Australian Government
Australian Institute of Health and Welfare

Flinders University

# Trends in hospitalised injury, Australia 1999–00 to 2014–15

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# Trends in hospitalised injury, Australia

**1999–00 to 2014–15**

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# Abbreviations

| | |
|---|---|
| ABDS | Australian Burden of Disease Study |
| ABS | Australian Bureau of Statistics |
| AIHW | Australian Institute of Health and Welfare |
| ASGC | Australian Standard Geographical Classification |
| CVS | continuous ventilatory support |
| DALY | disability-adjusted life year |
| ERP | estimated resident population |
| HTTL | high threat to life |
| ICD 10 AM | International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification |
| ICU | intensive care unit |
| LOS | length of stay |
| METeOR | Metadata Online Registry |
| MLOS | mean length of stay |
| NCCC | National Casemix and Classification Centre |
| NEC | not elsewhere classified |
| NHMD | National Hospital Morbidity Database |
| NMDS | National Minimum Data Set |
| NPHP | National Public Health Partnership |
| WHO | World Health Organization |
| YLD | years lived with a disability |
| YLL | years of life lost |

# Symbols

| | |
|---|---|
| n.p. | not publishable because of small numbers, confidentiality or other concerns about the quality of the data |
| *p* | probability |
| CI | confidence interval |

# Summary

This report describes trends in the occurrence of injuries requiring hospitalisation in Australia from 1 July 1999 to 30 June 2014. The annual number of cases rose from about 327,000 to 484,000 during this period.

## Injuries in 2014–15

Overall, injuries were more common among males (266,951 cases) than females (216,722 cases). Case numbers and population-based rates were higher for males than for females for all age groups to 65–69, the largest difference being for ages 20–24. Rates were higher for females than for males for age groups 65–69 and older. The highest rates occurred at 85–89 years.

There were an estimated 23,182 cases due to injury and poisoning for Indigenous people during 2014–15. More males than females were hospitalised (1.3:1). Rates of injury among Indigenous people (3,593 cases per 100,000) were twice those of non-Indigenous people (1,922 cases per 100,000) in 2014–15.

The average length of stay in hospital as a result of an injury was 4 days (more than 1.7 million days for the 484,000 cases). About 1 in 6 injury cases were classified as 'high threat to life'. Two per cent of hospitalised injury cases involved time in an intensive care unit at an average of 82 hours per case.

Two of the main causes of injury in 2014–15 were *Falls* (41%) and transport crashes (12%). Almost 200,000 people were hospitalised as a result of a fall in 2014–15. Females made up just over half (112,075) of all *Fall* cases. *Transport crash* injuries were more common in males (38,947 cases) than in females (19,643 cases) and rates were highest for the 20–24 age group.

## Trends in injury cases

The age-standardised rate of injury increased from 1999–00 to 2014–15 by an average of 1% per year. The rate of injury was 1,715 cases per 100,000 population at the beginning of the period, and by the end the rate was 1,966 per 100,000.

Increases in age-standardised rates across the period were found for injuries due to *Falls* (a 2.8% increase per year from 2002–03); *Exposure to inanimate mechanical forces* (a 0.7% increase per year from 1999–00); *Exposure to animate mechanical forces* (a 2.9% increase per year from 1999–00); and *Intentional self-harm* (a 0.5% increase per year from 1999–00). Significant decreases occurred in the rate of hospitalised cases due to *Accidental poisoning* (a 3.0% decrease per year from 1999–00); *Assault* (a 0.9% decrease per year from 1999–00); *Thermal causes of injury* (a 0.5% decrease per year from 1999–00) and *Drowning and submersion* (a 0.3% decrease per year from 1999–00). No significant trends were observed for transport-related injuries.

# 1 Introduction

This report describes trends in the occurrence of injuries requiring hospitalisation in Australia (in both public and private hospitals) from 1 July 1999 to 30 June 2015. Injury is described according to major types of external causes of injury. The report covers injuries that occurred in community settings such as car accidents, interpersonal violence, sporting and recreational activities, and work. Health-care-associated harm is not included.

The external-cause categories presented in this report differ slightly from those in previous editions of the *Trends in hospitalised injury* series. The following changes have been made:

- Previous reports have included 2 categories of poisoning (*Poisoning, pharmaceuticals* and *Poisoning, non-pharmaceutical substances*) while the present report covers both types of poisoning within 1 broad category of *Accidental poisoning*.
- The large non-descript category *Other unintentional injury* has been split into 3 separate sections covering injury due to inanimate mechanical forces, injury due to *Exposure to animate mechanical forces* and all other remaining unintentional external causes of injury.

Injury is the subject of 3 national prevention plans: the National Injury Prevention and Safety Promotion Plan: 2004–14 (NPHP 2005b); the National Falls Prevention for Older People Plan: 2004 onwards (NPHP 2004); and the National Indigenous People Safety Promotion Strategy (NPHP 2005a).

## Structure of this report

The broad topics in this report are:

- an overview of hospitalised injury cases in 2014–15
- trends in injury (the number and rate of separations and estimated cases over time by age and sex)
- trends in the severity of injury (high threat to life and length-of-stay indicators)
- trends in external causes of injury (number and rate of estimated cases over time by age and sex for each major external cause).

**Chapter 2** presents an overview of injury in Australia including time series information.

**Chapter 3** presents information on measures of the severity of injury using proportions of high threat to life, length of stay, and time spent in intensive care.

**Chapters 4 to 13** present analyses, including time series, on each major external cause of injury.

**Chapter 14** presents information on estimates of the non-fatal burden of injury.

**Appendix A: Data issues** provides summary information on the National Hospital Morbidity Database (NHMD), notes on the presentation of data, the population estimates used to calculate population rates, and analysis methods.

**Appendix B: Additional tables** consists of tables underpinning results presented in the chapters.

# Chapter structure

In this report, chapters 3–13 each begin by answering the following 2 questions:

- What data are reported? (describes the data presented in the chapter)
- What methods were used? (outlines issues such as inclusions and exclusions of records, and calculation methods).

The data presentations that follow answer, where possible, the following questions:

- How many hospitalised cases for injury were there in 2014–15?
- How have hospitalised cases for injury changed over time?
- How have hospitalised cases for injury varied by age and sex?
- How have hospitalised cases for injury varied by remoteness of usual residence?
- How have hospitalised cases for injury among Indigenous people changed over time? How does this compare with trends for non-Indigenous Australians?

Generally, summary tables and figures are placed immediately below the discussion in related text. Where appropriate, tables and figures within the chapter are accompanied by footnotes referring readers to additional statistical tables available for download from the AIHW website. Further information about the methods used in this report can be found in 'Appendix A: Data issues'.

# Methods

This report uses data from the National Hospital Morbidity Database (NHMD) covering the years 1 July 1999 to 30 June 2015 to provide information on trends in injury in Australia. This period was chosen as it covers the time after the transition from the International Statistical Classification of Diseases and Related Health Problems, 9th revision, Clinical modification (ICD-9-AM) to the International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification (ICD-10-AM) to the most recent year of data available. Analysis of trends in injury among Aboriginal and Torres Strait Islander people is presented for the period 2004–05 to 2014–15. The year 2004–05 was chosen as the starting period for the analysis to maximise the number of jurisdictions available for inclusion that were assessed by the AIHW as having adequate identification of Indigenous hospitalised cases. Further information about the selection of hospital separations for Indigenous and non-Indigenous Australians and other methodological issues can be found in Box 1.2 and in 'Appendix A: Data issues'. (For a definition of the term 'separation', see Box 1.1 and the Glossary.)

Diagnosis and external-cause information for the hospital separations reported here were coded according to 7 editions of ICD-10-AM that were current during parts of the period 1999 to 2015.

## What data are reported?

The data are presented by:

- age
- sex
- external cause of injury
- diagnosis

- remoteness of the patient's area of usual residence
- Indigenous status.

## Selection criteria for records, and data terms and definitions

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

- hospital separations occurring in Australia 1 July 1999 to 30 June 2015
- principal diagnosis in the ICD-10-AM range S00–T75 or T79 using Chapter XIX *Injury, poisoning and certain other consequences of external causes* codes
- mode of admission was not a transfer from another acute hospital (see 'Appendix A: Data issues' for details).

Important terms relating to the data used in this report are summarised in boxes 1.1 to 1.3, and further information on data and methods is provided in 'Appendix A: Data issues'. Other information boxes are included within relevant areas in various chapters in the report.

In tables and charts, unless stated otherwise:

- the patient's age is calculated at the date of admission
- in tables by age group and sex, separations for which age and sex were not reported were included in totals
- rates were age-standardised as detailed in 'Appendix A: Data issues'
- trends were analysed using the negative binomial distribution regression technique, as described in Berry and Harrison (2006). See also 'Appendix A: Data issues'.

All chapters on specific external causes have used this methodology, supplemented by additional selection criteria for the specific external cause.

## Changes in separation rates due to changes in underlying population data

All populations, except those used for analyses by Indigenous status (see 'Appendix A: Data issues'), are based on 2011 Census data. The age-standardised rates (per 100,000 population) presented in this report for the years 1999–00 to 2014–15 in time series have been calculated using 'rebased' 2011 estimated resident populations. Therefore, the rates in this report are not directly comparable to the rates presented in earlier injury reports.

**Box 1.1: Summary of terms relating to hospitalised injury**

Statistics on admitted patients are compiled when an **admitted patient** (a patient who undergoes a hospital's formal admission process) completes an episode of admitted-patient care and 'separates' from the hospital. This is because most of the data on the use of hospitals by admitted patients are based on information provided at the end of the patients' episodes of care, rather than at the beginning. The length of stay and the procedures carried out are then known and the diagnostic information is more accurate.

**Separation** is the term used to refer to the episode of admitted-patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation). 'Separation' also means the process by which an admitted patient completes

*(continued)*

**Box 1.1 (continued): Summary of terms relating to hospitalised injury**

an episode of care by being discharged, dying, transferring to another hospital or changing type of care.

The **principal diagnosis** is the diagnosis established, after study, to be chiefly responsible for occasioning the patient's episode of admitted-patient care.

An **external cause** is defined as the environmental event, circumstance or condition that was the cause of injury or poisoning. Whenever a patient has a principal or additional diagnosis of an injury or poisoning, an external-cause code should be recorded.

The **injury separation records** included in this report are those that have a principal diagnosis code in the ICD-10-AM range S00–T75 or T79. Whenever a patient has a principal or additional diagnosis of an injury or poisoning, an external-cause code should be recorded. This includes records where the main reason for the episode in hospital was a recent injury, such as a fracture, laceration or burn to any part of the body, or poisoning. It also includes a small number of episodes mainly due to complications of surgical and medical care or due to sequelae present a year or more after injury, or other late effects.

Records are included whether caused unintentionally ('accidents') or intentionally (*Intentional self-harm*, or *Assault*). Records where intent was not determined are also included. Throughout this report, records with a principal diagnosis of S00–T75 or T79 are included in the totals of tables unless otherwise indicated, even if they lack an external cause or have a first-reported external-cause code of complications of surgical and medical care, or codes describing the sequelae of external causes. These records meet the principal diagnosis definition of community injury, but lack a meaningful external cause.

**Injury cases** are estimated as the number of injury separations, less those records where the mode of admission was 'inward transfer'. Inward transfers are omitted to reduce over-counting.

The criteria for injury cases retain a small number of records with a first external-cause code that is invalid or refers to a sequelae (late effect) or complication of care. These cases are reported as 'other or missing' in tables of external causes.

The **mean length of stay (MLOS)** is the average number of days each patient stayed in hospital. This is calculated by dividing the total number of patient days for **injury separations** by the number of **injury cases**, estimated as above. Patients who were admitted and discharged from hospital on the same day are counted as staying for 1 day.

Injuries can be classified according to the likelihood that a patient with that injury will die in hospital. The method used refers to cases with a predicted mortality risk of about 6% or higher as having a **high threat to life (HTTL)** (Stephenson et al. 2003). Injuries of this severity are likely to have a large impact on the patient, often with persisting problems and ongoing need for health care services.

**Box 1.2: Indigenous reporting**

In this report, the terms 'Indigenous' and 'other Australian' are used to refer to persons identified as such in Australian hospital separations data and population data collections. Separations for which Indigenous status was 'not stated' have been included in *Other Australians*. There were 7,717 cases in 2014–15 with Indigenous status recorded as *Not stated*.

From 2010–11 onwards, Indigenous status information within hospital separations data from all jurisdictions were of sufficient quality for statistical reporting purposes (AIHW 2013). An AIHW study found that an estimated 88% of Indigenous patients were correctly identified in Australian public hospital admission records in 2011–12.

The report recommends that the data for all jurisdictions are used in analysis of Indigenous hospitalisation rates, for hospitalisations in total in national analyses of Indigenous admitted-patient care for data from 2010–11 onwards.

Injury rates were age-standardised to 85+ by the direct method (whole of population injury rates were age-standardised to 95+).

Further information is available in 'Appendix A: Data issues'.

# 2 Overview of hospitalised injury

This chapter presents information on patients who were admitted to hospital as a result of an injury. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

**Key findings**

About 480,000 cases of hospitalised injury occurred in Australia in 2014–15.

**Sex of patient**

In 2014–15, 55% of cases were men and boys.

**Age of patient**

In 2014–15, people aged 65 or over accounted for 30% of cases; among females it was 42%.

**Indigenous status**

Age-standardised rates of injury were much higher overall among Indigenous Australians (3,593 per 100,000 population), compared with other Australians (1,922 per 100,000 population).

**Cause of injury**

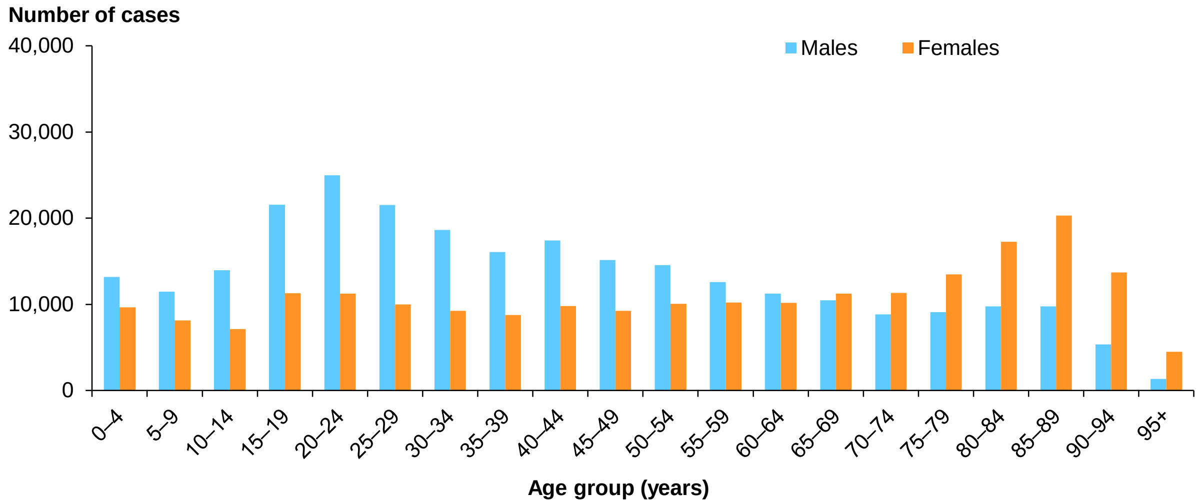
Falls constituted the largest proportion of injury cases overall in 2014–15 (41%).

**Trends in injury**

The age-standardised rate of injury increased from 1999–00 to 2014–15 by an average of 1% per year.

## Age group and sex

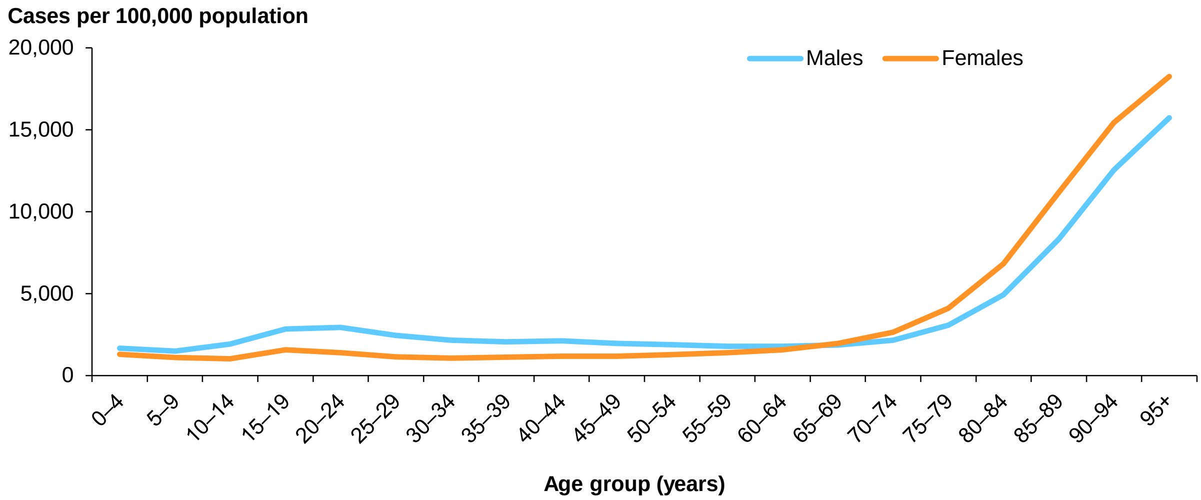
There were 483,678 cases of hospitalised injury in Australia in 2014–15. More males (266,951) than females (216,722) were hospitalised as a result of an injury. An analysis of injury cases by age and sex shows a greater number of males in each age category to 60–64 (Figure 2.1). The greatest number of injury cases (20,305 cases) among older women occurred in the age range 85–89. Among males, the largest number of injury cases (about 25,000) was seen in the age range 20–24.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 2.

**Figure 2.1: Number of cases of injury, by age group, by sex, Australia, 2014–15**

In 2014–15, the age-specific rates of injury were much higher in the older age groups (those above about 75) (Figure 2.2). Males had a higher rate of injury across all age groups, up to about 60–64; thereafter females had much higher rates. The highest rate of injury for females occurred for the age group 95 and above, with 18,240 cases per 100,000 compared with 15,732 for males at the same age.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 2.

**Figure 2.2: Age-specific rates of injury, by age group, by sex, Australia, 2014–15**

# Nature of injury

Hospitalised injuries resulted in damage to various body regions with the most common being the *Head and neck* (21%) and *Hip and lower limb* (21%) (Table 2.1). Females had a larger proportion of injuries to the *Hip and lower limb*, reflective of the much higher rates of *Falls* injury in older women. By contrast, males had larger proportions of *Wrist and hand injuries*.

**Table 2.1: Injury cases, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 59,053 | 22 | 42,788 | 20 | 101,842 | 21 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 27,574 | 10 | 26,991 | 13 | 54,565 | 11 |
| Shoulder and upper limb (excluding wrist and hand) | 43,614 | 16 | 38,962 | 18 | 82,576 | 17 |
| Wrist and hand | 47,070 | 18 | 16,801 | 8 | 63,872 | 13 |
| Hip and lower limb (excluding ankle and foot) | 48,028 | 18 | 51,116 | 24 | 99,144 | 21 |
| Ankle and foot | 11,413 | 4 | 7,793 | 4 | 19,206 | 4 |
| Other, multiple and incompletely specified body regions | 10,667 | 4 | 7,036 | 3 | 17,704 | 4 |
| Injuries not described in terms of body region | 19,532 | 7 | 25,235 | 12 | 44,769 | 9 |
| **Total** | **266,951** | **100** | **216,722** | **100** | **483,678** | **100** |

Fractures were the most common type of injury sustained, with almost 200,000 (38%) cases in 2014–15 (Table 2.2). Males and females had a similar pattern of type of injury, with *Fractures*, followed by *Open wounds*, common for both.

**Table 2.2: Injury cases, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 95,843 | 36 | 89,531 | 41 | 185,374 | 38 |
| Dislocation | 6,195 | 2 | 4,210 | 2 | 10,405 | 2 |
| Soft-tissue injury | 32,146 | 12 | 16,511 | 8 | 48,657 | 10 |
| Open wound | 42,678 | 16 | 26,457 | 12 | 69,135 | 14 |
| Intracranial injury | 12,922 | 5 | 7,739 | 4 | 20,661 | 4 |
| Internal organ or vessel of trunk | 3,903 | 2 | 1,571 | 1 | 5,474 | 1 |
| Burn | 4,662 | 2 | 2,571 | 1 | 7,233 | 2 |
| Superficial injury | 13,511 | 5 | 14,821 | 7 | 28,333 | 6 |
| Poisoning or toxic effect | 16,017 | 6 | 23,012 | 11 | 39,031 | 8 |
| Other and unspecified injuries | 39,074 | 15 | 30,299 | 14 | 69,375 | 14 |
| **Total** | **266,951** | **100** | **216,722** | **100** | **483,678** | **100** |

# Remoteness of usual residence

The age-standardised rate of injury in 2014–15 increased with increasing remoteness of usual residence (Table 2.3). The rate of injury in *Very remote* regions (3,709 per 100,000 population) was more than double the rate in *Major cities* (1,837 per 100,000 population).

**Table 2.3: Injury cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Injury cases | 319,066 | 93,299 | 48,667 | 9,219 | 7,488 |
| Age-standardised rate/100,000 population | 1,837.1 | 2,087.5 | 2,311.8 | 2,943.3 | 3,708.7 |

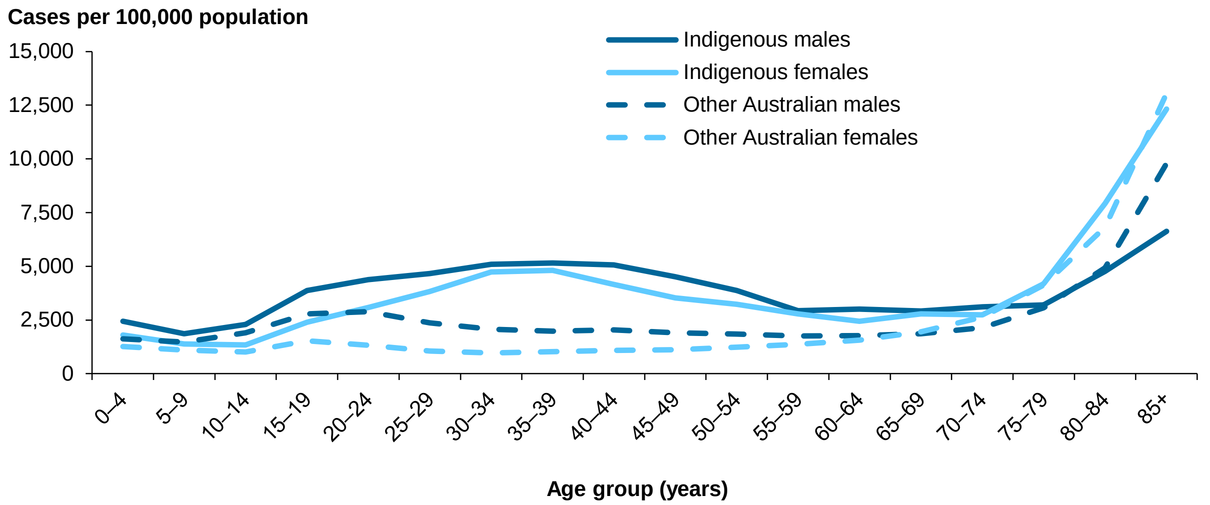
# Aboriginal and Torres Strait Islander people

There were 23,182 cases of hospitalised injury among Indigenous Australians in 2014–15 (Table 2.4). More males than females were hospitalised as a result of an injury. Age-standardised rates of injury were much higher overall among Indigenous Australians (3,593 per 100,000 population), compared with other Australians (1,922 per 100,000 population). Rates of injury among Indigenous females were twice those of other Australians.

**Table 2.4: Injury cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Injury cases | 12,881 | 10,300 | 23,182 | 254,070 | 206,422 | 460,496 |
| Age-standardised rate/100,000 population | 3,834.8 | 3,317.6 | 3,592.8 | 2,225.1 | 1,595.2 | 1,922.4 |

An analysis of the rate of hospitalised injury by age and sex shows age-specific rates were higher in each age group for Indigenous males and females, up to the 75–79 age group, compared with their *Other Australian* counterparts (Figure 2.3). Indigenous males and females had higher rates of hospitalised injury throughout adulthood, whereas the initial rise in rates seen among other Australian males and females in their late teens dissipated during middle age.




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 2.

**Figure 2.3: Age-specific rates of injury, by Indigenous status, by age group, by sex, Australia, 2014–15**

# Causes of injury

*Falls* constituted the largest proportion of injury cases overall in 2014–15 (41%), followed by *Exposure to inanimate mechanical forces* (14%) and *Transport crash* (12%) (Table 2.5).

*Exposure to inanimate mechanical forces* includes cases of being struck or having contact with objects such as sporting equipment, sharp objects such as glass or knives, as well as tools and machinery of various types. The *Exposure to inanimate mechanical forces* category is described more fully in Chapter 9.

For males the leading external cause of injury was *Falls* (32%), followed by *Transport crash* (15%).

For females the rankings were: *Falls* (52%), followed by *Transport crash* (9%) and *Exposure to inanimate mechanical forces* (9%).

**Table 2.5: Major external cause groups for injury cases, by sex, Australia, 2014–15**

| | **Males** | | **Females** | | **Persons** | |
|---|---|---|---|---|---|---|
| **External cause description** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Transport crash | 38,947 | 14.6 | 19,643 | 9.1 | 58,591 | 12.1 |
| Accidental drowning and submersion | 386 | 0.1 | 196 | 0.1 | 582 | 0.1 |
| Accidental poisoning | 5,336 | 2 | 4,756 | 2.2 | 10,092 | 2.1 |
| Falls | 86,500 | 32.4 | 112,075 | 51.7 | 198,576 | 41.1 |
| Thermal causes | 3,659 | 1.4 | 2,181 | 1 | 5,840 | 1.2 |
| Exposure to inanimate mechanical forces | 50,036 | 18.7 | 18,581 | 8.6 | 68,618 | 14.2 |
| Exposure to animate mechanical forces | 13,107 | 4.9 | 7,049 | 3.3 | 20,156 | 4.2 |
| Intentional self-harm | 9,999 | 3.7 | 18,118 | 8.4 | 28,119 | 5.8 |
| Assault | 12,768 | 4.8 | 6,257 | 2.9 | 19,025 | 3.9 |
| **Other external causes of accidental injury** | | | | | | |
| Other accidental threats to breathing | 399 | 1 | 337 | 1.4 | 736 | 1.1 |
| Exposure to electric current, radiation and extreme ambient air temperature and pressure | 523 | 1.3 | 172 | 0.7 | 695 | 1.1 |
| Contact with venomous animals and plants | 2,195 | 5.3 | 1,178 | 4.9 | 3,373 | 5.1 |
| Exposure to forces of nature | 445 | 1.1 | 213 | 0.9 | 658 | 1 |
| Overexertion, travel and privation | 8,431 | 20.3 | 6,089 | 25.3 | 14,520 | 22.1 |
| Accidental exposure to other and unspecified factors | 29,589 | 71.2 | 16,118 | 66.9 | 45,707 | 69.6 |
| *Subtotal* | *41,582* | *15.6* | *24,107* | *11.1* | *65,689* | *13.6* |
| Undetermined intent | 2,648 | 1 | 2,174 | 1 | 4,822 | 1 |
| Other or missing | 1,983 | 0.7 | 1,585 | 0.8 | 3,568 | 0.8 |
| **Total** | **266,951** | **100** | **216,722** | **100** | **483,678** | **100** |

# Socioeconomic status

The proportion of injury cases in each SES group ranged between 18% and 22% (Table 2.6). The highest proportion, for males and females, comprised people living in areas with the lowest (most disadvantaged) SES classification.

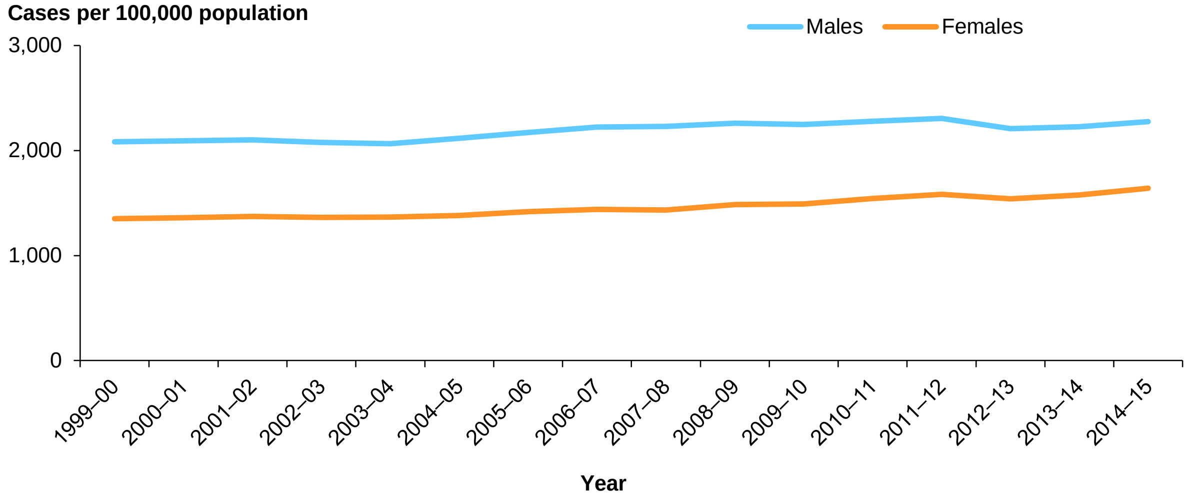
**Table 2.6: Injury cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 59,567 | 22.3 | 47,935 | 22.1 | 107,503 | 22.2 |
| 2 | 55,587 | 20.8 | 44,399 | 20.5 | 99,986 | 20.7 |
| 3 | 53,200 | 19.9 | 42,406 | 19.6 | 95,606 | 19.8 |
| 4 | 49,086 | 18.4 | 39,820 | 18.4 | 88,908 | 18.4 |
| 5–Highest | 45,762 | 17.1 | 39,870 | 18.4 | 85,633 | 17.7 |
| **Total[(a)]** | **266,951** | **100** | **216,722** | **100** | **483,678** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# How have injury cases changed over time?

Age-standardised rates of injury for males and females showed little real variation over the period (Figure 2.4). The rate of injury for males has remained consistently higher than for females for the entire period.



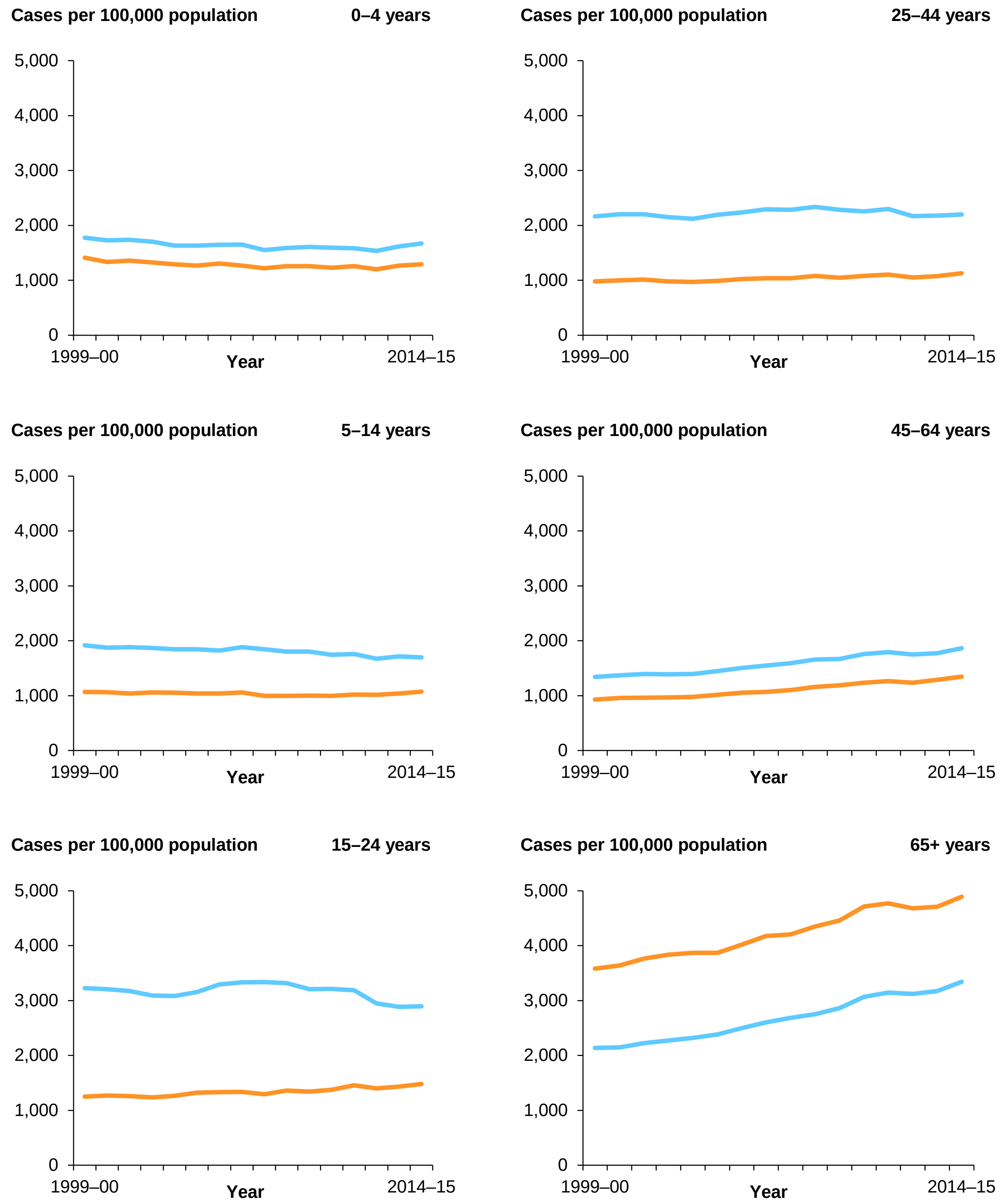

*Note:* Data underpinning this figure can be found in supplementary table spreadsheet 'Chapter 2'.

**Figure 2.4: Age-standardised rates of injury, by sex, Australia, 1999–00 to 2014–15**

Changes in rates of injury over time, by broad age groups as well as by sex, are shown in Figure 2.5. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015). Age-specific rates of injury have increased among males and females 45–64 and 65+ over the period, while change at other ages is not as evident.

Among those aged 45–64, rates of injury for males were higher, compared with females, with rates for both increasing over the period. The rate of injury for males aged 45–64 in 1999–00 was 1,342 cases per 100,000 population, rising to 1,863 in 2014–15. For females, the rate was 931 in 1999–00, rising to 1,345 in 2014–15.

Compared with males, age-specific rates for injury were much higher for females in the 65+ group and higher overall, compared with all other age groups. The rate of injury for males aged 65 or over in 1999–00 was 2,136 cases per 100,000 population, rising to 3,341 in 2014–15. For females, the rate was 3,583 in 1999–00, rising to 4,890 in 2014–15.

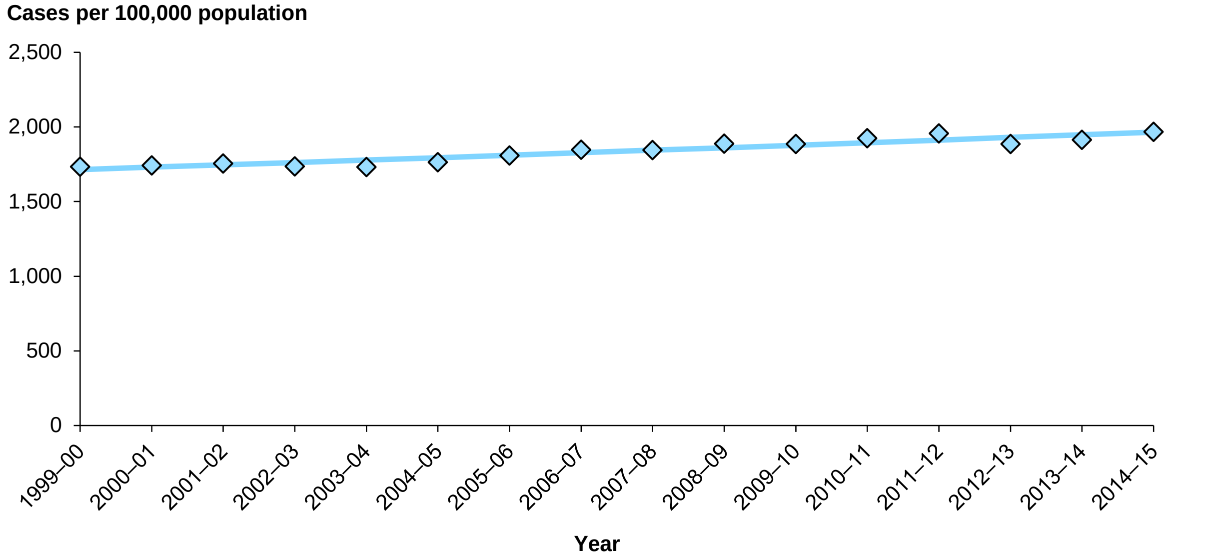



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in supplementary table spreadsheet for Chapter 2.

**Figure 2.5: Age-specific rates of injury, by age group, by sex, Australia, 1999–00 to 2014–15**

The population-based age-standardised rate of cases of hospitalised injury tended to rise during the 15 years to 2014–15 (Figure 2.6). The rate was 1,715 per 100,000 population in 1999–00 and 1,966 in 2014–15. The rise in the modelled rate averaged 0.9% per year and was statistically significant (95% CI: 0.8%, 1.1%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 2.6: Modelled age-standardised rates of injury, Australia, 1999–00 to 2014–15**

# How have the causes of injury cases varied over time?

Changes in age-standardised rates of injury for various causes over the 1999–2015 period are summarised in Table 2.7. More information on trends for each of the causes of injury listed in the table is available in subsequent chapters of this report.

Five categories of external cause showed statistically significant increases in age-standardised rates: *Falls* (2.8% increase per year from 2002–03), *Exposure to inanimate mechanical forces* (0.7% increase per year from 1999–00), *Exposure to animate mechanical forces* (2.9% increase per year from 1999–00), *Intentional self-harm* (0.5% increase per year from 1999–00) and *Other external causes of accidental injury* (1.8% increase per year from 1999–00).

Only 1 of the causes (*Transport crashes*) showed little or no trend over time.

Significant downward trends were seen in the rate of hospitalised cases due to *Accidental poisoning* (3.0% decrease per year from 1999–00); *Assault* (0.9% decrease per year from 1999–00); *Thermal causes of injury* (0.5% decrease per year from 1999–00) and *Accidental* d*rowning and submersion* (0.3% decrease per year from 1999–00).

**Table 2.7: Trends in age-standardised rates of injury cases, by major external cause group, Australia, 1999–00 to 2014–15**

| External cause | Trend | % change per year | % of all injuries 2014–15 |
|---|---|---|---|
| Transport crash | ↔ | ** | 12.1 |
| Accidental drowning and submersion | ↓ | 0.3* | 0.1 |
| Accidental poisoning | ↓ | 3.0* | 2.0 |
| Falls | ↑ | 1.8* | 41.1 |
| Thermal causes of injury | ↓ | 0.5* | 1.2 |
| Exposure to inanimate mechanical forces | ↑ | 0.7* | 14.2 |
| Exposure to animate mechanical forces | ↑ | 2.9* | 4.2 |
| Intentional self-harm | ↑ | 0.5* | 5.8 |
| Assault | ↓ | 0.9* | 3.9 |
| Other external causes of accidental injury | ↑ | 1.8* | 13.6 |

* Average per cent change per year differed from zero to a statistically significant extent ($p$ <0.05).

** Average per cent change per year was small (<0.1%) and did not differ significantly from zero ($p$ ≥0.05).

# 3 Severity of injury

Three measures of severity for hospitalised injury cases are length of stay, time spent in intensive care and on ventilator support, and the proportion of high threat to life cases (see Box 3.2).

'Length of stay' provides an approximate indication of case severity, because severe injuries are more likely to result in long episodes of care than minor injuries. However, some severe cases have relatively short lengths of stay because the injured person dies in hospital. Estimates of length of stay are likely to be underestimates of the total amount of time an individual spends in hospital as a result of their injury. Length of stay information presented here is based on cases of hospitalisation and those with *Transfer in* as the mode of admission (see 'Appendix A: Data issues' and Box 3.1). Some of the included cases may have had additional time spent in hospital (for example, for rehabilitation) but that is not included here.

This chapter also presents information on the number of hours that patients stayed in an intensive care unit (ICU) and the number of hours of continuous ventilator support (CVS) received (see 'Appendix A: Data issues').

**Box 3.1: Calculating length of stay**

The 'mean length of stay' (MLOS) is the average number of days each patient stays in hospital in acute care. This was calculated by dividing the total number of patient days for a reporting period (including inward transfers) by the estimated number of cases for the same period. 'Patient days' are the number of full and partial days a patient spends in hospital. One patient day is counted for same-day patients (admitted and discharged from hospital on the same day).

**Box 3.2: High threat to life injuries**

Injuries can be classified according to the likelihood that a patient with that injury will die in hospital. Cases with predicted mortality risk of about 6% or higher as having a 'high threat to life' (Stephenson et al. 2003). Injuries of this severity may well have a large impact on the patient, often with persisting problems and ongoing need for health care services.

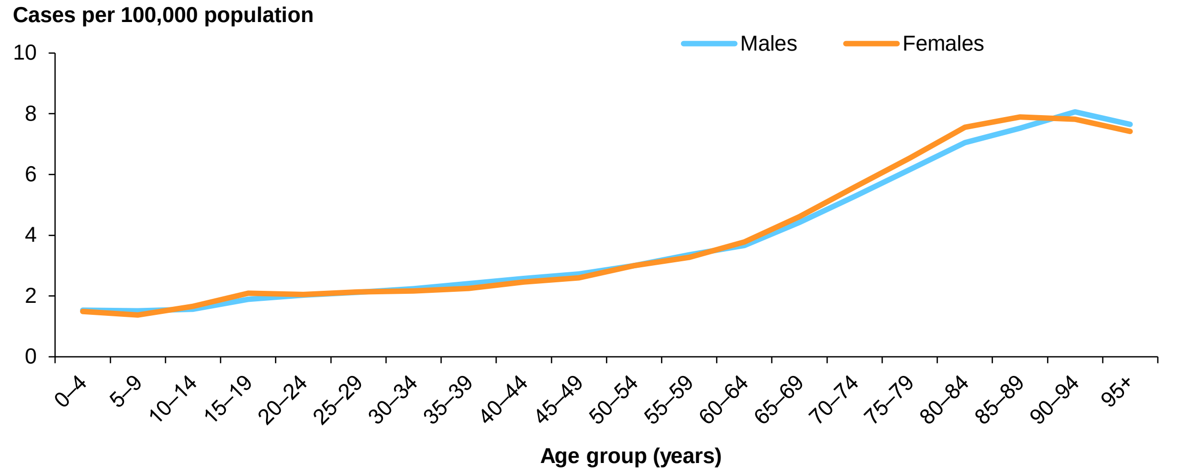
## Length of stay

In 2014–15, the overall MLOS for injury was 3.6 days (more than 1.7 million days for 483,678 cases) (Table 3.1). MLOS was shorter for males, overall, than for females (3.1 days compared with 3.6). However, age-specific MLOS was very similar for both sexes. Hence, the overall difference is due to the different age distribution of male and female cases. Discharge occurred on the same day as admission for one-third of all injury cases (180,947 separations, or 35%). More males (107,472 separations, or 37.4%) were discharged on the same day, compared with females (73,473, or 31%).

**Table 3.1: Length of stay for injury: case counts, total patient days and mean length of stay, by age group, by sex, Australia, 2014–15**

| | Males | | | Females | | | Persons | | |
|---|---|---|---|---|---|---|---|---|---|
| Age group | Cases | Total patient days | MLOS | Cases | Total patient days | MLOS | Cases | Total patient days | MLOS |
| 0–4 | 13,173 | 20,223 | 1.5 | 9,655 | 14,401 | 1.5 | 22,828 | 34,624 | 1.5 |
| 5–14 | 25,429 | 39,133 | 1.5 | 15,235 | 22,946 | 1.5 | 40,664 | 62,079 | 1.5 |
| 15–24 | 46,561 | 91,430 | 2.0 | 22,554 | 46,778 | 2.1 | 69,116 | 138,209 | 2.0 |
| 25–44 | 73,639 | 170,916 | 2.3 | 37,830 | 85,227 | 2.3 | 111,470 | 256,144 | 2.3 |
| 45–64 | 53,539 | 168,392 | 3.1 | 39,657 | 125,886 | 3.2 | 93,198 | 294,281 | 3.2 |
| 65+ | 54,609 | 344,577 | 6.3 | 91,791 | 634,156 | 6.9 | 146,400 | 978,733 | 6.7 |
| **Total** | **266,951** | **834,675** | **3.1** | **216,722** | **929,394** | **3.6** | **483,678** | **1,764,075** | **3.6** |

MLOS was much higher for those aged 65 or over in 2014–15 (Figure 3.1). The average stay for people aged 95 or over (7.5 days) was almost twice that for the overall population (3.6 days). There was very little difference between males and females.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 2.

**Figure 3.1: Mean length of stay for injury, by age group, by sex, Australia, 2014–15**

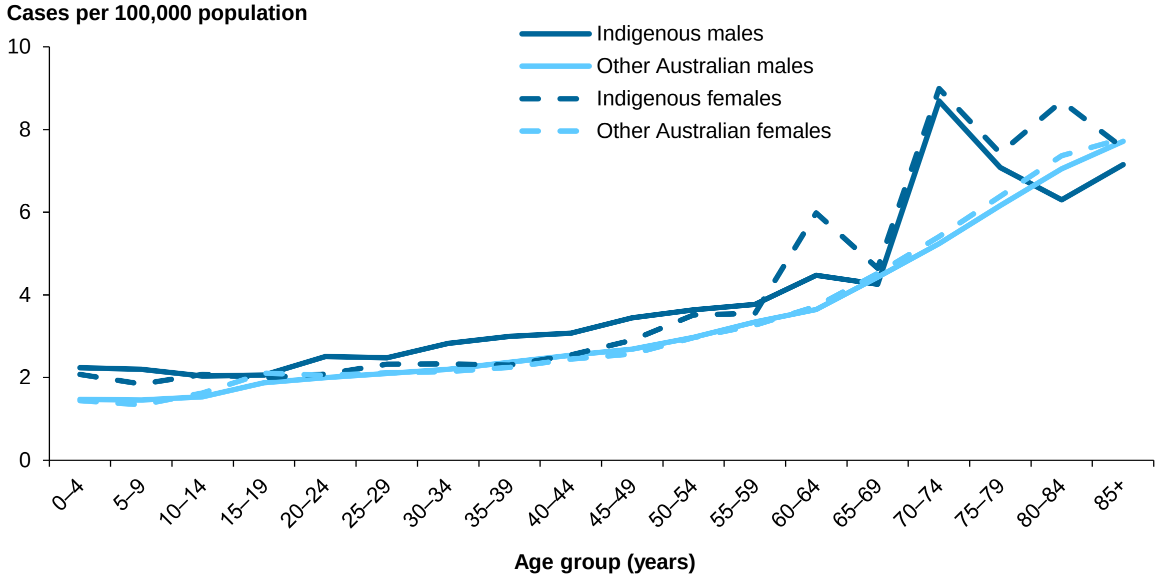
## Aboriginal and Torres Strait Islander people

Table 3.2 presents information on length of stay for Indigenous and other Australians. In 2014–15, the overall MLOS for injury among Indigenous people was 2.8 days (more than 60,000 days for 23,182 cases). Discharge occurred on the day of admission for just over one-third of all injury cases among Indigenous people (9,188 separations, or 37%), similar to other Australians (171,759, or 35%). A larger proportion of Indigenous females (39%) were discharged on the same day, compared with other Australian females (31%).

**Table 3.2: Length of stay for injury: case counts, total patient days and mean length of stay, by Indigenous status, by age group, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Age group** | **Cases** | **Total patient days** | **MLOS** | **Cases** | **Total patient days** | **MLOS** |
| 0–4 | 1,809 | 3,922 | 2.2 | 21,019 | 30,702 | 1.5 |
| 5–14 | 2,782 | 5,698 | 2.0 | 37,882 | 56,381 | 1.5 |
| 15–24 | 5,051 | 11,081 | 2.2 | 64,065 | 127,128 | 2.0 |
| 25–44 | 8,620 | 22,461 | 2.6 | 102,850 | 233,683 | 2.3 |
| 45–64 | 3,886 | 14,202 | 3.7 | 89,312 | 280,079 | 3.1 |
| 65+ | 1,033 | 7,011 | 6.8 | 145,367 | 971,722 | 6.7 |
| **Total** | **23,182** | **64,379** | **2.8** | **460,496** | **1,699,696** | **3.7** |

MLOS for Indigenous males and females generally increased with age (Figure 3.2). The highest lengths of stay were recorded for Indigenous males and females in the 70–74 age group (9 days each); by comparison, the highest lengths of stay for other Australian males and females occurred for those aged 85 and over (8 days each).




*Note:* Data underpinning this figure can be found in supplementary table spreadsheet ‘Chapter 2’.

**Figure 3.2: Mean length of stay for injury, by Indigenous status, by age group, Australia, 2014–15**

## Length of stay by cause of injury

The MLOS varied by the external cause of the injury (Table 3.3). The longest average lengths of stay occurred for those injured as a result of a *Fall* (5.2 days), *Thermal causes* (4.6 days), *Transport crashes* (3.6 days) and *Intentional self-harm* (3.5 days). The shortest lengths of stay were associated with *Contact with venomous animals and plants* (1.5 days) and *Exposure to inanimate mechanical forces* (1.9 days).

**Table 3.3: Length-of-stay statistics for major external cause groups for injury cases, Australia, 2014–15**

| External cause description | Cases | Total patient days | MLOS |
|---|---|---|---|
| Transport crash | 58,591 | 212,988 | 3.6 |
| Accidental drowning and submersion | 582 | 1,436 | 2.5 |
| Accidental poisoning | 10,092 | 23,914 | 2.4 |
| Falls | 198,576 | 1,022,706 | 5.2 |
| Thermal causes | 5,840 | 27,140 | 4.6 |
| Exposure to inanimate mechanical forces | 68,618 | 130,600 | 1.9 |
| Exposure to animate mechanical forces | 20,156 | 42,377 | 2.1 |
| Intentional self-harm | 28,119 | 97,949 | 3.5 |
| Assault | 19,025 | 40,851 | 2.1 |
| **Other external causes of accidental injury** | | | |
| Other accidental threats to breathing | 736 | 1,765 | 2.4 |
| Exposure to electric current, radiation and extreme ambient air temperature and pressure | 695 | 1,557 | 2.2 |
| Contact with venomous animals and plants | 3,373 | 5,011 | 1.5 |
| Exposure to forces of nature | 658 | 1,746 | 2.7 |
| Overexertion, travel and privation | 14,520 | 33,816 | 2.3 |
| Accidental exposure to other and unspecified factors | 45,707 | 91,580 | 2.0 |
| *Subtotal* | *65,689* | *135,475* | *2.1* |
| Undetermined intent | 4,822 | 11,400 | 2.4 |
| Other or missing | 3,568 | 17,239 | 4.8 |
| **Total** | **483,678** | **1,764,075** | **3.6** |

## How has length of stay changed over time?

There was little change in the MLOS for injury over the period 1999–00 to 2014–15. In 2012–13 the MLOS was 3.3 for males and 4.6 for females and in 2014–15 the MLOS was 3.1 for males and 4.3 for females. Females continued to have longer mean lengths of stay compared with males in each of the years examined. The difference was at its smallest in 2014–15 (3.3 for males; 4.6 for females).

As with the population as a whole, there was no change over the period in the MLOS among Indigenous people.

Although MLOS is only an approximate indication of case severity, the consistency over time in MLOS suggests that the overall severity of injuries treated in hospital has not increased or decreased markedly.

# High threat to life

About 1 in 6 injury cases (72,995, or 15%) were classified as *High threat to life* (HTTL) in 2014–15 (Table 3.4). There were 35,874 HTTL cases reported for males; however, as more males were hospitalised for injury overall, this represented a smaller proportion of male injury cases (13%) compared with 17% of HTTL cases for females. The majority of HTTL cases in both males and females occurred in the 65+ age group.

**Table 3.4: High threat to life injury cases, by age group, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| Age group | Number | % HTTL | Number | % HTTL | Number | % HTTL |
| 0–4 | 866 | 6.6 | 606 | 6.3 | 1,472 | 6.4 |
| 5–14 | 1,123 | 4.3 | 507 | 3.4 | 1,630 | 4.0 |
| 15–24 | 3,851 | 8.2 | 1,474 | 6.5 | 5,325 | 7.7 |
| 25–44 | 7,085 | 9.7 | 2,570 | 6.8 | 9,655 | 8.7 |
| 45–64 | 7,481 | 9.2 | 3,679 | 9.2 | 11,160 | 12.1 |
| 65+ | 15,467 | 42.0 | 28,285 | 42.8 | 43,752 | 42.7 |
| **Total** | **35,874** | **13.4** | **37,121** | **17.1** | **72,995** | **15.1** |

## Aboriginal and Torres Strait Islander people

The pattern of HTTL cases is somewhat similar between Indigenous and other Australians, with greater proportions of HTTL cases among people 65+ (Table 3.5).

**Table 3.5: High threat to life injury cases, by Indigenous status, by age group, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| | Number | % HTTL | Number | % HTTL | Number | % HTTL |
| **Indigenous** | | | | | | |
| 0–4 | 95 | 8.9 | 57 | 7.6 | 152 | 8.4 |
| 5–14 | 103 | 6.0 | 49 | 4.6 | 152 | 5.5 |
| 15–24 | 309 | 10.0 | 169 | 8.7 | 478 | 9.5 |
| 25–44 | 535 | 11.8 | 372 | 9.1 | 907 | 10.5 |
| 45–64 | 301 | 14.7 | 185 | 10.1 | 486 | 12.5 |
| 65+ | 97 | 23.2 | 173 | 28.1 | 270 | 26.1 |
| **Total** | **1,441** | **11.2** | **1,005** | **9.8** | **2,446** | **10.6** |
| **Other Australians** | | | | | | |
| 0–4 | 771 | 6.4 | 549 | 6.2 | 1,320 | 6.3 |
| 5–14 | 1,020 | 4.3 | 458 | 3.2 | 1,478 | 3.9 |
| 15–24 | 3,542 | 8.2 | 1,305 | 6.3 | 4,847 | 7.6 |
| 25–44 | 6,550 | 9.5 | 2,198 | 6.5 | 8,748 | 8.5 |
| 45–64 | 7,180 | 13.9 | 3,494 | 9.2 | 10,674 | 12.0 |
| 65+ | 15,370 | 28.4 | 28,112 | 30.8 | 43,482 | 29.9 |
| **Total** | **34,433** | **13.6** | **36,116** | **17.5** | **70,549** | **15.3** |

## HTTL by cause of injury

Causes of injury that resulted in high proportions of HTTL cases include *Accidental* d*rowning and submersion* (76%), *Other accidental threats to breathing* (46%), *Transport crashes* and *Falls* (24% each) (Table 3.6). Injury cases due to *Accidental* d*rowning and submersion* and *Threat to breathing* both had the highest proportion of HTTL cases for males and females.

**Table 3.6: High threat to life injury cases, by major external cause groups, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause description** | **Number** | **% HTTL** | **Number** | **% HTTL** | **Number** | **% HTTL** |
| Transport crash | 38,947 | 24.8 | 19,643 | 20.9 | 58,591 | 23.5 |
| Accidental drowning and submersion | 386 | 76.2 | 196 | 76.5 | 582 | 76.3 |
| Accidental poisoning | 5,336 | 2.4 | 4,756 | 1.7 | 10,092 | 2.1 |
| Falls | 86,500 | 21.1 | 112,075 | 25.6 | 198,576 | 23.6 |
| Thermal causes | 3,659 | 14.3 | 2,181 | 13.3 | 5,840 | 14.0 |
| Exposure to inanimate mechanical forces | 50,036 | 2.7 | 18,581 | 2.8 | 68,618 | 2.7 |
| Exposure to animate mechanical forces | 13,107 | 5.4 | 7,049 | 3.7 | 20,156 | 4.8 |
| Intentional self-harm | 9,999 | 8.8 | 18,118 | 2.9 | 28,119 | 5.0 |
| Assault | 12,768 | 20.1 | 6,257 | 13.8 | 19,025 | 18.0 |
| **Other external causes of accidental injury** | | | | | | |
| Other accidental threats to breathing | 399 | 40.9 | 337 | 51.6 | 736 | 45.8 |
| Exposure to electric current, radiation and extreme ambient air temperature and pressure | 523 | 6.9 | 172 | 2.9 | 695 | 5.9 |
| Contact with venomous animals and plants | 2,195 | 0.2 | 1,178 | 0.1 | 3,373 | 0.1 |
| Exposure to forces of nature | 445 | 16.6 | 213 | 23.5 | 658 | 18.8 |
| Overexertion, travel and privation | 8,431 | 1.8 | 6,089 | 3.3 | 14,520 | 2.4 |
| Accidental exposure to other and unspecified factors | 29,589 | 2.7 | 16,118 | 6.0 | 45,707 | 3.8 |
| *Subtotal* | *41,582* | *2.9* | *24,107* | *5.8* | *65,689* | *4.0* |
| Undetermined intent | 2,648 | 4.2 | 2,174 | 3.0 | 4,822 | 3.6 |
| Other or missing | 1,983 | 8.2 | 1,585 | 12.2 | 3,568 | 10.0 |
| **Total** | **266,951** | **13.4** | **216,722** | **17.1** | **483,678** | **15.1** |

### How have HTTL cases of injury varied over time?

The proportion of HTTL cases remained stable over the period. In 2013–14, the proportion of HTTL cases overall was 15.5%, compared with 15.1% in 2014–15. Females continued to make up a greater proportion of HTTL cases in each of the years examined.

As with the population as a whole, there was no change over the period in the proportion of HTTL cases among Indigenous people.

## Intensive care

This section presents information on the number of hours that patients stayed in an ICU and the number of hours of CVS received (not all admitted patients receive CVS in an ICU). It is likely that the numbers reported here are underestimates, as they are based on the initial episode of care and do not include any additional time an individual spent in an ICU. In 2014–15, almost a million hours in ICU care were reported for about 11,000 cases (Table 3.7). About 2% of hospitalised injury cases involved time in an ICU, which was the same for males and females. The average period in ICU care was 82 hours and males spent a greater amount of time (92 hours) in an ICU compared with females (68 hours).

**Table 3.7: Cases involving time in an intensive care unit, by sex, Australia, 2014–15**

| | Males | Females | Persons |
|---|---|---|---|
| Cases involving time in an ICU | 6,480 | 4,519 | 10,999 |
| Hours in ICU | 593,085 | 305,562 | 898,647 |
| Average duration in ICU (hours) | 92 | 68 | 82 |

Almost half a million hours of CVS were reported for about 6,000 cases in 2014–15 (Table 3.8). About 1% of hospitalised injury cases involved CVS, which was the same for males and females. The average period of CVS was 74 hours, and males had longer periods (81 hours) of CVS compared with females (63 hours).

**Table 3.8: Cases involving continuous ventilatory support, by sex, Australia, 2014–15**

| | Males | Females | Persons |
|---|---|---|---|
| Cases involving CVS | 3,774 | 2,262 | 6,036 |
| Hours received CVS | 304,871 | 142,035 | 446,906 |
| Average duration CVS (hours) | 81 | 63 | 74 |

## Aboriginal and Torres Strait Islander people

There was little difference between Indigenous and other Australians in the time spent in ICU care in 2014–15 (Table 3.9). With respect to CVS, Indigenous people (60 hours) had fewer hours of CVS, compared with their *Other Australian* counterparts (75 hours) (Table 3.10).

**Table 3.9: Cases involving time in an intensive care unit, by Indigenous status, by sex, Australia, 2014–15**

| | Males | Females | Persons |
|---|---|---|---|
| **Indigenous people** | | | |
| Cases involving time in an ICU | 309 | 198 | 507 |
| % of cases involving time in an ICU | 2.4 | 1.9 | 2.2 |
| Hours in ICU | 27,795 | 12,532 | 40,327 |
| Average duration in ICU (hours) | 90 | 63 | 80 |
| **Other Australians** | | | |
| Cases involving time in an ICU | 6,171 | 4,321 | 10,492 |
| % of cases involving time in an ICU | 2.4 | 2.1 | 2.3 |
| Hours in ICU | 565,290 | 293,030 | 858,320 |
| Average duration in ICU (hours) | 92 | 68 | 82 |

**Table 3.10: Cases involving continuous ventilatory support, by Indigenous status, by sex, Australia, 2014–15**

| | Males | Females | Persons |
|---|---|---|---|
| **Indigenous people** | | | |
| Cases involving CVS | 227 | 105 | 332 |
| % of cases involving CVS | 1.8 | 1.0 | 1.4 |
| Hours received CVS | 14,982 | 4,800 | 19,782 |
| Average duration CVS (hours) | 66 | 46 | 60 |
| **Other Australians** | | | |
| Cases involving CVS | 3,547 | 2,157 | 5,704 |
| % of cases involving CVS | 1.4 | 1.0 | 1.2 |
| Hours received CVS | 289,889 | 137,235 | 427,124 |
| Average duration CVS (hours) | 82 | 64 | 75 |

## Intensive care by cause of injury

The proportion of cases involving a stay in an ICU varied by cause of injury (Table 3.11). The largest proportion of cases involving a stay in an ICU were caused by *Accidental* d*rowning and submersion* (10%); *Intentional self-harm* (10%) and *Other accidental threats to breathing* (7%). However, the length of stay in ICU was higher for different causes of injury. For example, the longest lengths of stay in ICU occurred in cases caused by *Transport crashes* (130 hours) and *Thermal causes* (131 hours).

**Table 3.11: Cases involving time in an intensive care unit, by major external cause group, Australia, 2014–15**

| External cause description | Cases involving time in an ICU | % of cases involving time in an ICU | Hours in ICU | Average duration in ICU (hours) |
|---|---|---|---|---|
| Transport crash | 2,489 | 4.2 | 322,597 | 130 |
| Accidental drowning and submersion | 59 | 10.1 | 3,900 | 66 |
| Accidental poisoning | 620 | 6.1 | 28,321 | 46 |
| Falls | 3,065 | 1.5 | 243,119 | 79 |
| Thermal causes | 192 | 3.3 | 25,158 | 131 |
| Exposure to inanimate mechanical forces | 383 | 0.6 | 26,834 | 70 |
| Exposure to animate mechanical forces | 137 | 0.7 | 6,494 | 47 |
| Intentional self-harm | 2,786 | 9.9 | 152,918 | 55 |
| Assault | 451 | 2.4 | 39,193 | 87 |
| **Other external causes of accidental injury** | | | | |
| Other accidental threats to breathing | 53 | 7.2 | 3,904 | 74 |
| Exposure to electric current, radiation and extreme ambient air temperature and pressure | 12 | 1.7 | 1,210 | 101 |
| Contact with venomous animals and plants | 58 | 1.7 | 2,106 | 36 |

*(continued)*

**Table 3.11 (continued): Cases involving time in an intensive care unit, by major external cause group, Australia, 2014–15**

| External cause description | Cases involving time in an ICU | % of cases involving time in an ICU | Hours in ICU | Average duration in ICU (hours) |
|---|---|---|---|---|
| Exposure to forces of nature | 21 | 3.2 | 1,423 | 68 |
| Overexertion, travel and privation | 33 | 0.2 | 1,518 | 46 |
| Accidental exposure to other and unspecified factors | 197 | 0.4 | 12,480 | 63 |
| *Subtotal* | *374* | *0.6* | *22,641* | *65* |
| Undetermined intent | 356 | 7.4 | 19,044 | 53 |
| Other or missing | 87 | 2.4 | 8,428 | 97 |
| **Total** | **10,999** | **2.3** | **898,647** | **82** |

The largest proportion of cases involving CVS were caused by *Accidental drowning and submersion* (8%) and *Intentional self-harm* (7%) (Table 3.12). The highest average number of hours receiving CVS was seen for *Transport crashes* (126 hours) and *Thermal causes* (126 hours).

**Table 3.12: Cases involving continuous ventilatory support, by major external cause group, Australia, 2014–15**

| External cause description | Cases involving CVS | % of cases involving CVS | Hours received CVS | Average duration CVS (hours) |
|---|---|---|---|---|
| Transport crash | 1,445 | 2.5 | 182,383 | 126 |
| Accidental drowning and submersion | 47 | 8.1 | 2,801 | 60 |
| Accidental poisoning | 390 | 3.9 | 13,377 | 34 |
| Falls | 1,013 | 0.5 | 93,770 | 93 |
| Thermal causes | 118 | 2.0 | 14,849 | 126 |
| Exposure to inanimate mechanical forces | 182 | 0.3 | 12,804 | 70 |
| Exposure to animate mechanical forces | 38 | 0.2 | 1,918 | 50 |
| Intentional self-harm | 2,068 | 7.4 | 82,140 | 40 |
| Assault | 276 | 1.5 | 19,540 | 71 |
| **Other external causes of accidental injury** | | | | |
| Other accidental threats to breathing | 40 | 5.4 | 2,537 | 63 |
| Exposure to electric current, radiation and extreme ambient air temperature and pressure | 7 | 1.0 | 502 | 72 |
| Contact with venomous animals and plants | 12 | 0.4 | 398 | 33 |
| Exposure to forces of nature | 16 | 2.4 | 963 | 60 |
| Overexertion, travel and privation | 5 | 0.0 | 160 | 32 |
| Accidental exposure to other and unspecified factors | 66 | 0.1 | 4,489 | 68 |
| *Subtotal* | *146* | *0.2* | *9,049* | *62* |
| Undetermined intent | 275 | 5.7 | 10,292 | 37 |
| Other or missing | 38 | 1.1 | 3,983 | 99 |
| **Total** | **6,036** | **1.2** | **446,906** | **74** |

# 4 Transport crash injury

This chapter presents information on patients who were admitted to hospital as a result of a *Transport crash* injury. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

More detailed information on *Transport crash* injuries, including trend information, can be found in publications available on the AIHW website: for example, *Trends in serious injury due to road vehicle traffic crashes, Australia: 2001 to 2010* (AIHW: Henley & Harrison 2016).

**Key findings**

Almost 60,000 cases of hospitalised injury were due to a *Transport crash* in 2014–15.

**Sex of patient**

In 2014–15, twice as many males (38,947) as females (19,643) were hospitalised due to a *Transport crash*.

**Age of patient**

The highest rate of *Transport crash* injury occurred in males aged 20–24 (552 per 100,000 population) and the equivalent rate for females in this age group was 260 per 100,000.

**Cause of transport injury**

Thirty-five per cent of people hospitalised due to a *Land transport crash* were car occupants (19,163); 26% (14,657) were motorcyclists; 20% (11,430) were pedal cyclists; and 7% (3,807) were pedestrians.

**Trends in injury**

*Transport crash* injury hospitalisations remained steady over the period 1999–00 to 2014–15.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Chapter 1, provided that the first-reported external-cause code was in the ICD-10-AM range V00–V99 (*Transport accidents*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2 and 4.1. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 4.1: External causes of transport crash injury**

This chapter focuses on the **Transport accidents (V00–V99)** section of ICD-10-AM 'Chapter XX External causes of morbidity and mortality', which contains the following 12 groups:

- Pedestrian injured in transport accident (V00–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 accident (V80–V89)
- Water transport accident (V90–V94)
- Air and space transport accident (V95–V97)
- Other and unspecified transport accident (V98–V99).

# How many transport crash injury cases were there in 2014–15?

There were an estimated 58,591 *Transport crash* injury cases during 2014–15 (Figure 4.1). Transport crash injury cases made up 12% of all hospitalised injury cases.

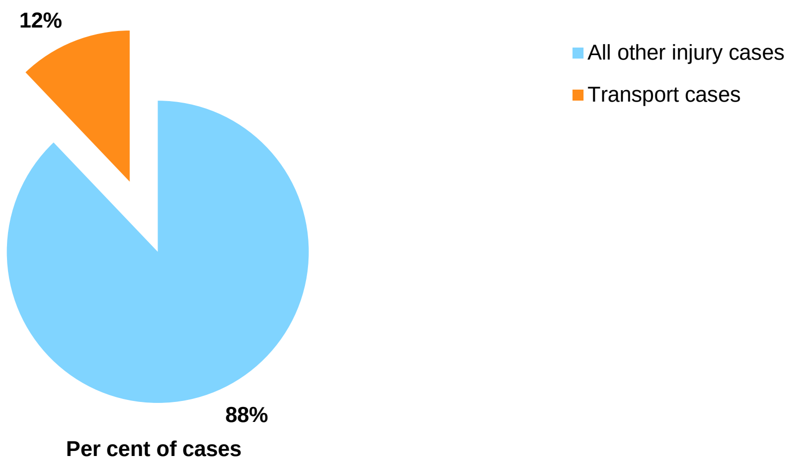
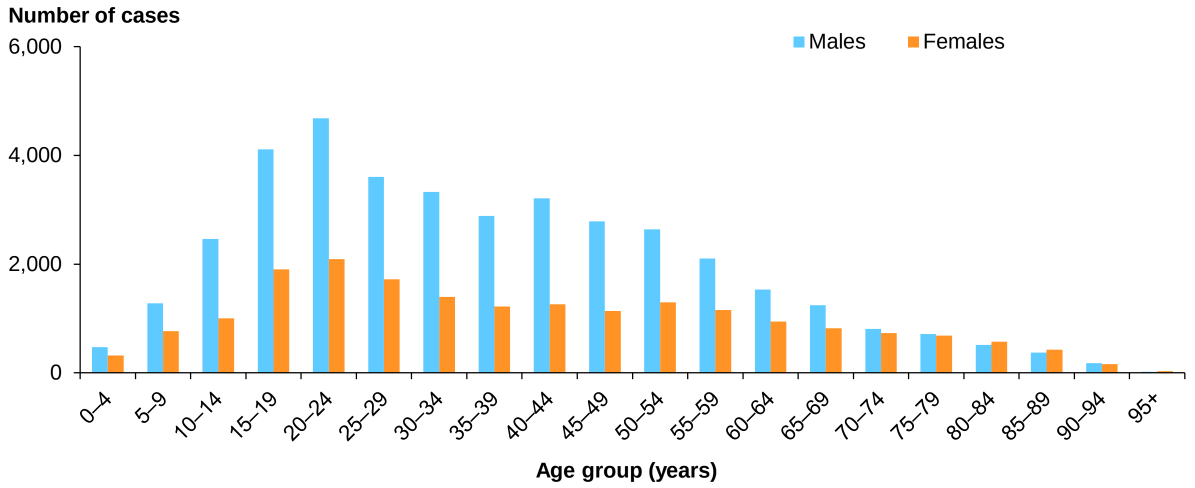



**Figure 4.1: Proportion of injury cases due to *Transport crash* injury, Australia, 2014–15**

## Age group and sex, 2014–15

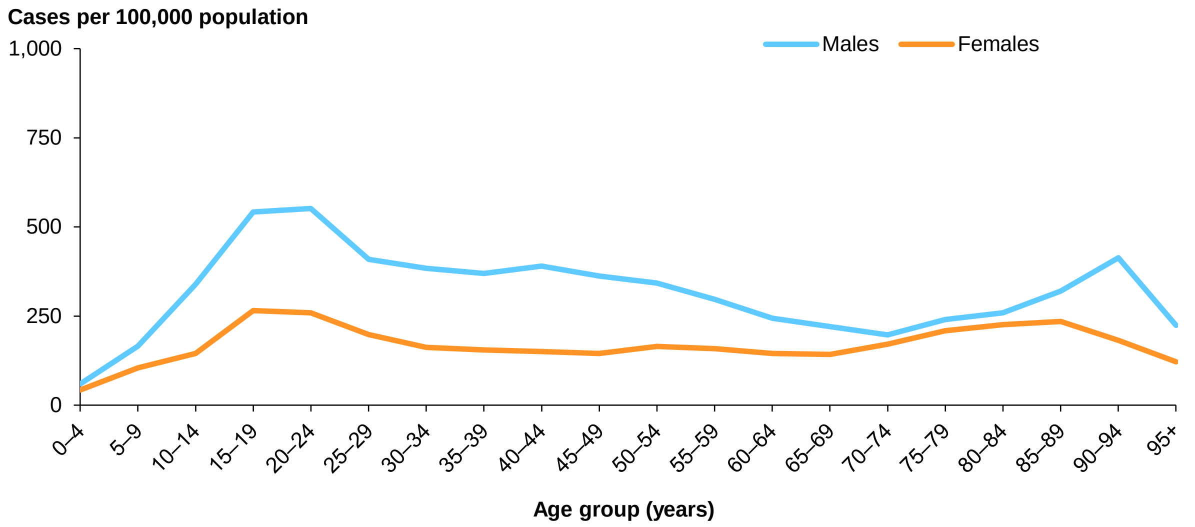
Of the 58,591 cases of *Transport crash* injury in Australia in 2014–15, more males (38,947) than females (19,643) were hospitalised. An analysis of *Transport crash* injury cases by age and sex shows a greater number of males in each age category up to and including the 75–79 age group (Figure 4.2). Among females, the largest number of *Transport crash* injury cases, about 2,000, was seen in the 20–24 age group. By comparison, the largest number of transport crash injury cases among males occurred in the 20–24 age group (about 4,500).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 4.2: Number of cases of *Transport crash* injury, by age group, by sex, Australia, 2014–15**

Males had a higher rate of tra *Transport crash* t crash injury across all age groups (Figure 4.3). The rate for males and for females was highest in the 15–19 and 20–24 age groups (552 per 100,000 population for males aged 20–24 and 552 per 100,000 for females in this age group.) A slight rise in rates with age was seen for both sexes in later years, but declined for women aged 90 and over, and for men aged 95 and over.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 4.

**Figure 4.3: Age-specific rates of *Transport crash* injury, by age group, by sex, Australia, 2014–15**

## Nature of injury

Hospitalised *Transport crash* injuries resulted in damage to various body regions with the most common being the *Head and neck* (27%), *Trunk* (23%), and *Shoulder and upper limb* (22%) (Table 4.1). Males and females had similar distributions of body regions injured, although females (59%) had higher proportions of upper-body (*Head and neck* and *Trunk*) injuries as a result of a transport crash, compared with males (46%).

**Table 4.1: *Transport crash* injury cases, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Body region injured** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 9,810 | 25.2 | 6,168 | 31.4 | 15,979 | 27.3 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 8,119 | 20.8 | 5,469 | 27.8 | 13,588 | 23.2 |
| Shoulder and upper limb (excluding wrist and hand) | 9,232 | 23.7 | 3,560 | 18.1 | 12,792 | 21.8 |
| Wrist and hand | 2,693 | 6.9 | 769 | 3.9 | 3,462 | 5.9 |
| Hip and lower limb (excluding ankle and foot) | 7,087 | 18.2 | 2,882 | 14.7 | 9,969 | 17.0 |
| Ankle and foot | 1,497 | 3.8 | 603 | 3.1 | 2,100 | 3.6 |
| Other, multiple and incompletely specified body regions | 345 | 0.9 | 149 | 0.8 | 494 | 0.8 |
| Injuries not described in terms of body region | 164 | 0.4 | 43 | 0.2 | 207 | 0.4 |
| **Total** | **38,947** | **100** | **19,643** | **100** | **58,591** | **100** |

Fractures were the most common type of injury sustained, with 27,035 (46%) of cases in 2014–15 (Table 4.2). Males and females had a similar pattern of type of injury, with *Fractures*, followed by *Open wounds*, common for both.

**Table 4.2: *Transport crash* injury cases, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 19,102 | 49.0 | 7,933 | 40.4 | 27,035 | 46.1 |
| Dislocation | 1,014 | 2.6 | 239 | 1.2 | 1,253 | 2.1 |
| Soft-tissue injury | 2,324 | 6.0 | 1,508 | 7.7 | 3,832 | 6.5 |
| Open wound | 3,928 | 10.1 | 1,461 | 7.4 | 5,389 | 9.2 |
| Intracranial injury | 2,917 | 7.5 | 1,404 | 7.1 | 4,321 | 7.4 |
| Internal organ or vessel of trunk | 1,523 | 3.9 | 514 | 2.6 | 2,037 | 3.5 |
| Burn | 209 | 0.5 | 62 | 0.3 | 271 | 0.5 |
| Superficial injury | 3,018 | 7.7 | 2,359 | 12.0 | 5,378 | 9.2 |
| Poisoning or toxic effect | 11 | 0 | 1 | 0 | 12 | 0 |
| Other and unspecified injuries | 4,901 | 12.6 | 4,162 | 21.2 | 9,063 | 15.5 |
| **Total** | **38,947** | **100** | **19,643** | **100** | **58,591** | **100** |

## Remoteness of usual residence

The age-standardised rate of injury in 2014–15 increased as the remoteness of usual residence increased (Table 4.3). The rate of injury in *Very remote* regions (210 cases per 100,000 population) was more than double the rate in *Major cities* (489 per 100,000).

**Table 4.3: *Transport crash* injury cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Injury cases | 35,404 | 12,844 | 6,968 | 1,294 | 994 |
| Age-standardised rate/100,000 population | 210.4 | 315.6 | 354.1 | 420.6 | 488.8 |

# Aboriginal and Torres Strait Islander people

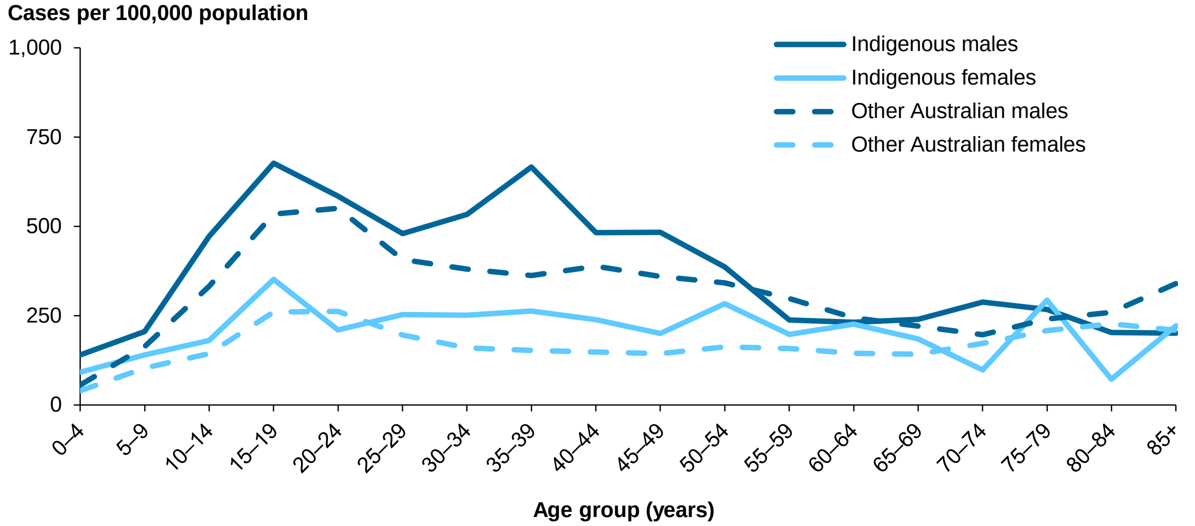
There were an estimated 2,299 cases of Indigenous people hospitalised as a result of a *Transport crash* injury in 2014–15 (Table 4.4). More than twice as many males were hospitalised as females. The age-standardised rates of *Transport crash* injury were higher for both Indigenous males and females, compared with other Australian males and females. Further information on *Transport crash* injury among Aboriginal and Torres Strait Islander people can be found in *Injury of Aboriginal and Torres Strait Islander people due to transport, 2005–06 to 2009–10* (Henley & Harrison 2013).

**Table 4.4: *Transport crash* injury cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Injury cases | 1,533 | 765 | 2,299 | 37,414 | 18,878 | 56,292 |
| Age-standardised rate/100,000 population | 419.0 | 217.3 | 317.5 | 331.6 | 162.9 | 247.5 |

The pattern of *Transport crash* injury rates by age was similar for Indigenous males and females (Figure 4.4). While rates for Indigenous males were higher than for other Australian males at nearly all ages, the excess was greatest from the teen years to the 40–44 age group. For Indigenous females, a noteworthy excess was present from 25–29 to 50–54.

Transport crash injury rates for Indigenous males were highest at the 2 age groups 15–19 and 35–39 (677 and 666 cases per 100,000 population, respectively). A similar second peak at 35–39 years was not seen for other Australian males. For Indigenous females, the highest rate of *Transport crash* injury occurred for the 15–17 age group (352 per 100,000). By comparison, the highest rate in other Australian females occurred for the 20–24 age group (262 per 100,000).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 4.

**Figure 4.4: Age-specific rates of *Transport crash* injury, by Indigenous status, by age group, by sex, Australia, 2014–15**

# Socioeconomic status

The proportion of transport crash injury cases in each SES group ranged between 16% and 22% (Table 4.5). The highest proportion, for both males and females, were for those living in areas with the lowest (most disadvantaged) SES classification.

**Table 4.5: *Transport crash* injury cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 8,724 | 22.4 | 4,284 | 21.8 | 13,009 | 22.2 |
| 2 | 8,414 | 21.6 | 4,159 | 21.2 | 12,573 | 21.5 |
| 3 | 7,903 | 20.3 | 3,920 | 20.0 | 11,823 | 20.2 |
| 4 | 7,019 | 18.0 | 3,630 | 18.5 | 10,649 | 18.2 |
| 5–Highest | 6,237 | 16.0 | 3,200 | 16.3 | 9,437 | 16.1 |
| **Total**[(a)] | **38,947** | **100** | **19,643** | **100** | **58,591** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of transport crash injury

*Land transport crash* injury includes cases due to crashes occurring on a public road (traffic) and cases due to vehicle crashes that occur entirely in any place other than a public road (non-traffic) (restricted to external-cause codes V00–V89). Of all people hospitalised due to *Land transport crash*, 62% of cases occurred in traffic.

*Land transport crash* resulted in 56,877 hospitalised cases in 2014–15. Thirty-five per cent of people hospitalised due to a *Land transport crash* were car occupants (19,163); 26% (14,657) were motorcyclists; 20% (11,430) were pedal cyclists; and 7% (3,807) were pedestrians (Table 4.6).

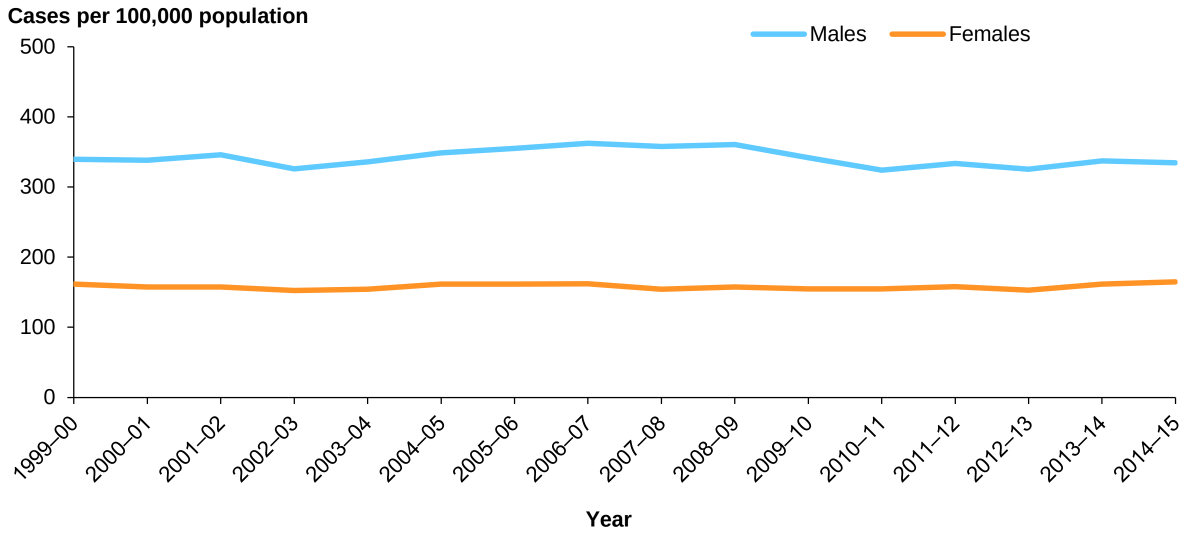
For traffic cases (36,530), the most frequent mode of transport of the injured person was a car (17,304 cases, or 48%). For non-traffic cases (14,559), the most frequent mode of transport was a motorcycle (6,083, or 42%) followed by a pedal cycle (4,535, or 31%). Almost 6,000 (10%) of cases were unspecified as to whether they occurred (traffic or non-traffic), and the majority of these (3,601 cases) involved an animal rider or occupant of an animal-drawn vehicle.

**Table 4.6: Mode of transport for land transport crash injury cases, Australia, 2014–15**

| Injured person's mode of transport | Non-traffic | Traffic | Unspecified | Total |
|---|---|---|---|---|
| Car | 1,120 | 17,304 | 739 | 19,163 |
| Motorcycle | 6,083 | 8,355 | 219 | 14,657 |
| Pedal cycle | 4,535 | 6,725 | 170 | 11,430 |
| Pedestrian | 774 | 2,672 | 361 | 3,807 |
| Animal or animal-drawn vehicle | 0 | 0 | 3601 | 3,601 |
| Heavy transport vehicle | 108 | 490 | 100 | 698 |
| Pick-up truck or van | 67 | 252 | 30 | 349 |
| Special all-terrain or off-road vehicle | 1,220 | 30 | 11 | 1,261 |
| Bus | 56 | 250 | 254 | 560 |
| Special agricultural vehicle | 225 | 3 | 14 | 242 |
| Train | 0 | 1 | 125 | 126 |
| Special industrial vehicle | 118 | 2 | 10 | 130 |
| Three-wheeled motor vehicle | 22 | 16 | 1 | 39 |
| Tram | 1 | 8 | 86 | 95 |
| Special construction vehicle | 45 | 1 | 4 | 50 |
| Unknown | 185 | 421 | 63 | 669 |
| **Total** | **14,559** | **36,530** | **5,788** | **56,877** |

# How have cases of *Transport crash* injury changed over time?

Age-standardised rates for males were consistently higher than for females at all times throughout the period (Figure 4.5). Rates varied more for males than for females but there is no evidence of any substantial change in *Transport crash* injury rates for either sex over the period.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 4.

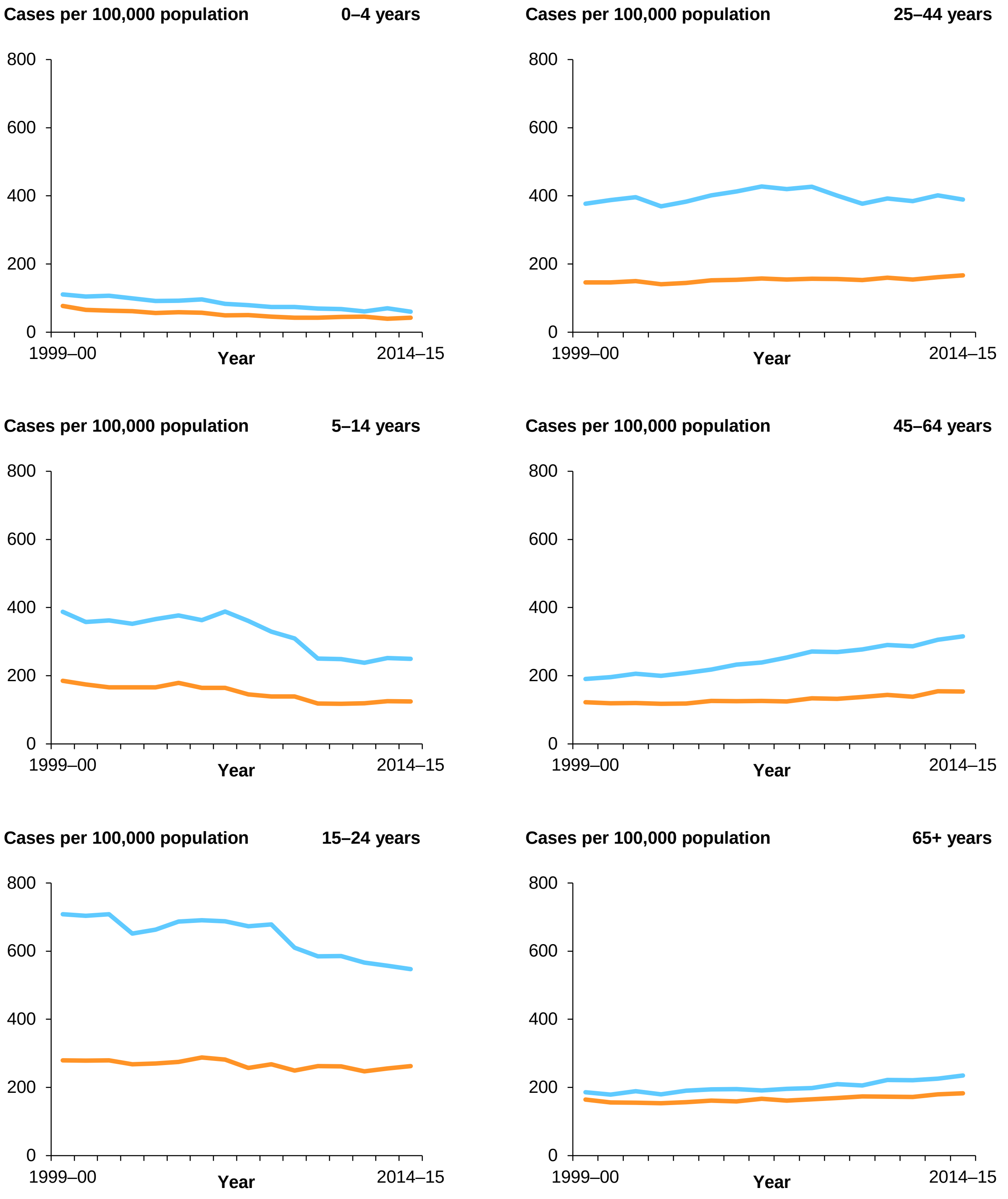
**Figure 4.5: Age-standardised rates of *Transport crash* injury cases, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by age group as well as by sex, is shown in Figure 4.6. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015).

In contrast to the lack of a strong trend in overall age-standardised rates, age-specific rates for males show noteworthy trends that differ with age group. Trends in the age-specific rates for females were less marked.

Rates of *Transport crash* injury were low, and declining, in the youngest age group for boys and girls (0–4). Rates for males aged 5–14 and 15–24 declined in the last few years, beginning in 2006–07 for those aged 5–14 and in 2008–09 for those aged 15–24. Rates for males aged 25–44 remained steady from about 2008–09.

In contrast to the declines shown in younger age groups, rates of *Transport crash* injury increased steadily for males aged 45–64 over this period. A much smaller increase can also be seen among females of the same age. Small rises in rates of *Transport crash* injury were also seen in the oldest age group for both males and females.

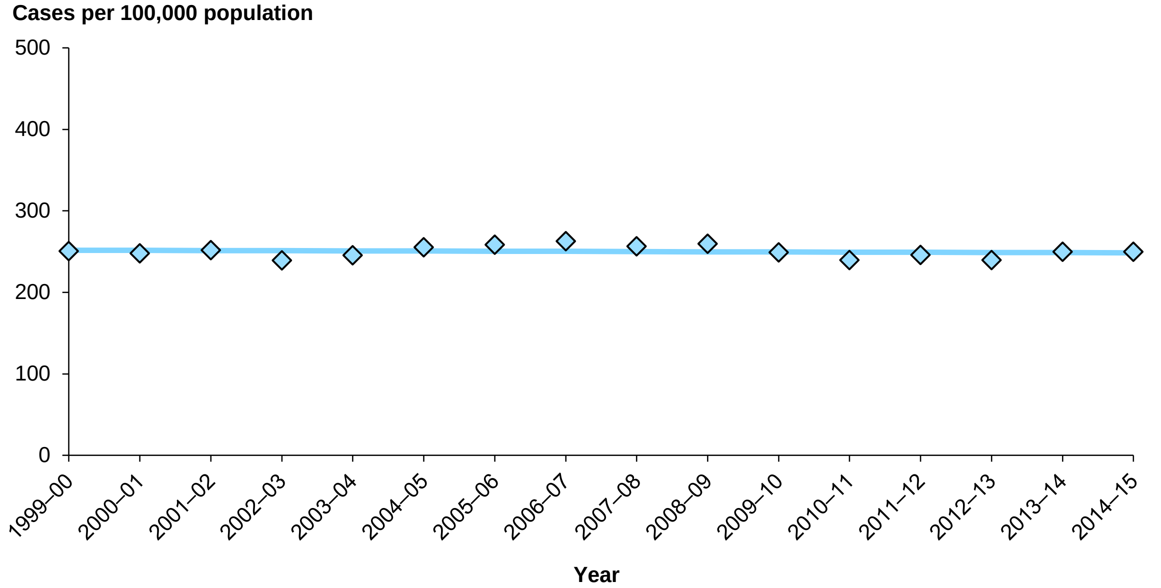



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 4.

**Figure 4.6: Age-specific rates of *Transport crash* injury cases, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of *Transport crash* injury showed little change from the beginning of the period. In 1999–00, the base rate was 251 cases per 100,000 population and in 2014–15 the observed rate was 250 cases per 100,000 (95% CI: 0.8%, 0.2%) (Figure 4.7).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 4.

**Figure 4.7: Modelled age-standardised rates of *Transport crash* injury cases, Australia, 1999–00 to 2014–15**

# 5 Accidental drowning and submersion

This chapter presents information on patients who were admitted to hospital as a result of *Accidental drowning and submersion*. Information in this chapter includes:

- age group and sex of the patient
- location of the injury
- trends over time.

**Key findings**

Almost 600 cases of hospitalised injury were due to *Accidental drowning and submersion* in 2014–15.

**Sex of patient**

In 2014–15, less than 1% of all hospitalised injury cases were due to *Accidental drowning and submersion*.

**Age of patient**

The largest proportion of *Accidental drowning and submersion* injuries occurred in children aged 0–4 (38%).

**Location of drowning**

Just over one-third of all drowning-related cases occurred in a swimming pool (180 cases, or 31%). Children under 15 accounted for 81% of all swimming pool drowning-related cases.

**Trends in injury**

*Accidental drowning and submersion* injury hospitalisations decreased over the period 1999–00 to 2014–15, decreasing by 0.3% per year on average.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, provided that the first-reported external-cause code was in the ICD-10-AM range W65–W74 (*Accidental drowning and submersion*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2, 5.1 and 5.2. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 5.1: External causes of drowning and submersion injury**

This chapter focuses on the **Accidental drowning and submersion (W65–W74)** section of 'Chapter XX External causes of morbidity and mortality' (ICD-10-AM), which contains the following groups:

- Drowning and submersion while in bathtub (W65)
- Drowning and submersion following fall into bathtub (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).

**Understanding 'drowning'**

The cases included in this chapter are those involving unintentional drowning and submersion in the circumstances covered by the categories listed above. Note that this chapter does not include unintentional drowning and submersion related to water transportation, or related to other transportation crashes, or due to cataclysms such as storms and floods—unless the first-mentioned external cause code is one of those listed above (see Box 5.2 below). *Accidental drowning and submersion* (W65–W74) is not defined in the ICD-10-AM*.* A discussion of terms such as 'drowning' and 'submersion' can be found in WHO 2014.

*Submersion:* Brief submersion (or immersion) in water or other non-toxic liquid is usually harmless. However, injuries can occur while a person is submerged, particularly following a fall or dive into water, and these account for about 30% of the 2014–15 cases included in this chapter. A submerged person may experience respiratory impairment (see 'drowning', below). Harm can also result from submersion to a great depth (nitrogen narcosis), or from rising rapidly from a deep dive ('the bends'). Such cases are out of scope for this chapter.

*Drowning:* Prolonged submersion (or brief submersion in some circumstances—for example, if a person is unconscious when entering the water), puts a person at immediate risk of death by drowning. The drowning process typically involves breath-holding; attempted inhalation triggering spasm of the larynx; depletion of oxygen and build-up of carbon dioxide; loss of consciousness; and, eventually, inhalation of water into the lungs.

Sometimes the process is interrupted before death (for example, by rescue), in which case the person may survive with harm, such as brain damage due to lack of oxygen. That situation is variously referred to as 'drowning with a non-fatal outcome' (this is the term currently recommended by the WHO), or 'near-drowning'. If the process ends at an early stage of respiratory distress, then the person is likely to survive with no physical ill-effects.

In 2014–15, 67.9% of the cases included in this chapter had Accidental d*rowning and non-fatal submersion* as the principal diagnosis code, while the remainder were coded to other injury conditions, most commonly *Fractures*.

**Box 5.2: Additional Accidental drowning and submersion cases**

Each year there are additional drowning and submersion cases that have an external-cause code outside the range of *Accidental drowning and submersion* (ICD-10-AM W65–W74) but have a principal diagnosis of *T75.1 Drowning and non-fatal submersion*.

In 2014–15 there were an additional 136 cases of drowning and submersion that fell outside the definition used in this chapter. All of these cases are included in other chapters of this report. The cases were as follows:

- 27 cases of *Water transport-related drowning and submersion without accident to water craft* (V92)
- 20 cases of *Intentional self-harm by drowning and submersion* (X71)
- 9 cases of *Drowning and submersion, undetermined intent* (Y21).

There were also 80 cases with various external-cause codes that do not refer to drowning (for example, *Fall*) but still had a principal diagnosis of T75.1 *Drowning and non-fatal submersion*.

# How many drowning and submersion injury cases were there in 2014–15?

There were an estimated 582 Accidental d*rowning and submersion* injury cases during 2014–15. *Accidental drowning and submersion* injury made up 0.1% of all hospitalised injury cases (Figure 5.1).

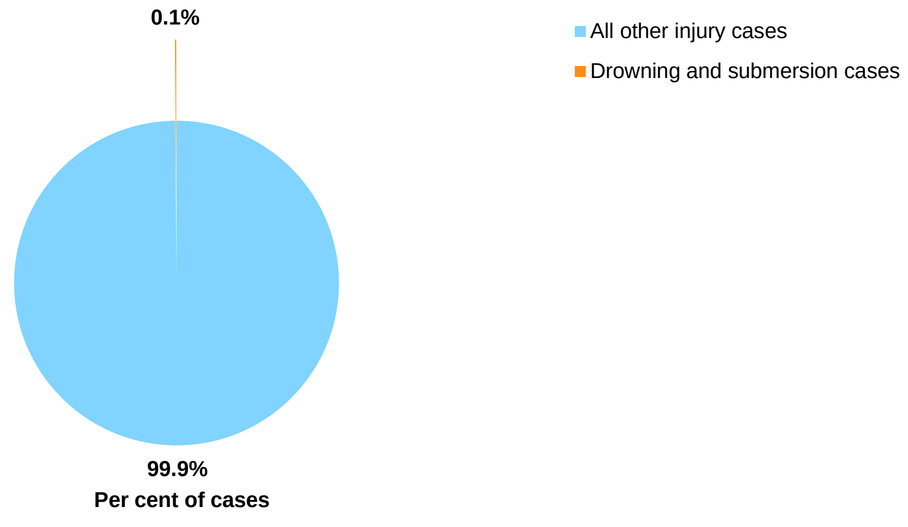



**Figure 5.1: Proportion of injury cases due to accidental drowning and submersion, Australia, 2014–15**

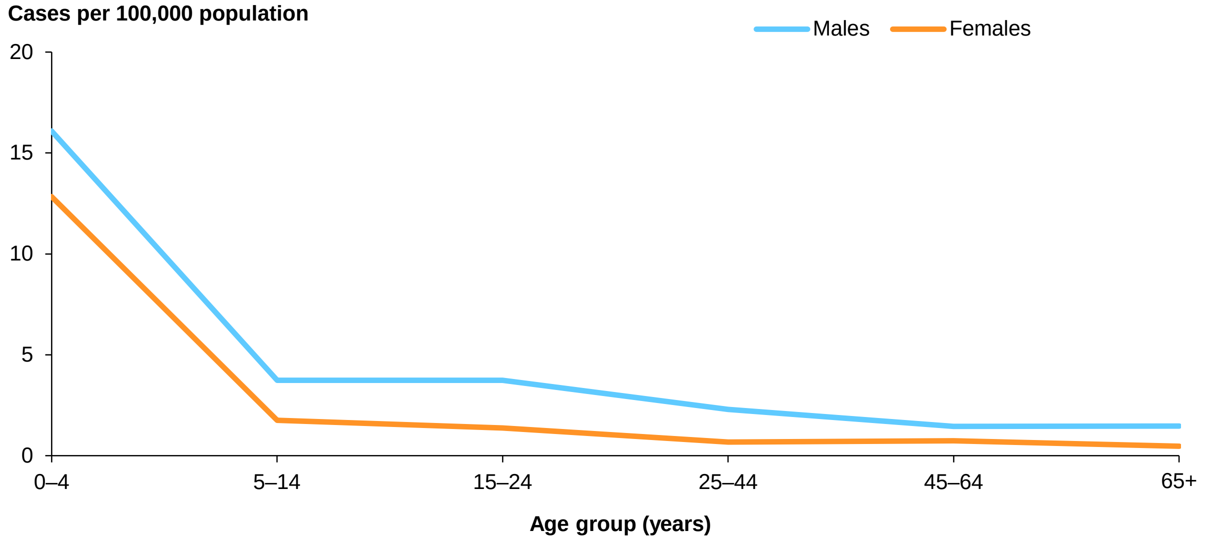
# Age group and sex, 2014–15

The largest proportion of *Drowning and submersion* injuries occurred in children aged 0–4 (38%) (Table 5.1). Within the age group 0–4, a greater proportion of hospitalised cases for drowning were for girls (49%) than for boys (33%). Drowning and near-drowning injuries were more common in men aged 15–44 than in women.

**Table 5.1: Accidental drowning and submersion cases, by age group, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| Age group | Number | % | Number | % | Number | % |
| 0–4 | 127 | 32.9 | 96 | 49.0 | 223 | 38.3 |
| 5–14 | 56 | 14.5 | 25 | 12.8 | 81 | 13.9 |
| 15–24 | 60 | 15.5 | 21 | 10.7 | 81 | 13.9 |
| 25–44 | 77 | 19.9 | 23 | 11.7 | 100 | 17.2 |
| 45–64 | 42 | 10.9 | 22 | 11.2 | 64 | 11.0 |
| 65+ | 24 | 6.2 | 9 | 4.6 | 33 | 5.7 |
| **Total** | **386** | **100** | **196** | **100** | **582** | **100** |

In 2014–15, the age-specific rates of *Accidental drowning and submersion* injury were much higher in the 0–4 age group (Figure 5.2). Males had a higher rate of injury across all age groups. The rate for males was highest in the 0–4 age group (16 per 100,000), and similarly for females (13 per 100,000).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 5.2: Age-specific rates of accidental drowning and submersion injury, by age group, by sex, Australia, 2014–15**

# Location of drowning incident

Location of occurrence information is contained within the *Drowning and submersion* external-cause categories—for example, W65 *Drowning and submersion while in bathtub*. Just over one-third of all drowning-related cases in Australia in 2014–15 occurred in a swimming pool (180 cases, or 31%) (Table 5.2). Children under 15 accounted for 81% of all swimming pool drowning-related cases; those aged 0–4 constituted 59% of these alone. Almost all (92%) of cases of bathtub drowning-related injuries occurred in young children aged 0–4. The second most common specified setting for *Accidental drowning and submersion* cases overall was a body of natural water (including rivers, lakes and the ocean) (25%); natural water was also the principal setting for adult drowning and submersion cases.

**Table 5.2: Drowning and submersion cases, by location, by age group, Australia, 2014–15**

| | Swimming pool | | Natural water | | Bathtub | | Other or unspecified | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Age group** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 0–4 | 107 | 59.4 | 8 | 5.5 | 35 | 92.1 | 73 | 33.5 | 223 | 38.3 |
| 5–14 | 38 | 21.1 | 19 | 13 | 1 | 2.6 | 23 | 10.6 | 81 | 13.9 |
| 15–24 | 7 | 3.9 | 39 | 26.7 | 0 | 0 | 35 | 16.1 | 81 | 13.9 |
| 25–44 | 17 | 9.4 | 44 | 30.1 | 0 | 0 | 39 | 17.9 | 100 | 17.2 |
| 45–64 | 5 | 2.8 | 29 | 19.9 | 2 | 5.3 | 28 | 12.8 | 64 | 11 |
| 65+ | 6 | 3.3 | 7 | 4.8 | 0 | 0 | 20 | 9.2 | 33 | 5.7 |
| **Total** | **180** | **100** | **146** | **100** | **38** | **100** | **218** | **100** | **582** | **100** |

# Remoteness of usual residence

The age-standardised rates of *Drowning and submersion* injury by remoteness of place of usual residence are shown in Table 5.3. The highest rate occurred in *Outer regional* areas (3 cases per 100,000 population). Caution should be exercised in interpreting these results because of low numbers of cases in regions outside *Major cities* (on average fewer than 20 cases per 5-year age band, other than for the 0–4 group).

**Table 5.3: Drowning and submersion cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Drowning and submersion cases | 382 | 101 | 60 | 7 | 4 |
| Age-standardised rate/100,000 population | 2.3 | 2.5 | 3.0 | 2.0 | 2.0 |

# Aboriginal and Torres Strait Islander people

There were an estimated 26 cases of Indigenous people hospitalised as a result of *Accidental drowning and submersion* in 2014–15 (Table 5.4). More males than females were hospitalised. Age-specific rates of *Accidental drowning and submersion* were unable to be presented for Indigenous people, due to the lack of case numbers in age groups other than 0–4. Caution should be exercised in interpreting all drowning results, however, because of low case numbers in all but the youngest (0–4) and among Indigenous people in particular.

**Table 5.4: Key indicators for accidental drowning and submersion cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australian | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Drowning and submersion cases | 19 | 7 | 26 | 367 | 189 | 556 |
| Age-standardised rate/100,000 population | n.p. | n.p. | n.p. | 3.3 | 1.7 | 2.5 |

As can be seen in Table 5.5, relatively few Indigenous children aged 0–4 were hospitalised because of *Accidental drowning and submersion* injury, compared with their *Other Australian* counterparts. About two-thirds of all cases occurred among Indigenous children aged 0–4, compared with around a third of all cases for non-Indigenous children. The age-specific rates of *Accidental drowning and submersion* among Indigenous children overall were higher than for other Australian children—but this difference was seen for Indigenous boys and not for Indigenous girls.

**Table 5.5: Key indicators for accidental drowning and submersion cases in 0–4-year olds, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australian | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Drowning and submersion cases | 12 | 5 | 17 | 115 | 91 | 206 |
| Age-specific rate/100,000 population | 27.6 | 12.0 | 20.0 | 15.4 | 12.9 | 14.2 |

# Socioeconomic status

The proportion of injury cases in each SES group ranged between 14% and 31% (Table 5.6). The highest proportions, for males and females, were for people living in areas with the lowest (most disadvantaged) SES classification.

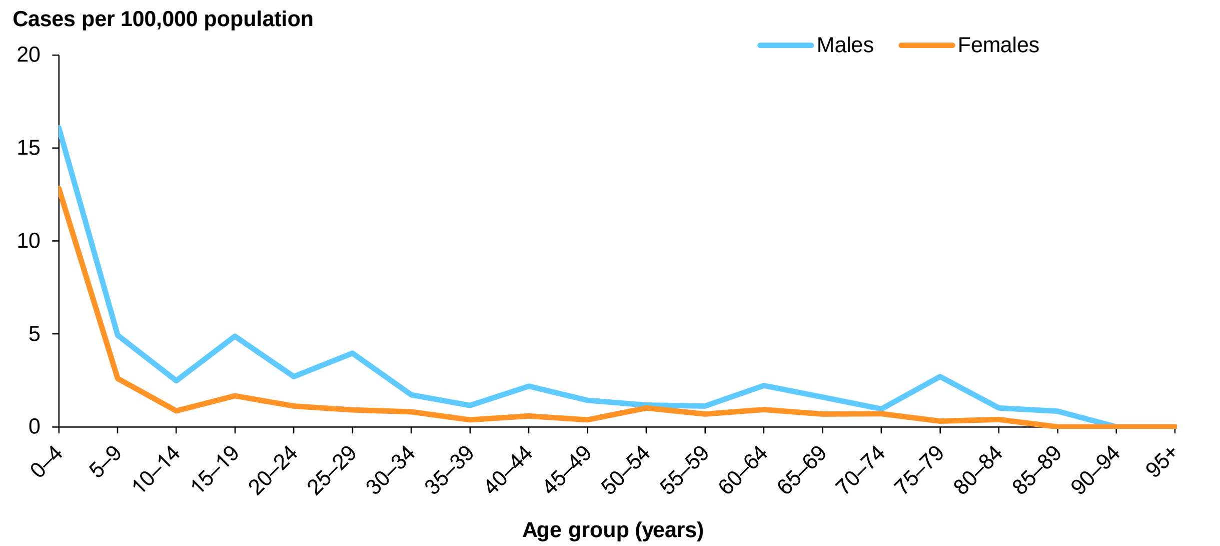
**Table 5.6: Drowning and submersion injury cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 79 | 20.5 | 60 | 30.6 | 139 | 23.9 |
| 2 | 76 | 19.7 | 40 | 20.4 | 116 | 19.9 |
| 3 | 80 | 20.7 | 31 | 15.8 | 111 | 19.1 |
| 4 | 69 | 17.9 | 31 | 15.8 | 100 | 17.2 |
| 5–Highest | 60 | 15.5 | 28 | 14.3 | 88 | 15.1 |
| **Total**[a] | **386** | **100** | **196** | **100** | **582** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# How have cases of Accidental drowning and submersion injury changed over time?

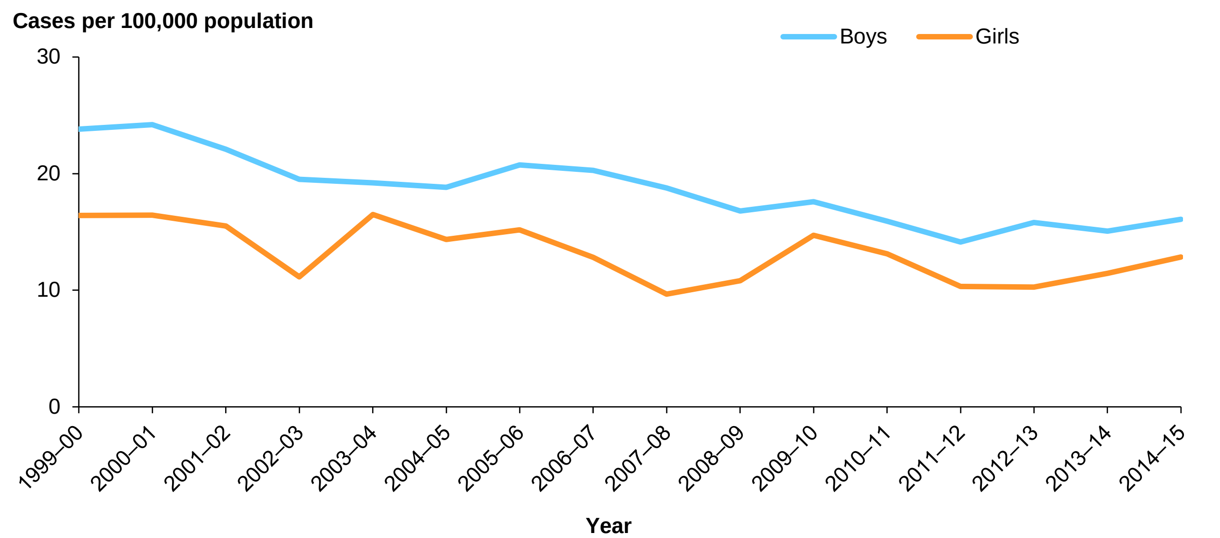
The age-standardised rate of *Accidental drowning and submersion* fluctuated over the period, primarily due to small case numbers (Figure 5.3). Age-standardised rates for males were consistently higher than for females at all times.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 5.3: Age-standardised rates of accidental drowning and submersion, by age group, by sex, Australia, 1999–00 to 2014–15**

As the great majority of *Accidental drowning and submersion* cases occur in the 0–4 age group, a separate analysis was undertaken for this age group (Figure 5.4). A decrease in age-specific rates of *Accidental drowning and submersion* in those aged 0–4 can be seen for both boys and girls to about 2011–12. Since then, rates of drowning injury for both boys and girls in this age group have increased.

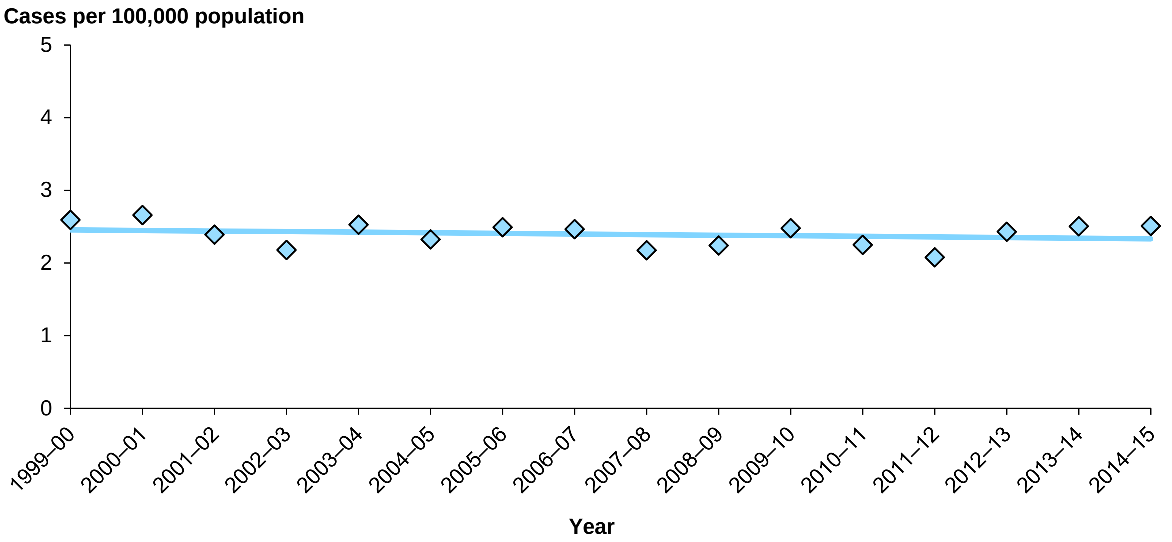



*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 5.4: Age-specific rates of accidental drowning and submersion, by sex, 0–4 year olds, Australia, 1999–00 to 2014–15**

Due to the small number of cases each year in all age groups, other than those aged 0–4, no further analysis is presented by age.

Age-standardised annual rates of *Accidental drowning and submersion* cases showed a small decrease from the beginning of the period. In 1999–00, the rate was 2.6 cases per 100,000 population and in 2014–15 it was 2.5 (Figure 5.5). The decrease in modelled rates from 1999–00 to 2014–15 averaged 0.3% per year and was statistically significant (95% CI: –1.0%, 0.4%).

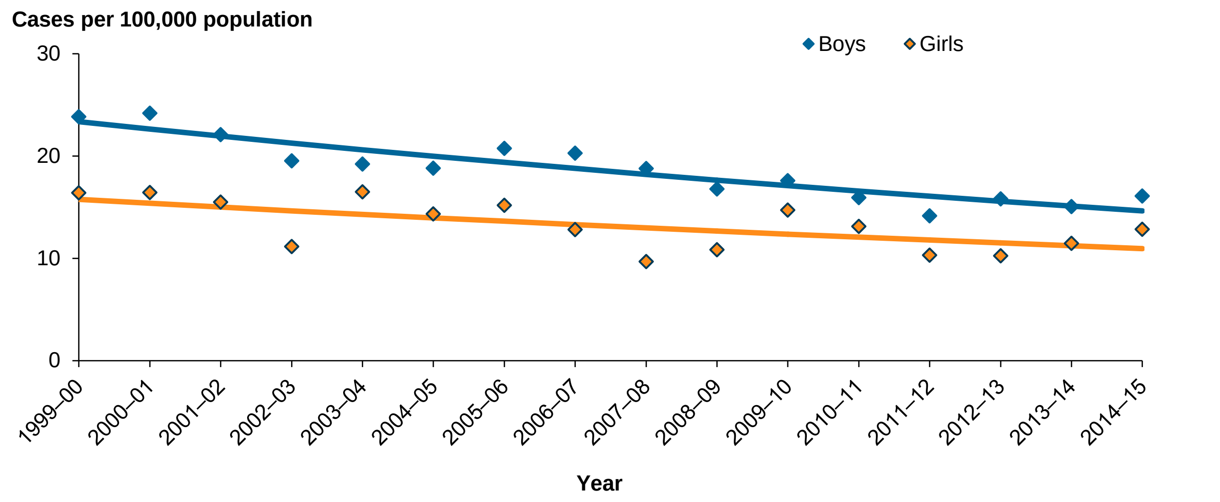



*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 5.5: Modelled age-standardised rates of accidental drowning and submersion cases, Australia, 1999–00 to 2014–15**

As the great majority of *Accidental drowning and submersion* cases occur in the 0–4 age group, a separate trend analysis was undertaken for this age group (Figure 5.6). A steeper decline in rates of *Accidental drowning and submersion* was evident in boys and girls in this age group over the period than in the all-ages rates. For boys, the decrease in rates averaged 3.1% per year and was statistically significant (95% CI: –4.0%, –2.2%). For girls, the decrease in rate averaged 2.4% per year and was also statistically significant (95% CI: –3.8%, –1.0%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 5.

**Figure 5.6: Modelled age-standardised rates of accidental drowning and submersion cases, 0–4 year olds, by sex, Australia, 1999–00 to 2014–15**

# 6 Accidental poisoning

This chapter presents information on patients who were admitted to hospital as a result of an *Accidental poisoning* injury. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

More detailed information on *Accidental poisoning* injuries, including trend information, can be found in publications available on the AIHW website. For example, *Poisoning in children and young people 2012–13* (AIHW: Pointer 2016).

**Key findings**

Almost 10,000 cases of hospitalised injury were due to *Accidental poisoning* in 2014–15.

**Sex of patient**

In 2014–15, 2% (10,092) injury cases were due to *Accidental poisoning*. There were similar numbers of males (5,336) and females (4,756).

**Age of patient**

The greatest number of cases of *Accidental poisoning* (1,517) occurred among those aged 0–4. While rates of *Accidental poisoning* injury were high among those aged 0–4 (99 cases per 100,000), the highest rate of *Accidental poisoning* injury occurred in people aged 85–89 (103).

**Cause of accidental poisoning**

The most common type of *Accidental poisoning* was caused by *Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified* (27%). Among these cases, 845 were caused by benzodiazepines.

**Trends in injury**

*Accidental poisoning* hospitalisations fell over the period 1999–00 to 2014–15, decreasing on average 3.0% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, provided that the first-reported external-cause code was in the ICD-10-AM range X40–X49 (*Accidental poisoning by and exposure to noxious substances*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2 and 6.1. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 6.1: External causes of poisoning**

This chapter focuses on the **Accidental poisoning by and exposure to noxious substances (X40–X49)** section of ICD-10-AM 'Chapter XX External causes of morbidity and mortality', which contains the following groups:

- Accidental poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics (X40)
- Accidental poisoning by and exposure to anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified (X41)
- Accidental poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified (X42) (includes opioids)
- 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)
- 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).

# How many accidental poisoning cases were there in 2014–15?

There were an estimated 10,092 *Accidental poisoning* cases during 2014–15. Accidental poisoning cases made up 2% of all hospitalised injury cases (Figure 6.1).

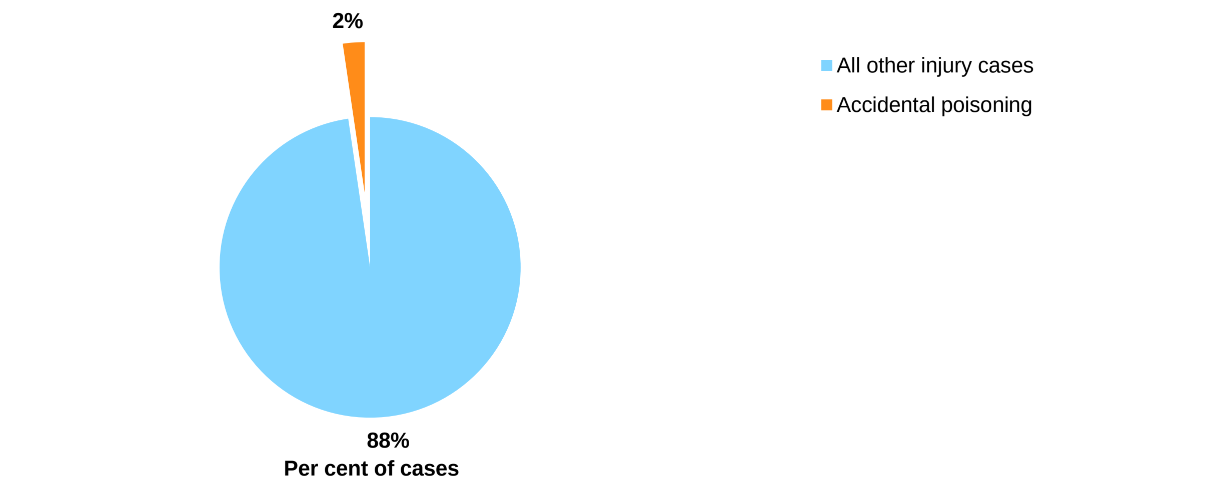
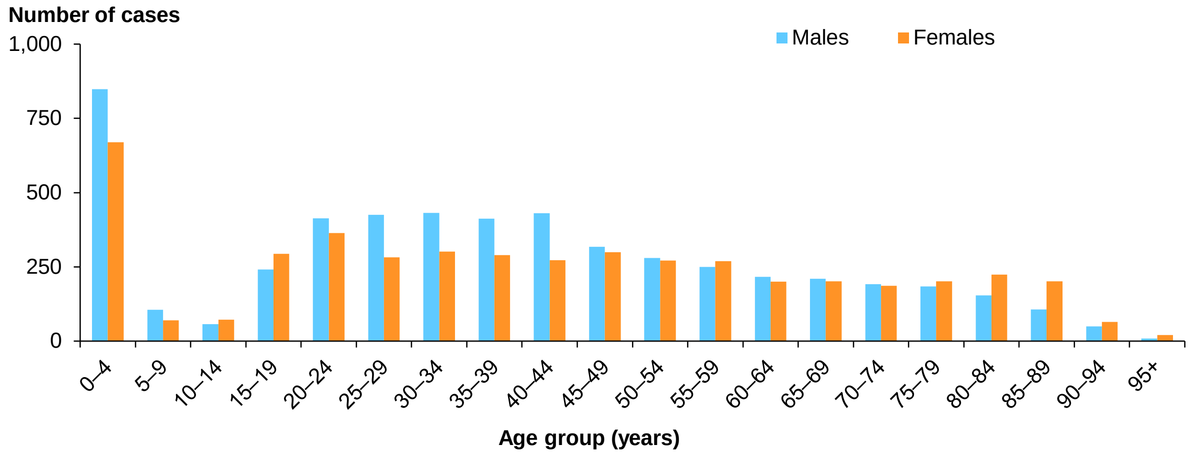



**Figure 6.1: Proportion of injury cases due to accidental poisoning, Australia, 2014–15**

## Age group and sex, 2014–15

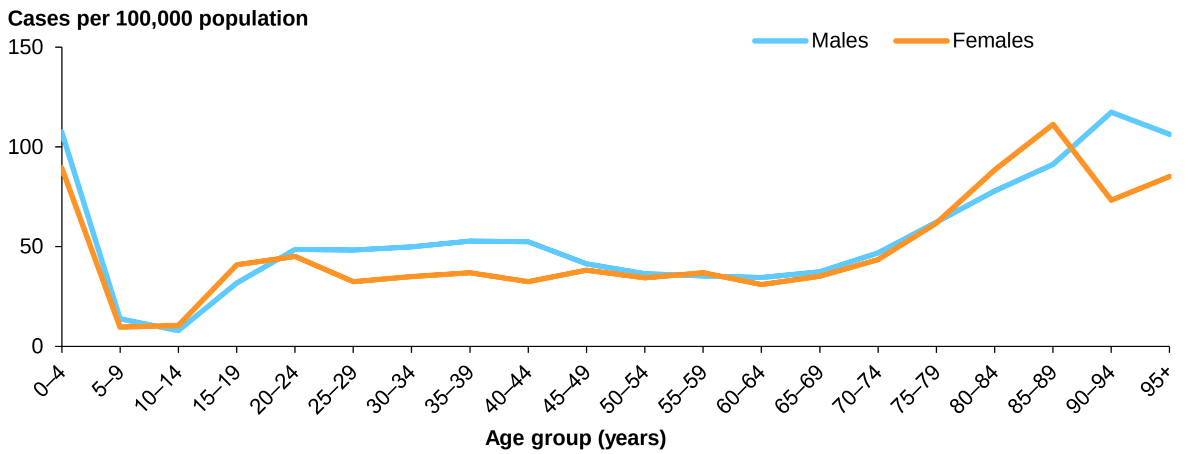
Of the 10,092 cases of *Accidental poisoning* injury in Australia in 2014–15, similar numbers of males (5,336) and females (4,756) were hospitalised. Overall, the greatest number of *Accidental poisoning* cases, about 1,500 (15%), were seen in the 0–4 age group (Figure 6.2). An analysis of *Accidental poisoning* cases by age and sex shows differences between males and females by age group. Among females, higher numbers of cases appeared in the 15–19 and 55–59 age groups and for those aged 75 or over. Males had higher numbers of cases in the other age groups. For both groups, the highest rates were seen in the 0–4 age group, falling sharply in the 5–9 and 10–14 age groups.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 6.

**Figure 6.2: Number of cases of accidental poisoning, by age group, by sex, Australia, 2014–15**

Males and females had a similar pattern of rates of accidental poisoning, by age, with the highest rates in the youngest and oldest age groups for both males and females (Figure 6.3). In the younger age groups, children 0–4 had the highest rates of accidental poisoning: 107 and 90 cases per 100,000 population for boys and girls, respectively. In the middle age groups, males had higher rates of accidental poisoning than females, from about 20–24 to 45–49 years. Young women aged 15–19 had higher rates of accidental poisoning than males (41 cases per 100,000 and 32 cases per 100,000, respectively).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 6.

**Figure 6.3: Age-specific rates of accidental poisoning, by age group, by sex, Australia, 2014–15**

# Cause of accidental poisoning

Five of the 10 types of *Accidental poisoning* accounted for almost 90% (9,034 cases) of all hospitalised *Accidental poisoning* cases (Table 6.1). The 2 most common types of *Accidental poisoning* in 2014–15 were poisoning due to *Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified* (27%) and poisoning due to *Other and unspecified drugs, medicaments and biological substances* (23%). Differences between males and females were slight, with similar proportions of types of poisoning cases for both sexes.

**Table 6.1: Accidental poisoning cases, by type of poisoning, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of accidental poisoning** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Non-opioid analgesics, antipyretics and anti-rheumatics (X40) | 507 | 9.5 | 654 | 14.0 | 1,161 | 11.5 |
| Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified (X41) | 1,348 | 25.3 | 1,360 | 28.6 | 2,708 | 26.8 |
| Narcotics and psychodysleptics [hallucinogens], not elsewhere classified (X42) | 899 | 16.8 | 727 | 15.0 | 1,626 | 16.1 |
| Other drugs acting on the autonomic nervous system (X43) | 143 | 2.7 | 161 | 3.0 | 304 | 3.0 |
| Other and unspecified drugs, medicaments and biological substances (X44) | 1,184 | 22.2 | 1,181 | 25 | 2,365 | 23.4 |
| Alcohol (X45) | 102 | 1.9 | 58 | 1.2 | 160 | 1.6 |
| Organic solvents and halogenated hydrocarbons and their vapours (X46) | 123 | 2.3 | 40 | 0.8 | 163 | 1.6 |
| Other gases and vapours (X47) | 217 | 4.1 | 96 | 2.0 | 313 | 3.1 |
| Pesticides (X48) | 67 | 1.3 | 51 | 1.1 | 118 | 1.2 |
| Other and unspecified chemicals and noxious substances (X49) | 746 | 14.0 | 428 | 9.0 | 1,174 | 11.6 |
| **Total** | **5,336** | **100** | **4,756** | **100** | **10,092** | **100** |

In this chapter, external causes were tabulated to describe the groups of drugs responsible for poisoning cases (see Box 6.1). However, principal diagnoses can offer a more detailed description of the substances involved for each of these groups. In Table 6.2 and accompanying text, the top 2 principal diagnosis categories associated with the 5 major external causes for *Accidental poisoning* have been presented.

**Table 6.2: Cases of accidental poisoning, by drug type, Australia, 2014–15**

| Accidental poisoning by and exposure to: | Number | % |
|---|---|---|
| **Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs** | **2,708** | **30.0** |
| *Poisoning by psychotropic drugs, not elsewhere classified (T43)* | *1,484* | *54.8* |
| *Poisoning by anti-epileptic, sedative-hypnotic and anti-parkinsonism drugs (T42)* | *1,203* | *44.4* |
| **Other and unspecified drugs, medicaments and biological substances** | **2,365** | **26.2** |
| *Poisoning by hormones and their synthetic substitutes and antagonists, not elsewhere classified (T38)* | *772* | *32.6* |
| *Poisoning by agents primarily affecting the cardiovascular system (T46)* | *471* | *19.9* |
| **Narcotics and psychodysleptics (hallucinogens)** | **1,626** | **18.0** |
| *Other opioids (codeine and morphine) (T40.2)* | *695* | *42.7* |
| *Heroin (T40.1)* | *263* | *16.2* |
| **Other and unspecified chemicals and noxious substances** | **1,174** | **13.0** |
| *Toxic effect of other noxious substances eaten as food (T62)* | *183* | *15.6* |
| *Toxic effect of corrosive substances (T54)* | *148* | *12.6* |
| **Non-opioid analgesics, antipyretics and anti-rheumatics** | **1,161** | **12.9** |
| *4-Aminophenol derivatives (T39.1)* | *936* | *80.6* |
| *Other non-steroidal anti-inflammatory drugs (NSAIDs) (T39.3)* | *206* | *17.7* |
| **Total** | **9,034** | **100** |

*Note:* The external-cause groups are presented in bold. Information about the specific drugs types taken from the principal diagnosis codes are presented in italics.

From Table 6.2 we can see that:

- 30% (2,708 cases) were poisoning by *Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs*. Within this category, *Poisoning by psychotropic drugs, not elsewhere classified* (55%) and *Poisoning by anti-epileptic, sedative-hypnotic and anti-parkinsonism drugs* (44%) were the 2 most common causes. Among the *Poisoning by psychotropic drugs* category, *Poisoning by psychostimulants with potential for use disorder* was the most common (579 cases). Benzodiazepines (845 cases) were the largest category of drugs under the *Anti-epileptic, sedative-hypnotic and anti-parkinsonism drugs category*.
- 26% (2,365 cases) were poisoning by *Other and unspecified drugs, medicaments, and biological substances*. This is a diverse group that includes hormones and their synthetic substitutes and antagonists drugs (33%) and agents primarily affecting the cardiovascular system (20%).
- 18% (1,626 cases) were poisoning by *Narcotics and psychodysleptics (hallucinogens)*, of which 695 or 43% were 'other' opioids such as codeine and morphine and 16% were heroin.
- 13% (1,174 cases) were poisoning by *Other and unspecified chemicals and noxious substances*. This is another diverse group that includes the *Toxic effect of other noxious substances eaten as food* (16%) and the *Toxic effect of corrosive substances* (13%).
- 15% of cases (1,074 cases) were poisoning by, and exposure to, *Non-opioid analgesics, antipyretics and anti-rheumatics*. Most of these (81%) involved *4-aminophenol derivatives* such as paracetamol and *Other non-steroidal anti-inflammatory drugs* (18%).

## Remoteness of usual residence

The age-standardised rate of *Accidental poisoning* in 2014–15 increased with increasing remoteness of usual residence (Table 6.3). The highest rate of *Accidental poisoning* occurred in *Very remote* regions (63 cases per 100,000 population), followed by *Outer regional* areas (53 per 100,000).

**Table 6.3: Accidental poisoning cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Accidental poisoning cases | 6,822 | 1,719 | 1,098 | 161 | 125 |
| Age-standardised rate/100,000 population | 39.9 | 40.1 | 53.1 | 49.5 | 63.0 |

## Aboriginal and Torres Strait Islander people

There were an estimated 659 cases of Indigenous people hospitalised as a result of an *Accidental poisoning* in 2014–15 (Table 6.4). More Indigenous males were hospitalised than females. The age-standardised rates of *Accidental poisoning* were more than twice as high for Indigenous males and females, compared with their *Other Australian* counterparts.

**Table 6.4: Accidental poisoning cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Accidental poisoning cases | 360 | 299 | 659 | 4,976 | 4,457 | 9,433 |
| Age-standardised rate/100,000 population | 108.6 | 100.6 | 105.5 | 43.4 | 37.5 | 40.4 |

Age-specific rates of accidental poisoning were unable to be presented for Indigenous people due to the lack of case numbers in the age groups older than 0–4. As can be seen in Table 6.5, relatively few Indigenous children aged 0–4 were hospitalised because of *Accidental poisoning*, compared with their *Other Australian* counterparts. Almost a quarter (23%) of all cases occurred among Indigenous children aged 0–4, compared with 15% of all cases for non-Indigenous children. The age-specific rates of *Accidental poisoning* among Indigenous children overall was higher than for other Australian children, which was true for both boys and girls.

**Table 6.5: Key indicators for accidental poisoning cases in 0–4-year olds, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australian | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Accidental poisoning cases | 98 | 51 | 149 | 750 | 618 | 1,368 |
| Age-specific rate/100,000 population | 225.2 | 122.7 | 175.1 | 100.6 | 87.5 | 94.2 |

## Socioeconomic status

The proportion of *Accidental poisoning* cases in each SES group ranged between 14% and 26% (Table 6.6). The highest proportions, for males and females, were for people living in areas with the lowest (most disadvantaged) SES classification.

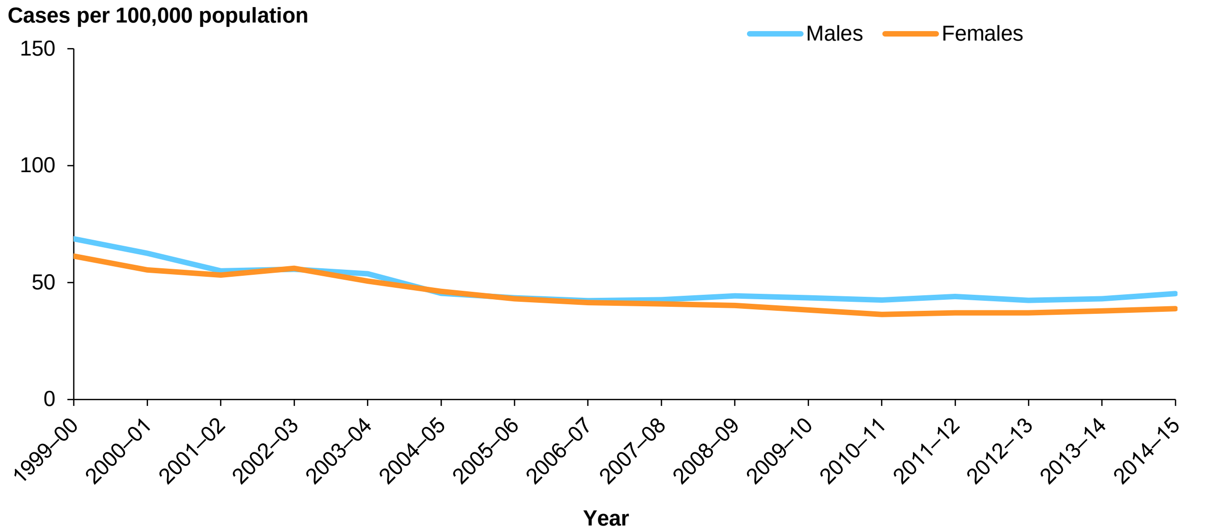
**Table 6.6: Accidental poisoning cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| SEIFA | Number | % | Number | % | Number | % |
| 1–Lowest | 1,381 | 25.9 | 1,193 | 25.1 | 2,574 | 25.5 |
| 2 | 1,140 | 21.4 | 1,089 | 22.9 | 2,229 | 22.1 |
| 3 | 1,020 | 19.1 | 918 | 19.3 | 1,938 | 19.2 |
| 4 | 963 | 18.0 | 842 | 17.7 | 1,805 | 17.9 |
| 5–Highest | 722 | 13.5 | 655 | 13.8 | 1,377 | 13.6 |
| **Total[(a)]** | **5,336** | **100** | **4,756** | **100** | **10,092** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# How have cases of accidental poisoning injury changed over time?

Age-standardised rates for males and females were similar throughout the period, although males have had slightly higher rates since about 2006–07 (Figure 6.4). After an initial decline for both males and females since the beginning of the period, rates appear to be steady, with no evidence of any substantial change in *Accidental poisoning* rates since the middle of the period.



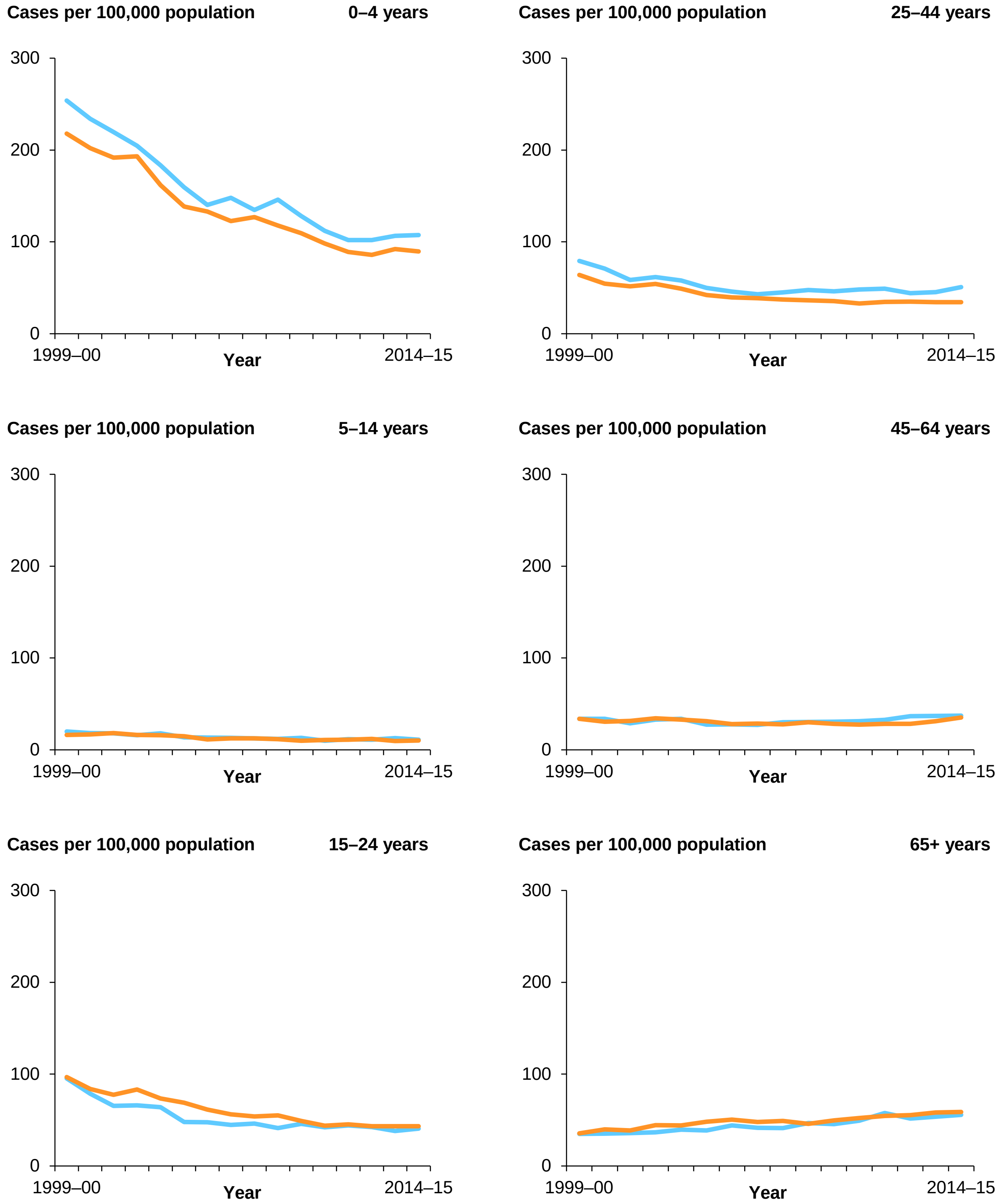

*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 6.

**Figure 6.4: Age-standardised rates of accidental poisoning, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 6.5. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015).

As can be seen in Figure 6.5, the arrest in the gradual decline in age-standardised rates since about 2008–09 is reflected in the age-specific rates for all age groups, other than for the 0–4 and 65+ age groups. The plateauing of rates in children aged 0–4 appears to have commenced in 2010–11, with rates of *Accidental poisoning* averaging 106 cases per 100,000 for boys and 91 for girls since that time. By comparison, the average rate for the period prior to 2010–11 was 177 per 100,000 for boys and 156 for girls.

In contrast to all other age groups, rates of *Accidental poisoning* among those aged 65 or over have continued to increase. For males aged 65 or over, the age-specific rate of poisoning in 1999–00 was 35 cases per 100,000, and in 2014–15 it was 55. Similarly, the rate for females was 35 per 100,000 in 1999–00 and 59 in 2014–15.

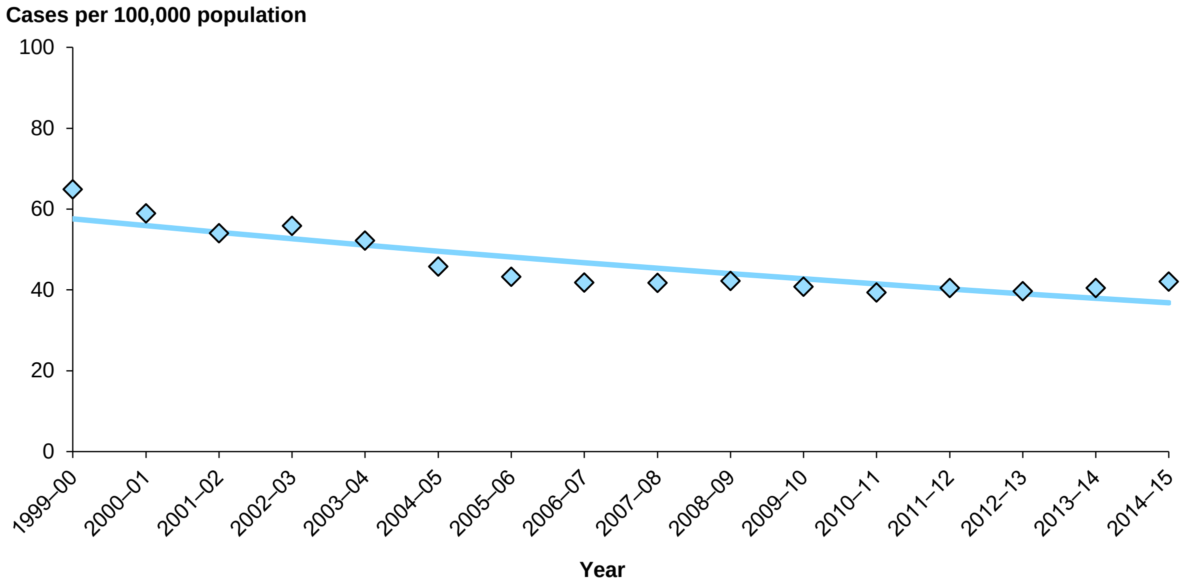



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 6.

**Figure 6.5: Age-specific rates of accidental poisoning, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised annual rates of *Accidental poisoning* showed a small decrease from the beginning of the period. In 1999–00, the rate was 65 cases per 100,000 population and in 2014–15 it was 42 (Figure 6.6). The decrease in modelled rates from 1999–00 to 2014–15 averaged 3.0% per year and was statistically significant (95% CI: –3.7%, –2.2%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 6.

**Figure 6.6: Modelled age-standardised rates of accidental poisoning, Australia, 1999–00 to 2014–15**

# 7 Falls

This chapter presents information on patients who were admitted to hospital as a result of a fall. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

More detailed information on fall injuries, including trend information, can be found in publications available on the AIHW website. For example, *Trends in hospitalisations due to falls by older people, Australia 1999–00 to 2010–11* (Bradley 2013).

**Key findings**

Almost 200,000 cases of hospitalised injury were due to a fall in 2014–15.

**Sex of patient**

In 2014–15, females (112,075) made up just over half of all cases of hospitalised *Falls*.

**Age of patient**

In 2014–15, people aged 65 or over accounted for 56% of cases; among females it was 66%.

**Indigenous status**

*Falls* among Indigenous people made up a lower proportion of all injury (23%) compared with other Australians (42%), but rates of injury were higher.

**Cause of injury**

*Fall on the same level from slipping, tripping and stumbling* accounted for more than one-quarter of all fall injuries (28%) in 2014–15.

**Trends in injury**

Fall injury hospitalisations rose over the period 1999–00 to 2014–15, increasing on average by 1.8% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM range W00–W19 (*Falls*) in ‘Chapter XX External causes of morbidity and mortality’.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2 and 7.1. Further information on methods is provided in ‘Appendix A: Data issues’.

**Box 7.1: External causes of falls**

This chapter focuses on the **Other external causes of accidental injury (W00–X59)** section of ICD-10-AM ‘Chapter XX External causes of morbidity and mortality’, but is restricted to *Falls* (W00–W19), as follows:

- 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 1 level to another (W17)
- Other fall on same level (W18)
- Unspecified fall (W19).

# How many fall injury cases were there in 2014–15?

There were an estimated 198,576 fall injury cases during 2014–15, an increase of about 20,000 cases since the last trends report was published in 2012–13. Fall cases made up 41% of all hospitalised injury cases (Figure 7.1).

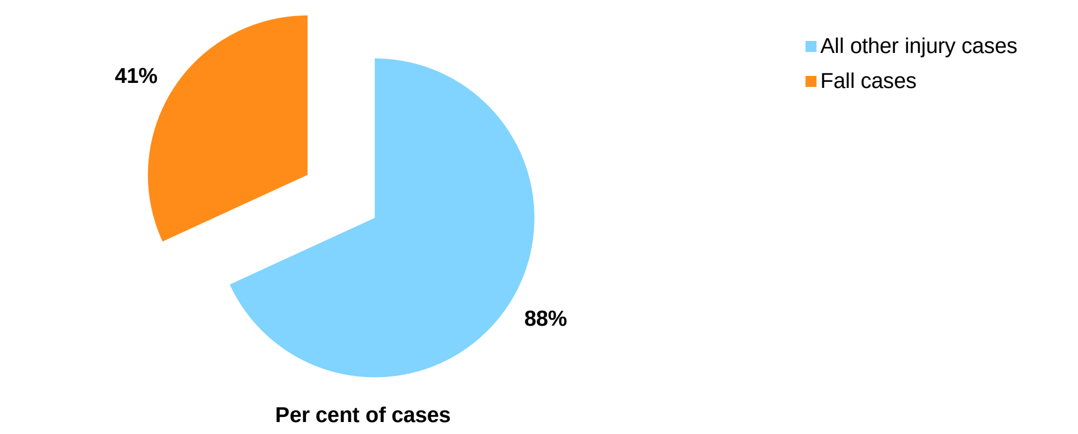
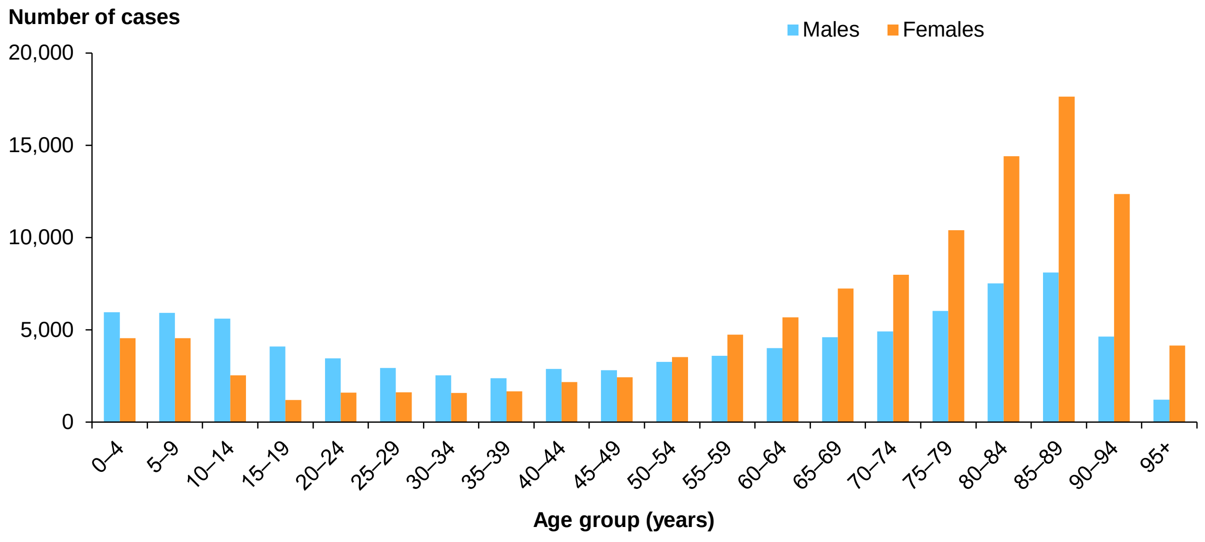



**Figure 7.1: Proportion of injury cases due to falls, Australia, 2014–15**

## Age group and sex, 2014–15

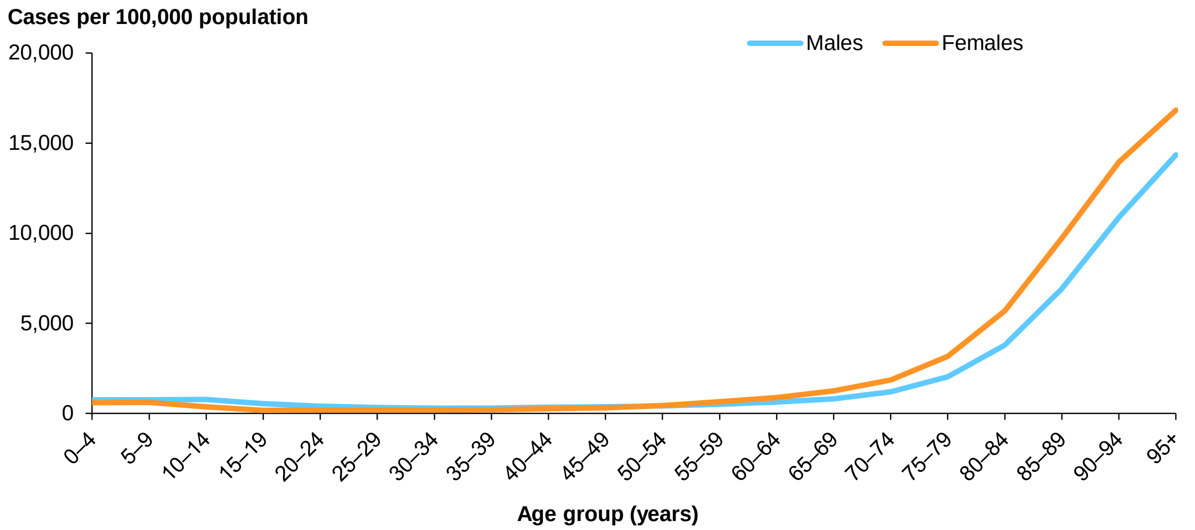
Of the 198,576 fall injury cases in Australia in 2014–15, just over half were female (112,075) and 56% occurred in people aged 65 or over. Among females, the proportion of fall injury cases occurring at ages 65 or over was 66%. An analysis of fall injury cases by age and sex shows a greater number of males in each age category, up to the 50–54 age group (Figure 7.2). The greatest number of fall injury cases for both males and females occurred in the 85–89 age group, at 17,639 and 8,115 cases, respectively.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 7.

**Figure 7.2: Number of fall cases, by age group, by sex, Australia, 2014–15**

For both sexes, age-specific rates of falls were higher in each successive age group from about age 65 onwards (Figure 7.3). Rates for males were higher than for females from the 5–9 age group to the 20–24 age group. By contrast, from the 55–59 age group onwards, rates for females were higher than for males.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 7.

**Figure 7.3: Age-specific rates of fall cases, by age group, by sex, Australia, 2014–15**

# Nature of injury

Fall injuries resulted in damage to various body regions, with the most common being the *Hip and lower limb* (28%) and *Head and neck* (26%) (Table 7.1). Females had a larger proportion of injuries to the *Hip and lower limb* (32%), while males had larger proportions of *Head and neck injuries* (31%).

**Table 7.1: Fall cases, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 26,437 | 30.6 | 26,061 | 23.3 | 52,498 | 26.4 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 11,861 | 13.7 | 15,864 | 14.2 | 27,725 | 14 |
| Shoulder and upper limb (excluding wrist and hand) | 20,206 | 23.4 | 28,472 | 25.4 | 48,678 | 24.5 |
| Wrist and hand | 4,212 | 4.9 | 2,838 | 2.5 | 7,051 | 3.6 |
| Hip and lower limb (excluding ankle and foot) | 20,831 | 24.1 | 35,614 | 31.8 | 56,445 | 28.4 |
| Ankle and foot | 2,213 | 2.6 | 2,355 | 2.1 | 4,568 | 2.3 |
| Other, multiple and incompletely specified body regions | 243 | 0.3 | 316 | 0.3 | 559 | 0.3 |
| Injuries not described in terms of body region | 497 | 0.6 | 555 | 0.5 | 1,052 | 0.5 |
| **Total** | **86,500** | **100** | **112,075** | **100** | **198,576** | **100** |

Fractures were the most common type of injury sustained, with just over 100,000 cases in 2014–15 (Table 7.2). Males and females had a similar pattern of type of injury, with *Fractures*, followed by *Open wounds*, being common for both.

**Table 7.2: Fall cases, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 43,242 | 50.0 | 66,739 | 59.5 | 109,981 | 55.4 |
| Dislocation | 2,240 | 2.6 | 2,058 | 1.8 | 4,298 | 2.2 |
| Soft-tissue injury | 5,008 | 5.8 | 4,320 | 3.9 | 9,328 | 4.7 |
| Open wound | 11,701 | 13.5 | 10,913 | 9.7 | 22,614 | 11.4 |
| Intracranial injury | 6,694 | 7.7 | 5,194 | 4.6 | 11,888 | 6.0 |
| Internal organ or vessel of trunk | 978 | 1.1 | 447 | 0.4 | 1,425 | 0.7 |
| Burn | 10 | 0 | 4 | 0 | 14 | 0 |
| Superficial injury | 5,261 | 6.1 | 8,076 | 7.2 | 13,337 | 6.7 |
| Poisoning or toxic effect | 3 | 0 | 4 | 0 | 7 | 0 |
| Other and unspecified injuries | 11,363 | 13.2 | 14,320 | 12.8 | 25,684 | 13 |
| **Total** | **86,500** | **100** | **112,075** | **100** | **198,576** | **100** |

# Remoteness of usual residence

The age-standardised rate of falls in 2014–15 varied somewhat according to remoteness of usual residence (Table 7.3). The highest rates were in *Remote* and *Very remote* areas (814 and 894 per 100,000 population, respectively).

**Table 7.3: Fall cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Fall cases | 138,147 | 37,034 | 17,660 | 2,537 | 1,593 |
| Age-standardised rate/100,000 population | 761.7 | 713.2 | 746.1 | 813.5 | 893.5 |

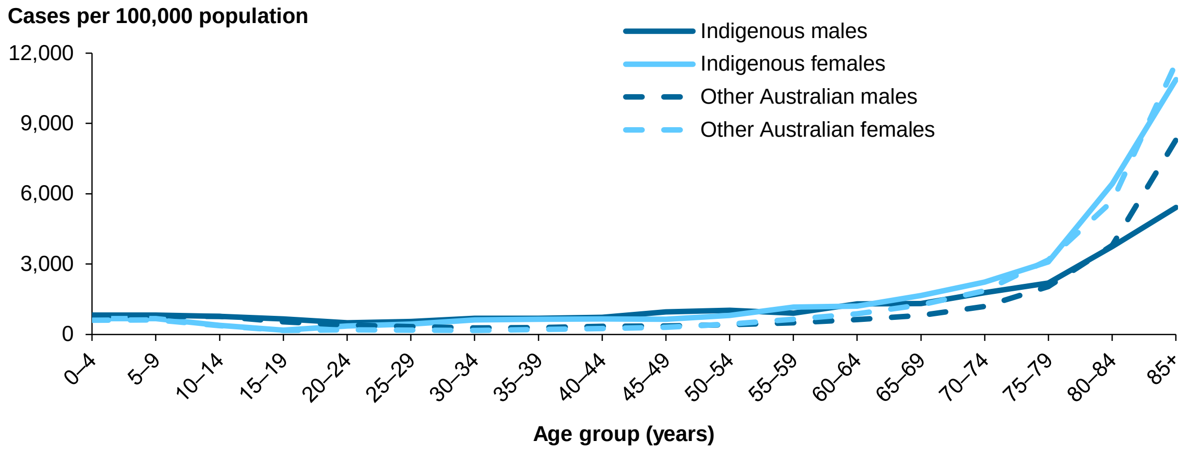
# Aboriginal and Torres Strait Islander people

There were an estimated 5,291 cases of Indigenous people hospitalised as a result of a fall in 2014–15 (Table 7.4). Falls among Indigenous people made up a lower proportion of all injury (23%) compared with other Australians (42%). In contrast to other Australians, more Indigenous males than Indigenous females were hospitalised as a result of a fall. The age-standardised rate of *Falls* among Indigenous people was higher than that of other Australians, for males as well as for females.

**Table 7.4: Fall cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Fall cases | 2,857 | 2,434 | 5,291 | 83,643 | 109,641 | 193,285 |
| Age-standardised rate/100,000 population | 984.1 | 1,017.8 | 1,018.2 | 720.0 | 759.9 | 750.4 |

Generally speaking, the pattern of fall, by age, for Indigenous males and females was similar to that for other Australian males and females (Figure 7.4). Fall rates were low until the 65–69 age group, and after that, fall rates increased substantially for both Indigenous and other Australians, regardless of sex. Caution should be exercised in interpreting rates in the older age categories, due to the small numbers of Indigenous cases.




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 7.

**Figure 7.4: Age-specific rates of fall injury, by Indigenous status, by age group, by sex, Australia, 2014–15**

# Socioeconomic status

The proportion of fall injury cases in each SES group ranged between 18% and 22% (Table 7.5). The highest proportion, for males and females, were for people living in areas with the lowest (most disadvantaged) SES classification.

**Table 7.5: Fall cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 18,738 | 21.7 | 23,732 | 21.2 | 42,470 | 21.4 |
| 2 | 17,756 | 20.5 | 22,817 | 20.4 | 40,573 | 20.4 |
| 3 | 17,146 | 19.8 | 21,946 | 19.6 | 39,092 | 19.7 |
| 4 | 16,202 | 18.7 | 20,829 | 18.6 | 37,032 | 18.6 |
| 5–Highest | 15,788 | 18.3 | 21,987 | 19.6 | 37,775 | 19.0 |
| **Total**[(a)] | **86,500** | **100** | **112,075** | **100** | **198,576** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of fall

*Fall on the same level from slipping, tripping and stumbling* accounted for more than one-quarter of all fall injuries (28%) in 2014–15 (Table 7.6). The next 2 most commonly reported types of fall were *Other fall on same level* and *Fall on and from stairs and steps*, accounting for 20% and 7% of cases, respectively.

Fall injuries where males outnumbered females by more than 3:1 were *Other fall on same level due to collision with, or pushing by, another person*; *Fall on and from ladder*; *Fall on and from scaffolding*; and *Fall from, out of or through building or structure*.

**Table 7.6: External causes of fall cases, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fall on same level from slipping, tripping and stumbling | 18,883 | 21.8 | 36,854 | 32.9 | 55,737 | 28.1 |
| Other fall on same level | 15,691 | 18.1 | 24,266 | 21.7 | 39,957 | 20.1 |
| Fall on and from stairs and steps | 5,382 | 6.2 | 8,454 | 7.5 | 13,837 | 7.0 |
| Fall involving playground equipment | 3,746 | 4.3 | 3,293 | 2.9 | 7,039 | 3.5 |
| Other fall from 1 level to another | 4,435 | 5.1 | 2,533 | 2.3 | 6,968 | 3.5 |
| Fall involving bed | 2,634 | 3.0 | 4,027 | 3.6 | 6,661 | 3.4 |
| Fall involving chair | 2,479 | 2.9 | 3,484 | 3.1 | 5,963 | 3.0 |
| Fall involving ice-skates, skis, roller-skates or skateboards | 4,031 | 4.7 | 1,755 | 1.6 | 5,786 | 2.9 |
| Other fall on same level due to collision with, or pushing by, another person | 4,363 | 5.0 | 816 | 0.7 | 5,179 | 2.6 |
| Fall on and from ladder | 4,226 | 4.9 | 1,030 | 0.9 | 5,256 | 2.6 |
| Fall from, out of or through building or structure | 3,230 | 3.7 | 871 | 0.8 | 4,101 | 2.1 |
| Fall involving wheelchair | 492 | 0.6 | 588 | 0.5 | 1,080 | 0.5 |
| Fall from tree | 725 | 0.8 | 283 | 0.3 | 1,008 | 0.5 |
| Fall while being carried or supported by other persons | 347 | 0.4 | 399 | 0.4 | 746 | 0.4 |
| Fall involving other furniture | 417 | 0.5 | 411 | 0.4 | 828 | 0.4 |
| Diving or jumping into water causing injury other than drowning or submersion | 524 | 0.6 | 210 | 0.2 | 734 | 0.4 |
| Fall from cliff | 327 | 0.4 | 148 | 0.1 | 475 | 0.2 |
| Fall on and from scaffolding | 280 | 0.3 | 12 | 0 | 292 | 0.1 |
| Fall on same level involving ice and snow | 34 | 0 | 56 | 0 | 90 | 0 |
| Unspecified fall | 14,254 | 16.5 | 22,585 | 20.2 | 36,839 | 18.6 |
| **Total** | **86,500** | **100** | **112,075** | **100** | **198,576** | **100** |

Cases lacking specific information about the type of fall (19%) may have occurred for a number of reasons, including patients arriving unconscious to the hospital; information not being reported by or on behalf of the patient; or information not being recorded in the patient's hospital record. Unspecified falls were greater among people aged 65 or over (23%).

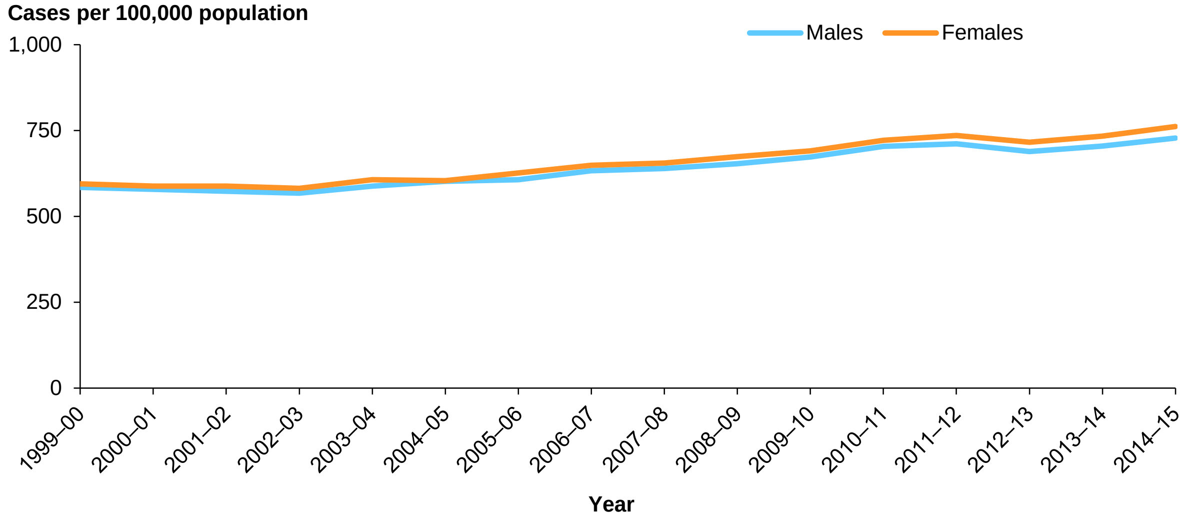
The external cause of fall injury varied by age. For young children (0–4), falls from playground equipment and furniture were common (Table 7.7). Older children (5–14) were also frequently hospitalised as a result of a fall from playground equipment, but were also increasingly hospitalised as a result of falling from pedestrian conveyances (for example, skateboards). For people aged 65 or over, falls resulting from slips, trips and stumbles or falls on the same level accounted for about a third of all cases.

**Table 7.7: Selected external causes of fall cases, by selected age groups, Australia, 2014–15**

| | Number | % |
|---|---:|---:|
| **0–4 year olds** | | |
| Fall involving playground equipment | 1,538 | 14.6 |
| Fall involving chair | 1,335 | 12.7 |
| Fall on same level from slipping, tripping and stumbling | 1,266 | 12.1 |
| Other fall on same level | 1,091 | 10.4 |
| All other causes of falls | 5,269 | 50.2 |
| **Total falls 0–4** | **10,499** | |
| | | |
| **5–14 year olds** | | |
| Fall involving playground equipment | 4,931 | 26.5 |
| Other fall on same level | 2,411 | 13.0 |
| Fall on same level from slipping, tripping and stumbling | 2,301 | 12.4 |
| Fall involving ice-skates, skis, roller-skates or skateboards | 2,169 | 11.7 |
| All other causes of falls | 6,798 | 36.4 |
| **Total falls 5–14** | **18,610** | |
| | | |
| **65+ year olds** | | |
| Fall on same level from slipping, tripping and stumbling | 37,616 | 33.8 |
| Other fall on same level | 27,232 | 24.5 |
| Unspecified fall | 25,533 | 23 |
| Fall on and from stairs and steps | 7,042 | 6.3 |
| All other causes of falls | 13,799 | 12.4 |
| **Total falls 65+** | **111,222** | |

# How have fall injury cases changed over time?

The age-standardised rate for fall injury increased over the period for both males and females (Figure 7.5). Rates were slightly higher for females, compared with males.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 7.

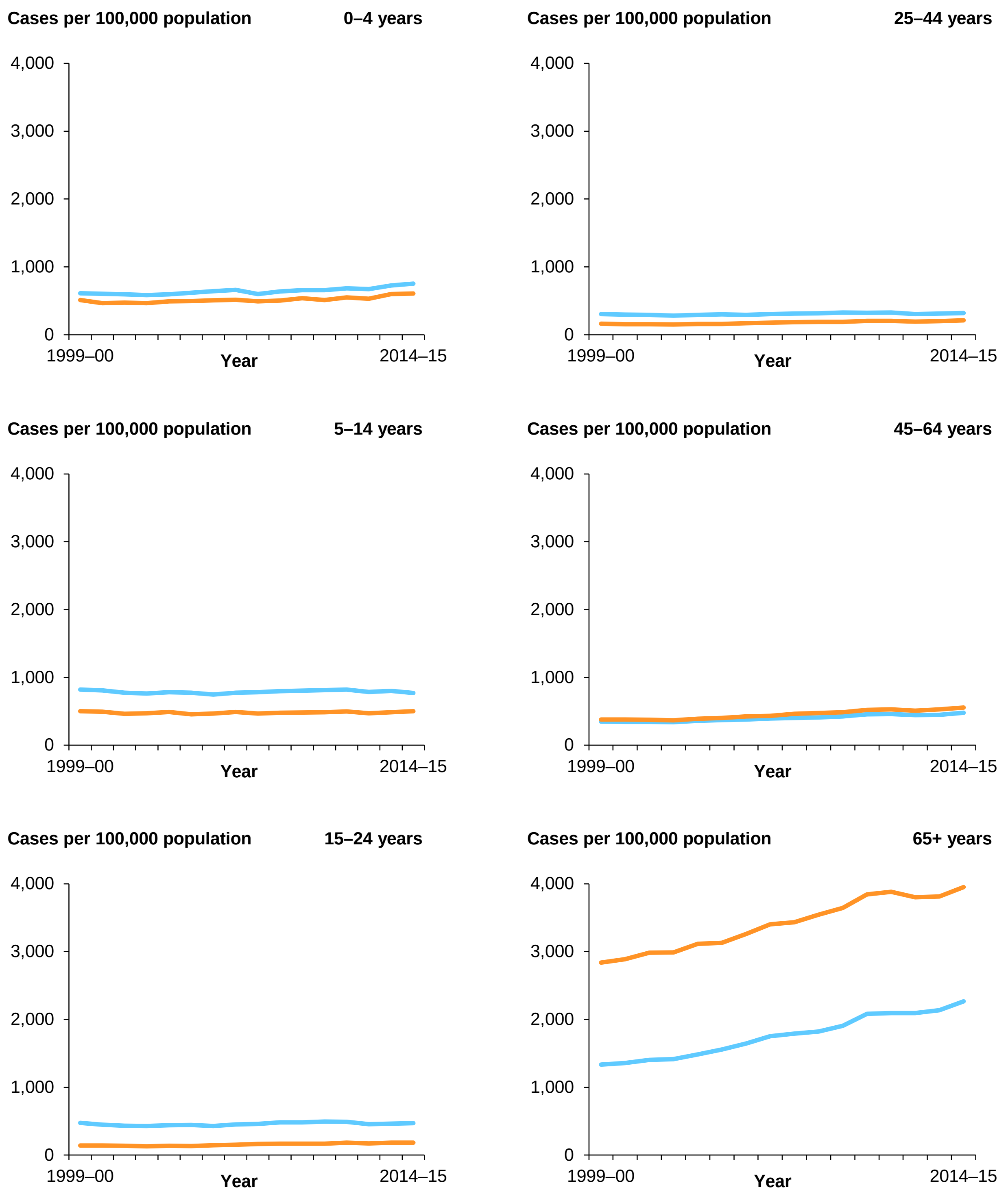
**Figure 7.5: Age-standardised rates of fall injury, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 7.6. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015).

As can be seen in Figure 7.6, age-specific rates for females 65+, and to a lesser extent males 65+, showed a marked increase, again reflecting the increasing population within this age group. A small rise in age-specific rates among those aged 0–4 was noted, but a rise was not seen in any other age group.

The rate of injury at the beginning of the period for females aged 65 or over was 2,842 per 100,000, and in 2014–15 it was 3,953 per 100,000. For males aged 65 or over, the corresponding rates were 1,335 and 2,266 cases per 100,000 population.

While the trend in rates of fall injury cases in very young boys and girls (the 0–4 age group) increased to a much smaller extent than did the rates for older people (from 609 cases per 100,000 in 1999–00 to 754 in 2014–15 for the youngest group and from 511 cases per 100,000 in 1999–00 to 608 in 2014–15 for older people), falls in children aged 0–4 make up a large proportion (about 40% each year) of all hospitalised cases of injury.

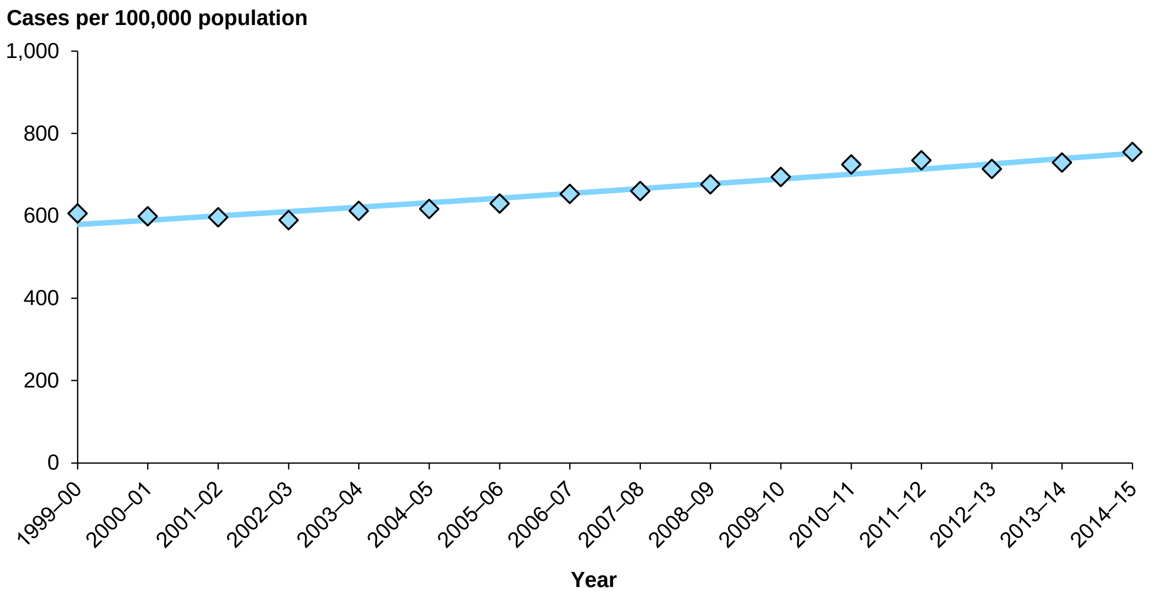



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 7.

**Figure 7.6: Age-specific rates of fall injury, by age, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of fall injury increased from 606 per 100,000 population in 1999–00 to 756 per 100,000 in 2014–15 (Figure 7.7). The increase averaged 1.8% per year and was statistically significant (95% CI: 1.5%, 2.0%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 7.

**Figure 7.7: Modelled age-standardised rates of fall injury, Australia, 1999–00 to 2014–15**

# 8 Thermal causes of injury

This chapter presents information on patients who were admitted to hospital as a result of *Thermal causes of injury*. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

More detailed information on *Thermal causes of injury* can be found in publications available on the AIHW website. For example, *Hospitalised burn injuries, Australia, 2013–14* (AIHW: Pointer & Tovell 2016).

**Key findings**

Almost 6,000 cases of hospitalised injury were due to *Thermal causes of injury* in 2014–15.

**Sex of patient**

In 2014–15, males (3,659) made up more than half of all cases due to *Thermal causes of injury* .

**Age of patient**

In 2014–15, the largest proportion of all *Thermal causes of injury* cases occurred in very young children (0–4).

**Indigenous status**

Rates of injury due to *Thermal causes of injury* among Indigenous people (67 cases per 100,000) were more than twice those of other Australians (23 per 100,000).

**Cause of injury**

*Contact with hot drinks, food, fats and cooking oils* was the leading cause of thermal hospitalised injury cases (21%), at each age group and for males and females.

**Trends in injury**

*Thermal causes of injury* hospitalisations declined over the period 1999–00 to 2014–15 decreasing on average by 0.5% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM range X00–X19 in 'Chapter XX External causes of morbidity and mortality'. This includes cases of *Exposure to smoke, fire and flames* (ICD 10 AM X00–X09) or *Contact with heat and hot substance*s (X10–X19)—collectively these are referred to as 'thermal causes'. Burns are the injury that usually (although not always) results from thermal causes.

Relevant terms and information applying to 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: Data issues'.

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

This chapter focuses on the **Other external causes of accidental injury (W00–X59)** section of ICD-10-AM 'Chapter XX External causes of morbidity and mortality' and is restricted to *Exposure to smoke, fire and flames* (X00–X09) and *Contact with heat and hot substances* (X10–X19), as follows:

**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).

# How many thermal causes of injury cases were there in 2014–15?

There were an estimated 5,840 *Thermal causes of injury* cases during 2014–15. Injury cases due to thermal causes made up 1% of all hospitalised injury cases (Figure 8.1).

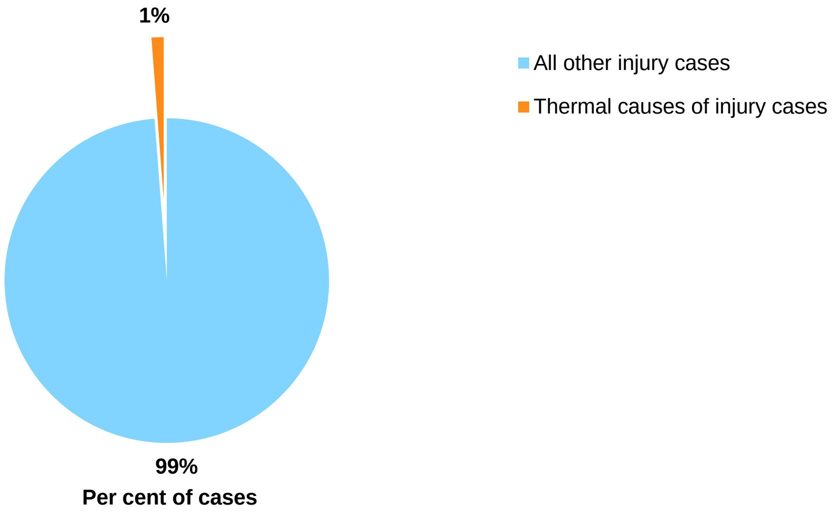
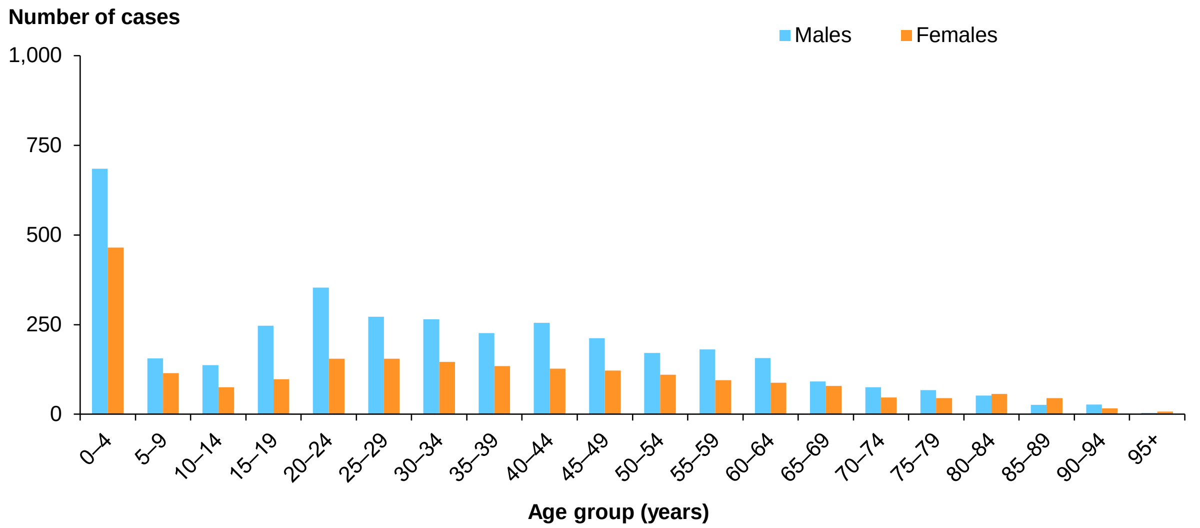



**Figure 8.1: Proportion of injury cases due to thermal causes, Australia, 2014–15**

## Age group and sex, 2014–15

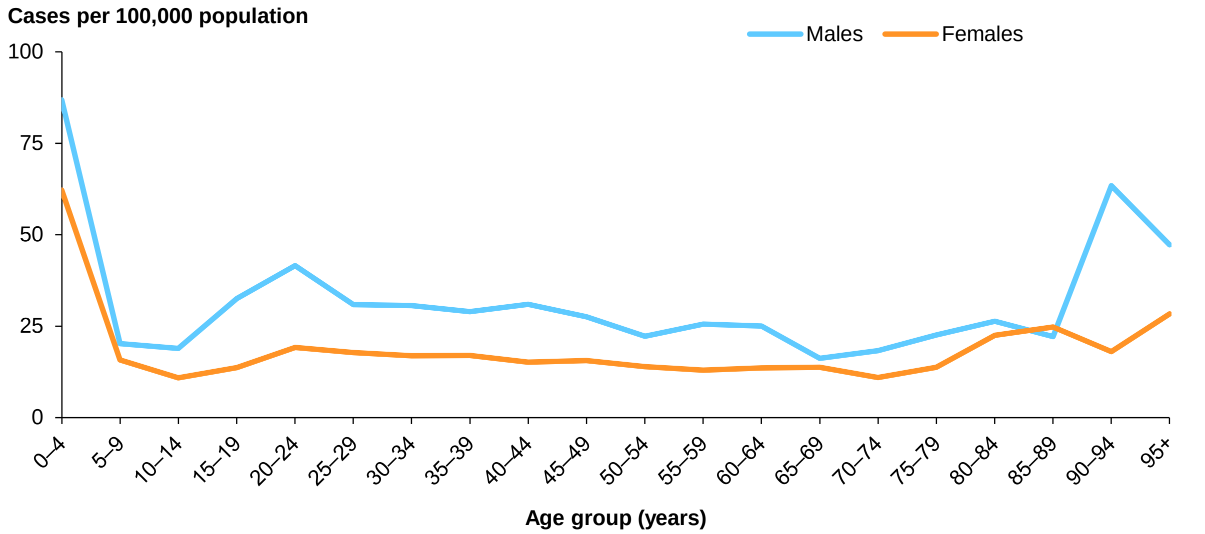
Of the 5,840 *Thermal causes of injury* cases in Australia in 2014–15, more males (3,659) than females (2,181) were hospitalised. A large proportion of all *Thermal causes of injury* cases occurred in very young children: 685 and 465 cases for boys and girls, respectively (Figure 8.2). Overall, an analysis of cases by age and sex shows a greater number of males in each age category, up to the 80–84 age group.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 8.

**Figure 8.2: Number of thermal causes of injury cases, by age group, by sex, Australia, 2014–15**

Rates of injury due to thermal causes were highest for young children aged 0–4. The incidence rate for boys aged 0–4 was 87 per 100,000 population, compared with 62 per 100,000 for girls of the same age (Figure 8.3).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 8.

**Figure 8.3: Age-specific rates of thermal causes of injury, by age group, by sex, Australia, 2014–15**

# Remoteness of usual residence

The age-standardised rates of *Thermal causes of injury* in 2014–15 varied according to remoteness of usual residence (Table 8.1). The highest rates were in *Remote* and *Very remote* areas (60 and 90 per 100,000 population, respectively).

**Table 8.1: Thermal causes of injury cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Thermal causes of injury cases | 3,307 | 1,199 | 834 | 192 | 196 |
| Age-standardised rate/100,000 population | 19.6 | 29.2 | 41.8 | 59.7 | 89.8 |

# Aboriginal and Torres Strait Islander people

There were an estimated 506 cases of Indigenous people hospitalised due to *Thermal causes of injury* in 2014–15 (Table 8.2). Rates of *Thermal causes of injury* were more than twice as high for Indigenous people, compared with other Australians, both for Indigenous males and for Indigenous females.

**Table 8.2: Key indicators for thermal causes of injury cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Thermal causes of injury cases | 317 | 189 | 506 | 3,342 | 1,992 | 5,334 |
| Age-standardised rate/100,000 population | 85.4 | 48.9 | 66.9 | 29.4 | 17.4 | 23.4 |

Age-specific rates of *Thermal causes of injury* cases are only presented for Indigenous children in the 0–4 age group, due to the lack of case numbers in the older age groups. As can be seen in Table 8.3, relatively few Indigenous children aged 0–4 were hospitalised as a result of *Thermal causes of injury*, compared with their *Other Australian* counterparts. However, one-third of all *Thermal causes of injury* cases occurred among Indigenous children aged 0–4, compared with 18% of all cases for other Australian children. The age-specific rates of *Thermal causes of injury* cases among Indigenous children were much higher than for other Australian children, for both boys and girls.

**Table 8.3: Key indicators for thermal causes of injury cases in 0–4-year olds, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australian | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Thermal causes of injury cases | 91 | 77 | 168 | 594 | 388 | 982 |
| Age-specific rate/100,000 population | 209.1 | 185.3 | 197.5 | 79.7 | 55.0 | 67.6 |

# Socioeconomic status

The proportion of *Thermal causes of injury* cases in each SES group ranged between 12% and 29% (Table 8.4). The highest proportions, for both males and females, were for people living in areas with the lowest (most disadvantaged) SES classification. For males, the difference in the proportion of *Thermal causes of injury* cases occurring in the highest SES group was more than twice that of the lowest SES group.

**Table 8.4: Thermal causes of injury cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 1,044 | 28.5 | 593 | 27.2 | 1,637 | 28.0 |
| 2 | 843 | 23.0 | 486 | 22.3 | 1,329 | 22.8 |
| 3 | 728 | 19.9 | 368 | 16.9 | 1,096 | 18.8 |
| 4 | 535 | 14.6 | 354 | 16.2 | 889 | 15.2 |
| 5–Highest | 443 | 12.1 | 334 | 15.3 | 777 | 13.3 |
| **Total**[(a)] | **3,659** | **100** | **2,181** | **100** | **5,840** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of thermal injury

*Contact with hot drinks, food, fats and cooking oils* was the leading cause of thermal hospitalised injury cases (21%), followed by *Contact with other hot fluid* (for example, water heated on a stove) (14%); and by *Exposure to ignition of highly flammable material* (for example, gasoline, kerosene, petrol) and *Exposure to controlled fire, not in building or structure* (for example, camp fire) (8% for both causes) (Table 8.5).

There were some notable differences between the sexes: 28% of females experienced an injury from *Contact with hot drinks, food, fats and cooking oils* compared with 17% of males. Similarly, females were more likely to experience a scald from *Contact with other hot fluids,* compared with males (20% versus 10%). Males had higher proportions of burn injuries from *Exposure to ignition of highly flammable material* (for example, gasoline, kerosene, petrol) and *Exposure to controlled fire, not in building or structure* (for example, a camp-fire) (11% versus 3%, and 10% versus 5%, respectively).

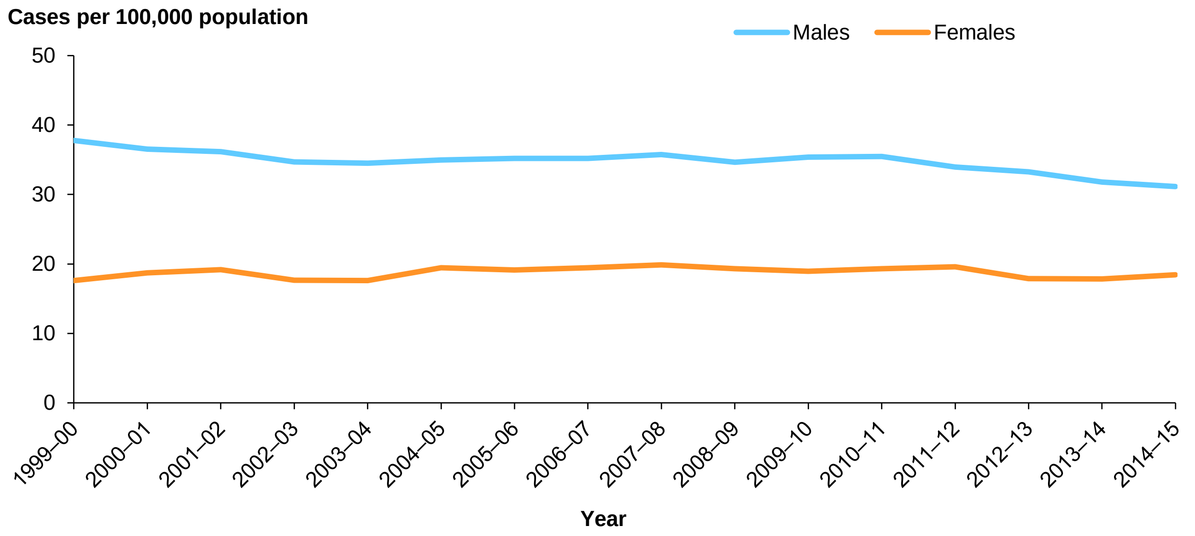
**Table 8.5: Type of thermal cause of injury cases, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **Count** | **%** | **Count** | **%** | **Count** | **%** |
| Exposure to uncontrolled fire in building or structure | 128 | 3.5 | 75 | 3.4 | 203 | 3.5 |
| Exposure to uncontrolled fire, not in building or structure (for example, forest fire) | 90 | 2.5 | 16 | 0.7 | 106 | 1.8 |
| Exposure to controlled fire in building or structure (for example, fireplace, stove) | 171 | 4.7 | 78 | 3.6 | 249 | 4.3 |
| Exposure to controlled fire, not in building or structure (for example, camp-fire) | 374 | 10.2 | 104 | 4.8 | 478 | 8.2 |
| Exposure to ignition of highly flammable material (for example, gasoline, kerosene, petrol) | 396 | 10.8 | 72 | 3.3 | 468 | 8.0 |
| Exposure to ignition or melting of nightwear | 8 | 0.2 | 4 | 0.2 | 12 | 0.2 |
| Exposure to ignition or melting of other clothing and apparel | 30 | 0.8 | 18 | 0.8 | 48 | 0.8 |
| Exposure to other specified smoke, fire and flames | 264 | 7.2 | 92 | 4.2 | 356 | 6.1 |
| Exposure to unspecified smoke, fire and flames | 261 | 7.1 | 112 | 5.1 | 373 | 6.4 |
| Contact with hot drinks, food, fats and cooking oils | 603 | 16.5 | 614 | 28.2 | 1,217 | 20.8 |
| Contact with hot tap-water | 184 | 5 | 146 | 6.7 | 330 | 5.7 |
| Contact with other hot fluids (for example, water heated on stove) | 364 | 9.9 | 439 | 20.1 | 803 | 13.8 |
| Contact with steam and hot vapours | 49 | 1.3 | 28 | 1.3 | 77 | 1.3 |
| Contact with hot air and gases | 22 | 0.6 | 0 | 0 | 22 | 0.4 |
| Contact with hot household appliances | 162 | 4.4 | 116 | 5.3 | 278 | 4.8 |
| Contact with hot heating appliances, radiators and pipes | 152 | 4.2 | 85 | 3.9 | 237 | 4.1 |
| Contact with hot engines, machinery and tools | 193 | 5.3 | 54 | 2.5 | 247 | 4.2 |
| Contact with other hot metals | 50 | 1.4 | 4 | 0.2 | 54 | 0.9 |
| Contact with other and unspecified heat and hot substances | 158 | 4.3 | 124 | 5.7 | 282 | 4.8 |
| **Total** | **3,659** | **100** | **2,181** | **100** | **5,840** | **100** |

The leading cause of thermal injury did not vary by age group: *Contact with hot drinks, food, fats and cooking oils* was the primary cause of thermal injury cases in every age group. The proportion of thermal injuries due to *Contact with hot drinks, food, fats and cooking oils* was highest in the youngest age group (36%) and averaged around 15% in other age groups (data not shown).

# How have thermal causes of injury cases changed over time?

The age-standardised rate for *Thermal causes of injury* was consistently higher for males than for females (Figure 8.4). For females, there was little change in rate over the period, while for males a small decrease has been evident since about 2010–11.

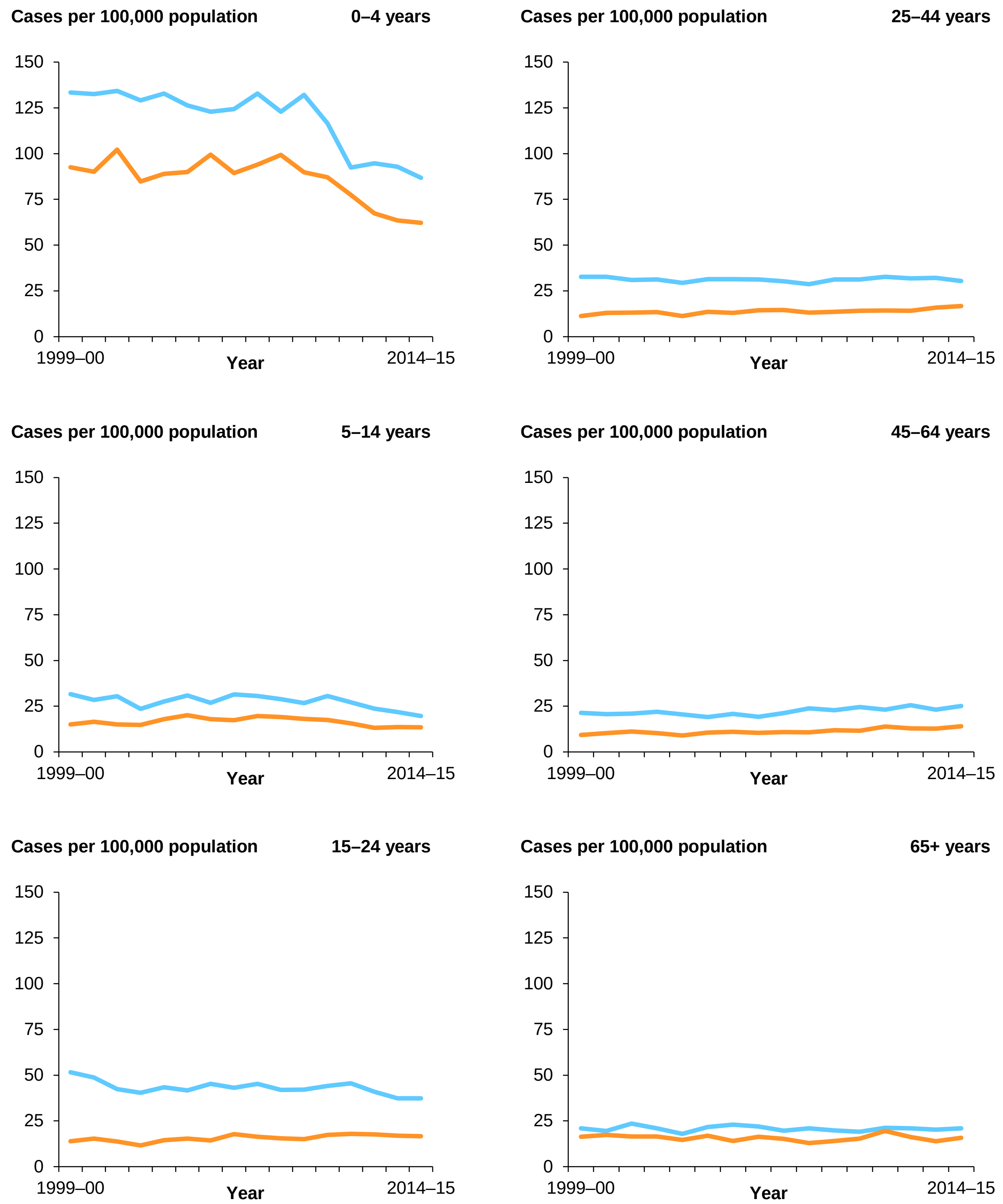



*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 8.

**Figure 8.4: Age-standardised rates of thermal causes of injury, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 8.5. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury report* (AIHW: Pointer 2015).

As can be seen in Figure 8.5, age-specific rates were highest over time in young children aged 0–4, and were marked by a pronounced decline from 2009–10. Rates did not change much for most of the other age groups. Caution should be exercised in interpreting rates in people aged 65 or over, due to small numbers of cases.

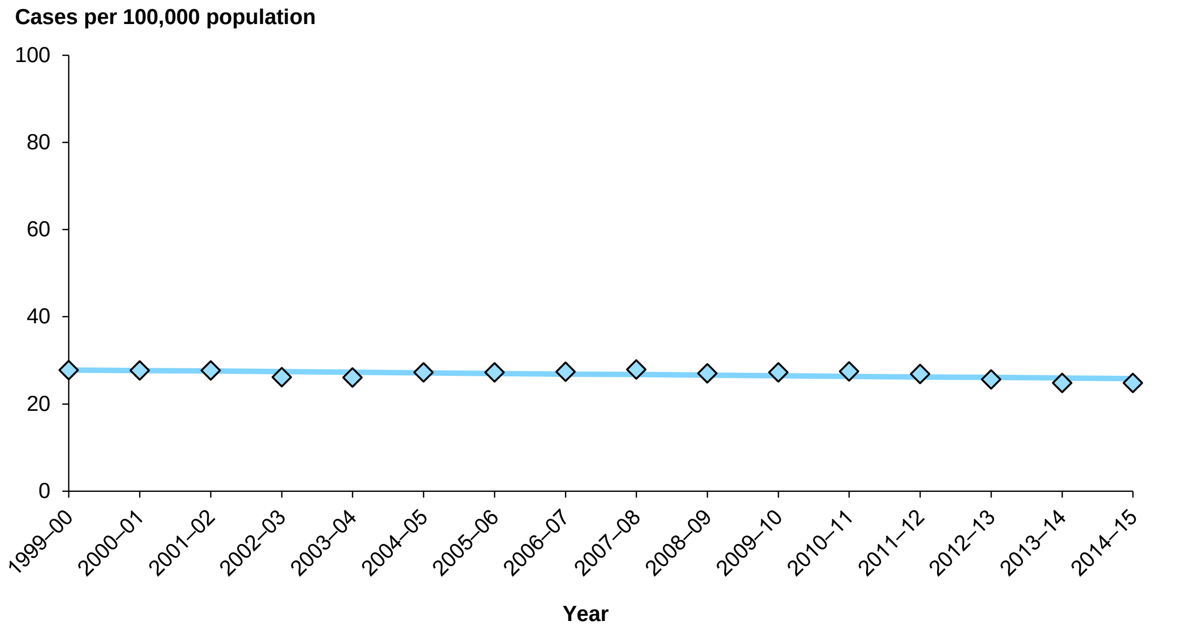



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 8.

**Figure 8.5: Age-specific rates of thermal causes of injury, by age, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of *Thermal causes of injury* decreased from 28 per 100,000 population in 1999–00 to 25 per 100,000 in 2014–15 (Figure 8.6). The decrease averaged 0.5% per year and was statistically significant (95% CI: –0.8%, –0.2%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 8.

**Figure 8.6: Modelled age-standardised rates of thermal causes of injury, Australia, 1999–00 to 2014–15**

# 9 Injury due to exposure to inanimate mechanical forces

This chapter presents information on patients who were admitted to hospital as a result of an injury due to *Exposure to inanimate mechanical forces*. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

The specific causes of inanimate mechanical force injury are listed in Box 9.1 and include events such as being unintentionally struck, crushed and contacted by objects.

**Key findings**

Almost 70,000 cases of hospitalised injury were due to inanimate mechanical forces in 2014–15.

**Sex of patient**

In 2014–15, there were 68,618 cases of injury due to *Exposure to inanimate mechanical forces,* and of these, almost three-quarters (50,036) were male.

**Age of patient**

In 2014–15, the largest number of cases of injury due to *Exposure to inanimate mechanical forces* occurred among 20–24 year-old males (5,483).

**Indigenous status**

Injury cases due to inanimate mechanical forces among Indigenous people made up 14% of all hospitalised injury among Indigenous people, and rates of injury were twice as high among Indigenous females (298 cases per 100,000), compared with other Australian females (152 cases per 100,000).

**Cause of injury**

*Striking against or struck by other objects* accounted for 16% of injuries due to inanimate mechanical forces in 2014–15 followed by *Foreign body or object entering through skin* (13%) and *Foreign body entering into or through eye or natural orifice* (12%).

**Trends in injury**

Injury hospitalisations due to inanimate mechanical forces rose over the period 1999–00 to 2014–15, increasing on average by 0.7% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM range W20–W49 (*Exposure to inanimate mechanical forces*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2 and 9.1. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 9.1: External causes of exposure to inanimate mechanical forces**

This chapter focuses on the injury due to **Exposure to inanimate mechanical forces (W20–X49)** section of ICD-10-AM 'Chapter XX External causes of morbidity and mortality', which contains the following groups:

- Struck by thrown, projected or falling object (W20)
- Striking against or struck by sports equipment (W21)
- Striking against or struck by other objects (W22)
- Caught, crushed, jammed or pinched in or between objects (W23)
- Contact with lifting and transmission devices, not elsewhere classified (W24)
- Contact with sharp glass (W25)
- Contact with knife, sword or dagger (W26)
- Contact with nonpowered hand tool (W27)
- Contact with powered lawnmower (W28)
- Contact with other powered hand tools and household machinery (W29)
- Contact with agricultural machinery (W30)
- Contact with other and unspecified machinery (W31)
- Handgun discharge (W32)
- Discharge from other and unspecified firearms (W34)
- Explosion and rupture of boiler (W35)
- Explosion and rupture of gas cylinder (W36)
- Explosion and rupture of pressurised tyre, pipe or hose (W37)
- Explosion and rupture of other specified pressurised devices (W38)
- Discharge of firework (W39)
- Explosion of other materials (W40)
- Exposure to high-pressure jet (W41)
- Exposure to noise (W42)
- Exposure to vibration (W43)
- Foreign body entering into or through eye or natural orifice (W44)
- Foreign body or object entering through skin (W45)
- Contact with hypodermic needle (W46)
- Exposure to other and unspecified inanimate mechanical forces (W49).

# How many cases of injury due to inanimate mechanical forces were there in 2014–15?

There were an estimated 68,618 cases of injury due to *Exposure to inanimate mechanical forces* during 2014–15. Cases due to inanimate mechanical forces made up 14% of all hospitalised injury cases, the second largest contributor to hospitalised injury in 2014–15 (Figure 9.1).

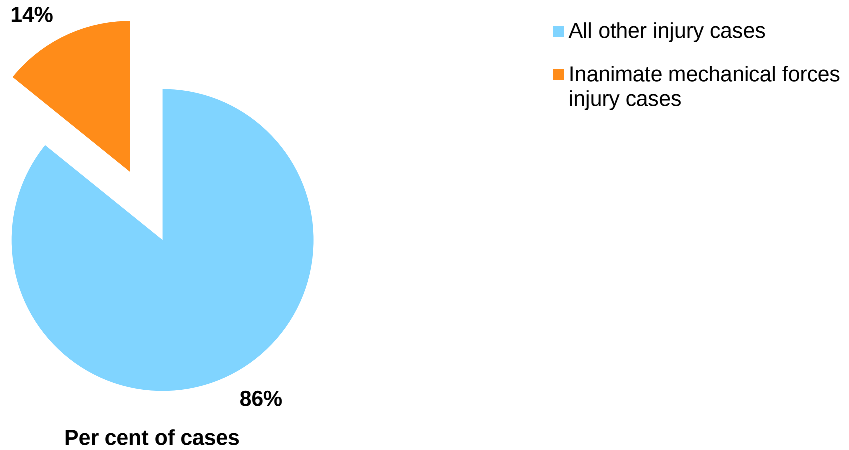
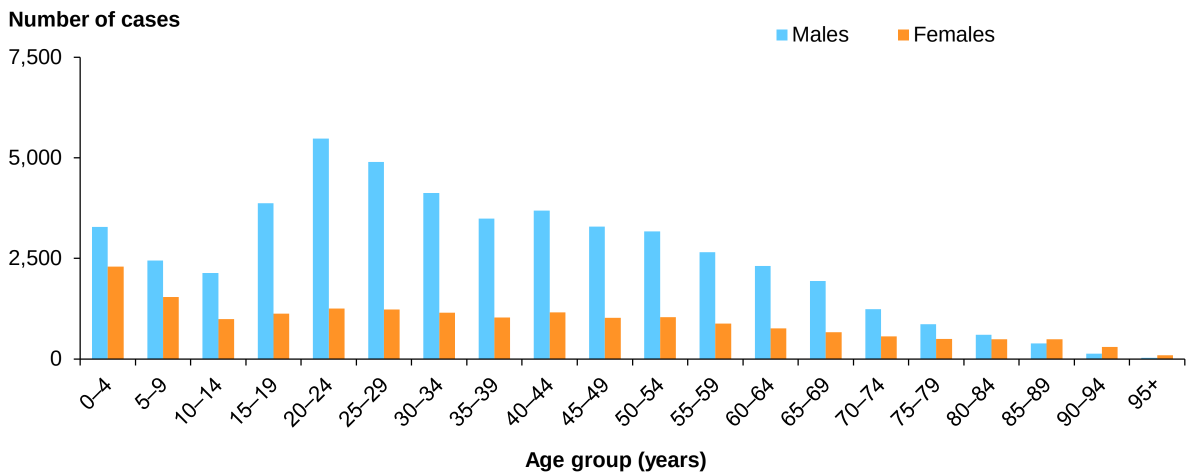



**Figure 9.1: Proportion of injury cases due to exposure to inanimate mechanical forces, Australia, 2014–15**

# Age group and sex, 2014–15

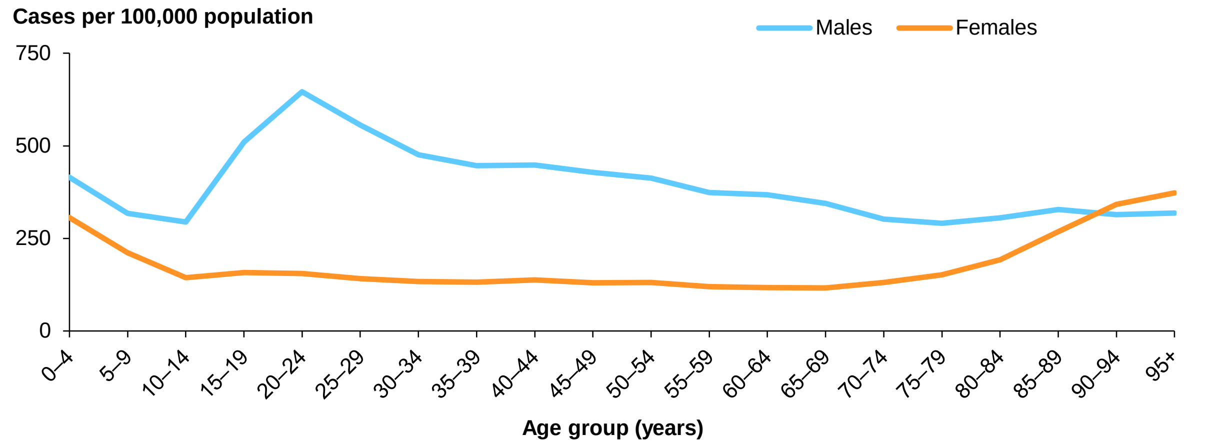
Of the 68,628 cases of injury due to *Exposure to inanimate mechanical forces* in Australia in 2014–15, almost three-quarters were male (50,036). Gender differences, by age, were apparent—with higher numbers of cases occurring at very young ages for females, while cases due to *Exposure to inanimate mechanical forces* among males were higher in successive age groups from early adulthood onwards (Figure 9.2). Among males, the largest number of cases due to *Exposure to inanimate mechanical forces* occurred in the 20–24 age group (5,483).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 9.

**Figure 9.2: Number of cases due to exposure to inanimate mechanical forces, by age group, by sex, Australia, 2014–15**

Age-specific rates of injury due to *Exposure to inanimate mechanical forces* were higher for males than for females, except in the 2 oldest age groups (Figure 9.3). For young children, rates were lower in successive age groups, from an initial high of 416 and 307 cases per 100,000 population for those aged 0–4, to 294 and 144 for those aged 10–14, for boys and girls, respectively. For males, rates of injury due to *Exposure to inanimate mechanical forces* were much higher from the 15–19 age group onwards than those for females, and remained so until the 70–74 age group. By contrast, the rates of injury among females remained low, rising between the 75–79 age group and the 90–94 age group, and then remained steady.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 9.

**Figure 9.3: Age-specific rates of cases due to exposure to inanimate mechanical forces, by age group, by sex, Australia, 2014–15**

# Nature of injury

Injury due to *Exposure to inanimate mechanical forces* resulted in damage to various body regions, with the most common being the *Wrist and hand* (49%) (Table 9.1). Males had a larger proportion of injuries to the *Wrist and hand* (53%). Females also had a high proportion of *Wrist and hand* injuries (39%). The second most common type of injury among females was injuries to *Other, multiple and incompletely specified body regions* (17%), but for males the proportion was much lower (10%).

**Table 9.1: Cases due to inanimate mechanical forces, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 5,415 | 10.8 | 2,646 | 14.2 | 8,061 | 11.7 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 1,507 | 3 | 598 | 3.2 | 2,105 | 3.1 |
| Shoulder and upper limb (excluding wrist and hand) | 3,424 | 6.8 | 985 | 5.3 | 4,409 | 6.4 |
| Wrist and hand | 26,597 | 53.2 | 7,154 | 38.5 | 33,751 | 49.2 |
| Hip and lower limb (excluding ankle and foot) | 3,638 | 7.3 | 1,486 | 8 | 5,124 | 7.5 |
| Ankle and foot | 4,214 | 8.4 | 2,322 | 12.5 | 6,536 | 9.5 |
| Other, multiple and incompletely specified body regions | 4,882 | 9.8 | 3,217 | 17.3 | 8,100 | 11.8 |
| Injuries not described in terms of body region | 359 | 0.7 | 173 | 0.9 | 532 | 0.8 |
| **Total** | **50,036** | **100** | **18,581** | **100** | **68,618** | **100** |

*Open wounds* were the most common type of injury due to *Exposure to inanimate mechanical forces*, with 21,426 cases in 2014–15 (Table 9.2). Males and females had a similar pattern of type of injury, with *Open wounds,* followed by *Fractures,* common for both.

**Table 9.2: Cases due to inanimate mechanical forces, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 10,510 | 21.0 | 3,018 | 16.2 | 13,528 | 19.7 |
| Dislocation | 437 | 0.9 | 129 | 0.7 | 566 | 0.8 |
| Soft-tissue injury | 7,014 | 14.0 | 1,787 | 9.6 | 8,801 | 12.8 |
| Open wound | 15,533 | 31.0 | 5,893 | 31.7 | 21,426 | 31.2 |
| Intracranial injury | 621 | 1.2 | 332 | 1.8 | 953 | 1.4 |
| Internal organ or vessel of trunk | 291 | 0.6 | 94 | 0.5 | 385 | 0.6 |
| Burn | 262 | 0.5 | 83 | 0.4 | 345 | 0.5 |
| Superficial injury | 1,983 | 4.0 | 1,248 | 6.7 | 3,231 | 4.7 |
| Poisoning or toxic effect | 3 | 0 | 4 | 0 | 7 | 0 |
| Other and unspecified injuries | 13,382 | 26.8 | 5,993 | 32.3 | 19,376 | 28.2 |
| **Total** | **50,036** | **100** | **18,581** | **100** | **68,618** | **100** |

# Remoteness of usual residence

The age-standardised rate of injury due to *Exposure to inanimate mechanical forces* in 2014–15 varied according to remoteness of usual residence (Table 9.3). The highest rates were in *Remote* and *Very remote* areas (421 and 462 per 100,000 population, respectively).

**Table 9.3: Cases due to inanimate mechanical forces, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Cases due to inanimate mechanical forces | 44,835 | 13,760 | 6,872 | 1,339 | 957 |
| Age-standardised rate/100,000 population | 267.3 | 332.1 | 338.9 | 420.9 | 462.3 |

# Aboriginal and Torres Strait Islander people

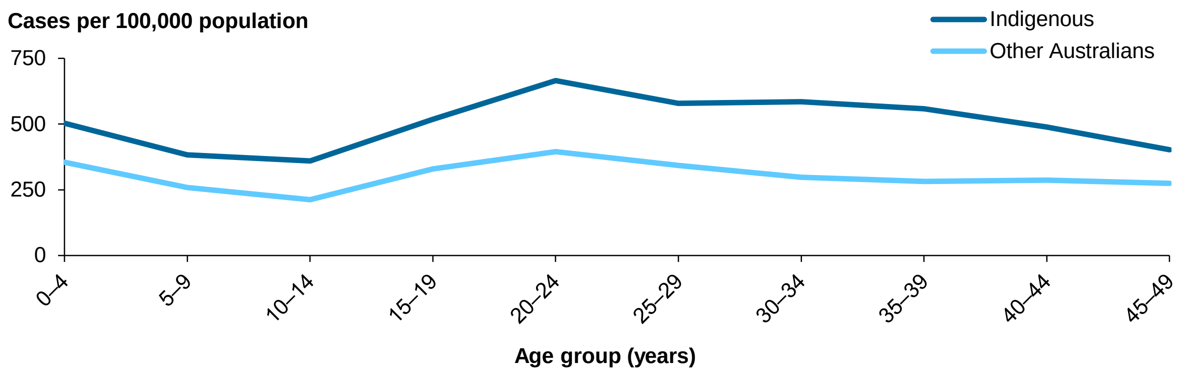
There were an estimated 3,406 cases of Indigenous people hospitalised as a result of injury due to *Exposure to inanimate mechanical forces* in 2014–15 (Table 9.4). *Injury due to inanimate mechanical forces* among Indigenous people comprised the same proportion of all injury cases as for other Australians (14%).

The age-standardised rate of injury due to *Exposure to inanimate mechanical forces* among Indigenous people was higher than that for other Australians, for males as well as for females. For Indigenous females, the rate was almost twice that of their *Other Australian* counterparts.

**Table 9.4: Cases due to inanimate mechanical forces, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Cases due to inanimate mechanical forces | 2,266 | 1,140 | 3,406 | 47,770 | 17,441 | 65,212 |
| Age-standardised rate/100,000 population | 588.1 | 297.8 | 442.1 | 419.6 | 151.5 | 285.9 |

Due to the small case numbers of injury due to *Exposure to inanimate mechanical forces* among Indigenous people over the age of 50, analyses were restricted by age and limited to *All Indigenous people*. Age-specific rates of injury due to *Exposure to inanimate mechanical forces* were higher at all age groups for Indigenous people, compared with other Australians, however the pattern was similar regardless of Indigenous status (Figure 9.4).




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 9.

**Figure 9.4: Age-specific rates due to exposure to inanimate mechanical forces , by Indigenous status, by age group, Australia, 2014–15**

# Socioeconomic status

The proportion of cases of injury due to *Exposure to inanimate mechanical forces* in each SES group ranged between 16% and 23% (Table 9.5). The highest proportions, for both males and females, were for people living in areas with the lowest (most disadvantaged) SES classification.

**Table 9.5: Cases due to inanimate mechanical forces, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 11,538 | 23.1 | 4,285 | 23.1 | 15,823 | 23.1 |
| 2 | 10,541 | 21.1 | 3,594 | 19.3 | 14,135 | 20.6 |
| 3 | 10,178 | 20.3 | 3,591 | 19.3 | 13,769 | 20.1 |
| 4 | 9,002 | 18.0 | 3,397 | 18.3 | 12,399 | 18.1 |
| 5–Highest | 8,124 | 16.2 | 3,501 | 18.8 | 11,625 | 16.9 |
| **Total**[(a)] | **50,036** | **100** | **18,581** | **100** | **68,618** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of injury due to inanimate mechanical forces

*Striking against or struck by other objects* accounted for 16% of *Injuries due to inanimate mechanical forces* in 2014–15 (Table 9.6). The next 2 most commonly reported causes were *Foreign body or object entering through skin* and *Foreign body entering into or through eye or natural orifice*, accounting for 13% and 12% of cases, respectively.

Notable differences between males and females with respect to the causes of injury due to inanimate mechanical forces include *Foreign body entering into or through eye or natural orifice* (males 9%, females 17%) and *Contact with other powered hand tools and household machinery* (males 11%, females 3%)**.**

**Table 9.6: External causes of cases due to inanimate mechanical forces, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **Count** | **%** | **Count** | **%** | **Count** | **%** |
| Striking against or struck by other objects | 7,211 | 14.4 | 3,512 | 18.9 | 10,723 | 15.6 |
| Foreign body or object entering through skin | 6,466 | 12.9 | 2,265 | 12.2 | 8,731 | 12.7 |
| Foreign body entering into or through eye or natural orifice | 4,706 | 9.4 | 3,206 | 17.3 | 7,913 | 11.5 |
| Caught, crushed, jammed or pinched in or between objects | 4,478 | 8.9 | 2,082 | 11.2 | 6,560 | 9.6 |
| Contact with other powered hand tools and household machinery | 5,581 | 11.2 | 464 | 2.5 | 6,045 | 8.8 |
| Contact with sharp glass | 4,001 | 8 | 1,962 | 10.6 | 5,963 | 8.7 |
| Struck by thrown, projected or falling object | 3,883 | 7.8 | 1,291 | 6.9 | 5,174 | 7.5 |
| Contact with knife, sword or dagger | 3,306 | 6.6 | 1,536 | 8.3 | 4,842 | 7.1 |
| Contact with other and unspecified machinery | 3,671 | 7.3 | 383 | 2.1 | 4,054 | 5.9 |
| Striking against or struck by sports equipment | 2,828 | 5.7 | 883 | 4.8 | 3,711 | 5.4 |
| Contact with nonpowered hand tool | 1,837 | 3.7 | 513 | 2.8 | 2,350 | 3.4 |
| Contact with powered lawnmower | 554 | 1.1 | 166 | 0.9 | 720 | 1 |
| Contact with lifting and transmission devices, not elsewhere classified | 545 | 1.1 | 77 | 0.4 | 622 | 0.9 |
| Contact with agricultural machinery | 273 | 0.5 | 32 | 0.2 | 305 | 0.4 |
| Explosion of other materials | 150 | 0.3 | 38 | 0.2 | 188 | 0.3 |
| Contact with hypodermic needle | 138 | 0.3 | 87 | 0.5 | 225 | 0.3 |
| Discharge from other and unspecified firearms | 108 | 0.2 | 8 | 0 | 116 | 0.2 |
| Explosion and rupture of gas cylinder | 104 | 0.2 | 34 | 0.2 | 138 | 0.2 |
| Explosion and rupture of pressurised tyre, pipe or hose | 35 | 0.1 | 3 | 0 | 38 | 0.1 |
| Discharge of firework | 39 | 0.1 | 3 | 0 | 42 | 0.1 |
| Exposure to other and unspecified inanimate mechanical forces | 69 | 0.1 | 26 | 0.1 | 95 | 0.1 |
| Handgun discharge | 6 | 0 | 0 | 0 | 6 | 0 |
| Explosion and rupture of boiler | 1 | 0 | 0 | 0 | 1 | 0 |
| Explosion and rupture of other specified pressurised devices | 24 | 0 | 9 | 0 | 33 | 0 |
| Exposure to high-pressure jet | 17 | 0 | 0 | 0 | 17 | 0 |
| Exposure to noise | 1 | 0 | 1 | 0 | 2 | 0 |
| Exposure to vibration | 4 | 0 | 0 | 0 | 4 | 0 |
| **Total** | **50,036** | **100** | **18,581** | **100** | **68,618** | **100** |

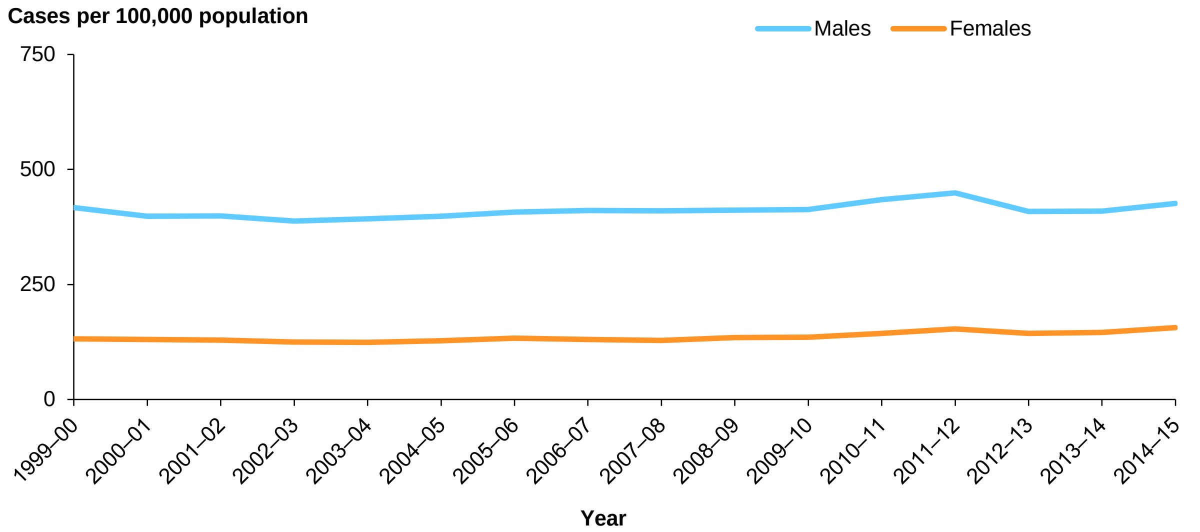
External causes of injury due to *Exposure to inanimate mechanical forces* varied by age. The rate of injuries was highest among males aged 20–24 and the top 10 causes are shown in Table 9.7. As for the group as a whole, the most common cause of injury due to *Exposure to inanimate mechanical forces* among males aged 20–24 was *Striking against or struck by other objects* (16%). Unfortunately, the ICD-10-AM offers no further detail on these cases other than providing the example of 'walked into wall'. The second most common cause was *Contact with glass* (14%), and while some further specification was available, 32% of these cases were coded to *Contact with unspecified sharp glass* (238 cases). A further 24% of *Contact with glass* cases were caused by *Contact with glass skylight and glass roof panels* (178 cases) and 143 cases were due to *Contact with mirror*.

**Table 9.7: Top 10 external causes of cases due to inanimate mechanical forces, 20–24 year-old males, Australia, 2014–15**

| External cause | Number | % |
|---|---|---|
| Striking against or struck by other objects | 886 | 16.2 |
| Contact with sharp glass | 748 | 13.6 |
| Foreign body or object entering through skin | 732 | 13.4 |
| Contact with knife, sword or dagger | 582 | 10.6 |
| Contact with other powered hand tools and household machinery | 547 | 10.0 |
| Contact with other and unspecified machinery | 417 | 7.6 |
| Caught, crushed, jammed or pinched in or between objects | 347 | 6.3 |
| Struck by thrown, projected or falling object | 334 | 6.1 |
| Striking against or struck by sports equipment | 331 | 6.0 |
| Contact with nonpowered hand tool | 190 | 3.5 |
| All other causes | 369 | 6.9 |
| **Total** | **5,483** | **100** |

# How have cases due to inanimate mechanical forces changed over time?

Age-standardised rates for males were consistently higher than for females at all times throughout the period (Figure 9.5). There is no evidence any substantial change in cases due to inanimate mechanical forces rates for either sex over the period.



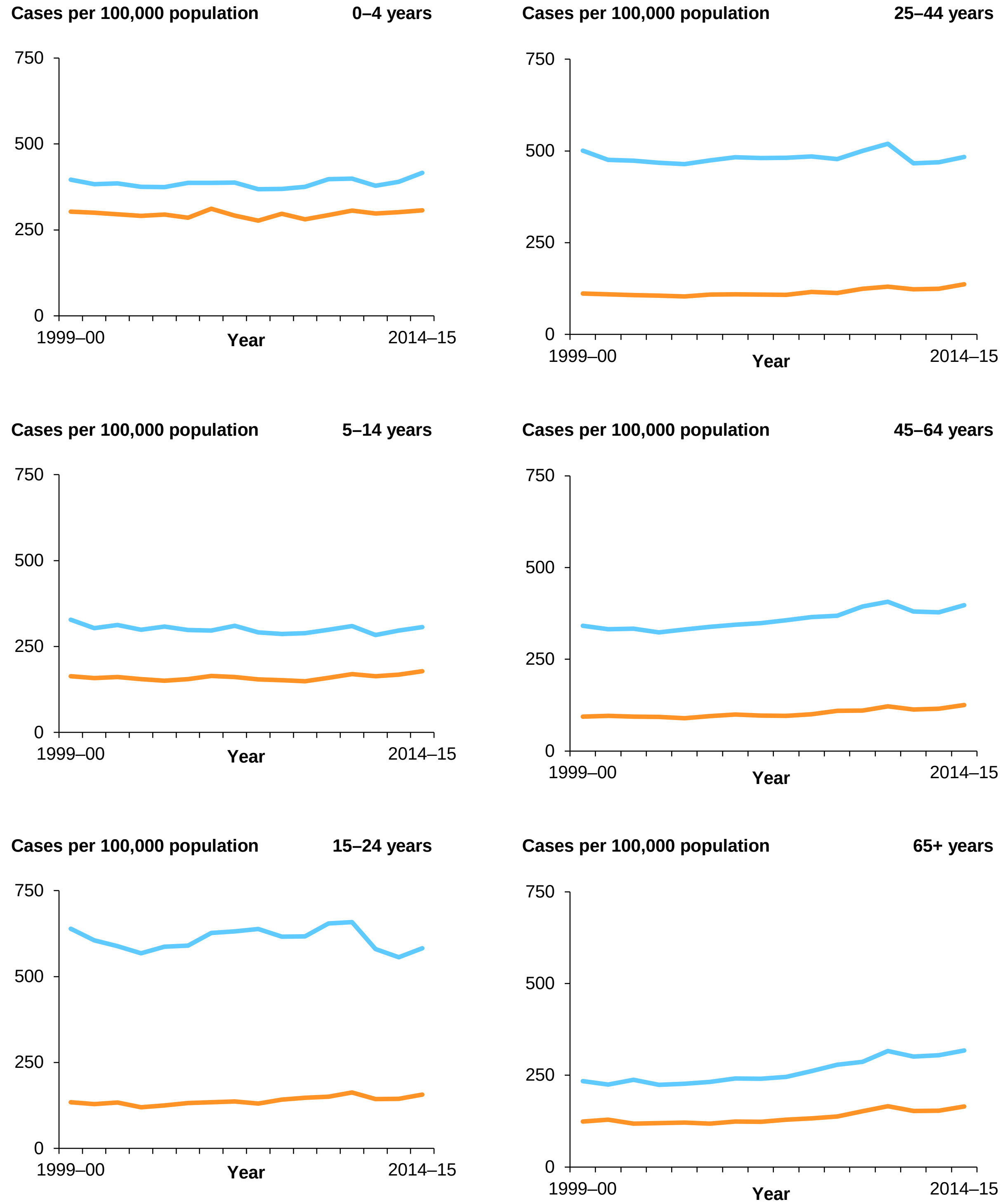

*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 9.

**Figure 9.5: Age-standardised rates of cases due to exposure to inanimate mechanical forces, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 9.6. Age-specific rates were higher among males in every age group, compared with females, over the period. There appeared to be little change over time in the 2 youngest age groups with rates of injury due to *Exposure to inanimate mechanical forces* remaining steady for boys and girls over the period.

In contrast to the steady rate of injury among younger children, rates of injury due to inanimate mechanical forces appeared to increase among the 2 oldest age groups, particularly among males. For example, the rate of injury among males aged 65 or older in 1999–00 was 234 cases per 100,000 and in 2014–15 it had reached 317.

In the 2 intervening age groups, 15–24 and 25–44, there was more variability in rates over time among males—more so in the younger group.

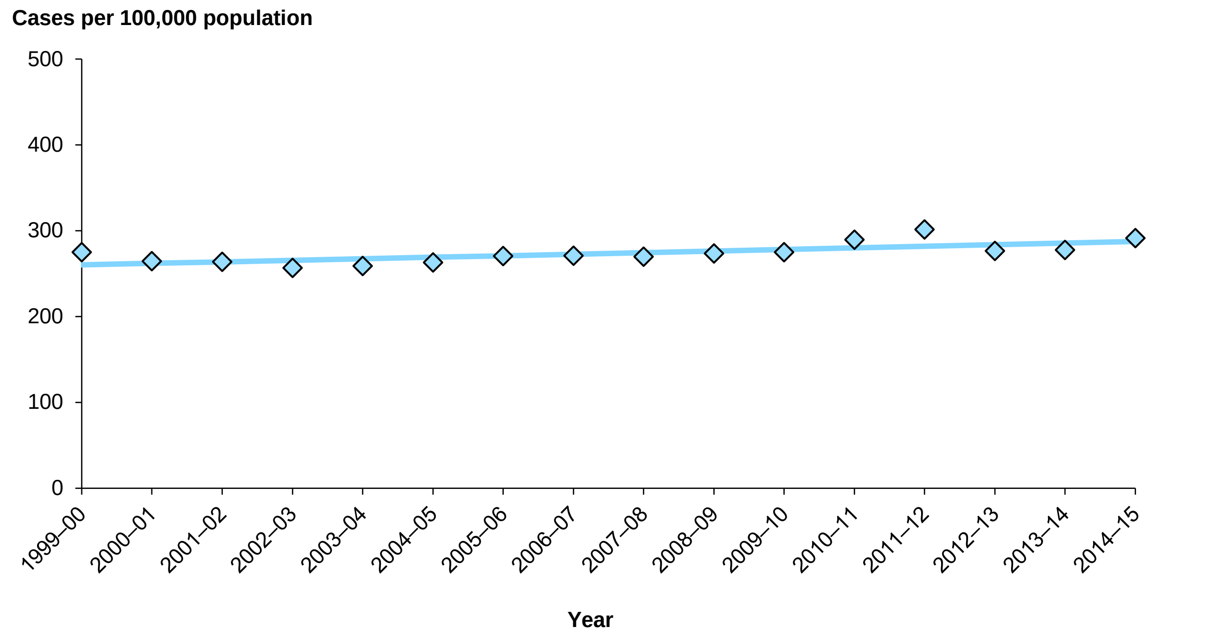



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 9.

**Figure 9.6: Age-specific rates of cases due to exposure to inanimate mechanical forces, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of injury due to inanimate mechanical forces increased from 275 per 100,000 population in 1999–00 to 292 per 100,000 in 2014–15 (Figure 9.7). The increase averaged 0.7% per year and was statistically significant (95% CI: 0.4%, 1.0%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 9.

**Figure 9.7: Modelled age-standardised rates of injury due to exposure to inanimate mechanical forces, Australia, 1999–00 to 2014–15**

# 10 Injury due to exposure to animate mechanical forces

This chapter presents information on patients who were admitted to hospital as a result of an injury due to *Exposure to animate mechanical forces*. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

The specific causes of *Exposure to animate mechanical forces* injury are listed in Box 10.1 and include events such as being unintentionally hit, crushed, contacted and bitten by people and animals.

**Key findings**

About 20,000 cases of hospitalised injury were due to *Exposure to animate mechanical forces* in 2014–15.

**Sex of patient**

In 2014–15, there were 20,156 cases of injury due to *Exposure to animate mechanical forces* and of these, one-third (13,107) were male.

**Age of patient**

In 2014–15, the largest number of cases due to *Exposure to animate mechanical forces* occurred among males aged 15–19 (1,953).

**Indigenous status**

Age-standardised rates of injury due to *Exposure to animate mechanical forces* were twice as high among Indigenous people compared with other Australians.

**Cause of injury**

Unintentionally being *Hit, struck, kicked, twisted, bitten or scratched by another person* accounted for 32% of injuries due to *Exposure to animate mechanical forces* in 2014–15.

**Trends in injury**

Injury hospitalisations due to *Exposure to animate mechanical forces* rose over the period 1999–00 to 2014–15, increasing on average by 2.9% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM range W50–W64 (*Exposure to animate mechanical forces*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2 and 10.1. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 10.1: External causes of exposure to animate mechanical forces**

This chapter focuses on the injury due to the **Exposure to animate mechanical forces (W50–X64)** section of ICD-10-AM 'Chapter XX External causes of morbidity and mortality', which contains the following groups:

- Hit, struck, kicked, twisted, bitten or scratched by another person (W50)
- Striking against or bumped into by another person (W51)
- Crushed, pushed or stepped on by crowd or human stampede (W52)
- Bitten by rat (W53)
- Bitten or struck by dog (W54)
- Bitten or struck by other mammals (W55)
- Contact with marine animal (W56)
- Bitten or stung by nonvenomous insect and other nonvenomous arthropods (W57)
- Bitten or struck by crocodile or alligator (W58)
- Bitten or crushed by other reptiles (W59)
- Contact with plant thorns and spines and sharp leaves (W60)
- Contact with bird (W61)
- Exposure to other and unspecified animate mechanical forces (W64).

## How many cases of injury due to exposure to animate mechanical forces were there in 2014–15?

There were an estimated 20,156 cases due to *Exposure to animate mechanical forces* during 2014–15. Cases due to *Exposure to animate mechanical forces* made up 4% of all hospitalised injury cases in 2014–15 (Figure 10.1).

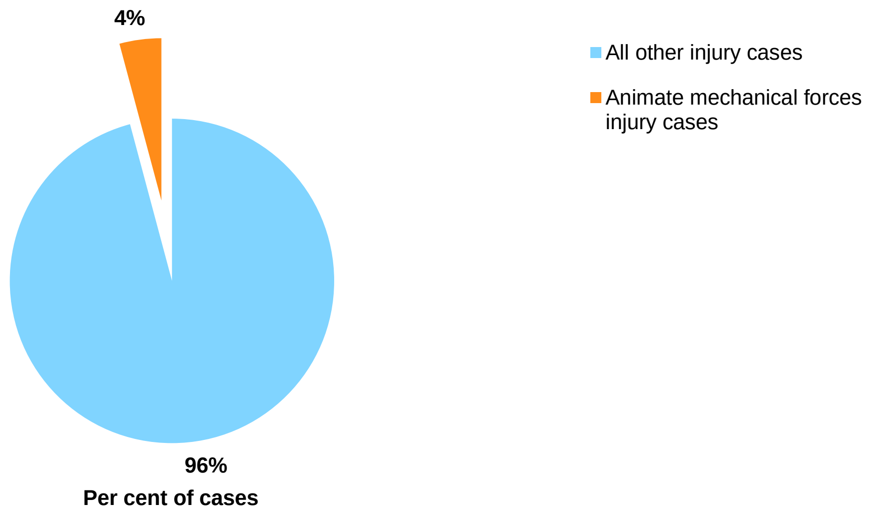
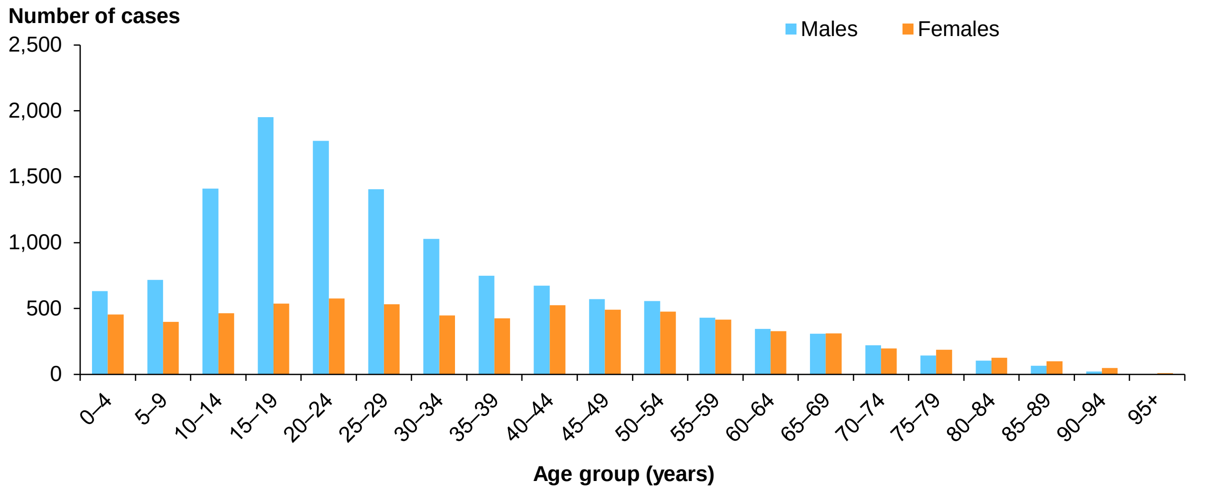



**Figure 10.1: Proportion of injury cases due to exposure to animate mechanical forces, Australia, 2014–15**

## Age group and sex, 2014–15

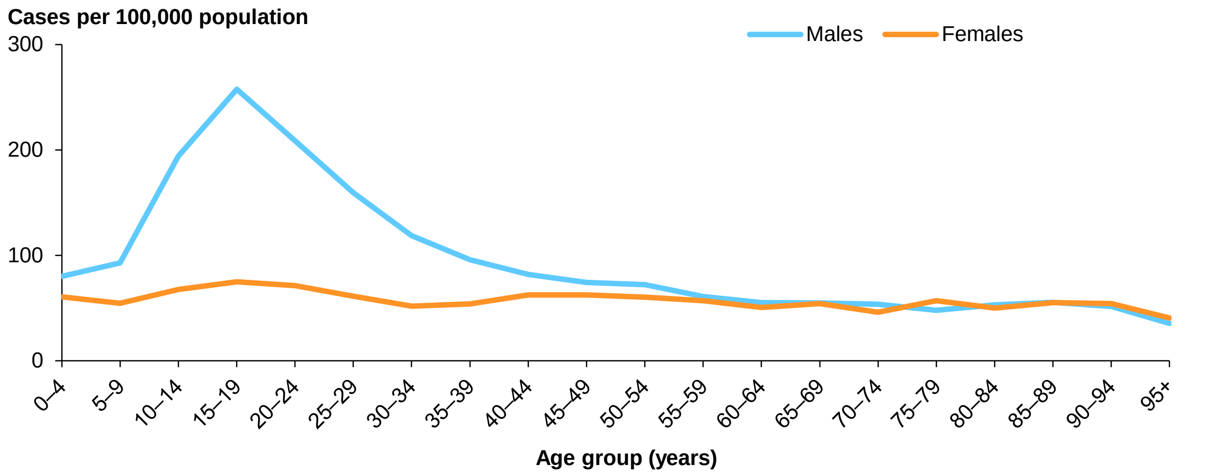
Of the 20,156 cases of injury due to *Exposure to animate mechanical forces* in Australia in 2014–15, two-thirds were male (13,107). Gender differences by age were apparent, particularly for males, where high numbers of cases were seen in age groups 10–29 (Figure 10.2). Cases among males were highest for the 15–19 age group (1,953); by contrast, for females in the same age group, there were only 538 cases. The number of cases in each age group for females varied.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 10.

**Figure 10.2: Number of cases due to exposure to animate mechanical forces, by age group, by sex, Australia, 2014–15**

Age-specific rates of injury due to *Exposure to animate mechanical forces* were higher for males than for females, up to the 55–59 age group (Figure 10.3). The greatest difference in rates between males and females occurred in the 15–19 age group, where the rate of injury due to *Exposure to animate mechanical forces* for males was 258 cases per 100,000 population compared with 75 for females.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 10.

**Figure 10.3: Age-specific rates of cases due to exposure to animate mechanical forces, by age group, by sex, Australia, 2014–15**

# Nature of injury

Injuries due to *Exposure to animate mechanical forces* resulted in damage to various body regions, with the most common being the *Head and neck* (28%) and the *Wrist and hand* (27%) (Table 10.1). Males had a larger proportion of injuries to the *Head and neck* (31%). By contrast, females had a high proportion of *Wrist and hand* injuries (30%). Injuries to the *Hip and lower limb* and were also common for both males and females.

**Table 10.1: Cases due to exposure to animate mechanical forces, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 4,047 | 30.9 | 1,557 | 22.1 | 5,604 | 27.8 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 1,083 | 8.3 | 524 | 7.4 | 1,607 | 8 |
| Shoulder and upper limb (excluding wrist and hand) | 1,527 | 11.7 | 814 | 11.5 | 2,341 | 11.6 |
| Wrist and hand | 3,255 | 24.8 | 2,144 | 30.4 | 5,399 | 26.8 |
| Hip and lower limb (excluding ankle and foot) | 2,109 | 16.1 | 1,143 | 16.2 | 3,252 | 16.1 |
| Ankle and foot | 846 | 6.5 | 683 | 9.7 | 1,529 | 7.6 |
| Other, multiple and incompletely specified body regions | 114 | 0.9 | 75 | 1.1 | 189 | 0.9 |
| Injuries not described in terms of body region | 126 | 1 | 109 | 1.5 | 235 | 1.2 |
| **Total** | **13,107** | **100** | **7,049** | **100** | **20,156** | **100** |

Open wounds were the most common type of injury due to *Exposure to animate mechanical forces*, accounting for 39% of cases in 2014–15 (Table 10.2). *Open wounds* were far more common among females, with almost half of all cases (49%) resulting in an open wound. Among males, *Fractures* (33%) and *Open wounds* (33%) were equally likely to result from an injury due to animate mechanical forces.

**Table 10.2: Cases due to exposure to animate mechanical forces, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 4,340 | 33.1 | 1,453 | 20.6 | 5,793 | 28.7 |
| Dislocation | 293 | 2.2 | 81 | 1.1 | 374 | 1.9 |
| Soft-tissue injury | 779 | 5.9 | 404 | 5.7 | 1,183 | 5.9 |
| Open wound | 4,282 | 32.7 | 3,471 | 49.2 | 7,753 | 38.5 |
| Intracranial injury | 842 | 6.4 | 213 | 3 | 1,055 | 5.2 |
| Internal organ or vessel of trunk | 302 | 2.3 | 59 | 0.8 | 361 | 1.8 |
| Burn | 960 | 7.3 | 680 | 9.6 | 1,640 | 8.1 |
| Superficial injury | 13 | 0.1 | 15 | 0.2 | 28 | 0.1 |
| Poisoning or toxic effect | 554 | 4.2 | 318 | 4.5 | 872 | 4.3 |
| Other and unspecified injuries | 742 | 5.7 | 355 | 5 | 1,097 | 5.4 |
| **Total** | **13,107** | **100** | **7,049** | **100** | **20,156** | **100** |

## Remoteness of usual residence

The age-standardised rate of injury due to *Exposure to animate mechanical forces* in 2014–15 varied according to remoteness of usual residence (Table 10.3). The highest rates were in *Remote* and *Very remote* areas (177 and 228 per 100,000 population, respectively).

**Table 10.3: Cases due to exposure animate mechanical forces, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Cases due to animate mechanical forces | 11,763 | 4,635 | 2,505 | 554 | 475 |
| Age-standardised rate/100,000 population | 71.5 | 113.7 | 126.0 | 176.6 | 227.9 |

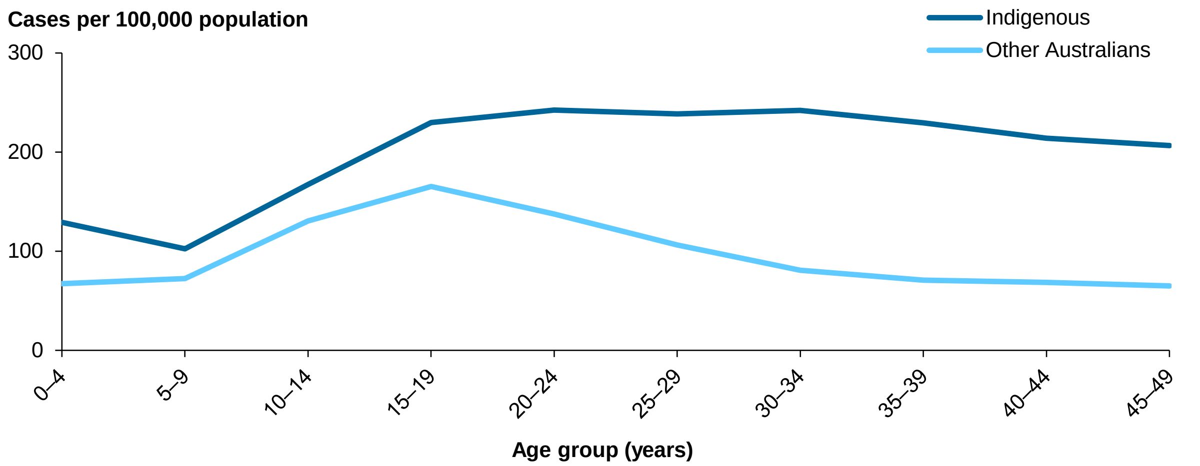
## Aboriginal and Torres Strait Islander people

There were an estimated 1,292 cases of Indigenous people hospitalised as a result of injury due to *Exposure to animate mechanical forces* in 2014–15 (Table 10.4). The proportion of injury cases due to animate mechanical forces among Indigenous people was slightly higher (6%), compared with other Australians (4%). Age-standardised rates of injury due to *Exposure to animate mechanical forces* were twice as high among Indigenous people compared with other Australians, both for Indigenous males and for Indigenous females.

**Table 10.4: Cases due to exposure to animate mechanical forces, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Cases due to animate mechanical forces | 899 | 393 | 1,292 | 12,208 | 6,656 | 18,864 |
| Age-standardised rate/100,000 population | 238.6 | 110.2 | 173.3 | 109.7 | 58.3 | 84.5 |

Due to the small case numbers of injury due to *Exposure to animate mechanical forces* among Indigenous people over the age of 50, analyses were restricted by age and limited to *All Indigenous people*. Age-specific rates of injury due to *Exposure to animate mechanical forces* were higher at all age groups for Indigenous people, compared with other Australians (Figure 10.4). The gap in rates of injury due to *Exposure to animate mechanical forces* between Indigenous and other Australians widened from the 15–19 age group onwards. The rate ratio (3.0) between Indigenous and other Australians was greatest in the 30–34 age group.




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 10.

**Figure 10.4: Age-specific rates of injury due to exposure to animate mechanical forces, by Indigenous status, by age group, Australia, 2014–15**

# Socioeconomic status

The proportion of cases of injury due to *Exposure to animate mechanical forces* in each SES group ranged between 16% and 22% (Table 10.5). The highest proportion, for both males and females, were for people living in areas with the lowest (most disadvantaged) SES classification.

**Table 10.5: Cases due to exposure to animate mechanical forces, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 2,878 | 22.0 | 1,590 | 22.6 | 4,468 | 22.2 |
| 2 | 2,782 | 21.2 | 1,480 | 21.0 | 4,262 | 21.1 |
| 3 | 2,727 | 20.8 | 1,557 | 22.1 | 4,284 | 21.3 |
| 4 | 2,411 | 18.4 | 1,243 | 17.6 | 3,654 | 18.1 |
| 5–Highest | 2,157 | 16.5 | 1,101 | 15.6 | 3,258 | 16.2 |
| **Total**[(a)] | **13,107** | **100** | **7,049** | **100** | **20,156** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of injury due to exposure to animate mechanical forces

*Hit, struck, kicked, twisted, bitten or scratched by another person* accounted for 32% of injuries due to *Exposure to animate mechanical forces* in 2014–15 (Table 10.6). The next 2 most commonly reported causes were *Bitten or struck by dog* and *Bitten or struck by other mammals*, accounting for 22% and 17% of cases, respectively.

Notable differences between males and females with respect to the causes of injury due to *Exposure to animate mechanical forces* include *Hit, struck, kicked, twisted, bitten or* *scratched by another person* (males 40%, females 16%) and *Bitten or struck by dog* (males 18%, females 31%). Being bitten or struck by a dog or other mammals accounted for over half of all injuries due to *Exposure to animate mechanical forces* among females. By contrast, half of all males with injuries due to *Exposure to animate mechanical forces* were injured as a result of contact with other people.

**Table 10.6: External causes of cases due to exposure to animate mechanical forces, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **Count** | **%** | **Count** | **%** | **Count** | **%** |
| Hit, struck, kicked, twisted, bitten or scratched by another person | 5,210 | 39.7 | 1,138 | 16.1 | 6,348 | 31.5 |
| Bitten or struck by dog | 2,328 | 17.8 | 2,196 | 31.2 | 4,524 | 22.4 |
| Bitten or struck by other mammals | 1,496 | 11.4 | 1,855 | 26.3 | 3,351 | 16.6 |
| Striking against or bumped into by another person | 1,847 | 14.1 | 498 | 7.1 | 2,345 | 11.6 |
| Bitten or crushed by other reptiles | 1,005 | 7.7 | 602 | 8.5 | 1,607 | 8 |
| Bitten or stung by nonvenomous insect and other nonvenomous arthropods | 546 | 4.2 | 432 | 6.1 | 978 | 4.9 |
| Contact with plant thorns and spines and sharp leaves | 255 | 1.9 | 126 | 1.8 | 381 | 1.9 |
| Exposure to other and unspecified animate mechanical forces | 104 | 0.8 | 108 | 1.5 | 212 | 1.1 |
| Contact with marine animal | 170 | 1.3 | 36 | 0.5 | 206 | 1 |
| Crushed, pushed or stepped on by crowd or human stampede | 111 | 0.8 | 31 | 0.4 | 142 | 0.7 |
| Contact with bird | 22 | 0.2 | 20 | 0.3 | 42 | 0.2 |
| Bitten or struck by crocodile or alligator | 12 | 0.1 | 0 | 0 | 12 | 0.1 |
| Bitten by rat | 1 | 0 | 7 | 0.1 | 8 | 0 |
| **Total** | **13,107** | **100** | **7,049** | **100** | **20,156** | **100** |

For all people, the top 4 causes of injury due to *Exposure to animate mechanical forces* accounted for 82% of cases. Two of these causes were human in origin (*Hit, struck, kicked, twisted, bitten or scratched by another person* and *Striking against or bumped into by another person)*, and 2 are animal in origin (*Bitten or struck by dog* and *Bitten or struck by other mammals*).

When examined by 6 broad age groups, the overall proportion that these 4 causes account for ranged from 72% for those aged 0–4 to 89% in those aged 15–24. In addition, the pattern of external causes of human or of animal origin varied by age group (Figure 10.5). For example, about half of all injury cases due to *Exposure to animate mechanical forces* in those aged 0–4 were animal in origin; 42% were caused by being *Bitten or struck by a dog*, and 10% were caused by being *Bitten or struck by other mammals*. The proportion of animal-origin injuries decreased in the middle age groups, before rising again in older age groups. By contrast, human-origin injuries were prominent in the 3 age groups from 5–14. Among those aged 15–24, 67% of injury cases had a human origin: 53% were *Hit, struck, kicked, twisted, bitten or scratched by another person* and 16% due to *Striking against or bumped into by another person*.

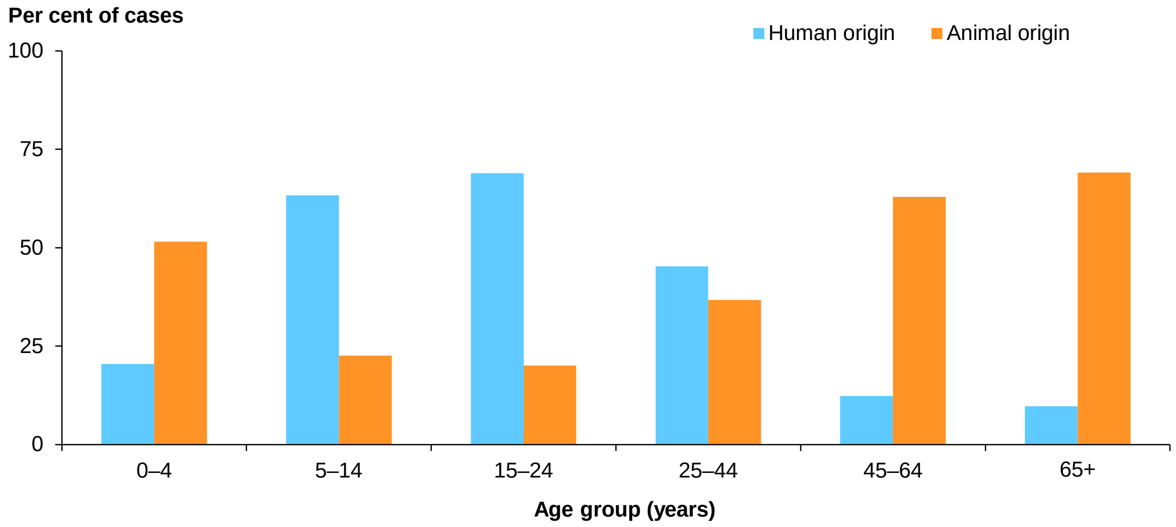
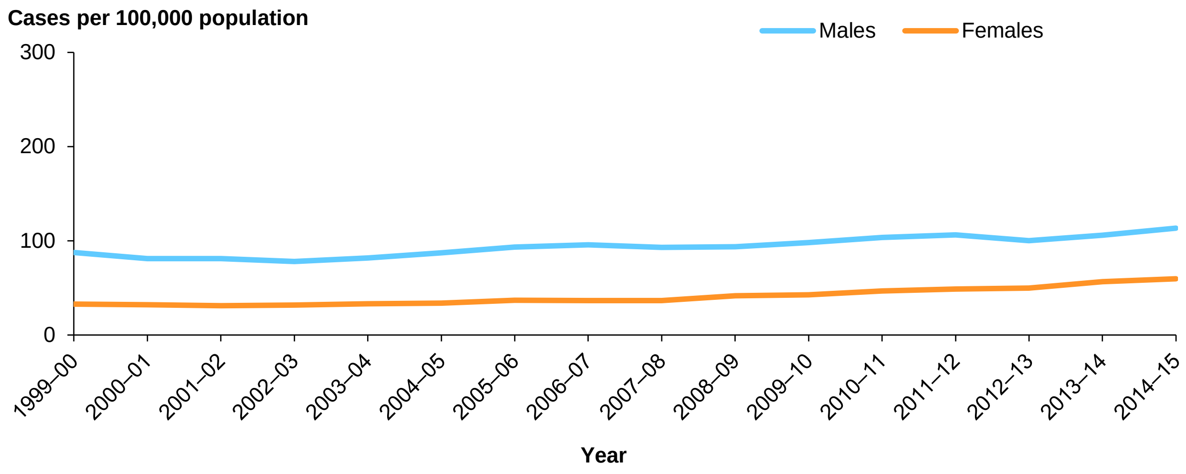



**Figure 10.5: Proportion of selected causes of injury due to exposure to animate mechanical forces cases, by age group, Australia, 2014–15**

# How have cases due to exposure to animate mechanical forces changed over time?

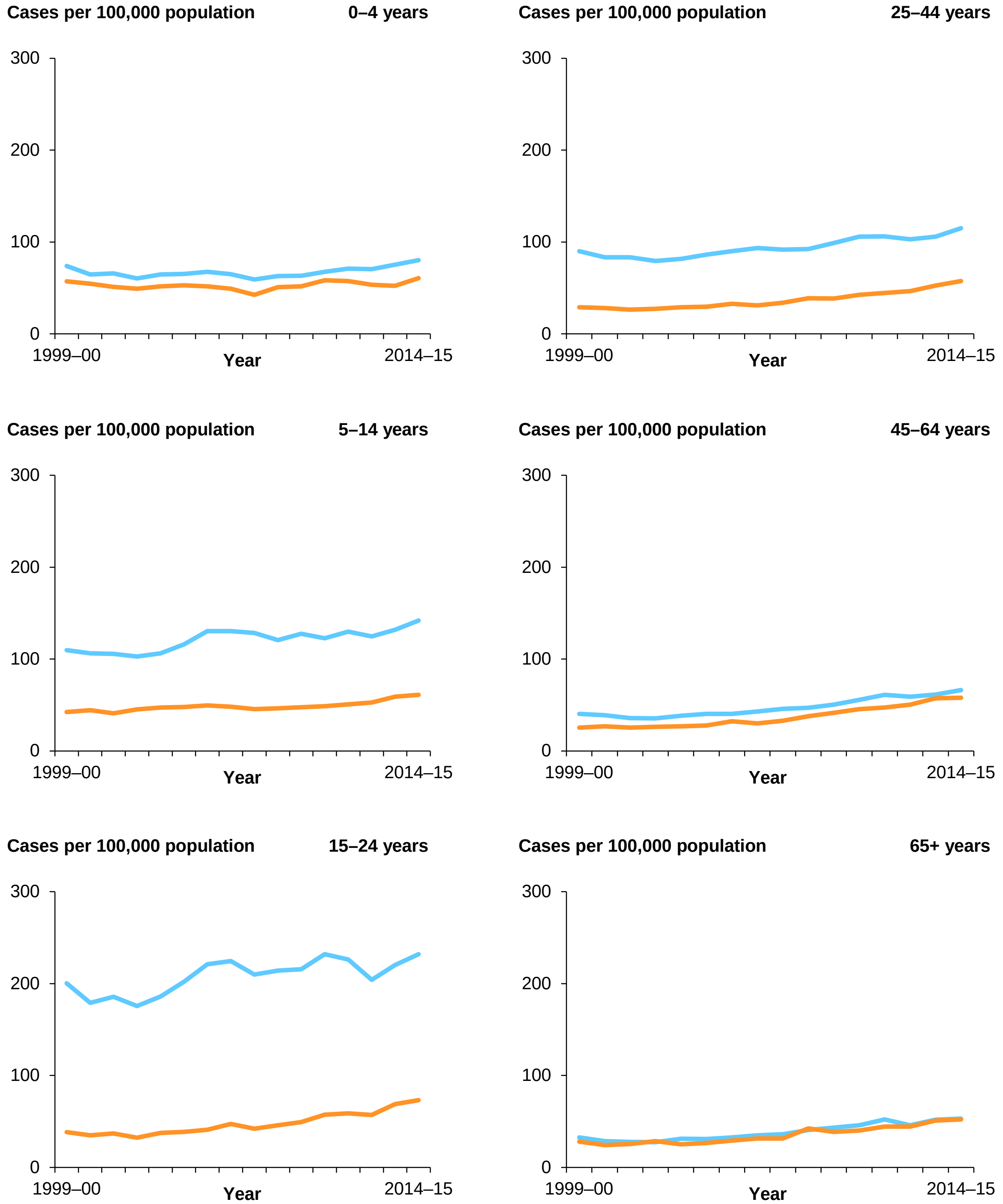
Age-standardised rates for males were consistently higher than for females at all times throughout the period (Figure 10.6). There was no evidence of any substantial change in cases of injury due to *Exposure to animate mechanical forces* rates, for either sex, over the period.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 10.

**Figure 10.6: Age-standardised rates of cases due to exposure to animate mechanical forces, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury due to *Exposure to animate mechanical forces* over time, by broad age group as well as by sex, is shown in Figure 10.7. Age-specific rates were higher among males than females in every age group over the period, except for those aged 65 or over. Rates of injury due to *Exposure to animate mechanical forces* appeared to have increased in all age groups other than the 0–4 age group. For women in particular, rates of injury have doubled or almost doubled in the 15–24, 25–44, and 45–64 year age groups.

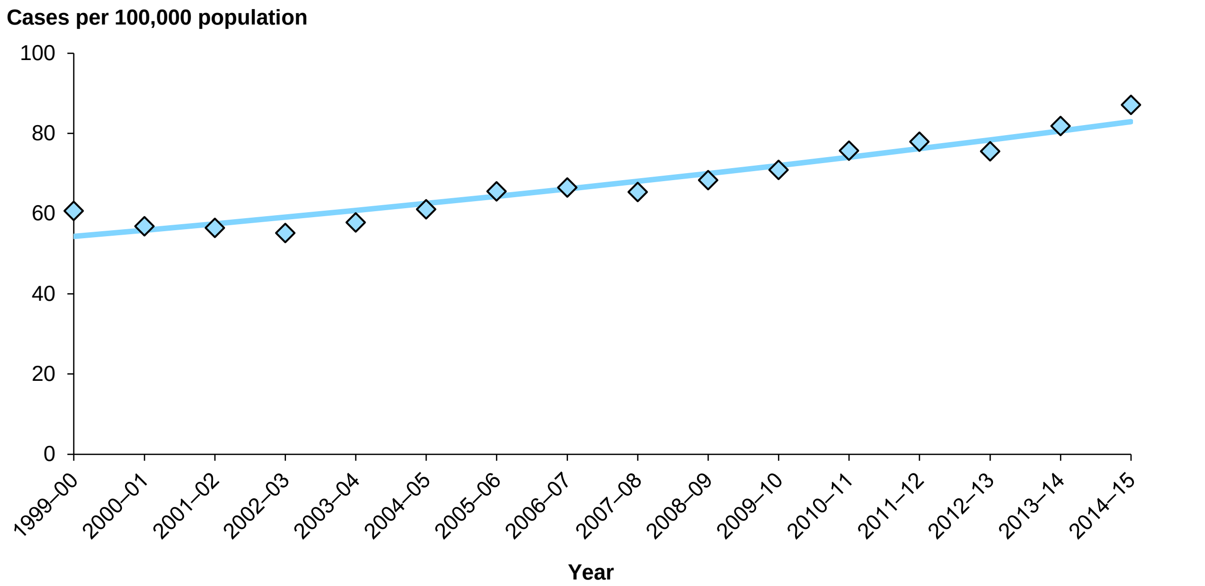



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 10.

**Figure 10.7: Age-specific rates of cases due to exposure to animate mechanical forces, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of *Injury due to inanimate mechanical forces* increased from 61 per 100,000 population in 1999–00 to 87 per 100,000 in 2014–15 (Figure 10.8). The increase averaged 2.9% per year and was statistically significant (95% CI: 2.4%, 3.3%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 10.

**Figure 10.8: Modelled age-standardised rates of injury due to exposure to animate mechanical forces, Australia, 1999–00 to 2014–15**

# 11 Intentional self-harm

This chapter presents information on patients who were admitted to hospital as a result of injury due to *Intentional self-harm*. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

This chapter includes suicide and attempts to suicide, as well as cases where people have intentionally hurt themselves, but not necessarily with the intention of suicide—for example, acts of self-mutilation. This chapter does not include cases where the intent was unspecified, unstated or could not be determined.

**Key findings**

Almost 30,000 cases of hospitalised injury were due to *Intentional self-harm* in 2014–15.

**Sex of patient**

In 2014–15, females made up two-thirds (18,118) of *Intentional self-harm* cases.

**Age of patient**

In 2014–15, the largest number of cases of injury due to *Intentional self-harm* occurred among females aged 15–19 (3,729).

**Indigenous status**

Age-standardised rates of injury due to *Intentional self-harm* were twice as high for Indigenous people, compared with other Australians.

**Cause of injury**

*Intentional self-poisoning* (X60–X69) accounted for 82% of all cases of self-harm in 2014–15.

**Trends in injury**

Injury hospitalisations due to *Intentional self-harm* rose over the period 1999–00 to 2014–15, increasing on average by 0.5% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM range X60–X84 (*Intentional self-harm*) in ‘Chapter XX External causes of morbidity and mortality’.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2, 11.1 and 11.2. Further information on methods is provided in ‘Appendix A: Data issues’.

**Box 11.1: External causes of exposure to intentional self-harm**

This chapter focuses on the **Intentional self-harm (X60–X84)** section of ICD-10-AM ‘Chapter XX External causes of morbidity and mortality’, which includes the following:

- Intentional self-poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics (X60)
- Intentional self-poisoning by and exposure to anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified (X61)
- Intentional self-poisoning by and exposure to narcotics and psychodysleptics (hallucinogens), not elsewhere classified (X62) (includes opioids)
- 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 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).

**Box 11.2: Ascertainment of intentional self-harm**

According to inclusion notes in ICD-10-AM, cases should be assigned codes in the range X60–X84 if they were purposely self-inflicted poisoning or injury, suicide or attempted suicide (NCCC 2012). Determining whether an injury is due to intentional self-harm is not always straightforward. Cases may appear to be intentional self-harm, but inconclusiveness of available information may preclude them being coded as such. In this situation, the case can be coded to an 'undetermined intent' category—for example, Y30 *Falling, jumping or pushed from a high place, undetermined intent* or Y32 *Crashing of motor vehicle, undetermined intent*.

Some patients may choose not to disclose that their injuries resulted from intentional self-harm, or may be unable to do so due to the nature of the injuries, or because their motives were ambiguous.

In very young children, ascertaining whether an injury was due to intentional self-harm can be difficult and may involve a parent or caregiver's perception of the intent. Ability to form an intention to inflict self-harm, and to understand the implications of doing so, requires a degree of maturation that is absent in infancy and early childhood.

It is not possible to differentiate between acts of self-injury and acts of self-harm with suicidal intent within the NHMD, but it is likely that an unknown proportion of cases of intentional self-harm are self-injurious in nature rather than suicidal in intent.

Such sources of uncertainty about the assignment of intent limit the certainty of any estimates of intentional self-harm based on routine hospital data, particularly for children. For these reasons, in this report, cases of intentional self-harm are presented in aggregate for ages up to and including 14.

## How many intentional self-harm cases were there in 2014–15?

There were an estimated 28,119 cases due to *Intentional self-harm* during 2014–15. Cases due to *Intentional self-harm* made up 6% of all hospitalised injury cases in 2014–15 (Figure 11.1).

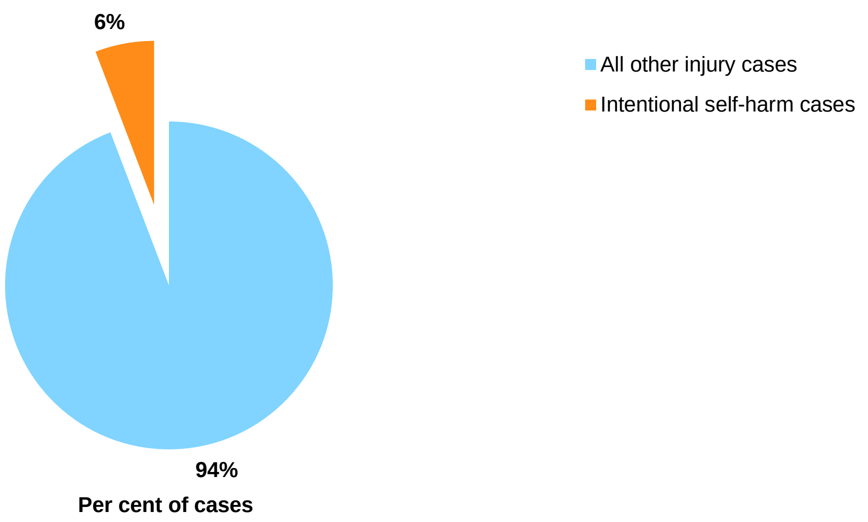
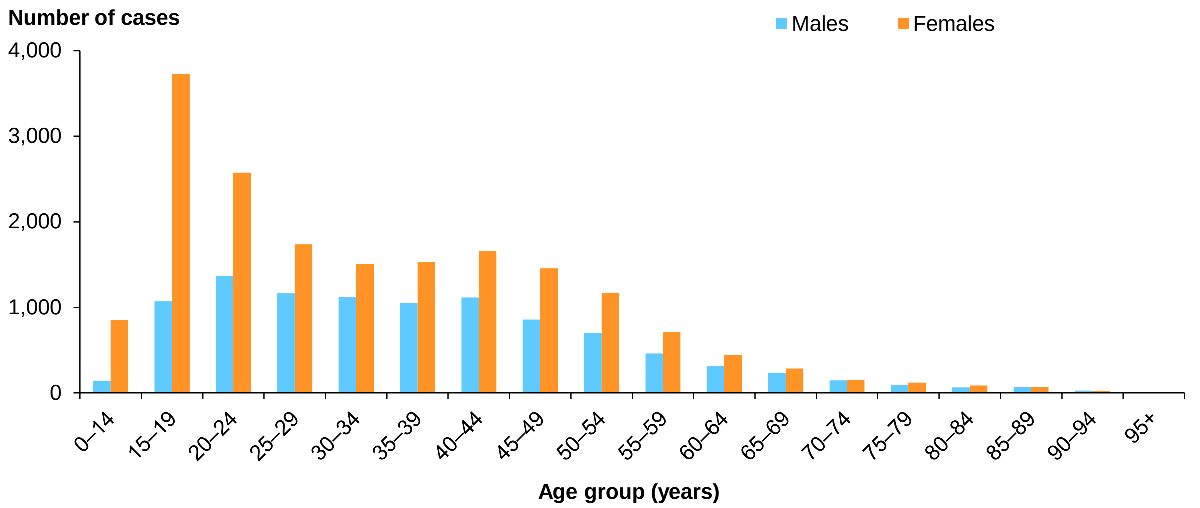



**Figure 11.1: Proportion of injury cases due to intentional self-harm, Australia, 2014–15**

## Age group and sex, 2014–15

Cases of *Intentional self-harm* in very young children may be subject to misinterpretation, given the difficulties in assigning intent to the actions of young children. With this in mind, and due to the small number of cases of *Intentional self-harm* in children, the youngest age groups have been combined (see Box 11.2).

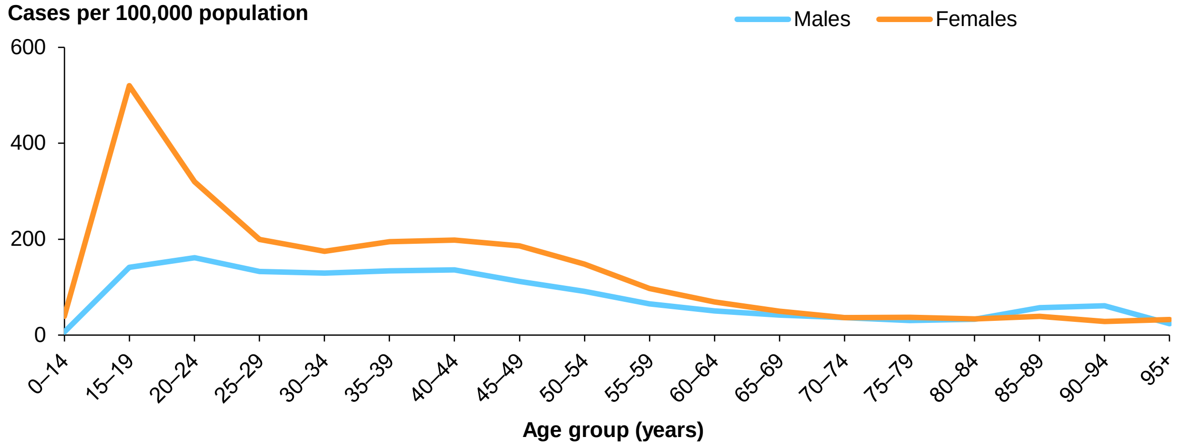
Of the 28,119 *Intentional self-harm* cases in Australia in 2014–15, two-thirds were female (18,118). There were more females than males in each age group (Figure 11.2). The highest number of cases (3,729) occurred among females aged 15–19; by comparison there were only 1,071 cases of *Intentional self-harm* among males in the same age group.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 11.

**Figure 11.2: Number of intentional self-harm cases, by age group, by sex, Australia, 2014–15**

Age-specific rates of *Intentional self-harm* differed by sex (Figure 11.3). Up to the 70–74 age group, rates were higher for females than for males. The difference was substantial at 15–19, where the rate for females (520 cases per 100,000 population) was more than 3 times that of males (141 cases per 100,000).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 11.

**Figure 11.3: Age-specific rates of intentional self-harm, by age group, by sex, Australia, 2014–15**

## Nature of injury

*Poisoning or toxic effect* was the most common type of injury due to *Assault*, accounting for 82% of cases in 2014–15 (Table 11.1). Among males (11%) and females (9%), *Open wound* was the second most likely injury to result from *Intentional self-harm*.

**Table 11.1: Intentional self-harm cases, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 126 | 1.3 | 67 | 0.4 | 193 | 0.7 |
| Dislocation | 1 | 0 | 0 | 0 | 1 | 0 |
| Soft-tissue injury | 153 | 1.5 | 144 | 0.8 | 297 | 1.1 |
| Open wound | 1,069 | 10.7 | 1,620 | 8.9 | 2,689 | 9.6 |
| Intracranial injury | 64 | 0.6 | 30 | 0.2 | 94 | 0.3 |
| Internal organ or vessel of trunk | 99 | 1 | 42 | 0.2 | 141 | 0.5 |
| Burn | 53 | 0.5 | 75 | 0.4 | 128 | 0.5 |
| Superficial injury | 132 | 1.3 | 180 | 1 | 312 | 1.1 |
| Poisoning or toxic effect | 7,591 | 75.9 | 15,493 | 85.5 | 23,086 | 82.1 |
| Other and unspecified injuries | 711 | 7.1 | 467 | 2.5 | 1,178 | 4.2 |
| **Total** | **9,999** | **100** | **18,118** | **100** | **28,119** | **100** |

## Remoteness of usual residence

The age-standardised rate of injury due to *Intentional self-harm* in 2014–15 varied according to remoteness of usual residence (Table 11.2). The lowest rate of *Intentional self-harm* was in *Major cities* (108 per 100,000 population) and the highest in *Very remote* areas (169 per 100,000).

**Table 11.2: Intentional self-harm cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Intentional self-harm cases | 18,049 | 5,610 | 3,099 | 510 | 355 |
| Age-standardised rate/100,000 population | 108.3 | 144.9 | 164.6 | 165.1 | 168.7 |

## Aboriginal and Torres Strait Islander people

There were an estimated 2,086 cases of Indigenous people hospitalised as a result of *Intentional self-harm* in 2014–15 (Table 11.3). More females than males were hospitalised. Intentional self-harm cases among Indigenous people made up a slightly higher proportion (9%) of all injury cases compared with other Australians (6%). Age-standardised rates of *Intentional self-harm* among Indigenous people were more than twice those of other Australians, and in the case of Indigenous men, 3 times the rate for other Australians.

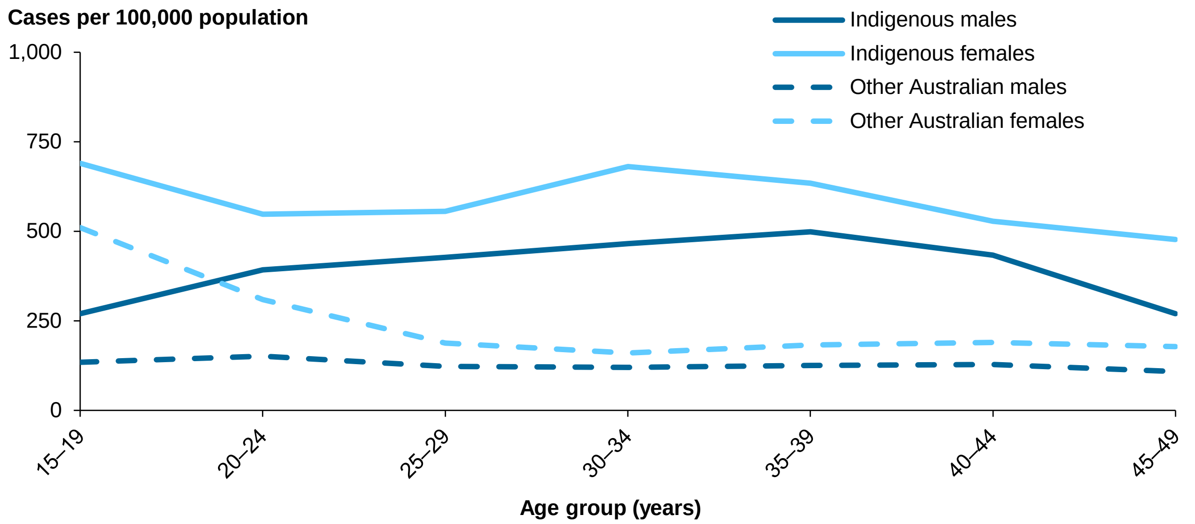
**Table 11.3: Intentional self-harm cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Intentional self-harm cases | 814 | 1,272 | 2,086 | 9,185 | 16,846 | 26,033 |
| Age-standardised rate/100,000 population | 245.7 | 348.3 | 296.6 | 81.5 | 153.3 | 116.9 |

Due to the small case numbers of injury due to *Intentional self-harm* among Indigenous people over the age of 50 and younger than 15, analyses were restricted by age.

The pattern of age- and sex-specific rates of *Intentional self-harm* for Indigenous people was different from those of non-Indigenous people (Figure 11.2). Indigenous rates of *Intentional self-harm* remained high after the late teenage years, while rates decreased from this point among other Australians. Rates of *Intentional self-harm* were higher for both male and female Indigenous people in all age groups, compared with other Australians. Rates of self-harm were higher for Indigenous females, compared with Indigenous males, at all ages.

The highest rate of injury due to *Intentional self-harm* in Indigenous males occurred for those aged 35–39 (498 cases per 100,000 population), while the rate of injury for other Australian males in the same age group was 120. For Indigenous females, the highest rate of self-harm injury occurred for those aged 15–19 (690 cases per 100,000 population), while the rate of injury in other Australian females in the same age group was 540.




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 11.

**Figure 11.4: Age-specific rates of intentional self-harm injury, by Indigenous status, by selected age group, by sex, Australia, 2014–15**

# Socioeconomic status

The proportion of injury due to *Intentional self-harm* cases in each SES group ranged between 13% and 26% (Table 11.4). The highest proportions, for both males and females, were for people living in areas with the lowest (most disadvantaged) SES classification. For males, twice the proportion of *Intentional self-harm* cases were from those living in areas with the lowest (most disadvantaged) SES classification, compared with those in areas with the highest (most advantaged) SES classification.

**Table 11.4: Intentional self-harm cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 2,601 | 26.0 | 4,394 | 24.3 | 6,995 | 24.9 |
| 2 | 2,276 | 22.8 | 3,984 | 22.0 | 6,260 | 22.3 |
| 3 | 1,860 | 18.6 | 3,547 | 19.6 | 5,407 | 19.2 |
| 4 | 1,686 | 16.9 | 3,251 | 17.9 | 4,938 | 17.6 |
| 5–Highest | 1,316 | 13.2 | 2,697 | 14.9 | 4,014 | 14.3 |
| **Total[(a)]** | **9,999** | **100** | **18,118** | **100** | **28,119** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of injury due to intentional self-harm

*Intentional self-poisoning* (X60–X69) accounted for 82% of all cases of self-harm in 2014–15 (Table 11.5), with female case numbers (15,493) more than twice those of males (7,597). The second most common cause overall was *Intentional self-harm by sharp object* (12%), and again there were more cases for females than for males.

*Hanging, strangulation and suffocation* accounted for 3% of all self-harm cases, but substantially more males were admitted for this method than females (488 and 271 cases, respectively). More than twice as many males as females were admitted for *Intentional poisoning by other gases and vapours*, a category which includes the toxic effects of carbon monoxide.

Forty-four per cent of all cases of *Intentional self-harm* were *Intentional poisoning by and exposure to anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs* (12,258). This category includes benzodiazepines, other and unspecified antidepressants—which include selective serotonin reuptake inhibitors; other and unspecified antipsychotics and neuroleptics; other anti-epileptic and sedative-hypnotic drugs; tricyclic and tetracyclic antidepressants; phenothiazine antipsychotics; and neuroleptics and psychostimulants with potential for use disorder.

*Intentional self-poisoning by narcotics and psychodysleptics (hallucinogens)* accounted for 6% of self-harm cases. This category includes cannabis (and its derivatives), cocaine, heroin, codeine and LSD, among others. *Intentional self-poisoning by alcohol* was reported in 311 cases.

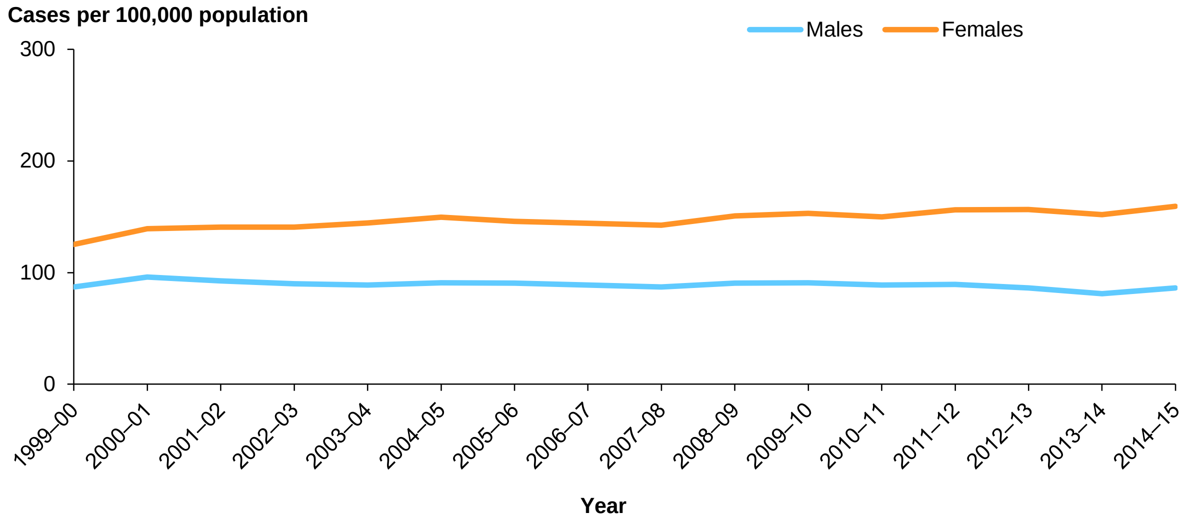
**Table 11.5: Cause of intentional self-harm injury cases, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Cause** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Intentional self-poisoning by and exposure to: | | | | | | |
| Non-opioid analgesics, antipyretics and anti-rheumatics | 1,316 | 13.2 | 4,319 | 23.8 | 5,635 | 20 |
| Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs | 4,070 | 40.7 | 8,186 | 45.2 | 12,258 | 43.6 |
| Narcotics and psychodysleptics (hallucinogens) (includes opioids) | 793 | 7.9 | 971 | 5.4 | 1,764 | 6.3 |
| Other drugs acting on the autonomic nervous system | 111 | 1.1 | 201 | 1.1 | 312 | 1.1 |
| Other and unspecified drugs, medicaments and biological substances | 728 | 7.3 | 1,189 | 6.6 | 1,917 | 6.8 |
| Alcohol | 134 | 1.3 | 177 | 1 | 311 | 1.1 |
| Organic solvents and their halogenated hydrocarbons and their vapours | 30 | 0.3 | 22 | 0.1 | 52 | 0.2 |
| Other gases and vapours (for example, carbon monoxide) | 186 | 1.9 | 90 | 0.5 | 276 | 1 |
| Pesticides | 70 | 0.7 | 58 | 0.3 | 128 | 0.5 |
| Other and unspecified chemicals and noxious substances | 159 | 1.6 | 280 | 1.5 | 439 | 1.6 |
| Intentional self-harm by hanging, strangulation and suffocation | 488 | 4.9 | 271 | 1.5 | 759 | 2.7 |
| Intentional self-harm by drowning and submersion | 8 | 0.1 | 18 | 0.1 | 26 | 0.1 |
| Intentional self-harm by handgun discharge | 2 | 0 | 0 | 0 | 2 | 0 |
| Intentional self-harm by other and unspecified firearm discharge | 28 | 0.3 | 0 | 0 | 28 | 0.1 |
| Intentional self-harm by explosive material | 1 | 0 | 0 | 0 | 1 | 0 |
| Intentional self-harm by smoke, fire and flames | 42 | 0.4 | 42 | 0.2 | 84 | 0.3 |
| Intentional self-harm by steam, hot vapours and hot objects | 2 | 0 | 3 | 0 | 5 | 0 |
| Intentional self-harm by sharp object | 1,454 | 14.5 | 1,935 | 10.7 | 3,389 | 12.1 |
| Intentional self-harm by blunt object | 40 | 0.4 | 43 | 0.2 | 83 | 0.3 |
| Intentional self-harm by jumping from a high place | 76 | 0.8 | 52 | 0.3 | 128 | 0.5 |
| Intentional self-harm by jumping or lying before moving object | 28 | 0.3 | 19 | 0.1 | 47 | 0.2 |
| Intentional self-harm by crashing of motor vehicle | 60 | 0.6 | 31 | 0.2 | 91 | 0.3 |
| Intentional self-harm by other specified means | 131 | 1.3 | 138 | 0.8 | 269 | 1 |
| Intentional self-harm by unspecified means | 42 | 0.4 | 73 | 0.4 | 115 | 0.4 |
| **Total** | **9,999** | **100** | **18,118** | **100** | **28,119** | **100** |

The top 3 causes of *Intentional self-harm* did not vary much by age group, with *Intentional self-poisoning by and exposure to anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs* the most common cause, followed by *Intentional self-poisoning and exposure to non-opioid analgesics, antipyretics and anti-rheumatics* and *Intentional self-harm by sharp object*. The relative proportions of causes did not vary much by age group, with the top 2 causes in each age group accounting for around of 60% all *Intentional self-harm* cases (data not shown).

## How have intentional self-harm cases changed over time?

Age-standardised rates for females were consistently higher than for males throughout the period (Figure 11.5). There is no evidence of any substantial change in *Intentional self-harm* cases rates for either sex over the period.

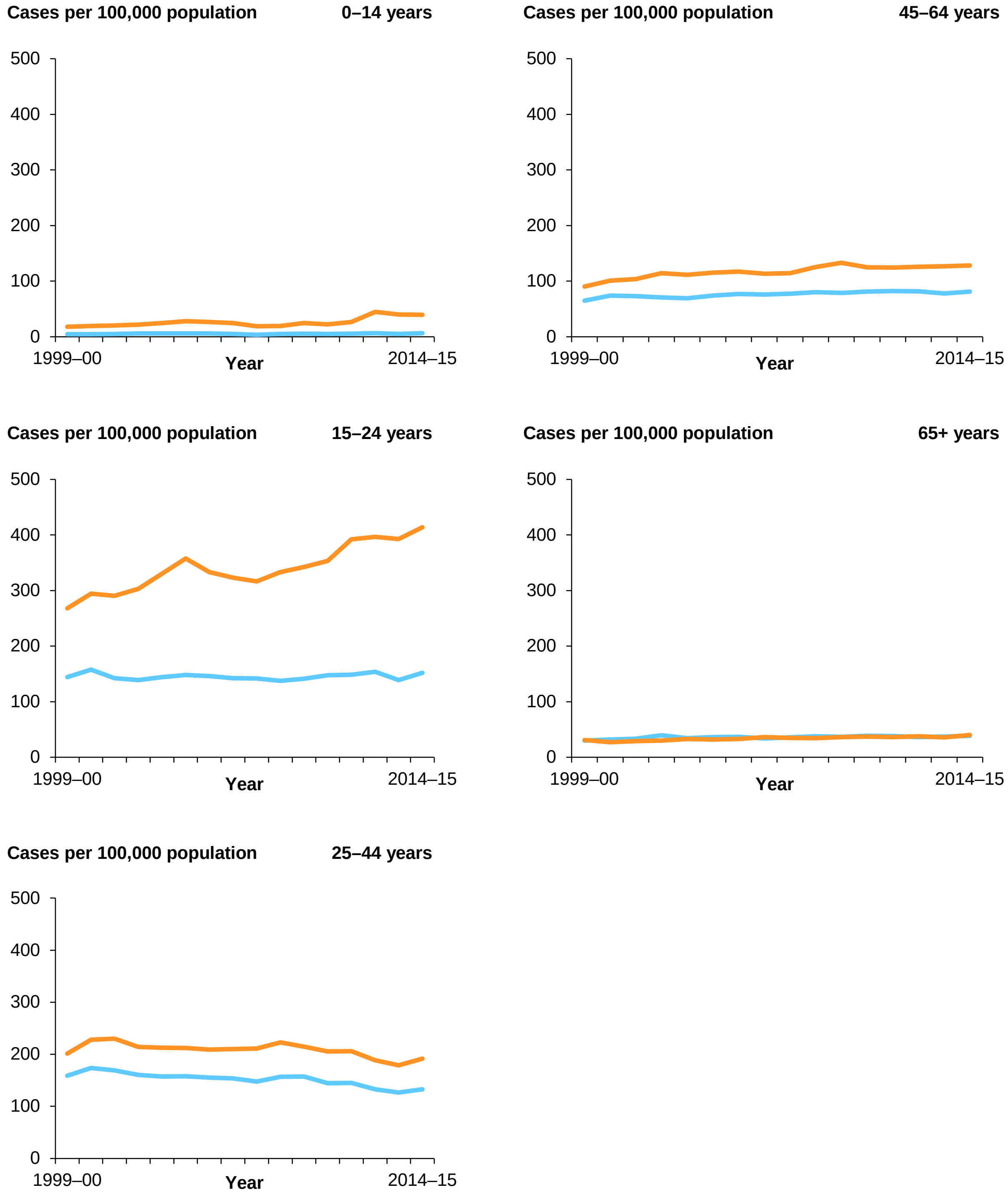



*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 11.

**Figure 11.5: Age-standardised rates of intentional self-harm, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 11.6. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015). Age-specific rates for *Intentional self-harm* for children aged 0–14 are shown in aggregate, due to small case numbers.

Age-specific rates of *Intentional self-harm* were higher for females in all age groups other than for those aged 65 or over. Within the specific category of *Intentional self-harm by poisoning*, case numbers were highest, and rose over the period, among females aged 15–24, from a total of 3,050 cases in 1999–00 to 5,240 cases in 2014–15. Large increases in this group were seen in the number of cases of poisoning by *Anti-epileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs* (from 1,308 to 2,313 cases) and *Non-opioid analgesics, antipyretics and anti-rheumatics* drugs (from 983 to 2,2137 cases), during the period.

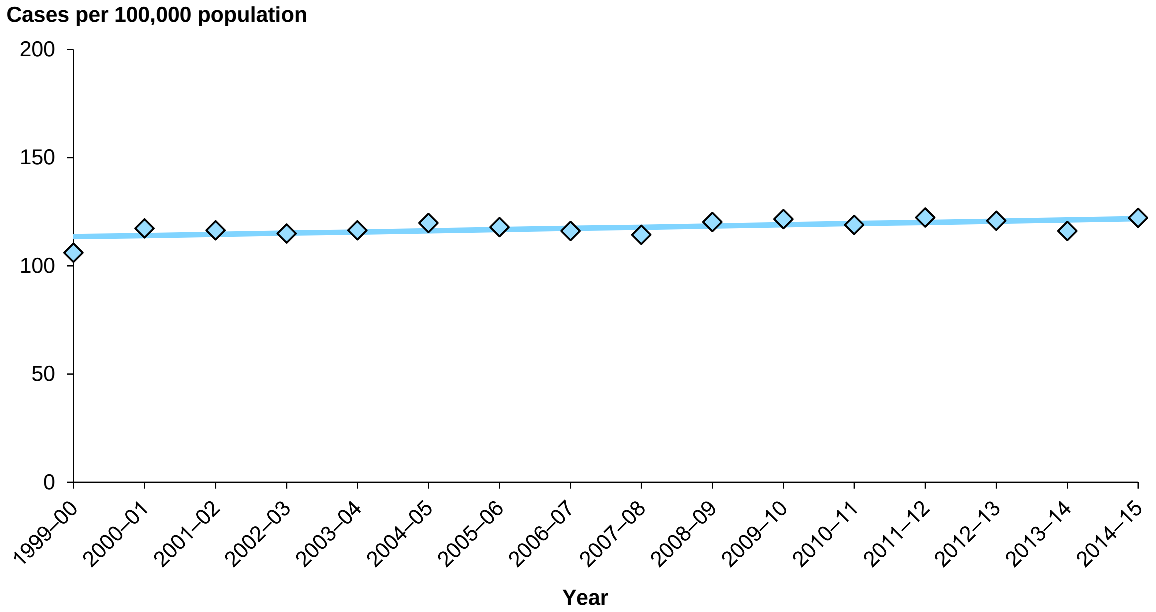



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 11.

**Figure 11.6: Age-specific rates of intentional self-harm cases, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of injury due to *Intentional self-harm* increased from 106 per 100,000 population in 1999–00 to 122 per 100,000 in 2014–15 (Figure 11.7). The increase averaged 0.5% per year and was statistically significant (95% CI: 0.2%, 0.7%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 11.

**Figure 11.7: Modelled age-standardised rates of injury due to intentional self-harm, Australia, 1999–00 to 2014–15**

# 12 Assault

This chapter presents information on patients who were admitted to hospital as a result of injury due to intentional assault. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

**Key findings**

Almost 20,000 cases of hospitalised injury were due to *Assault* in 2014–15.

**Sex of patient**

In 2014–15, males made up two-thirds (12,768) of hospitalised *Assault* cases.

**Age of patient**

In 2014–15, for both males and females, cases of *Assault* were more frequent from the age group 15–19 onwards. Among males, the largest number of cases of injury due to intentional assault occurred in the 20–24 age group (2,028).

**Indigenous status**

Assaults made up a much higher proportion of all hospitalised injury cases among Indigenous people (23%), compared with other Australians (3%). The age-standardised rate of *Assault* among Indigenous people was 13 times that of other Australians. The rate for Indigenous females was over 27 times the rate for other Australian females.

**Cause of injury**

The most common cause of injury due to intentional assault was *Assault by bodily force*, comprising 60% of cases in 2014–15.

**Trends in injury**

Assault injury hospitalisations declined over the period 1999–00 to 2014–15, decreasing on average by 0.9% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM ranges X85–Y09 (*Assault*) and Y35–Y36 (*Legal intervention and operations of war*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2, 12.1 and 12.2. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 12.1: External causes of assault injury**

This chapter focuses on 2 sections of the ICD-10-AM ‘Chapter XX External causes of morbidity and mortality’: **Assault (X85–Y09)** and **Legal intervention and operations of war (Y35–Y36)**, which 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).

**Box 12.2: Ascertainment of injury due to assault**

As with injury due to intentional self-harm, cases of injury due to intentional assault may be difficult to identify. Feelings of shame or embarrassment may underlie reticence to admit to either of these forms of intentional injury. In addition, most injuries due to interpersonal violence have potential legal implications. Pressures or incentives to not reveal assault may be particularly likely in circumstances such as injury of a child or other dependent person by a caregiver, or injury of one spouse by the other. Cases recognised as possibly being due to assault, but where doubt remains, may therefore be coded as *Undetermined intent*.

Perpetrator codes are used in ICD-10-AM when a code from the ICD-10-AM category *Assault* (X85–Y09) is present (see 'Appendix A: Data issues'). A coding standard (NCCH 2002) provides guidance to clinical coders in assigning codes identifying the perpetrator of assault, abuse or neglect. The coding rules operate on a hierarchical basis, with coders required to code the closest relationship between the perpetrator and the victim. The 10 subcategories of perpetrator consist of the following:

- Spouse or domestic partner
- Parent
- Other family member
- Carer
- Acquaintance or friend
- Official authorities
- Person unknown to the victim
- Multiple persons unknown to the victim
- Other specified person
- Unspecified person.

# How many assault cases were there in 2014–15?

There were an estimated 19,025 cases of injury due to intentional assault during 2014–15. These cases made up 4% of all hospitalised injury cases in 2014–15 (Figure 12.1).

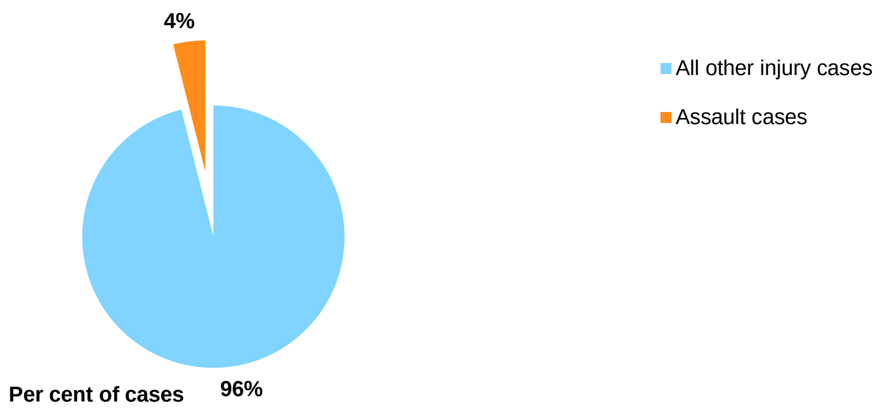
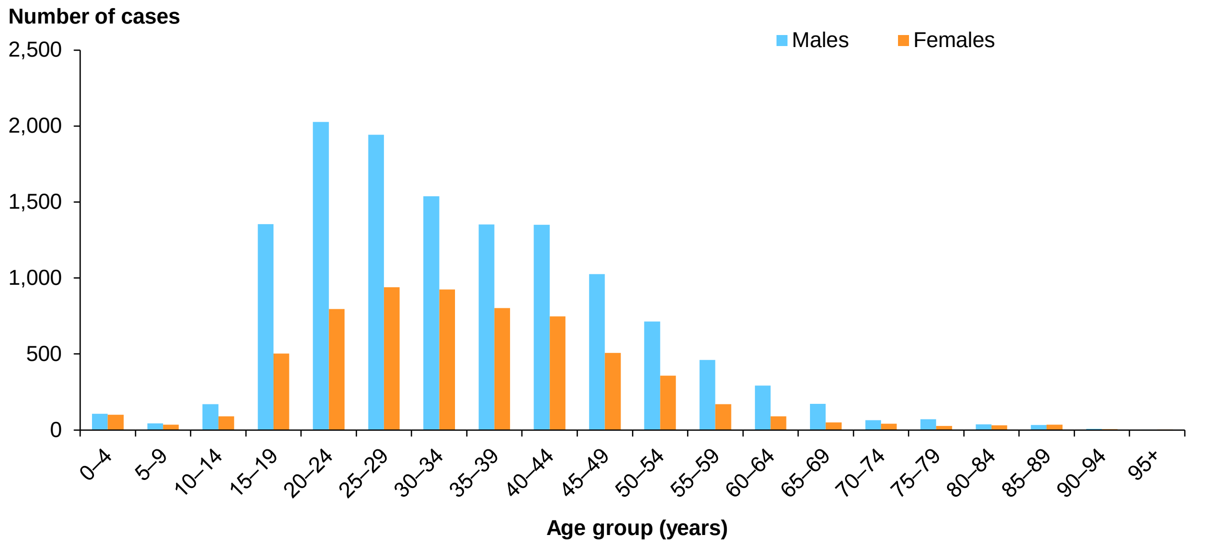



**Figure 12.1: Proportion of injury cases due to assault, Australia, 2014–15**

## Age group and sex, 2014–15

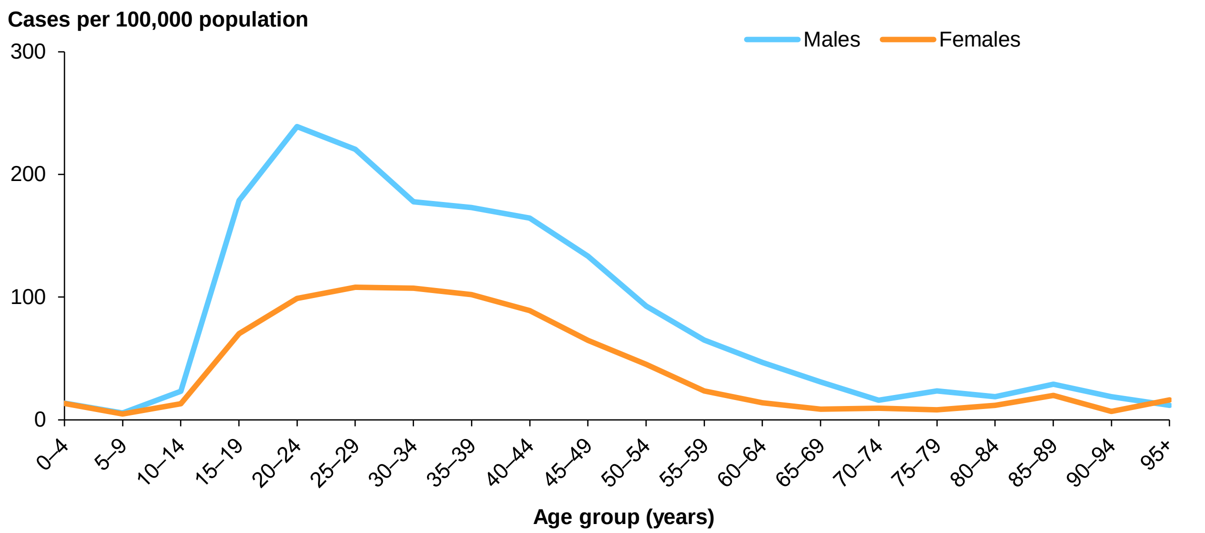
Of the 19,025 cases due to *Assault* in Australia in 2014–15, two-thirds (12,768) were male. Gender differences by age were apparent, with higher numbers of cases among males occurring for every age group (Figure 12.2). For both males and females, cases of *Assault* were more frequent from the 15–19 age group onwards. Among males, the largest number of cases due to *Assault* occurred in the 20–24 age group (2,028), while among females, the largest number of cases occurred in the 25–29 age group (940).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 12.

**Figure 12.2: Number of assault cases, by age group, by sex, Australia, 2014–15**

Between the age groups 15–19 and 70–74, age-specific rates for males were much higher than for females (Figure 12.3). Male rates for *Assault* peaked in the 20–24 age group, with an age-specific rate of 239 hospitalised cases per 100,000 population compared with 99 per 100,000 for females in the same age group.




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 12.

**Figure 12.3: Age-specific rates of assault injury, by age group, by sex, Australia, 2014–15**

## Nature of injury

Injury due to intentional assault resulted in damage to various body regions, but the most common region was the *Head and neck* (66%), both for males (69%) and for females (60%) (Table 12.1).

**Table 12.1: Cases due to assault, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 8,749 | 68.5 | 3,771 | 60.3 | 12,520 | 65.8 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 1,307 | 10.2 | 830 | 13.3 | 2,137 | 11.2 |
| Shoulder and upper limb (excluding wrist and hand) | 908 | 7.1 | 550 | 8.8 | 1,458 | 7.7 |
| Wrist and hand | 975 | 7.6 | 428 | 6.8 | 1,403 | 7.4 |
| Hip and lower limb (excluding ankle and foot) | 560 | 4.4 | 305 | 4.9 | 865 | 4.5 |
| Ankle and foot | 70 | 0.5 | 79 | 1.3 | 149 | 0.8 |
| Other, multiple and incompletely specified body regions | 89 | 0.7 | 75 | 1.2 | 164 | 0.9 |
| Injuries not described in terms of body region | 110 | 0.9 | 219 | 3.5 | 329 | 1.7 |
| **Total** | **12,768** | **100** | **6,257** | **100** | **19,025** | **100** |

*Fracture* was the most common type of injury due to intentional assault, accounting for 49% of cases in 2014–15 (Table 12.2). *Fracture* was far more common among males, with 40% of cases resulting in a fracture. Among females, *Fracture* (21%), *Open wound* (20%) and *Superficial injury* (20%) were the injuries most likely to result from intentional assault.

**Table 12.2: Cases due to assault, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 5,062 | 39.6 | 1,314 | 21.0 | 6,376 | 33.5 |
| Dislocation | 104 | 0.8 | 61 | 1.0 | 165 | 0.9 |
| Soft-tissue injury | 407 | 3.2 | 188 | 3.0 | 595 | 3.1 |
| Open wound | 2,565 | 20.1 | 1,228 | 19.6 | 3,793 | 19.9 |
| Intracranial injury | 1,412 | 11.1 | 408 | 6.5 | 1,820 | 9.6 |
| Internal organ or vessel of trunk | 448 | 3.5 | 143 | 2.3 | 591 | 3.1 |
| Burn | 56 | 0.4 | 30 | 0.5 | 86 | 0.5 |
| Superficial injury | 912 | 7.1 | 1,249 | 20.0 | 2,161 | 11.4 |
| Poisoning or toxic effect | 19 | 0.1 | 32 | 0.5 | 51 | 0.3 |
| Other and unspecified injuries | 1,783 | 14.0 | 1,604 | 25.6 | 3,387 | 17.8 |
| **Total** | **12,768** | **100** | **6,257** | **100** | **19,025** | **100** |

## Remoteness of usual residence

The age-standardised rate of injury due to intentional assault in 2014–15 varied according to remoteness of usual residence (Table 12.3). The rate of assault in *Very remote* areas (851 cases per 100,000 population) was 14 times the rate in *Major cities* (60 cases per 100,000).

**Table 12.3: Assault cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Assault cases | 10,104 | 2,666 | 2,458 | 1,292 | 1,858 |
| Age-standardised rate/100,000 population | 59.9 | 71.4 | 134.6 | 411.9 | 850.8 |

## Aboriginal and Torres Strait Islander people

There were an estimated 5,247 cases of Indigenous people hospitalised as a result of *Assault* in 2014–15 (Table 12.4). More females were hospitalised than males. Assaults made up a much higher proportion of all hospitalised cases among Indigenous people (23%), compared with other Australians (3%). The age-standardised rate of assault among Indigenous people was 13 times that of other Australians. The rate among Indigenous females was over 27 times the rate for other Australian females.

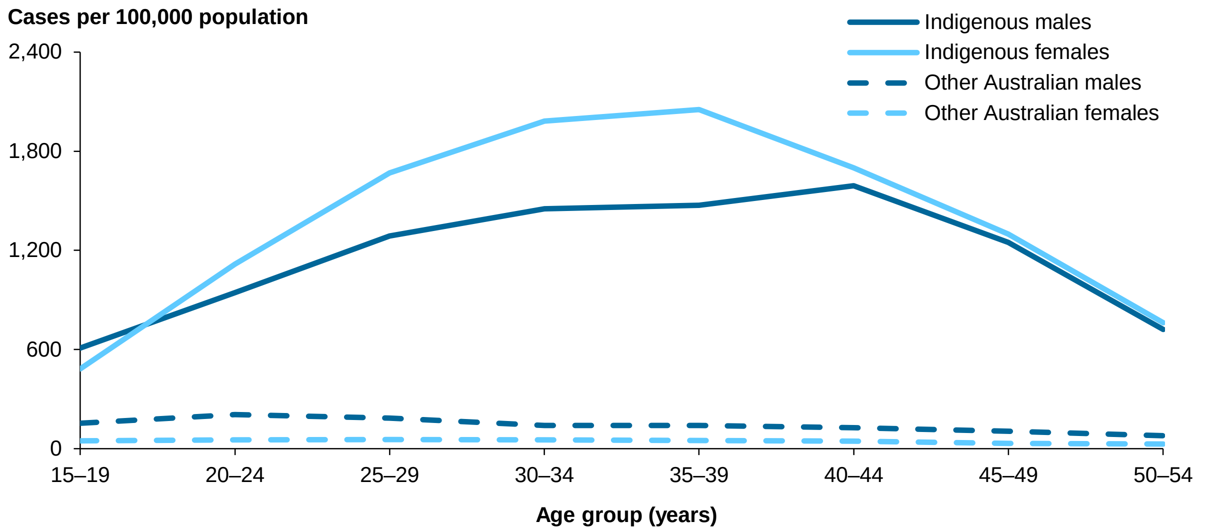
**Table 12.4: Assault cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Assault cases | 2,415 | 2,832 | 5,247 | 10,353 | 3,425 | 13,778 |
| Age-standardised rate/100,000 population | 741.0 | 858.8 | 800.7 | 92.2 | 30.7 | 61.6 |

Due to the small case numbers of injury due to assault among Indigenous people over the age of 54 and younger than 15, analyses were restricted by age.

The patterns of age- and sex-specific rates of *Assault* for Indigenous people were different from those of other Australians (Figure 12.4). Rates of *Assault* were higher for both male and female Indigenous people in all age groups, compared with other Australians. Compared with other Australians, Indigenous rates of *Assault* were higher in each successive age category until 35–39 for females and 40–44 for males.

The highest rate of *Assault* for Indigenous females occurred in the 35–39 age group (2,052 cases per 100,000 population), while the rate of *Assault* injury for other Australian females in this age group was 51 cases per 100,000. For Indigenous males, the highest rate occurred in the 40–44 age group (1,591 cases per 100,000 population), while the rate for other Australian males in the same age group was 128 cases per 100,000.




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 12.

**Figure 12.4: Age-specific rates of assault injury, by Indigenous status, by selected age group, by sex, Australia, 2014–15**

# Socioeconomic status

The proportion of *Assault* cases in each SES group ranged between 7% and 42% (Table 12.5). The highest proportion, for both males and females, were for people living in areas with the lowest (most disadvantaged) SES classification. For females, 6 times the proportion of *Assault* cases occurred for those living in areas with the lowest SES classification, compared with those in the highest (most advantaged) SES group.

**Table 12.5: Assault cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 4,152 | 32.5 | 2,616 | 41.8 | 6,768 | 35.6 |
| 2 | 2,726 | 21.4 | 1,296 | 20.7 | 4,022 | 21.1 |
| 3 | 2,216 | 17.4 | 1,020 | 16.3 | 3,236 | 17.0 |
| 4 | 1,851 | 14.5 | 718 | 11.5 | 2,569 | 13.5 |
| 5–Highest | 1,337 | 10.5 | 432 | 6.9 | 1,769 | 9.3 |
| **Total[(a)]** | **12,768** | **100** | **6,257** | **100** | **19,025** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of injury due to assault

The most common cause by which injury occurred was *Assault by bodily force*, comprising 60% of cases (11,471). Twice as many males as females were injured as a result of bodily force (Table 12.6). The second and third most common causes of injury were *Assault by blunt object* (14%) and *Assault by sharp object* (12%), and again, more males than females were hospitalised due to these causes. Females were much more likely than males to be hospitalised as a result of a sexual assault (129 and 11 cases, respectively).

**Table 12.6: Cause of assault cases, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Cause** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Assault by drugs, medicaments and biological substances | 16 | 0.1 | 26 | 0.4 | 42 | 0.2 |
| Assault by corrosive substance | 3 | 0 | 1 | 0 | 4 | 0 |
| Assault by other specified chemicals and noxious substances | 4 | 0 | 4 | 0.1 | 8 | 0 |
| Assault by unspecified chemical or noxious substance | 3 | 0 | 4 | 0.1 | 7 | 0 |
| Assault by hanging, strangulation and suffocation | 33 | 0.3 | 71 | 1.1 | 104 | 0.5 |
| Assault by drowning and submersion | 2 | 0 | 0 | 0 | 2 | 0 |
| Assault by handgun discharge | 10 | 0.1 | 2 | 0 | 12 | 0.1 |
| Assault by other and unspecified firearm discharge | 57 | 0.4 | 7 | 0.1 | 64 | 0.3 |
| Assault by explosive material | 1 | 0 | 1 | 0 | 2 | 0 |
| Assault by smoke, fire and flames | 21 | 0.2 | 17 | 0.3 | 38 | 0.2 |
| Assault by steam, hot vapours and hot objects | 29 | 0.2 | 16 | 0.3 | 45 | 0.2 |
| Assault by sharp object | 1,672 | 13.1 | 527 | 8.4 | 2,199 | 11.6 |
| Assault by blunt object | 1,628 | 12.8 | 960 | 15.3 | 2,588 | 13.6 |
| Assault by pushing from high place | 5 | 0 | 6 | 0.1 | 11 | 0.1 |
| Assault by pushing or placing victim before moving object | 3 | 0 | 2 | 0 | 5 | 0 |
| Assault by crashing of motor vehicle | 13 | 0.1 | 6 | 0.1 | 19 | 0.1 |
| Assault by bodily force | 7,732 | 60.6 | 3,739 | 59.8 | 11,471 | 60.3 |
| Sexual assault by bodily force | 11 | 0.1 | 129 | 2.1 | 140 | 0.7 |
| Neglect and abandonment | 18 | 0.1 | 17 | 0.3 | 35 | 0.2 |
| Other maltreatment syndromes | 83 | 0.7 | 199 | 3.2 | 282 | 1.5 |
| Assault by other specified means | 227 | 1.8 | 113 | 1.8 | 340 | 1.8 |
| Assault by unspecified means | 1,115 | 8.7 | 400 | 6.4 | 1,515 | 8 |
| Legal intervention involving firearm discharge and Operations of war | 82 | 0.6 | 10 | 0.2 | 92 | 0.5 |
| **Total** | **12,768** | **100** | **6,257** | **100** | **19,025** | **100** |

The top 3 causes of hospitalisation as a result of *Assault* did not vary much by age. *Assault by bodily force* accounted for well over 50% of all causes of hospitalisation in each age group, other than for children aged 0–4. For that age group, the most common cause was *Other maltreatment syndromes* (Table 12.7).

**Table 12.7: Top 3 causes of assault cases, 0–4 years, Australia, 2014–15**

| **0–4 year olds** | **Number** | **%** |
|---|---|---|
| Other maltreatment syndromes | 114 | 55.1 |
| Assault by bodily force | 39 | 18.8 |
| Neglect and abandonment | 20 | 9.7 |
| **Total assault, 0–4** | **207** | |

## Perpetrator

The relationship of the perpetrator to the victim of assault is presented in Table 12.8. Overall, the most commonly reported perpetrator of an assault was a *Spouse or domestic partner* (18%), followed by *Other family member* (9%). Gender differences were apparent, with 45% of female assault victims identifying the perpetrator as a *Spouse or domestic partner,* compared with just 4% of males. For males hospitalised as a result of an assault, reported perpetrators were more likely to be a person or persons unknown to the victim (17% for the 2 categories combined). Almost 50% of cases had an *Unspecified person* listed as the perpetrator. Cases lacking specific information about a perpetrator may have occurred for a number of reasons, including information not being reported by or on behalf of victims, or information not being recorded in the patient's hospital record.

**Table 12.8: Relationship of the perpetrator to the victim of assault cases, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Perpetrator** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Spouse or domestic partner | 561 | 4.4 | 2,831 | 45.2 | 3,392 | 17.8 |
| Parent | 197 | 1.5 | 185 | 3.0 | 382 | 2.0 |
| Other family member | 905 | 7.1 | 765 | 12.2 | 1,670 | 8.8 |
| Carer | 12 | 0.1 | 10 | 0.2 | 22 | 0.1 |
| Acquaintance or friend | 1,192 | 9.3 | 412 | 6.6 | 1,604 | 8.4 |
| Official authorities | 133 | 1.0 | 14 | 0.2 | 147 | 0.8 |
| Person unknown to the victim | 989 | 7.7 | 200 | 3.2 | 1,189 | 6.2 |
| Multiple persons unknown to the victim | 1,136 | 8.9 | 150 | 2.4 | 1,286 | 6.8 |
| Other specified person | 720 | 5.6 | 276 | 4.4 | 996 | 5.2 |
| Unspecified person | 6,840 | 53.6 | 1,404 | 22.4 | 8,244 | 43.3 |
| **Total**[(a)] | **12,768** | **100** | **6,257** | **100** | **19,025** | **100** |

(a) Contains 92 cases of *Legal intervention involving firearm discharge* or *Operations of war*.

The type of perpetrator reported also differed by age group of victim (Table 12.9). For children, the majority of perpetrators were a *Parent* or *Other family member* (80% and 40% for victims aged 0–4 and 5–14, respectively). Among those aged 15–24 who were hospitalised as a result of an assault, *Spouse or domestic partner* was the most commonly identified perpetrator (13%). Similar results were seen for the 25–44 age group, where 22% of cases had *Spouse or domestic partner* listed as the perpetrator. In the oldest age group, high proportions identified *Other family member* (23%) and *Acquaintance or friend* (13%) as perpetrators.

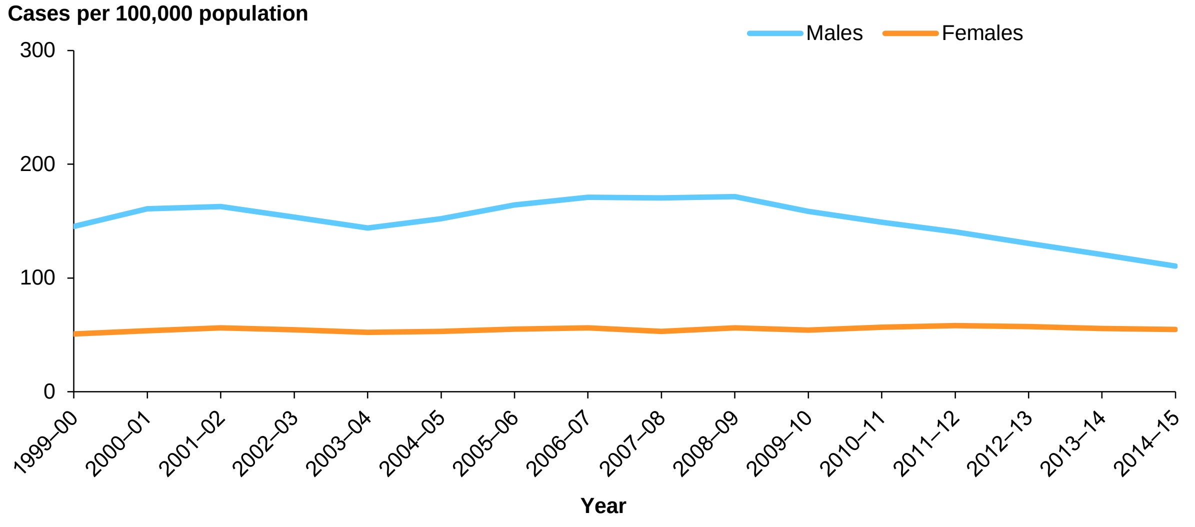
**Table 12.9: Relationship of the perpetrator to the victim of assault cases, by age of victim, Australia, 2014–15**

| | 0–4 | | 5–14 | | 15–24 | | 25–44 | | 45–64 | | 65+ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Spouse or domestic partner | 0 | 0 | 5 | 1.5 | 599 | 12.8 | 2,110 | 22 | 612 | 16.9 | 66 | 11.4 |
| Parent | 147 | 71 | 70 | 20.8 | 92 | 2 | 63 | 0.7 | 10 | 0.3 | 0 | 0 |
| Other family member | 18 | 8.7 | 66 | 19.6 | 319 | 6.8 | 742 | 7.7 | 389 | 10.8 | 136 | 23.4 |
| Carer | 1 | 0.5 | 0 | 0 | 0 | 0 | 5 | 0.1 | 8 | 0.2 | 8 | 1.4 |
| Acquaintance or friend | 5 | 2.4 | 62 | 18.4 | 360 | 7.7 | 729 | 7.6 | 373 | 10.3 | 75 | 12.9 |
| Official authorities | 0 | 0 | 0 | 0 | 29 | 0.6 | 91 | 0.9 | 23 | 0.6 | 4 | 0.7 |
| Person unknown to the victim | 0 | 0 | 8 | 2.4 | 361 | 7.7 | 546 | 5.7 | 235 | 6.5 | 39 | 6.7 |
| Multiple persons unknown to the victim | 0 | 0 | 9 | 2.7 | 379 | 8.1 | 624 | 6.5 | 246 | 6.8 | 28 | 4.8 |
| Other specified person | 6 | 2.9 | 44 | 13.1 | 220 | 4.7 | 457 | 4.8 | 204 | 5.6 | 65 | 11.2 |
| Unspecified person | 30 | 14.5 | 73 | 21.7 | 2,306 | 49.2 | 4,182 | 43.6 | 1,495 | 41.3 | 158 | 27.2 |
| **Total**[(a)] | **207** | **100** | **337** | **100** | **4,684** | **100** | **9,598** | **100** | **3,618** | **100** | **581** | **100** |

(a) Contains 92 cases of *Legal intervention involving firearm discharge* or *Operations of war*.

# How have assault cases changed over time?

Age-standardised rates of *Assault* for males were consistently higher than for females at all times throughout the period, although in recent years the gap has narrowed (Figure 12.5). There has been a decrease in the rate of *Assault* injury for males from 2008–09 (172 cases per 100,000 population) to the most recent year (110 cases per 100,000).

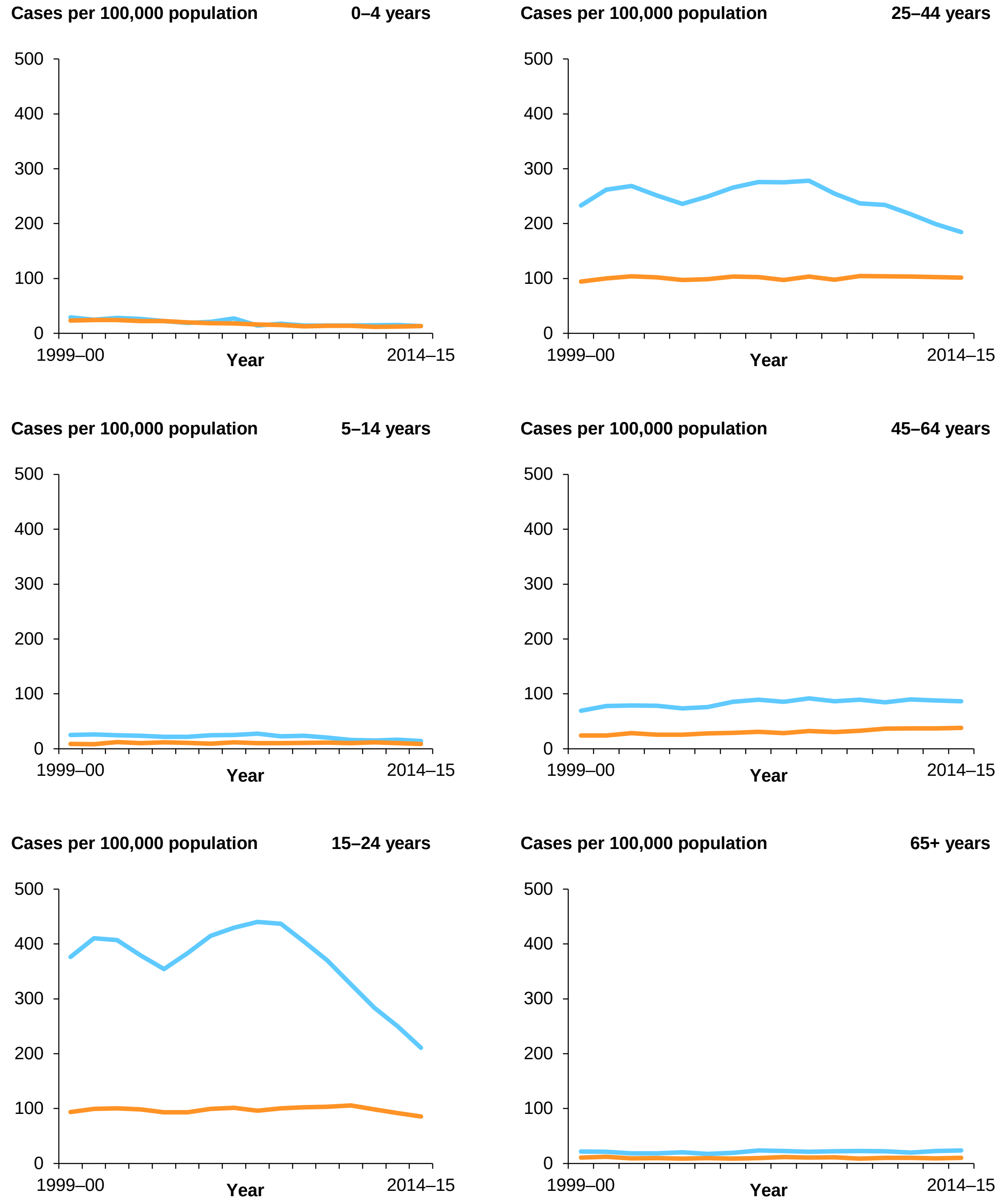



*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 12.

**Figure 12.5: Age-standardised rates of assault, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 12.6. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015). As can be seen in Figure 12.6, age-specific rates of *Assault* vary by age and by sex, with the highest rates for both males and females occurring in the 15–24 age group.

Rates of *Assault* injury for males aged 15–24 and 25–44 have continued to decline since about the middle of the period. For males aged 15–24, the rate of *Assault* has almost halved from 2005–06 (414 cases per 100,000 population) to 2014–15 (211). A similar decrease can be seen in males aged 25–44, where the rate of *Assault* injury has dropped from 278 in 2008–09 to 185 in the most recent year.

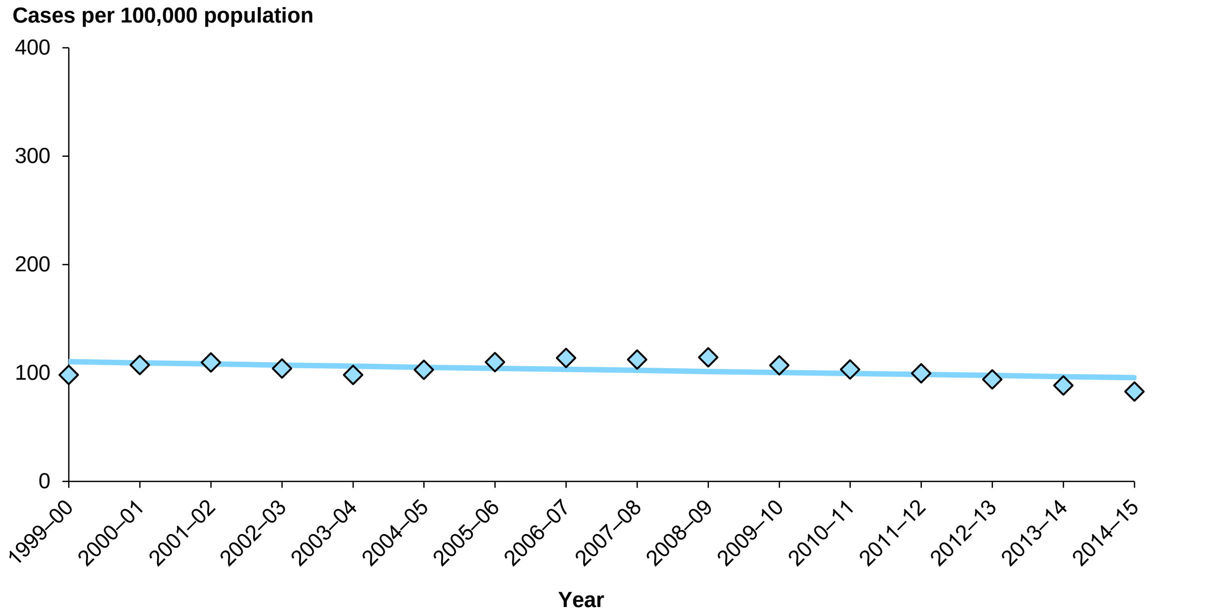



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 12.

**Figure 12.6: Age-specific rates of cases due to assault, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of injury due to *Assault* decreased from 98 per 100,000 population in 1999–00 to 83 per 100,000 in 2014–15 (Figure 12.7). The decrease averaged 0.9% per year and was statistically significant (95% CI: –1.8%, –0.1%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 12.

**Figure 12.7: Modelled age-standardised rates of assault, Australia, 1999–00 to 2014–15**

# 13 Other external causes of accidental injury

This chapter presents information on patients who were admitted to hospital as a result of an injury due to *Other external causes of accidental injury*. Information in this chapter includes:

- age group and sex of the patient
- cause of the injury
- trends over time.

The specific causes of injury due to *Other external causes of accidental injury* are listed in Box 13.1 and include events such threats to breathing, electrical injuries and exposure to the forces of nature.

**Key findings**

Almost 66,000 cases of hospitalised injury were due to *Other external causes of accidental injury* in 2014–15.

**Sex of patient**

In 2014–15, males made up two-thirds (41,582) of all hospitalised cases of injury due to *Other external causes of accidental injury* .

**Age of patient**

Age-specific rates for males were significantly higher than for females, up to the 70–74 age group.

**Indigenous status**

Injury due to *Other external causes of accidental injury* made up a smaller proportion of all hospitalised cases among Indigenous people (8%) compared with other Australians (14%), and rates of injury were similar.

**Cause of injury**

The most common cause of injury due to *Other external causes of accidental injury* was *Accidental exposure to other and unspecified factors* (70%), with the second most common cause being *Overexertion, travel and privation* (22%).

**Trends in injury**

Injury hospitalisations due to *Other external causes of accidental injury* rose over the period 1999–00 to 2014–15, increasing on average by 1.8% per year.

## What methods were used?

This chapter includes injury cases meeting the criteria set out in Section 1.3, providing that the first-reported external-cause code is in the ICD-10-AM ranges W75–W84 (*Other accidental threats to breathing*), W85–W99 (*Exposure to electric current, radiation and extreme ambient air temperature and pressure*), X20–X29 (*Contact with venomous animals and plants*), X30–X39 (*Exposure to forces of nature*), X50–X57 (*Overexertion, travel and privation*), and X58–X59 (*Accidental exposure to other and unspecified factors*) in 'Chapter XX External causes of morbidity and mortality'.

Relevant terms and information applying to the data used in this chapter are summarised in boxes 1.1, 1.2, and 13.1. Further information on methods is provided in 'Appendix A: Data issues'.

**Box 13.1: Other external causes of accidental injury**

This chapter focuses on several sections of ICD-10-AM 'Chapter XX External causes of morbidity and mortality': *Other 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); *Accidental exposure to other and unspecified factors* (X58–X59); *Overexertion, travel and privation* (X50–X57); *and Exposure to forces of nature* (X30–X39), which include:

**Other accidental threats to breathing (W75–W84)**

- Accidental suffocation and strangulation in bed (W75)
- Other accidental hanging and strangulation (W76)
- Threat to breathing due to cave-in, falling earth and other substances (W77)
- Inhalation of gastric contents (W78)
- Inhalation and ingestion of food causing obstruction of respiratory tract (W79)
- Inhalation and ingestion of other objects causing obstruction of respiratory tract (W80)
- Confined to or trapped in a low-oxygen environment (W81)
- Other specified threats to breathing (W83)
- Unspecified threat to breathing (W84).

**Exposure to electric current, radiation and extreme ambient air temperature and pressure (W85–W99)**

- Exposure to electric transmission lines (W85)
- Exposure to other specified electric current (W86)
- Exposure to unspecified electric current (W87)
- Exposure to ionising radiation (W88)
- Exposure to man-made visible and ultraviolet light (W89)
- Exposure to other non-ionising radiation (W90)
- Exposure to unspecified type of radiation (W91)
- Exposure to excessive heat of man-made origin (W92)
- Exposure to excessive cold of man-made origin (W93)
- Exposure to high and low air pressure and changes in air pressure (W94)
- Exposure to other and unspecified man-made environmental factors (W99).

*(continued)*

**Box 13.1 (continued): Other external causes of accidental injury**

**Contact with venomous animals and plants (X20–X29)**

- Contact with venomous snakes and lizards (X20)
- Contact with spiders (X21)
- Contact with scorpions (X22)
- Contact with hornets, wasps and bees (X23)
- Contact with centipedes and venomous millipedes (tropical) (X24)
- Contact with other venomous arthropods (X25)
- Contact with venomous marine animals and plants (X26)
- Contact with other specified venomous animals (X27)
- Contact with other specified venomous plants (X28)
- Contact with unspecified venomous animal or plant (X29).

**Exposure to forces of nature (X30–X39)**

- Exposure to excessive natural heat (X30)
- Exposure to excessive natural cold (X31)
- Exposure to sunlight (X32)
- Victim of lightning (X33)
- Victim of earthquake (X34)
- Victim of volcanic eruption (X35)
- Victim of avalanche, landslide and other earth movements (X36)
- Victim of cataclysmic storm (X37)
- Victim of flood (X38)
- Exposure to other and unspecified forces of nature (X39).

**Overexertion, travel and privation (X50–X57)**

- Overexertion and strenuous or repetitive movements (X50)
- Travel and motion (X51)
- Prolonged stay in weightless environment (X52)
- Lack of food (X53)
- Lack of water (X54)
- Unspecified privation (X57).

**Accidental exposure to other and unspecified factors (X58–X59)**

- Exposure to other specified factors (X58)
- Exposure to unspecified factor (X59).

## How many Other external causes of accidental injury cases were there in 2014–15?

There were an estimated 65,689 cases due to *Other external causes of accidental injury* during 2014–15. Cases due to *Other external causes of accidental injury* made up 14% of all hospitalised injury cases in 2014–15 (Figure 13.1).

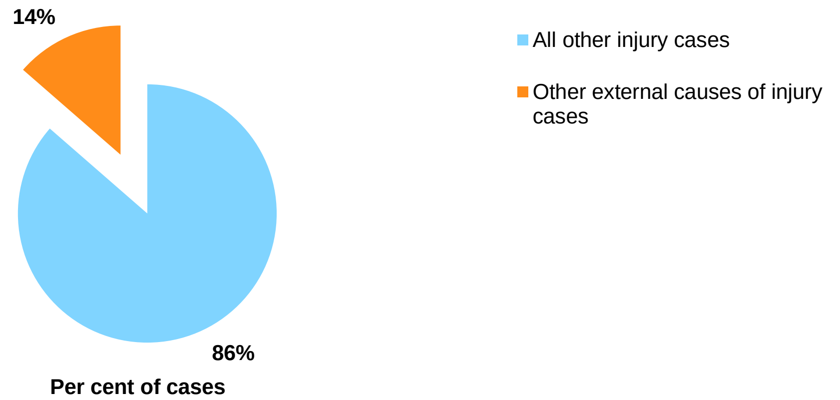
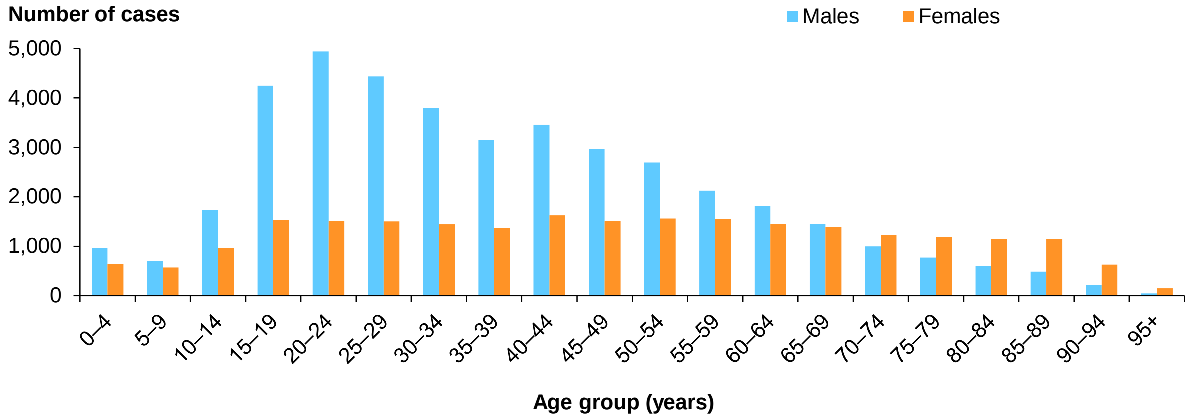



**Figure 13.1: Proportion of injury cases due to Other external causes of accidental injury, Australia, 2014–15**

## Age group and sex, 2014–15

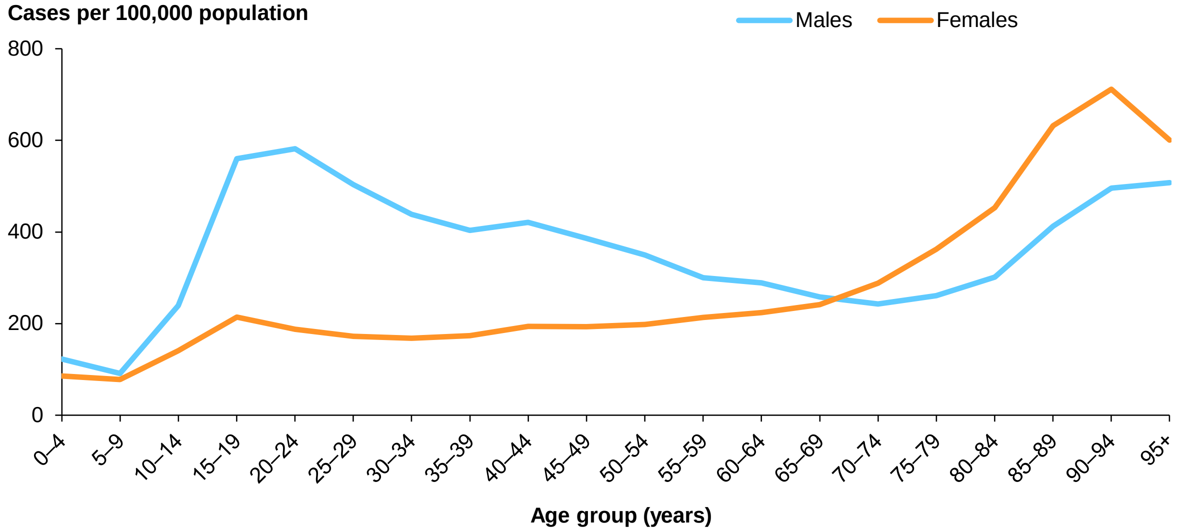
Of the 65,689 cases due to *Other external causes of accidental injury* in Australia in 2014–15, two-thirds were male (41,582). Gender differences by age were apparent, with higher numbers of cases among males occurring at every age group until the 70–74 age group (Figure 13.2). For both males and females, cases of *Other external causes of accidental injury* were more frequent from the 15–19 group, more so in males. Among males, the largest number of cases due to *Other external causes of accidental injury* occurred in the 20–24 age group (4,938). Among females, the largest number of cases occurred in the 40–44 age group (1,623).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 13.

**Figure 13.2: Number of Other external causes of accidental injury cases, by age group, by sex, Australia, 2014–15**

Age-specific rates for males were significantly higher than for females, up to the 70–74 age group (Figure 13.3). Male rates for *Other external causes of accidental injury* peaked in the 20–24 age group, with an age-specific rate of 582 hospitalised cases per 100,000 population, compared with 187 per 100,000 for females in the same age group. The highest rate for females occurred in the 90–94 age group (712).




*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 13.

**Figure 13.3: Age-specific rates of Other external causes of accidental injury, by age group, by sex, Australia, 2014–15**

# Nature of injury

The diverse causes of *Other external causes of accidental injury* resulted in damage to various body regions, but the most common region was the *Hip and lower limb* (34%), both for males (32%) and for females (38%) (Table 13.1).

**Table 13.1: Cases due to Other external causes of accidental injury, by body region injured, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Head and neck | 3,621 | 8.7 | 2,101 | 8.7 | 5,722 | 8.7 |
| Trunk (thorax, abdomen, lower back, lumbar spine and pelvis) | 2,981 | 7.2 | 2,982 | 12.4 | 5,963 | 9.1 |
| Shoulder and upper limb (excluding wrist and hand) | 7,464 | 18.0 | 3,591 | 14.9 | 11,055 | 16.8 |
| Wrist and hand | 8,373 | 20.1 | 2,597 | 10.8 | 10,970 | 16.7 |
| Hip and lower limb (excluding ankle and foot) | 13,106 | 31.5 | 9,072 | 37.6 | 22,178 | 33.8 |
| Ankle and foot | 2,355 | 5.7 | 1,611 | 6.7 | 3,966 | 6 |
| Other, multiple and incompletely specified body regions | 830 | 2.0 | 620 | 2.6 | 1,450 | 2.2 |
| Injuries not described in terms of body region | 2,852 | 6.9 | 1,533 | 6.4 | 4,385 | 6.7 |
| **Total** | **41,582** | **100** | **24,107** | **100** | **65,689** | **100** |

*Soft-tissue injuries* (36%) and *Fractures* (33%) were the most common types of injury due to *Other external causes of accidental injury* in 2014–15 (Table 13.2). Males and females had similar patterns of type of injury.

**Table 13.2: Cases due to Other external causes of accidental injury, by type of injury, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Type of injury** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Fracture | 12,836 | 30.9 | 8,554 | 35.5 | 21,390 | 32.6 |
| Dislocation | 2,045 | 4.9 | 1,592 | 6.6 | 3,637 | 5.5 |
| Soft-tissue injury | 15,982 | 38.4 | 7,926 | 32.9 | 23,908 | 36.4 |
| Open wound | 3,026 | 7.3 | 1,531 | 6.4 | 4,557 | 6.9 |
| Intracranial injury | 304 | 0.7 | 120 | 0.5 | 424 | 0.6 |
| Internal organ or vessel of trunk | 132 | 0.3 | 90 | 0.4 | 222 | 0.3 |
| Burn | 166 | 0.4 | 48 | 0.2 | 214 | 0.3 |
| Superficial injury | 1,022 | 2.5 | 825 | 3.4 | 1,847 | 2.8 |
| Poisoning or toxic effect | 1,592 | 3.8 | 913 | 3.8 | 2,505 | 3.8 |
| Other and unspecified injuries | 4,477 | 10.7 | 2,508 | 10.4 | 6,985 | 10.6 |
| **Total** | **41,582** | **100** | **24,107** | **100** | **65,689** | **100** |

# Remoteness of usual residence

The age-standardised rate of injury due to *Other external causes of accidental injury* in 2014–15 varied according to remoteness of usual residence (Table 13.3). The highest rates were in *Remote* and *Very remote* areas (372 and 403 per 100,000 population, respectively).

**Table 13.3: Other external causes of accidental injury cases, by remoteness of usual residence, Australia, 2014–15**

| | Remoteness of usual residence | | | | |
|---|---|---|---|---|---|
| **Indicators** | **Major cities** | **Inner regional** | **Outer regional** | **Remote** | **Very remote** |
| Other external causes of accidental injury cases | 44,949 | 12,093 | 6,142 | 1,174 | 811 |
| Age-standardised rate/100,000 population | 264.7 | 286.8 | 302.9 | 372.4 | 403.3 |

# Aboriginal and Torres Strait Islander people

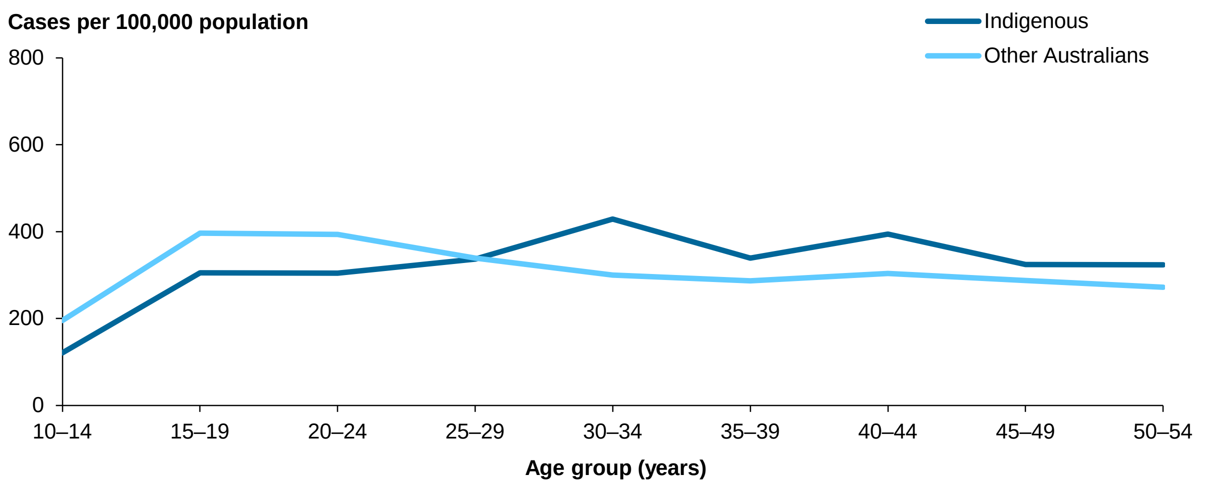
There were an estimated 5,247 cases of Indigenous people hospitalised as a result of *Other external causes of accidental injury* in 2014–15 (Table 13.4). More males were hospitalised than females. *Other external causes of accidental injury* made up a smaller proportion of all hospitalised cases among Indigenous people (8%), compared with other Australians (14%). The age-standardised rate of *Other external causes of accidental injury* among Indigenous people (283 cases per 100,000) was similar to that of other Australians (276), both for Indigenous males and for Indigenous females.

**Table 13.4: Other external causes of accidental injury cases, by Indigenous status, by sex, Australia, 2014–15**

| | Indigenous | | | Other Australians | | |
|---|---|---|---|---|---|---|
| **Indicators** | **Males** | **Females** | **Persons** | **Males** | **Females** | **Persons** |
| Other external causes of accidental injury cases | 1,138 | 705 | 1,843 | 40,444 | 23,402 | 63,846 |
| Age-standardised rate/100,000 population | 341.1 | 224.7 | 282.8 | 356.3 | 192.3 | 275.6 |

Due to the small case numbers of injury due to *Other external causes of accidental injury* among Indigenous people over the age of 54 and younger than 15 years, analyses were restricted by age and limited to *All Indigenous people*.

Age-specific rates of injury due to *Other external causes of accidental injury* were higher at all age groups for Indigenous people, compared with other Australians (Figure 13.4). Rates of injury were lower among Indigenous people up to the 25–29 age group, after which they were consistently higher than for other Australians. The highest rate of injury occurred in Indigenous people aged 30–34 (429 cases per 100,000 population), while the highest rate among other Australians occurred among those aged 15–19 (397).




*Notes*

1. 'Other Australians' includes cases where Indigenous status was not stated.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 13.

**Figure 13.4: Age-specific rates of Other external causes of accidental injury, by Indigenous status, by selected age group, Australia, 2014–15**

# Socioeconomic status

The proportion of *Other external causes of accidental injury* cases in each SES group ranged between 17% and 22% (Table 13.5). The highest proportion, for both males and females, were for people living in areas with the lowest (most disadvantaged) SES classification.

**Table 13.5: Other external causes of accidental injury cases, by SEIFA quintile, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **SEIFA** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| 1–Lowest | 7,267 | 17.5 | 4,206 | 17.4 | 11,473 | 17.5 |
| 2 | 7,965 | 19.2 | 4,591 | 19.0 | 12,556 | 19.1 |
| 3 | 8,541 | 20.5 | 4,880 | 20.2 | 13,421 | 20.4 |
| 4 | 8,534 | 20.5 | 4,926 | 20.4 | 13,460 | 20.5 |
| 5–Highest | 8,916 | 21.4 | 5,325 | 22.1 | 14,241 | 21.7 |
| **Total[(a)]** | **41,582** | **100** | **24,107** | **100** | **65,689** | **100** |

(a) Total includes cases for which the SES group was not able to be determined.

# Cause of Other external causes of accidental injury

The majority of cases in the *Other external causes of accidental injury* category were coded to *Accidental exposure to other and unspecified factors* (70%) (Table 13.6). No further details on these cases were available. Of the remaining cases, *Overexertion, travel and privation* accounted for 22% and the proportion of cases of this type was similar for males and females.

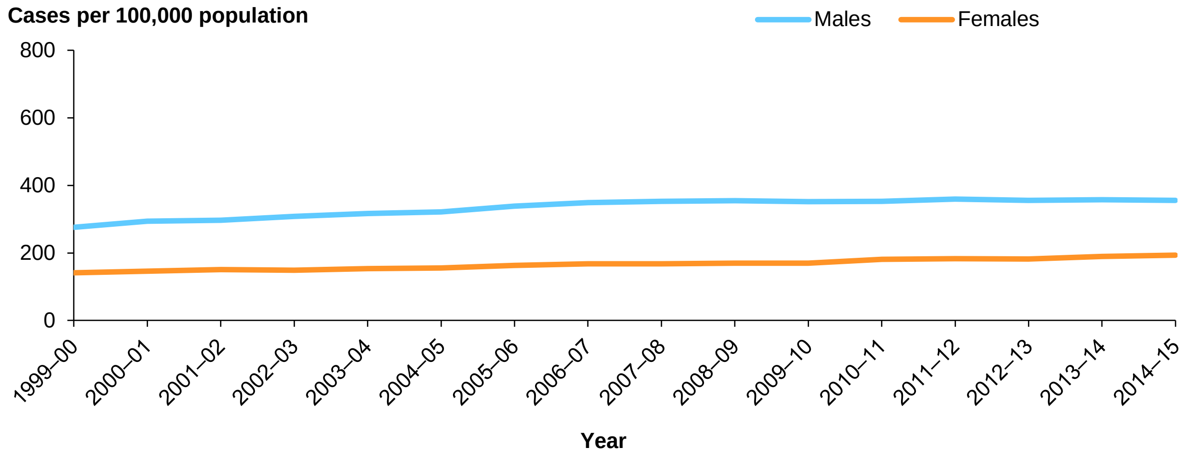
**Table 13.6: Types of Other external causes of accidental injury cases, by sex, Australia, 2014–15**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **Cause** | **Number** | **%** | **Number** | **%** | **Number** | **%** |
| Other accidental threats to breathing | 399 | 1.0 | 337 | 1.4 | 736 | 1.1 |
| Exposure to electric current, radiation and extreme ambient air temperature and pressure | 523 | 1.3 | 172 | 0.7 | 695 | 1.1 |
| Contact with venomous animals and plants | 2,195 | 5.3 | 1,178 | 4.9 | 3,373 | 5.1 |
| Exposure to forces of nature | 445 | 1.1 | 213 | 0.9 | 658 | 1.0 |
| Overexertion, travel and privation | 8,431 | 20.3 | 6,089 | 25.3 | 14,520 | 22.1 |
| Accidental exposure to other and unspecified factors | 29,589 | 71.2 | 16,118 | 66.9 | 45,707 | 69.6 |
| **Total** | **41,582** | **100** | **24,107** | **100** | **65,689** | **100** |

The causes of hospitalisation as a result of *Other external causes of accidental injury* cases did not vary much by age. The exception was the proportion of *Other accidental threats to breathing* cases among those aged 0–4 (12%) (data not shown).

# How have Other external causes of accidental injury cases changed over time?

Age-standardised rates of *Other external causes of accidental injury* for males were consistently higher than for females at all times throughout the period and there was very little change (Figure 13.5).

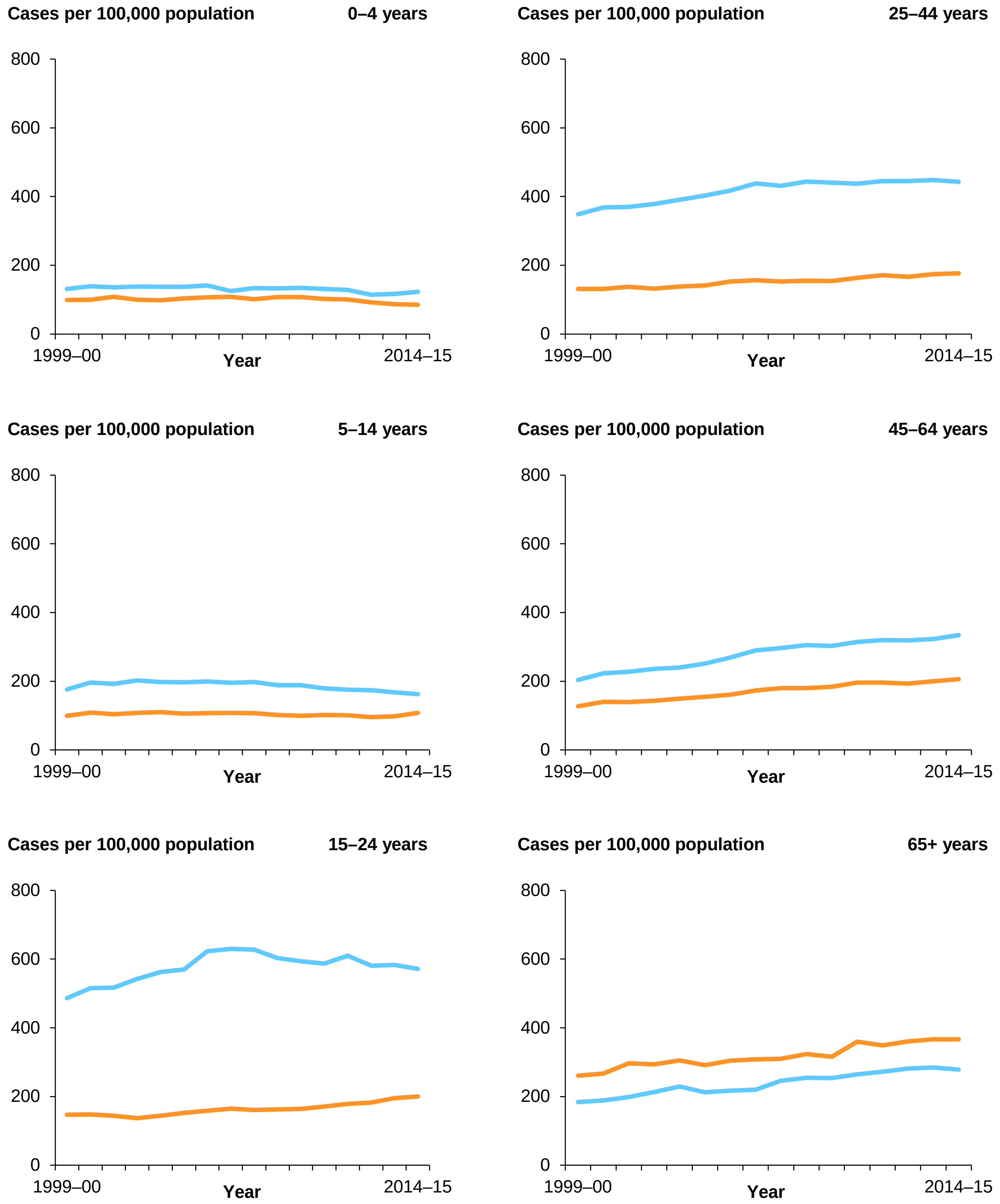



*Note:* Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 13.

**Figure 13.5: Age-standardised rates of Other external causes of accidental injury, by sex, Australia, 1999–00 to 2014–15**

An examination of changes in rates of injury over time, by broad age group as well as by sex, is shown in Figure 13.6. The figures show an additional 2 years of data since the publication of the previous *Trends in hospitalised injury* report (AIHW: Pointer 2015). As can be seen in Figure 13.6, age-specific rates of *Other external causes of accidental injury* vary by age and by sex. The highest rates for males occurred in the 15–24 age group, while for females it was among those aged 65 or over.

Rates of *Other external causes of accidental injury* were increasing among the 3 older age groups, particularly among males.

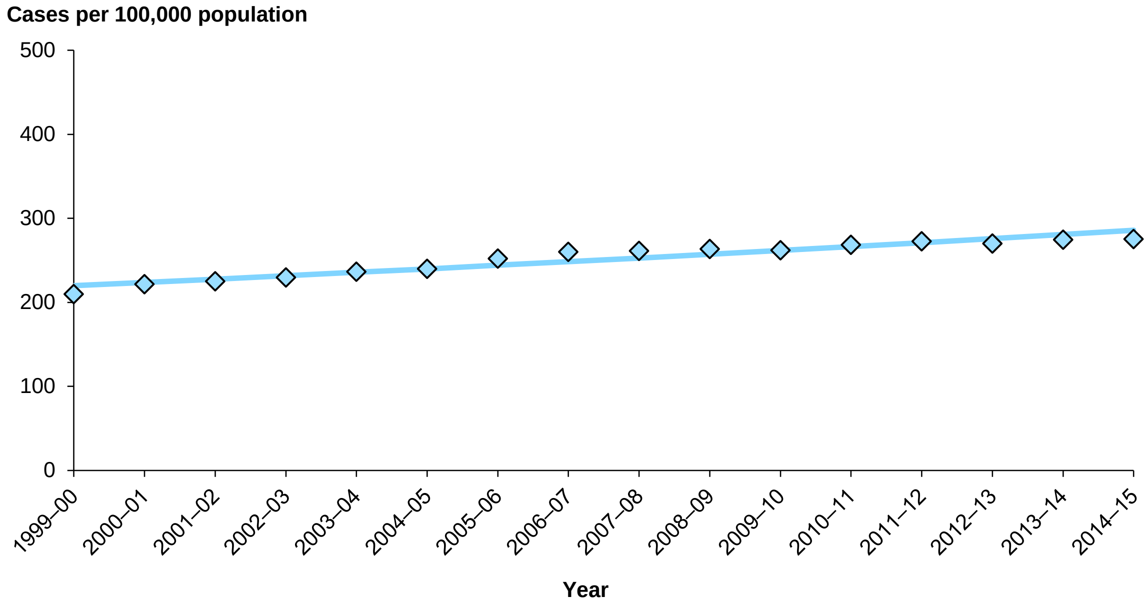



*Notes*

1. Rates for males are indicated by the blue line and rates for females by the orange line in all charts.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 13.

**Figure 13.6: Age-specific rates of cases due to Other external causes of accidental injury, by age group, by sex, Australia, 1999–00 to 2014–15**

Age-standardised rates of injury due to *Other external causes of accidental injury* increased from 210 per 100,000 population in 1999–00 to 276 per 100,000 in 2014–15 (Figure 13.7). The increase averaged 1.8% per year and was statistically significant (95% CI: 1.5%, 2.0%).




*Notes*

1. The solid line represents the modelled rate from 1999–00 to 2014–15. The filled symbols represent the observed age-standardised rate value for each year.
2. Data underpinning this figure can be found in the supplementary table spreadsheet for Chapter 13.

**Figure 13.7: Modelled age-standardised rates of injury due to Other external causes of accidental injury, Australia, 1999–00 to 2014–15**

# 14 Non-fatal burden of injury

This chapter includes information taken from the Australian Burden of Disease Study (ABDS) 2011 (AIHW 2016d) on the non-fatal burden of injury in Australia.

Burden of disease analysis is a technique used to assess and compare the impact of different diseases; conditions or injuries; and risk factors on a population. This section presents data on the non-fatal burden of injury, based on the ABDS 2011 (AIHW 2016d). The results described in this section are for the period 2011 and are not directly comparable with 2014–15 data presented elsewhere in this report.

Results are presented as years lived with a disability (YLD), which is a measure of the years of what could have been a healthy life but were instead spent in states of less than full health—due to injury, in the case of this analysis. Further details on the calculation and interpretation of YLD can be found in Appendix A and in Box 14.1.

The 'external cause' categories presented in Chapter 2 are not all equivalent to the categories used in this report:

- The inclusion criteria for categories of injury due to *Accidental* d*rowning and submersion*, *Accidental poisoning, Falls* and *Thermal causes* are equivalent.
- YLD estimates for *Injuries due to intentional self-harm* and *Assault* include an additional code covering sequelae of intentional self-harm and assault, respectively.
- The detailed transport-crash-related categories are not used in this report and the *Other unintentional injury* and all *Other external causes of injury* categories are also not equivalent.

A full list of the inclusions for the ABDS categories can be found in Table A2 of the ABDS 2011 (AIHW 2016d).

**Box 14.1: How are burden of disease estimates calculated?**

Expressed as YLD, non-fatal burden is a measure of healthy years lost due to ill health. YLD are calculated from the point prevalence (the number of people with the condition on a given day) multiplied by a disability weight (which reflects the severity of the disease). The non-fatal burden is added to the fatal burden, or years of life lost due to premature death (YLL), to derive the total burden experienced by the population.

Total YLD are influenced by the number of people with each disease, the duration of its effects and how severe those effects are. The overall burden, which is expressed as disability-adjusted life years (DALY), is the sum of YLL and YLD. One DALY is 1 year of 'healthy life' lost due to premature death or living with the effects of an illness or injury. The more DALY associated with a disease, the greater the burden.

Previous Australian burden of disease studies primarily estimated non-fatal burden based on incident cases in the year, which described the number of healthy years lost from the new cases in a given year that will accrue into the future.

As a result, the estimates in this report cannot be compared with incidence-based estimates in previous Australian burden of disease studies. See *Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011* (AIHW 2016d) and *Australian Burden of Disease 2011: methods and supplementary material* (AIHW 2016b) for more information.

*(continued)*

**Box 14.1 (continued): How are burden of disease estimates calculated?**

**How were burden of injury estimates calculated?**

In the ABDS 2011, injury burden was reported using 2 perspectives—the external cause that resulted in the injury (for example, *Road traffic accident*, *Falls* or *Poisoning*), and the nature of the injury (for example, Hip fracture, traumatic brain injury or poisoning). Only external cause estimates are reported here.

YLD was estimated for each injury sustained in an incident. That is, where a person sustained multiple injuries—for example, a traumatic brain injury, plus a fractured pelvis, plus an arm amputation from a road traffic accident—the YLD associated with each injury in the disease list was counted. To maintain consistency for YLD, the total sum of these YLD were attributed to a single external cause.

Non-fatal injuries were identified as all injuries either admitted to hospital ('admitted') or presented to an emergency department without hospital admission ('non-admitted'). Injury cases were identified in NHMD based on separations in the 2003 and 2011 calendar years.

Detailed information on the methods used to derived estimates of injury burden can be found in the report *Australian Burden of Disease 2011: methods and supplementary material* (AIHW 2016b).

**Aboriginal and Torres Strait Islander people**

Information on the burden of injury among Indigenous people is presented in the same external-cause groupings as for all injury cases. Hospitalisation data used in the calculation of Indigenous YLD estimates were adjusted for Indigenous under-identification using adjustment factors from hospital data quality studies undertaken by the AIHW (AIHW 2013).

Detailed information on the methods used to calculate Indigenous burden of injury can be found in the report *Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011* (AIHW 2016c). See also *Australian Burden of Disease Study 2011: methods and supplementary material* (AIHW 2016b) for more information.

Injuries were the 5th leading cause (9%) of total disease burden in Australia in 2011. Together, cancer (19% of total DALY), cardiovascular diseases (15%), mental & substance-use disorders (12%), musculoskeletal conditions (12%) and injuries (9%) accounted for around two-thirds of the disease burden in Australia (69% for males, 62% for females) (AIHW 2016d).

In terms of non-fatal burden (YLD), injuries were responsible for a higher proportion of the burden in males (5.6%), compared with females (2.1%).

In 2011, Australians lost 84,260 years of healthy life due to the impact of living with injury. The non-fatal burden of injury was more than twice as high in males, who lost 60,432 years of healthy life compared with 23,828 years for females. Additionally, a comparison of age-standardised YLD rates showed that males had around 2.7 times the health loss due to injuries, compared with females.

An analysis by external cause of injury shows major differences in YLD by cause (Table 14.1). *Falls* accounted for the most non-fatal injury burden (42%), with around 35,000 years of healthy life lost. This was followed by *Homicide and violence*, which contributed to 13% of total injury YLD, and *Road traffic injuries to motor vehicle occupants* (9%). Males lost more years of healthy life due to *Assault* (8,911 YLD, representing 15% of total injury burden) compared with females (10,601 YLD; 7%).

**Table 14.1: Non-fatal burden (YLD), by external cause of injury, by sex, Australia, 2011**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **YLD** | **% Injury YLD** | **YLD** | **% Injury YLD** | **YLD** | **% Injury YLD** |
| Road traffic injuries - motor vehicle occupants | 5,175 | 8.6 | 2,155 | 9.0 | 7,330 | 8.7 |
| Road traffic injuries - motorcyclists | 2,837 | 4.7 | 171 | 0.7 | 3,008 | 3.6 |
| Other road traffic injuries | 2,993 | 5.0 | 968 | 4.1 | 3,961 | 4.7 |
| Other land transport injuries | 4,223 | 7.0 | 1,455 | 6.1 | 5,677 | 6.7 |
| Drowning | 233 | 0.4 | 110 | 0.5 | 342 | 0.4 |
| Poisoning | 486 | 0.8 | 266 | 1.1 | 752 | 0.9 |
| Falls | 22,783 | 37.7 | 12,199 | 51.2 | 34,982 | 41.5 |
| Suicide and self-inflicted injuries | 741 | 1.2 | 809 | 3.4 | 1,550 | 1.8 |
| Homicide and violence | 8,911 | 14.7 | 1,689 | 7.1 | 10,601 | 12.6 |
| Fire, burns and scalds | 2,658 | 4.4 | 1,369 | 5.7 | 4,027 | 4.8 |
| **Other external causes of accidental injury** | | | | | | |
| Other unintentional injuries | 8,393 | 13.9 | 2,068 | 8.7 | 10,461 | 12.4 |
| All other external causes of injury | 999 | 1.7 | 570 | 2.4 | 1,568 | 1.9 |
| **Injury YLD** | **60,432** | **100** | **23,828** | **100** | **84,260** | **100** |

*Sources:* AIHW 2016b; AIHW 2016d.

## Aboriginal and Torres Strait Islander people

Injuries are the second leading cause of disease burden in Indigenous Australians, after mental and substance-use disorders (AIHW 2016c). In 2011, injuries were responsible for 28,790 (15%) of all DALY (24.1% of YLL and 5% of YLD) in Indigenous Australians (AIHW 2016c). In 2011, Indigenous Australians lost 4,523 years of healthy life due to the impact of living with injury (Table 14.2).

Injury was ranked as the fourth leading cause of non-fatal burden for Indigenous males, accounting for 7% (3,176 YLD) of the non-fatal burden, compared with 3% (1,347 YLD) for Indigenous females. A comparison of age-standardised YLD rates showed Indigenous males had around 2.5 times the health loss due to injuries than Indigenous females (AIHW 2016c).

**Table 14.2: Non-fatal burden (YLD), Indigenous Australians, by external cause of injury, by sex, 2011**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **YLD** | **% Injury YLD** | **YLD** | **% Injury YLD** | **YLD** | **% Injury YLD** |
| Road traffic injuries—motor vehicle occupants | 264 | 8.3 | 119 | 8.9 | 383 | 8.5 |
| Road traffic injuries—motorcyclists | 146 | 4.6 | 10 | 0.8 | 157 | 3.5 |
| Other road traffic injuries | 161 | 5.1 | 54 | 4.0 | 214 | 4.7 |
| Other land transport injuries | 220 | 6.9 | 82 | 6.1 | 303 | 6.7 |
| Drowning | 13 | 0.4 | 12 | 0.9 | 26 | 0.6 |
| Poisoning | 26 | 0.8 | 20 | 1.5 | 46 | 1.0 |

*(continued)*

**Table 14.2 (continued): Non-fatal burden (YLD) by external cause of injury, by sex, Indigenous Australians, 2011**

| | Males | | Females | | Persons | |
|---|---|---|---|---|---|---|
| **External cause** | **YLD** | **% Injury YLD** | **YLD** | **% Injury YLD** | **YLD** | **% Injury YLD** |
| Falls | 1,182 | 37.2 | 586 | 43.5 | 1,769 | 39.1 |
| Suicide and self-inflicted injuries | 40 | 1.3 | 52 | 3.9 | 93 | 2.0 |
| Homicide and violence | 487 | 15.3 | 100 | 7.4 | 586 | 13.0 |
| Fire, burns and scalds | 142 | 4.5 | 151 | 11.2 | 293 | 6.5 |
| **Other external causes of accidental injury** | | | | | | |
| Other unintentional injuries | 446 | 14.0 | 124 | 9.2 | 570 | 12.6 |
| All other external causes of injury | 48 | 1.5 | 35 | 2.6 | 82 | 1.8 |
| **Injury YLD** | **3,176** | **100** | **1,347** | **100** | **4,523** | **100** |

*Sources:* AIHW 2016b; AIHW 2016c.

# Appendix A: Data issues

## Data sources

The data on hospital separations are from the Australian Institute of Health and Welfare's National Hospital Morbidity Database (NHMD). Comprehensive information on the quality of the data for 2014–15 is available in *Australian hospital statistics 2014–15* (AIHW 2016a) and in the data quality statement below. Nearly all injury cases admitted to hospitals in Australia are included in the NHMD data reported.

Diagnosis, procedure and external-cause data for 2014–15 were reported to the NHMD by all states and territories using the 8th edition of the International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification (ICD-10-AM) (NCCC 2012). Data from 1999–2000 were coded to earlier editions of ICD-10-AM.

Denominators for most age-specific and age-standardised rates are estimated resident population (ERP) values as at 31 December of the relevant year. Australian ERPs for 30 June 2001 (persons, by 5-year age groups to 85+) were used as the standardising population throughout the report (ABS 2003). Data from other sources, mostly based on ERPs, were used as denominators for rates by remoteness of usual residence and Indigenous status (see 'Rates', below).

## Selection criteria

This report is intended to describe the population incidence of injuries newly occurring that resulted in admission to a hospital. This section describes the criteria that were used to select cases to achieve this purpose.

### Period

This report is restricted to admitted-patient episodes that ended in the period 1 July 2014 to 30 June 2015 for the single-year analyses, and admitted-patient episodes that ended in the period 1 July 1999 to 30 June 2015 for the trend analyses. Selection was based on the financial year of separation, but choice of this time period is arbitrary. Use of calendar year would result in different rates, particularly where case numbers were small.

### Injury

Injury separations were defined as records that contained a principal diagnosis in the ICD-10-AM range S00–T75 or T79 using 'Chapter XIX Injury, poisoning and certain other consequences of external causes' codes. Nearly all injury separations were thought to be included in the data reported, representing minimal risk of sampling error.

## Estimating incident cases

Each record in the NHMD refers to a single episode of care in a hospital. Some injuries result in more than 1 episode in hospital and, hence, more than 1 NHMD record.

This can occur in 2 main ways:

- a person is admitted to 1 hospital, then transferred to another or has a change in care type (for example, acute to rehabilitation) within the 1 hospital
- a person has an episode of care in hospital, is discharged home (or to another place of residence) and is then admitted for further treatment for the same injury, to the same hospital or another one.

The NHMD does not include information designed to enable the set of records belonging to an injury case to be recognised as such. Hence, there is potential for some incident injury cases to be counted more than once, which occurs when a single incident injury case results in 2 or more NHMD records being generated, all of which satisfy the selection criteria being used.

Information in the NHMD enables this problem to be reduced, though not eliminated. The approach used for this report makes use of the ‘Mode of admission’ variable, which indicates whether the current episode began with inward transfer from another acute care hospital. Episodes of this type (inward transfers) are likely to have been preceded by another episode that also met the case selection criteria for injury cases, so are omitted from our estimated case counts.

This procedure should largely correct for over-estimation of cases due to transfers, but will not correct for over-estimation due to re-admissions.

# Length of stay

The patient days reported during the episodes that were omitted to reduce overestimation of incident cases are part of the hospital care provided to the incident cases and are therefore retained when calculating mean and total length of stay.

Note that ‘length of stay’ as presented in this report does not include some patient days potentially attributable to injury. In particular, it does not include days for most aspects of injury rehabilitation, which were difficult to assign correctly without information enabling identification of all admitted episodes associated with an injury case.

# Intensive care and continuous ventilatory support

## Intensive care

Data for hours in an ICU are required to be reported by public hospitals that have either an approved level 3 adult ICU or an approved paediatric ICU. Information on ICU hours was not available for private hospitals in New South Wales, Tasmania, the Australian Capital Territory or the Northern Territory.

A level 3 adult ICU must be capable of providing complex, multisystem life support for an indefinite period; be a tertiary referral centre for patients in need of intensive care services; and have extensive backup laboratory and clinical service facilities to support the tertiary referral role. It must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring for an indefinite period—or care of a similar nature.

A paediatric ICU must be capable of providing complex, multisystem life support for an indefinite period; be a tertiary referral centre for children needing intensive care; and have extensive backup laboratory and clinical service facilities to support this tertiary role. It must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring for an indefinite period to infants and children aged less than 16—or care of a similar nature.

If a patient's episode involves more than 1 period in an ICU, then the total number of hours in ICU were summed for reporting. Values of '0' in the record were assumed to indicate no stay in ICU.

## Continuous ventilatory support

CVS (also known as invasive ventilatory support or mechanical ventilation) refers to the use of a machine to assist breathing.

If a patient undergoes CVS on more than 1 occasion during their admitted-patient episode, then the CVS hours are summed for reporting. For example, if a patient is on CVS on the first day of their admission, then again on the fourth day of their admission, the 2 periods of ventilation are added together for reporting.

Periods of ventilatory support that are associated with anaesthesia during surgery, and which are considered an integral part of the surgical procedure, are not included.

Information on CVS hours was not available for private hospitals in Tasmania, the Australian Capital Territory or the Northern Territory.

# Rates

## Age-standardisation

Cases per 100,000 population are reported as directly age-standardised rates based on the Australian population as at 30 June of the year of interest. The Australian population as at 30 June 2001 was used as the reference population. Age-standardisation of rates enables valid comparison across years and/or jurisdictions without being affected by the differences in age distributions.

### Changes in rates due to changes in underlying population data

All populations, except those used for analyses by Indigenous status, are based on the 2011 Census data. The age-standardised rates (per 100,000 population) presented in this report for the years 1999–00 to 2011–12 in time series tables have been calculated using 'rebased' estimated resident populations. Therefore, the separation rates reported for 1999–00 to 2011–12 in this report are not comparable to the separation rates presented in earlier hospitalised injury statistics reports.

## Population denominators

### General population

Where possible, rates were calculated using the final ERP as at 31 December in the relevant year as the denominator (for example, 31 December 2006 for 2006–07 data). Where tables of 31 December ERPs were not available but tables of 30 June ERPs were available, population denominators were calculated as the average of 30 June estimates for adjacent years. This method was used to produce denominators for rates by remoteness of usual residence.

### Indigenous population

Separation rates by Indigenous status were directly age-standardised, using the projected Indigenous population (low series) as at 30 June 2014. The population for non-Indigenous Australians was based on the estimated resident populations as at 30 June 2014, based on 2011 Census data.

Rates for Indigenous Australians in this report are only reported by financial year. Hence, all rates were calculated using, as the denominator, the final estimate of the estimated resident Indigenous population as at 31 December for the relevant period (for example, 31 December 2006 for 2006–07 cases). Since estimates of resident Indigenous populations are only provided for 30 June, estimates for 31 December are calculated by adding 2 consecutive 30 June estimates and dividing by 2 (for example, the estimate for 31 December 2006 is calculated by adding estimates for 30 June 2006 and 30 June 2007 and dividing by 2).

## Estimated change in rates over time

Estimated trends in rates of separations were reported as annual percentage change, obtained using negative binomial regression modelling using Stata 13 (StataCorp 2013).

The use of the terms 'significant' or 'significantly' throughout this report indicates an outcome that was *statistically* significant ($p$ = 0.05 or less).

Population-based rates of injury tend to have a similar value in 1 year and the next. Exceptions to this can occur (for example, due to a mass-casualty disaster) but are unusual in Australian injury data. Some year-to-year variation and other short-run fluctuations are to be expected, due to unknown and essentially random factors, and so small changes in rates over a short period normally do not provide a firm basis for asserting that a trend is present.

However, the period covered by this report is long enough for noteworthy changes to occur. The fundamental questions concerning a series of annual estimates of population-based rates are whether they show a statistically significant rise or fall over the period and, if so, the average rate of change. Analysis in this report is limited to those characteristics of change.

For each type of injury for which estimates of change were made:

- age-adjusted annual case numbers were obtained by multiplying age-adjusted unscaled rates by the Australian population in the corresponding year
- negative binomial regression, a method suitable for count-based data, was run with the adjusted case numbers as the dependent variable; year (as an integer, from 0 to the number of years of data) as an independent variable; and annual population as the exposure. The relevant outputs are a modelled rate for each year and a model-based estimate of average annual change in rate and its 95% confidence interval (CI).

Interpretation: if the 95% CI around the point estimate for trend is entirely above zero then the rates have tended to rise; if the 95% CI is entirely below zero then the rates have tended to fall; otherwise it cannot be said with useful confidence that the age-standardised rates tended to rise or to fall in the period considered.

# Classification of remoteness area

Data on geographical location of the patient's usual residence and of the hospital location are defined using the Australian Bureau of Statistics (ABS) Australian Statistical Geography Standard (ASGS). Data on remoteness area of usual residence are defined using the ABS's ASGS Remoteness Structure 2011 (ABS 2011). The period examined in this report is limited to 2001–02 to 2014–15, due to changes in the Remoteness Structure at the time of the 2006 Census (see ABS 2006).

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 was admitted to hospital, assigned on the basis of the reported Statistical Local Area (SLA) of residence.

The remoteness areas were specified according to the ABS Australian Standard Geographical Classification (ASGC). Remoteness categories were defined in a manner 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 to 0.2

*Inner regional* (for example, Hobart, Ballarat, Coffs Harbour), ARIA index >0.2 and ≤2.4

*Outer regional* (for example, Darwin, Cairns, Coonabarabran), ARIA index >2.4 and ≤5.92

*Remote* (for example, Alice Springs, Broome, Strahan), ARIA index of >5.92 and ≤10.53

*Very remote* (for example, Coober Pedy, Longreach, Exmouth), ARIA index >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. However, 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 one or other of the remoteness areas present in it, in proportion to the resident population of that SLA.

### Socioeconomic status

Data on SES groups are defined using the ABS's Socio-Economic Indexes for Areas 2011 (SEIFA 2011 [ABS 2013]).

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.

However, they are also compiled for higher levels of aggregation. The SEIFAs are described in detail on the ABS website <www.abs.gov.au>.

The SEIFA Index of Relative Socio-Economic Disadvantage (IRSD) is one of the ABS's SEIFA indexes. The relative disadvantage scores indicate the collective SES 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. However, such an area is also likely to contain people who are not disadvantaged, and people who are relatively advantaged.

Separation rates by SES were generated by the AIHW using the IRSD scores for the SA2 of usual residence of the patient reported or derived for each separation. 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 SES groups do not necessarily represent 20% of the population in each state or territory. Disaggregation by SES group is based on the area of usual residence of the patient, not the location of the hospital.

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

1—Lowest Most disadvantaged

2—Second most disadvantaged

3—Middle

4—Second least disadvantaged

5—Highest Least disadvantaged.

# Indigenous status

In this report, the term 'Indigenous people' is used to refer to persons identified as such in Australian hospital separations data and population data collections. For this report, the term 'other Australians' includes all separations for persons identified as not Indigenous and includes separations where Indigenous status was not stated**.**

## Quality of Indigenous status data

The AIHW report *Indigenous identification in hospital separations data: Quality report* (AIHW 2013) presents the latest findings on the quality of Indigenous identification in hospital separations data in Australia, based on studies conducted in public hospitals during 2011. Private hospitals were not included in the assessment. The results of the study indicate that, overall, the quality of Indigenous identification in hospital separations data was similar to that achieved in a previous study (AIHW 2010). However, the survey for the 2013 report was performed on larger samples for each jurisdiction/region and is therefore considered more robust than the previous study.

The report recommends using data from all jurisdictions in national analyses of Indigenous admitted-patient care for data from 2010–11 onwards. Therefore the trend analyses presented in this report commence from 2010–11.

# Suppression of small cell counts in data tables

The AIHW operates under a strict privacy regime, which has its basis in Section 29 of the *Australian Institute of Health and Welfare Act 1987* (AIHW Act). Section 29 of the AIHW Act requires that confidentiality of data relating to persons (living and deceased) and organisations be maintained. The Privacy Act governs confidentiality of information about living individuals.

The AIHW is committed to reporting that maximises the value of information released for users while being statistically reliable and meeting legislative requirements described above. Data (cells) in tables may be suppressed in order to maintain the privacy or confidentiality of a person or organisation, and to avoid attribute disclosure. Some measures have been suppressed if there were fewer than 100 separations in the category being presented (for example, for length of stay and separations rates), or because a proportion or other measure related to a small number of events and may therefore not be reliable.

# Rounding

Due to rounding, the sum of the percentages in tables may not equal 100%.

# Data quality statement: National Hospital Morbidity Database

The National Hospital Morbidity Database (NHMD) is a compilation of episode-level records from admitted-patient morbidity data collection systems in Australian hospitals. The data supplied are based on the National minimum data set (NMDS) for admitted-patient care and include demographic, administrative and length-of-stay data, as well as data on the diagnoses of the patients, the procedures they underwent in hospital and external causes of injury and poisoning.

The purpose of the NMDS for admitted-patient care is to collect information about care provided to admitted patients in Australian hospitals. The scope of the NMDS is episodes of care for admitted patients in all public and private acute and psychiatric hospitals, free-standing day hospital facilities, and alcohol and drug treatment centres in Australia. Hospitals operated by the Australian Defence Force, corrections authorities and in Australia's off-shore territories are not in scope but some are included.

The reference period for this data set is 2014–15. The data set includes records for admitted-patient separations between 1 July 2014 and 30 June 2015.

A complete data quality statement for the NHMD is available online at <www.meteor.aihw.gov.au>.

## Summary of key issues

- The NHMD is a comprehensive data set that has records for all separations of admitted patients from essentially all public and private hospitals in Australia.
- A record is included for each separation, not for each patient, so patients who separated more than once in the year have more than 1 record in the NHMD. (AIHW 2016a).
- For 2014–15, almost all public hospitals provided data for the NHMD. The exception was an early parenting centre in the Australian Capital Territory. The great majority of private hospitals also provided data, the exception being the private free-standing day hospital facilities in the Australian Capital Territory.
- There is some variation between jurisdictions as to whether hospitals that predominantly provide public hospital services, but are privately owned and/or operated, are reported as public or private hospitals. In addition, hospitals may be re-categorised as public or private between or within years.
- Revised definitions for care types were implemented from 1 July 2013 with the aim of improving comparability in care-type assignment among jurisdictions. Therefore, information presented by care type may not be comparable with data presented for earlier periods.
- There was variation between states and territories in the reporting of separations for *Newborns* (without qualified days).
- Data on state of hospitalisation should be interpreted with caution because of cross-border flows of patients. This is particularly the case for the Australian Capital

Territory. In 2014–15, about 18% of separations for Australian Capital Territory hospitals were for patients who resided in New South Wales.

- Although there are national standards for data on hospital services, there are some variations in how hospital services are defined and counted, between public and private hospitals, among the states and territories and over time. For example, there is variation in admission practices for some services, such as chemotherapy and endoscopy. As a result, people receiving the same type of service may be counted as same-day admitted patients in some hospitals and as non-admitted patients in other hospitals. In addition, some services are provided by hospitals in some jurisdictions and by non-hospital health services in other jurisdictions. The national data on hospital care does not include care provide by non-hospital providers, such as community health centres.
- Caution should be used in comparing diagnosis, procedure and external-cause data over time, as the classifications and coding standards for those data can change over time.
- Between 2010–11 and 2014–15, there were changes in coverage or data supply for New South Wales, Victoria, Queensland and Western Australia that may affect the interpretation of the data:
  - For New South Wales, increases in the numbers of separations reported for private hospitals are, in part, accounted for by improvement in the coverage of reporting.
  - For Victoria, between 2011–12 and 2012–13, a relatively large decrease in public hospital separations reflects a change in Victoria’s emergency department admission policy.
  - For Queensland, between 2013–14 and 2014–15, a relatively large increase in same-day separations in public hospitals partly reflects a change in admission practices for chemotherapy in some hospitals.
  - For Western Australia, between 2012–13 and 2013–14, the relatively large decrease in public hospital separations may reflect a change in Western Australia’s emergency department admission policy, which resulted in fewer admissions.
- The Indigenous status data in the NHMD for all states and territories are considered to be of sufficient quality for statistical reporting. In 2011–12, an estimated 88% of Indigenous patients were correctly identified in public hospitals (AIHW 2013). In the publication Admitted patient care 2014–15: Australian hospital statistics, the overall quality of the data provided for Indigenous status is considered to be in need of some improvement, and varied between states and territories. It is unknown to what extent Indigenous Australians might be under-identified in private hospital admissions data.

# Glossary

Registry (METeOR). METeOR is Australia's central repository for health, community services and housing assistance metadata, or 'data about data'. It provides definitions for data for health and community services-related topics and specifications for related national minimum data sets (NMDSs). METeOR can be viewed on the AIHW website at <www.meteor.aihw.gov.au>.

**acute:** Having a short and relatively severe course.

**acute care:** See **care type**.

**acute care hospital:** See **establishment type**.

**additional diagnosis:** A condition or complaint either coexisting with the principal diagnosis or arising during the episode of admitted-patient care, episode of residential care or attendance at a health care establishment. METeOR identifier: 514271.

**admitted patient:** A patient who undergoes a hospital's admission process to receive treatment and/or care. This treatment and/or care is provided over a period of time and can occur in hospital and/or in the person's home (for hospital-in-the-home patients). METeOR identifier: 268957.

**age-standardisation:** A set of techniques used to remove, as far as possible, the effects of differences in age when comparing 2 or more populations.

**burden of disease and injury:** The quantified impact of a disease or injury on an individual or population, using the **disability-adjusted life year** (DALY) measure.

**care type:** The care type defines the overall nature of a clinical service provided to an admitted patient during an episode of care (admitted care), or the type of service provided by the hospital for boarders or posthumous organ procurement (care other than admitted care). METeOR identifier: 491557.

**Admitted-patient care** consists of:

- acute care
- rehabilitation care
- palliative care
- geriatric evaluation and management
- psychogeriatric care
- maintenance care
- newborn care
- other admitted-patient care—this is where the principal clinical intent does not meet the criteria for any of the above.

**Care other than admitted care** includes:

- posthumous organ procurement
- hospital boarder.

**DALY (disability-adjusted life years):** A measure (in years) of healthy life lost, either through premature death—defined as dying before the expected life span at the age of death (YLL)—or through living with ill health due to illness or injury (YLD).

**disability:** In burden of disease analysis, any departure from an ideal health state.

**disability weight:** A factor that reflects the severity of health loss from a particular health state on a scale from 0 (perfect health) to 1 (equivalent to death).

**disease:** A broad term that can be applied to any health problem, including symptoms, diseases, injuries and certain risk factors, such as high blood cholesterol and obesity. Often used synonymously with 'condition', 'disorder' or 'problem'.

**episode of care:** The period of admitted-patient care between a formal or statistical admission and a formal or statistical separation, characterised by only 1 care type (see **Care type** and **Separation**). METeOR identifier: 491557 (Care type). METeOR identifier: 268956 (Episode of admitted-patient care).

**external cause:** The environmental event, circumstance or condition given as the cause of injury, poisoning and other adverse effect. METeOR identifier: 514295.

**hospital:** A health-care facility established under Commonwealth, state or territory legislation as a hospital or a free-standing day procedure unit and authorised to provide treatment and/or care to patients. METeOR identifier: 268971.

**inpatient:** See **Admitted patient**. METeOR identifier: 268957.

**International Classification of Diseases and Related Health Conditions (ICD):** The World Health Organization's internationally accepted classification of diseases and related health conditions. The 10th revision, Australian modification (ICD-10-AM) is currently in use in Australian hospitals for admitted patients.

**length of stay:** The length of stay of an overnight patient is calculated by subtracting the date the patient is admitted from the date of separation and deducting days the patient was on leave. A same-day patient is allocated a length of stay of 1 day. METeOR identifier: 269982.

**mode of admission:** The mechanism by which a person begins an episode of admitted-patient care. METeOR identifier: 269976.

**mode of separation:** Status at separation of person (discharge/transfer/death) and place to which person is released (where applicable). METeOR identifier: 270094.

**non-fatal burden:** The burden from living with ill health as measured by years lived with disability. Often used synonymously with YLD, and also referred to as 'health loss' in this report.

**patient days:** The total number of days for patients who were admitted for an episode of care and who separated during a specified reference period. A patient who is admitted and separated on the same day is allocated 1 patient day. METeOR identifier: 270045.

**population attributable fraction (PAF):** The proportion (fraction) of a disease, illness, disability or death in a population that can be attributed to a particular risk factor or combination of risk factors.

**premature mortality:** Deaths that occur at a younger age than a selected cut-off.

**principal diagnosis:** The diagnosis established, after study, to be chiefly responsible for occasioning an episode of admitted-patient care. METeOR identifier: 514273.

**private hospital:** A privately owned and operated institution, catering for patients who are treated by a doctor of their own choice. Patients are charged fees for accommodation and other services provided by the hospital and relevant medical and paramedical practitioners.

Acute care and psychiatric hospitals are included, as are private free-standing day hospital facilities.

**public hospital:** A hospital controlled by a state or territory health authority. Public hospitals offer free diagnostic services, treatment, care and accommodation to all eligible patients.

**same-day patient:** An admitted patient who is admitted and separated on the same date.

**separation:** An episode of care for an admitted patient, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a stay beginning or ending in a change of type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care either by being discharged, dying, transferring to another hospital or changing type of care.

**separation rate:** The total number of episodes of care for admitted patients divided by the total number of persons in the population under study. Often presented as a rate per 10,000 or 100,000 members of a population. Rates may be crude or standardised.

**separations:** The total number of episodes of care for admitted patients, which can be total hospital stays (from admission to discharge, transfer or death) or portions of hospital stays beginning or ending in a change of type of care (for example, from acute to rehabilitation) that cease during a reference period. METeOR identifier: 270407.

**YLD (years lived with disability):** A measure of the years of what could have been a healthy life but were instead spent in states of less than full health. YLD represent **non-fatal burden**.

**YLL (years of life lost):** Years of life lost due to premature death, defined as dying before the global ideal life span at the age of death. YLL represent **fatal burden**.

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# Related publications

The AIHW has published annual reports on hospitalised cases occurring as a result of an injury. Earlier editions and any published subsequently can be downloaded for free from the AIHW website at <www.aihw.gov.au/publications>. The website also includes information on ordering printed copies.

The following AIHW publications relating to injury might also be of interest:

AIHW (various years). Australian hospital statistics. Canberra: AIHW

AIHW 1999. Health services series no. 12. Cat. no. HSE 6.

AIHW 2000. Health services series no. 15. Cat. no. HSE 11.

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AIHW 2014. Health services series no. 60 Cat. no. HSE 156.

AIHW 2015. Health services series no. 68. Cat. no. HSE 172.

This report shows that the rate of hospitalised injury cases in Australia rose between 1999–00 and 2014–15 by an average of 1% per year. In 2014–15, case numbers and rates were higher for males than females for all age groups up to 60–64, and higher for females for those aged 65–69 and older.

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