidence data was sufficiently complete for reporting up to 2018 (with some estimation of late registrations) and ACD mortality data was complete up to 2017. It is possible that, like the 2018 incidence data, there may still be some outstanding mortality information that is yet to be provided to the ACD. Accordingly, the 2017 ACD may under-count mortality to some extent. This will need to be investigated more fully but preliminary work suggests this is likely to be occurring to some extent.

The AIHW is liaising with the ABS in regard to cancer mortality data. Through the investigations and liaison with ABS, it is expected that it may be possible to improve cancer mortality understandings and reporting.

Mortality reporting for Cancer data in Australia (2022 release)

At present, AIHW has included actual ACD mortality data from 2007 to 2017 and projections up to 2022. It has also produced NMD mortality reporting from 1971 to 2020 and projections up to 2022. Within the Cancer mortality by age and Cancer risk data visualisations, there is some general information to help identify which source of data is appropriate for the selected cancer. This general information will soon be accompanied by guidelines to better help people who may wish guidance on how to select the most appropriate source of data. The general information and upcoming guidelines are offered for assistance only, these are not intended to be prescriptive and it is acknowledged that users of the data may wish to undertake their own analysis to select the most appropriate data source for their needs.

The AIHW usually also reports on cancer mortality by state and territory. The preliminary data investigations are focussing on national data. Cancer mortality statistics by state and territory will not be published by AIHW within the CdiA report until further investigations have been completed to a sufficient standard to release mortality statistics for state or sub-state geographic areas.

Mortality data is normally available within the CdiA summary statistics data visualisations. They have not been included this year as the reporting is too complex to include within this general information page. Mortality data is published within the ‘Cancer mortality by age’ and ‘Cancer risk’ data visualisations.

Future reporting

The timeliness of the NMD ensures that, wherever its reporting for a cancer is of a sufficient consistency with the ACD, it is recommended for mortality reporting. However, where the NMD produces cancer mortality statistics that are considered to be particularly distant from the ACD results, they are not expected to be released in the CdiA in future.

The AIHW aims to investigate whether it is possible to use the ACD to derive estimated pre-2007 deaths from cancers . If successful, this information will be published to provide a longer time-series of cancer mortality statistics from the ACD.

It is possible that ACD mortality and NMD mortality will continue to be released in the future in some form. However, it is an aim of the project to provide users with cancer mortality statistics that are as simple to use as possible and meet users needs. As the release of data from multiple data sources to report on one item would not achieve the desired simplicity, this is hoped to be remedied in future CdiA reports.

Cancer data commentaries

Cancer data commentary no. 7

Cancer data in Australia (CdiA) now includes the group ‘all sarcomas combined’. Sarcomas are cancers that originate in bone, cartilage and the soft tissues of the body (for example, the ligaments, tendons, muscles, subcutaneous tissue and blood vessels). CdiA already includes data on soft tissue sarcoma and bone cancer and the combination of these produces ‘all sarcomas combined’.

Note that many kinds of cancer that originate outside bones can spread to the bones. However, CdiA only reports on cancers classified by their primary (original) site, not where they spread to (secondary sites). In the context of primary site, the terms “bone cancer” and “bone sarcoma” are equivalent, i.e. every primary cancer of the bone is a sarcoma.

Prior to the creation of this new cancer reporting category, a review was undertaken of the CdiA definitions of soft tissue sarcoma and bone cancer. This resulted in changes to both definitions. This commentary summarises the impact of these changes on the time series of incidence counts.

About the review process

The definitions of soft tissue sarcoma and bone cancer used in previous versions of CdiA were compared with the RARECAREnet project list of cancers. The RARECAREnet project involves partners all around Europe and aims at building an information network to provide comprehensive information on rare cancers to the community at large. The definitions used within the RARECAREnet project and potential changes to them were discussed with Australia’s cancer registries. It should be noted that the potential changes discussed with Australian cancer registries relate only to the cancer coding and not whether the cancer is rare.

Progress of the review

At the time of releasing CdiA, the review is not fully complete. It is possible that some further small changes will occur as work continues in this area. However, the current new definitions already offer a substantial improvement to existing reporting.

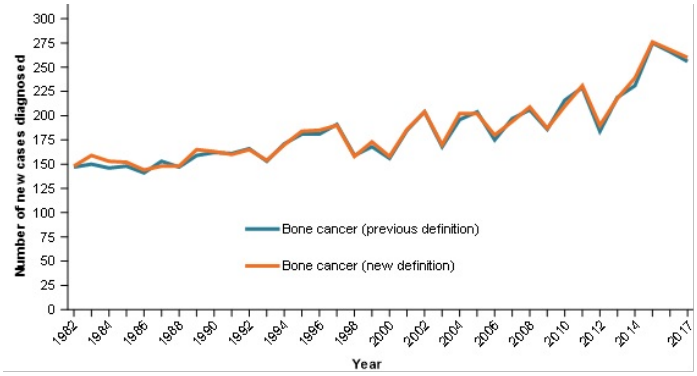
Impact of changes

The following sections highlight the impact of the changes to cancer incidence counts. The definitions themselves can be found in Appendix A.

Bone cancer

The impact of using the new definition is very small. Between 2008 and 2017 the new definition gives an average of 2 more cases per year than the old definition.

Figure 1: Cases of bone cancer, old and new definitions, persons, 1982–2017



Notes:

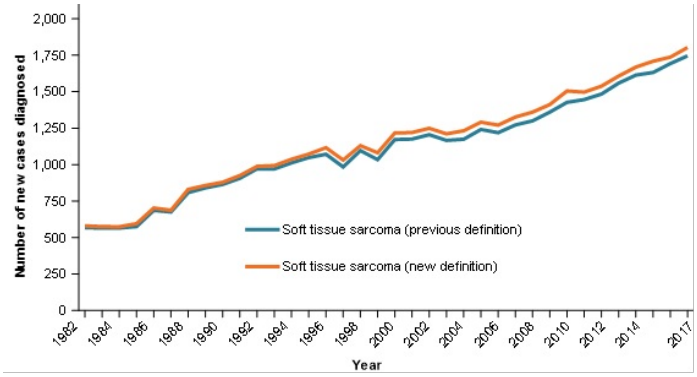
1. 2017 counts include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
2. 2016 counts include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017

Soft tissue sarcoma

The impact of using the new definition varies from year to year. Between 2008 and 2017 the new definition gives an average of around 58 more cases per year than the old definition.

Figure 2: Cases of soft tissue sarcoma, old and new definitions, persons, 1982–2017



Notes:

1. 2017 counts include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
2. 2016 counts include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017

Appendix A

The definitions are given in terms of ICD-O-3 topography and histology codes. The RARECAREnet list of cancers is available within the supplementary tables of the Incidence and survival of rare cancers in the US and Europe research paper.

Bone cancer

Topograpy codes	Histology codes
C40, C41	All except 9050–9055, 9140, 9590–9993

Table 2: RARECAREnet definition for bone cancer

Topography codes	Histology codes
C40, C41	8004
C30, C32.3, C33, C34.0, C40, C41	8800–8806, 8810–8812, 8815, 8830, 8840, 8850–8855, 8890, 8891, 8894–8896, 8900–8902, 8910, 8912, 8920, 9040–9044, 9120, 9124, 9130, 9133, 9150, 9170, 9180–9187, 9192–9195, 9220, 9221, 9230, 9231, 9240, 9242, 9243, 9250, 9260, 9364, 9473, 9540, 9560, 9561, 9571, 9580, 9581
All	9370, 9371, 9372

The new CdiA definition for bone cancer is the same as the RARECAREnet definition but also includes codes shown in Table 3.

Table 3: Additional codes to be used in the CdiA definition of bone cancer

Topography codes	Histology codes
C40, C41	8000, 8002, 8003
C30, C32.3, C33, C34.0, C40, C41	9261

Soft tissue sarcoma

Table 4: Old CdiA definition for soft tissue sarcoma

Topography codes	Histology codes
All except C40, C41	8800–8936, 8990–8992, 9040–9045, 9120–9262, 9540–9582

Table 5: RARECAREnet definition for soft tissue sarcoma

Topography codes	Histology codes
C49	8004

All except C30, C32.3, C33, C34.0, C40, C41	8710, 8711, 8714, 8800–8806, 8810–8815, 8825, 8830, 8832, 8833, 8840, 8842, 8850–8855, 8857, 8858, 8890, 8891, 8894–8896, 8900–8902, 8910, 8912, 8920, 8921, 8930, 8931, 8933–8935, 8959, 8963, 8964, 8990, 8991, 9020, 9040–9044, 9120, 9124, 9130, 9133, 9137, 9150, 9170, 9180–9183, 9185–9187, 9192–9195, 9220, 9231, 9240, 9251, 9252, 9260, 9364, 9365, 9540, 9542, 9560, 9561, 9571, 9580, 9581
All except C30, C32.3, C33, C34.0, C40, C41 and C07, C08, C44, C60, C63.2	8940
All except C30, C32.3, C33, C34.0, C40, C41 and C56, C71, C72	9473
All except C30, C32.3, C33, C34.0, C40, C41 and C71, C72	9503

The new CdiA definition for soft tissue sarcoma is the same as the RARECAREnet definition but also includes codes shown in Table 6.

Table 6: Additional codes to be used in the CdiA definition of soft tissue sarcoma

Topography codes	**Histology codes**
All	8936, 9140
All except C30, C32.3, C33, C34.0, C40, C41	9045

Cancer data commentaries

Cancer data commentary no. 6

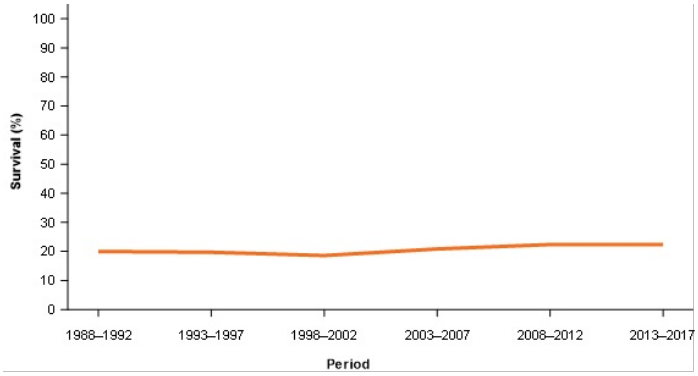
Changes in cancer survival rates over time are often used to gain insights into how survival *outcomes* are changing for people diagnosed with cancer. However, for some cancers the insights may be confounded by changes in the age composition of those diagnosed over time. Age-adjusted survival estimates have been added to Cancer data in Australia (CdiA). These rates enable the assessment of which cancers' survival rates have been impacted by changes over time in relation to age at diagnosis and therefore may not dependably reflect changes in survival outcomes over time,.

This commentary discusses age-adjusted survival and the impacts age at diagnosis can have on cancer survival rates. The advice provided within this commentary is general advice to help increase the familiarity with the data now being offered. Recommendations are not meant to be prescriptive nor a recommendation of best practice and may change to some extent depending on the investigation being undertaken.

How changes in age of those diagnosed can impact on the overall survival rate

Brain cancer survival time series are used here to illustrate a time series where changes in the age of those diagnosed impacts substantially on the survival rates over time. Figure 1 provides the 5-year relative survival rates over time for brain cancer. The change from 20% in the earliest period to 22% in the latest period could lead to the conclusion that brain cancer survival outcomes haven't changed much over time.

Figure 1: Five-year relative survival, brain cancer, persons, 1988-1992 to 2013-2017



Source: AIHW Australian Cancer Database 2017.

However, while the changes in rates are accurate, this trend may not provide the whole picture. Cancer survival rates often differ considerably by age. On average, older people generally have lower cancer survival rates than younger people. Therefore, if progressively higher proportions of the people diagnosed over time are older then improvements in survival rates may be offset by the greater proportions of older people being diagnosed.

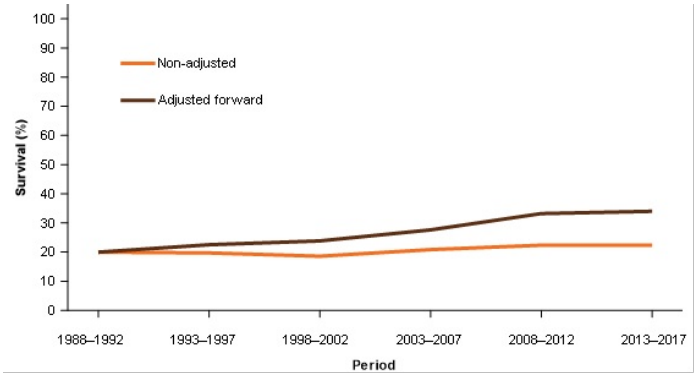
Age adjusted survival rates

Age-adjusted survival rates help to identify the occasions where changes in cancer survival rates over time are impacted by age. CdiA includes "forward looking age-adjusted rates" and "backward looking age-adjusted rates". They are both age-adjusted rates but the age adjustments have been applied differently. The forward looking and backward looking descriptions are terms used to more simply distinguish between the two.

Age-adjusted survival rates (forward looking)

The forward looking age-adjusted rates detail what the survival rates would be if the age composition of those diagnosed in the base period (that is 1988–1992) remained the same in all future periods. If the age composition of the people diagnosed with brain cancer in 2013–2017 was the same as in 1988–1992, brain cancer survival rates would be 34% in 2013–2017, not 22% as per the unadjusted relative survival rates (Figure 2).

Figure 2: Five-year relative survival and age-adjusted relative survival, brain cancer, persons, 1988-1992 to 2013-2017



Note: Age composition in each period has been adjusted to equal the age composition of those diagnosed with brain cancer for the 1988–1992 survival period.

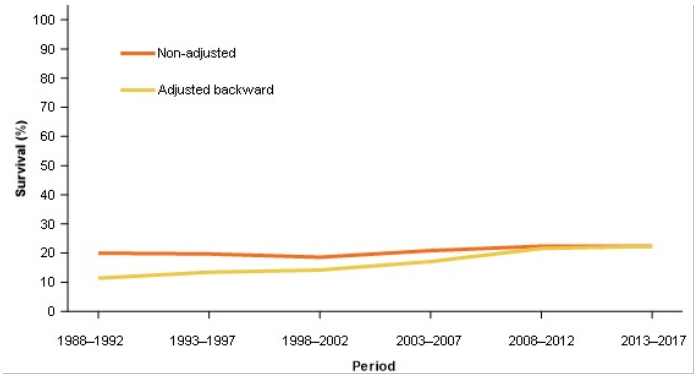
Source: AIHW Australian Cancer Database 2017.

Age-adjusted survival rates (backward looking)

However, the age composition of people diagnosed with brain cancer has changed over time. Noting what the rates would have been only indicates that the time series is strongly impacted by changes in age. The backward looking age-adjusted survival rates offer an alternative perspective of the time series in relation to changes in cancer survival outcomes.

The backward looking age-adjusted rates provide what the survival rates for each period would be if the age composition of those diagnosed in the most recent period (2013–2017 in this example) occurred across all previous periods. Using backward looking age-adjusted survival rates, 5-year relative survival rates for brain cancer have doubled between 1988–1992 and 2013–2017 (increased from 11% to 22%) (Figure 3).

Figure 3: Five-year relative survival and age-adjusted relative survival, bain cancer, persons, 1988-1992 to 2013-2017



Note: Ages are adjusted to equal the age composition of those diagnosed with brain cancer for the 2013–2017 survival period.

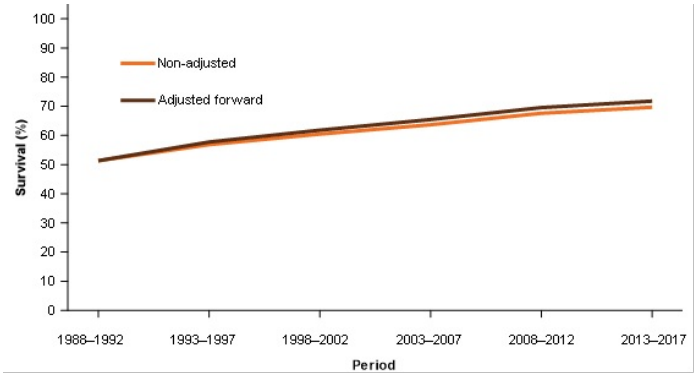
Source: AIHW Australian Cancer Database 2017.

Why produce forward looking and backward looking age-adjusted rates?

In general, we recommend the use of actual (unadjusted) relative survival rates when these are not overly impacted by changes in age composition. Backward looking age-adjusted survival rates are recommended for use when the actual time series does not appear to represent changes in survival outcomes; that is, rate changes over time are influenced substantially by changes in the age at diagnosis. The forward looking age adjusted survival rates are useful to not only identify if changes in age are affecting actual relative survival time series but provide complementary information for the actual relative time series (an example using all cancers combined follows).

The 5-year relative survival rate for all cancers combined has improved from 51% to 70% between 1998–1992 and 2013–2017. The forward looking age-adjusted survival trend suggests that the change in rates would have been more if not for changes in the age composition of people diagnosed with cancer over time (Figure 4).

Figure 4: Five-year relative survival and age-adjusted relative survival, all cancers combined, persons, 1988-1992 to 2013-2017



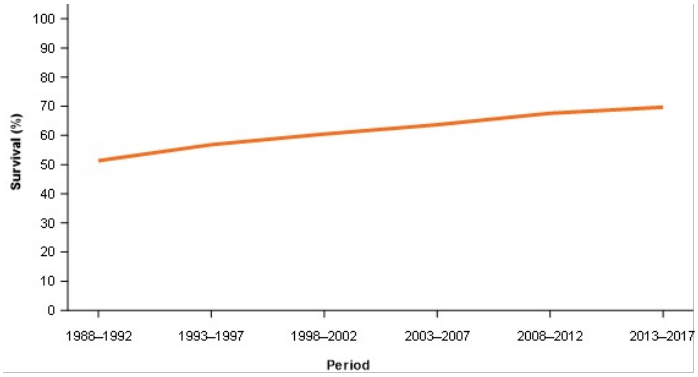
Note: Ages are adjusted to equal the age composition of those diagnosed with brain cancer for the 1988–1992 survival period.

Source: AIHW Australian Cancer Database 2017.

For all cancers combined, the actual relative survival rate doesn't appear to be greatly impacted by age so it likely provides a reasonable general reflection of improvement in survival outcomes. When discussing changes in actual relative survival rates, the information gained from the forward looking age-adjusted rates allows a more informative description of survival outcomes to be provided, for example:

The 5-year relative survival rate for cancer has improved from 51% to 70% between 1988–1992 and 2013–2017 (Figure 5). Improvements in survival outcomes are slightly under-stated because some improvements have been offset by increasing proportions of older people diagnosed with cancer as the Australian population ages over time (noting that older people generally have lower cancer survival rates).

Figure 5: Five-year relative survival rates, all cancers combined, persons, 1988-1992 to 2013-2017



Source: AIHW Australian Cancer Database 2017.

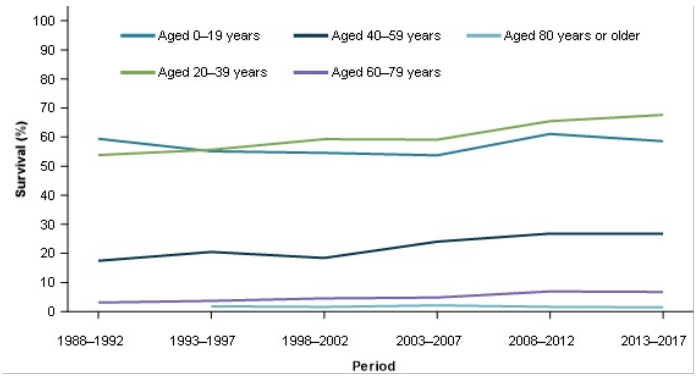
Survival by age group and proportion of people diagnosed by age

Up to this point, we've talked about older people having lower survival rates and that, for some cancers, there are proportionally more older people being diagnosed. This will not be true for all cancers so where can this information be found? The cancer survival by age data visualisation includes a couple of other sets of data that allow survival rates by age, and changes in age at diagnosis, to be more simply obtained; these are discussed below.

Cancer survival rates by age group

In 2013–2017, brain cancer 5-year relative survival rates were as high as 68% for people aged between 20 and 39 and as low as 1.4% for people aged over 80 (Figure 6). Similar information is available for all cancers reported within the CdiA and can be located within the Cancer survival by age data visualisation.

Figure 6: Five-year relative survival rates, by age group, brain cancer, persons, 1988-1992 to 2013-2017

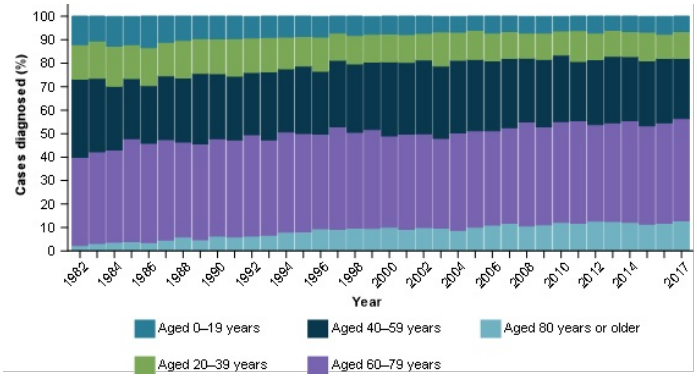


Source: AIHW Australian Cancer Database 2017.

Proportion of cases diagnosed by age

The proportion of people diagnosed with brain cancer who were aged over 80 has increased from 2.3% in 1982 to 12.9% in 2017 (Figure 7). Similar information by 20-year age groups is available for all cancers reported on within the CdiA and can be located within the Cancer survival by age data visualisation.

Figure 7: Proportion of cases diagnosed by age group, brain cancer, persons, 1982 to 2017



Source: AIHW Australian Cancer Database 2017.

A summary of how the information presented in the cancer survival by age data visualisation can be used together

For brain cancer, we've noted that actual relative survival rates are substantially different to the age-adjusted survival rates (Figure 2). The data on the proportion of cases by age indicates that a much greater proportion of people diagnosed with brain cancer are older in more recent periods (Figure 7) and the survival rates are very low for older age groups (Figure 6). In this example, the actual relative survival rates for brain cancer don't reflect the overall changes in survival outcomes very well because they are impacted by age (Figure 2) and so we present the age-adjusted (backward looking) time series in place of the actual (Figure 3).

For all cancers combined, we've noted that actual relative survival rates are reasonably close to the age-adjusted survival rates (Figure 4). This indicates that age hasn't substantially impacted the survival rates over time so we can simply use the actual relative survival rates to describe the changes over time in survival outcomes (Figure 5). We can also choose to use information from the forward looking age-adjusted rates to provide context that improvements are slightly understated because proportionally more older people are being diagnosed (data not presented here but available within the Cancer survival by age data visualisation).

Concluding points

1. Age-adjusted rates (forward looking) are primarily developed to investigate whether the time series for actual relative survival is substantially impacted by changes in age composition but also offer additional context about actual changes in survival outcomes over time.
2. Age-adjusted rates (backward looking) are primarily developed to provide an alternative reporting option to actual relative survival rates for instances where the actual relative survival rates aren't considered to adequately represent changes in survival outcomes over time.
3. Age-adjusted rates are intended to provide a more comprehensive understanding of survival outcomes over time for the reported cancer but these rates are not comparable with other cancers (or even the same cancer for a different sex – this is discussed in the next section).
4. Both observed and relative age-adjusted survival rates are available within CdiA.

As the length of the survival time series presented in CdiA increases, changes in the age composition of those diagnosed over time has greater potential to influence survival rates. The cancer survival by age data visualisation aims to provide people with information to help understand changes in survival outcomes (and not simply rates) over time.

Future work – age-standardised survival rates

Age-adjusted rates have been added to CdiA to focus on how to better understand how survival outcomes are changing over time for each individual cancer. These age-adjusted survival rates are not directly comparable with actual, or age-adjusted, rates for different cancers (or by sex) because the age composition for one age-adjusted series will more than likely be different to another.

In our future work program, we plan to also produce age-standardised survival rates. These rates will enable comparisons to be made between cancers because they will use the same standard population (and therefore have the same age composition) across different cancers. The age-standardised rates will allow comparisons to be made between cancers but in moving towards this objective, will not capture actual changes over time in survival outcomes for specific cancers as well as age-adjusted survival rates do.

At present, and within the CdiA, to compare survival rates across cancers, comparisons by age group will be the most directly comparable. Comparisons of actual relative survival rates are commonly performed and are useful for general survival comparisons. More precise comparisons between cancers will become available when work on age-standardised survival rates is complete and included within CdiA (tentatively scheduled for the first release of 2022).

Cancer data commentaries

Cancer data commentary No. 5

Ovarian cancer incidence rates have been decreasing, with some larger decreases in more recent years. Without additional context, it appears as though the real world risk of being diagnosed with ovarian cancer in Australia is reducing. However, the rate decreases are perhaps more due to research that has led to some cancers previously thought to be ovarian in origin now being considered cancers of the fallopian tube.

This commentary provides information to help understand ovarian cancer trends.

The issue impacting ovarian cancer data

Histology and cancer site

Fundamental to understanding the issue impacting ovarian cancer statistics is a familiarity with the terms 'cancer histology' and 'cancer site'. Histology describes the types of cells in which cancer originates, while cancer site describes the site of the body where the cancer originates. A high grade serous carcinoma is an example of a histology while the ovaries are an example of a site.

Research improves the understanding of primary site of diagnosis

It was first recognised in 2001 that a high percentage of so-called ovarian high grade serous carcinomas (HGSCs) in women with certain genetic mutations actually begin in the fallopian tube rather than the ovary (Colgan et al. 2001; Piek et al. 2001). Further research indicated that the fallopian tube is also the primary site of HGSCs that are not associated with those mutations (Garg 2013). In 2015 the International Collaboration on Cancer Reporting guidelines for assigning the primary site of HGSCs were updated to reflect this new understanding (McCluggage et al. 2015). These influential guidelines have affected practice in pathology laboratories and hence cancer registries.

The impact of the research on ovarian cancer rates

Following the research, we would expect ovarian cancer rates to decrease to some extent. This is not because there is a real world reduced risk but because some cancers that would have previously been recorded as ovarian will be recorded as cancers of the fallopian tube.

The impact of the changes in the data on the ovarian cancer time series

Ovarian cancer time series are likely to be measuring different things at different points in time. Where decreasing rates occur, there may be uncertainty as to whether the apparent decreases are due to fewer real world cases or because more cases historically thought to be ovarian in origin are being recorded as cancers of the fallopian tube.

Defining the terms 'historical understanding' and 'current understanding'

For the rest of this commentary, the term 'historical understanding of ovarian cancer' refers to ovarian cancer as well as the serous carcinomas of the fallopian tube that were previously thought to be ovarian cancers.

The term 'current understanding of ovarian cancer' is used to refer to ovarian cancer as it is now understood. It includes only cases where the ovaries are the primary site and excludes all cancers of the fallopian tube that were historically recorded as ovarian cancers.

There is no clear single break in time series

Ideally, all pathology reports involving the diagnosis of non-uterine HGSC would be based on a consistent understanding of the site where the cancer originated and these understandings would uniformly change when research dictates. If this were the case, we could clearly suggest the year when ovarian cancer rates changed from the historical understanding of ovarian cancer to the current understanding.

Unfortunately, with the complexity of determining histology, the evolving research and the diverse number of people making diagnoses, it can take some time before research findings are broadly accepted and changes are consistently implemented. Given this, it is not possible to identify a single point in time when ovarian cancer incidence rates changed from measuring the historical understanding of ovarian cancer to measuring the current understanding. Indeed, it is likely that for years following the research that incidence rates will be measuring a hybrid of current and historical understandings of ovarian cancer.

The above paragraphs highlight an issue impacting the data; it is not a comment on data collection practices. We would like to acknowledge the enduring efforts, the quality of work, and considerable expertise, of cancer registries and those in the medical field who provide the foundation from which the Australian Cancer Database (ACD) is produced.

Incidence rates

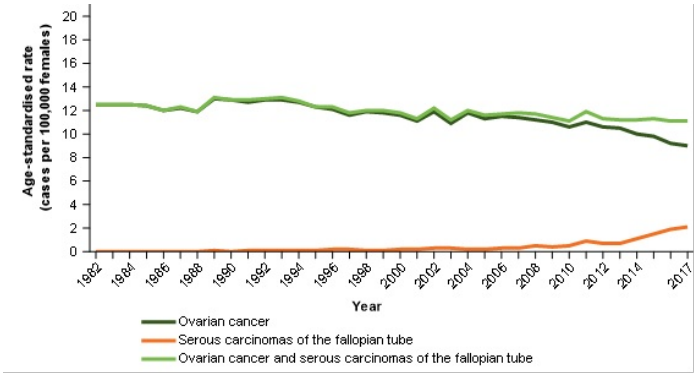
Measuring incidence rates based on the historical understanding of ovarian cancer

Our investigations into the quality of ovarian cancer data highlighted the need to improve the reliability of ovarian cancer rates. We have introduced the 'ovarian cancer and serous carcinomas of the fallopian tube' reporting group as a step towards this. This new reporting group is likely to suit the needs of people who wish to understand how ovarian cancer incidence rates, as ovarian cancer is historically understood, have changed over time.

Figure 1 shows that the incidence rates for serous carcinomas of the fallopian tube have increased as ovarian cancer decreased. A proportion of these changes are likely the result of a shift in the understanding of the site rather than independent increases/decreases; larger offsetting movements are evident from 2012.

The new combined reporting group (ovarian cancer and serous carcinomas of the fallopian tube) is much more stable over time. The speculated movements from ovarian cancer to cancer of the fallopian tube are offset within the new combined reporting group (Figure 1).

Figure 1: Age-standardised incidence rates, females, 1982 to 2017



Notes:

1. 2017 rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
2. 2016 rates include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017

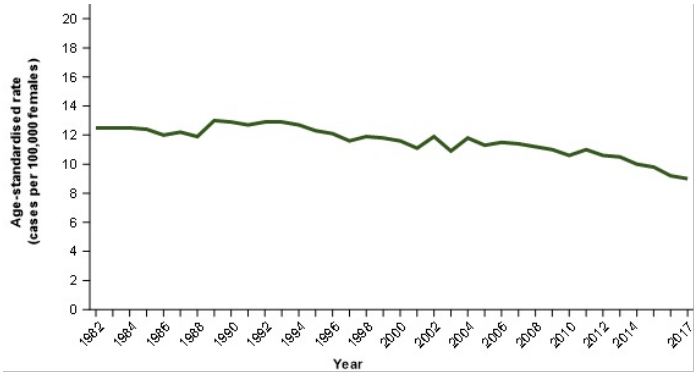
We acknowledge that the ovarian cancer and serous carcinomas of the fallopian tube cancer group may include a small number of serous carcinomas of the fallopian tube that may historically always have been diagnosed as such.

Appendix 1 outlines which histologies are included within serous carcinomas of the fallopian tube and mentions why these have been selected.

Measuring incidence rates based on the current understanding of ovarian cancer

The 2017 incidence rate is likely to be the best estimate of ovarian cancer based on the current understanding but may still include some serous carcinomas of the fallopian tube (Figure 2).

Figure 2: Ovarian cancer age-standardised incidence rates, females, 1982 to 2017



Notes:

1. 2017 rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
2. 2016 rates include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017

We will continue to publish ovarian cancer incidence rates but will either refer data users to this commentary or provide the following caution:

- Rates for more recent years are unlikely to be comparable with earlier years. Earlier years are more likely to include serous carcinomas of the fallopian tube while the most recent years are less likely to do so.

Ovarian cancer incidence time series based on the current understanding are likely to be of a poor quality. We expect that as time progresses, future years of ovarian cancer incidence rates will better measure the current understanding of ovarian cancer and time series will become more reliable.

Ovarian cancer incidence projections

For the 2021 Cancer data in Australia report (CdiA), actual cancer incidence data is available up to 2017 and projections are available for 2018 to 2021. Projections have been made for 'ovarian cancer and serous carcinomas of the fallopian tube' but not for ovarian cancer.

This is because projections are produced based on the premise that trends occurring over the most recent 10 years are a reasonable basis from which to project future cancer rates. Unfortunately, there is too much uncertainty within the ovarian cancer incidence rate time series to provide a reasonable basis to derive projections.

Survival rates

Both incidence and survival rates are derived from the ACD. Ovarian cancer survival rates are provided in Table 1. The recommendations outlined in the incidence section also apply to survival rates and all data derived from the ACD. More precisely:

- the 'ovarian cancer and serous carcinomas of the fallopian tube' survival rates better align with the historical understanding of ovarian cancer.
- The most recent ovarian cancer best aligns with the current understanding of ovarian cancer.
- Ovarian cancer survival rates from earlier years are likely to include more serous carcinomas of the fallopian tube and may not be directly comparable with later years.

Table 1: Five-year relative survival rates, ovarian cancer and serous carcinomas of the fallopian tube and ovarian cancer, females, 1988–1992 to 2013–2017

Period	Ovarian cancer 5-year relative survival rate	Ovarian cancer Confidence interval (95%)	Ovarian cancer and serous carcinomas of the fallopian tube 5-year relative survival rate	Ovarian cancer and serous carcinomas of the fallopian tube Confidence interval (95%)
1988–1992	37.4%	35.9% – 38.9%	37.4%	35.9% – 38.9%
1993–1997	40.3%	38.9% – 41.7%	40.4%	39.0% – 41.8%
1998–2002	40.6%	39.2% – 42.0%	40.7%	39.3% – 42.1%
2003–2007	41.7%	40.4% – 43.1%	42.2%	40.8% – 43.5%
2008–2012	44.1%	42.8% – 45.4%	44.8%	43.5% – 46.1%
2013–2017	47.1%	45.8% – 48.4%	48.1%	46.9% – 49.4%

Source: AIHW Australian Cancer Database 2017

Mortality rates

Unlike incidence and survival data, mortality data are sourced from the National Mortality Database (NMD), not the ACD. NMD data are derived from information recorded on death certificates. Therefore, the NMD does not include histology information nor have access to some of the additional information used to derive the ACD data, which enables cancer type to be more accurately assigned in the ACD in some cases.

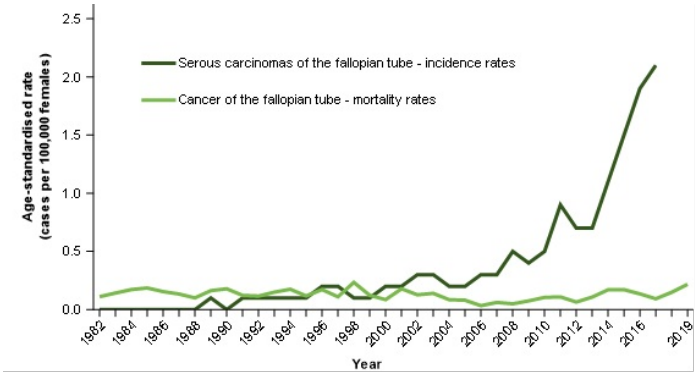
As the NMD data is based on less information than the ACD, it is likely to generally record the historical understanding of ovarian cancer. The two points discussed below support this possibility.

1. Cancers of the fallopian tube mortality rate trends remain quite constant

Figure 3 compares the serous cancers of the fallopian tube incidence rates with the fallopian tube cancer mortality rates. An exact comparison cannot be made because the NMD does not collect information about cancer histology. It is therefore not possible to isolate deaths from serous carcinomas of the fallopian tube, only deaths from all cancers of the fallopian tube (all histologies, not only serous carcinomas).

We would expect that the increasing incidence of cancers of the fallopian tube should lead to increasing mortality rates to some extent; this does not occur and mortality rates for cancers of the fallopian tube remain quite stable.

Figure 3: Age-standardised incidence rate for serous cancers of the fallopian tube comparison with age-standardised mortality rates for cancer of the fallopian tube



Notes:

1. 2017 incidence rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
2. 2016 incidence rates include estimates of late registrations for the Northern Territory only.

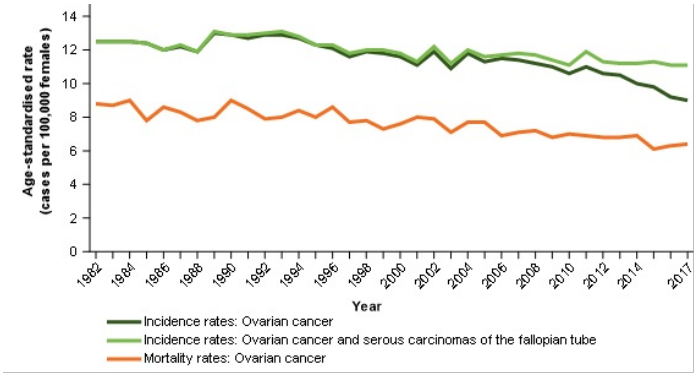
Source: AIHW Australian Cancer Database 2017 and AIHW National Mortality Database

2. Ovarian cancer mortality rates appear to align better with 'ovarian cancer and serous carcinomas of the fallopian tube' incidence rates

Ovarian cancer mortality rates have been decreasing over time (Figure 4). Reducing rates may be explained by improvements in survival (Table 1). Unlike ovarian cancer incidence rates, ovarian cancer mortality rates have not been decreasing sharply. This suggests that mortality data are not being impacted by ovarian cancer deaths (as historically understood) being recorded as cancer of the fallopian tube deaths (Figure 3).

Incidence, survival and mortality rates have the general relationship that, where data is coherent, improvements in survival should generally correspond with increases in the difference between incidence and mortality rates. For ovarian cancer incidence and ovarian cancer mortality comparisons – this is not the case (Figure 4)

Figure 4: Age-standardised incidence and mortality rates, selected cancers, females, 1982 to 2017



Notes:

1. 2017 incidence rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
2. 2016 incidence rates include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017 and AIHW National Mortality Database

Mortality to incidence ratio tests

We use mortality to incidence ratios to further explore the relationship between mortality and incidence data. Age-standardised mortality rates from the NMD are compared with age-standardised incidence rates from the ACD for each year and annual ratios are formed.

Survival rates have improved for ovarian cancer over time. Given this, the mortality to incidence ratio should be decreasing over time.

Figure 5 contrasts the mortality to incidence ratio for:

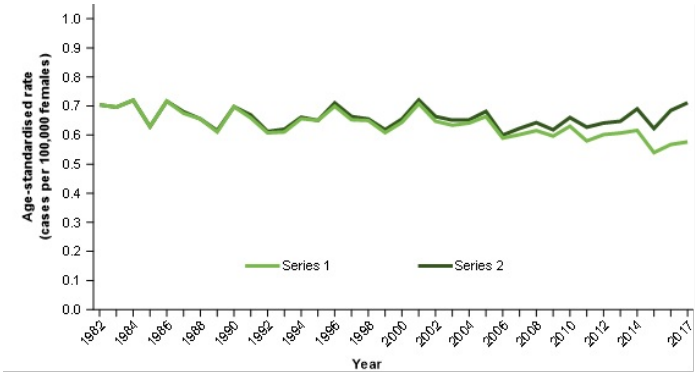
- Series 1: Ovarian cancer age-standardised mortality rates / ovarian cancer and serous carcinomas of the fallopian tube age standardised incidence rates

  Over time, the mortality to incidence ratio improves for series 1. This is to be expected where survival increases. The ovarian cancer mortality data appears to be measuring the historical understanding of ovarian cancer and these two data sources appear to provide complementary information about ovarian cancer as it is historically understood.
- Series 2: Ovarian cancer age-standardised mortality rates / ovarian cancer age-standardised incidence rates

  Over time, the incidence to mortality ratio for series 2 remains quite stable. This is not to be expected where survival is increasing.

  The stability of the ratio likely occurs because the improvements in survival are resulting in fewer deaths but for the ratio, these are offset by the reduction of cases diagnosed as ovarian cancer (and instead diagnosed as cancer of the fallopian tube).

Figure 5: Age-standardised mortality rate to age-standardised incidence rate, rate ratios, selected cancers, females, 1982 to 2017



Notes:

1. Series 1 = ovarian cancer age-standardised mortality rate divided by the ovarian cancer and serous carcinomas of the fallopian tube age-standardised incidence rate.
2. Series 2 = ovarian cancer age-standardised mortality rate divided by the ovarian cancer age-standardised incidence rate.
3. 2017 incidence rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
4. 2016 incidence rates include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017 and AIHW National Mortality Database

Recommendations for how to use the data together

Ovarian cancer as it is historically understood

We believe the ovarian cancer and serous carcinomas of the fallopian tube group provides a useful representation of ovarian cancer as it is historically understood. This reporting group is available for cancer incidence, survival, prevalence and conditional survival.

Ovarian cancer mortality data is derived from the NMD and appears to provide a strong representation of ovarian cancer as it is historically understood. Within the CdiA, we will footnote data to note that ovarian cancer mortality rates likely include some cancers originating in the fallopian tube.

Ovarian cancer as it is currently understood

The most recent incidence and survival rates represent the closest estimate of ovarian cancer as it is currently understood but data should be used with a degree of caution, particularly in earlier years.

At present, national mortality rates do not exist for ovarian cancer as it is currently understood but possible approaches to remedy this are being considered for future CdiA releases.

Future work

Our work towards better understanding ovarian cancer incidence and mortality rates will continue into the future. As new data is received, the guidance provided within this paper may need to evolve. We will continue to monitor ovarian cancer rates and update advice within the CdiA data commentary series if necessary.

Appendix 1

ICD-10 and histology codes for the ovarian cancer and serous carcinomas of the fallopian tube group (derived from the ACD)

ICD10: C56 Ovarian cancer (all histologies)

ICD10: C570 Cancer of the fallopian tube (selected histologies)

ICD10: C578 Cancer of overlapping sites of female genital organs (selected histologies)

Selected histologies

8441 – Serous carcinoma not otherwise specified

8460 – Low grade serous carcinoma

8461 – High grade serous carcinoma

About the construction of the ovarian cancer and serous carcinomas of the fallopian tube group

The selected histologies were identified as the histologies that contributed to unusual increases in incidence rates for the C570 and C578 ICD10 codes. The increase was confirmed as likely being due to the change in understanding of ovarian cancer. It is acknowledged that some increase in serous carcinomas of the fallopian tube may not be directly related to changes in ovarian cancer rates. However, given the generally low rates of serous carcinomas of the fallopian tube, it is speculated that increases in serous carcinomas of the fallopian tube are mostly related to changes in the understandings of ovarian cancer.

The group is called ‘ovarian cancer and serous carcinomas of the fallopian tube’ for simplicity and to reflect the general intent of what it aims to measure. However, the code C57.8 also includes cancer of two or more contiguous sites of the female genital organs whose point of origin cannot be determined. Therefore, this code may contain some cancers that are neither ovarian nor of the fallopian tube.

Given that serous carcinoma of the ovary remains a legitimate diagnosis, we cannot speculate on the extent to which current ovarian cancer incidence data may still contain cancers of the fallopian tube. This does not impact on the ovarian cancer and serous carcinomas of the fallopian tube group but may for those interested only in ovarian cancer as currently understood.

Cancer data commentaries

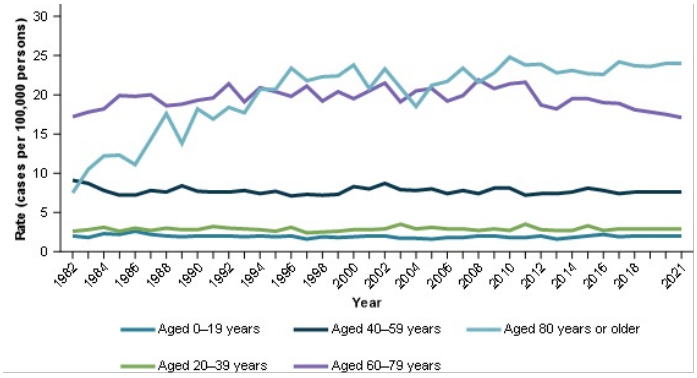
Cancer data commentary no. 4

Examination of brain cancer rate time series provides us with understandings of how brain cancer has been changing over time. Various brain cancer time series give the appearance that very little is changing over time. However, all may not be as it seems with brain cancer statistics. This commentary provides additional information that may refine conclusions about how brain cancer rates are changing over time.

Brain cancer incidence and mortality rates for people aged 80 or more increased substantially between 1982 and 1996

With the exception of the population aged 80 and over, brain cancer incidence rates by age groups have been relatively constant since 1982. For people aged over 80, the incidence rates have more than tripled between 1982 and 2021 (7.5 cases per 100,000 persons to an estimated 24 cases per 100,000 persons) with most of the change occurring prior to 1996 (Figure 1).

Figure 1: Age-specific incidence rates, brain cancer, by age group, persons, 1982 to 2021



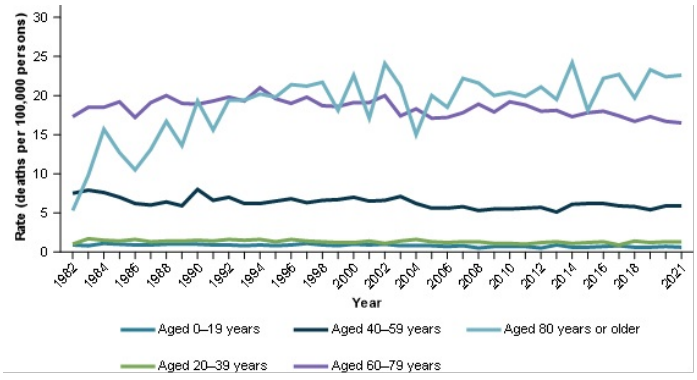
Notes:

1. Actual rates are provided between 1982 and 2017, 2018 and onwards are projections.
2. 2017 rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
3. 2016 rates include estimates of late registrations for the Northern Territory only.

Source: AIHW Australian Cancer Database 2017

Brain cancer mortality rates for people aged 80 and over have also increased substantially; these rates are estimated to have more than quadrupled between 1982 and 2021 (5.3 deaths per 100,000 persons to an estimated 23 deaths per 100,000 persons) (Figure 2).

Figure 2: Age-standardised mortality rates, brain cancer, by age group, persons, 1982 to 2021



Note: Actual rates are provided between 1982 and 2019, 2020 and 2021 are projections.

Source: AIHW National Mortality Database

Why have the incidence and mortality rates for the older populations increased?

It has been suggested that the increasing rates of death from brain cancer for people older than 80 may not be genuine, rather brain cancers in the elderly were not diagnosed as often in earlier years. Increasing rates for the elderly began to occur with the availablity of more sophisticated, non-invasive diagnostic technology and changes in the attitude toward care for the elderly (Modan et al. 1992).

What do brain cancer incidence and mortality rates look like when adjusted for possible undercount?

The increase in brain cancer incidence in the elderly populations may be related to more aggressive diagnostic testing for this population (Legler et al. 1999) rather than brain cancer becoming more common in this population. Our interpretations of brain cancer rates today and how things have changed is based in part on comparisons with past rates. When we adjust time series for the possible historical under-diagnosis of brain cancer in the elderly, our understandings of brain cancer trends alters accordingly (particularly mortality trends).

Adjusting brain cancer age-standardised incidence and mortality rates for possible under-diagnosis

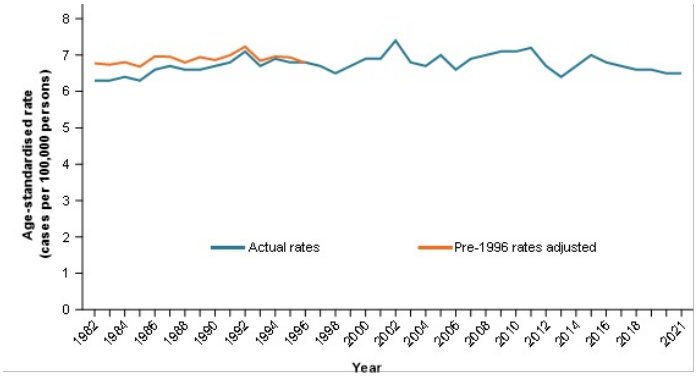
We have created a time series that aims to remove the potential under-diagnosis of the elderly in earlier years. Pre-1996 brain cancer incidence rates appear to be at most risk of reduced incidence and mortality rates arising from potential under-diagnosis. By using the 1996 incidence rates for the elderly and applying these age-specific rates to earlier years, we are able to derive adjusted age-standardised incidence rates; these rates provide an indication of the age-standardised rates without the possible under-diagnosis of the elderly. This same process has been used for mortality data.

We emphasise that the actual/raw rates represent the accurate rates of diagnosis and death as they were recorded at the time. The adjusted time series may provide a more comparable time series from which brain cancer trends may be better understood.

How do brain cancer incidence rates change over time when adjusted for possible under-diagnosis?

Figure 3 provides the actual and adjusted age-standardised brain cancer incidence rates from 1982 to 2021. Actual age-standardised incidence rates remain quite stable throughout time, as do the adjusted rates. The impact of adjusting incidence rates for possible under-diagnosis on how time series is interpreted is relatively limited. Its main impact for incidence may be to alter the possible interpretation that brain cancer age-standardised incidence rates were historically lower and that the occasional lower rates occurring in some more recent years have occurred in the past.

Figure 3: Age-standardised incidence rates and adjusted age-standardised incidence rates, brain cancer, persons, 1982 to 2021



Notes:

1. Actual rates are provided between 1982 and 2017, 2018 and onwards are projections.
2. 2017 rates include estimates for the Northern Territory and an estimate of late registrations for all other jurisdictions.
3. 2016 rates include estimates of late registrations for the Northern Territory only.
4. For 1982 to 1995, brain cancer rates for the population aged over 80 are adjusted to equal the 1996 rate of this population.

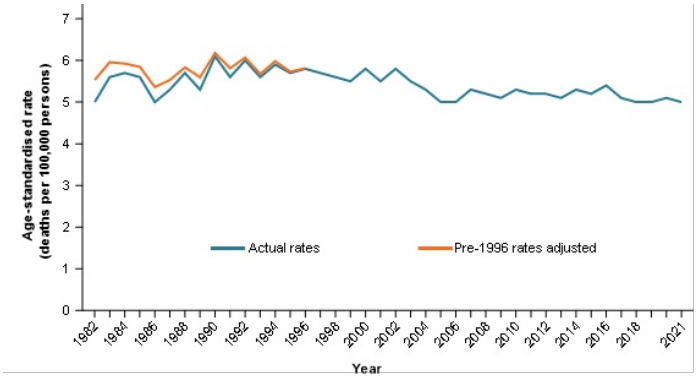
Source: AIHW Australian Cancer Database 2017

How do brain cancer mortality rates change over time when adjusted for possible under-diagnosis?

Actual age-standardised mortality rates for brain cancer suggest there is some volatility but overall little has changed over time. However, adjusted mortality rates more clearly show there has been a decrease in mortality rates. (Figure 4).

For mortality rates to have improved while incidence remained relatively stable, survival rates must have improved to some degree. This has occurred and is discussed in the next section.

Figure 4: Age-standardised mortality rates and adjusted age-standardised mortality rates, brain cancer, persons, 1982 to 2021



Notes:

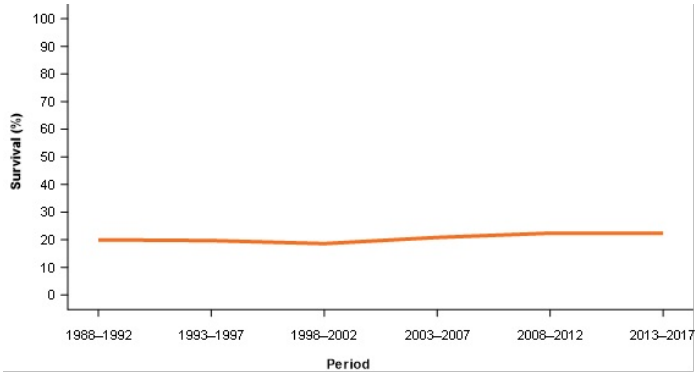
1. Actual rates are provided between 1982 and 2019, 2020 and 2021 are projections.
2. For 1982 to 1995, brain cancer rates for the population aged over 80 are adjusted to equal the 1996 rate of this population.

Source: AIHW National Mortality Database

Brain cancer survival rates have changed more over time than it appears

Brain cancer 5-year relative survival rates appear to have increased by only 2 percentage points over a span of more than 20 years (20% in 1988–1992 to 22% in 2013–2017) (Figure 5). However, further analysis suggests that this time series is unlikely to satisfactorily capture the extent that brain cancer has really improved (which is discussed in detail in Cancer data commentary number 6 and briefly summarised below).

Figure 5: Five-year relative survival, persons, brain cancer, 1988-1992 to 2013-2017



Source: AIHW Australian Cancer Database 2017

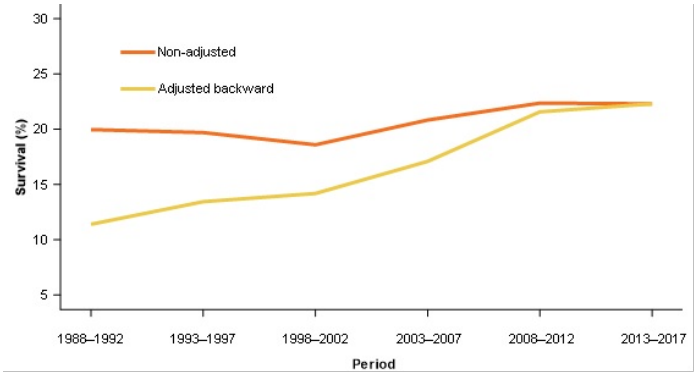
Why aren't improvements in brain cancer relative survival being adequately captured?

Relative survival time series (all ages) across the different time periods are based on the survival for the entire population diagnosed with brain cancer for each of the relevant periods. The population aged over 80 has much lower survival rates than younger ages. Periods such as 1988–1992 include much smaller proportions of people aged over 80 than later periods. As time goes by, increases in brain cancer survival that have been occurring for most age groups which would normally also be apparent in the relative survival rate for all ages combined are being offset by the growing number of older people being diagnosed with brain cancer in later years.

When adjusting for age, brain cancer 5-year survival rates have doubled

When adjusting for age, the 2013–2017 brain cancer 5-year relative survival rate is effectively double that of 1988–1992 (11% to 22%). The actual 1988–1992 5-year relative survival rate of 20% is derived from a younger population of those diagnosed with brain cancer. If it had the same age characteristics as the population diagnosed in 2013–2017 the 5-year relative survival rate would have been 11% and not 20% (Figure 6). The age adjusted relative survival time series provides a more genuine reflection of changes in brain cancer survival outcomes over time.

Figure 6: Five-year relative survival and age-adjusted relative survival, brain cancer, persons, 1988-1992 to 2013-2017



Note: The age composition in earlier periods are adjusted to equal the age composition of those diagnosed with brain cancer for the 2013-2017 survival period.

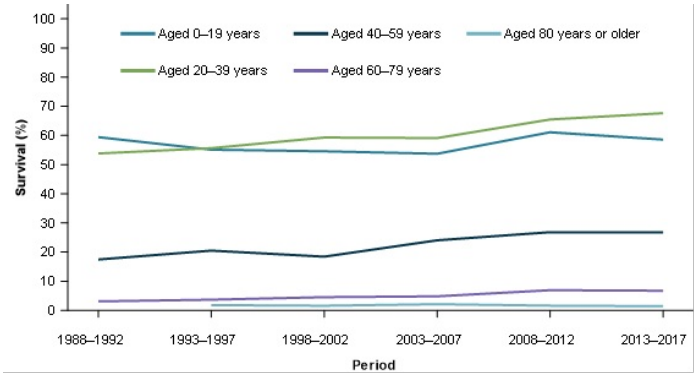
Source: AIHW Australian Cancer Database 2017.

Improvements in brain cancer survival have occurred for most age groups

Changes in brain cancer survival are better considered by viewing how survival rates have changed for each of the specific age groups.The population aged 20 to 39 has had the largest improvement in brain cancer 5-year survival rates between 1988–1992 and 2013-2017 (54% to 68%). For people aged 40 to 59, 5-year relative survival rates improved from 18% to 27% for the same period. Even though 5-year relative

survival rates for people aged 60 to 79 remain low at 6.7%, this rate is double the rate of 3.1% in 1988–1992 (Figure 7).

Figure 7: Five-year relative survival, brain cancer, by age group, persons, 1988–1992 to 2013–2017



Source: AIHW Australian Cancer Database 2017

Improvements in survival are generally more evident for shorter survival periods (such as 2-year survival rates), particularly for cancers with relatively low survival rates such as brain cancer. These rates are available within the CdiA Survival by age data visualisation.

Concluding points

The incidence and mortality data adjusted for under-diagnosis appears to provide a more reasonable interpretation of brain cancer rates over time than the actual data. Relatively stable age-standardised incidence rates are accompanied by mortality data that is stable before decreasing. Decreases in mortality are likely to be driven by improvements in survival.

While there is some evidence supporting the under-diagnosis of the older populations in earlier years, it cannot be known with certainty. The age-adjusted mortality and incidence age-standardised rates presented are speculative of how rates would look assuming under-diagnosis of the elderly occurred in the past.

Actual age-standardised and crude incidence and mortality rates for brain cancer remain an accurate description of what was recorded in the relevant years and will therefore continue to be published in CdiA without adjustment. This commentary is intended to support interpretations of brain cancer data, but not replace the data recorded.

Brain cancer relative survival time series will continue to be published within CdiA. This data remains an accurate reflection of relative survival rates for the population diagnosed with brain cancer for the respective periods. These survival rates are now accompanied by the age-adjusted tool which is used to identify whether changes in survival rates are being impacted by changes in the age of those diagnosed with cancer across time.

CdiA now includes survival rates by 20 year age groups over time. These data provide further insights into cancer survival over time and provide important information for all cancers.

Cancer data commentaries

Cancer data commentary no. 3

This commentary discusses trends in pancreatic cancer incidence, mortality and survival, in particular, changes that have occurred since around 2000.

The pancreas is located near the stomach; it produces enzymes that aid digestion and hormones that regulate blood sugar levels. Pancreatic cancer occurs when abnormal cells in the pancreas multiply out of control and form a tumour.

Pancreatic cancer has very low survival rates and is becoming more commonly diagnosed. Research indicates that the poorer outcomes associated with pancreatic cancer are primarily due to its presentation at an advanced stage. Early stages of pancreatic cancer do not usually produce symptoms, so it is generally advanced when it is diagnosed (AIHW 2012).

Terms used

Incidence rates refer to the rate of pancreatic cancer cases diagnosed.

Mortality rates refer to the rate of death from pancreatic cancer.

Projections are estimates for the most recent years (2017-2020 for incidence and 2019-2020 for mortality). Estimates are derived based on trends from the previous 10 years of actual data. Where this commentary discusses rates based on projections, the rates are described as 'estimated'.

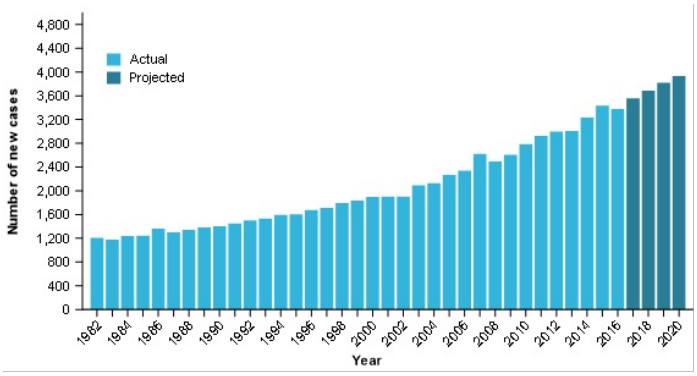
For those less familiar with statistical methods and terms, some assistance in their use is provided within the commentary. Please see the methods section of Cancer data in Australia for more detailed information.

Pancreatic cancer trends

The estimated number of pancreatic cancer cases diagnosed per year has more than doubled in 20 years

From 1982, the number of pancreatic cancer cases diagnosed each year was steadily increasing; from 2002, the number of cases continued to increase but overall, increases were greater. Between 1982 and 2002, the number of pancreatic cancer cases diagnosed increased by around 60% (from 1,200 cases in 1982 to 1,900 in 2002). It is estimated that the number of pancreatic cancer cases diagnosed in 2020 will be more than double those of 2002 (estimated 3,900 cases in 2020) (Figure 1). This increase in incidence from 2002 is attributable to general population growth, an ageing population and pancreatic cancer becoming more commonly diagnosed across various age groups.

Figure 1: Pancreatic cancer cases diagnosed, persons, 1982-2020



Source: AIHW Australian Cancer Database 2016

The ageing population places upwards pressure on pancreatic cancer case numbers

The Australian population continues to increase but the growth is not uniform across age groups. With life expectancy increasing, more people are living to older ages than in the past and older populations are growing at a faster pace than younger populations and the overall population growth.

Older populations experience higher rates of pancreatic cancer. The combination of the size of older populations increasing at greater rates and pancreatic cancer being more common at older ages contributes to the number of cases diagnosed increasing at greater rates than general population growth. A clearer understanding of the influence of the ageing population upon the number of pancreatic cancer cases diagnosed over time can be gained through the following crude and age-standardised incidence rate time series.

Pancreatic cancer incidence rates are increasing

About crude rates - interpreting time series

The crude rate of cancer is the rate of cancer within the population. The crude rate of cancer will remain the same where the rate of cancer increases at the same rate as population growth.

Given that pancreatic cancer more commonly occurs in older people and the size of older populations is increasing at a faster rate than general population growth, there is a regular upwards pressure on crude rates.

Crude incidence rates for pancreatic cancer increased from 7.9 cases per 100,000 persons in 1982 to 9.8 cases per 100,000 people in 2002; most of the increase during this time is attributable to impacts of an ageing population. By 2020, crude rates are estimated to reach 15 cases per 100,000; this increase is attributable to both the ageing population and pancreatic cancer becoming more commonly diagnosed across various age groups (Figure 2).

About age-standardised rates - interpreting time series

Like crude rates, age-standardised rate time series focus on changes to cancer rates. Unlike crude rates, they remove the impact of changes to the age composition of the population (such as impacts due to the ageing population).

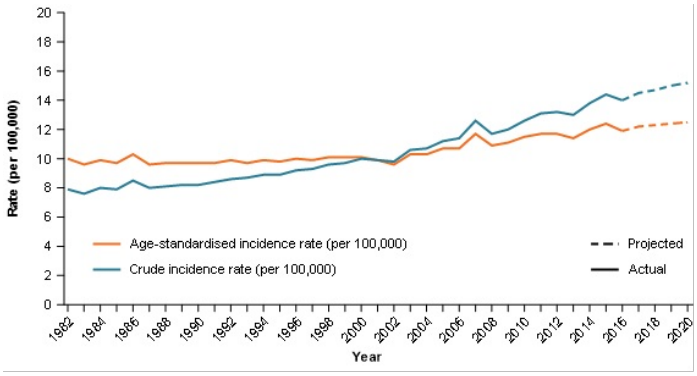
An increase in age-standardised rates indicates that overall cancer rates are increasing and there are ages for which the cancer is becoming more commonly diagnosed (and vice versa for decreasing age-standardised rates).

Whether an age-standardised rate is increasing, decreasing or remaining stable, it only indicates overall movement. Some rates among individual age groups may not be moving in the same direction as the overall age-standardised cancer rates.

Between 1982 and 2002, age-standardised incidence rates were stable and ranged between 9.6 cases per 100,000 people and 10.3 cases per 100,000 people (Figure 2).

Age-standardised incidence rates began to increase from 2002. It is estimated that age-standardised incidence rates for pancreatic cancer in Australia will be 12.5 cases per 100,000 persons by 2020 (Figure 2).

Figure 2: Pancreatic cancer age-standardised and crude incidence rates, persons, 1982-2020



Source: AIHW Australian Cancer Database 2016

The median age at diagnosis has fallen

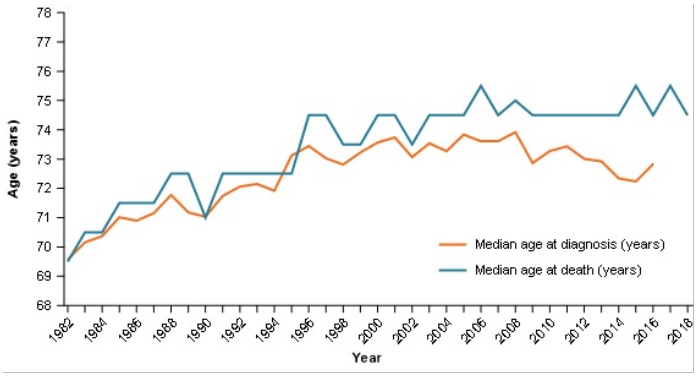
The median age at diagnosis had been increasing from 1982.These increases slowed from the late 90's and began to decrease from 2008 (the median age was 69.6 in 1982, increasing to a peak of 73.9 in 2008 and by 2016 it was 72.8) (Figure 3).

The median age at death from pancreatic cancer has moved in a relatively similar manner in that there has been a general stabilisation from original increases; it differs in that there has not been a drop in median age at death (Figure 3).

Comparability of median age at diagnosis and median age at death

Please note that median age at diagnosis and median age at death are derived from different data sources. The median age at diagnosis time series is more sensitive to change as it is calculated to a month whereas median age at death is only calculated to a year. Comparisons between the two may be impacted by the difference in sensitivity to some extent.

Figure 3: Pancreatic cancer median age at diagnosis and median age at death, persons, 1982-2018



Note: Median age of diagnosis and death are obtained from different data sources. Median age at diagnosis can be calculated to a month while median age at death can only be calculated to a year.

Source: AIHW Australian Cancer Database 2016 and AIHW National Mortality Database

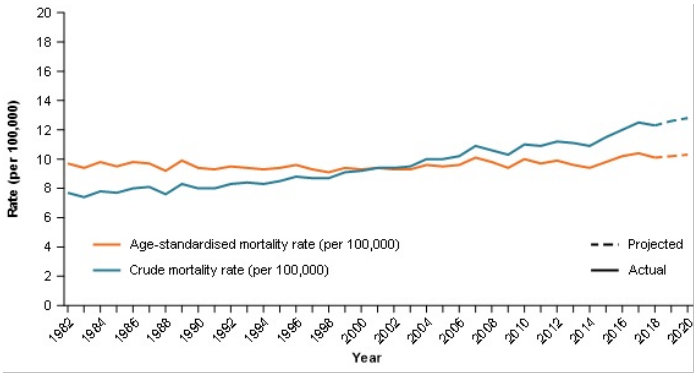
Despite increases in incidence, mortality rate trends remain relatively consistent

Between 1982 and 2020, crude mortality rates ranged between 7.4 cases per 100,000 persons in 1983 and an estimated 12.8 cases per 100,000 persons in 2020. The ageing population is the predominant driver for increasing crude mortality rates (Figure 4).

Between 1982 and 2020, age-standardised mortality rates ranged from 9.2 cases per 100,000 persons in 1982 to 10.4 cases per 100,000 persons in 2017 (Figure 4). While the more recent mortality rates are generally on the higher end of the pancreatic cancer mortality rate range, they have not increased to the same degree as age-standardised incidence rates.

The widening of the gap between incidence and mortality rates indicates improvements in survival rates and the risk data provided later in this commentary help visualise the improvements.

Figure 4: Age-standardised and crude mortality rates, pancreatic cancer, persons, 1982–2020



Source: AIHW National Mortality Database

Survival rates remain low but have improved

About relative survival

An observed cancer survival rate is the rate of survival of those diagnosed with cancer. An observed survival rate considers only whether the person has survived for the period in question. It is limited to the extent that it does not take into account the fact that some deaths may have occurred due to causes other than the relevant cancer.

A relative survival rate adjusts the observed survival rate to account for deaths that may be expected to occur in the general population. A relative cancer survival rate is the survival rate of people diagnosed with cancer relative to the survival rate for the general population. A rate of 100% indicates there is no difference between the survival of those diagnosed with cancer and the survival of the general population.

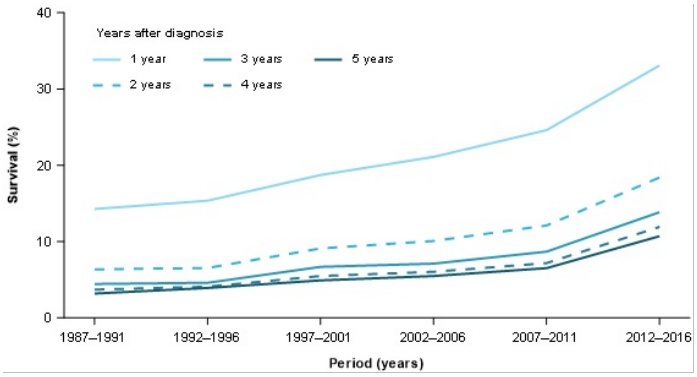
All survival rates referred to in this commentary are relative survival rates. Confidence intervals are available in the supplementary tables.

Survival rates for pancreatic cancer are amongst the lowest of all cancers. The 5-year survival rate for all cancers combined (that is, the survival rate of people diagnosed with any type of cancer) in 2012–2016 was around 69%; the equivalent 5-year survival rate for pancreatic cancer was 10.7%.

The 5-year survival rate of 10.7% remains low but it has been improving (6.5% in 2007–2011) and is around 3 times the survival in1987–1991 (3.2%) (Figure 5).

Shorter-term survival rates have improved over time and greater improvement is evident in more recent years. For instance, between 2007–2011 and 2012–16, 1-year survival improved by over 8 percentage points (from 24.6% to 33.1%) (Figure 5).

Figure 5: Relative survival rates, 1-5 years, pancreatic cancer, persons, 1987-1991 to 2012-2016



Source: AIHW Australian Cancer Database 2016

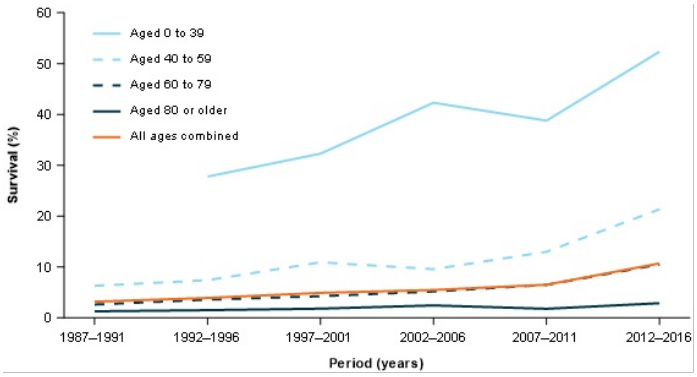
Survival is improving for younger and older populations

Survival rates for pancreatic cancer decrease as age at diagnosis increases. In 2012–2016 the 5-year survival for people aged 0 to 39 was 52%; the equivalent rate for people aged over 80 was 2.9% (Figure 6).

5-year survival rates have been improving for younger and older age groups. In 1997–2001, the 5-year survival for people aged 0–39 was 32%; by 2012–2016 it had increased to 52%. Across the same time periods, for people aged 40–59 years, survival increased from 11% to 21% and for people aged 60–79, survival has increased from 4.3% to 10.5% (Figure 6).

Of the 16,000 total cases in 2012–2016, around 8,600 (54%) were diagnosed in people aged 60 to 79 years. The 5-year survival rate for pancreatic cancer (all ages) continues to be very close to that of the 60–79 age group. For example, the 5-year survival rate for people aged 60–79 was 10.5% in 2012–2016 and 10.7% for pancreatic cancer overall (all ages combined) (Figure 6).

Figure 6: 5-year relative survival rates, by age, pancreatic cancer, persons, 1987-1991 to 2012-2016



Source: AIHW Australian Cancer Database 2016

Pancreatic cancer incidence risk is increasing

About risk adjusted for competing mortality - time series

Pancreatic cancer risk is either the risk of being diagnosed with (incidence) or dying from (mortality) pancreatic cancer by a specified age.

Risk estimates are adjusted for competing mortality. A fundamental aspect of risk adjusted for competing mortality is that it considers the likelihood of reaching a given age and then considers the likelihood of diagnosis with (or death from) the cancer.

Given that life expectancy in Australia is increasing, more people are reaching the ages at which pancreatic cancer is more commonly diagnosed. Within the risk time series, risk increases to some extent because more people are more likely to survive to older ages.

Where risk is low and estimates are more volatile, analysis of risk is discussed using the average over a period of time rather than single years (for example, the average risk from 2011 to 2020).

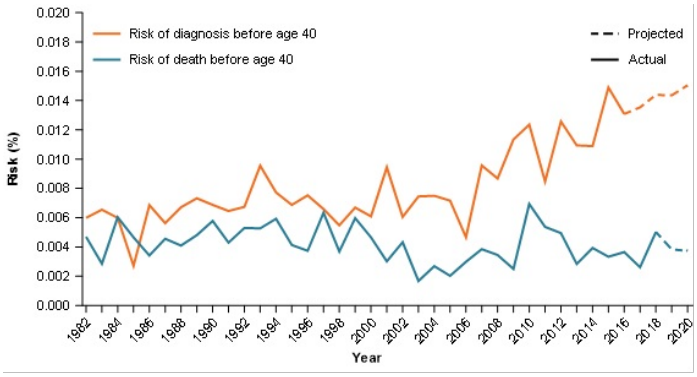
Risk by the age of 40

The risk of being diagnosed with pancreatic cancer by the age of 40 has been increasing (average risk of 1 in 14,300 for the 1991–2000 period, to 1 in 11,900 in 2001–2010 and 1 in 7,800 in 2011–2020) (Figure 7).

While the risk of being diagnosed with pancreatic cancer by the age of 40 is reaching its highest levels in 2011–2020, this is not the case for the risk of dying from pancreatic cancer. The average risk of death for the 2011–2020 period is 1 in 25,500. This is an increase on the average risk over 2001–2010 (1 in 29,900) but is lower than the average risk of death for the 1991–2000 period (1 in 20,300) (Figure 7). The increasing gap between the risks of diagnosis and death reflects the improvement in survival for younger people diagnosed with pancreatic cancer.

The risk of being diagnosed with pancreatic cancer is increasing but it remains a relatively low risk for younger populations. To provide some context by comparison with a couple of cancers more commonly associated with ages 40 and under, the average risk of being diagnosed with colorectal cancer by the age of 40 between 2011–2020 is 1 in 550; for melanoma of the skin it is 1 in 301.

Figure 7: Risk of diagnosis and risk of death, by the age of 40, pancreatic cancer, persons, 1982–2020

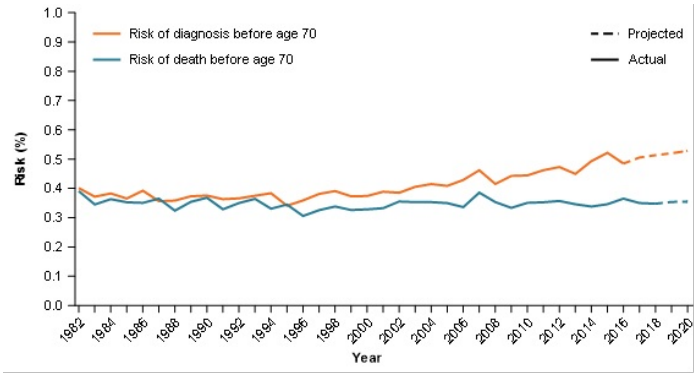


Source: AIHW Australian Cancer Database 2016 and AIHW National Mortality Database

Risk by age 70

Since 1982, the median age of diagnosis has generally remained around the age of 70. The risk of being diagnosed with pancreatic cancer by the age of 70 has trended upwards since 2002 (1 in 260 in 2002 to an estimated 1 in 189 in 2020). Over the same time, the risk of death by the age of 70 remained similar (1 in 281 in 2002 to an estimated 1 in 282 in 2020) (Figure 8).

Figure 8: Risk of diagnosis and risk of death, by the age of 70, pancreatic cancer, persons, 1982–2020



Source: AIHW Australian Cancer Database 2016 and AIHW National Mortality Database

Can the data provide insights into the potential reasons behind changing pancreatic cancer rates?

More information and data is required to better understand the potential drivers affecting pancreatic cancer incidence, mortality and survival trends in Australia. This section discusses the available data trends and highlights some possible reasons for the observed changes.

The possibilities considered in this section include:

- improvements in cancer detection
- changes in risk factors
- improvements in cancer treatment
- changes in the proportion of different histological types of pancreatic cancer (noting that mortality by histology is not currently available).

Changes in histology type

Histology describes the type of cells in which cancer originates. Symptom patterns and survival outcomes vary based on histology type. Histology groupings presented in this commentary are based on the histological groups described in *Cancer incidence in five continents* (Brayet al. 2017). See Appendix A for more details.

The histological types for pancreatic cancer include adenocarcinoma, unspecified malignant neoplasms, unspecified carcinomas, neuroendocrine neoplasms, other specified carcinomas, sarcomas and other specified malignant neoplasms. Sarcomas and other specified malignant neoplasms are not discussed further due to the small number of cases diagnosed (4 cases in total in 2016) but are included in totals.

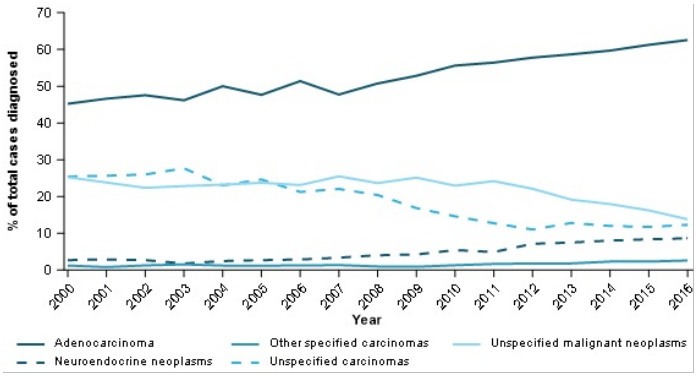
Please note that changes in the proportion of cases diagnosed by histology type may change over time to some degree due to changes in coding practices (for example, some proportion of adenocarcinoma increases over time may be due to reductions in unspecified carcinomas).

While acknowledging changes in coding practices make it difficult to establish the degree to which different histology types may be becoming more commonly diagnosed, neuroendocrine neoplasms increasingly appear to make up a greater portion of the total number of pancreatic cancer's diagnosed (Figure 9). Neuroendocrine neoplasms also have the highest survival rates of all pancreatic cancer histological types (neuroendocrine neoplasms had a 5-year survival of 69% in 2012–2016) (Figure 10).

Neuroendocrine 5-year survival in 2012–2016 improved by around 10 percentage points from 2007–2011 (from 59% to 69%). Improvements in survival for pancreatic cancer's most common histology type, adenocarcinomas, are key to improvements in pancreatic cancer survival rates. Adenocarcinoma has very low 5-year survival rates but they have also improved (from 4.7% in 2007–2011 to 6.7% in 2012–2016) (Figure 10).

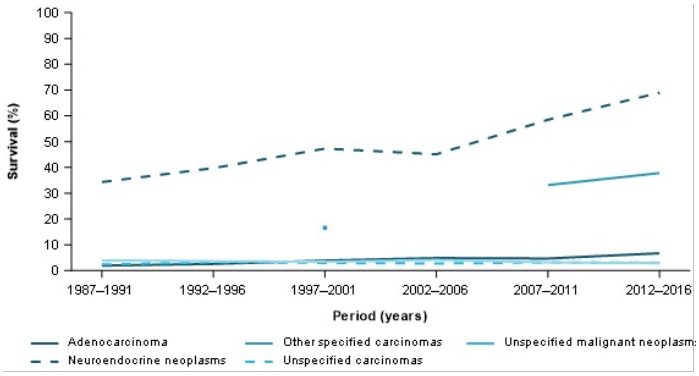
In 1987–1991, the adenocarcinoma 5-year survival rate was 1.9% and the overall pancreatic cancer survival rate was 3.2%. In 2012–2016, the respective rates were 6.7% and 10.7% (Figures 5 and 10). Improvements in adenocarcinoma survival are key to the improvements in pancreatic cancer survival overall. The increasing difference between the overall pancreatic survival rate and the adenocarcinoma rate is suggestive that histology types with higher survival are contributing more towards overall pancreatic cancer survival rates.

Figure 9: Proportion of pancreatic cancer cases diagnosed by histology type, persons, 1982–2016



Source: AIHW Australian Cancer Database 2016

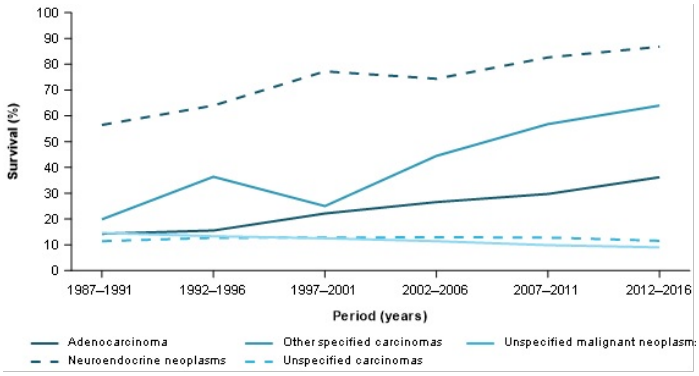
Figure 10: 5-year relative survival, pancreatic cancer, by histology type, persons, 1987–1991 to 2012–2016



Source: AIHW Australian Cancer Database 2016

Focussing on shorter-term survival for the most common histology type, adenocarcinoma 1-year survival improved from 30% in 2007–2011 to 36% in 2012–2016 (Figure 11).

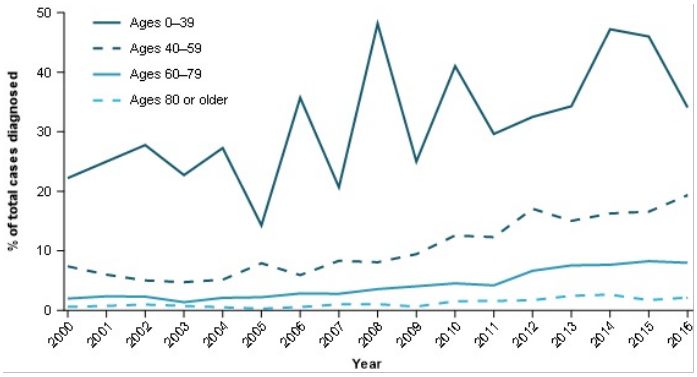
Figure 11: 1-year relative survival, pancreatic cancer, by histology type, persons, 1987–1991 to 2012–2016



Source: AIHW Australian Cancer Database 2016

As previously discussed, survival rates for pancreatic cancer decrease with increasing age. Higher survival rates for younger ages (Figure 6) are also influenced by histology to some degree. In particular, the higher survival neuroendocrine neoplasms are proportionally more common in younger age groups (Figure 12).

Figure 12: Proportion of pancreatic cancers diagnosed with neuroendocrine neoplasm histology type, by age group, persons, 2000–2016



Source: AIHW Australian Cancer Database 2016

Exploring survival rates by age group can provide insights into whether the higher survival rates observed for neuroendocrine neoplasms are only due to it having a younger age profile. Comparisons of the 2012–2016 5-year survival rates for people diagnosed at age 60–79 show that the survival rate is much higher for those diagnosed with neuroendocrine neoplasms (64%) than adenocarcinomas (7.1%) (AIHW 2020, unpublished). This highlights that the higher survival rates for neuroendocrine neoplasms are not solely due to a younger age profile.

Improvements in cancer detection

Improvements in cancer detection would be expected to generally result in increasing incidence rates (for a period of time), increasing survival rates and potentially younger age at diagnosis (as the cancer is diagnosed earlier than it would have otherwise been). Mortality rates would be expected to either decrease or at least not increase proportional to incidence rates.

There are no early detection tests for pancreatic cancer. Pancreatic cancer trends do however exhibit some similarities to trends arising from improvements in cancer detection. As national data on stage at diagnosis are not currently available for pancreatic cancer, it is not possible to determine whether the cancer is being diagnosed at earlier stages.

Increase in the prevalence of risk factors for pancreatic cancer

Risk factors associated with pancreatic cancer include smoking, overweight/obesity, age, family history, diabetes, chronic pancreatitis, liver cirrhosis and stomach infections (Cancer Australia 2020). An increase in the prevalence of these risk factors may lead to increases in pancreatic cancer incidence.

Each risk factor will be changing to varying degrees within the population, the extent to which these changes impact on pancreatic cancer rates cannot be known with any certainty. Focussing on several key risk factors, smoking rates are declining while overweight/obesity and diabetes are increasing. If the key risk factors for pancreatic cancer are changing over time, it may lead to changes in incidence rates and possibly the age at diagnosis may change over time as a result.

The ageing population's impact on incidence and mortality counts and crude rates is discussed earlier. The ageing population will also place upwards pressure on median age at diagnosis and downwards pressure on survival rates (because survival rates decrease with increasing age at diagnosis).

More effective treatment

More effective treatments would be expected to result in increases in survival rates, decreases in mortality and increases in median age at death. Increases in rates of survival by stage at diagnosis (which is not available nationally for pancreatic cancer) would indicate that any improvements in survival are likely to be due to improvements in treatment rather than pancreatic cancers being diagnosed at earlier stages on average.

National Pancreatic Cancer Roadmap

Cancer Australia is working with the Department of Health to develop a *National Pancreatic Cancer Roadmap* to improve outcomes and survival for people with pancreatic cancer. The Roadmap will identify key priority areas for action over the next five years, across the continuum of pancreatic cancer care and pancreatic cancer research. The roadmap is expected to be developed by December 2021. More information about the roadmap is available on the Cancer Australia website.

Where can I find more data on pancreatic cancer?

Data used to inform this commentary are available on the Data page.

A more complete range of pancreatic cancer data is available within the Cancer data in Australia report. including by sex. General incidence, mortality and survival trends discussed in this paper are common across the sexes although males have higher incidence and mortality rates (survival rates are generally similar).

The Cancer data in Australia report is updated annually but note that the data to inform this commentary were obtained from the Australian Cancer Database, National Mortality Database and associated projections as at the time this commentary was released. For this reason, the estimates presented in this commentary may not be consistent with the estimates presented in Cancer data in Australia

after it has been updated.

Attachment A

Pancreatic cancer (ICD-10 C25) histology groupings

Histology group	ICD-O-3.1 histology codes
Carcinomas	801–857
Adenocarcinomas	814, 816, 819–823, 825–842, 848–855, 8570–8574, 8576–8579
Neuroendocrine neoplasms	8013, 8041–8045, 815, 824
Other specified carcinomas	8046, 809–813, 817–818, 843–847, 856, 8575
Unspecified carcinomas	8010–8012, 8014–8039
Sarcomas	880–893, 899, 904, 9120–9139, 9141–9249, 954–958
Other specified malignant neoplasms	858–879, 894–898, 900–903, 906–911, 925–953
Unspecified malignant neoplasms	800

Note: Only the first 3 digits are given except when the 4th digit is necessary.

Cancer data commentaries

Cancer data commentary 2

This commentary discusses risk trends for melanoma of the skin at different ages and over time. It supports the introduction of the expanded risk data available in the Cancer data in Australia report.

Some key terms

- For convenience, melanoma of the skin has been abbreviated to ‘melanoma’; please note melanoma may occur in other sites of the body.
- Melanoma incidence risk’ is the risk of being diagnosed with melanoma while ‘melanoma mortality risk’ is the risk of dying from melanoma. This paper uses a risk method that adjusts for competing mortality; Cancer data commentary no.1 provides help in understanding cancer risk methods and concepts.

Melanoma risk

Cancer awareness campaigns such as the 'Slip-Slop-Slap’ campaign of the 1980s and ensuing advertisements since have increased public awareness of melanoma and its prevention. Through continuing education, today’s population should be better informed about how to identify and prevent melanoma than populations of the past.

Lifetime melanoma incidence risk informs risk of being diagnosed with melanoma for the total population (that is, the risk across all ages of the population). Within the total population, older people have lived most of their lives in a less ‘sun smart’ environment while younger Australians have lived the majority of their life in times when public awareness was greater. The following melanoma incidence risk by age commentary highlights the falling risk for the younger populations of today and increasing risk for older populations.

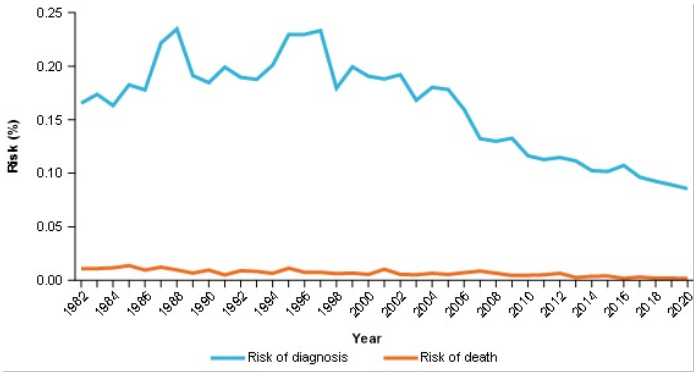
The risk of being diagnosed with melanoma of the skin by the age of 30 has more than halved in 23 years

In 1982, the risk of being diagnosed with melanoma by the age of 30 was around 1 in 600 people. Incidence risk trended upwards and in 1997 has risen to around 1 in 430 people (Figure 1).

From 1997, the risk of melanoma by the age of 30 began to fall. Based on current projections, in 2020 the risk of being diagnosed with melanoma by the age of 30 (estimated at around 1 in 1,170 people) has fallen to less than half of the risk in 1997 (Figure 1).

Following years of consistent decline, the risk of death from melanoma by the age of 30 in 2020 is estimated to be less than one-sixth of the risk in 1982 (1 in 62,000 persons in 2020 compared with 1 in 9,100 persons in 1982) (Figure 1).

Figure 1: Incidence and mortality risk by the age of 30, melanoma of the skin, persons



Note: Incidence risk for 2017–2020 and mortality risk for 2019 – 2020 are based on projections.

Source: AIHW Australian Cancer Database 2016 and National Mortality Database

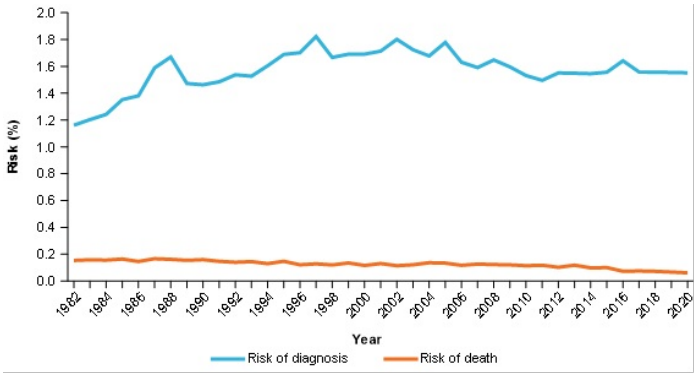
The risk of being diagnosed with melanoma of the skin by the age of 60 peaked in the 1990’s

In 2005, and following years of increasing risk from 1982, melanoma incidence risk by the age of 60 began to fall and then stabilise from around 2012 (1 in 56 people in 2005 to an estimated 1 in 65 people in 2020) (Figure 2).

The large difference between the incidence risk and mortality risk reflects the relatively high survival rates for melanoma when considered in the context of other cancers..

The risk of death from melanoma by the age of 60 decreased consistently from 1982; from 2013 melanoma mortality risk decreased more sharply (from 1 in 650 in 1982 to 1 in 850 in 2013 and an estimated 1 in 1,600 in 2020) (Figure 2).

Figure 2: Incidence and mortality risk by the age of 60, melanoma of the skin, persons



Note: Incidence risk for 2017–2020 and mortality risk for 2019 – 2020 are based on projections.

Source: AIHW Australian Cancer Database 2016 and National Mortality Database

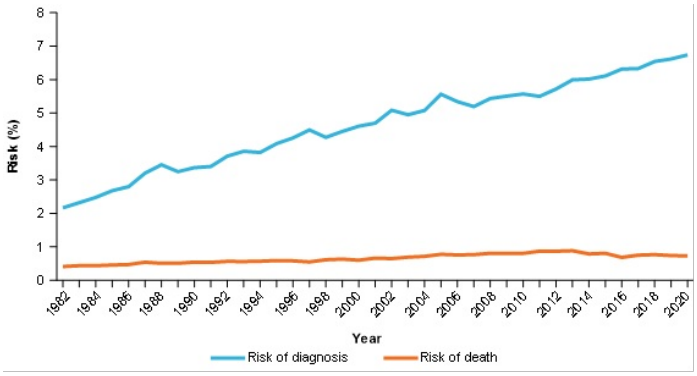
The risk of death from melanoma of the skin peaked in 2013

The lifetime risk of being diagnosed with melanoma is estimated to have tripled since 1982 (1 in 46 people in 1982 to an estimated 1 in 15 people in 2020) (Figure 3). Considering the younger population's melanoma of the skin incidence risk has been decreasing and incidence risk by the age of 60 has been stabilising, the continuation of increasing melanoma incidence risk is driven by risks from the older population.

Part of the increase in the total population's risk of being diagnosed with melanoma is due to increasing life expectancy. Essentially, the ageing population increases the proportion of people living to ages for which melanoma is generally more common (Figure 3).

The lifetime risk of death from melanoma continued to rise up until 2013 (Figure 3). Please note that lifetime risk is not the risk for the 'average lifetime', it includes all people within the population and in very broad terms may be considered as risk by age 100 and more.

Figure 3: Lifetime incidence and mortality risk, melanoma of the skin, persons

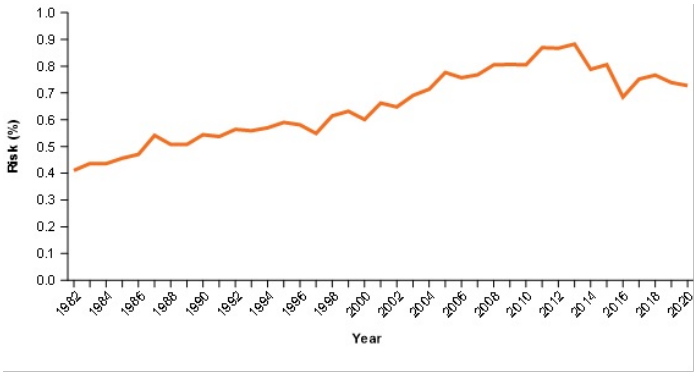


Note: Incidence risk for 2017–2020 and mortality risk for 2019 – 2020 are based on projections.

Source: AIHW Australian Cancer Database 2016 and National Mortality Database

In 2013, the total population's risk of death from melanoma was around 1 in 110 people; the lifetime melanoma mortality risk in 2013 had more than doubled from 1982 (1 in 240 people). Since the 2013 peak, lifetime melanoma mortality risk is estimated to have fallen to 1 in 140 people (Figure 4). Sharply decreasing mortality risk in conjunction with increasing incidence risk is indicative of improving survival outcomes for those diagnosed with melanoma (Figure 4).

Figure 4: Lifetime mortality risk, melanoma of the skin, persons



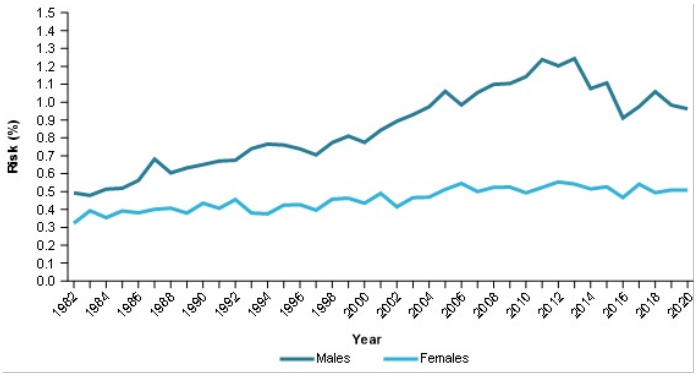
Note: Mortality risk for 2019 – 2020 are based on projections.

Source: National Mortality Database

The lifetime risk of death for males from melanoma of the skin has fallen strongly

The decrease in lifetime mortality risk from 2013 is driven largely by reductions in the comparatively high risk for males (1 in 80 in 2013 to an estimated 1 in 104 in 2020). For females, the lifetime risk of death also fell but at a slower rate (1 in 185 in 2013 to an estimated 1 in 197 in 2020 (Figure 5).

Figure 5: Lifetime mortality risk, melanoma of the skin, by sex, 1982–2020

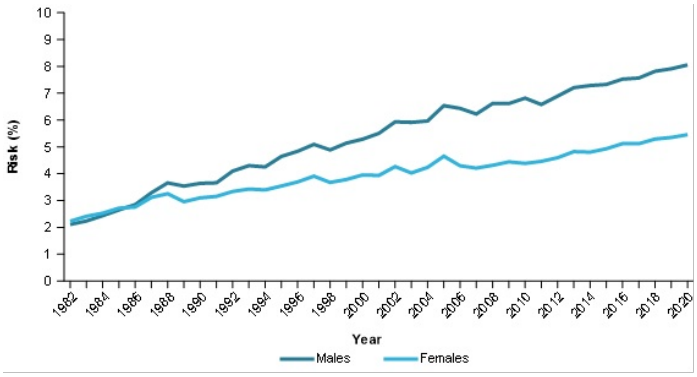


Note: Mortality risk for 2019 – 2020 are based on projections.

Source: National Mortality Database

For both sexes, the lifetime risk of being diagnosed with melanoma continues to increase (figure 6) but the lifetime mortality risk for melanoma is starting to decrease.

Figure 6: Lifetime incidence risk, melanoma of the skin, by sex, 1982–2020



Note: Incidence risk for 2017–2020 are based on projections.

Source: AIHW Australian Cancer Database 2016

While melanoma mortality risk peaked in 2013, impacts of an ageing population (that is, more people living to ages where melanoma incidence rates are higher) will continue to place upwards pressure on the risk of being diagnosed with melanoma and in turn the risk of death from melanoma; this may be particularly true for the ageing populations living in times when 'Sunsmart' awareness was less.

Information about the risk data, terms used and where to find melanoma data

About the risk data

- This paper uses a risk method that adjusts for competing mortality; Cancer data commentary no.1 provides help in understanding cancer risk methods and concepts.
- Risk within this paper outlines the risk within the Australian population; an individual's risk may be different depending on their own risk factors (for example, a daily smoker may have a higher risk of developing types of cancer where smoking is a risk factor).
- Cancer incidence risk in 2017–2020 and cancer mortality risk in 2019–2020 are projections; actual data informs other years.

Terms used

Lifetime risk refers to the risk of (being diagnosed with or dying from) melanoma of the skin for the total population. Lifetime risk is not the risk of the 'average lifetime'; it is risk by age 100 and greater (to the oldest person/s in the population for the year).

Melanoma incidence risk refers to the risk of being diagnosed with melanoma of the skin.

Melanoma mortality risk refers to the risk of dying from melanoma of the skin.

Where to find melanoma of the skin data

Melanoma data used in the commentary

Data used to inform this commentary is available in these Excel workbooks:

Data tables: Cancer data in Australia commentary no. 2 - Risk of melanoma of the skin by age and over time (XLSX 145kB).

Cancer data in Australia is updated and revised annually. The data used to inform this commentary is consistent with Cancer data in Australia as of 30 October 2020. Following future updates to Cancer data in Australia, the data within this commentary will differ from future Cancer data in Australia reports to some extent.

Cancer data commentaries

Cancer data commentary no. 1

The 2020 release of Cancer data in Australia (CDiA) contains a greater range of risk data than previous AIHW releases. This cancer data commentary provides guidance on using the new risk data and summarises key changes.

Changes in the 2020 release of cancer risk data

Changes to CDiA include the following:

- Previously, the only risk data available was not adjusted for competing mortality; now risk adjusted for competing mortality is also available
- Risk by age 5 up to risk by age 90 (in 5-year increments) and lifetime risk are now released – previously only risk by age 75 and by age 85 were available
- Because of methodological issues associated with its derivation, 'All cancers combined' incidence risk time series is not available
- While the previous method of calculating incidence risk (not adjusted for competing mortality) has been revised, the new method is similar to the previous method and produces comparable results (with the exception of 'All cancers combined' incidence).

About the two methods for measuring risk

'Cancer risk' is generally used to describe the risk of being diagnosed with, or the risk of dying from, cancer.

CDiA includes a 'risk adjusted for competing mortality' (AdjCom) method and a 'risk unadjusted for competing mortality' (RUCM) method. A more technical overview of the methods is available in the methods section of CDiA.

Risk unadjusted for competing mortality only considers the likelihood of being diagnosed with, or dying from, cancer. 'Competing mortality' considers the probability of a certain event occurring for a person (e.g. diagnosis of cancer, death from cancer) while taking into account the fact that the person might die before the event happens. The additional factor of competing mortality results in an estimate that better reflects the 'real world' risk but it also produces more complex comparisons. In particular, to what extent are changes in risk over time, or differences between the risk for two populations, influenced by competing mortality and to what extent are they driven by cancer risk?

Why publish two risk methods?

The different methods have their own respective strengths and limitations. Therefore, one method may be better suited to inform a particular investigation than the other. Guidance on using the methods is provided in more detail in the following sections.

What are the practical differences between the risk methods?

AdjCom measures risk by taking into account the mortality that occurs due to other causes whereas RUCM does not. The following hypothetical situation helps highlight the practical differences.

- Suppose that in 1982 and then in 2015, only people aged 10 to 14 were diagnosed with condition X and only people aged 85 to 89 were diagnosed with condition Y.
- Suppose that the number of people who were diagnosed with condition X was equal to 0.5% of the population alive aged 10 to 14, and the number of people who were diagnosed with condition Y was equal to 0.5% of the population alive aged 85 to 89.

Table 1 provides the risk of diagnosis using RUCM and AdjCom for conditions X and Y in 1982 and 2015 and calculates the risk for each condition.

Table 1: Risk of diagnosis, hypothetical conditions X and Y, RUCM and AdjCom, 1982 and 2015

Condition	RUCM 1982	RUCM 2015	AdjCom 1982	AdjCom 2015
Condition X	2.4690% (1 in 41)	2.4690% (1 in 41)	2.4635% (1 in 41)	2.4889% (1 in 40)
Condition Y	2.4690% (1 in 41)	2.4690% (1 in 41)	0.4822% (1 in 207)	1.0636% (1 in 94)

Observations:

- RUCM for conditions X and Y were the same for 1982. RUCM does not distinguish between age groups. A population risk based only on a rate of 0.5% of 10 to 14 year olds will be the same as a population risk based only on 0.5% of all 85 to 89 year olds.
- AdjCom for condition Y is less than AdjCom for condition X. When competing mortality is taken into account, people have less chance of being diagnosed with condition Y than condition X because a much smaller proportion of people reach age 85 than reach age 10.
- RUCM has remained the same over time. For conditions X and Y, RUCM is the same from 1982 to 2015 because the incidence rates of X and Y have remained unchanged and RUCM does not distinguish between age groups or the likelihood of surviving to a given age.

- AdjCom has increased over time. The risk of being diagnosed with condition Y has more than doubled, even though the incidence rates in 1982 and 2015 are the same (0.5% of the population aged 85 to 89). This occurred because a much greater proportion of people are living to the age of 85 in 2015 than in 1982.

Please note that RUCM minus AdjCom does not somehow isolate the effect of competing mortality. In fact, AdjCom can be higher than RUCM, as is the case for condition X in 2015 in the example above. To view RUCM and AdjCom formulas, please go to Cancer data in Australia methods section.

Which risk method should I use?

The selection of which risk method to use depends on the purpose of the investigation. The most complete understanding of risk is accomplished when using the two methods together.

By factoring in competing mortality, AdjCom provides a better estimate of 'real world' cancer risk (that is, a better approximation of the likelihood of being diagnosed with, or dying from, cancer in Australia). However, when viewing changes over time or between populations, the question when using AdjCom is "are the observed differences or changes due to competing mortality or due to the risk purely attributable to cancer?".

On the other hand, in not factoring in competing mortality, RUCM is less representative of the 'real world' risk, particularly at older ages. However, its strength is that comparisons and time series are solely attributable to cancer risk (i.e. not affected by differences in competing mortality).

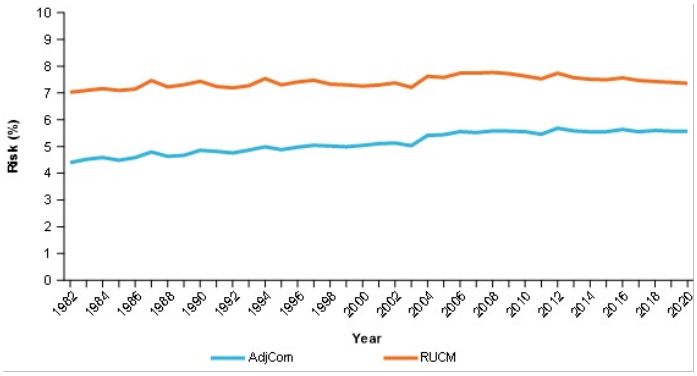
Because the methods have opposing strengths and limitations, use of the two methods together can help provide a more complete understanding of risk. In general, when writing about cancer risk, AIHW cite AdjCom but also use RUCM to understand cancer-specific trends that are isolated from competing mortality.

How the risk methods can be used together

RUCM and AdjCom measure risk differently and are not directly comparable. However, the information from the respective time series can be used in a complementary manner to provide greater insights into changes over time; the following discussion of changes in lung cancer risk over time helps illustrate this by using AdjCom to estimate the 'real world' risk and RUCM to isolate cancer risk.

Between 1982 and 2020, the risk of persons being diagnosed with lung cancer by the age of 90 is estimated to have increased from 1 in 23 to 1 in 18. The increase in risk of being diagnosed with lung cancer by the age of 90 is mostly due to a greater proportion of people surviving to the ages where lung cancer is more commonly diagnosed but increasing lung cancer rates have contributed to some degree (Figure 1).

Figure 1: Risk of being diagnosed with lung cancer by the age of 90, risk adjusted for competing mortality and risk unadajusted for competing mortality, persons, 1982 to 2020



Source: AIHW ACD 2016

The above interpretation of lung cancer risk is undertaken by using AdjCom to provide the 'real world' estimate but RUCM to interpret cancer specific risk change over time. Given RUCM focusses only on cancer risk and the RUCM time series is considerably flatter than AdjCom, the sharper increase in AdjCom is likely predominantly due to changes in competing mortality over time.

When using RUCM to assist in the interpretation of AdjCom time series, note that RUCM less AdjCom does not equal competing mortality.

Difficulties using AdjCom to compare populations with different competing mortality

AdjCom comparisons between different populations are accurate but can be open to misinterpretation. Where readers are not aware of the competing mortality concept, it is likely that comparisons will be interpreted as only being due to cancer rates. Where readers are aware of the concept, the question often arises as to whether differences are due to competing mortality or cancer rates.

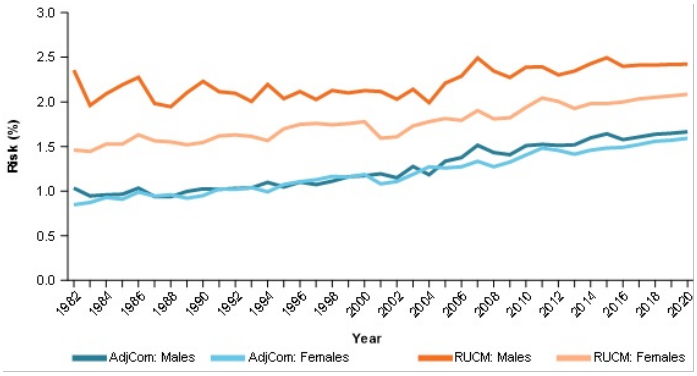
The potential for misinterpretation, and how to address the issue by using the methods together, is demonstrated in the following consideration of the question 'Are males more likely to be diagnosed with pancreatic cancer?'.

AdjCom analysis:
The risk of males being diagnosed with pancreatic cancer by the age of 90 between 1982 and 2020 is generally quite similar to females (Figure 2).

RUCM analysis:
Between 1982 and 2020, males consistently have a greater risk of being diagnosed with pancreatic cancer by the age of 90 (Figure 2).

AdjCom used in conjunction with RUCM analysis:
Between 1982 and 2020, the risk of males being diagnosed with pancreatic cancer is quite similar to females. More precisely though, males have a greater risk of being diagnosed with pancreatic cancer but females are more likely to live to the ages where pancreatic cancer more commonly occurs (Figure 2).

Figure 2: Risk of being diagnosed with pancreatic cancer by the age of 90, by sex, RUCM and AdjCom, 1982 to 2020



Source: AIHW ACD 2016

International cancer risk comparisons

When comparing Australian cancer risk data internationally, care should be taken to ensure the comparisons use the same method.

The International Agency for Research on Cancer presents international risk comparisons; these comparisons are unadjusted for competing mortality and the comparisons measure risk of being diagnosed with (based on cases), and risk of death from, specific cancers. The RUCM data AIHW produces is the most comparable method, noting that it measures the risk of being diagnosed for people, not cases (Appendix B provides information on the generally negligible difference between measuring risk of people being diagnosed with cancer and the risk of cancer cases being diagnosed).

General hints for using risk adjusted for competing mortality

Using life expectancy to help interpret change in risk adjusted for competing mortality

Over time, life expectancy is increasing. Cancer is more common in older ages and more people are surviving to older ages. Cancer specific risk may be increasing or decreasing depending on the cancer but the greater number of people reaching older ages, the greater the upwards pressure on the population's cancer risk.

Using life expectancy to help risk adjusted for competing mortality comparisons

AdjCom comparisons between populations are influenced by cancer rates and competing mortality. RUCM can be used to identify which population has higher rates of cancer. In regards to competing mortality differences, the population with lower life expectancy should have less upwards pressure on risk to some extent because the population is less likely to live to the ages where cancer more commonly occurs.

Using 'younger' age groups to simplify interpreting risk adjusted for competing mortality

In many circumstances, risk will be used as supportive information or used a simple measure to inform a general audience. In such circumstances, it may be both undesirable and impractical to distinguish between competing mortality impacts and cancer specific impacts. If appropriate, consideration could be given to reporting on risk by age 75 in preference to older ages. Risk by age 75 is less impacted by competing mortality than older ages; this results in:

- RUCM and AdjCom estimates being more similar than at older ages and therefore less likely to provide contradictory comparisons or trends
- interpretation of risk over time, or between sexes, being more strongly influenced by cancer specific risk (cancer specific risk is assumed to be the focal point for many general audiences).

Lifetime risk may not be the most appropriate indicator to inform risk for the general population

Lifetime risk is not the risk for an average lifetime. Lifetime risk may be considered as risk by the age of the oldest person in the population for each year; this will be risk by age over 100 for the cancer data time series. Given most people are not expected to live to beyond 100, lifetime risk may not be the most appropriate indicator where the purpose is to provide the general population with a simple and relevant indication of cancer risk.

More about the additional risk by age data

For both AdjCom and RUCM, risk is reported in 5-year increments from risk by age 5 to risk by age 90. Lifetime risk is also provided for AdjCom.

The provision of additional risk data by age allows interpretation of cancer risk, and cancer risk trends, for more stages of life.

All cancers combined' incidence risk time series is not available

The time series for All cancers combined incidence risk are not available because the RUCM and AdjCom methods cannot do so with suitable accuracy; the following paragraphs discuss this in more detail.

What should AdjCom and RUCM measure?

The AdjCom and RUCM methods should ideally calculate incidence risk only including people who have not been diagnosed with cancer before; the population who have previously been diagnosed with cancer realised their cancer incidence risk in the year they were first diagnosed with cancer.

What do AdjCom and RUCM measure?

The AdjCom and RUCM methods used calculate incidence risk based on the number of people diagnosed in the year, irrespective of whether individuals have been diagnosed with cancer in previous years.

Why can't cancer incidence risk be calculated using only those diagnosed with cancer for the first time?

Over 100 years of cancer incidence data would be required to identify all people diagnosed with cancer for the first time so the data required to calculate the exact risk of diagnosis are not yet available, i.e. based only on those diagnosed with cancer for the first time.

A 'best estimate' of cancer incidence risk using the 'first time diagnosed' concept is provided in Attachment A. The 'best estimate' is provided for 2015 and uses 34 years of cancer data to identify and account for the population who have previously been diagnosed with cancer.

Are the AdjCom and RUCM incidence risk measures reliable?

Comparisons between AdjCom and the 'best estimate' of cancer incidence risk are provided in Attachment A. Where the two values are suitably close, AdjCom and RUCM risk are considered acceptable proxies that are accurate enough to approximate cancer incidence risk.

For most cancers, the proxy and the best estimate are usually quite close. However, for the group 'all cancers combined', the proxy measure of risk is around 10 percentage points higher than the best estimate. The all cancers combined incidence risk using the proxy is over-stated to the extent that it is not considered suitable.

Is the all cancers combined mortality risk time series available?

All cancers combined mortality risk is available. The complexities surrounding cancer incidence risk do not apply to cancer mortality risk. This is because death occurs only once, so the issue of multiple diagnoses and recognising the first occurrence does not apply to mortality risk.

What information is available to inform all cancers combined risk?

The 'best estimate' of all cancers combined incidence risk as presented in Attachment A can be used as the most recent estimate of risk. The 'best estimate' is only produced for the most recent year for which all states and territories have provided data. A time-series is not available due to comparability issues across time. For example, 2015 will have over 30 years of data from which to identify if a person has been diagnosed with cancer before, whereas the first year of data, 1982, would have no earlier years to identify if a person has been diagnosed with cancer before.

The previous method of cancer incidence risk is no longer available

Prior to the 2020 release of cancer risk data, AIHW measured risk of diagnosis using the RUCM method. However, the previous method measured this risk using '*cases* diagnosed in the year' while the replacement method of RUCM measures this risk using '*people* diagnosed in the year'. The change to measuring risk of people being diagnosed is closer to the recommended measure of measuring risk of people who were diagnosed for the first time. Attachment B quantifies the impact of changing measurement from cases to people for 2015.

Note that the RUCM method of measuring the risk of death from cancer has not changed from previous publications.

Attachment A

Lifetime risk of diagnosis and risk of diagnosis before age 85 for persons, 2015

Comparison of risk adjusted for competing mortality estimates based on:

- people diagnosed for the first time ever (Method A)
- people diagnosed in a year (Method B)

* the first time ever only factors if a person has been diagnosed previously and since 1982; data on earlier years is not available

Cancer site/type	Lifetime risk of diagnosis Method A %	Lifetime risk of diagnosis Method A 1 in ...	Lifetime risk of diagnosis Method B %	Lifetime risk of diagnosis Method B 1 in ...	Risk of diagnosis before age 85 Method A %	Risk of diagnosis before age 85 Method A 1 in ...	Risk of diagnosis before age 85 Method B %	Risk of diagnosis before age 85 Method B 1 in ...
Acute lymphoblastic leukaemia (ALL)	0.1492	670	0.1492	670	0.1414	707	0.1414	707
Acute myeloid leukaemia (AML)	0.4826	207	0.4826	207	0.3842	260	0.3842	260
All blood cancers combined	6.9784	14	7.0902	14	5.5780	18	5.6781	18
All cancers combined	50.7679	2	60.4152	2	43.2378	2	50.5515	2
Anal cancer	0.2056	486	0.2056	486	0.1824	548	0.1824	548
Bladder cancer	1.5179	66	1.5204	66	1.0836	92	1.0846	92
Bone cancer	0.1051	951	0.1051	951	0.0966	1,036	0.0966	1,036
Brain cancer	0.7492	133	0.7492	133	0.6738	148	0.6738	148
Breast cancer	13.9630	7	13.9794	7	12.5910	8	12.6060	8
Cancer of other and ill-defined digestive organs	0.1537	650	0.1537	650	0.0792	1,262	0.0792	1,262
Cancer of other soft tissue	0.3402	294	0.3402	294	0.2881	347	0.2881	347
Cancer of small intestine	0.2561	391	0.2561	391	0.2175	460	0.2175	460
Cancer of the gallbladder and extrahepatic bile ducts	0.5128	195	0.5128	195	0.3793	264	0.3793	264
Cancer of the salivary glands	0.1552	644	0.1552	644	0.1218	821	0.1218	821
Cancer of unknown primary site	1.4443	69	1.4450	69	0.8589	116	0.8596	116
Cervical cancer	0.5805	172	0.5818	172	0.5545	180	0.5557	180
Chronic lymphocytic leukaemia (CLL)	0.8249	121	0.8249	121	0.6783	147	0.6783	147
Chronic myeloid leukaemia (CML)	0.1368	731	0.1368	731	0.1127	887	0.1127	887
Colon cancer	5.3789	19	5.3863	19	4.2091	24	4.2132	24
Colorectal cancer	7.5169	13	7.6324	13	6.0378	17	6.1236	16
Eye cancer	0.1575	635	0.1575	635	0.1348	742	0.1348	742
Gynaecological cancers	4.7001	21	4.7502	21	4.1486	24	4.1853	24
Head and neck cancer (excluding lip)	1.5594	64	1.6196	62	1.3639	73	1.4184	71
Head and neck	1.9785	51	2.0507	49	1.7096	58	1.7737	56

cancer (with lip)								
Hodgkin lymphoma	0.2423	413	0.2423	413	0.2244	446	0.2244	446
Hypopharyngeal cancer	0.0827	1,209	0.0827	1,209	0.0739	1,354	0.0739	1,354
Immunoproliferative cancers	0.1363	734	0.1363	734	0.1086	921	0.1086	921
Kaposi sarcoma	0.0239	4,188	0.0239	4,188	0.0191	5,232	0.0191	5,232
Kidney cancer	1.5171	66	1.5171	66	1.3577	74	1.3577	74
Laryngeal cancer	0.2821	355	0.2821	355	0.2521	397	0.2521	397
Leukaemia	1.8992	53	1.9088	52	1.5405	65	1.5492	65
Lip cancer	0.4311	232	0.4311	232	0.3553	281	0.3553	281
Liver cancer	0.9608	104	0.9611	104	0.8270	121	0.8273	121
Lung cancer	5.8633	17	5.9000	17	4.8731	21	4.9077	20
Lymphoma	2.6273	38	2.6425	38	2.2005	45	2.2156	45
Melanoma of the skin	6.1037	16	6.1086	16	5.1930	19	5.1978	19
Mesothelioma	0.4134	242	0.4134	242	0.3074	325	0.3074	325
Mouth cancer	0.2841	352	0.2841	352	0.2295	436	0.2295	436
Multiple myeloma	0.9315	107	0.9315	107	0.7660	131	0.7660	131
Myelodysplastic syndromes	0.8336	120	0.8336	120	0.5236	191	0.5236	191
Nasal cavity, middle ear and sinuses cancer	0.0979	1,021	0.0979	1,021	0.0771	1,297	0.0771	1,297
Nasopharyngeal cancer	0.0498	2,010	0.0498	2,010	0.0488	2,050	0.0488	2,050
Neuroendocrine tumours	1.7932	56	1.8010	56	1.5412	65	1.5473	65
Non-Hodgkin lymphoma	2.3953	42	2.4010	42	1.9864	50	1.9921	50
Non-melanoma skin cancer (rare types)	0.5461	183	0.5511	181	0.3592	278	0.3635	275
Oesophageal cancer	0.7208	139	0.7215	139	0.5733	174	0.5740	174
Oropharyngeal cancer	0.2661	376	0.2661	376	0.2560	391	0.2560	391
Ovarian cancer	1.2121	83	1.2121	83	1.0084	99	1.0084	99
Pancreatic cancer	1.7829	56	1.7829	56	1.3386	75	1.3386	75
Penile cancer	0.1017	983	0.1017	983	0.0852	1,174	0.0852	1,174
Peritoneal cancer	0.0968	1,033	0.0971	1,030	0.0835	1,197	0.0839	1,192
Prostate cancer	17.4717	6	17.4732	6	15.6084	6	15.6099	6
Rectal cancer	2.3007	43	2.3017	43	1.9581	51	1.9591	51
Soft tissue sarcoma	0.6944	144	0.6970	143	0.5882	170	0.5908	169
Stomach cancer	1.0694	94	1.0702	93	0.8354	120	0.8362	120
Testicular cancer	0.5093	196	0.5093	196	0.5078	197	0.5078	197

Thyroid cancer	1.0519	95	1.0548	95	1.0204	98	1.0232	98
Tongue cancer	0.3795	264	0.3795	264	0.3428	292	0.3428	292
Uterine cancer	2.3069	43	2.3089	43	2.0998	48	2.1018	48
Vaginal cancer	0.0792	1,263	0.0792	1,263	0.0582	1,717	0.0582	1,717
Vulvar cancer	0.3492	286	0.3492	286	0.2657	376	0.2657	376

Notes:

1. Risk estimates for sex-specific cancers are presented for the relevant sex e.g. the risk of being diagnosed with prostate cancer is presented as the risk of being diagnosed in males.
2. Risk estimates for breast cancer are presented as the risk of diagnosis in females.

Source: AIHW 2016 Australian Cancer Database

Attachment B

Risk of diagnosis before age 75 and age 85, persons, 2015

Comparison of risk unadjusted for competing mortality estimates based on:

- cases diagnosed in a year (Method A)
- people diagnosed in a year (Method B)

Cancer site/type	Diagnosis before age 75 Method A %	Diagnosis before age 75 Method A 1 in ...	Diagnosis before age 75 Method B %	Diagnosis before age 75 Method B 1 in ...	Diagnosis before age 85 Method A %	Diagnosis before age 85 Method A 1 in ...	Diagnosis before age 85 Method B %	Diagnosis before age 85 Method B 1 in ...
Acute lymphoblastic leukaemia (ALL)	0.1292	774	0.1292	774	0.1532	653	0.1532	653
Acute myeloid leukaemia (AML)	0.2468	405	0.2468	405	0.4831	207	0.4831	207
All blood cancers combined	3.7598	27	3.7512	27	6.9097	14	6.8820	15
All cancers combined	31.6111	3	31.1792	3	47.0215	2	46.3565	2
Anal cancer	0.1469	681	0.1469	681	0.2176	459	0.2176	459
Bladder cancer	0.5817	172	0.5817	172	1.4279	70	1.4279	70
Bone cancer	0.0827	1,210	0.0827	1,210	0.1097	912	0.1097	912
Brain cancer	0.5438	184	0.5438	184	0.7925	126	0.7925	126
Breast cancer	10.2107	10	10.2101	10	13.2263	8	13.2258	8
Cancer of other and ill-defined digestive organs	0.0403	2,478	0.0403	2,478	0.1055	948	0.1055	948
Cancer of other soft tissue	0.2182	458	0.2182	458	0.3463	289	0.3463	289
Cancer of small intestine	0.1591	628	0.1587	630	0.2652	377	0.2648	378
Cancer of the gallbladder and extrahepatic bile ducts	0.2208	453	0.2205	454	0.4935	203	0.4932	203

Cancer of the salivary glands	0.0867	1,154	0.0867	1,154	0.1496	669	0.1496	669
Cancer of unknown primary site	0.4514	222	0.4514	222	1.1344	88	1.1344	88
Cervical cancer	0.4890	204	0.4878	205	0.6040	166	0.6027	166
Chronic lymphocytic leukaemia (CLL)	0.4671	214	0.4671	214	0.8525	117	0.8525	117
Chronic myeloid leukaemia (CML)	0.0940	1,064	0.0940	1,064	0.1325	755	0.1325	755
Colon cancer	2.5473	39	2.5391	39	5.2992	19	5.2846	19
Colorectal cancer	3.9495	25	3.9167	26	7.5604	13	7.4842	13
Eye cancer	0.1040	961	0.1040	961	0.1641	609	0.1641	609
Gynaecological cancers	3.2728	31	3.2380	31	4.7229	21	4.6777	21
Head and neck cancer (excluding lip)	1.1712	85	1.1657	86	1.6840	59	1.6770	60
Head and neck cancer (with lip)	1.4484	69	1.4429	69	2.1027	48	2.0957	48
Hodgkin lymphoma	0.1972	507	0.1972	507	0.2500	400	0.2500	400
Hypopharyngeal cancer	0.0569	1,759	0.0569	1,759	0.0897	1,115	0.0897	1,115
Immunoproliferative cancers	0.0733	1,365	0.0733	1,365	0.1360	735	0.1360	735
Kaposi sarcoma	0.0144	6,942	0.0144	6,942	0.0238	4,202	0.0238	4,202
Kidney cancer	1.0910	92	1.0903	92	1.6202	62	1.6195	62
Laryngeal cancer	0.1932	518	0.1928	519	0.3112	321	0.3101	323
Leukaemia	1.0659	94	1.0643	94	1.9144	52	1.9106	52
Lip cancer	0.2805	357	0.2805	357	0.4259	235	0.4259	235
Liver cancer	0.6056	165	0.6056	165	1.0117	99	1.0117	99
Lung cancer	3.1713	32	3.1580	32	6.1065	16	6.0845	16
Lymphoma	1.5740	64	1.5726	64	2.7017	37	2.7003	37
Melanoma of the skin	3.9255	25	3.9255	25	6.0996	16	6.0996	16
Mesothelioma	0.1625	616	0.1625	616	0.4081	245	0.4081	245
Mouth cancer	0.1775	564	0.1771	565	0.2814	355	0.2811	356
Multiple myeloma	0.5055	198	0.5055	198	0.9699	103	0.9699	103
Myelodysplastic syndromes	0.2225	449	0.2225	449	0.7120	140	0.7120	140
Nasal cavity, middle ear and sinuses cancer	0.0616	1,624	0.0616	1,624	0.0916	1,092	0.0916	1,092
Nasopharyngeal cancer	0.0436	2,294	0.0436	2,294	0.0555	1,802	0.0555	1,802

Neuroendocrine tumours	1.1545	87	1.1515	87	1.8807	53	1.8759	53
Non-Hodgkin lymphoma	1.3796	72	1.3791	73	2.4579	41	2.4574	41
Non-melanoma skin cancer (rare types)	0.1886	530	0.1883	531	0.4796	209	0.4792	209
Oesophageal cancer	0.3762	266	0.3754	266	0.7307	137	0.7298	137
Oropharyngeal cancer	0.2392	418	0.2392	418	0.2914	343	0.2914	343
Ovarian cancer	0.7546	133	0.7529	133	1.1633	86	1.1616	86
Pancreatic cancer	0.8343	120	0.8338	120	1.7042	59	1.7037	59
Penile cancer	0.0574	1,742	0.0574	1,742	0.1154	867	0.1154	867
Peritoneal cancer	0.0592	1,690	0.0592	1,690	0.1038	963	0.1038	963
Prostate cancer	12.0198	8	12.0198	8	18.2445	5	18.2445	5
Rectal cancer	1.4389	69	1.4370	70	2.3877	42	2.3858	42
Soft tissue sarcoma	0.4343	230	0.4343	230	0.7162	140	0.7154	140
Stomach cancer	0.5361	187	0.5351	187	1.0632	94	1.0622	94
Testicular cancer	0.5165	194	0.5165	194	0.5249	191	0.5249	191
Thyroid cancer	0.9721	103	0.9603	104	1.1448	87	1.1322	88
Tongue cancer	0.2999	333	0.2999	333	0.3998	250	0.3998	250
Uterine cancer	1.6707	60	1.6701	60	2.3797	42	2.3771	42
Vaginal cancer	0.0429	2,328	0.0429	2,328	0.0674	1,483	0.0674	1,483
Vulvar cancer	0.1747	572	0.1747	572	0.3159	317	0.3159	317

Notes:

1. Risk estimates for sex-specific cancers are presented for the relevant sex e.g. the risk of being diagnosed with prostate cancer is presented as the risk of being diagnosed in males.
2. Risk estimates for breast cancer are presented as the risk of diagnosis in females.

Source: AIHW 2016 Australian Cancer Database

Using the data - FAQs

Using the data - frequently asked questions

Which cancers are available in this report?

The List of cancers available within CdiA.

How are the cancers grouped?

For most of the CdiA report, cancer groupings have been based on the International Classification of Diseases, Tenth Revision (ICD-10) classifications.

Where possible, specified cancers have been provided as well as the larger groupings in which they are included – for example, acute myeloid leukaemia and acute lymphoblastic leukaemia have separate filter options in the summary visualisations, as well as their higher-level grouping leukaemia.

Note that in the rankings visualisation, higher-level groupings such as leukaemia and head and neck cancers are generally excluded; instead, individual cancers such as acute myeloid leukaemia, are included in rankings.

Which cancers are excluded from the cancer data?

Registration of all cancers, excluding basal and squamous cell carcinomas of the skin, is required by law in each state and territory. Information on newly diagnosed cancers are collected by each state and territory cancer registry and provided to the Australian Institute of Health and Welfare annually to produce the Australian Cancer Database. Since basal and squamous cell carcinomas of the skin are not notifiable, data on these cancers are not presented in statistics from the ACD.

Why are some survival rates greater than 100%?

Five-year relative survival is the percentage of people diagnosed with a cancer who survived for at least 5 years after diagnosis, relative to people of the same age and sex in the population. Where the survival rate of the population diagnosed with a cancer is greater than the general population and there are little to no deaths in the diagnosed population, the relative survival rate may be greater than 100%. The 5-year relative survival is used as an example, the same principles apply to all relative survival data.

Why are some rates missing?

Suppression rules have been applied to the data. Rates for state and territory incidence and mortality are not calculated where the count of cancers is less than 5. Suppression occurs because population rate trends and comparisons derived from low counts may have a greater likelihood of being misinterpreted. While rates based on low counts are not provided for state and territory incidence and mortality, counts of the data are available in the relevant 'Cancer data in Australia source' worksheet.

Survival rates are also suppressed for smaller populations. Count data is not provided for survival, only the rates. Accordingly, suppressed survival rates may appear as missing data.

Why do some cancers have a shorter time series?

Data from the Australian Cancer Database (ACD) is reportable from 1982 onwards and the National Mortality Database (NMD) data is reported from 1971 onwards. However, time series are only presented for a cancer where the data is considered complete. Where the data for a cancer is not considered complete for a period of time, the time series for that cancer will exclude those years.

Why don’t state and territory counts of new cases of cancer equal the Australian total?

The Australian Capital Territory and Northern Territory incidence counts for each cancer are equal to the average of the most recent 5 years of data. The presentation of rolling averages are used to reduce volatility associated with cancer rates in these smaller populations. The method is used within this report for methodological consistency with data produced by the respective data custodians.

How do I download data from visualisations?

All of the data visualisations have been created using a program called Tableau. You can interact with filters on these visualisations to see the specific data you are interested in.

To view the underlying data from the visualisations click on the link at the bottom of the page to download an Excel file containing the data.

How do I print?

Pages can be printed by pressing Ctrl and P on the keyboard at the same time, or by clicking on ‘File’ at the top of the browser and selecting print. However, note that the visualisations in Tableau do not print correctly with this method.

To print a Tableau visualisation, select ‘Download’ on the menu below the visualisation and choose to download as an image or PDF. Using this method, the visualisation prints in the same way that it is presented on the screen, with the selected filters.

Another useful tool for selecting only the visualisation(s) you require is the ‘Snipping Tool’, which allows a screenshot to be taken of the relevant area on the screen.

How do I interact with the graphs and maps?

The graphs, maps and figures have been developed in a program called Tableau. You can interact with these to see the specific data you are interested in. If the mouse pointer is placed over the graph, map or figure to display the Tooltip it will change to a hand selector. The Tooltip displays the underlying data.

You can also download the underlying data from the Tableau visualisations into an Excel file. Click on the link at the bottom of the page which displays the graph you are interested in.

Some Tableau visualisations have a legend where one element can be selected to highlight it. To do this, place the mouse pointer over the legend and a small selector icon will appear (it looks like a highlighter). Click on this icon and then click on the specific element you are interested in.

Some graphs, maps or figures allow the data to be filtered. Filters are displayed either as a button or a drop down list. In either option, select the data you’re interested in to display it.

If you want to clear your selections and return the graph, map or figure to its original appearance, click on the 'revert' button at the bottom.

When you position your mouse pointer over a Tableau map, a toolbar will appear on the left. The + and – buttons provide zoom in and out. Clicking on the arrow pointing to the right allows you to choose to zoom, pan, or select areas of the map. Click on the home button to return to the map’s default view.

Please note that Tableau is not compatible with versions of Internet Explorer below version 11.

How do I extract data files?

Data files are available in .xlsx format by clicking the link at the bottom of each page.

Where does the information come from?

This report predominantly uses data from the Australian Cancer Database (ACD) and the National Mortality Database (NMD). Please visit the Notes section for more information.

I want to do my own data analysis, where can I get more data?

The information in this report is free to download, but must be used in accordance with the AIHW’s data use policy. Most information released by AIHW is made available under a Creative Commons BY 4.0 licence.

For more information see copyright at AIHW.

Tableau allows you the freedom to view and manipulate a selection of data. If you require data not currently available here, please:

- email cancer@aihw.gov.au for questions regarding cancer or
- email screeninganalysismonitoring@aihw.gov.au for questions regarding cancer screening or
- email hospitaldata@aihw.gov.au for questions regarding cancer hospitalisation
- submit a data request

and we will contact you.

Should you wish to request additional data, the AIHW generally charges for data requests at an hourly rate on a cost-recovery basis.

Where can I get help?

If you need help using our interactive visualisations (graphs and figures), or help downloading data, you can contact us at cancer@aihw.gov.au.

Technical notes

- Cancer is classified by the *International Statistical Classification of Diseases and Related Health Problems Version 10* (ICD–10). This is a statistical classification, published by the World Health Organization, in which each morbid condition is assigned a unique code according to established criteria.
- Actual mortality data, from the National Mortality Database, up to 2020 are based on the year of *occurrence* of the death and data for 2021 are based on the year of *registration* of the death.
- With the exception of prostate cancer, the 2020–2023 incidence estimates are projections based on 2010–2019 incidence data. The 2022–2023 mortality estimates from the National Mortality Database are projections based on 2012-2021 data. Mortality estimates from the Australian Cancer Database for 2019-2023 are based on 2009-2018 data.
- Projection methods rely on the assumption that past trends may be reasonably used to estimate future counts and rates. For prostate cancer incidence, this has generally not been the case in more recent years. Prostate cancer incidence use current age specific rates, and not cancer trend data, applied to population estimates.
- Relative survival was calculated with the period method, using the period 2015–2019 (Brenner & Gefeller 1996). This captured the survival experience of people who were diagnosed with cancer before or during 2015–2019 and were still alive at the beginning of 2015. Data from the National Death Index (NDI) on deaths (from any cause) that occurred up to 31 December 2019 were used to determine which people with cancer had died and when this occurred.
- Relative survival for registry-derived (RD) stage tables was calculated using the cohort method, using the period 2011–2016. In this method, a cohort of patients diagnosed with cancer is followed over time to estimate the proportion surviving for a selected timeframe (e.g. 5 years).
- Age-specific incidence and mortality rates are expressed as per 100,000 population.
- Age-standardised incidence and mortality rates for the Australian population were age standardised to the 2001 Australian Standard Population and a separate series are available and standardised to the 2023 Australian population; rates are expressed per 100,000 population.
- Incidence and mortality rates are based on the Australian population as at 30 June. Prevalence rates are based on the Australian population as at 31 December.
- Stage data for colorectal cancer excludes cases identified from death certificates only, cancer of the appendix (ICD-10 code C18.1), and colorectal cancers with a histology for which staging rules are not applicable.
- Stage data for breast cancer in females includes ICD-10 code C50, lung cancer excludes trachea (C34), melanoma of the skin excludes skin of genitals and melanoma of “unknown primary site” (C43) and prostate cancer includes C61. Certain morphology codes are excluded.

Technical notes

Age-adjusted survival

Comparisons of cancer survival rates over time may be affected by changes in the age composition of those diagnosed. For example, if more older people are diagnosed with cancer over time and older people have lower survival rates, improvements in survival over time may be offset by the increasingly older age of people diagnosed with cancer.

In order to calculate age-adjusted survival we first choose a fixed period, called the base period, and take note of the age composition of the people who were diagnosed with the cancer of interest during that period. We calculate age-adjusted survival for other periods by assuming that the age composition of patients in the other period is the same as that of the base period. Thus the age-adjusted survival is effectively the survival that would have occurred had there been no change in age composition from the base period.

Age-*adjusted* survival is different to age-*standardised* survival. An age-standardised rate uses the same standard population for all cancers and sexes (including persons). Using a standard population allows meaningful comparisons between different cancers, sexes and across time. In contrast, age-adjusted survival rates use a population relevant to the specific cancer (or cancer group) and sex to allow meaningful comparisons across time. Age-adjusted survival rates are only intended to enhance the understanding of how survival has changed over time for the specific cancer and sex and are not directly comparable with other cancers or sexes.

CdiA does not currently report on age-standardised survival but future releases are expected to contain age-standardised survival rates.

Age-standardised rates (ASR)

A crude rate provides information on the number of, for example, new cases of cancer or deaths from cancer by the population at risk in a specified period. No age adjustments are made when calculating a crude rate. Since the risk of cancer heavily depends on age, crude cancer incidence and mortality rates are not as suitable for looking at changes over time or making comparisons between different population groups if there are differences in those populations' age structures.

More meaningful comparisons can be made using ASRs, with such rates adjusted for age in order to facilitate comparisons between populations that have different age structures – for example, between Indigenous Australians and other Australians. This standardisation process effectively removes the influence of age structure on the summary rate.

There are two methods commonly used to adjust for age: direct and indirect standardisation. In this report, the direct standardisation approach presented by Jensen and colleagues (1991) is used. To age-standardise using the direct method, the first step is to obtain population numbers and numbers of cases (or deaths) in age ranges – typically 5-year age ranges. The next step is to multiply the age-specific population numbers for the standard population (in this case, the Australian population as at 30 June 2001) by the age-specific incidence rates (or death rates) for the population of interest. The next step is to sum across the age groups and divide this sum by the total of the standard population to give an ASR for the population of interest. Finally, this is expressed per 100,000 population in this report.

In addition to rates age-standardised to the 2001 Australian Standard Population, the CdiA report also offers rates age-standardised to the year of release. The basic trend analysis between the two rates is often similar. However, the 2023 population is overall, much older than the 2001 population. Cancer is more common in the older populations and accordingly, the 2023 age-standardised rates are often higher than the 2001 and are more relevant to cancer today. The 2001 Australian Standard Population is available as the current Australian standard. World Health Organisation and Segi age standardised incidence rates are also available in the summary data visulation as well as Excel data tables.

Age-specific rates

Age-specific rates provide information on the incidence of a particular event in an age group relative to the total number of people at risk of that event in the same age group. It is calculated by dividing the number of events occurring in each specified age group by the corresponding 'at-risk' population in the same age group and then multiplying the result by a constant (for example, 100,000) to derive the rate. Age-specific rates are often expressed per 100,000 population.

Australian Cancer Database

All forms of cancer, except basal and squamous cell carcinomas of the skin, are notifiable diseases in each Australian state and territory. This means there is legislation in each jurisdiction that requires hospitals, pathology laboratories and various other institutions to report all cases of cancer to their central cancer registry. An agreed subset of the data collected by these cancer registries is supplied annually to the AIHW, where it is compiled into the ACD. The ACD currently contains data on all cases of cancer diagnosed from 1982 to 2019 for all states and territories.

Cancer reporting and registration is a dynamic process, and records in the state and territory cancer registries may be modified if new information is received. As a result, the number of cancer cases reported by the AIHW for any particular year may change slightly over time and may not always align with state and territory reporting for that same year.

For more information on the ACD please see the ACD 2019 Data Quality Statement.

Estimating late registrations of cancer for 2019

In recent CdiA reports, the most recent year of incidence data included an estimate for late registrations. This year's release does not include estimates for late registrations. Late registrations are likely to still occur and incidence counts and rates may be understated to some extent.

International Classification of Diseases for Oncology (ICDO)

Cancers were originally classified solely under the ICD classification system, based on topographic site and behaviour. However, during the creation of the Ninth Revision of the ICD in the late 1960s, working parties suggested creating a separate classification for cancers that included improved morphological information. The first edition of the ICD-O was subsequently released in 1976 and, in this classification, cancers were coded by both morphology (histology type and behaviour) and topography (site).

Since the First Edition of the ICD-O, a number of revisions have been made, mainly in the area of lymphoma and leukaemia. The current edition, the Third Edition (ICD-O-3), was released in 2000 and is used by most state and territory cancer registries in Australia, as well as by the AIHW in regard to the ACD.

National Mortality Database

The AIHW National Mortality Database (NMD) contains information provided by the Registries of Births, Deaths and Marriages and the National Coronial Information System – and coded by the ABS – for deaths from 1964 to 2020. Registration of deaths is the responsibility of each state and territory Registry of Births, Deaths and Marriages. These data are then collated and coded by the ABS and are maintained at the AIHW in the NMD.

In the NMD, both the year in which the death occurred and the year in which it was registered are provided. For the purposes of this report, actual mortality data are shown based on the year the death occurred, except for the most recent year (namely 2021) where the number of people whose death was registered is used. Previous investigation has shown that the year of death and its registration coincide for the most part. However, in some instances, deaths at the end of each calendar year may not be registered until the following year. Thus, year of death information for the latest available year is generally an underestimate of the actual number of deaths that occurred in that year.

In this report, deaths registered in 2018 and earlier are based on the final version of cause of death data; deaths registered in 2019, 2020 and 2021 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.

The data quality statements underpinning the AIHW NMD can be found on the following ABS internet pages:

- ABS quality declaration summary for *Deaths, Australia*
- ABS quality declaration summary for *Causes of death, Australia*.

For more information on the AIHW NMD see *Deaths data at AIHW*.

Population Data

Throughout this report, population data were used to derive rates of, for example, cancer incidence and mortality. The population data were sourced from the ABS using the most up-to-date estimates available at the time of creating this report.

To derive its estimates of the resident populations, the ABS uses the 5-yearly Census of Population and Housing data and adjusts it as described here:

- All respondents in the Census are placed in their state or territory, Statistical Local Area and postcode of usual residence; overseas visitors are excluded.
- An adjustment is made for persons missed in the Census.
- Australians temporarily overseas on Census night are added to the usual residence Census count.

Estimated resident populations are then updated each year from the Census data, using indicators of population change, such as births, deaths and net migration. More information is available from the ABS website.

The 2023 to 2033 population estimates were sourced from the Centre of Population January 2023 update of the National age and sex structure, 2021–22 to 2032–33.

Prevalence

Limited-duration prevalence is expressed as *N-year prevalence* throughout this report. *N-year prevalence* on a given index date – where *N* is any number 1, 2, 3 and so on – is defined as the number of people alive at the end of that day who had been diagnosed with cancer in the past *N* years. For example:

- 1-year prevalence is the number of living people who were diagnosed in the past year to 31 December 2019
- 5-year prevalence is the number of living people who were diagnosed in the past 5 years to 31 December 2019. This includes the people defined by 1-year prevalence.

Note that prevalence is measured by the number of people diagnosed with cancer, not the number of cancer cases. An individual who was diagnosed with two separate cancers will contribute separately to the prevalence of each cancer. However, this individual will contribute only once to prevalence of all cancers combined. For this reason, the sum of prevalence for individual cancers will not equal the prevalence of all cancers combined.

Projections - Estimating the incidence of cancer

Please note that no adjustments have been made to the projections to account for the potential impact of COVID.

Estimates of national incidence in 2020–2023 were estimated by projecting the sex- and age-specific incidence rates observed in Australia during 2010–2019. The time series were stratified by the following variables:

- sex
- 5-year age group (0–4, …, 85–89, 90+)
- 4-character ICD-O-3 topography code (C00.0, …, C80.9)
- 4-digit ICD-O-3.1 histology code (8000, …, 9992).

For each time series, the process was as described below:

- least squares linear regression was used to find the straight line of best fit through the time series
- if the slope was positive, the straight line of best fit was extrapolated to obtain the estimate of the 2020 rate
- if the slope was negative, the time series floor was set to 0
- the estimated incidence rates for 2020 were then multiplied by the Estimated Resident Populations for 2020 to obtain the estimated incidence numbers.

Note the following:

- estimates were made for Australia as a whole, not for individual jurisdictions
- for the majority of cancers, instead of using the topography and histology codes to define the cancer groups, ICD-10 codes were used (for example breast or melanoma of the skin as well as groupings such as head and neck cancers which is a consolidation of cancers of the lip, tongue, mouth, salivary glands, oropharynx, nasopharynx, hypopharynx and other sites in the pharanyx).
- the 10 years of incidence data used as the baseline were 2010–2019
- for populations, the ABS Estimated Resident Populations were used for 2010–2022, and the 2023 population estimates were sourced from the Centre of Population.
- The method for projecting cancer incidence rates relies on the assumption that incidence trends are likely to provide a useful basis to project future cancer incidence rates and counts. For prostate cancer, this has not been the case in more recent years. Prostate cancer incidence trends now use the latest available incidence rates by age, applied to the relevant populations by age, to arrive at projected incidence and counts.

Projections - Estimating the mortality of cancer

This method is the same as the incidence projections with the exceptions that:

- the 10-year baseline for incidence is 2010–2019 while the baseline for mortality from the NMD is 2012–2021 and the baseline for mortality from the ACD is 2009–2018.

Relative survival

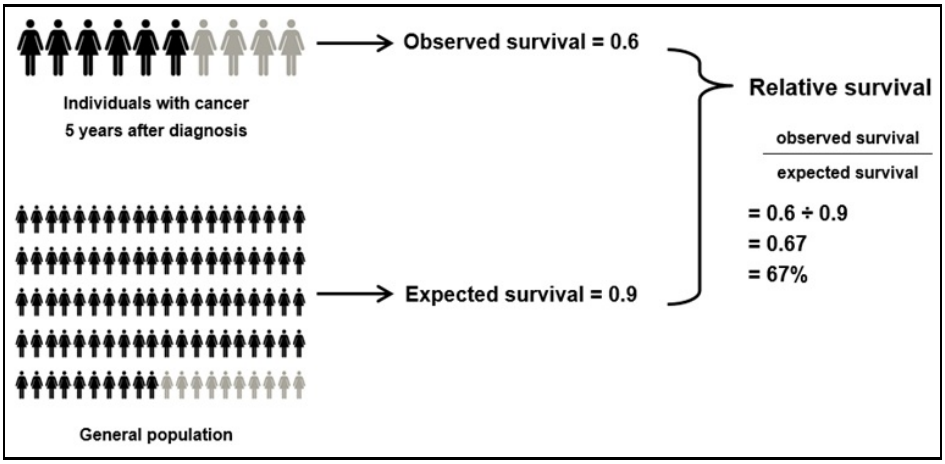
Relative survival is a measure of the survival of people with cancer compared with that of the general population. It is the standard approach used by cancer registries to produce population-level survival statistics and is commonly used as it does not require information on cause of death. Relative survival reflects the net survival (or excess mortality) associated with cancer by adjusting the survival experience of those with cancer for the underlying mortality that they would have experienced in the general population.

Relative survival is calculated by dividing observed survival by expected survival, where the numerator and denominator have been matched for age, sex and calendar year.

Observed survival refers to the proportion of people alive for a given amount of time after a diagnosis of cancer; it is calculated from population-based cancer data. Expected survival refers to the proportion of people in the general population alive for a given amount of time and is calculated from life tables of the entire Australian population. (Ideally these life tables should be restricted to the population of Australians who do not have cancer but such life tables are unavailable. It is standard practice around the world to use life tables for the entire population.)

A simplified example of how relative survival is interpreted is shown in Figure G1. Given that 6 in 10 people with cancer are alive 5 years after their diagnosis (observed survival of 0.6) and that 9 in 10 people from the general population are alive after the same 5 years (expected survival of 0.9), the relative survival of people with cancer would be calculated as 0.6 divided by 0.9, which is 0.67. This means that individuals with cancer are 67% as likely to be alive for at least 5 years after their diagnosis as are their counterparts in the general population.

Figure M1: Simplified example of how relative survival is calculated



The survival statistics in this report were produced using a modified version of a SAS program written by Dickman (2004) and employed the period method (Brenner and Gefeller 1996) with 1-year intervals. Observed survival was calculated from data in the ACD. Expected survival was calculated using the Ederer II method whereby matched people in the general population are considered to be at risk of death until the corresponding cancer patient dies or is censored (Ederer and Heise 1959).

Calculation of conditional relative survival

Conditional survival is the probability of surviving *j* more days, given that an individual has already survived *i* days. It was calculated using the formula:

$$S(j|i) = \frac{S(i+j)}{S(i)}$$

where

$S(j|i)$ is the probability of surviving at least *j* more days given that the person has already survived at least *i* days

$S(i+j)$ is the probability of surviving at least $i + j$ days

$S(i)$ is the probability of surviving at least *i* days

Confidence intervals for conditional survival were calculated using a variation of Greenwood's (1926) formula for variance (Skuladottir & Olsen 2003):

$$\mathrm{Var}[S(j|i)] = \sum_{k=i+1}^{i+j} \frac{d_k}{r_k(r_k - d_k)}$$

where

d_k is the number of deaths

r_k is the number at risk during the *k*th interval.

The 95% confidence intervals were constructed assuming that conditional survival estimates follow a normal distribution.

Risk

We use 19 age groups, numbered 1 to 19. Age group *i* (*i* = 1 to 18) is 5 years wide and comprises all ages in the interval (5*i* - 5, 5*i)*. Age group 19 comprises all ages 90 and above. The cancer under consideration is referred to as “the cancer”. This could be a specific cancer, a group of related cancers or all cancers combined. There are two different measures of risk, one adjusted for competing mortality and one not adjusted. For brevity, these are called the adjusted risk (*AR*) and unadjusted risk (*UR*). The full notation is as follows, where *D* is for diagnosis and *M* is for mortality.

ARD(5*i*) = adjusted risk of being diagnosed with the cancer before age 5*i* (*i* = 1 to 18),

ARD(∞) = adjusted lifetime risk of being diagnosed with the cancer,

ARM(5*i*) = adjusted risk of dying from the cancer before age 5*i* (*i* = 1 to 18),

ARM(∞) = adjusted lifetime risk of dying from the cancer,

and similarly for *URD* and *URM*.

For each age group *i*, the following three rates are used in the risk formulas.

D_i = rate of first ever diagnosis of the cancer (the first in one's life, not the first in age group *i*) ,

M_i = rate of death from the cancer ,

A_i = rate of death from all causes (including the cancer) ,

Note that the denominator of D_i is the general population, not the population of people who have never been diagnosed with the cancer.

Risk not adjusted for competing mortality

As this measure of risk is not adjusted for competing mortality, the formulas are relatively simple and do not involve A_i. The formulas come from Day (1987).

$URD(5i) = 1 - e^{-5(D_1+D_2+\ldots+D_i)}$, $i = 1, 2, \ldots, 18$

$URD(\infty) = 1$.

$URM(5i) = 1 - e^{-5(M_1+M_2+\ldots+M_i)}$, $i = 1, 2, \ldots, 18$

$URM(\infty) = 1$.

Note that the lifetime risks are necessarily 1. Not adjusting for competing mortality is equivalent to the scenario where it is impossible to die of any cause other than the cancer. Hence every person must eventually be diagnosed with the cancer and eventually die from it. This is why it is not informative to report unadjusted lifetime risks.

Risk adjusted for competing mortality

The formulas in this section come from Fay *et al*. (2003). The risk of diagnosis is as follows.

$$ARD(5) = \frac{D_1}{A_1}(1 - e^{-5A_1})$$

$$ARD(5i) = ARD(5i-5) + \frac{D_i}{A_i}(1 - e^{-5A_i})e^{-5(A_1+A_2+\ldots+A_{i-1})}, \qquad i = 2, 3, \ldots, 18$$

$$ARD(\infty) = ARD(90) + \frac{D_{19}}{A_{19}}e^{-5(A_1+A_2+\ldots+A_{18})}.$$

The formula for risk of death is the same as above except that M_i replaces D_i throughout.

$$ARM(5) = \frac{M_1}{A_1}(1 - e^{-5A_1})$$

$$ARM(5i) = ARM(5i-5) + \frac{M_i}{A_i}(1 - e^{-5A_i})e^{-5(A_1+A_2+\ldots+A_{i-1})}, \qquad i = 2, 3, \ldots, 18$$

$$ARM(\infty) = ARM(90) + \frac{M_{19}}{A_{19}}e^{-5(A_1+A_2+\ldots+A_{18})}.$$

Use of a proxy to calculate risk of diagnosis

In order to calculate the risk of diagnosis we need the age-specific rates, D_i, at which people are being diagnosed with the cancer for the first time in their lives. This requires knowledge of each person's cancer history from birth. As the Australian Cancer Database (ACD) starts from the beginning of 1982, this is impossible for most age groups and will remain impossible for many decades to come. In order to estimate the risk of diagnosis we need a satisfactory proxy for D_i.

The best available estimate of D_i is obtained by using the entire history of the ACD. That is, instead of counting first ever diagnoses (which is impossible) we count "first from 1/1/1982" diagnoses. However, using such an estimate would mean that we couldn't produce a consistent time series of risks. This is because each estimate in the time series would be based on a different amount of "lookback time" for previous diagnoses. The estimate in 1982 would be based on at most one year of lookback time, the estimate in 1983 would be based on up to two years of lookback time, and so on.

In order to enable the production of a time series of risks, the AIHW has chosen to use a lookback time of up to one calendar year for both the adjusted and unadjusted risks of diagnosis. That is, for the year for which the risks are being calculated, lookback goes back to the 1st of January of that year. Using this method we are in fact counting the number of people (not cancers) diagnosed in the year under

consideration, irrespective of whether they have been diagnosed with the same cancer in a previous year. AIHW analysis has shown that this method provides a satisfactory estimate of D_i, except for the group “all cancers combined”. No suitable period of lookback time was identified for this group. As such, AIHW does not produce a time series of risk of diagnosis for all cancers combined. However, the best available estimate for the latest year of data available is produced. This estimate is based on lookback to the beginning of 1982. Based on the analysis referred to above, this estimate is likely to be a few percentage points higher than the true value.

Technical notes

The following two indices are commonly used to assess the completeness and accuracy of incidence data in cancer registries. A detailed discussion of how they are used can be found in Cancer Incidence in Five Continents.

Percentage of cases that were microscopically verified (MV%)

Microscopic verification is the gold standard for diagnosing cancer. The MV% is the percentage of registered cases for which the diagnosis was microscopically verified. A high MV% suggests higher quality data. A low MV% suggests (1) incomplete notification of pathology reports and therefore possibly lower accuracy of diagnoses, and (2) incomplete notification of cancers for which histology is often the only source of notification, e.g. melanoma of the skin.

Percentage of cases that are death certificate only (DCO%)

The DCO% is the percentage of registered cases for which the only notification of cancer to the cancer registry was the death certificate. A low DCO% suggests higher quality data. A high DCO% suggests incomplete incidence notification. Also, such diagnoses may be less accurate.

Indices of data quality for the 2019 Australian Cancer Database, year of diagnosis 2019

Cancer site/type (ICD-10 codes)	No. of cases	MV%	DCO%
Lip (C00)	849	99.2	0.0
Tongue (C01–C02)	1,081	97.3	0.8
Mouth (C03–C06)	686	96.5	0.9
Parotid gland (C07)	292	98.6	0.7
Submandibular gland (C08.0)	46	100.0	0.0
Sublingual gland (C08.1)	2	100.0	0.0
Overlapping and unspecified major salivary glands (C08.8–C08.9)	31	100.0	0.0
Tonsil and oropharynx (C09–C10)	846	96.7	0.1
Nasopharynx (C11)	169	92.3	1.8
Pyriform sinus and hypopharynx (C12–C13)	155	94.2	0.6
Other and ill-defined sites in lip, oral cavity and pharynx (C14)	49	87.8	8.2
Oesophagus (C15)	1,665	93.6	1.9
Stomach (C16)	2,439	95.1	1.2
Small intestine (C17)	764	94.4	1.3
Colon (C18)	10,634	93.5	1.7
Rectum and rectosigmoid junction (C19–C20)	4,897	95.8	0.8
Anus and anal canal (C21)	524	97.3	0.0
Liver (C22)	2,416	52.9	5.0
Gallbladder (C23)	355	80.3	2.8
Extrahepatic bile duct (C24.0)	360	75.3	2.2
Ampulla of Vater (C24.1)	198	91.9	2.5
Overlapping and unspecified sites in biliary tract (C24.8–C24.9)	184	63.6	9.8
Pancreas (C25)	3,751	75.1	5.4
Other and ill-defined digestive organs (C26)	324	59.3	24.7

Nasal cavity (C30.0)	113	97.3	1.8
Middle ear (C30.1)	6	100.0	0.0
Sinuses (C31)	94	97.9	0.0
Larynx (C32)	598	94.1	2.2
Lung, bronchus and trachea (C33–C34)	13,140	86.2	3.3
Thymus, heart, mediastinum, pleura and ill-defined sites in respiratory and intrathoracic organs (C37–C39)	164	93.3	1.2
Bones, joints and articular cartilage (C40–C41)	237	94.9	1.3
Melanoma of the skin (C43)	15,628	99.2	0.2
Non-melanoma of the skin (C44)	1,269	97.2	0.8
Mesothelioma (C45)	776	90.7	2.6
Kaposi sarcoma (C46)	53	96.2	0.0
Peripheral nerves and autonomic nervous system (C47)	34	94.1	0.0
Peritoneum and retroperitoneum (C48)	216	91.2	0.5
Connective, subcutaneous and other soft tissue (C49)	752	96.4	0.8
Breast (C50)	18,659	98.8	0.5
Vulva (C51)	398	96.7	1.8
Vagina (C52)	94	98.9	0.0
Cervix (C53)	945	96.3	1.0
Uterus (C54–C55)	2,931	98.2	0.6
Ovary (C56)	1,284	89.8	2.6
Other and unspecified female genital organs (C57)	457	95.8	1.8
Placenta (C58)	10	70.0	0.0
Penis (C60)	122	97.5	1.6
Prostate (C61)	23,027	96.6	0.9
Testis (C62)	913	99.3	0.0
Other and unspecified male genital organs (C63)	35	94.3	0.0
Kidney (C64)	4,061	90.4	1.9
Renal pelvis (C65)	313	88.8	1.0
Ureter (C66)	170	90.6	1.8
Bladder (C67)	2,815	91.0	3.4
Urethra (C68.0)	35	94.3	2.9
Paraurethral gland (C68.1)	1	100.0	0.0
Overlapping and unspecified sites in urinary tract (C68.8–C68.9)	47	70.2	12.8
Eye and adnexa (C69)	305	74.4	1.0
Brain (C71)	1,828	86.1	2.6
Other and unspecified parts of central nervous system (C70, C72, C75.1–C75.3)	135	72.6	1.5
Thyroid (C73)	3,466	98.9	0.2
Other and unspecified endocrine glands and related structures (C74, C75.0, C75.4–C75.9)	175	91.4	2.3

Hodgkin lymphoma (C81)	716	98.5	0.0
Non-Hodgkin lymphoma (C82–C86)	5,743	96.1	0.7
Immunoproliferative cancers (C88)	394	95.9	0.5
Multiple myeloma (C90.0)	2,163	92.2	1.8
Other plasma cell cancers (C90.1–C90.9)	81	91.4	2.5
Acute lymphoblastic leukaemia (C91.0)	397	98.0	0.3
Chronic lymphocytic leukaemia (C91.1)	1,855	94.0	1.3
Other and unspecified lymphoid leukaemias (C91.2–C91.9, C94.7)	172	94.8	0.6
Acute myeloid leukaemia (C92.0, C92.3–C92.8, C93.0, C94.0, C94.2, C94.4–C94.5)	1,206	92.0	1.6
Chronic myeloid leukaemia (C92.1)	398	89.8	3.0
Chronic myelomonocytic leukaemia (including juvenile) (C93.1, C93.3)	334	86.8	1.2
Other and unspecified myeloid leukaemias (C92.2, C92.9, C93.2, C93.7, C93.9, C94.6)	14	92.9	0.0
Other and unspecified leukaemias (C95)	78	35.9	46.2
Myeloproliferative neoplasms excluding chronic myeloid leukaemia (C94.1, D45, D47.1, D47.3–D47.5)	1,412	82.3	2.6
Myelodysplastic syndromes (D46)	1,559	79.7	4.1
Other blood cancers (C94.3, C96)	97	93.8	0.0
Other and ill-defined sites (C76)	158	80.4	7.0
Unknown primary site (C80)	2,786	52.3	20.7
All cancers combined (C00-C97, D45, D46, D47.1, D47.3-D47.5)	**147,586**	**92.5**	**1.9**

Notes:

1. The categories “non-melanoma of the skin” and “all cancers combined” exclude basal and squamous cell carcinomas of the skin.

Source: AIHW Australian Cancer Database, 2019.

Technical notes

Age-adjusted survival: a method to remove the influence of changes in the ages of those diagnosed with a specific cancer type (or group) over time when considering changes in relative survival rates over time. As the adjustments are applied to a specific cancer type (or group), age-adjusted survival rates for a cancer (or group) are not directly comparable with other cancers (or groups) or between different sexes for the same cancer (or group).

Age-specific rate: the rate for a specific age-group. The numerator and denominator relate to the same age group.

Age-standardisation: a method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure; then the disease rates that would have occurred with that structure are calculated and compared.

Cancer: refers to a large range of diseases in which some of the body's cells become defective, begin to multiply out of control, can invade and damage the area around them, and can also spread to other parts of the body to cause further damage.

Cancer incidence: the number of new cancers diagnosed during a specified time period (usually one year).

Cancer mortality: the number of deaths occurring during a specified time period (usually one year) for which the underlying cause of death is cancer.

Cohort method: a method for calculating survival. It follows a group (cohort) of patients all diagnosed in a specified era, e.g. 2005–2009, and calculates the proportion of the original cohort that is still alive after a specified period of time after diagnosis, e.g. 5 years. Compare to the period method.

Crude rate: the number of events in a given period divided by the size of the population at risk in a specified time period.

Period method: a method for calculating survival. It specifies a period of time, e.g. 2010–2014, and calculates survival based on all patients who live part or all of their post-diagnosis life during that period. Compare to the cohort method.

Prevalence: the number of people alive with a prior diagnosis of cancer at a given time. The longest period for which it is possible to calculate prevalence using the available national data (from 1982 to 2018) is currently 36 years so this is used to provide an estimate of the 'total' prevalence of cancer as at the end of 2017, noting that people diagnosed with cancer before 1982 are not included.

Relative survival: the ratio of observed survival of a group of persons with cancer to expected survival of those in the corresponding general population after a specific interval (such as 1, 3 or 5 years) following diagnosis.

Risk adjusted for competing mortality: 'Cancer risk' describes the risk of being diagnosed with, or dying from, cancer. Risk adjusted for competing mortality considers the probability of a certain event occurring for a person (for example, diagnosis of cancer or death from cancer) while taking into account the fact that the person might die before the event happens.

Risk not adjusted for competing mortality: 'Cancer risk' describes the risk of being diagnosed with, or dying from, cancer. It does not factor the likelihood of a person dying before being diagnosed or the likelihood of a person dying from another cause.

Stage: the extent of a cancer in the body. Staging is usually based on the size of the tumour, whether lymph nodes contain cancer, and whether cancer has spread from the original site to other parts of the body.

Survival: a general term indicating the probability of being alive for a given amount of time after a particular event, such as diagnosis of cancer.

Technical notes

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Notes

This report provides a wide range of cancer related statistics including historical data ranging back to 1982 and projections up to 2023; cancer mortality data ranges back to 1971 and cancer incidence projections up to 2033 available for selected cancers.

Data quality statement

Visit the ACD 2019 for the respective Data Quality Statement. METEOR website.

The data quality statements underpinning the AIHW NMD can be found on the following ABS internet pages:

- ABS quality declaration summary for Deaths, Australia (ABS cat. no. 3302.0)
- ABS quality declaration summary for Causes of death, Australia (ABS cat. no. 3303.0)

For more information on the AIHW NMD visit Deaths data at AIHW, and for the National Death Index Data Quality Statement visit the NDI.

Data

Handy tip: The CdiA Excel workbooks are often very large and it can be difficult to locate exactly what you are looking for. Given the size of these Excel worksheets, we recommend using the Excel filter to more easily locate the specific data you are looking for.

The filter function may be used by highlighting the title row and pressing Shift+Ctrl+L. You may then more simply locate the data you are looking for through the dropdown lists available from each column heading.

The data: The Need help locating data? page provides a brief description of the Excel data and it may be of assistance to more easily navigate through the Excel data. The page also provides information about which Excel data informs various visualisations as well as providing links to the various data visualisations.

Rankings data are only available from the Tableau presentation.

Mortality data: This year's release of CdiA continues to include mortality data from the National Mortality Database and now also includes mortality data from the Australian Cancer Database. The additional source is being released in conjunction with AIHWs cancer mortality data investigations. These investigations are in a preliminary stage with the overall objective of the project to improve mortality reporting. Please read Cancer data commentary number 8 for more information about the investigations and two sources of mortality data. Recommendations in relation to which data source to use are available within Cancer data commentary 8b.

ACD pivot table

The 2019 Australian Cancer Database (ACD) pivot table contains incidence counts from the 2019 ACD by cancer type (defined by 3-character ICD-10 code), sex, age group and year of diagnosis.

The ACD pivot table includes a ‘Pivot table’ worksheet and a ‘raw data’ worksheet. The raw data worksheet provides the background data that is used to generate the pivot tables. The raw data worksheet now also includes rates. Rates are not recommended for use in the pivot tables but have been provided in the raw data worksheet (because the pivot table adds data to arrive at totals and rates are not additive).

Related material

Resources