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# Descriptive epidemiology of traumatic fractures in Australia

*Clare Bradley, James Harrison*

AH&W

# **Descriptive epidemiology of traumatic fractures in Australia**

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**Clare Bradley  
and  
James Harrison**

**2004**

Australian Institute of Health and Welfare  
Canberra

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# Executive summary

This report aims to describe fractures as a type of injury morbidity in Australia and to present the findings in relation to the methods and priorities of public health injury prevention. Unit records for hospital separations during 2001–02 from nearly all hospitals in Australia were analysed.

## Findings

- In the year to 30 June 2002, at least one fracture was recorded as a diagnosis for 156,450 episodes of inpatient hospital care in Australia. These cases accounted for 888,460 bed-days.
- The cases involving at least one fracture diagnosis accounted for 2% of all hospital episodes in 2001-02, and 36% of the episodes for which the Principal Diagnosis was an injury of any type.
- A fall (54% of episodes) or a transport accident (19%) were the most common types of event resulting in a hospitalised fracture.
- Four case types accounted for 52% of all episodes in which a fracture was recorded and over 65% of bed-days due to fractures. These were:
  - ◆ Lower limb fracture due to a fall by a person aged 65+ years;
  - ◆ Upper limb or trunk fracture due to a fall by a person aged 65+ years;
  - ◆ Upper limb fracture due to a fall by a person aged 0–19 years, and;
  - ◆ Any fracture due to a transport accident at ages 5–54 years.
- Fractures were the most common of all forms of hospitalised trauma.
- Fractures sustained by older persons, particularly lower limb fractures attributed to falls, were common and accounted for a large number of bed-days. These are projected to increase in number.
- Other events, notably transport accidents, were common causes of hospitalised fractures for young and middle aged adults.
- Two of the four current injury prevention priority topics under the National Injury Prevention Plan refer to events for which fractures are the main type of trauma: falls by older persons and falls by children. Prevention programs are being developed and implemented, particularly for falls by older persons.

# Acknowledgment

Thank you to Stacey Avefua and Jacki Douglas for their assistance with editing and production.

## Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ICD-9-CM	9 <sup>th</sup> Revision of the International Classification of Diseases, Clinic Modification
ICD-10-AM	10 <sup>th</sup> Revision of the International Classification of Diseases, Australian Modification
NCCH	National Centre for Classification in Health
NISU	National Injury Surveillance Unit
RCIS	Research Centre for Injury Studies



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# 1 Introduction

This paper describes hospitalised cases that involve fractures. Fractures are a common type of injury morbidity among injury cases that result in admission to a hospital in Australia. Recent improvements in the national collection of data on hospital cases make it a good source for this purpose. The description of hospitalised fracture cases is a broad topic and the data source contains a considerable range of data.

This report provides an overview of hospitalised fractures in terms of:

- case numbers and rates;
- basic demographic characteristics;
- circumstances of occurrence; and
- types of case.

This report provides an insight into fractures generally. This may be useful for injury prevention and control, and as a basis for more specific investigations.

Unit record data were obtained from the National Hospital Morbidity Database compiled by the Australian Institute of Health and Welfare (AIHW). This collection includes records for nearly all of the 'separations' (i.e. discharge, transfer, or death) that occurred during the financial year 2001–02 from nearly all acute-care hospitals in Australia (total number of separations for 2001–02 was 6,394,498). Details of the data set have been published elsewhere (AIHW 2003).

Diagnoses and external causes of injury and poisoning for 2001–02 were coded according to the second edition of the Australian clinical modification of the 10th revision of the International Classification of Injuries, ICD-10-AM (NCCH 2000).

The sub-set of records used for this paper met the following criteria:

- Principal Diagnosis was recorded as injury or poisoning (ICD-10-AM codes S00–T98)
- The first-listed External Cause of morbidity was in the range V01–Y89 of ICD-10-AM; and
- A code representing a fracture was in the Principal Diagnosis field or in any of the Additional Diagnosis fields (n=156,450).

The ICD-10-AM codes representing 'fracture' are those having 'S' as the first character and '2' as the third character, 'T02', 'T08', 'T10' or 'T12' as the first three characters, or the code 'T14.2' (see Table A5.1).

## 2 Profile

During the year to 30 June 2002, at least one fracture was recorded as a diagnosis (not necessarily as a principal diagnosis) for 156,450 episodes of in-patient hospital care in Australia. These cases accounted for 0.89 million bed-days, at an average of 5.7 days per episode (Table 2.1).

The cases involving fractures made up 2% of all hospital separations and 36% of the episodes for which the Principal Diagnosis was an injury of any type.

Of the 156,450 episodes with any mention of a fracture, 147,349 (94.2%) had a fracture recorded as the Principal Diagnosis.

The number of episodes of hospital care is larger than the number of individual cases of fracture that resulted in hospital care. This is because some cases result in more than one episode of care. For example, following the occurrence of a fracture, a person may be admitted to a nearby hospital, then transferred to another hospital for further treatment. Prolonged episodes in hospital are sometimes punctuated by a 'statistical type change' that gives rise to a new episode. Also, a person may be discharged home and later re-admitted to the same hospital, or a different one, for planned or unplanned further treatment of the fracture. Available data, at a national level, do not enable precise accounting of the difference between episodes and individual cases.

**Table 2.1: Hospital separations with and without any fracture diagnosis for which Principal Diagnosis is injury or poisoning (S01-T98); Australia 2001-02**

	Number of Fracture Diagnoses	
	At least one	None
Episodes (i.e. Separations)	156,450	274,411
Bed-days	888,460	911,215
Mean bed-days per episode	5.7	3.3
Mean age (years)	45.3	41.0
Proportion male	56%	58%

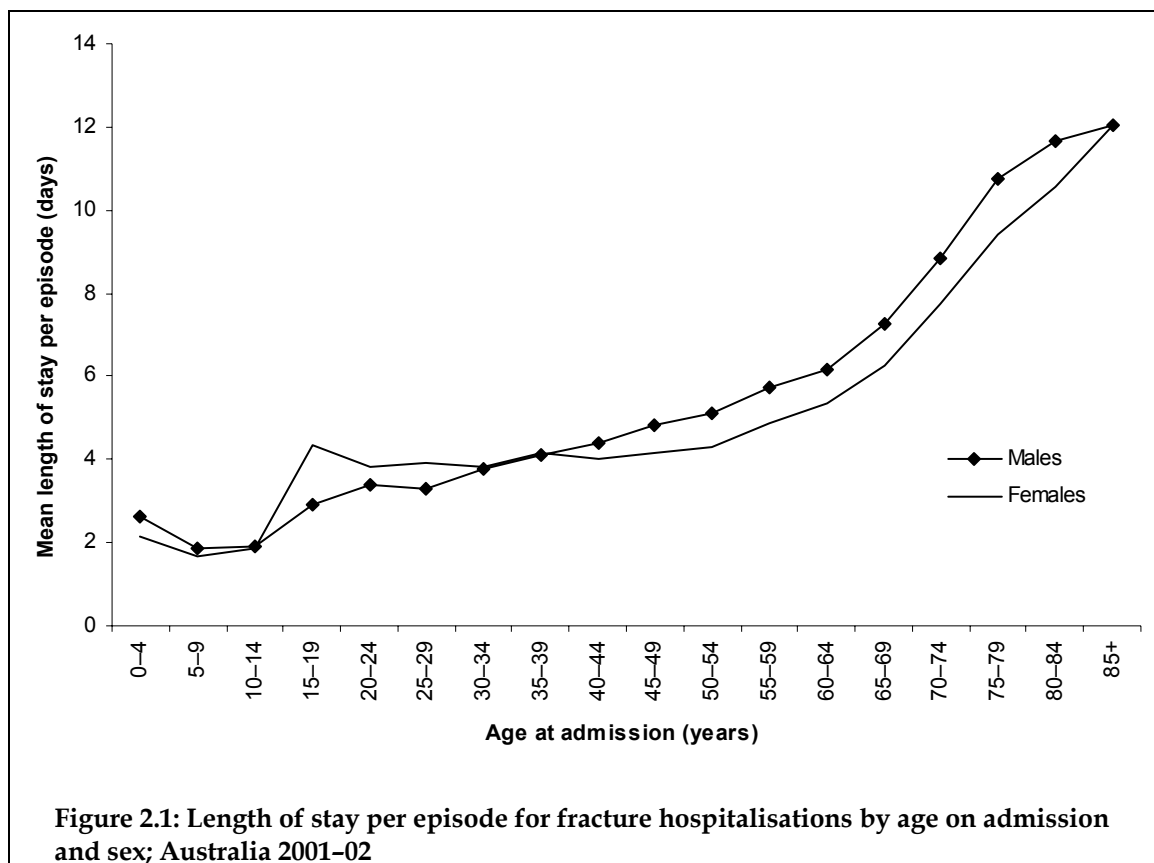
## Age and sex distribution

Males accounted for 56% (n=87,504) of fracture-related episodes in hospital in 2001-02, but made up only 45% (n=396,989) of total bed-days (Table 2.2). Females accounted for 68,944 episodes, but had a longer mean length of stay (LOS). The longer mean LOS for females admitted with a fracture reflects differences in age on admission and the nature of the fractures sustained.

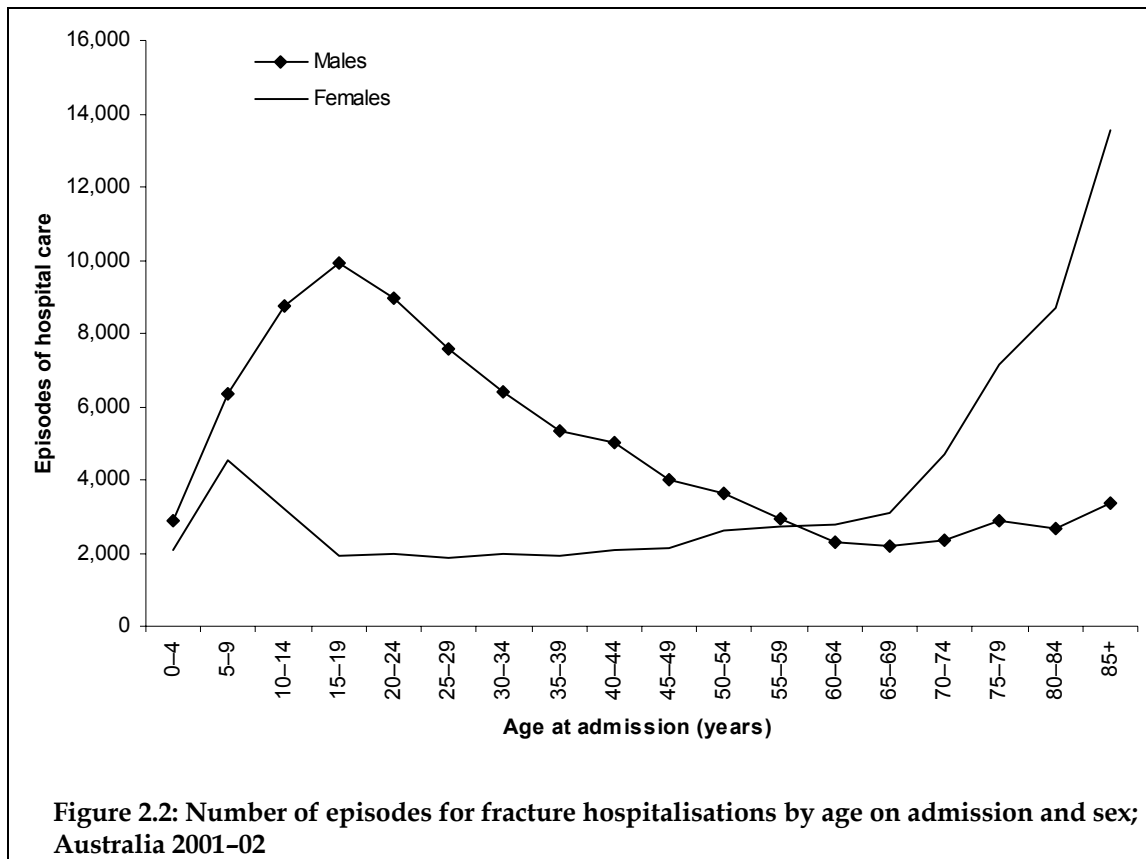
**Table 2.2: Number, mean duration and total duration of episodes for fracture hospitalisations with at least one fracture diagnosis by sex; Australia 2001-02**

	Males		Females	
Episodes	87,504	(56%)	68,944	(44%)
Mean length of stay (days)	4.5		7.1	
Total bed-days	396,989	(45%)	491,468	(55%)

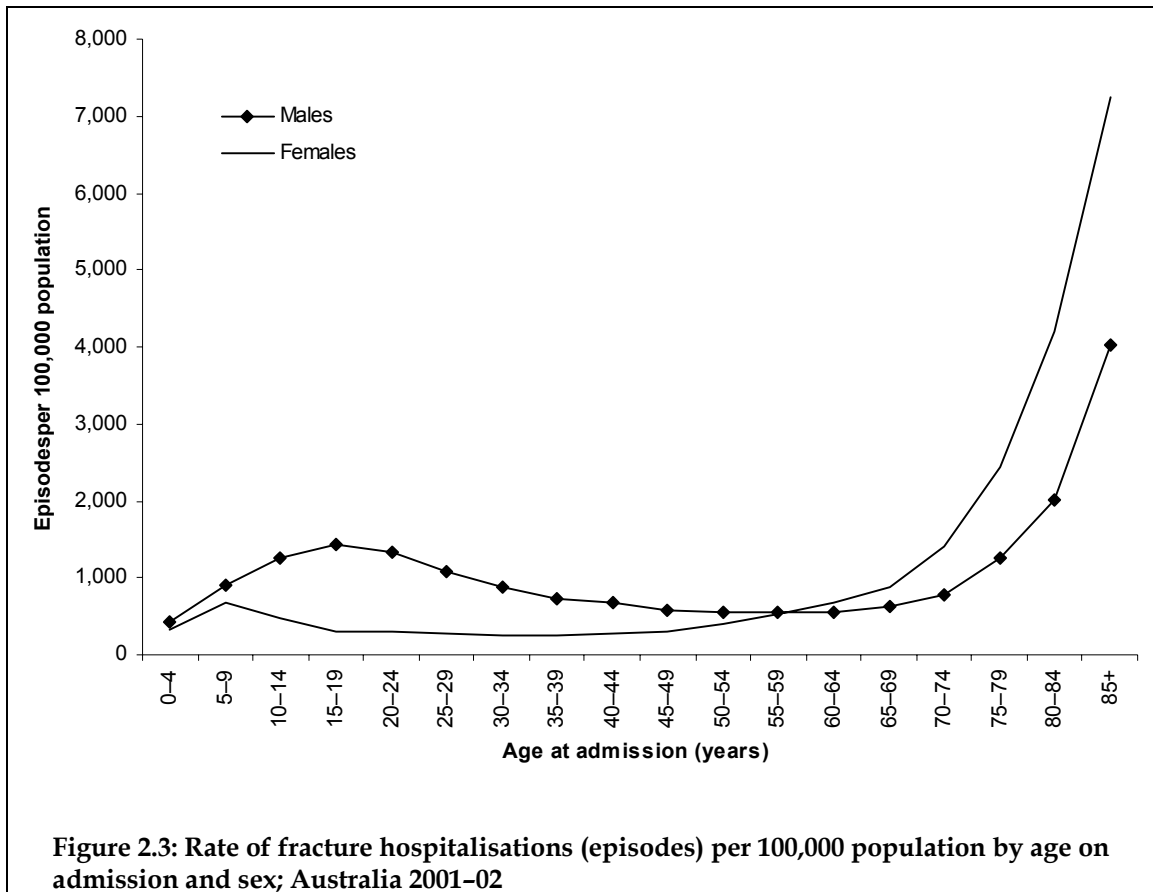
Mean length of stay per episode for fracture hospitalisations generally rose with age (Figure 2.1).



Age-specific mean lengths of stay did not differ greatly between sexes, apart from a slight peak in mean LOS for females 15–19 years (due primarily to lengthy stays for some cases of intentional self-harm). However, females contributed disproportionately to the total number of bed-days because of the older age distribution of female cases (Figure 2.2). This difference is reflected in mean age on admission – 58.1 years for females with a fracture diagnosis and 35.2 years for males.



The number and the age distribution of hospitalisations differs considerably between males and females, reflecting the different ages at which injuries occur and the age structures of the male and female populations (Figure 2.2). Age-specific rates per 100,000 population of fracture hospitalisations are less marked, but male-female differences still exist. Male rates for older age groups were much lower than for females (Fig 2.3). However, rates for males for those from childhood to about 50 years of age were higher than females, with those in the age group 15–19 being much higher (male to female ratio = 4.91).



## External causes

Some information about the causes of fractures and the circumstances in which they occur is recorded in the hospital separation records in the form of ICD-10-AM External Cause codes.

More than 87% of episodes with a fracture diagnosis can be placed into five groups of External Cause (Table 2.3). Four of these five groups refer to events in which injury occurred unintentionally (i.e. 'accidents'). The fifth category involved assault. The remaining episodes involving a fracture were either recorded as having external causes that were unintentional but not specified to a useful extent, or other, and mostly uncommon, external causes. These are grouped as 'Other' in Table 2.3 and throughout the section.

Note that a difference between external cause codes in revisions 9 and 10 of the ICD affects the comparability of the category for accidental falls. ICD-10-AM does not include an External Cause code that is equivalent to the ICD-9-CM code E887, *Fracture, cause unspecified*. An assessment of ICD-9-CM coded Australian hospital data for a period soon before the change to ICD-10-AM showed that about 7% of ICD-9-CM 'accidental falls' cases had been coded to E887 (about half this proportion when considering cases at ages 65 years and older) (Cripps, Steenkamp 2002, page 32).



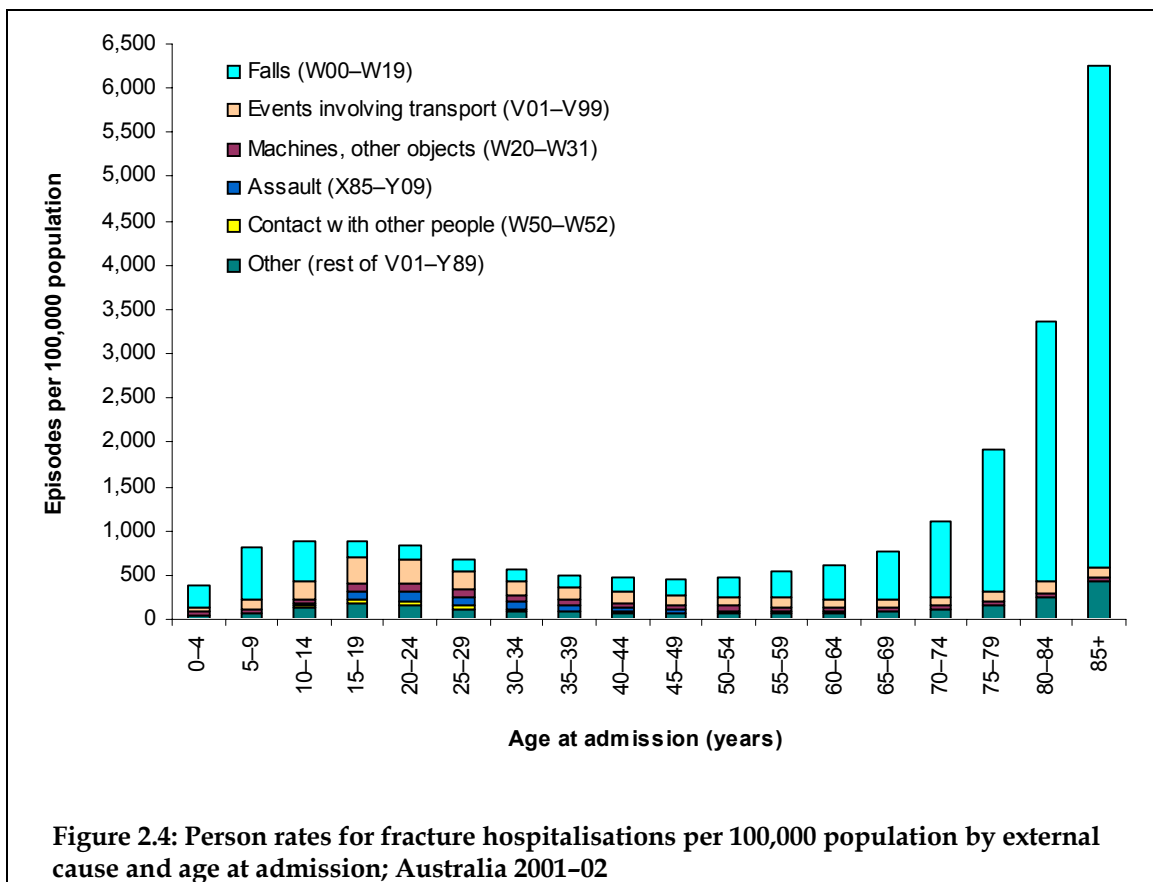
The ICD-9 category E887 can be approximated in ICD-10 by specifying a group including cases for which External Cause is coded to X59, *Exposure to unspecified factor*, and a diagnosis code for fracture is present (n=14,533). If all of these *Fracture, cause unspecified* separations are assumed to have been due to a fall, then the proportion for Falls shown in Table 2.3 rises to 63% and the proportion for Other drops to 4%. (This assumption probably overstates the number of fractures due to falls, as it is likely that some of the *Fracture, cause unspecified* separations were due to external causes other than falls.)

The main purpose of this section is to describe fracture cases in terms of available information about their external causes. In keeping with this, we have restricted the Falls category to the ICD-10-AM External Cause codes which specify the presence of an accidental fall (i.e. W00–W19).

**Table 2.3: Groups of external causes for hospitalised fractures; Australia 2001–02**

Category	External cause code range	Proportion
Falls	W00–W19	54%
Events involving transport	V01–V99	19%
Contact with machines and certain other objects	W20–W31	7%
Assault	X85–Y09	5%
Contact with other people	W50–W52	2%
Other	Rest of V01–Y89	13%

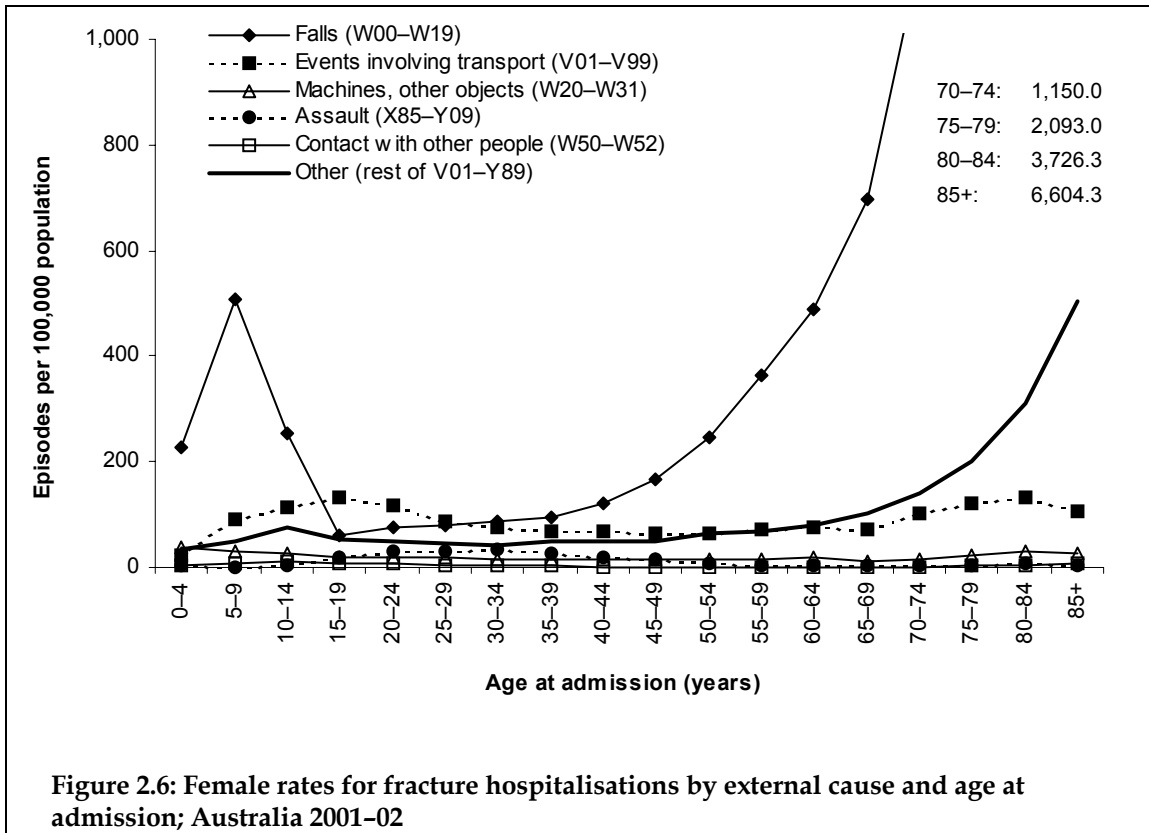
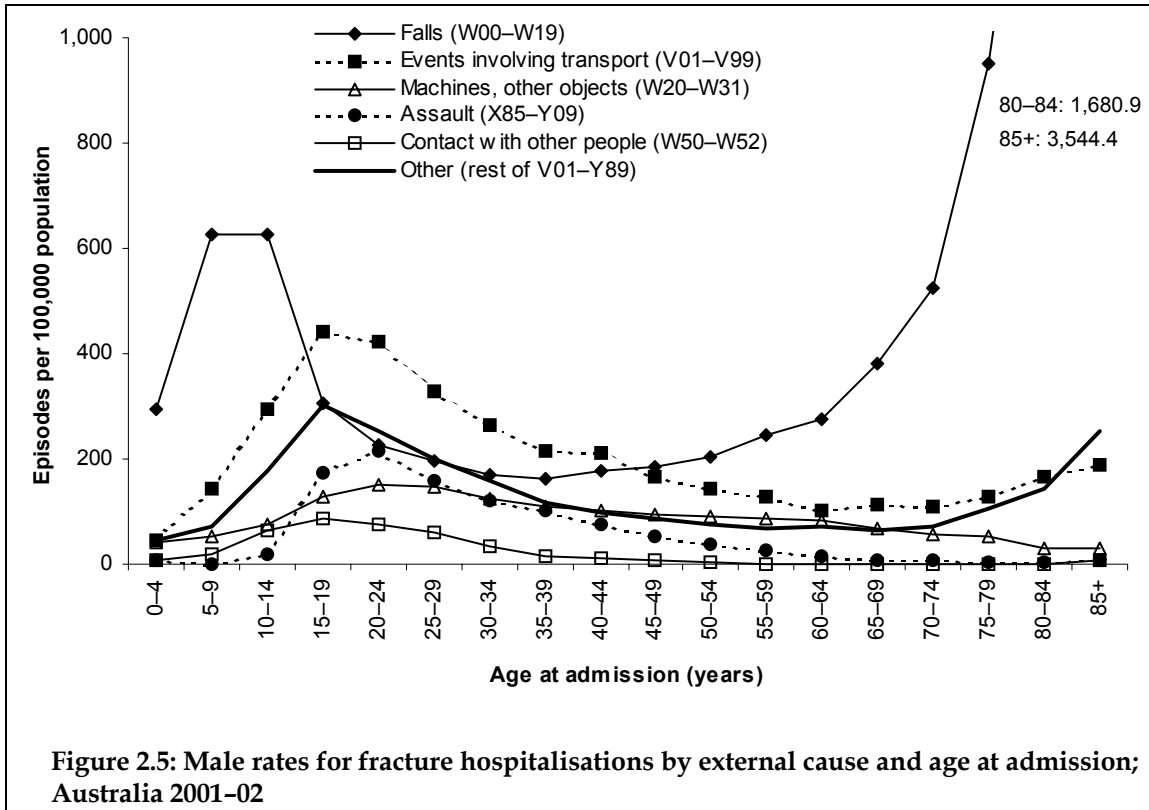
‘Accidental falls’ (ICD-10-AM codes W00–W19) dominate the picture when rates in old age are considered (Figure 2.4).



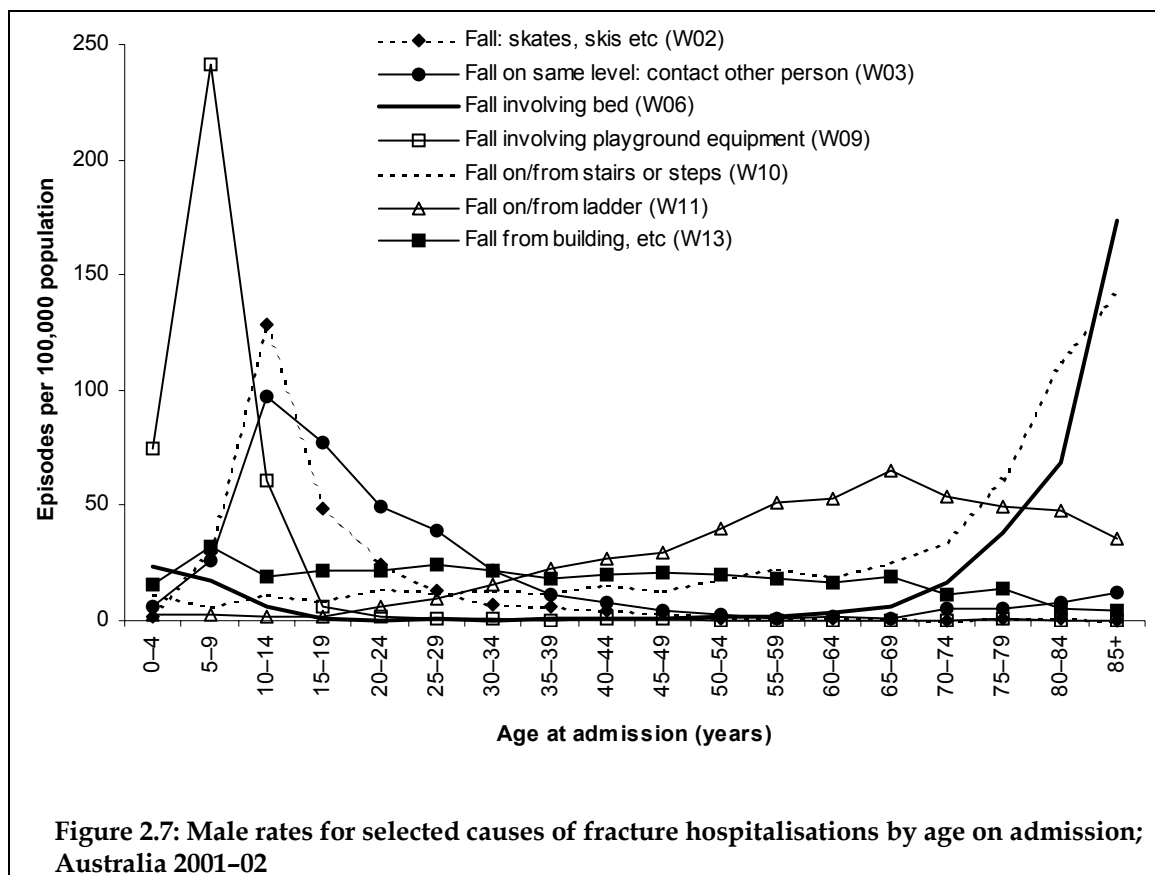
*Falls* were the main external cause of fractures for children of both sexes, though rates were higher for males than females among older children and teenagers (Figures 2.5 and 2.6). *Transport* (mainly road crashes) was the leading external cause of fractures for young adults, male rates being much higher than female rates.

The next two categories of external causes shown were also much more common among males than females. *Machines, other objects* is a diverse category that includes events such as being struck by thrown or falling objects, being caught between objects, or contacting powered or non-powered machinery. These events often occurred during work (39% of cases where activity was specified), or during sport (16%). Fractures attributed to intentional harm by another person (*Assault*) peaked in the early adult age group.

The vertical axis has been cut at 1,000 in Figures 2.5 and 2.6. This enables patterns to be seen more clearly than if the axis is set to display the very high rates in the oldest age groups for *Falls* and (for females) *Other*.



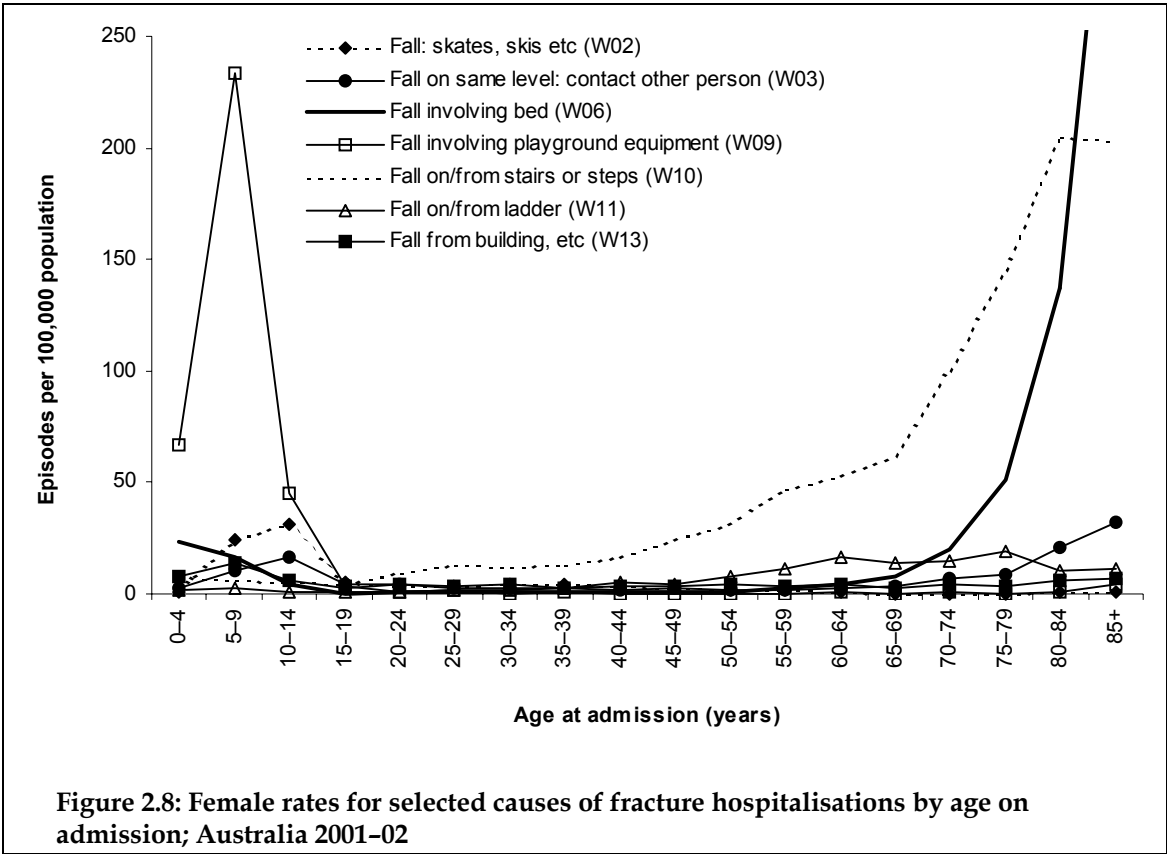
External causes can be considered at a more specific level, when collection and coding allow. Figures 2.7 and 2.8 show male and female age-specific rates for selected categories where the external cause of the fracture was recorded as being a fall. The vertical axis in both figures has been cut at 250 for clarity. Rates of fractures due to these external causes are sharply age-specific.



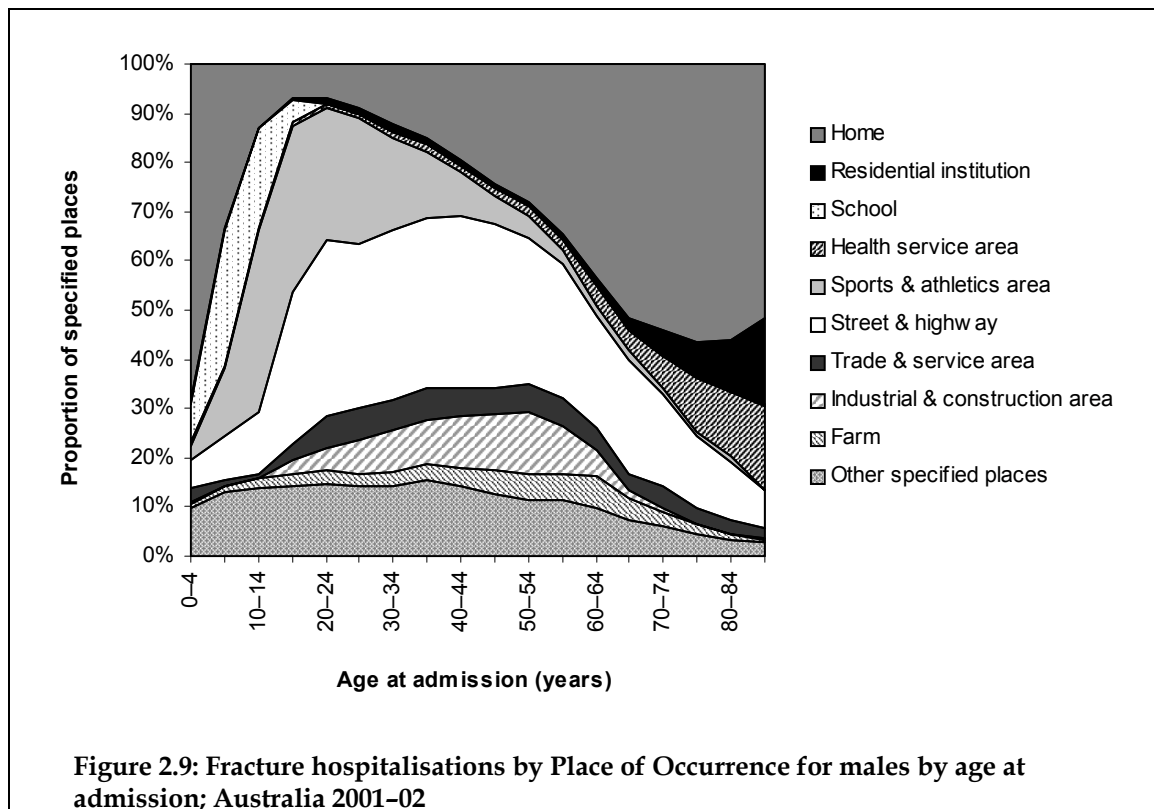
Falls involving playground equipment are the most common cause of hospitalised fractures for children of both sexes, especially in the age group 5-9 years. Hospitalised fractures due to falls involving skates and other 'pedestrian conveyances' peak at a slightly older age (10-14 years). Hospitalised fractures reported as due to falls involving contact with another person are also most common at ages 10-14 years, but this type of case (which often occurs during sport) remains fairly common for males through early adult age groups.

Rates for both falls involving skates and other 'pedestrian conveyances' and falls involving contact with another person showed similar trends for both males and females, but these rates were much lower for females overall. Falls involving a ladder accounted for a rate of hospitalisation that rose with age group through middle adult years and again, rates were much lower for females than for males. Falls involving a bed, and falls on or from stairs and steps, were common causes of fractures resulting in hospital admission for

older persons. As indicated in Figures 2.5 and 2.6 previously, female rates for falls in older age were much higher than for males. While the rate of falls due to stairs or steps appears to plateau for females aged 85+, the rate of falls involving a bed continues to rise. The rate of falls involving a bed for females aged 85+ was 380.8 per 100,000. A smaller peak in falls involving a bed is also seen for young children.



A 'Place of Occurrence' data item provides information on the broad types of locations at which falls resulting in hospitalised fractures occurred. Note that the type of place was not specified for about 15% of hospitalised fracture cases. Excluding these, Figure 2.9 summarises the proportions of male cases hospitalised due to a fracture by type of place of occurrence and age group. Figure 2.10 is a similar chart for females.



*Home* was the most common specified setting for hospitalised fractures among children under ten years of age, and for adults aged 55 years and older for both sexes. *Residential institution* was a common setting for the oldest age groups.

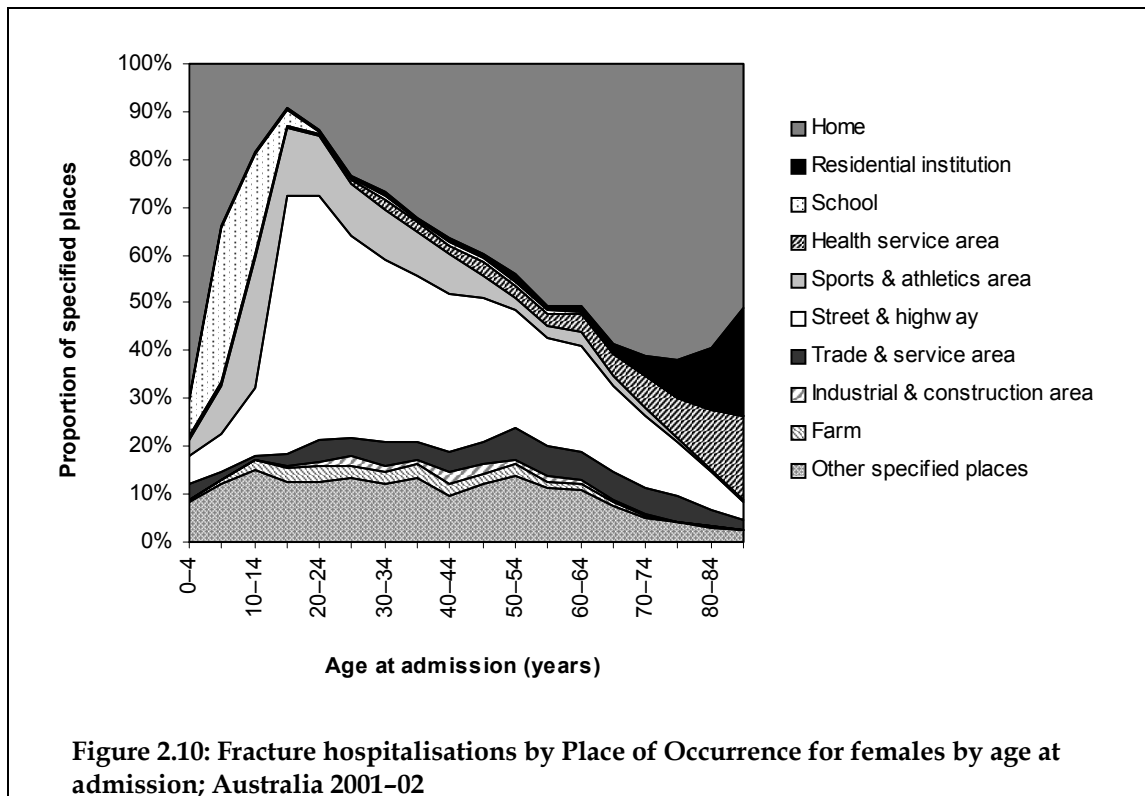
*Street and highway* was the most common specified setting for hospitalised fractures at ages 20–44 years, and the second most common for age groups to 79 years. The great majority of these cases were due to transport accidents (80%). Accidental falls accounted for most of the remaining hospitalised fractures on streets and highways—15% overall, but rising with age to over 50% for persons aged 80 years or older.

ICD-10 includes a broad Place of Occurrence category titled *School, other institution and public administrative area*. A revised version of the classification, introduced with the second edition of ICD-10-AM, splits this category into three subcategories: *School*, *Health service area*, (both shown in Figures 2.9 and 2.10) and a less commonly used residual category (this has been added to *Other specified place*).

*School* was the second most common setting for fractures for children aged 5 to 14 years. *Health service area*, which includes hospitals and nursing homes, was the third most common type of setting for fractures at ages 80 years and older and, in combination with fractures occurring in *Residential institution*, accounted for over 25% of fracture hospitalisations in those aged 80 or older. *Health service area* accounted for 6% of all fractures where the Place of Occurrence was

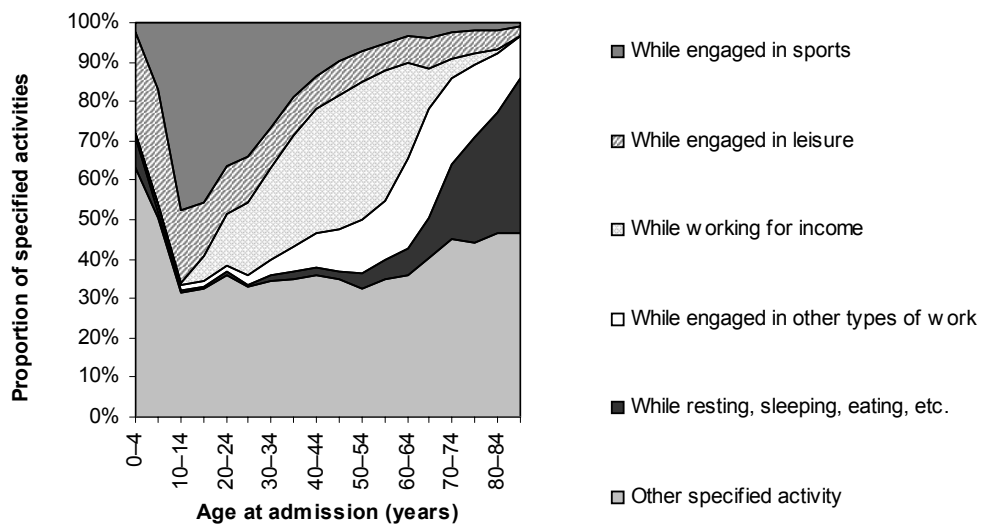
specified (dropping to 4% of all fractures when cases with unspecified Place of Occurrence are included in the denominator).

Fractures in childhood and early adult years commonly occurred in areas for sports and athletics, especially for males. Workplaces were a common setting for hospitalised fractures involving males in middle-adult years.

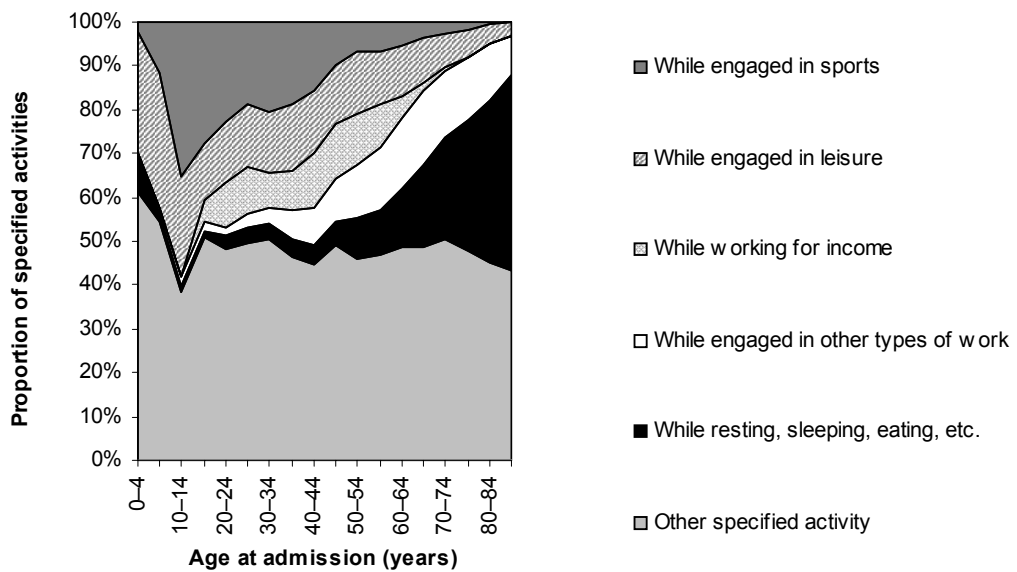


**Figure 2.10: Fracture hospitalisations by Place of Occurrence for females by age at admission; Australia 2001-02**

Figures 2.11 and 2.12 summarise, for males and females, available information on the type of activity being undertaken by people when they sustained fractures resulting in hospital admission. Activity was unspecified for a large proportion of cases (52%). As for Place of Occurrence, it is possible that the cases for which the type of Activity was specified differ from those for which it was not specified. Figures 2.11 and 2.12 omit cases for which Activity was unspecified and summarise the remainder as age-specific proportions. Sports and work (for income, or other work) are the two most specific categories of Activity shown. Both were more prominent among male cases than female cases. For males, sport was the most common specified setting for hospitalised fractures from mid-childhood to early adult years (over 45% for 10-19 years and over 25% for 10-34 years). Working for income was the most common specified activity for males injured in middle age (over 20% of specified cases from 30-64 years).



**Figure 2.11: Fracture hospitalisations by Activity for males by age at admission; Australia 2001-02**



**Figure 2.12: Fracture hospitalisations by Activity for females by age at admission; Australia 2001-02**



A type of sport was specified for 72% of the 11,328 fracture separations by males recorded as occurring *While engaged in sports*, and for 43% of the 2,573 equivalent separations by females. These are summarised in Table 2.4. The common types of football account for the largest proportions of male cases. Case numbers are much lower for females than males except for netball. Note that these counts do not indicate relative hazardousness of the activities because they do not take account of differences in exposure (numbers of participants, duration of participation per person etc.).

**Table 2.4: Fracture hospitalisations for which Activity was recorded as 'While engaged in sport' by sex; Australia 2001–02**

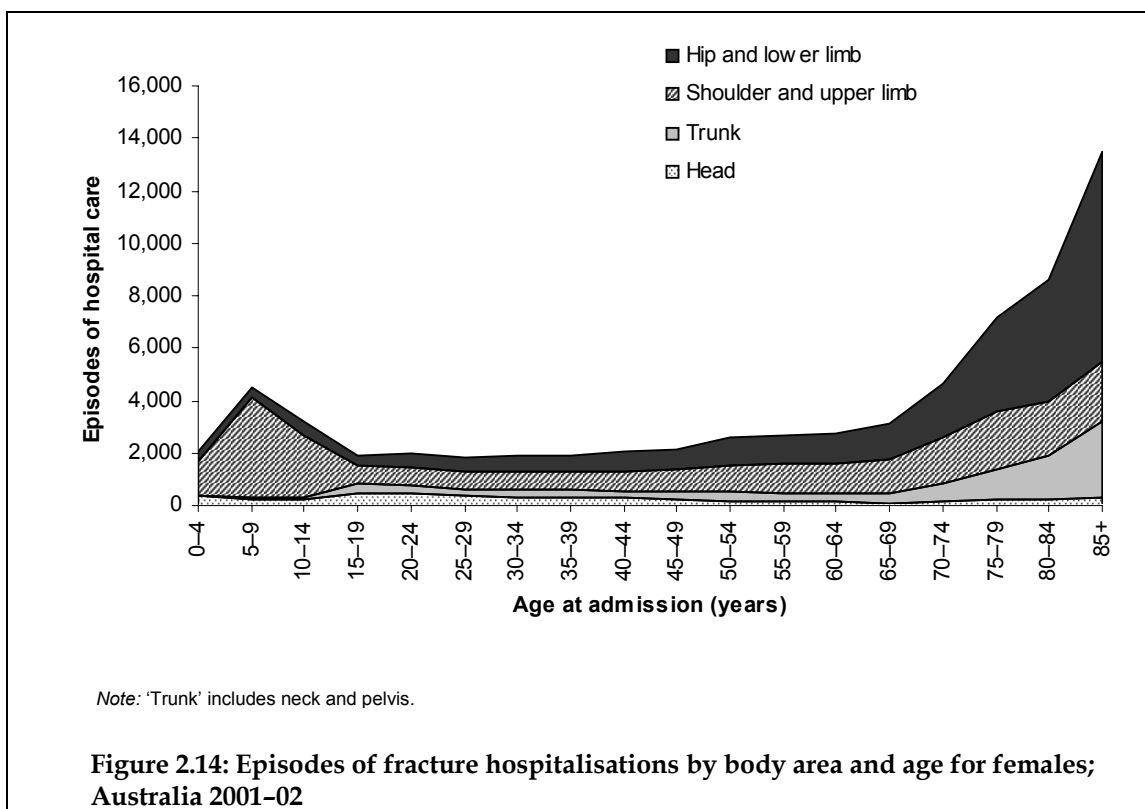
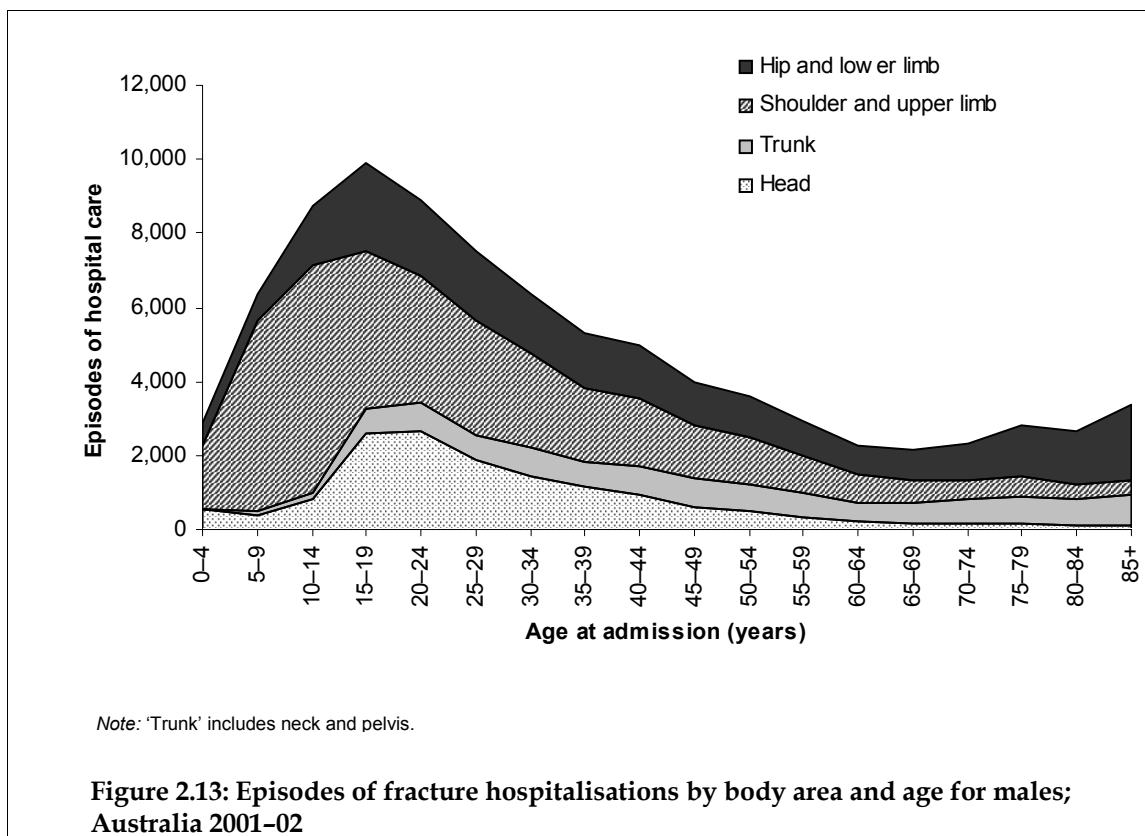
Activity	Males		Females	
	Separations	%	Separations	%
Football, Rugby	2,302	20%	86	3%
Football, Australian	2,306	20%	64	2%
Football, Soccer	1,575	14%	158	6%
Hockey	126	1%	53	2%
Squash	9	0%	12	0%
Basketball	479	4%	155	6%
Netball	35	0%	318	12%
Cricket	463	4%	15	1%
Roller-blading, roller skating & skateboarding	810	7%	251	10%
Other and unspecified sporting activity	3,223	28%	1,461	57%
<b>Total</b>	<b>11,328</b>	<b>100%</b>	<b>2,573</b>	<b>100%</b>

## Body part injured

The bodily location of fractures can be described specifically (i.e. the bone or part of bone affected) or more broadly. A broad categorisation of bodily locations has been used in this section to provide an overview of patterns of this type of trauma.

Figures 2.13 (for men) and 2.14 (for women) show the numbers of hospitalisations where the Principal Diagnosis was a fracture of a bone in one of four body areas.

These figures highlight the markedly different patterns of fractures for men and women in Australia, except in childhood. Most males who were admitted due to a fracture in 2001–02 were teenagers and young adults, most often with upper limb injuries (Figure 2.13). Most women admitted due to a fracture were aged 60 or older, most commonly with fractures of the hip and lower limb (Figure 2.14).



## Common case types

A fall (54% of episodes) or a transport accident (19%) were the most common types of event resulting in a hospitalised fracture.

Four types of cases accounted for over half of all episodes in which a fracture was recorded, and over 65% of bed-days in 2001–02 (Table 2.5).

**Table 2.5 Four common cases of hospitalised fractures; Australia 2001–02**

Type of case	Proportion of %	
	Episodes	Bed-days
Lower limb fracture due to a fall by a person aged 65+ years	15%	30%
Upper limb or trunk fracture due to a fall by a person aged 65+ years	12%	18%
Upper limb fracture due to a fall by a person aged 0–19 years	10%	2%
Any fracture due to a transport accident at ages 5–54 years	16%	15%
<b>Total for four types of cases</b>	<b>52%</b>	<b>65%</b>

*Note:* Episodes total is less than the sum of case type proportions due to rounding.

### 3 Conclusions

Fractures are the most common of all forms of hospitalised trauma, accounting for 36% of all injury hospitalisations in Australia in 2001–02.

Fractures by older persons, particularly lower limb fractures attributed to falls, are common and account for a large number of bed-days. The number of cases of this type is likely to increase substantially due to projected increases in the size of this segment of the Australian population.

Other events, notably transport accidents, are common causes of hospitalised fractures for young and middle aged adults.

Two of the four current priority topics for injury prevention under the National Injury Prevention Plan refer to events for which fractures are the main type of trauma: falls by older persons and falls by children (Commonwealth Department of Health and Aged Care 2001). Prevention programs are being developed and implemented, particularly for falls by older persons (Commonwealth Department of Health and Aged Care 2000, NSW Health 2001).

# 4 Data issues

## Data source

The data on hospital separations were provided by the Australian Institute of Health and Welfare (AIHW 2003).

Population data were obtained from the Australian Institute of Health and Welfare and are similar to data presented in the Demographic Statistics Catalogue No. 3101.0 (Australian Bureau of Statistics). Rates were calculated using final population estimates as at 31 December 2001.

Less than 1% of injury and poisoning separations are thought to be missing from the data reported, representing minimal risk of sampling error.

## Selection criteria

The selection criteria are stated in Chapter 1.

## Hospitalised cases versus other cases

Not all injuries result in hospital admission. It has been estimated that one admission occurs for every seven injury cases presenting to emergency departments, and that at least as many injury cases again consult a GP rather than present to a hospital (Harrison and Steenkamp 2002). In addition, an unknown number of injuries occur that resolve without medical treatment. Similarly, severe injury cases resulting rapidly in death go unrecorded in terms of hospital separations, but are captured as mortality data.

## Errors, inconsistencies and uncertainties

This report uses data collected from state and territory hospitals. After coding and collection from the states and territories, the data are further processed by the AIHW and NISU. The geographical spread of the data and the large number of people involved in its processing increases the risk of inconsistencies across time and place in the data. Variations in reporting and coding continue to exist across jurisdictions, although National Minimum Data Sets have been in place for some considerable amount of time.

Incidence is not equivalent to number of hospital separations. Methods to extract actual cases of incidence produce estimates only.

In the data file of hospital separations in 2001–02 available to NISU, some records in which more than one external cause code was reported had been processed in a way that altered the order of the external cause codes. The consequences are generally small

(about 1% of all Injury & Poisoning cases at national level are affected), but are larger for certain subsets. The main effect is to increase the proportion of records reported as “Complications of Medical and Surgical Care”.

## **Calculation of rates**

For relevant comparisons across ages and years, rates have been adjusted by direct standardisation to correct proportional differences in age, using the Australian population in 2001 as the standard. Age is presented in five-year bands up to 80 to 84 years, and a group for ages 85 years and older.

## **ICD-10-AM**

This Report is based on data coded according to the second edition of the Australian clinical modification of ICD-10, ICD-10-AM (NCCH 2000).

# 5 Appendices

**Table A5.1: ICD-10-AM codes representing ‘fractures’**

<b>Code</b>	<b>Description</b>
S02	Fracture of skull and facial bones
S12	Fracture of neck
S22	Fracture of rib(s), sternum and thoracic spine
S32	Fracture of lumbar spine and pelvis
S42	Fracture of shoulder and upper arm
S52	Fracture of forearm
S62	Fracture at wrist and hand level
S72	Fracture of femur
S82	Fracture of lower leg, including ankle
S92	Fracture of foot, except ankle
T02	Fractures involving multiple body regions
T08	Fractures of spine, level unspecified
T10	Fracture of upper limb, level unspecified
T12	Fracture of lower limb, level unspecified
T14.2	Fracture of unspecified body region

**Table A5.2: Counts, age-specific rates and male to female ratio for hospitalised fractures by five-year age groups for males and females; Australia 2001–02**

Age group (years)	Males		Females		Rate ratio
	Case counts	Age-specific rate	Case counts	Age-specific rate	
0–4	2,878	439.37	2,075	333.11	1.32
5–9	6,348	916.56	4,507	686.56	1.34
10–14	8,771	1,259.46	3,197	481.83	2.61
15–19	9,943	1,435.22	1,936	292.19	4.91
20–24	8,962	1,342.45	1,959	302.81	4.43
25–29	7,560	1,086.62	1,872	268.17	4.05
30–34	6,407	870.49	1,951	260.52	3.34
35–39	5,329	722.20	1,917	256.72	2.81
40–44	4,992	671.62	2,062	273.95	2.45
45–49	4,014	590.43	2,160	313.71	1.88
50–54	3,616	554.60	2,607	401.45	1.38
55–59	2,959	556.58	2,705	524.39	1.06
60–64	2,296	545.75	2,791	674.01	0.81
65–69	2,162	635.76	3,113	886.88	0.72
70–74	2,333	768.29	4,712	1,412.52	0.54
75–79	2,867	1,245.83	7,158	2,442.45	0.51
80–84	2,684	2,024.88	8,681	4,207.54	0.48
85+	3,382	4,025.18	13,540	7,252.39	0.56
<b>Total *</b>	<b>87,504†</b>	<b>922.79</b>	<b>68,944†</b>	<b>642.03</b>	<b>1.44</b>

\* Total population rates are age-standardised.

† Age was missing from 2 cases.



**Table A5.3: Male case counts and rates for fracture hospitalisations by external cause and age at admission; Australia 2001–02**

External cause	Age at admission (years)													Total *					
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64		65–69	70–74	75–79	80–84	85+
<b>Case counts</b>																			
Falls (W00–W19)	1,934	4,340	4,359	2,111	1,502	1,359	1,236	1,198	1,314	1,246	1,338	1,308	1,159	1,301	1,592	2,189	2,228	2,978	34,692
Transport (V01–V99)	293	994	2,058	3,061	2,818	2,282	1,954	1,598	1,562	1,139	934	684	425	390	334	296	219	157	21,198
Objects, machines (W20–W31)	266	359	538	899	1,004	1,011	912	808	758	637	591	456	342	227	170	123	42	24	9,167
Assault (X85–Y09)	38	13	129	1,190	1,445	1,100	900	747	551	369	248	132	70	29	22	13	6	7	7,009
Person or people (W50–W52)	41	143	442	596	503	424	240	122	84	45	20	10	4		2	3	1	5	2,685
Other (rest of V01–W98)	306	499	1,245	2,086	1,690	1,384	1,165	856	723	578	485	369	296	215	213	243	188	211	12,753
<b>All</b>	<b>2,878</b>	<b>6,348</b>	<b>8,771</b>	<b>9,943</b>	<b>8,962</b>	<b>7,560</b>	<b>6,407</b>	<b>5,329</b>	<b>4,992</b>	<b>4,014</b>	<b>3,616</b>	<b>2,959</b>	<b>2,296</b>	<b>2,162</b>	<b>2,333</b>	<b>2,867</b>	<b>2,684</b>	<b>3,382</b>	<b>87,504</b>
<b>Age-specific rates</b>																			
Falls (W00–W19)	295.3	626.6	625.9	304.7	225.0	195.3	167.9	162.4	176.8	183.3	205.2	246.0	275.5	382.6	524.3	951.2	1,680.9	3,544.4	380.1
Transport (V01–V99)	44.7	143.5	295.5	441.8	422.1	328.0	265.5	216.6	210.1	167.5	143.3	128.7	101.0	114.7	110.0	128.6	165.2	186.9	217.9
Objects, machines (W20–W31)	40.6	51.8	77.3	129.8	150.4	145.3	123.9	109.5	102.0	93.7	90.6	85.8	81.3	66.8	56.0	53.4	31.7	28.6	94.0
Assault (X85–Y09)	5.8	1.9	18.5	171.8	216.5	158.1	122.3	101.2	74.1	54.3	38.0	24.8	16.6	8.5	7.2	5.6	4.5	8.3	71.6
Person or people (W50–W52)	6.3	20.6	63.5	86.0	75.3	60.9	32.6	16.5	11.3	6.6	3.1	1.9	1.0	0.0	0.7	1.3	0.8	6.0	27.3
Other (rest of V01–W98)	46.7	72.0	178.8	301.1	253.2	198.9	158.3	116.0	97.3	85.0	74.4	69.4	70.4	63.2	70.1	105.6	141.8	251.1	132.0
<b>All</b>	<b>439.4</b>	<b>916.6</b>	<b>1,259.5</b>	<b>1,435.2</b>	<b>1,342.4</b>	<b>1,086.6</b>	<b>870.5</b>	<b>722.2</b>	<b>671.6</b>	<b>590.4</b>	<b>554.6</b>	<b>556.6</b>	<b>545.7</b>	<b>635.8</b>	<b>768.3</b>	<b>1,245.8</b>	<b>2,024.9</b>	<b>4,025.2</b>	<b>922.8</b>

\* Total population rates are age-standardised.

**Table A5.4: Female case counts and rates for fracture hospitalisations by external cause and age at admission; Australia 2001–02**

External cause	Age at admission (years)														Total *				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69		70–74	75–79	80–84	85+
<b>Case counts</b>																			
Falls (W00–W19)	1,420	3,339	1,692	394	500	554	665	701	912	1,157	1,588	1,868	2,028	2,445	3,837	6,134	7,688	12,330	49,252
Transport (V01–V99)	147	593	750	870	771	617	574	507	511	451	427	380	315	254	347	353	273	195	8,335
Objects, machines (W20–W31)	236	205	177	134	130	140	126	127	116	100	109	73	86	44	48	63	62	50	2,026
Assault (X85–Y09)	25	5	15	129	192	219	260	194	141	96	50	26	22	12	9	9	12	10	1,426
Person or people (W50–W52)	27	48	72	54	38	30	27	23	12	9	8	3	6	3	6	7	8	14	395
Other (rest of V01–W98)	220	317	491	355	328	312	299	365	370	347	425	355	334	355	465	592	638	941	7,510
<b>All</b>	<b>2,075</b>	<b>4,507</b>	<b>3,197</b>	<b>1,936</b>	<b>1,959</b>	<b>1,872</b>	<b>1,951</b>	<b>1,917</b>	<b>2,062</b>	<b>2,160</b>	<b>2,607</b>	<b>2,705</b>	<b>2,791</b>	<b>3,113</b>	<b>4,712</b>	<b>7,158</b>	<b>8,681</b>	<b>13,540</b>	<b>68,944</b>
<b>Age-specific rates</b>																			
Falls (W00–W19)	228.0	508.6	255.0	59.5	77.3	79.4	88.8	93.9	121.2	168.0	244.5	362.1	489.7	696.6	1,150.2	2,093.0	3,726.3	6,604.3	446.1
Transport (V01–V99)	23.6	90.3	113.0	131.3	119.2	88.4	76.6	67.9	67.9	65.5	65.8	73.7	76.1	72.4	104.0	120.5	132.3	104.4	84.4
Objects, machines (W20–W31)	37.9	31.2	26.7	20.2	20.1	20.1	16.8	17.0	15.4	14.5	16.8	14.2	20.8	12.5	14.4	21.5	30.1	26.8	20.6
Assault (X85–Y09)	4.0	0.8	2.3	19.5	29.7	31.4	34.7	26.0	18.7	13.9	7.7	5.0	5.3	3.4	2.7	3.1	5.8	5.4	14.6
Person or people (W50–W52)	4.3	7.3	10.9	8.1	5.9	4.3	3.6	3.1	1.6	1.3	1.2	0.6	1.4	0.9	1.8	2.4	3.9	7.5	4.0
Other (rest of V01–W98)	35.3	48.3	74.0	53.6	50.7	44.7	39.9	48.9	49.2	50.4	65.4	68.8	80.7	101.1	139.4	202.0	309.2	504.0	72.3
<b>All</b>	<b>333.1</b>	<b>686.6</b>	<b>481.8</b>	<b>292.2</b>	<b>302.8</b>	<b>268.2</b>	<b>260.5</b>	<b>256.7</b>	<b>274.0</b>	<b>313.7</b>	<b>401.5</b>	<b>524.4</b>	<b>674.0</b>	<b>886.9</b>	<b>1,412.5</b>	<b>2,442.5</b>	<b>4,207.5</b>	<b>7,252.4</b>	<b>642.0</b>

\* Total population rates are age-standardised.

**Table A5.5: Person case counts and rates for fracture hospitalisations by external cause and age at admission; Australia 2001–02**

External cause	Age at admission (years)														Total *				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69		70–74	75–79	80–84	85+
<b>Case counts</b>																			
Falls (W00–W19)	3,354	7,679	6,051	2,505	2,002	1,913	1,901	1,899	2,226	2,403	2,926	3,176	3,187	3,746	5,429	8,323	9,916	15,308	83,944
Transport (V01–V99)	440	1,587	2,808	3,931	3,589	2,899	2,528	2,105	2,073	1,590	1,361	1,064	740	644	681	649	492	352	29,533
Objects, machines (W20–W31)	502	564	715	1,033	1,134	1,151	1,038	935	874	737	700	529	428	271	218	186	104	74	11,193
Assault (X85–Y09)	63	18	144	1,319	1,637	1,319	1,160	941	692	465	298	158	92	41	31	22	18	17	8,435
Person or people (W50–W52)	68	191	514	650	541	454	267	145	96	54	28	13	10	3	8	10	9	19	3,080
Other (rest of V01–W98)	526	816	1,736	2,441	2,018	1,696	1,464	1,221	1,093	925	910	724	630	570	678	835	826	1,152	20,263
<b>All</b>	<b>4,953</b>	<b>10,855</b>	<b>11,968</b>	<b>11,879</b>	<b>10,921</b>	<b>9,432</b>	<b>8,358</b>	<b>7,246</b>	<b>7,054</b>	<b>6,174</b>	<b>6,223</b>	<b>5,664</b>	<b>5,087</b>	<b>5,275</b>	<b>7,045</b>	<b>10,025</b>	<b>11,365</b>	<b>16,922</b>	<b>156,448</b>
<b>Age-specific rates</b>																			
Falls (W00–W19)	262.5	569.2	445.0	184.8	152.3	137.3	128.0	127.9	148.8	175.6	224.8	303.2	381.8	542.1	851.9	1,590.8	2,926.2	5,654.6	427.8
Transport (V01–V99)	34.4	117.6	206.5	290.0	273.0	208.0	170.2	141.8	138.6	116.2	104.6	101.6	88.6	93.2	106.9	124.0	145.2	130.0	151.3
Objects, machines (W20–W31)	39.3	41.8	52.6	76.2	86.3	82.6	69.9	63.0	58.4	53.9	53.8	50.5	51.3	39.2	34.2	35.6	30.7	27.3	57.3
Assault (X85–Y09)	4.9	1.3	10.6	97.3	124.5	94.6	78.1	63.4	46.3	34.0	22.9	15.1	11.0	5.9	4.9	4.2	5.3	6.3	43.3
Person or people (W50–W52)	5.3	14.2	37.8	48.0	41.2	32.6	18.0	9.8	6.4	3.9	2.2	1.2	1.2	0.4	1.3	1.9	2.7	7.0	15.8
Other (rest of V01–W98)	41.2	60.5	127.7	180.1	153.5	121.7	98.6	82.2	73.1	67.6	69.9	69.1	75.5	82.5	106.4	159.6	243.8	425.5	103.7
<b>All</b>	<b>387.6</b>	<b>804.6</b>	<b>880.0</b>	<b>876.4</b>	<b>830.8</b>	<b>676.7</b>	<b>562.9</b>	<b>488.1</b>	<b>471.5</b>	<b>451.2</b>	<b>478.2</b>	<b>540.7</b>	<b>609.4</b>	<b>763.3</b>	<b>1,105.5</b>	<b>1,916.1</b>	<b>3,353.8</b>	<b>6,250.8</b>	<b>799.2</b>

\* Total population rates are age-standardised.

**Table A5.6: Male case counts for fracture hospitalisations by Place of Occurrence and age at admission; Australia 2001–02**

Place of occurrence	Age at admission (years)														Total				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69		70–74	75–79	80–84	85+
Home	1,192	1,113	591	384	358	390	467	471	589	598	601	613	633	754	926	1,253	1,201	1,479	13,613
Residential institution	10	12	10	25	52	56	55	38	25	16	13	18	18	37	90	154	226	498	1,353
School	138	924	933	229	12	4	7	3	11	6	7	5	4	1	0	2	1	2	2,289
Health Service Area	14	16	23	43	37	40	46	42	40	41	43	35	62	56	115	244	286	488	1,671
Sports and athletics area	49	460	1,700	1,858	1,368	1,127	698	419	263	137	93	50	27	32	23	18	18	7	8,347
Street and highway	99	296	573	1,703	1,831	1,487	1,310	1,077	1,058	812	636	490	336	336	316	321	255	221	13,157
Trade and service area	47	43	41	178	337	280	230	197	165	131	130	102	62	48	81	73	64	60	2,269
Industrial and construction area	9	7	11	149	231	322	312	286	319	282	264	170	81	26	15	6	2	4	2,496
Farm	14	40	81	143	153	95	105	102	109	120	113	95	91	65	49	40	22	9	1,446
Other specified place	169	433	643	775	745	637	543	476	431	304	248	202	144	106	102	101	71	87	6,217
<b>All specified</b>	<b>1,741</b>	<b>3,344</b>	<b>4,606</b>	<b>5,487</b>	<b>5,124</b>	<b>4,438</b>	<b>3,773</b>	<b>3,111</b>	<b>3,010</b>	<b>2,447</b>	<b>2,148</b>	<b>1,780</b>	<b>1,458</b>	<b>1,461</b>	<b>1,717</b>	<b>2,212</b>	<b>2,146</b>	<b>2,855</b>	<b>52,858</b>
Unspecified place of occurrence	1,135	2,998	4,161	4,443	3,826	3,099	2,610	2,205	1,962	1,559	1,451	1,164	834	692	610	641	530	508	34,429†
Place not reported/not applicable	2	6	4	13	12	23	24	13	20	8	17	15	4	9	6	14	8	19	217
<b>All</b>	<b>2,878</b>	<b>6,348</b>	<b>8,771</b>	<b>9,943</b>	<b>8,962</b>	<b>7,560</b>	<b>6,407</b>	<b>5,329</b>	<b>4,992</b>	<b>4,014</b>	<b>3,616</b>	<b>2,959</b>	<b>2,296</b>	<b>2,162</b>	<b>2,333</b>	<b>2,867</b>	<b>2,684</b>	<b>3,382</b>	<b>87,504†</b>

† Age was missing from 1 case.

**Table A5.7: Female case counts for fracture hospitalisations by Place of Occurrence and age at admission; Australia 2001–02**

Place of occurrence	Age at admission (years)														Total				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69		70–74	75–79	80–84	85+
Home	835	781	294	109	165	251	300	355	440	520	683	865	931	1,237	2,077	3,431	4,180	5,880	23,335†
Residential institution	5	8	7	4	3	3	5	4	10	11	22	11	25	43	143	440	927	2,605	4,276
School	91	753	332	39	3	3	11	7	8	12	18	15	6	1	3	2	3	2	1,309
Health Service Area	9	14	7	8	8	13	22	21	21	36	37	41	69	99	230	467	878	2,055	4,035
Sports and athletics area	40	233	437	167	146	115	117	105	102	58	35	43	55	43	45	37	19	21	1,818
Street and highway	75	185	220	635	605	448	426	382	398	394	389	384	407	383	519	645	572	425	7,492
Trade and service area	36	36	15	29	55	40	56	45	51	63	98	110	114	120	190	288	231	253	1,830
Industrial and construction area	0	3	2	7	13	23	14	8	30	27	17	22	13	10	9	3	8	13	222
Farm	5	21	30	32	37	29	25	30	31	25	40	22	22	16	13	7	7	7	399
Other specified place	102	278	241	148	149	142	136	150	118	159	212	191	201	161	172	228	220	281	3,289
<b>All specified</b>	<b>1,198</b>	<b>2,312</b>	<b>1,585</b>	<b>1,178</b>	<b>1,184</b>	<b>1,067</b>	<b>1,112</b>	<b>1,107</b>	<b>1,209</b>	<b>1,305</b>	<b>1,551</b>	<b>1,704</b>	<b>1,843</b>	<b>2,113</b>	<b>3,401</b>	<b>5,548</b>	<b>7,045</b>	<b>11,542</b>	<b>48,005</b>
Unspecified place of occurrence	876	2,195	1,610	746	760	788	820	792	842	847	1,056	996	939	993	1,303	1,591	1,624	1,979	20,757
Place not reported/not applicable	1	0	2	12	15	17	19	18	11	8	0	5	9	7	8	19	12	19	182
<b>All</b>	<b>2,075</b>	<b>4,507</b>	<b>3,197</b>	<b>1,936</b>	<b>1,959</b>	<b>1,872</b>	<b>1,951</b>	<b>1,917</b>	<b>2,062</b>	<b>2,160</b>	<b>2,607</b>	<b>2,705</b>	<b>2,791</b>	<b>3,113</b>	<b>4,712</b>	<b>7,158</b>	<b>8,681</b>	<b>13,540</b>	<b>68,944†</b>

† Age was missing from 1 case.

**Table A5.8: Male case counts for fracture hospitalisations by Activity and age at admission; Australia 2000-01**

External cause	Age at admission (years)														Total				
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69		70-74	75-79	80-84	85+
While engaged in sports	36	662	2,728	2,452	1,711	1,394	892	523	355	210	136	78	38	39	25	20	17	12	11,328
While engaged in leisure	358	1,136	1,057	742	579	457	348	280	212	178	145	94	72	75	65	67	47	32	5,944
While working for income	1	2	4	344	614	768	784	778	815	728	656	476	269	101	49	31	10	2	6,432
While engaged in other types of work	11	74	88	87	73	82	132	185	225	221	255	221	254	269	220	211	146	138	2,892
While resting, sleeping, eating, etc.	107	60	34	28	39	32	45	53	43	45	72	70	70	100	188	298	291	503	2,078
Other specified activity	886	1,983	1,807	1,743	1,705	1,341	1,170	969	934	737	605	502	398	391	454	496	449	598	17,168
<b>All specified</b>	<b>1,399</b>	<b>3,917</b>	<b>5,718</b>	<b>5,396</b>	<b>4,721</b>	<b>4,074</b>	<b>3,371</b>	<b>2,788</b>	<b>2,584</b>	<b>2,119</b>	<b>1,869</b>	<b>1,441</b>	<b>1,101</b>	<b>975</b>	<b>1,001</b>	<b>1,123</b>	<b>960</b>	<b>1,285</b>	<b>45,842</b>
Unspecified activity	1,475	2,419	3,042	4,519	4,206	3,452	2,994	2,514	2,377	1,874	1,720	1,495	1,183	1,166	1,308	1,713	1,706	2,069	41,233 <sup>†</sup>
<b>All</b>	<b>2,874</b>	<b>6,336</b>	<b>8,760</b>	<b>9,915</b>	<b>8,927</b>	<b>7,526</b>	<b>6,365</b>	<b>5,302</b>	<b>4,961</b>	<b>3,993</b>	<b>3,589</b>	<b>2,936</b>	<b>2,284</b>	<b>2,141</b>	<b>2,309</b>	<b>2,836</b>	<b>2,666</b>	<b>3,354</b>	<b>87,075<sup>†</sup></b>

<sup>†</sup> Age was missing from 1 case.

**Table A5.9: Female case counts for fracture hospitalisations by Activity and age at admission; Australia 2000–01**

External cause	Age at admission (years)														Total				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69		70–74	75–79	80–84	85+
While engaged in sports	22	330	684	247	212	157	182	158	135	91	69	70	59	42	45	42	19	9	2,573
While engaged in leisure	262	861	440	116	127	119	120	126	123	120	152	130	120	120	135	166	134	138	3,509
While working for income	0	0	1	43	95	89	73	76	112	114	123	100	54	18	11	2	2	7	920
While engaged in other types of work	3	45	40	18	19	26	30	54	71	89	130	154	168	197	266	373	406	429	2,518
While resting, sleeping, eating, etc.	83	53	29	14	27	29	34	33	41	48	99	108	144	219	403	790	1,165	2,210	5,529
Other specified activity	581	1,531	739	453	450	413	444	389	386	448	486	495	514	560	880	1,245	1,413	2,129	13,557†
<b>All specified</b>	<b>951</b>	<b>2,820</b>	<b>1,933</b>	<b>891</b>	<b>930</b>	<b>833</b>	<b>883</b>	<b>836</b>	<b>868</b>	<b>910</b>	<b>1,059</b>	<b>1,057</b>	<b>1,059</b>	<b>1,156</b>	<b>1,740</b>	<b>2,618</b>	<b>3,139</b>	<b>4,922</b>	<b>28,606</b>
Unspecified activity	1,121	1,681	1,255	1,027	1,012	1,018	1,044	1,054	1,179	1,232	1,541	1,638	1,713	1,934	2,949	4,491	5,493	8,559	39,941
<b>All</b>	<b>2,072</b>	<b>4,501</b>	<b>3,188</b>	<b>1,918</b>	<b>1,942</b>	<b>1,851</b>	<b>1,927</b>	<b>1,890</b>	<b>2,047</b>	<b>2,142</b>	<b>2,600</b>	<b>2,695</b>	<b>2,772</b>	<b>3,090</b>	<b>4,689</b>	<b>7,109</b>	<b>8,632</b>	<b>13,481</b>	<b>68,547†</b>

† Age was missing from 1 case.

**Table A5.10: Bed days for fracture hospitalisations by sex and age at admission; Australia 2000–01**

Body region injured	Age at admission (years)														Total <sup>(a)</sup>				
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69		70–74	75–79	80–84	85+
<b>Males</b>																			
Head	1,444	1,123	2,285	6,932	8,081	5,368	4,649	4,345	4,653	3,100	2,496	2,177	1,486	1,258	1,560	1,317	1,235	961	54,471
Trunk (neck, thorax, abdomen to pelvis)	84	409	724	6,042	7,686	5,980	7,102	5,719	4,970	5,889	5,709	5,699	4,401	5,071	6,927	7,518	8,619	10,266	98,815
Shoulder and upper limb	2,102	6,274	7,512	6,456	5,698	5,315	4,588	4,026	3,731	3,055	2,895	2,695	1,957	2,209	2,214	3,399	3,038	3,795	70,959
Hip and lower limb	3,878	4,079	6,078	9,374	8,731	8,192	7,680	7,340	8,100	7,101	7,161	6,359	6,009	6,774	9,674	17,946	18,261	25,442	168,179
Other	75	23	42	219	374	199	295	541	405	191	193	58	309	342	202	603	168	326	4,565
<b>Total</b>	<b>7,583</b>	<b>11,908</b>	<b>16,641</b>	<b>29,023</b>	<b>30,570</b>	<b>25,054</b>	<b>24,314</b>	<b>21,971</b>	<b>21,859</b>	<b>19,336</b>	<b>18,454</b>	<b>16,988</b>	<b>14,162</b>	<b>15,654</b>	<b>20,577</b>	<b>30,783</b>	<b>31,321</b>	<b>40,790</b>	<b>396,989</b>
<b>Females</b>																			
Head	778	689	557	2,189	1,796	1,497	1,265	1,324	860	869	569	833	485	559	1,187	1,687	1,145	2,345	20,634
Trunk (neck, thorax, abdomen to pelvis)	64	298	706	3,474	2,031	2,029	1,930	2,232	2,157	2,081	2,405	2,419	3,039	3,120	6,757	13,348	20,905	38,310	107,316
Shoulder and upper limb	1,698	4,611	2,734	1,228	1,429	1,320	1,448	1,294	1,608	1,985	2,077	2,871	2,863	3,706	6,665	11,385	13,458	19,986	82,366
Hip and lower limb	1,938	1,953	1,958	1,419	2,146	2,487	2,776	3,095	3,615	3,965	6,117	6,931	8,262	11,684	21,405	40,039	55,461	101,091	276,342
Other injuries	11	18	14	79	103	52	78	56	54	48	31	93	300	370	546	853	772	1,332	4,810
<b>Total</b>	<b>4,489</b>	<b>7,569</b>	<b>5,969</b>	<b>8,389</b>	<b>7,505</b>	<b>7,385</b>	<b>7,497</b>	<b>8,001</b>	<b>8,294</b>	<b>8,948</b>	<b>11,199</b>	<b>13,147</b>	<b>14,949</b>	<b>19,439</b>	<b>36,560</b>	<b>67,312</b>	<b>91,741</b>	<b>163,064</b>	<b>491,468</b>

(a) Includes two cases where age was not stated. Excludes one case where sex was not stated.

(b) Includes neck, thorax, abdomen, lower back, lumbar spine and pelvis.

(c) Injuries not specified by body region.



## 6 References

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# INJURY RESEARCH & STATISTICS

Fractures are the most common type of injury that results in admission to a hospital in Australia. This report describes injury cases hospitalised in Australia during the financial year 2001–02 that involved fractures.

The report provides an overview of hospitalised fractures in terms of case numbers and rates, demographic characteristics of patients, circumstances of occurrence and types of case.

This report will be useful for injury prevention and control initiatives, as well as forming a basis for more specific investigations.