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# Trends in injury deaths, Australia

1999–00 to 2016–17



AIHW





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# **Trends in injury deaths, Australia**

**1999–00 to 2016–17**

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# Summary

This report describes trends in the occurrence of injury deaths in Australia from 1 July 1999 to 30 June 2017, and provides a summary of injury deaths in 2016–17. The information is based on all causes of death recorded on death certificates.

## Injury deaths in 2016–17

*Injury* was recorded as a cause of 13,144 deaths in 2016–17 in Australia (8% of all deaths in that year)—an age-standardised rate of 48 deaths per 100,000 population (64 for males; 32 for females).

Rates were highest in those aged 65 and over—196 per 100,000 men, and 180 per 100,000 women. Rates for males were at least twice as high as rates for females in all other age groups, except in children aged 0–4, where male rates were 1.6 times as high.

The age-standardised injury death rate was highest for residents of the Northern Territory—82 deaths per 100,000 population—1.7 times the national rate.

Rates rose with increasing remoteness of place of residence—the rate for residents of *Very remote* areas (87 deaths per 100,000 population) was more than twice the rate for residents of *Major cities* (43 per 100,000).

Rates also rose with socioeconomic disadvantage, although rates for people living in the 2 lowest socioeconomic areas were similar. The rate for residents living in the 2 lowest socioeconomic areas was 1.4 times the rate for those living in the highest socioeconomic areas.

The 2 main causes of injury deaths were *Unintentional falls* (38%; 5,002 deaths) and *Suicide* (23%, 3,039 deaths). Almost 95% (4,728) of fall-related injury deaths occurred among people aged 65 and over. There were 2.9 times as many male suicides (2,253) as female suicides (786).

## Trends in injury deaths

The age-standardised rate of injury deaths fell from 55.4 deaths per 100,000 population in 1999–00 to 47.2 deaths per 100,000 in 2004–05 and changed little after that. The number of injury deaths varied but was about 10,000 per year during this period.

Rates of injury deaths declined from 1999–00 to 2016–17, by an average of 3.7% per year for transport-related injury, 2.6% for drowning, and 2.3% for homicide.

Rates of poisoning deaths involving pharmaceuticals fell sharply to 2001–02, then rose to 2016–17, particularly for men aged 25–64 and women aged 45–64.

Rates of fall-related injury deaths, poisoning deaths involving substances other than pharmaceuticals, thermal-related injury deaths, and suicide deaths did not show a significant trend, despite a large peak in thermal injury deaths in 2008–09.

Age-standardised injury death rates for Aboriginal and Torres Strait Islander people fluctuated but did not change significantly between 2001–02 and 2016–17. Rates fell for transport injury and rose for cases involving pharmaceuticals.

Rates for Indigenous Australians were generally at least twice as high as for non-Indigenous Australians over this period.

# 1 Introduction

This report presents trends in the number of injury-related deaths in Australia from 1 July 1999 to 30 June 2017, by year of death. It also provides a summary of injury deaths in 2016–17. Three reports presenting data in a similar way on hospitalised injury have been published (AIHW: Pointer 2013, 2015, 2018).

Most injuries, which includes suicide and poisonings, occur in circumstances such as car crashes, inter-personal violence, home maintenance, sporting and recreational activities, and work. Injury deaths that occurred in these types of community settings are the focus of this report.

## 1.1 Structure of this report

This report presents an overview of injury deaths in 2016–17, and trends in injury deaths and death rates, overall and for deaths involving major external causes of injury.

- **Chapter 2** presents an overview of injury deaths in Australia including time series information.
- **Chapters 3–11** present analyses for each major external cause of injury-related deaths.
- **Appendix A** provides summary information on: the Australian Bureau of Statistics (ABS) mortality data collection, which underlies the Australian Institute of Health and Welfare (AIHW) National Mortality Database; other data sources used in the report; and notes on the presentation of data, the population estimates used to calculate population rates, and analysis methods. Additional information on data sources, validity and methods, and the effects of changes made to the recording and classification of cause-of-death information have previously been reported for 1999–2010 (AIHW: Harrison & Henley 2015).
- **Appendix B** presents additional summary statistics for transport-related deaths involving motor vehicle traffic in 2016–17.
- **Appendix C** provides information on injury deaths counts reference year, and ABS release for the Cause of Death Unit Record File (CODURF).

## 1.2 Chapter structure

In this report, chapters are structured to address the following common set of questions:

- What data are reported?
- How many injury deaths were there in 2016–17?
- How have injury deaths changed over time?
- How have injury deaths varied by age and sex?
- How have injury deaths varied by place of usual residence?
- How have injury deaths of Aboriginal and Torres Strait Islander people changed over time?

## 1.3 Methods

### What data are reported?

The main source for the injury deaths data presented in this report is the series of ABS Cause of Death Unit Record Files (CODURF) for reference years 1999–2017.

CODURF data are provided to the AIHW by the state and territory registries of births, deaths and marriages and the National Coronial Information System (NCIS), and are coded by the ABS. The data are maintained by the AIHW in the National Mortality Database (NMD).

Underlying cause of death (UCoD) and multiple causes of death (MCoD) information for deaths presented in this report was coded by the ABS according to the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10).

Other data sources were used to obtain supplementary information for some external causes of injury death. These are specified where they are used.

### How are data presented?

Data are reported according to the year in which each death occurred. 'Years' are the 12-month periods ending on 30 June.

The ABS now releases 3 versions of CODURF—*Preliminary*, *Revised*, and *Final*—as part of its revision process to update coroner-certified deaths as new information becomes available on the cause of death. The cause codes assigned to injury deaths can change between releases. The revision process and its implications for the data used in this report are discussed further in Appendix A.

When analysis was done for this report, *Final* release data were available for none of the injury deaths that occurred in 2015–16 and 2016–17, and for only 42% of injury deaths that occurred in 2014–15. Values for these years could change a little due to later revisions of cause-of-death data by the ABS, and triangle markers have been used distinguish these values in trend graphs.

Data for more than 99% of the injury deaths that occurred in earlier years was either *Final*, or predated the introduction of the ABS revision process, and so these values are not expected to change.

In tables and charts, unless stated otherwise:

- the age is as at the date of death
- deaths for which table variables—such as age and sex—were not reported are included in totals
- rates are age-standardised.

Further information is provided in Appendix A.



## Which deaths were included?

Deaths were considered as being due to injury and poisoning, and were included in this report, if they met the following criteria:

- the death occurred between 1 July 1999 and 30 June 2017, and had been registered by 31 December 2017, and
- the UCoD was an external cause code in the range V01–Y36, or
- at least 1 MCoD was an external cause code in the range V01–Y36, and at least 1 other MCoD was a code for injury (S00–T75 or T79).

The codes are from the World Health Organization (WHO) ICD-10 (WHO 2016).

The code range V01–Y36 includes all unintentional (accidental) deaths, intentional self-harm (suicide), homicides, and deaths where intent remained undetermined. This code range also includes: traumatic injuries (such as fractures and lacerations); burns; poisoning and toxic effects of substances; and certain other effects of external causes, such as drowning, asphyxiation, effects of radiation, heat, pressure, deprivation, and maltreatment.

Details on the criteria for each topic are given at the start of each chapter.

Important terms about the data used in this report are summarised in Box 1.1, Box 1.2, and the Glossary.

### Box 1.1: Key terms and concepts

An **external cause** is the environmental event, circumstance, or condition that was the cause of injury or poisoning.

**Multiple causes of death (MCoD)** are defined as all causes listed on the death certificate. This includes the underlying cause of death and all associated causes of death. This information is useful for describing the role of all diseases involved in deaths, especially for chronic diseases, where more than 1 disease usually contributes to the death.

The **underlying cause of death (UCoD)** code represents the external cause of the injury that initiated the train of morbid events leading directly to a person's death, according to information available to the coder.

The diseases or conditions recorded on the death certificate consist of:

- the cause that led directly to the death (the UCoD)
- the causes that gave rise to the underlying cause of death
- the causes of death that contributed to the death, but were not related to the disease or condition causing it.

Coding is according to the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10), which includes a chapter for injury, and another for external causes of injuries and other conditions. Rules that form part of the ICD determine which cause should be coded as the UCoD.

### **Box 1.2: Aboriginal and Torres Strait Islander reporting**

Indigenous status data are considered to be of sufficient quality for statistical reporting for the period from 2001–02 onwards for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory.

These 5 jurisdictions represent close to 88% of the total Indigenous population.

Appendix A provides further information.

### **Box 1.3: Socioeconomic area**

Socioeconomic factors both influence and reflect health, and many recent AIHW reports on injury include measures the socioeconomic areas in which people live.

The information is usually based on the Socio-Economic Indexes for Areas (SEIFA) developed by the ABS. SEIFA indexes rank areas in Australia according to relative socioeconomic advantage and disadvantage, estimated using information collected each 5 years in the national Census of Population and Housing (ABS 2018).

Each of the 4 SEIFA indexes is based on a set of variables, such as the percentage of people who lived in low- or high-income households, who had particular educational attainment or employment status, and the percentage of dwellings with characteristics such as high rent or mortgage repayments, or spare rooms available.

Appendix A provides further information.

## **Supplementary tables**

The data underpinning the figures in the body of the report are provided in supplementary tables, which are accessible at <https://www.aihw.gov.au/reports/injury/trends-in-injury-deaths-australia-1999-00-to-2016/data>. Each tab within the spreadsheet contains the data for 1 figure, and the name of the tab corresponds to the figure number within the report. (For example, worksheet tab Table SF2.3 corresponds to Figure 2.3 in the report.)

The spreadsheet also contains some tables that correspond to data mentioned in the text of the report. These worksheet tabs are named 'Table S.1', 'Table S.2', and so on.

## 2 Overview of injury deaths

This chapter provides an overview of injury deaths in 2016–17, and trends to 2016–17. For trends analysis, counts for 2014–15 to 2016–17 are subject to revision, but there are relatively small differences between unrevised and revised counts for most major external cause groups for deaths registered in 2012 and after (see Appendix C).

### 2.1 What is the profile of injury deaths in 2016–17?

*Injury* was recorded as a cause of 13,144 deaths in 2016–17 in Australia, which is 8.2% of all deaths (Table 2.1). Rates for males were almost twice as high as for females.

**Table 2.1: Key indicators for injury deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	7,935	5,209	13,144
Crude rate (deaths per 100,000 population)	65.6	42.4	53.9
Age-standardised rate (deaths per 100,000 population)	64.0	32.4	47.8

Source: AIHW NMD.

#### Age and sex

The majority of deaths occurred at ages 65 and over—at 43% for males, and 68% for females. Fewer than 2% of injury deaths were at ages younger than 15 (Table 2.2).

**Table 2.2: Injury deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	65	0.8	38	0.7	103	0.8
5–14	68	0.9	28	0.5	96	0.7
15–24	641	8.1	187	3.6	828	6.3
25–44	1,993	25.1	629	12.1	2,622	19.9
45–64	1,745	22.0	760	14.6	2,505	19.1
65+	3,423	43.1	3,567	68.5	6,990	53.2
<b>Total</b>	<b>7,935</b>	<b>100.0</b>	<b>5,209</b>	<b>100.0</b>	<b>13,144</b>	<b>100.0</b>

Source: AIHW NMD.

#### State or territory of usual residence

Residents of the Northern Territory had the highest age-standardised injury mortality rate (81.7 deaths per 100,000 population), which was 1.7 times the national rate (Table 2.3).

Apart from New South Wales and Victoria, all jurisdictions recorded rates over the national rate. Residents of Victoria recorded the lowest rate, at 42.3 deaths per 100,000 population.

**Table 2.3: Injury deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	4,094	3,063	2,718	1,497	1,048	357	206	161
%	31.1	23.3	20.7	11.4	8.0	2.7	1.6	1.2
Age-standardised rate (deaths per 100,000 population)	45.1	42.3	52.1	56.0	49.1	57.7	50.4	81.7

Source: AIHW NMD.

## Remoteness of usual residence

Age-standardised rates of injury death rose with increasing remoteness (Table 2.4). The rate for residents of *Very remote* areas (87.0 deaths per 100,000 population) was just over twice as high as the rate for residents of *Major cities* (42.8 deaths per 100,000 population).

**Table 2.4: Injury deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	8,339	2,964	1,396	186	145
%	63.4	22.6	10.6	1.4	1.1
Age-standardised rate (deaths per 100,000 population)	42.8	57.6	60.8	65.8	87.0

(a) Excludes 113 deaths where remoteness was not available.

(b) Derived using the Australian Statistical Geography Standard (ASGS) classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate of injury death rose steadily with increasing socioeconomic disadvantage, although rates for people living in the 2 lowest socioeconomic areas were similar (Table 2.5).

The rate for people living in the 2 lowest socioeconomic areas (53.7 and 54.7 deaths per 100,000 population) was more than 1.4 times as high as the rate for people living in the highest socioeconomic areas (37.8 deaths per 100,000 population).

**Table 2.5: Injury deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	2,959	3,131	2,658	2,217	2,064
%	22.5	23.8	20.2	16.9	15.7
Age-standardised rate (deaths per 100,000 population)	53.7	54.7	49.2	42.1	37.8

Note: Excludes 115 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised injury death rate for Aboriginal and Torres Strait Islander people was 2.3 times the rate for non-Indigenous Australians (Table 2.6).

**Table 2.6: Key indicators for injury deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	332	155	487	5,376	3,484	8,860
Age-standardised rate (deaths per 100,000 population)	141.8	72.4	106.2	62.9	31.3	46.7
Rate ratio <sup>(a)</sup>	2.3	2.3	2.3	..	..	..
Rate difference <sup>(b)</sup>	78.9	41.1	59.5	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons, divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons, minus standardised rates for non-Indigenous males, females, and persons.

*Note:* Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

*Source:* AIHW NMD.

Proportions of injury deaths in each age group differed considerably between Indigenous and non-Indigenous Australians (Table 2.7).

For Aboriginal and Torres Strait Islander people aged 25–44, 43% and 37% of injury deaths occurred for men and women, respectively, compared with 24% and 12% for non-Indigenous Australian men and women.

Conversely, the proportions of injury deaths of Aboriginal and Torres Strait Islander men and women aged 65 and over were much lower than for non-Indigenous Australians.

**Table 2.7: Injury deaths, by Indigenous status, age, and sex, 2016–17**

	Indigenous		Non-Indigenous	
	Number	%	Number	%
<b>Males</b>				
0–4	10	3.0	37	0.7
5–14	6	1.8	50	0.9
15–24	70	21.1	418	7.8
25–44	141	45.2	1,281	23.8
45–64	73	22.0	1,220	22.7
65+	32	9.6	2,370	44.1
<b>Total</b>	<b>332</b>	<b>100.0</b>	<b>5,376</b>	<b>100.0</b>
<b>Females</b>				
0–4	5	3.2	27	0.8
5–14	30	1.9	20	0.6
15–24	29	18.7	114	3.3
25–44	57	36.8	408	11.7
45–64	32	20.6	504	14.5
65+	29	18.7	2,411	69.2
<b>Total</b>	<b>155</b>	<b>100.0</b>	<b>3,484</b>	<b>100.0</b>

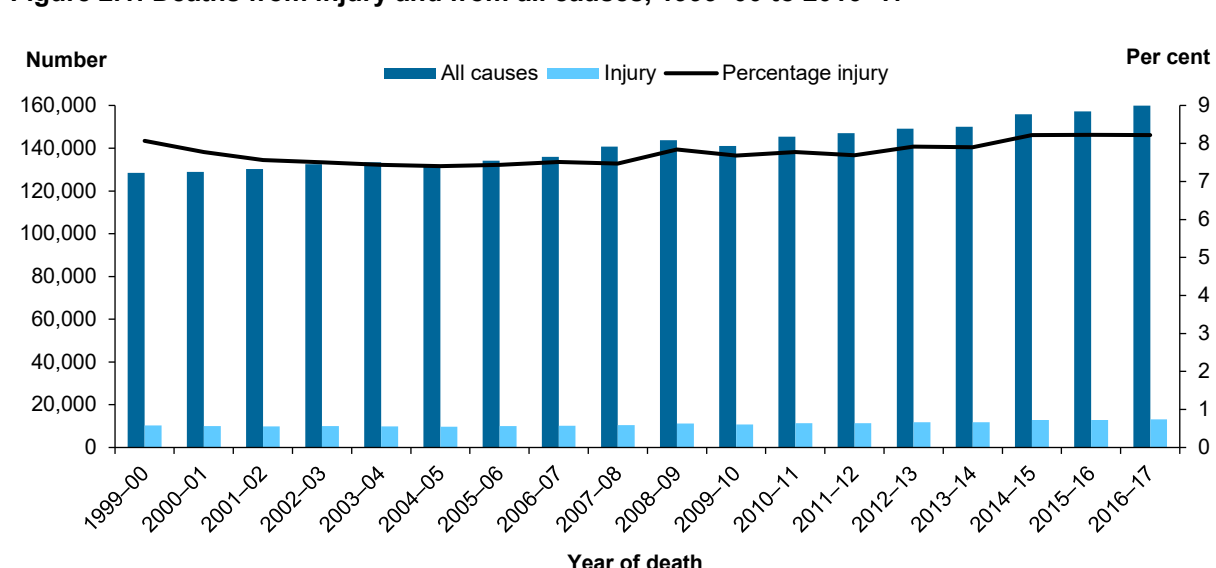
Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 2.2 How have injury deaths changed over time?

Between 1999–00 and 2016–17, injury deaths have comprised a fairly constant proportion of all deaths in Australia, ranging from 7.4% to 8.2% (Figure 2.1).

**Figure 2.1: Deaths from injury and from all causes, 1999–00 to 2016–17**



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table SF2.1.

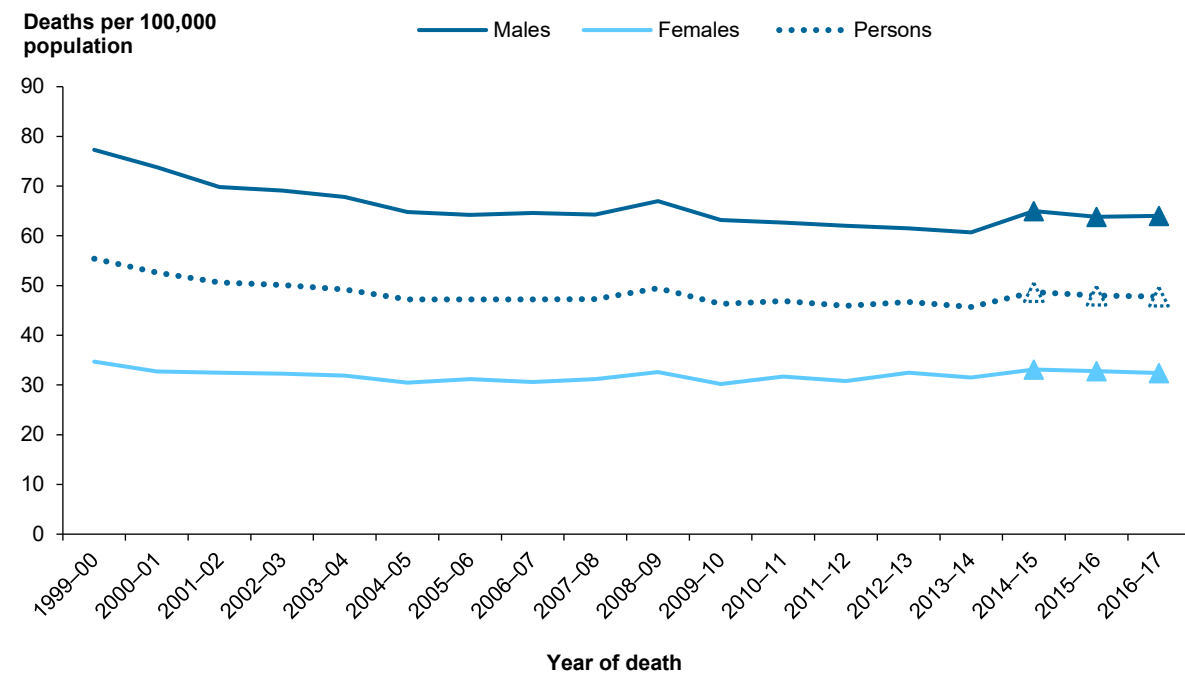
Source: AIHW NMD.

## Age and sex

Age-standardised rates of injury deaths fell from 55.4 to 47.2 per 100,000 population between 1999–00 and 2004–05, with little change in more recent years (Figure 2.2).

Rates for both males and females also declined from the start of the reported period until 2004–05, then remained relatively steady. Age-standardised rates for males were consistently more than double the rates for females.

**Figure 2.2: Age-standardised rates of injury deaths, by sex, 1999–00 to 2016–17**



### Notes

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF2.2.

Source: AIHW NMD.

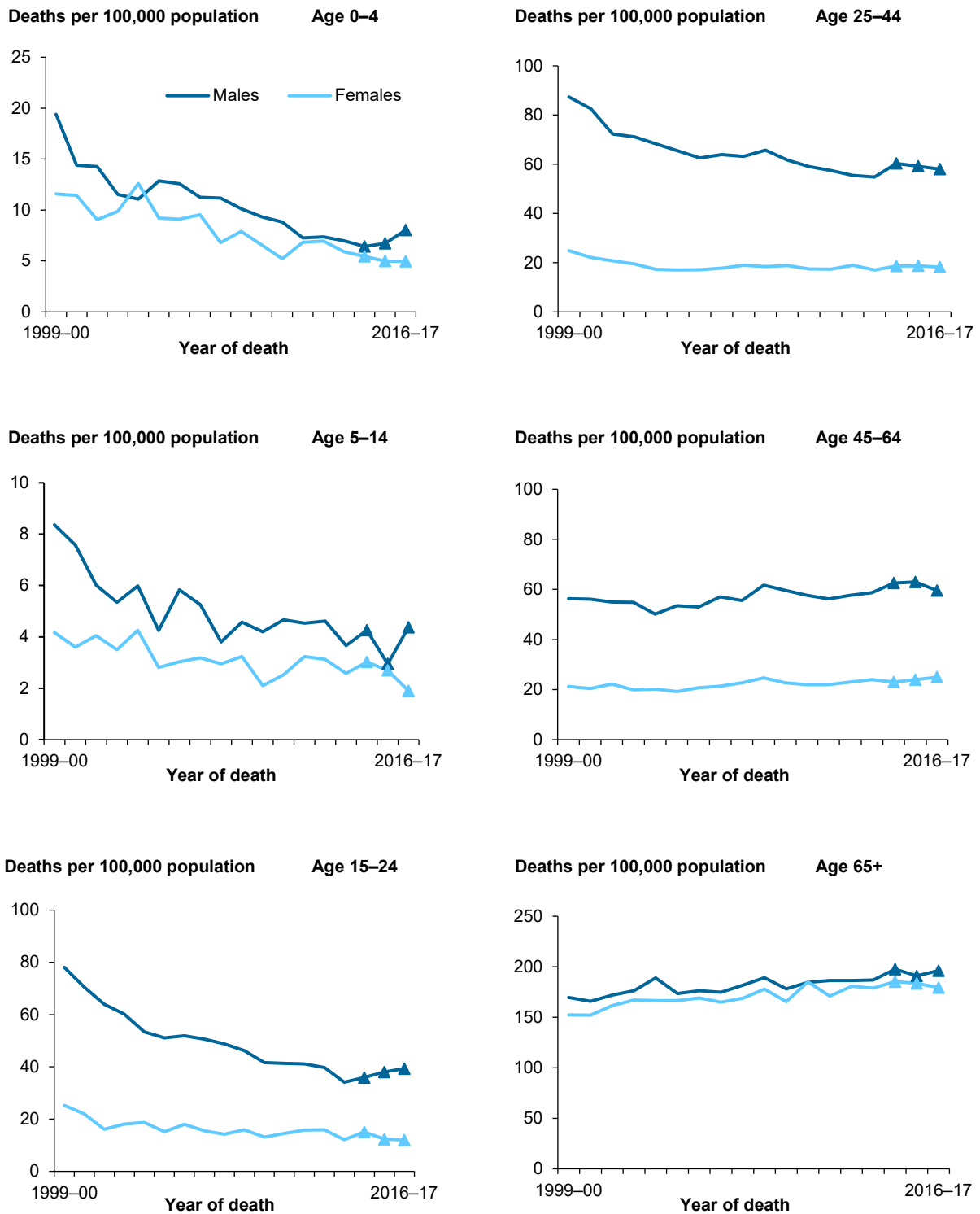
Figure 2.3 shows changes in injury death rates between 1999–00 and 2016–17 in each age group by sex. In nearly all instances, age-specific rates for males were higher than for females, though differences were relatively small for the youngest and oldest age groups.

A downward trend in rates was seen for both males and females in the 3 youngest age groups, and for males aged 25–44. But rates for males in these age groups were steady or increased late in the period.

Rates for both males and females in the 2 oldest age groups rose slowly over the period.

Overall, rates were much higher for those aged 65 and over than for other age groups, while children aged 5–14 had the lowest rate.

**Figure 2.3: Age-specific rates of injury deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF2.3.

Source: AIHW NMD.

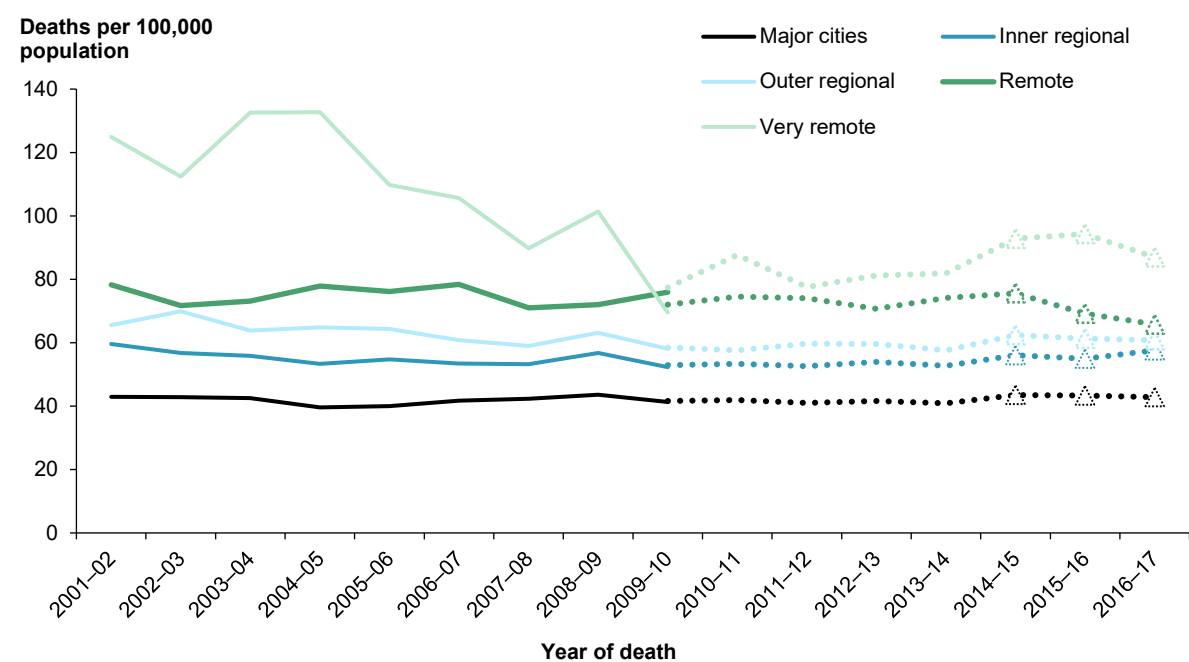


## Remoteness of usual residence

Rates of injury deaths rose with increasing remoteness of place of usual residence. Rates were higher for residents of *Very remote* areas than for residents of other remoteness areas between 2001–02 and 2016–17 (Figure 2.4).

There was a downward trend in rates for residents of *Very remote* areas between 2001–02 and 2009–10, after which rates began to rise again. Rates for the residents of the other remoteness areas remained relatively steady over time.

**Figure 2.4: Age-standardised rates of injury deaths, by remoteness of usual residence, 2001–02 to 2016–17**



**Notes**

1. Data for 1999–00 and 2000–01 were unavailable.
2. Full lines are based on the Australian Standard Geographical Classification (ASGC), while dotted lines are ASGS-based.
3. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
4. Data underpinning this figure are available in the supplementary table spreadsheet Table SF2.4.

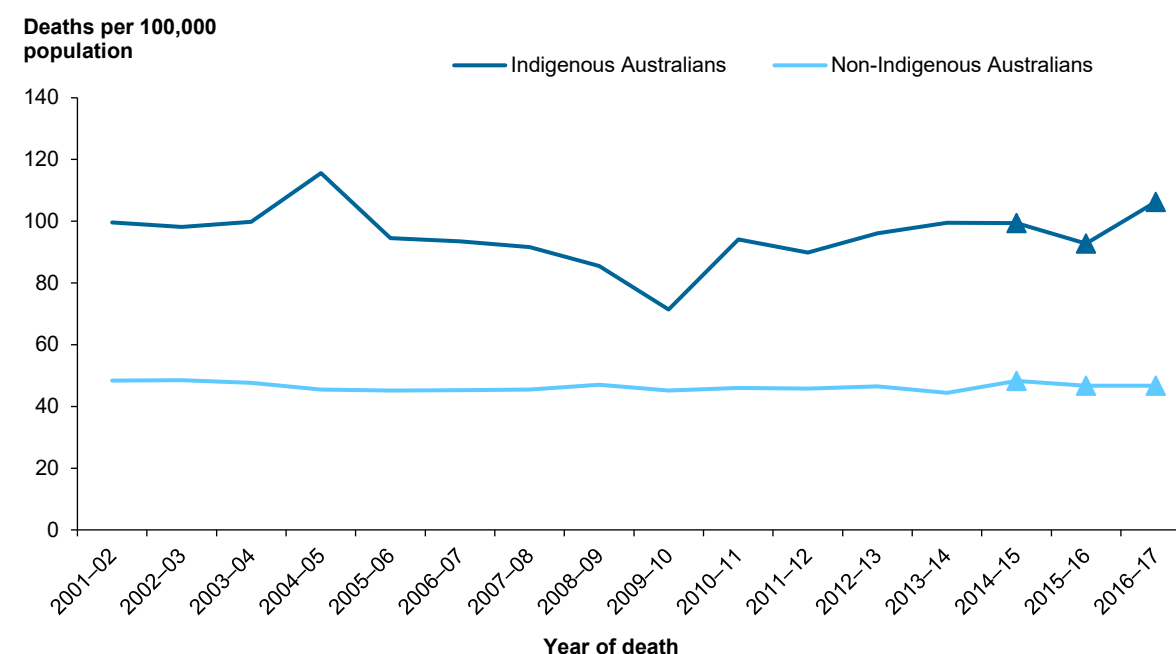
Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

Except for 2008–09 and 2009–10, age-standardised rates of injury deaths for Aboriginal and Torres Strait Islander people were consistently at least twice as high as rates for non-Indigenous Australians between 2001–02 and 2016–17 (Figure 2.5).

Despite some fluctuations, rates for both Indigenous and non-Indigenous Australians remained relatively steady over time.

**Figure 2.5: Age-standardised rates of injury deaths, by Indigenous status, 2001–02 to 2016–17**



### Notes

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF2.5.

Source: AIHW NMD.

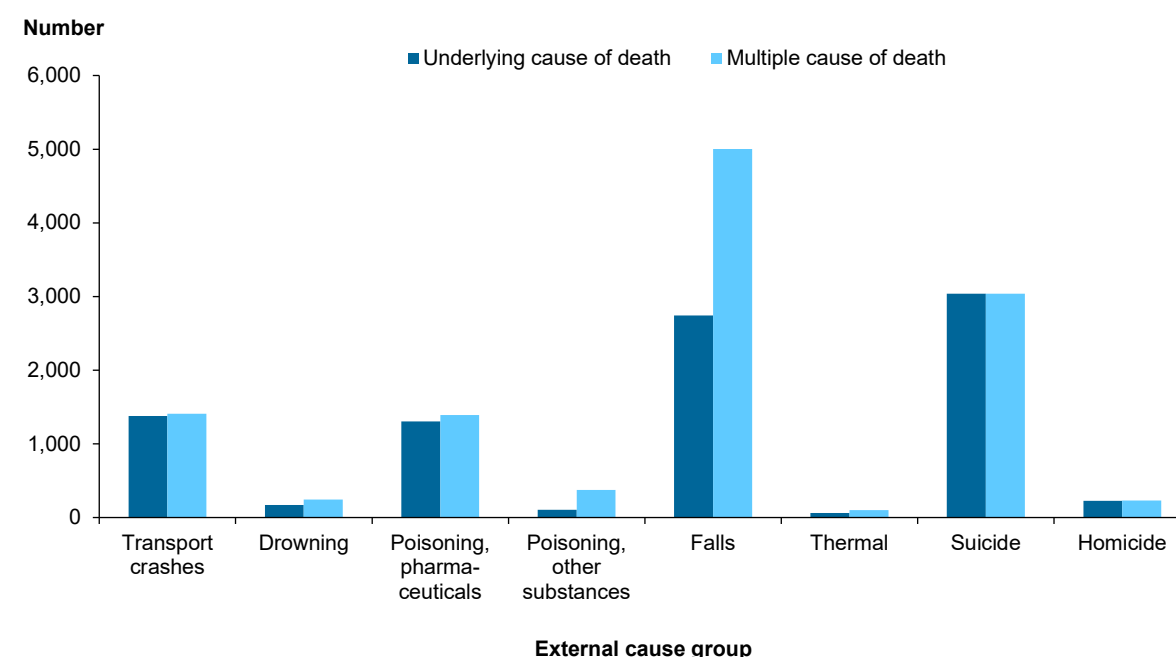
## 2.3 Effect of including multiple causes of death codes in case selection

Data in this report and in other recent reports in this series were analysed using MCoD codes, whereas data in earlier reports in this series were analysed using UCoD codes.

Figure 2.6 compares the number of injury deaths in 2016–17 that would have been included in this report using only UCoD codes with the number deaths included using MCoD codes.

Use of MCoD codes resulted in a large increase in counts for fall-related deaths and deaths involving poisoning by substances other than pharmaceuticals. There were less marked increases in counts for other external cause groups, and little difference in counts for suicides and homicides. Patterns were similar for the other years covered in this report.

**Figure 2.6: Comparison of deaths for underlying cause of death codes and multiple causes of death codes, by external cause group, 2016–17**



Source: AIHW NMD.

## 2.4 How have the causes of injury mortality varied over time?

### All injury deaths

Table 2.8 shows changes in the age-standardised rates of external causes of injury between 1999–00 and 2016–17. Although counts for 2014–15 to 2016–17 are subject to revision, there are relatively small differences between unrevised and revised counts for most major external cause groups for deaths registered in 2012 and after (see Appendix C). More information on trends in each of the causes of injury listed in the table is available in subsequent chapters of this report.

Rates of injury deaths declined from 1999–00 to 2016–17, by 3.7% per year for transport injury, 2.6% per year for drowning and 2.3% for homicide.

Rates of poisoning deaths involving pharmaceuticals fell sharply to 2001–02, then rose by 2.7% per year to 2016–17.

Rates of fall injury deaths, poisoning deaths involving other substances, and thermal injury deaths did not show a significant trend, despite a large peak in thermal injury deaths in 2008–09 as a result of the 2009 Victorian bushfires.

Rates of suicide deaths declined to 2004–05 and rose until 2014–15, but this rise was not statistically significant.

**Table 2.8: Trends in age-standardised rates of injury deaths, by cause of injury, 1999–00 to 2016–17**

External cause	Trend	Annual change (%) <sup>(a)</sup>	Percentage of all injury deaths 2016–17 <sup>(a)</sup>	Comments
<b>Unintentional injuries</b>				
Transport	↓	-3.7	10.7	
Drowning	↓	-2.6	1.8	
Poisoning, pharmaceuticals	~ <sup>(c)</sup>	2.7 <sup>(d)</sup>	10.6	Declined to 2001–02 then rose
Poisoning, other substances	~ <sup>(c)</sup>	..	2.8	
Falls	↔ <sup>(e)</sup>	..	38.1	
Smoke, fire, heat and hot substances	~ <sup>(c)</sup>	..	0.8	Large peak in 2008–09
<b>Intentional injuries</b>				
Intentional self-harm (suicide)	↔ <sup>(e)</sup>	..	23.1	Declined to 2004–05 then rose
Assault (homicide)	↓	-2.3	1.8	

(a) Average annual change for 1999–00 to 2016–17.

(b) Percentage does not add to 100%, as deaths due to *Other unintentional injury* are not included.

(c) Direction of trends varied during the study period.

(d) Average percentage change per year calculated for 2001–02 to 2016–17.

(e) Average percentage change per year did not differ significantly from 0 ( $p \leq 0.05$  or less).

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

Table 2.9 shows changes in age-standardised rates of injury for major external causes for Aboriginal and Torres Strait Islander people between 2001–02 and 2016–17.

Over this period, rates of injury deaths declined by 3.2% per year for transport injury, rose by 6.8% per year for poisoning deaths involving pharmaceuticals, and rose by 2.8% per year for suicides.

Rates for all other external causes either did not change significantly, or had annual case counts that were too small for any meaningful change to be calculated.

**Table 2.9: Trends in age-standardised rates of injury deaths for Indigenous Australians, by cause of injury, 2001–02 to 2016–17**

External cause	Trend	Annual change (%)	Percentage of Indigenous injury deaths 2016–17 <sup>(a)</sup>
<b>Unintentional injuries</b>			
Transport	↓	3.2%	16.6
Drowning <sup>(b)</sup>	n.p.	..	2.7
Poisoning, pharmaceuticals	↑	6.8%	15.6
Poisoning, other substances	↔ <sup>(c)</sup>	..	6.4
Falls	↔ <sup>(c)</sup>	..	8.6
Smoke, fire, heat, and hot substances <sup>(b)</sup>	n.p.	..	1.4
<b>Intentional injuries</b>			
Intentional self-harm (suicide)	↑	2.8%	36.3
Homicide	↔ <sup>(b)</sup>	..	7.0

(a) Percentage does not add to 100%, as deaths due to *Other unintentional injury* are not included.

(b) Annual cases counts were too small for meaningful change in rates over time to be calculated.

(c) Average percentage change per year did not differ significantly from 0 ( $p \leq 0.05$  or less).

Source: AIHW NMD.

## 3 Transport crashes

This chapter provides:

- a brief overview of unintentional (accidental) transport injury deaths in 2016–17
- a description of trends in unintentional transport injury deaths from 1999–00 to 2016–17.

Summary statistics for unintentional transport injury deaths in 2016–17 that involved motor vehicle traffic are provided in Appendix B.

### 3.1 What methods were used?

The criteria given in Section 1.3 were applied, and unintentional transport injury deaths were identified in the NMD by the following ICD-10 codes:

- the UCoD was *Transport accident* (V01–V99)
- the MCoD included codes for *Transport accident* (V01–V99) and for *Injury* (S00–T75 or T79).

Suicide and homicide (UCoD X60–Y09) and undetermined intent (UCoD Y10–Y34) deaths were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 3.1. Further information on methods is provided in Appendix A.

#### **Box 3.1: External causes of unintentional transport injury**

The *Transport accidents* (V01–V99) section of Chapter XX *External causes of morbidity and mortality* includes the following groups:

- *Pedestrian injured in transport accident* (V01–V09)
- *Pedal cyclist injured in transport accident* (V10–V19)
- *Motorcycle rider injured in transport accident* (V20–V29)
- *Occupant of three-wheeled motor vehicle injured in transport accident* (V30–V39)
- *Car occupant injured in transport accident* (V40–V49)
- *Occupant of pick-up truck or van injured in transport accident* (V50–V59)
- *Occupant of heavy transport vehicle injured in transport accident* (V60–V69)
- *Bus occupant injured in transport accident* (V70–V79)
- *Other land transport accidents* (V80–V89)
- *Water transport accidents* (V90–V94)
- *Air and space transport accidents* (V95–V97)
- *Other and unspecified transport accidents* (V98–V99).

## 3.2 Overview of transport injury deaths

Although most transport injury deaths are unintentional, some are found to be suicides or homicides. The NMD data on injury deaths in 2016–17 available for use in this report also include 14 deaths involving the crashing of a motor vehicle where intent remained undetermined. (The intent might be determined for some or all of these deaths in the *Final* release of the ABS data.) Suicide, homicide and undetermined intent deaths are not included in this chapter, unless specified.

Table 3.1 summarises all of the transport-related injury deaths in 2016–17 that can be identified by means of the ICD-coded *Injury* death data that are in-scope for this report. *Unintentional transport injury* deaths, the subject of this chapter, accounted for more than 95% of all transport injury deaths in 2016–17.

The remainder of this chapter is limited to unintentional transport injury.

**Table 3.1: All identifiable transport injury deaths, 2016–17**

Terminology in this report	Coverage in this report	ICD-10 codes	Number	%
Unintentional transport injury	Unintentional Transport injury (Chapter 3)	UCoD V01–V99; or MCoD V01–V99 and S00–T75, T79	1,409	95.3
Intentional self-harm by crashing of motor vehicle	Suicide (Chapter 10)	UCoD X82; or MCoD X82 and S00–T75, T79	42	2.8
Assault by crashing of motor vehicle	Homicide (Chapter 11)	UCoD Y03; or MCoD Y03 and S00–T75, T79	14	0.9
Crashing of motor vehicle, undetermined intent	Undetermined intent (Chapter 2)	UCoD Y32; or MCoD Y32 and S00–T75, T79	14	0.9
<b>Total transport-related deaths</b>			<b>1,479</b>	<b>100.0</b>

Source: AIHW NMD.

## 3.3 How many deaths in 2016–17 were due to unintentional transport injury?

Transport injuries accounted for 1,409 unintentional injury deaths, almost 11% of all injury deaths (Table 3.2). Unintentional transport injury deaths were 2.9 times as common for males as for females.

**Table 3.2: Key indicators for unintentional transport injury deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	1,052	357	1,409
Percentage of all injury deaths	13.3	6.9	10.7
Crude rate (deaths per 100,000 population)	8.7	2.9	5.8
Age-standardised rate (deaths per 100,000 population)	8.6	2.7	5.6

Source: AIHW NMD.

A very high proportion (95%, 1,336) of deaths due to unintentional transport injury involved land transport (Table 3.3). Of these, almost 88% (1,173) involved accidents on roads.

**Table 3.3: Unintentional transport injury deaths, by setting, 2016–17**

Indicator	Land transport				Total
	On-road deaths	Off-road deaths	Unspecified <sup>(a)</sup>	Other <sup>(b)</sup>	
Number	1,173	125	38	73	1,409
Percentage of all unintentional transport injury deaths	83.3	8.9	2.7	5.2	100.0
Age-standardised rate (deaths per 100,000 population)	4.7	0.5	0.1	0.3	5.6

(a) Land transport deaths unspecified as to whether they occurred in an on-road or off-road setting.

(b) Includes water, air, and space transport-related deaths.

More than 29% of all transport injury deaths occurred among people aged 25–44, and nearly 25% among people aged 45–64 (Table 3.4). The proportion of transport injury deaths within each age group was broadly similar for both males and females.

**Table 3.4: Unintentional transport injury deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	15	1.4	10	2.8	25	1.8
5–14	21	2.0	9	2.5	30	2.1
15–24	207	19.7	51	14.3	258	18.3
25–44	332	31.6	82	23.0	414	29.4
45–64	252	24.0	94	26.3	346	24.6
65+	225	21.4	111	31.1	336	23.8
<b>Total</b>	<b>1,052</b>	<b>100.0</b>	<b>357</b>	<b>100.0</b>	<b>1,409</b>	<b>100.0</b>

Source: AIHW NMD.

## State or territory of usual residence

The age-standardised rate for transport-related injury deaths for residents of the Northern Territory (16.1 deaths per 100,000 population) was almost 3 times the national rate (5.6 deaths per 100,000) (Table 3.5). Queensland, Western Australia, South Australia, and Tasmania all recorded rates that were higher than the national rate, while the Australian Capital Territory recorded the lowest rate (2.5 deaths per 100,000).

**Table 3.5: Unintentional transport injury deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	375	299	315	213	115	39	11	42
%	26.6	21.2	22.4	15.1	8.2	2.8	0.8	3.0
Age-standardised rate (deaths per 100,000 population)	4.6	4.5	6.4	8.4	6.2	7.5	2.5	16.1

Source: AIHW NMD.



## Remoteness of usual residence

The rate of transport-related injury deaths rose markedly with increasing remoteness of usual place of residence—in *Very remote* areas, it was 5 times as high as in *Major cities* (Table 3.6).

**Table 3.6: Unintentional transport injury deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	652	412	235	36	37
%	47.5	30.0	17.1	2.6	2.7
Age-standardised rate (deaths per 100,000 population)	3.6	9.3	11.5	12.0	17.9

(a) Excludes 37 deaths where remoteness was not available.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate of injury death rose with increasing disadvantage (Table 3.7). The highest rates were among residents of the 2 lowest socioeconomic areas. The rate for people living in the second lowest socioeconomic areas (7.6 deaths per 100,000 population) was 2.5 times as high as the rate for people living in the highest socioeconomic area (3.1 deaths per 100,000 population).

**Table 3.7: Unintentional transport injury deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	347	380	288	196	161
%	24.6	27.0	20.4	13.9	11.4
Age-standardised rate (deaths per 100,000 population)	7.0	7.6	5.8	3.9	3.1

Note: Excludes 37 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised unintentional transport injury death rate for Aboriginal and Torres Strait Islander people was 2.3 times the rate for non-Indigenous Australians (Table 3.8).

**Table 3.8: Key indicators for unintentional transport injury deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	59	22	81	714	242	956
Age-standardised rate (deaths per 100,000 population)	19.9	6.4	13.0	8.6	2.7	5.6
Rate ratio <sup>(a)</sup>	2.3	2.4	2.3	..	..	..
Rate difference <sup>(b)</sup>	11.3	3.7	7.4	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

Due to small case numbers for Aboriginal and Torres Strait Islander people, comparisons with non-Indigenous Australians for unintentional transport injury deaths in each age group was difficult (Table 3.9). But the proportions of injury deaths of Indigenous men and women aged 65 and over were much lower than for non-Indigenous men and in that age group.

**Table 3.9: Unintentional transport injury deaths, by Indigenous status, age, and sex, 2016–17**

	Indigenous		Non-Indigenous	
	Number	%	Number	%
<b>Males</b>				
0–4	3	5.1	8	1.1
5–14	3	5.1	14	2.0
15–24	17	28.8	146	20.4
25–44	21	35.6	219	30.7
45–64	13	22.0	178	24.9
65+	2	3.4	149	20.9
<b>Total</b>	<b>59</b>	<b>100.0</b>	<b>714</b>	<b>100.0</b>
<b>Females</b>				
0–4	4	18.2	4	1.7
5–14	0	0.0	8	3.3
15–24	5	22.7	39	16.1
25–44	9	40.9	57	23.6
45–64	4	18.2	59	24.4
65+	0	0.0	75	31.0
<b>Total</b>	<b>22</b>	<b>100.0</b>	<b>242</b>	<b>100.0</b>

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

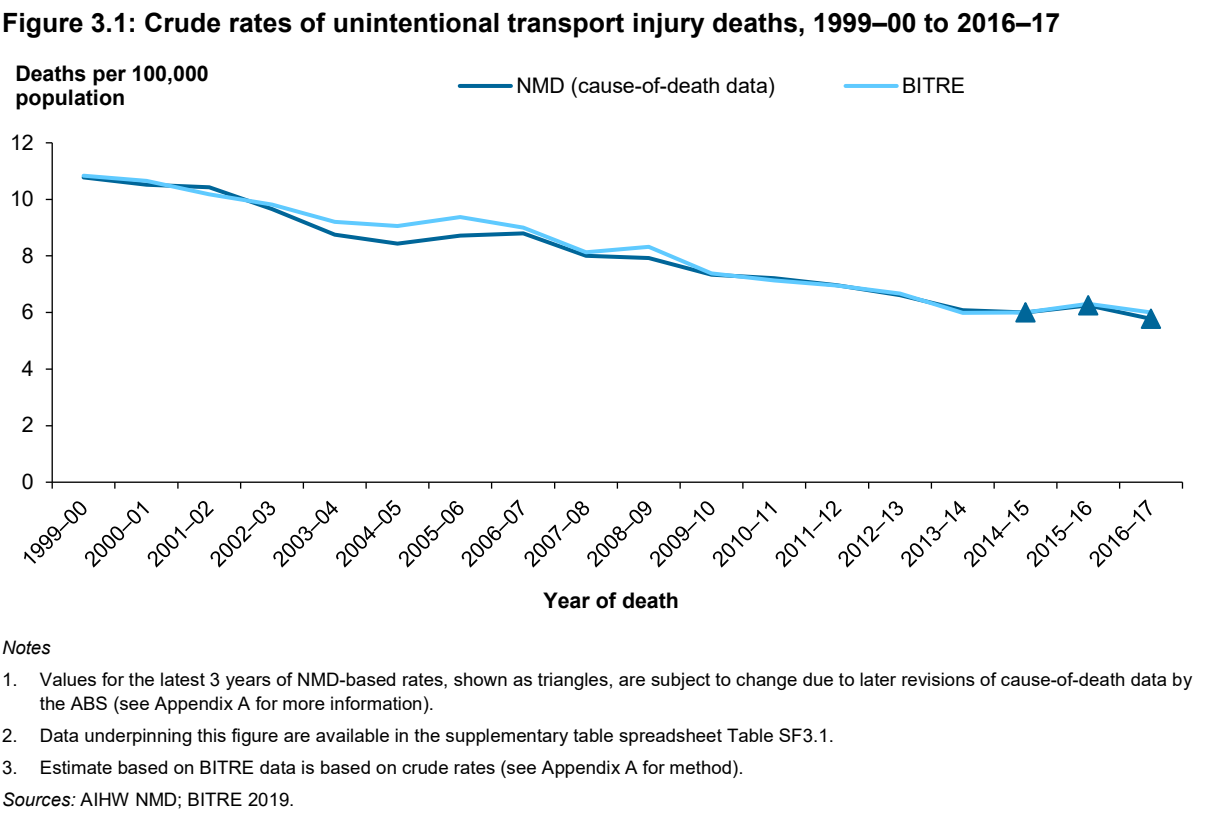
Source: AIHW NMD.

### 3.4 How have unintentional transport injury deaths changed over time?

Crude rates of deaths from transport crashes decreased from 10.8 deaths per 100,000 population in 1999–00 to 5.8 in 2016–17, an average decrease of 3.7% per year (Figure 3.1). This decrease and the pattern of variation with time should be treated with caution, due to issues related to data processing during this period (see Appendix A).

Supplementary estimates, based on road death data from the Bureau of Infrastructure, Transport and Regional Economics (BITRE 2019), also show an average decrease of 3.7% per year during this period, with less fluctuation in the mid-2000s.

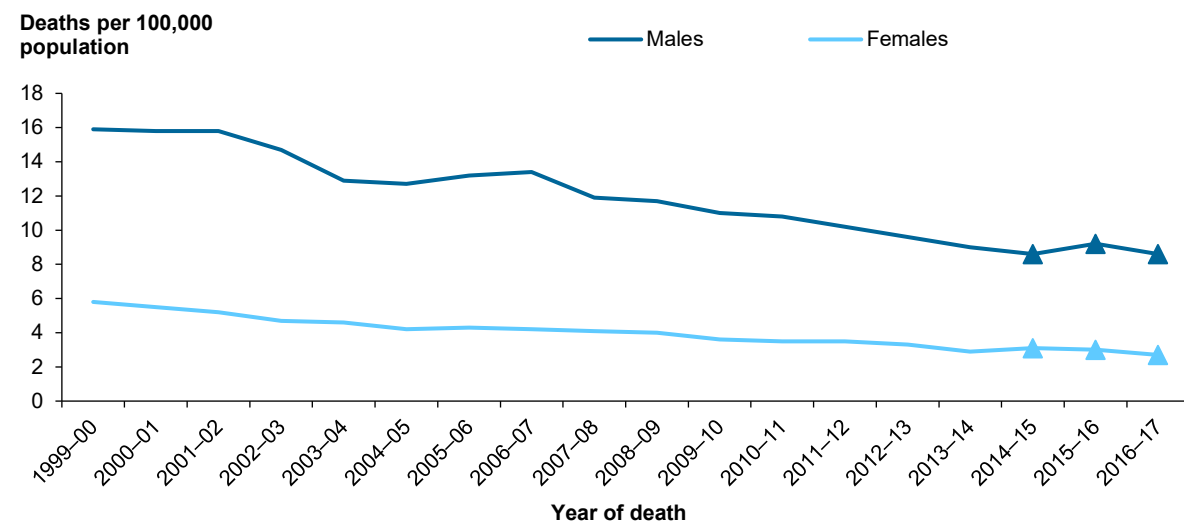
Crude rates were calculated for NMD data to allow better comparability with the BITRE estimates, and because there was little difference between crude and adjusted rates for the NMD data.



## Age and sex

Between 1999–00 and 2016–17, age-standardised rates of transport-related injury deaths declined for both males and females (Figure 3.2). For males, rates fell by an average of 3.7% per year, while for females, rates fell by an average of 3.9% per year. Rates were consistently about 3 times as high for males as for females.

**Figure 3.2: Age-standardised rates of unintentional transport injury deaths, by sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF3.2.

Source: AIHW NMD.

Figure 3.3 shows changes in rates of transport-related injury deaths between 1999–00 and 2016–17 in each age group by sex.

Age-specific rates for males were higher than for females across all age groups for all years, except for children aged 0–4, where rates were generally similar for both genders. The differences in rates between males and females was most marked in those aged 25–44, with rates for males being consistently more than 4 times as high as for females. Rates for all age groups declined over time (with fluctuations), for both males and females. The smallest decline occurred for those aged 45–64.

**Figure 3.3: Age-specific rates of unintentional transport injury deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF3.3.

Source: AIHW NMD.

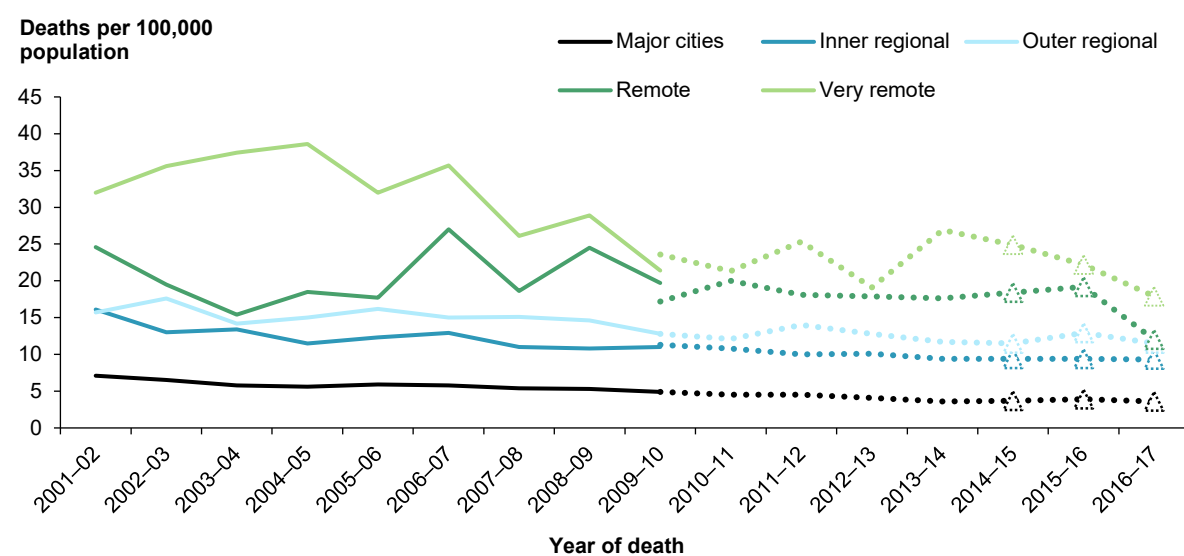
## Remoteness of usual residence

Rates of transport injury deaths were consistently higher over time for residents of *Very remote* areas, compared with residents of all other remoteness areas (Figure 3.4). Rates for residents of *Very remote* areas were consistently 5–7 times as high as rates for residents of *Major cities*. Rates for all 5 remoteness areas declined between 2000–01 and 2016–17.

The fluctuation in rates of injury deaths in *Very remote* and *Remote* areas partly reflects the small population and number of incidents occurring each year.

In 2009–10, the only year for which both ASGC-based and ASGS-based rates are shown, the ASGC-based rates were higher than the ASGS-based rates in *Remote* areas, while for *Very remote* areas, the ASGS-based rates were higher (see Appendix A for more information of the ASGC and ASGS classification systems).

**Figure 3.4: Age-standardised rates of unintentional transport injury deaths, by remoteness of usual residence, 2001–02 to 2016–17**



### Notes

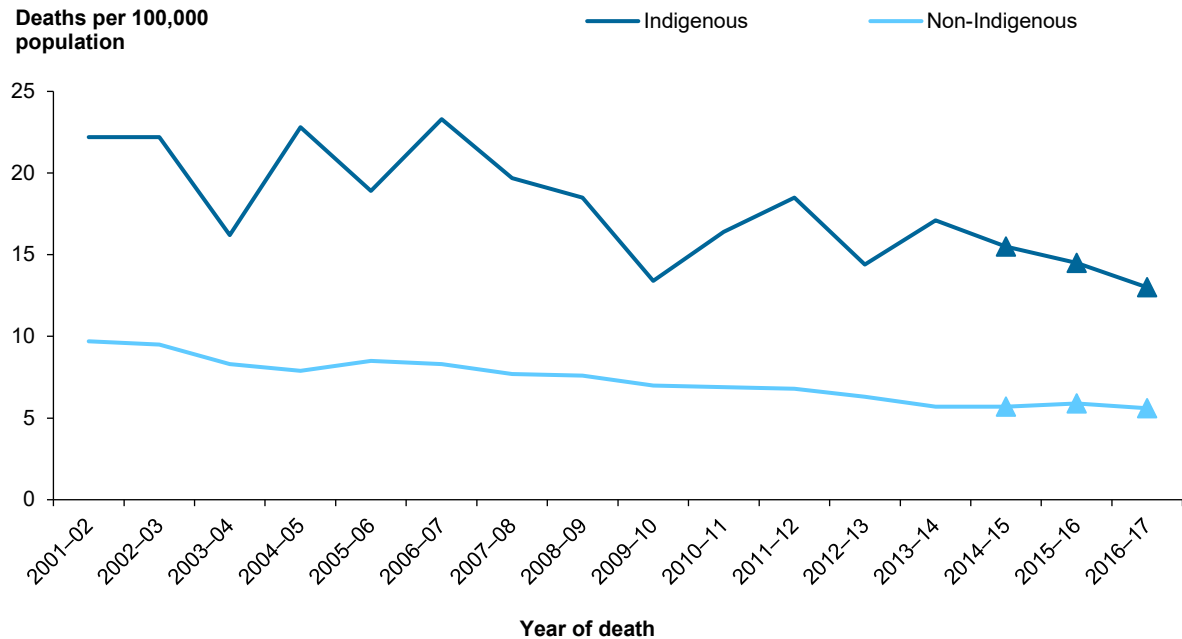
1. Data for 1999–00 and 2000–01 were unavailable.
2. Full lines are ASGC-based, while dotted lines are ASGS-based.
3. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
4. Data underpinning this figure are available in the supplementary table spreadsheet Table SF3.4.

Source: AIHW NMD.

# Aboriginal and Torres Strait Islander people

Age-standardised rates of transport-related injury deaths decreased over time for both Aboriginal and Torres Strait Islander people and for non-Indigenous Australians (Figure 3.5). Between 1999–00 and 2016–17, rates fell by an average of 3.2% per year for Aboriginal and Torres Strait Islander people, and by an average of 3.5% per year for non-Indigenous Australians. Rates were consistently about 2–3 times as high for Indigenous Australians as for non-Indigenous Australians.

**Figure 3.5: Age-standardised rates of unintentional transport injury deaths, by Indigenous status, 2001–02 to 2016–17**



**Notes**

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF3.5.

Source: AIHW NMD.

## 4 Drowning

This chapter provides:

- a summary of all drowning deaths in 2016–17 that are identifiable in the deaths data
- a summary of unintentional drowning deaths in 2016–17
- a description of trends in unintentional drowning deaths from 1999–00 to 2016–17.

### 4.1 What methods were used?

The criteria given in Section 1.3 were applied, and records that included the following ICD-10 codes were included in this chapter:

- the UCoD was *Accidental drowning and submersion* (W65–W74)
- the MCoDs included codes for *Accidental drowning and submersion* (W65–W74) and for *Injury* (S00–T75 or T79)
- the MCoDs included codes for *Drowning and non-fatal submersion* (T75.1) and for an *Unintentional external cause of injury* (V01–X59).

Suicide and homicide deaths (UCoD X60–Y09) were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 4.1. Further information on methods is provided in Appendix A.

#### **Box 4.1: External causes of drowning and submersion injury**

The *Accidental drowning and submersion* (W65–W74) section of Chapter XX *External causes of morbidity and mortality* of ICD-10 contains the following groups:

- *Drowning and submersion while in bath-tub* (W65)
- *Drowning and submersion following fall into bath-tub* (W66)
- *Drowning and submersion while in swimming-pool* (W67)
- *Drowning and submersion following fall into swimming-pool* (W68)
- *Drowning and submersion while in natural water* (W69)
- *Drowning and submersion following fall into natural water* (W70)
- *Other specified drowning and submersion* (W73)
- *Unspecified drowning and submersion* (W74).



## 4.2 Overview of drowning deaths

Drowning occurs in many circumstances, and deaths are assigned codes from several parts of the ICD.

Table 4.1 summarises all of the drowning deaths in 2016–17 that can be identified by means of the ICD-coded cause-of-death data.

Unintentional drowning deaths, the subject of this chapter, accounted for almost three-quarters (71%) of all drowning deaths in 2016–17 (Table 4.1). Analyses of deaths reported as due to *Intentional self-harm by drowning and submersion*, *Assault by drowning and submersion*, and *Drowning and submersion, undetermined intent* are not included in this chapter.

**Table 4.1: All identifiable drowning deaths, 2016–17**

Terminology in this report	Coverage in this report	ICD-10 codes	Number	%
Unintentional drowning <sup>(a)</sup>	Drowning (Chapter 4)	UCoD W65–W74; or MCoD S00–T75, T79 and W65–W74; or MCoD T75.1 and V01–X59	243	70.6
Intentional self-harm by drowning and submersion	Suicide (Chapter 10)	MCoD X60–X84 and MCoD T75.1	77	22.4
Assault by drowning and submersion	Homicide (Chapter 11)	MCoD X85–Y09 and MCoD T75.1	2	0.6
Drowning and submersion, undetermined intent	Undetermined intent (Chapter 2)	MCoD Y10–Y34 and MCoD T75.1	20	5.8
<b>Total drowning deaths</b>			<b>344</b>	<b>100.0</b>

(a) Includes deaths that meet the inclusion criteria for Chapter 3 *Transport crashes* in which drowning occurred.

Source: AIHW NMD.

## 4.3 How many deaths in 2016–17 were due to unintentional drowning?

There were 243 unintentional drowning deaths, 1.8% of all injury deaths for this period (Table 4.2). About 2.7 times as many males as females drowned in 2016–17.

**Table 4.2: Key indicators for unintentional drowning deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	178	65	243
Percentage of all injury deaths	2.2	1.2	1.8
Crude rate (deaths per 100,000 population)	1.5	0.5	1.0
Age-standardised rate (deaths per 100,000 population)	1.4	0.5	1.0

Source: AIHW NMD.

Drowning tends to occur at younger ages than injury from most other causes—52% of drowning deaths occurred among people aged under 45 (compared with 28% of all injury deaths), and 11% occurred among children aged 0–4 (compared with 0.8% of all injury deaths) (Table 4.3).

**Table 4.3: Unintentional drowning deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	15	8.4	12	18.5	27	11.1
5–14	9	5.1	3	4.6	12	4.9
15–24	22	12.4	5	7.7	27	11.1
25–44	48	27.0	13	20.0	61	25.1
45–64	38	21.3	13	20.0	51	21.0
65+	46	25.8	19	29.2	65	26.7
<b>Total</b>	<b>178</b>	<b>100.0</b>	<b>65</b>	<b>100.0</b>	<b>243</b>	<b>100.0</b>

Source: AIHW NMD.

## State or territory of usual residence

For all jurisdictions, except for Victoria and South Australia, age-standardised rates for drowning deaths were close to or over the national rate of 1.0 deaths per 100,000 population (Table 4.4).

The Northern Territory recorded the highest rate (2.3 deaths per 100,000 population), while South Australia recorded the lowest rate (0.4 deaths per 100,000 population). These results must be treated with some caution, because relatively small numbers in the Northern Territory and the other less-populated jurisdictions can cause rates to fluctuate markedly from year to year.

**Table 4.4: Unintentional drowning deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	81	40	53	40	8	10	5	6
%	33.3	16.5	21.8	16.5	3.3	4.1	2.1	2.5
Age-standardised rate (deaths per 100,000 population)	1.0	0.6	1.1	1.5	0.4	1.9	1.1	2.3

Source: AIHW NMD.

## Remoteness of usual residence

The age-standardised rate of drowning deaths rose with increasing remoteness of usual place of residence—in *Very Remote* areas it was almost 8.6 times as high as in *Major cities* (Table 4.5). These results should be treated with some caution, due to the small numbers in *Remote* and *Very remote* areas, which can cause rates to fluctuate markedly from year to year in these areas.

**Table 4.5: Unintentional drowning deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	130	56	29	5	11
%	56.2	24.1	12.4	2.3	4.9
Age-standardised rate (deaths per 100,000 population)	0.7	1.3	1.3	2.0	6.0

(a) Excludes 12 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate of unintentional drowning deaths rose with increasing disadvantage. The rate for people living in the lowest socioeconomic areas (1.2 deaths per 100,000 population) was twice as high as the rate for people living in the second highest socioeconomic areas (0.6 deaths per 100,000 population).

**Table 4.6: Unintentional drowning deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	62	53	46	32	38
%	25.5	21.8	18.9	13.2	15.6
Age-standardised rate (deaths per 100,000 population)	1.2	1.1	0.9	0.6	0.8

Note: Excludes 12 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised unintentional drowning death rate for Aboriginal and Torres Strait Islander people was 2.2 times the rate for non-Indigenous Australians (Table 4.7). Separate counts and rates for Indigenous males and females have not been published, due to small numbers.

**Table 4.7: Key indicators for unintentional drowning deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	..	..	13	124	48	172
Age-standardised rate (deaths per 100,000 population)	..	..	2.2	1.5	0.5	1.0
Rate ratio <sup>(a)</sup>	..	..	2.2	..	..	..
Rate difference <sup>(b)</sup>	..	..	1.2	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 4.4 In what circumstances did people drown?

### Drowning in natural bodies of water

A total of 106 (44%) drowning deaths were the result of drowning in a natural body of water, such as a lake, river, or the open sea. Of these deaths, 89 (84%) involved males.

Of those deaths 76 (72%) occurred when the person was already in the water, while 30 (28%) occurred after the person fell into a body of natural water.

### Drowning in bathtub

A total of 20 (8%) drowning deaths occurred in a bathtub. In nearly all instances, the person drowned while already in a bathtub, rather than from a fall into a bathtub.

### Transport-related drowning

A total of 40 (16%) unintentional drowning deaths were related to transport, so are included in Chapter 3. Of these deaths, 33 (83%) were males.

In 17 (43%) of these deaths, drowning was caused by an accident to a watercraft (for example, an overturning or sinking boat, falling or jumping from a burning ship, and so forth).

In another 16 (40%) of deaths, the drowning was related to water transport, but did not result from an accident to watercraft (for example, fall from ship, fall overboard, and so forth).

### Drowning in swimming pools

A total of 38 (16%) unintentional drowning deaths occurred in a swimming pool. Of these, 11 (29%) involved children aged under 5, while just over half (53%) were males.

In 18 (47%) of these deaths, the person was already in the swimming pool, while 20 (53%) drowned after falling into the pool.

Drowning in swimming pools has been a major cause of death for young children in Australia for several decades, and the subject of specific preventative efforts. Age-standardised rates of swimming-pool drowning for boys and girls aged 0–4 fluctuated over the period, due to small case numbers, and have remained under 1.5 deaths per 100,000 population for both sexes since 2004–05 (Figure 4.1).

In 2016–17, the rate of death by drowning in a swimming pool for children aged 0–4 was 0.7 deaths per 100,000 population.

**Figure 4.1: Age-specific rates of unintentional drowning deaths in swimming pools, children aged 0–4, by sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF4.1.

Source: AIHW NMD.

## 4.5 How have unintentional drowning deaths changed over time?

Crude rates of drowning deaths decreased from 1.7 deaths per 100,000 population in 1999–00 to 1.1 in 2007–08, an average decline of 5.3% per year (Figure 4.2).

Rates rose between 2007–08 and 2009–10, before dropping back to 1.0 by 2016–17. Over the entire period from 1999–00 to 2016–17, there was an average decline in rates of 2.6% per year. But rates for 2014–15 to 2016–17 are subject to review and revision.

Estimates based on NMD data are supplemented in this section by rates based on 2 other sources of data.

Data based on annual drowning reports published by the Royal Life Saving Society (RLSS), and available at the [RLSS Website](#), show an average fall of 4.7% per year between 2002–03 and 2007–08, and a fall of 2.4% per year between 2002–03 and 2016–17.

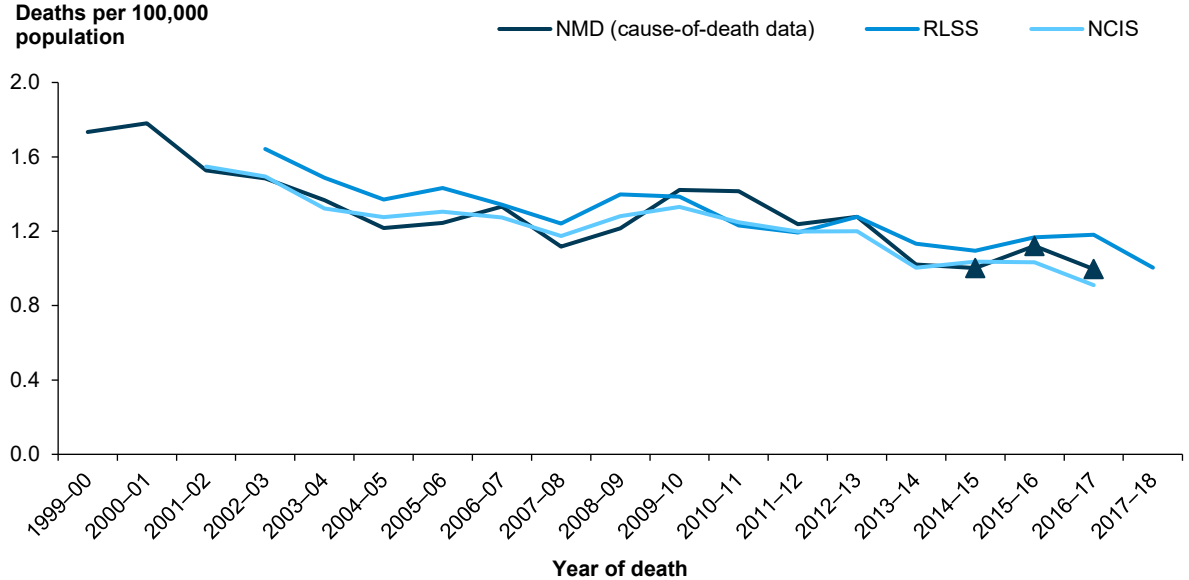
Estimates based on NCIS data, as at March 2019, show an average annual fall of 4.1% per year between 2001–02 (the first full year for which national NCIS data were available) and 2007–08, and a fall of 2.6% per year between 2001–02 and 2016–17.

Differences in case definitions and methods between sources, particularly between the NMD and the RLSS, are such that identical rates are not be expected.

Further information on the method used to produce the supplementary estimates is provided in Appendix A.

Crude rates were calculated for NMD data to allow better comparability with the RLSS and NCIS-based estimates, and because there was little difference between crude and adjusted rates for the NMD data.

**Figure 4.2: Crude rates of unintentional drowning deaths, 1999–00 to 2016–17**



*Notes*

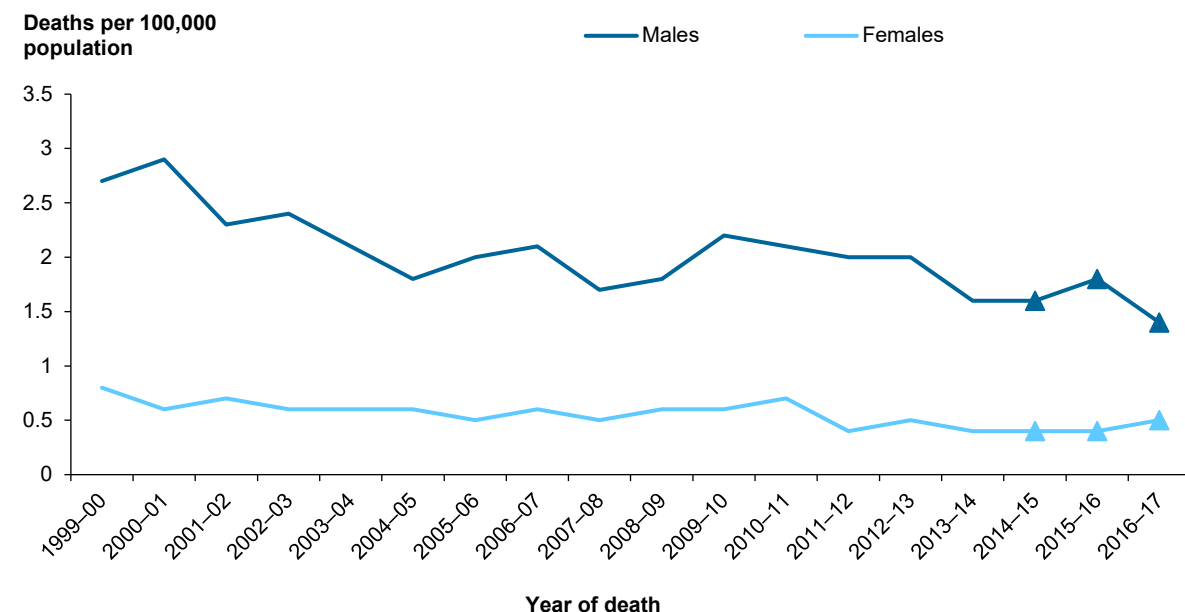
1. Values for the latest 3 years of NMD-based rates, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF4.2.

Sources: AIHW NMD; RLSS; NCIS.

## Age and sex

Between 1999–00 and 2016–17, age-standardised rates of drowning deaths for males declined by an average of 2.5% per year, while rates for females declined by an average of 2.6% per year (Figure 4.3). Rates were consistently 3–5 times as high for males as for females.

**Figure 4.3: Age-standardised rates of unintentional drowning deaths, by sex, 1999–00 to 2016–17**



### Notes

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF4.3.

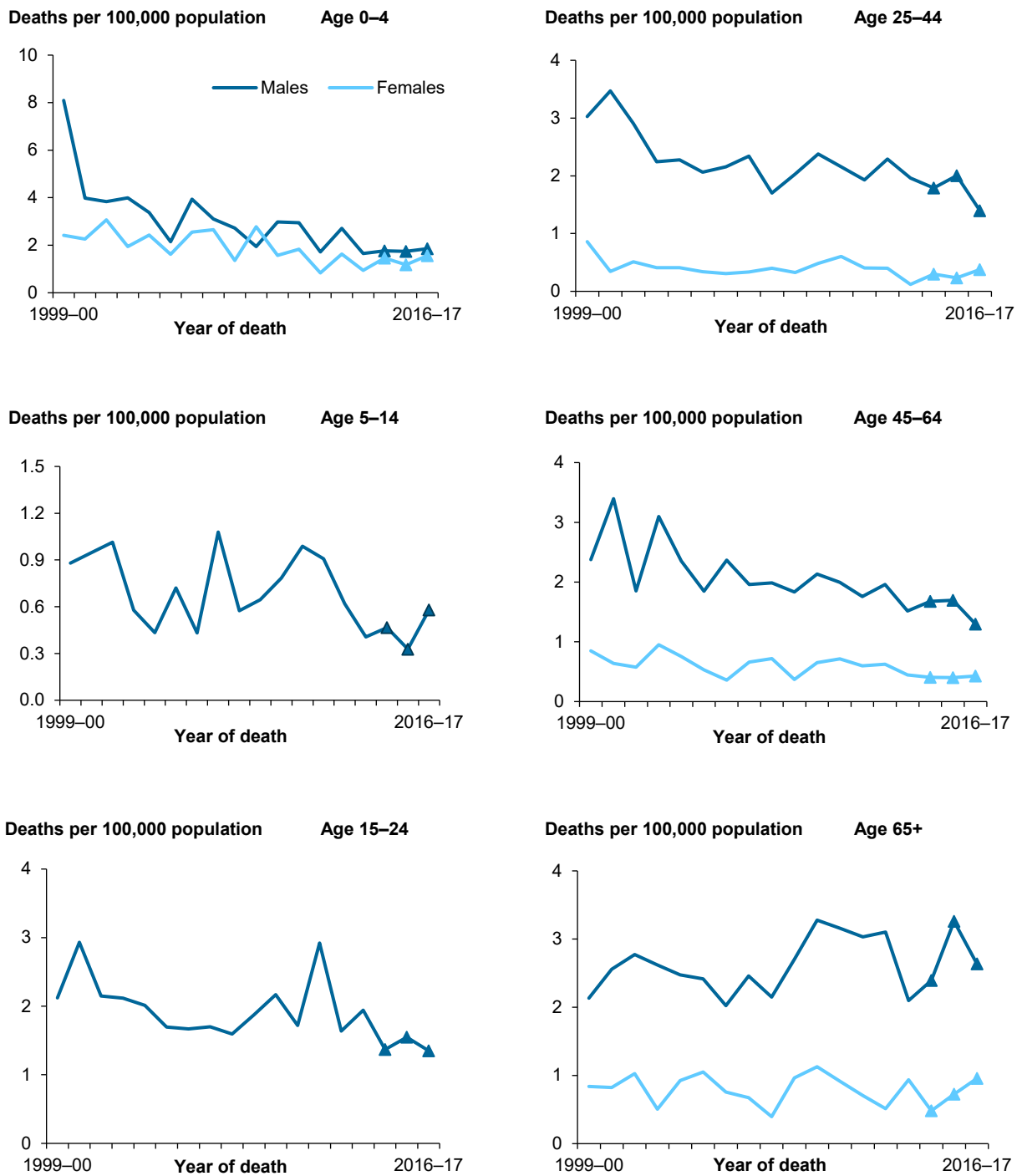
Source: AIHW NMD.

Figure 4.4 shows changes in drowning death rates between 1999–00 and 2016–17, in each age group by sex.

Rates for males were higher than for female across all age groups for all years, except in 2008–09 for young children aged 0–4, where case numbers are low. The differences in rates between males and females was most marked for those aged 25–44, where male rates were consistently more than 4 times as high as female rates.

Apart from men aged 65 and over, there was a general downward trend in rates for all age groups for males over the period. Rates for boys aged 5–14 fluctuated markedly over time, due to relatively small numbers. Rates for females fell over the period for those aged 0–4, 25–44, and 45–64. Rates for females aged 5–14 and 15–24 were not shown due to low case numbers.

**Figure 4.4: Age-specific rates of unintentional drowning deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF4.4.
3. Rates for females aged 5–14 and 15–24 are not shown, due to small numbers.

Source: AIHW NMD.



## Remoteness of usual residence

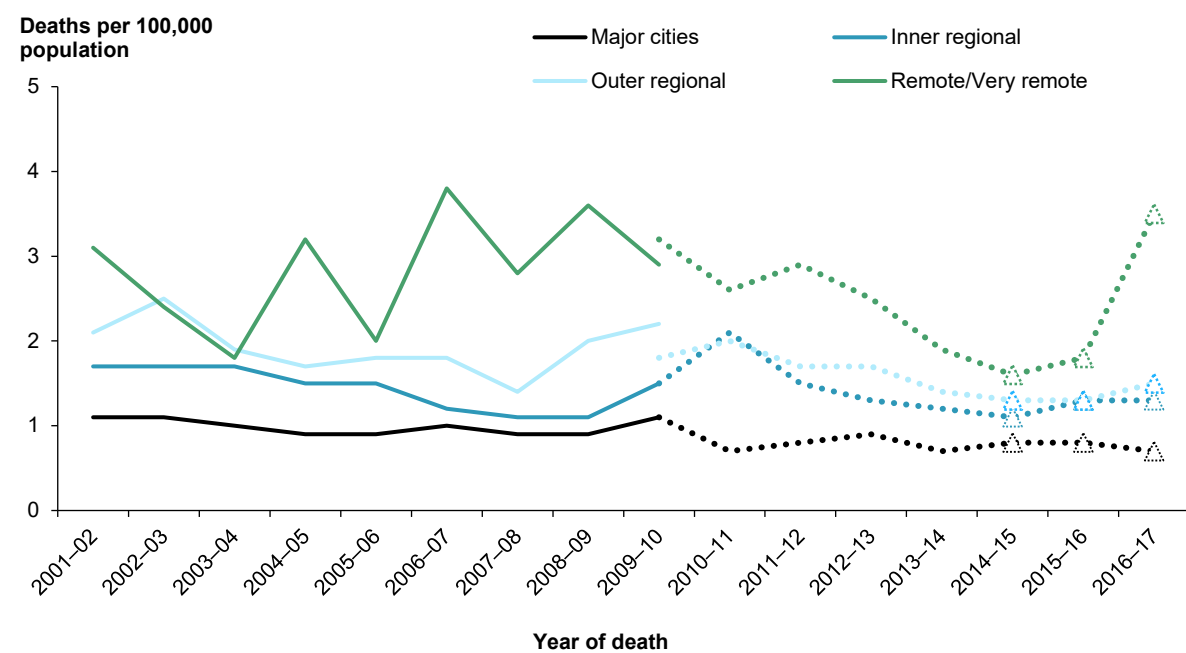
Rates for *Remote* and *Very remote* areas are combined in this section, due to small numbers of deaths.

Rates of drowning deaths for residents *Remote and very remote* areas were consistently higher than rates for residents of less remote areas, and consistently 2–4 times as high as for residents of *Major cities* (Figure 4.5). The fluctuation in rate of drowning deaths in *Remote and very remote* areas is partly a reflection of the small population and number of deaths each year. The rise in the rate for *Remote and very remote* areas between 2015–16 and 2016–17 is partly due to a mass fatality incident involving widespread flooding.

In 2009–10—the only year for which both ASGC-based and ASGS-based rates are shown—ASGC-based rates for residents of *Outer regional* areas were higher than the ASGS-based rates, while for *Remote and very remote* areas, the ASGS-based rates were higher.

See Appendix A for more information of the ASGC and ASGS classification systems.

**Figure 4.5: Age-standardised rates of unintentional drowning deaths, by remoteness of usual residence, 2001–02 to 2016–17**



**Notes**

1. Data for 1999–00 and 2000–01 were unavailable.
2. The rates for *Remote and very remote* areas are combined, due to small numbers.
3. Full lines are ASGC-based, while dotted lines are ASGS-based.
4. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
5. Data underpinning this figure are available in the supplementary table spreadsheet Table SF4.5.

Source: AIHW NMD.

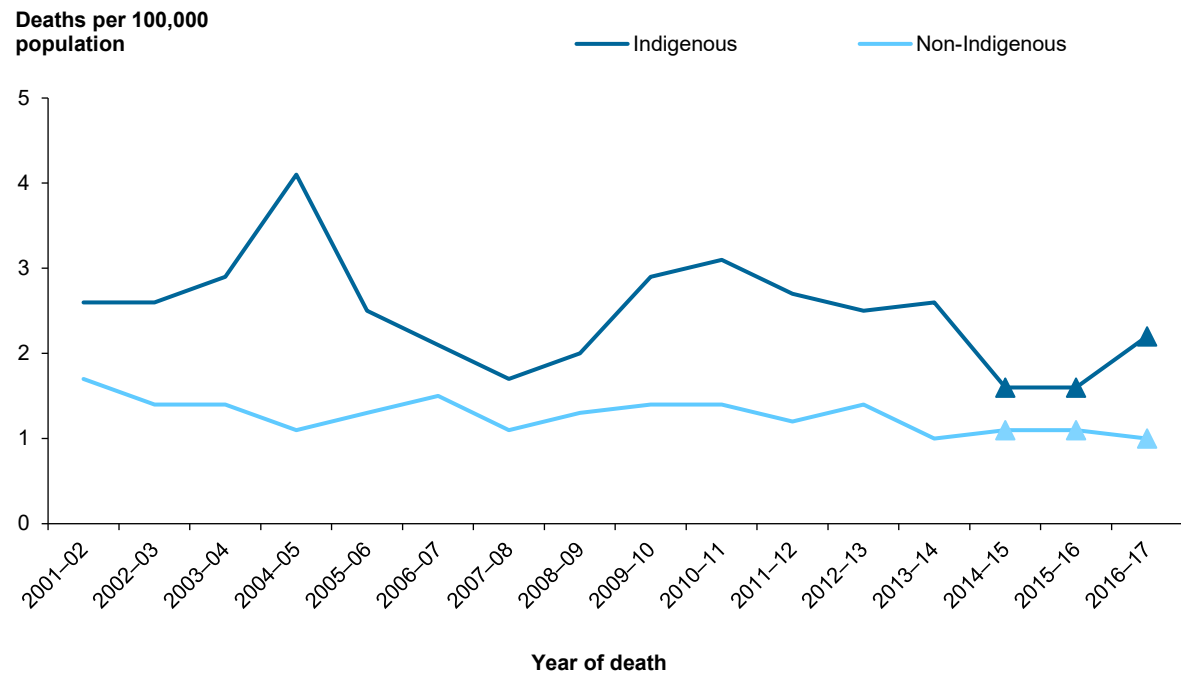
# Aboriginal and Torres Strait Islander people

Age-standardised rates of drowning for Aboriginal and Torres Strait Islander people fluctuated markedly from year to year between 1999–00 and 2016–17, at least partly because even small changes in the annual number of deaths (10–20 per year) have a substantial effect on the rates (Figure 4.6).

Rates declined slightly over the period, but this was not statistically significant. In comparison, rates for non-Indigenous Australians declined by an average of 2.0% per year over the period of interest.

Rates for Aboriginal and Torres Strait Islander people were generally 1.5–2.5 times as high as rates for non-Indigenous Australians over the period.

**Figure 4.6: Age-standardised rates of unintentional drowning deaths, by Indigenous status, 2001–02 to 2016–17**



**Notes**

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF4.6.

Source: AIHW NMD.

## 5 Poisoning by pharmaceuticals

This chapter provides:

- a summary of all poisoning deaths involving pharmaceuticals in 2016–17 that are identifiable in the deaths data
- a summary of unintentional poisoning deaths involving pharmaceuticals in 2016–17
- a description of trends in unintentional poisoning deaths involving pharmaceuticals from 1999–00 to 2016–17.

This chapter includes unintentional deaths due to poisoning by medications intended to treat various health conditions. This includes medications prescribed for a particular individual by a medical practitioner, as well as medications obtained through other means, such as medications prescribed for another person or the illegal purchase of pharmaceutical medications from a website that does not require a prescription. Also included are unintentional deaths due to poisoning by illicit drugs, such as heroin and cocaine.

### 5.1 What methods were used?

The criteria given in Section 1.3 were applied, and records that included the following ICD-10 codes were included in this chapter:

- the UCoD was Unintentional poisoning by pharmaceuticals (X40–X44)
- the MCoDs included codes for Unintentional poisoning by pharmaceuticals (X40–X44) and for Injury (S00–T75 or T79)
- the MCoDs included codes for Toxic effects of pharmaceuticals (T36–T50) and for Unintended external cause of injury (V01–X59).

Suicide and homicide deaths (UCoD X60–Y09) were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 5.1. Further information on methods is provided in Appendix A.

### Box 5.1: External causes of poisoning by pharmaceuticals

*Accidental poisoning by and exposure to noxious substances (X40–X49)* is the subject of a section of Chapter XX *External causes of morbidity and mortality* of ICD-10. The first 5 categories in this section refer to poisoning by, and exposure to, drugs, medicaments, and biological substances (X40–X44):

- *Accidental poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics (X40)*
- *Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified (X41)*
- *Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified (X42)*
- *Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system (X43)*
- *Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances (X44).*

## 5.2 Overview of poisoning by pharmaceuticals deaths

In 2016–17, unintentional poisoning deaths involving pharmaceuticals accounted for 69% of all poisoning by drugs deaths (Table 5.1). Those reported as *Intentional self-harm by drug poisoning*, *Assault by drug poisoning*, and *Drug poisoning, undetermined intent* are not included in this chapter.

Counts of deaths involving poisoning by pharmaceuticals included in this report will differ from those published by the ABS. This is because the ABS selects cases only on the basis of UCoD codes, and includes codes for mental and behavioural disorders (F11–F16, F19) and for *Abuse of non-dependence-producing substances (F55)*.

**Table 5.1: All identifiable poisoning deaths involving pharmaceuticals, 2016–17**

Terminology in this report	Coverage in this report	ICD-10 codes	Number	%
Unintentional poisoning by drugs	Poisoning by pharmaceuticals (Chapter 5)	UCoD X40–X44; or MCoD X40–X44 and S00–T75, T79; or MCoD V01–X59 and T36–T50	1,391	69.2
Intentional self-harm by drug poisoning	Suicide (Chapter 10)	UCoD X60–X64; or MCoD X60–X64 and S00–T75, T79	535	26.6
Assault by drug poisoning	Homicide (Chapter 11)	UCoD X85; or MCoD X85 and S00–T75, T79	4	0.2
Drug poisoning, undetermined intent	Undetermined intent (Chapter 2)	UCoD Y10–Y14; or MCoD Y10–Y14 and S00–T75, T79	81	4.0
<b>Total deaths involving poisoning by drugs</b>			<b>2,011</b>	<b>100.0</b>

Source: AIHW NMD.

## 5.3 How many deaths in 2016–17 were due to unintentional poisoning involving pharmaceuticals?

Unintentional poisoning involving pharmaceuticals accounted for 1,391 injury deaths, 10.6% of all injury deaths for this period (Table 5.2). About twice as many males as females died as a result of unintentional poisoning involving pharmaceuticals.

**Table 5.2: Key indicators for unintentional poisoning deaths involving pharmaceuticals, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	965	426	1,391
Percentage of all injury deaths	12.2	8.2	10.6
Crude rate (deaths per 100,000 population)	8.0	3.5	5.7
Age-standardised rate (deaths per 100,000 population)	8.3	3.4	5.9

Source: AIHW NMD.

People aged 25–44 (50%) and 45–64 (39%) were the most likely to die from unintentional poisoning involving pharmaceuticals (Table 5.3). In comparison, 20% and 19% of all injury deaths occurred at these ages.

The proportion of deaths within each age group was higher for males than for females in those aged 15–24 and 25–44 but were higher for females than males among those aged 45–64 and 65 and over.

**Table 5.3: Unintentional poisoning deaths involving pharmaceuticals, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	1	0.1	1	0.2	2	0.1
5–14	2	0.2	0	0.0	2	0.1
15–24	47	4.9	9	2.1	56	4.0
25–44	520	53.9	169	39.7	689	49.5
45–64	345	35.8	194	45.5	539	38.7
65+	50	5.2	53	12.4	103	7.4
<b>Total</b>	<b>965</b>	<b>100.0</b>	<b>426</b>	<b>100.0</b>	<b>1,391</b>	<b>100.0</b>

Source: AIHW NMD.

### State or territory of usual residence

The age-standardised rate for unintentional poisoning deaths involving pharmaceuticals was highest for residents of Western Australia (7.7 deaths per 100,000 population) and New South Wales (6.3 per 100,000) (Table 5.4). Residents of the Northern Territory recorded the lowest rate of all jurisdictions, with 3.1 deaths per 100,000 population.

**Table 5.4: Unintentional poisoning deaths involving pharmaceuticals, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	483	349	235	192	78	26	20	8
%	34.7	25.1	16.9	13.8	5.6	1.9	1.4	0.6
Age-standardised rate (deaths per 100,000 population)	6.3	5.7	5.0	7.7	4.8	5.1	4.8	3.1

Source: AIHW NMD.

## Remoteness of usual residence

The number and age-standardised rate of unintentional poisoning deaths involving pharmaceuticals declined with increasing remoteness of usual place of residence (Table 5.5).

Rates for residents of *Inner regional areas* (6.6 deaths per 100,000 population) were above the national rate of 5.9 deaths per 100,000 population, while residents of the *Remote and very remote* areas recorded a combined rate of 2.5 deaths per 100,000 population, which was less than half the rate of the other remoteness areas.

Numbers in *Remote and very remote* areas have generally been small in the previous reports in this series, with the rate for residents of *Remote* areas being about 1.5–2 times as high as for residents of *Very remote* areas.

**Table 5.5: Unintentional poisoning deaths involving pharmaceuticals, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>			
	Major cities	Inner regional	Outer regional	Remote/Very remote
Number <sup>(a)</sup>	998	259	106	12
%	72.5	18.8	7.7	0.9
Age-standardised rate (deaths per 100,000 population)	5.8	6.6	5.3	2.5

(a) Excludes 16 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate for unintentional poisoning deaths involving pharmaceuticals generally rose with increasing disadvantage (Table 5.6). The highest rate was among people living in the lowest socioeconomic areas (7.6 deaths per 100,000 population), which was twice as high as the rate for people living in the highest socioeconomic areas (3.8 per 100,000).

**Table 5.6: Unintentional poisoning deaths involving pharmaceuticals, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	342	295	257	297	184
%	24.6	21.2	18.5	21.4	13.2
Age-standardised rate (deaths per 100,000 population)	7.6	6.3	5.4	6.1	3.8

Note: Excludes 16 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised rate of unintentional poisoning deaths involving pharmaceuticals for Aboriginal and Torres Strait Islander people was 2.6 times the rate for non-Indigenous Australians (Table 5.7).

**Table 5.7: Key indicators for unintentional poisoning deaths involving pharmaceuticals, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	49	27	76	608	283	891
Age-standardised rate (deaths per 100,000 population)	18.9	10.2	14.4	7.7	3.3	5.5
Rate ratio <sup>(a)</sup>	2.5	3.1	2.6	..	..	..
Rate difference <sup>(b)</sup>	11.2	6.9	8.9	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons, divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons, minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 5.4 Types of pharmaceuticals

Of unintentional poisoning deaths involving pharmaceuticals:

- more than 74% (1,034) involved *Poisoning by narcotics and psychodysleptics [hallucinogens]* (735 males; 299 females), of which:
  - 39% (399) were *Poisoning by heroin*
  - 39% (402) were *Poisoning by other opioids*
  - 21% (212) were *Poisoning by methadone*
  - more than 74% (767) were among people aged 30–54
- more than 52% (727) involved *Poisoning by psychotropic drugs, not elsewhere classified* (503 males; 224 females), of which:
  - 46% (337) involved *Poisoning by antidepressants*
  - 51% (368) involved *Psychostimulants with potential use for disorder*
  - about 73% (531) were among people aged 30–54

- more than 45% (631) involved *Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs* (429 males; 202 females), of which:
  - 92% (581) involved *Poisoning by benzodiazepines*
  - just over 73% (462) were among people aged 30–54.

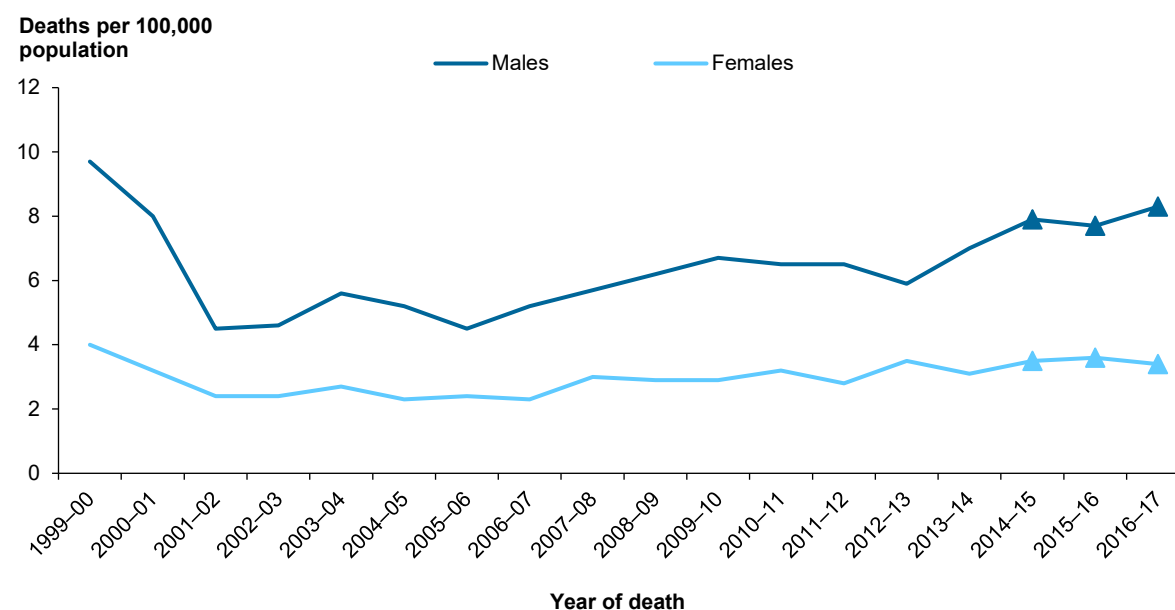
## 5.5 How have unintentional poisoning deaths involving pharmaceuticals changed over time?

Age-standardised rates for unintentional poisoning deaths involving pharmaceuticals fell dramatically between 1999–00 and 2001–02, from 6.9 to 3.4 deaths per 100,000 population, for both males and females (Figure 5.1). This was most likely due to a reduction in the supply of opiate narcotics (chiefly heroin), with an abrupt onset in all Australian jurisdictions in early 2001 (Degenhardt et al. 2006). Rates increased by an annual average of 2.7% per year between 2001–02 and 2016–17.

### Age and sex

Rates for males were at their lowest between 2001–02 and 2005–06, before rising to 8.3 deaths per 100,000 population in 2016–17. Rates for females were at their lowest between 2001–02 and 2006–07, rising in 2007–08, then remaining relatively steady. Between 1999–00 and 2016–17, rates for males were consistently 2–2.5 times as high as for females.

**Figure 5.1: Age-standardised rates of unintentional poisoning deaths involving pharmaceuticals, by sex, 1999–00 to 2016–17**



#### Notes

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF5.1.

Source: AIHW NMD.

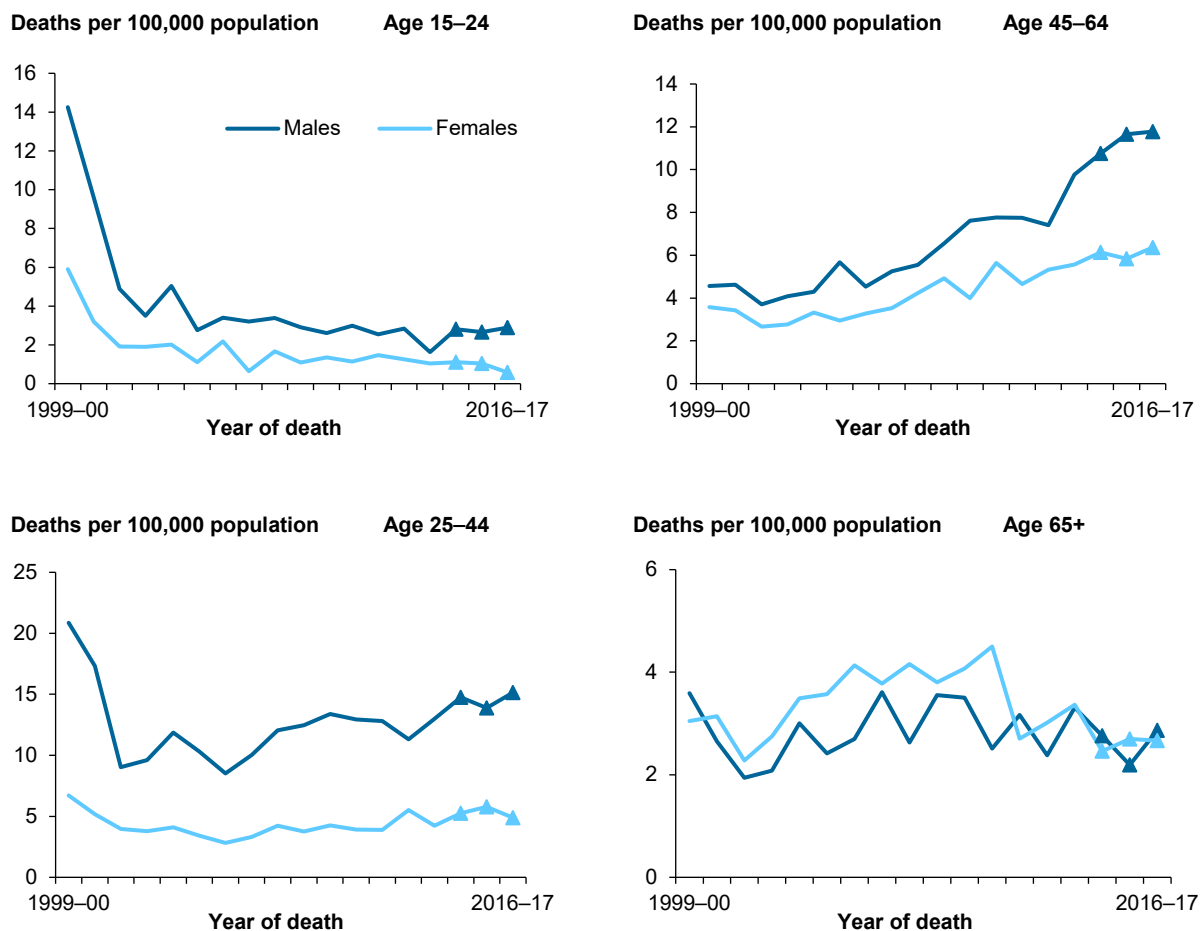


Figure 5.2 shows changes in age-standardised rates for unintentional poisoning deaths involving pharmaceuticals between 1999–00 and 2016–17 in each age group by sex.

Rates for males were higher than for females for most age groups, except among those aged 65 and over whose rates for men were about the same as rates for women.

There were marked decreases in rates for males aged 15–24 and 25–44 in the first 2 years of the period. Female rates also decreased in those 2 years for females in these age groups, but this was less marked than for males. Rates for both men and women aged 25–44 and 45–64 rose between 2001–02 and 2016–17.

**Figure 5.2: Age-specific rates of unintentional poisoning deaths involving pharmaceuticals, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF5.2.
3. Rates for children aged 0–4 and 5–14 are not shown, due to small numbers.

Source: AIHW NMD.

## Remoteness of usual residence

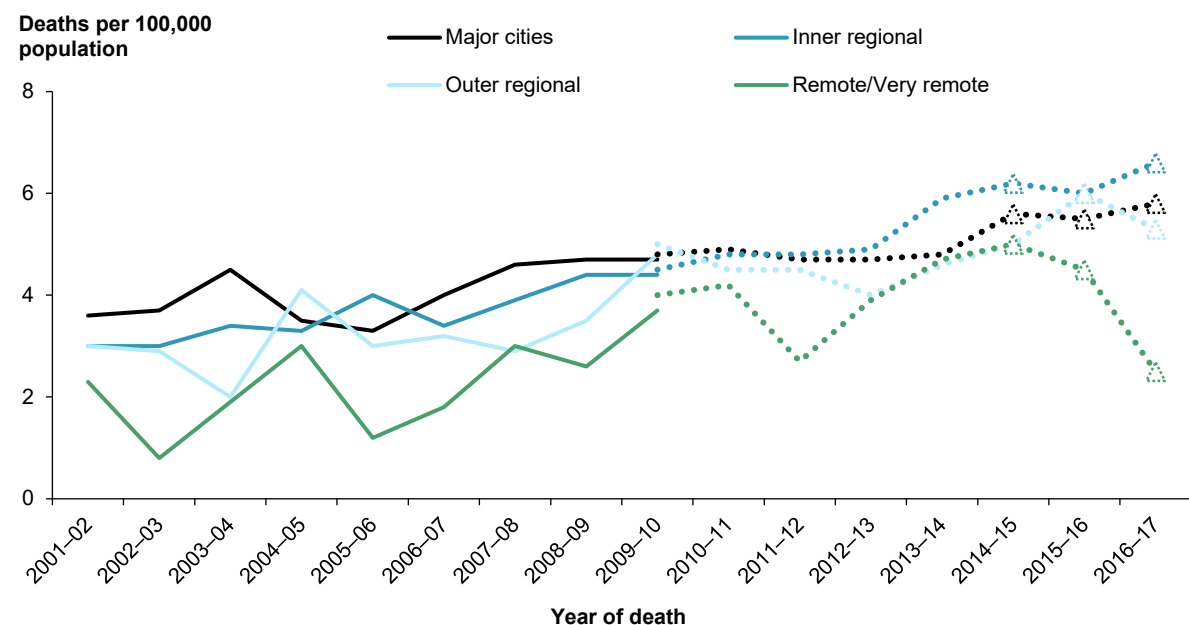
Between 2001–02 and 2016–17, rates of unintentional poisoning deaths involving pharmaceuticals were broadly similar across all remoteness areas (Figure 5.3). With a few exceptions, rates for residents of *Remote and very remote* areas (combined, due to small case numbers) were lower than for residents of less remote areas.

Rates increased over time for all remoteness areas, although the rate in *Remote and very remote* areas was sensitive to small changes in the annual number of cases.

In 2009–10, the only year for which both ASGC-based and ASGS-based rates are shown, ASGS-based rates were higher than the ASGC-based rates in *Outer regional* and *Remote and very remote* areas.

See Appendix A for more information of the ASGC and ASGS classification systems.

**Figure 5.3: Age-standardised rates of unintentional poisoning deaths involving pharmaceuticals, by remoteness of usual residence, 2001–02 to 2016–17**



### Notes

1. Data for 1999–00 and 2000–01 were unavailable.
2. The rates for *Remote and very remote* areas are combined, due to small numbers.
3. Full lines are ASGC-based, while dotted lines are ASGS-based.
4. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
5. Data underpinning this figure are available in the supplementary table spreadsheet Table SF5.3.

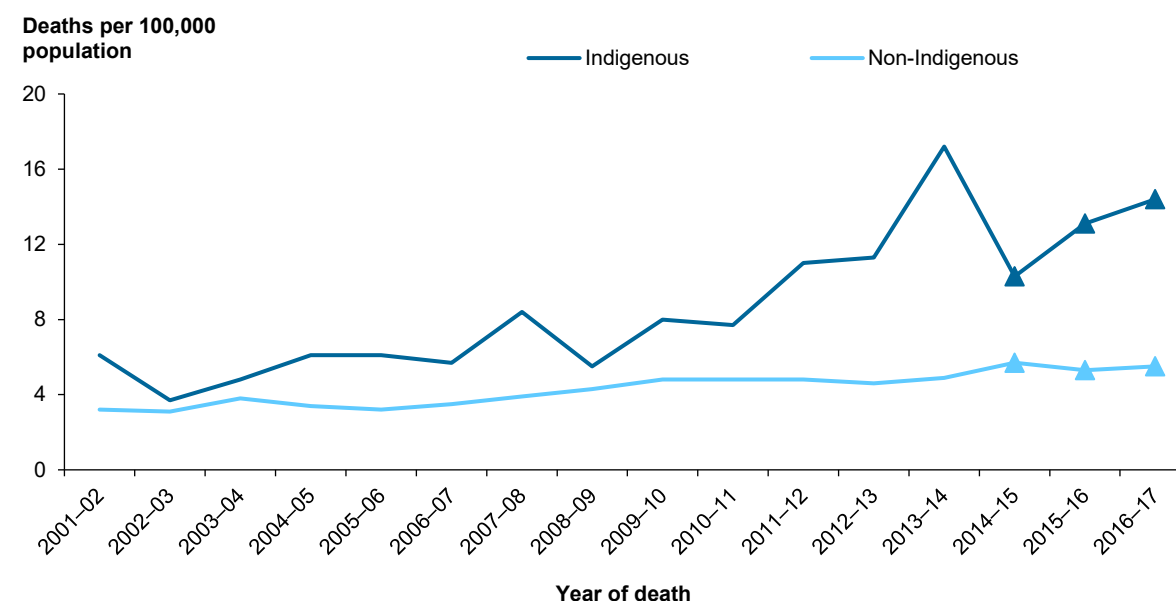
Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

Age-standardised rates of unintentional poisoning deaths involving pharmaceuticals for Aboriginal and Torres Strait Islander people rose by an average of 6.8% per year between 2001–02 and 2016–17 (Figure 5.4). Over the same period, rates for non-Indigenous Australians increased by an average of 3.3% per year.

Rates for Aboriginal and Torres Strait Islander people varied between 1.2–3.5 times as high as rates for non-Indigenous Australians over this period.

**Figure 5.4: Age-standardised rates of unintentional poisoning deaths involving pharmaceuticals, by Indigenous status, 2001–02 to 2016–17**



**Notes**

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF5.4.

Source: AIHW NMD.

## 5.6 Reporting on drugs of public interest

ICD-10, the classification applied to case data in the main data source used in this report (the NMD), has categories that distinguish some drugs (for example, heroin and cocaine) but not others, including some that have become the subject of public interest (for example, oxycodone).

ICD-10 provides a way to code deaths that involved any type of poison, but mostly to categories that are non-specific. For example, coders are instructed to assign cases involving oxycodone to category T40.2 *Other opioids*, which is also the category for cases involving codeine and morphine. As a result, when using only ICD-10 coded mortality data, there is no way to determine how many deaths were recorded as having involved a drug such as oxycodone.

The NCIS, which is used as a supplementary source in this report, allows specific coding of oxycodone and many other substances, and allows access, for many cases, to the police report to the coroner, investigation, autopsy, and toxicology reports and the coroner’s findings. A preliminary investigation into use of that source to provide more detailed information on selected drugs was done while preparing this report. Findings were promising, but it was concluded that further work is required before the method is ready for use in reports like this one.

## 6 Poisoning by other substances

This chapter provides:

- a summary of all poisoning deaths involving substances other than pharmaceuticals in 2016–17 that are identifiable in the deaths data
- a statistical summary of unintentional poisoning deaths involving substances other than pharmaceuticals in that year
- a description of trends in unintentional poisoning deaths involving substances other than pharmaceuticals from 1999–00 to 2016–17.

### 6.1 What methods were used?

The criteria given in Section 1.3 were applied, and the records that included the following ICD-10 codes were included in this chapter:

- the UCoD was Unintentional poisoning by substances other than pharmaceuticals (X45–X49)
- the MCoDs included codes for Unintentional poisoning by substances other than pharmaceuticals (X45–X49) and for Injury (S00–T75 or T79)
- the MCoDs included codes for Toxic effects of substances other than pharmaceuticals (T51–T65) and for External causes of unintentional injury (V01–X59).

Suicide and homicide deaths (UCoD X60–Y09) were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 6.1. Further information on methods is provided in Appendix A.

#### **Box 6.1: External causes of poisoning by other substances**

*Accidental poisoning by and exposure to noxious substances (X40–X49)* is the subject of a section of Chapter XX *External causes of morbidity and mortality* of ICD-10. The second set of categories in this section refer to poisoning by, and exposure to, drugs, medicaments, and biological substances (X45–X49):

- *Accidental poisoning by and exposure to alcohol (X45)*
- *Accidental poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours (X46)*
- *Accidental poisoning by and exposure to other gases and vapours (X47)*
- *Accidental poisoning by and exposure to pesticides (X48)*
- *Accidental poisoning by and exposure to other and unspecified chemicals and noxious substances (X49).*

## 6.2 Overview of poisoning deaths involving other substances

Unintentional cases accounted for 56% of all poisoning deaths involving other substances (Table 6.1). Another 41% of the deaths were by intentional self-harm; these and deaths due to *Assault* or with *Undetermined intent* are not included in the remainder of this chapter.

**Table 6.1: All identifiable poisoning deaths involving other substances, 2016–17**

Terminology in this report	Coverage in this report	ICD-10 codes	Number	%
Unintentional poisoning by other substances	Poisoning by other substances (Chapter 6)	UCoD X45–X49; or MCoD X45–X49 and S00–T75, T79; or MCoD T51–T65 and V01–X59	373	56.2
Intentional self-harm, poisoning by other substances	Suicide (Chapter 10)	UCoD X65–X69; or MCoD X65–X69 and S00–T75, T79	273	41.1
Assault, poisoning by other substances	Homicide (Chapter 11)	UCoD X86–X90; or MCoD X86–X90 and S00–T75, T79	3	0.5
Poisoning by other substances, undetermined intent	Undetermined intent (Chapter 2)	UCoD Y15–Y19; or MCoD Y15–Y19 and S00–T75, T79	15	2.3
<b>Total poisoning by other substances deaths</b>			<b>664</b>	<b>100.0</b>

Source: AIHW NMD.

## 6.3 How many deaths in 2016–17 were due to unintentional poisoning involving other substances?

Unintentional poisoning deaths involving other substances accounted for 373 injury deaths, 2.8% of all injury death for this period (Table 6.2). Almost 2.8 times as many males as females died as a result of unintentional poisoning by other substances.

**Table 6.2: Key indicators for unintentional poisoning deaths involving other substances, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	274	99	373
Percentage of all injury deaths	3.5	1.9	2.8
Crude rate (deaths per 100,000 population)	2.3	0.8	1.5
Age-standardised rate (deaths per 100,000 population)	2.3	0.8	1.5

Source: AIHW NMD.

People aged 25–64 accounted for 85% of all unintentional poisoning deaths involving other substances (Table 6.3), compared with just 39% of all injury deaths. The proportion of deaths was higher for females than males in the 2 oldest age groups.

**Table 6.3: Unintentional poisoning deaths involving other substances, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	0	0.0	0	0.0	0	0.0
5–14	0	0.0	3	3.0	3	0.8
15–24	12	4.4	1	1.0	13	3.5
25–44	123	44.9	34	34.3	157	42.1
45–64	113	41.2	48	48.5	161	43.2
65+	26	9.5	13	13.1	39	10.5
<b>Total</b>	<b>274</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>373</b>	<b>100.0</b>

Source: AIHW NMD.

## State or territory of usual residence

The age-standardised rate for unintentional poisoning deaths involving other substances was highest for residents of the Northern Territory (6.9 deaths per 100,000 population), which was 4.6 times the national rate of 1.5 deaths per 100,000 (Table 6.4). Tasmania recorded the second highest rate (2.0 deaths per 100,000), while South Australia recorded the lowest rate (1.1 deaths per 100,000).

**Table 6.4: Unintentional poisoning deaths involving other substances, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	130	93	55	44	18	12	5	16
%	34.9	24.9	14.7	11.8	4.8	3.2	1.3	4.3
Age-standardised rate (deaths per 100,000 population)	1.7	1.5	1.2	1.7	1.1	2.0	1.3	6.9

Source: AIHW NMD.

## Remoteness of usual residence

The rate of unintentional poisoning deaths involving other substances rose with increasing remoteness of usual place of residence (Table 6.5). The rate for residents of *Very remote* areas (3.1 deaths per 100,000 population) was 2.4 times as high as the rate for residents of *Major cities* (1.3 deaths per 100,000). These results should be treated with caution due to the relatively small numbers in *Remote* and *Very remote* areas, which can result in marked year-to-year variability.

**Table 6.5: Unintentional poisoning deaths involving other substances, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	234	76	42	8	6
%	64.0	20.8	11.4	2.2	1.6
Age-standardised rate (deaths per 100,000 population)	1.3	1.8	2.0	3.0	3.1

(a) Excludes 8 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate of unintentional poisoning deaths involving other substances rose with increasing disadvantage (Table 6.6). The rates for residents of the 3 middle socioeconomic areas were similar, while the rate for those living in the lowest socioeconomic areas (2.0 deaths per 100,000 population) was twice as high as for people living in the highest socioeconomic areas (1.0 per 100,000).

**Table 6.6: Unintentional poisoning deaths involving other substances, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	93	79	73	72	48
%	24.9	21.2	19.6	19.3	12.9
Age-standardised rate (deaths per 100,000 population)	2.0	1.6	1.5	1.5	1.0

Note: Excludes 5 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised rate of unintentional poisoning deaths involving other substances for Aboriginal and Torres Strait Islander people was 4.4 times the rate for non-Indigenous Australians (Table 6.7).

**Table 6.7: Key indicators for unintentional poisoning deaths involving other substances, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	20	11	31	167	60	227
Age-standardised rate (deaths per 100,000 population)	8.1	4.4	6.2	2.1	0.7	1.4
Rate ratio <sup>(a)</sup>	3.9	6.3	4.4	..	..	..
Rate difference <sup>(b)</sup>	<b>6.0</b>	<b>3.7</b>	<b>4.8</b>	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 6.4 Types of substances

In 2016–17, more than 88% (328) of the unintentional poisoning deaths involving other substances involved the *Toxic effect of alcohol* (244 males; 84 females), with more than 81% (267) of those being among people aged 30–59.

Almost 6% (22) of deaths involved the *Toxic effect of other gases, fumes and vapours* (16 males; 6 females), and more than 4% (12 males; 4 females) involved the *Toxic effect of carbon monoxide*.

## 6.5 How have unintentional poisoning deaths involving other substances changed over time?

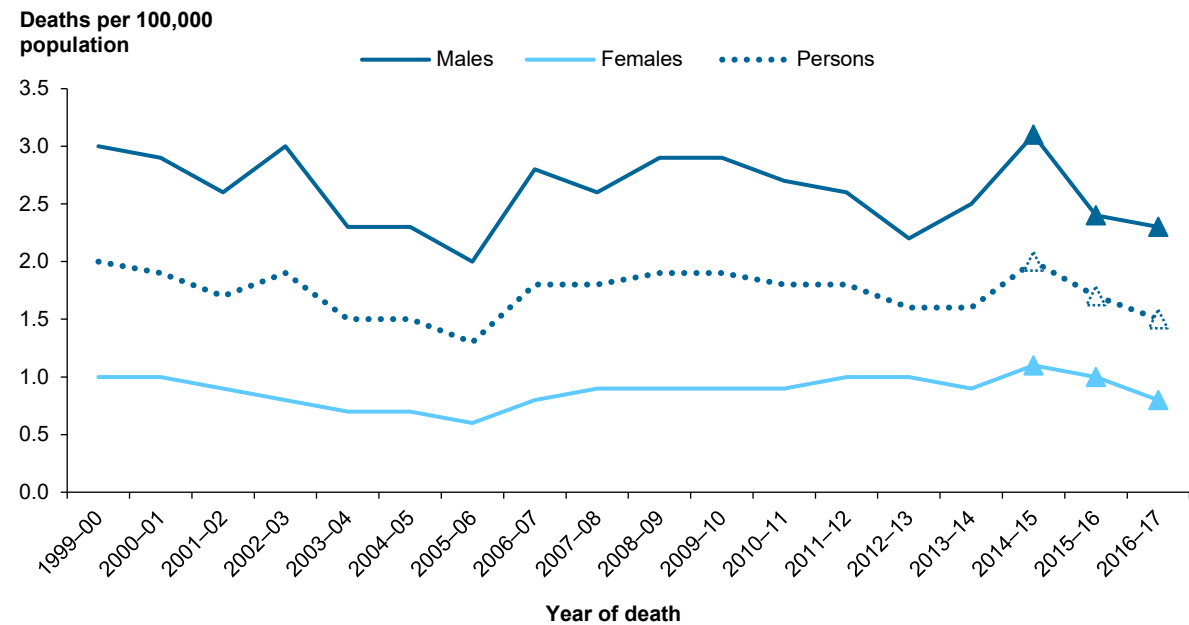
Age-standardised rates of unintentional poisoning deaths involving other substances fluctuated between 1999–00 and 2016–17, ranging from 1.3 deaths per 100,000 population in 2005–06 to 2.0 deaths per 100,000 in 1999–00 and 2014–15 (Figure 6.1).

### Age and sex

While rates were generally higher towards the latter part of the period, there was no significant change in rates for either males or females. Between 1999–00 and 2016–17, rates were consistently 2.5–3.5 times as high for males as for females.



**Figure 6.1: Age-standardised rates of unintentional poisoning deaths involving other substances, by sex, 1999–00 to 2016–17**



*Notes*

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure is available in the supplementary table spreadsheet Table SF6.1.

Source: AIHW NMD.

Figure 6.2 shows changes in rates of unintentional poisoning deaths involving other substances between 1999–00 and 2016–17 in each age group by sex.

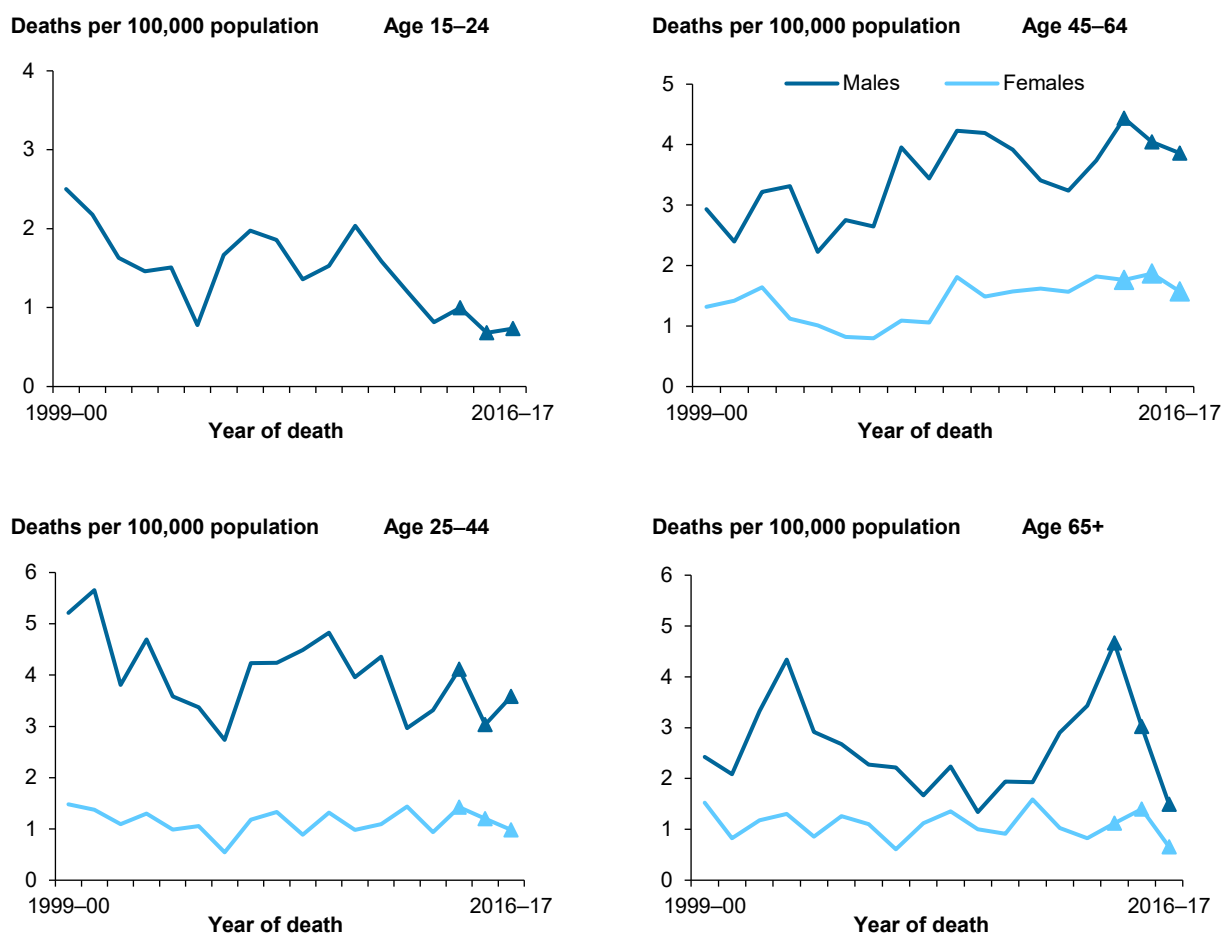
Age-standardised rates for males were much higher than rates for females across all age groups, for nearly all years. Rates for males aged 15–24 and 25–44 followed a similar pattern, showing an overall decline in rates marked by significant fluctuation.

Rates for men aged 45–64 trended upwards overall, while rates for men aged 65 and over showed marked peaks in 2002–03 and 2014–15 without any overall trend.

Rates for women 25–44 and 65 and over remained relatively steady, despite some fluctuation, while there was a moderate upward trend for women aged 45–64.

Rates for females aged 15–24 and for both sexes at younger ages are not shown, due to small numbers.

**Figure 6.2: Age-specific rates of unintentional poisoning deaths involving other substances, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF6.2.
3. Rates for children aged 0–4 and 5–14 and for females aged 15–24 are not shown, due to small numbers.

Source: AIHW NMD.

## Remoteness of usual residence

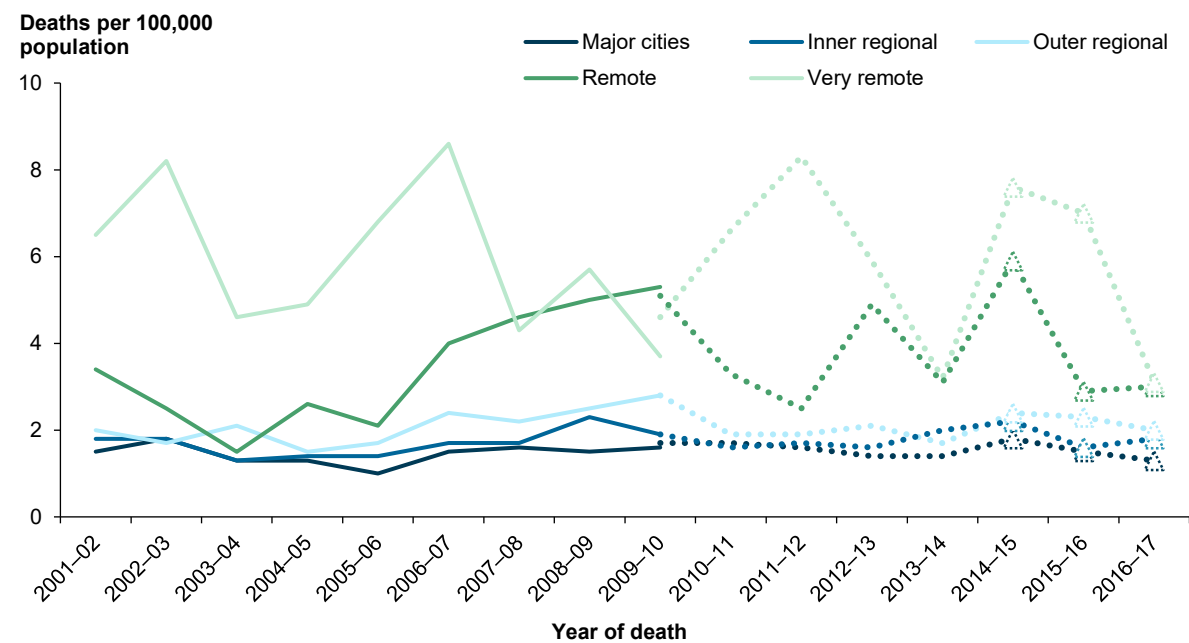
Between 2001–02 and 2016–17, rates of unintentional poisoning deaths involving other substances were generally higher for residents of *Remote* and *Very remote* areas than for residents of other remoteness areas (Figure 6.3). Rates for residents of the 3 least remote areas were generally similar, and relatively steady over the period.

Rates for residents of *Very remote* areas were 2–7 times as high as rates for residents of *Major cities*. The fluctuation in rates in *Very remote* areas—and to some degree in the *Remote* areas—is partly a reflection of the small population and number of deaths occurring each year.

In 2009–10, the only year for which both ASGC-based and ASGS-based rates are shown, ASGS-based rates were higher than ASGC-based rates in *Very remote* areas.

See Appendix A for more information of the ASGC and ASGS classification systems.

**Figure 6.3: Age-standardised rates of unintentional poisoning deaths involving other substances, by remoteness of usual residence, 2001–02 to 2016–17**



**Notes**

1. Data for 1999–00 and 2000–01 were unavailable.
2. Full lines are ASGC-based, while dotted lines are ASGS-based.
3. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
4. Data underpinning this figure are available in the supplementary table spreadsheet Table SF6.3.

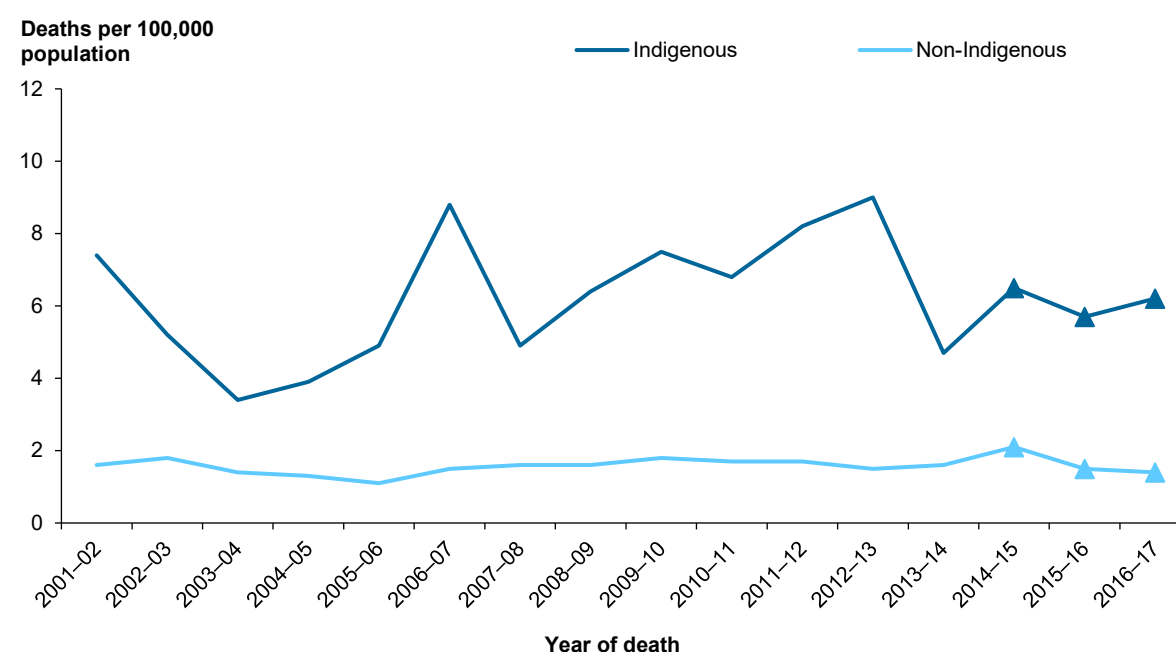
Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

Age-standardised rates of unintentional poisoning deaths involving other substances for Aboriginal and Torres Strait Islander people fluctuated markedly from year to year between 2001–02 and 2016–17 (Figure 6.4). By contrast, rates for non-Indigenous Australians remained relatively steady over the same period, partly reflecting the larger numbers of cases.

Rates for Aboriginal and Torres Strait Islander people were consistently 3–6 times as high as rates for non-Indigenous Australians over most of the period.

**Figure 6.4: Age-standardised rates of unintentional poisoning deaths involving other substances, by Indigenous status, 2001–02 to 2016–17**



**Notes**

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF6.4.

Source: AIHW NMD.

# 7 Falls

This chapter provides:

- a summary of all fall injury deaths in 2016–17 that are identifiable in the deaths data
- a statistical summary of unintentional fall injury deaths in that year
- a description of trends in unintentional fall injury deaths from 1999–00 to 2016–17.

## 7.1 What methods were used?

The criteria given in Section 1.3 were applied, and the records that included the following ICD-10 codes were included in this chapter:

- the UCoD was an *Unintentional fall* (W00–W19)
- the UCoD was coded as *Exposure to unspecified factor* (X59), and the MCoDs included a code for *Fracture*
- the MCoDs included codes for *Unintentional fall* (W00–W19) and for *Injury* (S00–T75 or T79)
- the MCoDs included codes for *Exposure to unspecified factor* (X59) and for *Fracture*.

The codes for fractures are S02, S12, S22, S32, S42, S52, S62, S72, S82, S92, T02, T08, T10, T12, and T14.2.

These criteria are the same as in previous reports (AIHW: Henley & Harrison 2009, 2015). Deaths with UCoD X59 and a fracture code as MCoD have been included routinely when reporting fall injury mortality, because of indications that most involve falls (Kreisfeld & Harrison 2005).

The 2 criteria that use an X59 code in combination with a fracture code accounted for 34% (1,679) of fall injury deaths reported for 2016–17. For more than 97% of deaths chosen by these criteria, the person was aged 65 and over, and for more than two-thirds (67%), the person was aged 85 and over. More than two-thirds of these deaths (69%) included a fracture of femur as MCoD.

It is possible that some of the deaths that were included using the X59 code and a fracture code might not be fall-related. But the inclusion of these 2 criteria provides a more accurate estimate of fall injury deaths than if they were excluded. For further background, see the sections on falls in previous reports (AIHW: Harrison & Henley 2015; AIHW: Henley & Harrison 2015).

Suicide and homicide deaths (UCoD X60–Y09) were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 7.1. Further information on methods is provided in Appendix A, and from a previously published report covering 1999–00 to 2009–10 (AIHW: Harrison & Henley 2015).

### **Box 7.1: External causes of falls**

The *Falls* (W00–W19) section of Chapter XX *External causes of morbidity and mortality of ICD-10* includes:

- *Fall on same level involving ice and snow* (W00)
- *Fall on same level from slipping, tripping and stumbling* (W01)
- *Fall involving ice-skates, skis, roller-skates or skateboards* (W02)
- *Other fall on same level due to collision with, or pushing by, another person* (W03)
- *Fall while being carried or supported by other persons* (W04)
- *Fall involving wheelchair* (W05)
- *Fall involving bed* (W06)
- *Fall involving chair* (W07)
- *Fall involving other furniture* (W08)
- *Fall involving playground equipment* (W09)
- *Fall on and from stairs and steps* (W10)
- *Fall on and from ladder* (W11)
- *Fall on and from scaffolding* (W12)
- *Fall from, out of or through building or structure* (W13)
- *Fall from tree* (W14)
- *Fall from cliff* (W15)
- *Diving or jumping into water causing injury other than drowning or submersion* (W16)
- *Other fall from one level to another* (W17)
- *Other fall on same level* (W18)
- *Unspecified fall* (W19).

## **7.2 Overview of fall injury deaths**

Unintentional fall injury deaths accounted for 96% of all fall injury deaths in 2016–17 (Table 7.1). Falls attributed to *Intentional self-harm*, *Assault*, and those with *Undetermined intent* are not included in this chapter.

**Table 7.1: All identifiable deaths involving falls, 2016–17**

Terminology in this report	Coverage in this report	ICD-10 codes	Number	%
Unintentional falls <sup>(b)</sup>	Falls (Chapter 7)	UCoD W00–W19; or UCoD X59 and MCoD fracture; or MCoD W00–W19 and S00–T75, T79 or MCoD X59 and fracture(a)	5,002	95.6
Intentional self-harm involving fall	Suicide (Chapter 10)	UCoD X80	158	3.0
Assault involving fall	Homicide (Chapter 11)	UCoD Y01	1	0.0
Undetermined intent involving fall	(Chapter 2)	UCoD Y30	13	0.2
Fall from animal or animal-drawn vehicle	Transport crashes (Chapter 3)	UCoD V80.0	6	0.1
Fall in or from railway train	Transport crashes (Chapter 3)	UCoD V81.5 or V81.6	0	0.0
Drowning following fall into bathtub, swimming pool or natural water	Drowning (Chapter 4)	UCoD W66, W68 or W70	50	1.0
<b>Total fall injury deaths</b>			<b>5,230</b>	<b>100.0</b>

(a) The 4 criteria include 2,742, 742, 581, and 1,682 deaths, respectively (745 deaths met more than 1 of the criteria).

(b) The codes for fractures are S02, S12, S22, S32, S42, S52, S62, S72, S82, S92, T02, T08, T10, T12, and T14.2.

Source: AIHW NMD.

## 7.3 How many deaths in 2016–17 were due to unintentional fall injury?

Unintentional falls were involved in 5,002 injury deaths (Table 7.2). This was more than 53% of all female injury deaths, and more than 28% of all male injury deaths for this period. Unintentional fall injury deaths for females were more than 1.2 times the number of deaths for males, although the age-standardised rate was higher for males.

**Table 7.2: Key indicators for unintentional fall injury deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	2,231	2,771	5,002
Percentage of all injury deaths	28.1	53.2	38.1
Crude rate (deaths per 100,000 population)	18.4	22.5	20.5
Age-standardised rate (deaths per 100,000 population)	17.1	14.4	15.7

Source: AIHW NMD.

People aged 85 and over accounted for almost 63% of unintentional fall injury deaths, while those aged 75–84 accounted for a further 24% (Table 7.3).

**Table 7.3: Unintentional fall injury deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	1	0.0	0	0.0	1	0.0
5–14	0	0.0	0	0.0	0	0.0
15–24	13	0.6	2	0.1	15	0.3
25–44	33	1.5	15	0.5	48	1.0
45–64	143	6.4	67	2.4	210	4.2
65–74	236	10.6	150	5.4	386	7.7
75–84	633	28.4	579	20.9	1,212	24.2
85+	1,172	52.5	1,958	70.7	3,130	62.6
<b>Total</b>	<b>2,231</b>	<b>100.0</b>	<b>2,771</b>	<b>100.0</b>	<b>5,002</b>	<b>100.0</b>

Source: AIHW NMD.

## State or territory of usual residence

The age-standardised rate of unintentional fall injury deaths for residents of the Northern Territory (26 per 100,000 population) was more than 1.6 times the national rate (15.7 deaths per 100,000) (Table 7.4). Most other jurisdictions recorded rates close to or over the national rate, with residents of New South Wales recording the lowest rate (14.5 deaths per 100,000).

**Table 7.4: Unintentional fall injury deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	1,568	1,370	925	464	427	133	86	29
%	31.3	27.4	18.5	9.3	8.5	2.7	1.7	0.6
Age-standardised rate (deaths per 100,000 population)	14.5	16.4	16.0	16.2	15.3	17.0	21.0	25.7

Source: AIHW NMD.

## Remoteness of usual residence

Age-standardised rates of unintentional fall injury deaths were similar across all remoteness areas except for *Very remote* areas where rates were noticeably higher (Table 7.5).

**Table 7.5: Unintentional fall injury deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	3,302	1,139	493	42	19
%	66.1	22.8	9.9	0.8	0.4
Age-standardised rate (deaths per 100,000 population)	15.1	16.7	17.6	15.5	21.5

(a) Excludes 8 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.



## Socioeconomic area

Age-standardised rates of unintentional fall injury deaths were similar across socioeconomic areas (Table 7.6). The highest rate was recorded for residents of second lowest socioeconomic area (17.4 deaths per 100,000 population).

**Table 7.6: Unintentional fall injury deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	1,019	1,229	1,017	849	879
%	20.4	24.6	20.3	17.0	17.6
Age-standardised rate (deaths per 100,000 population)	14.7	17.4	16.5	14.9	14.5

Note: Excludes 9 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised rate for unintentional fall injury deaths for Aboriginal and Torres Strait Islander people was 1.5 times the rate for non-Indigenous Australians (Table 7.7).

**Table 7.7: Key indicators for unintentional fall injury deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	19	23	42	1,495	1,838	3,333
Age-standardised rate (deaths per 100,000 population)	21.9	22.8	22.5	16.4	13.7	15.0
Rate ratio <sup>(a)</sup>	1.3	1.7	1.5	..	..	..
Rate difference <sup>(b)</sup>	5.5	9.1	7.5	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 7.4 How have unintentional fall injury deaths changed over time?

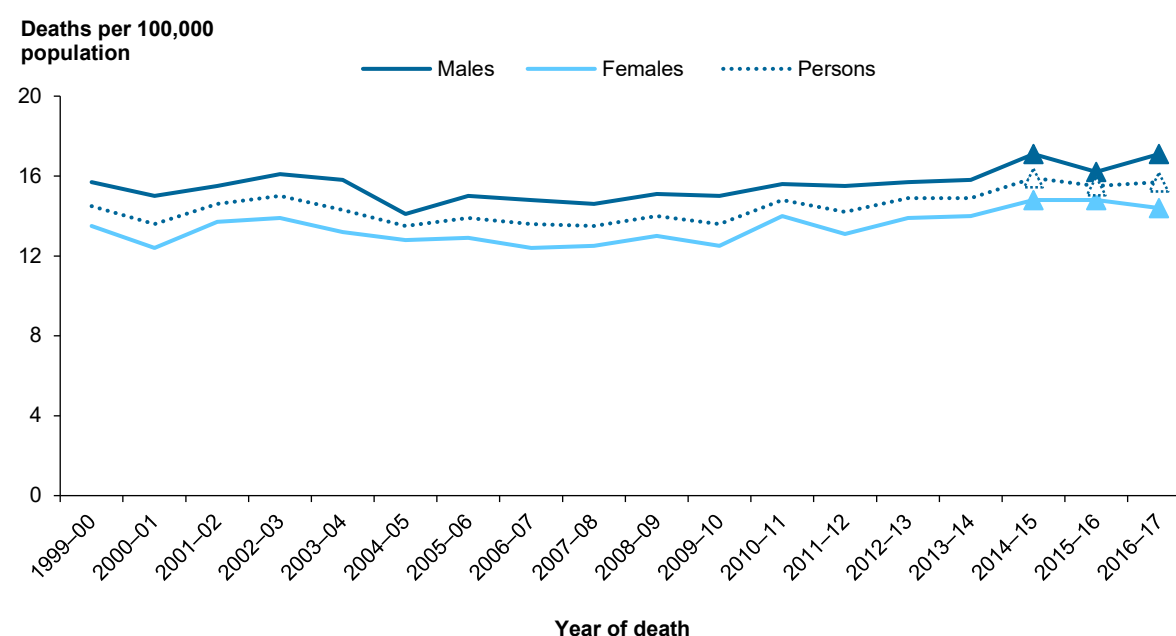
Between 1999–00 and 2016–17, age-standardised rates for unintentional fall injury deaths remained relatively steady (Figure 7.1).

### Age and sex

Rates fluctuated a little for both males and females over the period, but with no apparent trend. Rates for males were consistently 1.1–1.2 times as high as rates for females.

While age-adjusted rates have not varied greatly, the number of deaths has risen from 2,628 in 1999–00 to just over 5,000 in 2016–17. This largely reflects growth in the older part of the Australian population, in which rates of fall-related injury are high.

**Figure 7.1: Age-standardised rates of unintentional fall injury deaths, by sex, 1999–00 to 2016–17**



#### Notes

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF7.1.

Source: AIHW NMD.

Figure 7.2 shows changes in fall injury death rates between 1999–00 to 2016–17 in each age group by sex.

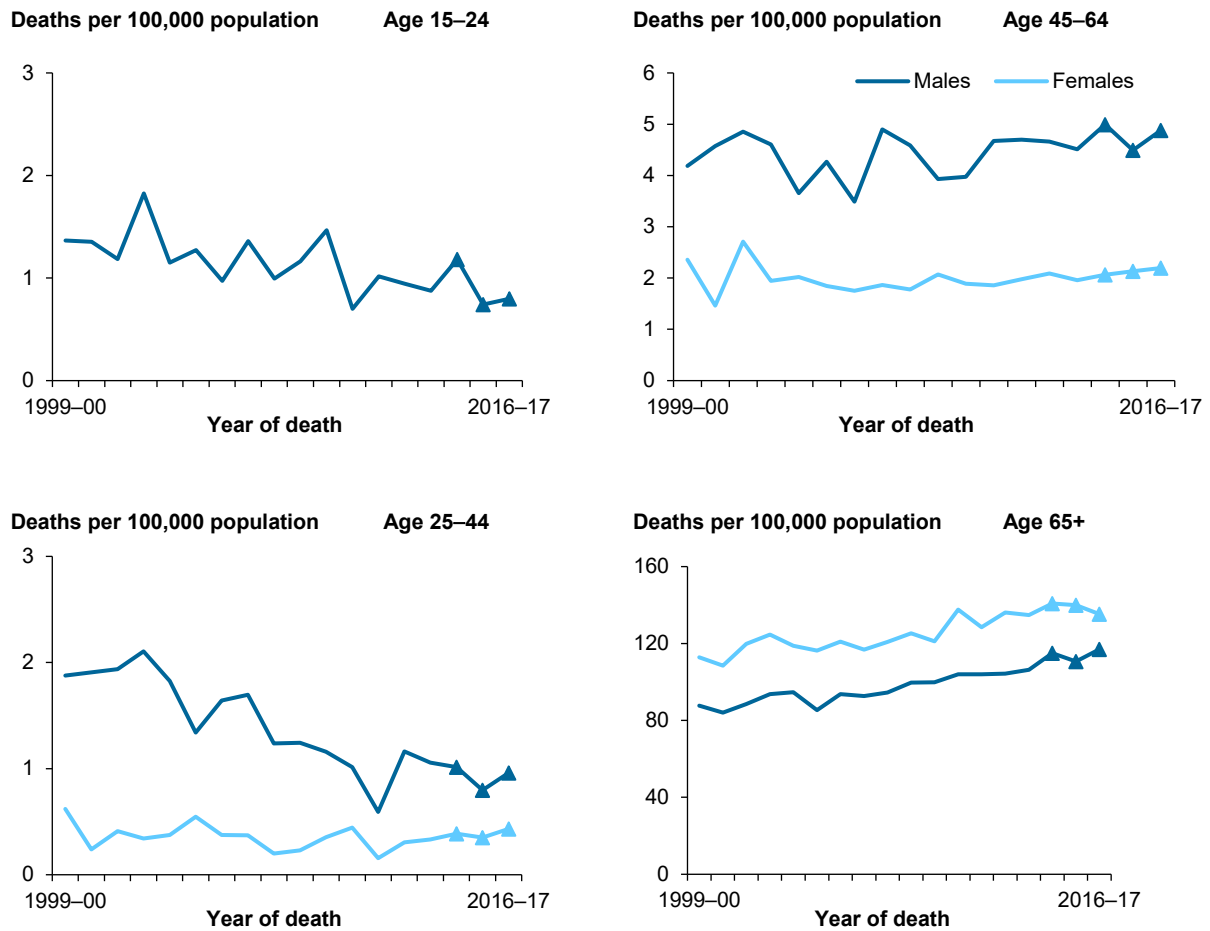
Age-specific rates for males were higher than female rates for those aged 15–24, 25–44, and 45–64, while rates for women were higher than men among those aged 65 and over.

Rates for males aged 15–24 and 25–44 declined over time, while rates for males in the 2 oldest age groups rose over time.

Rates for women aged 25–44 and 45–64 were relatively steady over time despite some fluctuations, while rates for women aged 65 and over rose over time at a rate similar to males in the same age group.

Rates for children aged 0–14 and women aged 15–24 are not shown, due to small numbers.

**Figure 7.2: Age-specific rates of unintentional fall injury deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

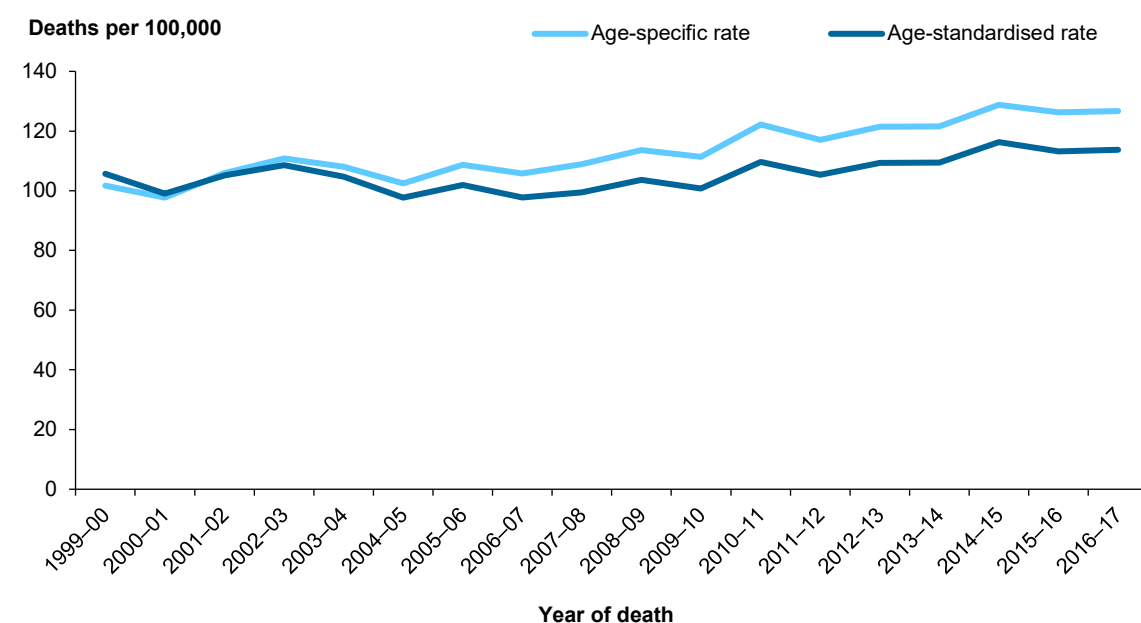
1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF7.2.
3. Rates for children aged 0–4 and 5–14 and for females aged 15–24, are not shown, due to small numbers.

Source: AIHW NMD.

Figure 7.3 shows a comparison of age-specific and age-standardised rates of unintentional fall injury deaths for people aged 65 and over between 1999–00 and 2016–17.

Although the pattern for both rates was similar over time, the rise for the age-standardised rate was much less than the rise for the age-specific rate. This difference is most likely due to the higher increases over time in the number of deaths in older ages—such as those aged 85 and over—than in those aged 65–84.

**Figure 7.3: Unintentional fall injury deaths for people aged 65 and over, by age-specific and age-standardised rates, 1999–00 to 2016–17**



Source: AIHW NMD.

## Remoteness of usual residence

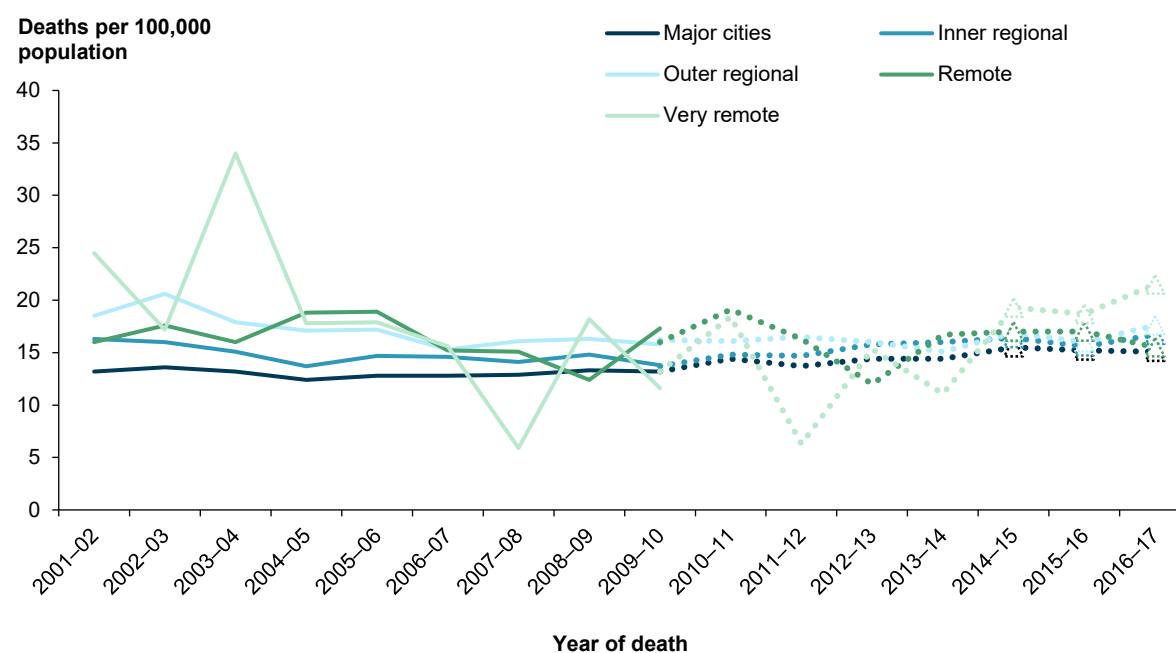
Between 2001–02 and 2016–17, rates of unintentional fall injury deaths were generally more similar for residents of all remoteness areas than was the case for other external causes of injury (Figure 7.4).

Rates were relatively steady over time, regardless of the remoteness of the person’s usual place of residence. The fluctuation for residents of *Very remote* regions partly reflects the small population and number of deaths occurring each year.

In 2009–10, the only year for which both ASGC-based and ASGS-based rates are shown, the ASGC-based rate for *Remote* areas was higher than the ASGS-based rate, while for *Very remote* areas, the ASGS-based rate was higher.

See Appendix A for more information of the ASGC and ASGS classification systems.

**Figure 7.4: Age-standardised rates of unintentional fall injury deaths, by remoteness of usual residence, 2001–02 to 2016–17**



**Notes**

1. Data for 1999–00 and 2000–01 were unavailable.
2. Full lines are ASGC-based, while dotted lines are ASGS-based.
3. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
4. Data underpinning this figure are available in the supplementary table spreadsheet Table SF7.3.

Source: AIHW NMD.

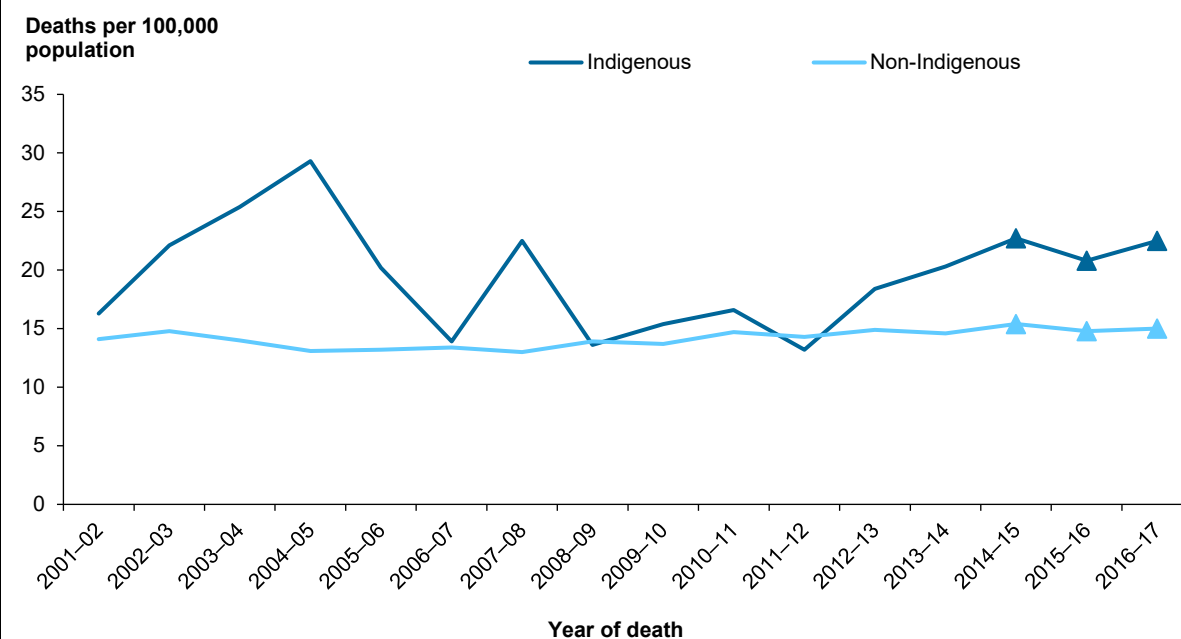
## Aboriginal and Torres Strait Islander people

Age-standardised rates of unintentional fall injury deaths for Aboriginal and Torres Strait Islander people fluctuated markedly from year to year between 2001–02 and 2016–17, with no statistically significant change (Figure 7.5).

The rates varied from 1–2 times the rates for non-Indigenous Australians over the period.

Changes in rates for Aboriginal and Torres Strait Islander peoples over time need to be treated with caution, due to the relatively low numbers of deaths annually.

**Figure 7.5: Age-standardised rates of unintentional fall injury deaths, by Indigenous status, 2001–02 to 2016–17**



*Notes*

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF7.4.

Source: AIHW NMD.

## 8 Thermal injury

The focus of this chapter is injury deaths related to *Exposure to smoke, fire and flames* or *Contact with heat and hot substances*. For brevity, the injuries resulting from these types of exposures are referred to in this report as ‘thermal injuries’.

The chapter provides:

- a summary of all thermal injury deaths in 2016–17 that are identifiable in the deaths data
- a statistical summary of unintentional thermal injury deaths in that year
- a description of trends in unintentional thermal injury deaths from 1999–00 to 2016–17.

### 8.1 What methods were used?

The criteria given in Section 1.3 were applied, and the records that included the following ICD-10 codes were included in this chapter:

- the UCoD was Exposure to smoke, fire and flames or Contact with heat and hot substances (X00–X19)
- the MCoDs included codes for Exposure to smoke, fire and flames or Contact with heat and hot substances (X00–X19) and for Injury (S00–T75 or T79)
- the MCoDs included codes for Burns (T20–T31) and for External causes of unintentional injury (V01–X59).

Suicide and homicide deaths (UCoD X60–Y09) were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2 and 8.1. Further information on methods is provided in Appendix A.

### **Box 8.1: External causes of injury due to exposure to smoke, fire, heat, and hot substances injury**

The sections of Chapter XX *External causes of morbidity and mortality* of ICD-10 about unintentional *Exposure to smoke, fire and flames* (X00–X09) and unintentional *Contact with heat and hot substances* (X10–X19) include:

- *Exposure to smoke, fire and flames* (X00–X09)
- *Exposure to uncontrolled fire in building or structure* (X00)
- *Exposure to uncontrolled fire, not in building or structure* (X01)
- *Exposure to controlled fire in building or structure* (X02)
- *Exposure to controlled fire, not in building or structure* (X03)
- *Exposure to ignition of highly flammable material* (X04)
- *Exposure to ignition or melting of nightwear* (X05)
- *Exposure to ignition or melting of other clothing and apparel* (X06)
- *Exposure to other specified smoke, fire and flames* (X07)
- *Exposure to unspecified smoke, fire and flames* (X09)
- *Contact with heat and hot substances* (X10–X19)
- *Contact with hot drinks, food, fats and cooking oils* (X10)
- *Contact with hot tap-water* (X11)
- *Contact with other hot fluids* (X12)
- *Contact with steam and hot vapours* (X13)
- *Contact with hot air and gases* (X14)
- *Contact with hot household appliances* (X15)
- *Contact with hot heating appliances, radiators and pipes* (X16)
- *Contact with hot engines, machinery and tools* (X17)
- *Contact with other hot metals* (X18)
- *Contact with other and unspecified heat and hot substances* (X19).

## **8.2 How many deaths in 2016–17 were due to unintentional thermal injury?**

*Unintentional* thermal injuries accounted for 101 injury deaths, 0.8% of all injury deaths (Table 8.1). More than twice as many males as females were fatally injured due to this type of injury in 2016–17.



**Table 8.1: Key indicators for unintentional thermal injury deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	70	31	101
Percentage of all injury deaths	0.9	0.6	0.8
Crude rate (deaths per 100,000 population)	0.6	0.3	0.4
Age-standardised rate (deaths per 100,000 population)	0.6	0.2	0.4

Source: AIHW NMD.

People aged 65 and over accounted for almost 41% of all unintentional thermal injury deaths (Table 8.2).

The proportion of male deaths was higher than female deaths in people aged 25–44 and 45–64, while the opposite occurred for those aged 65 and over. These results should be treated with caution due to the relatively low number of deaths involved.

**Table 8.2: Unintentional thermal injury deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	1	1.4	0	0.0	1	1.0
5–14	0	0.0	3	9.7	3	3.0
15–24	7	10.0	4	12.9	11	10.9
25–44	18	25.7	4	12.9	22	21.8
45–64	17	24.3	6	19.4	23	22.8
65+	27	38.6	14	45.2	41	40.6
<b>Total</b>	<b>70</b>	<b>100.0</b>	<b>31</b>	<b>100.0</b>	<b>101</b>	<b>100.0</b>

Source: AIHW NMD.

## State or territory of usual residence

Age-standardised rates for unintentional thermal injury deaths for residents of Tasmania (1.7 deaths per 100,000 population) and the Northern Territory (1.4 deaths per 100,000) were, respectively, 4.3 times and 3.5 times as high as the national rate (0.4 deaths per 100,000) (Table 8.3). These results should be treated with caution, as even small variation in the case numbers in these jurisdictions can lead to proportionately large variability in rates from year to year. The more populous jurisdictions recorded rates similar to the national rate.

**Table 8.3: Unintentional thermal injury deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	35	20	14	10	8	10	0	4
%	34.7	19.8	13.9	9.9	7.9	9.9	0.0	4.0
Age-standardised rate (deaths per 100,000 population)	0.4	0.3	0.3	0.4	0.4	1.7	0.0	1.4

Source: AIHW NMD.

## Remoteness of usual residence

Age-standardised rates for unintentional thermal injury were higher in *Inner regional* and *Outer regional* areas than in *Major cities* (Table 8.4). Rates for the 2 most remote areas are difficult to interpret, because they are sensitive to even small variation in the case numbers.

**Table 8.4: Unintentional thermal injury deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	45	27	24	2	2
%	45.3	26.8	24.0	2.0	1.9
Age-standardised rate (deaths per 100,000 population)	0.3	0.5	1.2	0.8	1.6

(a) Excludes 1 death where remoteness was not reported.

(b) Derived using ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised death rates for unintentional thermal injury were similar for residents of the 3 lowest socioeconomic areas (Table 8.5). These rates were 1.7 times the rate for residents of the second highest socioeconomic areas, and 5 times the rate for residents of the highest. Comparison of rates between socioeconomic areas should be treated with caution due to the relatively small numbers of deaths involved.

**Table 8.5: Unintentional thermal injury deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	24	27	26	16	7
%	23.8	26.7	25.7	15.8	6.9
Age-standardised rate (deaths per 100,000 population)	0.5	0.5	0.5	0.3	0.1

Note: Excludes 1 death where socioeconomic area was not reported.

Source: AIHW NMD.

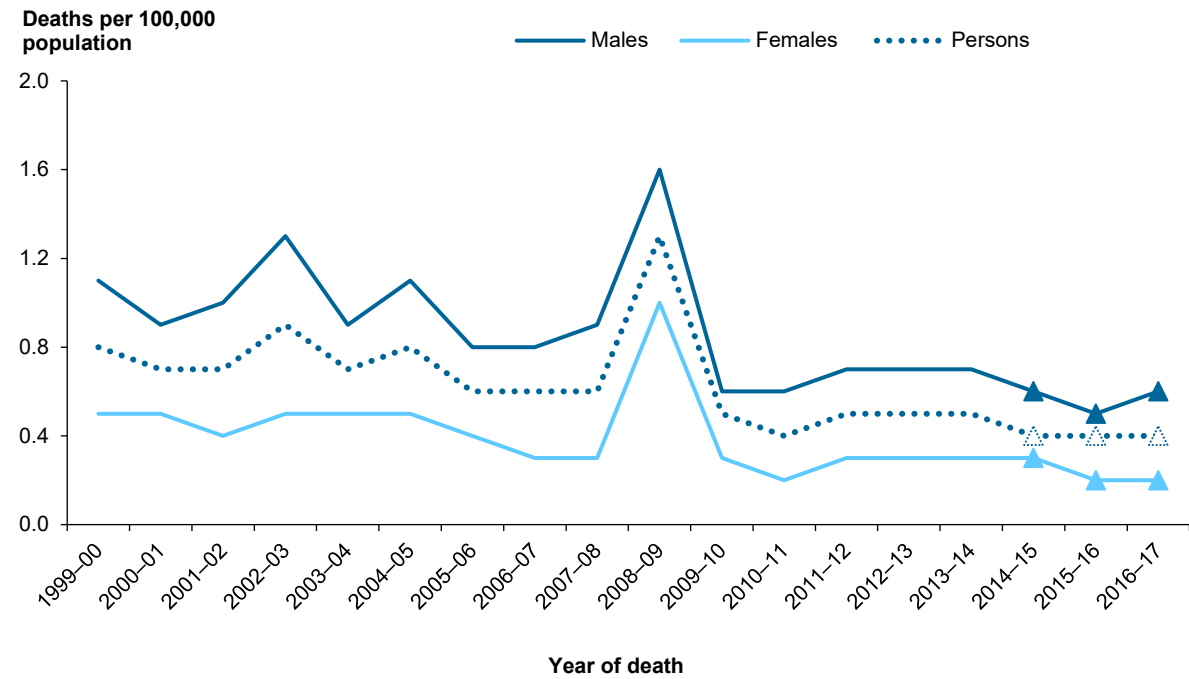
## 8.3 How have unintentional thermal injury deaths changed over time?

Between 1999–00 and 2016–17, age-standardised rates of unintentional thermal injury deaths fluctuated, but fell over time, with the exception of a spike in 2008–09 as a result of the 2009 Victorian bushfires (Figure 8.1).

### Age and sex

Despite some fluctuations, patterns in rates for males and females were similar. Rates for males were consistently 1.5–3 times as high as female rates.

**Figure 8.1: Age-standardised rates of unintentional thermal injury deaths, by sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF8.1.

Source: AIHW NMD.

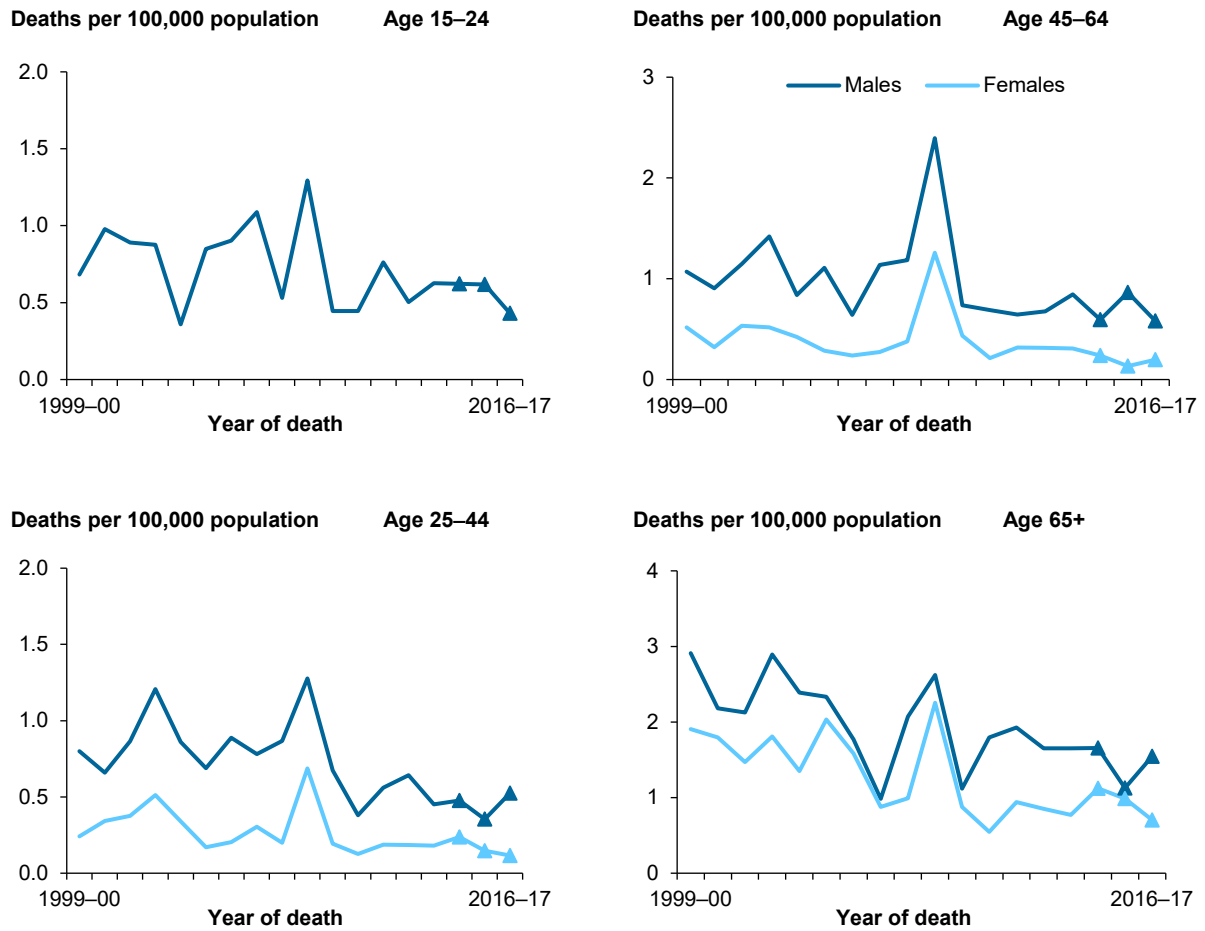
Figure 8.2 shows changes in thermal injury death rates between 1999–00 and 2016–17 in each age group by sex.

Age-specific rates for males were higher than female rates for all ages and in all years. The peak in rates in 2008–09—due to the 2009 Victorian bushfires—was most prominent in those aged 45–64. The difference in rates between males and females was most marked at ages 25–44.

Rates declined over time for both males and females in all 4 of the age groups shown, with the most marked downward trend among those aged 65 and over.

Rates for children aged 0–14 and women aged 15–24 are not shown, due to small numbers.

**Figure 8.2: Age-specific rates of unintentional thermal injury deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF8.2.
3. Rates for children aged 0–4 and 5–14 and for females aged 15–24 are not shown, due to small numbers.

Source: AIHW NMD.

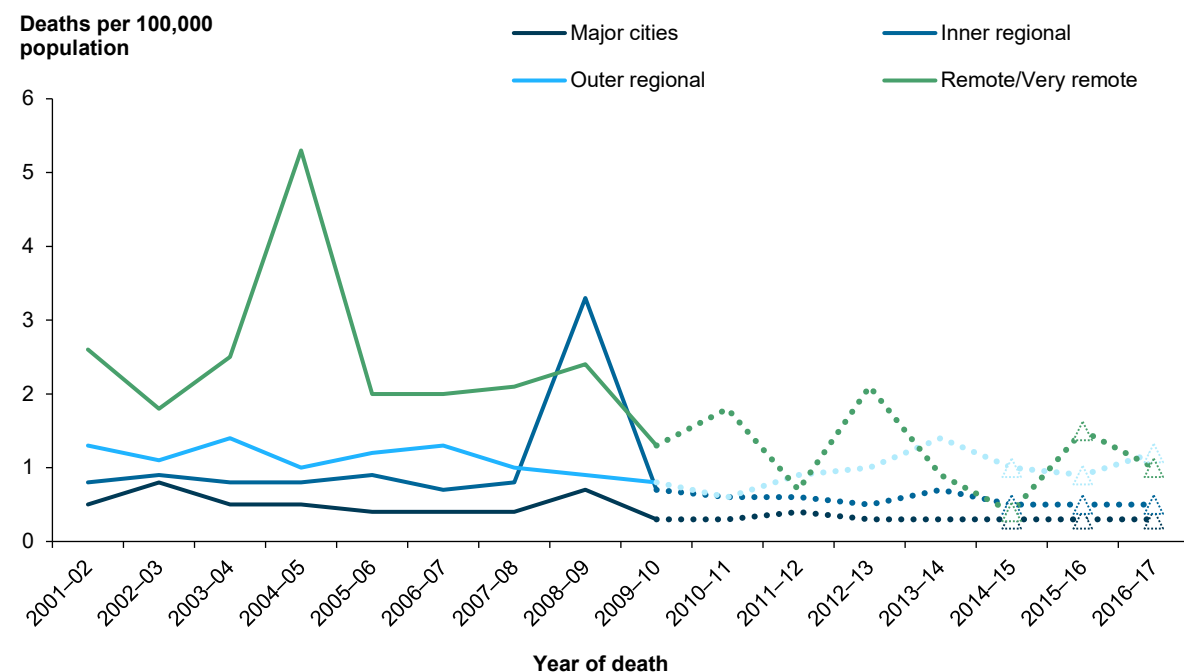
## Remoteness of usual residence

Between 2001–02 and 2016–17, rates of unintentional thermal injury deaths were consistently higher for residents of *Remote and very remote* areas than for residents of all other remoteness areas (Figure 8.3). Notably, in 2016–17, the rates for all remoteness areas were similar.

The fluctuation in rate of injury deaths in the *Remote and very remote* areas is partly a reflection of the small population and number of incidents occurring each year. But it also reflects the pattern of deaths due to bushfires, with the number varying greatly between years.

The peak in *Remote and very remote* areas in 2004–05 includes the deaths that occurred in the Eyre Peninsula fire in January 2005, while the peak in *Inner regional* areas in 2008–09 includes the deaths that occurred in the Victorian bushfires in February 2009.

**Figure 8.3: Age-standardised rates of unintentional thermal injury deaths, by remoteness of usual residence, 2001–02 to 2016–17**



### Notes

1. Data for 1999–00 and 2000–01 were unavailable.
2. The rates for *Remote* and *Very remote* areas are combined, due to small numbers.
3. Full lines are ASGC-based, while dotted lines are ASGS-based.
4. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
5. Data underpinning this figure are available in the supplementary table spreadsheet Table SF8.3.

Source: AIHW NMD.

## 9 Other unintentional injury

This chapter provides a brief overview of deaths in 2016–17 that involved types of unintentional injury not covered in chapters 3–8 of this report.

Trends are not presented in this section, because it includes deaths due to a diverse variety of causes.

Trends of some types of death included in this chapter were also affected markedly by changes in methods of processing mortality data that occurred during the period, which is shown by presenting trends for certain causes. Further information for 1999–2010 has previously been reported (AIHW: Harrison & Henley 2015).

### 9.1 What methods were used?

The criteria given in Section 1.3 were applied, and the records that included the following ICD-10 codes were included in this chapter:

- the UCoD was a code from *Unintentional external causes of injury* not included in other chapters
- the MCoDs included codes from *Unintentional external causes of injury* not included in other chapters, and at least 1 code for *Injury* (S00–T75 or T79).

#### **Box 9.1: External causes of other unintentional injury**

Other unintentional injury of Chapter XX *External causes of morbidity and mortality* of ICD-10 includes:

- *Exposure to inanimate and animate mechanical forces* (W20–W64)
- *Accidental threats to breathing* (W75–W84)
- *Exposure to electric current, radiation and extreme ambient air temperature and pressure* (W85–W99)
- *Contact with venomous animals and plants* (X20–X29)
- *Exposure to forces of nature* (X30–X39)
- *Overexertion, travel and privation* (X50–X57)
- *Accidental exposure to other and unspecified factors* (X58–X59).

All deaths with UCoD of X59 (*Accidental exposure to unspecified factors*) in conjunction with fracture codes are included in Chapter 7 ‘Falls’, and not in this chapter.

Suicide and homicide deaths (UCoD X60–Y09) were excluded. The concepts underlying the abbreviations used in this section are defined in the Glossary.

## 9.2 How many deaths in 2016–17 were due to other unintentional injury?

Other unintentional injury accounted for 1,698 injury deaths, about 13% of all injury deaths for this period (Table 9.1). During this time, 1.5 times as many males as females were fatally injured due to other unintentional causes.

**Table 9.1: Key indicators for other unintentional injury deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	1,017	681	1,698
Percentage of all injury deaths	12.8	13.1	12.9
Crude rate (deaths per 100,000 population)	8.4	5.5	7.0
Age-standardised rate (deaths per 100,000 population)	7.9	4.1	5.9

Source: AIHW NMD.

## 9.3 Overview of other unintentional injury deaths

Table 9.2 shows the mechanisms that were responsible for deaths included in this chapter, with numbers and proportions of deaths in 2016–17.

The most common mechanism was *Inhalation and ingestion of gastric contents, food or other objects causing obstruction of the respiratory tract* (1,048 deaths, or 62% of all deaths from other unintentional injury deaths). Deaths were heavily concentrated in older age groups, with 858 (82%) of deaths involving this mechanism being among people aged 65 and over.

**Table 9.2: Major mechanisms of deaths included in the other unintentional injury category, 2016–17**

ICD-10 codes	Mechanism	Number <sup>(a)</sup>	%
W20–W22	Struck against or struck by object	38	2.2
W23	Caught, crushed, jammed or pinched in or between objects	22	1.3
W24	Contact with lifting and transmission devices, n.e.c.	2	0.1
W25–W26	Contact with sharp object (includes sharp glass, knife, sword or dagger)	7	0.4
W27–W31	Contact with tools or machinery (includes non-powered or powered hand tools, agricultural machinery, powered lawnmower)	10	0.6
W32–W34	Unintentional discharge of firearms	3	0.2
W35–W40	Unintentional explosions (includes explosion and rupture of boiler, gas cylinder, pressurised tyre, pipe, hose, firework, and other materials)	3	0.2
W41–W43	Exposure to high-pressure jet, noise or vibration	0	0.0
W44–W45	Foreign body entering into or through eye or natural orifice, or through skin	1	0.1
W46	Contact with hypodermic needle	4	0.2
W49	Exposure to other and unspecified inanimate mechanical forces	3	0.2
W50–W52	Struck by or against another person, or crushed, pushed or stepped on by crowd of people	4	0.2
W53–W59	Bitten, struck, stung, crushed or contact with mammals, marine animals, insects or reptiles	13	0.8
W64	Exposure to other and unspecified animate mechanical forces	0	0.0
W75–W77	Unintentional hanging, suffocation and strangling	30	1.8
W78–W80	Inhalation and ingestion of gastric contents, food or other objects causing obstruction of the respiratory tract	1,048	61.7
W81–W84	Other threats to breathing (includes trapped in a low oxygen environment, asphyxiation, aspiration and suffocation, n.e.c.)	18	1.1
W85–W87	Electrocution	12	0.7
W91	Exposure to unspecified type of radiation	1	0.1
W92–W99	Exposure to environmental factors (includes heat or cold of man-made origin and exposure to high and low air pressure)	3	0.2
X20–X29	Contact with venomous animals and plants	6	0.4
X30–X39	Exposure to forces of nature (includes natural heat or cold, lightning, earthquake, flood, avalanche or landslide)	48	2.8
X50–X57	Overexertion, travel and privation	11	0.6
X58–X59 <sup>(b)</sup>	Exposure to other or unspecified factors	423	24.9
<b>Total</b>		<b>1,698</b>	<b>100.0<sup>(b)</sup></b>

(a) Excludes X59 accompanied by MCoD for fracture (these deaths are included in Chapter 7).

(b) The total number of the individual mechanisms exceeds the total number of deaths, because some deaths have been assigned more than 1 external cause code, resulting in death being counted in more than 1 category, and the mechanism-specific proportions sum to more than 100%.

Source: AIHW NMD.



## 9.4 Trends for selected mechanisms of injury

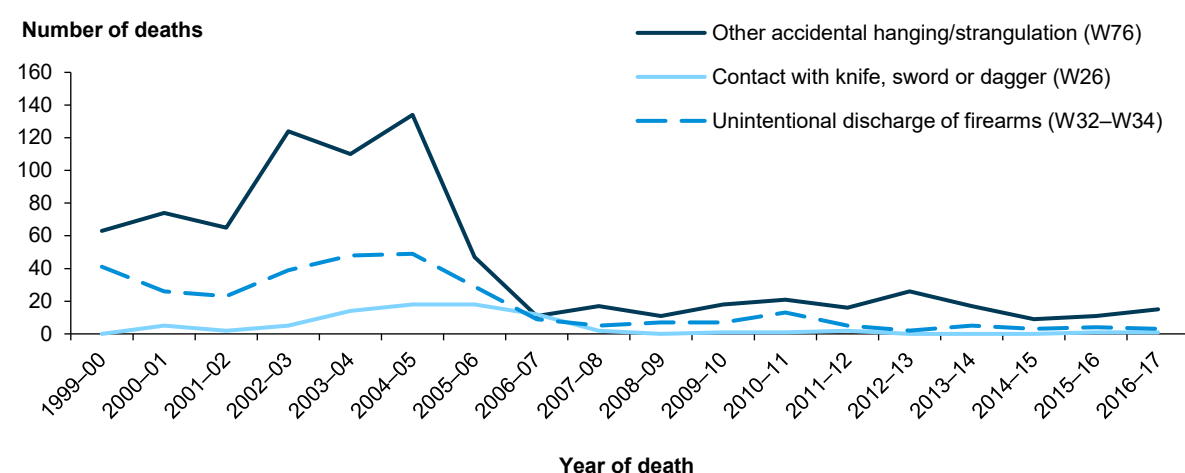
Classification of some of the types of deaths included in this chapter varied markedly with the changes in processing of deaths data that occurred in the period covered by this report (see Appendix A). This is demonstrated in the trends in numbers of deaths involving 3 mechanisms of injury (Figure 9.1).

The codes charted include deaths by mechanisms that are common in suicide and homicide: hanging, stabbing, and shooting. For all 3 mechanisms, there was an increase in numbers of deaths coded as ‘unintentional’ early in the decade followed by a sharp drop after 2004–05. The revised processing method applied to all deaths with a year of death 2005–06 or later and, in that period, few injury deaths with these mechanisms were recorded as being unintentional.

Deaths registered in 2006 provide the most direct indication of the effect of the changes in processing. The first release was processed before the changes were introduced, and the second release (used when preparing Figure 9.1) was processed after. The numbers of deaths coded to the 3 mechanisms shown in the Figure 9.1 in the first and second release of 2006 data were:

- W76 Other accidental hanging and strangulation—179 and 16
- W26 Contact with knife, sword or dagger—58 and 27
- W32–W34 Unintentional discharge of firearms—56 and 11.

**Figure 9.1: Deaths involving mechanisms commonly associated with suicide and homicide, and recorded as unintentional, 1999–00 to 2016–17**



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table SF9.1.

Source: AIHW NMD.

### Firearm-related deaths

Between 1999–00 to 2016–17, there were 318 unintentional firearm-related deaths, of which only 27 (less than 9%) were females (Table S.1). In the period before the ABS introduced its revised process (1999–00 to 2004–05), there was an average of about 36 deaths annually, while in the period following the change (2006–07 to 2016–17), there was an average of about 6 deaths annually (nearly all males). This suggests that, after the change, firearm-related deaths were more likely to be assigned as an intentional cause of death.

# 10 Suicide deaths

This chapter provides:

- a brief overview of suicide deaths in 2016–17
- a description of trends in suicide deaths from 1999–00 to 2016–17.

Trends in suicide have been the subject of much attention, and the ABS revised its process during the period covered by this report, because of problems resulting in under-identification (see Appendix A and AIHW: Harrison & Henley 2014).

## 10.1 What methods were used?

The criteria given in Section 1.3 were applied, and the records that included the following ICD-10 codes were included in this chapter:

- the UCoD was *Intentional self-harm* (X60–X84)
- the MCoDs included codes for *Intentional self-harm* and for *Injury* (S00–T75 or T79).

Few deaths were included by the second criterion (about 4 per year, on average). The concepts underlying the abbreviations used in this section are defined in the Glossary.

The title of ICD-10 code block X60–X84 is *Intentional self-harm*. Deaths coded to this range are commonly referred to as ‘suicide’, a practice followed in this report, although the scope of inclusion of the code block includes ‘purposely self-inflicted poisoning or injury’, suicide and attempted suicide. That is, it could include deaths due to intentional self-harm where a fatal outcome was not intended.

Data from the NCIS were used to supplement the data from the ABS. That is particularly important for the period before the start of the improved methods for recording suicide deaths, which were fully implemented for deaths registered in 2008, and have been used since then. The revised methods solved a problem which had resulted in under-reporting of suicide deaths (AIHW: Harrison et al. 2009).

The ABS applied revised methods to deaths registered in 2006, but not to deaths registered before 2006. This report uses a method modelled on the method used by the ABS for deaths registered in 2008, and later to identify intentional self-harm deaths from the NCIS (see Appendix A and AIHW: Henley & Harrison 2015) This method was applied to the entire period for which NCIS data are available (2001 onwards).

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 10.1.

### **Box 10.1: External causes of intentional self-harm (suicide)**

The *Intentional self-harm* (X60–X84) section of Chapter XX *External causes of morbidity and mortality* of ICD-10 includes:

- *Intentional self-poisoning by and exposure to nonopioid analgesics, antipyretics and antirheumatics* (X60)
- *Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified* (X61)
- *Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified* (X62)
- *Intentional self-poisoning by and exposure to other drugs acting on the autonomic nervous system* (X63)
- *Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances* (X64)
- *Intentional self-poisoning by and exposure to alcohol* (X65)
- *Intentional self-poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapours* (X66)
- *Intentional self-poisoning by and exposure to other gases and vapours* (X67)
- *Intentional self-poisoning by and exposure to pesticides* (X68)
- *Intentional self-poisoning by and exposure to other and unspecified chemicals and noxious substances* (X69)
- *Intentional self-harm by hanging, strangulation and suffocation* (X70)
- *Intentional self-harm by drowning and submersion* (X71)
- *Intentional self-harm by handgun discharge* (X72)
- *Intentional self-harm by rifle, shotgun and larger firearm discharge* (X73)
- *Intentional self-harm by other and unspecified firearm discharge* (X74)
- *Intentional self-harm by explosive material* (X75)
- *Intentional self-harm by smoke, fire and flames* (X76)
- *Intentional self-harm by steam, hot vapours and hot objects* (X77)
- *Intentional self-harm by sharp object* (X78)
- *Intentional self-harm by blunt object* (X79)
- *Intentional self-harm by jumping from a high place* (X80)
- *Intentional self-harm by jumping or lying before moving object* (X81)
- *Intentional self-harm by crashing of motor vehicle* (X82)
- *Intentional self-harm by other specified means* (X83)
- *Intentional self-harm by unspecified means* (X84).

## 10.2 How many deaths in 2016–17 were due to suicide?

Suicides accounted for 3,039 injury deaths, about 23% of all injury deaths in this period (Table 10.1). There were 2.9 times as many suicide deaths for males as for females.

**Table 10.1: Key indicators for suicide deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	2,253	786	3,039
Percentage of all injury deaths	28.4	15.1	23.1
Crude rate (deaths per 100,000 population)	18.6	6.4	12.5
Age-standardised rate (deaths per 100,000 population)	18.6	6.3	12.3

Source: AIHW NMD.

People aged 25–44 and 45–64 accounted for 70% of all suicide deaths (Table 10.2). By contrast, 40% of injury deaths from all causes were in this age range. Males and females had similar proportions of suicide deaths across age groups.

**Table 10.2: Suicide deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
10–14	20	0.9	6	0.8	26	0.9
15–24	308	13.7	103	13.1	411	13.5
25–44	877	38.9	272	34.6	1,149	37.8
45–64	699	31.0	278	35.4	977	32.1
65+	349	15.5	127	16.2	476	15.7
<b>Total</b>	<b>2,253</b>	<b>100.0</b>	<b>786</b>	<b>100.0</b>	<b>3,039</b>	<b>100.0</b>

Source: AIHW NMD.

### State or territory of residence

All jurisdictions, except for New South Wales, Victoria, and the Australian Capital Territory, and an age-standardised rate for suicides over the national rate of 12.3 deaths per 100,000 population (Table 10.3). Tasmania recorded the highest rate (18.5 deaths per 100,000), while Victoria recorded the lowest rate (9.5 deaths per 100,000).

It has been shown for an earlier period that timing of processing of intentional self-harm deaths differed between jurisdictions (AIHW: Henley & Harrison 2009). The data for deaths in 2016–17 are subject to review and revision, so final jurisdiction-specific rates might differ from those shown in this section.

**Table 10.3: Suicide deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	892	604	750	388	225	97	41	42
%	29.4	19.9	24.7	12.8	7.4	3.2	1.3	1.4
Age-standardised rate (deaths per 100,000 population)	11.3	9.5	15.4	15.0	13.0	18.5	10.4	17.5

Source: AIHW NMD.

## Remoteness of usual residence

Age-standardised suicide rates rose with increasing remoteness of place usual residence, although rates for *Inner regional*, *Outer regional* and *Remote* areas were similar (Table 10.4). The rate for residents of *Remote* areas was more than 2.4 times the rate for residents of *Major cities*.

**Table 10.4: Suicide deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	1,884	694	343	48	50
%	62.4	23.0	11.4	1.6	1.7
Age-standardised rate (deaths per 100,000 population)	10.6	16.4	17.0	16.2	25.6

(a) Excludes 19 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate of suicide rose with socioeconomic disadvantage (Table 10.5). The rate for people living in the lowest socioeconomic areas (14.7 deaths per 100,000 population) was almost 1.5 times the rate for people living in the highest socioeconomic areas (9.9 per 100,000 population).

**Table 10.5: Suicide deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	698	694	645	490	492
%	23.0	22.8	21.2	16.1	16.2
Age-standardised rate (deaths per 100,000 population)	14.7	14.0	13.2	9.9	9.9

Note: Excludes 20 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised suicide rate for Aboriginal and Torres Strait Islander people was 2.3 times as high as the rate for non-Indigenous Australians (Table 10.6).

**Table 10.6: Key indicators for suicide deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	133	44	177	1,539	525	2,064
Age-standardised rate (deaths per 100,000 population)	42.5	13	27.6	18.5	6.1	12.2
Rate ratio <sup>(a)</sup>	2.3	2.1	2.3	..	..	..
Rate difference <sup>(b)</sup>	24.0	6.9	15.4	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons, divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons, minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

The proportions of suicides in each age group differed markedly between Indigenous and non-Indigenous Australians (Table 10.7).

For Aboriginal and Torres Strait Islander people, 82% of suicides occurred among those aged 15–44, compared with 48% for non-Indigenous Australians. Conversely, there were only 5 (2.7%) suicide deaths of Aboriginal and Torres Strait Islander people aged 65 and over, whereas 17% (347) of suicide deaths for non-Indigenous Australians were among people in this age group.

**Table 10.7: Suicide deaths, by Indigenous status, age and sex, 2016–17**

	Indigenous		Non-Indigenous	
	Number	%	Number	%
<b>Males</b>				
10–14	2	1.5	14	0.9
15–24	45	33.8	187	12.2
25–44	65	48.9	576	37.4
45–64	17	12.8	507	32.9
65+	4	3.0	255	16.6
<b>Total</b>	<b>133</b>	<b>100.0</b>	<b>1,539</b>	<b>100.0</b>
<b>Females</b>				
10–14	0	0.0	6	1.1
15–24	21	47.7	53	10.1
25–44	15	34.1	175	33.3
45–64	7	15.9	199	37.9
65+	1	2.3	92	17.5
<b>Total</b>	<b>44</b>	<b>100.0</b>	<b>525</b>	<b>100.0</b>

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 10.3 Mechanisms of suicide

The most frequently recorded mechanism of suicide in 2016–17 was *Hanging, strangulation and suffocation* (1,716; 57% of suicide deaths), which accounted for 60% (1,342) of male suicide deaths and 48% (374) of female suicide deaths (Table 10.8). In 1999–2000, these proportions were 43% for males and 37% for females, and proportions for both sexes have risen since then.

The second most frequently recorded type of suicide method was *Poisoning* (639; 21% of suicide deaths), which accounted for 34 % of female suicide deaths, compared with 17% of male suicide deaths.

The use of firearms was much more prominent among male suicides (6.8%; 153 deaths) than among female suicides (1.0%; 8 deaths).

**Table 10.8: Mechanism of suicide deaths, by sex, 2016–17**

Mechanism of suicide	Males		Females		Persons	
	Number	%	Number	%	Number	%
Hanging, strangulation and suffocation	1,342	59.6	374	47.6	1,716	56.5
Poisoning	373	16.6	266	33.8	639	21.0
Firearms	153	6.8	8	1.0	161	5.3
Jumping from a high place	115	5.1	43	5.5	158	5.2
Jumping or lying before moving object	74	3.3	29	3.7	103	3.4
Cutting, piercing	81	3.6	15	1.9	96	3.2
Drowning and submersion	38	1.7	25	3.2	63	2.1
Crashing of motor vehicle	34	1.5	7	0.9	41	1.3
Smoke, fire and flames, and hot substances	24	1.1	10	1.3	34	1.1
Other specified mechanisms	10	0.4	2	0.3	12	0.4
Unspecified mechanisms	9	0.4	7	0.9	16	0.5
<b>Total suicides</b>	<b>2,253</b>	<b>100.0</b>	<b>786</b>	<b>100.0</b>	<b>3,039</b>	<b>100.0</b>

Source: AIHW NMD.

Table 10.9 lists the type of poisoning agent coded for suicide deaths that involved poisoning by drugs or the toxic effects of substances chiefly non-medicinal as to source.

The most common poisoning agents leading to death were *Antiepileptic, sedative-hypnotic and antiparkinsonism drugs*, which were involved in 40% (254) of deaths. Of deaths involving this class of drugs, 77% (196) involved the use of benzodiazepines, and 17% (42) involved the use of barbiturates.

Other classes of drugs commonly leading to death were *Psychotropic drugs, not elsewhere classified* (243) and *Narcotics and psychodysleptics [hallucinogens]* (214). Of deaths involving psychotropic drugs, 75% (182) involved the use of antidepressants.

The most common poisoning agent for non-pharmaceutical substances was carbon monoxide, which was involved in 23% (145) of poisoning-related suicide deaths.

**Table 10.9: Poisoning-related suicide deaths, by type of poisoning agent, 2016–17**

Poisoning agent	Number	%
<b>Drugs, medicaments and biological substances</b>		
Antiepileptic, sedative-hypnotic and antiparkinsonism drugs	254	39.7
Psychotropic drugs, not elsewhere classified	243	38.0
Narcotics and psychodysleptics [hallucinogens]	214	33.5
Nonopioid analgesics, antipyretics and antirheumatics	92	14.4
Diuretics and other unspecified drugs, medicaments and biological substances	42	6.6
Drugs primarily affecting the autonomic nervous system	29	4.4
Primarily systemic and haematological agents, not elsewhere classified	35	5.5
Hormones and their synthetic substitutes and antagonists, not elsewhere classified	22	3.4
Agents primarily affecting the cardiovascular system	15	2.3
Other and unspecified drugs, medicaments and biological agents	20	3.1
<b>Non-pharmaceutical substances</b>		
Carbon monoxide	145	22.7
Alcohol	72	11.3
Other gases, fumes and vapours	8	1.3
Pesticides	7	1.1
Other and unspecified	6	0.9
<b>Total</b>	<b>639</b>	<b>100.0<sup>(a)</sup></b>

(a) More than 1 type of poisoning agent was reported for some suicide deaths, so the numbers of suicide deaths including codes for the specified types of agent sum to more than the total number of suicide deaths involving poisoning (661 deaths), and the agent-specific proportions sum to more than 100%.

Source: AIHW NMD.

## 10.4 How have suicide deaths changed over time?

Age-standardised rates of suicide, based on data from the NMD, fell from 13.3 deaths per 100,000 population in 1999–00 to 10.2 deaths per 100,000 in 2004–05, before rising to 12.6 deaths per 100,000 by 2014–15, then remaining relatively steady (Figure 10.1).

Supplementary estimates, based on NCIS data as at March 2019, indicate a more constant downward trend in age-standardised rates of suicide for 2001–02 to 2009–10, with rates rising again towards the end of the charted period.

Further information on the method used to produce the supplementary estimates is provided in Appendix A.

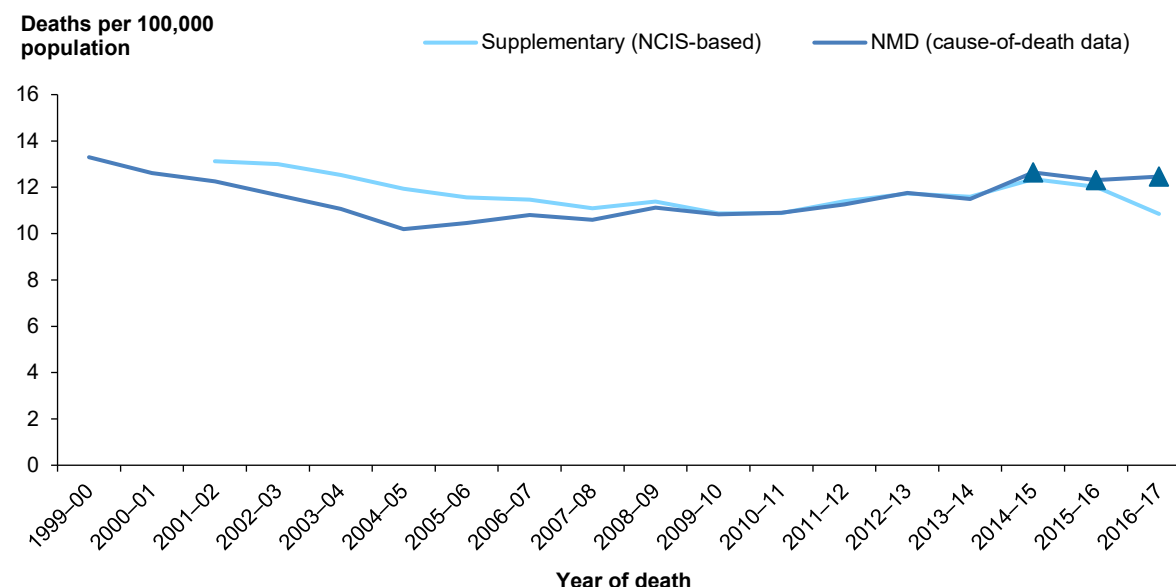
Between 2008–09 and 2015–16, both data sources produced very similar annual rates of suicide. Rates for 2014–15 to 2016–17 might rise, as revisions to causes for deaths are reported to coroners.

The difference between the 2 series for earlier years, before the ABS revised its methods, is consistent with earlier work (AIHW: Henley & Harrison 2009; AIHW: Harrison et al. 2009). A previous report of suicide deaths in 2004–05, based on NCIS data in 2008, estimated there were 2,341 deaths for that year (AIHW: Henley & Harrison 2009), which is similar to numbers used to calculate the supplementary rate for 2004–05, shown in Figure 10.1 (2,395).

Further information on the effects of changes in methods on estimates of suicide for 1999–2010 has previously been reported (AIHW: Harrison & Henley 2015).



**Figure 10.1: Age-standardised rates of suicide deaths for cause-of-death (NMD) data and supplementary (NCIS-based) data, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years of NMD-based rates, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF10.1.

Sources: AIHW NMD; NCIS.

## Firearm-related suicides

Between 1999–00 and 2016–17, there were 3,347 firearm-related suicides, of which 168 (5%) were females (Table S.1). After the ABS revised its process (from 2006–07), the annual numbers of firearm-related suicides were higher than the number of suicides that would have been recorded using the pre-revisions processes.

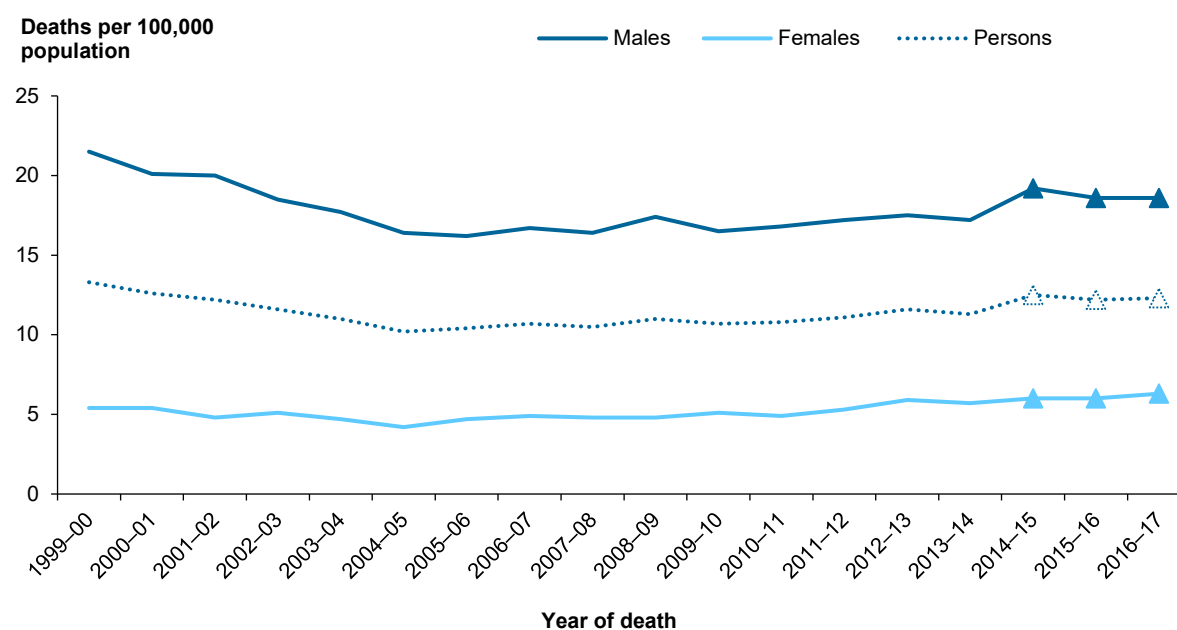
Reasons for this are detailed in Appendix A, and have previously been reported for 1999–2010 (AIHW: Harrison & Henley 2015). Long-term trends for firearm-related suicides have previously been reported (AIHW: Harrison & Henley 2014).

## Age and sex

Age-standardised rates of suicides fell from 13.3 deaths per 100,000 population in 1999–00 to 10.2 per 100,000 in 2004–05, before rising to 12.5 per 100,000 by 2014–15 (Figure 10.2).

The pattern was similar for both males and females. For males, rates fell from 21.5 deaths per 100,000 population in 1999–00 to 16.2 per 100,000 in 2005–06, before rising to 19.2 per 100,000 by 2016–17. For females, rates fell from 5.4 per 100,000 1999–00 to 4.2 per 100,000 in 2004–05, before rising to 6.3 per 100,000 by 2016–17. The rise in female rates from 2004–05 onwards was close to 3% per year and was statistically significant. Rates were consistently 3–4 times as high for males as for females.

**Figure 10.2: Age-standardised rates of suicide deaths, by sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF10.2.

Source: AIHW NMD.

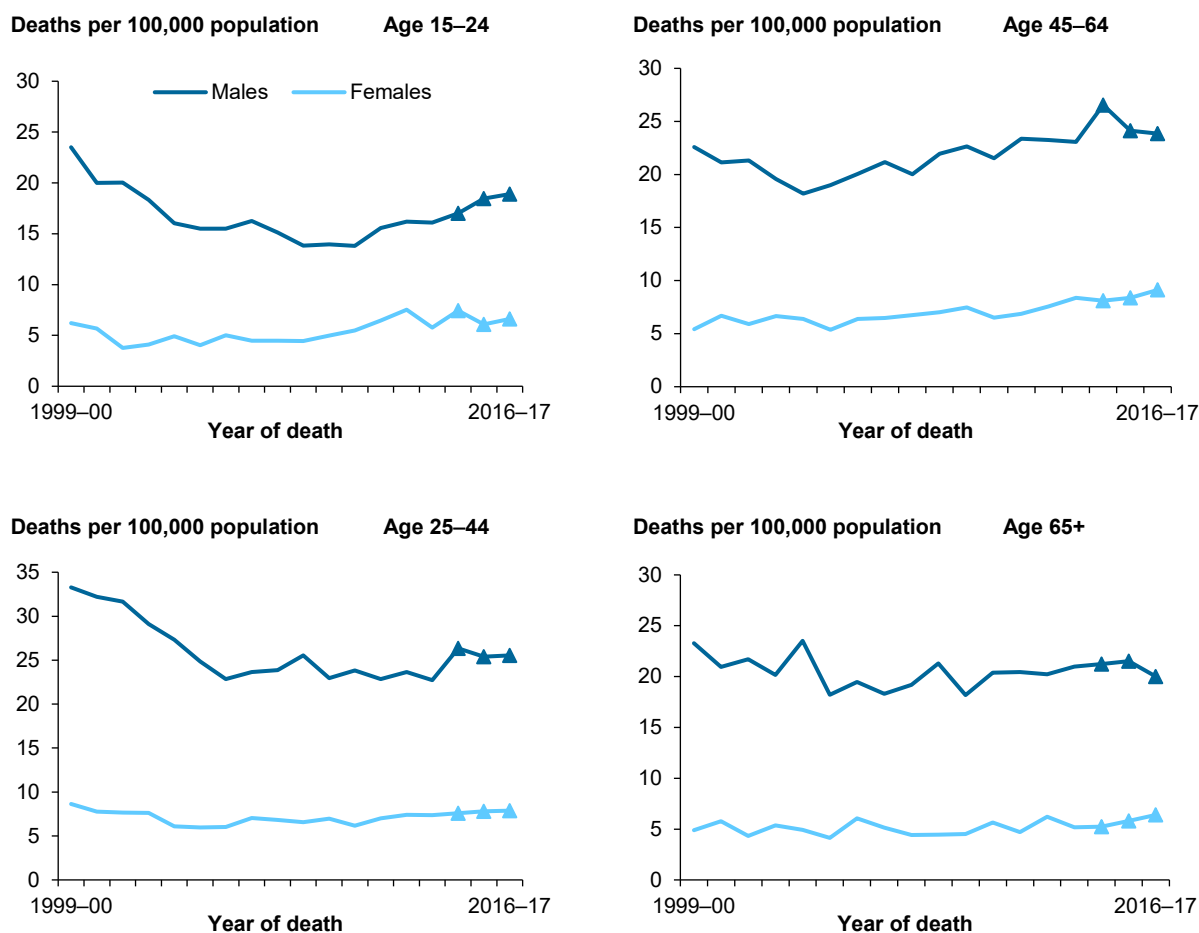
Figure 10.3 shows changes in suicide rates between 1999–00 and 2016–17 in each age group by sex.

Age-standardised rates for males were much higher than rates for females across all age groups for all years.

Rates for males aged 15–24 and 25–44 declined markedly in the first half of the period of interest. But for those aged 15–24, rates rose again in the latter part of the period, while for those aged 25–44, they remained relatively steady after the initial fall. There was an overall rise in rates over the period for males aged 45–64, while rates for males aged 65 and over remained relatively steady.

Rates for females aged 15–24 and 45–64 rose over the period, while rates for females aged 25–44 and 65 and over remained relatively steady.

**Figure 10.3: Age-specific rates of suicide deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF10.3.
3. Rates for children aged 0–4 and 5–14 are not shown, due to small numbers.

Source: AIHW NMD.

## Remoteness of usual residence

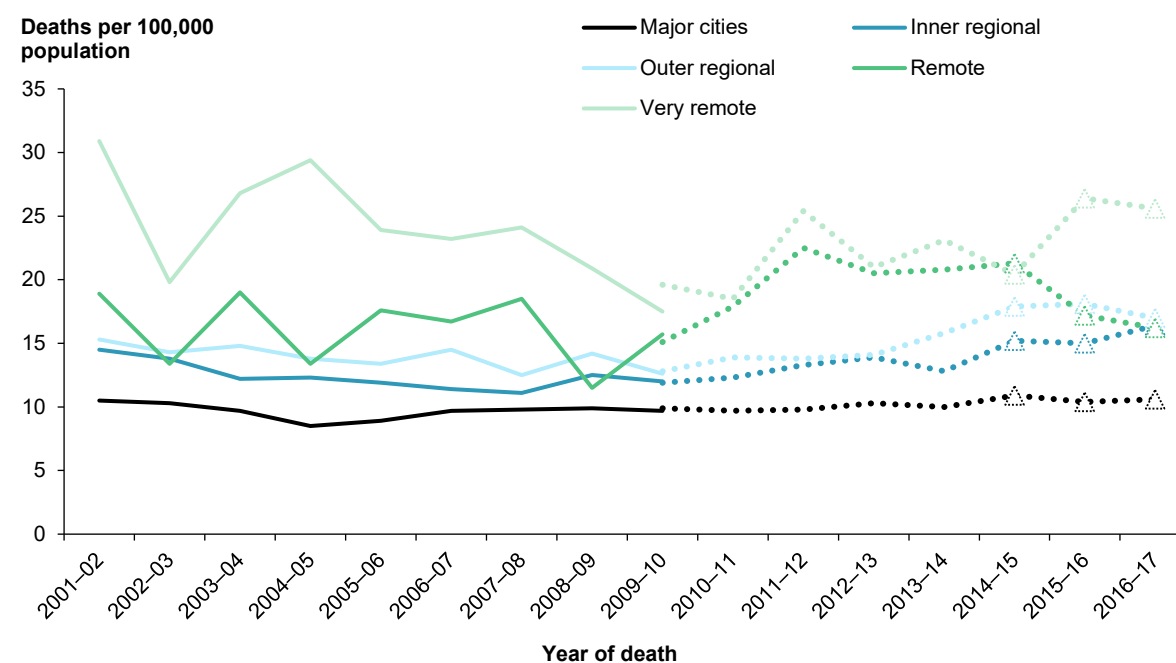
Between 2001–02 and 2016–17, rates of suicide deaths were consistently higher for residents of *Very remote* areas than for residents of all other remoteness areas (Figure 10.4). Rates for residents of *Very remote* areas were consistently 2–3 times as high as rates for residents of *Major cities*.

The fluctuation in the rates of suicide deaths in the *Very remote* and *Remote* areas of Australia is partly a reflection of the small population and number of deaths occurring each year. Rates for residents of *Inner regional* and *Outer regional* areas rose in the latter part of the period, while rates for residents of *Major cities* remained relatively steady.

In 2009–10, the only year for which both ASGC-based and ASGS-based rates are shown, the ASGS-based rate was higher than the ASGC-based rate for *Very remote* areas.

See Appendix A for more information of the ASGC and ASGS classification systems.

**Figure 10.4: Age-standardised rates of suicide deaths, by remoteness of usual residence, 2001–02 to 2016–17**



**Notes**

1. Data for 1999–00 and 2000–01 were unavailable.
2. Full lines are ASGC-based, while dotted lines are ASGS-based.
3. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
4. Data underpinning this figure are available in the supplementary table spreadsheet Table SF10.4.

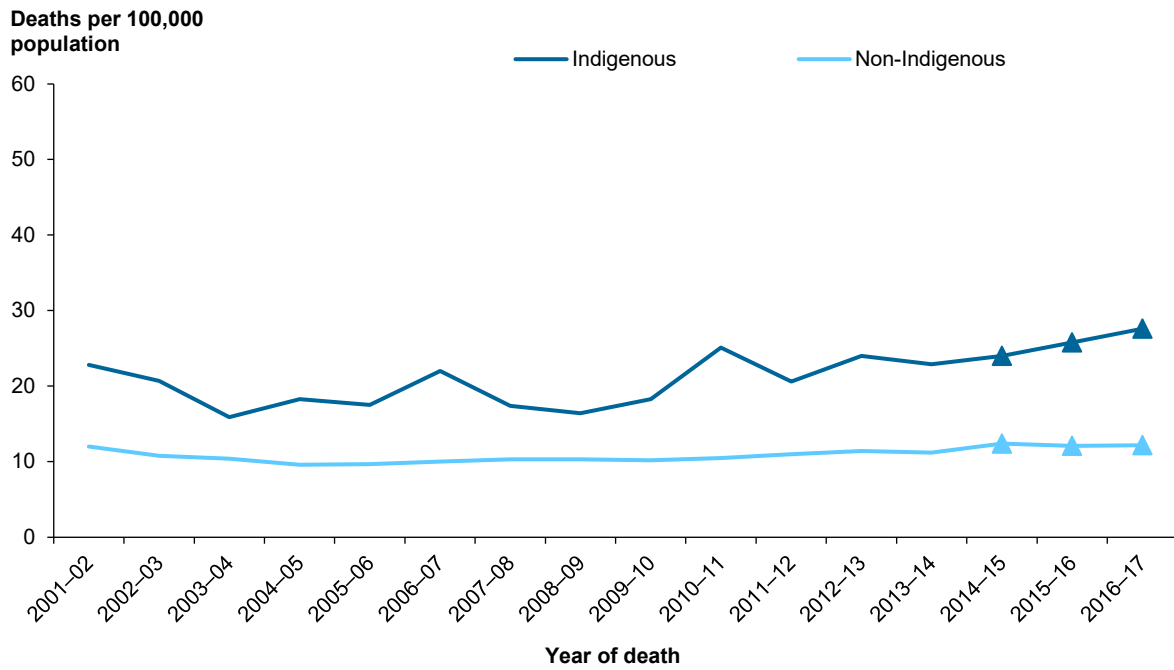
Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

Age-standardised rates of suicide deaths for Aboriginal and Torres Strait Islander people fluctuated to some degree between 2001–02 and 2016–17, recording a statistically significant rise of 2.8% per year (Figure 10.5).

Rates for non-Indigenous Australians did not change significantly over the period. Rates for Aboriginal and Torres Strait Islander people were consistently 1.5–2.5 times as high as the rates for non-Indigenous Australians over this period.

**Figure 10.5: Age-standardised rates of suicide deaths, by Indigenous status, 2001–02 to 2016–17**



**Notes**

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF10.5.

Source: AIHW NMD.

# 11 Homicide deaths

This chapter provides:

- a brief overview of homicide deaths in 2016–17
- a description of trends in homicide deaths from 1999–00 to 2016–17.

Variation in numbers for this cause of death must be interpreted with caution, for reasons described in Section 11.4, Appendix A, and as previously reported for 1999–2010 (AIHW: Harrison & Henley 2015).

## 11.1 What methods were used?

The criteria given in Section 1.3 were applied, and the records that included the following ICD-10 codes were included in this chapter:

- the UCoD was Assault (X85–Y09) or Legal intervention and operations of war (Y35–Y36)
- the MCoDs included any of these codes and a code for Injury (S00–T75 or T79).

Few deaths were included by the second criterion (about 4 per year, on average). Deaths due to legal intervention were also included.

Very few deaths were attributed to operations of war, reflecting the practice that deaths overseas of members of Australian armed forces are not normally registered in Australia (AIHW: Harrison & Henley 2015). The concepts underlying the abbreviations used in this section are defined in the Glossary.

Relevant terms and information about the data used in this chapter are summarised in boxes 1.1, 1.2, 1.3 and 11.1.

### **Box 11.1: External causes of assault (homicide) injury**

The sections of Chapter XX *External causes of morbidity and mortality* of ICD-10 on *Assault* (X85–Y09) and *Legal intervention and operations of war* (Y35–Y36) include:

#### **Assault (X85–Y09)**

- *Assault by drugs, medicaments and biological substances* (X85)
- *Assault by corrosive substance* (X86)
- *Assault by pesticides* (X87)
- *Assault by gases and vapours* (X88)
- *Assault by other specified chemicals and noxious substances* (X89)
- *Assault by unspecified chemical or noxious substance* (X90)
- *Assault by hanging, strangulation and suffocation* (X91)
- *Assault by drowning and submersion* (X92)
- *Assault by handgun discharge* (X93)
- *Assault by other and unspecified firearm discharge* (X95)
- *Assault by explosive material* (X96)
- *Assault by smoke, fire and flames* (X97)
- *Assault by steam, hot vapours and hot objects* (X98)
- *Assault by sharp object* (X99)
- *Assault by blunt object* (Y00)
- *Assault by pushing from high place* (Y01)
- *Assault by pushing or placing victim before moving object* (Y02)
- *Assault by crashing of motor vehicle* (Y03)
- *Assault by bodily force* (Y04)
- *Sexual assault by bodily force* (Y05)
- *Neglect and abandonment* (Y06)
- *Other maltreatment syndromes* (Y07)
- *Assault by other specified means* (Y08)
- *Assault by unspecified means* (Y09).

#### **Legal intervention and operations of war (Y35–Y36)**

- *Legal intervention* (Y35)
- *Operations of war* (Y36).

## 11.2 How many deaths in 2016–17 were due to homicide?

Homicides accounted for 231 injury deaths, just under 2% of all injury deaths in this period (Table 11.1). There were 2.3 times as many homicide deaths of males as of females in this period.

**Table 11.1: Key indicators for homicide deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	161	70	231
Percentage of all injury deaths	2.0	1.3	1.8
Crude rate (deaths per 100,000 population)	1.3	0.6	0.9
Age-standardised rate (deaths per 100,000 population)	1.4	0.6	1.0

Source: AIHW NMD.

Deaths of people aged 25–44 accounted for 46% of homicides (Table 11.2). By contrast, 21% of all injury deaths occurred in this age range. The age pattern of these deaths (peaking in the age groups 25–44 and 45–64) was broadly similar for males and females.

**Table 11.2: Homicide deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	5	3.1	5	7.1	10	4.3
5–14	6	3.7	3	4.3	9	3.9
15–24	20	12.4	5	7.1	25	10.8
25–44	76	47.2	29	41.4	105	45.5
45–64	36	22.4	16	22.9	52	22.5
65+	18	11.2	12	17.1	30	13.0
<b>Total</b>	<b>161</b>	<b>100.0</b>	<b>70</b>	<b>100.0</b>	<b>231</b>	<b>100.0</b>

Source: AIHW NMD.

### State or territory of usual residence

The age-standardised rate of homicide deaths for residents of the Northern Territory was 2.6 times the national rate of 1.0 deaths per 100,000 population (Table 11.3).

Rates for residents of other jurisdictions varied markedly, ranging from 1.6 deaths per 100,000 population in Tasmania to 0.7 deaths per 100,000 population in Victoria.

Results should be treated with caution due to low numbers in smaller jurisdictions, particularly the Australian Capital Territory, which can lead to marked year-to-year variations in rates.



**Table 11.3: Homicide deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	65	44	45	36	24	9	1	7
%	28.1	19.0	19.5	15.6	10.4	3.9	0.4	3.0
Age-standardised rate (deaths per 100,000 population)	0.8	0.7	0.9	1.4	1.4	1.6	n.p.	2.6

Source: AIHW NMD.

## Remoteness of usual residence

The age-standardised rates of homicide rose with the level of remoteness. The rate for residents of *Very remote* areas was 5.3 times as high as the rate for residents of *Major cities* (Table 11.4).

But the numbers of cases in these areas were not very large, and even modest variations in small annual case numbers have large effects on rates.

**Table 11.4: Homicide deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	141	41	24	8	9
%	63.2	18.5	10.7	3.5	4.2
Age-standardised rate (deaths per 100,000 population)	0.8	1.0	1.2	2.9	4.2

(a) Excludes 8 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

The age-standardised rate of homicide rose with socioeconomic disadvantage (Table 11.5). The rate for people living in the lowest socioeconomic areas (1.5 deaths per 100,000 population) was 2.5 times the rate for people living in the highest socioeconomic areas (0.6 per 100,000).

**Table 11.5: Homicide deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	72	51	44	29	27
%	31.2	22.1	19.0	12.6	11.7
Age-standardised rate (deaths per 100,000 population)	1.5	1.0	0.9	0.6	0.6

Note: Excludes 8 deaths where socioeconomic area was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

The age-standardised homicide rate for Aboriginal and Torres Strait Islander people was more than 7 times as high as the rate for non-Indigenous Australians (Table 11.6).

**Table 11.6: Key indicators for homicide deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	21	13	34	97	41	138
Age-standardised rate (deaths per 100,000 population)	7.6	4.3	5.9	1.2	0.5	0.8
Rate ratio <sup>(a)</sup>	6.3	8.6	7.4	..	..	..
Rate difference <sup>(b)</sup>	6.4	3.8	5.1	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## 11.3 Circumstances of homicide

Of the 161 male homicide deaths that occurred in 2016–17:

- 37% (60) involved *Assault by a sharp object*
- 19% (31) involved *Assault by bodily force*
- 15% (24) involved *Assault by firearms*.

Of the 73 female homicide deaths that occurred in 2016–17:

- 30% (21) involved *Assault by a sharp object*
- 14% (10) involved *Assault by bodily force*
- 10% (7) involved *Assault by firearms*.

## 11.4 How have homicide deaths changed over time?

Crude rates of homicide, based on data from the NMD, fell from 1.7 deaths per 100,000 population in 2000–01 to 0.9 deaths per 100,000 in 2004–05, before rising to 1.2 deaths per 100,000 in 2005–06, then remaining steady (Figure 11.1).

Rates based on these data fell by an average of 10.6% per year from 1999–00 to 2004–05, and by an average of 2.3% per year from 1999–00 to 2016–17.

These changes need to be treated with caution, due to revisions in the way the ABS processes death registration data (see Appendix A). Changes in the revision process have been previously reported, focusing on homicides in 2004–05 (AIHW: Henley & Harrison 2009).

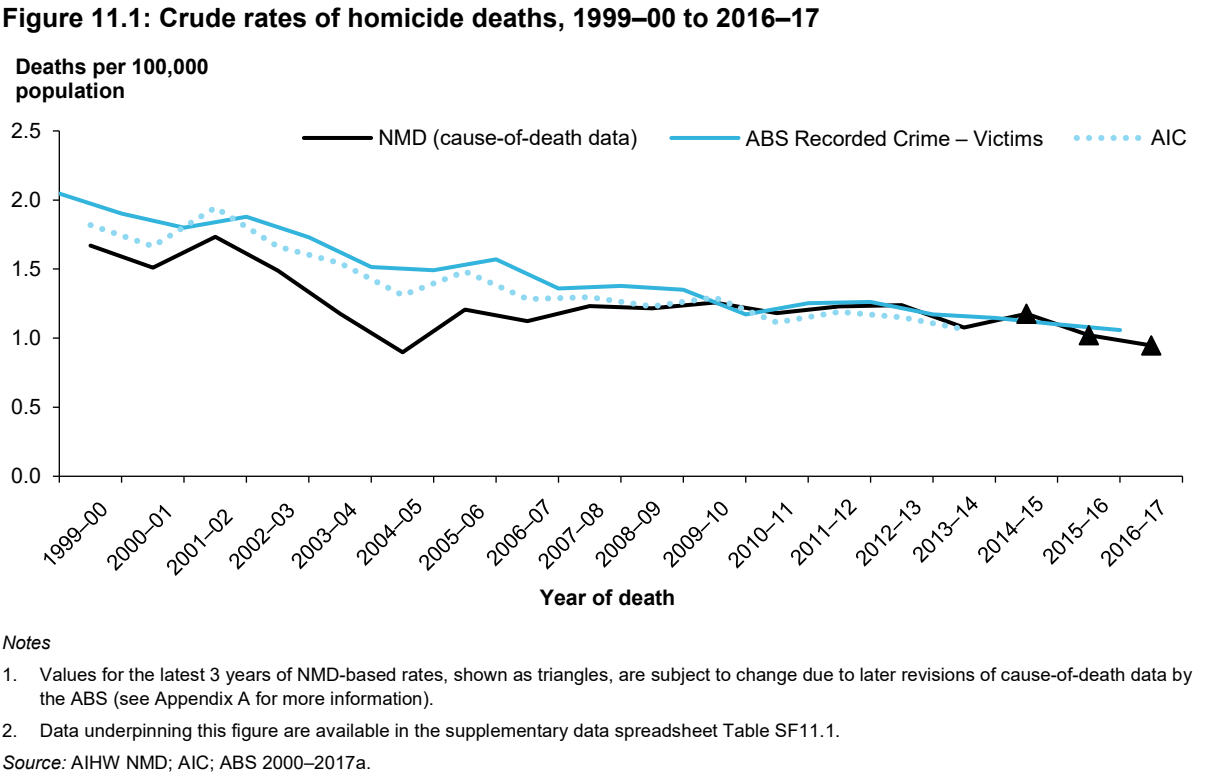
Estimates based on the NMD data are supplemented in this section by rates based on 2 other sources of data. Australian Institute of Criminology (AIC) homicide data indicate an average fall of 5.5% per year between 1999–00 and 2004–05, and a fall of 3.8% per year between 1999–00 and 2013–14.

Data on homicide and related offences from the ABS *Recorded crime—victims, Australia* publication series (ABS 2000–2017a) indicated an average rate of decrease of 3.7% per year over 1999–2016. Differences in case definitions and methods between the sources are such that identical rates should not be expected.

The main reason for using the supplementary sources is to assess whether the dip in ABS homicide counts, deepest in 2004–05, is evident in other sources. The ABS *Recorded crime—victims, Australia* publication series shows a nearly linear downward trend, with small fluctuations. The AIC homicide series shows a little more fluctuation, with a small dip in 2004–05. Neither supplementary series shows a dip as large as that evident in the NMD data.

All 3 series provide similar estimates for 2013–14, the latest year for which NMD data were essentially final at the time of writing, as well as the latest year for which AIC homicide data were available.

Crude rates were calculated for NMD data to allow better comparability with ABS-based and AIC-based estimates, and because there was little difference between crude and adjusted rates for the NMD data.



### Firearm-related homicides

Between 1999–00 and 2016–17, there were 665 firearm-related homicides, of which 175 (26%) were females (Table S.1). After the ABS revised its process (from 2006–07), the annual numbers of firearms-related homicides were higher than the number of homicides that would have been recorded using the pre-revisions processes.

Reasons for this are detailed in Appendix A and have previously been reported for 1999–2010 (AIHW: Harrison & Henley 2015).

## Age and sex

Age-standardised rates of homicides fell from 1.7 deaths per 100,000 population in 1999–00 to 0.9 deaths per 100,000 in 2004–05, then fluctuated between 1.0 and 1.3 deaths per 100,000.

The pattern was similar for both males and females, with rates declining between 1999–00 and 2004–05, then staying relatively steady, despite some fluctuations. Age-standardised rates of homicides for males were consistently 1.5–2.5 times the rates for females (Figure 11.2) (see the start of this section for cautionary notes on trends).

**Figure 11.2: Age-standardised rates of homicide deaths, by sex, 1999–00 to 2016–17**

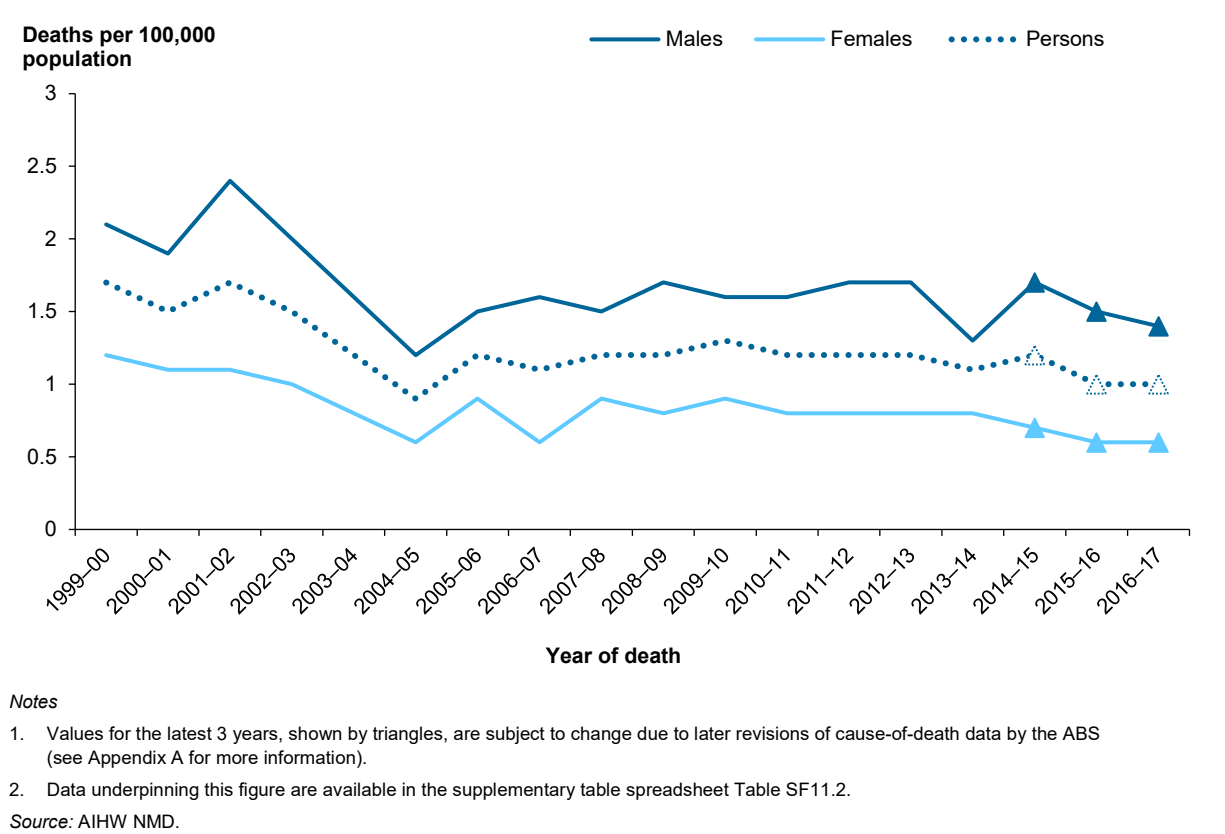
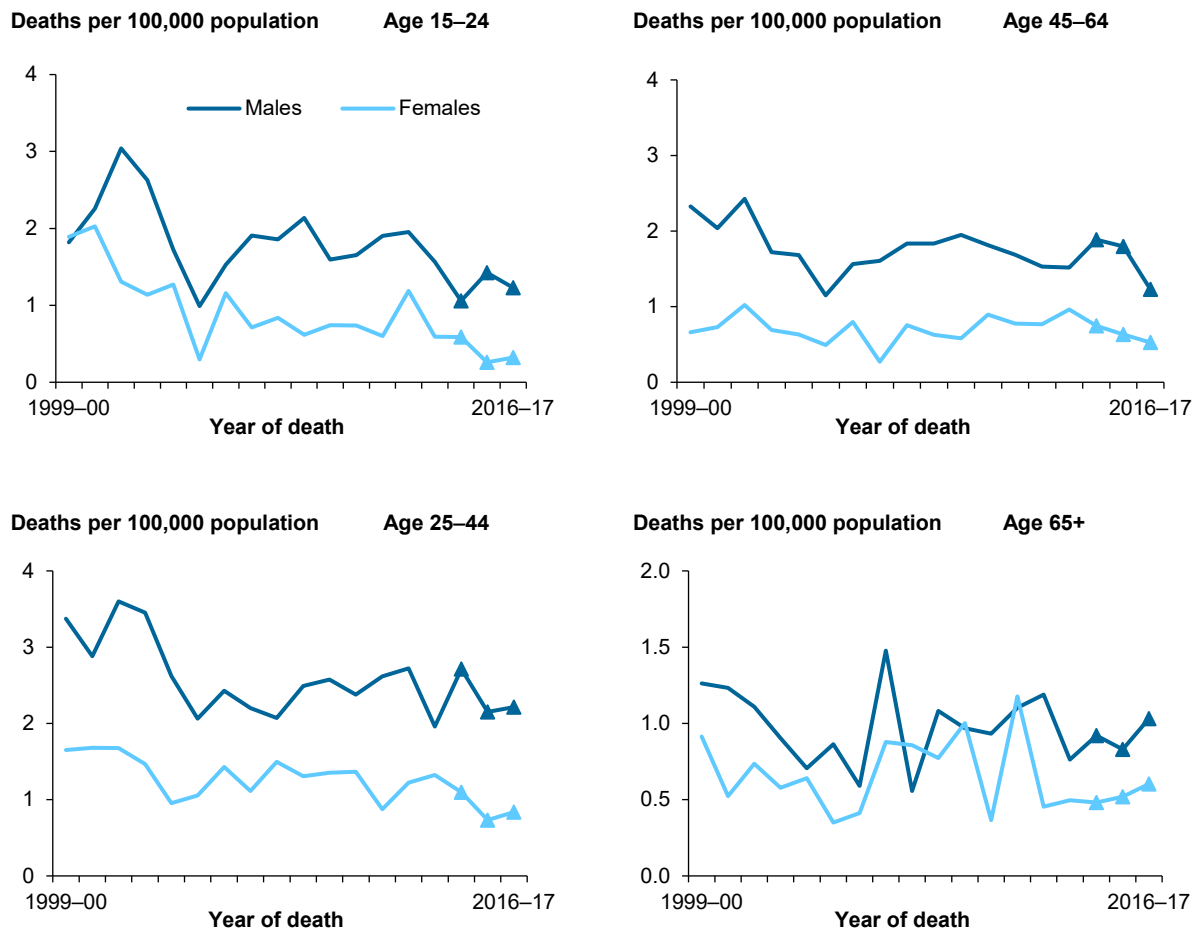


Figure 11.3 shows changes in homicide rates between 1999–00 and 2016–17 in each age group by sex.

Age-standardised rates for males were higher than for females across all age groups, for almost all years. There were downward trends over time for both males and females aged 15–24 and 25–44. There was a slight downward trend in rates for males aged 45–64, while for females aged 45–64 and those aged 65 and over, there were no discernible trends over time, despite large fluctuations resulting from relatively small year-to-year numbers.

**Figure 11.3: Age-specific rates of homicide deaths, by age and sex, 1999–00 to 2016–17**



**Notes**

1. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table SF11.3.
3. Rates for children aged 0–4 and 5–14 are not shown, due to small numbers.

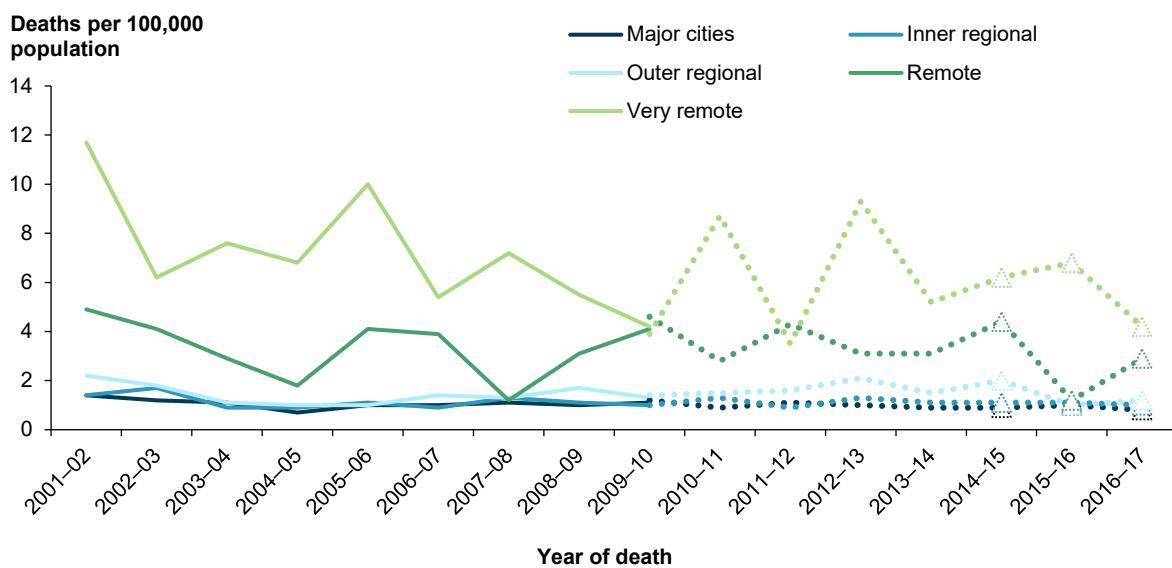
Source: AIHW NMD.

## Remoteness of usual residence

Between 2001–02 and 2016–17, rates of homicide deaths were consistently higher for residents of *Very remote* areas than for all other remoteness areas (Figure 11.4). Rates for residents of *Remote* areas were second highest in most years, while rates for residents of the *Major cities*, and *Inner regional* and *Outer regional* areas differed very little and were relatively steady over time.

The year-to-year fluctuation of rates for residents of *Very remote* and *Remote* areas is at least partly a reflection of the small population and number of incidents occurring each year.

**Figure 11.4: Age-standardised rates of homicide deaths, by remoteness of usual residence, 2001–02 to 2016–17**



**Notes**

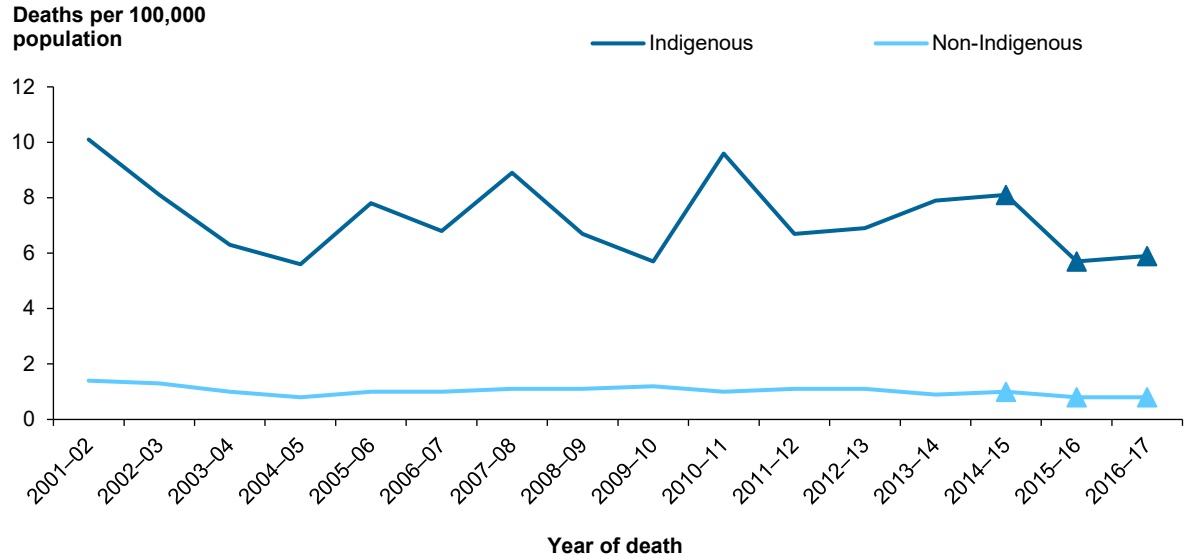
1. Data for 1999–00 and 2000–01 were unavailable.
2. Full lines are ASGC-based, while dotted lines are ASGS-based.
3. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
4. Data underpinning this figure are available in the supplementary table spreadsheet Table SF11.4.

Source: AIHW NMD.

# Aboriginal and Torres Strait Islander people

Rates of homicide death for Aboriginal and Torres Strait Islander people fluctuated between 2001–02 and 2016–17, although there was no statistically significant trend (Figure 11.5). Rates for Aboriginal and Torres Strait Islander people were consistently 6–8 times as high as the rates for non-Indigenous Australians over this period.

**Figure 11.5: Age-standardised rates of homicide deaths, by Indigenous status, 2001–02 to 2016–17**



**Notes**

1. Data are for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory, the 5 jurisdictions for which recording of Indigenous status was considered to be of adequate quality throughout the study period.
2. Values for the latest 3 years, shown as triangles, are subject to change due to later revisions of cause-of-death data by the ABS (see Appendix A for more information).
3. Data underpinning this figure are available in the supplementary table spreadsheet Table SF11.5.

Source: AIHW NMD.

# Appendix A: Data information and issues

This appendix provides information on the data used in the report, and on issues relevant to interpreting the data. Further information on Australian injury death data for 1999–2010 has previously been reported (AIHW: Harrison & Henley 2015).

## Injury deaths data

Most data in this report on fatal injuries are from the NMD. This database comprises CODURF data, which are provided to the AIHW by the state and territory registries of births, deaths and marriages and the NCIS, and are coded by the ABS.

Data are presented according to the financial year in which each death occurred, rather than the calendar year in which the death was registered, for 2 reasons:

- Presenting data by year of occurrence provides a more meaningful interpretation of data in comparison to presenting data by year of registration, where cases can be registered at a time significantly later (in some cases years later) than when death occurred.
- Reporting by financial year is in line with AIHW reports on injury morbidity, enabling deaths and hospitalisations to be compared for the same period.

Records that met the following criteria were included in this report:

- deaths that occurred on 1 July 1999 to 30 June 2017, and had been registered by 31 December 2017; and
- the UCoD was an external cause code in the range V01–Y36; or
- at least 1 MCoD was an external cause code in the range V01–Y36, and at least 1 other MCoD was a code for injury (S00–T75 or T79).

The codes are from the WHO ICD-10 (WHO 2016). The external cause codes are from Chapter XX *External causes of morbidity and mortality*, and the injury codes are from Chapter XIX *Injury, poisoning and certain other consequences of external causes*.

### Box A.1: Multiple causes of death (MCoD)

Box 1.1 provided standard definitions of the terms underlying cause of death (UCoD) and multiple causes of death (MCoD) codes.

MCoD codes in this report relate to the causes of death that contributed to death and may or may not have been related to the underlying cause.

For example, an elderly person might fall and fracture their hip. This person's advanced age, frailty, and perhaps other comorbid conditions might limit their capacity to tolerate injury, leading to their death. In this instance, this record would most likely be assigned an UCoD of an external cause code for fall (W00–W19) and a MCoD code for hip injury (S72).

In another example, an elderly person might suffer a heart attack that results in a fall, and subsequently a hip fracture. As with the first example, a combination of factors might lead to death. In this instance, this record would most likely be assigned an UCoD code for acute myocardial infarction (I21), a MCoD of an external cause code for fall (W00–W19), and a MCoD code for hip injury (S72).

Both of these cases would be included in this report, because the first example meets the second of the criterion, while the second example meets the third criterion.



## Supplementary data sources

For some external causes of injury, trends in age-standardised rates over time calculated using NMD mortality data have been compared with trends in rates calculated using supplementary sources of mortality data.

These comparisons were made for external causes shown in previous work to have been significantly affected by problems relating to classification (see ‘Coding of deaths data’ in this appendix).

### Transport-related injury

Rates for deaths due to unintentional transport-related injury calculated using NMD mortality data were compared with rates calculated using data extracted from the Australian Road Deaths Database in March 2019, available from the website of the Bureau of Infrastructure, Transport and Regional Economics (BITRE 2019). This website provides data on road deaths, but not total transport injury.

The number of transport deaths for each financial year was estimated by multiplying the recorded number of road deaths by a factor obtained by dividing the number of transport deaths in the NMD data by the number of deaths occurring in traffic (on-road) deaths in the NMD data for each data year.

### Drowning

Rates for deaths involving unintentional drowning were compared with rates calculated using data extracted online from the NCIS, at [www.ncis.org.au](http://www.ncis.org.au), as at March 2019, as well as rates calculated using data extracted from national drowning reports published by the Royal Life Saving Society of Australia, at [www.royallifesaving.com.au/facts-and-figures/research-and-reports/drowning-reports](http://www.royallifesaving.com.au/facts-and-figures/research-and-reports/drowning-reports).

Data were downloaded from the NCIS website, and duplicate records (that is, records with matching NCIS numbers) were removed before analysis.

Table A.1 provides the criteria used to select drowning-related deaths.

**Table A.1: Inclusion and exclusion criteria for drowning-related cases extracted from the NCIS website**

Criteria for inclusion	Criteria for exclusion
(Case type <sup>(a)</sup> notification or case type completion) = Death due to external cause(s)  <b>and</b> Mechanism level 2 = Drowning/near drowning.	Case type completion = Death due to natural cause(s)  <b>or</b> Intent at completion = <i>Intentional self-harm, Assault, Legal intervention, Operations of war, civil conflict and acts of terrorism, or Complications of medical or surgical care.</i>

(a) Case type indicates whether a death was due to natural, external, or unknown causes, or the body was never recovered.

### Suicide

Rates for deaths due to suicides calculated using NMD mortality data were compared with rates calculated using data extracted online from the NCIS, at [www.ncis.org.au](http://www.ncis.org.au), as at March 2019. Data were downloaded from the NCIS website, and duplicate records (that is, records with matching NCIS numbers) were removed before analysis.

Table A.2 provides the criteria for selecting suicide deaths.

**Table A.2: Inclusion and exclusion criteria for suicide cases extracted from the NCIS website**

Criteria for inclusion	Criteria for exclusion
(Case type <sup>(a)</sup> notification or case type completion = Death due to external cause(s) <b>and</b> Intent notification or intent completion = Intentional self-harm) <b>or</b> Activity code level 2 = Self-inflicted harm.	Case type completion = Death due to natural cause(s) <b>or</b> Intent completion = <i>Unintentional, Assault, Legal intervention, Operations of war, civil conflict and acts of terrorism, or Complications of medical or surgical care.</i>

(a) Case type indicates whether a death was due to natural, external, or unknown causes, or the body was never recovered.

## Homicide

Rates for deaths due to homicides calculated using NMD mortality data were compared with rates calculated using case data extracted from the AIC National Homicide Monitoring Program annual reports, at <https://aic.gov.au/national-homicide-monitoring-program>, and from reports of the ABS series *Recorded crime—victims* (ABS 2000–2017a).

## Coding of deaths data

The ABS obtains deaths registration data from the state and territory death registers, which, in turn, obtain information from the doctor or coroner who certifies each death.

The ABS codes causes of death according to the ICD-10 and, after de-identification, creates the CODURF. Most of the coding is done using an automated coding system.

If a death was due to an injury, the ICD-10 requires coding of the ‘external cause’ of the injury, such as a car crash of a particular type as the UCoD. Most injury deaths are certified by a coroner. For these deaths, the ABS seeks additional information required to code external causes from the NCIS.

Some injury deaths, and most deaths from other causes, are certified by a medical practitioner. In these instances, ABS coders rely on information about causes of death that was entered onto the death certificate. Of the deaths included in this report, the most common type of injury in doctor-certified deaths is ‘fall’.

The result of this process is a record in an annual ABS mortality data file that summarises characteristics of the person who died (for example, age, sex, and Indigenous status), and characteristics of his or her death (for example, causes, date, and place where the person usually lived).

Certain aspects of the method used by the ABS have differed according to the registration year of deaths during the period covered by this report. The reasons for making the changes and their nature have been reported by the ABS (ABS 2009). The changes are described in this appendix because of their potential to affect injury death statistics, including those in this report.

## Changes in death registrations over time

### Deaths registered to end of 2005

- Each death was assessed within about 1 year after the end of the year in which it was registered.
- For most injury deaths, coronial investigation had ended, and information was available through NCIS by the ABS's cut-off date.
- But for some injury deaths, information was lacking in the NCIS when the death was assessed. This could occur if a coroner was still investigating the death, or if information about it had not been entered into the NCIS.
- The cause code assigned sometimes differed importantly from the cause code that would have been assigned had the data in NCIS been complete when the ABS ceased coding an annual set of data to finalise the file for reporting and release. Deaths due to suicide and homicide were most affected, because the records for these causes tend to take longer than others to be finalised in NCIS.
- It has been found that suicide deaths were under-counted in the ABS cause-of-death data for 2004 (AIHW: Harrison et al. 2009), and transport-related deaths were under-counted for 2004–05 (AIHW: Henley & Harrison 2009).

### Deaths registered in 2006

- The initial version, released in 2008, was affected in much the same way as the file of deaths registered in 2005.
- The ABS made a second release of this file in 2012, coded on the basis of information that was in the NCIS by 2011, and applied like those described in the next section (ABS 2012a).
- The second release file of 2006 registrations was used in this project.

### Deaths registered in 2007–2017

- The ABS introduced several changes in response to the problems outlined in the previous section, which have been applied to deaths registered in 2007 and subsequent years (ABS 2009).
- The most important change was to make 3 releases of the data concerning deaths registered in each calendar year: preliminary (released a little over 1 year after the end of the registration year), revised (1 year after that), and final (2 years after preliminary).
- Further changes were implemented by the ABS for deaths registered in 2008 and later.
- For both open and closed coroner cases, more time has been spent investigating Part II of the Medical Certificate of Death when information in Part I is not sufficient to allow assignment of a specific UCoD code.
- Also, increased resources have been used, and more time spent investigating coroners' reports to identify specific causes of death. This involved making increased use of police reports, toxicology reports, autopsy reports, and coroners' findings for both open and closed cases, to minimise the use of non-specific causes and intents (ABS 2010a, 2011, 2012a).

In this report, *Final* release data have been used for deaths registered in 2007–2014, *Revised* release data have been used for deaths registered in 2015, and *Preliminary* release data have been used for deaths registered in 2016 and 2017, which were the latest data available at the time of analysis.

Due to the multiple release process, future reports based on later releases of cause-of-death data might show different results to those presented in this report.

The ABS revision process will have no more than a very small effect on the data for years of death up to and including 2013–14 (Table A.3). By contrast, all of the cases reported that have year of death of 2016–17 and 2015–16, and 58% of those with year of death 2014–15, were based on *Preliminary* or *Revised* CODURF releases. Re-analysis of deaths data for those periods when final CODURF releases are available can be expected to produce different results.

**Table A3: Injury deaths, by ABS CODURF release and financial year of death**

Financial year of death	ABS CODURF release		
	Preliminary (%)	Revised (%)	Final (%)
2016–17	100.0	0.0	0.0
2015–16	55.9	44.1	0.0
2014–15	0.5	57.5	42.0
2013–14	0.2	0.3	99.5
1999–00 to 2010–11	<0.1	<0.1	99.9

Appendix C compares counts for *Preliminary*, *Revised* and *Final* releases of CODURF data for all injury deaths, and for some external causes of injury.

Further information on effects of the matters discussed in this section on estimates of injury mortality for 1999–2010 has previously been reported (AIHW: Harrison & Henley 2015; AIHW: Henley & Harrison 2015).

## Indigenous status data

Although the identification of Indigenous Australians in deaths data is incomplete in all state and territory registration systems, 5 jurisdictions (New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory) have been assessed by the ABS and AIHW as having adequate identification from at least 2001 onwards (AIHW 2014).

As a result, this report presents trends data for Indigenous Australians from 2001–02 to 2016–17. Mortality data for these 5 jurisdictions should not be assumed to represent the experience in other jurisdictions. Data for these 5 jurisdictions over-represent Indigenous populations in less urbanised and more remote locations.

## Late and revised registration of Indigenous deaths

Issues on deaths in Western Australia that were incorrectly recorded as Aboriginal and/or Torres Strait Islander deaths between 2007 and 2009, and some Indigenous deaths that were late registrations in Queensland in 2010 are detailed in previous reports in this series.

## Adjustment of injury deaths

The extent of under-identification of Indigenous deaths in death registrations has been estimated in the ABS Census Data Enhancement Indigenous Mortality Quality Study, by linking 2011 Census data with deaths registered from 10 August 2011 to 27 September 2012 (ABS 2013b). The method described in this report has been used as a basis for adjusting for under-identification of Indigenous deaths in some reports.

Indigenous injury deaths in this report are as reported, and have not been adjusted for under-identification for 2 main reasons:

- The coverage estimates are for deaths from all causes. Injury deaths differ from most deaths in the way data are collected, which might affect the number of deaths recorded as Indigenous—most deaths are certified by a doctor, while the great majority of injury deaths are reported by police to a coroner. No adjustment factors are specific to coroner-certified deaths (or injury deaths).
- Comparable adjustment factors are not available for years before 2011–12, due to differences in the method used. This report covers 1999–00 to 2016–17, for which coverage of Indigenous deaths is likely to vary.

## Population data and the calculation of rates

### General population

Rates were calculated using, as the denominator, the estimated resident population as at 31 December in the relevant year (for example, 31 December 2016 for 2016–17 data). Where possible, the final release of estimated resident population was used.

### Indigenous population

Rates of injury death of Aboriginal and Torres Strait Islander people are provided in this report for 2001–02 to 2016–17, using data from 5 jurisdictions (New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory). Data were selected on the basis of place of usual residence.

The assessments of the quality of identification of Indigenous status are affected by restrictions that jurisdictions place on what is included in the data. The assessments are subject to review, and some recent AIHW reports include New South Wales data from 1999 onwards (AIHW 2014).

For non-Indigenous Australians, population denominators were derived by subtracting the Aboriginal and Torres Strait Islander population based on the 2011 Census (ABS 2014) from the total Australian estimated resident population (of the states and territories eligible for inclusion), as at 31 December of the relevant year. Current standard practice in AIHW reports is to omit cases where Indigenous status was not stated or unknown.

### Rates and change in rates

Directly age-standardised rates were calculated using the Australian population in 2001 as the standard (ABS 2002). Estimated trends in age-standardised rates were reported as average annual percentage changes, obtained using negative binomial regression modelling, performed in Stata.

### Quantifying variability

The data presented in this report are subject to 2 types of statistical error—non-random and random (a third type of statistical error, sampling error, does not apply in this report, because none of the data sources used involved probability sampling).

## Non-random error

Some level of non-random error is to be expected in administrative data collections, such as the NMD on which this report relies. For example, non-random error could occur if the approach to assigning cause codes to deaths were to differ systematically between jurisdictions or over time. Systems are in place to encourage uniform data collection, and coding and scrutiny of data during analysis include checking for patterns that might reflect non-random error. But some non-random error remains.

## Random error

The values presented in the report are subject to random error, or variation. Variation is relatively large when the case count is small (especially if less than about 10), and small enough to be unimportant in most circumstances when the case count is larger (that is, more than a few tens of cases).

Some of the topics for which results are reported compare groups that vary widely in case count, largely due to differences in population size (for example, the population of New South Wales is more than 30 times as large as the Northern Territory population, and the population of *Major cities* is nearly 90 times that of *Very remote* areas). In this situation, year-to-year changes in counts or rates for the smaller-population groups might be subject to large random variation. There is potential to misinterpret such fluctuations as meaningful rises or falls in occurrence.

## Classification of remoteness area

Remoteness area' in this report refers to the place of usual residence of the person who died. The remoteness areas for 1999–00 to 2009–10 were specified according to the ABS ASGC, while remoteness areas for 2009–10 to 2016–17 were specified according to the ABS ASGS.

## Australian Standard Geographical Classification

Australia can be divided into several regions based on their distance from urban centres. This is considered to determine the range and types of services available. In this report, remoteness area refers to the place of usual residence of the person who died, assigned on the basis of the reported statistical local area (SLA) of residence.

Remoteness categories were defined based on the Accessibility/Remoteness Index of Australia (ARIA). According to this method, remoteness is an index applicable to any point in Australia, based on road distance from urban centres of 5 sizes. The reported areas are defined as the following ranges of the index:

- *Major cities* (for example, Sydney, Geelong, Gold Coast): ARIA index 0–0.2
- *Inner regional* (for example, Hobart, Ballarat, Coffs Harbour): ARIA index 0.21–2.4
- *Outer regional* (for example, Darwin, Cairns, Coonabarabran): ARIA index 2.41–5.92
- *Remote* (for example, Alice Springs, Broome, Strahan): ARIA index of 5.93–10.53
- *Very remote* (for example, Coober Pedy, Longreach, Exmouth): ARIA index more than 10.53.

Most SLAs lie entirely within 1 of the 5 areas. If this was so for all SLAs, then each record could simply be assigned to the area in which its SLA lies. But some SLAs overlap 2 or more of the areas. Records with these SLAs were assigned to remoteness areas in proportion to

the area-specific distribution of the resident population of the SLA, according to the 2006 Census. Each record in the set having a particular SLA code was randomly assigned to 1 of the remoteness areas present in it, in proportion to the resident population of that SLA.

## **Australian Statistical Geography Standard**

The ASGS is a hierarchical classification system of geographical regions and consists of interrelated structures. The ASGS brings all the regions for which the ABS publishes statistics within a single framework, and has been used by the ABS to collect and disseminate geographically classified statistics from 1 July 2011. It provides a common framework of statistical geography, and enables the production of statistics that are comparable and can be spatially integrated.

*Australian Statistical Geography Standard (ASGS) volume 1—main structure and greater capital city statistical areas* (ABS 2010b) is the first in a series of volumes that detail the various structures and regions of the ASGS. Its purpose is to outline the conceptual basis of the regions of the main structure and of the greater capital city statistical areas, and their relationship to each other. This product contains several elements, including the ASGS manual, maps, codes, and names and the digital boundaries current for the ASGS Edition 2011 (date of effect 1 July 2011).

The digital boundaries for Volume 1 of the ASGS are the spatial units for the main structure and the Greater Capital City Statistical Areas. These spatial units are:

- Mesh Blocks
- Statistical Area Level 1 (SA1)
- Statistical Area Level 2 (SA2)
- Statistical Area Level 3 (SA3)
- Statistical Area Level 4 (SA4)
- Greater Capital City Statistical Areas
- State and Territory.

Each case is allocated to 1 of 5 remoteness areas on the basis of the place of usual residence of the person who died, according to Statistical Area Level 2 (SA2). Most SA2s lie entirely within 1 of the 5 areas. If this was so for all SA2s, then each record could simply be assigned to the area in which its SA2 lies. But some SA2s overlap 2 or more of the areas. Records with these SA2s were assigned to remoteness areas in proportion to the area-specific distribution of the resident population of the SA2, according to the 2011 Census. For death registrations, each record in the set having a particular SA2 code was assigned to 1 of the areas probabilistically, in proportion to the resident population of that SA2. The resulting values are integers. A SA2 to remoteness area map can be found at the ABS website (ABS 2012b).

## **Socioeconomic area**

Data on socioeconomic groups are defined using the ABS's SEIFA 2011 (ABS 2013a).

The SEIFA 2011 data are generated by the ABS using a combination of 2011 Census data, such as income, education, health problems/disability, access to internet, occupation/unemployment, wealth and living conditions, dwellings without motor vehicles, rent paid, mortgage repayments, and dwelling size.

Composite scores are averaged across all people living in areas and defined for areas based on the Census collection districts. But they are also compiled for higher levels of aggregation. The SEIFAs are described in detail [www.abs.gov.au/websitedbs/censushome.nsf/home/seifa](http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa).

The SEIFA Index of Relative Socio-economic Disadvantage is one of the ABS's SEIFA indexes. The relative disadvantage scores indicate the collective socioeconomic level of the people living in an area, with reference to the situation and standards applying in the wider community at a given point in time. A relatively disadvantaged area is likely to have a high proportion of relatively disadvantaged people. But such an area is also likely to contain people who are not disadvantaged, as well as people who are relatively advantaged.

Mortality rates by socioeconomic area were generated by the AIHW using the Index of Relative Socio-economic Disadvantage scores for the SA2 of usual residence of the person who died.

The '1—lowest' group represents the areas containing the 20% of the national population with the most disadvantage, and the '5—highest' group represents the areas containing the 20% of the national population with the least disadvantage. These groups do not necessarily represent 20% of the population in each state or territory.

The following labels for each socioeconomic group have been used throughout this report:

<b>Label</b>	<b>Socioeconomic area</b>
1—lowest	Most disadvantaged
2	Second most disadvantaged
3	Middle
4	Second least disadvantaged
5—highest	Least disadvantaged



# Appendix B: Transport deaths—motor vehicle traffic

This appendix presents additional summary statistics for unintentional transport injury deaths in 2016–17 that were due to events that occurred in traffic. The deaths included in this appendix are a subset of the unintentional transport injury deaths presented in Chapter 3.

## Case selection

Restricting unintentional transport injury deaths to those due to road injury required the following selection criteria to be used:

- The UCoD is classified to ICD-10 (WHO 2016) external cause codes in the ranges V02–V04 (.1), V09.2, V09.3, V12–V14 (.4–.6), V19 (.4–.6, .9), V20–V28 (.4–.9), V29 (.4–.6, .9), V30–V38 (.5–.9), V39 (.4–.6, .9), V40–V48 (.5–.9), V49 (.4–.6, .9), V50–V58 (.5–.9), V59 (.4–.6, .9), V60–V68 (.5–.9), V69 (.4–.6, .9), V70–V78 (.5–.9), V79 (.4–.6, .9), V81.1, V82.1, V82.9, V83–V86 (.0–.3), V87, V89.2 or V89.3 of Chapter XX *External causes of morbidity and mortality*
- At least 1 MCoD is classified to external cause codes in the ranges V02–V04 (.1), V09.2, V09.3, V12–V14 (.4–.6), V19 (.4–.6, .9), V20–V28 (.4–.9), V29 (.4–.6, .9), V30–V38 (.5–.9), V39 (.4–.6, .9), V40–V48 (.5–.9), V49 (.4–.6, .9), V50–V58 (.5–.9), V59 (.4–.6, .9), V60–V68 (.5–.9), V69 (.4–.6, .9), V70–V78 (.5–.9), V79 (.4–.6, .9), V81.1, V82.1, V82.9, V83–V86 (.0–.3), V87, V89.2 or V89.3, or at least 1 MCoD is classified to diagnosis codes in the range S00–T75 or T79 (*Injury*).

## How many deaths due to unintentional motor vehicle traffic injury were there in 2016–17?

Motor vehicle traffic injuries accounted for 1,176 injury deaths in Australia during 2016–17, 9% of all injury deaths for this period (Table B.1). Motor vehicle traffic injury deaths were 2.9 times as common for males as for females.

**Table B.1: Key indicators for unintentional motor vehicle traffic injury deaths, by sex, 2016–17**

Indicator	Males	Females	Persons
Number	876	300	1,176
Percentage of all injury deaths	11.0	5.8	8.9
Age-standardised rate (deaths per 100,000 population)	7.2	2.3	4.7

Source: AIHW NMD.

## Age and sex

In 2016–17, people aged 25–44 accounted for almost 32% of all unintentional motor vehicle traffic injury deaths, while those aged 45–64 accounted for a further 23% (Table B.2). The proportion of deaths within each age group was broadly similar for males and females.

**Table B.2: Unintentional motor vehicle traffic injury deaths, by age and sex, 2016–17**

Age group	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–4	5	0.6	8	2.7	13	1.1
5–14	18	2.1	6	2.0	24	2.0
15–24	190	21.7	46	15.3	236	20.1
25–44	300	34.2	74	24.7	374	31.8
45–64	197	22.5	75	25.0	272	23.1
65+	166	18.9	91	30.3	257	21.9
<b>Total</b>	<b>876</b>	<b>100.0</b>	<b>300</b>	<b>100.0</b>	<b>1,176</b>	<b>100.0</b>

Source: AIHW NMD.

## State or territory of usual residence

In 2016–17, the age-standardised rate for unintentional motor vehicle traffic injury deaths for residents of the Northern Territory (15.3 deaths per 100,000 population) was 3.3 times that of the national rate of 4.7 deaths per 100,000 population (Table B.3).

Residents of Western Australia recorded the second highest rate (7.2 deaths per 100,000), while residents of the Australian Capital Territory recorded the lowest rate (2.1 deaths per 100,000).

**Table B.3: Unintentional motor vehicle traffic injury deaths, by state/territory of usual residence, 2016–17**

Indicator	State/territory of usual residence							
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Number	311	253	268	183	83	29	9	40
%	26.4	21.5	22.8	15.6	7.1	2.5	0.8	3.4
Age-standardised rate (deaths per 100,000 population)	3.9	3.9	5.5	7.2	4.5	5.5	2.1	15.3

Source: AIHW NMD.

## Remoteness of usual residence

In 2016–17, the age-standardised rate of unintentional motor vehicle traffic injury deaths rose with increasing remoteness of residence (Table B.4). The rate for residents of *Very remote* areas was 5.5 times the rate for residents of *Major cities*.

**Table B.4: Unintentional motor vehicle traffic injury deaths, by remoteness of usual residence, 2016–17**

Indicators	Remoteness of usual residence <sup>(b)</sup>				
	Major cities	Inner regional	Outer regional	Remote	Very remote
Number <sup>(a)</sup>	545	342	195	29	33
%	47.6	29.9	17.0	2.6	2.9
Age-standardised rate (deaths per 100,000 population)	3.0	7.9	9.7	9.8	16.5

(a) Excludes 32 deaths where remoteness was not reported.

(b) Derived using the ASGS classification.

Source: AIHW NMD.

## Socioeconomic area

In 2016–17, the age-standardised rate of unintentional motor vehicle traffic injury deaths rose with socioeconomic disadvantage (Table B.5). The highest rates were among residents of the 2 most disadvantaged socioeconomic areas. The rate for people living in the second lowest socioeconomic area (6.5 deaths per 100,000 population) was 2.8 times the rate for people living in the highest socioeconomic areas (2.3 per 100,000 population).

**Table B.5: Unintentional motor vehicle traffic injury deaths, by socioeconomic area, 2016–17**

Indicator	Socioeconomic area				
	1—lowest	2	3	4	5—highest
Number	304	321	235	166	118
%	25.9	27.3	20.0	14.1	10.0
Age-standardised rate (deaths per 100,000 population)	6.1	6.5	4.7	3.3	2.3

Note: Excludes 32 deaths where SEIFA quintile was not reported.

Source: AIHW NMD.

## Aboriginal and Torres Strait Islander people

In 2016–17, the age-standardised rate of unintentional transport injury deaths for Aboriginal and Torres Strait Islander people was 2.6 times as high as the rate for non-Indigenous Australians (Table B.6).

**Table B.6: Key indicators for unintentional motor vehicle traffic injury deaths, by Indigenous status and sex, 2016–17**

Indicator	Indigenous			Non-Indigenous		
	Males	Females	Persons	Males	Females	Persons
Number	55	21	76	592	197	789
Age-standardised rate (deaths per 100,000 population)	18.7	6.1	12.3	7.2	2.2	4.7
Rate ratio <sup>(a)</sup>	2.6	2.8	2.6	..	..	..
Rate difference <sup>(b)</sup>	11.5	3.9	7.6	..	..	..

(a) Rate ratios are standardised rates for Indigenous males, females, and persons divided by standardised rates for non-Indigenous males, females, and persons.

(b) Rate differences are standardised rates for Indigenous males, females, and persons minus standardised rates for non-Indigenous males, females, and persons.

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

Differences between Indigenous and non-Indigenous Australians for the proportions of unintentional transport injury deaths in each age group were difficult to interpret, due to small numbers in some age groups (Table B.7).

Notably, the proportions of injury deaths of Aboriginal and Torres Strait Islander males and females aged 65 and over were much lower than for non-Indigenous Australians of the same age.

**Table B.7: Unintentional motor vehicle traffic injury deaths, by Indigenous status, age, and sex, 2016–17**

	Indigenous		Non-Indigenous	
	Number	%	Number	%
<b>Males</b>				
0–4	2	3.6	3	0.5
5–14	2	3.6	13	2.2
15–24	17	30.9	134	22.6
25–44	21	38.2	196	33.1
45–64	11	20.0	136	23.0
65+	2	3.6	110	18.6
<b>Total</b>	<b>55</b>	<b>100.0</b>	<b>592</b>	<b>100.0</b>
<b>Females</b>				
0–4	4	19.0	2	1.0
5–14	0	0.0	5	2.5
15–24	5	23.8	36	18.3
25–44	8	38.1	50	25.4
45–64	4	19.0	42	21.3
65+	0	0.0	62	31.5
<b>Total</b>	<b>21</b>	<b>100.0</b>	<b>197</b>	<b>100.0</b>

Note: Includes data for New South Wales, Queensland, Western Australia, South Australia, and the Northern Territory (see Box 1.2).

Source: AIHW NMD.

## Appendix C: Injury death counts by reference year and ABS release

As described in Appendix A, the ABS has released more than 1 version of the CODURF for 2006 and later. Changed coding in later releases reflects the additional information that becomes available for some deaths, most often reflecting completion of coronial investigation and reporting of deaths.

This appendix provides a summary of case counts in each release for all external causes of injury, and for each of the major groups of external causes that are the subject of chapters in this report.

For reference years 1999–2005, only a single version of the mortality data was released by the ABS. For reference year 2006, initial and final releases of data were made. For more recent reference years, the ABS has made 3 releases: *Preliminary*, *Revised* and *Final*. All 3 releases of data were available for reference years 2007–2014.

The reference year is usually the year in which a death is registered, and when the registration data were received by the ABS. In some instances, a reference year file might include deaths registered in years before the reference year, but not received by the ABS until the reference year or the first quarter of the subsequent year. For further information about reference year, refer to the ‘Explanatory notes’ of the ABS report *Causes of death, Australia, 2013* (ABS 2015).

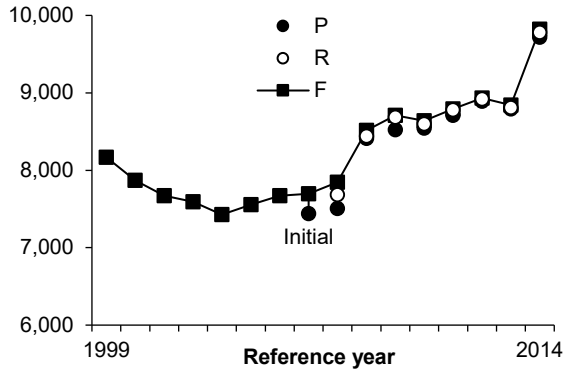
Figure C.1 shows counts for all injury and selected causes of injury by CODURF releases for ABS reference years 1999–2014. The difference between the *Preliminary* and *Final* counts for unintentional transport injuries fell from 375 in 2007 to 32 in 2014, while this difference for *Unintentional poisoning by pharmaceuticals* fell from 242 in 2008 to 47 in 2014. These outcomes suggest that *Preliminary counts* in the years towards the end of the period more accurately reflect true counts. Differences between *Preliminary* and *Final* counts for *All injury* and *Unintentional drowning* were less pronounced.

Figure C.2 shows counts for selected causes of injury by CODURF releases for ABS reference years 1999–2014. Generally, differences between *Preliminary* and *Final* counts were not pronounced for the 4 external cause categories shown in this figure. Notable differences between the *Initial* and *Final* counts in 2006 were seen for *Unintentional poisoning by other substances* and *Other unintentional injury*.

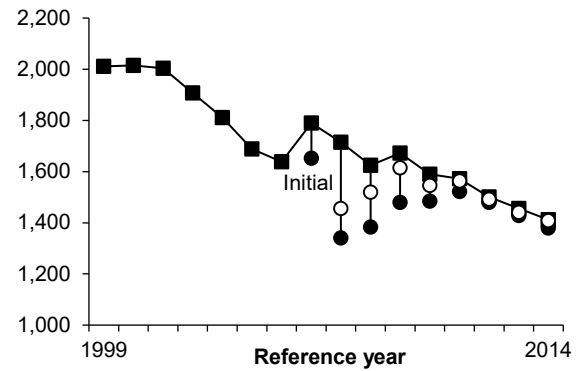
Figure C.3 shows counts for selected causes of injury by CODURF releases for ABS reference years 1999–2014. The difference between the *Preliminary* and *Final* counts for suicide fell from 347 in 2007 to 58 in 2014, while the difference between the *Preliminary* and *Final* counts for homicide fell from 54 in 2011 to 38 in 2014. The difference between the *Preliminary* and *Final* counts for deaths where intent was undetermined fell from 727 in 2007 to 99 in 2014, suggesting that deaths in the *Preliminary* release of data registered in the years from about 2012 onwards were more likely to be assigned to the correct intent (for example, suicide, homicide) than deaths registered in previous years.

**Figure C.1: Counts of injury deaths for All injury, Unintentional transport injury, Unintentional drowning, and Unintentional poisoning involving pharmaceuticals, by reference year and CODURF release, 1999–2014**

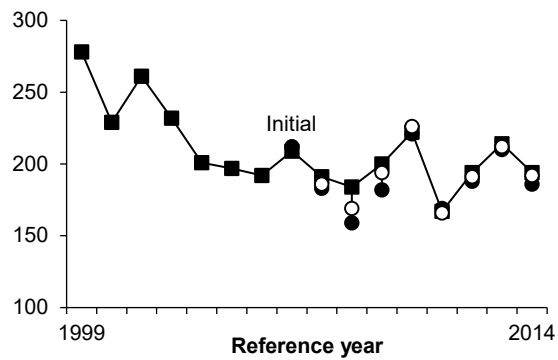
**Number of deaths All injury**



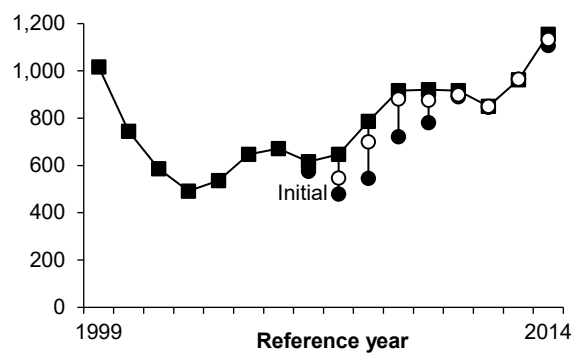
**Number of deaths Transport**



**Number of deaths Drowning**



**Number of deaths Poisoning, pharmaceuticals**



P = Preliminary CODURF

R = Revised CODURF

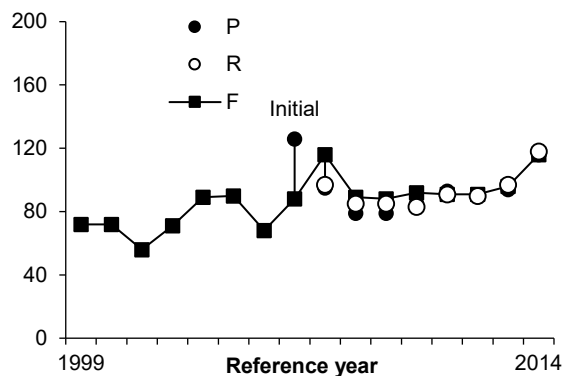
F = Final CODURF

Note: Periods are reference years. The first 2006 CODURF is referred to as the Initial release.

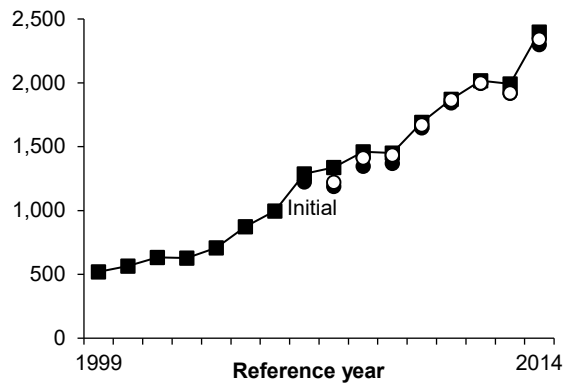
Source: ABS 2000–2017b.

**Figure C.2: Counts of injury deaths for *Poisoning involving other substances, Unintentional fall injury, Unintentional thermal injury, and Other unintentional injury*, by reference year and CODURF release, 1999–2014**

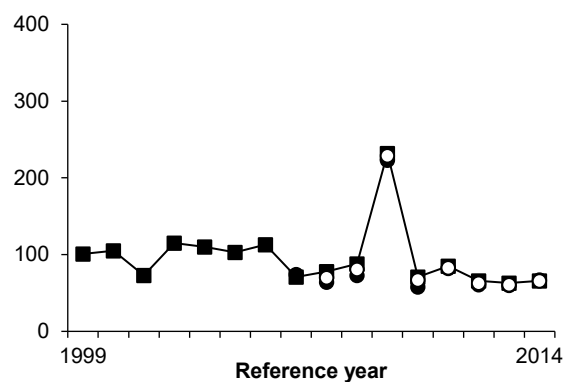
**Number of deaths Poisoning, other substances**



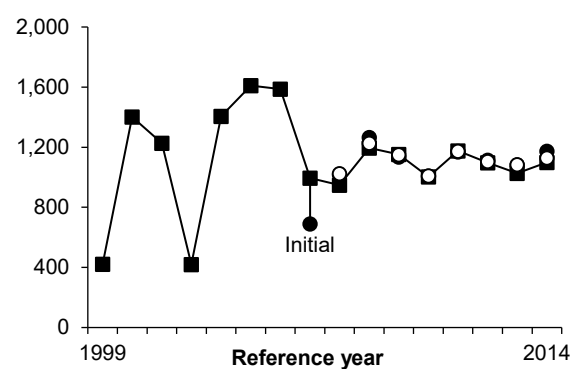
**Number of deaths Falls**



**Number of deaths Thermal**



**Number of deaths Other unintentional**



P = Preliminary CODURF

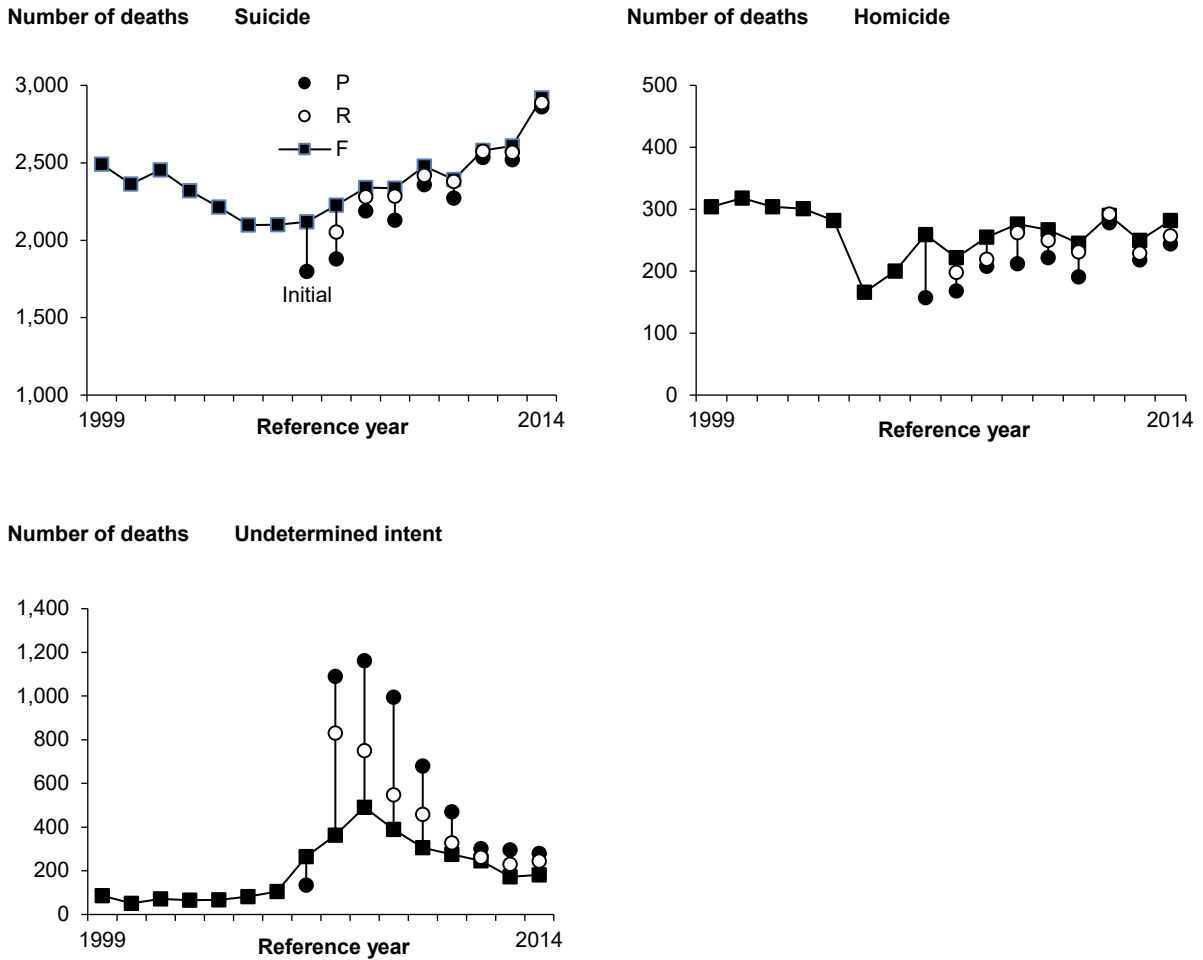
R = Revised CODURF

F = Final CODURF

Note: Periods are reference years. The first 2006 CODURF is referred to as the *Initial* release.

Source: ABS 2000–2017b.

**Figure C.3: Counts of injury deaths for Suicide, Homicide, and Undetermined intent, by reference year and CODURF release, 1999–2014**



P = Preliminary CODURF

R = Revised CODURF

F = Final CODURF

Note: Periods are reference years. The first 2006 CODURF is referred to as the *Initial* release.

Source: ABS 2000–2017b.

Table C.1 shows counts by major external cause groups at *Final* release for deaths registered in 2014 that were assigned a non-injury UCoD code in the *Preliminary* release, and were subsequently reassigned an injury UCoD code in the *Final* release.

More than 32% (41) of these deaths were assigned an UCoD code for *Falls*, and 21% (27) an UCoD code for *Poisoning by pharmaceuticals* in the final release. Almost 60% (76) were assigned an UCoD code of R99 *Other ill-defined and unspecified causes of mortality* in the *Preliminary* release.



**Table C.1: Deaths, by major external cause group at *Final* release for deaths assigned a non-injury UCoD code in *Preliminary* release and an injury<sup>(a)</sup> UCoD code in *Final* release, 2014**

Major external cause group (final release)	Number	%
Transportation	5	3.9
Drowning	4	3.2
Poisoning, pharmaceuticals	27	21.2
Poisoning, other substances	3	2.4
Falls	41	32.3
Other unintentional	16	12.6
Intentional, self-inflicted	7	5.5
Intentional, inflicted by another	17	13.4
Undetermined intent	7	5.5
<b>Total</b>	<b>127<sup>(b)</sup></b>	<b>100.0</b>

(a) 'Injury' is defined as deaths assigned an UCoD code in the range V01–Y36.

(b) Includes 76 deaths assigned an UCoD code of R99 in the *Preliminary* release.

Source: ABS 2017.

Table C.2 shows counts by major external cause groups at *Preliminary* release for deaths registered in 2012 that were assigned an injury UCoD code at the time of the *Preliminary* release, and were subsequently reassigned a non-injury UCoD code at the time of the *Final* release.

Almost 29% (6) of these deaths were assigned an UCoD code for *Undetermined intent* at the time of the *Preliminary* release, while 24% (5) were assigned an UCoD code of R99 *Other ill-defined and unspecified causes of mortality* at the time of the *Final* release.

**Table C.2: Deaths, by major group at *Preliminary* release for deaths assigned an injury<sup>(a)</sup> UCoD code in *Preliminary* release and a non-injury UCoD code in *Final* release, 2014**

Major external cause group ( <i>Preliminary</i> release)	Number	%
Drowning	1	4.8
Poisoning, pharmaceuticals	1	4.8
Falls	4	19.1
Other unintentional	6	28.6
Intentional, self-inflicted	1	4.8
Intentional, inflicted by another	2	9.5
Undetermined intent	6	28.6
<b>Total</b>	<b>21<sup>(b)</sup></b>	<b>100.0</b>

(a) 'Injury' is defined as deaths assigned an UCoD code in the range V01–Y36.

(b) Includes 5 deaths assigned an UCoD code of R99 in *Final* release.

Source: ABS 2017.

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# Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIC	Australian Institute of Criminology
AIHW	Australian Institute of Health and Welfare
ARIA	Accessibility/Remoteness Index of Australia
ASGC	Australian Standard Geographical Classification
ASGS	Australian Statistical Geography Standard
BITRE	Bureau of Infrastructure, Transport and Regional Economics
CODURF	Cause of Death Unit Record File
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th revision
MCoD	multiple causes of death
NCIS	National Coronial Information System
NMD	National Mortality Database
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
RLSS	Royal Life Saving Society
SA	South Australia
SA1, 2, 3, 4	Statistical Area Level 1, 2, 3, 4
SEIFA	Socio-Economic Indexes for Areas
SLA	statistical local area
Tas	Tasmania
UCoD	underlying cause of death
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

# Symbols

n.e.c.	not elsewhere classified
n.p.	not published
$p$	P-value
..	not applicable

# Glossary

**Aboriginal or Torres Strait Islander:** A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Indigenous**.

**age-standardisation:** A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, and then the disease rates that would have occurred with that structure are calculated and compared.

**associated causes of death:** All causes listed on the death certificate, other than the **underlying cause of death**. They include the immediate cause, any intervening causes, and conditions that contributed to the death but were not related to the disease or condition causing the death.

**cause of death:** From information reported on the medical certificate of cause of death, each death is classified by the underlying cause of death, according to rules and conventions of the 10th revision of the **International Statistical Classification of Diseases and Related Health Problems**. The underlying cause is defined as the disease that initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the fatal injury, rather than to the nature of the injury. See also **underlying cause of death**.

**crude death rate:** The number of deaths in a given period divided by the size of the corresponding population (typically expressed per 1,000 or per 100,000 population).

**external cause:** The term used in disease classification to refer to an event or circumstance in a person's external environment that is considered to be the cause of injury or poisoning.

**Index of Relative Socio-economic Disadvantage:** One of the sets of **Socio-Economic Indexes for Areas** for ranking the average socioeconomic conditions of the population in an area. It summarises attributes of the population such as low income, low educational attainment, high unemployment, and jobs in relatively unskilled occupations.

**Indigenous:** A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Aboriginal or Torres Strait Islander**.

**International Statistical Classification of Diseases and Related Health Problems:** The World Health Organization's internationally accepted classification of death and disease. The 10th revision (ICD-10) is currently in use.

**multiple causes of death:** All causes listed on the death certificate. This includes the **underlying cause of death** and all **associated causes of death**.

**population estimates:** Official population numbers compiled by the Australian Bureau of Statistics at both state and territory and statistical local area levels, by age and by sex, at 30 June each year. These estimates allow comparisons to be made between geographical areas of differing population sizes and age structures.

**P-value:** The probability that an observed difference has arisen by chance alone when the null hypothesis is true. By convention, a P-value of 0.05 or less is usually considered statistically significant because the difference it relates to would occur by chance alone only 1 in 20 times or less often.

**remoteness classification:** Each state and territory is divided into several regions based on their relative accessibility to goods and services (such as general practitioners, hospitals, and specialist care), as measured by road distance. These regions are based on the Accessibility/Remoteness Index of Australia and defined as remoteness areas by either the Australian Standard Geographical Classification (before 2011) or the Australian Statistical Geographical Standard (from 2011 onwards) in each Census year.

**socioeconomic area:** An indication of how 'well off' a person or group is. In this report, socioeconomic area is mostly reported using the **Socio-Economic Indexes for Areas**, typically for 5 groups, from the most disadvantaged (worst off) to the least disadvantaged (best off).

**Socio-Economic Indexes for Areas:** A set of indexes, created from Census data, that aim to represent the socioeconomic status of Australian communities, and identify areas of advantage and disadvantage. The index value reflects the overall or average level of disadvantage of the population of an area; it does not show how individuals living in the same area differ from each other in their socioeconomic status. This report uses the **Index of Relative Socio-economic Disadvantage**.

**underlying cause of death:** The disease or injury that initiated the train of morbid events leading directly to a person's death, or the circumstances of the accident or violence that produced the fatal injury.

**usual residence:** The area of the address at which the deceased lived or intended to live, for 6 months or more before death.

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This report focuses on trends in injury deaths that occurred over the period 1999–00 to 2016–17. The age-standardised rate of injury deaths decreased from 55.4 to 47.2 deaths per 100,000 between 1999–00 and 2004–05 and has changed little after that. Rates for Aboriginal and Torres Strait Islander people were generally at least twice as high as rates for non-Indigenous Australians over the period from 2001–02 to 2016–17.

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