



Government of **Western Australia**
Department of **Health**

Cancer Incidence, Mortality, and Survival in Western Australia, 2021

Classification:

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Acknowledgement of Country and People

The Department of Health acknowledges the Aboriginal people of the many traditional lands and language groups of Western Australia. It acknowledges the wisdom of Aboriginal Elders both past and present and pays respect to Aboriginal communities of today.

Introduction and methods

Western Australian Cancer Registry

The Western Australian Cancer Registry (WACR) is a population-based cancer registry established in 1981, operating within the Western Australian (WA) Department of Health. Since 1982, the WACR has provided population-based cancer data for use in the planning of health care services and the support of cancer-related research at local, national, and international levels. The main sources of information to the WACR are reports from pathologists, haematologists, and radiation oncologists, supplemented by death registrations, hospital statistical discharge records, as well as information from hospital files and clinical information systems, and responses to enquiries directed to treating medical practitioners. Currently, the WACR is managed within the Information and Performance Governance Directorate of the Purchasing and System Performance Division of the WA Department of Health.

Legislative basis

The WACR operates under the *Health (Western Australian Cancer Register) Regulations 2011*. This legislation describes the legal requirement to notify WACR of a malignant neoplasm within 30 days by appropriate health practitioners. This information is to be maintained in the register and used to:

- monitor the number of cases of cancer in Western Australia
- plan, monitor and evaluate services for the control of cancer and the care of cancer patients in Western Australia
- compile and publish general or statistical information relating to cancer
- carry out research into the causes, prevention, screening, and treatment of cancer

Report overview

This is the latest in the Registry's series of incidence, mortality, and survival reports, and represents WA cancer incidence, mortality, and survival for 2021. This report is primarily concerned with invasive tumours, or "cancers", diagnosed in WA using standardised collection, coding and epidemiological practices aligned with Australian and international cancer registries. The latest data on notifiable cancers collected for a complete calendar year by the WACR is presented in this report. Incidence, mortality, and risk are presented for 2021 and trends over time where appropriate. Whole population relative survival is presented for all cases diagnosed in five-year windows from 2002-2006 to 2017-2021.

The main statistics presented for 'all cancers combined' are the incidence and cancer-related mortality counts, age-standardised rates, and age-specific rates, cumulative cancer risk and relative cancer survival in the WA total population as well as disaggregating the data to show cancer statistics in the WA Aboriginal population.

Statistical methods

Statistics from the WACR commonly fall into one of two major groups: incidence is reported for all malignancies except primary squamous cell carcinoma (SCC) and basal cell carcinoma (BCC), and mortality for all malignancies (including SCC and BCC) and certain other tumours or tumour-like conditions.

Incidence and mortality rates are calculated separately for females, males, and total persons expressed as events (diagnosed cases or deaths) per 100,000 person-years (Box 1).

The primary measure of survival used in this report is relative survival. Relative survival was estimated as the ratio of the observed survival among cancer patients to the expected survival of the general population matched on age, sex and calendar year. Expected survival was calculated using the Ederer II method (Ederer & Heise, 1959), which applies population life-table mortality rates to individuals over the entire follow-up period to reflect the survival that would have been expected in the absence of a cancer diagnosis. To provide timely and up-to-date estimates, survival was calculated using the period method, whereby observed survival contributions were restricted to a defined recent calendar window (e.g., 2017–2021, 2012–2016). Relative survival at 1 to 5 years following initial diagnosis was derived for each period and is presented as percentages. All estimates were generated using the R package *periodR*, which implements standard period-based relative survival methodology (Holleczek et al., 2009) consistent with international cancer registry practices.

Box 1: Key terms

Age-Specific Rates (ASPR) are based on five-year (or fifteen-year) age groups and are calculated by dividing the numbers of cases by the population of the same sex and age group. Whole population data has been sourced from the Australian Bureau of Statistics (ABS) and regional data from the Epidemiology Directorate, Department of Health (WA).

Age-Standardised Rates (ASR) are calculated by the direct method, as a summation of weighted age-specific rates. Throughout this report, the Australian 2001 standard population has been used to derive the ASRs.

Cumulative incidence and cumulative risk are closely related. Cumulative incidence is an estimate of the proportion of persons, up to a specific age, who have been affected by a particular condition at some time.

Cumulative risk estimates the probability of having cancer (incidence) or dying of it (mortality), up to a specific age. This is derived from the relevant cumulative incidence figures and calculated for ages 0 to 74 years. In this report, cumulative risk is expressed as a “1 in n” chance of diagnosis or death.

Survival is defined as the proportion of people who are alive after a certain time (such as one or five years) following the initial diagnosis of a specific disease. Cancer survival is generally used as an indicator of cancer prognosis and the effectiveness of cancer treatments available.

Relative survival is a way of comparing the survival in people who have the disease to survival in those who are disease free i.e. it is a measure of the excess mortality observed among cancer patients compared to mortality (due to all-cause deaths) in a corresponding general population. Relative survival is expressed as the proportion (probability) of people being alive for a given amount of time after diagnosis of cancer.

Interpretation

The Cancer Registry is continually updated with the most recent available information. Accordingly, numbers in this report for earlier years may vary slightly from those in previous publications, as some WA cases are eventually found to have been diagnosed elsewhere or in earlier years, and case counts therefore rise and fall as new information is available to the registry. Mortality information sheds new light on a person's cancer history and often leads to the initiation of new enquiries. The data used in this report was current as of 28th November 2025.

Throughout this report, readers should be aware that assessing the relevance of annual changes in cancer incidence and mortality is complex and depends on the temporal changes in the size of underlying populations and their age structures. Caution is required in assessing changes based on single rate comparisons. Furthermore, WA is particularly polarised into metropolitan and rural areas, with a large variation in population density and age structure, and there are likely to be *some* statistical biases between metropolitan and rural areas.

Rates and risks

It should be noted that incidence and mortality rates and cumulative risks may not be in proportion to one another because of variations in the age structures of populations.

Small case counts

Rates in this report relating to small-number case counts (especially <20 counts) have not been provided. This is because small numbers are subject to much larger relative variance, and random variations by chance in the absolute number of events can have a significant but less reliable effect on outcomes (rates). Additionally, case counts less than 6 are not displayed to protect privacy and confidentiality.

2021 Data overview – Total population

Cancer in Western Australia 2021

There were **14,912 new diagnoses** of cancer.

In 2021, cumulative incidence estimates showed that...



**1 in 4
females**



**1 in 3
males**

...were at **risk** of receiving a **cancer diagnosis** before the age of 75.

Leading cancer type by incidence count:



1. Prostate



2. Breast



3. Melanoma



4. Colorectal



5. Lung



6. Lymphoma

Leading cancer type by mortality count:



1. Lung



2. Colorectal



3. Pancreas



4. Breast



5. Prostate



6. Unknown primary

There were **4,628 cancer-related deaths**.

In 2021, **cumulative mortality** estimates showed that...



**1 in 15
females**



**1 in 11
males**

...were at **risk** of **death due to cancer** before the age of 75.

72.3% of all people diagnosed with cancer (excluding BCC and SCC) **survived at least five years** after diagnosis in **2017–2021**.

Cancer incidence in WA

Age-standardised cancer incidence rates in WA

In 2021, there were 14,912 new diagnoses of cancer in WA, with 42.9 per cent of diagnoses occurring in females (6,403 cases) and 57.1 per cent in males (8,509 cases). The age-standardised incidence rate (ASR) decreased by 6.1 per cent over the past decade, from 492.5 cases per 100,000 people in 2012 to an estimated 462.3 cases per 100,000 people in 2021 (Figure 1). In 2021, cumulative risk estimates indicated that in WA, 1 in 4 females and 1 in 3 males were at risk of receiving a cancer diagnosis before the age of 75. Between 2012 and 2021, the ASR among females decreased by 5.8 per cent, from 416.2 to 392.1 per 100,000 females. While the ASR for males decreased by 6.9 per cent, from 581.4 to 541.1 per 100,000 males (Figure 1).

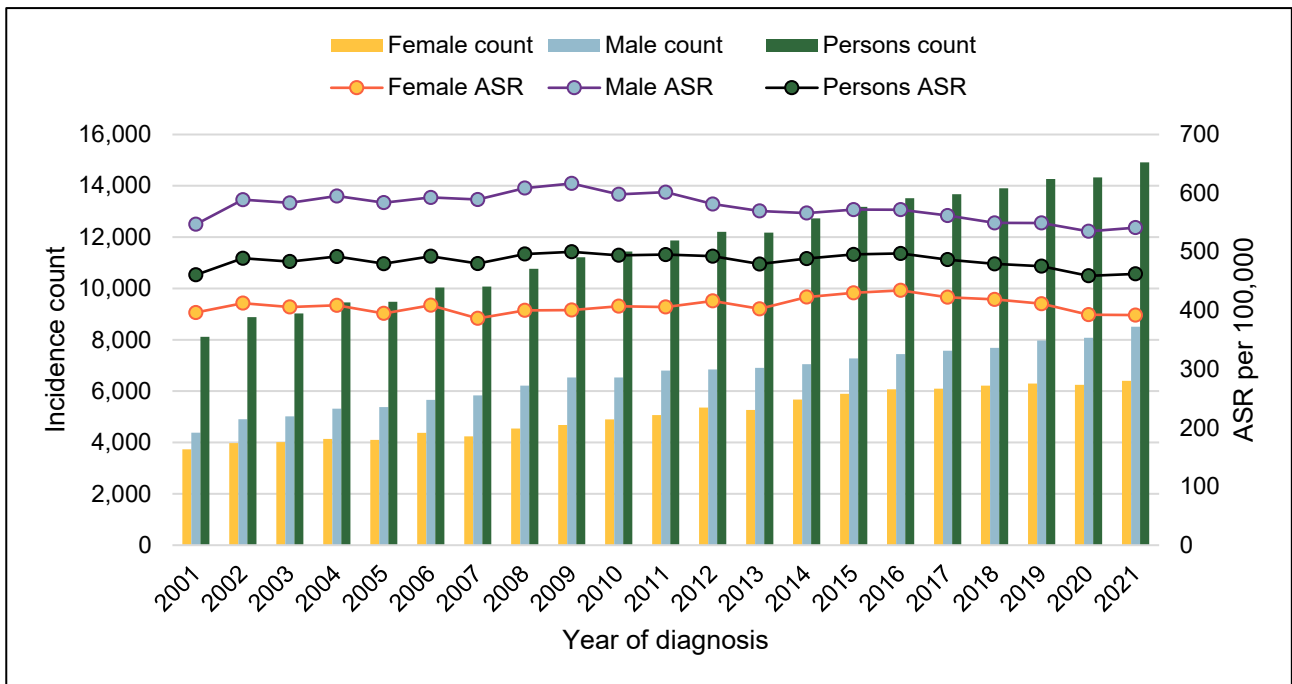


Figure 1. Incidence counts and age-standardised incidence rates (per 100,000) of all cancers by sex, WA, 2001 to 2021

Leading cancer type by cancer incidence in WA

The most common cancer diagnoses in 2021 were prostate, breast, melanoma, colorectal, lung and lymphatic cancer, representing 64.5 per cent of all new cancer diagnoses (9,623 of 14,912 cases) (Figure 2).

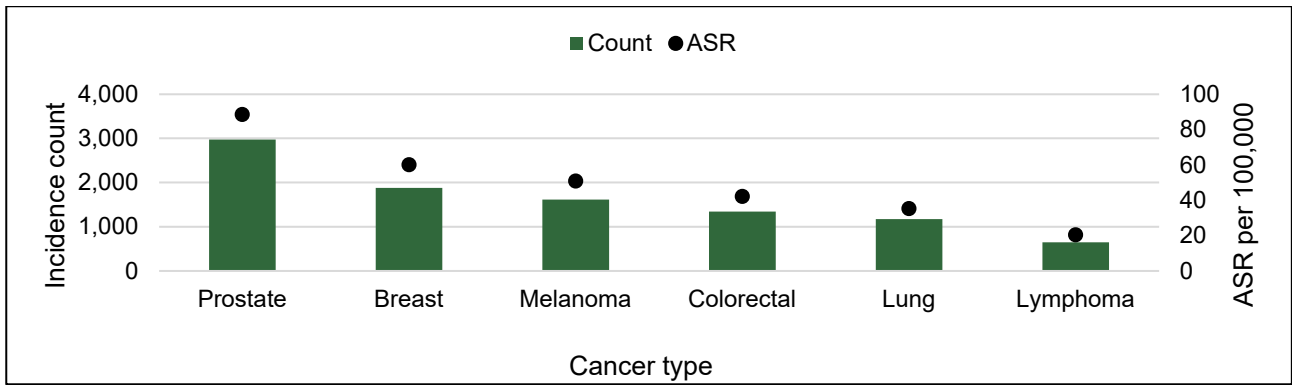


Figure 2. Leading cancer type by incidence count and age-standardised incidence rate among persons, WA, 2021

Among females, the most common cancer diagnoses were breast, colorectal, melanoma, lung, lymphoma, and uterine cancer, representing 66.4 per cent of all new female cancer diagnoses (4,252 of 6,403 cases) (Figure 3). Among males, the most common cancer diagnoses were prostate, melanoma, colorectal, lung, lymphoma, and head and neck cancer, representing 70.1 per cent of all male cancer diagnoses (5,962 of 8,509 cases) (Figure 4).

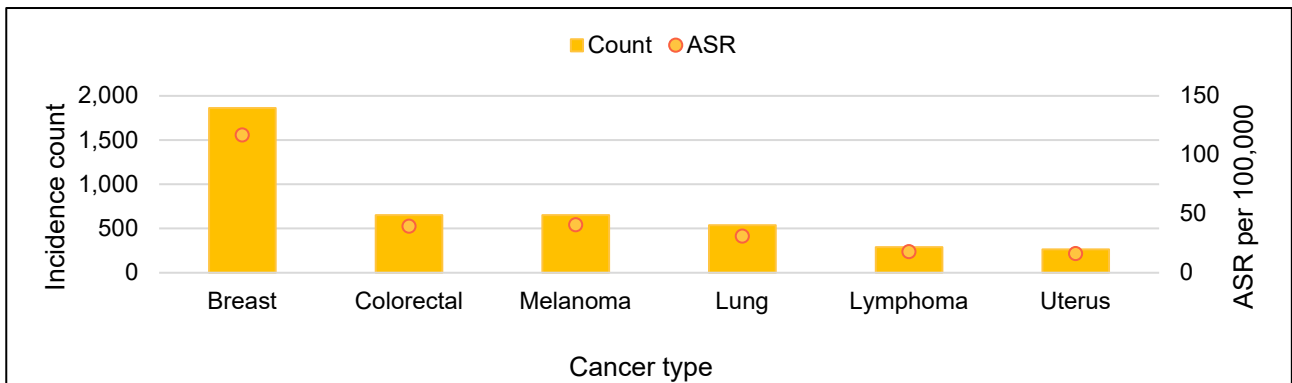


Figure 3. Leading cancer type by incidence count and age-standardised incidence rate among females, WA, 2021

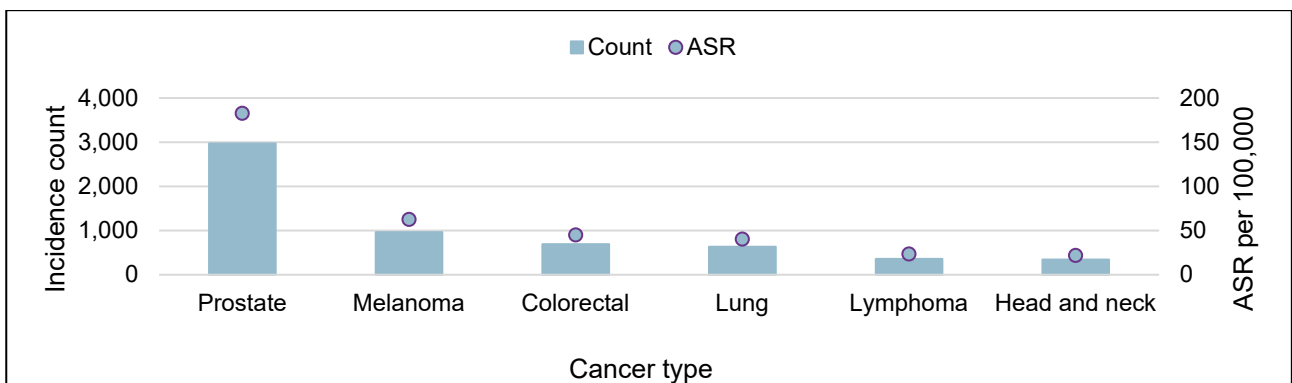
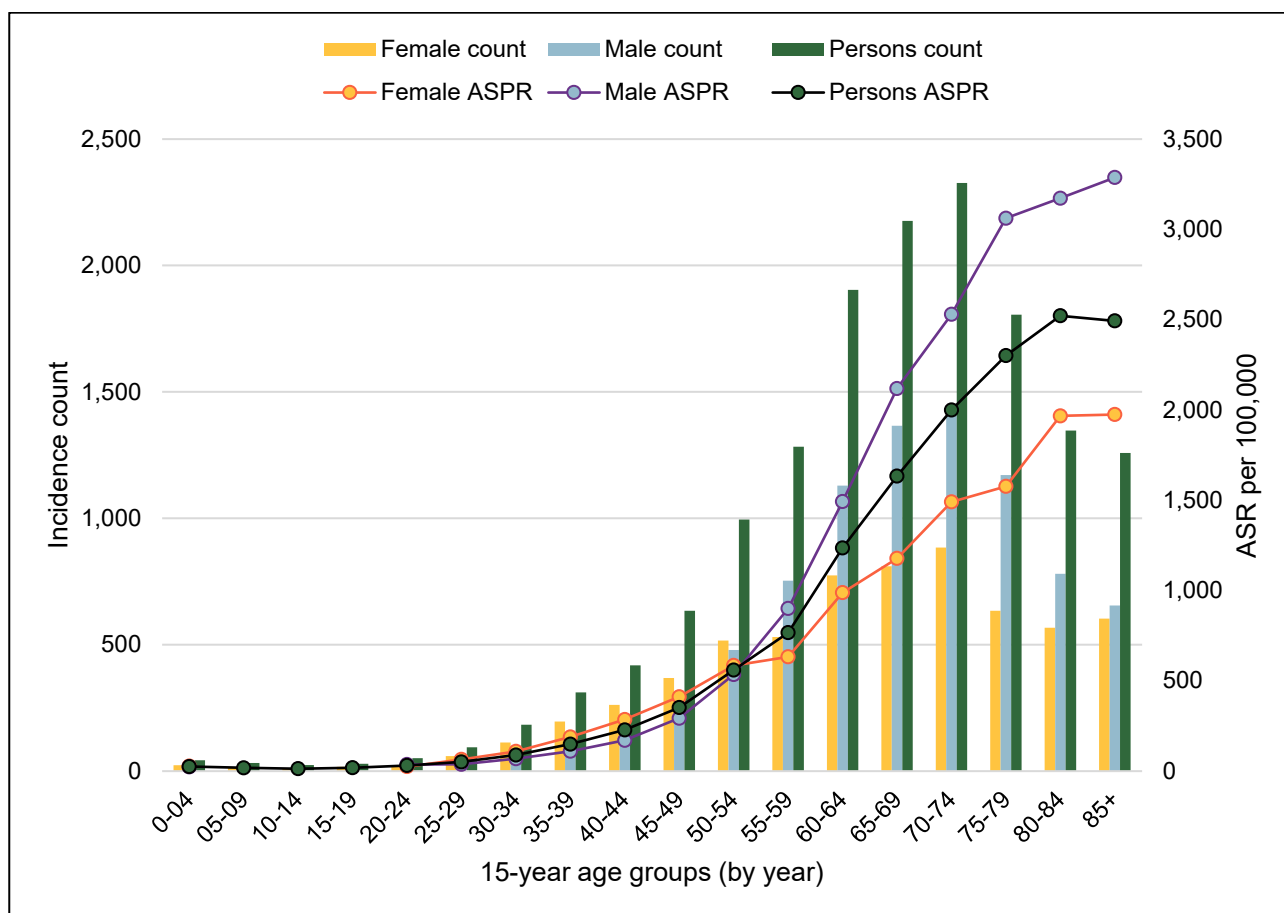


Figure 4. Leading cancer type by incidence count and age-standardised incidence rate among males, WA, 2021

Age-specific cancer incidence rates in WA

Cancer incidence increases substantially with age (Figure 5). In 2021, persons aged 85 years and older experienced an incidence rate double that of those aged 60 to 64 years, and 28 times higher than those aged 30 to 34 years. By sex, from 25 to 29 years and 50 to 54 years, females experienced a higher age-specific incidence rate than males, however from 55 to 59 years and older, males experienced a higher rate than females. Among both females and males, the 85 years and older age group experienced the highest age-specific incidence rate (Figure 5).



Note: Age-specific incidence rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable. Case counts less than 6 are not displayed to protect privacy and confidentiality.

Figure 5. Age-specific incidence rates of all cancers by sex, WA, 2021

Cancer mortality in WA

Age-standardised cancer mortality rates in WA

There were 4,628 cancer-related deaths in WA in 2021, with 43.1 per cent of deaths recorded in females (1,995 cases) and 56.9 per cent in males (2,633 cases). The age-standardised cancer mortality has decreased by 16.2 per cent since 2012, declining from 166.0 deaths per 100,000 people to an estimated 139.1 per 100,000 people in 2021 (Figure 6). Cumulative risk estimates in 2021 indicated that in WA, 1 in 15 females and 1 in 11 males were at risk of dying from cancer before the age of 75. From 2012 to 2021, the

age-standardised mortality rate for females declined by 15.1 per cent, from 132.9 to 112.9 per 100,000 females. For males, the mortality rate declined by 18.2 per cent, from 208.5 to 170.5 per 100,000 males (Figure 6).

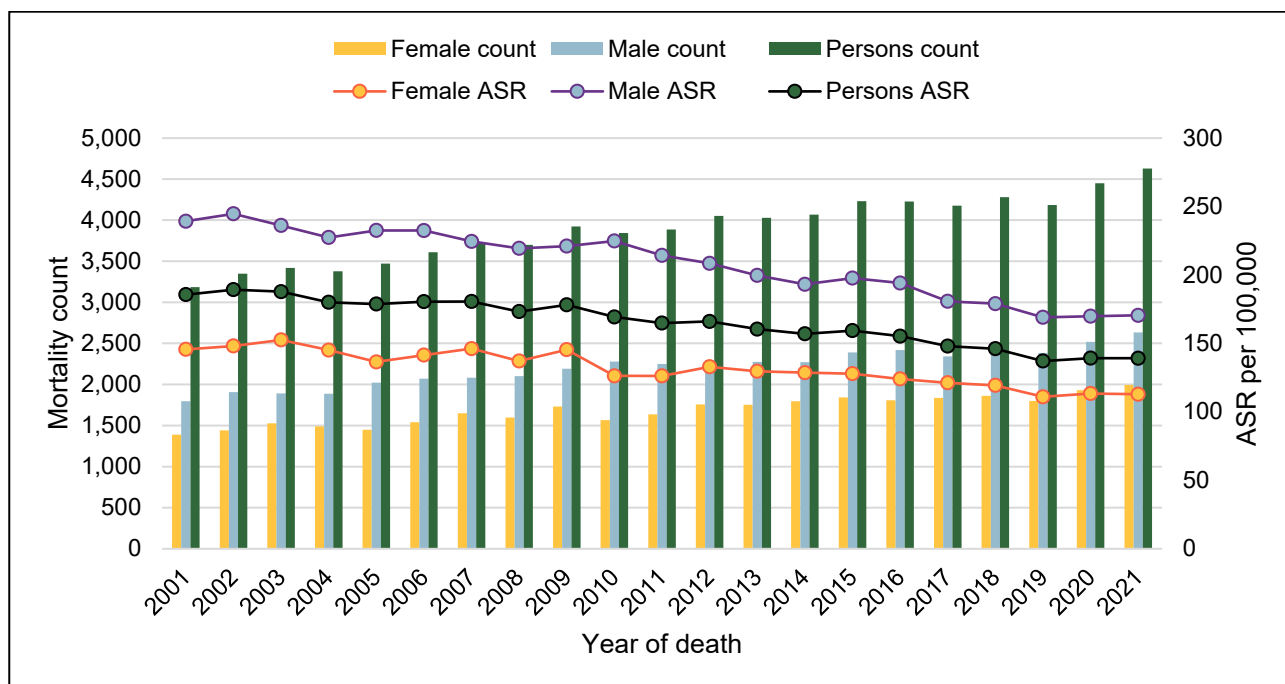


Figure 6. Mortality counts and age-standardised mortality rates (per 100,000) of all cancers by sex, WA, 2001 to 2021

Leading cancer type by cancer mortality in WA

The cancers responsible for the highest cancer-related mortality in WA were lung, colorectal, pancreas, breast, prostate and unknown primary cancer (metastatic cancer that has an unknown starting point or primary site). These cancers represented 51.7 per cent of all cancer-related mortality in 2021 (2,392 of 4,628 cases) (Figure 7).

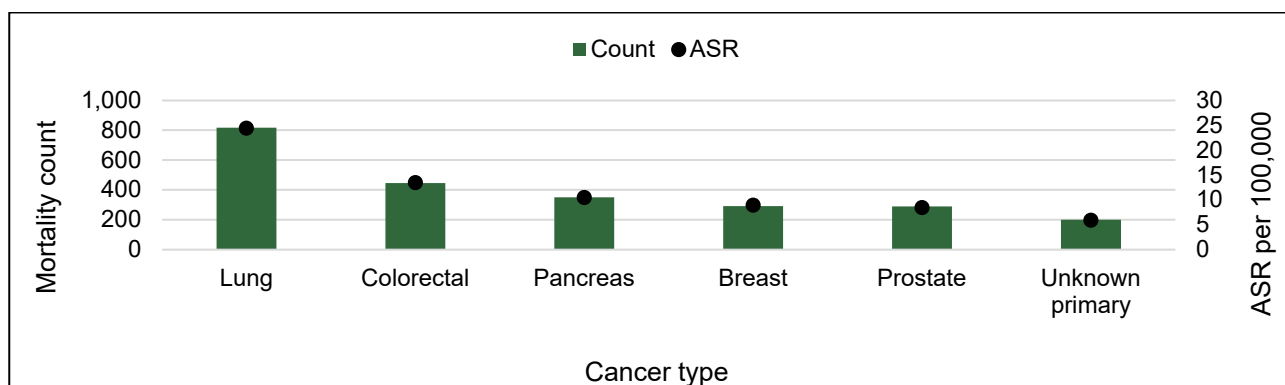


Figure 7. Leading cancer type by mortality count and age-standardised mortality rate among persons, WA, 2020

Among females, the cancers responsible for the highest cancer-related mortality included lung, breast, colorectal, pancreatic, unknown primary, and ovarian cancer representing 59.3 per cent of female cancer-related deaths in 2021 (1,183 of 1,995 cases) (Figure 8). Among males, the cancers responsible for the highest cancer-related mortality included

lung, prostate, colorectal, pancreas, liver, and melanoma, representing 53.5 per cent of the male cancer-related deaths in 2021 (1,408 of 2,633 cases) (Figure 9).

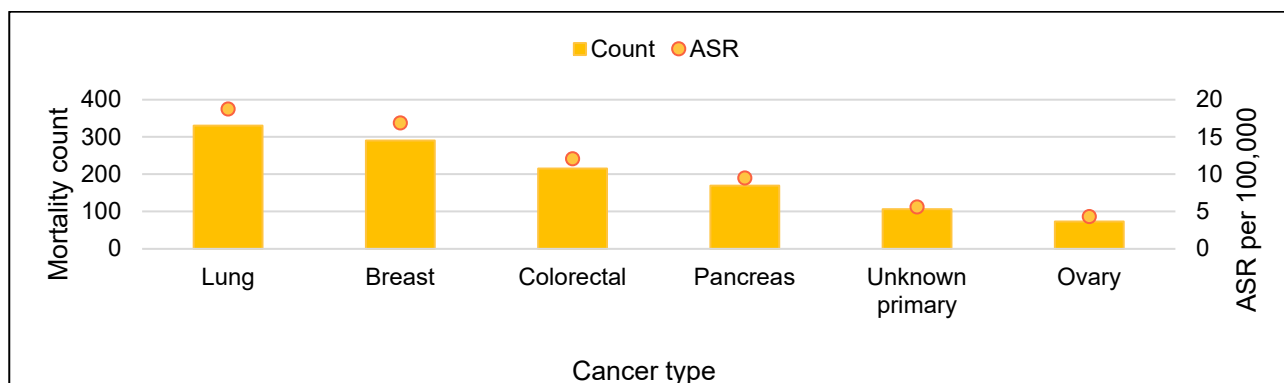


Figure 8. Leading cancer type by mortality count and age-standardised mortality rate among females, WA, 2021

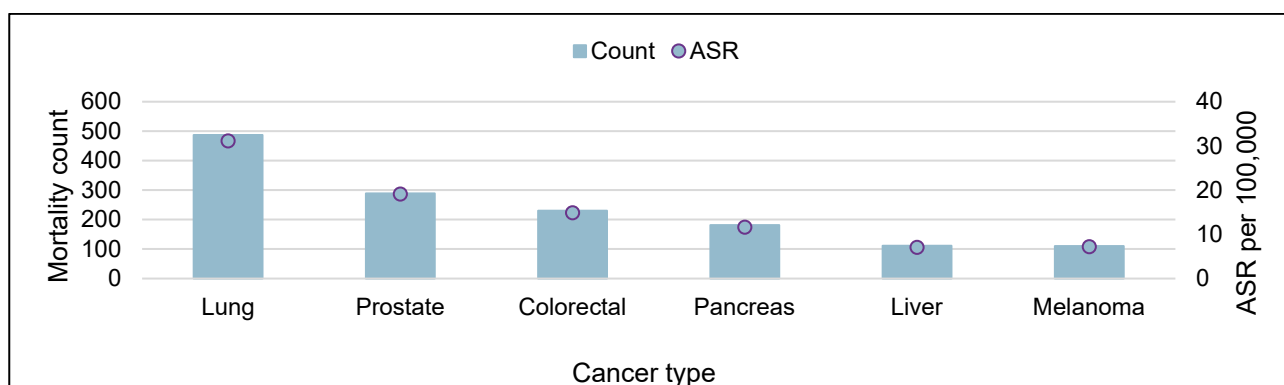
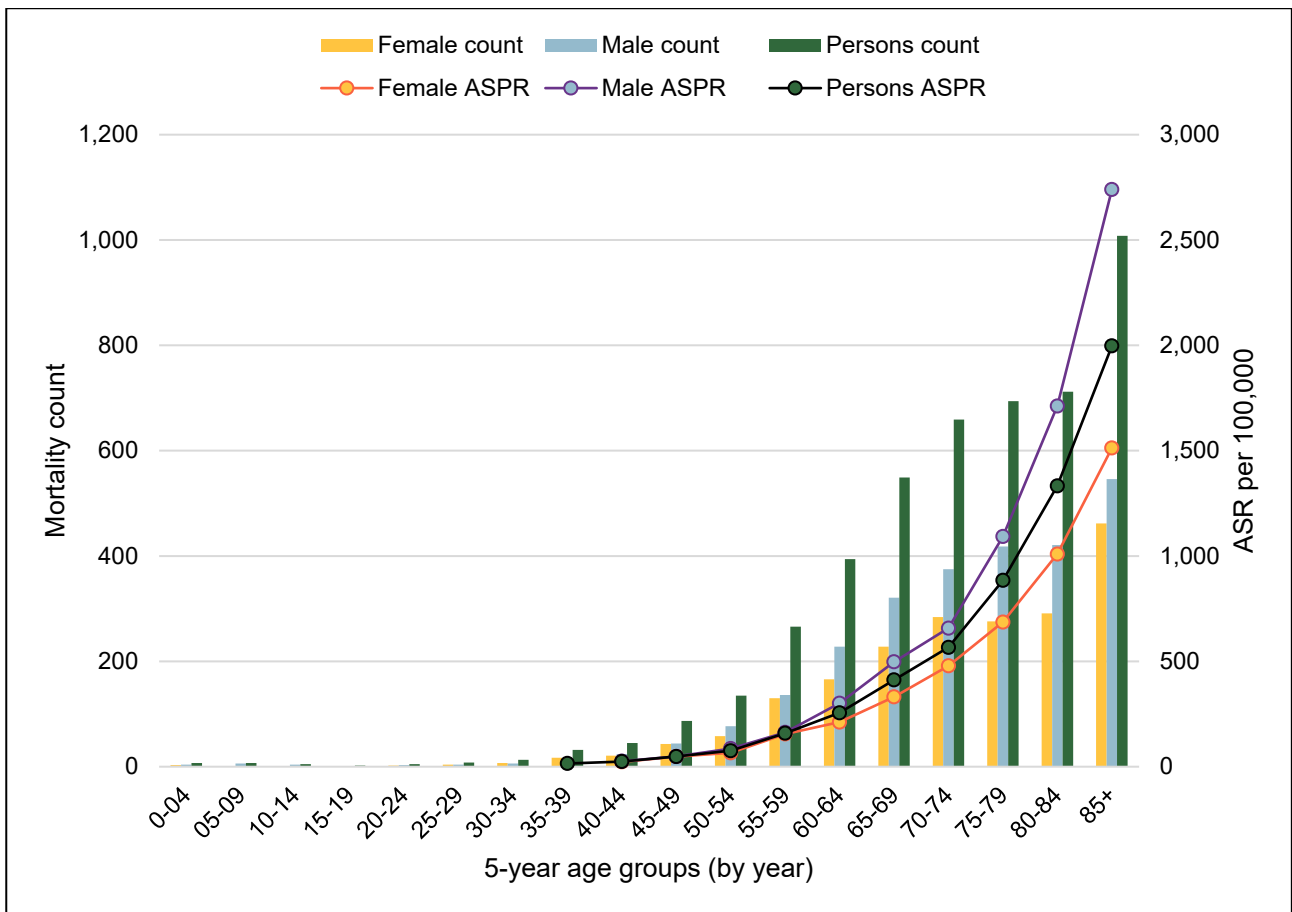


Figure 9. Leading cancer type by mortality count and age-standardised mortality rate among males, WA, 2021

Age-specific cancer mortality rates in WA

Cancer mortality increases substantially with age (Figure 10). In 2021, persons aged 85 years and older experienced a mortality rate almost 8 times higher than that of those aged 60 to 64 years, and 130 times higher than those aged 35 to 39 years. By sex, from 35 to 39 years and older, males experienced a higher mortality rate than females. Among both females and males, the 85 years and older age group experienced the highest age-specific mortality rate (Figure 10).



Note: Age-specific mortality rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable. Case counts less than 6 are not displayed to protect privacy and confidentiality.

Figure 10. Age-specific mortality rates of all cancers by sex, WA, 2021

Relative five-year survival for all cancers in WA

Relative survival varies depending on the type of cancer diagnosed. However, relative survival rates for all cancers combined continue to improve in WA. Between 2017 and 2021, 72.3 per cent of individuals diagnosed with cancer (excluding BCC and SCC) survived at least five years following diagnosis (Table 1). This represents an increase from 64.0 per cent during the 2002 to 2006 period.

Improved survival may be attributed to a range of factors, including advances in medical treatments, earlier detection through national cancer screening programs (e.g. breast, cervical, and bowel screening), and broader health system changes such as updates to diagnostic guidelines. Increased public awareness of cancer signs and symptoms may also play a role, though this requires further empirical support (Australian Institute of Health and Welfare, 2021).

Table 1. 5-year relative survival for all cancer types by time period, WA persons

Number of years following initial diagnosis	Relative survival (per cent)			
	2002-2006	2007-2011	2012-2016	2017-2021
1	79.6	82.0	83.8	84.8
2	72.4	75.5	77.6	79.3
3	68.7	71.7	74.2	76.2
4	65.9	69.3	71.8	74.0
5	64.0	67.5	70.2	72.3

Between 2017 and 2021, 73.1 per cent of females diagnosed with cancer (excluding BCC and SCC) survived at least five years following diagnosis (Table 2). This represents an increase from 65.7 per cent relative survival for period 2002 to 2006.

Table 2. 5-year relative survival for all cancer types by time period, WA females

Number of years following initial diagnosis	Relative survival (per cent)			
	2002-2006	2007-2011	2012-2016	2017-2021
1	80.6	82.3	84.7	85.3
2	74.0	76.2	78.7	80.2
3	70.4	72.3	75.3	77.1
4	68.2	70.1	72.7	74.9
5	65.7	68.4	71.0	73.1

Between 2017 and 2021, 71.6 per cent of males diagnosed with cancer (excluding BCC and SCC) survived at least five years following diagnosis (Table 3). This represents an increase from 62.7 per cent relative survival for period 2002 to 2006.

Table3. 5-year relative survival for all cancer types by time period, WA males

Number of years following initial diagnosis	Relative survival (per cent)			
	2002-2006	2007-2011	2012-2016	2017-2021
1	78.8	81.7	83.1	84.4
2	71.0	74.9	76.7	78.6
3	67.3	71.3	73.3	75.5
4	64.1	68.8	71.1	73.3
5	62.7	66.8	69.6	71.6

2021 Data overview – Aboriginal population

Cancer among Aboriginal people in Western Australia 2021

There were **284 new diagnoses** of cancer.

In 2021, cumulative incidence estimates showed that...



**1 in 3
females**



**1 in 3
males**

...were at **risk** of receiving a **cancer diagnosis** before the age of 75.

Leading cancer type by incidence count:



1. Breast



1. Lung



2. Colorectal



3. Prostate



4. Head and neck



5. Uterus

Leading cancer type by mortality count:



1. Lung



2. Head and neck



3. Breast



4. Oesophagus



4. Prostate



4. Stomach

There were **124 cancer-related deaths**.

In 2021, **cumulative mortality** estimates showed that...



**1 in 8
females**



**1 in 6
males**

...were at **risk** of **death due to cancer** before the age of 75.

Contextual notes

Aboriginal communities across WA continue to demonstrate leadership in shaping culturally secure responses to cancer care. Wellbeing is understood holistically and is supported through connection to Country, kinship, Aboriginal knowledges, culture, language, and self-determination.

Community-led services, including Aboriginal Community Controlled Health Organisations and Aboriginal Health Workers, play a vital role in delivering culturally appropriate prevention, screening, treatment, and follow-up care. These approaches are grounded in Aboriginal knowledge systems, strengths, and ways of being.

There are ongoing limitations in the completeness and accuracy of cancer data for Aboriginal peoples in WA. Under-identification, inconsistent data recording, and limited community governance over how data is collected and used may affect the visibility of cancer trends and outcomes. Addressing these limitations requires a commitment to Indigenous Data Sovereignty and the development of meaningful partnerships with communities to ensure that data practices are transparent and aligned with community priorities.

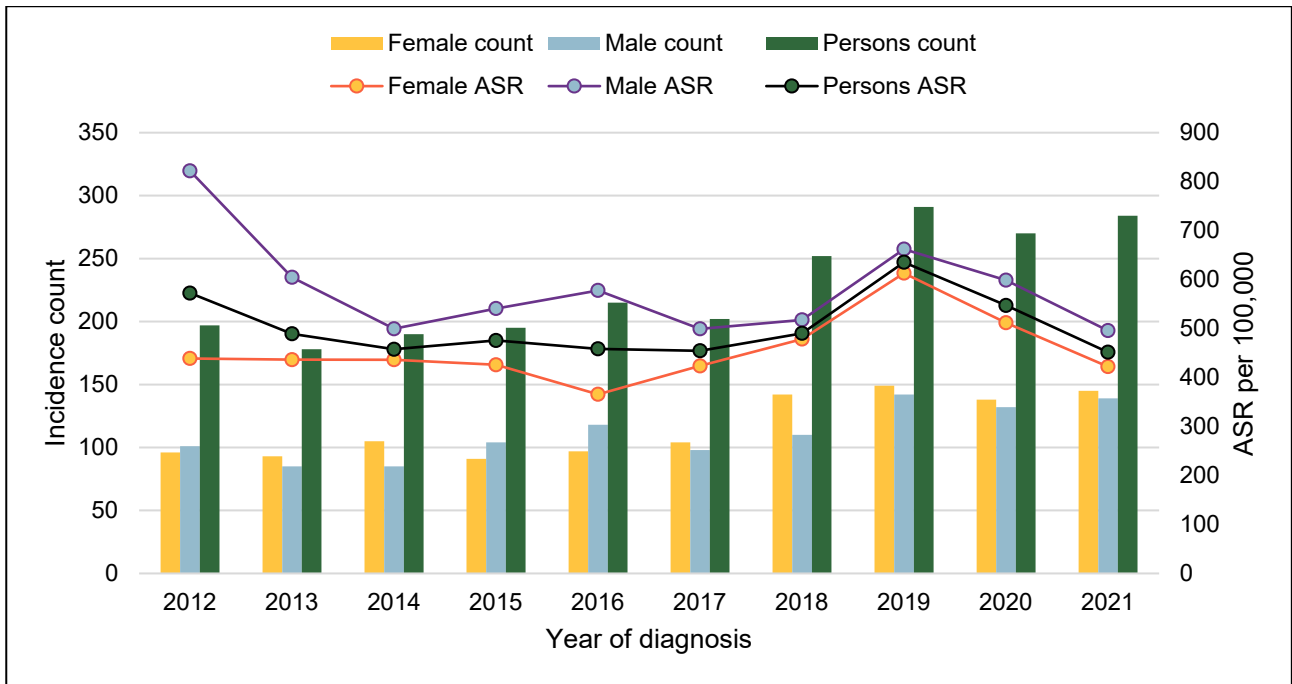
Efforts to improve cancer outcomes must continue to be guided by Aboriginal leadership and embedded in culturally safe, self-determined models of care.

Reporting for the WA Aboriginal population is presented from 2012 onwards to align with improvements in Indigenous identification and reporting practices across health datasets in WA.

Cancer incidence in WA Aboriginal population

Age-standardised cancer incidence rates in WA Aboriginal population

In 2021, there were 284 new diagnoses of cancer among Aboriginal persons living in WA. Of these, 51.1 per cent were female (145 cases) and 48.9 per cent were male (139 cases). The age-standardised incidence rate decreased by 21.1 per cent, from 572.4 cases per 100,000 people in 2012 to an estimated 451.7 cases per 100,000 in 2021 (Figure 11). In 2021, cumulative risk estimates indicated that 1 in 3 Aboriginal females and 1 in 3 Aboriginal males were at risk of receiving a cancer diagnosis before the age of 75. Between 2018 and 2021, incidence rates among females decreased by 11.7 per cent, from 478.4 to 422.3 per 100,000. In contrast, incidence rates for males decreased by 4.2 per cent, from 517.7 to 496.0 per 100,000 (Figure 11). Small case numbers may influence annual variability, and caution should be exercised in interpreting trends over time.

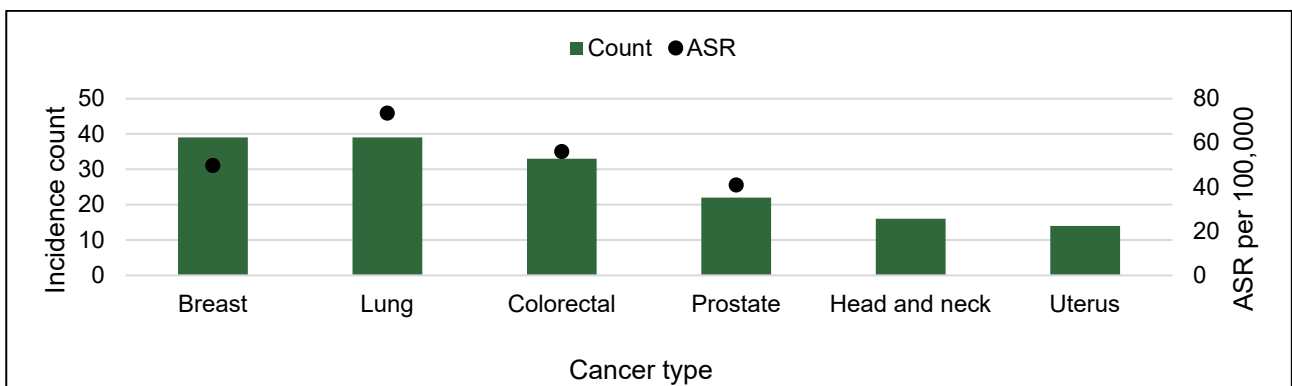


Note: These results should be interpreted with caution due to small case numbers and year-to-year fluctuations.

Figure 11. Incidence counts and age-standardised incidence rates (per 100,000) of all cancers by sex among Aboriginal people, WA, 2012 to 2021

Leading cancer type by cancer incidence in WA Aboriginal population

The most common cancer diagnoses in 2021 were breast, lung, colorectal, prostate, head and neck, and uterine cancer, representing 57.4 per cent of all new cancer diagnoses within the Aboriginal population (163 of 284 cases) (Figure 12).

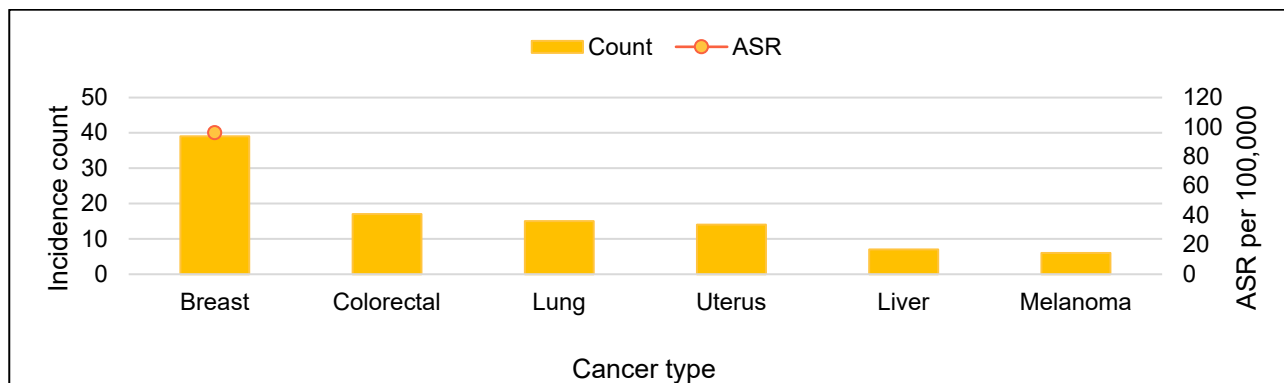


Note: These results should be interpreted with caution due to small case numbers. Age-standardised incidence rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable.

Figure 12. Leading cancer type by incidence count and age-standardised incidence rate among Aboriginal persons, WA, 2021

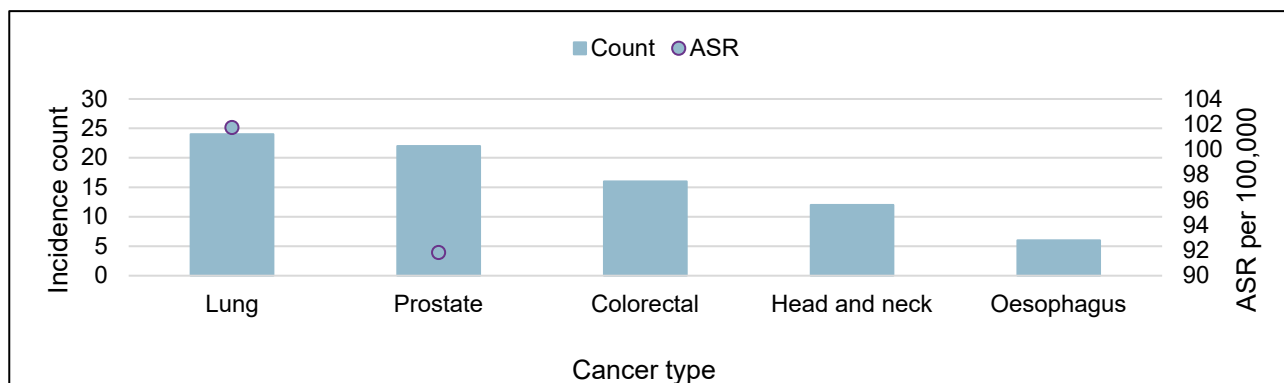
For Aboriginal females, breast, colorectal, lung, uterine, liver, and melanoma were the most diagnosed cancers, accounting for 67.6 per cent of new diagnoses in 2021 (98 of 145 cases) (Figure 13). For Aboriginal males, lung, prostate, colorectal, head and neck,

and oesophageal cancer were the most diagnosed cancers, accounting for 57.6 per cent of new diagnoses in 2021 (80 of 139 cases) (Figure 14).



Note: These results should be interpreted with caution due to small case numbers. Age-standardised incidence rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable.

Figure 13. Leading cancer type by incidence count and age-standardised incidence rate among Aboriginal females, WA, 2021

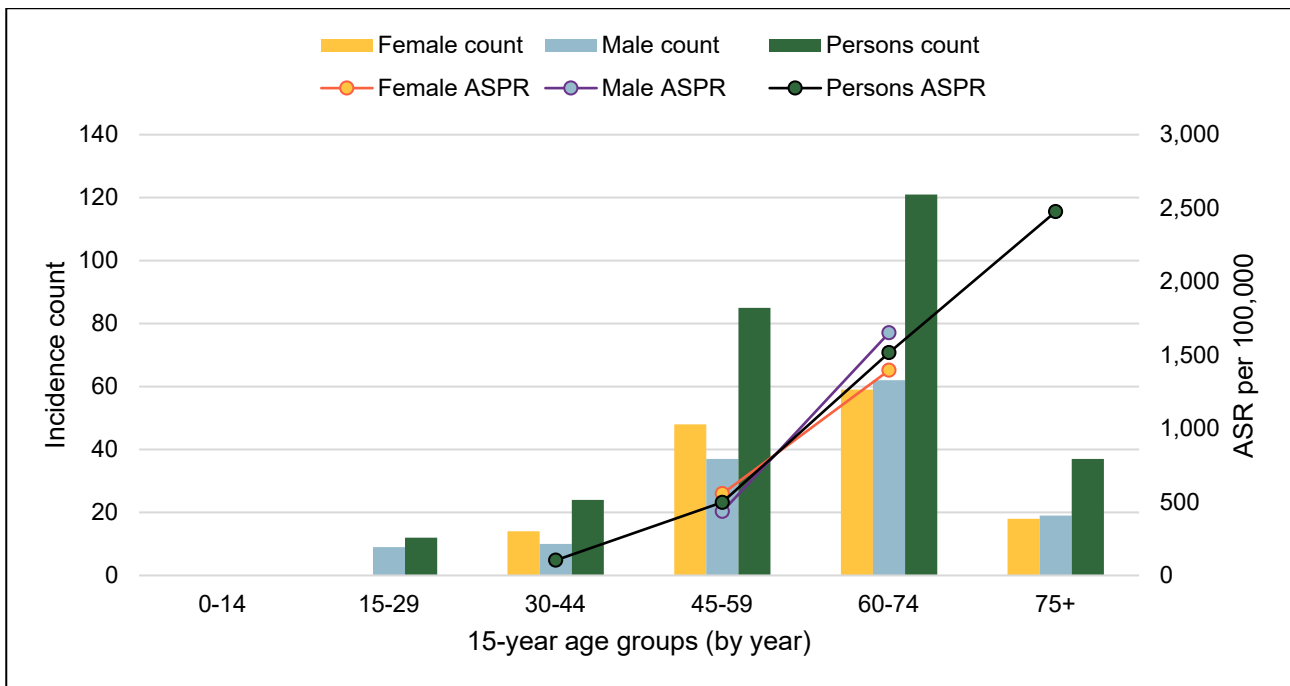


Note: These results should be interpreted with caution due to small case numbers. Age-standardised incidence rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable.

Figure 14. Leading cancer type by incidence count and age-standardised incidence rate among Aboriginal males, WA, 2021

Age-specific cancer incidence rates in WA Aboriginal population

Cancer incidence also generally increased with age within the WA Aboriginal population (Figure 15). In 2021, Aboriginal persons aged 75 years and older had an incidence rate almost double that of those aged 60 to 74 years, 5 times higher than those aged 45 to 59 years, and 24 times higher than those aged 30 to 44 years. By sex, the highest reportable age-specific incidence rate was experienced by those aged 60 to 74 years for both Aboriginal females and males.



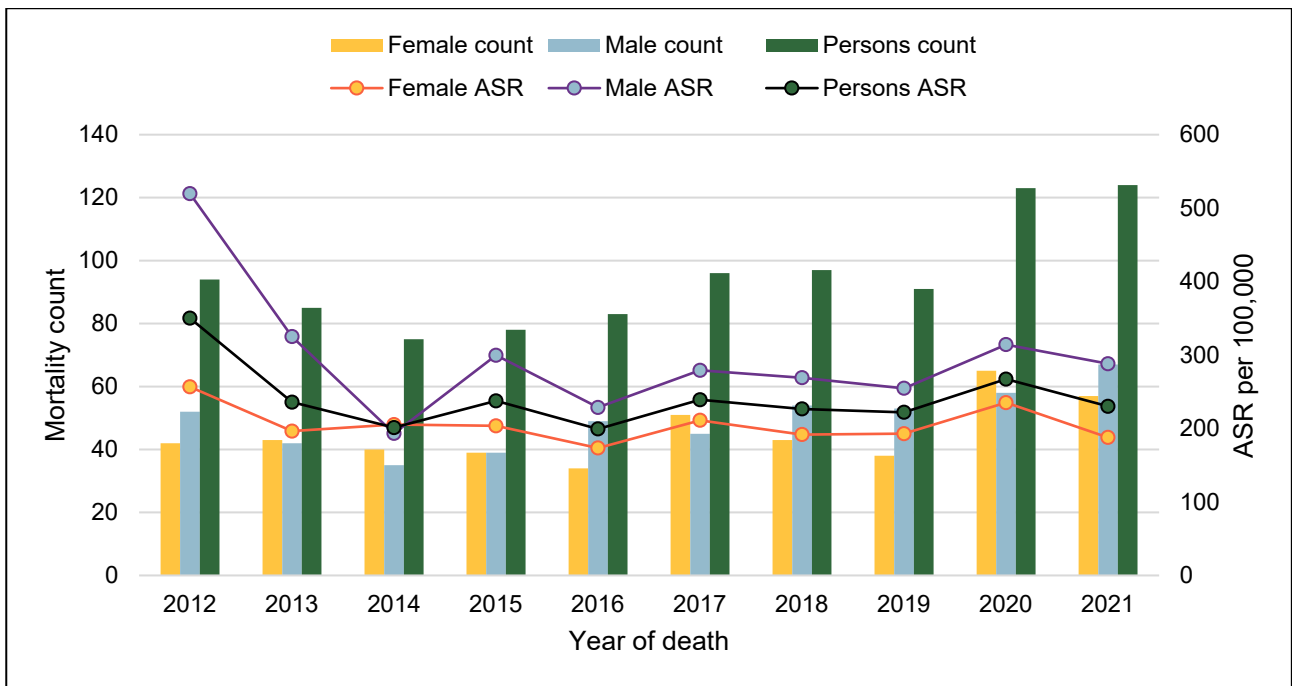
Note: These results should be interpreted with caution due to small case numbers. Age-specific incidence rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable. Case counts less than 6 are not displayed to protect privacy and confidentiality.

Figure 15. Age-specific incidence rates of all cancers by sex among Aboriginal people, WA, 2021

Cancer mortality in WA Aboriginal population

Age-standardised cancer mortality rates in WA Aboriginal population

In 2021, there were 124 cancer-related deaths among Aboriginal persons living in WA. Of these, 46.0 per cent occurred in females (57 cases) and 54.0 per cent in males (67 cases). The age-standardised mortality rate (ASR) decreased by 34.3 per cent, from 350.1 deaths per 100,000 people in 2012 to an estimated 230.2 deaths per 100,000 people in 2021 (Figure 16). Cumulative risk estimates in 2021 indicated that in WA, 1 in 8 Aboriginal females and 1 in 6 Aboriginal males were at risk of dying from cancer before the age of 75. Between 2012 and 2021, mortality rates decreased by 26.8 per cent among females (from 256.6 to 187.8 per 100,000) and has decreased by 44.6 per cent among males (from 519.6 to 288.1 per 100,000) (Figure 16). Small case numbers may influence annual variability, and caution should be exercised in interpreting trends over time.

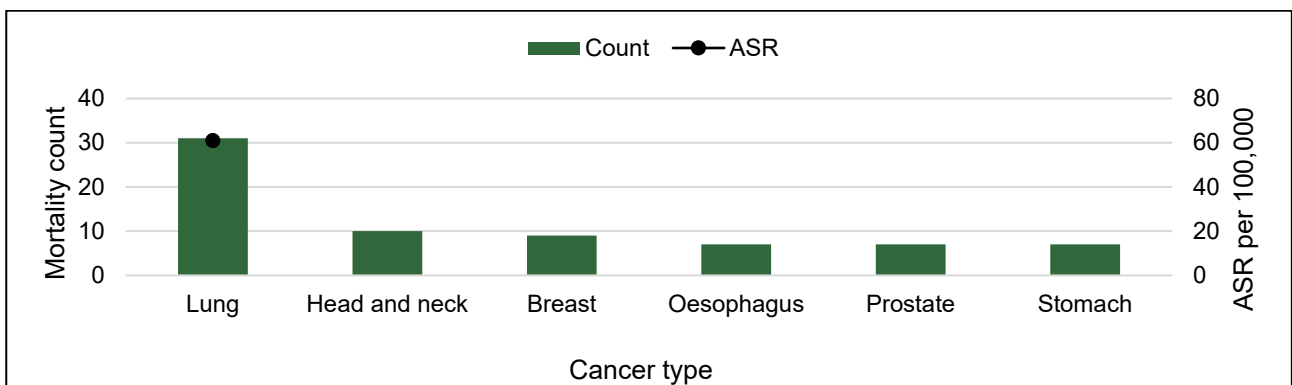


Note: These results should be interpreted with caution due to small case numbers and year-to-year fluctuations.

Figure 16. Mortality counts and age-standardised mortality rates (per 100,000) of all cancers by sex among Aboriginal people, WA, 2001 to 2021

Leading cancer type by cancer mortality in WA Aboriginal population

The cancers responsible for the highest cancer-related mortality within the Aboriginal population were lung, head and neck, breast, oesophageal, prostate, and stomach cancer, accounting for 57.3 per cent of cancer-related mortality in 2021 (71 of 124 cases) (Figure 17).

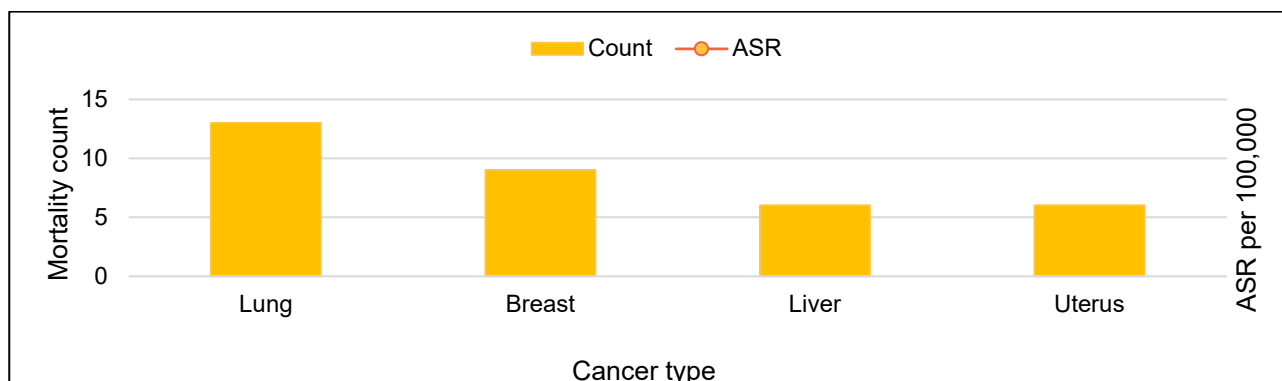


Note: These results should be interpreted with caution due to small case numbers. Age-standardised mortality rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable.

Figure 17. Leading cancer type by mortality count and age-standardised mortality rate among Aboriginal persons, WA, 2021

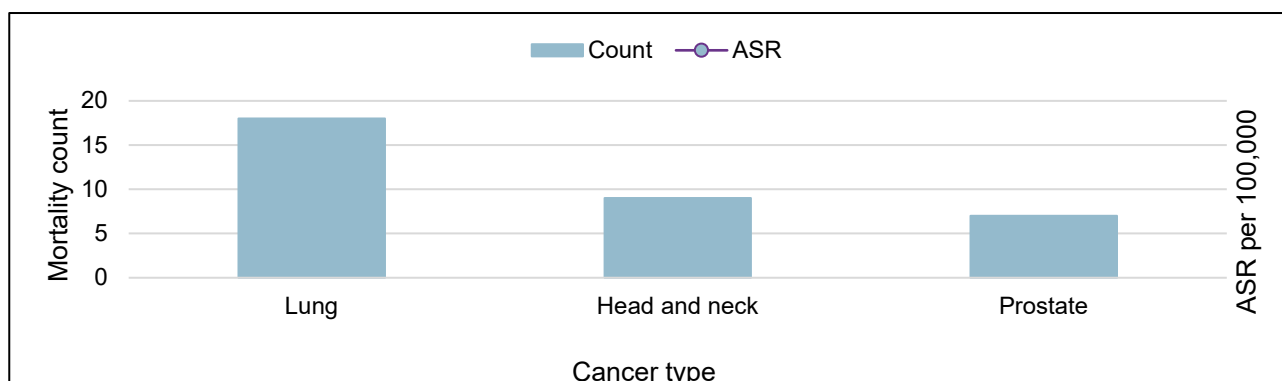
Due to small mortality counts (less than 20), leading cancer types for mortality by sex is only presented by count as no age-standardised rates could be derived. Only counts above 5 are presented to protect privacy and confidentiality. Among Aboriginal females,

lung, breast, liver and uterine cancer were the leading causes of cancer-related mortality (Figure 18). Among Aboriginal males, leading causes of cancer-related mortality included, lung, head and neck, and prostate cancer (Figure 19).



Note: These results should be interpreted with caution due to small case numbers. Age-standardised mortality rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable.

Figure 18. Leading cancer type by mortality count and age-standardised mortality rate among Aboriginal females, WA, 2021

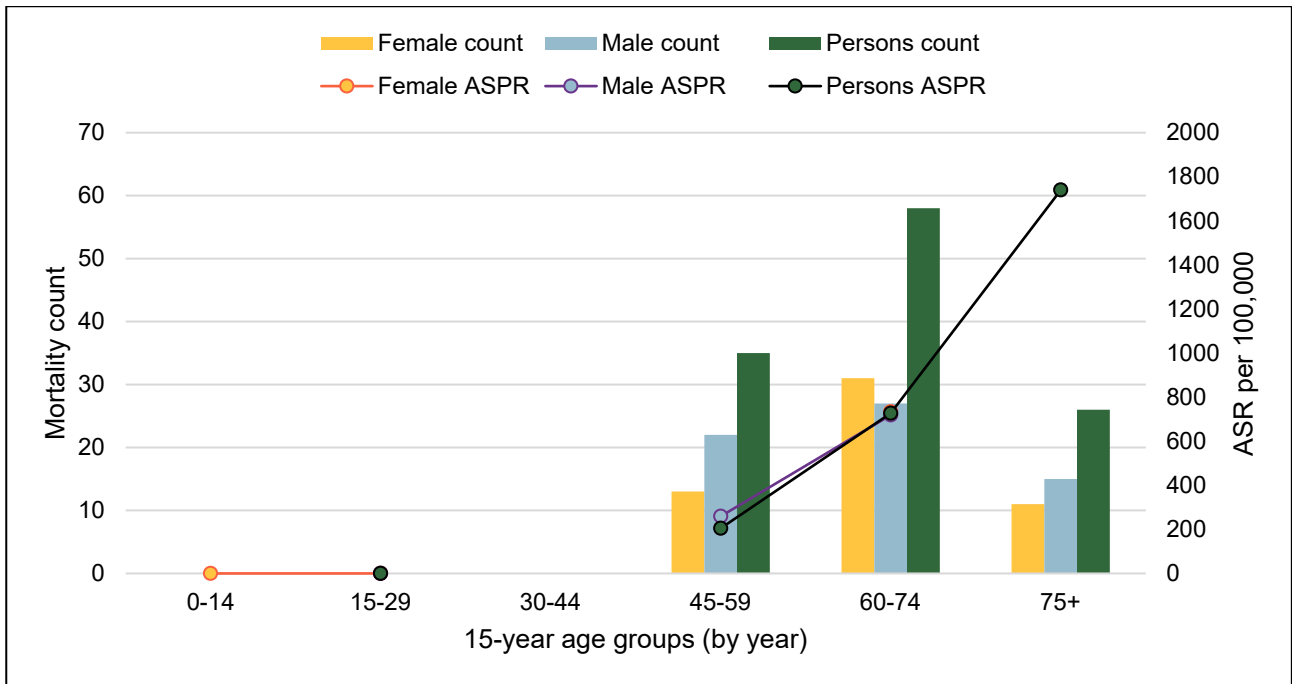


Note: These results should be interpreted with caution due to small case numbers. Age-standardised mortality rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable.

Figure 19. Leading cancer type by mortality count and age-standardised mortality rate among Aboriginal males, WA, 2021

Age-specific mortality rates in WA Aboriginal population

In 2021, cancer-related mortality continued to generally increase with age, a similar trend to that observed among the total WA population (Figure 20). Aboriginal persons aged 75 years and older had a mortality rate more than double that of those aged 60 to 74 years, and almost 9 times higher than those aged 45 to 59 years. By sex, the highest reportable age-specific mortality rate was experienced by those aged 60 to 74 years for both Aboriginal females and males.



Note: These results should be interpreted with caution due to small case numbers. Age-specific mortality rates are not calculated when the number of cases is less than 20, as estimates based on small numbers are statistically unstable and unreliable. Age-specific mortality rates of zero are shown in the figure where there are zero cases. Case counts less than 6 are not displayed to protect privacy and confidentiality.

Figure 20. Age-specific mortality rates of all cancers by sex among Aboriginal people, WA, 2021

Data sources and acknowledgements

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A report of the Western Australian Cancer Registry

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