



# What do Australians die from?

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## About

Understanding what Australians die from is complex and can vary depending on how we ask the question. We may want to know which health conditions ultimately end a person's life, the conditions responsible for initiating the death, what other conditions contributed to the death, or the risk factors that led to the disease or injury that caused the death. This report answers these questions and highlights the most common causes involved in the deaths of Australians.

Cat. no: PHE 344

### Findings from this report:

- [4 in 5 deaths involve more than one cause](#)
  - [Hypertension contributed to 8% of deaths in 2022](#)
  - [Lower respiratory infections were the direct cause in 8% of deaths in 2022](#)
  - [Coronary heart disease was involved in 1 in 5 deaths](#)
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## Summary

Understanding how and why Australians die provides insights into the health of the population. This can lead to a better awareness of what health conditions have the biggest impact on the community, and can aid health services and decision makers to develop strategies and interventions to reduce the impact of diseases and promote better health.

The question ‘What do Australians die from?’ is more complicated than it sounds and can vary depending on what we want to know. We may want to know what specific conditions ultimately end a person’s life, which disease or injury is responsible for initiating a person’s death, what risk factors lead to the disease or injury that caused a person’s death, or if any conditions contributed to their death in other ways. This report answers these questions and highlights the most common causes involved in the deaths of Australians.

Traditionally, statistics about how people die are based on the initiating or ‘underlying’ cause of death (see [Cause of death terminology](#)). But medical death certificates contain other information that can be useful in understanding why a death occurred. For example, while the underlying cause of death for a person might be coronary heart disease, the death certificate might also record the health condition that led directly to death (such as acute myocardial infarction) referred to as ‘direct’ causes of death in this report. Other conditions that significantly contributed to the death such as diabetes, alcohol use disorders and other contextual factors (referred to as ‘contributory’ causes in this report) may also be recorded on the death certificate. Consideration of all these cause types (underlying, direct, and contributory) is referred to as ‘multiple’ causes of death (see [Cause of death terminology](#) below).

### Cause of death terminology

**Underlying cause:** the condition which initiated the chain of events leading to death. It provides a significant point in the sequence of events where an intervention, if available, could take place to prevent the death from occurring.

**Direct causes:** the health events that arise from the underlying cause. They can relate to consequences and complications of the underlying cause. Some direct causes reflect the health events experienced at the end of life, or conditions experienced for lengthy periods before death.

**Contributory causes:** the conditions that significantly contributed to the death but were not in the chain of events leading to death. Typically, these causes relate to prior or co-existing long-term health conditions, and social and other circumstances that were involved in the death. They highlight additional health conditions that could be the focus of prevention strategies, for example, the causes that contribute to chronic disease deaths.

**Multiple causes:** all the causes involved in causing the death (underlying, direct, and contributory). When assessed in combination these describe the most common conditions involved in causing deaths.

Throughout this report, each of the cause types described above is presented in terms of the percentage of deaths it caused as multiple, underlying, direct, or contributory causes. It is important to note that each death can have more than one multiple, direct, or contributory cause.

This report uses all of the information included on the medical death certificate to provide new insights into the question ‘What do Australians die from?’ It shows that the answer to this question is very different depending on whether the focus is the diseases or causes that are responsible for initiating the pathway to death (underlying cause), the conditions that lead directly to death (direct causes), the causes that contribute to death (contributory causes) or all of the causes involved in a death (multiple causes). The report also looks at what risk factors and psychosocial factors contribute to deaths in Australia. Using different ways of looking at causes of death can enhance our understanding of the roles played by different diseases and conditions in a person’s health and in their death.

The involvement of multiple causes in a person’s death and how this information is recorded on a person’s death certificate is best illustrated using an example.

### Example of multiple conditions involved in causing death

Consider a person who has lung cancer as the underlying cause of death. However, they also had hypertension (high blood pressure) and diabetes and had been a smoker. Shortly before death it was found that the cancer had spread (metastasis) to their liver, bones and brain. They eventually suffered from multiple-organ failure. Considering the underlying cause alone, potentially understates the importance of these other health conditions that played a role in causing the death.

A doctor would use their knowledge of the deceased person as their patient, from medical records, or from next of kin to record each of these health events on the death certificate ([Figure 1.1](#)). These events are recorded as either the underlying cause, a direct cause (such as a complication) or a contributory cause (such as a significant condition that contributed to the death).

In this example, the underlying cause would be lung cancer. The direct causes were multiple-organ failure, which was a consequence of the development of metastasis (secondary cancer). The hypertension, diabetes and history of smoking were considered by the doctor to be significant contributors to the death ([Figure 1.1](#)).

When asking what caused this person's death, it would be valid to give a range of answers, depending on what is meant by this question and the lens through which causes of death are examined.

Figure 1.1: Example death certificate

<b>Part I</b>		<i>The chain of events (diseases, injuries or complications) that directly caused the death</i>
a.	<b>multiple-organ failure</b>	<i>(terminal cause* arising from the cause on line b)</i>
b.	<b>multiple metastasis (secondary cancer) to liver, bone and brain</b>	<i>(direct cause arising from the cause on line c)</i>
c.	<b>lung cancer</b>	<i>(underlying cause)</i>
d.		
<b>Part II</b>		<i>Other significant conditions contributing to the death, but not in the chain of events in Part 1</i>
	<b>hypertension, diabetes, smoker</b>	<i>(contributory causes)</i>

\* In this example, multiple-organ failure would be considered the 'terminal' cause. In this report, all causes in the chain of event that directly caused death, other than the underlying cause, are referred to as 'direct' causes.

#### Four in 5 deaths involve more than one cause

While some people die from a single, isolated cause (for example, brain cancer), many people die after long periods of illness while experiencing multiple health conditions, or in a state of frailty and old age.

In 2022, 191,000 deaths were registered in Australia. Of these deaths, 4 in 5 had more than one cause recorded and almost one-quarter of deaths had 5 or more causes recorded. The average number of causes recorded per death generally increased with age and has been slowly increasing over time.

#### Leading causes of death differ depending on the question asked

The leading (most common) causes of death in Australia differ depending on whether the assessment is based on the multiple causes involved in the death, the underlying cause only, the direct causes or the contributory causes.

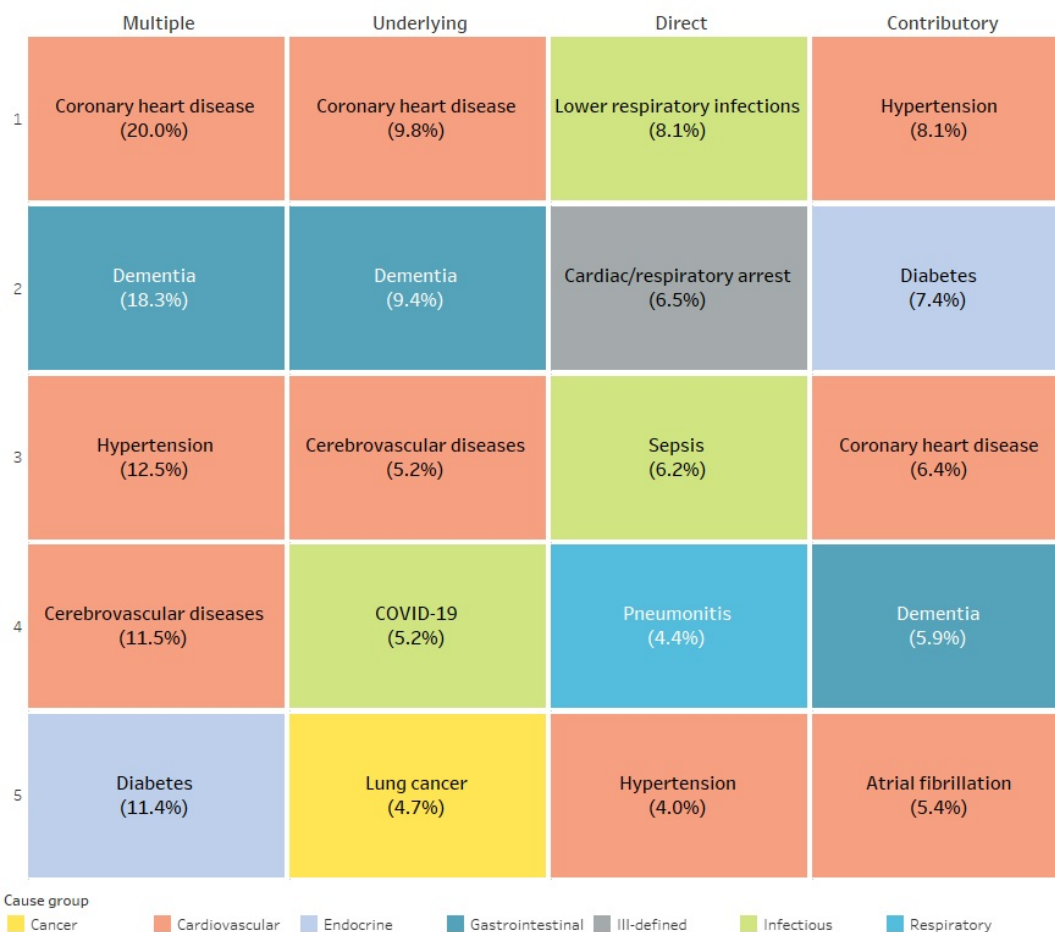
The 5 most common conditions involved in deaths of Australians in 2022 were coronary heart disease (CHD) (in 20% of deaths), dementia (18%), hypertension (12%), cerebrovascular diseases (11%) and diabetes (11%) (Figure 1.2).

Considering only the underlying cause, the most common causes were also CHD (in 10% of deaths) and dementia (9%). This was followed by cerebrovascular diseases, COVID-19 and lung cancer (each responsible for 5% of deaths).

The most common direct causes of death reflected conditions related to the underlying cause and included lower respiratory infections (in 8% of deaths), cardiac or respiratory arrest (6%), sepsis (6%), pneumonitis (4%) and hypertension (4%).

The most common contributory causes typically reflected chronic diseases and risk factor-related health conditions and included hypertension (contributing to 8% of deaths), diabetes (7%), coronary heart disease (6%), dementia (6%), and atrial fibrillation (5%).

Figure 1.2: Most common causes of death, by cause type, per cent of deaths, 2022



Note: Most common causes of death are based on the cause list for this report, see Technical notes: [Classification of health conditions](#).

Source: AIHW National Mortality Database; [Table S4.1](#).

### Why is looking at multiple causes of death important?

When looking at what Australians die from, understanding the underlying cause of death is important to develop health programs and policies and for monitoring population health. However, death typically results from the interplay between multiple health conditions. Focusing solely on the underlying cause can underestimate the impact of other health conditions on a person's death. Using a multiple cause approach provides a more complete picture of the health status of Australians. This approach can inform policy and prevention, for example, by:

- highlighting the involvement of potentially preventable complications of the underlying cause to inform strategies to minimise their occurrence.
- showing the contribution of preventable causes and modifiable risk factor-related conditions to provide additional focus for prevention strategies.

For example, when using all of the causes reported on Australian death certificates, coronary heart disease (the leading underlying cause of death), is shown to be involved in twice as many deaths as indicated by the underlying cause alone. Sepsis, a potentially preventable condition, does not feature as an underlying cause of death but was the third most common direct cause of death in 2022. Depressive disorders, hypertension, and alcohol use disorders were factors involved in death at rates 58, 35 and 10 times respectively, more than when looking only at the underlying cause.

### What Australians die from differs by age and sex

Using the multiple cause approach, coronary heart disease was the most common cause of death for males in 2022, recorded in 24% of deaths. Dementia was the most common cause involved in female deaths, recorded in 23% of deaths. The most common underlying causes were also coronary heart disease in males and dementia in females, responsible for 11% and 12% of male and female deaths, respectively.

The most common direct causes of death were similar for males and females: lower respiratory infections (9% and 7%, respectively), cardiac/respiratory arrest (6% and 7% respectively) and sepsis (6% each). The most common contributory causes for males were diabetes (8%), coronary heart disease (8%) and hypertension (8%), and for females were hypertension (9%), dementia (7%) and diabetes (7%). Substance use disorders (alcohol, tobacco, other drugs) were common contributory causes for males, while musculoskeletal conditions (osteoporosis and osteoarthritis) were common contributory causes for females.

The most common causes of death also differed by age group: external causes were more common in people aged less than 54 and chronic diseases more common in people 55 and older. Direct causes of death for those aged 0-54 were more likely to be complications of external causes of death such as injury and poisoning. For those aged 55 and over, direct causes reflected complications of chronic diseases (such as infections, cardiac arrest, and respiratory failure) and other conditions experienced in the end stages of life (such as frailty).

Old age-related causes such as senility and frailty were common causes of death (underlying and direct) among centenarians (persons aged 100 years or over). Senility (old age) was reported in 17%, and frailty in 14%, of deaths of centenarians in 2022.

The most common causes contributing to deaths at ages 0-54 years included substance use disorders, depression, history of self-harm, and psychosocial factors such as those related to support systems and intimate partners. Chronic diseases emerged as common contributory causes from age 55 upwards with diabetes being the leading contributor between the ages of 55 and 84. This pattern is consistent with what we see for common underlying causes at these ages; that is, deaths at younger ages are due mainly to external causes, and deaths in the older ages due to chronic diseases.

## Tobacco use is the leading risk factor causing death

Another way to look at what Australians die from is to examine health-related risk factors that contribute to death. Based on the latest burden of disease estimates for risk factors, tobacco use was the risk factor responsible for the most deaths, equivalent to 13% of all deaths in Australia in 2018 (AIHW 2021). This was followed by high blood pressure, overweight (including obesity) and dietary risks. Together, 44% of all deaths in 2018 were attributable to these 4 risk factors.

## Psychosocial factors involved in death

Death is not wholly attributable to disease, injury, or health-related risk factors (such as smoking). It is well established that non-medical factors, such as social determinants, play a role in a person's life and death (WHO 2024; AIHW 2022). Through an initiative of the Australian Bureau of Statistics, when available, these factors are now recorded together with a person's other cause of death information. In this report, factors are presented for coroner-certified deaths only, and are described as psychosocial factors. In 2022, 4,007 deaths involved at least 1 psychosocial factor. The psychosocial factors most commonly involved in death in 2022 were issues related to support systems (in 25% of deaths), issues related to intimate partners (24%), suicide ideation (23%) and personal history of self-harm (21%).

## References

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AIHW (Australian Institute of Health and Welfare) (2021) *Australian Burden of Disease Study 2018: Interactive data on risk factor burden*, AIHW, Australian Government, accessed 10 April 2024.

AIHW (2022) *Social determinants of health*, AIHW, Australian Government, accessed 10 April 2024.

WHO (World Health Organization) (2024) *Social determinants of health*, WHO, accessed 10 April 2024.

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## Introduction

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- [What are the different ways of looking at causes of death?](#)
- [Cause of death terminology](#)
- [Why are multiple causes of death important?](#)

Although some people die from a single, isolated cause (for example, brain cancer), many people die after long periods of illness while experiencing multiple health conditions, or in a state of frailty and old age.

By looking at all the causes recorded on death certificates we can identify the health conditions that ultimately end a person's life; those that were responsible for initiating the death; and the conditions that played a significant contributory role in the death. The role of risk factors can be measured to understand the extent they are responsible for a person's illness or death. The causes most responsible for death in Australia are different depending on which of these ways we look at the causes of death.

From a public health perspective, understanding the different roles played by common causes of death highlights the extent of their involvement in causing death. This can inform different ways to target prevention strategies in addition to what is known about the underlying causes of death.

### Where do cause of death statistics come from?

To understand how these different views of cause of death information can be applied, it is useful to get a sense of how the events that cause death play out and are reported (certified) in Australia and translated into data.

All deaths in Australia must be registered with a state or territory Registry of Births, Deaths and Marriages. When a death occurs, a doctor or a coroner must also document what caused the death. This information is recorded on the Medical Certificate of Cause of Death, referred to in this report as the medical death certificate.

For a doctor-certified death, doctors provide their best medical opinion on what caused the persons death, through:

- their knowledge of the deceased person as their patient.
- information in patient medical records.
- information provided by next of kin.

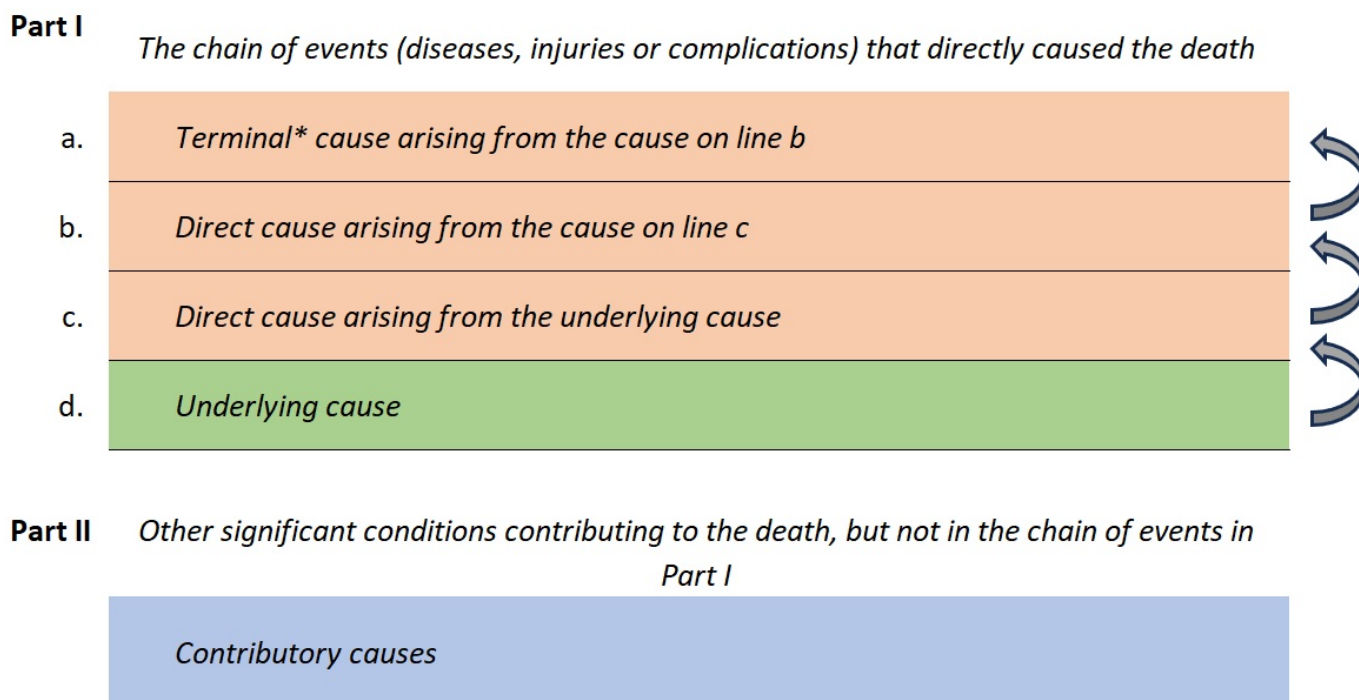
A coroner investigates and certifies deaths which occurred in accidental, unexpected, or unknown circumstances. Coroners investigate the circumstances around the death and determine the cause of death.

The short video below explains how diseases, conditions, and health events are recorded on a death certificate, and how this information is translated for statistical purposes.



Figure 2.1 shows the standard international format of a medical certificate of cause of death (medical death certificate) and the part and location that is used to record each cause involved in causing the death. Part I is used for describing the underlying cause and the direct causes (the health events arising from the underlying cause) in the chain of events that led to death. In Part II, the certifier describes all other significant medical conditions and other circumstances that contributed to the death (that is, the contributory causes).

Figure 2.1: Cause types assessed in this report based on the international format of the medical certificate of cause of death



\* In this report, the terminal cause and all direct causes are assessed together as 'direct' causes.

International coding standards are applied to the health conditions and circumstances listed on the medical death certificate to identify a single underlying cause, and if present, the direct and contributory causes (see [Cause of death terminology](#)).

In Australia, deaths data are compiled and coded by the Australian Bureau of Statistics (ABS). The ABS compiles the annual causes of death data, including doctor- and coroner-certified deaths. Cause of death information is provided to the ABS from the state and territory Registrars of Births, Deaths and Marriages. For coroner-certified deaths, information is also supplied through the National Coronial Information System (NCIS). The information available through the NCIS can provide additional contexts round the death which can enhance coding of the causes of death.

Since 2017 an ABS initiative has improved the availability of information in coroner-certified deaths to include the coding of non-medical psychosocial circumstances associated with a person's death (ABS 2019).

A more detailed account of the collection and collation of causes of death in Australia is provided by the [Australian Bureau of Statistics](#).

### What are the different ways of looking at causes of death?

Traditionally cause of death statistics are generated using only the underlying cause of death, see [Deaths in Australia](#). However, more than one disease or condition can be involved in causing a death. All the information on the death certificate is useful for understanding why the death occurred, and for identifying where interventions could potentially take place to prevent the death occurring.

Conditions which lead directly to death (referred to as 'direct causes' in this report) often reflect complications of the underlying cause. These are experienced at the end of life and provide insight into the events experienced directly before death. Terminal conditions are often acute failure of body systems, overwhelming infections, or injuries. Direct causes can also include conditions that are experienced long-term. For example, chronic kidney disease can arise as a complication of diabetes and be present for decades.

People may also have conditions, diseases or contextual factors which didn't directly lead to or cause death, but their presence contributed to the death. These are referred to as 'contributory causes' in this report. Contributory causes can reflect chronic diseases, risk factor-related conditions such as smoking or obesity, and psychosocial factors such as issues with support systems or needs for certain health-related care.

Consideration of all the causes collectively (underlying, direct, and contributory) is referred to as 'multiple causes of death' (see [Cause of death terminology](#)) and can help understand which types of conditions are most involved in causing death. Using all the causes involved highlights the interplay of multiple diseases or conditions and the role (direct, underlying, or contributory) played by each.

### Cause of death terminology

**Underlying cause:** the condition which initiated the chain of events leading to death. It provides a significant point in the sequence of events where an intervention, if available, could take place to prevent the death from occurring.

**Direct causes:** the health events that arise from the underlying cause. They can relate to consequences and complications of the underlying cause. Some direct causes reflect the health events experienced at the end of life, or conditions experienced for lengthy periods before death.

**Contributory causes:** the conditions that significantly contributed to the death but were not in the chain of events leading to death. Typically, these causes relate to prior or co-existing long-term health conditions, and social and other circumstances that were involved in the death. They highlight additional health conditions that could be the focus of prevention strategies, for example, the causes that contribute to chronic disease deaths.

**Multiple causes:** all the causes involved in causing the death (underlying, direct, and contributory). When assessed in combination these describe the most common conditions involved in causing deaths.

Throughout this report, each of the cause types described above are described in terms of the percentage of deaths they caused as multiple, underlying, direct, or contributory causes. It is important to note that each death can have more than one multiple, direct, or contributory cause.

## Why are multiple causes of death important?

Understanding what people die from is vital for informing health programs and policies, not only at a broad population level, but also for age-specific health risks and outcomes. A multiple cause approach to assessing causes of death is necessary to highlight the range of conditions causing death and the extent of their involvement, other than what is known by assessing only the underlying cause. By looking at all the diseases and conditions that contribute to deaths in Australia, a more complete picture of the health status of Australians emerges.

For example, by understanding the conditions or events that cause death in older Australians, preventable causes such as chronic conditions and falls may be better addressed through prevention programs, or improvements in disease and injury management. Collating information for deaths due to suicide, for example, can be used to monitor suicide prevention programs and identify additional areas of support for those who are found to be most at risk of suicide.

Understanding the most common underlying causes of death is important in developing health programs and policies and monitoring population health. However, as death typically results from the interplay between multiple health conditions, focusing solely on the underlying cause can underestimate the impact of other health conditions on a population.

Information on the direct causes of death can lead to improvements in care. It can identify specific prevention strategies such as reducing infection rates in medical settings. Similarly, in deaths due to road traffic accidents, the types of injuries sustained can be better understood. Understanding the types of injuries can inform public health initiatives to target the most severe injuries. An example of this is the measure taken to reduce fatal head injuries by implementing mandatory use of helmets when riding a bicycle (Olivier et al. 2019).

Likewise, information on patterns of the contributory causes of death can identify additional health conditions that could benefit from preventive or intervention strategies, for example, the role of overweight and obesity on premature mortality (Adair and Lopez 2020).

This web report looks at the most common causes of death in Australia using all the information provided on the death certificate. It shows that the answer to the question 'What do Australians die from?' can vary depending on what we want to know and the lens through which causes of death are viewed (as underlying, direct, or contributory causes). It identifies frequently occurring causes of death that are less visible when considering only the underlying cause. The report also looks at the psychosocial factors (social determinants) involved in causing deaths that are certified by a coroner, and the impact of leading modifiable risk factors on deaths in Australia.

## References

Adair T and Lopez AD (2020) '[The role of overweight and obesity in adverse cardiovascular disease mortality trends: an analysis of multiple cause of death data from Australia and the USA](#)', *BMC Medicine*, 18: 1-11.

ABS (Australian Bureau of Statistics) (2019) '[Psychosocial risk factors as they relate to coroner-referred deaths in Australia](#)', ABS, Australian Government, accessed 16 April 2024.

Olivier J, Boufous S and Grzebieta R (2019) '[The impact of bicycle helmet legislation on cycling fatalities in Australia](#)', *International Journal of Epidemiology*, 48(4): 1197-1203, doi:10.1093/ije/dyz003.



# How many deaths and how many causes?

## Comparability with other mortality-related publications

For standard reporting on the leading causes of death, countries such as Australia and other WHO member states have adopted a cause list defined by Becker and colleagues (Becker et al. 2006). In this report, a different cause list was applied. A multiple cause of death cause list was developed based on the Australian Burden of Disease Study cause list due to the breadth of diseases covered (AIHW 2021). The cause list was further modified to include a range of health conditions that in burden of disease studies could be considered ill-defined, and to incorporate the psychosocial contexts that are known to influence a person's health.

For this reason, the tabulations in this report are not directly comparable with other published causes of death statistics, such as Deaths in Australia 2022, Mortality Over Regions and Time (MORT) books and General Record of Incidence of Mortality (GRIM) books.

The multiple cause of death cause list comprises 21 cause groups (for example, cancers) and 197 specific causes (for example, lung cancer). For a list of the ICD-10 (International Statistical Classification of Diseases and Related Health Problems, 10th revision) (WHO 2019) codes used to define each cause and cause group see Classification of health conditions in the Technical notes of this report.

## Four in 5 deaths involved more than one cause

In 2022, 190,939 deaths were registered in Australia. Four in 5 of these deaths (80%) involved more than one cause. The proportion of deaths involving a single cause was similar in all years assessed: 19% in 2014 and 2018, and 20% in 2022. (Figure 3.1). The proportion of deaths with 5 or more causes was higher in 2022 (23%) compared with 2014 (20%).

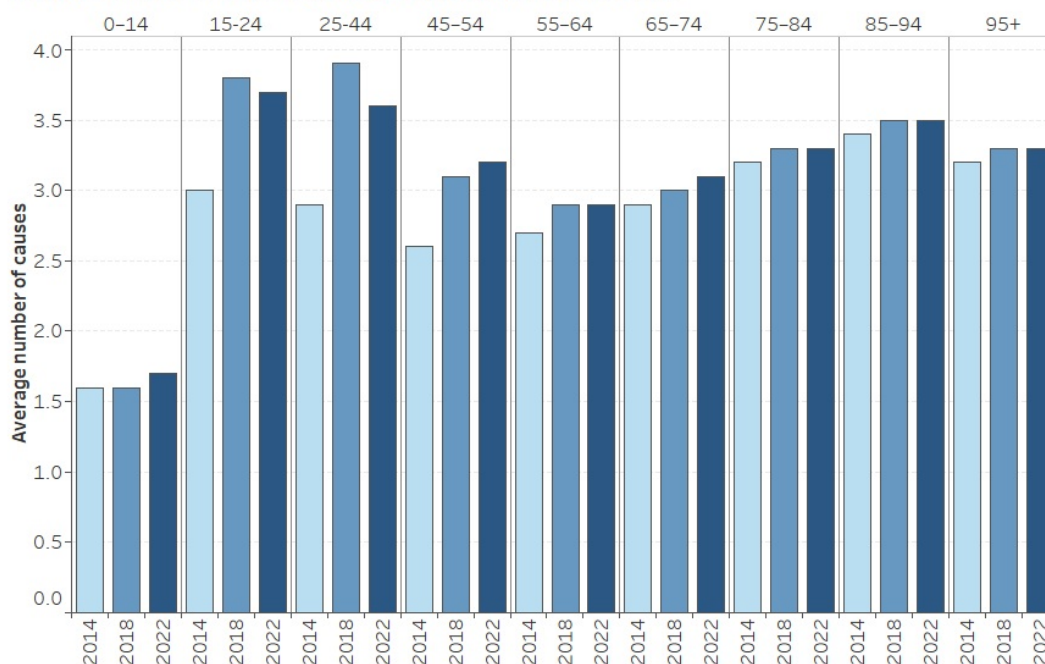
**Figure 3.1: Multiple cause of death metrics, 2014, 2018 and 2022**

There are two types of multiple cause of death metrics for 2014, 2018 and 2022. One describes the average number of causes per death. This is typically highest for deaths at younger ages (15 to 44 years) and lowest under 14. From age 45, the average number of causes increases with increasing age until the oldest age (95 or more) where the average number declines to about the same as the deaths at ages 75 to 84. The other metric shows the distribution of the number of causes per death. This ranges from one sequentially up to five or more causes. It shows that, consistently across the years assessed, about 1 in 5 deaths have one cause. In 2022 almost one-quarter of deaths had five or more causes.

### Analysis

Average number of causes by age group

**Average number of causes by age group, 2014, 2018 and 2022**



Note: Deaths registered in 2014 and 2018 are based on the final version of cause of death data; deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.

Source: AIHW National Mortality Database; Table S3.1; Table S3.2.  
<https://www.aihw.gov.au/>

The number of causes recorded on death certificates can be influenced by a range of factors including certification practices (which can also vary over time), access to medical records including medical history, the resources (personnel and technology) for completing the death certificate and the nature of the underlying health condition. Variation over time might also be related to better diagnostics and increasing multimorbid chronic disease (that is, the presence of 2 or more long-term health conditions) (Harrison and Siriwardena 2018).

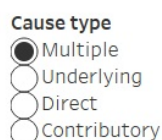
Other reasons could be the arrival of new widespread infectious diseases such as COVID-19, where presumably people continue to experience the same level of chronic comorbidity involvement in death as in pre-COVID years, but with the addition of COVID-19-related complications and causes. In 2017, an initiative was undertaken by the Australian Bureau of Statistics to improve the coding of information in coroner-certified deaths. As a result, the psychosocial contexts that contributed to a death were able to be included in the Australian cause of death data (ABS 2019). This practice is likely to increase the number of causes recorded in specific circumstances.

### External causes have the highest average number of causes

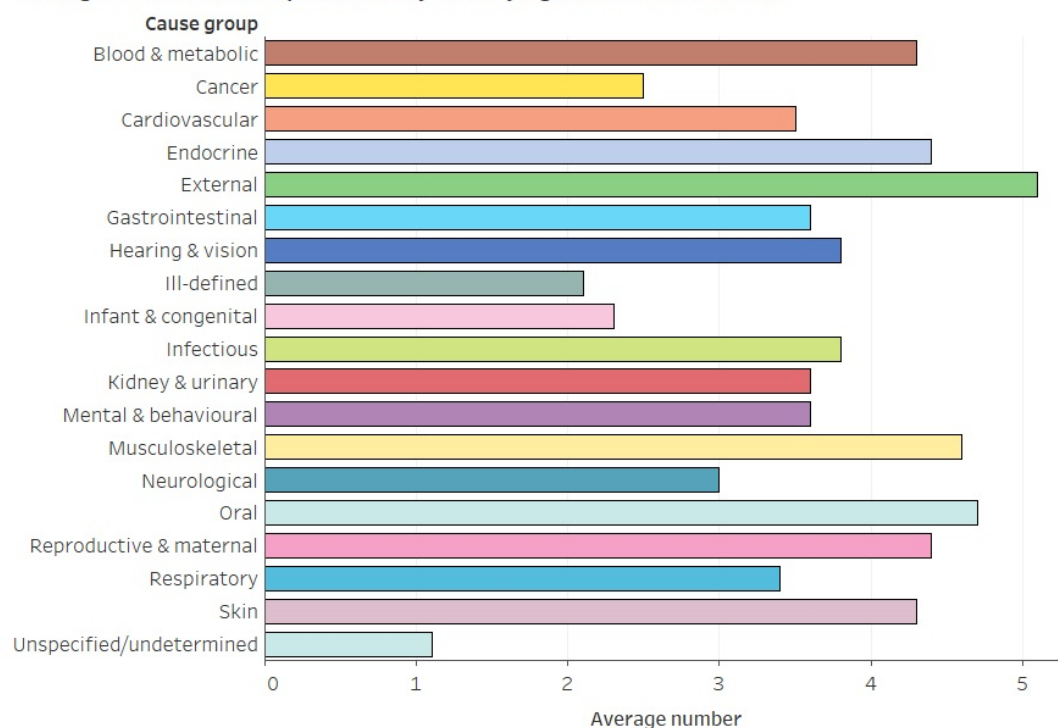
When the deaths are grouped according to the underlying cause, the highest average number of causes per death (5.1) was for external causes (events causing injury, for example) (Figure 3.2). This is not surprising as external causes of death are usually reported to a coroner for a detailed assessment of the causes and circumstances involved in the death. As a result, the causes of death include the range of injuries sustained in an accident or all toxic substances involved in deaths due to accidental poisoning. More recently, the coding of non-medical (psychosocial) circumstances could also contribute to this high average number of causes (see [Psychosocial factors contribute to death](#)).

**Figure 3.2: Average number of causes per death by cause group as the underlying cause, 2022**

The average number of causes per death differs by the underlying cause of death. All causes of death only have one underlying cause. Deaths due to external, oral, musculoskeletal, reproductive & maternal, and endocrine disorders have the highest average number of causes involved in death. Oral, musculoskeletal, reproductive & maternal, and endocrine disorders have the highest average number of direct causes of death, while external causes have the highest average number of contributory causes. Ill-defined or unspecified/undetermined causes have the lowest average number across all cause types.



**Average number of Multiple causes by underlying cause of death, 2022**



**Notes:**

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Average number of multiple causes may not equal the sum of the averages for the underlying, direct, and contributory causes, due to rounding.

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## What most commonly causes death in Australia?

Understanding what Australians die from is complex and can vary depending on the purpose of the information. From a public health perspective, identifying the conditions responsible for initiating the death (the underlying cause) is crucial to informing preventive health programs. Assessing the other cause types (multiple, direct, and contributory) can provide additional insight into, for example potentially preventable conditions that ultimately end a person's life, or which causes contribute to high proportions of deaths. This information is less visible when using only the underlying cause perspective.

### Multiple causes of death

Most commonly reported causes of death are coronary heart disease, dementia and hypertension

### Underlying causes of death

Coronary heart disease and dementia are the most common underlying causes

### Direct causes of death

Lower respiratory infections, cardiac/respiratory failure and sepsis are the most common direct causes of death

### Contributory causes of death

Hypertension is the cause that most commonly contributes to death

Figure 4.1 shows for each cause type (multiple, underlying, direct and contributory), the most common causes in 2022.

### Figure 4.1: Most common causes of death, by cause type, 2022

Cardiovascular conditions are some of the most common causes across all cause types (multiple, underlying, direct, contributory). Coronary heart disease, hypertension, and cerebrovascular diseases make up 3 of the 4 most common multiple causes of death. The most common direct causes of death include infections (lower respiratory infections and sepsis), ill-defined causes (including cardiac/respiratory arrest and heart failure (unspecified)), pneumonitis, and hypertension. Some of the most common contributory conditions are chronic conditions (hypertension, diabetes, coronary heart disease and dementia) as well as depressive disorders and alcohol use disorders.

	Multiple	Underlying	Direct	Contributory
1	Coronary heart disease	Coronary heart disease	Lower respiratory infections	Hypertension
2	Dementia	Dementia	Cardiac/respiratory arrest	Diabetes
3	Hypertension	Cerebrovascular diseases	Sepsis	Coronary heart disease
4	Cerebrovascular diseases	COVID-19	Pneumonitis	Dementia
5	Diabetes	Lung cancer	Hypertension	Atrial fibrillation
6	Chronic kidney disease	COPD	Heart failure (unspecified)	Chronic kidney disease
7	Lower respiratory infections	Colorectal cancer	Heart failure (specified)	COPD
8	COPD	Diabetes	Respiratory failure	Cerebrovascular diseases
9	Atrial fibrillation	Chronic kidney disease	Coronary heart disease	Heart failure (specified)
10	Heart failure (specified)	Falls	Cancer of secondary site	High cholesterol
11	Sepsis	Prostate cancer	Chronic kidney disease	Other cardiovascular diseases
12	COVID-19	Pancreatic cancer	Cerebrovascular diseases	Depressive disorders
13	Cardiac/respiratory arrest	Suicide	Multiple-organ failure	Heart failure (unspecified)
14	Heart failure (unspecified)	Breast cancer	Dementia	Other neurological conditions
15	Other cardiovascular diseases	Cancer unknown primary	Atrial fibrillation	Frailty
16	Lung cancer	Unspecified/undetermined	Frailty	COVID-19
17	Pneumonitis	Other cardiovascular diseases	Other cardiovascular diseases	Alcohol use disorders
18	Frailty	Chronic liver disease	Acute renal failure	Osteoporosis
19	Cancer of secondary site	Lower respiratory infections	Medical events (external)	Non-rheumatic valvular disease
20	Respiratory failure	Atrial fibrillation	Senility	Peripheral vascular disease

Cause group

■ Blood & metabo..	■ Cardiovascular	■ External	■ Ill-defined	■ Kidney & urinary	■ Musculoskeletal	■ Respiratory
■ Cancer	■ Endocrine	■ Gastrointestinal	■ Infectious	■ Mental & behav..	■ Neurological	■ Unspecified/un..

## Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Each death can involve one or more multiple, direct or contributory cause. As a result, the total percentage by a cause type can be greater than 100.

Source: AIHW National Mortality Database; [Table S4.1](#).

## Most commonly reported causes of death are coronary heart disease, dementia and hypertension

Multiple causes reflect how often the health condition is involved in causing death. In 2022, the 20 causes most commonly involved in death included a mix of chronic conditions, infectious diseases, risk factor-related causes and non-specific causes.

The 5 most common conditions involved in death in 2022 were:

- coronary heart disease (CHD) (involved in 20% of deaths)
- dementia (18%)
- hypertension (12%)
- cerebrovascular diseases (11.5%)
- diabetes (11.4%) ([Figure 4.1](#)).

## Coronary heart disease and dementia are the most common underlying causes

Understanding the underlying causes provides fundamental public health information for monitoring and improving the health of populations, and is the standard used for international and other comparisons.

When looking at the underlying cause of death, the most common were coronary heart disease in 10% and dementia in 9% of deaths, followed by cerebrovascular diseases (5.2%), COVID-19 (5.2%) and lung cancer (4.7%). The leading 20 underlying causes also included other cancers, falls and suicide ([Figure 4.1](#)).

## Lower respiratory infections are the most common direct cause of death

The most common direct causes differed substantially from the underlying causes.

The most common direct causes of death in 2022 were:

- lower respiratory infections (in 8% of deaths)

- cardiac or respiratory arrest (6.5%)
- sepsis (6.2%)
- pneumonitis (4.4%)
- hypertension (4.0%) (Figure 4.1).

At the end of life, there is increased risk of lower respiratory complications, such as pneumonia, particularly for people with coronary heart disease, dementia and COVID-19 (ABS 2023; Dementia Australia 2018).

To improve treatment and interventions at the end of life, it is important to identify direct causes which are potentially preventable or treatable, or could be minimised (for example, sepsis and pneumonitis). Consequences of medical and surgical care (for example, postoperative complications) were direct causes in 2% of deaths. These conditions reflect complications that can arise from care in the hospital setting or later as postoperative complications (ANZCA 2023; WHO 2023; ACSQHC 2018). With more than half of all deaths in Australia occurring in a hospital or medical setting (ABS 2021), understanding these outcomes is of particular importance for improving health care (ACSQHC 2022; ABS 2021; ACSQHC 2018; The George Institute 2017). Data on direct causes of death can be used to harness this information and inform specific monitoring activities.

Not all direct causes are consequences or complications of the underlying cause. Chronic conditions such as dementia, coronary heart disease, and hypertension are frequently indicated in Part I of the death certificate alongside another underlying cause. There are many reasons why chronic conditions are recorded as direct causes, including that: they arise as a consequence of some other condition (such as in the case of secondary hypertension); they may reflect the underlying cause for an additional sequence of events; the medical death certificate has not been completed in line with certification guidelines. Incorrect certification can lead to causes being included in Part I when they are not part of the chain of events leading directly to death.

## Hypertension is the cause that most commonly contributes to death

Around two-thirds of Australians (almost 16.5 million people) are estimated to have 2 or more long-term health conditions (referred to as multimorbidity) (ABS 2022). The impact of multimorbidity is mirrored in causes of death data with long-term conditions featuring as the most common contributors to death.

The leading specific contributory causes of death in Australia in 2022 were:

- hypertension (contributing to 8% of deaths)
- diabetes (7%)
- coronary heart disease (6.4%)
- dementia (5.9%)
- atrial fibrillation (5.4%) (Figure 4.1).

Additionally, high cholesterol was a contributing cause in 2% of deaths, depressive disorders in 2%, alcohol use disorders in 1% and osteoporosis in 1% of deaths.

Many of these conditions are preventable or treatable, and their involvement as contributory causes of death is less visible in statistics based on the underlying cause.

## Total involvement of conditions in death

Some causes featured as underlying, direct, and contributory causes. Coronary heart disease, dementia, cerebrovascular diseases, chronic kidney disease and atrial fibrillation featured among the 20 most common conditions across all cause types. This would suggest that these conditions frequently play multiple roles in causing death.

In particular, the approach using multiple causes shows that using an underlying cause approach in isolation can underestimate the involvement of certain conditions in causing death. For example, in 2022:

- coronary heart disease was the leading underlying cause for almost 1 in 10 deaths but was involved in 1 in 5 deaths when multiple causes were considered.
- the proportion of deaths involving dementia and cerebrovascular disease was twice as high as the proportion of deaths identifying them as the underlying cause.
- diabetes was involved in 4 times as many deaths as were shown using the underlying cause.

On the other hand, the conditions most involved in causing death are often not revealed by looking at the underlying cause only. For example, hypertension, (specified) heart failure and sepsis were among the most commonly recorded causes, but were not among the leading underlying causes.

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## Do causes of death differ for males and females?

The 20 most common causes involved in male and female deaths in 2022 by cause type (underlying, direct, contributory, multiple) is shown in Figure 5.1.

Figure 5.1: Most common causes of death by sex and cause type, 2022

For multiple causes of death, males and females had similar common causes, although with different proportions involved in death. The 3 most common direct causes of death were the same between males and females. Respiratory, cardiovascular, and other ill-defined causes were also common direct for both males and females. Substance use disorders and diabetes were more common contributory causes for males, with musculoskeletal conditions and dementia more common for females.

### Cause type

Multiple

#### Most common Multiple causes of death by sex, 2022

	Males	Females
1	Coronary heart disease (23.7%)	Dementia (22.6%)
2	Dementia (14.4%)	Coronary heart disease (16.0%)
3	Diabetes (12.5%)	Hypertension (13.9%)
4	Chronic kidney disease (11.3%)	Cerebrovascular diseases (12.5%)
5	Hypertension (11.2%)	Chronic kidney disease (10.8%)
6	COPD (10.8%)	Diabetes (10.3%)
7	Lower respiratory infections (10.8%)	Atrial fibrillation (10.1%)
8	Cerebrovascular diseases (10.6%)	Lower respiratory infections (9.5%)
9	Atrial fibrillation (8.9%)	COPD (9.2%)
10	Sepsis (7.2%)	Heart failure (specified) (8.0%)
11	COVID-19 (7.1%)	Sepsis (7.4%)
12	Heart failure (specified) (6.7%)	Heart failure (unspecified) (6.8%)
13	Cardiac/respiratory arrest (6.4%)	Cardiac/respiratory arrest (6.7%)
14	Pneumonitis (6.1%)	COVID-19 (6.4%)
15	Heart failure (unspecified) (6.1%)	Other cardiovascular diseases (6.2%)
16	Prostate cancer (6.0%)	Frailty (5.3%)
17	Lung cancer (5.9%)	Lung cancer (4.8%)
18	Other cardiovascular diseases (5.7%)	Breast cancer (4.8%)
19	Cancer of secondary site (4.3%)	Pneumonitis (4.3%)
20	Chronic liver disease (4.3%)	Respiratory failure (4.1%)

Cause group:

<span style="color: yellow;">■</span> Cancer	<span style="color: lightblue;">■</span> Gastrointestinal	<span style="color: red;">■</span> Kidney & urinary
<span style="color: orange;">■</span> Cardiovascular	<span style="color: grey;">■</span> Ill-defined	<span style="color: teal;">■</span> Neurological
<span style="color: lightblue;">■</span> Endocrine	<span style="color: lightgreen;">■</span> Infectious	<span style="color: blue;">■</span> Respiratory

### Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Each death can involve one or more multiple, direct, or contributory cause. As a result, the total percentage by a cause type can be greater than 100.

Source: AIHW National Mortality Database; [Table S5.1](#).

### Most common (multiple) causes

While the 20 most common causes involved in deaths in Australia in 2022 (using multiple causes) were similar for males and females, their rankings and proportions differed. For example, coronary heart disease (CHD) was the cause most commonly involved in deaths for males (in 24% of male deaths) and the second most common for females (16%). Dementia was the most common cause involved in female deaths (in 23% of deaths) and the second most common for males (14%). Diabetes was the third most common cause involved in male deaths (in 12%), while hypertension was the third most common cause involved in female deaths (14%).

### Underlying causes



The 6 leading underlying causes of death were the same for males and females, and included: coronary heart disease, dementia, cerebrovascular diseases, COVID-19, lung cancer and COPD. However, dementia was responsible for almost twice as many deaths among females as among males and was the underlying cause in 12% and 7% of female and male deaths, respectively.

Only 4 of the 20 leading underlying causes differed between the sexes. For males these were prostate cancer, suicide, Parkinson disease and liver cancer. Common causes responsible for deaths in females, not common in male deaths, were breast cancer, atrial fibrillation, non-rheumatic valvular disease and (specified) heart failure.

## Direct causes

The most common direct causes were largely the same for males and females. The direct involvement of hypertension was proportionally higher in female deaths (4.7%) compared with male deaths (3.4%). The pattern was similar for frailty: it was directly involved in 1.9% of male compared with 3.5% of female deaths. The only difference in the specific leading direct causes were that COPD was a leading direct cause in 1.7% of male deaths and senility in 2.2% of female deaths.

## Contributory causes



Substance use disorders commonly contributed to male deaths



Musculoskeletal conditions commonly contributed to female deaths

Chronic diseases and risk factor-related conditions contributed frequently to both male and female deaths. The 6 most common contributors were the same for males and females, with differing levels of contribution.

The 4 leading contributors to male deaths were diabetes, coronary heart disease, hypertension, and chronic kidney disease. For females these were hypertension, dementia, diabetes and atrial fibrillation.

Diabetes caused approximately equal proportions of male and female deaths as the underlying cause (2.7% and 2.4% of deaths, respectively). However, it contributed disproportionately: to 8.2% of male and 6.5% of female deaths.

Alcohol, drug use and tobacco use disorders and peripheral vascular disease were among the most common causes contributing to death for males but not females.

Osteoporosis, frailty, osteoarthritis, and asthma were among the most common causes contributing to death for females but not males.

## How do causes of death vary by age?

The 10 most common causes of death in 2022 varied by cause type (multiple, underlying, direct and contributory) and age group (Figure 6.1).

### Multiple causes of death

External causes, mental and behavioural conditions and psychosocial factors are most commonly involved in deaths at ages 15 to 54. Chronic conditions are most commonly involved in deaths at ages 55 and older.

### Underlying causes of death

Suicide, coronary heart disease and dementia were the most common underlying causes at different ages.

### Direct causes of death

Injuries were a common direct cause in younger people, infections in older people.

### Contributory causes of death for people aged under 55

Mental, behavioural and psychosocial factors were common contributors to deaths under age 55.

### Contributory causes of death for people aged over 55

Chronic disease and risk factor-related conditions were common contributors to deaths from age 55.

Figure 6.1: Most common causes of death, by cause type and age group, 2022

Acute conditions, external causes of death, and other factors relating to death (such as psychosocial factors) are the most common multiple, underlying, and direct causes of death for younger Australians (aged 44 and under). Chronic conditions and infections are more common for those aged 45 and over.

#### Cause type

Multiple

#### Most common Multiple causes of death by age group, 2022

	Age group								
	0-14	15-24	25-44	45-54	55-64	65-74	75-84	85-94	95+
1	Infant and congenital excl. SIDS	Suicide	Suicide	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease	Dementia	Dementia
2	Unspecified/undetermined	Asphyxiation	Drug use disorders	Chronic liver disease	Diabetes	COPD	Dementia	Coronary heart disease	Coronary heart disease
3	Other neurological conditions	Drug use disorders	Asphyxiation	Alcohol use disorders	COPD	Diabetes	Diabetes	Hypertension	Hypertension
4	Other blood & metabolic disorders	Road traffic injuries	Alcohol use disorders	Diabetes	Chronic liver disease	Hypertension	COPD	Cerebro-vascular diseases	Cerebro-vascular diseases
5	Other infectious diseases	Multiple (unspecified) injuries	Substances & drugs	Suicide	Lung cancer	Lung cancer	Hypertension	Atrial fibrillation	Atrial fibrillation
6	Childhood events	Depressive disorders	Depressive disorders	Drug use disorders	Hypertension	Chronic kidney disease	Cerebro-vascular diseases	Chronic kidney disease	Heart failure (specified)
7	Lower respiratory infections	Alcohol use disorders	Accidental poisoning	Substances & drugs	Cerebro-vascular diseases	Cerebro-vascular diseases	Chronic kidney disease	Lower respiratory infections	Chronic kidney disease
8	Medical events (external)	Substances & drugs	Intimate partner	Depressive disorders	Lower respiratory infections	Lower respiratory infections	Lower respiratory infections	Diabetes	Lower respiratory infections
9	Cardiac/respiratory arrest	Personal history of self-harm	Coronary heart disease	Other neurological conditions	Cancer of secondary site	Sepsis	Atrial fibrillation	Heart failure (specified)	Frailty
10	Brain cancer	Other mental & behavioural disorders	Chronic liver disease	Cerebro-vascular diseases	Chronic kidney disease	Dementia	Sepsis	Heart failure (unspecified)	Senility

#### Cause group

■ Blood & metabo.. ■ Cardiovascular ■ External ■ Ill-defined ■ Infectious ■ Kidney & urinary ■ Neurological ■ .  
■ Cancer ■ Endocrine ■ Gastrointestinal ■ Infant & congen.. ■ Injury ■ Mental & behav.. ■ Psychosocial ■ .

## Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Each death can involve one or more multiple, direct, or contributory cause. As a result, the total percentage by a cause type can be greater than 100.
3. See [Psychosocial factors contribute to death](#) for a description of circumstances included in psychosocial factor groups.
4. Other CVD: other cardiovascular disease.

Source: AIHW National Mortality Database; [Table S6.1](#).

## External causes, mental and behavioural conditions and psychosocial factors are most commonly involved in deaths at ages 15 to 54

Suicide, road traffic injuries, poisoning, medical complications (for example, from surgery), and the injuries they cause, were among the 10 causes most often involved in deaths at ages 15 to 54. Notably at all ages to 44, psychosocial factors such as personal history of self-harm were frequently involved in causing death (see [Psychosocial factors contribute to death](#)). The involvement of mental and behavioural conditions also featured prominently at ages 15 to 54.

Chronic diseases, including coronary heart disease, diabetes, COPD, chronic kidney disease and dementia were commonly involved in causing deaths in most age groups above 25 years. Hypertension was frequently involved in causing deaths from age 55 years and over.

## Suicide, CHD and dementia were the most common underlying causes at different ages

Suicide was the most common underlying cause of death between the ages of 15 and 44. Accidental poisoning was among the 4 most common underlying causes between the ages of 15 and 54. Other external causes also featured in the leading underlying cause of death at different ages: drowning in deaths of those aged under 25; road traffic injuries in those aged up to 44; and falls from age 85 upwards.

Coronary heart disease was the leading underlying cause of death between the ages of 55 and 74, and dementia at ages 75 and over. However, coronary heart disease featured among the 10 leading underlying causes from age 25 and dementia from age 65. Other chronic diseases were prominent in the most common underlying causes: cerebrovascular diseases from age 45, COPD from age 55, and diabetes between the ages of 65 and 94.

Cancers were a common underlying cause at all ages but varied by cancer type. The 10 most common underlying causes included, for example:

- brain, in deaths aged 0 to 14 and 25 to 44.
- colorectal between ages 25 to 84.
- lung between ages 45 and 84.
- breast between ages 25 and 74.
- pancreatic between ages 55 and 84.
- prostate between ages 75 and 94.

## Injuries a common direct cause in younger people, infections in older people

Up to age 54, injuries featured prominently as leading direct causes of death. This is due to their association with external causes. Asphyxiation, drowning, poisoning (substances and drugs), and spinal cord injuries were common direct causes at these ages.

Direct causes of death are consequences or complications of the underlying cause. With a shift from ages 25 in underlying causes from largely external causes to chronic diseases, there is a corresponding change in direct causes. From age 25, cardiac/respiratory arrest was among the 10 leading direct causes of death. Respiratory failure was a common direct cause from ages 45 to 84, multiple-organ failure from ages 45 to 74, and pneumonitis between ages 55 and 94.

Lower respiratory infections (such as pneumonia) was a leading direct cause of death at all ages, and was the most common at ages 65 years and over. Sepsis was a leading direct cause at all ages except 15-24.

## Mental, behavioural and psychosocial factors were common contributors to deaths under age 55

Mental and behavioural conditions (such as drug use and alcohol use disorders, and depressive and anxiety disorders) and psychosocial factors (such as support systems issues, intimate partner issues and personal history of self-harm) dominated the most common 10 contributory causes in deaths aged less than 55 years. At ages 15 to 54, drug use disorders were the most common contributor to death, followed by alcohol use and depressive disorders.

Childhood events were the leading contributor to deaths at ages under 15.

## Chronic disease and risk factor-related conditions were common contributors to deaths from age 55

In deaths at ages 55 and over, chronic diseases featured prominently among the most common contributory causes. Diabetes was the most common at ages 55 to 84 years, dementia from ages 85 and upwards. COPD, coronary heart disease and chronic kidney disease were also among the leading contributors to death from age 55.

Hypertension was the second leading contributor to death at ages 55 and over, but also a leading contributor to deaths at ages 45 to 54. Coronary heart disease was among the 10 most common contributors in all ages 55 years and upwards.

### Ill-defined causes increased with age

Ill-defined causes such as cardiac or respiratory arrest were prominent among the leading direct causes. Cardiac or respiratory arrest and respiratory failure are modes of dying and are considered ill-defined in mortality coding (WHO 2016). Ill-defined causes that were common among direct causes in deaths at ages 55 and over were: cardiac or respiratory arrest, multiple-organ failure, (unspecified) heart failure, frailty and senility. The proportion of deaths with a direct cause of cardiac or respiratory arrest increased with age.

Unspecified or undetermined (unknown) causes of death were among the most common underlying causes in deaths at ages under 55. A death may be unspecified or undetermined where:

- after an investigation by the coroner the event or condition causing the death could not be determined.
- the intent (accident or intentional) of the event is still under investigation.
- the death of an infant does not meet criteria to be classified as sudden infant death syndrome (SIDS), and a more specific cause of death could not be determined.
- the death was from unknown natural causes.

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## What do the very old die from?

Australia has one of the highest life expectancies at birth in the world (OECD 2023). The median age of death in 2022 was 79.7 years for males and 85.0 years for females (AIHW 2024). About 4 in 10 deaths (41%) in 2022 occurred at age 85 or over and this proportion has been slowly increasing over time. Older Australians (85 years or more) die from more chronic disease and age-related conditions and events than younger Australians.

Among older Australians:

- dementia and coronary heart disease were the 2 most common causes involved in causing death, and the 2 most common underlying causes.
- infections, cardiac/respiratory arrest, and heart failure were consistently common direct causes.
- hypertension and dementia were the 2 most common causes contributing to death (Figure 7.1).

The high prevalence of comorbidity with cardiovascular diseases in Australia is recognised (AIHW 2023), and in 2022 half of the leading contributory causes of death at ages 85 and over were cardiovascular-related. In these age groups, diabetes and dementia were also among the most common contributory causes and dementia was among the 10 leading direct causes. This highlights the different roles that these conditions play in causing death.

**Figure 7.1: Most common causes of death, persons aged 85 years or more, by cause type and age group, 2022**

Cardiovascular conditions make up 5 of the 10 most common causes involved in deaths across all older age groups. Other cardiovascular conditions also commonly contributed to death across all age groups. These include coronary heart disease, atrial fibrillation, cerebrovascular disease, and heart failure. Diabetes was also mentioned cross all age groups as a contributory cause of death.

### Cause type

Multiple cause

### Most common Multiple causes of death, persons aged 85 years or more, 2022

	85–89	90–94	95–99	100+
1	Dementia (27.1%)	Dementia (30.7%)	Dementia (32.5%)	Dementia (28.9%)
2	Coronary heart disease (22.6%)	Coronary heart disease (23.0%)	Coronary heart disease (22.8%)	Coronary heart disease (19.9%)
3	Cerebrovascular diseases (14.4%)	Hypertension (15.9%)	Hypertension (16.5%)	Senility (16.9%)
4	Hypertension (14.4%)	Atrial fibrillation (14.9%)	Cerebrovascular diseases (15.0%)	Hypertension (16.5%)
5	Chronic kidney disease (14.0%)	Cerebrovascular diseases (14.8%)	Atrial fibrillation (14.4%)	Cerebrovascular diseases (14.5%)
6	Atrial fibrillation (13.6%)	Chronic kidney disease (13.9%)	Chronic kidney disease (13.4%)	Frailty (13.5%)
7	Diabetes (12.7%)	Lower respiratory infections (12.6%)	Heart failure (specified) (13.4%)	Lower respiratory infections (12.7%)
8	Lower respiratory infections (11.8%)	Heart failure (specified) (12.2%)	Lower respiratory infections (12.4%)	Atrial fibrillation (12.7%)
9	Heart failure (specified) (9.8%)	Diabetes (10.1%)	Frailty (10.1%)	Heart failure (specified) (12.3%)
10	COPD (9.8%)	Heart failure (unspecified) (9.6%)	Heart failure (unspecified) (9.6%)	Chronic kidney disease (11.7%)

Cause group:

- Cardiovascular
- Endocrine
- Ill-defined
- Infectious
- Kidney & urinary
- Neurological
- Respiratory

### Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Each death can involve one or more multiple, direct or contributory cause. As a result, the total percentage by a cause type can be greater than 100.
3. See [Psychosocial factors contribute to death](#) for a description of circumstances included in psychosocial factor groups.

## 'Old age' is a common cause of centenarian deaths

### 'Old age'

The use of terminology such as 'old age', 'frailty' and 'senility' written alone on the medical death certificate should be used in limited circumstances as these terms do not provide insight into the medical cause of death and can be viewed as ageist (WHO 2022). To better align with the WHO Healthy Ageing framework, senility has been replaced with 'Ageing associated decline in intrinsic capacity' in the next revision to the International Classification of Diseases (ICD) (Rabheru et al. 2022).

People in the oldest age groups frequently have ill-defined age-related causes including senility (a proxy for 'old age') or frailty as a cause of death.

Among centenarians, senility was involved in causing 17% of deaths, was the most common direct cause (in 11% of deaths) and was a leading underlying and contributory cause. Frailty was also most commonly involved in deaths at older ages: as a leading contributor and as a leading direct cause from age 90 or over.

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## Other ways of looking at multiple causes of death

The cause of death varies depending on the way that the causes are assessed. The underlying cause approach is not sufficient to capture the involvement of certain causes, including potentially preventable health conditions, in causing death (Bishop et al. 2023).

If we are interested, for example, in understanding sepsis as a cause of death, we know that it was one of the most common causes recorded on death certificates in 2022. However, sepsis was not identified as a leading underlying cause of death. A more complete picture of sepsis as a cause of death requires looking at more than just the underlying cause.

Other ways of looking at multiple causes highlights the role (underlying, direct or contributory) most played by a specific cause of death, and the extent to which people die with a condition, compared to from the condition.

### Health conditions can play different roles in causing death

Some conditions reported as causing death are more likely to be the underlying, rather than a direct or contributory cause. [Figure 8.1](#) shows the role played by each cause of death according to broad cause groups.

When cancer, external causes, or neurological conditions were involved in causing death, they were usually the underlying cause (in 70%, 57% and 48% of their involvement, respectively). External causes, such as surgeries, can be involved as direct causes where the underlying condition requires medical intervention, for example, a kidney transplant for chronic renal disease, or a hip replacement after a fall.

Some causes were mostly involved as direct causes: injuries (88%), ill-defined causes (75%), infectious diseases (59%), respiratory diseases (48%) and skin diseases (45%). Infectious, respiratory, and skin diseases can often arise as a complication of the underlying cause and often in a medical setting. Injuries are almost always direct causes as these reflect the consequences of external causes.

Endocrine, musculoskeletal, and mental and behavioural conditions are usually reported as contributory causes (in 61%, 71% and 72% of their involvement, respectively).

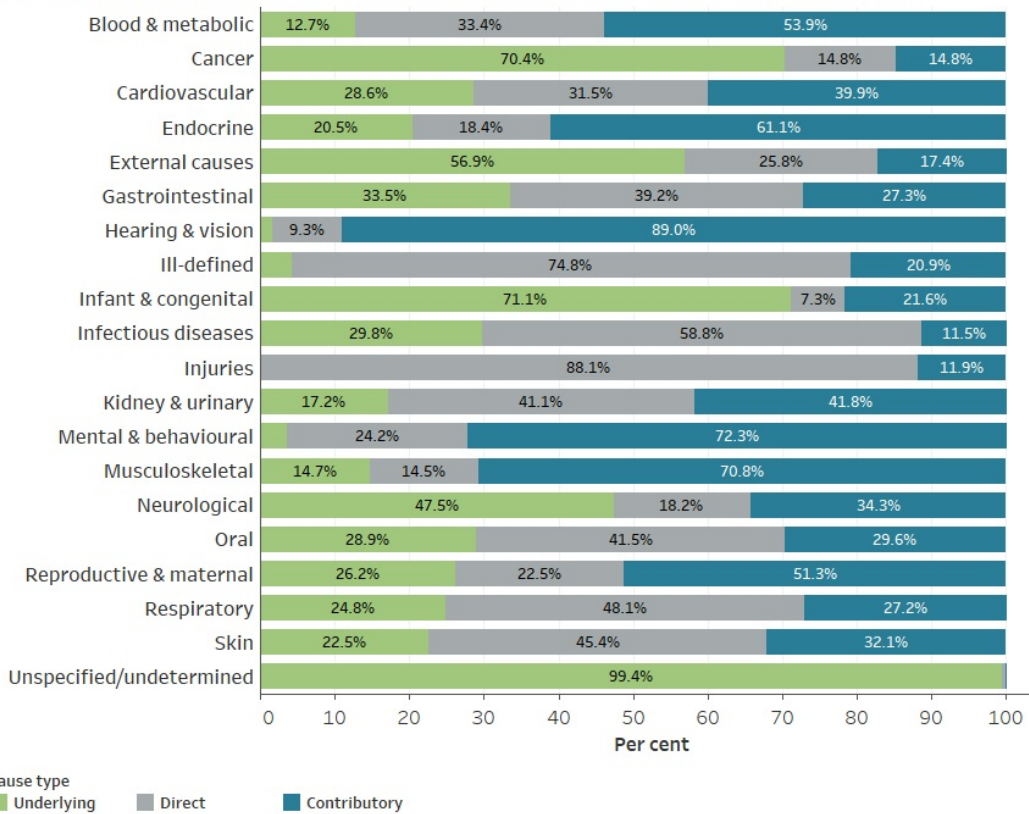
More detailed explorations could demonstrate which underlying causes are most associated with the direct causes, and linked data could identify other relevant factors such as the setting where infections are acquired. Further investigation can also highlight how particular causes contribute to specific underlying causes.

### Figure 8.1: Cause of death, per cent involvement by cause type, cause groups and specific causes, 2022

The per cent involvement in death for each cause group and specific cause changes by the role it plays as different cause types. It shows that for example, cancer, external causes and neurological conditions, when they are involved in causing death are more often the underlying cause. Endocrine, musculoskeletal, and mental and behavioural conditions are usually contributory causes, while injuries, unspecified or undetermined causes, infectious diseases and respiratory diseases are usually direct causes of death.

Cause of death group  
All cause groups

Per cent of All cause groups deaths as underlying, direct or contributory causes, 2022



Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. The percentages across cause type may not sum to 100 due to rounding.

Source: AIHW National Mortality Database; [Table S8.1](#).

Comparing multiple causes to underlying causes

Another way to look at multiple causes is to assess the extent to which the cause is not the underlying cause. We can do this for specific causes by comparing the death rate based on multiple causes with the death rate based on the underlying cause. This measure is referred to as the ‘standardised ratio of multiple to underlying’ (SRMU) (Désesquelles et al. 2010). The calculation and interpretation of the SRMU is shown in [Table 8.1](#).

The SRMU helps to understand the extent to which people die with the condition compared to from the condition. When a cause is more often an underlying cause than a non-underlying cause (for example, the SRMU is 2.0), it shows that people are more likely to die from the condition than they are to die with the condition.

Table 8.1: Standardised ratio of multiple to underlying

Underlying cause rate (A)	Multiple cause rate (B)	SRMU (B/A)	Interpretation
150 deaths per 100,000	150 deaths per 100,000	1.0	Most likely to die from, than with, the cause (Cause is always the underlying cause)
150 deaths per 100,000	225 deaths per 100,000	1.5	More likely to die from, than with, the cause
150 deaths per 100,000	300 deaths per 100,000	2.0	Equally likely to die from or with the cause
150 deaths per 100,000	780 deaths per 100,000	5.2	More likely to die with, than from, the cause
0 deaths per 100,000	150 deaths per 100,000	..	Most likely to die with, than from, the cause (Cause is never the underlying cause)

.. not applicable

[Figure 8.2](#) shows the SRMU for different causes of death.



### **Which conditions are people more likely to die from rather than with?**

Most cancers (with the exception of prostate, non-melanoma skin and some blood cancers) have an SRMU close to 1, suggesting people are more likely to die from, than with, the cancer. Cancers themselves are often the cause that led directly to the death without other causes recorded on the death certificate.

People are more likely to die from than with suicide, accidental poisoning, falls and road traffic injuries (SRMUs between 1.0 and 1.2). Motor neuron disease and influenza also have low SRMU (1.1 and 1.4 respectively); that is, people are more likely to die from these conditions, than with, the condition.

The SRMU for COVID-19 was 1.3 suggesting that people mostly died from, than with COVID-19. Over time, as more data becomes available, we can assess changes in the SRMU to better understand the role of COVID-19 in causing death.

### **Which conditions do people die equally from and with?**

Coronary heart disease and dementia (the 2 leading underlying causes of death in Australia) had an SRMU of 2; that is people are equally likely to die from or with these conditions. It also suggests that these causes are involved at twice the rate indicated by the underlying cause.

### **Which conditions are people more likely to die with rather than from?**

Chronic kidney disease, diabetes and COPD are among the 20 leading underlying causes. The SRMU for these causes was 5.0, 4.5 and 2.5, respectively (Figure 8.2). This suggests that people are more likely to die with, than from, these causes. The SRMU shows for example, that in every 5 deaths per 100,000 from chronic kidney disease, 4 deaths per 100,000 had this condition as a direct or contributory cause.

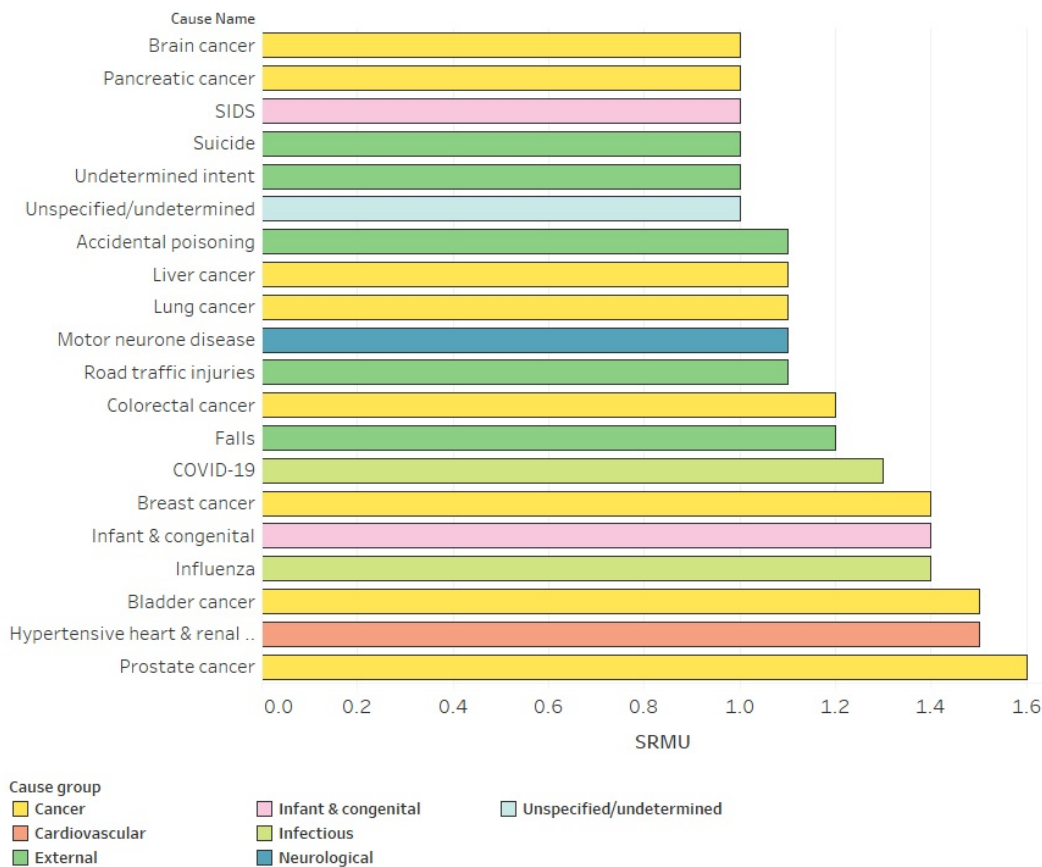
Causes with very high SMRUs included hypertension, delirium, depressive disorders, drug use disorders, medical complications, anxiety disorders, tobacco use disorders and immobility/bed-bound (Figure 8.2, Table S8.2).

Causes having the highest SRMU often reflect risk factor-related conditions. Drug use disorders for example, are highly associated with deaths due to suicide, accidental poisoning and chronic liver disease (for example, Case & Deaton 2015). Assessment of the association between causes was out of scope for this report.

### **Figure 8.2: Standardised ratio of multiple to underlying cause (SRMU) for selected<sup>1</sup> causes of death, 2022**

Analysis of the Standardised ratio of multiple to underlying cause (SRMU) shows people are more likely to die from cancers, most external causes, motor neurone disease, influenza and COVID-19, for example, as the underlying cause. People are more likely to die with, for example, hypertension, depressive disorders, drug use disorders and tobacco use disorders as non-underlying causes. People died from and with coronary heart disease and dementia at approximately equal rates.

**Standardised ratio of multiple to underlying**  
More likely to die from, than with, the cause



**Notes**

1. Dying from the cause refers to having the condition as underlying cause. Dying with the cause refers to having the conditions as a direct or contributory cause.
2. Causes were selected to demonstrate the variation in the extent of dying with compared to dying from a cause. The SRMU is available for all causes assessed in [Table S8.2](#).
3. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
4. SIDS: Sudden infant death syndrome.
5. Infant & congenital excludes SIDS.

Source: AIHW National Mortality Database; [Table S8.2](#).

**References**

Bishop K, Moreno-Betancur M, Balogun S, Eynstone-Hinkins J, Moran L, Rao C, Banks E, Korda RJ, Gourley M and Joshy G (2023) 'Quantifying cause-related mortality in Australia, incorporating multiple causes: observed patterns, trends and practical considerations', *International Journal of Epidemiology*, 52(1): 284-294.

Case A and Deaton A (2015) 'Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century', *Proceedings of the National Academy of Science USA*, 112(49):15078-83, doi:10.1073/pnas.1518393112.

Désesquelles A, Salvatore MA, Frova L, Oace M, Pappagallo M, Meslé F and Egidi V (2010) 'Revisiting the mortality of France and Italy with the multiple-cause-of-death approach', *Demographic Research*, 23:771-805.

## Which risk factors cause most deaths?

Another way of looking at what causes death is to measure the number of deaths that can be attributed to risk factors, for example, tobacco use, high blood pressure and physical inactivity.

The involvement of certain health-related risk factors can to some extent be identified in cause of death information provided on the death certificate. For example, in 2022, hypertension was involved in causing 12% of deaths.

However, the recording of this information on death certificates is not as rigorous as data collected on exposure to risk factors and the assessments of causal association with different diseases through surveys and epidemiological research. It is also not possible to fully estimate the number of attributable deaths due to selected risk factors using multiple causes of death data. Burden of disease methodology can be used to estimate the fatal burden of disease attributable to risk factors.

To get a more complete picture of the impact of risk factors on causing death, we used the [Australian Burden of Disease Study \(ABDS\)](#). This study identifies a set of known and modifiable health-related risk factors, which have been measured in the Australian population.

### Tobacco use causes the most deaths attributable to risk factors

The disease burden attributable to 20 individual risk factors includes an estimate of the number of deaths attributable to each risk factor (AIHW 2021). Figure 9.1 shows the risk factors that caused the highest number of deaths in 2011, 2015 and 2018. Exposure to tobacco use led to the highest number of attributable deaths in all years (see [Figure 9.1](#)). Exposure to high blood pressure, overweight (including obesity) and dietary risks were the next leading causes of attributable death. All risk factors included in the ABDS accounted for 49% of all deaths in 2018.

The number of deaths attributable to some risk factors decreased over time. For example, comparing 2011 and 2018, there were fewer deaths attributable to high blood pressure, dietary risks and high cholesterol ([Figure 9.1](#)). For some risk factors, such as overweight (including obesity) and alcohol use, the number of deaths rose over this period ([Figure 9.1](#)). The number of deaths attributable to illicit drug use increased by 44% between 2011 and 2018.

As the number of deaths can increase each year due to population growth and ageing, the proportion of deaths in each year attributable to the risk factors can also be examined to highlight changes over time. Though the number of deaths attributable to tobacco use rose between 2011 and 2018, the proportion of deaths attributable to this risk factor decreased slightly from 13.5% to 12.9% ([Figure 9.1](#)). Alongside a declining number of attributable deaths, the proportion of deaths due to high blood pressure declined, from 13.2% to 10.9%, and for dietary risks, from 12.0% to 9.9%. The number and proportion of deaths attributable to overweight (including obesity), alcohol use and illicit drug use increased over the period are shown here.

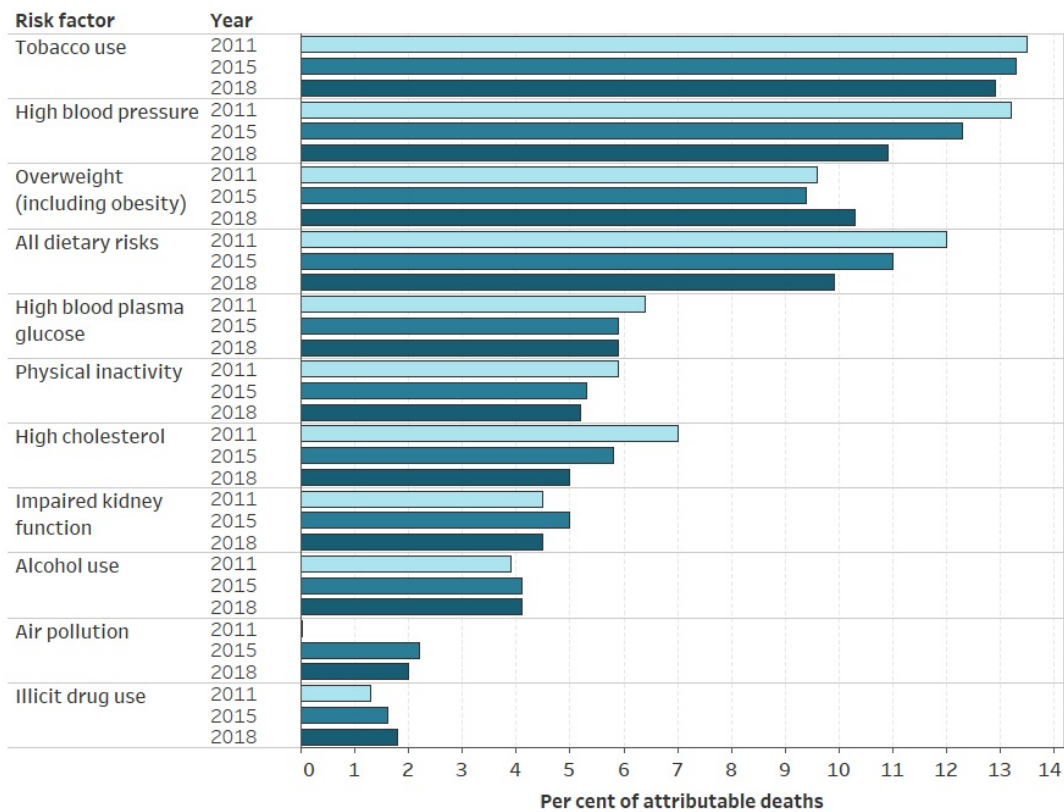
### Figure 9.1: Number and per cent of deaths attributable to risk factors, 2011, 2015, 2018

Number and percent of risk factor attributable deaths from the 2018 Australian Burden of Disease Study. Across all years (2011, 2015, 2018) tobacco use caused the most attributable burden (13.5%, 13.3%, 12.9%). High blood pressure, all dietary risks, and high cholesterol decreased the most between 2011-2018. Overweight (including obesity) increased the most.

## Measure

Per cent of attributable deaths

### Per cent of attributable deaths, by risk factor and year



## Notes

1. Burden attributable to air pollution was not estimated in 2011.
2. All dietary risks refers to the joint attributable fatal burden for each dietary risk factor; Illicit drug refers to the joint attributable fatal burden for each type of drug use.
3. The number and per cent of attributable deaths for individual risk factors cannot be summed to estimate the combined impact as the risk factors were assessed independently.

Source: AIHW (2021); [Table S9.1](#).

## References

AIHW (Australian Institute of Health and Welfare) (2021) *Australian Burden of Disease Study 2018: Interactive data on risk factor burden*, AIHW, Australian Government, accessed 06 February 2024.

## Psychosocial factors contribute to death

If you experience any impacts by viewing this material, please stop reading and seek support.

### [Crisis and support services](#)

Death is not wholly attributable to disease, injury or health-related risk factors (such as smoking). It is well established that non-medical factors, such as social determinants, play a role in a person's life and death (WHO 2024; AIHW 2022). Since 2017, information on some of these factors (described as psychosocial risk factors) has been collected for coroner-referred deaths (ABS 2019). Deaths are referred to a coroner in circumstances where: the death was a result of an accident or injury; the identity of the person is unknown; they were in custody or care; the death was health care-related; the person died unexpectedly; or the cause of death is not known.

In 2022, more than 23,000 deaths were certified by a coroner. Of these more than 40% were due to (an underlying) external cause, such as falls, road traffic accidents, poisoning, and suicide. Information from police, pathology and coroner reports can provide details of the non-medical circumstances that were experienced by the person and were thought to have contributed to the death. Understanding these circumstances can highlight the need to implement or improve social policies or interventions for specific groups of people.

Psychosocial factors can include long-standing and unmodifiable circumstances such as negative events in a person's childhood, history of self-harm or care needs due to disability. Other more temporary factors, such as fights within a primary support group, legal proceedings or unemployment, could also be identified as contributing to a person's death.

Looking at psychosocial factors more broadly as determinants of health, we can begin to understand these circumstances and how they affect death. In this report, psychosocial factors have been categorised into 14 specific groups, including for example: housing; economic and education; intimate partner issues; support systems; and other community and safety issues. Examples of these contexts are provided below (see [Classification of health conditions](#) in the Technical notes for a more detailed list).

### Intimate partner

- Relationship issues
- Separation/divorce
- Domestic violence

### Personal

- Stress and burnout
- Beliefs and behaviours
- Life management

### Individual health status

- Health status and history
- Health behaviours
- Worried well

### Personal history of self-harm

- Suicidal and non-suicidal deliberate self-injury
- Self-inflicted pain
- History of suicide attempt

### Other community and safety issues

- Social environment issues
- Bullying
- Family history of disease

### Employment

- Unemployment
- Job loss
- Stressful work schedule
- Discord with workmates

### Experience of violence/trauma

- Physical or sexual assault
- Psychological trauma

- Abuse or maltreatment
- Experience of violence/trauma not in childhood

#### Support systems

- Primary support group issues
- Estrangement from family
- Living alone or social isolation

#### Childhood

- Negative events in childhood
- Issues relating to upbringing
- Physical or sexual abuse

#### Care needs

- Need for assistance
- Palliative care
- Limitation of activities due to disability

#### Suicide ideation

- Thoughts of suicide, with or without intent

#### Housing

- Homelessness
- Inadequate housing

#### Economic and education

- Financial issues
- Low income
- Problems with education

#### Environment

- Occupational exposures
- Unsafe sleeping environments
- Natural disasters

#### Policing/Justice

- Imprisonment
- Incarceration
- Other legal circumstances

### Data source for psychosocial factors

Analysis of psychosocial and social determinants of health in this web report are compiled from data available on the National Mortality Database. These circumstances as they relate to death are captured through information available on the National Coronial Information System and are coded by the Australian Bureau of Statistics. Data for 2022 are preliminary and subject to further revision (ABS 2022).

The availability and detail of information surrounding these circumstances differ by jurisdiction. While this report does not represent complete coverage of the circumstances experienced by all people, it provides insight into the value of utilising non-medical circumstances in multiple cause of death analysis.

For more statistics on determinants of health, see Determinants of health in [Health indicators](#) and [Welfare indicators](#).

### References

ABS (Australian Bureau of Statistics) (2019) *Psychosocial risk factors as they relate to coroner-referred deaths in Australia*, ABS, Australian Government, accessed 10 April 2024.

ABS (2022) *Causes of Death, Australia*, ABS, Australian Government, accessed 10 April 2024.

AIHW (Australian Institute of Health and Welfare) (2022) *Social determinants of health*, AIHW, Australian Government, accessed 10 April 2024.

WHO (World Health Organization) (2024) *Social determinants of health*, WHO, accessed 10 April 2024.



## Psychosocial factors contribute to death

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### Crisis and support services

In 2022, 4,007 coroner-referred deaths mentioned at least one psychosocial factor. External causes of death were the most common underlying cause for these deaths with 59% being due to suicide and 11% to accidental poisoning.

Almost three-quarters (73%) of suicide deaths and one-third (33%) of accidental poisoning deaths mentioned at least one psychosocial factor (Table 10.1). More than one quarter (28%) of homicide and violence deaths and 3 in 5 sudden infant death syndrome deaths recorded at least 1 psychosocial factor.

Psychosocial factors are complex and are not often seen in isolation. In 2022, among the deaths identifying psychosocial factors, on average 1.8 factors per death were identified.

Table 10.1: Selected<sup>1</sup> underlying causes of death identifying at least one psychosocial factor, 2022

Underlying cause of death	Total number of deaths	Number of deaths with at least one psychosocial risk factor	Per cent of deaths <sup>2</sup>
Suicide	3,249	2,374	73.1
Sudden infant death syndrome	15	9	60.0
Undetermined intent	184	77	41.8
Accidental poisoning	1,318	440	33.4
Homicide and violence	228	63	27.6
Other unintentional injuries	445	60	13.5
Drug use disorders	37	5	13.5
Other external causes	275	29	10.5
Drowning	250	21	8.0
Falls	4,084	290	7.1
All coroner-certified deaths	23,282	4,007	17.2 <sup>3</sup>

### Notes

1. Deaths with the highest proportion mentioning at least one psychosocial risk factor. Deaths with small numbers (less than 5) are excluded.
2. Percentage of deaths due to the underlying cause mentioning at least one psychosocial risk factor.
3. Percentage of coroner certified deaths which identify at least one psychosocial factor.

Source: AIHW National Mortality Database.



## Psychosocial factors contribute to death

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### Crisis and support services

The types of psychosocial factors involved in a person’s death vary depending on their underlying cause of death.

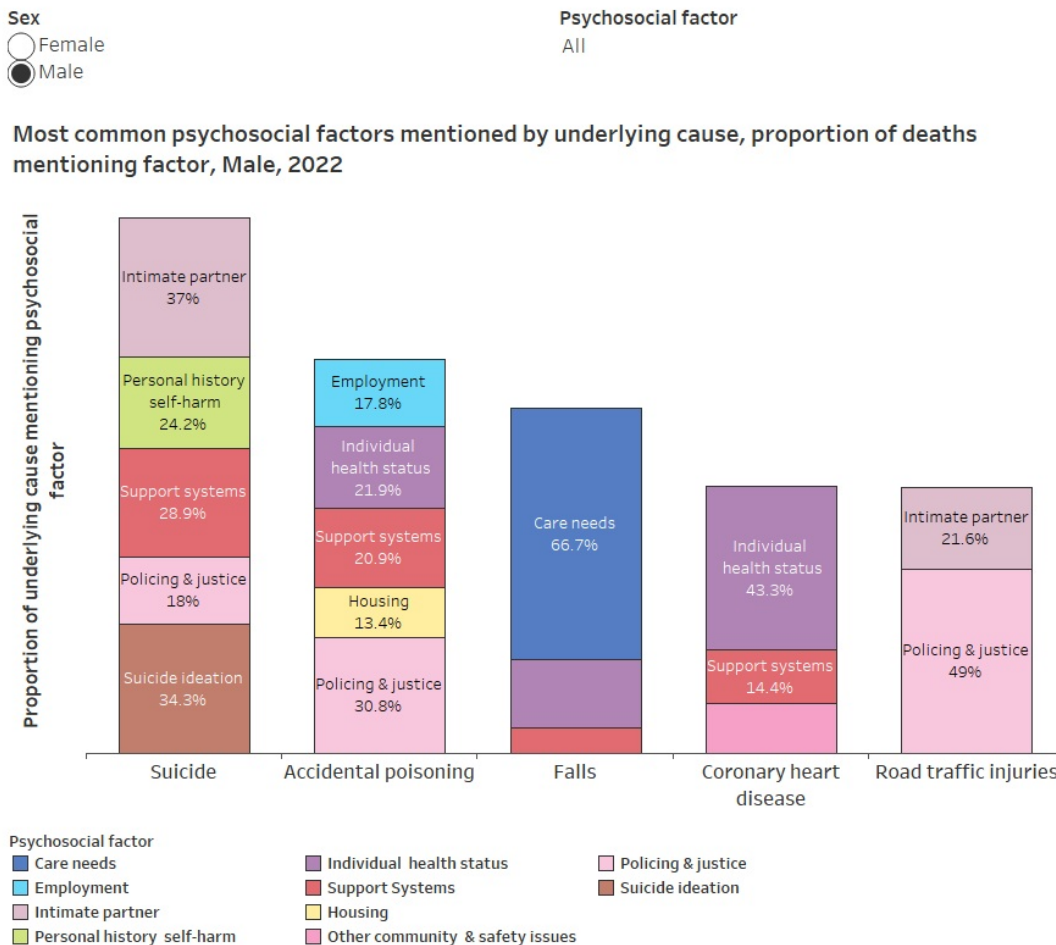
Multiple and complex personal and social factors are known to be experienced by people who die by suicide (Turecki and Brent, 2015). In 2022 deaths due to suicide were associated with a range of risk factors. The most frequently mentioned psychosocial factors were history of self-harm, intimate partner issues and support system factors (Figure 10.1).

Of the deaths which mentioned at least one psychosocial factor:

- 24% of males and 44% of females who died by suicide, mentioned personal history of self-harm.
- 21% of males and 30% of females who died due to accidental poisoning mentioned issues relating to support systems.
- for both males and females, 2 in 3 deaths due to falls mentioned care needs.

**Figure 10.1: Most common psychosocial factors mentioned by underlying cause, per cent of deaths mentioning factor, by sex, 2022**

Issues surrounding intimate partners, personal history of self-harm, suicide ideation and circumstances surrounding support systems were mentioned for both males and females who died by suicide. Factors surrounding policing & justice were more likely to be mentioned for males, and care needs for women. The most common psychosocial factor mentioned in deaths due to falls was care needs.



### Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Each death can involve one or more psychosocial factors. As a result, the total percentage by a cause type can be greater than 100.

Source: AIHW National Mortality Database; [Table S10.1](#).

## References

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Turecki G and Brent DA (2015) '[Suicide and suicidal behaviour](#)', *Lancet*, 387(10024):1227-39, doi:10.1016/S0140-6736(15)00234-2.

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## Psychosocial factors contribute to death

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### Crisis and support services

The most commonly mentioned psychosocial factors in male and female deaths were similar, however with different levels of involvement (Figure 10.2).

The psychosocial factors mentioned in 2022 were similar for male and females, however with different proportions. Issues with intimate partners were the most common psychosocial factor for males, and for females with was personal history of self-harm. Employment was mentioned in almost twice the proportion of males, than females (14% compared with 7%). Economic & education factors were mentioned for males, but not females, in the 10 most common mentioned psychosocial factors. Childhood events were mentioned for females, but not males.

Figure 10.2 Most common psychosocial factors by sex, 2022

	Males	Females	Persons
1	Intimate partner (26.3%)	Personal history self-harm (27.5%)	Support systems (24.8%)
2	Suicide ideation (24.0%)	Support systems (27.0%)	Intimate partner (24.2%)
3	Support systems (23.9%)	Suicide ideation (22.0%)	Suicide ideation (23.4%)
4	Individual health status (17.9%)	Intimate partner (19.1%)	Personal history self-harm (20.5%)
5	Personal history self-harm (17.6%)	Individual health status (18.7%)	Individual health status (18.2%)
6	Policing & justice (17.5%)	Care needs (18.6%)	Care needs (14.4%)
7	Employment (14.4%)	Employment (7.3%)	Policing & justice (14.3%)
8	Care needs (12.6%)	Policing & justice (6.8%)	Employment (12.3%)
9	Housing (7.1%)	Childhood events (5.7%)	Housing (6.5%)
10	Economic & education (7.0%)	Housing (5.3%)	Economic & education (6.0%)

### Notes

- Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
- Each death can involve one or more psychosocial factors. As a result, the total percentage by a cause type can be greater than 100.

Source: AIHW National Mortality Database; [Table S10.2](#).

Of the deaths in 2022 with at least one psychosocial factor:

- personal history of self-harm was mentioned in 18% of male and 28% of female deaths.
- issues with intimate partners were mentioned in proportionally more male (26%) than female (19%) deaths.
- circumstances around support systems were proportionally higher in female (27%) than male (24%) deaths.
- circumstances related to policing and justice were proportionally more common in male (18%) than female (7%) deaths.

## Psychosocial factors contribute to death

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### Crisis and support services

In deaths that involved psychosocial factors, the patterns varied by age ([Figure 10.3](#)).

**Figure 10.3 Most common psychosocial factors by age group and sex, 2022**

For males, the most common psychosocial factors mentioned were issues surrounding intimate partners (for ages 15-54), individual health status (for ages 55-74), and care needs (for ages 75-94). For females, the most common psychosocial factors mentioned were personal history of self-harm (for ages 15-44), support systems (for ages 45-74) and care needs (for ages 75-94).

Sex  


**Most common psychosocial factors by age group, Persons, 2022**

	Age group						
	15-24	25-44	45-54	55-64	65-74	75-84	85-94
1	Personal history self-harm	Intimate partner	Intimate partner	Support systems	Individual health status	Care needs	Care needs
2	Suicide ideation	Personal history self-harm	Support systems	Individual health status	Care needs	Support systems	Support systems
3	Intimate partner	Suicide ideation	Suicide ideation	Suicide ideation	Support systems	Individual health status	Individual health status
4	Support systems	Support systems	Personal history self-harm	Intimate partner	Suicide ideation	Suicide ideation	Suicide ideation
5	Policing & justice	Policing & justice	Employment	Personal history self-harm	Personal history self-harm	Personal history self-harm	Personal history self-harm

### Notes

1. Deaths registered in 2022 are based on the preliminary version and are subject to further revision by the Australian Bureau of Statistics.
2. Each death can involve one or more psychosocial factors. As a result, the sum of the per cent involvement by a cause type can be greater than 100.
3. Due to the sensitivity surrounding psychosocial factors, numbers less than 10 are not published.

Source: AIHW National Mortality Database; [Table S10.3](#).

Personal history of self-harm was one of the most commonly mentioned factors for females across all age groups. For males it was more common in the younger (15-44) and older (65-74) age groups.

Issues with intimate partners was the most mentioned psychosocial factor for males aged 15-54.

Factors relating to support systems were mentioned in all age groups, with it being the most common for females aged 45-74.

Factors relating to individual health status was commonly mentioned across all age groups from age 15 to 94 for females, and from age 55 to 94 for males.





## Technical notes

- [Classification of health conditions](#)
  - [Deaths data](#)
  - [Year of analysis](#)
  - [Standardised ratio of multiple to underlying](#)
  - [Abbreviations](#)
- 



## Technical notes

The list of health conditions that underpin this analysis (and their organisation into cause groups and specific causes) is shown below ([Cause list](#)). The classification of the health conditions into groups and causes are mutually exclusive (non-overlapping). The cause list was designed to reflect the disease and conditions that are commonly reported on and monitored in Australia, as well as to fit with a multiple cause analysis approach.

**Cause groups:** 21 cause groups each comprising a set of related specific causes, for example, cardiovascular diseases, respiratory diseases and mental and behavioural conditions. The cause list also includes the following groups:

- **Injury** which includes specific causes to reflect the types of injuries involved in causing death.
- **Ill-defined** which includes modes of dying such cardiac or respiratory arrest and respiratory failure. These are ill-defined as an underlying cause of death. Due to their involvement in causing death, it is necessary to identify these conditions in a multiple cause of death analysis.
- **Unspecified or undetermined** includes deaths where the cause was not able to be determined. This could occur, for example, where there is insufficient detail recorded on the medical death certificate.
- **Psychosocial** includes non-medical factors, such as social determinants, that play a role in a person's life and death. These include, for example, (adverse) childhood events, issues with support systems, employment-related issues or suicide ideation.

**Specific causes:** there are 197 specific causes in the cause list used here; each is aligned to one of the 21 cause groups.

### Cause list: Cause group and cause name, International Classification of Disease (ICD-10) code inclusions

#### Infectious

Cause group and cause name	ICD-10 codes
HIV/AIDS	B20-B24, O987
Tuberculosis	A15-A199, B90-B909, N330, N740-N741, O980, P370
Other respiratory infections	J00-J069, J987
Lower respiratory infections	J12-J129, J14-J22, J85-J869
Influenza	J09-J118
Urinary tract infections	N30-N309, N34-N343, N390
COVID-19	U071-U109
Sepsis	A40-A402, A408-A419
Hepatitis	B15-B179, B19-B199, B942
Gastrointestinal infections	A00-A099, D593
Other infectious diseases	A20-A399, A403, A42-A449, A48-B07, B080, B082-B083, B085-B09, B25-B854, B87-B89, B91-B92, B940-B941, B948-B99, G00-G07, H65-H669, H68-H681, H70-H709, J13, N290, N742-N744, O981-O986, O988-O989, P350, P373-P374

#### Infant & congenital

Cause group and cause name	ICD-10 codes
Infant & congenital (excluding SIDS)	G80-G809, P00-P299, P351-P369, P371-P372, P375-Q999
Sudden infant death syndrome (SIDS)	R95-R959

#### Cancer

Cause group and cause name	ICD-10 codes
Laryngeal cancer	C32-C329
Oesophageal cancer	C15-C159
Stomach cancer	C16-C169
Colorectal cancer	C18-C20, C260
Liver cancer	C22-C229
Gallbladder cancer	C23-C249
Pancreatic cancer	C25-C259
Lung cancer	C33-C349
Mesothelioma	C45-C459
Melanoma of the skin	C43-C439
Non-melanoma skin cancer	C44-C449
Breast cancer	C50-C509

Cervical cancer	C53-C539
Uterine cancer	C54-C559
Ovarian cancer	C56
Prostate cancer	C61
Bladder cancer	C67-C679
Kidney cancer	C64-C649
Brain cancer	C70-C729
Thyroid cancer	C73
Non-Hodgkin lymphoma	C82-C866
Hodgkin lymphoma	C81-C819
Myeloma	C90-C903
Other blood cancers	C88-C889, C96-C969, D45-D469, D471, D473-D475
Cancer unknown primary	C76-C768, C80-C809, C97
Benign/uncertain brain tumour	D32-D339, D42-D439
Acute myeloid leukaemia	C920, C923-C926, C928, C930, C940, C942, C944-C945
Chronic myeloid leukaemia	C921
Acute lymphoblastic leukaemia	C910
Chronic lymphocytic leukaemia	C911
Other leukaemias	C912-C919, C922, C927, C929, C931-C939, C941, C943, C946-C959
Oral cancers	C00-C148
Cancer of secondary site	C77-C799
Other malignant cancers	C17-C179, C21-C218, C261-C319, C37-C419, C46-C499, C51-C52, C57-C609, C62-C639, C65-C66, C68-C699, C74-C759
Other benign cancers	D00-D24, D26-D319, D34-D419, D44-D449, D470, D472, D477-D489

## Cardiovascular

Cause group and cause name	ICD-10 codes
Coronary heart disease	I20-I259
Cerebrovascular diseases	G45-G459, I60-I698
Rheumatic heart disease	I00-I069, I080-I081, I083, I09-I099
Non-rheumatic valvular disease	I07-I079, I082, I088-I089, I34-I398
Atrial fibrillation	I48-I489
Inflammatory heart disease	I30-I339, I40-I418
Cardiomyopathy	I42-I438
Aortic aneurysm	I71-I719
Peripheral vascular disease	I700-I708, I72-I749
Arrhythmias	I47-I479, I49-I499
Pulmonary embolism	I26-I269
Cardiomegaly	I517
Hypertension	I10
Hypertensive heart & renal disease	I13-I139, I150
Heart failure (specified)	I500-I501
Other cardiovascular diseases	I11-I119, I158-I159, I27-I289, I44-I459, I460, I51-I516, I518-I528, I709, I77-I849, I86-I959, I98-I99

## Respiratory

Cause group and cause name	ICD-10 codes
Asthma	J45-J46
COPD	J40-J449
Interstitial lung disease	J84-J849
Upper respiratory conditions	J30-J339, J341-J399
Asbestosis	J61
Respiratory failure	J96-J969
Pulmonary oedema	J81
Pleural effusion	J90
Pneumonitis	J69-J698
Other respiratory diseases	D860, D862, D869, J47-J60, J62-J689, J70-J80, J82, J91-J949, J98-J986, J988-J998

## Gastrointestinal

Cause group and cause name	ICD-10 codes
----------------------------	--------------



Gastroduodenal disorders	K221, K25-K279, K29-K299
Abdominal wall hernia	K40-K439, K45-K469
Vascular disorders of intestine	K55-K559
Intestinal obstruction without hernia	K56-K567
Inflammatory bowel disease	K50-K529
Diverticulitis	K57-K579
Chronic liver disease	B18-B189, I85-I859, K70-K709, K710-K711, K713-K769
Gallbladder diseases	K80-K839
Pancreatitis	K85-K869
Gastro-oesophageal reflux	K20-K219, K44-K449
Gastrointestinal haemorrhage (unspecified)	K631, K922
Peritonitis	K65-K669
Other gastrointestinal disorders	K22-K220, K222-K238, K28-K289, K30-K389, K58-K621, K624-K630, K632-K649, K67-K678, K712, K77-K778, K87-K909, K92-K921, K928-K938

## Neurological

Cause group and cause name	ICD-10 codes
Epilepsy	G40-G419
Dementia	F00-F03, G30-G319
Parkinson disease	G20
Multiple sclerosis	G35
Motor neurone disease	G122
Other neurological conditions	G08-G121, G128-G14, G21-G26, G32-G328, G36-G379, G43-G448, G46-G737, G81-G969, G98-G998

## Mental & behavioural

Cause group and cause name	ICD-10 codes
Depressive disorders	F32-F339, F341-F349, F39
Anxiety disorders	F40-F439
Bipolar affective disorder	F30-F319, F340
Alcohol use disorders	F10-F109, R780
Drug use disorders	F11-F169, F18-F199, R781-R788
Schizophrenia	F20-F29
Intellectual disability	F70-F799
Delirium	F05-F059
Tobacco use disorders	F17-F179
Other mental & behavioural disorders	F04, F06-F09, F38-F388, F44-F69, F80-F99

## Endocrine

Cause group and cause name	ICD-10 codes
Diabetes	E10-E101, E103-E111, E113-E121, E123-E131, E133-E141, E143-E149, O240-O242
Obesity	E66-E669
Volume depletion	E86
Hypothyroidism (unspecified)	E039
Hyperthyroidism	E05-E059
Other endocrine disorders	E030-E038, E04-E049, E06-E079, E15-E279, E280-E281, E283-E358, E853-E859, E87-E878, I152

## Kidney & urinary

Cause group and cause name	ICD-10 codes
Chronic kidney disease	E102, E112, E122, E132, E142, I12-I129, N02-N088, N13-N168, N18-N19, N391-N392
Enlarged prostate	N40
Kidney stones	N20-N219
Interstitial nephritis	N10-N12
Acute renal failure	N17-N179
Other kidney & urinary diseases	I151, N00-N019, N22-N289, N291-N298, N31-N329, N338, N35-N378, N393-N399, N41-N429

## Reproductive & maternal

Cause group and cause name	ICD-10 codes
Reproductive & maternal conditions	D25-D259, E282, K622-K623, N43-N739, N748-N989, O00-O239, O243-O979, O99-O998

## Musculoskeletal

Cause group and cause name	ICD-10 codes
Osteoarthritis	M15-M199
Gout	M10-M109
Rheumatoid arthritis	M05-M069, M08-M089
Back pain & problems	M40-M419, M45-M549, M99-M999
Osteoporosis	M80-M828
Other arthropathies	M00-M036, M07-M076, M09-M098, M11-M148, M20-M259
Other osteopathies	M83-M908
Other musculoskeletal conditions	M30-M368, M42-M439, M60-M799, M91-M959

## Hearing & vision

Cause group and cause name	ICD-10 codes
Hearing & vision diseases	H001-H588, H602-H628, H67-H678, H69-H699, H71-H948

## Skin

Cause group and cause name	ICD-10 codes
Ulcers	L89-L899, L97, L984
Skin infections	A46, B081, B084, H000, H600-H601, J340, L00-L039, L08-L089
Other skin disorders	B86, L04-L059, L10-L88, L90-L959, L980-L983, L985-L998

## Oral

Cause group and cause name	ICD-10 codes
Oral disorders	K00-K149

## Blood & metabolic

Cause group and cause name	ICD-10 codes
Haemolytic anaemias	D55-D589
Iron-deficiency anaemia	D501-D509
Protein-energy deficiency	E40-E46
High cholesterol	E780, E785
Acquired/other anaemia	D500, D59-D592, D594-D649
Other blood & metabolic disorders	D51-D539, D65-D849, D861, D863-D868, D89-E02, E50-E65, E67-E779, E781-E784, E786-E849, E850-E852, E88-E889, E90

## External

Cause group and cause name	ICD-10 codes
Accidental poisoning	X40-X499
Falls	W00-W199
Drowning	V90-V909, V92-V929, W65-W749
Other unintentional injuries	V91-V919, V93-V99, W20-W641, W75-W779, W81-W99, X20-X399, X50-X589, Y35-Y369, Y86-Y862, Y890-Y891
Suicide	X60-X849, Y870
Homicide & violence	X85-Y099, Y871
Unspecified external factors	X59-X590, X599
Inhalation & choking	W78-W809
Undetermined intent	Y10-Y349
Road traffic injuries	V011-V019, V021-V029, V031-V039, V041-V049, V051-V059, V061-V069, V092-V099, V103-V109, V113-V119, V123-V129, V133-V139, V143-V149, V153-V159, V163-V169, V173-V179, V183-V189, V194-V199, V203-V209, V213-V219, V223-V229, V233-V239, V243-V249, V253-V259, V263-V269, V273-V279, V283-V289, V294-V299, V304-V309, V314-V319, V324-V329, V334-V339, V344-V349, V354-V35
Medical events (external)	U129, Y40-Y849, Y88-Y883
Other external causes	U070, U831, V010, V020, V030, V040, V050, V060, V090-V091, V100-V102, V110-V112, V120-V122, V130-V132, V140-V142, V150-V152, V160-V162, V170-V172, V180-V182, V190-V193, V200-V202, V210-V212, V220-V222, V230-V232, V240-V242, V250-V252, V260-V262, V270-V272, V280-V282, V290-V293, V300-V303, V310-V313, V320-V323, V330-V333, V340-V343, V350-V353, V360-V363, V370

## Injury

Cause group and cause name	ICD-10 codes
Traumatic brain injury	S020-S021, S027, S029, S06-S069, T902, T905
Spinal cord injuries	S097-S099, S140-S141, S147, S197-S199, S240-S241, S247, S340-S341, S347, T060-T061, T093, T903, T913
Internal & crush injury	S07-S079, S110, S17-S18, S224-S225, S25-S281, S297, S35-S379, S380-S381, S396-S397, S47, S57-S579, S67-S678, S77-S772, S87-S878, S97-S978, T04-T049, T065, T147, T914-T915
Substances & drugs	T36-T659, T96-T97
Drowning/submersion injuries	T751
Hip fracture	S72-S729, T931
Other fractures	S022-S026, S028, S12-S129, S220-S223, S228-S229, S32-S328, S42-S429, S497, S52-S529, S597, S62-S628, S697, S82-S829, S92-S929, T02-T029, T08-T081, T10-T101, T12-T121, T142, T911-T912, T921-T922, T932
Burn injuries	T20-T329, T95-T959
Multiple (unspecified) injuries	T07
Asphyxiation	T71
Foreign body - respiratory tract	T17-T179
Medical events (complications)	E89-E899, G97-G979, H59-H599, H95-H959, I97-I979, J95-J959, K91-K919, M96-M969, N99-N999, T80-T890, T983
Other injuries	S00-S019, S03-S059, S08-S092, S10-S11, S111-S119, S13-S136, S142-S146, S15-S16, S19, S20-S219, S23-S235, S242-S246, S290, S298-S318, S33-S337, S342-S346, S348, S382-S383, S390, S398-S418, S43-S469, S48-S489, S498-S519, S53-S568, S58-S589, S598-S619, S63-S669, S68-S689, S698-S718, S73-S767, S78-S819, S83-S869, S88-S918, S93-S969, S98-T019, T03-T039, T05-T059

## Ill-defined

Cause group and cause name	ICD-10 codes
Cardiac/respiratory arrest	I461-I469, R092
Heart failure (unspecified)	I509
Gangrene	R02
Asphyxia	R090
Dysphagia	R13
Somnolence, stupor & coma	R40-R402
Disorientation/amenia	R41-R418
Ill-defined pain	R07-R074, R10-R104, R14, R30-R309, R51-R529
Frailty	R53
Senility	R54
Convulsions	R56-R568
Septic shock	R572
Haemorrhage	R04-R049, R58
Food/fluid intake issues	R63-R638
Cachexia	R64
Multiple-organ failure	R688
Immobility/bed-bound	R263
Tendency to fall	R296
Ill-defined urinary	R31-R398
Cardiogenic shock	R570
All other ill-defined	R00-R012, R03-R031, R05-R068, R091, R093-R098, R11-R12, R15-R258, R260-R262, R268-R278, R290-R294, R298, R42-R448, R450-R457, R46-R509, R55, R571, R578-R579, R59-R629, R65-R659, R680-R683, R69-R779, R789-R948, R96-R98

## Unspecified/undetermined

Cause group and cause name	ICD-10 codes
Unspecified/undetermined	R99

Note: Unspecified/undetermined includes deaths where the cause of death is unknown or not able to be determined. Deaths due to unspecified events with known intent, or specified causes of death with unknown intent are included in the [External](#) cause group.

## Psychosocial

Cause group and cause name	ICD-10 codes
Support Systems	Z593, Z602, Z604, Z631-Z634, Z636-Z639, Z735, Z742-Z748, Z811-Z813, Z818

Childhood events	Z353, Z381, Z588, Z601, Z610-Z619, Z622, Z624-Z625, Z628-Z629
Experience of violence/trauma	Z654, Z914, Z916, Z918
Intimate partner	Z630, Z635
Policing & justice	Z650-Z653
Economic & education	Z550, Z552-Z553, Z558-Z559, Z596-Z598
Employment	Z560-Z567, Z659
Housing	Z590-Z591, Z599
Environment	Z572-Z575, Z578-Z579, Z587, Z655
Care needs	Z515, Z736, Z740-Z741
Personal	Z031-Z032, Z038, Z282, Z312, Z411, Z418, Z465, Z518-Z519, Z538, Z594, Z600, Z644, Z715, Z730, Z733, Z738-Z739, Z752-Z754, Z759, Z763, Z768
Individual health status	Z33, Z351, Z532, Z643, Z711, Z723-Z726, Z758, Z850-Z861, Z864-Z865, Z867-Z871, Z873-Z876, Z878, Z892, Z894-Z897, Z901-Z902, Z904-Z906, Z910-Z913, Z922, Z930, Z933, Z940-Z942, Z944, Z964, Z966, Z988, Z991-Z993
Suicide ideation	R458
Other community & safety issues	Z024-Z025, Z290, Z299, Z554, Z592, Z603, Z605-Z609, Z658, Z734, Z800, Z803-Z804, Z809, Z823-Z824, Z827, Z831, Z848
Personal history self-harm	Z915

#### Notes

1. Causes that related to Health services for counselling (ICD-10 codes Z70, Z71) Need for vaccination against COVID-19 (ICD-10 code U119), doctor-certified deaths for Factors influencing health status and contact with health services (ICD-10 codes Z00-Z99) and all causes in 2014 coded to Factors influencing health status and contact with health services (ICD-10 codes Z00-Z99) were excluded from the analysis.
2. For a list of inclusions coded under each ICD-10 code, see [Psychosocial risk factors as they relate to coroner-referred deaths in Australia, ABS, 2022](#).

## Technical notes

Information about deaths is collected on death certificates and certified by either a medical practitioner or a coroner. Registration of deaths is compulsory in Australia and is the responsibility of each state and territory Registrar of Births, Deaths and Marriages (RBDM) under jurisdiction-specific legislation. Additional information about coroner-certified deaths is maintained by the National Coronial Information System (NCIS). On behalf these agencies (RBDM & NCIS), deaths data are assembled, coded and published by the Australian Bureau of Statistics. Causes of death are coded by the ABS to the International Statistical Classification of Diseases and Related Health Problems 10<sup>th</sup> Revision (ICD-10). The Australian Coordinating Registry undertakes the coordination and management of the data on behalf of the RBDMs, and supplies the AIHW with the Cause of Death Unit Record File. The data are maintained by the AIHW in the National Mortality Database (NMD).

For more information about Australian mortality data, including scope and coverage of the collection and a quality declaration, please refer to [Deaths, Australia](#) and [Causes of death, Australia](#) available from the ABS website.

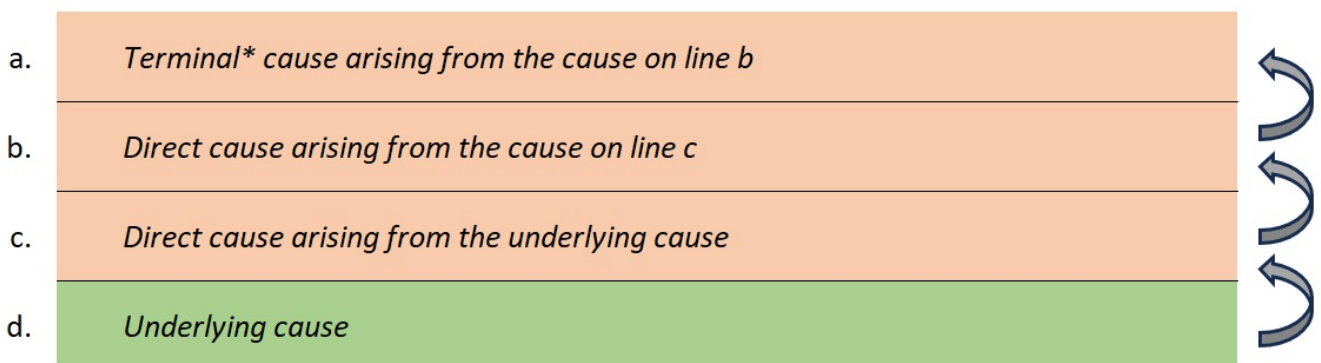
The data used in this report was extracted from the NMD. The NMD comprises two sets of causes:

- record data - which has causes of death that have been coded to an ICD-10 code based on the standard international coding rules. These data contain the underlying cause and the associated causes (that is, all conditions that were not the underlying cause).
- entity data - which has the causes of death in the order and location that they were recorded on the medical death certificate. These data contain information about the location (Part I or Part II) on the medical death certificate (see [Figure below](#)). The location of the cause can be used to identify whether the cause was in the chain of events leading directly to death (Part I) or whether it was a cause that significantly contributed to the death (Part II).

**Figure:** Cause types assessed in this report based on the international format of the medical certificate of cause of death

### Part I

*The chain of events (diseases, injuries or complications) that directly caused the death*



### Part II

*Other significant conditions contributing to the death, but not in the chain of events in Part I*

*Contributory causes*

\* In this report, the terminal cause and all direct causes are assessed together as 'direct' causes.

### Identifying the cause type for each condition involved in death

For this report, we extracted the underlying cause of death from the record data. That is, we used the cause which was designated as the underlying cause based on the standard international coding rules.

We used the entity data to identify causes in Part I and assigned these as 'direct' causes and causes in Part II assigned as 'contributory' causes.

### Mapping deaths data to the cause

For this report, the ICD-10 codes from the data extracted from the NMD were mapped to the relevant cause in the cause list.

As a result of combining the underlying cause from the record data and the causes in Part I and Part II from the entity data, there can be some duplication of causes in each death record. With each cause assigned to a specific cause in the cause list, each death was assessed for duplicate mentions of causes. That is, if two causes on the same death record aligned to the same cause in the cause list, only one instance of the cause was included in the analysis of multiple causes. To avoid double counting causes within each death, the duplicate mentions of causes were excluded from the analysis.

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## Technical notes

In Australia, causes of death can be assessed using the year that the death occurred or the year that it was registered with the Registry of Births, Deaths and Marriage (RBDM). In this report, data are presented for deaths in 2014, 2018 and 2022 and are based on the year of registration (with the RBDM).

Using the year of registration of the death facilitates comparisons over time. However, due to data revisions, the latest year of data can underestimate the occurrence of some causes of death. Most notably, these causes are those that occur in deaths certified by a coroner. The anomaly arises due to the time that is required for investigation into the intent and causes of these deaths. Revisions are made (by the ABS) to the deaths data on two occasions after the initial (preliminary) release of the cause of death data as a revised and then a final version. Deaths registered in 2014 and 2018 are based on the final version of cause of death data; deaths registered in 2022 are based on the preliminary version and are subject to further revision by the ABS. It is not unusual for data in the preliminary version to have a higher number of deaths with an undetermined cause than would be expected in the final version, once coroners have been able to investigate the cause of death more thoroughly.

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## Technical notes

The ‘standardised ratio of multiple to underlying’ (SRMU) describes the extent to which a cause is involved in the death (multiple cause) compared to its involvement only as the underlying cause (Désesquelles et al. 2010). It shows the extent to which people die due to a cause compared with dying with the cause.

The SRMU is calculated for a specific cause. It is a rate ratio; specifically the ratio of the age-standardised mortality rate based on the multiple cause involvement to the age-standardised mortality rate based on the underlying cause. The SRMU is calculated as follows:

$$SRMU = \frac{ASR_M}{ASR_U}$$

where:

- $ASR_M$  is the age-standardised rate based on the multiple cause
- $ASR_U$  is the age-standardised rate based on the underlying cause.
- A guide to the interpretation of the SRMU is shown in the table below.

**Table: Interpretation of the standardised ratio of multiple to underlying**

Underlying cause rate ( $ASR_U$ )	Multiple cause rate ( $ASR_M$ )	SRMU ( $ASR_M/ASR_U$ )	Interpretation
150 deaths per 100,000	150 deaths per 100,000	1.0	Most likely to die from, than with, the cause (Cause is always the underlying cause)
150 deaths per 100,000	225 deaths per 100,000	1.5	More likely to die from, than with, the cause
150 deaths per 100,000	300 deaths per 100,000	2.0	Equally likely to die from or with the cause
150 deaths per 100,000	780 deaths per 100,000	5.2	More likely to die with, than from, the cause
0 deaths per 100,000	150 deaths per 100,000	..	Most likely to die with, than from, the cause (Cause is never the underlying cause)

.. not applicable

## References

Désesquelles A, Salvatore MA, Frova L, Oace M, Pappagallo M, Meslé F and Egidi V (2010) ‘Revisiting the mortality of France and Italy with the multiple-cause-of-death approach’, *Demographic Research*, 23:771-805.





## Technical notes

ABS: Australian Bureau of Statistics

AIHW: Australian Institute of Health and Welfare

CHD: Coronary heart disease

COPD: Chronic obstructive pulmonary disease

COVID-19: Coronavirus disease 2019

SIDS: Sudden Infant Death Syndrome

SRMU: Standardised ratio of multiple cause (rate) to underlying cause (rate)

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## Glossary

**contributory causes:** the conditions that significantly contributed to the death but were not in the chain of events leading to death. Typically, these causes relate to prior or co-existing long-term health conditions, and social and other circumstances that were involved in the death. They highlight additional health conditions that could be the focus of prevention strategies, for example, the causes that contribute to chronic disease deaths.

**direct causes:** the health events that arise from the underlying cause. They can relate to consequences and complications of the underlying cause. Some direct causes reflect the health events experienced at the end of life, or conditions experienced for lengthy periods before death.

**Medical Certificate of Cause of Death (MCCD):** The international standard form for collecting cause of death information. The MCCD comprises of two parts. Part I is used for describing the underlying cause and the direct causes (the health events arising from the underlying cause) in the chain of events that led to death. In Part II, the certifier describes all other significant medical conditions and other circumstances that contributed to the death (that is, the contributory causes).

**multiple causes:** all the causes involved in causing the death (underlying, direct, and contributory). When assessed in combination these describe the most common conditions involved in causing deaths.

**Standardised Ratio of Multiple to Underlying (SRMU):** Compares the death rate for a specific cause of death based on the multiple causes with the death rate based on the underlying cause. The SRMU helps to understand the extent to which people die from a cause compared with dying with the cause.

**underlying cause:** the condition which initiated the chain of events leading to death. It provides a significant point in the sequence of events where an intervention could take place to prevent the death from occurring.

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## Notes

### Amendments

#### June 2024

In the section [Which risk factors cause most deaths?](#) The sentence about the combined attributable number of deaths due to individual risk factors has been updated to read: All risk factors included in the ABDS accounted for 49% of all deaths in 2018.

### Acknowledgements

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### Data quality statement

For more information on the AIHW National Mortality Database see [Deaths data](#).

The data quality statements underpinning the AIHW National Mortality Database can be found in the following ABS publications:

- ABS quality declaration summary for [Deaths, Australia](#)
- ABS quality declaration summary for [Causes of death](#)



# Data

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## Related material

### Resources

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