Australian Government
Australian Institute of Health and Welfare

Sports injury in Australia

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About

In 2020–21, about 66,500 sports injuries led to a hospital stay in Australia. This report describes the people who were hospitalised, the sports they were playing, and the types of injuries they sustained. 10-year trends and seasonal differences are illustrated and sports participation and rates of injury are discussed.

Cat. no: INJCAT 225

Findings from this report:

- After a dip in 2019–20 related to the lockdowns, the rate of sports injury hospitalisations rebounded higher in 2020–21.
- More than half of the injuries were fractures, most commonly a fractured arm or shoulder.
- Cycling was responsible for the most sports injury hospitalisations, reflecting the number of people participating.
- Injuries from solo sports such as cycling rose after COVID-19 began and remained at a higher level for most of 2020–21.

Introduction

Millions of Australians participate in sport and physical activity. Nine out of 10 Australians aged 15 or over participated in some form of sport or physical activity at least once during 2020–21, and 6 out of 10 participated at least 3 times a week, according to the Australian Sports Commission's AusPlay survey (ASC, 2021).

While participation has many health and social benefits, it also involves a risk of injury. The AusPlay survey suggests that about 19% of participants in 2022 were injured while participating (ASC, 2023).

Sometimes, an injury will lead to hospital admission. This report analyses the 66,500 sports injuries that were serious enough to require a person to stay in hospital in 2020–21. It looks at the demographics of those injured and the types of injuries that led to hospitalisation. 10-year trends, seasonal differences and the impact of COVID-19 restrictions are explored.

Participation and injury rates are presented for the most popular sports. Selected sports are discussed in more detail, including the various football codes, wheeled motor sports, netball, and cricket.

The report does not include information on people who sought treatment at hospital emergency departments, general practitioner clinics, sports medicine centres, or from allied health practitioners such as physiotherapists. National data for these services are not readily available at this time and are part of data development efforts under the National Sports Injury Data Strategy.

This report complements other studies by the AIHW into the economics of participation in sport and by others referenced in the Clearinghouse for Sport. This work aligns with the National Sport Research Agenda.

Data sources and limitations

This report uses admitted patient care data from the AIHW's National Hospital Morbidity Database (NHMD) and sports participation estimates from the Australian Sports Commission's (ASC) AusPlay survey (ASC, 2021).

National Hospital Morbidity Database (NHMD)

Data about sports injury hospitalisations are drawn from admitted patient care records in the NHMD. If enough detail about the cause of the injury was obtained from the patient, then a particular type of sports activity will be assigned.

A single injury can lead to a person having more than one episode of care in hospital. The methodology for this report was designed to minimise double counting, where possible.

A person can be hospitalised with multiple injuries, some of which will be more serious than others. This report only presents data about the main injury – known as the *principal diagnosis*.

AusPlay

Every year, the AusPlay survey asks a sample of 20,000 Australians about their participation in sports and physical activity. The survey results include estimates of the number of participants in a range of activities. This report only includes estimates for participants aged 15 and over.

Data limitations

These data sources do not fully capture either sports injury hospitalisations or sports participation in Australia. For hospital admissions, injuries are attributed to a sports activity if clinicians are informed about the activity and record it, but this will not always happen. Therefore, the sports injuries reported here are likely to be an undercount. The AusPlay survey does not distinguish between organised sports and recreational participation. As a result, rates of injury per participant in each sport should be treated as estimates, and comparisons made with this in mind.

What we don't know

This report only includes injuries that were serious enough to require a stay in hospital. This excludes injuries that were treated in the emergency department only, at a GP clinic, or by an allied health practitioner such as a physiotherapist, because there is no national dataset for these services.

It is likely that only a small proportion of sporting injuries lead to a stay in hospital, and these are typically more severe injuries. The AusPlay survey estimated that around 19% of participants in 2022 were injured while participating (ASC, 2023). A New South Wales Population Health Survey from 2005 estimated that less than 3% of organised sport injuries in persons aged 16 and over lead to a hospital admission (Mitchell et al. 2008).

It is also possible that many injuries that develop over time might have been caused by sports participation, including chronic injuries, but were not directly linked to a particular sport. If a person seeks treatment months or years after they played sport, they may not report the connection between their injury and a sport to their clinician, or it may not be recorded.

The AIHW is working with the Australian Sports Commission to improve the information about sports injury under the National Sports Injury Data Strategy.

For more on the scope, accuracy, and comparability of these data sets, see the technical notes.

References

Australian Sports Commission (ASC) 2021. AusPlay. Canberra: Sport Australia. Viewed 4 January 2023.

ASC 2023. AusPlay – Injury from sport and physical activity in Australia. Canberra: Australian Sports Commission.

Mitchell R, Boufous S, & Finch CF 2008. Sport/leisure injuries in New South Wales: Trends in sport/leisure injury hospitalisations (2003-2005) and the prevalence of non-injury hospitalisations (2005). Sydney: New South Wales Injury Risk Management Research Centre.

The next page presents data about sports injury hospitalisations in 2020–21.

Sports injury hospitalisations

There were 66,500 sports injury hospitalisations reported in Australia in 2020–21.

After a dip in 2019–20 related to COVID-19 lockdowns, the rate of sports injury hospitalisations rebounded higher in 2020–21 (Figure 1).

Figure 1: Sports injury hospitalisations, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

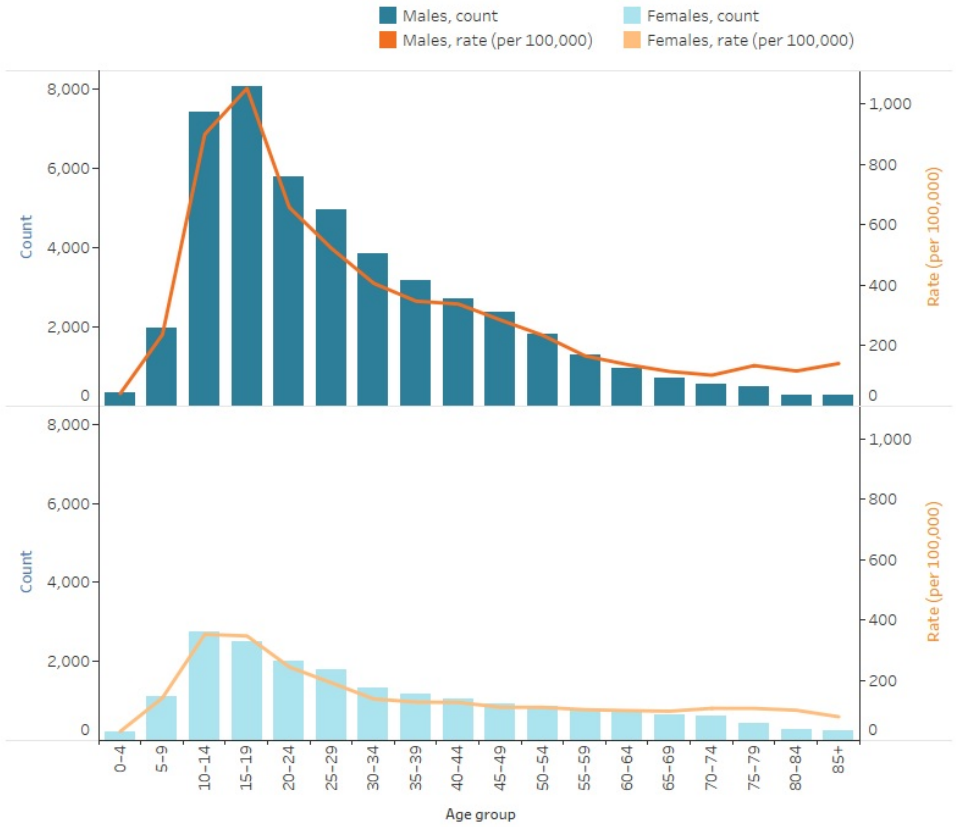
Males aged 15–19 are most likely to be hospitalised

There were more than twice as many cases of sports injury hospitalisation for males (47,000) than for females (19,500) in 2020–21.

Males had a higher rate of hospitalisation than females in every age group except the 70–74 and 80–84 age groups. Rates rise during childhood and peak in the teenage years, with a higher peak for males. The highest rates were in:

- the 15–19 age group for males (1,100 cases per 100,000)
- the 10–14 age group for females (350 cases per 100,000) (Figure 2).

Figure 2: Sports injury hospitalisations, by age and sex, 2020-21



Source: AIHW National Hospital Morbidity Database.

For more detail, see data tables A1 and A20.

Place of occurrence

As you might expect, the largest proportion of these injuries occurred at dedicated sports areas. For sports injury hospitalisations in 2020–21, the place of occurrence was specified in over two thirds of cases (69%). Of these specified cases:

- 6 out of 10 occurred at a sports or athletic area (61% or 28,000), including
  - over a third at an outdoor ground (35% or 16,300)
  - almost 1 in 10 at an indoor hall (7% or 3,300)
- more than 1 in 10 occurred on a street or highway (12% or 5,300).

For more detail, see data table A7.

Types of injury sustained

A person can be hospitalised with multiple injuries, some of which will be more serious than others. This report only presents data about the main injury – known as the *principal diagnosis* – additional concurrent injuries are not included.

This report discusses common injury types including:

Fracture: A partial or complete break in a bone

Soft-tissue injury: Sprain or strain of muscles, ligaments or joints

Open wound: A break in the skin such as a cut, puncture or bite

Intracranial injury: Injury inside the skull (often a concussion)

Dislocation: A separation of different bones where they join

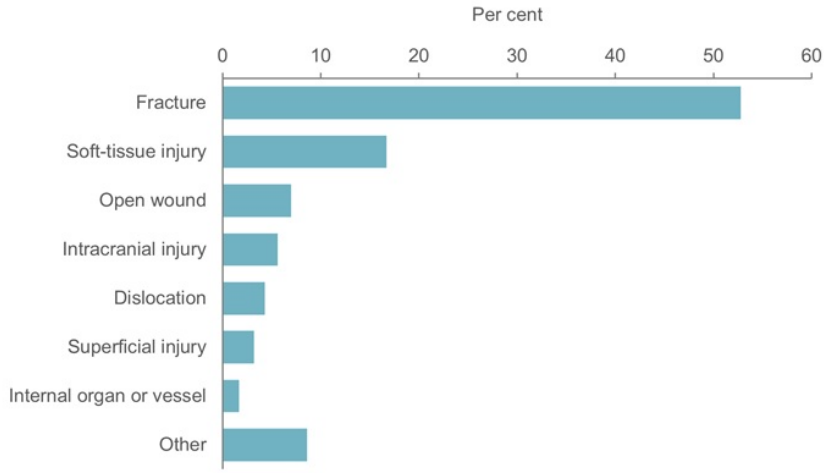
Superficial injury: An injury to the skin surface such as abrasion, bruising or blistering.

For more detail, see the appendix tables to the technical notes.

Fractures are the most common injury

In just over half of all sports injury hospitalisations in 2020–21, the main injury was a fracture (53% or 35,100). Soft-tissue injuries were the next most common (17% of cases or 11,100) (Figure 3).

Figure 3: Type of injury as a percentage of all sports injury hospitalisations, 2020–21



Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

The most common fractures were of the arm or shoulder (39% of fractures or 13,700 cases), followed by a fracture to a leg or hip (23% of fractures or 8,100 cases). 68% of soft tissue injuries were to the leg or hip (7,600 cases).

For more detail, see data tables A2–6.

Concussions

Most hospitalisations for intracranial injuries (injuries inside the skull) in sports (83%) were concussions in 2020–21. Concussions are usually caused by a knock to the head but can also be caused by a blow to the body (Concussion in Sport Australia, 2022).

There has been growing concern in Australia and internationally about the incidence of sport-related concussion and potential health ramifications for athletes (Concussion in Sport Australia, 2019). While short-term symptoms are reversible, a single knock to the head can have serious consequences in later life (Queensland Brain Institute, 2021).

Concussion can occur in nearly every sport, not just contact sports. There were almost 3,100 hospitalisations for concussion caused by sports in 2020–21. Of these:

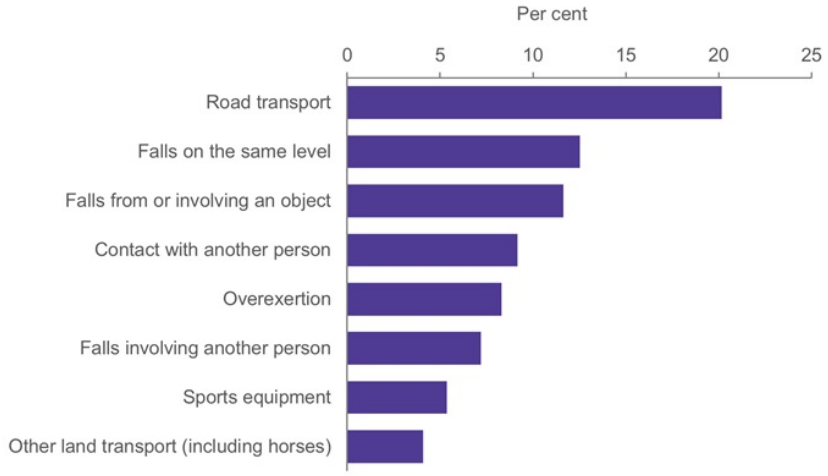
- around 2,200 were in males, and 900 were in females
- about 1,300 occurred while playing some form of football
- about 500 occurred while cycling.

For more detail, see data tables A15–18.

Falls and transport accidents cause over half of all injuries

Falls and transport accidents caused over half (57%) of all sports injury hospitalisations in 2020–21. Falls include falls on the same level (13% or 8,300 cases), falls involving an object (12% or 7,700 cases) and falls involving another person (7.2% or 4,800 cases). Transport accidents include road transport (20% or 13,400 cases) such as bicycle crashes, and other land transport including horses (4.1% or 2,700 cases) (Figure 4).

Figure 4: Selected causes of injury as a proportion of sports injury hospitalisations, 2020–21



Source: AIHW NHMD.

For more detail, see data tables A11–12.

Emergency admissions are more common than elective

Hospitalisations are classed as emergency admissions if the patient requires admission within 24 hours. About two-thirds of sports injury hospitalisations in 2020–21 (69%) were emergencies. The proportion that was emergencies varied by sport, ranging from 89% of hospitalisations for equestrian activity injuries, to 39% for netball injuries.

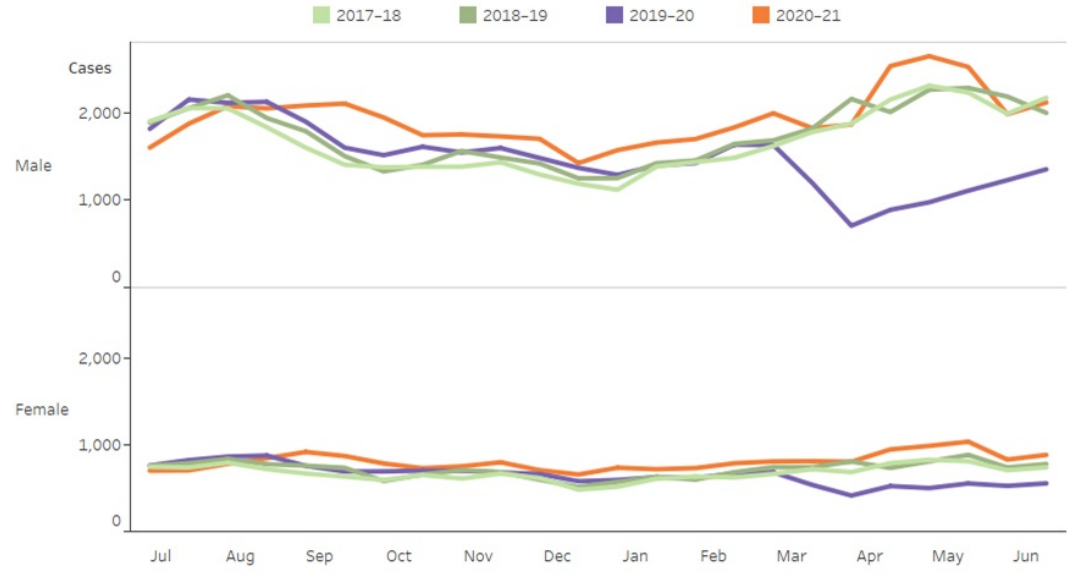
For more detail, see data table A24.

Winter sports create a peak in admissions

Date of admission data from four years of sports injuries suggests some patterns over the year. Admissions for males in particular show a rise during the winter sport season and a dip in the summer months.

In March 2020 the first lockdowns and social distancing measures associated with COVID-19 interrupted team sports participation and created a dip in hospitalisations that lasted several months. (Figure 5).

Figure 5: Sports injury hospitalisations by sex, by month of admission, 2017-18 to 2020-21

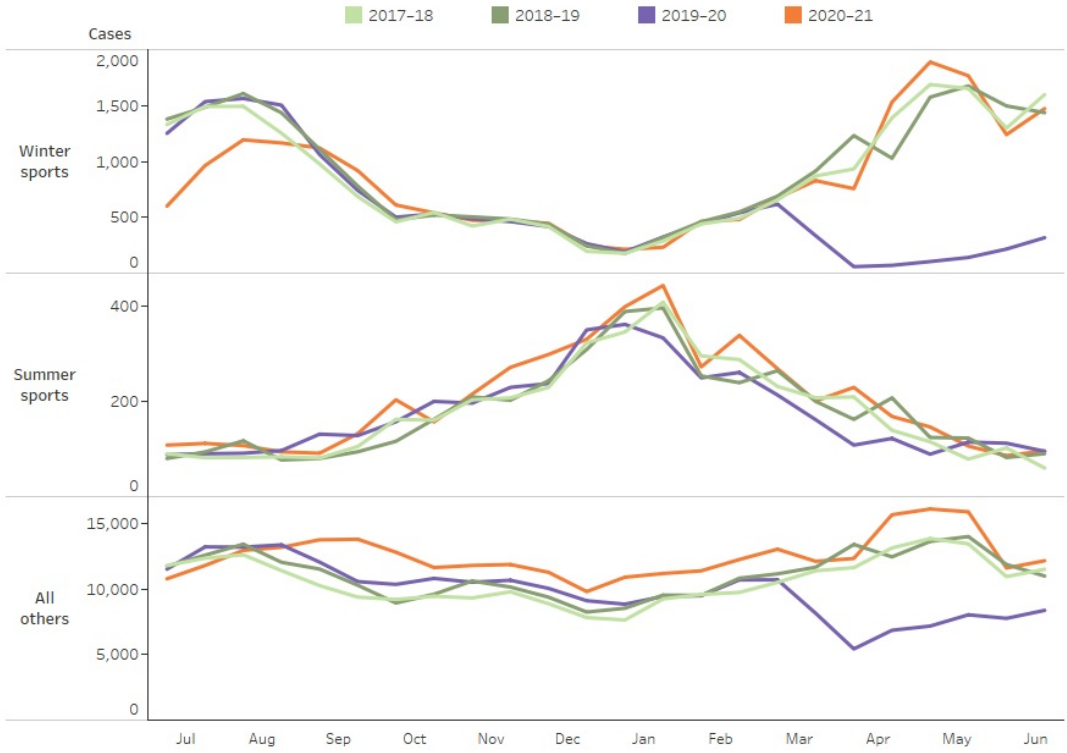


Title: Sports injury hospitalisations, by sex, by month of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B1.

The traditional seasons for many types of sport are reflected in their patterns of injury hospitalisation over the year. Winter sports (such as football and skiing) have a winter peak, summer sports (such as cricket and swimming) have a summer peak and sports that are less seasonal overall (such as basketball and motor sports) have a steadier flow of hospitalisations over the year (Figure 6).

Figure 6: Sports injury hospitalisations by main season, by month of admission, 2017-18 to 2020-21

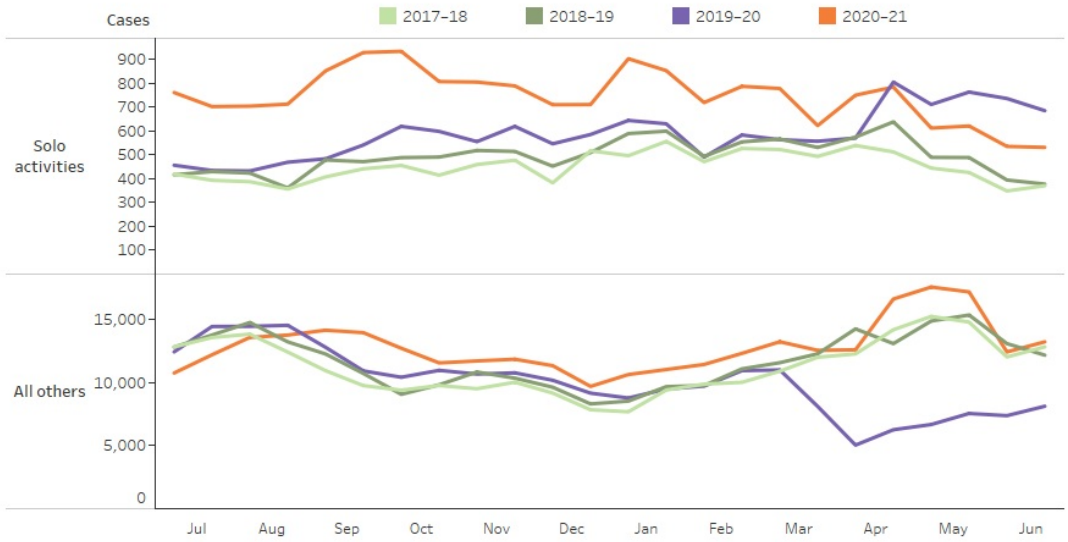


Title: Sports injury hospitalisations, by season category, by month of admission, 2017–18 to 2020–21.
Notes
1. 'Winter sports' are all kinds of football (except touch), snow and ice sports, netball and hockey. 'Summer sports' are cricket, surfing, swimming and diving, water skiing, boating, and fishing.
2. Admission counts have been standardised into two equal periods per month.
3. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Another interesting picture emerges when activities are grouped based on whether they can be done solo: there was a rise in injuries from solo activities such as cycling and running after March of 2020 and levels then generally remained higher than before throughout 2020–21 (Figure 7). Cycling is examined in more detail in its own section.

Figure 7: Sports injury hospitalisations by type of activity, by month of admission, 2017-18 to 2020-21



Title: Sports injury cases, by type of activity, by month of admission, 2017–18 to 2020–21.
Notes
1. 'Solo activities' are cycling, recreational walking, roller sports, and running.
2. Admission counts have been standardised into two 15-day periods per month.
3. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

References

Concussion in Sport Australia 2019. *Concussion in Sport Australia position statement*. Sport Australia. Viewed 1 Feb 2022.

Concussion in Sport Australia 2022. Concussion in sport website. Viewed 1 Feb 2022.

Queensland Brain Institute 2022. *How long does concussion last: long-term effects*. University of Queensland. Viewed 1 Feb 2022.

The next page examines participation and rates of injury in sports in Australia.

Sports participation and rates of injury

Bear in mind when making comparisons between sports that there are limitations in each of the data sets involved. Rates of injury per participant should be treated as estimates and are for those aged 15 and over only.

Nine in 10 adults participate in sport or physical activity

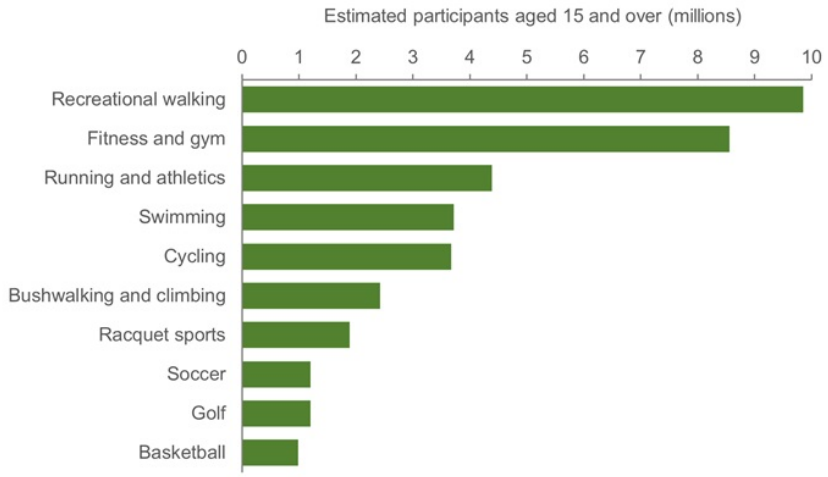
According to the AusPlay survey, about 18.8 million Australians aged 15 and over (89%) played sport or took part in physical activities in 2020–21.

In 2020–21:

- the most popular activity was recreational walking (9.9 million participants), followed by fitness and gym (8.6 million), and running and athletics (4.4 million) (Figure 8)
- the most popular team sports were soccer (1.2 million participants), basketball (990,000) and Australian Rules Football (622,000) (Figure 9).

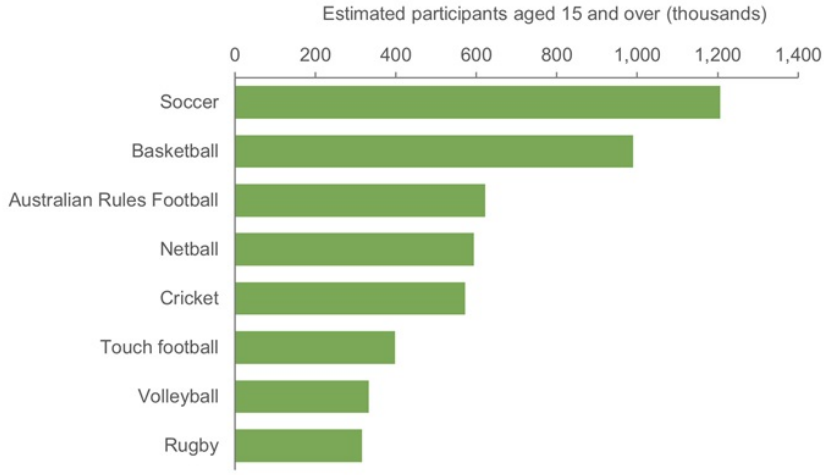
The survey classifies individual physical activity and organised team sport in the same way. A participant is someone who took part at least once in the previous 12 months.

Figure 8: Ten most popular physical activities by estimated number of participants in Australia, 2020–21



Source: Australian Sports Commission, AusPlay.

Figure 9: Popular team sports by estimated number of participants in Australia, 2020–21



Notes

1. 'Volleyball' includes both indoor and outdoor
2. 'Rugby' includes both major codes.

Source: Australian Sports Commission, AusPlay.

For more detail, see data table A29 and appendix.

Outdoor team sports had the highest rates of injury in 2022

In 2022, for the first time, the AusPlay survey asked participants in sports and physical activities if they had been injured while participating. While analysis by individual sports is not yet practical, the results give the estimated number of injuries and rate of injury per participant for various categories of sport or activity.

The highest rate of reported injury per participant was for the Outdoor team sports category, with about a quarter of participants (26%) injured in 2022. Combat sports was next with about 16% of participants injured, closely followed by Indoor team sports, motor and horse sports each with about 15% injured (ASC, 2023).

Cycling has the highest number of hospitalisations

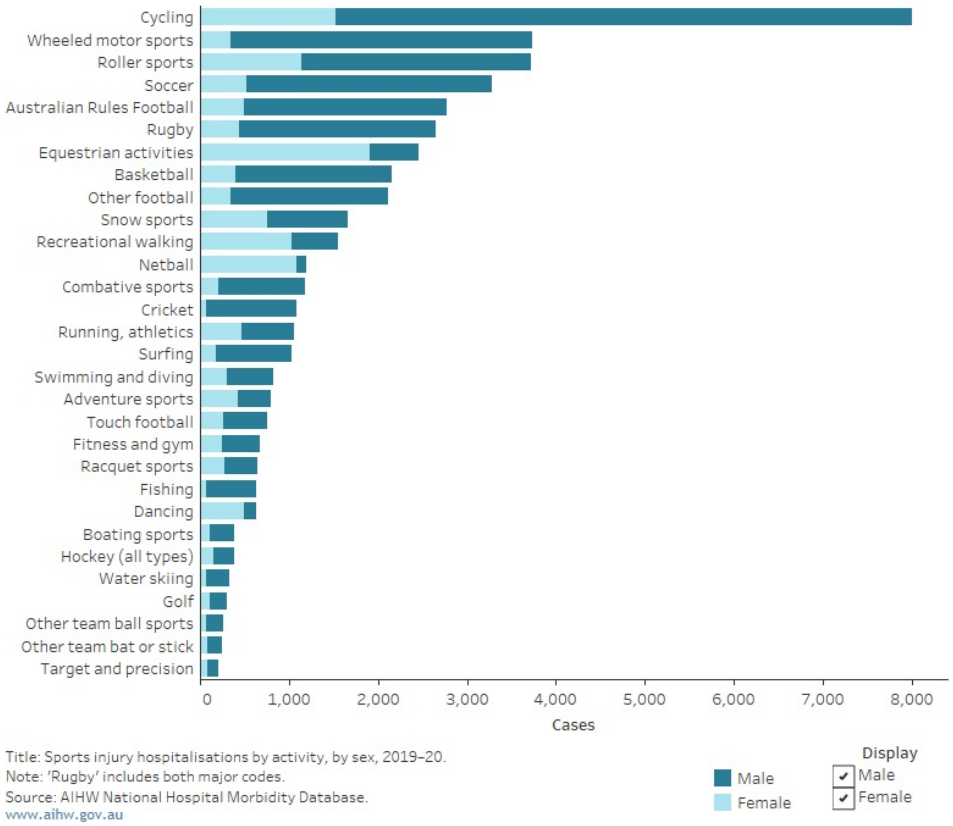
The sports responsible for the most injury hospitalisations in 2020–21 were those that involved wheels, and various types of football. Cycling saw around 9,800 reported injury hospitalisations, followed by soccer (5,100), roller sports (5,000) and rugby (5,000) (Figure 10).

Together, the 3 main specified types of football (Australian rules, rugby, and soccer) were attributed 14,800 hospitalisations. However, because generic terms are often used for any or all of the football codes, a relatively large number of injury hospitalisations are attributed to 'other and unspecified football' (3,000 cases in 2020–21).

There are some differences between males and females. For males, the number one cause of hospitalisation was cycling, whereas for females it was equestrian activities. You can view males and females separately in the following graph by using the filter at the bottom right.

Figure 10: Sports injury hospitalisations by activity, by sex, 2020–21

Bar graph showing sports injury hospitalisations by sport and sex in 2019 20. The viewer can view both males and females together or select one at a time. Cycling had the highest number of hospitalisations overall, and for males. Equestrian activities had the highest number of hospitalisations for females.

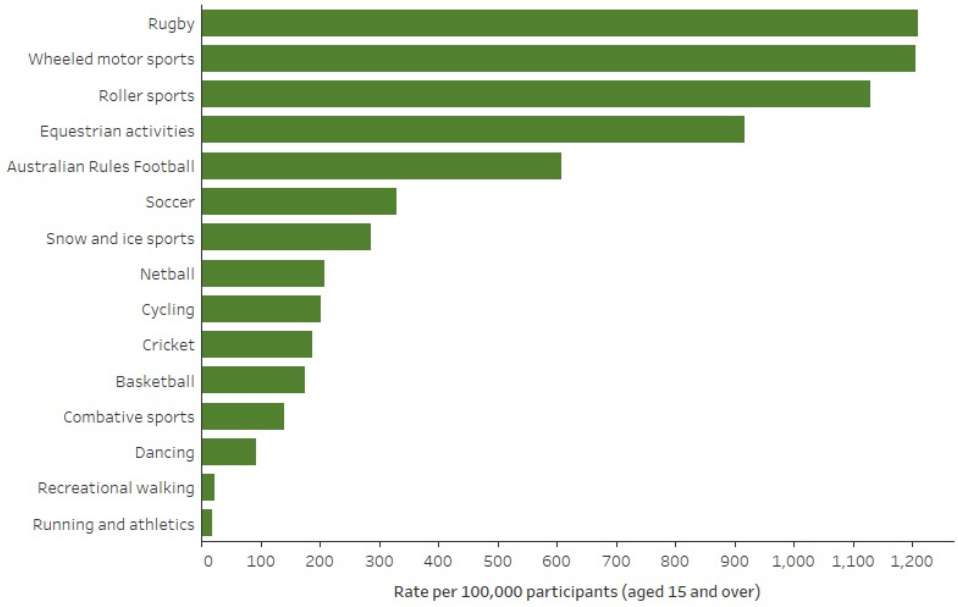


For more detail, see data table A28 and technical notes appendix table 3.

Rugby has the highest rate of hospitalisation

To evaluate the risk of injury for any sport, we can compare the reported number of injuries against the estimated number of participants. In 2020–21, rugby, wheeled motor sports, roller sports and equestrian activities had the highest injury hospitalisation rates (per 100,000 participants aged 15 and over) of all sports (Figure 11).

Figure 11: Rate per 100,000 participants (aged 15 and over) of injury hospitalisation, for selected sports categories, 2020–21



Title: Rate per 100,000 participants (aged 15 and over) of injury hospitalisation for selected sports categories, 2020–21.
Note: 'Rugby' includes both major codes.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

Note: 'Rugby' includes both major codes.
Source: AIHW National Hospital Morbidity Database.

For more detail, see data table A19.

Selected sports are featured in more detail on the next pages.

Featured sports

View further analyses for these popular sports:

Other sports can be found in the data tables.

Featured sports

An estimated 621,000 Australians aged 15 and over played Australian rules football in 2020–21 (ASC, 2021). There were 4,700 injury hospitalisations attributed to Australian rules football—3,800 male and 870 female. For those aged 15 and over, the rate of hospitalisation was about 610 per 100,000 participants.

The disruption to organised sports beginning in March of 2020 caused by COVID-19 was reflected by a dip in injury hospitalisations in 2019–20, followed by a rebound in 2020–21 (Figure 1).

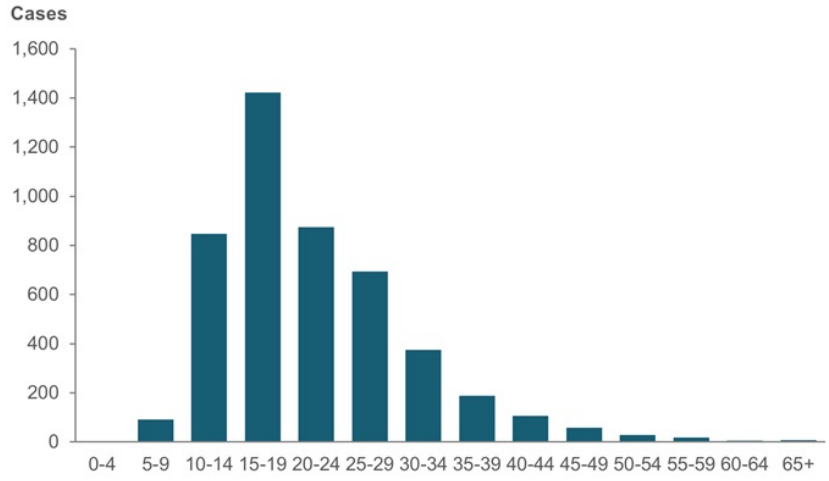
Figure 1: Trend in injury hospitalisations from Australian rules football, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations in 2020–21 was in the 15–19 age group (Figure 2).

Figure 2: Age distribution of injury hospitalisations from Australian rules football, 2020-21

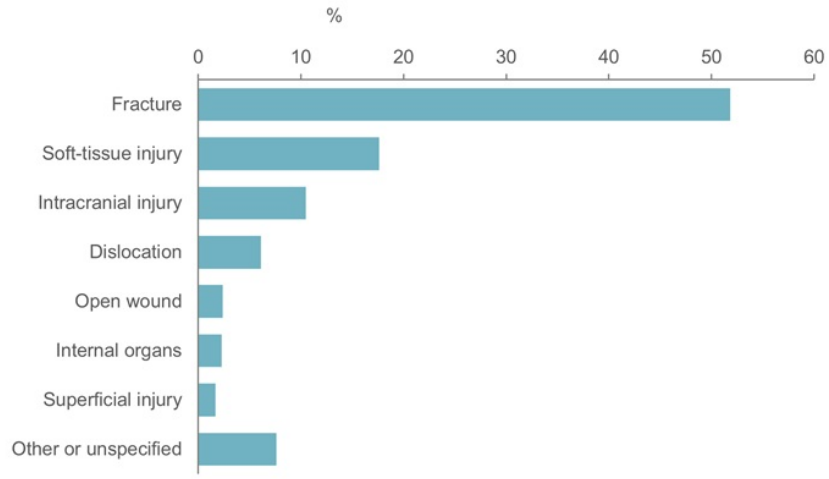


Source: AIHW NHMD.

For more detail, see data table A14.

Just over half of the injuries were fractures (52%), and another 18% were soft-tissue injuries (Figure 3).

Figure 3: Injury hospitalisations from Australian rules football, by type of injury as a proportion, 2020-21



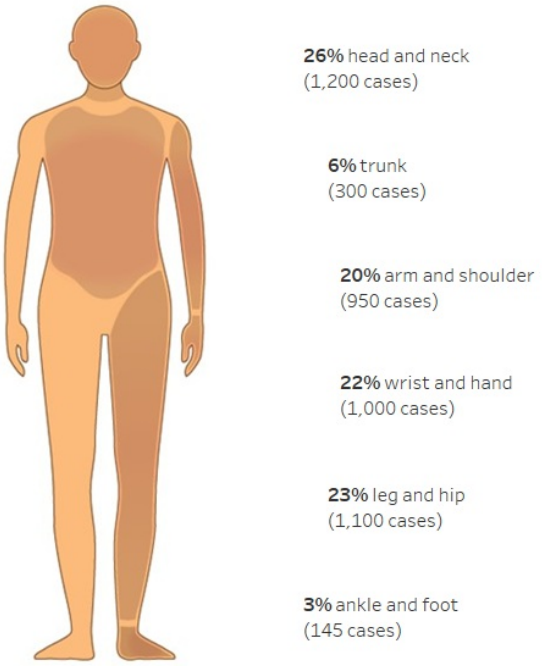
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 480 hospitalisations for concussion, 365 male and 115 female.

The head or neck was the main body part injured in just over a quarter of cases (26%), followed by the leg or hip (23%) (Figure 4).

Figure 4: Injury hospitalisations from Australian rules football, by body part injured, as a proportion, 2020–21



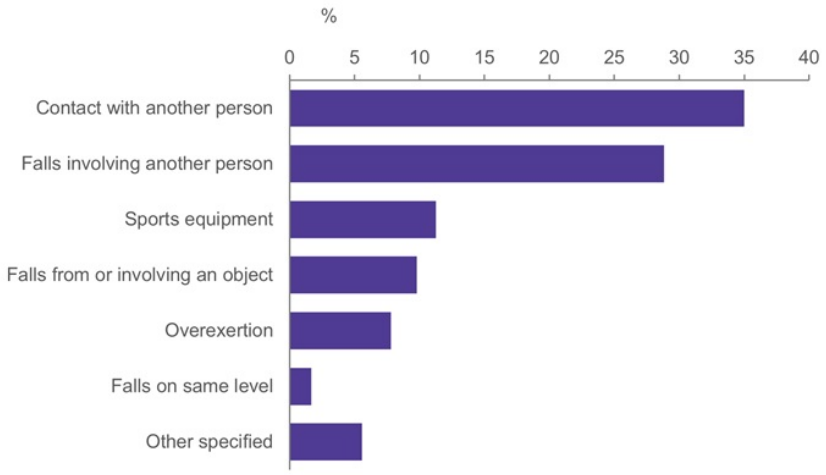
'Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Where the cause of injury was specified, contact with another person was the most common cause (Figure 5).

Figure 5: Cause of injury as a proportion when specified, hospitalisations from Australian rules football, 2020–21



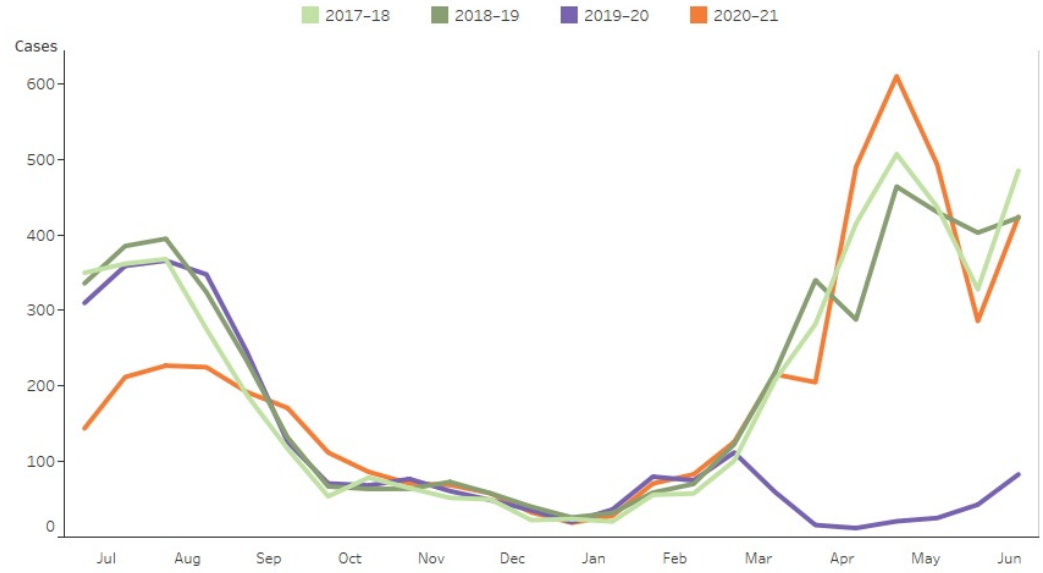
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

As a winter sport, Australian rules football usually sees a peak in injury hospitalisations in the winter months. The interruption caused by COVID-19 is evident in the drop from March 2020 (Figure 6).

Figure 6: Injury hospitalisations from Australian rules football by month of admission, 2017–18 to 2020–21



Title: Injury hospitalisations from Australian rules football, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

An estimated 990,000 Australians aged 15 and over played basketball in 2020–21 (ASC, 2021). There were 2,390 injury hospitalisations attributed to basketball1,940— male and 450 female. For those aged 15 and over, the rate of hospitalisation was about 175 per 100,000 participants.

After a dip in 2019–20 related to COVID-19 lockdowns, hospitalisations in 2020–21 rebounded near to 2018–19 levels (Figure 1).

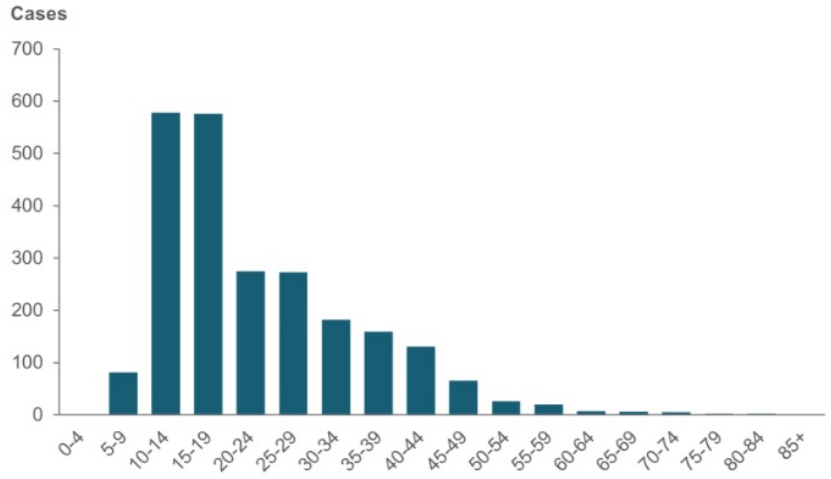
Figure 1: Trend in basketball injury hospitalisations, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of basketball injury hospitalisations were in the 10–14 and 15–19 age groups (Figure 2).

Figure 2: Age distribution of basketball injury hospitalisations, 2020-21

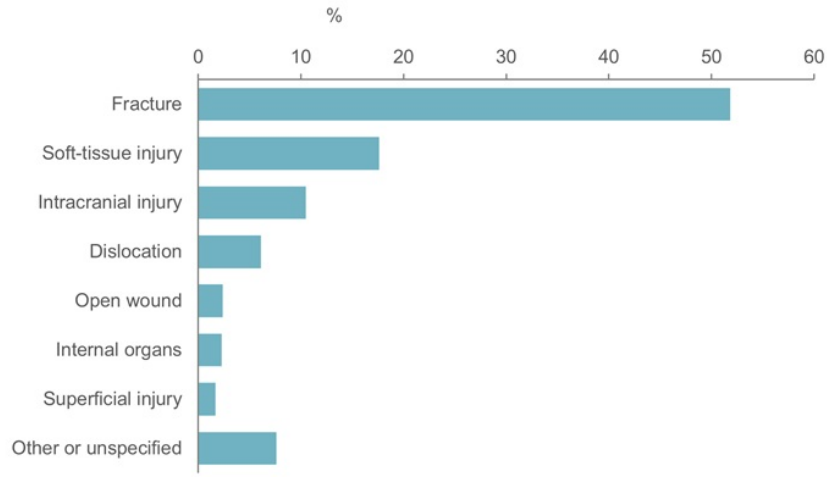


Source: AIHW NHMD.

For more detail, see data table A14.

Almost half of the hospitalisations were fractures (49%), and almost a third were soft-tissue injuries (31%) (Figure 3).

Figure 3: Basketball injury hospitalisations, by type of injury as a proportion, 2020-21



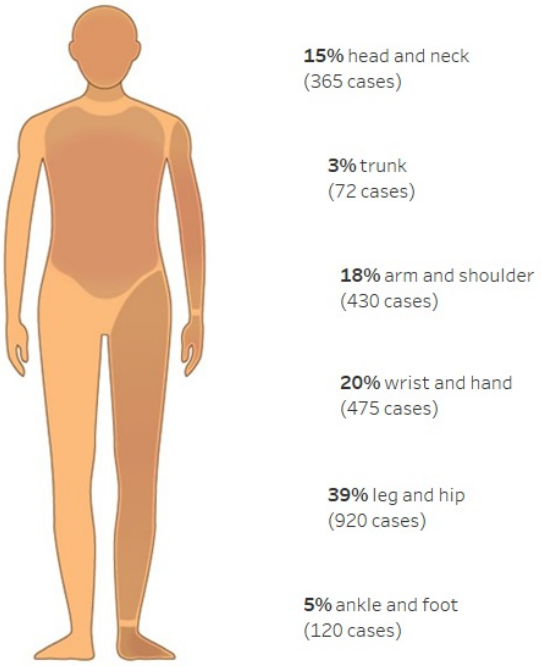
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 90 hospitalisations for concussion—61 male and 29 female.

The main injury was most often to the leg or hip (39%), followed by the hand or wrist (20%) (Figure 4).

Figure 4: Basketball injury hospitalisations, by body part injured, as a proportion, 2020-21



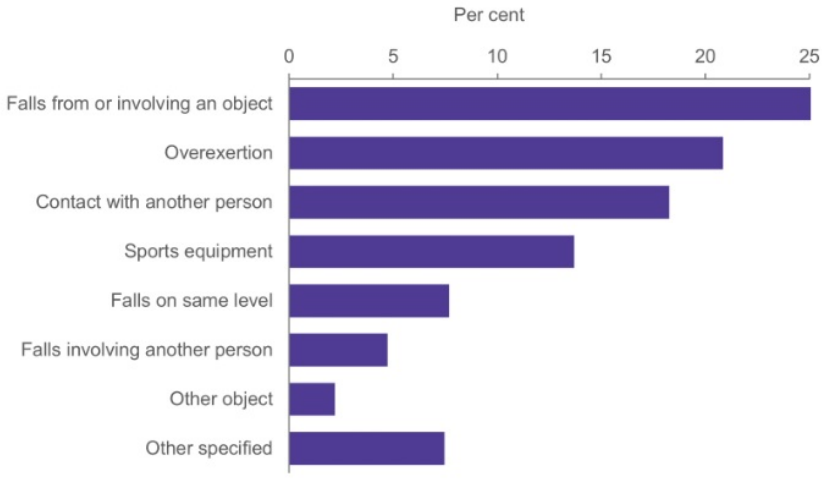
'Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Where it was specified, the most common cause of injury was 'falls from or involving an object' (25%), followed by overexertion (21%) (Figure 5).

Figure 5: Cause of injury as a proportion when specified, basketball injury hospitalisations, 2020-21



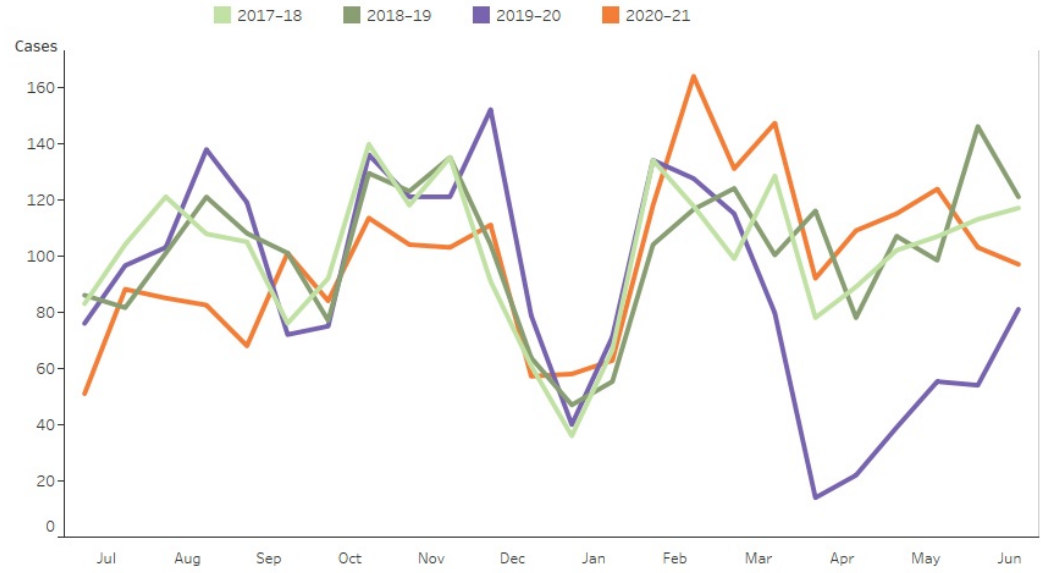
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

The last four years of data indicate a sawtooth pattern of hospitalisations over the year. This may reflect amateur basketball being played in two seasons each year. The interruption caused by COVID-19 is evident in the drop from March 2020 (Figure 6).

Figure 6: Basketball injury hospitalisations by month of admission, 2017-18 to 2020-21



Title: Basketball injury hospitalisations, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

An estimated 572,000 Australians aged 15 and over played cricket in 2020–21 (ASC, 2021). There were 1,250 injury hospitalisations attributed to cricket—1,160 male and 90 female. For those aged 15 and over, the hospitalisation rate was about 190 per 100,000 participants.

The age-standardised rate of injury hospitalisations increased between 2019–20 and 2020–21, after having been on a slight downward trend since 2013–14 (Figure 1).

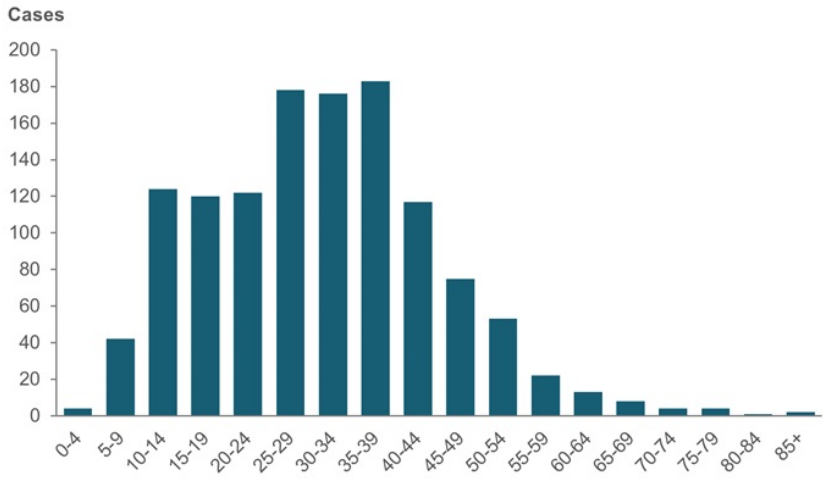
Figure 1: Trend in cricket injury hospitalisations, by sex, 2011–12 to 2020–21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations was in the 35–39 age group (Figure 2).

Figure 2: Age distribution of cricket injury hospitalisations, 2020–21

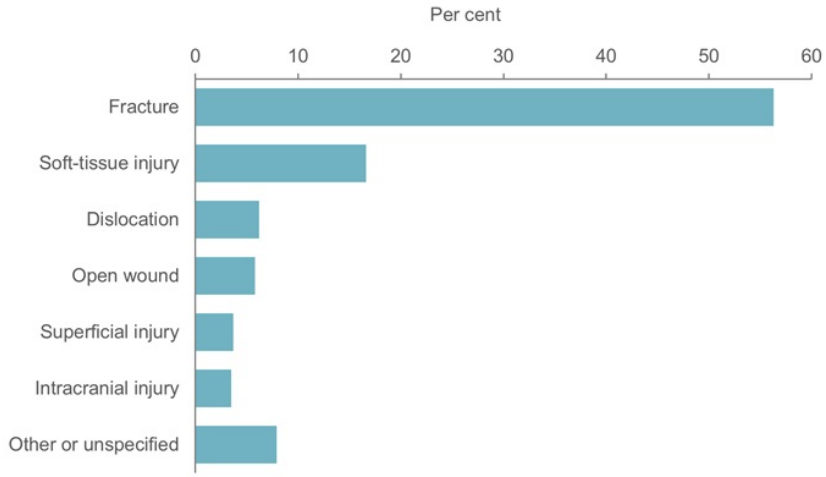


Source: AIHW NHMD.

For more detail, see data table A14.

Over half of the hospitalisations were fractures (56%) (Figure 3).

Figure 3: Cricket injury hospitalisations, by type of injury as a proportion, 2020–21



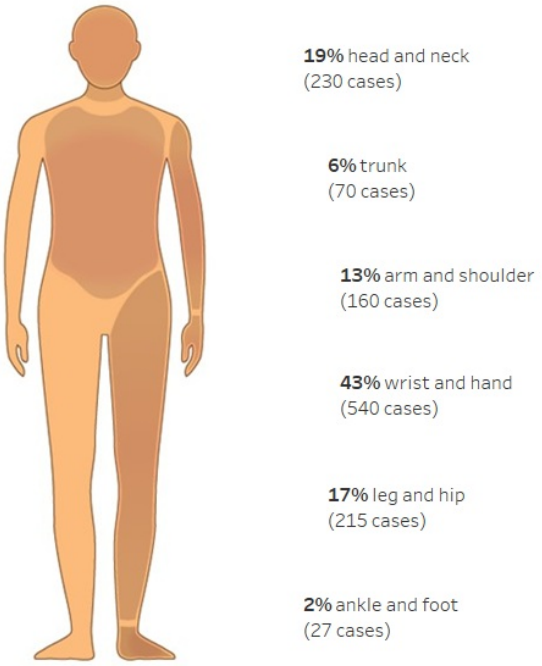
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 38 hospitalisations for concussion.

The main injury was to the hand or wrist in about 4 out of 10 cases (43%), and to the head or neck in about 2 in 10 cases (19%) (Figure 4).

Figure 4: Cricket injury hospitalisations, by principal body part injured, as a proportion, 2020-21



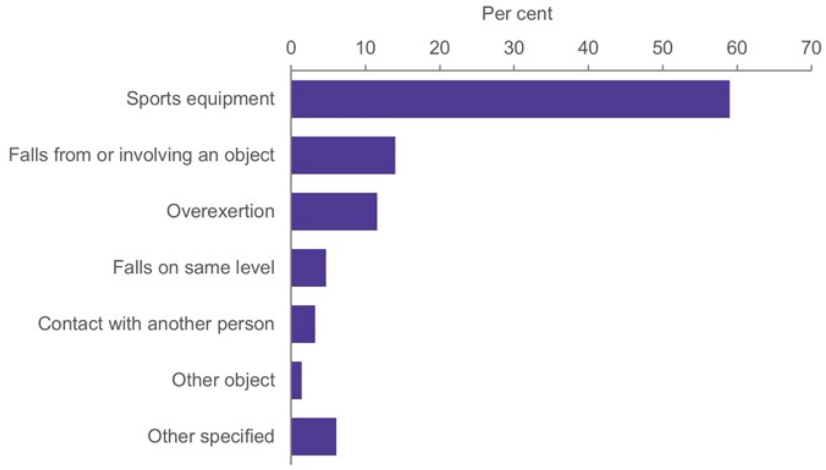
'Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Sports equipment incidents, such as being hit by the ball, were the most common cause of injury (Figure 5).

Figure 5: Cause of injury as a proportion when specified, cricket injury hospitalisations, 2020-21



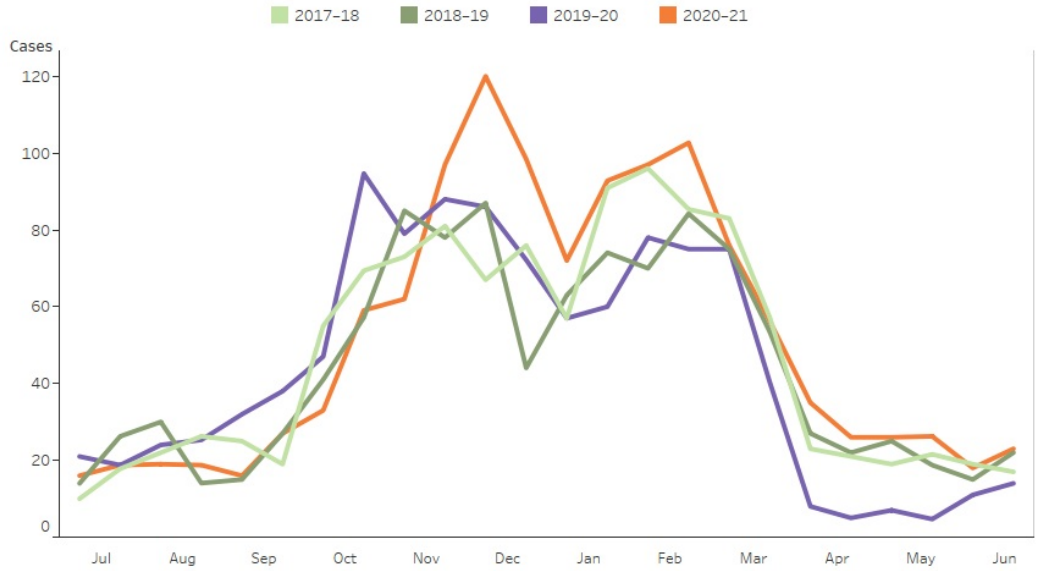
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

As a summer sport, cricket tends to see injury hospitalisations peak in late spring and summer (Figure 6).

Figure 6: Cricket injury hospitalisations by month of admission, 2017-18 to 2020-21



Title: Cricket injury hospitalisations, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

An estimated 3.7 million Australians cycled for sport in 2020–21 (ASC, 2021). There were 9,800 injury hospitalisations attributed to cycling as a sport—8,000 male and 1800 female. For those aged 15 and over, the rate of hospitalisation was 200 per 100,000 participants.

Cycling can be a sport, a leisure activity, or a mode of transport. There were 17,300 cycling injury hospitalisations in 2020–21, of which 9,800 were identified as cycling for sport. For more details, see the technical notes.

Injury hospitalisations from cycling for sport have been on an upward trend in the last ten years. Between 2017–18 and 2020–21 the age-standardised rate of hospitalisation increased 57% (Figure 1). AusPlay data shows that the estimated number of adults participating in cycling for sport or exercise increased from 2.3 million to 3.2 million over the same 3 year period (ASC, 2021).

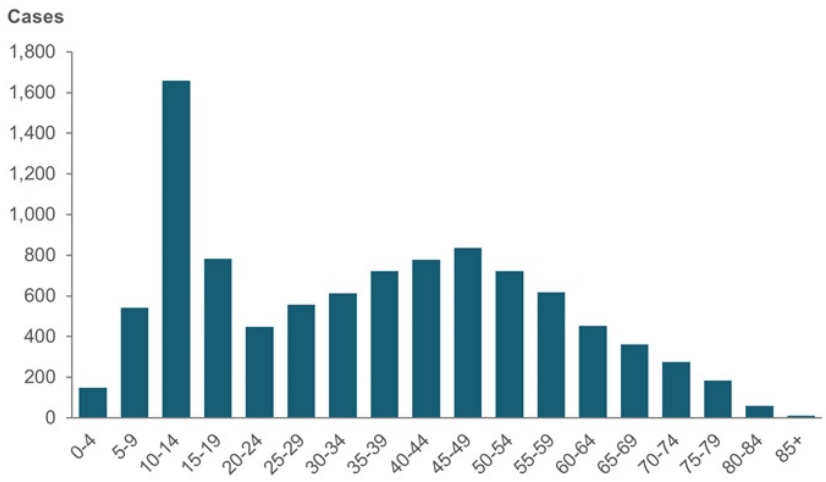
Figure 1: Trend in injury hospitalisations from cycling for sport, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The age distribution of hospitalisations shows a large spike for the 10–14 age group, and then a lower peak at the 45–49 age group (Figure 2).

Figure 2: Age distribution of injury hospitalisations from cycling for sport, 2020-21

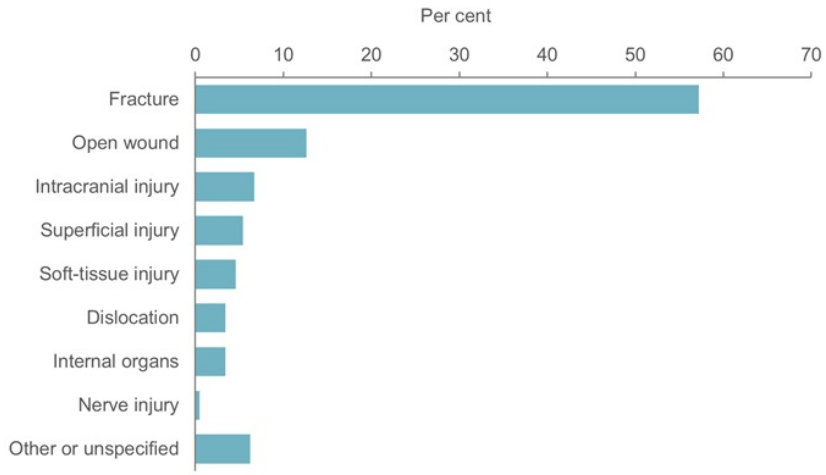


Source: AIHW NHMD.

For more detail, see data table A14.

Fractures accounted for over half of these hospitalisations (57%) (Figure 3).

Figure 3: Injury hospitalisations from cycling for sport, by type of injury as a proportion, 2020-21



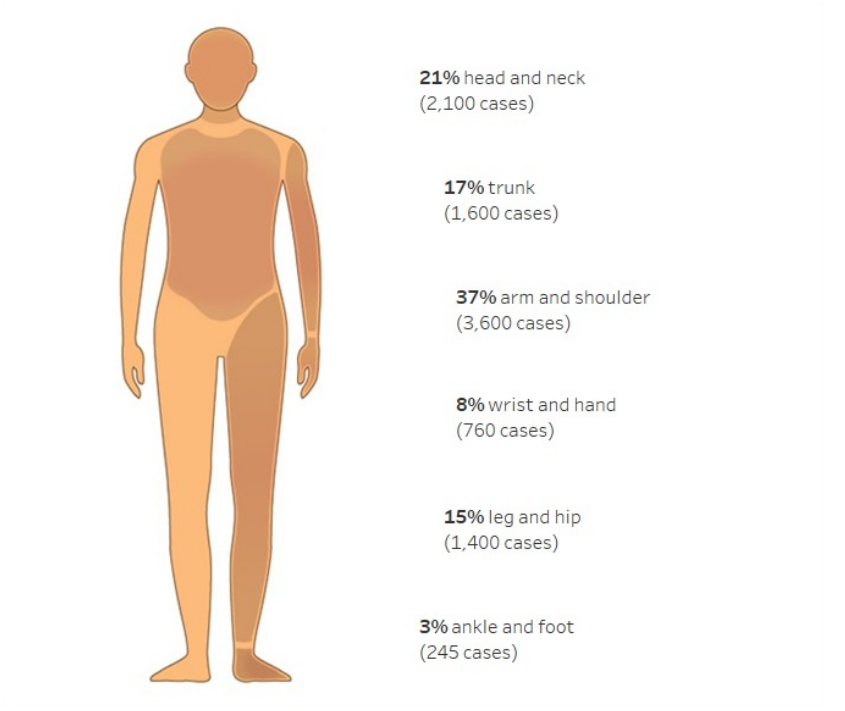
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 495 hospitalisations for concussion—410 male and 85 female.

The shoulder or arm was the main site of injury in just over a third of cases (37%), while the head and neck accounted for just over 1 in 5 cases (21%) (Figure 4).

Figure 4: Injury hospitalisations from cycling for sport, by body part injured, as a proportion, 2020–21



Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

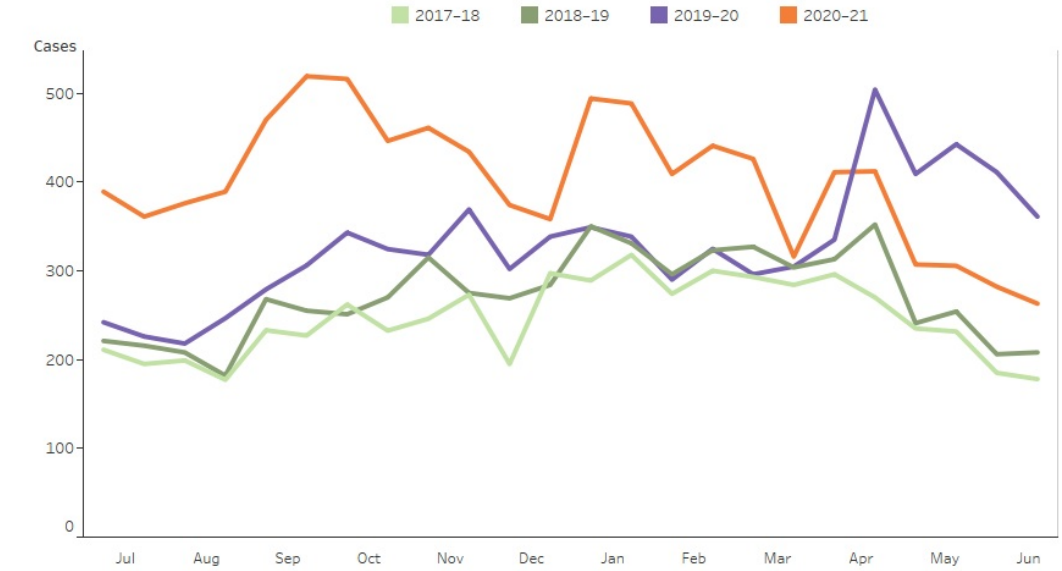
Source: AIHW NHMD.

For more detail, see data table A26.

Seasonal differences

Date of admission data for the past few years suggests that cycling activity has changed since the arrival of COVID-19. Before March of 2020, cycling activity (or at least, the number of cycling injuries) tended to increase in the warmer months. An unusual uptick in injury hospitalisations after March 2020, followed by a peak in September suggests that lockdowns resulted in more cycling activity than previous years (Figure 5).

Figure 5: Injury hospitalisations from cycling for sport, by month of admission, 2017–18 to 2020–21



Title: Cycling injury hospitalisations, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

An estimated 237,000 Australians aged 15 and over participated in equestrian activity in 2020–21 (ASC, 2021). Around 2,600 injury hospitalisations were attributed to equestrian activities – 2,100 female and 500 male. This was a similar number to the previous year. For those aged 15 and over, the rate of hospitalisation was about 917 per 100,000 participants.

The age-standardised rate of injury hospitalisations for males fell 26% between 2017–18 and 2020–21, while for females it rose by 12% (Figure 1).

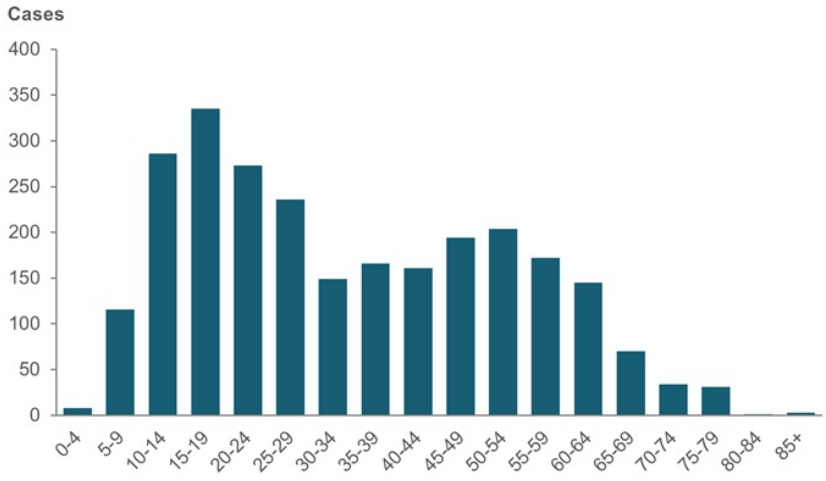
Figure 1: Trend in injury hospitalisations from equestrian activities, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations was in the 15–19 age group (Figure 2).

Figure 2: Age distribution of injury hospitalisations from equestrian activities, 2020–21

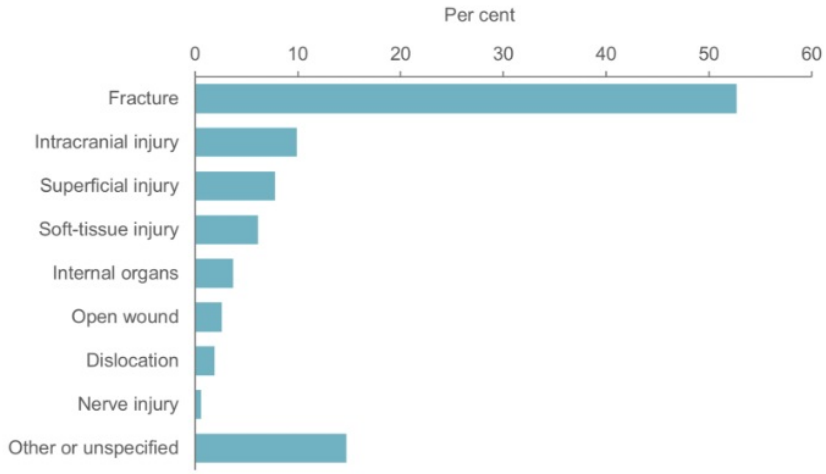


Source: AIHW NHMD.

For more detail, see data table A14.

About half of these hospitalisations were fractures (53%) (Figure 3).

Figure 3: Injury hospitalisations from equestrian activities, by type of injury as a proportion, 2020–21



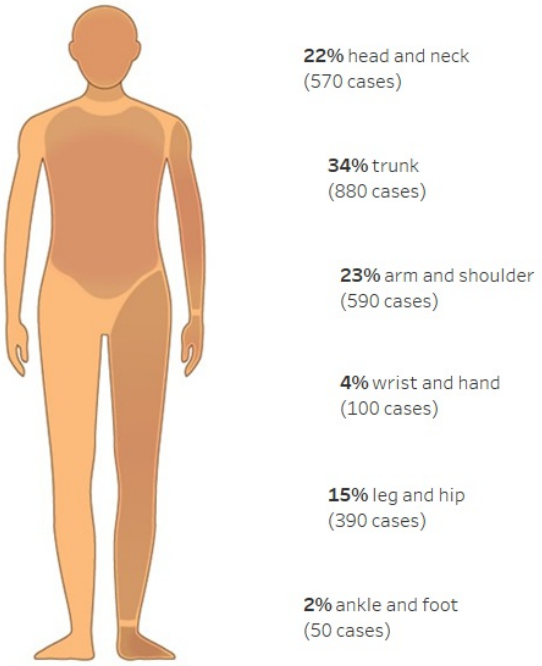
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 211 hospitalisations for concussion—184 female and 27 male.

The main injury was to the trunk of the body in a third of cases (34%), and the head and neck in almost a quarter of cases (22%) (Figure 4).

Figure 4: Injury hospitalisations from equestrian activities, by body part injured, as a proportion, 2020-21



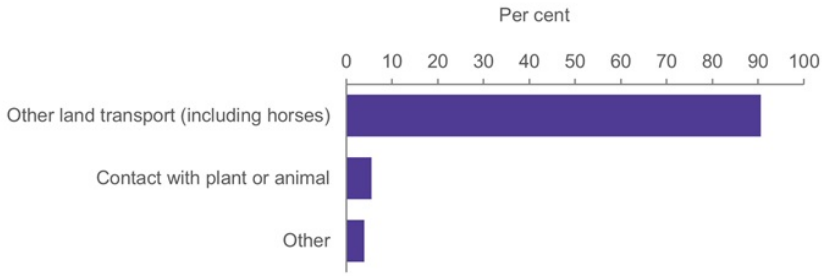
'Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Perhaps unremarkably, about 9 in 10 of these hospitalisations were reported to have been caused directly by an accident with a horse, such as a fall from a horse (Figure 5).

Figure 5: Cause of injury as a proportion when specified, hospitalisations from equestrian activities, 2020-21



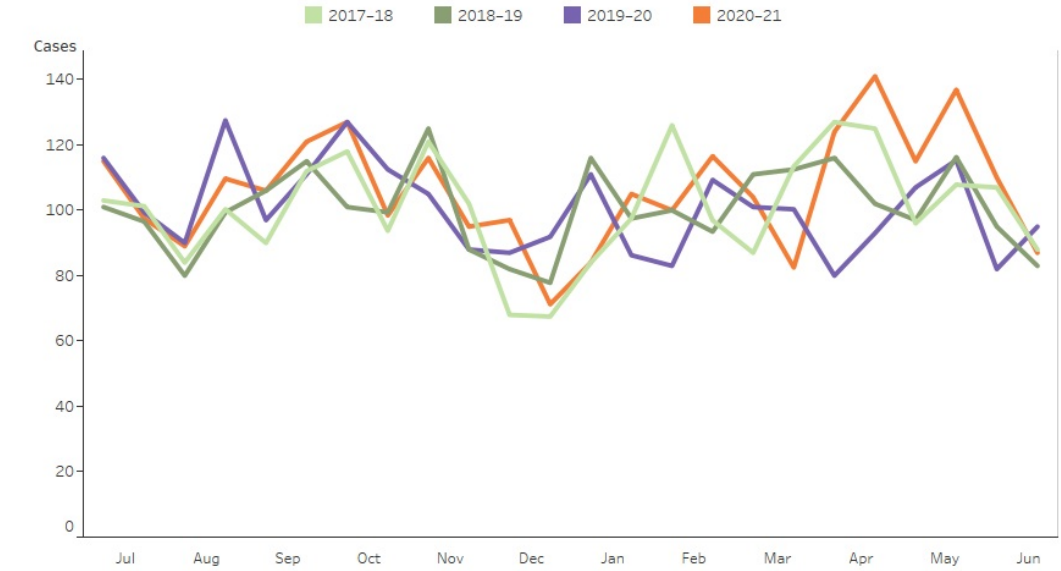
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

Four years of date of admissions data suggests that equestrian activities are less seasonal than many other sports (Figure 6).

Figure 6: Injury hospitalisations from equestrian activities by month of admission, 2017-18 to 2020-21



Title: Injury hospitalisations from equestrian activities, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

An estimated 594,000 Australians aged 15 and over played netball in 2020–21 (ASC, 2021). There were 1,500 injury hospitalisations attributed to netball—1,380 female and 120 male. For those aged 15 and over, the rate of hospitalisations was about 210 per 100,000 participants.

Disruptions related to COVID-19 lockdowns led to a drop in injury hospitalisations in 2019–20, and also affected the number in 2020–21 (Figure 1).

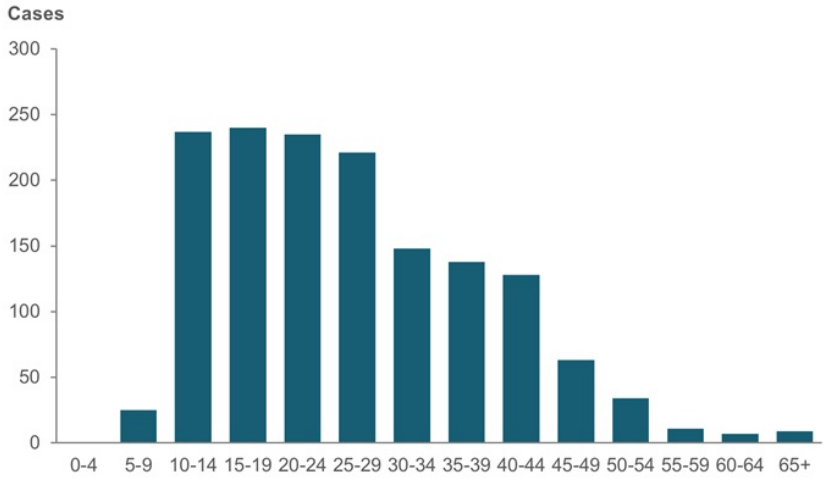
Figure 1: Trend in netball injury hospitalisations, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations in 2020–21 was in the 15–19 age group (Figure 2).

Figure 2: Age distribution of netball injury hospitalisations, 2020–21

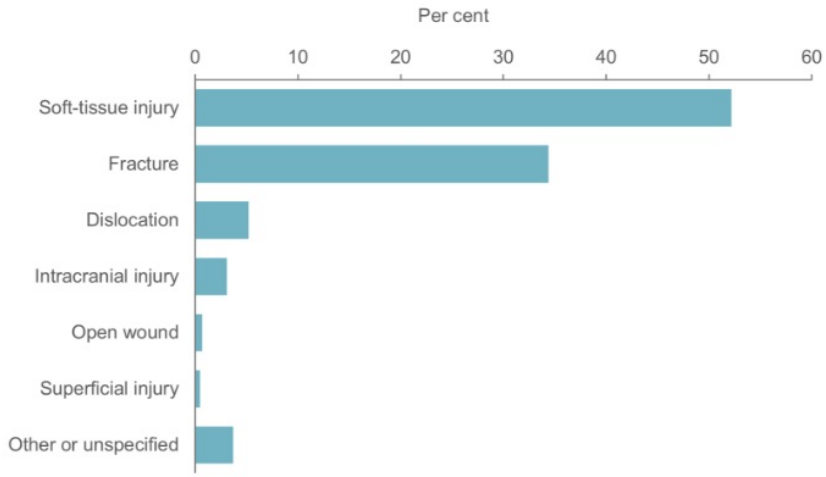


Source: AIHW NHMD.

For more detail, see data table A14.

Just over half of these hospitalisations were for soft-tissue injuries (52%), while just over a third were for fractures (34%) (Figure 3).

Figure 3: Netball injury hospitalisations, by type of injury as a proportion, 2020–21



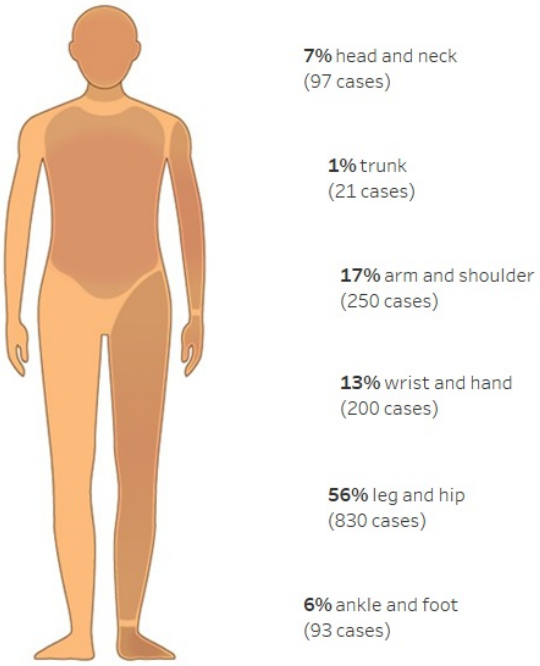
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 45 hospitalisations for concussion.

The main injury was to the leg or hip in 56% of cases (Figure 4).

Figure 4: Netball injury hospitalisations, by body part injured, as a proportion, 2020–21



'Notes

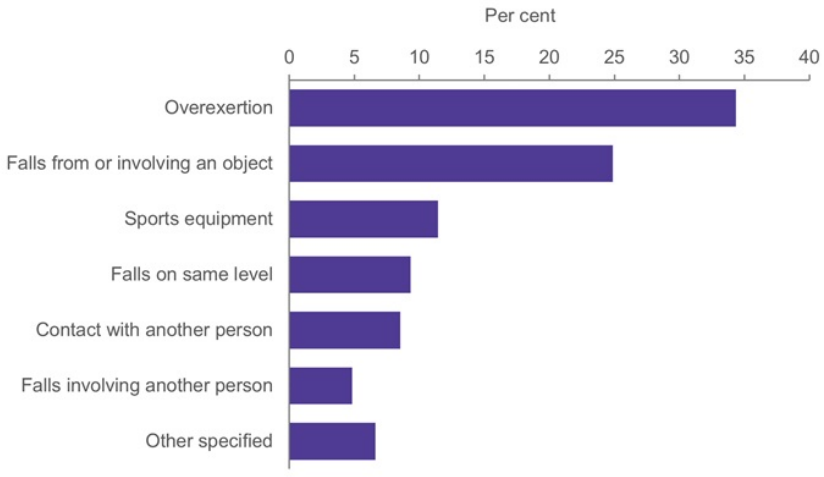
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Where it was specified, the most common cause of injury was overexertion (34%), followed by falls involving an object (25%) (Figure 5).

Figure 5: Cause of injury as a proportion when specified, netball injury hospitalisations, 2020–21



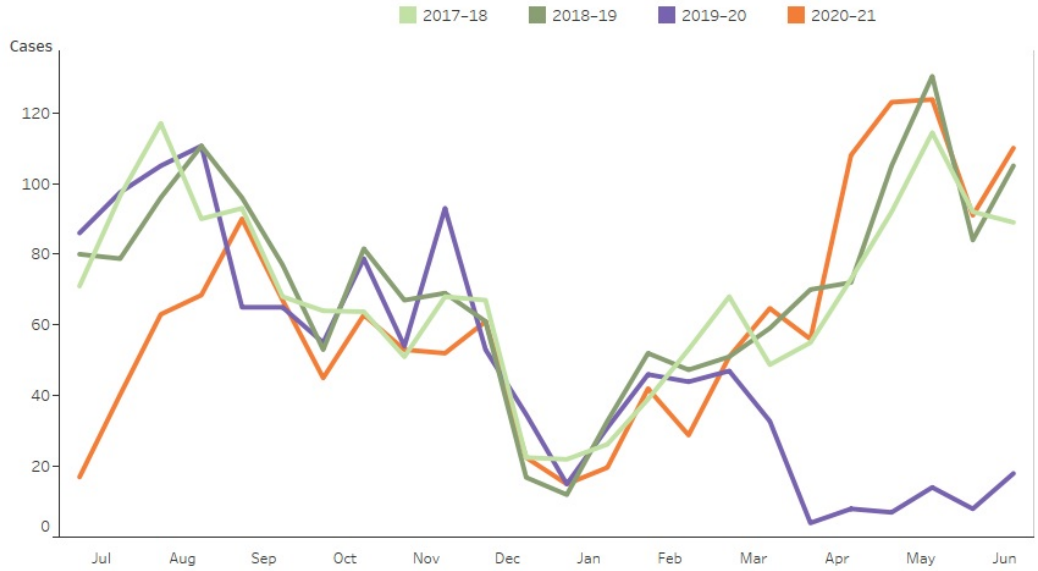
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

Netball injury hospitalisations tend to peak in the autumn and winter months. The interruption caused by COVID-19 is evident in the drop from March 2020 (Figure 6).

Figure 6: Netball injury hospitalisations by month of admission, 2017–18 to 2020–21



Title: Netball Injury hospitalisations, by month of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

Roller sports include skateboarding, rollerblading, and non-motored scooters.

An estimated 282,000 Australians aged 15 and over participated in roller sports in 2020–21 (ASC, 2021). There were about 5,000 injury hospitalisations attributed to roller sports—3,200 male and 1,800 female. For those aged 15 and over, the rate of hospitalisation was about 1,130 per 100,000 participants.

Between 2018–19 and 2020–21, there was a 50% increase in the age-standardised rate of hospitalisations for males, and a 123% increase for females. (Figure 1).

This increase in injury hospitalisations may be related to an increase in participation overall, the influence of COVID-19 restrictions on recreation choices, a new type of roller sport, or some combination of these. The 'Seasonal differences' section and Figure 5 illustrate how these hospitalisations are distributed over the months of the year.

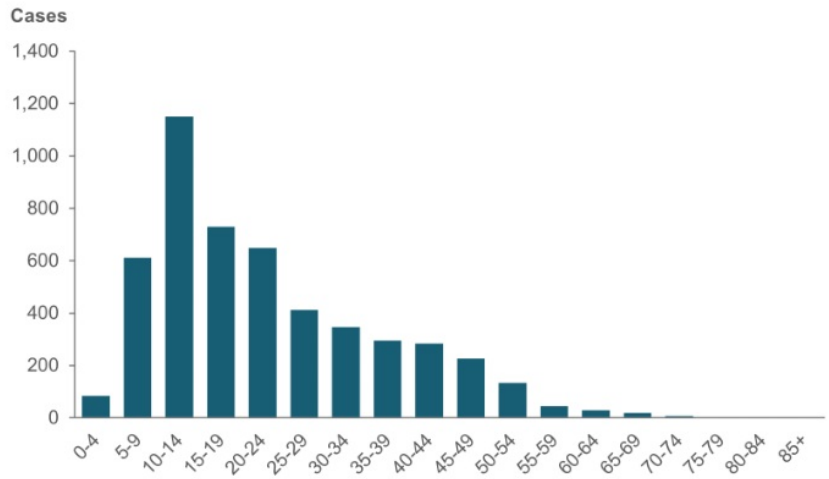
Figure 1: Trend in roller sports injury hospitalisations sports, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations was in the 10–14 age group (Figure 2).

Figure 2: Age distribution of injury hospitalisations from roller sports, 2020–21

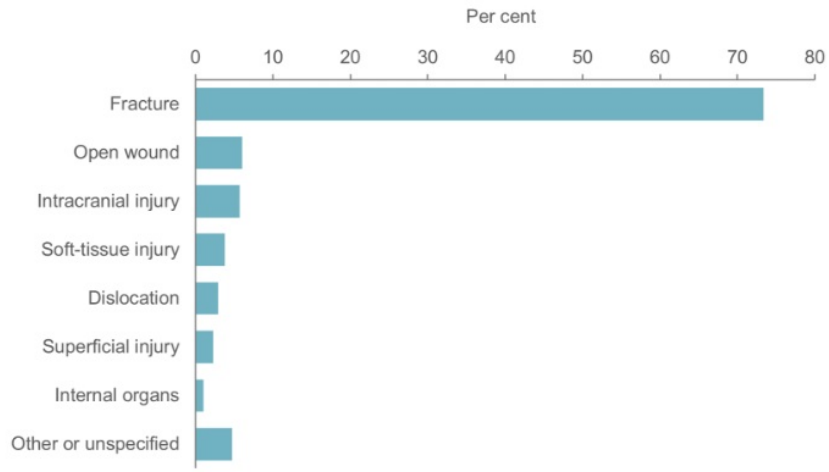


Source: AIHW NHMD.

For more detail, see data table A14.

About 7 in 10 of these hospitalisations (73%) were fractures (Figure 3).

Figure 3: Injury hospitalisations from roller sports, by type of injury as a proportion, 2020–21



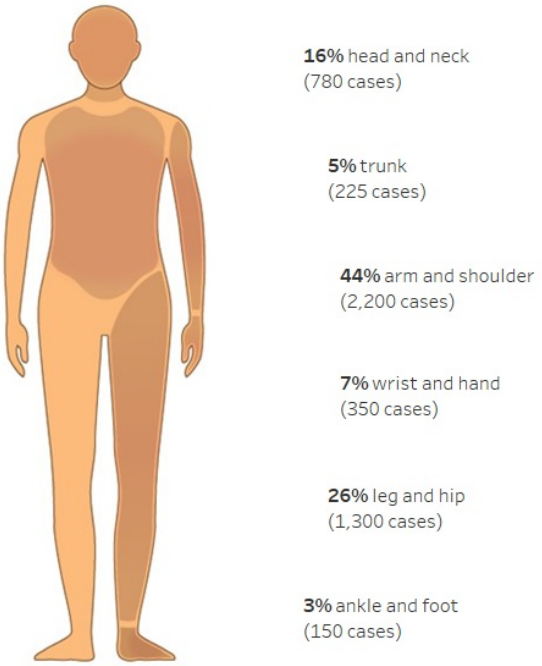
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 205 hospitalisations for concussion—155 male and 50 female.

The main site of injury was most often the arm and shoulder region (44%), followed by the leg and hip region (26%) (Figure 4).

Figure 4: Injury hospitalisations from roller sports, by body part injured, as a proportion, 2020–21



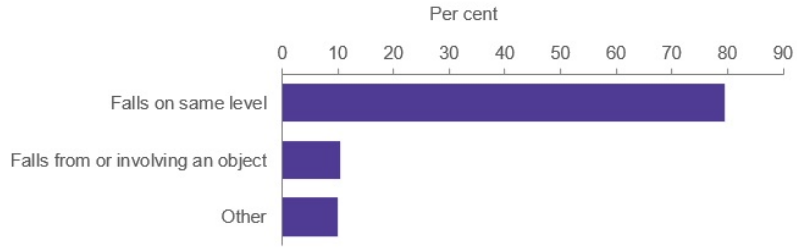
Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

When specified, the cause of 9 out of 10 of these injuries (92%) was a fall (Figure 5).

Figure 5: Cause of injury as a proportion when specified, injury hospitalisations from roller sports, 2020–21



Source: AIHW NHMD.

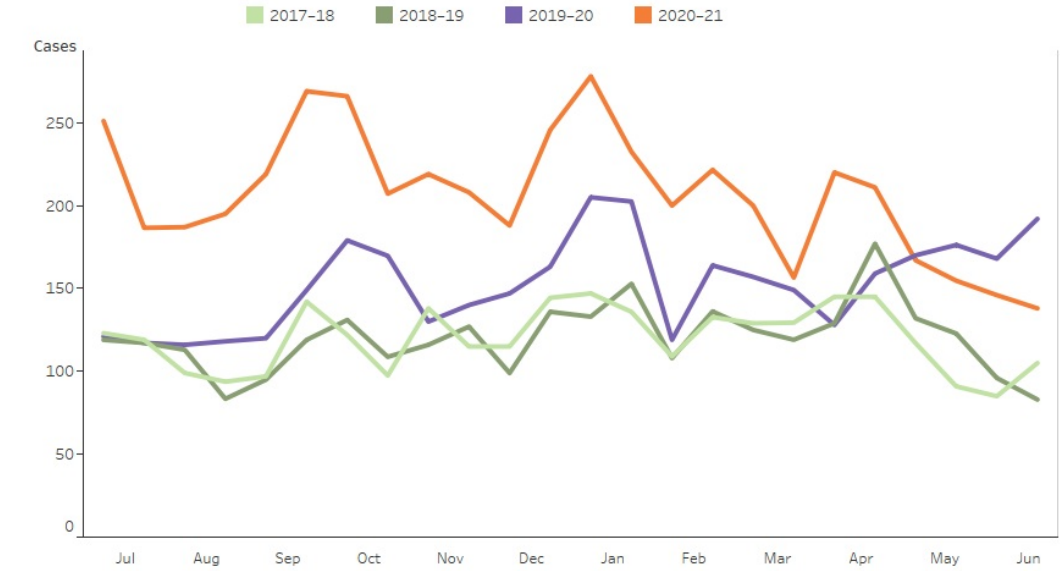
For more detail, see data table A27.

Seasonal differences

The pattern of injury hospitalisations in 2020–21 and 2019–20 was different to the two previous years. There were larger peaks in September/October and December/January, suggesting additional activity coinciding with school holiday periods. These larger peaks first appeared in late 2019, before the arrival of COVID-19 (Figure 6). They could be caused by increased participation, a new mode of roller sport, or some combination of these.

There was also an increase after March 2020 (and the arrival of COVID-19) compared with the previous years, and hospitalisation numbers remained at a higher level through most of 2020–21.

Figure 6: Injury hospitalisations from roller sports by month of admission, 2017–18 to 2020–21



Title: Injury hospitalisations from roller sports, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

The term ‘rugby’ covers both the major codes, rugby union and rugby league. Hospital records often do not specify which type of rugby an injured person was playing.

An estimated 316,000 Australians aged 15 and over played rugby in 2020–21 (ASC, 2021). There were 5,030 injury hospitalisations attributed to rugby—4,300 male and 730 female. For those aged 15 and over, the rate of hospitalisations was about 1,200 per 100,000 participants.

Following a dip in 2019–20 related to COVID-19 lockdowns, rugby injury hospitalisations in 2020–21 rebounded higher than in 2018–19? (Figure 1).

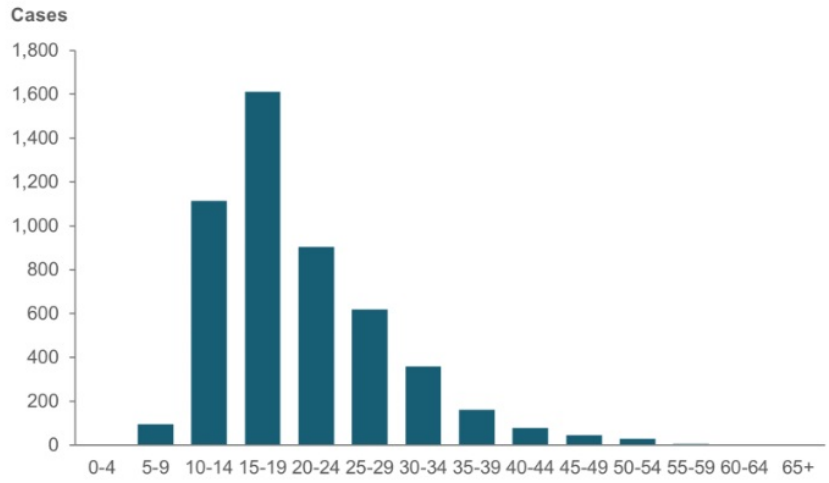
Figure 1: Trend in rugby injury hospitalisations, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations was in the 15–19 age group (Figure 2).

Figure 2: Age distribution of rugby injury hospitalisations, 2020-21

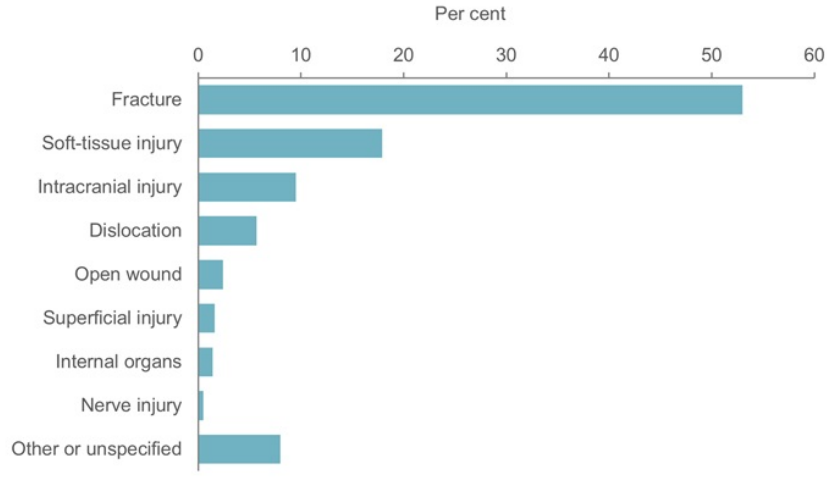


Source: AIHW NHMD.

For more detail, see data table A14.

Just over half of these injuries were fractures (53%), and another 18% were soft-tissue injuries (Figure 3).

Figure 3: Rugby injury hospitalisations, by type of injury as a proportion, 2020-21



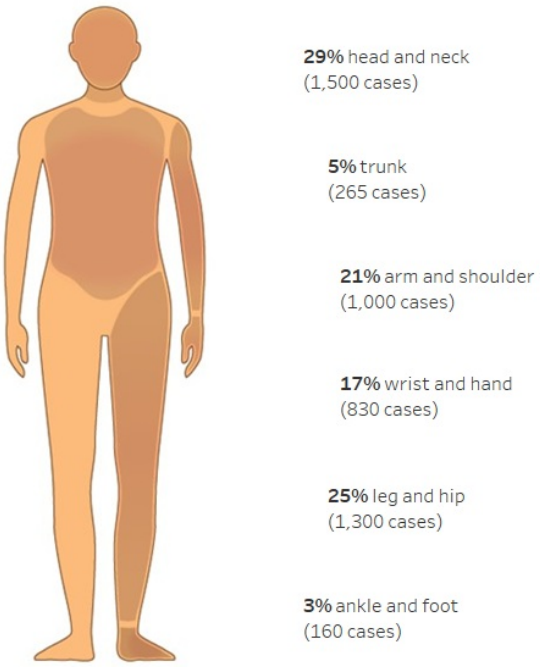
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 460 hospitalisations for concussion, 390 male and 73 female.

The main injury was most often to the head or neck (29%), followed by the leg or hip (25%) (Figure 4).

Figure 4: Rugby injury hospitalisations, by body part injured, as a proportion, 2020–21



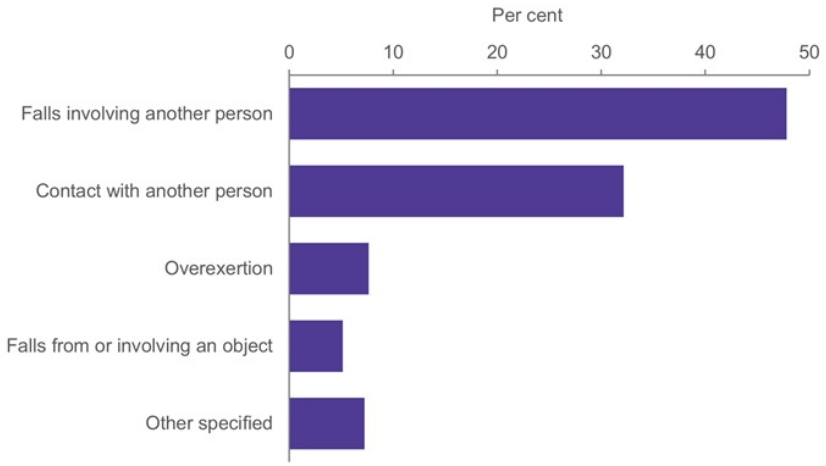
Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Where it was specified, the cause of injury was most often either 'falls involving another person' (48%) or 'contact with another person' (32%). (Figure 5).

Figure 5: Cause of injury as a proportion when specified, rugby injury hospitalisations, 2020–21



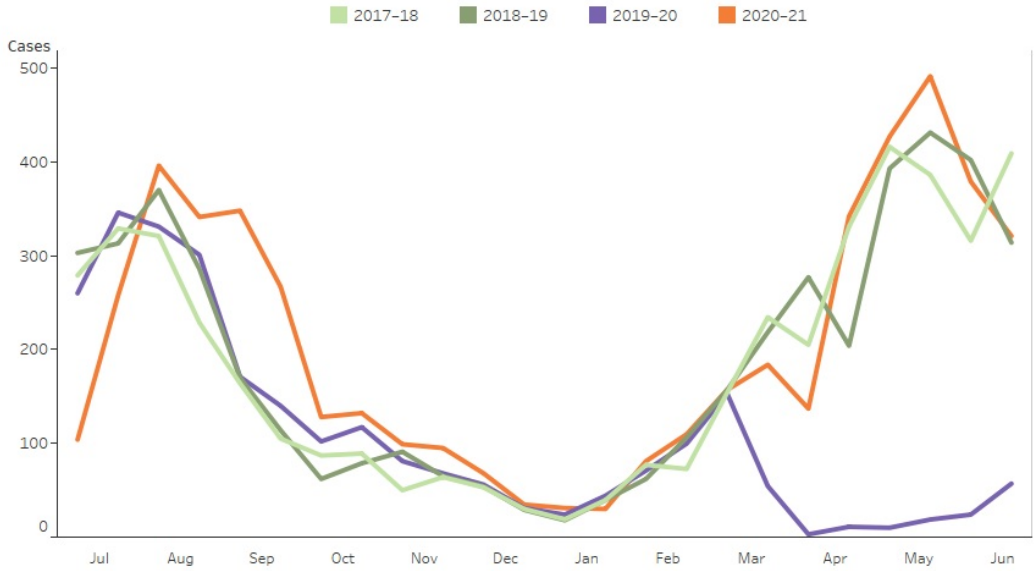
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

Because rugby is a winter sport, injury hospitalisations are usually highest between March and August. The interruption caused by COVID-19 is evident in the drop from March 2020 (Figure 6).

Figure 6: Rugby injury hospitalisations by month of admission, 2017–18 to 2020–21



Title: Rugby injury hospitalisations, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

An estimated 1.2 million Australians aged 15 and over played soccer in 2020–21 (ASC, 2021). There were 5,100 injury hospitalisations attributed to soccer—4,200 male and 880 female. For those aged 15 and over, the rate of hospitalisation was about 330 per 100,000 participants.

Following a dip in 2019–20 related to COVID-19 lockdowns, soccer injury hospitalisations in 2020–21 were similar to 2018–19 (Figure 1).

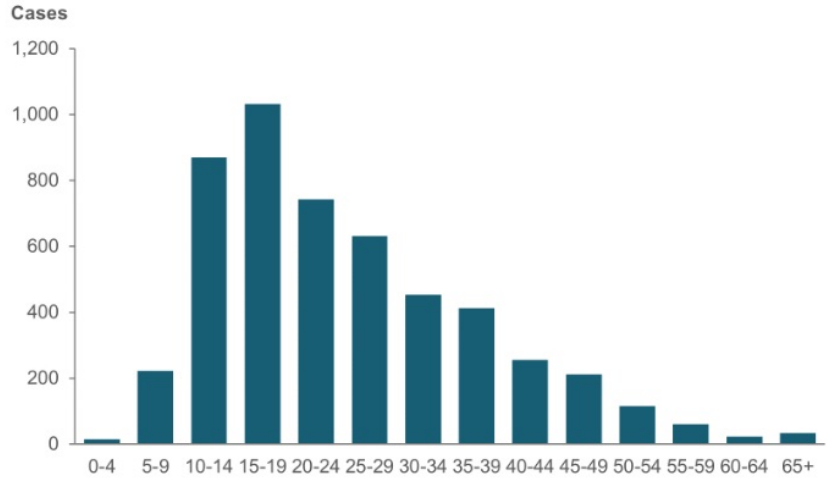
Figure 1: Trend in soccer injury hospitalisations, by sex, 2011-12 to 2020-21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations in 2020–21 was in the 15–19 age group (Figure 2).

Figure 2: Age distribution of soccer injury hospitalisations, 2020-21

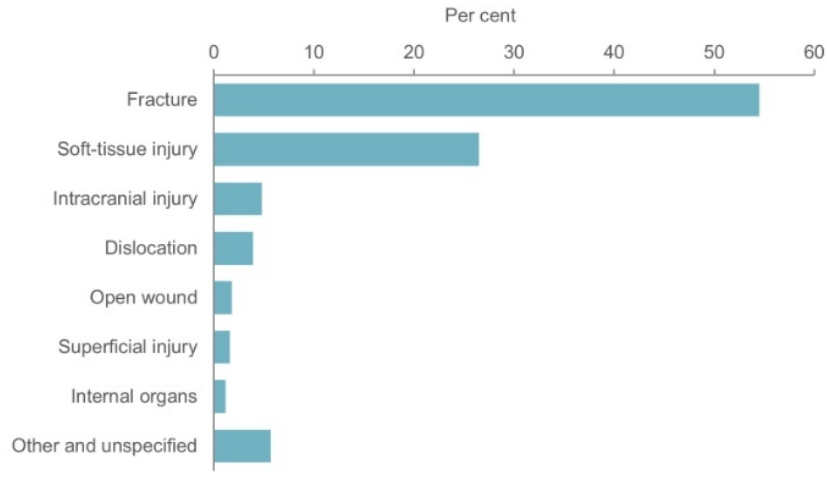


Source: AIHW NHMD.

For more detail, see data table A14.

Over half of hospitalisations were fractures (54%), and over a quarter were soft-tissue injuries (26%) (Figure 3).

Figure 3: Soccer injury hospitalisations, by type of injury as a proportion, 2020-21



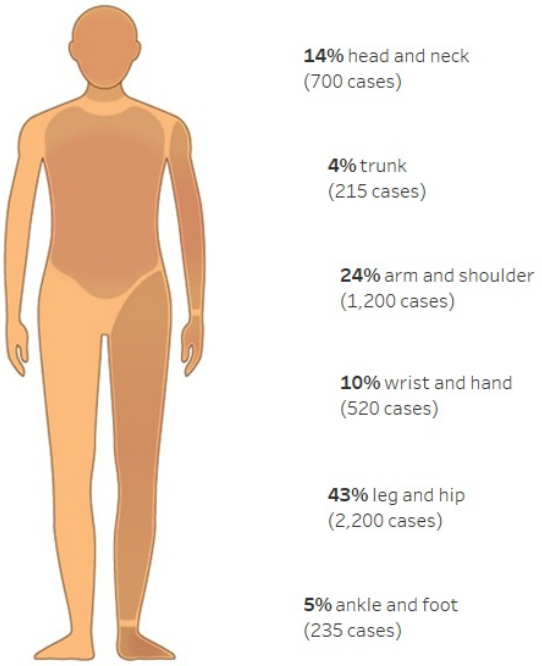
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 225 hospitalisations for concussion (4.5%).

The main injury was most often to the leg or hip (43%), followed by the arm or shoulder (24%) (Figure 4).

Figure 4: Soccer injury hospitalisations, by body part injured, as a proportion, 2020–21



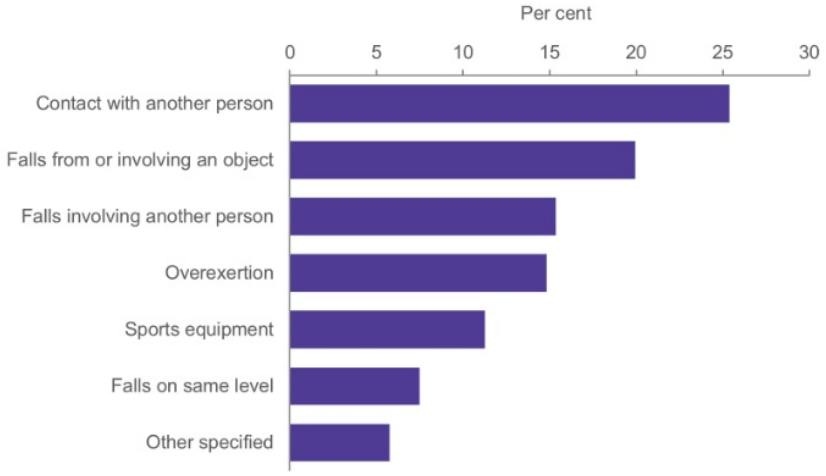
Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Where it was specified, the most common cause of injury was contact with another person, and the next most common was falls involving an object (Figure 5).

Figure 5: Cause of injury as a proportion when specified, soccer injury hospitalisations, 2020–21



Source: AIHW NHMD.

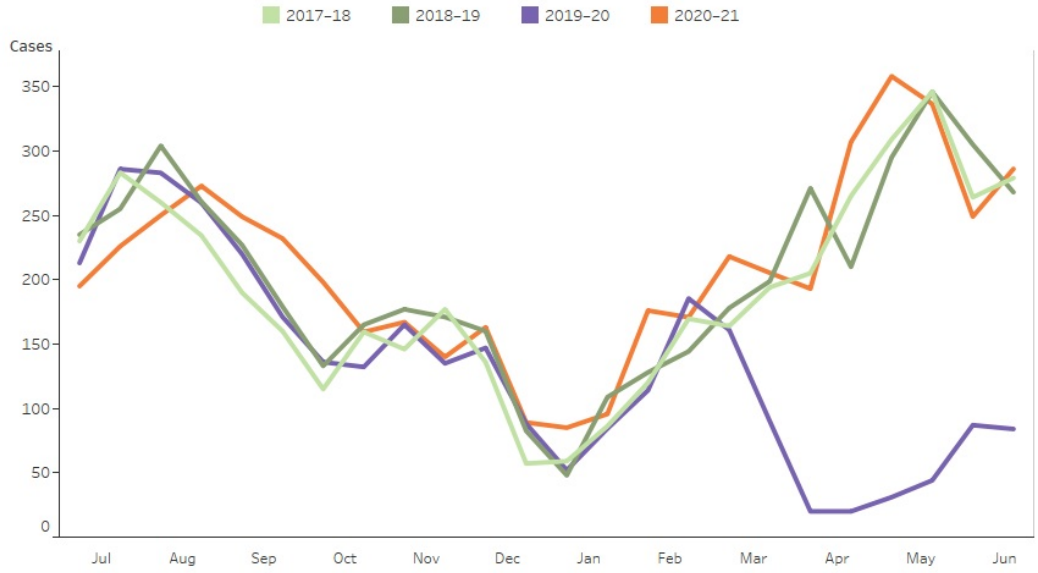
For more detail, see data table A27.

Seasonal differences

Amateur soccer is a winter sport in Australia and injury hospitalisations are usually highest between March and September.

The temporary interruption caused by COVID-19 lockdowns is reflected by a drop in injuries from March 2020 (Figure 6).

Figure 6: Soccer injury hospitalisations by month of admission, 2017–18 to 2020–21



Title: Soccer injury hospitalisations, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Featured sports

Wheeled motor sports include motorbike racing and jumping, car racing, all-terrain vehicle riding and go-carting.

An estimated 303,000 Australians aged 15 and over participated in wheeled motor sports in 2020–21 (ASC, 2021). There were 4,500 injury hospitalisations attributed to wheeled motor sports—4,100 male and 425 female. For those aged 15 and over, the rate of hospitalisation was about 1,200 per 100,000 participants.

The age-standardised rate of hospitalisations for injuries from wheeled motor sports increased by 21% between 2019–20 and 2020–21 (Figure 1).

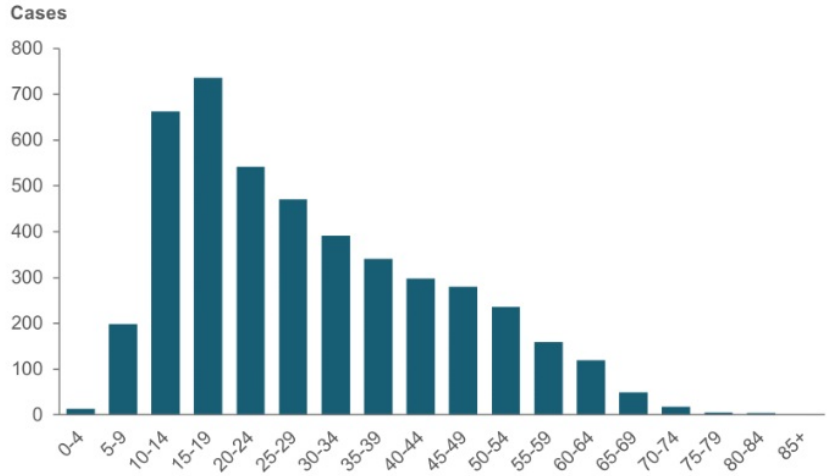
Figure 1: Trend in injury hospitalisations from wheeled motor sports, by sex, 2011–12 to 2020–21

Visualisation not available for printing

For more detail, see data tables B3–4.

The highest number of hospitalisations was in the 15–19 age group (Figure 2).

Figure 2: Age distribution of injury hospitalisations from wheeled motor sports, 2020–21

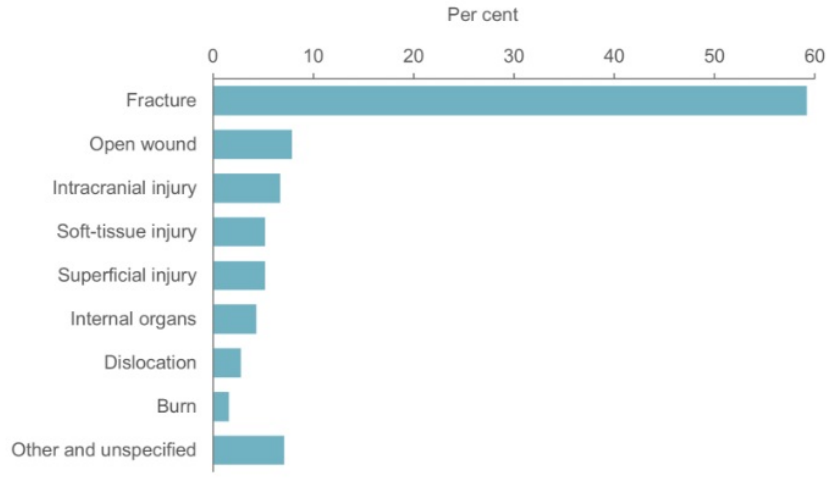


Source: AIHW NHMD.

For more detail, see data table A14.

Almost 6 in 10 of these hospitalisations were fractures (59%) (Figure 3).

Figure 3: Injury hospitalisations from wheeled motor sports, by type of injury as a proportion, 2020–21



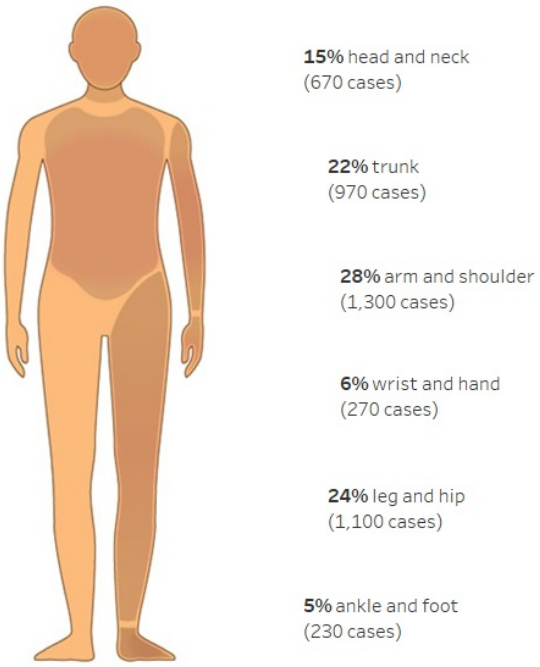
Note: Type of injury is derived from the principal diagnosis.
Source: AIHW NHMD.

For more detail, see data table A25.

There were 230 hospitalisations for concussion—200 male and 30 female.

The main injury was most commonly to the arm or shoulder (28%), followed by the leg or hip (24%) (Figure 4).

Figure 4: Injury hospitalisations from wheeled motor sports, by body part injured, as a proportion, 2020–21



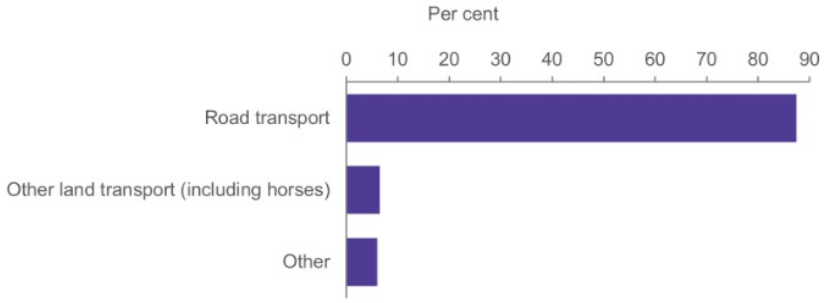
Notes
1. Body part injured is derived from the principal diagnosis.
2. 'Trunk' includes thorax, abdomen, lower back, lumbar spine & pelvis.

Source: AIHW NHMD.

For more detail, see data table A26.

Where the cause of injury was specified, it was most often a road transport accident (88%) (Figure 5).

Figure 5: Cause of injury as a proportion when specified, injury hospitalisations from wheeled motor sports, 2020–21



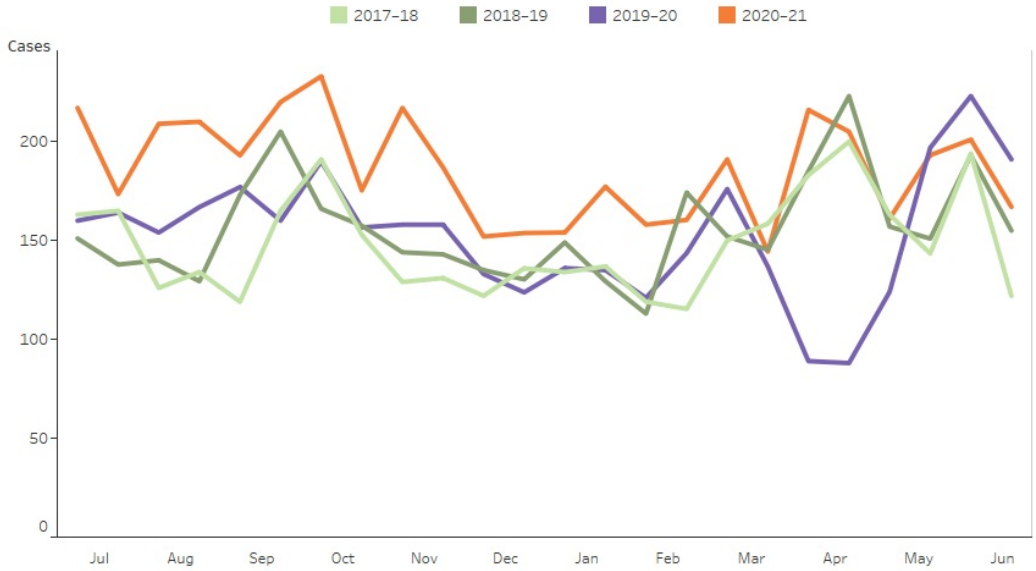
Source: AIHW NHMD.

For more detail, see data table A27.

Seasonal differences

Injury hospitalisations from wheeled motor sports have a relatively even distribution over the year compared with other sports. A short dip in hospitalisations after March 2020 may be connected to COVID-19 restrictions (Figure 6).

Figure 6: Injury hospitalisations from wheeled motor sports by month of admission, 2017–18 to 2020–21



Title: Injury hospitalisations from wheeled motor sports, by period of admission, 2017–18 to 2020–21.
Notes
1. Admission counts have been standardised into two 15-day periods per month.
2. A scale up factor was applied to the data for June admissions to account for cases not yet separated. See the data tables for details.
Source: AIHW National Hospital Morbidity Database.
www.aihw.gov.au

For more detail, see data table B3.

Technical notes

Scope

This report covers injury hospitalisations where the injured person's activity was reported to be a sport.

Only a small proportion of all incidents of injury result in admission to a hospital. For each hospital admission, many more cases present to hospital emergency departments but are not admitted, or are seen by a general practitioner. A larger number of generally minor injuries do not receive any medical treatment. A small number of severe injuries that quickly result in death go unrecorded in terms of hospital separations. Injury hospitalisations of longer duration that result in death are captured in hospitalisations data and included in this report, but not separately noted.

This section covers:

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

Data sources

The data on hospital separations are from the Australian Institute of Health and Welfare's (AIHW) National Hospital Morbidity Database (NHMD). Comprehensive information on the quality of data is available on MyHospitals. Nearly all injury cases admitted to hospitals in Australia are included in the NHMD data reported.

Sport and physical recreation participation data is from the AusPlay survey. Every year, a sample of 20,000 Australians is asked about their participation in sports and physical recreation. The survey results include estimates of the number of participants in a range of activities.

Admitted patient care data

Records are presented in the NHMD by hospital separations (discharges, transfers, deaths, or changes in care type) in the period 1 July 2020 to 30 June 2021. Data on patients who were admitted on any date before 1 July 2020 are included if they also separated between 1 July 2020 and 30 June 2021. A record is included for each separation, not for each patient, so patients who separated more than once in the year will have more than 1 record in the NHMD.

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

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, but who will separate in future reporting periods.

The numbers of separations and patient days can be a less accurate measure of the activity for establishments such as public psychiatric hospitals, and for patients receiving subacute or non-acute care, for which more variable lengths of stay are reported.

ICD-10-AM/ACHI

Diagnosis and external cause data for 2020–21 were reported to the NHMD by all states and territories using the 11th edition of the *International statistical classification of diseases and related health problems, 10th revision, Australian modification* (ICD-10-AM) (ACCD 2018). Data for 2017–18 and 2018–19 were reported to the NHMD using the 10th edition of the ICD-10-AM.

Estimated resident populations

Australian populations are based on the estimated resident population (ERP) 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 caused significant disruptions to the usual Australian population trends. The ERP for 30 June 2020, used in this report reflects these disruptions. The rates in table A20 may be greater than previous years due to decreases in the denominator of some sub-populations.

Sport and physical recreation participation data

AusPlay data is collected by Engine on behalf of Sport Australia. Australian residents are randomly selected using their mobile phone number and interviewed via a computer assisted telephone interview (CATI). The target sample size is 20,000 people aged 15 years and over. The survey period for the 2020–21 data is 1 July 2020 to 30 June 2021.

The sample data is projected to population estimates using a common post-stratified weighting (scaling) method. As the survey estimates are based on a sample, rather than the full population, they will have sample error. One measure of the sample error is the relative margin of error (RMOE). Survey estimates with a RMOE between 50% and 100% should be used with caution. Survey estimates with a RMOE greater than 100% are considered too unreliable to use.

AusPlay survey respondents answer questions about their participation in sports and physical recreation in the 12 months prior to interview. A respondent needs only to have participated once in the previous 12 months to be counted as a participant. The survey does not distinguish between organised sports and recreational participation. Thus, for example, a participant in soccer may have played consistently in an organised competition over a six month period, or may have played soccer recreationally at a park with friends: both are treated equally as soccer participants.

Estimating cases of sports injury

This report estimates the number of incidents of sports injury that led to hospitalisation. This is less than the number of sports injury-related records in the NHMD.

Each record in the NHMD refers to a single episode of care in a hospital. Some sports injury incidents result in more than one episode in hospital and, hence, more than one NHMD record.

This can occur in 2 main ways:

- a person is admitted to one hospital, then transferred to another or has a change in care type (for example, acute to rehabilitation) within the same 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 to another.

The NHMD does not allow for identifying where multiple separations belong to the same instance of injury. This means there is the potential for over counting injury events if simply counting the number of injury separations. To minimise this issue, the mode of admission is used to create an estimate of cases of injury. Separations with a mode of admission of transferred from another hospital (1) are excluded from injury case counts. This is because separations of this type (transfers) are likely to have been preceded by another separation that also met the case selection criteria for injury cases. 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.

The exception to this is in deriving average length of stay, in which the numerator (patient days) includes days recorded across all applicable separations regardless of admission mode. See length of stay section for more information.

This procedure should largely correct for overestimation of cases due to transfers, but will not correct for overestimation due to re-admissions nor statistical admissions where care type changes.

Selection criteria

Reporting on sports injury hospitalisations aims to describe sports injury events that resulted in admission to a hospital. This section describes the criteria used to estimate cases of hospitalised sports injury in Australia.

Period

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

Injury

Injury separations are defined as records that contained a principal diagnosis in the ICD-10-AM range S00–T75 or T79, using 'Chapter 19 Injury, poisoning and certain other consequences of external causes'.

Records where *Care involving use of rehabilitation procedures* (Z50) has been coded in any additional diagnosis field are excluded as out of scope for this analysis, except if the care type for the separation was acute.

Records where the care type is newborn with unqualified days only, organ procurement–posthumous or hospital boarder are excluded as out of scope for this analysis.

Sports injury hospitalisations are those with an activity code in the sports activity range (U50–U71 in the ICD-10-AM). For injury hospitalisations where the first recorded activity code is *Leisure activity, not elsewhere classified* (U72) or *While working for income* (U73), then the second recorded activity code is considered.

External causes

The external cause classification (Chapter 20 of ICD-10-AM) consists of 3-character categories in the range of U50 – Y98 (including place of occurrence and activity when injured). The NHMD is structured so that the first listed external cause for a record relates to the first listed injury diagnosis.

While multiple external causes may be recorded for a separation, we report only one cause for each case of injury. Where the first reported external cause code is U90.0 (*Staphylococcus aureus*) or a supplementary factor (Y90–Y98), then the second code is reported instead.

For the purposes of this report, cases where the first reported external cause relates to complications of medical and surgical care (Y40–Y84) or sequelae of external causes of morbidity and mortality (Y85–Y89), as well as records with a supplementary factor code (Y90–Y98) which have already passed through the above test, are excluded from the analysis.

Cycling

Cycling can be a sport, a recreation activity, or a mode of transport. For hospitalisations, information is recorded separately about the cause of the injury—which could be a cycling transport accident—and the activity being undertaken at the time of the injury—which could be cycling as a sport, a sport other than cycling, or a non-sport activity.

There were 17,277 cycling-related injury hospitalisations in 2020–21. Of these hospitalisations,

- 9,014 (52%) had a recorded activity of cycling as a sport, and the cause of injury was a cycling transport accident,
- 760 (4.4%) had a recorded activity of cycling as a sport, but the cause of injury was not a cycling transport accident,
- 172 (1.0%) had a recorded activity of a sport other than cycling, and the cause of injury was a cycling transport accident,
- 7,331 (42%) had a cause of injury of a cycling transport accident, but the activity was non-sport (such as leisure, working, or other specified activity).

Hospitalisations from the first two groups are included in this report as cycling sport injury hospitalisations. Hospitalisations from the third group are included in this report as sport injury hospitalisations and attributed to the recorded sport (which is not cycling). Hospitalisations in the fourth group are not sport injury hospitalisations and thus are not included in this report.

Presentation of data

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

Body part 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 hospitalised injury cases 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, separations for which age and/or sex were not reported are included in the totals.

Suppression of data

The AIHW operates under a strict privacy regime 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 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

Scale up factor for monthly admission data

The NHMD is structured by date of hospital separation (discharge, transfer, death or change in care type). This means, for example, that records are included in the 2020–21 NHMD if the date of hospital separation is in the period 1 July 2020 to 30 June 2021. Therefore, some records will be admitted in one financial year, but not reported until a future financial year, when the hospital separation is complete. This particularly affects records with an admission date in mid to late June. This is not considered an issue when reporting injury cases for the year as a whole, as it is expected that admissions not yet separated at the end of the year are counterbalanced by separations at the start of the year that were admitted in the previous year. However, it presents an issue when comparing hospitalisation cases by month of admission.

Where data are presented in this report by month of admission, a scale up factor is applied to the data for June to estimate cases that were admitted but not yet separated. The scale up factor is determined by calculating the average percent completion (separated from hospital in the same financial year as admission) across the previous 9 years of data for cases admitted on each day of June, for the analysis variable. For each day in June, the average percent of incomplete cases (separated in the following financial year) is then added onto the case numbers to create the scaled-up case numbers. For consistency, the scale up factor is applied to each year, not just the 2020–21 data.

This method ensures that causes and types of injury which average varying lengths of stay (thereby impacting on how many records are still receiving care into the next reporting year) are accounted for in the calculation. Additionally, while the final presentation of data is at the bimonthly level, the scaling is calculated for each day in June, from 1 June to 30 June. This means that the degree of scaling applied reflects the decreasing completeness of the data approaching 30 June.

The efficacy of scaling up reported admissions by the above method has been tested on 2017–18 and 2018–19 years (where a complete record was available for June admissions) and has found the resulting estimate to closely match the true case numbers.

In addition to the scale up factor, the number of admissions for each bimonthly period has been standardised to a 30-day month to enable comparison of trends over months of unequal days. Each month is split into two periods: 1st–15th, and the 16th – end of month. The standardisation is applied to the latter period.

As a result, the numbers presented in monthly analysis tables cannot be directly summed to the annual totals reported elsewhere in the report.

Length of stay

Patient days reported during the separations that were omitted to reduce overestimation of incident cases are an integral part of the hospital care provided for these injuries. The patient days in these subsequent admissions are therefore included when calculating average length of stay for causes of injury.

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 cannot be reliably assigned without information enabling identification of all admitted episodes associated with an injury case.

Rates

Change in population rates over time

Population-based rates of injury tend to have similar values from one year to 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, and so small changes in rates over a short period normally do not provide a firm basis for asserting that a trend is present.

For 2019–20 data, the COVID-19 pandemic resulted in lockdowns and social distancing measures from March 2020, which resulted in changed behaviour, and thus the counts of sports injury hospitalisations are different to previous years. Also, the pandemic and resulting Australian Government closure of the international border from 20 March 2020 caused significant disruptions to the usual Australian population trends. The ERP for 30 June 2020, used in this report, reflects these disruptions. Because of these issues, the sports hospitalisation rates for 2019–20 should be interpreted with this context in mind.

Participant rates

Rates of sports injury hospitalisations per participant are calculated using AusPlay participant data as the denominator. The AusPlay sports categories are not an exact match to the sports categories for the hospital data. Table 1 below provides the AusPlay to ICD-10-AM mapping used for this report.

Definitions and classifications

If not otherwise indicated, data elements were defined according to the definitions in the *National health data dictionary*, versions 16, 16.1 and 16.2 (AIHW 2012, 2015a, 2015b or METeOR), and summarised in the Glossary.

Data element definitions for the Admitted patient care National Minimum Data Set (NMDS) are also available online at METeOR.

Indigenous status

The term 'Indigenous Australians' is used to refer to persons identified as such in Australian hospital separations data. The term 'non-Indigenous Australians' is used where NHMD records the Indigenous status is explicitly stated as non-Indigenous.

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.

Geographical classifications

The ABS's Australian Geography Standard (ASGS) Remoteness Structure 2016 (ABS 2016a) is a hierarchical classification system of geographical regions and consists of interrelated structures. The ASGS provides a common framework of statistical geography, and enables the production of statistics that are comparable and can be spatially integrated.

The structure has seven hierarchical levels listed here from smallest to largest:

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

Each level directly aggregates to the level above. For example, SA1s are aggregates of Mesh Blocks, and themselves aggregate to SA2s. At each level, the units collectively cover all of Australia.

Remoteness area of usual residence of the patient

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,
data on geographical location are collected on the area of usual residence of patients in the NHMD. These data are specified in the Admitted patient care National Minimum Data Set (NMDS) as state or territory of residence and SA2. For 2019–20, the area of usual residence was voluntarily provided by some jurisdictions in the form of a Statistical Area level 1 (SA1). Where SA1 data were available, remoteness areas were allocated by the AIHW based on the SA1 information. If SA1 data were not available, the SA2 data were used to allocate remoteness areas.

Data on the remoteness area of usual residence are defined using the ABS's ASGS Remoteness Structure 2016 (ABS 2016b). The ASGS Remoteness Structure 2016 categorises geographical areas in Australia into remoteness areas, described at ABS.

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 follows:

- *Major cities* (for example, Sydney, Geelong, Gold Coast)
- *Inner regional* (for example, Hobart, Ballarat, Coffs Harbour)
- *Outer regional* (for example, Darwin, Cairns, Coonabarabran)
- *Remote* (for example, Alice Springs, Broome, Strahan)
- *Very remote* (for example, Coober Pedy, Longreach, Exmouth)

Sport participant reporting categories

Table 1 describes the AusPlay to ICD-10-AM code mapping used for this report.

Table 1: List of reporting categories, ICD-10-AM codes and AusPlay categories

Reporting category	ICD-10-AM code	AusPlay categories
Australian Rules Football		
	U50.00 Australian Rules	Australian football
Rugby		
	U50.01 Rugby Union	Rugby union
	U50.02 Rugby League	Rugby league
	U50.03 Rugby, unspecified	
Soccer		
	U50.04 Soccer	Football/soccer
Touch football		
	U50.05 Touch football	Touch football
Other & unspecified football		
	U50.08 Other specified football	Gridiron Gaelic football
	U50.09 Football, unspecified	
Basketball		
	U50.1 Basketball	Basketball
Other team ball sports		
	U50.2 Handball, team	Handball
	U50.4 Korfball	Korfball
	U50.5 Volleyball	Volleyball (indoor and outdoor)

	U50.8 Other specified team ball sport	Goalball Sepak takraw
	U50.9 Unspecified team ball sport	
Netball		
	U50.3 Netball	Netball
Other team bat or stick sports		
	U51.0 Baseball	Baseball
	U51.3 Softball	Softball
	U51.4 T-ball	Tee ball
	U51.8 Other specified team bat or stick sport	Lacrosse
	U51.9 Unspecified team bat or stick sport	
Cricket		
	U51.1 Cricket	Cricket
Hockey		
	U51.20 Ice hockey	Ice hockey
	U51.21 Street and ball hockey	
	U51.22 Field hockey	Hockey
	U51.23 Floor hockey	Floorball
	U51.28 Other specified hockey	Broomball
	U51.29 Hockey, unspecified	
Boating sports		
	U53.0 Canoeing	Canoeing/Kayaking Outrigger canoe
	U53.1 Jet skiing	Jet skiing
	U53.2 Kayaking	
	U53.3 Power boat racing	
	U53.4 Rowing and sculling	Rowing
	U53.5 Surf boating	
	U53.6 Yachting and sailing	Sailing
	U53.7 Surf skiing	
	U53.8 Other specified boating sport	Dragon boat racing Paddle sports
	U53.9 Unspecified boating sport	
Swimming and diving		
	U54.0 Diving	Diving
	U54.5 Swimming	Swimming
Fishing		
	U54.1 Fishing	Fishing (recreational) Fishing Sport

Surfing		
	U54.4 Surfing and boogie boarding	Surfing
	U54.7 Wind surfing	Kitesurfing/kiteboarding
Water skiing		
	U54.6 Water skiing	Water skiing/Wakeboarding
Skiing, ice skating & snowboarding		
	U55.1 Ice skating and ice dancing	Ice skating
	U55.2 Skiing	Ski & snowboard
	U55.4 Snow boarding	
	U55.5 Speed skating	Ice racing/speed skating
Fitness and gym		
	U56.0 Aerobics and calisthenics	Calisthenics
	U62.0 Power lifting	Powerlifting
	U62.1 Weight lifting	Weight lifting
	U62.3 Strength training and body building	Body building
	U62.8 Other specified power sport	
	U62.9 Unspecified power sport	
	U70.0 Athletic activities involving fitness equipment, not elsewhere classified	CrossFit Fitness/Gym
Running, athletics and track & field		
	U56.1 Jogging and running	Athletics, track and field (includes jogging and running)
	U56.3 Track and field	
	U56.4 Walking, competitive	
	U56.5 Marathon running	
	U56.8 Other specified individual athletic activity	
	U56.9 Unspecified individual athletic activity	
Recreational walking		
	U56.2 Walking	Walking (Recreational)
Dancing		
	U58.0 Dancing	DanceSport Dancing (recreational)
Racquet sports		
	U59.0 Badminton	Badminton
	U59.1 Racquetball	
	U59.2 Squash	Squash
	U59.3 Table tennis and ping-pong	Table tennis
	U59.4 Tennis	Tennis
	U59.8 Other specified racquet sport	

	U59.9 Unspecified racquet sport	
Target and precision		
	U60.0 Archery	Archery
	U60.1 Billiards, pool, and snooker	Billiards/Snooker/Pool Eight ball
	U60.2 Bowling	Bowls Carpet bowls Tenpin bowling
	U60.3 Croquet	Croquet
	U60.4 Darts	Darts
	U60.6 Firearm shooting	Shooting Shooting sports
	U60.8 Other specified target and precision sport	Bocce/Boules Boccia Petanque
	U60.9 Unspecified target and precision sports	
Golf		
	U60.5 Golf	Golf
Combative sports		
	U61.0 Aikido	
	U61.1 Boxing	Boxing
	U61.2 Fencing	Fencing
	U61.3 Martial arts	Judo Jujitsu Karate Kendo Kung fu wushu Martial arts Mixed martial arts Muay Thai Taekwondo
	U61.4 Wrestling	Wrestling
	U61.5 Self defence training	
	U61.8 Other specified combative sport	
	U61.9 Unspecified combative sport	
Equestrian activities		
	U63.0 Equestrian events	Equestrian
	U63.1 Endurance riding	
	U63.2 Polo and polocrosse	Polo

		Polocrosse
	U63.3 Horse racing events	Horse racing
	U63.4 Rodeo	Rodeo
	U63.5 Trail or general horseback riding	
	U63.6 Trotting and harness	Harness racing
	U63.8 Other specified equestrian activity	Campdrafting Pony Club Ready Set Trot
	U63.9 Unspecified equestrian activity	
Adventure and extreme sports		
	U64.0 Abseiling and rappelling	Rock climbing/Abseiling/Caving
	U64.1 Hiking	Bush walking
	U64.2 Mountaineering	
	U64.3 Orienteering and rogaining	Orienteering Rogaining
	U64.4 River rafting	
	U64.5 White-water rafting	
	U64.6 Rock climbing	
	U64.7 Bungy jumping	
	U64.8 Other specified adventure sport	Sport climbing Adventure racing
	U64.9 Unspecified adventure sport	
Wheeled motor sports		
	U65.0 Riding an all-terrain vehicle (ATV)	
	U65.1 Motorcycling	Motor cycling
	U65.2 Motor car racing	Motor sport
	U65.3 Go-carting	
	U65.8 Other specified motor sport	
	U65.9 Unspecified motor sport	
Cycling		
	U66.00 BMX	BMX
	U66.01 Mountain	Mountain biking
	U66.02 Road	Cycling
	U66.03 Track and velodrome	
	U66.08 Other specified cycling	
	U66.09 Cycling, unspecified	
Roller sports		
	U66.1 In-line skating and rollerblading	Skate
	U66.2 Roller skating	Roller Derby

U66.3 Skate boarding	
U66.4 Scooter riding	Scootering

Variation in coding practices

Adjusting for changes to rehabilitation coding

A change in coding practice for ICD-10-AM, introduced July 2015, *Care involving the use of rehabilitation procedures* (Z50) has necessitated a change to the standard record inclusion criteria for reports of hospital-admitted injury cases. The change applies to episodes that ended on 1 July 2015, or later.

Due to the change in coding practice, the numbers of separations in 2015–16 with a principal diagnosis in the ICD-10-AM 'Chapter 19 Injury, poisoning and certain other consequences of external causes' (S00–T98) range increased (approximately an additional 60,000 records).

In order to minimise the effect of the coding change on the estimation of injury occurrence and trends, a change to the case estimation method established by NISU was required. Records with Z50—either as Principal diagnosis or as Additional diagnosis—are were omitted in data-years both before and after the coding change, up to 2016–17. The change to data prior to 2015–16 amounts to an adjustment of less than 0.1% of records. Where injury trends are presented by Principal diagnosis for years prior to 2015–16, data will not be directly comparable with previous reporting periods. For 2017–18 and 2018–19 data in this report, records with a care type of 'acute' and with Z50 as an additional diagnosis were included.

Changes in New South Wales admission practice

The emergency department admission policy was changed for New South Wales (NSW) hospitals in 2017–18. Episodes of care delivered entirely within a designated emergency department or urgent care centre are no longer categorised as an admission regardless of the amount of time spent in the hospital. This narrowing of the categorisation has had the effect of reducing the number of admissions recorded in NSW from the 2017–18 financial year. For NSW the effect was a significant decrease (3.7%) in all public hospital admissions in 2017–18 compared to 2016–17. The impact of the change was felt disproportionately among hospitalisations for injury and poisoning. According to NSW Health, the number of hospitalisations for injury and poisoning in NSW decreased by 7.6% between 2016–17 and 2017–18, compared to a usual yearly increase of 2.8% (Centre for Epidemiology and Evidence 2019).

The change in NSW's emergency department admission policy may have had different effects on case numbers within different external cause categories. This is because different types of injury have a different likelihood of requiring prolonged care in an emergency department, but without an admission to a hospital ward.

Due to the size of the contribution of NSW data to the national total, Australian data from 2017–18 should therefore not be compared with data from previous years.

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Data

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