



Spinal injuries in Australia 2020-21

Web report | Last updated: 07 Mar 2024 | Topic: [Injury](#)

About

In Australia, 53 spinal injuries arrive in our Emergency Departments every day. The *Spinal injuries in Australia* report describes emergency department (ED) presentations and hospitalisations for spinal injuries during 2020-21.

Along with a 10-year time series to assess trends, this report describes the main types, causes and activity at the time of injury, variation among specific populations, and severity. Throughout this report, injuries to the spinal column, spinal cord and associated nerves are referred to as spinal injuries.

Cat. no: INJCAT 233

- [Data](#)

Findings from this report:

- [Falls were the leading cause of spinal injury hospitalisations, followed by transport](#)
 - [Males accounted for 2 in 3 spinal injury hospitalisations due to transport related causes](#)
 - [Fractures were the most common type of spinal injury](#)
 - [17% of all car related injury hospitalisations were for spinal injury hospitalisations](#)
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Summary

In 2020-21, spinal injuries resulted in:



19,378 ED presentations

75.5 per 100,000 population



26,556 hospitalisations

103.5 per 100,000 population

Key findings

- **Males** made up over half of spinal injury ED presentations and hospitalisations (52% and 53% respectively).
- People living in **Very remote** areas were over twice as likely to be hospitalised for a spinal injury compared to people living in **Major cities**.
- **First Nations Australians** are more likely to be affected by spinal injuries than non-indigenous Australians.
- **Falls** were the leading cause of spinal injury hospitalisations (56% or 14,845 cases).
 - Spinal injury hospitalisations contributed to 6% of all fall-related injury hospitalisations overall.
 - The majority of spinal injuries caused by falls were among females, for whom 2 in 3 spinal injury hospitalisations were due to a fall (63%). This proportion is higher than the proportion of all female injury hospitalisations due to falls (52%).
- **Transport** was the second most frequent cause of spinal injury hospitalisations (31% or 8,133 cases)
 - Spinal injury hospitalisations contributed to 12% of all transport-related injury hospitalisations.
 - Of all transport related spinal injury hospitalisations, most were car occupants (44%) and motorcyclists (20%), followed by pedal cyclists (13%) and pedestrians (6%).
 - Of all recorded injury hospitalisations that were car related, 17% were for spinal injury hospitalisations.
 - The majority of spinal injury hospitalisations caused by transport accidents were among males, comprising 63% or 5,125 cases.
- **Fractures** contributed to 3 in 5 spinal injury ED presentations (58%, or 11,317 cases) and 4 in 5 spinal injury hospitalisations (83% or 19,093 cases).
- While the **cervical spine** is the predominant site of injury in ED presentations (44%), the **lumbar region** was the most frequently affected spinal region in injury hospitalisations where spinal injury was the principal diagnosis (34%).
- Where the place of the incident was recorded (75% of cases), the **home** (46% or 9,108 cases) and **street or highway** (29% or 5,771 cases) were the most frequently reported locations for spinal injury related accidents.
- Spinal injury hospitalisations were **more severe** compared to total injury hospitalisations for all six severity measures used in this report.

Introduction

Injuries of all types pose a major healthcare concern in Australia. Spending on injuries is captured in the [Disease expenditure](#) database, including costs from injury hospitalisations and treatment in primary care settings. In 2021-21, a total of \$150 billion was allocated to health conditions, of which 7.3% (\$11 billion) was spent treating and managing injury. Injuries ranked fourth-highest in terms of spending (AIHW 2023a). [Burden of disease](#) measures the impact of illness and injury through time spent in ill health and premature death. In 2022, injuries were the 6th highest cause of total disease burden in Australia, accounting for 8% of total [burden of disease](#) (AIHW 2022).

In 2020-21, there were 1,952,000 ED presentations for injuries and 537,000 hospitalisations. Within that same year, spinal injuries contributed to 19,378, or 1% of all ED presentations and 26,556, or 4.6% of all injury related hospitalisations.

Back pain and related problems are a large contributor to illness, pain, and disability in Australia (Health Direct 2021). Data from the 2022 Australian Burden of Disease Study show that back pain and other problems accounted for just over 4% of Australia's total disease burden (AIHW 2022), the third leading cause.

Spinal injuries can significantly impact a person's mobility, daily activities, and overall quality of life. The impacts and health of people with chronic conditions and [disability](#) are further detailed in other AIHW publications.

Data sources

This report uses the National Hospital Morbidity Database (NHMD) to describe spinal injury cases, referred to here as **hospitalisations** for brevity. Emergency department (ED) data is sourced from the National Non-admitted Patient Emergency Department Care (NNAPEDC) Database. ED cases are referred to as **presentations**.

Scope

This report presents information on the 19,000 ED presentations and 27,000 spinal injury hospitalisations during the period 1 July 2020 to 30 June 2021. Hospitalisations data from The National Hospital Morbidity Database (NHMD) include Australian public and private hospitals in Australia, and ED presentations data from the National Non-Admitted Patient Emergency Department Care Database (NNAPEDC) include data from selected public hospitals.

In this report, spinal injuries are defined as any ED presentations, hospitalisation or death in hospital due to any external cause where the site of injury is the spine, spinal nerves or spinal cord.

For **ED presentations**, cases are included only where a person presented with a principal diagnosis (see box 1) of a spinal injury. ED presentations that have an end status of *admitted to hospital* may be counted in both the emergency department and hospitalisations data.

For **Hospitalisations**, data include cases where a person was admitted to hospital with a principal or additional diagnosis of a spinal injury. Inclusion criteria for spinal injury hospitalisations are summarised below and detailed in the [technical notes](#).

While multiple spinal injury diagnosis codes may be recorded for an ED presentation or hospitalisation, the records included in this report are generally for those where the spinal injury was the principal diagnosis (see box 1).

This report excludes information on spinal injury that did not result in emergency department presentation or hospitalisation. For each spinal injury ED presentation and hospitalisation there may be many more cases that are treated by general practitioners, allied health professionals or outpatient clinics.

This report differs from [Spinal cord injury, Australia 2017-18](#), and others in the *Spinal cord injury, Australia* series, which presents national statistics solely on spinal cord injury (SCI) using data from case registrations to the Australian Spinal Cord Injury Register (ASCIR). Funding for the ASCIR data collection ceased several years ago, and the last publication was on 2017-18 data.

For more detailed information on the methodology used in this report, see [technical notes](#).

Box 1: Inclusion criteria for hospitalisations

Principal diagnosis (18,922 cases)

Where the spinal injury was recorded as the principal diagnosis: "The diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the health care establishment, as represented by a code" (AIHW METeOR 2023a).

Additional diagnosis (7,386 cases)

Where the spinal injury was recorded as an 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, as represented by a code" (AIHW METeOR 2023b).

References

ACCD (Australian Consortium for Classification Development) 2019. The international statistical classification of diseases and related health problems, 10th revision, Australian modification (ICD-10-AM), 11th edn. Tabular list of diseases and alphabetic index of diseases. Adelaide: Independent Hospital Pricing Authority (IHPA), Lane Publishing.

Australian Institute of Health and Welfare (2021) [Spinal cord injury, Australia 2017-18](#), AIHW, Australian Government, accessed 11 October 2023.

AIHW (2022) [Australian Burden of Disease Study 2022](#), AIHW, Australian Government, accessed 31 July 2023.

AIHW (2022) [Health of people with disability](#), AIHW, Australian Government, accessed 05 February 2024.

AIHW (2023a) [Health system spending on disease and injury in Australia, 2020-21](#), AIHW, Australian Government, accessed 11 October 2023.

AIHW (2023b) [Injury in Australia](#), AIHW, Australian Government, accessed 18 July 2023.

AIHW METEOR (2023a) [Episode of care—principal diagnosis, code \(ICD-10-AM Twelfth edition\) ANN\[.N\[N\]\] \(aihw.gov.au\)](#), AIHW, Australian Government, accessed 3 April 2023.

AIHW METEOR (2023b) [Episode of care—additional diagnosis, code \(ICD-10-AM Twelfth edition\) ANN\[.N\[N\]\] \(aihw.gov.au\)](#), AIHW, Australian Government, accessed 3 April 2023.

HealthDirect (2021) [Back injuries](#), HealthDirect, Australian Government, accessed 15 July 2023.



Remoteness

Rates of injury vary across Australia according to where you live. In 2020-21, rates of hospitalised spinal injury increased along with remoteness of usual residence.

People living in *Very remote* areas, compared with people living in *Major cities*, were 2.3 times as likely to be hospitalised for a spinal injury.

Table 1: Age-standardised rates of hospitalisation (per 100,000) for spinal injury increase by remoteness for males and females, 2020-21

	Males	Females	People
Major cities	94.6	74.5	84.9
Inner regional	123.7	83.3	103.5
Outer regional	140	86.4	113.4
Remote	160.4	99.7	130.5
Very remote	146.3	116.6	132.6

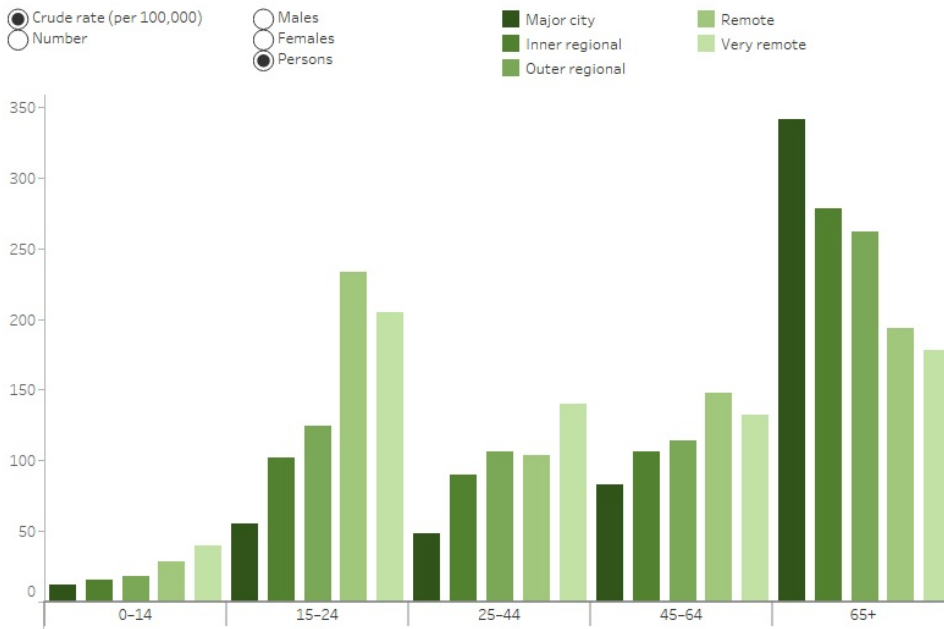
Note: Rates are age-standardised per 100,000 population.

Source: AIHW National Hospital Morbidity Database.

Numbers and rates of spinal injury hospitalisations generally increase with remoteness for males and females. Rates are highest in remote or very remote areas across all age groups except for the 65 and over age group where the reverse trend was seen and where highest rates were in major cities. For people aged 25-44, *Very remote* areas had the highest rates of spinal injury hospitalisations (Figure 1).

Figure 1: Numbers and rates of spinal injury hospitalisations increase with remoteness; age group and sex, 2020-21

Numbers and rates of spinal injury hospitalisations generally increase with remoteness for males and females. Rates are highest in *remote* or *very remote* areas across all age groups except for the 65 and over age group where the reverse trend was seen and where highest rates were in *major cities*. For people aged 25-44, *Very remote* areas had the highest rates of spinal injury hospitalisations.



Note: Rates are crude per 100,000 population.
Source: AIHW National Hospital Morbidity Database.
<http://www.aihw.gov.au/>

Demographics

Demographics

We note that the 'sex' variable currently available for national hospitals reporting only comprises of two categories M (male) and F (female) and is referring to the biological sex only. Work is underway to address this shortcoming. In the future, where numbers permit, we intend to report on:

sex i.e., M (male), F (female) or X (indeterminate/ intersex/ unspecified) and/or gender i.e., Man, or boy, or male; Woman, or girl, or female; Non-binary, Different term, Prefer not to say.

Rates, based on the Australian population data held by the AIHW (sourced from the ABS), are currently only available for M (male) /F (female) sex categories.

People 45 years and over had the highest rates of ED presentations

Males accounted for a slightly smaller proportion of spinal injury ED presentations compared to all injury ED presentations (52% and 57% respectively). More than half (54%) of the 19,378 spinal injury ED presentations were for people 45 years and over.

For spinal injury ED presentations in 2020-21, when comparing age groups:

- the highest number of males was in the 25-29 age group (7.8% or 789 cases)
- the highest number of females was in the 15-19 age group (7.0% or 656 cases).

Males were overrepresented in spinal injury hospitalisations

In 2020-21, 53% of spinal injury hospitalisations were for males (14,137 cases) and 47% were for females (12,417 cases). These proportions are similar to those across the group of all injuries in [Injury in Australia](#).

For spinal injury hospitalisations in 2020-21:

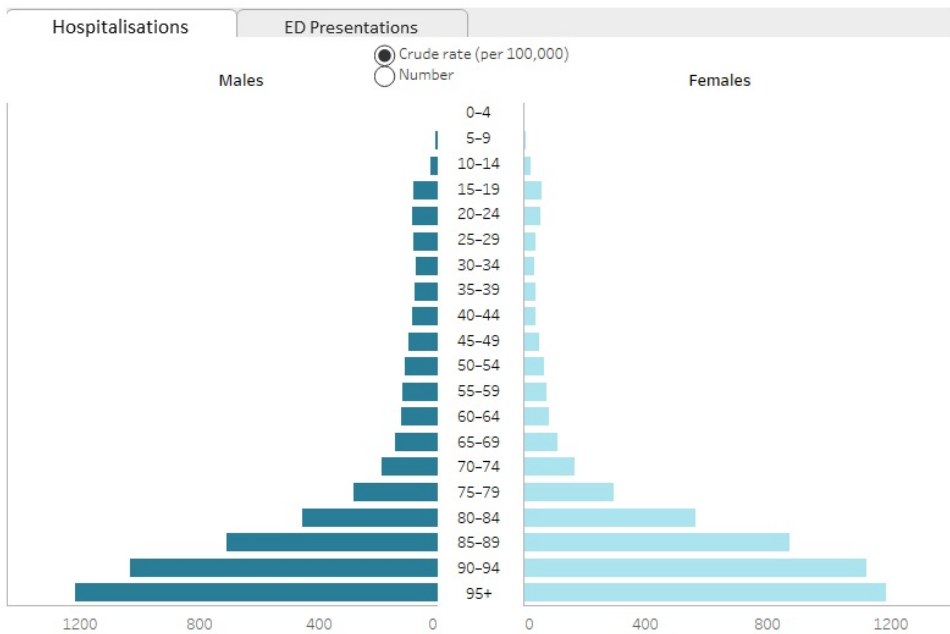
- The highest number of cases was in the 80-84 age group for both males and females (1,095 and 1,608 cases, respectively).
- Within each age group, males had higher rates of hospitalisations than females. The exception to this was the 75 years and older age groups, where rates of hospitalisations were higher for females (Figure 2).

Overall, rates of injury hospitalisations across Australia tended to be higher in males, and from around age 65, rates per 100,000 population rise dramatically for both males and females (293.5 and 342.4 respectively).

Rates of spinal injury varied between males and females and across different age groups, with certain causes of injury posing a higher risk for younger males, while other causes were more likely to affect older females.

Figure 2: Number and rate of spinal injury hospitalisations and ED presentations, by age group and sex, 2020-21

A butterfly chart showing the number and rate of spinal injury ED presentations and hospitalisations by age group and sex. The crude rate (per 100,000) of spinal injury hospitalisations tended to increase with age and was generally higher for males than females, with the highest for both males and females in the 95 and over age group. Similarly for ED presentations, the crude rate (per 100,000) of spinal injury ED presentations tended to increase with age, with the highest in the 95 and over age group. Rates were generally higher for males.



Notes: Rates are crude per 100,000
 Source: AIHW National Hospitals Morbidity Database
<https://www.aihw.gov.au>



Priority populations

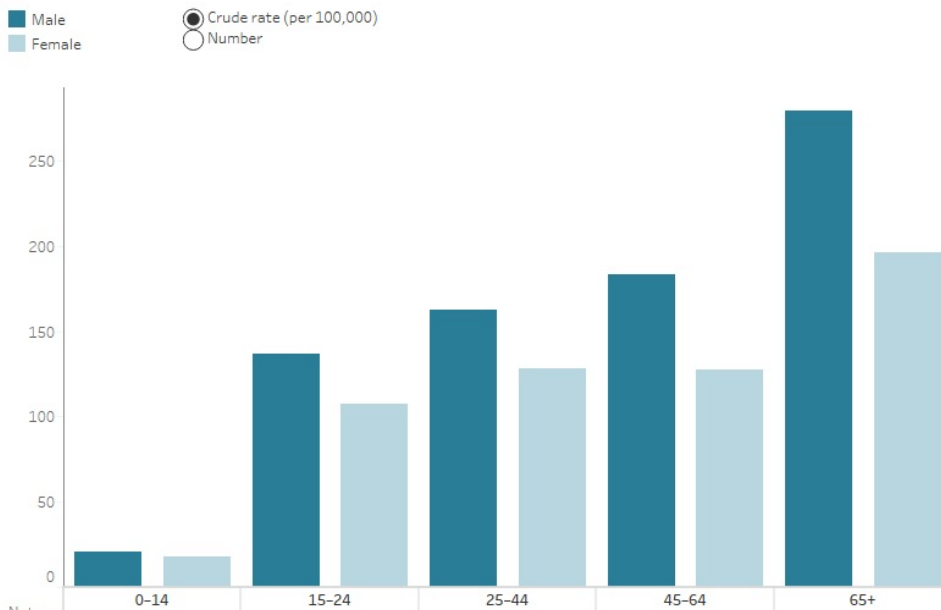


Priority populations

There were 909 spinal injury hospitalisations among First Nations Australians in 2020-21. There were more hospitalisations for First Nations Australians males than females (56% were males; 44% were females) and the crude rate per 100,000 was higher for males than females (118 cases and 93 cases per 100,000, respectively).

Figure 3: Number and rate of spinal injury hospitalisations, First Nations people, by age group and sex, 2020-21

Bar chart showing that numbers and crude rates of spinal injury hospitalisations for First Nations Australians are higher in males than females for all age groups, and increase with age.



Notes:
1. Rates are crude per 100,000 population
2. Records where Indigenous status is missing or not stated are excluded
Source: AIHW National Hospital Morbidity Database
<https://www.aihw.gov.au>

First Nations people and non-Indigenous Australians

Rates of spinal injury hospitalisations for First Nations Australians were higher than for non-Indigenous Australians (See Table 2).

In 2020-21, the age standardised rates of spinal injury hospitalisations for First Nations and non-Indigenous Australians showed:

- The rate for First Nations people was 1.5 times that of non-Indigenous people.
- For every hospitalisation for non-Indigenous females, there were 1.4 hospitalisations for First Nations females.
- For every hospitalisation for non-Indigenous males, there were 1.5 hospitalisations for First Nations males.

Table 2: Number and rate of spine-related injury hospitalisations, by Indigenous status, 2020-21

	First Nations Australians	Non-Indigenous Australians
Number	909	25,310
Age-standardised rates	131	90

Causes

Falls, followed by contact with objects were the two most common causes of hospitalisations across all injuries in 2020-21 (AIHW 2023b). Falls were similarly the leading cause of spinal injury hospitalisations (56% or 14,800 cases) followed by transport (31% or 8,100 cases).

Spinal injury hospitalisations contributed to 6% of fall-related injury hospitalisations and 12% of transport-related injury hospitalisations overall.

For fall related spinal injury hospitalisations:

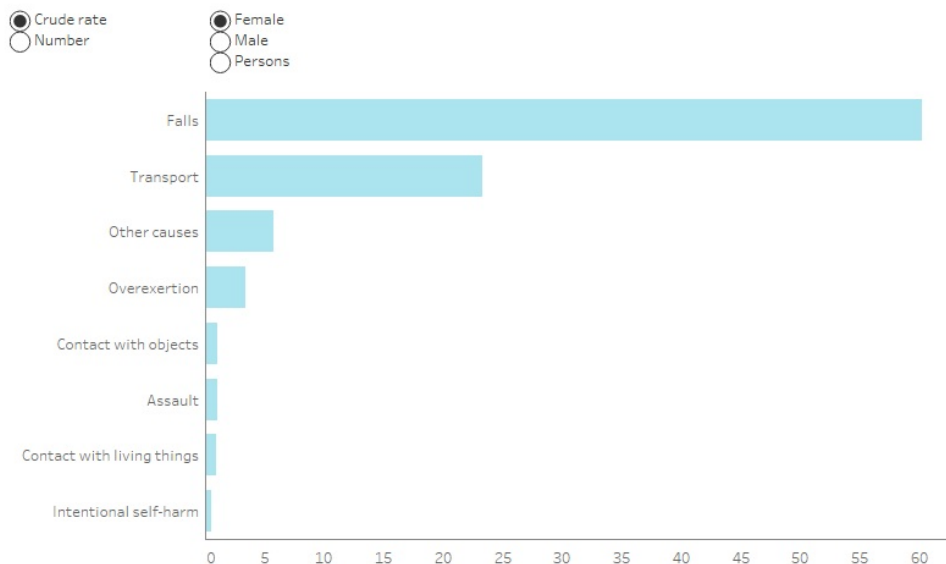
- Among females, 2 in 3 spinal injury hospitalisations were due to a fall (63%). This proportion is higher than the proportion of all female injury hospitalisations due to falls (52%).
- Among males, half of spinal injury hospitalisations were due to a fall (50%). This proportion is higher than the proportion of all male injury hospitalisations due to falls (34%).
- The most frequently recorded activity at time of fall was *while resting, sleeping, eating or engaging in other vital activities* (13%), followed by *while engaged in other types of work* (11%). For the majority, activity at time of fall was *unspecified or missing* in hospital records (63%).
- Falls involving beds contributed to 52% of fall injury hospitalisations occurring *while resting, sleeping, eating or engaging in other vital activities*.

For transport related spinal injury hospitalisations:

- Forty-four percent of all transport related spinal injury hospitalisations involved car occupants and 20% involved motorcyclists, followed by pedal cyclists (13%) and pedestrians (6%). These proportions are higher than the proportions of car and motorcyclist hospitalisations due to transport related injuries overall (31% and 25%, respectively).
- Sixty-three percent of spinal injury hospitalisations due to transport related causes were in males.

Figure 5: Proportion of spinal injury hospitalisations, by cause, 2020-21

A bar chart showing the highest crude rates for spinal injury hospitalisations by cause. Falls followed by transport contributed to the highest numbers and rates of spinal injury hospitalisations.



Notes:

1. 'Other causes' include *Other unintentional causes, Accidental poisoning, Thermal causes, Choking and suffocation, Forces of nature, Drowning and submersion, Electricity and air pressure*

2. Excludes cases where the external cause was *not reported or Undetermined intent*

Source: AIHW National Hospital Morbidity Database

<https://www.aihw.gov.au>

References

AIHW (2023) [Injury in Australia](#), AIHW, Australian Government, accessed 25 August 2023.

Activity at time of injury

In 2020-21, the majority of injury cases did not include a record of the activity being undertaken at the time of injury (64% or 16,950) so these findings should be interpreted with caution. For the remaining 36%, injury occurred most commonly while engaged in:

- other types of work or while working for income (12% or 3,260 cases)
- sport, exercise or recreational activities (11% or 2,835 cases)
- resting, sleeping, eating or other vital activities (8% or 2,018 cases).

Sport, exercise or recreational activities

In 2020-21, the largest contributors to sports-related spinal injury hospitalisations (Table 3) were:

- cycling (23% or 660 cases)
- wheeled motor sports (18% or 503 cases), and
- equestrian activities (16% or 457 cases).

Within each of these sports, there was a strong sex disparity:

- Males accounted for 86% of all sports-related spinal injury hospitalisations due to cycling, and 93% due to wheeled motor sports.
- Females accounted for 82% of all sports-related spinal injury hospitalisations due to equestrian activities (457 cases).
- Overall, males contributed to 68% of all sports-related spinal injury hospitalisations (1,940 cases).

Equestrian activities had the highest proportion of sports-related spinal injury hospitalisations, with 18% of all equestrian injuries being a spinal injury (Table 5).

Equestrian related spine injuries were highest in:

- Females
- People in the 45-64 age group, followed by the 25-44 then the 15-24 age group (37% or 168 cases, 31% or 141 cases, and 18% or 80 cases, respectively).

Table 3: Sports-related spinal injury hospitalisations as a percentage of all sport-related injury hospitalisations (top 5 by ranked by percentage), 2020-21

	Number of sports spinal injuries	Total number of injuries	Per cent
Equestrian activities	457	2584	18
Surfing	158	1138	14
Boating sports	61	519	12
Wheeled motor sports	513	4524	11
Swimming and diving	69	858	8
Total	2,835	66,513	4.3

Source: AIHW National Hospital Morbidity Database.

Types of injury

In 2020-21, for all injuries, fractures were the most common type of injury overall followed by open wounds and soft tissue injuries (AIHW 2023b).

In 2020-21, where spinal injuries were the principal diagnosis, fractures were reported in around:

- 3 in 5 spinal injury ED presentations (58% or 11,317 cases)
- 4 in 5 spinal injury hospitalisations (83% or 15,920 cases).

Fractures were the leading type of spinal injury for ED presentations

Following fracture, soft tissue injury was the leading type of injury for spinal injury ED presentations (58% or 11,317 cases, and 38% or 7,337 cases, respectively).

ED presentations were similar for males and females for injury type.

In 2020-21:

- Just under half of ED presentations for spinal injuries were triaged as *Urgent* (45%).
- Nearly a third of cases had a waiting time over one hour (31%).
- Almost a quarter (24%) of ED presentations for spinal injuries were attended to in under 10 minutes.

Table 4: Top 3 specified types of spinal injury, 2020-21

Spinal injury ED presentations	%	All injury ED presentations	%	Spinal injury hospitalisations	%	All injury hospitalisations	%
Fracture	58	Fracture	22	Fracture	83	Fracture	38
Soft-tissue	38	Open wound	17	Soft-tissue	10	Open wound	16
Nerve	3	Soft-tissue	15	Nerve	5	Soft-tissue	10

Source: AIHW National Hospitals Morbidity Database and AIHW National Non-admitted Patient Emergency Department Care (NNAPEDC) Database

Injury types for spinal injury hospitalisations were similar for males and females

For hospitalisations with a principal diagnosis of spinal injury, the distribution of injury types did not vary much between males and females, although:

- Males had a slightly higher proportion of nerve injuries than females (5% or 653 and 2% or 277 respectively).
- Females had a slightly higher proportion of fracture injuries than males (81% or 10,045, and 74% or 10,515 respectively).

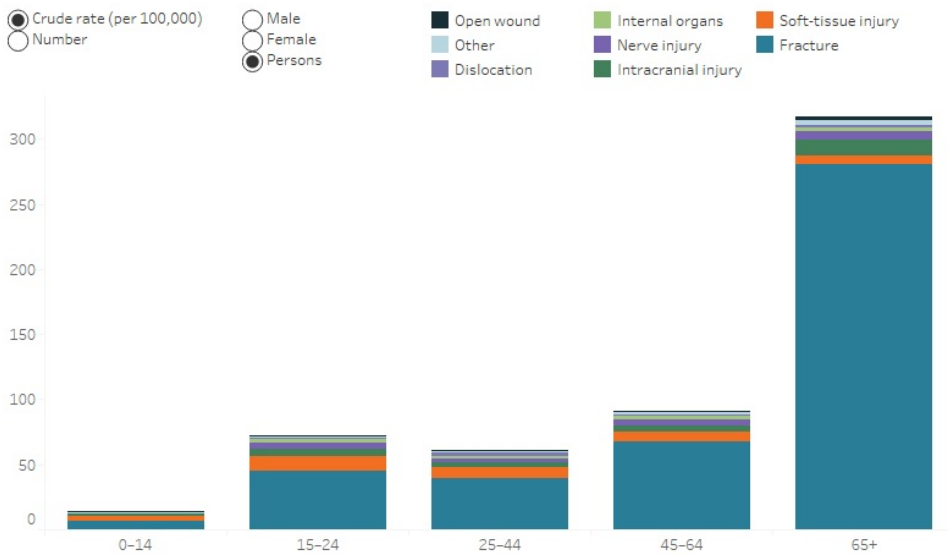
People 65 years and older had the highest rates of spinal injury hospitalisation across most injury types

Rates of principal diagnosis spinal injury hospitalisations were highest among people aged 65 years and over across all injury types, with a few notable exceptions:

- The 15-24 age group had the highest rates of *soft tissue injury* (11.7 per 100,000, respectively).
- The 25-44 age group had the highest rates of *dislocation injuries* (2.2 per 100,000 respectively).
- The 25-44 and 45-64 age groups had the highest rates of *blood vessels injuries* (0.4 per 100,000).

Figure 6: Number and rate of hospitalisations for spinal injuries, by injury type and age group, 2020-21

A stacked bar chart showing that the 65 and over age group had the highest rates of spinal injury hospitalisations for fracture, intracranial, open wound, nerve and other injuries.



Notes:

1. Rates are crude per 100,000 population
2. 'Other' injuries includes Burns, Superficial injuries, Poisoning or toxic effect, Amputation, Blood vessels, Foreign object (through orifice), and Other unspecified and/or multiple injuries
3. Other unspecified and not reported are excluded (195 cases)

Source: AIHW National Hospital Morbidity Database

<https://www.aihw.gov.au>

References

AIHW (2023) [Injury in Australia](#), AIHW, Australian Government, accessed 25 August 2023.

Part of spine injured

The lumbar region emerged as the most frequently affected spinal region in injury hospitalisations where spinal injury was the principal diagnosis, while the cervical spine was the predominant site of injury in ED presentations (Table 5). Perceived increased severity of cervical spinal injuries may lead to overrepresentation of this type of injury in ED presentations, as compared to injuries of other parts of the spine.

Table 5: Top 3 specified spinal regions of spinal injury, 2020-21

Spinal injury ED presentations	n	Rate per 100,000	%	Spinal injury hospitalisations	n	Rate per 100,000	%
Cervical	8,476	33.0	44	Lumbar	6,541	25.5	34
Thoracic	5,188	20.2	27	Thoracic	5,385	21.0	28
Lumbar	4,304	16.8	22	Cervical	5,193	20.2	27

Source: AIHW National Hospital Morbidity Database (NHMD) and AIHW National Non-admitted Patient Emergency Department Care (NNAPEDC) Database

Across spinal regions, rates of ED presentations varied by age

In 2020-21:

- In the cervical spine region, the highest rate of spinal injury ED presentations were among those aged 15-24 (50.1 per 100,000).
- In the thoracic, lumbar and sacrum spine regions, the highest rate of spinal injury ED presentations were among those aged 65 and over (38.9, 48.6 and 0.8 per 100,000).
- In the coccyx spine region, the highest rate of spinal injury ED presentations were among those aged 45-64 (0.4 per 100,000).

The lumbar region was most commonly injured in spinal injury hospitalisations

The lumbar region was the most commonly injured spinal region for both males and females, contributing to 1 in 3 (34% or 6,541 cases) of spinal injury hospitalisations where spinal injury was the principal diagnosis.

For most spinal regions, the rate of injury increased with age, and varied by sex. Notable difference in the distribution of spine region injury types within each sex were:

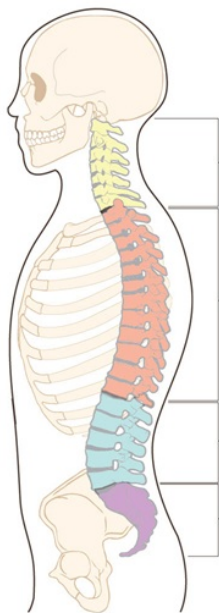
- Males had a higher proportion of cervical injuries than females (31% or 3,080, and 23% or 2,113 cases respectively).
- Females had a higher proportion of lumbar and sacral injuries than males (36% or and 33%, compared to 10% and 3% respectively).

Differences in primary diagnoses for spinal injury hospitalisations by sex were:

- *Fracture of lumbar vertebra, L1 level* was the leading diagnosis, followed by *Fracture of lumbar vertebra, L2 level* for males and *Fracture of sacrum* for females.
- Sacral spinal injuries were diagnosed 2 times more often in females than in males.

Figure 7: Number/percentage of hospitalisations for spinal injuries, by spine region, 2020-21

An interactive spine region visualisation showing top three most common injury types and causes by spine region for hospitalisations. The visualisation shows the leading specified location for spinal injuries was for the lumbar region.



Click on an area of the spine to explore spinal injuries by region or select directly from the dropdown box below:

All parts

CERVICAL	28% cervical (5,193 cases)
THORACIC	29% thoracic (5,385 cases)
LUMBAR	35% lumbar (6,541 cases)
SACRUM & COCCYX	8% sacrum and coccyx (1,409 cases)

Notes:

1. Includes cases only where the principal diagnosis was an in scope spine injury diagnosis.

Source: AIHW National Hospital Morbidity Database.

<https://www.aihw.gov.au>



Place where injury occurred

Just under 75% (19,897 cases) of spinal injury hospitalisations had a place of occurrence listed. Of those listed, home (46% or 9,108 cases) and street or highway (29% or 5,771 cases) were the most frequently reported spinal injury locations recorded.

The variation between the sexes for place of injury occurrence were:

- Females had a higher proportion of hospitalised spinal injuries occur in the *home* (40% or 5,026 cases) than males (29% or 4,082 cases.).
 - Males had a higher proportion of hospitalised spinal injuries occur in a *street or highway* (25% or 3,480 cases) than females (18% or 2,290 cases) which aligns with transport related injuries being higher in males.
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Severity of injury

Six measures that may indicate the seriousness or severity of a hospitalised injury are:

- ED triage category, waiting times and end status
- urgency of admission
- average length of stay
- proportion of cases with time in an intensive care unit (ICU)
- proportion of cases involving continuous ventilator support (CVS)
- proportion of in-hospital deaths.

Spinal injury hospitalisations were more severe compared to total injury hospitalisations across all measures (Table 6).

Table 6: Severity of spinal injury hospitalisations and all non-spinal injury hospitalisations, 2020-21

	Spinal injuries	All non-spinal injuries	Comparison between spinal and all non-spinal injuries
Average length of stay (days)	12.8	4.4	2.9x
Percentage (%) with time in ICU	8.2	2.2	3.7x
Percentage (%) with time on CVS	4.5	1.2	3.8x
Percentage (%) with urgent admission	94.3	80	1.2x
Deaths in hospital (per 1,000 cases)	17	5.3	3.2x

Source: AIHW National Hospital Morbidity Database.

ICU = intensive care unit

CVS = continuous ventilatory support

Triage and waiting time

Every presentation to an ED is assigned 1 of 5 triage categories based on the urgency with which the patient requires medical care. In 2020-21, almost a third (29%) of ED presentations for spinal injuries were triaged as *Semi-urgent*. 98% of ED presentations for spinal injuries had a waiting time of less than one hour.

Urgency of admission

In 2020-21, over 9 in 10 spinal injury hospitalisations were emergency admissions (94%, or 25,051 cases).

Of these admissions:

- 4 in 5 emergency admissions were for fractures (78% or 19,429 cases).
- Over half of all emergency admissions were for falls (56% or 13,999 cases).
- Males made up over half of emergency admissions (54% or 13,448 cases).
- Females contributed to more elective surgery admissions than males (54% or 614 cases).
- The proportion of emergency admissions decreased with age and was lowest in the 65+ age group (93% or 12,397 cases).

Average length of hospital stay

The average length of hospital stay for spinal injuries was approximately 3 times that of all injuries overall. The average length of stay for principal diagnosis spinal injury hospitalisations varied by sex, region of spine injured and increased with age.

In 2020-21, the most severe injuries in terms of average length of stay were for:

- males with injuries to the cervical spine (14 days) and females with injuries to the sacrum (14 days)
- nerve injuries (44 days).

Intensive care

In 2020-21, almost 1 in 10 spinal injury cases involved an intensive care unit (ICU) stay (8.2% or 2,174). By comparison, for all injury hospitalisations (including spinal injuries), only 2.2% of all cases involved a stay in an intensive care unit.

Of the spinal injury hospitalisations with time in intensive care:

- In over a third of ICU cases, the spinal injury was the principal diagnosis (35%).
- Almost 3 in 4 ICU hospitalisations were for males (71% or 1,540 cases).
- The number of ICU admissions increased with age and was highest in the 65+ age group (35% or 766 cases).
- Fracture of the sacrum was the most common spinal diagnosis (1,074 cases).
 - The leading causes of sacral region injuries were falls and transport injuries (64% or 2,218 cases and 30% or 1,038 cases, respectively).

Continuous ventilator support

There were 1,200 cases or 4.5% of spinal injury hospitalisations with time spent on continuous ventilatory support (CVS).

In 2020-21:

- three quarters of spinal injury hospitalisations requiring CVS were for those where the spinal injury was an additional diagnosis (74%, or 883 cases).
- Males contributed to 3 in 4 spinal injury hospitalisations with time spent on CVS (74%, or 885 cases).
- Younger people (those aged 15-24 year olds were more likely to need CVS during their hospitalisation (8.8%), compared to 2.3% for those aged 65+).
- Fracture of sacrum was the most common spine diagnosis for spinal injury diagnosis with time spent on CVS (669 cases).

Proportion of people who died in hospital

In 2020-21 there were 452 spinal injury hospitalisations where the patient died in care (17 deaths per 100,000 cases).

- Over half of spinal injury hospital deaths involved a fracture (51% or 231 cases).
- Additional diagnosis injuries had a higher rate of death than principal diagnosis injuries (33 and 11 deaths per 100,000 cases, respectively). This aligns with the principal diagnosis commonly being the most serious.
- Three in 4 deaths in care were for patients in the 65+ age group.
- The cause group *intentional self-harm* had the highest rate of death in hospital, with a rate over 3 times higher than the next leading cause group, *falls* (72 and 20 deaths per 100,000 cases respectively).



When do spinal injuries present?

Presentation time

The busiest time for spinal injury presentations to EDs was between 10:00 am to 11:59 am (14%) while the quietest was 4:00 am to 5:59 am (2%).

Almost 8% of presentations occurred between midnight and 6am, with older people comprising most of these cases (22% aged 45-64, and 36% aged 65 years and over).

Presentation day

Relatively more spinal injury ED presentations occurred over weekends. Sunday was the busiest day, with 2,995 presentations (15%), and Friday was the quietest with 2,600 presentations (13%). Those aged 15-24 were 1.5 times more likely to present with a spinal injury on a Sunday compared with a Friday (19% and 13% respectively).

Trends over time

Spinal injury hospitalisations have increased over the past decade

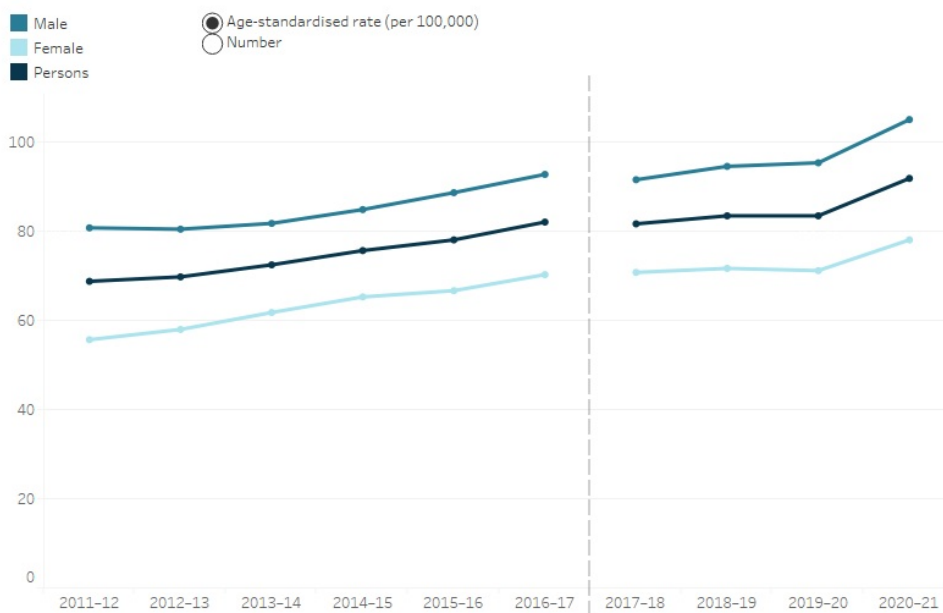
Hospitalisation data are divided into two distinct time periods: 2010-11 to 2016-17 and 2017-18 to 2020-21. Comparisons of hospitalisations data between these two time periods is not recommended due to a change in data collection methods between 2016-17 and 2017-18 (see [technical notes](#) for more details). Comparisons presented here are for within each of the two time periods.

Over the period from 2017-18 to 2020-21, the rate of hospitalisations increased by an annual average of 4%. A similar increase was seen over 2011-12 to 2016-17 where the rate of hospitalisations increased by an annual average of 3.6%.

The age-standardised rate of spinal injury hospitalisations in 2020-21 was 8.8% higher than a year earlier. This followed a dip the previous year that appears to mostly have been caused by COVID-19 restrictions.

Figure 8: Age-standardised rate and number of spinal injury hospitalisations, by sex, 2011-17 to 2017-21

Line chart showing change in the number and rate of spinal injury hospitalisations from 2011-12 to 2016-17, and from 2017-18 to 2020-21. Over the two separate periods, the rates and numbers of spinal injuries have increased.



Notes:
 1. Break in series between 2016-17 and 2017-18. See technical notes for discussion.
 Source: AIHW National Hospital Morbidity Database.
<https://www.aihw.gov.au/>

Technical notes

Introduction

This report counts and describes injury incidents that result in emergency department presentations, hospital admissions and/or death.

Our counting method is different to some other AIHW reporting (such as MyHospitals), where each use of a service may be counted rather than each incident. A single incident can lead to more than one use of a service. Our exclusion method minimises the associated double counting but does not eliminate it.

If a person dies from an injury after being admitted to hospital, both the hospitalisation and the death were counted for this report.

Injury hospitalisations

The terms ‘injury hospitalisation’, ‘hospitalised injury’ and ‘hospitalised case’ in this report refer to incidents where a person was admitted to hospital with injury as the main reason. If a single incident led to an admission in more than one hospital, the incident has only been counted once.

Exclusions

To minimise double-counting hospitalisations for injuries, we have excluded admissions that are transfers from another hospital and admissions with rehabilitation procedures (except for acute hospital admissions).

Injuries caused by complications of surgery or other medical care, or injuries that are a subsequent condition caused by a previous injury, are not included in this report.

Injury emergency department presentations

Emergency department (ED) care is a form of non-admitted hospital care separate to hospitalisations data. While emergency department presentation records have many of the same fields as hospital records, there are key differences in the way they are structured.

A notable distinction in ED records compared with hospitalisations and deaths, is the lack of external cause data. Additionally, there are unique variables only found within ED records such as triage category and waiting time that cannot be compared against hospitalisations and deaths.

To understand the analysis in more detail, please find below:

- [Spinal injury hospitalisations in Australia, 2020-21: about the data](#)
- [Spinal injury emergency department presentations in Australia, 2020-21: about the data](#)
- [Spinal injury deaths in Australia, 2020-21: about the data](#)
- [Appendix tables specifying the ICD-10 codes used for each cause category.](#)

Technical notes

Spinal injury hospitalisations in Australia, 2020-21: about the data

This report counts and describes injuries to the spine that lead to hospital admission, classified by cause.

For ease of reading, in this report cases of hospitalisations for injury are referred to as 'spinal injury hospitalisations'. However, throughout this technical note we have referred to a 'case' of hospitalisation for injury. This is deliberate to differentiate our count of injury hospitalisations from the usual counting unit for hospital patients which is a 'separation'. A single incident of injury may result in multiple consecutive hospital separations, which we count as one 'case' of hospitalisation to represent the one incident of injury.

A person may have more than one incident of injury resulting in hospitalisation in a financial year and each case of hospitalisation will be counted separately in this report. This is because we are counting incidents of injury resulting in hospitalisation, rather than the number of people who were hospitalised due to injury, in a given financial year.

Scope

The aim of this report is to count the number of spinal injury hospitalisations in Australia from 1 July 2020 to 30 June 2021, inclusive. In all cases, patients had a principal or additional spinal injury diagnosis code in their hospitalisation record.

Only a small proportion of all incidents of injury result in admission to a hospital. For each admission, many more people with injuries are treated in an emergency department but are not admitted, or visit a general practitioner, allied health provider (for example, a physiotherapist) or Urgent Care/Walk-in Clinic rather than a hospital. A larger number of minor injuries do not receive any medical treatment. A smaller number of severe injuries that result in death do not include a stay in hospital but are captured in mortality data.

This document covers:

- definitions and classifications used
- presentation of data in this report
- analysis methods.

Data sources

The data on hospitalised injury cases are from the Australian Institute of Health and Welfare's (AIHW) National Hospital Morbidity Database (NHMD). The NHMD is a compilation of episode-level records from admitted patient morbidity data collection systems (APC NMDS) in Australian public and private hospitals. The scope of the APC 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 may also be included. Hospitals specialising in dental, ophthalmic aids and other specialised acute medical or surgical care are included. This report may therefore be viewed as a definitive description of all injury cases admitted to hospitals in Australia. Comprehensive information on the quality of data is available on the AIHW [MyHospitals website](#).

Admitted patient care data

In the NHMD, records are presented by hospital *separations* (discharges, transfers, deaths, or changes in care type) by time period. Records from any selected period will include data on patients who were admitted before that period— if they separated during that period. A record is included for each separation, not each patient, so patients who separated more than once in the period will have more than one record.

Patient days is the number of days between the separation date and date of admission, not including any hospital leave days. Patient day statistics can provide information on hospital activity that, unlike separation statistics, accounts for differences in length of stay.

It is expected that patient days for patients who separated in 2020-21, but who were admitted before 1 July 2020, will be counterbalanced overall by the patient days for patients in hospital on 30 June 2021 who will separate in future reporting periods.

Estimated resident populations

All populations are based on the estimated resident population (ERP) or Indigenous projected population as at 30 June immediately prior to the reporting period (that is, for the reporting period 2020-21, the population at 30 June 2020 is used). The population is used as the denominator for age-specific/crude and age-standardised rates.

The ERP as at 30 June 2001 is used as the standardising population throughout the report (ABS 2003).

The COVID-19 pandemic and resulting Australian Government closure of the international border from 20 March 2020 disrupted the usual Australian population trends. The ERP for 30 June 2020, used in this report, reflects this disruption.

All population data are sourced from the Australian Bureau of Statistics (ABS) as follows:

- General populations are from [National, state and territory population](#) (Australian Bureau of Statistics 2023, March)

- Indigenous populations are from Estimates and Projections, Aboriginal and Torres Strait Islander Australians (ABS 2019)
- Remoteness populations (available on request from ABS)
- Socio-Economic Indexes For Areas (SEIFA) Index of Relative Socio-Economic Disadvantage (IRSD) quintile populations are from AIHW analysis of Census of Population and Housing: Socio-Economic Indexes for Areas (ABS 2018) and [Regional population](#) (Australian Bureau of Statistics 2022).

Estimating cases of injury

The NHMD does not allow for the identification of multiple episodes of care belonging to the same instance of injury. This means there is the potential for overcounting injury events if we are simply counting the number of injury episodes of care. To minimise this, the mode of admission is taken into account. Episodes of care with a mode of admission of *transferred from another hospital* (1) are excluded from injury case counts. This is because transfers are likely to have been preceded by an episode of care that already met the case selection criteria. Similarly, episodes of care where the mode of admission is *statistical admission - episode type change* (2) and the care type is not listed as *acute* (1, 7.1, 7.2), are also excluded as they are likely to have been preceded by an acute episode of care that already met the case selection criteria.

Please see Injury in Australia hospitalisations [Technical Notes](#) for further details.

Selection criteria

The following criteria were used to estimate numbers of cases of spinal injury hospitalisations in Australia, by cause of injury.

Period

Selection was based on the financial year of separation, from 1 July 2020 to 30 June 2021.

Standard separations

Standard separations were included, that is records were excluded where the care type was *newborn with unqualified days only* (7.3), *organ procurement - posthumous* (9), or *hospital boarder* (10).

Spinal injury

For the purposes of this report, spinal injury cases are defined as records meeting either of the criteria below:

1. principal diagnosis in the ICD-10-AM range S12.0-S12.2, S12.7, S12.9, S13.0-S13.3, S13.4, S14.0-S14.7, S15.1, S22.0, S22.1, S23.0, S23.1, S23.3, S24.0, S24.1-S24.7, S32.0-S32.2, S32.7, S32.82, S33.0, S33.1, S33.2, S33.5, S33.6, S34.0-S34.5, S34.7, T06.0, T06.1, T08, T09.3, T09.4 using 'Chapter 19 Injury, poisoning and certain other consequences of external causes', or
2. additional diagnosis in the ICD-10-AM range S12.0-S12.2, S12.7, S12.9, S13.0-S13.3, S13.4, S14.0-S14.7, S15.1, S22.0, S22.1, S23.0, S23.1, S23.3, S24.0, S24.1-S24.7, S32.0-S32.2, S32.7, S32.82, S33.0, S33.1, S33.2, S33.5, S33.6, S34.0-S34.5, S34.7, T06.0, T06.1, T08, T09.3, T09.4.

This scope excludes injuries due to *Complications of surgical and medical care* (T80 - T88) and *Sequelae of injuries, of poisoning and of other consequences of external causes* (T90 - T98).

Records where *Care involving use of rehabilitation procedures* (Z50) has been coded in any additional diagnosis field are excluded from this analysis, except if the care type for the separation was acute. Nearly all injury separations are thought to be included in the data reported, representing minimal risk of counting error.

External causes

Please see Injury in Australia hospitalisations [Technical Notes](#) Appendix tables for further details.

Presentation of data and analysis

Due to rounding, percentages in tables may not add up to 100.0. Percentages and rates reported as 0.0 or 0 usually indicate a zero.

Spinal region and injury type analysis contain principal diagnosis cases only.

The patient's age is calculated at the date of admission. In tables by age group and sex, separations for which age and/or sex were not reported are included in the totals. Refer to the Injury in Australia [technical notes](#) for more information.

For descriptions of the approach to suppression as well as analysis methods for length of stay, age-standardised rates and remoteness, refer to Injury in Australia [Technical Notes](#).

Definitions and classifications

If not otherwise indicated, data elements were defined as per their definitions in the AIHW's Metadata Online Registry (METeOR), <https://meteor.aihw.gov.au/content/181162> and summarised in the Glossary (AIHW 2023).

In particular, data element definitions for the Admitted patient care National Minimum Data Set (NMDS) are available at: <https://meteor.aihw.gov.au/content/713850> (AIHW 2021).

Injury classifications from ICD-10-AM/ACHI

Diagnosis, intervention and external cause data for 2020-21 was reported to the NHMD by all states and territories using classifications from the 11th edition of the *International statistical classification of diseases and related health problems, 10th revision, Australian modification* (ICD-10-AM) (ACCD 2019a).

In tables and figures, information on diagnoses, external causes, and interventions are presented using the codes and abbreviated descriptions of the ICD-10-AM and the 11th edition of the Australian classification of health interventions (ACHI). Full descriptions of the categories are available in ICD-10-AM/ACHI publications (ACCD 2019a, ACCD 2019b, ACCD 2019c). Some injury cases do not include an external cause (falls, transport, assault, etc.), or the only cause code provided is invalid for the scope of this report (i.e., supplementary factor codes). These cases are included in this report as 'not reported' and are counted towards to the total injury cases.

Where data are presented in a time series incorporating previous reporting periods, these have been coded according to the following editions of ICD-10-AM:

- 7th edition for 2011-12 and 2012-13 hospital data
- 8th edition for 2013-14 and 2014-15 hospital data
- 9th edition for 2015-16 and 2016-17 hospital data
- 10th edition for 2017-18 and 2018-19 hospital data
- 11th edition for 2019-20 hospital data.

This report simplified the most common ICD-10-AM codes and ACHI chapter procedure types into plain English terms. Simplified plain English ICD-10-AM codes are shown in Table 1.

Table 1: ICD-10-AM codes used to report principal diagnoses

ICD-10-AM Code	Diagnosis
S12.0	Fracture of first cervical vertebra
S12.1	Fracture of second cervical vertebra
S12.2	Fracture of other specified cervical vertebra
S12.7	Multiple fractures of cervical spine
S12.9	Fracture of neck, part unspecified
S13.0	Traumatic rupture of cervical intervertebral disc
S13.1	Dislocation of cervical vertebra
S13.3	Multiple dislocations of neck
S13.4	Sprain and strain of cervical spine
S14.0	Concussion and oedema of cervical spinal cord
S14.1	Other and unspecified injuries of cervical spinal cord
S14.2	Injury of nerve root of cervical spine
S14.3	Injury of brachial plexus
S14.4	Injury of peripheral nerves of neck
S14.5	Injury of cervical sympathetic nerves
S14.6	Injury of other and unspecified nerves of neck
S14.7	Functional level of cervical spinal cord injury
S15.1	Injury of vertebral artery
S22.0	Fracture of thoracic vertebra
S22.1	Multiple fractures of thoracic spine
S23.0	Traumatic rupture of thoracic intervertebral disc
S23.1	Dislocation of thoracic vertebra
S23.3	Sprain and strain of thoracic spine
S24.0	Concussion and oedema of thoracic spinal cord

S24.1	Other and unspecified injuries of thoracic spinal cord
S24.2	Injury of nerve root of thoracic spine
S24.3	Injury of peripheral nerves of thorax
S24.4	Injury of thoracic sympathetic nerves
S24.5	Injury of other nerves of thorax
S24.6	Injury of unspecified nerve of thorax
S24.7	Functional level of thoracic spinal cord injury
S32.0	Fracture of lumbar vertebra
S32.1	Fracture of sacrum
S32.2	Fracture of coccyx
S32.7	Multiple fractures of lumbar spine with pelvis
S32.82	Fracture of lumbosacral spine, part unspecified
S33.0	Traumatic rupture of lumbar intervertebral disc
S33.1	Dislocation of lumbar vertebra
S33.2	Dislocation of sacroiliac and sacrococcygeal joint
S33.5	Sprain and strain of lumbar spine
S33.6	Sprain and strain of sacroiliac joint
S34.0	Concussion and oedema of lumbar spinal cord
S34.1	Other injury of lumbar spinal cord
S34.2	Injury of nerve root of lumbar and sacral spine
S34.3	Injury of cauda equina
S34.4	Injury of lumbosacral plexus
S34.5	Injury of lumbar, sacral and pelvic sympathetic nerves
S34.7	Functional level of lumbar spinal cord injury
T06.0	Injuries of brain and cranial nerves with injuries of nerves and spinal cord at neck level
T06.1	Injuries of nerves and spinal cord involving other multiple body regions
T08	Fracture of spine, level unspecified
T09.3	Injury of spinal cord, level unspecified
T09.4	Injury of unspecified nerve, spinal nerve root and plexus of trunk

The ACHI procedure chapters and the code ranges covered by each under Edition 10 of the ACHI are available on the [Procedures data cubes](#) page.

References

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ABS (2022) *Regional population by age and sex*, ABS website, accessed 7 November 2023.

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AIHW (2021). [Admitted patient care NMDS 2020-21](#), AIHW Metadata Online Registry website, Australian Government, accessed 9 November 2023

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Technical notes

Emergency department presentations

Spinal injury emergency department presentations in Australia, 2020-21: about the data

This report aims to count and describe incidents of injuries to the spine that lead to hospital emergency department (ED) presentations.

The data on emergency department presentations for spinal injuries are from the Australian Institute of Health and Welfare's (AIHW) National Non-Admitted Patient Emergency Department Care Database (NNAPEDCD). Comprehensive information on the quality of data is available on the AIHW [MyHospitals website](#).

Scope

The aim of this section of the report is to count the number of spinal injury ED presentations in Australian public hospitals from 1 July 2020 to 30 June 2021, inclusive. In all cases included in this report, patients had a spinal injury diagnosis code in their record.

ED presentations for injury incidents are generally more numerous than hospitalisations because many injuries can be treated in ED and do not require admission to a hospital. In this report totals for ED presentations are lower due to the inclusion of both principal and additional diagnosis hospitalisations in the hospitalisations scope whereas only the principal diagnosis was included in the ED presentations data. Many more people with injuries are treated outside of a hospital such as at a general practice or physiotherapy clinic - these injuries are not captured in the data. A small number of severe injuries result in the person being dead on arrival at the emergency department, these cases are counted in both the emergency department and deaths data sources. Cases that are hospitalised after presenting to emergency departments are counted in both ED and hospitals data sources.

Spinal injury emergency department presentations account for 1% of all emergency department injury presentations. This document covers:

- Definitions and classifications used
- Presentation of data in this report
- Analysis methods.

Data source

Non-Admitted Patient Emergency Department Care Data

Data supplied by state and territory health authorities are used by the AIHW to assemble the National Non-Admitted Patient Emergency Department Care Database (NNAPEDCD). The data cover waiting times and other characteristics of presentations to public hospital emergency departments.

From 2020-21, all jurisdictions provided data for the NNAPEDCD using the NAMEDC NMDS. The NNAPEDCD provides information on the care provided (including waiting times for care) for non-admitted patients registered for care in public hospital emergency departments that have:

- purposely designed and equipped area with designated assessment, treatment, and resuscitation areas
- the ability to provide resuscitation, stabilisation, and initial management of all emergencies
- availability of medical staff in the hospital 24 hours a day
- designated emergency department nursing staff 24 hours per day 7 days per week, and a designated emergency department nursing unit manager.

Emergency departments (including 'accident and emergency' or 'urgent care centres') that do not meet the criteria above are not in scope for the NMDS, but data may have been provided for some of these by some states and territories.

Patients who were dead on arrival are in scope if an emergency department clinician certified the death of the patient. Patients who leave the emergency department after being registered/triaged to receive care and then advised of alternative treatment options are also in scope.

The scope includes only physical presentations to emergency departments. Advice provided by telephone or video conferencing is not in scope, although it is recognised that advice received by telehealth may form part of the care provided to patients physically receiving care in the emergency department. Also excluded from the scope of the NMDS is care provided to patients in general practitioner co-located units.

Since 2003-04, data for the NNAPEDCD have been reported annually. For this report, the most recent reference period for this data set includes records for Non-admitted patient emergency department service episodes between 1 July 2020 and 30 June 2021. Future injury reports may use slightly different procedures of extracting and analysing data from this source, and care should be considered when making direct comparisons to this report.

Summary of key data quality issues

Overall, the quality of the data in the NNAPEDCD is sufficient to be published in this report. However, the following limitations of the data should be taken into consideration when data are interpreted.

States and territories are primarily responsible for the quality of the data they provide. However, the AIHW undertakes extensive validations on receipt of data. Potential errors are queried with jurisdictions, and corrections and resubmissions may be made in response to these edit queries. The AIHW does not adjust data to account for possible data errors or missing values, except where stated.

The AIHW takes active steps to improve the consistency of these data over time.

For 2020-21, the NNAPEDCD may not include emergency presentations to hospitals that have emergency departments that are not in scope for the NAPEDC NMDS. The inclusion criteria for emergency departments may exclude some smaller regional public hospitals.

Prior to 2020-21, the following jurisdictions provided data to the NNAPEDCD using the NAPEDC National Best Endeavours Data Set (NBEDS) specification:

- Queensland (from 2015-16 to 2019-20);
- Victoria and Western Australia (from 2016-17 to 2019-20).

All other states and territories used the NAPEDC NMDS. The data provided using the NAPEDC NBEDS may not be entirely comparable with data provided using the NAPEDC NMDS.

Although there are national standards for data on non-admitted patient emergency department services, the way those services are defined and counted varies across states and territories, and over time.

Missing or invalid data

In some cases, the data provided may include missing values (for example, the date/time of physical departure was not recorded), or invalid values (for example, if the time of physical departure was recorded as occurring before the time of presentation).

External cause data

The NNAPEDCD does not include a field for external cause of injury (such as a fall or transport accident) or for other related factors such as place of occurrence, mechanism of the injury, activity being undertaken at the time, intent and perpetrator. Australian injury surveillance systems have a major focus on the external causes and these other factors in injuries, which are especially important from a prevention perspective. The lack of these data obstructs direct comparisons between the causes of injury across hospitalisations, deaths, and ED presentation data.

Reporting diagnosis information

For the 2020-21 NAPEDC NMDS/NBEDS, diagnosis information was reported using the ED ICD-10-AM version 11 (ACCD 2019) shortlist that can be found on the website of the [Independent Hospital Pricing Authority](#).

Episode end status

There is a difference between the number of presentations with a type of visit of *Dead on arrival* and the number of presentations with an episode end status of *Dead on arrival*. All presentations with a type of visit of *Dead on arrival* had an episode end status of *Dead on arrival*. However, some presentations with an episode end status of *Dead on arrival* did not have a type of visit of *Dead on arrival*.

Estimated resident populations

All populations are based on the estimated resident population (ERP) population as at 30 June immediately prior to the reporting period (that is, for the reporting period 2020-21, the population at 30 June 2020 is used). The population is used as the denominator for age-specific and age-standardised rates.

The ERP as at 30 June 2001 is used as the standardising population throughout the report (ABS 2003).

The COVID-19 pandemic and resulting Australian Government closure of the international border from 20 March 2020 disrupted the usual Australian population trends. The ERP for 30 June 2020, used in this report, reflects this disruption.

All population data are sourced from the Australian Bureau of Statistics (ABS) as follows:

- General populations are from [National, state and territory population](#) (Australian Bureau of Statistics 2023, March)
- Remoteness populations (available on request from ABS).

Estimating cases of injury

This report estimates the number of incidents of spinal injuries that lead to an emergency department presentation. This represents 1% of injury-related emergency department presentations in the NAPEDC.

Selection criteria

The following criteria were used to estimate numbers of cases of spinal injury emergency department presentations in Australia.

1. Financial year of presentation, records dated from 1 July 2020 to 30 June 2021 inclusive
2. Spinal injury principal diagnosis in the ICD-10-AM range S12.0-S12.2, S12.7, S12.9, S13.0-S13.3, S13.4, S14.0-S14.7, S15.1, S22.0, S22.1, S23.0, S23.1, S23.3, S24.0, S24.1-S24.7, S32.0-S32.2, S32.7, S32.82, S33.0, S33.1, S33.2, S33.5, S33.6, S34.0-S34.5, S34.7, T06.0, T06.1, T08, T09.3, T09.4 ([Table 1](#)) using 'Chapter 19 Injury, poisoning and certain other consequences of external causes'.

Some analysis compared emergency department presentations for spinal injuries and all injuries. Alongside the scope above for spinal injuries, all injuries were identified through the following criteria:

1. Financial year of presentation, from 1 July 2020 to 30 June 2021
2. Principal diagnosis in the ICD-10-AM range S00-T75 or T79 using 'Chapter 19 Injury, poisoning and certain other consequences of external causes'.

This scope excludes injuries due to *Complications of surgical and medical care* (T80 - T88) and *Sequelae of injuries, of poisoning and of other consequences of external causes* (T90 - T98) in line with our reporting on injury hospitalisations.

While up to two additional diagnoses can be reported within the data collection, very few records within the NAPEDC contain additional diagnoses. 6.8% of observations in the 2020-21 NAPEDC database had a first additional diagnosis, while just 0.6% contained a second additional diagnosis. Consequently, only presentations with a relevant principal diagnosis were considered within the selection criteria.

Presentation of data

The totals in tables include data only for those states and territories for which data were available, as indicated in the tables. Throughout the report, percentages may not add up to 100.0 because of rounding. Percentages and rates shown as 0.0 or 0 usually indicate a zero.

Spine location and injury type are derived from the principal diagnosis of the case. The sum of injuries by body part may not equal the total number of injury emergency department presentations because some injuries are not described in terms of body region.

The patient's age is calculated at the date of admission. In tables by age group and sex, presentations for which age and/or sex were not reported are included in the totals.

Suppression of data

The AIHW operates under a strict privacy policy based on Section 29 of the *Australian Institute of Health and Welfare Act 1987* (AIHW Act). Section 29 requires that confidentiality of data relating to persons (living and deceased) and organisations be maintained. The *Privacy Act 1988* (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 in the AIHW Act and the Privacy Act.

Data (cells) in tables may be suppressed to maintain the privacy or confidentiality of a person or organisation, or because a proportion, rate (numerator and/or denominator) or other measure is related to a small number of events (and may therefore not be reliable). Data may also be suppressed to avoid attribute disclosure. The abbreviation 'n.p.' (not published) has been used in tables to denote these suppressions. In these tables, the suppressed information is included in the totals.

Analysis methods

Principal diagnosis reporting

From 2018-19, Principal diagnoses were provided using the ICD-10-AM Principal Diagnosis Short List, developed by the Independent Hospital Pricing Authority (IHPA) from the full version of ICD-10-AM.

For 2020-21, the short list was based on ICD-10-AM version 11.

The codes included in scope for spinal injury ED presentations were the same as those used for admitted patients. This is because some jurisdictions code the principal diagnosis from the ICD-10-AM version 11 rather than the Principal Diagnosis Short List, these codes were included for completeness.

Waiting time to commencement of clinical care

The waiting times are determined as the time elapsed between presentation to the emergency department and the commencement of clinical care. The calculation is restricted to presentations with a type of visit of *Emergency presentation*, and presentations were excluded if the waiting time was missing or invalid, or if the patient *Did not wait to be attended by a health care professional* or was *Dead on arrival*. See Appendix A for information on the completeness of the data provided for waiting times calculations.

Proportion of presentations seen on time

The proportion of presentations seen on time was determined as the proportion of presentations in each triage category with a waiting time less than or equal to the maximum waiting time stated in the Australasian Triage Scale definition. A breakdown of the triage categories and respective clinically appropriate waiting times can be found in the [AIHW METEOR](#). For this report, a patient with a triage category of *Resuscitation* was considered to be seen on time if the waiting time to commencement of clinical care was less than or equal to 2 minutes. Presentations were excluded from analysis if the triage category was not reported.

Quality of data on ED waiting times

For 2020-21, 6 records that should have been included in the calculation of waiting times statistics were excluded, as they did not have a valid commencement of clinical care time recorded.

The criteria used to determine the proportion of *Resuscitation* patients seen on time varies between jurisdictions, therefore, the proportions of *Resuscitation* patients seen on time presented in this report may differ from those reported by individual jurisdictions.

Proportion of presentations ending in admission

The proportion of presentations ending in admission is determined as the proportion of all emergency presentations with an episode end status of *Admitted to this hospital* (either short-stay unit, hospital-in-the-home, or non-emergency department hospital ward).

Admission to hospital from emergency departments

Admission to hospital from emergency departments (for patients who were subsequently admitted) is calculated using the emergency department length of stay for presentations with an episode end status of *Admitted to this hospital* (either short-stay unit, hospital-in-the-home, or non-emergency department hospital ward).

Age and sex of patient

All states and territories supplied the date of birth of the patient, from which the age of the patient at the date of presentation was calculated. For 3 records, the sex of the patient was reported as either *Intersex or indeterminate* or *Not stated/inadequately described*.

Definitions and classifications

If not otherwise indicated, data elements were defined according to their definitions in the AIHW's [Metadata Online Registry \(METEOR\)](#) and summarised in the Glossary (AIHW 2023).

In particular, data element definitions for the Non-admitted patient emergency department care National Minimum Data Set (NMDS) are available online at: [METEOR website](#) (AIHW 2021).

ICD-10-AM Principal Diagnosis Short List inclusions

Table 1 and 2 describe the inclusion for each major principal diagnosis category and the relevant ICD-10-AM codes.

Table 1: List of ICD-10-AM codes for injuries to the spine and their descriptions

ICD-10AM code	Description
S12.0	Fracture of first cervical vertebra
S12.1	Fracture of second cervical vertebra
S12.2	Fracture of other specified cervical vertebra
S12.7	Multiple fractures of cervical spine
S12.9	Fracture of neck, part unspecified
S13.0	Traumatic rupture of cervical intervertebral disc
S13.1	Dislocation of cervical vertebra
S13.3	Multiple dislocations of neck
S13.4	Sprain and strain of cervical spine
S14.0	Concussion and oedema of cervical spinal cord
S14.1	Other and unspecified injuries of cervical spinal cord
S14.2	Injury of nerve root of cervical spine
S14.3	Injury of brachial plexus
S14.4	Injury of peripheral nerves of neck
S14.5	Injury of cervical sympathetic nerves
S14.6	Injury of other and unspecified nerves of neck
S14.7	Functional level of cervical spinal cord injury
S15.1	Injury of vertebral artery
S22.0	Fracture of thoracic vertebra
S22.1	Multiple fractures of thoracic spine

S23.0	Traumatic rupture of thoracic intervertebral disc
S23.1	Dislocation of thoracic vertebra
S23.3	Sprain and strain of thoracic spine
S24.0	Concussion and oedema of thoracic spinal cord
S24.1	Other and unspecified injuries of thoracic spinal cord
S24.2	Injury of nerve root of thoracic spine
S24.3	Injury of peripheral nerves of thorax
S24.4	Injury of thoracic sympathetic nerves
S24.5	Injury of other nerves of thorax
S24.5	Injury of other nerves of thorax
S24.6	Injury of unspecified nerve of thorax
S24.7	Functional level of thoracic spinal cord injury
S32.0	Fracture of lumbar vertebra
S32.1	Fracture of sacrum
S32.2	Fracture of coccyx
S32.7	Multiple fractures of lumbar spine with pelvis
S32.82	Fracture of lumbosacral spine, part unspecified
S33.0	Traumatic rupture of lumbar intervertebral disc
S33.1	Dislocation of lumbar vertebra
S33.2	Dislocation of sacroiliac and sacrococcygeal joint
S33.5	Sprain and strain of lumbar spine
S33.6	Sprain and strain of sacroiliac joint
S34.0	Concussion and oedema of lumbar spinal cord
S34.1	Other injury of lumbar spinal cord
S34.2	Injury of nerve root of lumbar and sacral spine
S34.3	Injury of cauda equina
S34.4	Injury of lumbosacral plexus
S34.5	Injury of lumbar, sacral and pelvic sympathetic nerves

Table 2: List of ICD-10-AM codes for injuries involving multiple body regions and their descriptions

T06.0	Injuries of brain and cranial nerves with injuries of nerves and spinal cord at neck level
T06.1	Injuries of nerves and spinal cord involving other multiple body regions
T08	Fracture of spine, level unspecified
T09.3	Injury of spinal cord, level unspecified
T09.4	Injury of unspecified nerve, spinal nerve root and plexus of trunk
T06.0	Injuries of brain and cranial nerves with injuries of nerves and spinal cord at neck level

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Data





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