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# Hospitalised sports injury in Australia, 2016–17

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Australia is often described as a nation that loves sport. Every year, millions of Australians participate in sport and physical recreation activities for many reasons, including competition, commuting and enjoyment (Clearinghouse for Sport and Physical Activity 2018).

Participation in sport contributes positively to a range of physical, mental and social health outcomes: people who maintain participation in sport throughout childhood reportedly have higher health-related quality of life, compared with those who do not participate in sport, and are more likely to be active as adults (Eime et al. 2016)

However, playing sport does not come without risk. In 2016–17, almost 60,000 people were hospitalised for sports injuries.

This report examines sports injuries that were serious enough to require a person to stay in hospital. It 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.

The report also takes a closer look at injuries sustained playing football, netball and basketball.



In 2016–17, **58,500** people were hospitalised for sports injuries.



**One in 10** injuries were life-threatening.



**Males** were more than twice as likely to be hospitalised as females.



For **males**, the sports that most frequently led to hospitalisation were **football** (all codes) (38%), cycling (12%) and wheeled motor sports (8%). For **females**, they were **football** (all codes) (15%), netball (10%; 13% when combined with basketball) and equestrian activities (11%).

Estimated injury rates per 100,000 participants were lowest for recreational walking (12) and fitness and gym activities (10).

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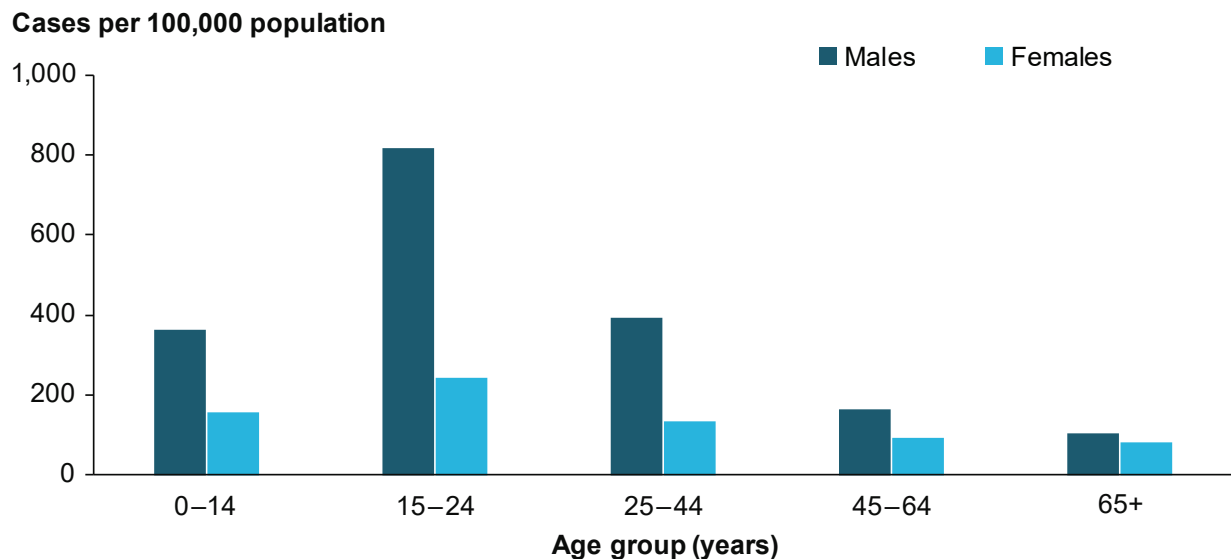
Stronger evidence,  
better decisions,  
improved health and welfare

## Who is most likely to be hospitalised for a sports injury?

In 2016–17, 58,500 people were hospitalised for an injury sustained while playing sport. By comparison, over the same period, just over 60,000 people were hospitalised due to transport crashes (AIHW: Pointer 2018). There were more than twice as many hospitalisations for males (42,000 cases, or 72%) due to sports injury than females (16,500 cases, or 28%).

Males also had higher age-specific rates of hospitalisation than females, in all age groups (Figure 1). The highest rate (817 per 100,000 population), was for males aged 15–24, compared with 245 for females in the same age group. The next highest rate (392 per 100,000) was for males aged 25–44.

Figure 1: Age-specific rates for sports injury hospitalisations, by sex, 2016–17



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

## What type of sport were people playing when they were injured?

The sports that most frequently led to hospitalisation were types of football (all codes combined). Among the football codes examined, *Australian rules*, *Rugby* and *Soccer* each accounted for about 10% of hospitalised sports injuries among men, while *Soccer* accounted for 4.5% of cases among women (Table 1). For males, the top 5 also included *Cycling* (12%), *Wheeled motor sports* (8%), *Basketball* (5%) and *Roller sports* (4%). For females, the top sports were football (15%), *Netball* (10%; 13% when combined with *Basketball*), *Equestrian activities* (11%), *Cycling* (7%); and *Skiing, ice skating and snowboarding* (4%).

### How are different sports classified?

Types of sport are classified differently in the sources used for injury cases (International Classification of Diseases (ICD-10-AM) Activity categories) and for participants (AusPlay survey activity types). Best efforts were used to select comparable types when calculating participation-based rates. Sports for which comparable categories were not available were included as *Other and unspecified* in Table 2 (11% of cases). *Other and unspecified football* (6% of cases) was placed with specified types of football to show the total number of football-related cases. Details of the ICD-10-AM and participation categories included for each type of sport presented in this report are available in the supplementary tables. More information about the Ausplay survey is available from the Clearinghouse for Sport and Physical Activity (2017).

**Table 1: Top ten sports associated with injury hospitalisations, 2016–17**

Males				Females			
Rank	Type of sport	No. of cases	%	Rank	Type of sport	No. of cases	%
1	Football (all codes combined)	16,001	38.1	1	Football (all codes combined)	2,480	15.0
	<i>Australian rules football</i>	4,232	10.1		<i>Australian rules football</i>	557	3.4
	<i>Rugby</i>	4,052	9.6		<i>Rugby</i>	465	2.8
	<i>Soccer</i>	4,035	9.6		<i>Soccer</i>	748	4.5
	<i>Touch football</i>	570	1.4		<i>Touch football</i>	345	2.1
	<i>Other and unspecified football</i>	3,112	7.4		<i>Other and unspecified football</i>	365	2.2
2	Cycling	5,062	12.1	2	Netball/basketball (combined)	2,109	12.8
3	Wheeled motor sports	3,451	8.2		<i>Netball</i>	1,582	9.6
4	Netball/basketball (combined)	2,082	5.0		<i>Basketball</i>	527	3.2
	<i>Basketball</i>	1,940	4.6	3	Equestrian activities	1,873	11.3
	<i>Netball</i>	142	0.3	4	Cycling	1,190	7.2
5	Roller sports	1,860	4.4	5	Skiing, ice skating and snowboarding	697	4.2
6	Cricket	1,108	2.6	6	Recreational walking	682	4.1
7	Combative sports	958	2.3	7	Roller sports	679	4.1
8	Skiing, ice skating and snowboarding	794	1.9	8	Dancing	570	3.5
9	Surfing	779	1.9	9	Running, athletics, track and field	436	2.6
10	Equestrian activities	647	1.5	10	Swimming and diving	369	2.2
	Other and unspecified activities	9,251	22.0		Other and unspecified activities	5,418	32.8
	<b>Total</b>	<b>41,993</b>	<b>100.0</b>		<b>Total</b>	<b>16,503</b>	<b>100.0</b>

*Notes*

1. Supplementary Table 1 in the accompanying supplementary spreadsheets provides case counts and proportions for additional types of sport.

*Data source:* AIHW National Hospital Morbidity Database.

When the rate of sports injury is examined by the estimated number of participants, the highest rates for people aged 15 and over were for *Wheeled motor sports* (1,283 cases for every 100,000 participants); *Rugby* (1,181 per 100,000); *Roller sports* (1,175 per 100,000) and *Equestrian activities* (1,049 per 100,000) (Table 2). The lowest number of cases per 100,000 participants among the 26 types of sport examined were for *Fitness and gym activities* (10 per 100,000), *Recreational walking* (12 per 100,000), *Swimming and diving* (21 per 100,000) and *Running, athletics, track and field* (23 per 100,000). These four activities have large numbers of participants.

**Table 2: Participation-based and population-based rates of sports injury hospitalisations, by type of sport, ages 15 and over, 2016–17**

Type of sport	No. of cases	Estimated no. of participants	Rate per 100,000 participants	Age-standardised rate per 100,000 population
Wheeled motor sports	3,091	241,000	1,283	17
Roller sports	1,730	147,200	1,175	9
Equestrian activities	2,152	205,200	1,049	11
All football codes combined	14,604	2,303,100	634	79
<i>Rugby</i>	3,421	289,700	1,181	19
<i>Australian rules football</i>	3,904	502,500	777	21
<i>Soccer</i>	3,644	1,129,900	323	20
<i>Touch football</i>	757	351,600	215	4
<i>Other and unspecified football</i>	2,878	n.a.	n.a.	16
Skiing, ice skating and snowboarding	1,328	282,200	471	7
Water skiing	411	111,500	369	2
Hockey (all types)	525	214,500	245	3
Netball and basketball combined	3,223	1,346,700	239	18
<i>Basketball</i>	1,761	724,400	243	10
<i>Netball</i>	1,462	622,300	235	8
Cricket	1,026	534,300	192	6
Cycling	4,919	2,600,900	189	26
Surfing	888	506,300	175	5
Fishing	555	346,800	160	3
Dancing	595	423,800	140	3
Combative sports	1,019	767,100	133	5
Boating sports	413	596,100	69	2
Racquet sports	692	1,395,700	50	3
Adventure and extreme sports	606	1,445,800	42	3
Golf	359	1,002,700	36	2
Running, athletics, track and field	683	3,026,300	23	4
Swimming and diving	627	3,030,600	21	3
Recreational walking	1,062	8,655,600	12	5
Fitness and gym	708	6,997,400	10	4
Other and unspecified	5,189	n.a.	n.a.	27
<b>Total</b>	<b>46,405</b>			<b>246</b>

*Notes*

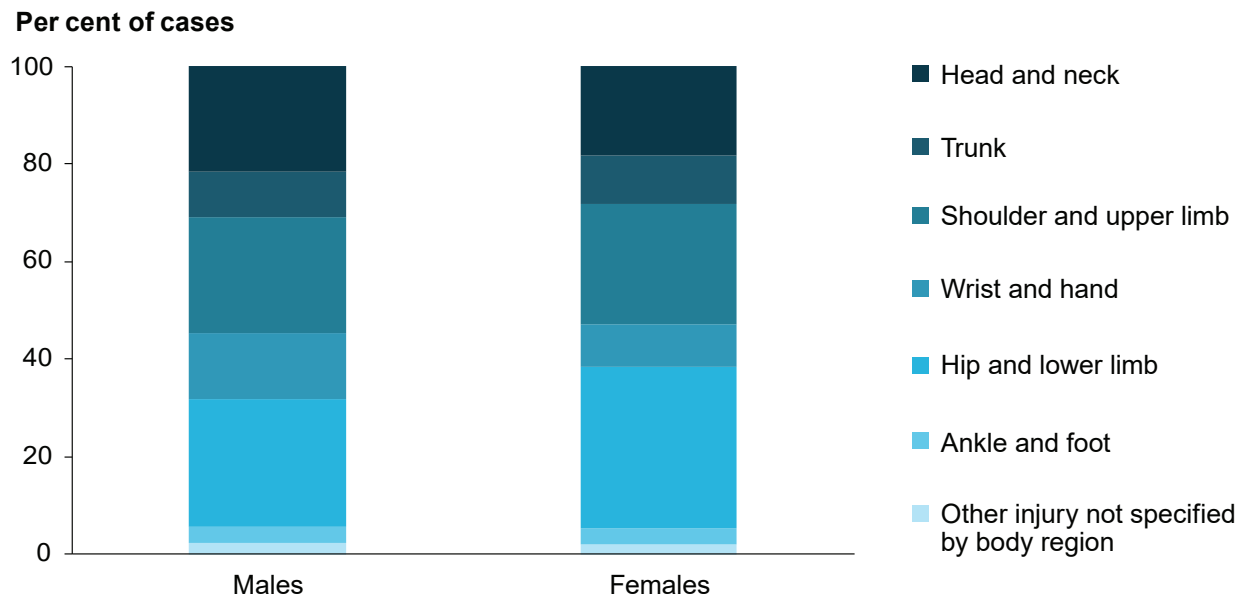
1. The number of cases in this table is not directly comparable to the number of cases in Table 1 due to the difference in age groups included.
2. Age-standardised to the 2001 Australian population (per 100,000).
3. Cases, but not comparable participant estimates, are available for *Other and unspecified football* and *Other and unspecified*, so meaningful participation based rates cannot be calculated. These values are shown as n.a. (not available).
4. Pedal cycles and motor vehicles are used for various purposes, including sport. While the records included in *Cycling* and *Wheeled motor sports* have a sport activity code, some cases may have occurred during use for other reasons, such as transportation. A similar consideration applies to some other activities, such as *Walking*, and the use of skateboards and other pedestrian conveyances.
5. Data underpinning this table can be found in the accompanying supplementary spreadsheets.

*Data sources:* AIHW National Hospital Morbidity Database and Ausplay.

## Fractures are the most common injury

For all types of sports combined, the largest proportion (28%) of hospitalised injuries were to the hip and lower limbs, followed by the shoulder and upper limbs (24%). Males had a higher proportion of head and neck injuries than females (21% and 18%, respectively) and injuries to the wrist and hand were also more common among males than females (14% and 9%, respectively) (Figure 2).

Figure 2: Sports injury hospitalisations, by main body region affected, by sex, 2016–17

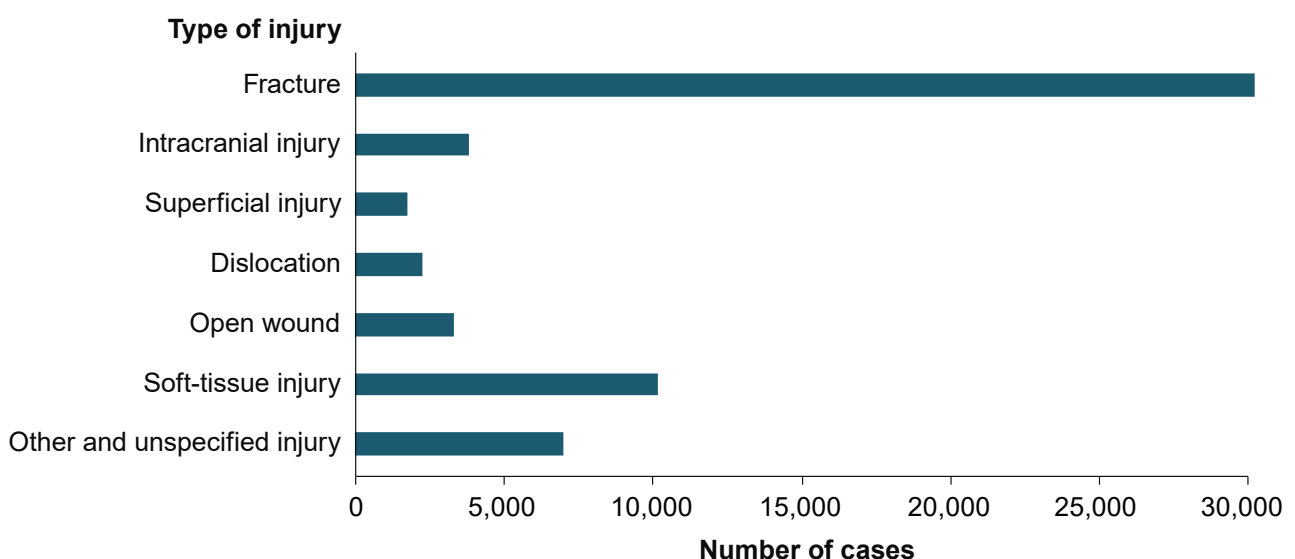


Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

For just over half of the people injured (52%, or 30,200 cases) a fracture was the reason for admission (Figure 3). Also frequent were soft tissue injury (17%, or 10,200 cases), intracranial injury (7%, or 3,800 cases) and open wounds (6%, or 3,300 cases). (Intracranial injuries include cases of concussion, traumatic cerebral oedema, diffuse brain injury and focal brain injuries.)

Figure 3: Sports injury hospitalisations, by type of injury, 2016–17



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

The most common fractures for men were of the elbow and forearm, followed by wrist and hand and knee and lower leg. The most common fractures for women were of the elbow and forearm and knee and lower leg (Table 3).

**Table 3: Fractures, by body region, by sex, for sports injury hospitalisations, 2016–17**

Fractured body region	Males		Females		Persons	
	No. of cases	%	No. of cases	%	No. of cases	%
Head	2,314	10.7	461	5.4	2,775	9.2
Neck	320	1.5	67	0.8	387	1.3
Trunk	1,594	7.3	766	9.0	2,360	7.8
Shoulder and upper arm	2,691	12.4	882	10.3	3,573	11.8
Elbow and forearm	4,978	23.0	2,734	32.0	7,713	25.5
Wrist and hand	4,301	19.8	1,083	12.7	5,384	17.8
Hip and thigh	773	3.6	463	5.4	1,236	4.1
Knee and lower leg	4,190	19.3	1,887	22.1	6,077	20.1
Ankle and foot	527	2.4	199	2.3	726	2.4
Other and unspecified injury	1	0.0	0	0.0	1	0.0
<b>Total</b>	<b>21,689</b>	<b>100.0</b>	<b>8,542</b>	<b>100.0</b>	<b>30,232</b>	<b>100.0</b>

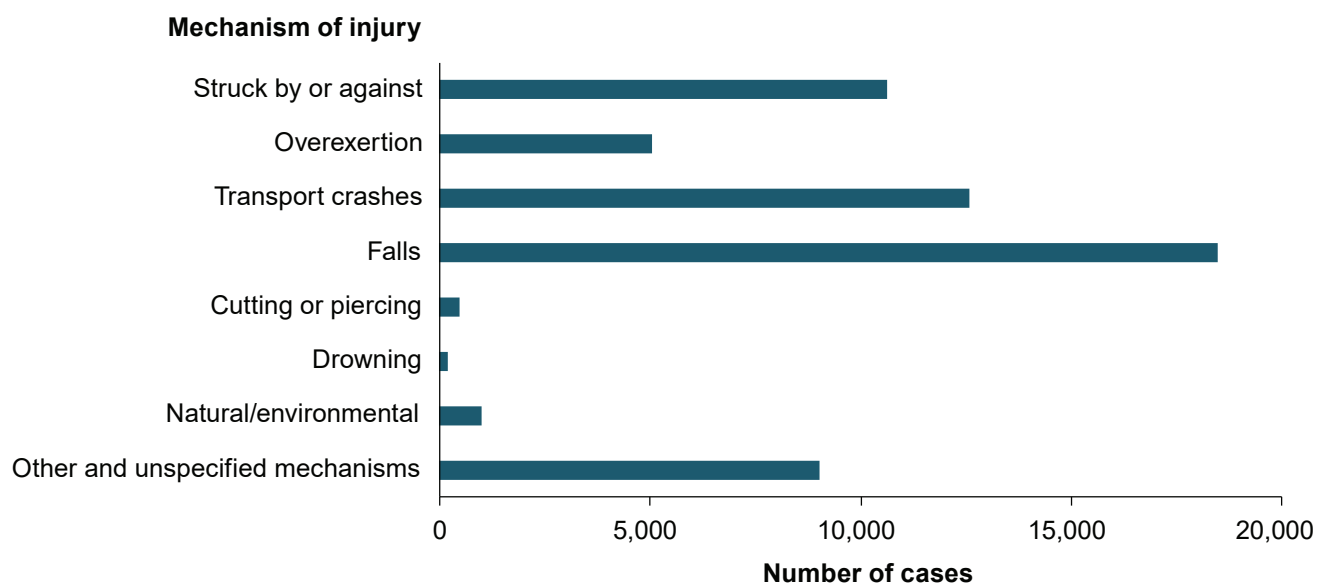
Note: Sex was not specified for one case of elbow and forearm injury.

Data source: AIHW National Hospital Morbidity Database.

## Half of injuries are caused by falls or crashes

One in 3 sports injuries (32% or 18,500 cases) were caused by a fall, and 1 in 5 (22% or 12,600 cases) by sport-related transport crashes—a major factor in wheeled motor sports and cycling cases (Figure 4). The other top causes were *Being struck by or striking against another person or object* (18% or 10,600 cases), and *Overexertion or strenuous and repetitive movements* (9% or 5,000 cases).

**Figure 4: Common causes of sports injury hospitalisations, 2016–17**



**Notes**

1. Overexertion includes strenuous and repetitive movements.
2. Data underpinning this figure can be found in the accompanying supplementary spreadsheets.
3. 1,079 sports injury cases are not included in Figure 4 because the records have no external cause code.

Data source: AIHW National Hospital Morbidity Database.

# 1 in 10 sports injuries are life threatening

Across all sports, 10% of people admitted to hospital due to a sports injury had life-threatening injuries. The sports with the highest proportions of life-threatening cases were *Swimming and diving* (27%), *Cycling* (24%), *Equestrian activities* (24%), *Wheeled motor sports* (21%) and *Recreational walking* (19%).

Recreational walkers tend to be older than participants in most other sports: it is estimated that nearly two-thirds are aged 45 and over. More than half of walkers hospitalised in 2016–17 were aged 65 or over.

## Football injuries

According to the AusPlay survey (Clearinghouse for Sport and Physical Activity 2017), more than 2 million people aged 15 and over had played some type of football in the previous 12 months. The main types of football played included Australian rules; rugby (union, league and unspecified); soccer; or touch football. This section reports on injury hospitalisations caused by these types of football. Other types, such as Gaelic, gridiron and American tackle, played much less in Australia, are included in totals. Of hospitalised injury cases in *Other & unspecified football*, 93% are cases where the type of football was not specified.

### How many people are hospitalised for football injuries?

In 2016–17, almost 18,500 people were hospitalised in Australia after being injured while playing football. Nine in ten of those hospitalised were male (87%).

Australian rules, rugby, and soccer each accounted for around 25% of all football injury hospitalisations. The split between males and females varied according to the football code played (Table 4). For example, larger proportions of injuries for females were from playing soccer (30%) and touch football (14%), compared with males.

**Table 4: Number of football injury hospitalisations, by type of football played, by sex, 2016–17**

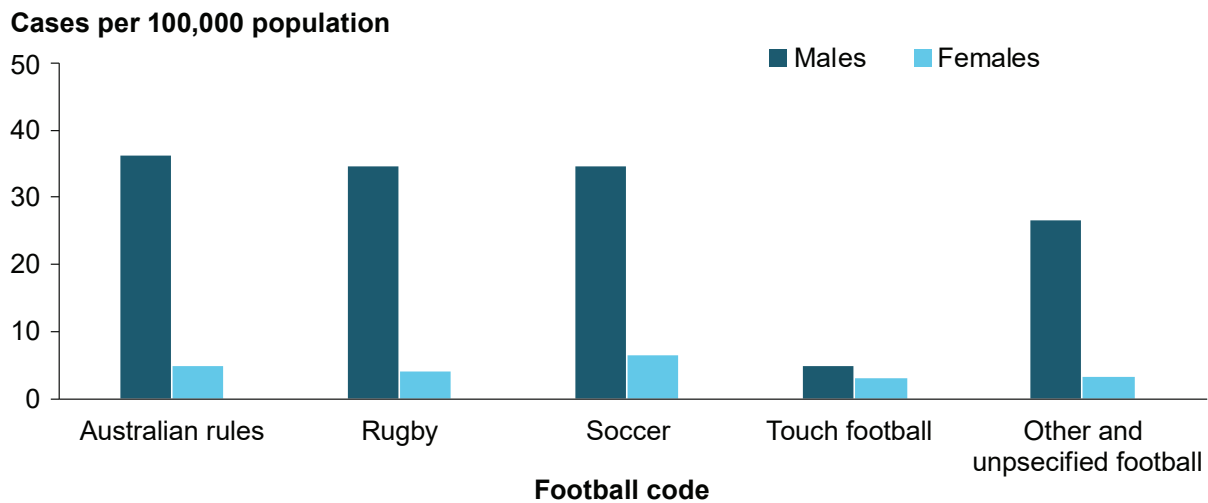
Football code	Males		Females		Persons	
	No. of cases	%	No. of cases	%	No. of cases	%
Australian rules	4,232	26.4	557	22.5	4,789	25.9
Rugby	4,052	25.3	465	18.8	4,517	24.4
Soccer	4,035	25.2	748	30.2	4,783	25.9
Touch football	570	3.6	345	13.9	915	5.0
Other & unspecified football	3,112	19.4	365	14.7	3,477	18.8
<b>Total</b>	<b>16,001</b>	<b>100.0</b>	<b>2,480</b>	<b>100.0</b>	<b>18,481</b>	<b>100.0</b>

*Note:* Data underpinning this table can be found in the accompanying supplementary spreadsheets.

*Data source:* AIHW National Hospital Morbidity Database.

Male players of Australian rules, rugby and soccer had the highest age-standardised hospitalisation rates. The rates for females were lower than for males, in all codes (Figure 5).

**Figure 5: Age-standardised rates of football injury hospitalisations, by type of football played, by sex, 2016–17**



*Notes*

1. Age-standardised to the 2001 Australian population (per 100,000).
2. Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

*Data source:* AIHW National Hospital Morbidity Database.

## Footballers aged 15–24 are the most likely to be hospitalised

Overall, the 15–24 age group had the largest number of hospitalised injuries due to football (Table 5). This was true for Australian rules and rugby players, but for soccer and touch football, older players (25–44) were just as frequently hospitalised for injuries.

**Table 5: Cases of football injury hospitalisations, by type of football played, by age group, 2016–17**

Age group	Football code					Total
	Australian rules	Rugby	Soccer	Touch football	Other and unsecsified football	
0–14	885	1,096	1,139	158	599	3,877
15–24	2,384	2,197	1,648	337	1,692	8,258
25–44	1,411	1,137	1,665	363	1,084	5,660
45–64	104	85	313	53	93	648
65+	5	2	18	4	9	38
<b>Total</b>	<b>4,789</b>	<b>4,517</b>	<b>4,783</b>	<b>915</b>	<b>3,477</b>	<b>18,481</b>

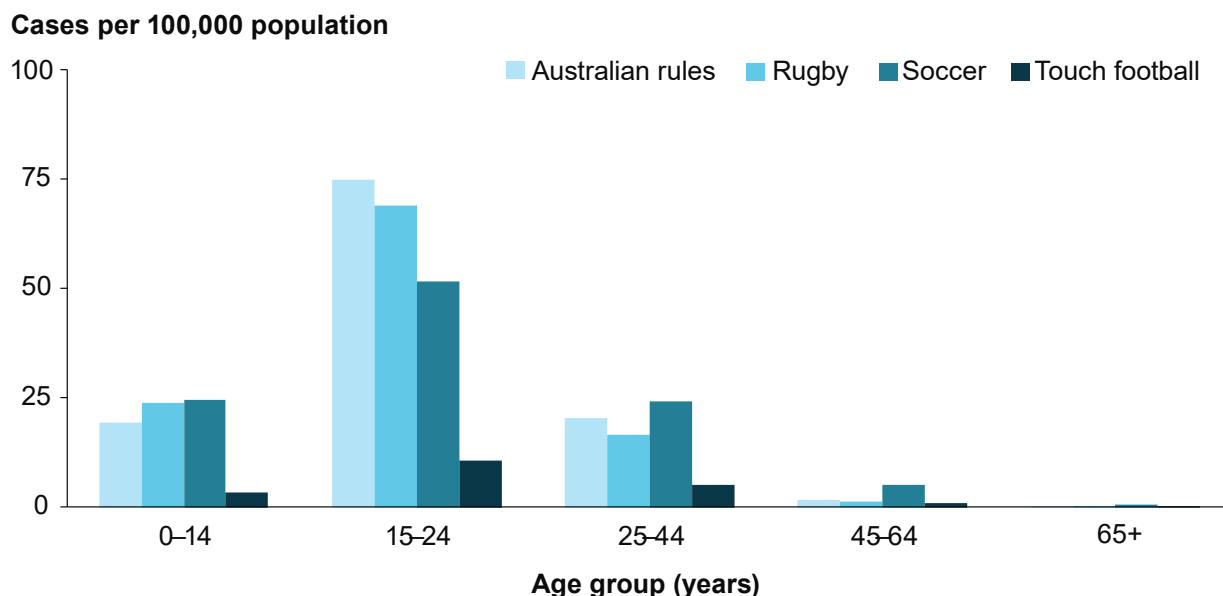
*Note:* Data underpinning this table can be found in the accompanying supplementary spreadsheets.

*Data source:* AIHW National Hospital Morbidity Database.

Age-specific population-based rates of hospitalised football injury were highest among 15–24 year olds, regardless of code (Figure 6). For younger people aged 0–14, the highest rates of injury occurred among soccer players (25 cases per 100,000), followed by rugby (24 cases per 100,000), then Australian rules players (19 cases per 100,000). Rates of hospitalised injury for 25–44 year olds were highest for soccer players (24 cases per 100,000).



Figure 6: Age-specific rates of football injury hospitalisations, by type of football played, 2016–17

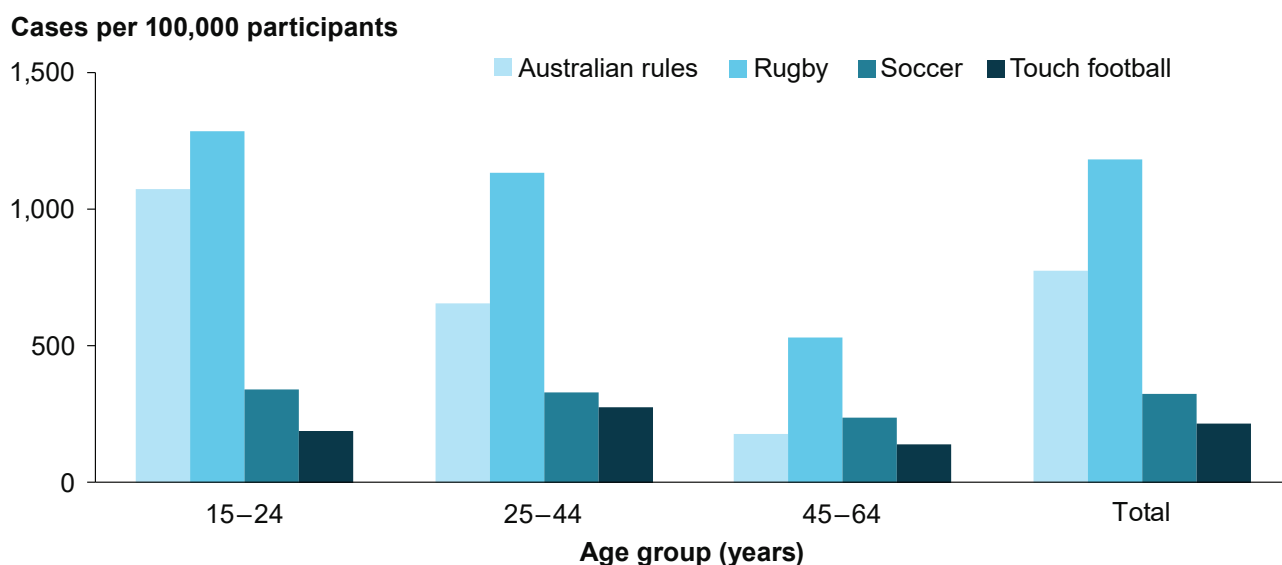


Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

Hospitalisation rates are considerably higher when looked at in relation to the number of people who report playing football than to the general population as a whole (Figure 7). For example, in 2016–17, for every 100,000 people aged 15 and over who played rugby, 1,181 players were admitted to hospital; for Australian rules football, it was 777 players per 100,000 participants. The equivalent age-standardised population-based rates were 19 and 21 hospitalised cases per 100,000 population, respectively.

Figure 7: Age-specific participation-based rates of football injury hospitalisations, ages 15 and over, by type of football played, 2016–17



Notes

1. Total includes all cases 15+, cases for those 65+ not shown due to small numbers.

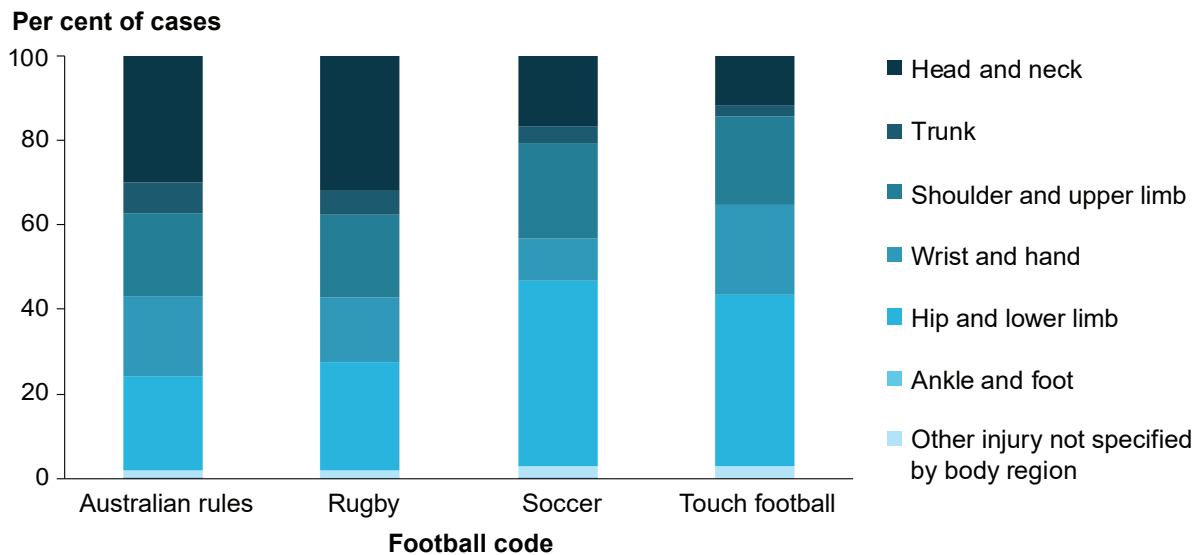
2. Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data sources: AIHW National Hospital Morbidity Database and Ausplay.

# Australian rules footballers and rugby players are more likely to have head and neck injuries

A greater proportion of hospitalised injuries from Australian rules and rugby were for *Head and neck* injuries (30 and 32%, respectively) than for soccer and touch football (17% and 12%, respectively). More than 4 in 10 (44% and 40%, respectively) injuries from soccer and touch football were for *Hip and lower limb* injury (Figure 8).

**Figure 8: Football injury hospitalisations, by main body region affected, by type of football played, 2016–17**

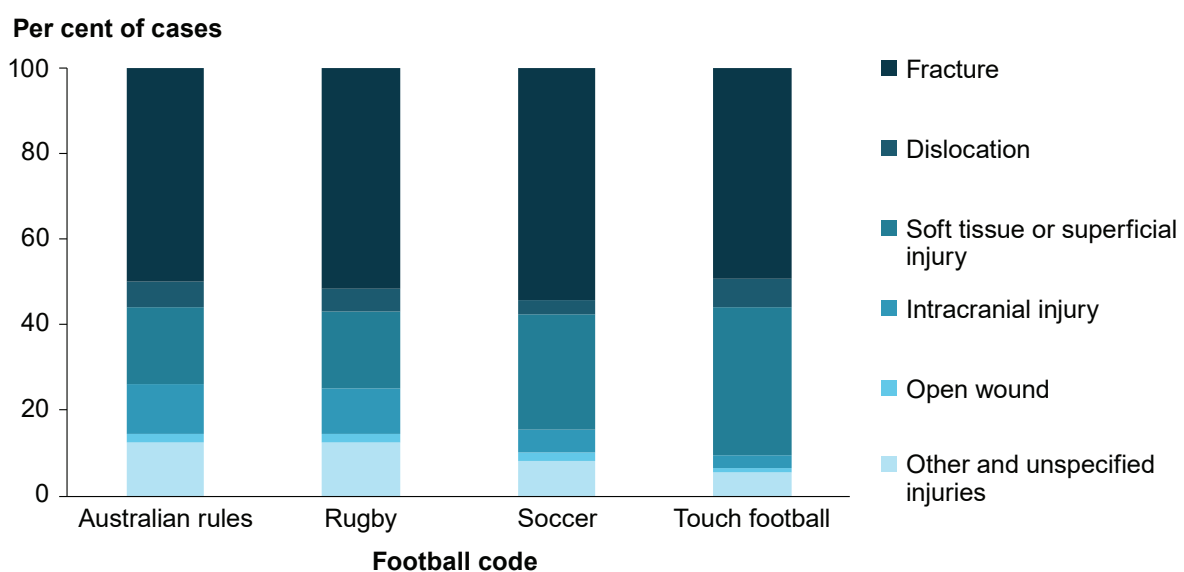


Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

Fractures were the most common type of hospitalised injury for all codes, accounting for around half of the injuries sustained (Figure 9). More than 1 in 10 hospitalised injuries for Australian rules (12%) and rugby (11%) were for *Intracranial injury*—more than double the proportions for soccer (5.3%) and touch football (3.1%).

**Figure 9: Football injury hospitalisations, by type of injury, by type of football played, 2016–17**



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

One of the most common principal diagnoses was *Ruptured anterior cruciate ligament*, which occurred in 10% of hospitalised injury cases sustained in football. This type of injury was more common among soccer and touch football cases than Australian rules cases (Table 6). In contrast, *Concussive injury* was more prominent among Australian rules and rugby player cases.

**Table 6: Common injuries among hospitalised footballers, by type of football played, 2016–17**

Principal diagnosis	Australian rules		Rugby		Soccer		Touch football	
	Cases	%	Cases	%	Cases	%	Cases	%
Ruptured anterior cruciate ligament	361	7.5	284	6.3	667	13.9	178	19.5
Concussive injury	540	11.3	465	10.3	242	5.1	28	3.1
Fractured thumb or finger	475	9.9	300	6.6	260	5.4	123	13.4
Fractured lower radius (lower arm)	264	5.5	213	4.7	491	10.3	68	7.4
Fractured malleolus (ankle)	219	4.6	305	6.8	383	8.0	33	3.6
Fractured metacarpal bones (hand)	193	4.0	237	5.2	104	2.2	34	3.7
Fractured nose	184	3.8	151	3.3	130	2.7	19	2.1
Fractured collarbone	159	2.1	120	2.2	103	1.5	44	3.9
Torn meniscus (knee)	74	1.5	65	1.4	138	2.9	25	2.7
Fractured lower jaw	87	1.8	98	2.2	24	0.5	6	0.7
Achilles tendon injury	31	0.6	27	0.6	163	3.4	32	3.5
All other diagnoses	2,202	47.2	2,252	50.3	2,078	44.1	325	36.4
<b>Total</b>	<b>4,789</b>	<b>100.0</b>	<b>4,517</b>	<b>100.0</b>	<b>4,783</b>	<b>100.0</b>	<b>915</b>	<b>100.0</b>

Note: ICD-10-AM inclusion criteria for diagnoses include the following: *Rupture of anterior cruciate ligament* (S83.53); *Concussive injury* (S06.0); *Fracture of thumb or other finger* (S62.5, S62.6); *Fracture of lower end of radius, unspecified* (S52.5); *Fracture of malleolus (ankle)* (S82.5, S82.6, S82.81, S82.82); *Fracture of metacarpal bones (hand)* (S62.2, S62.3); *Fracture of nasal bones* (S02.2); *Fracture of clavicle* (S42.0); *Tear of meniscus of knee* (S83.2); *Fracture of mandible* (S02.6); and *Injury of Achilles tendon* (S86.0).

Data source: AIHW National Hospital Morbidity Database.

## The causes of injury differ by football code

Four common causes accounted for three-quarters of football injuries: *Falls*; *Striking against or being struck by sports equipment*; *Interaction with another person* (mostly being hit, struck, kicked, twisted, bitten or scratched); and *Overexertion and strenuous or repetitive movements* (Figure 10).

One in 5 (21%) of records provided no information on the cause of injury.

Different causes were observed between the codes:

### Australian rules

- The largest proportion of cases were caused by *Interaction with another person* (23%, 1,560 cases)
- Among the 1,470 cases (31%) injured in a fall, two-thirds, or 1,010 cases, were caused by colliding with, or being pushed by, another person.

### Rugby

- Almost half of all rugby injuries occurred due to a fall (47%, 2,120 cases) and the majority of those were the result of colliding with, or being pushed by, another person (1,900 cases).
- 28% (1,250 cases) of rugby injuries were due to *Interaction with another person*.

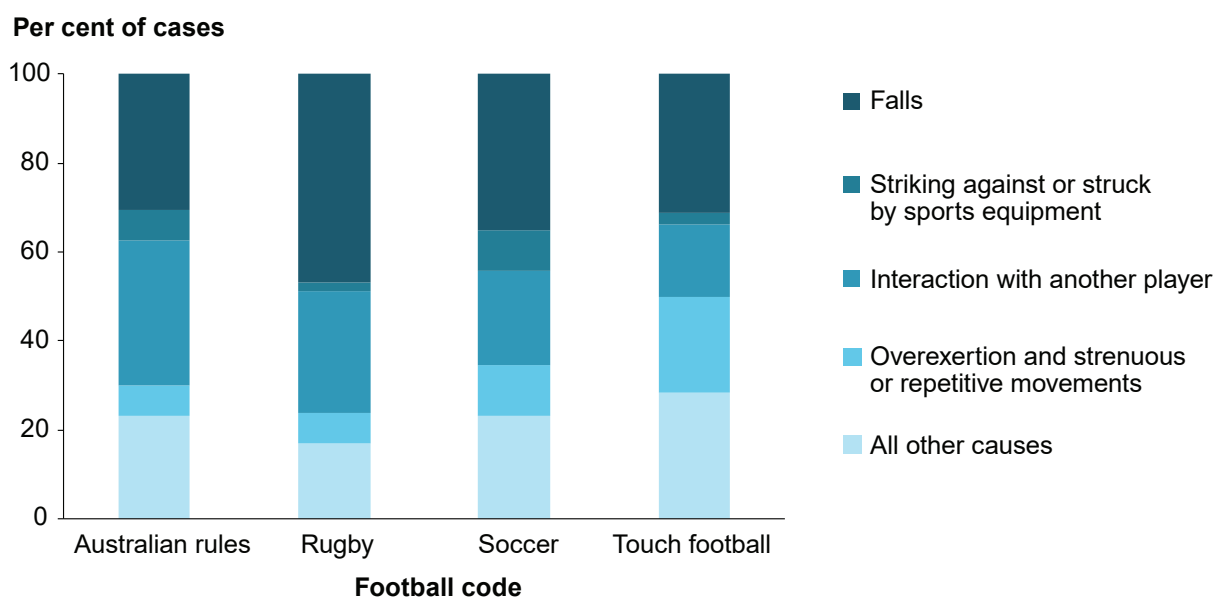
### Soccer

- The largest proportion of soccer injury cases were due to some kind of fall (35% or 1,680 cases). Unlike falls in Australian rules and rugby, falls in soccer varied—from slips and trips to falls due to collisions. The cause of about one-third of falls (37%) was unspecified.
- Soccer players had the second-largest proportion of hospitalised injury due to *Overexertion and strenuous or repetitive movements* (11%, 540 cases).

### Touch football

- 3 in 10 injuries (31% or 290 cases) in touch football were due to *Falls*. Nearly one-third (31%) of falls were from colliding with, or being pushed by, another person.
- *Overexertion and strenuous or repetitive movements* accounted for the second-largest proportion of injuries among touch football players (21% or 195 cases).

Figure 10: Common causes of football injury hospitalisations, by type of football played, 2016–17



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

## Netball and basketball injuries

During 2016–17, it is estimated that 1.3 million people aged 15 and over had played netball or basketball in the previous 12 months—netball had around 622,000 participants and basketball 724,000 (Clearinghouse for Sport and Physical Activity 2017).

### How many people are hospitalised for netball and basketball injuries?

In 2016–17, nearly 4,200 people were hospitalised after being injured playing netball or basketball (1,700 for netball and 2,500 for basketball). Basketball cases were mainly males (79%, or 1,940 cases) while netball cases were nearly all females (92%, or 1,580 cases) (Table 7).

**Table 7: Case numbers and age-standardised rates of hospitalisation for netball and basketball injury, by sex, 2016–17**

Type of sport	Males		Females		Persons	
	Cases	Rate per 100,000 population	Cases	Rate per 100,000 population	Cases	Rate per 100,000 population
Netball	142	1.2	1,582	13.8	1,724	7.4
Basketball	1,940	16.6	527	4.3	2,467	10.7
<b>Total</b>	<b>2,082</b>	<b>17.8</b>	<b>2,109</b>	<b>18.4</b>	<b>4,191</b>	<b>18.2</b>

#### Notes

1. Age-standardised to the 2001 Australian population (per 100,000).
2. Data underpinning this table can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

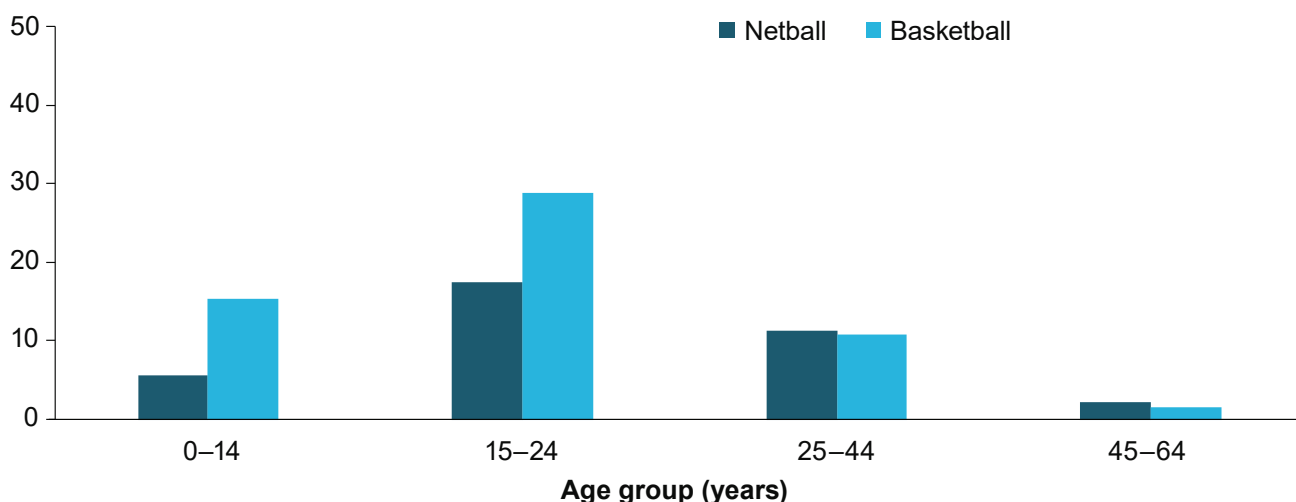
### Netballers and basketballers aged 15–24 are the most likely to be hospitalised

People aged 15–24 were the most likely to sustain an injury playing netball or basketball that required hospitalisation. In the 0–14 age group, the age-specific rate for basketball injury was almost three times that for netball injury (15 and 6 per 100,000, respectively) (Figure 11). Among those aged 15–24, rates of hospitalised injury for basketball were also substantially higher than those for netball (29 and 17 per 100,000, respectively).

Age-specific injury rates were low for both sports in the 45–64 age group. Because there were very few cases of hospitalisation at 65 and over, rates for this group have not been included in Figure 11.

**Figure 11: Age-specific rates of netball and basketball injury hospitalisations, 2016–17**

Cases per 100,000 population



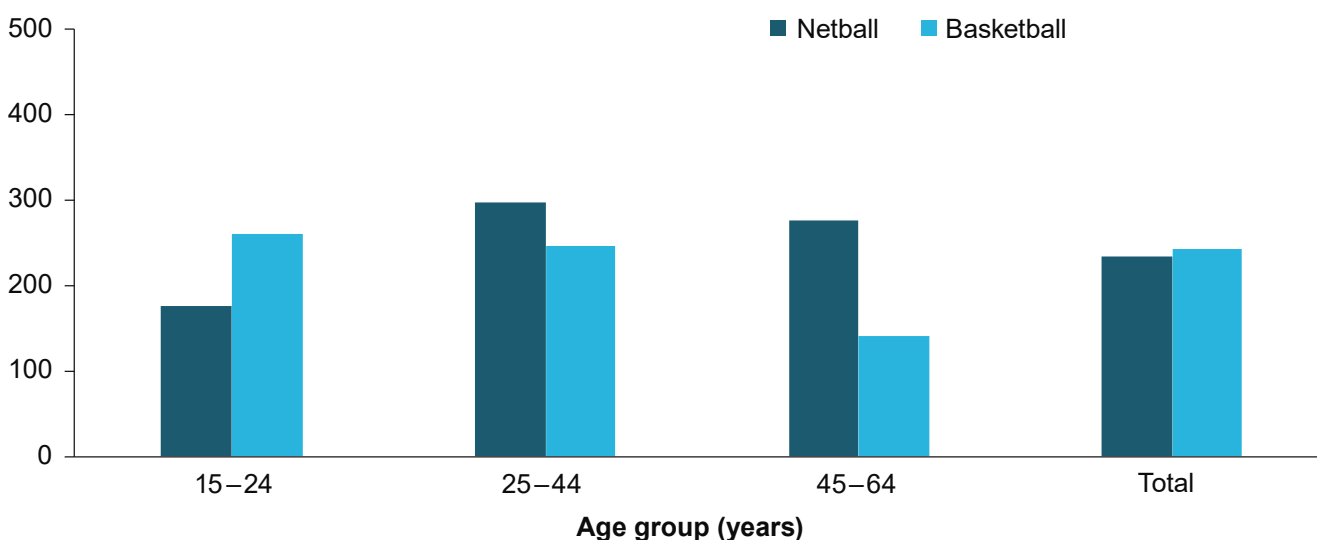
Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.

While participation-based hospitalisation rates for basketball were similar in the youngest 2 age groups (260 and 247 cases per 100,000 participants), the rate was substantially lower in the 45–64 age group (142 per 100,000) (Figure 12). For netball, participation-based rates were highest in the 25–44 age group (298 cases per 100,000 participants). For both sports, few hospitalised injury cases occurred among players at ages 65 and over and they have not been included in Figure 12.

**Figure 12: Age-specific participation-based rates of netball and basketball injury hospitalisations, ages 15 and over, 2016–17**

Cases per 100,000 participants



Notes

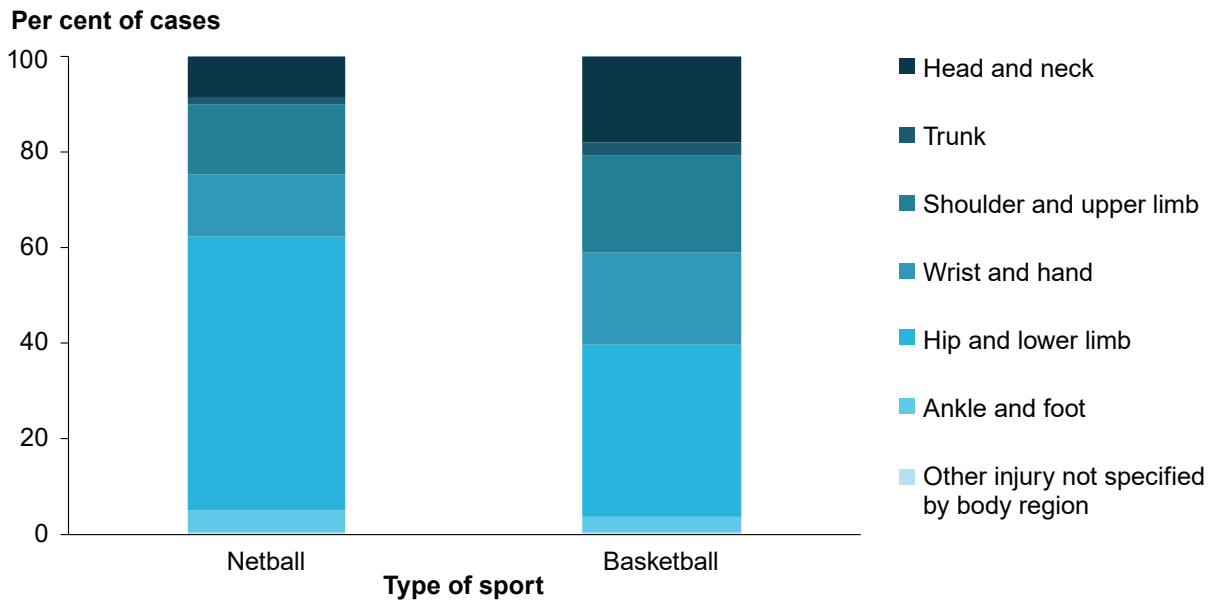
1. Total includes all cases 15+, cases for those 65+ not shown due to small numbers.
2. Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data sources: AIHW National Hospital Morbidity Database and Ausplay.

# Fractures and soft tissue injuries are common among netballers and basketballers

Injuries to the hip and lower limb accounted for more than half (57%) of the injuries sustained by netballers, compared with 36% for basketballers (Figure 13). Among basketball cases, the proportion with a head and neck injury was double the proportion for among netball cases (18% versus 9%, respectively). Within each of the sports, there were only minor differences between males and females in the body regions affected by injury.

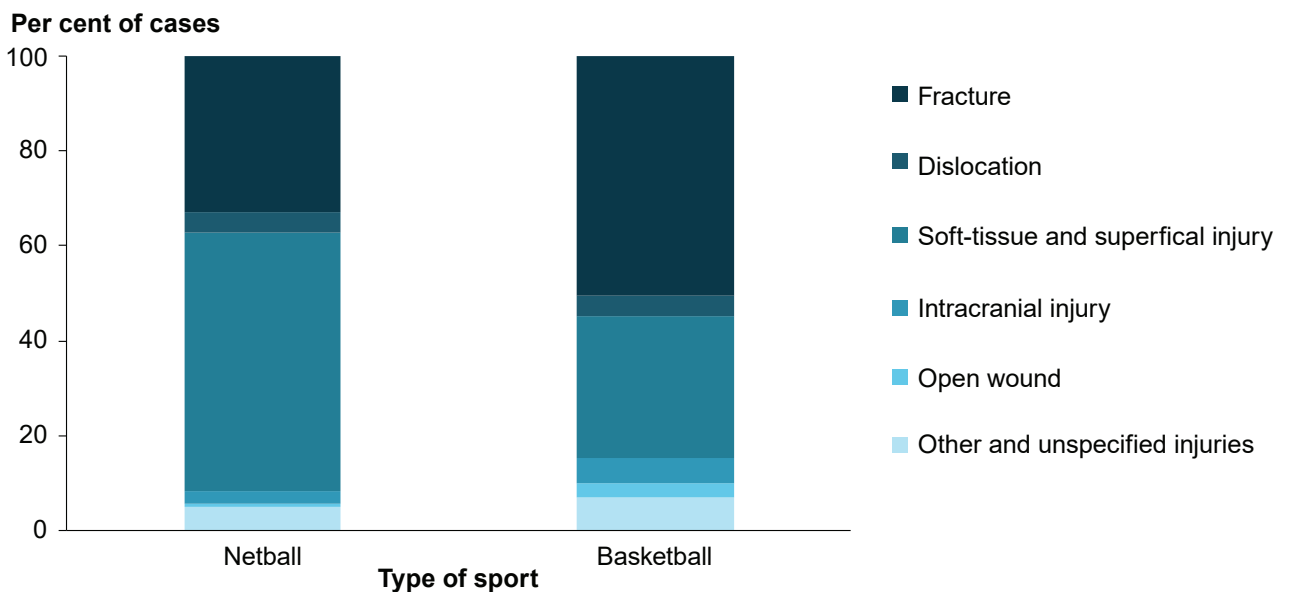
**Figure 13: Netball and basketball injury hospitalisations, by main body region affected, 2016–17**



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.  
 Data source: AIHW National Hospital Morbidity Database.

A large proportion of hospitalised injuries from basketball and netball were due to fractures (51% and 33%, respectively), as well as soft tissue and superficial injuries (30% of basketball injuries and 54% of netball injuries) (Figure 14).

**Figure 14: Netball and basketball injury hospitalisation, by type of injury, 2016–17**



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.  
 Data source: AIHW National Hospital Morbidity Database.

The most common principal diagnosis for both netball and basketball injury was a ruptured anterior cruciate ligament, accounting for around one-third (32%) of netball injury hospitalisations and 15% of basketball cases (Table 8). Achilles tendon injuries were also more prominent in netball than in basketball (11% and 5% of hospitalisations, respectively).

**Table 8: Common injuries among netballers and basketballers hospitalised, 2016–17**

Principal diagnosis	Netball		Basketball	
	Cases	%	Cases	%
Ruptured anterior cruciate ligament	545	31.6	370	15.0
Fractured thumb or finger	163	9.5	284	11.5
Fractured lower radius (lower arm)	141	8.2	245	9.9
Achilles tendon injury	189	11.0	110	4.5
Concussive injury	47	2.7	124	5.0
Fractured nose	21	1.2	116	4.7
Torn meniscus (knee)	71	4.1	53	2.1
Fractured malleolus (ankle)	35	2.0	77	3.1
All other diagnoses	512	29.7	1,088	44.2
<b>Total</b>	<b>1,724</b>	<b>100.0</b>	<b>2,467</b>	<b>100.0</b>

Note: ICD-10-AM inclusion criteria for diagnoses include the following: *Rupture of anterior cruciate ligament* (S83.53); *Fracture of thumb or other finger* (S62.5, S62.6); *Fracture of lower end of radius* (S52.5); *Injury of Achilles tendon* (S86.0); *Concussive injury* (S06.0); *Fracture of nasal bones* (S02.2); *Tear of meniscus of knee* (S83.2); and *Fracture of malleolus (ankle)* (S82.5, S82.6, S82.81, S82.82).

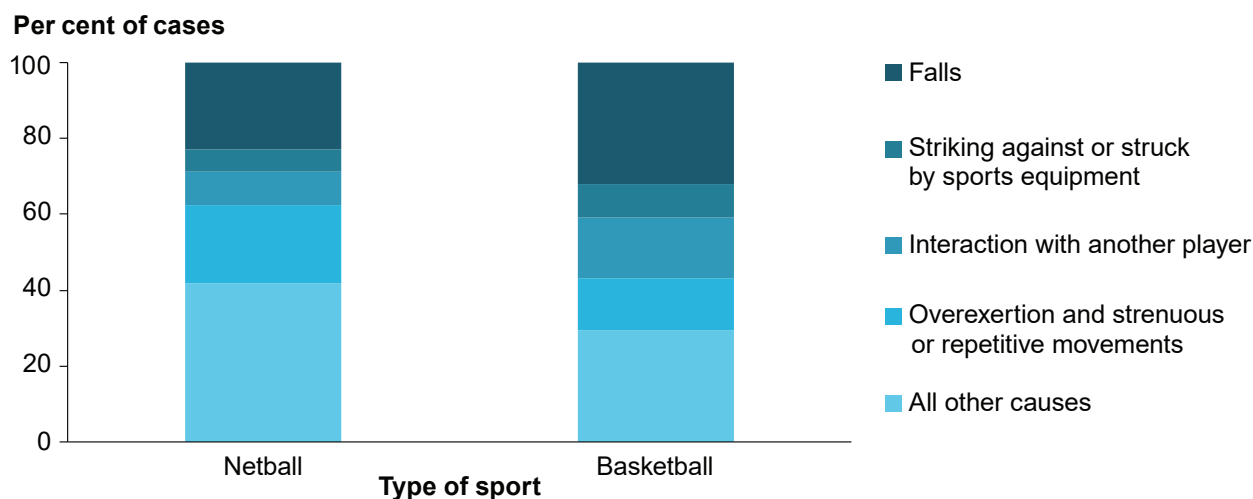
Data source: AIHW National Hospital Morbidity Database.

## Falls in basketball are more common than in netball

For the cases where cause was recorded, 4 causes accounted for two-thirds (66%) of all netball and basketball injury hospitalisations: falls, striking against or being struck by sports equipment, an interaction with another player (including being hit, struck, kicked, twisted, bitten or scratched by another), and overexertion and strenuous or repetitive movements. Falls were the most common cause for both sports (Figure 15).

Nearly one-third (30%) of all netball and basketball injury hospitalisations contained no information on the specific cause of the injury.

**Figure 15: Common causes of netball and basketball injury hospitalisations, 2016–17**



Note: Data underpinning this figure can be found in the accompanying supplementary spreadsheets.

Data source: AIHW National Hospital Morbidity Database.



## Netball

- The most common cause of injury was a fall (23%), followed by overexertion and strenuous or repetitive movements (21%).
- Two-thirds of fall cases (67% or 265 cases) had no specific information on the type of fall.

## Basketball

- The most common cause of injury was a fall (32%). As with netball cases, two-thirds of cases (64% or 512 cases) had no specific information on the type of fall.
- The second most common cause of injury was interactions with other players, accounting for 16% (392 cases) of basketball injuries. More than half (126) of these cases were due to being hit, struck, kicked, twisted, bitten or scratched by another player.

## What are the challenges to reporting on sports injury?

Providing good estimates of the size and scope of sports injury in Australia is challenging. Sources of data are limited. National data on non-hospitalised sports injuries are not readily available for treatment by hospital emergency departments, general practitioner clinics, sports medicine centres or allied health practitioners such as physiotherapists.

Within the National Hospital Morbidity Database (NHMD), information is not always collected on the sport that patients were participating in when they were injured, so the numbers of hospitalisations reported here are likely to be underestimated.

The availability of activity codes enabled us to select the hospitalisations that were attributed to a variety of sports. However, although the available codes are reasonably comprehensive, they do not distinguish between professional sports and community-based sports. They also do not differentiate, for example, between playing amateur team cricket and backyard cricket. While the introduction of activity codes was a major step forward for reporting on sports injury, their utility is hampered by the fact that, in a substantial proportion of cases, hospitalisation records have either a missing or unspecified activity code.

The results reported here are likely to underestimate the true extent of hospitalised sports injury in Australia. It is also possible that the quality of activity code data, when available, varies from sport to sport. For this reason, comparisons between different sports need to be interpreted with caution.

## Where do I go for more information?

More information on hospitalised sports injury in Australia can be found in an earlier publication *Australian sports injury hospitalisations, 2011–12* (AIHW: Kreisfeld et al. 2014). The Clearinghouse for Sport and Physical Activity contains detailed information on the AusPlay survey and the Australian Sports Commission website also contains information on preventing sports injury.

## What data did we use?

The case data were sourced from the AIHW's National Hospital Morbidity Database (NHMD) for 2016–17, which covers all admitted episodes of care in Australian hospitals. Included NHMD records are those that have *Injury* as the Principal Diagnosis, specified as International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian modification (ICD-10-AM) codes S00–T75 or T79, and contain an ICD-10-AM 'Activity at the time of injury' code in the range U50–U71, which includes sport and exercise activities (n = 58,497). Cases containing the activity codes U50.0 *Football* (n = 18,481) and U50.1 *Basketball* or U50.3 *Netball* in the record (n = 4,191) were the focus of sections of this report (ACCD 2014). Records with mode of admission reported as a *Transfer from another hospital* were excluded to reduce multiple counting of cases.

The results reported in this fact sheet are likely to **underestimate** the number of hospitalised sports injury cases because, for a high proportion of the NHMD records otherwise eligible to be included the activity code was missing or unspecified (61%).

Hospitalised cases per 100,000 population are reported as directly age standardised rates based on the Australian population as at 30 December 2016 (ABS 2018). The Australian population as at 30 June 2001 was used as the reference population for this report.

Estimates of the number of people aged 15 and over playing specific sports were derived from the 2016–17 AusPlay survey funded and led by the Australian Sports Commission. The AusPlay survey collects data from 20,000 adults and 3,600 children annually. More information on the survey methods are available from the Ausplay web page and supplementary tables.

In this report, analysis of type and bodily location of injury are based on the principal diagnosis, the condition that best explains the admission. Cause of injury is based on the first-occurring external cause code in the record. Measured in-hospital mortality of patients with each type of injury allows assessment of the threat to life posed by any set of injuries. Cases with a predicted mortality risk of about 6% or higher are described as having a high threat to life (Stephenson et al. 2003).

# Glossary

**age-standardisation:** A set of techniques used to remove, as far as possible, the effects of differences in age when comparing 2 or more populations. This is usually necessary because the rates of many injuries or diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, and then the disease/injury rates that would have occurred with that structure are calculated and compared.

**age-standardised rate:** A rate that results from removing the influence of age by converting the age structures of the different populations to the same 'standard' structure. This provides a more valid way of comparing rates from populations with different age structures.

**age-specific rate:** The rate for a specific age group. The numerator and denominator relate to the same age group.

**International Statistical Classification of Diseases and Related Health Problems (ICD):** The World Health Organization's internationally accepted classification of death and disease. The Tenth Revision (ICD-10) is currently in use. The ICD-10-AM is the Australian Modification of the ICD-10 and is used for diagnoses and procedures recorded for patients admitted to hospitals.

**intracranial injuries:** Intracranial injuries are sometimes referred to as traumatic brain injuries. They include cases of concussion, traumatic cerebral oedema, diffuse brain injury, and focal brain injuries.

**participation rate:** Participation-based rates were calculated using denominator data derived from the AusPlay survey and the number of cases of hospitalised sports injuries of equivalent sports as the numerator.

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

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