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# Trends in hospitalisations due to falls by older people, Australia

2002–03 to 2012–13

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**Australian Government**  
**Australian Institute of  
Health and Welfare**

Injury Research and Statistics Series  
Number 106

# **Trends in hospitalisations due to falls by older people, Australia**

**2002–03 to 2012–13**

Australian Institute of Health and Welfare  
Canberra

Cat. no. INJCAT 182

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ISSN 2205-510X (PDF)

ISSN 1444-3791 (Print)

ISBN 978-1-76054-202-3 (PDF)

ISBN 978-1-76054-203-0 (Print)

### **Suggested citation**

AIHW: Kreisfeld R, Pointer S, and Bradley C 2017. Trends in hospitalisations due to falls by older people, Australia 2002–03 to 2012–13. Injury research and statistics series no. 106. Cat. no. INJCAT 182. Canberra: AIHW.

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Published by the Australian Institute of Health and Welfare

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**Please note that there is the potential for minor revisions of data in this report.  
Please check the online version at <[www.aihw.gov.au](http://www.aihw.gov.au)> for any amendments.**

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# Acknowledgments

The Australian Institute of Health and Welfare (AIHW) acknowledges the financial and project support for this publication provided by the Department of Health. This report was produced by the AIHW National Injury Surveillance Unit (NISU) at Flinders University with assistance from James Harrison and Stacey Avefua.

Members of the AIHW National Injury Surveillance Unit Advisory Committee provided valuable comments.

The team at NISU would like to thank AIHW staff from the Hospitals, Resourcing and Classifications Group for peer reviewing the manuscript.

# Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ARIA	Accessibility/Remoteness Index of Australia
ASGS	Australian Statistical Geography Standard
CI	confidence interval
ERP	estimated resident population
ICD-10-AM	International Statistical Classification of Diseases, 10th revision, Australian Modification
ICISS	International Statistical Classification of Diseases-based Injury Severity Score
LOS	length of stay
METeOR	Metadata Online Registry
MLOS	mean length of stay
NCCH	National Centre for Classification in Health
NHMD	National Hospital Morbidity Database
NISU	National Injury Surveillance Unit
NMDS	National minimum data sets
NPHP	National Public Health Partnership
RACF	residential aged care
SLA	statistical local area

# Symbols

..	not applicable
n.e.c.	not elsewhere classified
$p$	probability
-	not calculated

# Summary

This report focuses on trends in hospitalised (serious) fall injury for people aged 65 and older that occurred over the period 2002–03 to 2012–13. Information is also presented on the incidence of hospitalised fall injury in the financial year 2012–13 and the hospital care provided.

## Fall injury cases

The estimated number of serious injuries due to falls in people aged 65 and older in 2012–13 was 98,704. Females accounted for most of these fall injury cases, and rates of cases were higher for females than for males for all age groups.

Age-standardised rates of hospitalised fall injury cases increased over the 11 years to June 2013 (3% per year). There were more than 24,000 extra fall injury cases for people aged 65 and older in 2012–13 than there would have been if the rate of falls had remained stable since 2002–03.

The largest proportion (26%) of fall injury cases for people aged 65 and older in 2012–13 were *Injuries to the hip and thigh*. Fractures of the neck of the femur (also commonly called hip fractures) accounted for the majority of these injuries (74%). Injuries to the head were the second most common outcome of a fall (22%). There was a decrease in the rate of hip fractures due to falls (–2% per year) between 2002–03 and 2012–13. In contrast, falls resulting in head injuries increased at a particularly high rate (7% per year).

Increases in the rate of fall injury cases and fall-related head injury were most apparent for residents of *Major cities* (4% and 8% per year, respectively).

Around 72% of fall injury cases in 2012–13 were recorded as having occurred in either the home or a residential aged care facility. The age-standardised rate of falls in the home for older people living in the community was 1,655 per 100,000 population while the rate of falls for older people living in residential aged care was 9,037 per 100,000 population. These rates are likely to be underestimated because of missing information on the places in which falls occurred.

## Hospital care for fall injury

In addition to the initial hospitalisations for these fall injury cases, there were more than 120,000 other fall-related hospital separations (mainly for rehabilitation care) for people aged 65 and older in 2012–13. The length of stay in hospital as a result of an injurious fall takes into account time spent in hospital following transfers after the initial hospitalisation and for fall-related rehabilitation and related care.

In total, there were 1.4 million days of patient care over the year, with the average total length of stay per fall injury case estimated to be 14.0 days. Overall, one in every 10 days spent in hospital by a person aged 65 or older in 2012–13 was attributable to an injurious fall. The days of patient care attributable to fall-related injury rose from 0.8 million patient days in 2002–03 to 1.4 million patient days in 2012–13.



# 1 Introduction

The main topics addressed in this report are:

- an overview of hospitalised cases of injury due to falls by people aged 65 and older in 2012–13
- trends in hospitalised injury cases due to falls by people aged 65 and older over the period 2002–03 to 2012–13
- an overview of additional episodes of hospital care for cases involving falls by people aged 65 and older
- trends in additional episodes of hospital care cases involving falls by people aged 65 and older.

Older people who have been injured as a result of a fall often require long stays in hospitals, frequently involving more than one episode of admitted patient care. Analyses restricted to incident cases (the focus of the first part of this report) do not fully account for the extent of inpatient health service utilisation among this group. Multiple episodes of inpatient care for a single fall event also make it difficult to estimate the total duration of care, in terms of days of patient care, attributable to an injurious fall. Two types of additional inpatient episodes of care described in this report are described below. Taken together with information about incident cases, a more complete picture of the impact of an injurious fall on health service utilisation can be presented.

Fall injury inward transfer separations are not included in estimates of the number of older people who sustained a serious injury due to a fall because, as inward transfers from one acute hospital to another, they probably represented a second episode of admitted patient care following an initial episode of admitted patient care for a particular fall injury event. The inclusion of these records in case counts would be likely to lead to over-counting.

Hospitalisation for fall-related rehabilitation and related care reflect the fact that many fall injury cases require rehabilitation and related care. This aspect of hospital care is typically recorded in a different separation record from the acute care phase. Many are coded with a principal diagnosis from Chapter 21 of the ICD-10-AM (*Factors influencing health status and contact with health services*). We class separations having one of four specific Chapter 21 principal diagnoses as well as an injury additional diagnosis and a fall external cause as being hospital care related to an injurious fall (see Appendix A: Data issues).

## Structure of this report

**Chapter 2** presents an overview of fall injury cases by people aged 65 and older in Australia in 2012–13 and over the period 2002–03 to 2012–13. Information is also included on falls by Indigenous Australians aged 65 and older.

**Chapters 3 to 5** present information on the types of injuries, external causes and places of occurrence of fall injuries.

**Chapter 6** presents information of additional episodes of hospital care due to falls by older people including hospital care following transfers after initial fall injury episodes and fall-related rehabilitation and related care. Other types of fall-related separations that were included in previous editions of this report are presented in Appendix B: Other fall-related separations.

**Appendix A: Data issues** provides summary information on the hospital data source and includes notes on the presentation of data, the population estimates used to calculate population rates and methods of analysis. Relevant terms regarding the data used in this report are summarised in Box 1.2.

**Appendix B: Other fall-related separations** presents summary information regarding 'other fall-related' and 'tendency to fall' separations for both the single year 2012–13 and over the period 2002–03 to 2012–13.

**Appendix C: Supplementary tables** consists of data tables underpinning results presented in the chapters.

Chapters are structured to address a common set of questions concerning the source data for each chapter, with section titles that include:

- What is reported?—which describes the analyses presented in the chapter.
- What data were used?—which outlines chapter-specific inclusion criteria and rate calculation methods, with references to more detailed information in 'Appendix A: Data issues'.

Generally, summary tables and figures are placed immediately below the discussion in related text.

## Methods

The Australian Institute of Health and Welfare (AIHW) provided the national hospital separations data from the National Hospital Morbidity Database (NHMD). A hospital separation is defined as:

The process by which an episode of care for an admitted patient ceases.  
A separation may be formal or statistical. METeOR identifier: 327268.

The report examines all NHMD records for people aged 65 and older that included both an ICD-10-AM injury diagnosis in the range S00–T75 or T79 and an external cause code signifying an unintentional fall (W00–W19). These codes could appear anywhere within the record (that is, analysis was not restricted to records that had a principal diagnosis indicating that the injury was the chief reason for the episode of hospital care). However, our definition of fall injury cases is restricted to records where the principal diagnosis is an injury. Hence, patients who fell while in hospital and had an injury only reported as an additional diagnosis (rather than as the principal diagnosis) would not have been counted as cases.

This report also includes an analysis of NHMD records for people aged 65 and older that included the diagnosis code R29.6 *Tendency to fall, not elsewhere classified*.

Chapters 3 to 5 focus on cases of fall injury. Some injuries result in more than one episode in hospital and, accordingly, generate more than one NHMD record. As the NHMD does not include information that enables a set of records belonging to a particular injury case to be recognised as such, case numbers need to be estimated. The approach used for this report excludes from estimates of case numbers separations which meet our injury criteria but which have a *Mode of admission* of a transfer from another acute hospital. Inclusion of such separations would be likely to result in the multiple counting of some cases. This approach corrects for overestimation of cases that is due to transfers, but cannot correct for overestimation that is due to readmissions.

Changes in Victorian emergency department admission policy require caution to be used in interpreting variation in rates between 2011–12 and 2012–13 in the trend analyses contained in this report (see Box 1.1).

Rates are generally age-standardised because risk of fall injury varies greatly with age and the age distribution of the Australian population aged 65 and older changed during the study period.

For tables and charts in this report:

- the patient's age is as at the date of admission
- in tables by age group and sex, cases for which age and/or sex were not reported are included in totals
- charts depicting trends generally present both modelled rates (as lines) and age-standardised rates (as symbols).

### **Box 1.1: Changes to NHMD inclusions for 2012–13**

Between 2011–12 and 2012–13 emergency department admission policy was changed for Victorian hospitals. Episodes of care delivered entirely within a designated emergency department or urgent care centre could no longer be categorised as an admission regardless of the amount of time spent in the hospital. This has had the effect of reducing the number of admissions recorded in Victoria for the 2012–13 financial year. According to *Australian Hospital Statistics 2012–13* there was a decrease of about 140,000 admissions in emergency departments (AIHW 2014a).

For this report we have used the NHMD data as provided, with consequently fewer injury separations than expected, for most analyses. We have undertaken modelling to examine the impact of the change to Victorian policy by comparing trend data for all jurisdictions excluding Victoria. We have also provided estimates of the approximate number of injury cases that are thought to be missing from the NHMD in 2012–13 due to the Victorian policy change. Details of the modelling procedure can be found in 'Appendix A: Data issues'.

### **Box 1.2: Summary of terms and classifications relating to hospitalised injury**

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

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

The **principal diagnosis** is the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted patient care. An additional diagnosis is a condition or complaint that either coexists with the principal diagnosis or arises during the episode of admitted patient care. Additional diagnoses are reported if the conditions affect patient management.

(continued)

### **Box 1.2 (continued): Summary of terms and classifications relating to hospitalised injury**

In 2012–13, diagnoses and external causes of injury were recorded using the 7th edition of the *International statistical classification of diseases and related health problems, 10th revision, Australian modification* ICD-10-AM, (NCCH 2010). It comprises classifications of diseases and external causes of injuries and poisoning, based on the World Health Organization's version of ICD-10.

Data covering the period 2002 to 2013 were coded according to seven editions of the ICD-10-AM. Changes across the ICD-10-AM over the revisions have not affected the analysis overall. Where analyses have been limited to specific editions of the ICD-10-AM, due to changes to the coding, this has been noted within the text).

The ICD-10-AM classification is hierarchical, with 19 disease chapters divided into a large number of more specific disease groups (represented by 3-character codes). Chapter 19 provides codes for injury conditions, such as *Fracture of neck of femur*. *External causes of morbidity and mortality* comprise the 20th chapter of the ICD-10-AM and are used in conjunction with injury diagnoses to describe the mechanism of injury (for example, injury due to a transport crash or, as in this report, injury due to a fall) and the role of human intent (for example, unintentional injuries or intentional self-harm). Most of the 3-character categories in ICD-10-AM are divided into more specific categories represented by 4- and 5-character codes. In this publication, most diagnosis and external cause information is presented at the 3-character level.

### **Box 1.3: National injury prevention plans**

Injury prevention and control is a National Health Priority Area. Injury is also the subject of three national prevention plans: the National Injury Prevention and Safety Promotion Plan: 2004–2014 (NPHP 2005a), the National Aboriginal and Torres Strait Islander Safety Promotion Strategy (NPHP 2005b) and—of particular relevance to this report—the National Falls Prevention for Older People Plan: 2004 Onwards (NPHP 2005c).

The aim of the National Falls Prevention Plan is to work strategically and collectively to reduce the burden and impact of falls and fall-related injury among older people in 3 key settings: residential aged care, acute care and the community.

The goals of the plan include:

- generating a low-risk population and promoting independence
- improving outcomes through local partnerships
- creating safer environments and products
- enhancing the capacity of workers in the health and related sectors in the prevention of falls and fall-related injury in older people
- developing and managing knowledge through research, information dissemination, and training.

The plan also advocates that prevention of fall-related injury should be a responsibility for all who promote products, services or information to older people.

#### **Box 1.4: Indigenous status reporting for time series analyses**

In this report, the terms 'Indigenous' and 'non-Indigenous' were used to refer to persons identified as such in Australian hospital separations data and population data collections. Separations for which Indigenous status was 'not stated' have been excluded from analyses presented in this report.

From 2010–11 onwards, Indigenous status information within hospital separations data from all jurisdictions was of sufficient quality for statistical reporting purposes (AIHW 2013a). While Indigenous people are still under-identified within hospital records, an AIHW study found an estimated 88% of Indigenous patients were correctly identified in Australian public hospital admission records in 2011–12. Analyses of 2012–13 hospitals data in this paper therefore include data for all jurisdictions, except for time trend analyses, which present data for the 6 jurisdictions that the AIHW has assessed as having adequate identification of Indigenous hospitalisations between 2004–05 and up to 2010–11: New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only).

Indigenous people in these 6 jurisdictions comprise approximately 96% of the Indigenous population of Australia. For the latest information on the quality of Indigenous status in the NHMD and recommendations for future reporting practices see Indigenous identification in hospital separations data-quality report (AIHW 2013a).

Injury rates were age-standardised to 85+ by the direct method.

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

#### **Box 1.5: Calculation of aged care place-specific rates**

In 2012–13, about 6 in every 7 hospitalised fall injury cases involving people aged 65 and older and with a specified place of occurrence had happened either at home (over 4 in 7) or in an aged care facility (nearly 2 in 7). We have estimated the age-standardised rate of hospitalised fall-injury in residential aged care by using the hospitalised fall-injury cases reported to have occurred in aged care facilities with population estimates derived from the AIHW report series Residential aged care in Australia (AIHW 2012a) and Residential aged care and aged care packages in the community (AIHW 2014b). Similarly, we have estimated the rate of hospitalised fall-injury for community-dwelling people aged 65 and older (that is, those who did not live in residential aged care) by using the hospitalised fall-injury cases reported to have occurred at home with ABS estimates of the resident population, reduced to omit those living in residential aged care. The remaining hospitalised fall injury cases were not included in these calculations because of greater uncertainty about whether they lived in aged care or in the community. The omitted hospitalised fall injury cases are the 17,557 (18%) that had either an unspecified place of occurrence code or no place code, and the 10,550 (11%) that had occurred in a range of locations other than at home or in a residential aged care facility.

## 2 Overview

There were an estimated 98,704 hospitalised fall injury cases for Australians aged 65 or older in 2012–13 (Table 2.1). Almost 3% of all hospitalisations for people aged 65 are a result of a fall.

**Table 2.1: Key indicators for hospitalised fall injury, Australia 2012–13**

Key indicators	Men	Women	People
All hospital separations 2012–13, people aged 65+(a)	1,941,136	1,783,167	3,724,310
Estimated fall injury cases(b)	31,735	66,969	98,704
As percentage of all hospital separations, people aged 65+	1.6%	3.8%	2.7%

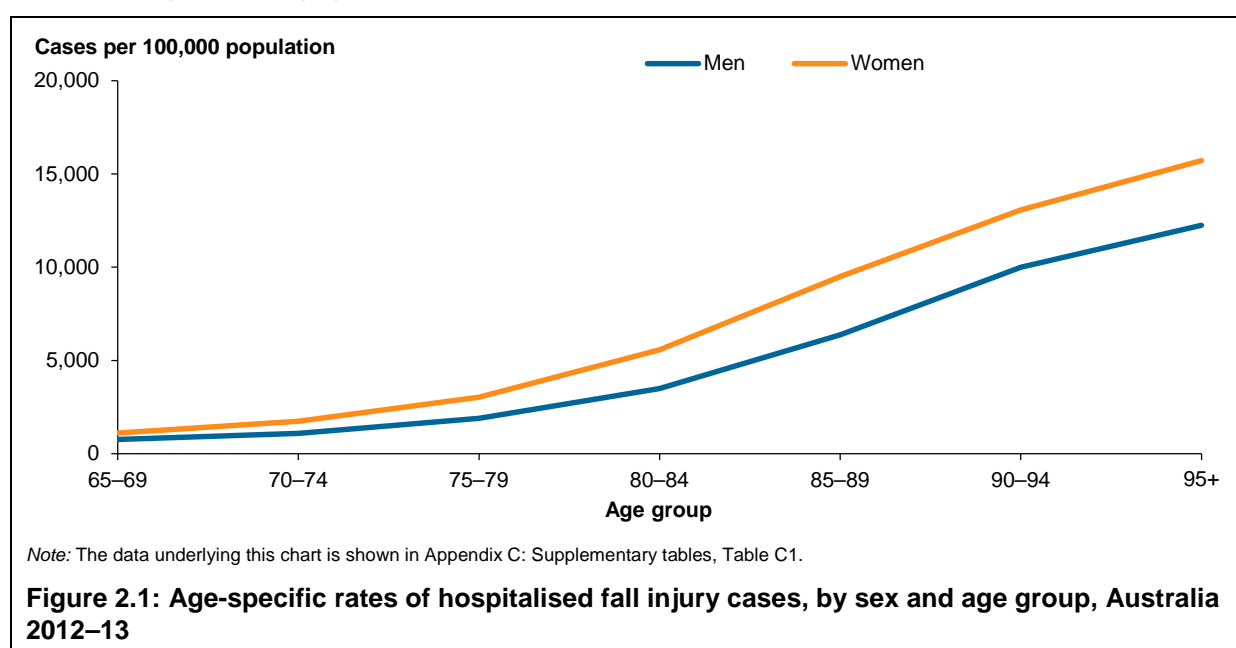
(a) Data source: *Australian hospital statistics 2012–13* (AIHW 2014a).

(b) Selection criteria are stated in Appendix A: Data issues.

### Age and sex

Unlike most other types of injury, women aged 65 and older sustained a greater number of hospitalised fall injuries than men, constituting 68% of the cases in 2012–13 (66,969). The age-standardised rate of hospitalised falls for older women was 3,346 per 100,000 population. This compares with 2,221 per 100,000 population for fall cases involving men aged 65 and older—a male:female rate ratio of 0.7 hospitalised falls for males for every case for females.

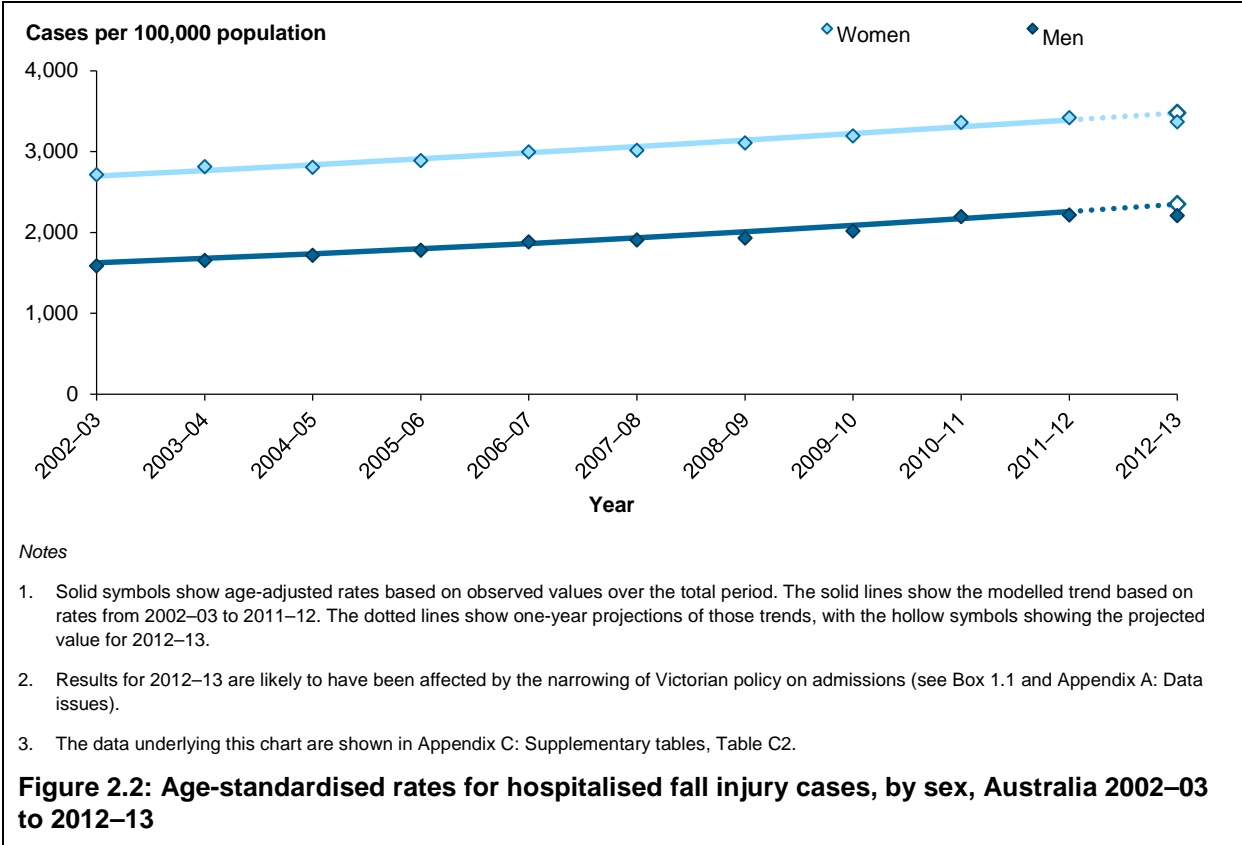
Age-specific rates of fall injury cases increased markedly with age for both men and women (Figure 2.1). The rate of fall injury cases was higher for women than men in all age groups. For all older people in 2012–13, the highest rate observed was for people aged 95 and older: 149 cases per 1,000 population.



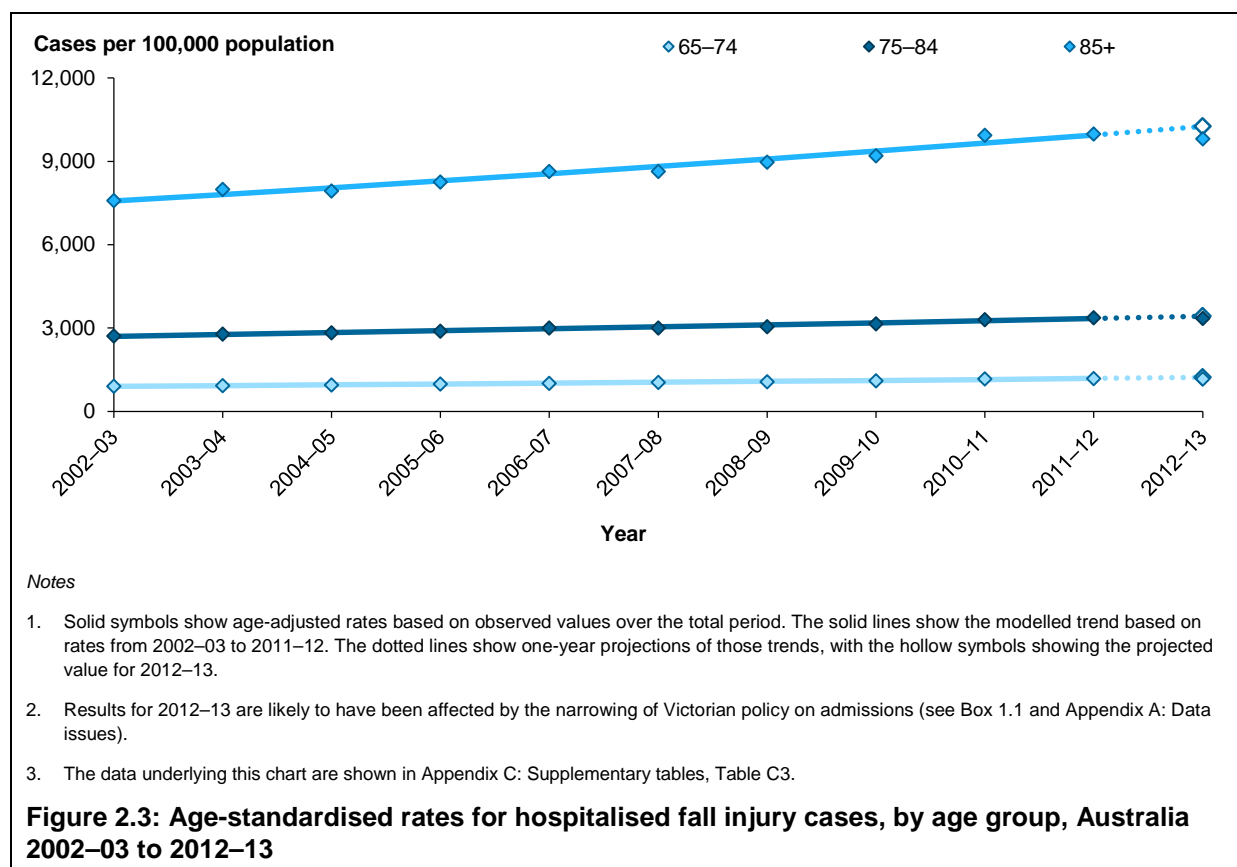
## How have fall injury cases changed over time?

The age-standardised rates of hospitalised fall injury cases for both men and women aged 65 and older rose over the period 2002–03 to 2012–13 (Figure 2.2). The increase for men and women combined was estimated to be 2.8% per year (95% CI: 2.5–3.0). While contributing fewer case numbers, the rate for men increased by a greater magnitude (3.7% per year, 95% CI: 3.4–4.1) than for women (2.6%, 95% CI: 2.3–2.8).

Based on these observations, we estimate that there were more than 26,000 extra fall injury cases for people aged 65 and older in 2012–13 than there would have been if the age-standardised rate had remained stable since 2002–03.



Increases in the rate of hospitalised falls were not consistent across all age groups in the older population (Figure 2.3). For those aged 65–74 and 85 and older, the increase was 3.1% per year between 2002–03 and 2012–13 (95% CI: 2.9–3.3 and 2.7–3.4, respectively), compared with 2.4% per year for people aged 75–84 (95% CI: 2.1–2.6). Again, these increases were statistically significant ( $p < 0.001$ ).



## Indigenous Australians

There were 503 hospitalised fall injury cases for Indigenous Australians aged 65 and older during the financial year 2012–13 (Table 2.2). For Indigenous Australians aged 65 and older, the age-standardised rate of hospitalised fall injury in 2012–13 was a little lower than that for non-Indigenous, a reversal on the rates reported for 2010–11 (AIHW: Bradley 2013). This was true for both male and female Indigenous Australians, with Indigenous women aged 65 and over having a substantially lower rate of hospitalised falls than non-Indigenous women in 2012–13. For more information about Indigenous reporting see Box 1.4.

**Table 2.2: Key indicators for hospitalised fall injury, by Indigenous status and sex, Australia 2012–13**

Indicator	Indigenous Australians			Non-Indigenous		
	Men	Women	Persons	Men	Women	Persons
Estimated fall injury cases	188	315	503	31,130	65,661	96,791
Age-standardised rate/100,000 population	1,901	2,733	2,421	2,177	3,323	2,832

Note: The non-Indigenous category excludes cases for which Indigenous status was not reported.



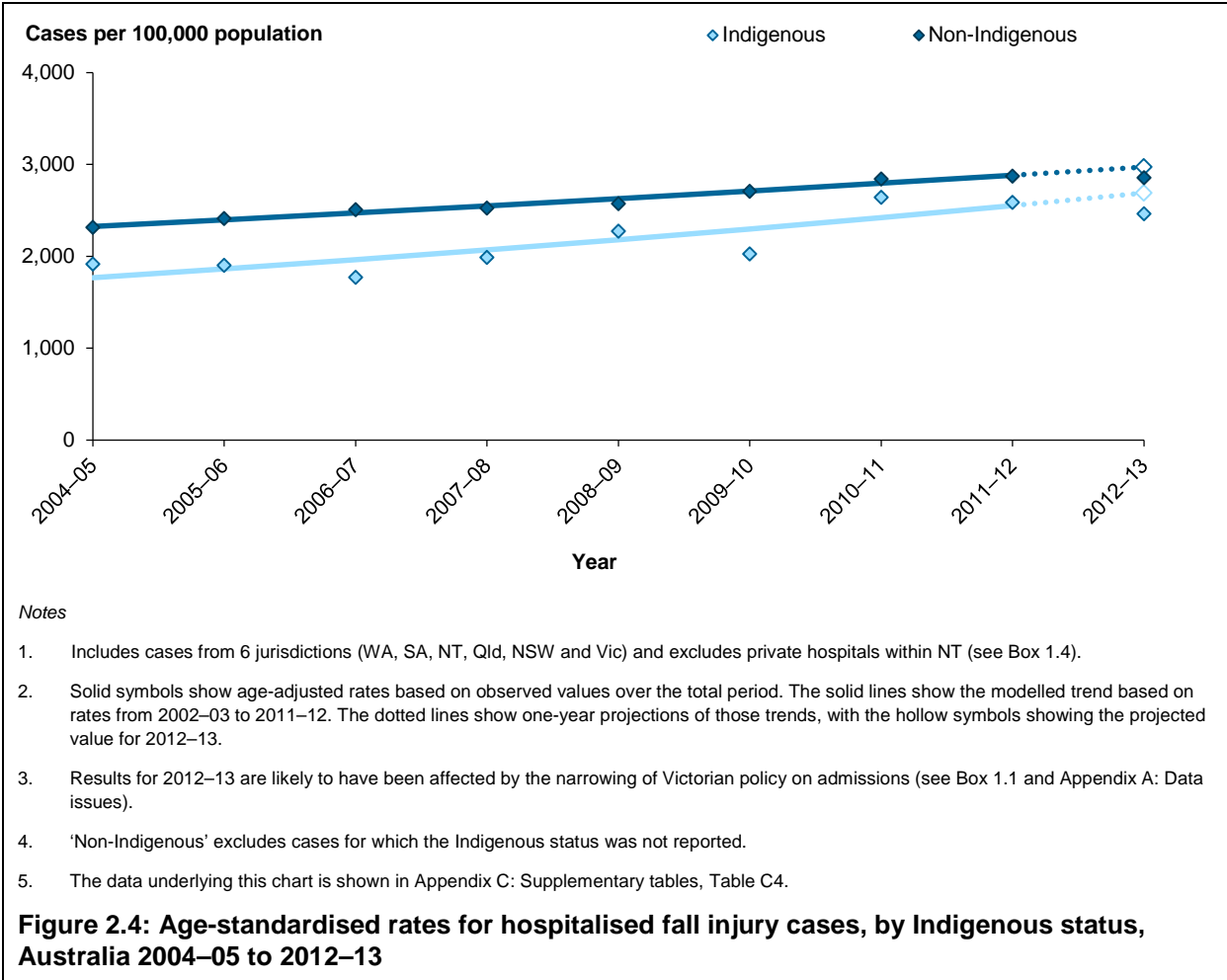
# How have fall injuries for Indigenous Australians changed over time?

The following figures present data for 6 jurisdictions (New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory) for the period 2004–05 to 2012–13 (see Box 1.4. for more information on time series analysis of Indigenous data).

Case numbers for Indigenous Australians rose considerably in the study period. The numbers of fall-related hospitalisations in the 9 years from 2004–05 rose from 253 to 487. This reflects the size of the Indigenous population aged 65 and older, which grew even more rapidly than the non-Indigenous population of the same age (ABS 2013a).

The focus of this report is risk of fall-related injury, and so the results in this section are presented as population-based rates. The rates are age-standardised to allow for rise in injury risk with age and for the different age distribution of Indigenous Australians aged 65 and older and the remainder of the population of this age. Figure 2.4 presents age-standardised rates of hospitalised fall injury from 2004–05 to 2012–13 for Indigenous and non-Indigenous Australians aged 65 and older.

For the period 2004–05 to 2012–13, the age-standardised rate of fall injury cases for Indigenous Australians rose by an average of 5.4% per year (95% CI: 3.0–7.8,  $p < 0.001$ ) while for non-Indigenous the rate rose by 3.1% (95% CI: 2.8% to 3.5% per year,  $p < 0.001$ ).



The interpretation of the results in this section requires care, for reasons outlined above. Uncertainty related to the relatively small annual numbers of cases for Indigenous Australians is exacerbated by the possibility that the completeness of Indigenous identification has changed over time.

The most noteworthy aspect of these findings is the similarity of age-standardised rates of fall-related injuries for both population groups.

There is some evidence of rising rates of hospitalised fall injury for Indigenous Australians. However, increasing completeness of Indigenous identification could also produce, or steepen, upward trends (see Box 1.4). It is important to be cautious in the interpretation of trends. In particular, we do not consider that there is a sound basis to conclude that trends for Indigenous Australians differ from those for non-Indigenous.

## 3 Type of injury

### Body region injured

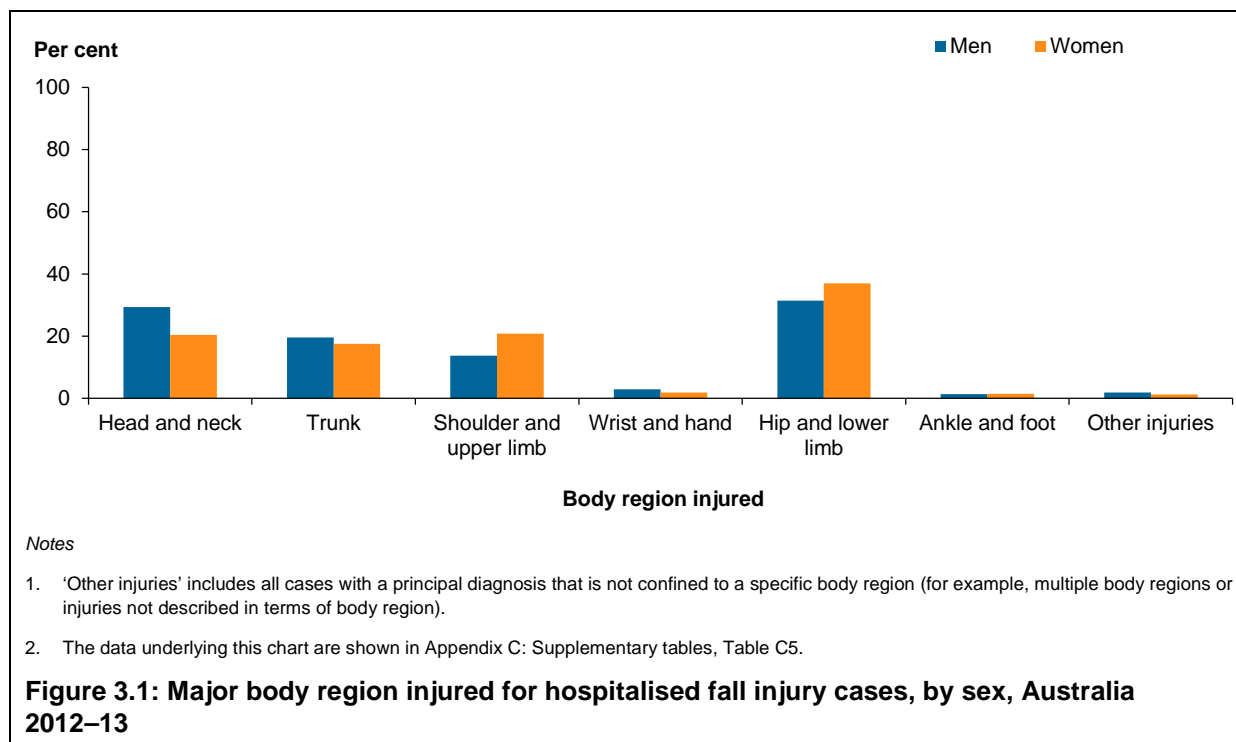
The largest proportion of fall injury cases for people aged 65 and older in 2012–13 was *Injuries to the hip and thigh* (Table 3.1). Fractures of the neck of the femur (also commonly called hip fractures; cases with a principal diagnosis of S72.0–S72.2) accounted for the majority of *Injuries to the hip and thigh* (74%). *Injuries to the hip and thigh*, and fractures of the neck of the femur, were proportionately more common for women than men. *Injuries to the head* was the most common principal diagnosis for men, and was the second most common injury for older people overall—constituting 22% of all fall cases.

Summarising the information in Table 3.1, Figure 3.1 highlights the differences in the types of injury that were sustained by men and women aged 65 and older in 2012–13. Men sustained proportionately more injuries to the head, trunk and wrist regions (according to the principal diagnosis for the case) while women sustained proportionately more injuries to the shoulder and upper limbs and to the hip and lower limbs.

**Table 3.1: Body region injured for hospitalised fall injury cases, by sex, Australia 2012–13**

Body region injured by principal diagnosis	Men		Women		People	
	Count	%	Count	%	Count	%
Injuries to the head	8,652	27.3	12,813	19.1	21,465	21.7
Injuries to the neck	646	2.0	805	1.2	1,451	1.5
Injuries to the thorax	3,046	9.6	3,857	5.8	6,903	7.0
Injuries to the abdomen, lower back, lumbar spine and pelvis	3,171	10.0	7,881	11.8	11,052	11.2
Injuries to the shoulder and upper arm	2,507	7.9	6,691	10.0	9,198	9.3
Injuries to the elbow and forearm	1,843	5.8	7,247	10.8	9,090	9.2
Injuries to the wrist and hand	914	2.9	1,196	1.8	2,110	2.1
Hip fractures	5,274	16.6	13,534	20.2	18,808	19.1
Other injuries to the hip and thigh	2,042	6.4	4,577	6.8	6,619	6.7
<i>Total injuries to the hip and thigh</i>	<i>7,316</i>	<i>23.1</i>	<i>18,111</i>	<i>27.0</i>	<i>25,427</i>	<i>25.8</i>
Injuries to the knee and lower leg	2,655	8.4	6,635	9.9	9,290	9.4
Injuries to the ankle and foot	416	1.3	924	1.4	1,340	1.4
Injuries involving multiple body regions	47	0.1	39	0.1	86	0.1
Injuries to unspecified parts of trunk, limb or body region	262	0.8	398	0.6	660	0.7
Other injuries	260	0.8	372	0.6	632	0.1
<b>Total</b>	<b>31,735</b>	<b>100</b>	<b>66,969</b>	<b>100</b>	<b>98,704</b>	<b>100</b>

*Note:* 'Other injuries' includes all cases with a principal diagnosis that is not confined to a specific body region (for example, multiple body regions or injuries not described in terms of body region).

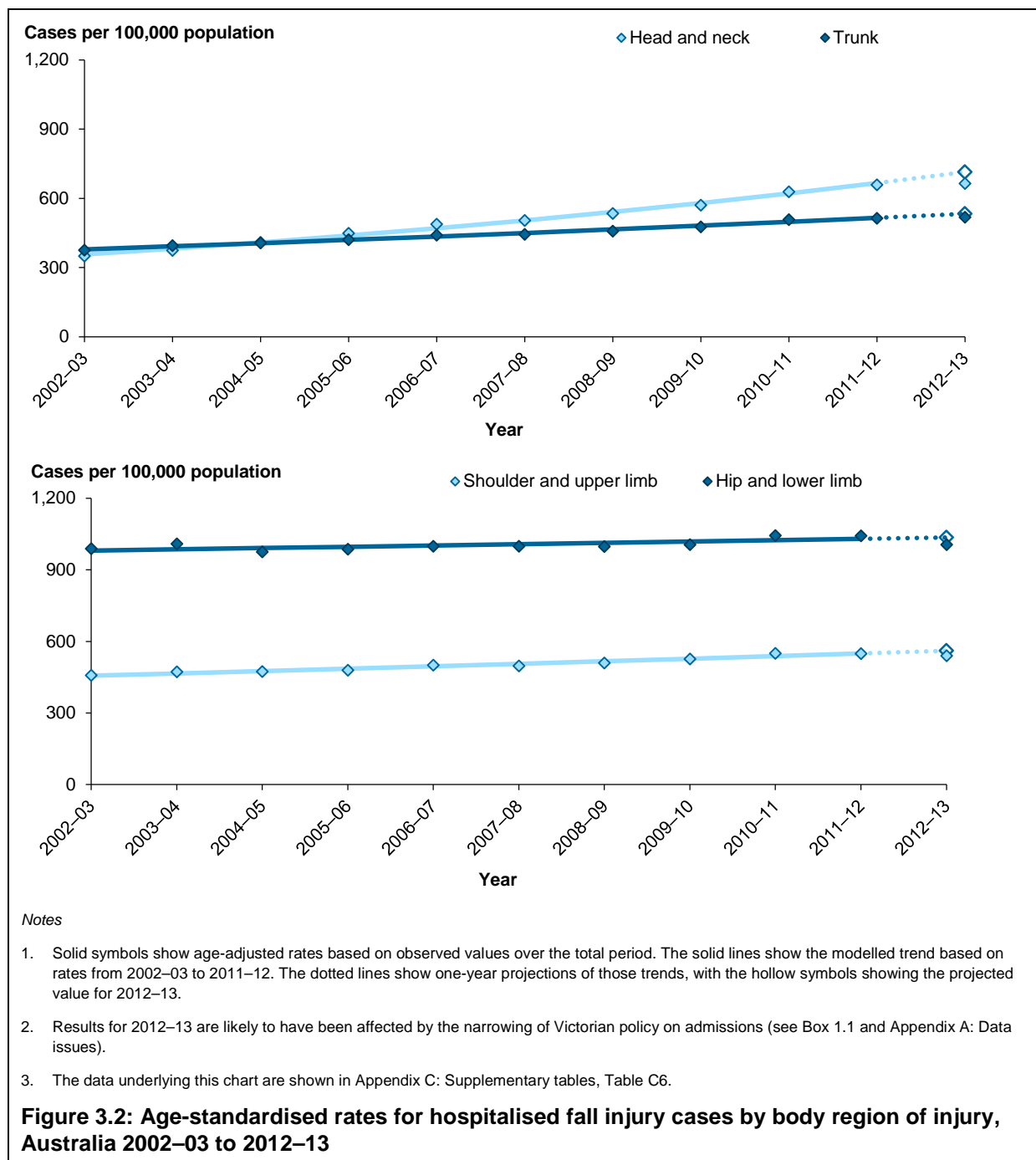


Analyses of fall injury cases over the 2002–03 to 2012–13 study period according to the type of injury (described by the principal diagnosis) demonstrate that rates increased for all body regions other than the hip and lower limb (Figure 3.2). Rates of injuries to the head and neck increased most substantially: 7.2% per year (95% CI: 6.8–7.6,  $p < 0.001$ .) Rates of injuries to the trunk region and to the shoulders and upper limbs also increased significantly over the 11 years to June 2013 (by 3.5% 95% CI: 3.2–3.7 and 2.1% 95% CI: 1.8–2.4 per year, respectively).

Injuries to the hand and wrist, and ankle and foot, increased by 4.6% (95% CI: 3.5–5.6,  $p < 0.001$ ) and 3.7% (95% CI: 3.0–4.5,  $p < 0.001$ ) per year, respectively. Fall injury cases classed as 'other injuries' increased by 6.6% per year (95% CI: 5.1–8.1,  $p < 0.001$ ). These 'other injury' cases (commonly having a principal diagnosis indicating *Injuries to unspecified part of trunk, limb or body region* or *Certain early complications of trauma, n.e.c.*), which accounted for a comparatively small proportion of cases, have not been included in Figure 3.2.

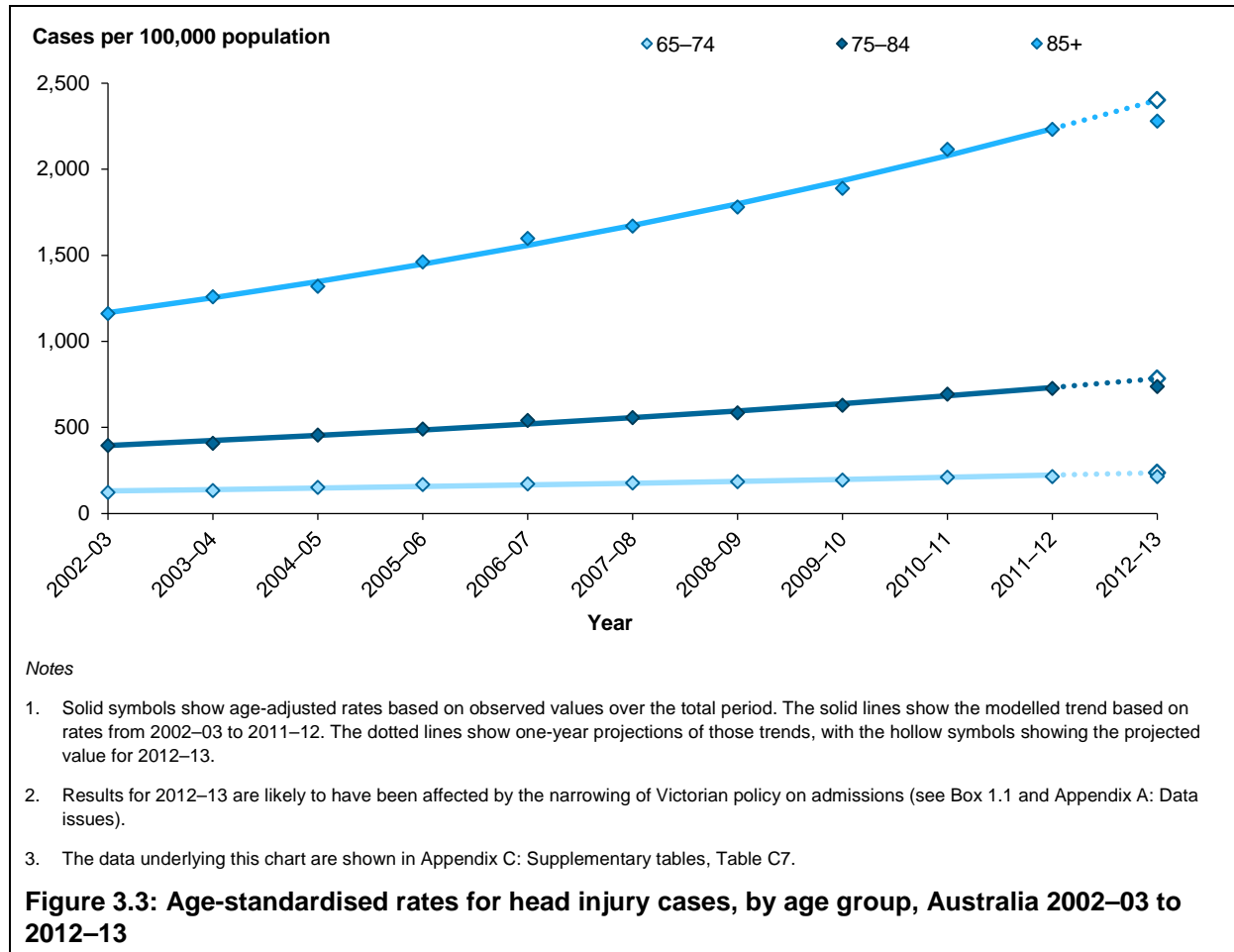
Conversely, injuries to the hip and lower limb region remained fairly stable over the study period (0.5% per year, 95% CI: 0.2 to 0.9,  $p < 0.001$ ). There was a slight decline in the rate of hip fractures but a steeper rise in the rate of other fall-related fractures so there was a net overall increase in all fall-related fractures.

While it is fairly certain that all cases of hip fracture are admitted to hospital, this level of certainty does not exist for other types of injuries, including head injuries. This should be borne in mind when interpreting trends for non-hip-fracture injuries.



## Head injuries

The large increase in head injuries due to falls affected all age groups and the magnitude of these increases was higher for older age groups: for those aged 65–74 the rate of head injury increased by 6.0% per year (95% CI: 5.1–6.9) while for those aged 75–84 the rate increased by 7.1% per year (95% CI: 6.7–7.5) (Figure 3.3). The increase in the rate of head injury was most substantial for those aged 85 and older and was estimated at 7.5% per year (95% CI: 7.1–7.9).



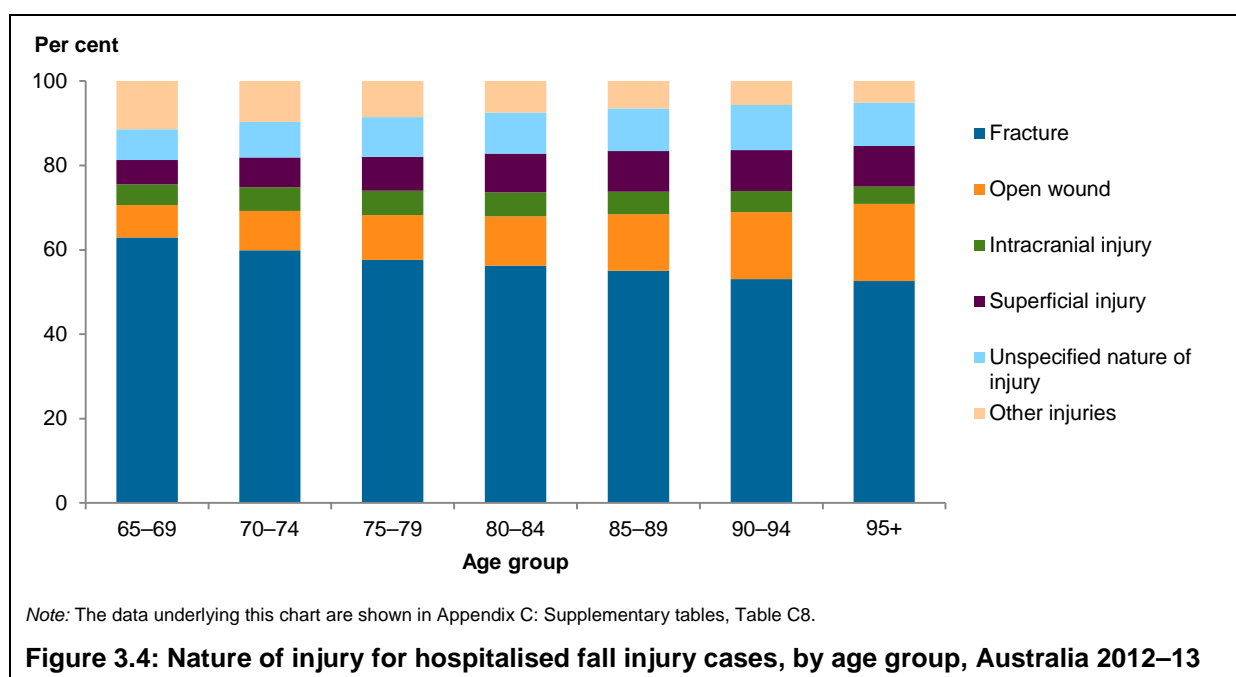
## Nature of injury

More than half of people aged 65 and older who were hospitalised due to an injurious fall in 2012–13 had a principal diagnosis of a fracture (57%, 55,882 cases). Fractures were proportionately more common principal diagnoses for women than for men whereas open wounds and soft tissue injuries were more common for men (Table 3.2).

Fracture principal diagnoses were less common for older people, reported for 63% of cases for people aged 65–69 and 53% of cases for people aged 95+. The proportion of cases with principal diagnoses of open wounds or superficial injuries, in particular, increased with age (Figure 3.4).

**Table 3.2: Nature of injury for hospitalised fall cases, by sex, Australia 2012–13**

Nature of injury	Men		Women		People	
	Count	%	Count	%	Count	%
Fracture	14,994	47.2	40,888	61.1	55,882	56.6
Dislocation	523	1.6	994	1.5	1,517	1.5
Soft-tissue injury	1,322	4.2	1,868	2.8	3,190	3.2
Open wound	5,096	16.1	6,935	10.4	12,031	12.2
Intracranial injury	2,531	8.0	2,761	4.1	5,292	5.4
Internal organ or vessel of trunk	283	0.9	209	0.3	492	0.5
Burn	1	0.0	0	0.0	1	0.0
Superficial injury	2,844	9.0	5,663	8.5	8,507	8.6
Poisoning or toxic effect	0	0.0	1	0.0	1	0.0
Other specified nature of injury	908	2.9	1,461	2.2	2,369	2.4
Unspecified nature of injury	3,233	10.2	6,189	9.2	9,422	9.5
<b>Total</b>	<b>31,735</b>	<b>100</b>	<b>66,969</b>	<b>100</b>	<b>98,704</b>	<b>100</b>



## Fractures

Over time, fractures have been the most frequent nature of injury, followed by open wounds and superficial injury. In 2012–13, fractures accounted for 6 in 10 (56.6%) of all fall-related injuries sustained by people aged 65 and over. The principal diagnosis in 12.2% of cases was an open wound and in 8.6% of cases a superficial injury was sustained. Together, these three types of injury accounted for over three-quarters of all injuries. This section focuses on fractures among older people.

Nearly three in every five people aged 65 and older who were hospitalised due to an injurious fall in 2012–13 sustained at least one fracture (59%, 58,412 cases). A higher proportion of women than men sustained fractures (63% and 51%, respectively).

Table 3.3 describes the location of the fracture for fall injury cases with at least one fracture, as well as the proportion of the specific type of injury that these cases represent (for example, 16% of all cases with a principal diagnosis of *Injuries to the head* involved a fracture). Fall cases with a principal diagnosis denoting *Injuries to the hip and thigh* and *Injuries to the elbow and forearm* had the largest proportion of fractures present in the patients' records: 82% (20,826) and 79% (7,208), respectively. *Injuries to the hip and thigh* accounted for the greatest proportion of all fracture-related fall injury cases, about one in every three such injuries (36%). The vast majority of these hip and thigh fracture cases had a principal diagnosis of fractured neck of femur (90%).

**Table 3.3: Fracture location by body region for hospitalised fall injury cases involving a fracture, by sex, Australia 2012–13**

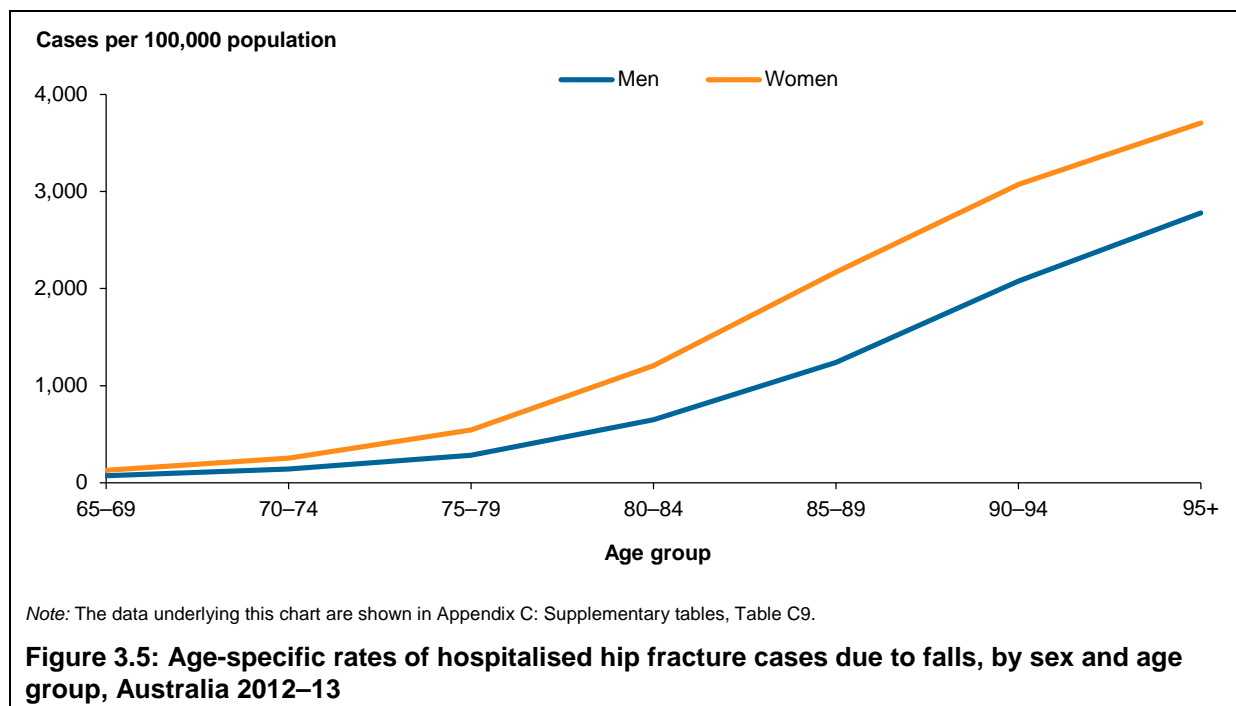
Body region	Men		Women		People		
	Count	%	Count	%	Count	%	% of type
Head	1,358	8.5	2,042	4.8	3,400	5.8	15.8
Neck	407	2.5	513	1.2	920	1.6	63.4
Thorax	2,284	14.2	2,795	6.6	5,079	8.7	73.6
Abdomen, lower back, lumbar spine and pelvis	2,052	12.8	5,859	13.8	7,911	13.5	71.6
Shoulder and upper arm	1,511	9.4	4,967	11.7	6,478	11.1	70.4
Elbow and forearm	923	5.7	6,285	14.8	7,208	12.3	79.3
Wrist and hand	366	2.3	579	1.4	945	1.6	44.8
Hip fractures	5,274	32.8	13,534	32.0	18,808	32.2	100.0
Other hip and thigh fractures	474	3.0	1,544	3.6	2,018	3.5	30.5
<i>Total fractures to the hip and thigh</i>	<i>5,748</i>	<i>35.8</i>	<i>15,078</i>	<i>35.6</i>	<i>20,826</i>	<i>35.7</i>	<i>81.9</i>
Knee and lower leg	1,198	7.5	3,731	8.8	4,929	8.4	53.1
Ankle and foot	204	1.3	456	1.1	660	1.1	49.3
Multiple body regions	2	0.0	5	0.0	7	0.0	8.1
<b>Total</b>	<b>16,053</b>	<b>100</b>	<b>42,310</b>	<b>100</b>	<b>58,363</b>	<b>100</b>	<b>59.2</b>

*Note:* Excludes cases (49 cases) with a fracture diagnosis that was not confined to a specific body region (for example, injuries not described in terms of body region).

## Hip fractures

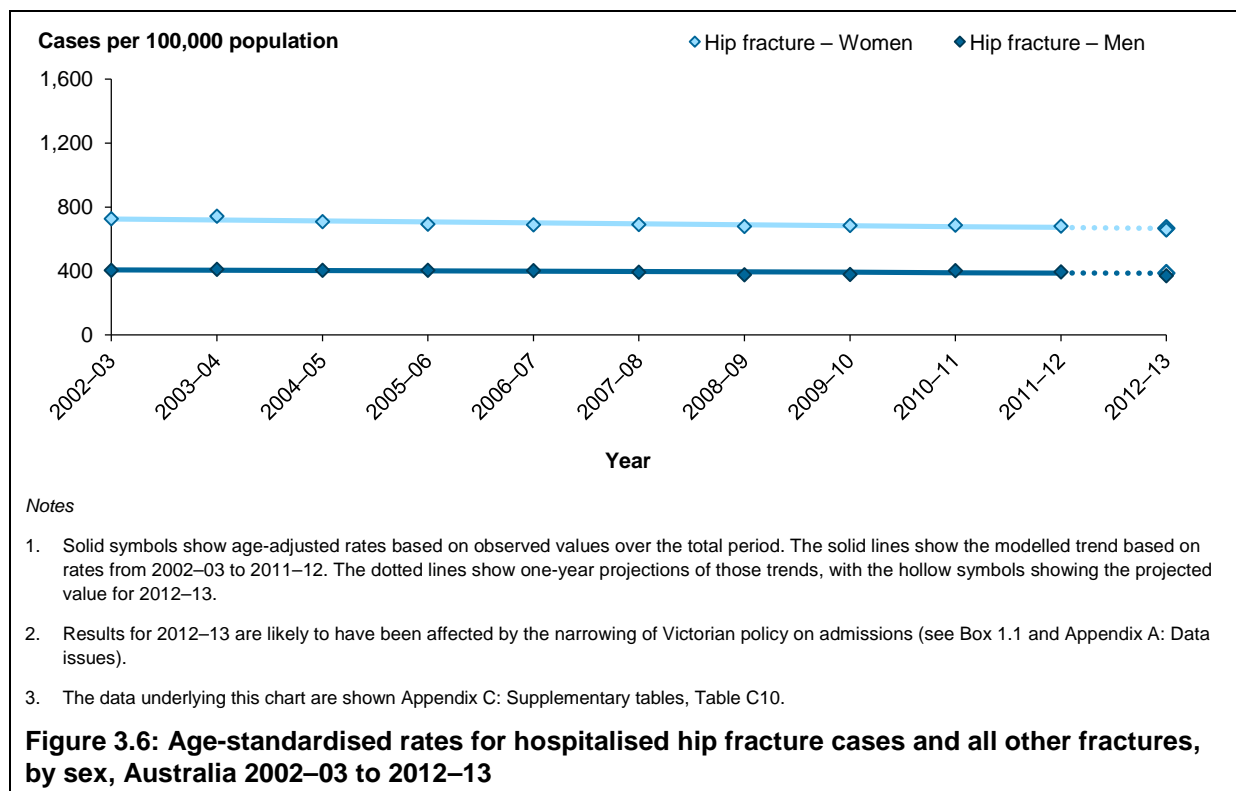
Fall injury cases that had a principal diagnosis of hip fracture (fractured neck of femur) occurred at an age-standardised rate of 536 per 100,000 population in 2012–13, somewhat lower than previously reported 570 per 100,000, (see AIHW: Bradley 2013). Women aged 65 and older in 2012–13 had a higher rate of fall-related hip fracture (654 cases per 100,000) than men (375 per 100,000). Age-specific rates of fall-related fractured neck of femur injuries were highest for people aged 95 and older: 35 per 1,000 population, compared with 1 per 1,000 for people aged 65–69 (see also Figure 3.5).



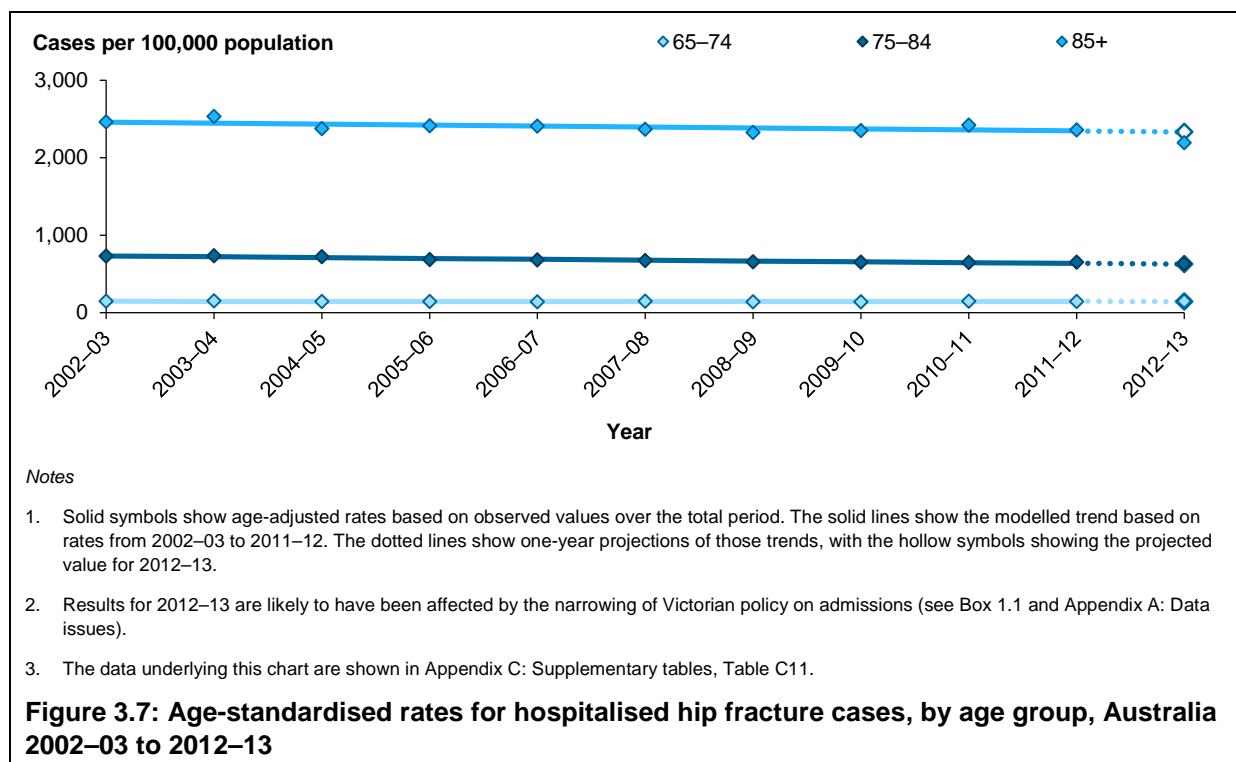


In contrast to fall injury cases generally, and head injuries specifically, the rates of hospitalised cases of hip fracture (principal diagnoses S72.0–S72.2) due to falls in people aged 65 and older decreased over the period 2002–03 to 2012–13 (Figure 3.6). While changes in admission practices over time may affect the rate of all hospitalised fall injury cases, it is thought that hip fractures are serious enough to be admitted to hospital in nearly every instance.

The decrease in the age-standardised rate of hip fracture over the 11 years to June 2013 was estimated to be –0.9% per year for Australians aged 65 and older (95% CI: –2.2 to –1.5). The rate of hip fracture for women decreased by –0.8% per year (95% CI: –1.2 to –0.5) and the rate for men decreased by –0.5% (95% CI: –1.0 to –0.1). Using these figures, we estimate that some 2,800 fewer hip fracture cases involving people aged 65 and older occurred in 2012–13 than would have occurred if the age-standardised rate had remained stable since 2002–03.

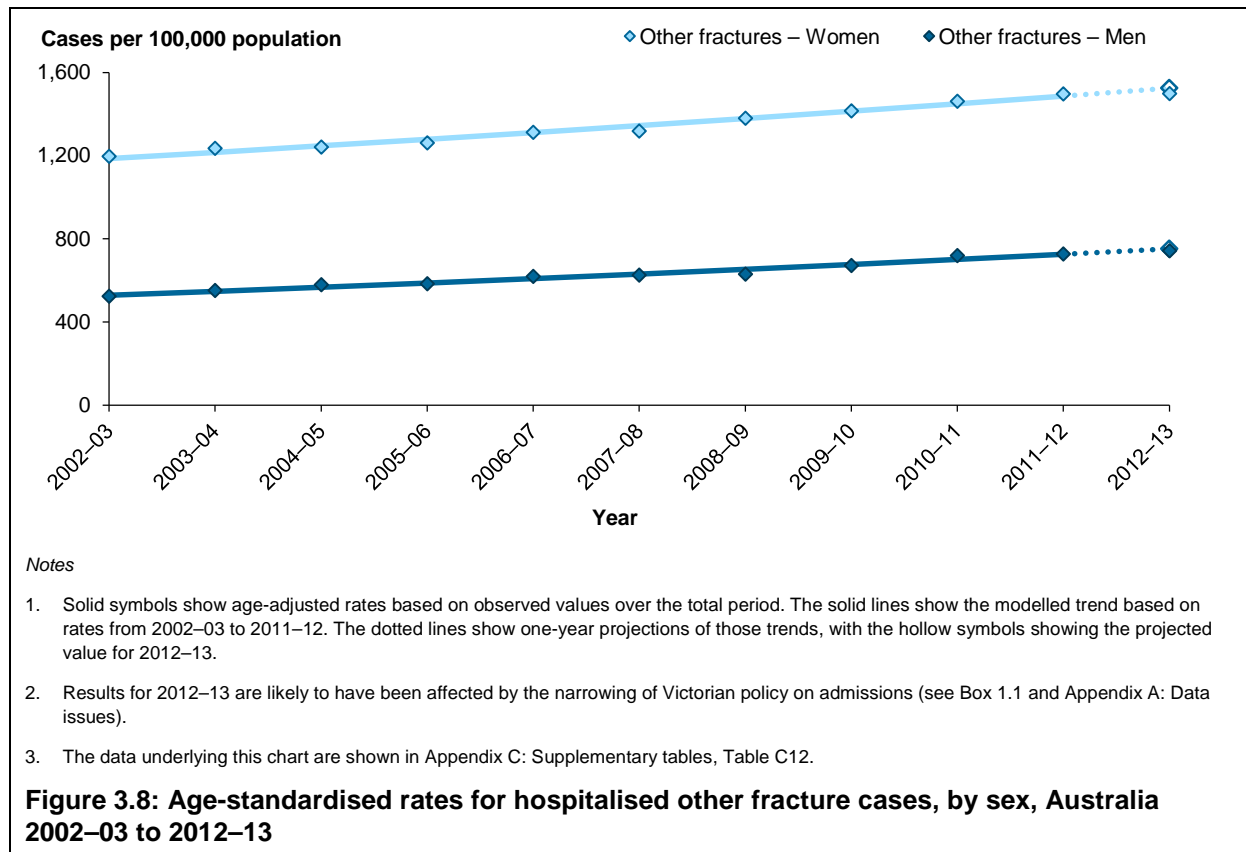


As for all hospitalised fall injuries and head injuries, decreases in the rate of hip fractures were not consistent across all age groups in the older population (Figure 3.7). The decrease in the rate of hospitalised hip fracture due to falls was estimated to be  $-0.1\%$  per year for people aged 65-74 (95% CI:  $-0.7$  to  $-0.4$ ) and  $-1.6\%$  per year for people aged 75-84 (95% CI:  $-1.9$  to  $-1.2$ ). The rate of decrease for the oldest age group, those aged 85 and older, was estimated at  $-0.5\%$  per year (95% CI:  $-0.9$  to  $-0.1$ ).



## Other types of fracture

Rates of other types of fracture (that is, any other fractures other than hip fractures) were estimated to have increased over the study period (Figure 3.8). The magnitude of this increase was estimated to be 2.6% per year for all people aged 65 and older (95% CI: 1.5–2.0) and the rate for men increased by a greater magnitude (3.6% per year, 95% CI: 3.2–4.0) than that for women (2.5% per year, 95% CI: 2.3–2.8).



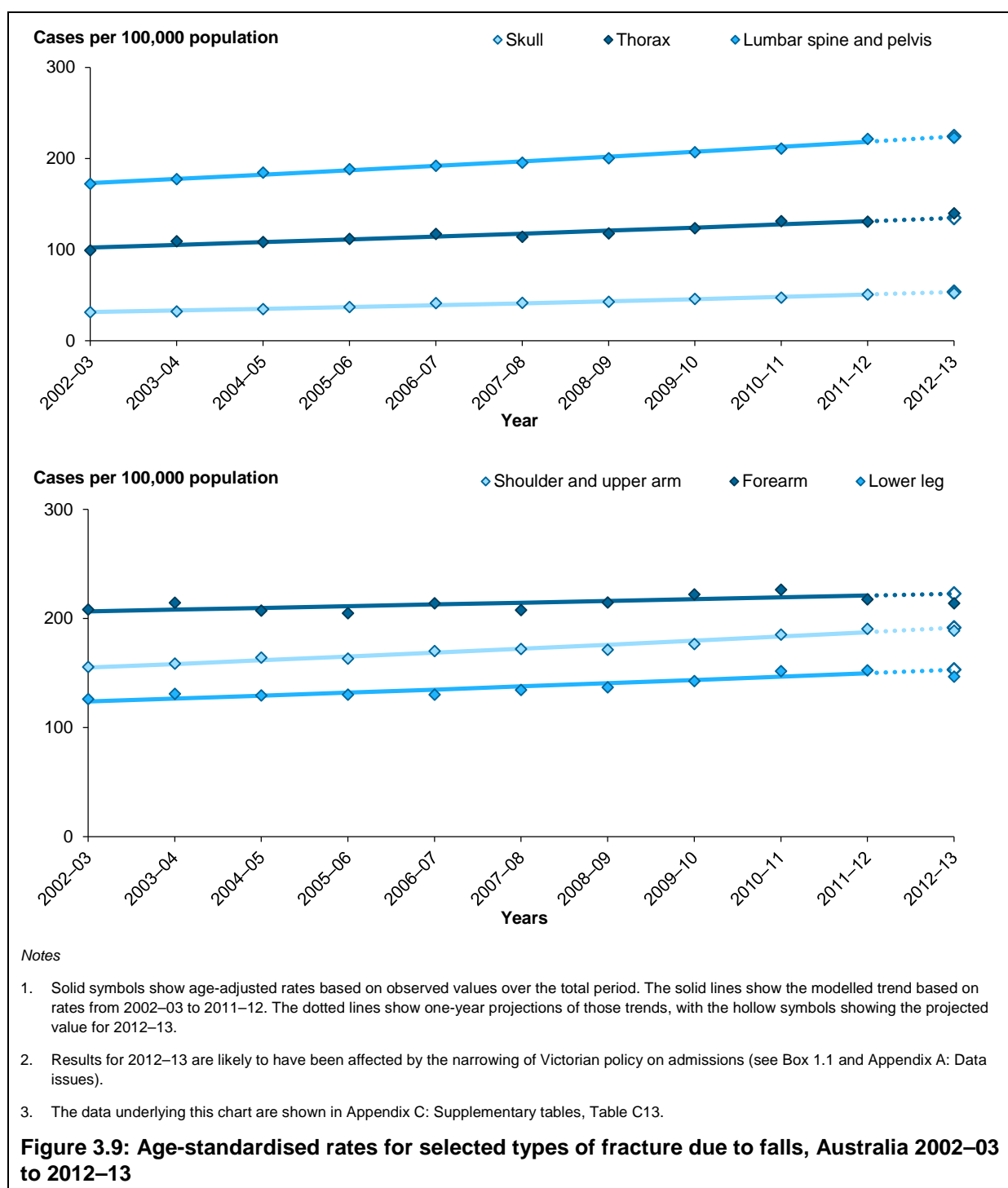
The decrease in hip fractures—which account for about a third of all hospitalised fall injury cases (36%) and more than this proportion of costs (see AIHW: Bradley 2012)—but an apparent increase in the rate of all fall injury cases raises interesting questions. What is the explanation for these divergent trends? Is there an increasing propensity to admit minor fractures to hospital? Have falls prevention interventions over the last decade or so focused on hip fractures specifically? Many of these questions cannot be answered with the data available. We can, however, examine the rates of other hospitalised fall-related fractures to see if they increased or decreased over the study period.

Fractures of the skull (ICD-10-AM diagnosis code S02), the thorax (S22), the lumbar spine and pelvis (S32), the shoulder and upper arm (S42), the forearm (S52), and the lower leg (S82) account for over half of all fall-related fracture cases (54%). Some of these are particularly numerous (for example, forearm fractures: 67,484, 13% of all fractures over the 11-year study period) and some are less common but likely to be of high severity (for example, skull fractures: 13,456).

The results of negative binomial modelling for these specific types of fracture were mixed (Figure 3.9). In line with the observation of large increases in the rate of fall-related head injury, a large increase in the rate of skull fractures (5.5%, 95% CI: 4.8–6.1,  $p < 0.001$ ) was not a surprise. Rates for fractures of the thorax (2.8%, 95% CI: 2.3–3.3), the lumbar spine and pelvis (2.6%, 95% CI: 2.3–2.9), the shoulder and upper arm (2.1%, 95% CI: 1.8–2.5) and

the lower leg (2.1%, 95% CI: 1.6–2.7) also increased significantly ( $p < 0.001$ ). An increase, though less strongly significant, was also observed for fractures of the forearm (0.8%, 95% CI: 0.3–1.2,  $p = 0.01$ ).

Of interest, the rate of femur fractures other than hip fractures (that is, excluding cases with a principal diagnosis S72.0–S72.2) was estimated to have increased at a rate of 1.7% per year between 2002–03 and 2012–13 (95% CI: 0.9–2.5). This increase was statistically significant ( $p < 0.01$ ). The difference in trends between fractures of the neck of femur (that is, hip fractures) and fractures of other parts of the femur remains to be explained.



## 4 External causes

The most common cause of fall injury cases at ages 65 and older in 2012–13 was falling on the same level from slipping, tripping and stumbling (33%) (Table 4.1). Slips, trips and stumbles were proportionately more common for women than for men and, for both sexes, most of these types of fall (62%) were attributed to tripping.

*Unspecified fall* (accounting for 25% of cases) and *Other fall on same level* (24%) were the second- and third-most common types of external cause of hospitalised fall injury in 2012–13. Relatively few cases were coded as falls from heights, such as *Fall on and from stairs and steps*, *Fall from one level to another*, or *Fall from, out of or through building or structure*.

**Table 4.1: Causes of hospitalised fall injury cases, by sex, Australia 2012–13**

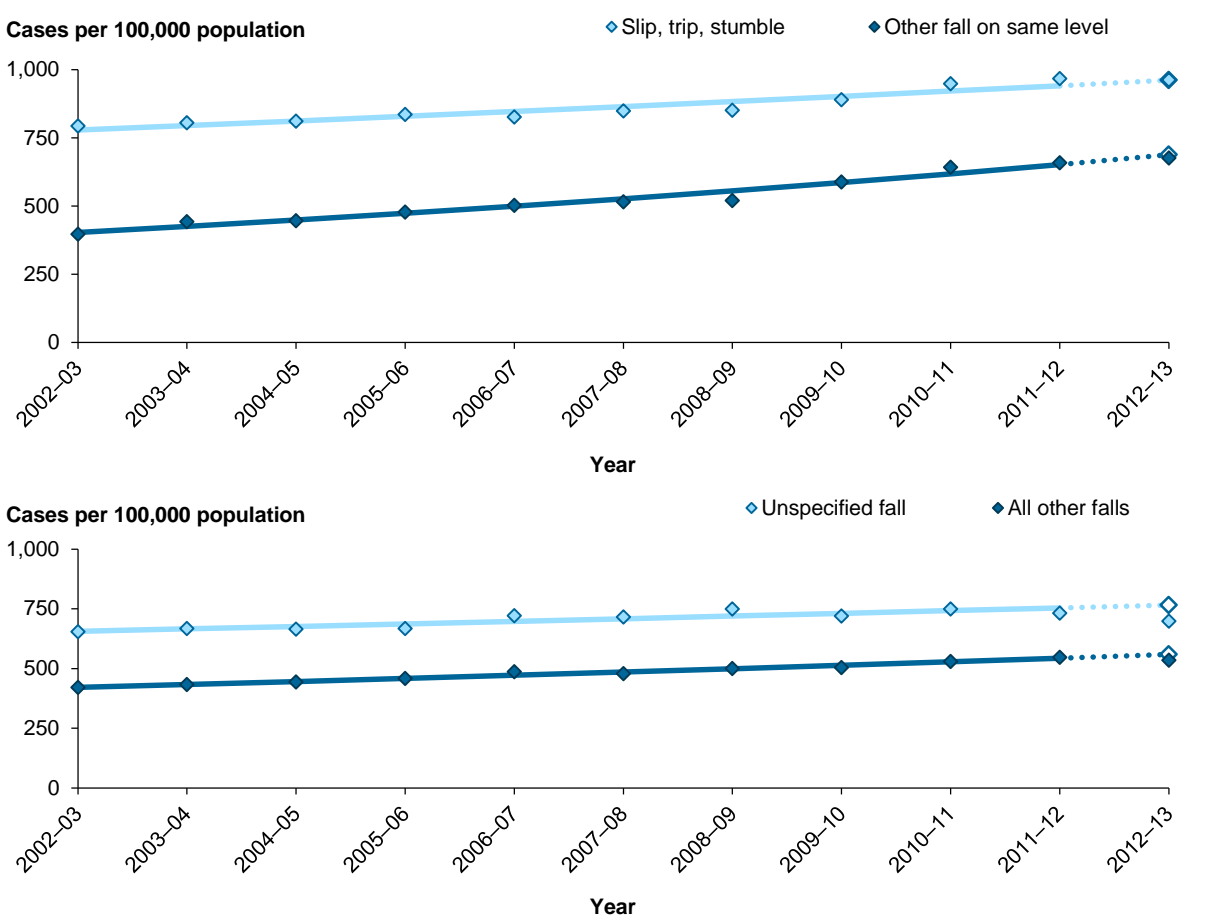
External cause	Men		Women		People	
	Count	%	Count	%	Count	%
Fall on same level involving ice and snow	3	0.0	8	0.0	11	0.0
Fall on same level from slipping	2,380	7.5	6,078	9.1	8,458	8.6
Fall on same level from tripping	5,675	17.9	14,630	21.8	20,305	20.6
Fall on same level from stumbling	1,335	4.2	2,677	4.0	4,012	4.1
<i>Total fall on same level from slipping, tripping and stumbling</i>	<i>9,390</i>	<i>29.6</i>	<i>23,385</i>	<i>34.9</i>	<i>32,775</i>	<i>33.2</i>
Fall involving ice-skates, skis, roller-skates or skateboards	205	0.6	226	0.3	431	0.4
Other fall on same level due to collision with, or pushing by, another person	52	0.2	202	0.3	254	0.3
Fall while being carried or supported by other persons	9	0.0	28	0.0	37	0.0
Fall involving wheelchair	250	0.8	359	0.5	609	0.6
Fall involving bed	1,300	4.1	2,828	4.2	4,128	4.2
Fall involving chair	912	2.9	1,972	2.9	2,884	2.9
Fall involving other furniture	55	0.2	73	0.1	128	0.1
Fall involving playground equipment	2	0.0	5	0.0	7	0.0
Fall on and from stairs and steps	2,144	6.8	4,085	6.1	6,229	6.3
Fall on and from ladder	1,306	4.1	344	0.5	1,650	1.7
Fall on and from scaffolding	21	0.1	0	0.0	21	0.0
Fall from, out of or through building or structure	360	1.1	112	0.2	472	0.5
Fall from tree	52	0.2	6	0.0	58	0.1
Fall from cliff	28	0.1	30	0.0	58	0.1
Diving or jumping into water causing injury other than drowning or submersion	15	0.0	2	0.0	17	0.0
Other fall from one level to another	511	1.6	580	0.9	1,091	1.1
Other fall on same level	7,562	23.8	15,955	23.8	23,517	23.8
Unspecified fall	7,558	23.8	16,769	25.0	24,327	24.6
<b>Total</b>	<b>31,735</b>	<b>100</b>	<b>66,969</b>	<b>100</b>	<b>98,704</b>	<b>100</b>

## How have the causes of fall injury cases changed over time?

Three external cause codes accounted for four in five (82%) fall injury cases for the 11-year study period 2002–03 to 2012–13 (W01 *Fall due to slipping, tripping and stumbling*, 33%; W18 *Other fall on same level*, 24%; and W19 *Unspecified fall*, 25%). Rates for these three external causes, and all other fall external causes combined, are shown in Figure 4.1.

The age-standardised rates for all four categories of falls increased significantly over the 11 years to 2012–13. The rate of falls due to slipping, tripping and stumbling was estimated to have increased by 2.1% per year (95% CI: 1.7–2.6,  $p < 0.001$ ). The rates for other falls on the same level and unspecified falls increased by 5.5% per year (95% CI: 4.8–6.2,  $p < 0.001$ ) and 1.6% (95% CI: 1.1–2.1,  $p < 0.001$ ), respectively.

Falls due to all other external causes combined (18% of cases over 2002–03 to 2012–13) increased over the study period by an estimated 2.9% per year (95% CI: 2.6–3.2), an increase that was statistically significant ( $p < 0.001$ ). This group includes falls from beds, or from chairs, or involving stairs and steps.



**Notes**

1. Solid symbols show age-adjusted rates based on observed values over the total period. The solid lines show the modelled trend based on rates from 2002–03 to 2011–12. The dotted lines show one-year projections of those trends, with the hollow symbols showing the projected value for 2012–13.
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions (see Box 1.1 and Appendix A: Data issues).
3. The data underlying this chart are shown in Appendix C: Supplementary tables, Table C14.

**Figure 4.1: Age-standardised rates for hospitalised fall injury cases, by selected external causes, Australia 2002–03 to 2012–13**

## 5 Place of occurrence

This section looks at the first-recorded *Place of occurrence* code for hospitalised fall injury cases. A specific place of occurrence was not identified in 16% of records for fall injury cases in 2012–13 (Table 5.1). Half of all hospitalised fall injury cases involving people aged 65 and older in 2012–13 occurred in the home, including the driveway to the home (50%, 49,411 cases). The bulk of these cases were recorded as occurring in ‘other and unspecified’ places in the home (42%, 20,569 cases). A further 17% of falls in the home were recorded as occurring in the outdoor areas of the home (8,363 cases), with falls occurring in the bathroom and bedroom also relatively common (12% and 10% of falls in the home, respectively).

Residential aged care was the reported place of occurrence for a further 21% of hospitalised fall injury cases in 2012–13 (21,186 cases). In all, about 6 in every seven fall injury cases with a *specified* place of occurrence were reported to have happened in either the home or an aged care facility (60% and 26% of specified places, respectively).

**Table 5.1: Place of occurrence for hospitalised fall injury cases, by sex, Australia 2012–13**

Place of occurrence	Men		Women		People		
	Count	%	Count	%	Count	%	% specified
Driveway to home	420	1.3	585	0.9	1,005	1.0	1.2
Outdoor areas	3,012	9.5	5,351	8.0	8,363	8.5	10.1
Garage	283	0.9	241	0.4	524	0.5	0.6
Bathroom	1,853	5.8	3,890	5.8	5,743	5.8	6.9
Kitchen	840	2.6	2,404	3.6	3,244	3.3	3.9
Bedroom	1,432	4.5	3,456	5.2	4,888	5.0	5.9
Laundry	61	0.2	240	0.4	301	0.3	0.4
Indoor living areas, n.e.c.	1,465	4.6	3,309	4.9	4,774	4.8	5.8
Other and unspecified place in home	6,589	20.8	13,980	20.9	20,569	20.8	24.8
<i>Total home</i>	<i>15,955</i>	<i>50.3</i>	<i>33,456</i>	<i>50.0</i>	<i>49,411</i>	<i>50.1</i>	<i>59.6</i>
Prison	3	0.0	5	0.0	8	0.0	0.0
Juvenile detention centre	0	0.0	2	0.0	2	0.0	0.0
Orphanage	1	0.0	1	0.0	2	0.0	0.0
Residential aged care	5,574	17.6	15,612	23.3	21,186	21.5	25.5
Other specified residential institution	73	0.2	113	0.2	186	0.2	0.2
Unspecified residential institution	15	0.0	68	0.1	83	0.1	0.1
<i>Total residential institution</i>	<i>5,666</i>	<i>17.9</i>	<i>15,801</i>	<i>23.6</i>	<i>21,467</i>	<i>21.7</i>	<i>25.9</i>
School	14	0.0	44	0.1	58	0.1	0.1
Health service area	515	1.6	936	1.4	1,451	1.5	1.7
Other specified institution and public administrative area	142	0.4	334	0.5	476	0.5	0.6
<i>Total school, other institution and public administration area</i>	<i>671</i>	<i>2.1</i>	<i>1,314</i>	<i>2.0</i>	<i>1,985</i>	<i>2.0</i>	<i>2.4</i>

(continued)

**Table 5.1 (continued): Place of occurrence for hospitalised fall injury cases, by sex, Australia 2012–13**

Place of occurrence	Men		Women		People		
	Count	%	Count	%	Count	%	% specified
Sports and athletics area	183	0.6	285	0.4	468	0.5	0.6
Sidewalk	947	3.0	1,718	2.6	2,665	2.7	3.2
Cycleway	4	0.0	10	0.0	14	0.0	0.0
Other specified public highway, street or road	161	0.5	287	0.4	448	0.5	0.5
Unspecified public highway, street or road	384	1.2	578	0.9	962	1.0	1.2
<i>Total street and highway</i>	<i>1,496</i>	<i>4.7</i>	<i>2,593</i>	<i>3.9</i>	<i>4,089</i>	<i>4.1</i>	<i>4.9</i>
Shop and store	507	1.6	1,472	2.2	1,979	2.0	2.4
Commercial garage	17	0.1	34	0.1	51	0.1	0.1
Office building	11	0.0	18	0.0	29	0.0	0.0
Cafe, hotel and restaurant	421	1.3	562	0.8	983	1.0	1.2
Other specified trade and service area	179	0.6	206	0.3	385	0.4	0.5
Unspecified trade and service area	32	0.1	40	0.1	72	0.1	0.1
<i>Total trade and service area</i>	<i>1,167</i>	<i>3.7</i>	<i>2,332</i>	<i>3.5</i>	<i>3,499</i>	<i>3.5</i>	<i>4.2</i>
Industrial and construction area	47	0.1	10	0.0	57	0.1	0.1
Farm	117	0.4	54	0.1	171	0.2	0.2
Other specified place of occurrence	671	2.1	1,150	1.7	1,821	1.8	2.2
Unspecified/not reported	5,762	18.2	9,974	14.9	15,736	15.9	..
<b>Total</b>	<b>31,735</b>	<b>100</b>	<b>66,969</b>	<b>100</b>	<b>98,704</b>	<b>100</b>	<b>..</b>

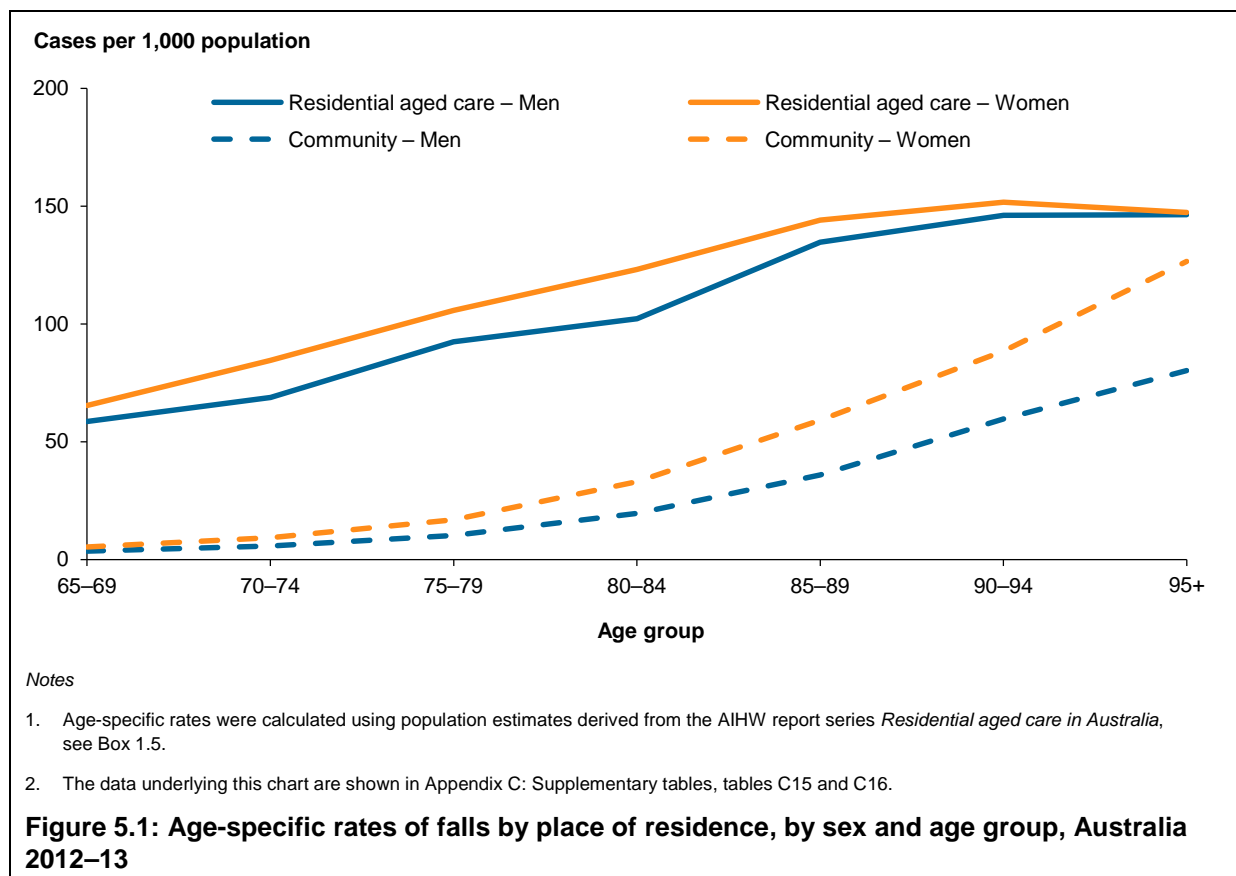
## Residential aged care

The estimated incidence of fall injury cases occurring in residential aged care for people aged 65 and older living in residential facilities in 2012–13 was 9,037 per 100,000 population, 5 times as high as the rate of falls in the home involving people aged 65 and older resident in the community (1,655 per 100,000 population). (Information about the calculating of rates of fall injury in residential aged care can be found in Box 1.5.)

The age-standardised rate of falls by female residents of residential aged care (9,566 per 100,000 population) was somewhat higher than that for male residents (8,309 per 100,000), giving a male:female rate ratio of 0.9. This compares to a rate of 1,982 per 100,000 for women and 1,228 per 100,000 for men resident in the community and falling at home (a male:female rate ratio of 0.6).

The age-specific rates of fall injury cases that occurred in the home and in residential aged care in 2012–13 are presented in Figure 5.1. Unlike falls reported to have occurred in the home, the rate of hospitalised falls for the oldest men resident in residential aged care was the same as the rate for the oldest women (146 per 1,000 population and 147 per 1,000 respectively). Contributing half of all fall injury cases, rates of falls in the home by older people living in the community present a pattern very similar to that for all cases (Figure 5.1), with rates higher for women than for men, especially for the oldest age groups.



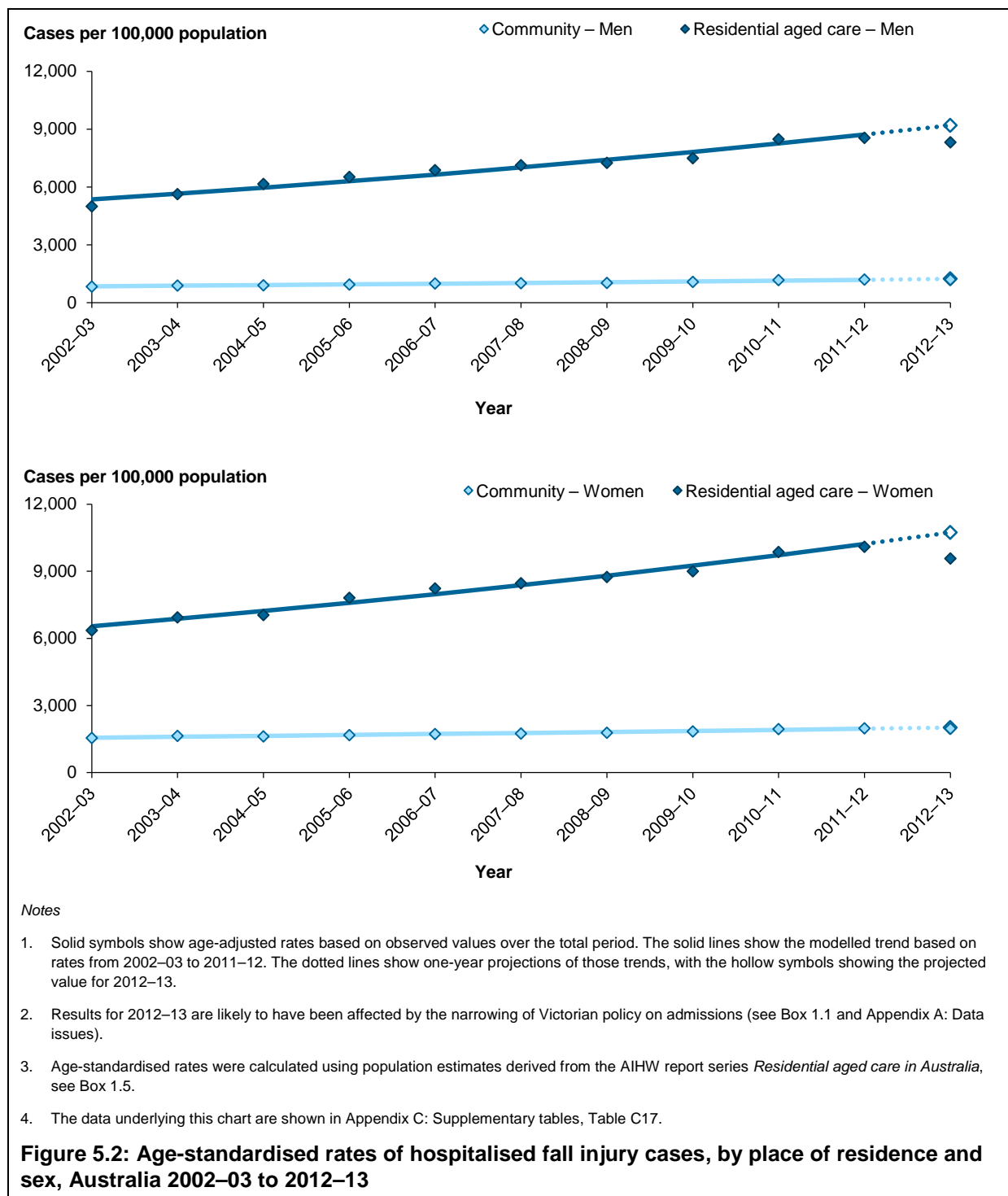


## How have the places where fall injuries occurred changed over time?

The two most common places of occurrence recorded for hospitalised fall injury cases for people aged 65 and older are the home and residential aged care. Over the 11-year period 2002–13, 72% of falls were reported to have occurred in the home or in residential aged care. Figure 5.2 presents the rates over time for fall injury cases resulting in hospitalisation that had been recorded as occurring in residential aged care or in the community at home.

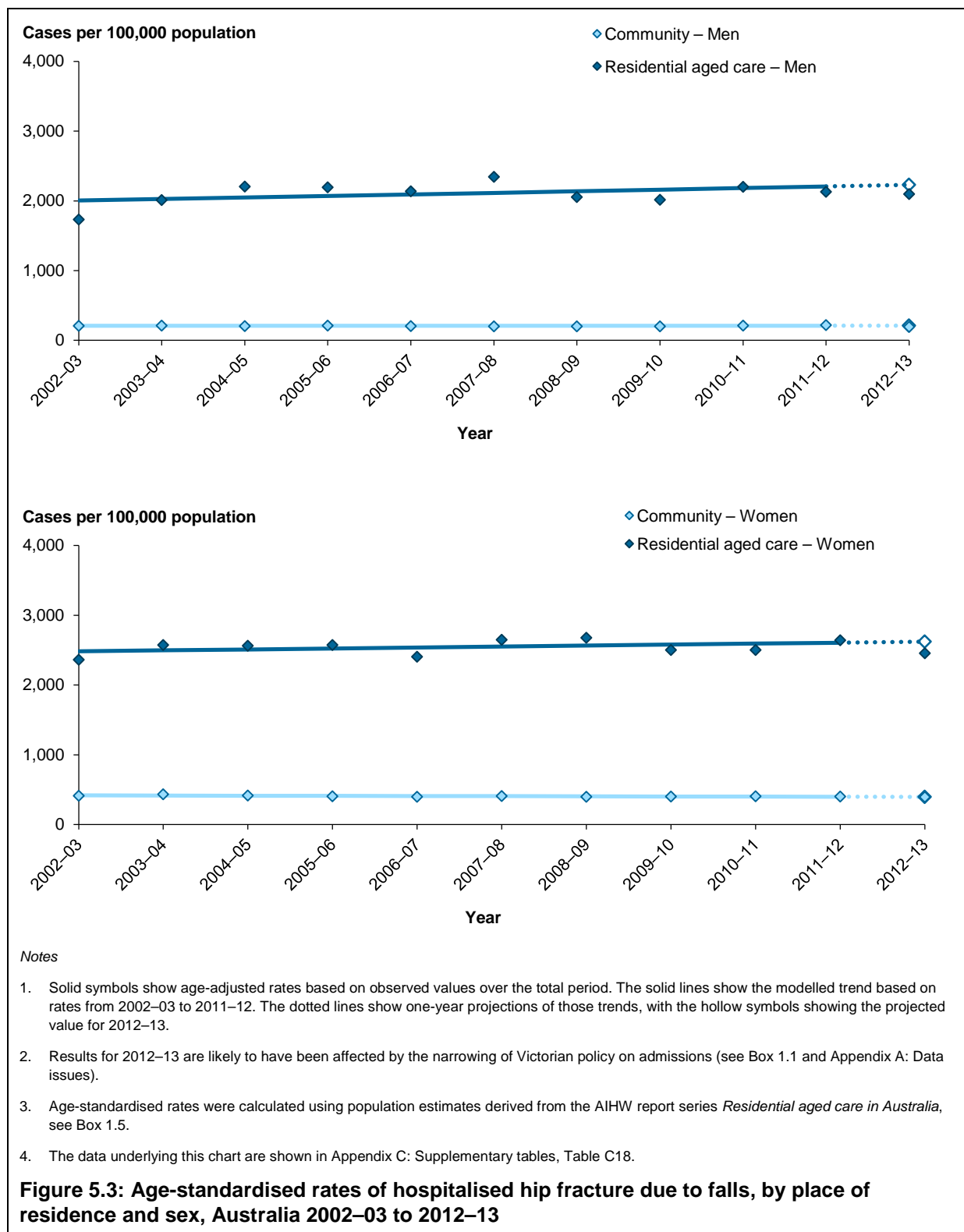
Residents of residential aged care had considerably higher rates of fall-related injury than community residents falling in the home in each year of the analysis, and both sets of rates increased significantly over the study period. Further, while age-standardised rates of falls occurring in the home that involved people aged 65 and older resident in the community increased significantly between 2002–03 and 2012–13 (men: 3.8% per year, 95% CI: 3.4–4.3; women: 2.6% per year, 95% CI: 2.3–2.9), rates of falls that occurred in an aged care facility increased faster (men: 5.6% per year, 95% CI: 4.8–6.3; women: 5.1% per year, 95% CI: 4.6–5.6).

Higher rates of fall-related injuries in residents of residential aged care are not surprising given the higher levels of frailty in this population relative to people of the same age that remain resident in the community. The faster annual increase in rates of falls for residents of residential aged care and the widening difference in injury risk suggest a continuing need for interventions designed for the aged care setting.



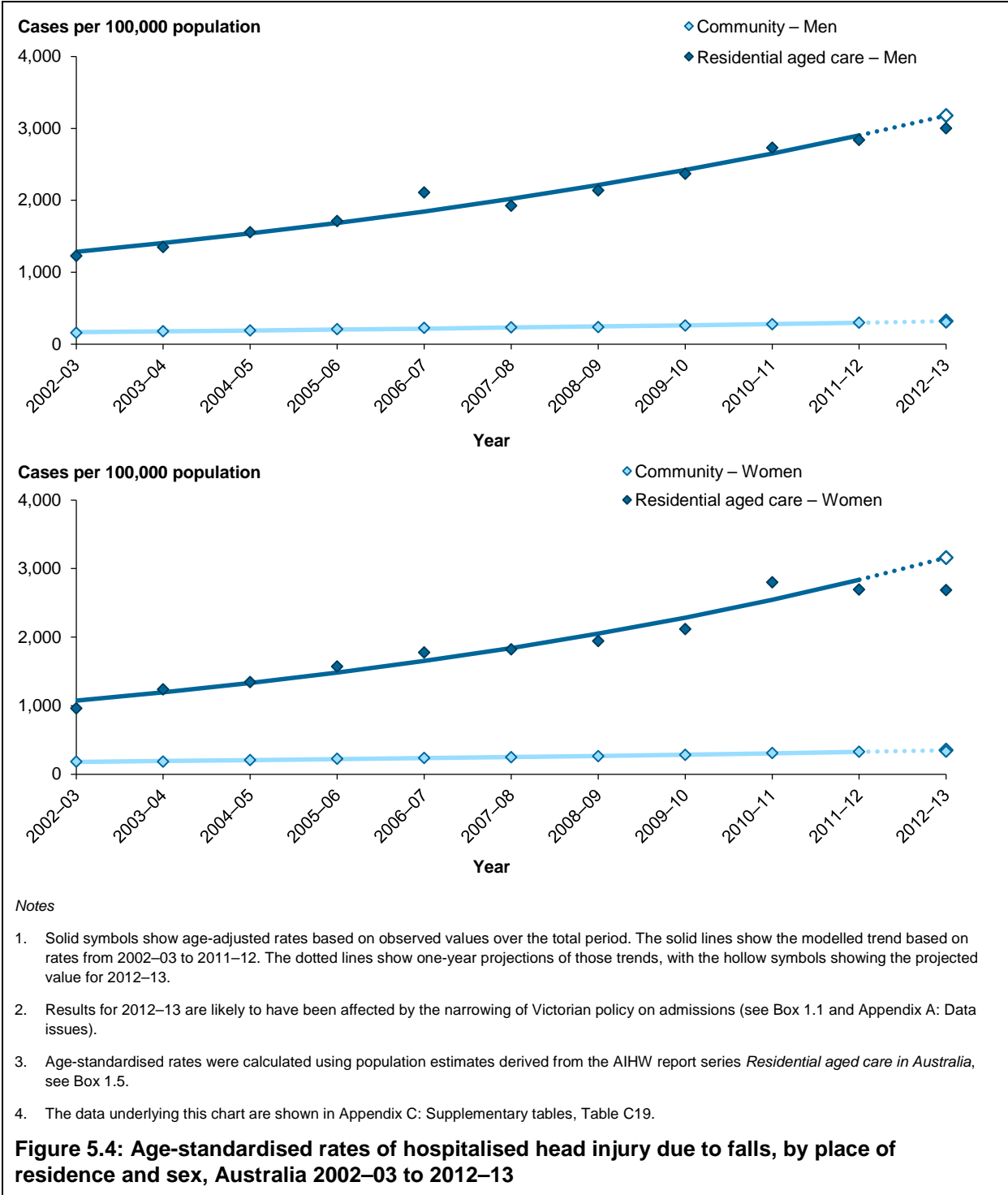
### Changes in type of injury by place over time

Rates of hip fractures due to falls were also much higher for residents of residential aged care than for residents of the community falling at home (Figure 5.3). Nevertheless, statistically significant trends were not observed for hip fracture rates for either sex in either setting in the period from 2002-03.



Rates of head injury due to falls were much higher for residents of residential aged care than for residents of the community falling at home (Figure 5.4). Strong upward trends in rates were observed for head injuries due to falls. Head injury rates were estimated to have increased by 6.9% per year (95% CI: 6.5–7.3) for residents of the community falling at home and 10.4% per year (95% CI: 9.1–11.7) for residents of residential aged care. This rate of

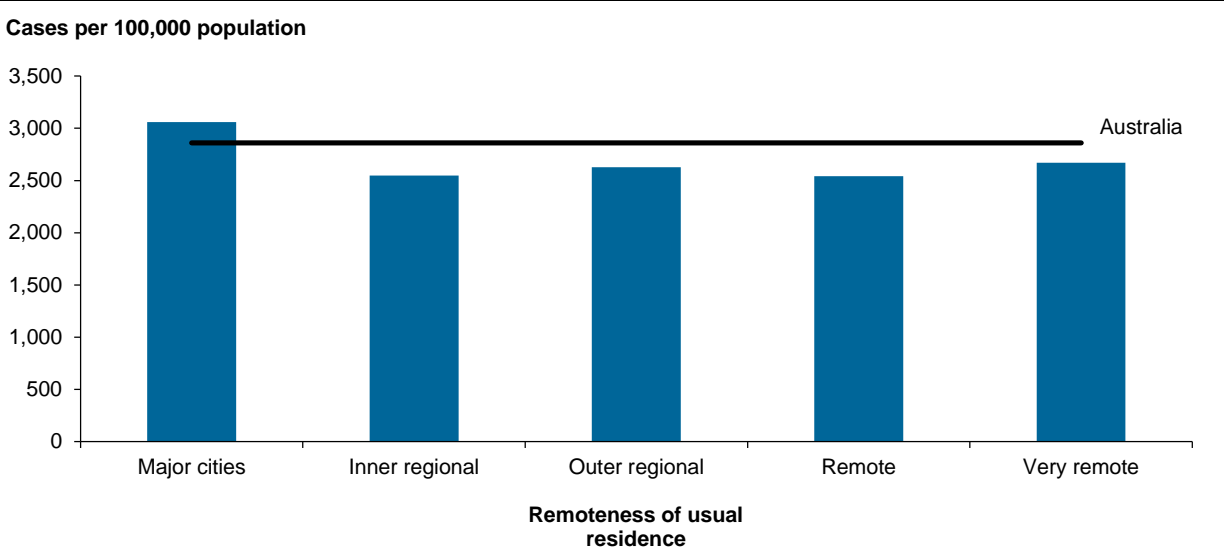
increase was a little more rapid for female than male residents of residential aged care: 11.4% per year (95% CI: 9.8–13.0) compared to 9.5% (95% CI: 8.2–10.8).



## Remoteness of usual residence

The number and rate of hospitalised fall injury cases varied with remoteness of usual residence, though not greatly (Figure 5.5). The rate for residents of *Major cities* was higher than for residents of every other region (3,061 per 100,000 population). Rates for most external causes are considerably higher for remote and very remote zones. In contrast,

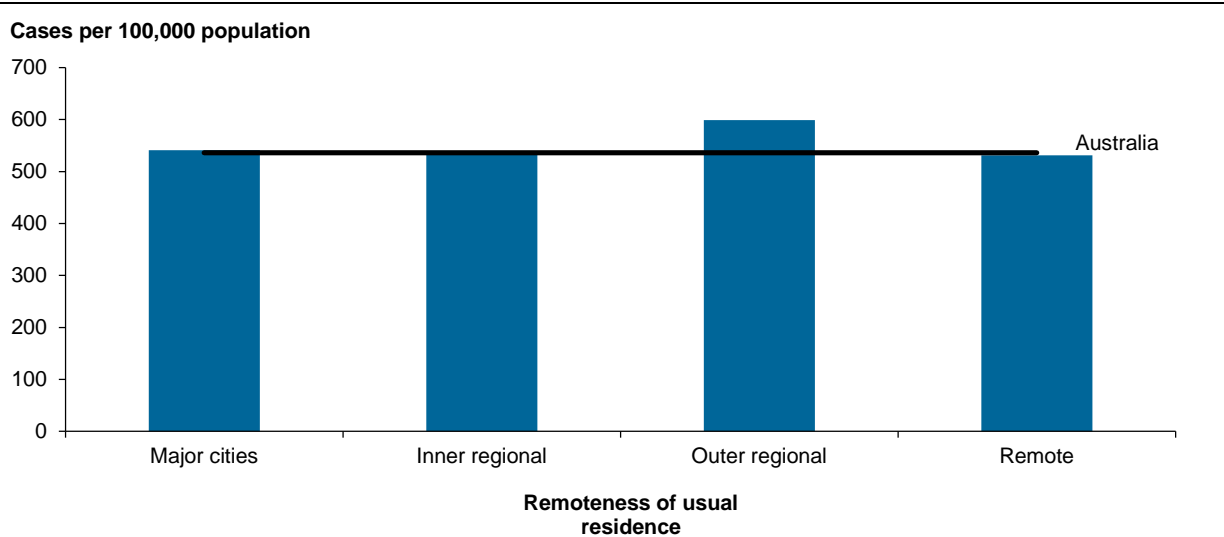
age-adjusted rates of fall-related injury vary less across remoteness areas (see Tovell et al. 2012). Such a pattern has been reported previously for fractures, particularly hip fractures involving older people both in Australia (Cooley & Jones 2002, Sanders et al. 2002) and internationally (Chevalley et al. 2002; Melton et al. 1999; Omsland et al. 2011; Wittich et al. 2010).



Note: The data underlying this chart are shown in Appendix C: Supplementary tables, Table C20.

**Figure 5.5: Age-standardised rates of hospitalised fall injury cases, by remoteness of usual residence, Australia 2012–13**

Figure 5.6 presents rates of hip fracture due to falls in older people by remoteness of residence. There is not a large difference between the regions, however: lowest rate of hip fracture was observed for residents of *Remote* areas (531 per 100,000 population) and the highest for residents of *Very remote* regions (642 per 100,000).



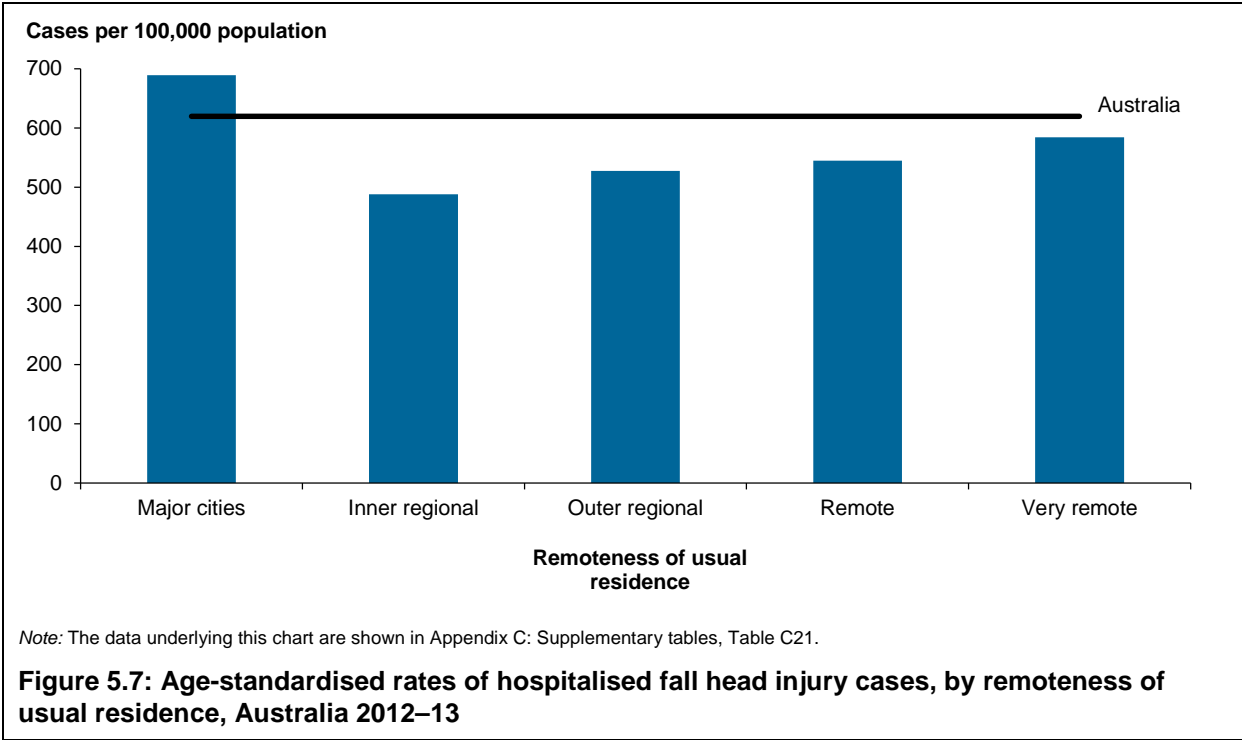
Notes

1. The data underlying this chart are shown in Appendix C: Supplementary tables, Table C21.
2. An age-standardised rate could not be calculated for the *Very remote* region.

**Figure 5.6: Age-standardised rates of hospitalised fall hip fracture cases, by remoteness of usual residence, Australia 2012–13**

Figure 5.7 shows that the pattern for head injuries due to falls in 2012–13 is somewhat similar to that for all types of fall-related cases) and to that of previous years (AIHW: Bradley 2013). Relatively high rates were observed for residents of *Major cities* (689 per 100,000 population) and *Very remote* areas (584 per 100,000 population) with lower—and quite similar—rates for residents in the other regions of Australia.

Rates of hip fracture and head injury due to falls should be interpreted with some caution, however, because of low numbers of cases in *Remote* and *Very remote* Australia (see supplementary tables C21 to C26 for case numbers).

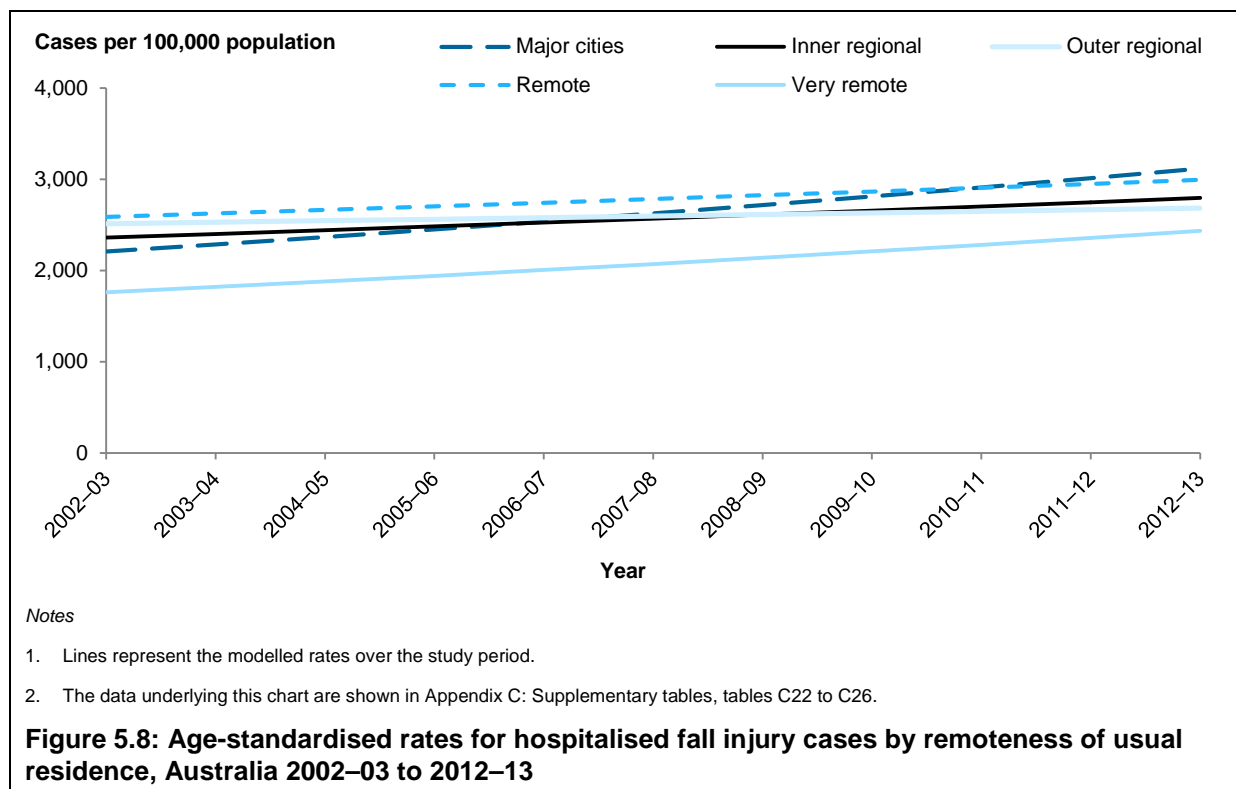


**Figure 5.7: Age-standardised rates of hospitalised fall head injury cases, by remoteness of usual residence, Australia 2012–13**

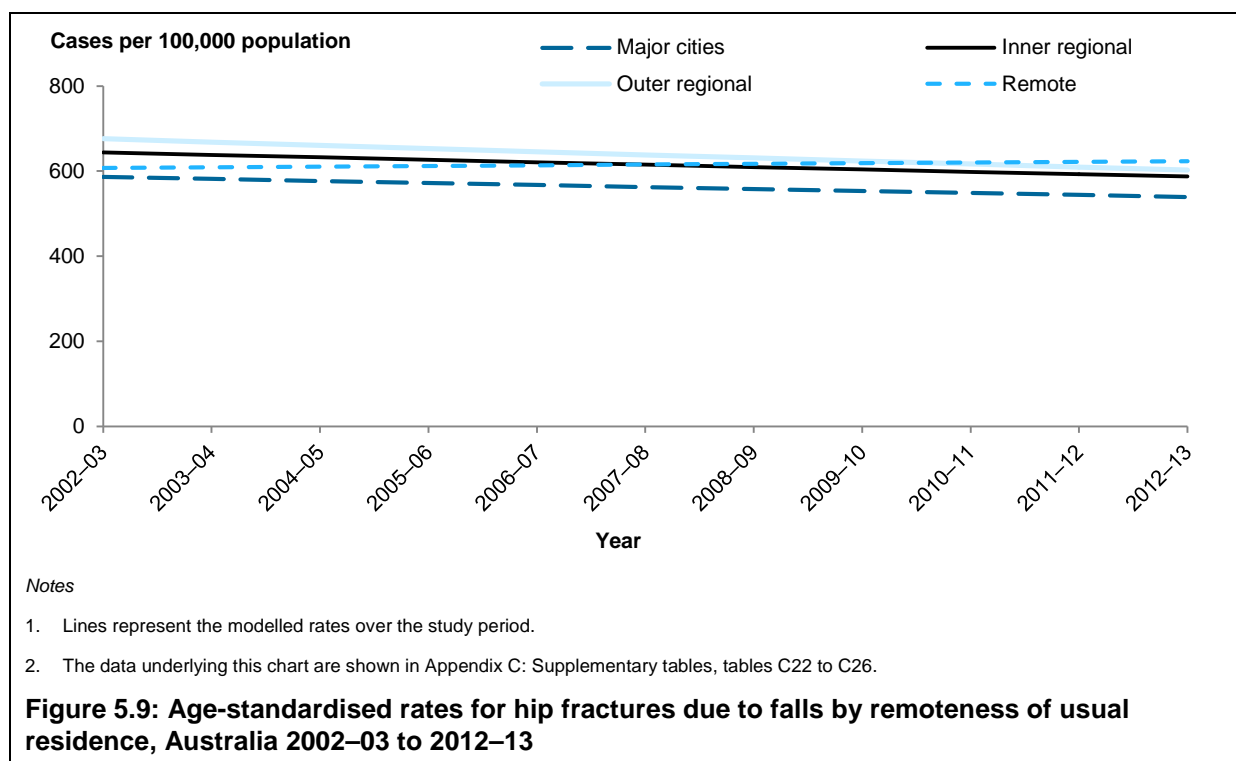
### How have hospitalised fall injuries varied by remoteness of usual residence over time?

Only modelled results are presented in the figures in this section as the numerous rate values are difficult to distinguish. Underlying rate values and case counts are provided in Appendix C: Supplementary tables.

Rates of fall injury overall did not differ greatly between residents of the five remoteness areas (Figure 5.8). This differs from most other external causes of injury, rates of which increase with remoteness of usual residence (see Tovell et al. 2012). Rates of fall injuries tended to rise over the study period in most of the regions. The trends were significant in all areas. The average annual increase was highest for *Major cities* (3.5% per year, 95% CI: 3.1–3.9).

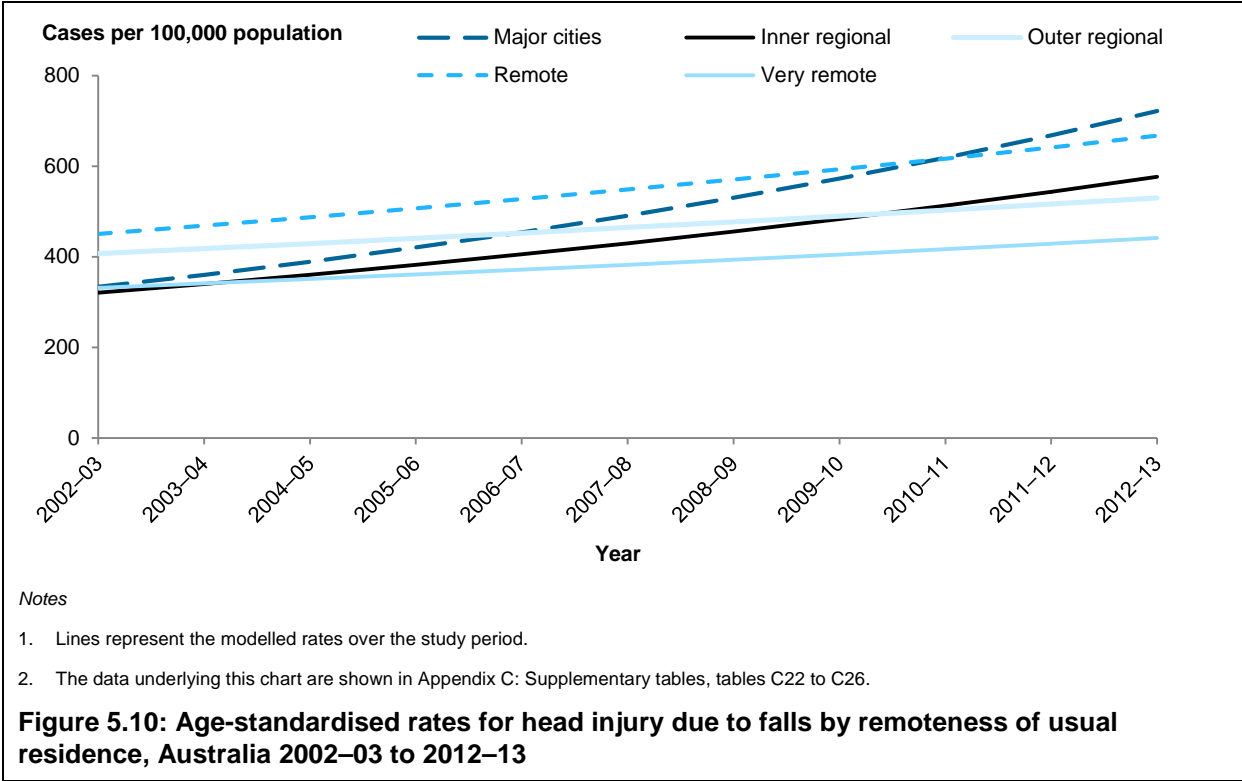


Decreases in the rate of fall-related hip fractures were observed in most remoteness areas (Figure 5.9). (Data for the *Very remote* zone were not sufficient to allow a model to be fitted) The largest decrease in the age-standardised rate of hospitalised hip fractures involved residents of Australia's *Outer regional* areas, falling  $-1.1\%$  per year over the 2002-13 study period (95% CI:  $-2.0$  to  $-0.33$ ,  $p < 0.01$ ). Trends for residents of *Remote* areas were not statistically significant ( $-0.3\%$  per year,  $p = 0.748$ ).



The rate of head injury due to falls increased over the study period in all remoteness areas (Figure 5.10). Rates of head injury increased by the greatest magnitude for residents of *Major cities* (8.0% per year, 95% CI: 7.5–8.5,  $p < 0.001$ ).

It is important to note that the case numbers underpinning the analyses presented in figures 5.8–5.10 are much smaller than those for the analysis of all fall injury cases by remoteness of usual residence, contributing to greater uncertainty around the results.





## 6 Additional episodes of hospital care due to falls by older people

The previous chapters described numbers and rates of cases of hospitalised injury due to falls in older people, based on the initial hospitalisation for each person having a fall. Many cases involve transfers between hospitals and follow-up care. This represents additional care of older people who have sustained injuries due to falls, rather than additional cases. These types of fall-related hospital care are the subject of this chapter.

In previous NISU *Falls* reports, two other types of episode were also described in the body of the report: 'other fall-related' and 'tendency to fall' separations. In this report analysis of 'other fall-related' and 'tendency to fall' separations is presented in Appendix B: Other fall-related separations.

### Fall injury inward transfer separations

A total of 11,144 fall injury inward transfer separations were identified for the 2012–13 study period. Women accounted for 68% (7,599 separations) of all fall injury inward transfer separations. The effect of the emergency department admission policy change in Victoria from July 2012 was much less for inward transfers than for cases, which is understandable given that, having been admitted previously, inward transfers should have very little to do with emergency departments. We estimate that only about 170 inward transfers would have been in the 2012–13 count if there had not been this policy change (see Appendix A: Data issues).

Inward transfers occurred at an age-standardised rate of 325 per 100,000 population, about the same as that reported for previous years. As for fall injury cases, these inward transfer separations occurred at a higher rate for women (383 per 100,000) than for men (249 per 100,000).

Over a third of fall injury inward transfers were *Injuries to the hip and thigh*, a much higher proportion than for fall injury cases (36% of inward transfer separations, see Table 6.1). Head injuries were a relatively common principal diagnosis for inward transfers; however they accounted for a much lower proportion than they did for fall injury cases (13% versus 22%, respectively).

**Table 6.1: Injury type for fall injury inward transfer separations, by sex, Australia 2012–13**

Principal diagnosis	Men		Women		People	
	Count	%	Count	%	Count	%
Injuries to the head	669	18.9	760	10.0	1,429	12.8
Injuries to the neck	180	5.1	167	2.2	347	3.1
Injuries to the thorax	266	7.5	391	5.1	657	5.9
Injuries to the abdomen, lower back, lumbar spine and pelvis	415	11.7	1,034	13.6	1,449	13.0
Injuries to the shoulder and upper arm	254	7.2	774	10.2	1,028	9.2
Injuries to the elbow and forearm	119	3.4	549	7.2	668	6.0
Injuries to the wrist and hand	70	2.0	63	0.8	133	1.2
Injuries to the hip and thigh	1,202	33.9	2,798	36.8	4,000	35.9

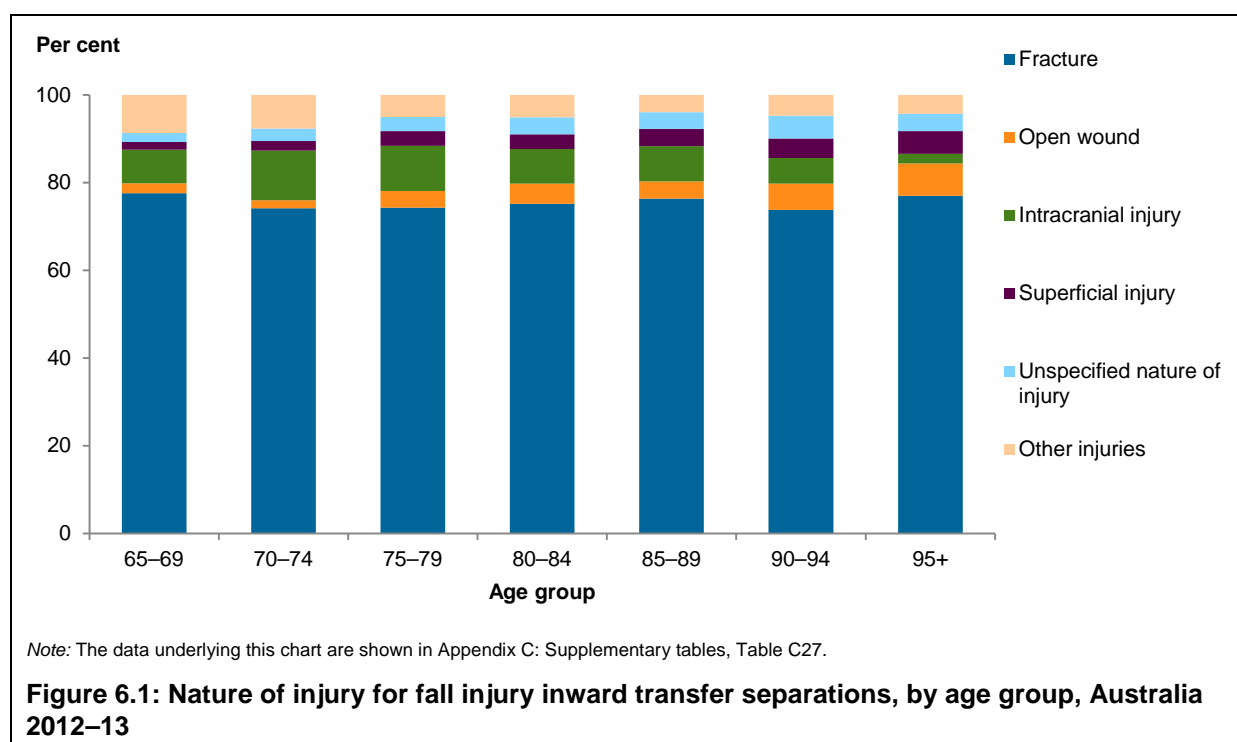
(continued)

**Table 6.1 (continued): Injury type for fall injury inward transfer separations, by sex, Australia 2012–13**

Principal diagnosis	Men		Women		People	
	Count	%	Count	%	Count	%
Injuries to the knee and lower leg	288	8.1	892	11.7	1,180	10.6
Injuries to the ankle and foot	38	1.1	91	1.2	129	1.2
Injuries involving multiple body regions	6	0.2	4	0.1	10	0.1
Injuries to unspecified parts of trunk, limb or body region	15	0.4	41	0.5	56	0.5
Other and unspecified effects of external causes	0	0.0	4	0.1	4	0.0
Certain early complications of trauma	23	0.6	31	0.4	54	0.5
<b>Total</b>	<b>3,545</b>	<b>100</b>	<b>7,599</b>	<b>100</b>	<b>11,144</b>	<b>100</b>

Figure 6.1 shows that most inward transfers were fractures in nature, and that fractures were common for all age groups. Fall injury inward transfers with a principal diagnosis of intracranial injury were more common for younger age groups while principal diagnoses describing open wounds and superficial injuries were more common for older age groups.

As for fall injury cases, the vast majority of inward transfers were attributed to three external causes: *Fall on same level from slipping, tripping and stumbling* (29% of inward transfer separations), *Other fall on same level* (21%), and *Unspecified fall* (33%) (data not shown).



## Fall-related rehabilitation and related care separations

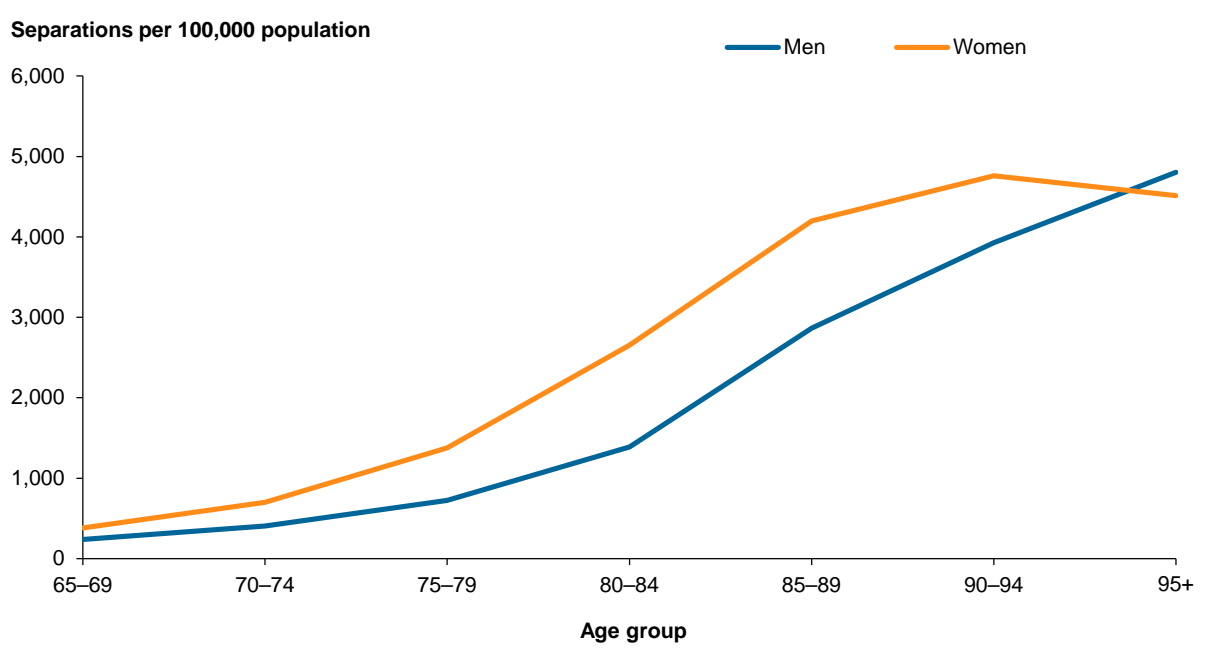
Many fall injury cases require rehabilitation and related care. This aspect of hospital care is typically recorded in a different separation record from the acute care phase. Many are coded with a principal diagnosis from Chapter 21 of the ICD-10-AM (*Factors influencing health status and contact with health services*). We class separations having one of four specific Chapter 21 principal diagnoses as well as an injury additional diagnosis and a fall external cause as being hospital care related to an injurious fall (see Appendix A: Data

issues). These ‘fall-related rehabilitation and related care’ separations must be included for an accurate assessment of the admitted patient care provided due to fall-related injury.

More than 40,000 fall-related rehabilitation and related care separations were identified for people aged 65 and older in 2012–13 (40,356). These 40,356 fall-related rehabilitation and related care separations represented 1.1% of all hospital separations for the older population in 2012–13 and nearly three-quarters involved women (69%, 27,971 separations). As for fall-related inward transfers, and for similar reasons, the effect of the emergency department admission policy change in Victoria from July 2012 was much less for fall-related rehabilitation and related care separations than for cases.

The age-standardised rate of fall-related rehabilitation and related care separations was 1,177 separations per 100,000 population—very similar to that reported previously. The age-standardised rate for women (1,419 per 100,000) was much higher than that for men (871 per 100,000). Figure 6.2 shows that, as with most other types of fall-related hospital care, age-specific rates of fall-related rehabilitation and related care separations in 2012–13 increased considerably with age for both men and women until very old age. For people aged 90+ the age-specific rate of fall-related rehabilitation and related care was 4,512 per 100,000.

Most fall-related rehabilitation and related care separations (90%, 36,140) had a principal diagnosis of Z50 *Care involving use of rehabilitation procedures*. Examining the first-listed injury diagnosis for fall-related rehabilitation and related care separations found that an even greater proportion of Injuries to the hip and thigh (42%, 17,000 separations) than for either fall injury cases or inward transfer separations (data not shown).



Note: The data underlying this chart are shown in Appendix C: Supplementary tables, Table C28.

**Figure 6.2: Age-specific rates of fall-related rehabilitation and related care separations, by sex and age group, Australia 2012–13**

# How have fall-related rehabilitation and related care separations changed over time?

Age-standardised rates of both fall injury inward transfer separations and fall-related rehabilitation and related care separations were observed to have significantly increased over the 11 years to June 2013 (Figure 6.3). Fall injury inward transfers were estimated to have increased by 2.3% per year over the study period (95% CI: 1.6–3.0,  $p < 0.001$ ) while fall-related rehabilitation and related care separations were estimated to have increased by a more substantial 8.6% per year (95% CI: 6.4–10.8,  $p < 0.001$ ).

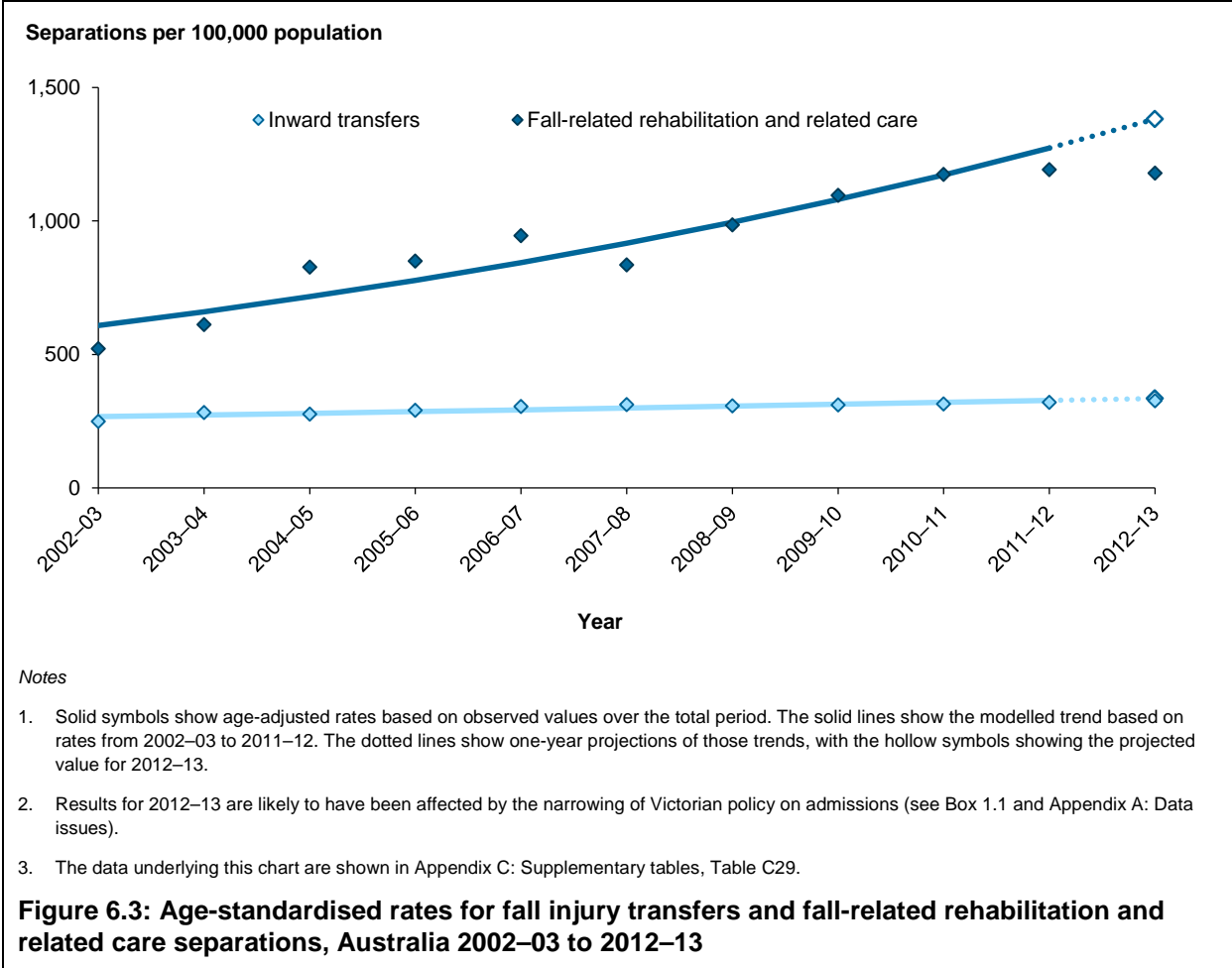
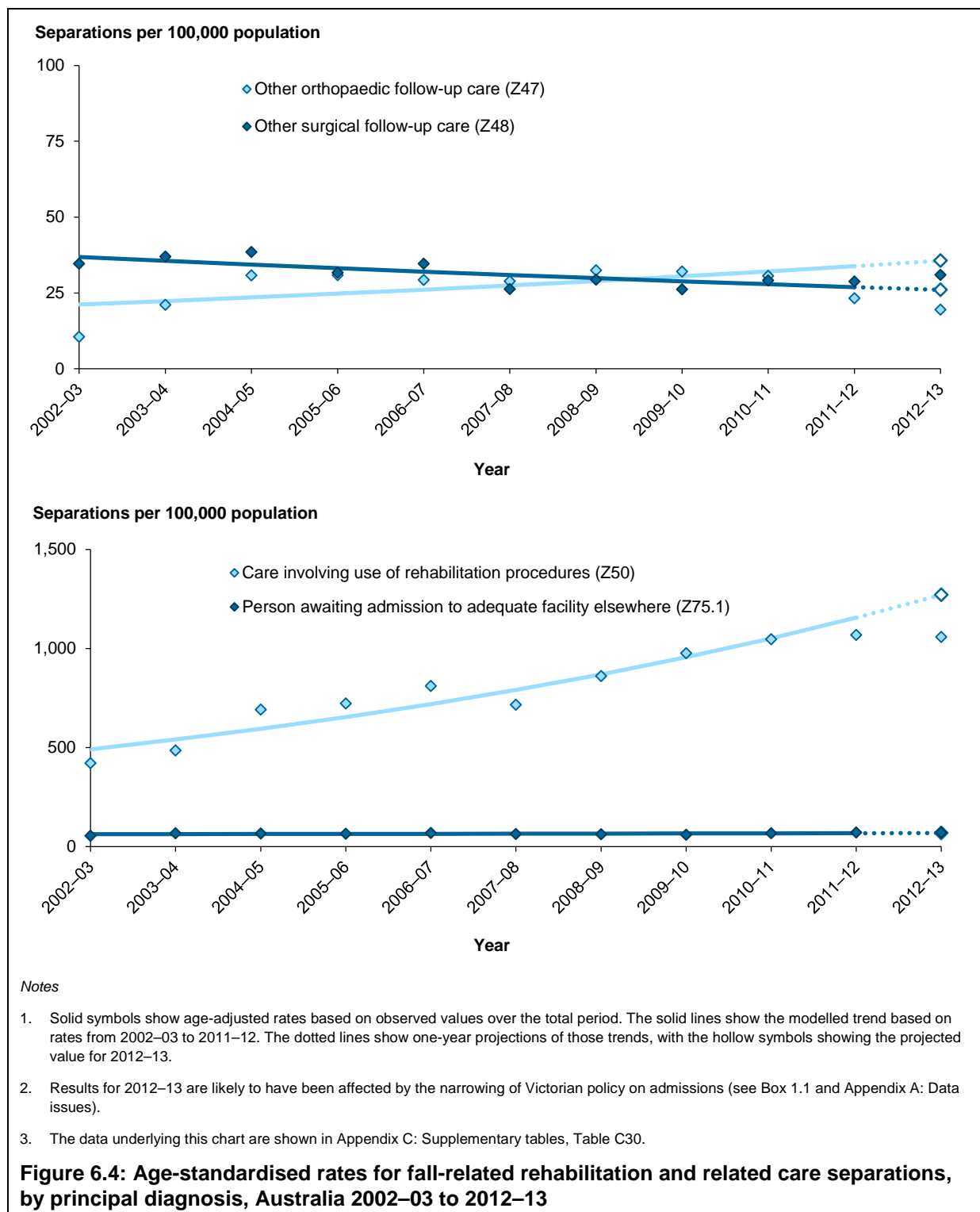


Figure 6.4 shows that a substantial increase for fall-related rehabilitation and related care separations was observed for those records with a principal diagnosis of Z50 *Care involving use of rehabilitation procedures*: 10.0% per year (95% CI: 7.6–12.4  $p < 0.001$ ).



We caution against interpreting the rises in rates shown in Figures 6.3 and 6.4 as necessarily representing more inpatient care for fall-related injuries in hospitals. They could be due to more complete recording of when episodes of follow-up care are related to falls. That is, what may be increasing is the number of separations per fall event (more transfers and more, or more identifiable, episodes of follow-up care) whereas overall length of stay for fall-related injuries may remain similar over time. Without person-linked data it is difficult to investigate patterns of admitted patient episodes per case; however, information on trends in length of stay is provided in the next section.

## Length of stay

There were 1,385,417 patient days for hospital care related to injurious falls (that is, fall injury cases, inward transfers and fall-related rehabilitation and related care separations) by people aged 65 and older in 2012–13 (Table 6.2). This figure represents 10% of all patient days for this population in this period and an increase of nearly 32,000 patient days on the figure reported for 2010–11 (2%).

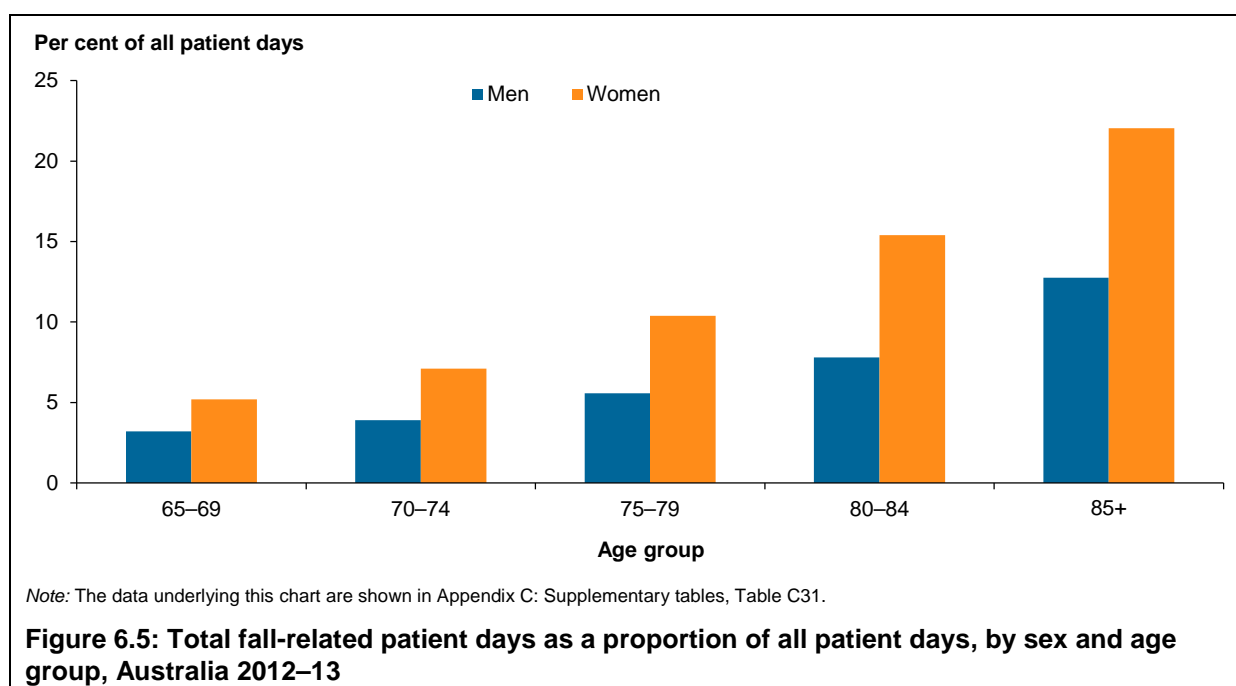
**Table 6.2: Total patient days for fall-related hospitalisations, by sex, Australia 2012–13**

Separation type	Men	Women	People	% of fall-related	% of all patient days 65+(a)
Fall injury case separations <sup>(b)</sup>	195,174	421,018	616,192	44.5	4.6
Fall injury inward transfer separations	43,113	99,145	142,258	10.3	1.1
Fall-related rehabilitation and related care separations	193,311	433,656	626,967	45.3	4.7
<b>Total fall-related separations</b>	<b>431,598</b>	<b>953,819</b>	<b>1,385,417</b>	<b>100</b>	<b>10.4</b>

(a) Patient days for total episodes due to all causes at ages 65+.

(b) Fall injury cases, described in Chapter 2, are included here to provide an overview of all three types of fall-related record.

The 1,385,417 patient days of hospital care attributable to injurious falls by people aged 65 and older in 2012–13 accounted for 7% of all patient days for men and 14% of patient days for women aged over 65. The patient days for fall-related separations in 2012–13, as a proportion of all patient days for any cause, increased with age for both men and women (Figure 6.5). For people aged 85 and older, fall-related separations accounted for nearly one-fifth of the total number of patient days for this age group (18%).



## **Total mean length of stay**

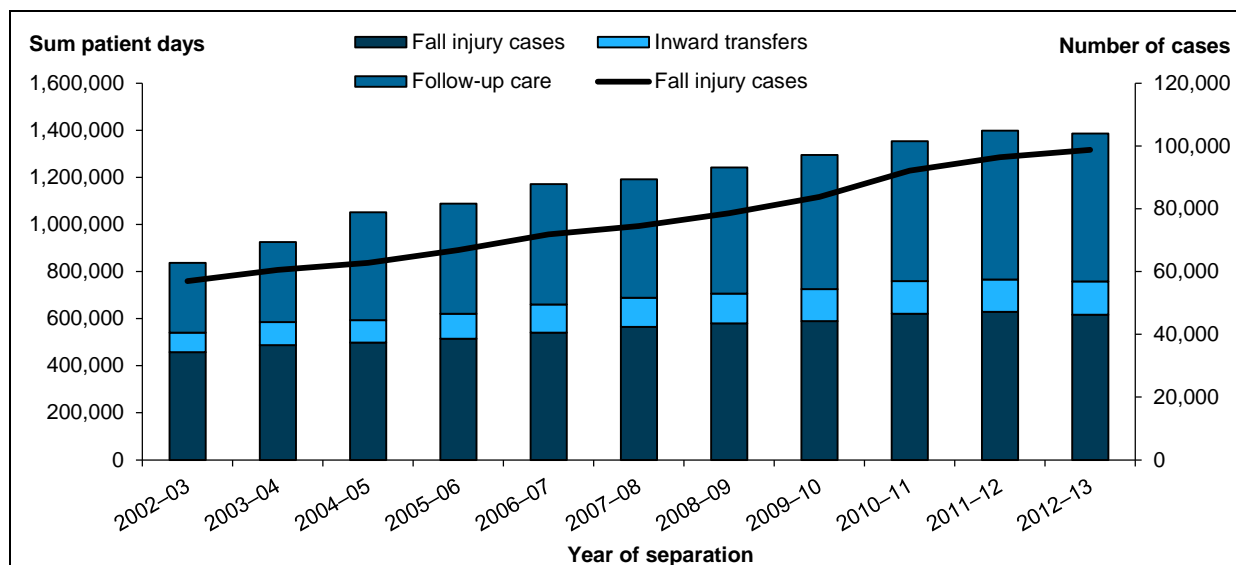
As described above, this report considers 3 groups of hospital separations that contribute to the admitted patient care provided due to a fall-related injury; fall injury inward transfers and fall-related rehabilitation and related care episodes are typically preceded by an initial episode for acute care of a fall injury case. Accordingly, a valid estimate of the average total duration of hospital care for admitted incidents of fall-related injury should include the patient days for all 3 of these types of record. That is, a mean total length of stay may be calculated by dividing the sum number of patient days reported for fall-related separations by the number of cases for the period. On this basis, the estimated total mean length of stay for fall injury cases in 2012–13 (98,704 cases) was 14.0 days—half a day shorter than that estimated in 2010–11 (14.7 days). Nevertheless, this estimate is very similar to that identified for fall-related acute hospital care by Close and colleagues (Close et al. 2012) when documenting the care pathways and healthcare use of older people in Sydney between 2007 and 2009. Importantly, though, when episodes of non-acute rehabilitation care were included in their estimates, mean lengths of stay were substantially longer: 35.6 days for men and 30.1 days for women (Close et al. 2012).

## **How has length of stay for fall injury changed over time?**

The number of patient days for all hospital care attributable to fall-related injury (that is, fall-related cases, transfers and follow-up care) increased substantially over the 11 years 2002–03 to 2012–13 (Figure 6.6). Commensurate with the increasing numbers of cases, all fall-related hospital care increased from 837,042 patient days in 2002–03 to 1,385,417 patient days in 2012–13.

The initial episode of admitted patient care for each fall injury case accounted for 55% of fall-related patient days in 2002–03. This proportion fell during the study period to 44% in 2012–13 because of marked increases in the number of patient days due to fall injury inward transfers and fall-related follow-up care.

The annual number of patient days for fall injury cases was 457,518 patient days in 2002–03, rising to 616,192 patient days in 2012–13, an increase of about one-third. The annual number of patient days for fall injury inward transfer and fall-related rehabilitation and related care separations more than doubled over the 11-year study period, however. Fall injury inward transfers accounted for 82,917 patient days in 2002–03 compared to 142,258 patient days in 2012–13, while fall-related rehabilitation and related care separations accounted for 296,607 patient days in 2002–03 compared to 626,967 patient days in 2012–13.



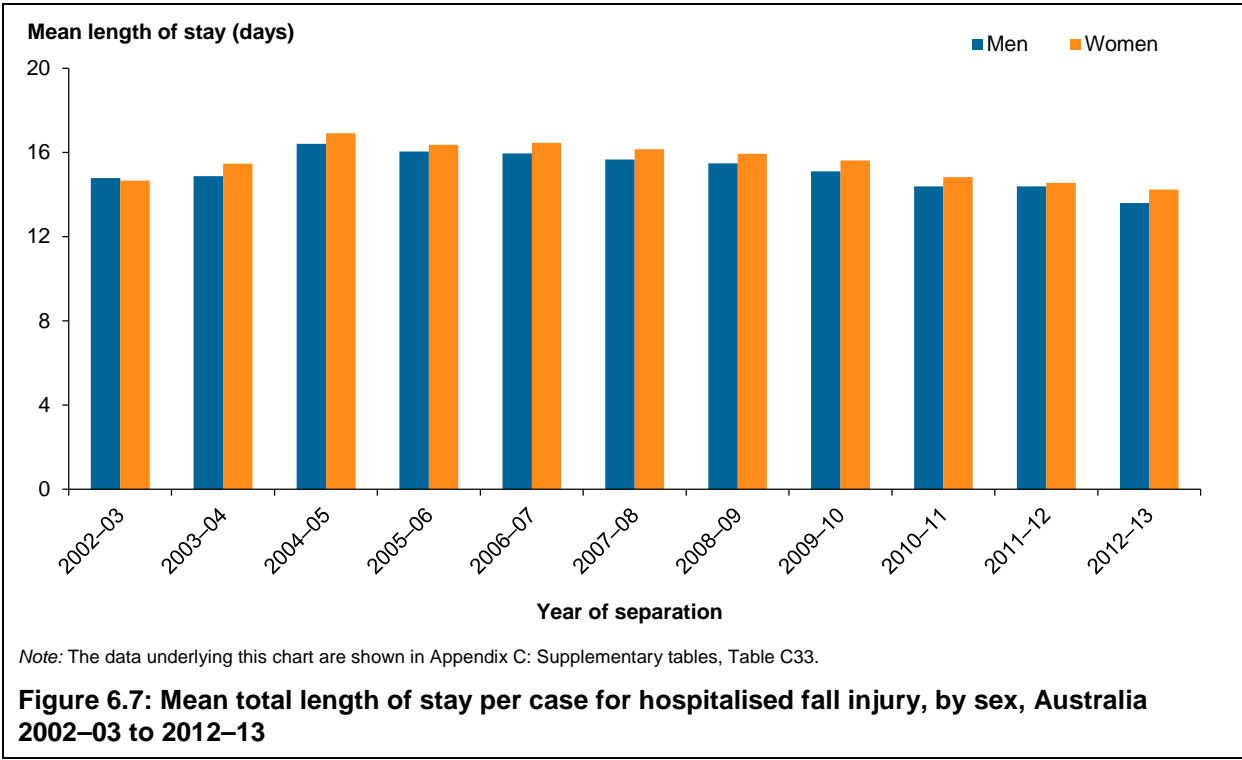
Note: The data underlying this chart are shown in Appendix C: Supplementary tables, Table C32.

**Figure 6.6: Patient days for fall-related separations and age-standardised rates of hospitalised fall injury cases, Australia 2002-03 to 2012-13**

More fall cases were hospitalised in each year over the 11 years 2002-03 to 2012-13 and many more patient days were provided, in aggregate, for the care of these injuries. However, this is not to say that each fall injury case required an increasing level of hospital care (that is, a longer stay in hospital) over the study period.

Figure 6.7 shows that the estimated mean total length of stay per case (all patient days attributable to falls divided by the number of cases for the year) was very similar, for both men and women, at the beginning of the study period and at the end. For men and women together this was a mean of 14.7 days per case in 2002-03 and 14.0 days per case in 2012-13. There was a rise in length of stay in the first half of the study period, to a maximum of 16.8 days per case for people in 2004-05 (coincident with the noticeable jump in the rate of fall-related rehabilitation and related care separations and associated patient days). A sustained decrease in mean total length of stay was observed to 2012-13. The change in the mix of types of fall injuries observed over the study period might have been a factor in the decrease in length of stay for an increasing rate of hospitalised fall injury. That is, a decreasing rate of hip fractures, which have a longer mean length of stay than most other types of hospitalised fall injury, might have off-set the additional care required by increasing rates of fall injury cases that have typically shorter lengths of stay.





# Appendix A: Data issues

## Data sources

The data on hospital separations were from the Australian Institute of Health and Welfare's (AIHW) National Hospital Morbidity Database (NHMD). Comprehensive information on the quality of the data for 2012–13 is available in *Australian hospital statistics 2012–13* (AIHW 2014a) and the data quality statement below. Nearly all fall injury cases admitted to hospitals in Australia are thought to be included in the NHMD data reported.

In 2012–13, diagnoses and external cause injury and poisoning were recorded using the seventh edition of the *International statistical classification of diseases and related health problems, 10th revision, Australia modification* (ICD-10-AM). Data from earlier years were coded to earlier editions of the ICD-10-AM.

Denominators for most age-specific and age-standardised rates are estimated resident population (ERP) values as at 31 December of the relevant year. Australian ERPs for 30 June 2001 (persons, by 5-year age groups to the same oldest group present in the population denominator data) were used as the standardising population throughout the report. Data from other sources, mostly based on ERPs, were used as denominators for rates by remoteness of usual residence, Indigenous status and residence in residential aged care (see Rates, below).

## Definitions

The principal diagnosis is the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted patient care (AIHW 2014a).

An external cause is defined as the environmental event, circumstance or condition that was the cause of injury or poisoning. Whenever a patient has a principal or additional diagnosis of an injury or poisoning, an external cause code should be recorded. In this report the focus was on external causes W00–W19 *Falls*.

## Selection criteria

This report describes the incidence of fall-related injuries newly occurring in the older Australian population which resulted in admission to a hospital (fall injury cases). For some purposes, particularly concerning length of stay and total patient days, several other types of fall-related separation record warrant attention. This section describes the criteria that were used to select NHMD records to achieve these purposes.

## Period

This report is restricted to admitted patient episodes that ended in the period 1 July 2012 to 30 June 2013 for the single-year analyses and admitted patient episodes that ended in the period 1 July 2002 to 30 June 2013 for the multi-year trend analyses.

## Fall cases

Fall injury cases were defined as all NHMD records that met all of the following four criteria:

- the patient was aged 65 or older when admitted
- the principal diagnosis was in the range S00–T75 or T79, which includes all of the ICD-10-AM Injury chapter except *Complications of surgical and medical care, n.e.c.*, *Adverse effects, n.e.c.* and *Sequelae of injuries, of poisoning and of other consequences of external causes*
- the first-reported external cause code was in the range W00–W19 *Falls*
- The mode of admission was not a transfer from another hospital.

Selection has been based on principal diagnosis because this refers to the condition ‘chiefly responsible for occasioning the episode of admitted patient care’ (AIHW 2014a). The first-reported external cause code was chosen as a selection criterion as this is most likely to be related to the principal diagnosis.

Separation records that met the first three criteria but were inward transfers from another acute care hospital (and thus excluded by the fourth criterion) were omitted from case counts to reduce over-counting (see Estimating incident cases, below).

## Inward transfer separations

Fall injury inward transfers were defined as all NHMD records that met all of the following four criteria:

- the patient was aged 65 or older when admitted
- the principal diagnosis was in the range S00–T75 or T79
- the first-reported external cause code was in the range W00–W19 *Falls*
- the mode of admission was a transfer from another hospital.

Inward transfers were analysed separately from cases but included in measures of patient days and length of stay due to fall-related injuries.

## Fall-related rehabilitation and related care separations

It is likely that many separations following an episode of admitted patient care recognisable as an injury case are coded with a principal diagnosis from Chapter 21 of the ICD-10-AM (*Factors influencing health status and contact with health services*), particularly for older people with fall injuries. Most such separations are coded as Z50 *Care involving use of rehabilitation procedures*. Rehabilitative care is implied by the diagnoses’ labels but not necessarily by the separation’s hospital service care type code. Such separations contribute a non-trivial proportion of hospital care due to falls by older people.

In this report, fall-related rehabilitation and related care separations were defined as all NHMD records that met all of the following four criteria:

- the patient was aged 65 or older when admitted
- the principal diagnosis was Z47 (*Other orthopaedic follow-up care*), Z48 (*Other surgical follow-up care*), Z50 (*Care involving use of rehabilitation procedures*) or Z75.1 (*Person awaiting admission to adequate facility elsewhere*)
- at least one additional diagnosis in the range S00–T75 or T79
- at least one external cause code in the range W00–W19 *Falls*.

## **‘Other fall-related’ separations**

The NHMD contains other records, not meeting the criteria for fall-related cases, transfers or follow-up care, which include one or more external cause codes in the range W00–W19 *Falls* as well as one or more injury diagnosis in the range S00–T75 or T79. The role of the injurious fall in bringing about the episode in hospital is less clear for this type of record than for the types defined above and as such analysis of these separations is presented in ‘Appendix B: Other fall-related separations’ rather than the body of the report.

These ‘other fall-related’ separations are defined as all NHMD records that met all of the following four criteria:

- the patient was aged 65 years or older when admitted
- additional diagnosis in the range S00–T75 or T79
- any external cause code in the range W00–W19
- the record did not satisfy the criteria for fall injury case, inward transfer or fall-related rehabilitation and related care separations.

## **‘Tendency to fall’ separations**

Also presented in ‘Appendix B: Other fall-related separations’ is analysis of separations containing the diagnosis code R29.6 *Tendency to fall, not elsewhere classified*. The ICD-10-AM has included the diagnosis code R29.6 since 1 July 2006, replacing the R29.81 *Other and unspecified symptoms and signs involving the nervous and musculoskeletal systems—falls* code used in earlier editions of the classification (NCCH 2010). The coding standard for R29.6 describes the ‘tendency to fall because of old age or other unclear health problems’ (NCCH 2010). Falls due to difficulty walking, dizziness and giddiness, syncope and collapse or causing injury are explicitly excluded. Further, the coding standards specify that R29.6 should not be applied in cases of known injury or when a medical condition is found to be the cause of the falls. Nevertheless, a relatively small number of records containing fall injury codes (for example, fall injury case separations, fall-related rehabilitation and related care separations) also contain code R29.6 as an additional diagnosis (10,828 in 2012–13). To avoid double-counting we have omitted records already included elsewhere in the report from the analysis of ‘tendency to fall’ separations presented in Appendix B: Other fall-related separations.

In this report, ‘tendency to fall’ separations were defined as all NHMD records that met all of the following three criteria:

- the patient was aged 65 years or older when admitted
- any diagnosis variable contained an R29.6 code
- the separation was not classed as a fall injury case, inward transfer, fall-related rehabilitation and related care or ‘other fall-related’ separation.

## **Estimating incident cases**

Each record in the NHMD refers to a single episode of admitted patient care in a hospital. Some fall injuries result in more than one episode in hospital and, hence, more than one NHMD record. This can occur in two main ways:

- a person is admitted to one hospital, then transferred to another and/or

- a person has an episode of admitted patient care in hospital, is discharged home (or to another place of residence) and is then admitted for further treatment for the same injury, to the same hospital or another one.

The NHMD does not include information designed to enable the set of records belonging to the same fall injury case to be recognised as such. Hence, there is potential for some cases to be counted more than once when two or more NHMD records are generated, all of which satisfy the selection criteria being used.

Information in the NHMD enables this problem to be reduced, though not eliminated. The approach used to estimate fall injury cases in this report makes use of the *Mode of admission* variable, which indicates whether the episode of admitted patient care commenced with inward transfer from another acute care hospital. Episodes of this type (inward transfers) are likely to have been preceded by another episode that also meets the selection criteria for fall injury cases, so are omitted from our estimates of case counts.

This procedure should largely correct for overestimation of cases that is due to transfers, but will not correct for overestimation that is due to readmissions.

## Length of stay

The patient days in hospital attributable to a fall injury include those associated with three of the types of record defined above: fall injury cases, fall injury inward transfers and fall-related rehabilitation and related care. Length of stay values reported here are sums of these three types (except where specified as being limited to one of these types).

Mean length of stay values were calculated as the sum of patient days for these three types of record divided by the number of fall injury cases.

Note that this method does not include the patient days, potentially attributable to fall-related injury, associated with the remaining two types of record distinguished in this report: 'other fall-related' and 'tendency to fall' separations.

## Rates

### Age standardisation

Rates of falls were generally age-standardised. This adjustment allows for comparison without distortion due to population group differences such as those that may occur due to the ageing of the Australian population over time. Direct standardisation was used, taking the Australian population in 2001 as the standard (ABS 2013b) and using 5-year age groups extending to the oldest age permitted by the case data and the population denominator data. Age-standardising national rates for the period commencing 2002–03 were based on 5-year age groups to 95.

### Population denominators

#### General population

Where possible, rates were calculated using the final estimate of the ERP as at 31 December in the relevant year as the denominator (for example, 31 December 2012 for 2012–13 data). Where tables of 31 December ERPs were not available but sufficient tables of 30 June ERPs were available population denominators were calculated as the average of 30 June estimates for adjacent years. However, due to the lack of June 2013 population data

at the time of analysis, this method was not used to produce denominators for rates by remoteness of usual residence.

Where possible, rates were calculated using denominator data in 5-year age groups from 65–69 to an oldest group of 95 years and older. Some population denominator data were not available with these age groups: populations by remoteness of usual residence and Indigenous status were available in 5-year groups to 85 and older. Negative binomial regression modelling for all trends in rates of fall-related separations used denominator data in 5-year age groups from 65–69 to an oldest group of 85 years and older.

### **Community and residential aged care population**

Rates of falls occurring in the home or in residential aged care were calculated using denominator data reflecting the estimated place of residence for the population. Population estimates of residents of residential aged care were obtained from the AIHW report series *Residential aged care in Australia* (AIHW 2012a) and *Residential aged care and aged care packages in the community* (AIHW 2013b) and *Residential aged care and aged care packages in the community* (AIHW 2014b). The populations resident in residential aged care as at 30 June in adjacent years were averaged to estimate this population as at 31 December, the mid-point of the financial years analysed. The number of people aged 65 and older who were resident in the community was then estimated by subtracting the number of residents of residential aged care from the general population (as at 31 December).

### **Indigenous population**

Measuring the rate of injury in the Indigenous population is not straightforward. Population estimates for Indigenous Australians have varied considerably over time. The increases in the Indigenous population between censuses are not entirely due to demographic factors such as births, deaths and migration, they are also due in part to changes in propensity to identify as Indigenous and improved enumeration (ABS 2013a).

Separation rates by Indigenous status were directly age-standardised, using the projected Indigenous population (low series) as at 30 June 2012, based on the 2006 Census data. The population for non-Indigenous was based on the estimated resident populations as at 30 June 2012, based on the 2006 Census data.

Population denominators for non-Indigenous were derived by subtracting the Indigenous population from the total Australian estimated resident population (of the states and territories eligible for inclusion) as at 31 December of the relevant year.

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

All populations, except those used for analyses by Indigenous status, are based on the 2011 Census data. The age-standardised rates (per 100,000 population) presented in this report for the years 2002–03 to 2012–13 in time series tables have been calculated using ‘rebased’ estimated resident populations. Therefore, the separation rates reported for 2002–03 to 2012–13 in this report are not comparable to the separation rates presented in earlier hospitalised injury statistics reports.

### **Estimated change in rates over time**

Estimated trends in rates of fall-related separations were reported as annual per cent change obtained using negative binomial regression modelling using Stata 12.0 (StataCorp, College Station, Texas).

The use of the terms 'significant' or 'significantly' throughout this report indicates an outcome which was *statistically* significant ( $p < 0.05$  or less).

## Change in Victorian admissions policy

Counts of admitted cases depend, in part, on the criteria or policies used to specify admission. The definition used in Victoria changed, beginning with cases whose episode of hospital care ended on 1 July 2012. The effect of the change was to decrease the number of admitted cases compared with the count that would have been obtained if the former criterion had continued to be used. This change affects all types of cases that are cared for in the emergency department, including injury cases.

Information is not available that would allow calculation of the exact number of cases that would have been reported in 2012–13 under the former criterion. Nor has a method been identified that allows exact calculation of the number of cases that would have been counted in the years before 2012–13 if the new Victorian criterion had been applied then. The effect of the change on case counts can, however, be estimated. Various methods can be used, and it is not evident that one method is superior to the others. One simple method is to project observed counts for Australia for a period ending in 2011–12 by one year, to 2012–13, and then compare the estimate obtained with the observed number. The estimates reported here are based on a negative binomial regression trend of annual age-adjusted rates based on national case counts to 2011–12. This method takes account of trends in the period to 2011–12. It is not sensitive to changes from 2011–12 to 2012–13 that differ markedly from the trend in the earlier period.

### Values for Victoria

- Observed (2012–13 compared with previous year): –21.5%
- Expected (based on the trend from 2002–03 to 2012–13): +2.1%
- Estimated reduction of 2012–13 count due to changed criterion: about –26,000 cases.

## Classification of remoteness area

Data on geographical location of the patient's usual residence and of the hospital location are defined using the Australian Bureau of Statistics (ABS) Australian Statistical Geography Standard (ASGS). Data on remoteness area of usual residence are defined using the ABS's ASGS Remoteness Structure 2011 (ABS 2011). The period examined in this report is limited to 2001–02 to 2012–13 due to changes in the Remoteness Structure at the time of the 2006 Census (see ABS 2006).

Australia can be divided into several regions based on their distance from urban centres. This is considered to determine the range and types of services available. In this report, remoteness area refers to the place of usual residence of the person who was admitted to hospital, assigned on the basis of the reported Statistical Local Area (SLA) of residence.

The remoteness areas were specified according to the ABS Australian Standard Geographical Classification (ASGC). Remoteness categories were defined in a manner based on the Accessibility/Remoteness Index of Australia (ARIA). According to this method, remoteness is an index applicable to any point in Australia, based on road distance from urban centres of 5 sizes. The reported areas are defined as the following ranges of the index:

- *Major cities* (for example, Sydney, Geelong, Gold Coast), ARIA index 0 to 0.2
- *Inner regional* (for example, Hobart, Ballarat, Coffs Harbour), ARIA index  $>0.2$  and  $\leq 2.4$

- *Outer regional* (for example, Darwin, Cairns, Coonabarabran), ARIA index >2.4 and ≤5.92
- *Remote* (for example, Alice Springs, Broome, Strahan), ARIA index of >5.92 and ≤10.53
- *Very remote* (for example, Coober Pedy, Longreach, Exmouth), ARIA index >10.53.

Most SLAs lie entirely within 1 of the 5 areas. If this was so for all SLAs, then each record could simply be assigned to the area in which its SLA lies. However, some SLAs overlap 2 or more of the areas. Records with these SLAs were assigned to remoteness areas in proportion to the area-specific distribution of the resident population of the SLA according to the 2006 Census. Each record in the set having a particular SLA code was randomly assigned to one or other of the remoteness areas present in it, in proportion to the resident population of that SLA.

## Indigenous status

In this report the term 'Indigenous people' is used to refer to persons identified as such in Australian hospital separations data and population data collections. For hospitals data, the term 'non-Indigenous' includes all separations for persons identified as not Indigenous people and does not include separations where Indigenous people status was not stated.

### Quality of Indigenous status data

The 2013 AIHW report *Indigenous identification in hospital separations data—2013 quality report* (AIHW 2013a) presented 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 indicated that, overall, the quality of Indigenous identification in hospital separations data was similar to that achieved in the previous study (AIHW 2010). However, the 2011–12 survey was performed on larger samples for each jurisdiction/region and is therefore considered more robust than the previous study.

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

Analyses in this report therefore include data for all jurisdictions, except for time trend analyses, which present data for the 6 jurisdictions that the AIHW has assessed as having adequate identification of Indigenous hospitalisations prior to 2010–11: New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only). Indigenous people in these 6 jurisdictions comprise approximately 96% of the Indigenous population of Australia.

The data presented on Indigenous people status in this report should therefore be interpreted with caution. Patterns of Indigenous people hospitalisations in jurisdictions not included may not be the same as in those that are included.

## Suppression of small cell counts in data tables

The AIHW operates under a strict privacy regime, which has its basis in Section 29 of the *Australian Institute of Health and Welfare Act 1987* (AIHW Act). Section 29 of the AIHW Act requires that confidentiality of data relating to persons (living and deceased) and organisations be maintained. The Privacy Act governs confidentiality of information about living individuals.



The AIHW is committed to reporting that maximises the value of information released for users while being statistically reliable and meeting legislative requirements described above. Data (cells) in tables may be suppressed in order to maintain the privacy or confidentiality of a person or organisation, or because a proportion or other measure related to a small number of events and may therefore not be reliable.

Data have been suppressed to avoid attribute disclosure. Some measures have been suppressed if there were fewer than 100 separations in the category being presented (for example, for length of stay and separation rates).

## **Errors, inconsistencies and uncertainties**

Due to rounding, the sum of the percentages in tables may not equal 100 per cent.

NHMD data are generally abstracted from records, entered and coded in hospitals, passed to state and territory health departments, then to the AIHW before being provided to the National Injury Surveillance Unit. Processing occurs at each of these steps. Errors and inconsistencies can arise due to the large number of people and processes involved in providing the data. Some variations occur in reporting and coding, although coding standards, national minimum data sets and other mechanisms have reduced this.

## **Data quality statement: National Hospital Morbidity Database 2012–13**

This section provides a summary of key issues relevant to interpretation of the National Hospital Morbidity Database (NHMD) for 2012–13.

The full AIHW Data Quality Statement for the NHMD is accessible at <http://meteor.aihw.gov.au/content/index.phtml/itemId/568730>.

### **Summary of key issues**

- The National Hospital Morbidity Database (NHMD) is a comprehensive dataset that has records for all separations of admitted patients from essentially all public and private hospitals in Australia.
- A record is included for each separation, not for each patient, so patients who separated more than once in the year have more than one record in the NHMD.
- For 2012–13, almost all public hospitals provided data for the NHMD. The exception was a mothercraft hospital in the Australian Capital Territory. The great majority of private hospitals also provided data, the exceptions being the private free-standing day hospital facilities in the Australian Capital Territory, the single private free-standing day hospital in the Northern Territory, and a private free-standing day hospital in Victoria.
- Hospitals may be re-categorised as public or private between or within years.
- There is apparent variation between states and territories in the use of statistical discharges and associated assignment of care types. For example, for public hospitals, the proportion of separations ending with a statistical discharge varied from 0.9% to 3.9% across states and territories.
- There was variation between states and territories in the reporting of separations for Newborns (without qualified days).
- Data on state of hospitalisation should be interpreted with caution because of cross-border flows of patients. This is particularly the case for the Australian Capital

Territory. In 2012–13, about 20% of separations for Australian Capital Territory hospitals were for patients who resided in New South Wales.

- Variations in admission practices and policies lead to variation among providers in the number of admissions for some conditions.
- Caution should be used in comparing diagnosis, procedure and external cause data over time, as the classifications and coding standards for those data can change over time. In particular, between 2009–10 and 2010–11, there were significant changes in the coding of diagnoses for diabetes and obstetrics and for imaging procedures. There were also significant changes made to coding practices for diabetes and related conditions for the 2012–13 year, resulting in increased counts for these conditions.
- The Indigenous status data in the NHMD for all states and territories are considered of sufficient quality for statistical reporting for 2010–11, 2011–12 and 2012–13. In 2011–12, an estimated 88% of Indigenous patients were correctly identified in public hospitals. The overall quality of the data provided for Indigenous status is considered to be in need of some improvement and varied between states and territories.

# Appendix B: Other fall-related separations

## ‘Other fall-related’ separations

An additional 34,123 episodes of hospital care involving people aged 65 and older were identified as ‘other fall-related’ separations in 2012–13. These records contained an injury diagnosis and a falls external cause but were not fall cases, inward transfers or fall-related rehabilitation and related care. These ‘other fall-related’ separations represented 0.9% of the total number of hospital separations for people aged 65 and older in 2012–13 and, as observed in previous years, a relatively low proportion of ‘other fall-related’ separations involved women (52%, 17,818 separations).

The age-standardised rate of ‘other fall-related’ separations was 1,004 per 100,000 population in 2012–13. Unlike the separations attributable to falls in this report (that is, fall injury cases, inward transfers and fall-related rehabilitation and related care), the age-standardised rate of ‘other fall-related’ separations was higher for men than for women: 1,145 per 100,000 compared to 903 per 100,000, respectively. The rate-ratio was 1.3 ‘other fall-related’ separations for men for every such separation for women. Further, the age-specific rates for men were higher than those for women for every age group.

One in five ‘other fall-related’ separations (19%, 6,495) had a principal diagnosis from Chapter 9 of the ICD-10-AM (*Diseases of the circulatory system*) and a similar number had a principal diagnosis from Chapter 18 (*Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified*: 19%, 6,327, see Table B1).

‘Other fall-related’ separations resulted in a total of 423,790 patient days in 2012–13.

Over the period 2002–03 to 2012–13, ‘other fall-related’ separations increased by 3.4% per year (95% CI: 2.9–3.9,  $p < 0.001$ ).

**Table B1: Principal diagnosis for ‘other fall-related’ separations, by sex, Australia 2012–13**

Principal diagnosis	Men		Women		People	
	Count	%	Count	%	Count	%
Certain infectious and parasitic diseases	622	3.8	597	3.4	1,219	3.6
Neoplasms	1,416	8.7	875	4.9	2,291	6.7
Diseases of the blood, blood-forming organs, and certain disorders involving the immune mechanism	274	1.7	255	1.4	529	1.6
Endocrine, nutritional and metabolic diseases	501	3.1	622	3.5	1,123	3.3
Mental and behavioural disorders	1,056	6.5	1,192	6.7	2,248	6.6
Diseases of the nervous system	755	4.6	642	3.6	1,397	4.1
Diseases of the eye and adnexa	20	0.1	37	0.2	57	0.2
Diseases of the ear and mastoid process	46	0.3	83	0.5	129	0.4
Diseases of the circulatory system	3,173	19.5	3,322	18.6	6,495	19.0
Diseases of the respiratory system	1,889	11.6	1,549	8.7	3,438	10.1
Diseases of the digestive system	661	4.1	740	4.2	1,401	4.1
Diseases of the skin and subcutaneous tissue	502	3.1	488	2.7	990	2.9

(continued)

**Table B1 (continued): Principal diagnosis for ‘other fall-related’ separations, by sex, Australia 2012–13**

Principal diagnosis	Men		Women		People	
	Count	%	Count	%	Count	%
Diseases of the musculoskeletal system and connective tissue	757	4.6	1,137	6.4	1,894	5.6
Diseases of the genitourinary system	838	5.1	1,363	7.6	2,201	6.5
Congenital malformations, deformations and chromosomal abnormalities	2	0.0	4	0.0	6	0.0
Symptoms, signs and abnormal clinical and laboratory findings, n.e.c.	2,855	17.5	3,472	19.5	6,327	18.5
Injury, poisoning and consequences of external causes	491	3.0	564	3.2	1,055	3.1
Factors influencing health status	447	2.7	876	4.9	1,323	3.9
<b>Total</b>	<b>16,305</b>	<b>100</b>	<b>17,818</b>	<b>100</b>	<b>34,123</b>	<b>100</b>

### ‘Tendency to fall’ separations

A total of 41,153 hospital separations for people aged 65 and older in 2012–13 included the diagnosis code R29.6 *Tendency to fall, not elsewhere classified*. Small numbers of these records are included in this report as fall injury cases, inward transfers, fall-related rehabilitation and related care or ‘other fall-related’ separations.

Of the 30,325 ‘tendency to fall’ separations for people aged 65 and older in 2012–13, slightly more than half (53%, 16,007) involved women. The age-standardised rate of ‘tendency to fall’ separations for all people aged 65 and older was 885 per 100,000 population and the rate was higher for men (1,013 per 100,000 population) than for women (801 per 100,000).

One in every three ‘tendency to fall’ separations (36%, 10,871) had a principal diagnosis from Chapter 21 of the ICD-10-AM (*Factors influencing health status and contact with health services*). Principal diagnoses from Chapter 18 (*Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified*) were also relatively common (22%, 6,615, see Table B2).

‘Tendency to fall’ separations resulted in a total of 310,091 patient days in 2012–13.

Over the period 2002–03 to 2012–13, ‘tendency to fall’ separations increased by 7.6% per year (95% CI: 6.3–8.9,  $p < 0.001$ ).

**Table B2: Principal diagnosis for ‘tendency to fall’ separations, by sex, Australia 2012–13**

Principal diagnosis	Men		Women		People	
	Count	%	Count	%	Count	%
Certain infectious and parasitic diseases	257	1.8	234	1.5	491	1.6
Neoplasms	578	4.0	368	2.3	946	3.1
Diseases of the blood, blood-forming organs, and certain disorders involving the immune mechanism	90	0.6	96	0.6	186	0.6
Endocrine, nutritional and metabolic diseases	253	1.8	322	2.0	575	1.9
Mental and behavioural disorders	667	4.7	771	4.8	1,438	4.7
Diseases of the nervous system	597	4.2	464	2.9	1,061	3.5
Diseases of the eye and adnexa	13	0.1	27	0.2	40	0.1
Diseases of the ear and mastoid process	29	0.2	34	0.2	63	0.2
Diseases of the circulatory system	1,176	8.2	1,147	7.2	2,323	7.7
Diseases of the respiratory system	976	6.8	712	4.4	1,688	5.6
Diseases of the digestive system	273	1.9	276	1.7	549	1.8
Diseases of the skin and subcutaneous tissue	177	1.2	210	1.3	387	1.3
Diseases of the musculoskeletal system and connective tissue	522	3.6	797	5.0	1,319	4.3
Diseases of the genitourinary system	542	3.8	860	5.4	1,402	4.6
Congenital malformations, deformations and chromosomal abnormalities	0	0.0	2	0.0	2	0.0
Symptoms, signs and abnormal clinical and laboratory findings, n.e.c.	3,015	21.1	3,600	22.5	6,615	21.8
Injury, poisoning and consequences of external causes	178	1.2	191	1.2	369	1.2
Factors influencing health status	4,975	34.7	5,896	36.8	10,871	35.8
<b>Total</b>	<b>14,318</b>	<b>100</b>	<b>16,007</b>	<b>100</b>	<b>30,325</b>	<b>100</b>

## Appendix C: Supplementary tables

**Table C1: Case counts and rates per 100,000, fall injury cases, by sex and age group, Australia 2012–13**

	65–69		70–74		75–79		80–84		85–89		90–94		95+		Total <sup>(a)</sup>	
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate
Men	4,030	769	4,147	1,099	5,170	1,902	6,736	3,503	6,921	6,376	3,810	9,991	921	12,249	31,735	2,221
Women	5,897	1,112	6,797	1,736	9,353	3,031	13,987	5,564	16,702	9,503	10,575	13,074	3,658	15,709	66,969	3,346
People	9,927	942	10,944	1,423	14,523	2,503	20,723	4,671	23,623	8,309	14,385	12,086	4,579	14,864	98,704	2,861

(a) Age-standardised to the 30 June 2001 Australian population.

**Table C2: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases, by sex, Australia 2002–03 to 2012–13**

Year	Men			Women			People		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	15,652	1,588	1,593	41,306	2,717	2,697	56,958	2,266	2,255
2003–04	16,784	1,655	1,652	43,726	2,813	2,767	60,510	2,347	2,318
2004–05	18,038	1,716	1,714	44,670	2,806	2,838	62,709	2,364	2,383
2005–06	19,500	1,781	1,778	47,322	2,889	2,911	66,822	2,439	2,449
2006–07	21,362	1,883	1,845	50,426	2,998	2,986	71,790	2,537	2,517
2007–08	22,481	1,908	1,914	51,990	3,018	3,063	74,471	2,557	2,588
2008–09	23,570	1,931	1,985	55,040	3,108	3,143	78,610	2,619	2,660
2009–10	25,597	2,019	2,060	58,171	3,197	3,224	83,768	2,701	2,734
2010–11	28,992	2,199	2,137	63,160	3,362	3,307	92,152	2,869	2,810
2011–12	30,422	2,215	2,217	65,969	3,420	3,392	96,391	2,904	2,888
2012–13	31,735	2,207	2,299	66,969	3,370	3,480	98,704	2,872	2,969

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C3: Case counts, estimated resident population, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases, by age group, Australia 2002–03 to 2012–13**

Year	65–74 years			75–84 years			85+ years		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	11,999	907	899	24,103	2,716	2,702	20,856	7,587	7,575
2003–04	12,405	932	927	25,554	2,783	2,767	22,551	7,996	7,808
2004–05	12,756	947	955	26,661	2,827	2,832	23,292	7,934	8,048
2005–06	13,432	985	985	27,747	2,886	2,900	25,643	8,255	8,296
2006–07	14,133	1,011	1,015	29,334	3,004	2,969	28,323	8,640	8,552
2007–08	15,051	1,047	1,047	29,693	3,008	3,039	29,727	8,634	8,815
2008–09	15,827	1,064	1,079	30,526	3,053	3,112	32,257	8,975	9,086
2009–10	17,122	1,105	1,112	31,910	3,151	3,186	34,736	9,209	9,366
2010–11	18,835	1,168	1,147	34,032	3,306	3,261	39,285	9,940	9,654
2011–12	19,931	1,181	1,182	35,190	3,373	3,339	41,270	9,985	9,951
2012–13	20,871	1,174	1,219	35,246	3,345	3,418	42,587	9,810	10,258

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).



**Table C4: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases, by Indigenous status, Australia 2004–05 to 2012–2013**

Year	Indigenous			Non-Indigenous		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2004–05	253	1,918	1,767	58,930	2,316	2,324
2005–06	258	1,902	1,862	63,272	2,412	2,397
2006–07	261	1,771	1,963	67,960	2,507	2,472
2007–08	312	1,989	2,068	70,472	2,525	2,549
2008–09	357	2,273	2,179	74,110	2,575	2,629
2009–10	355	2,025	2,297	80,499	2,710	2,711
2010–11	478	2,642	2,420	87,387	2,842	2,796
2011–12	476	2,588	2,551	91,247	2,874	2,883
2012–13	487	2,465	2,688	93,646	2,855	2,973

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C5: Case counts and percentages, by sex and major body region injured, Australia 2012–13**

Case counts	Head and neck	Trunk	Shoulder and upper limb	Wrist and hand	Hip and lower limb	Ankle and foot	Other injuries	Total
Men	9,298	6,217	4,350	914	9,971	416	569	31,735
Women	13,618	11,738	13,938	1,196	24,746	924	809	66,969
Percentage of all falls cases								
Men	29	20	14	3	31	1	2	100
Women	20	18	21	2	37	1	1	100

**Table C6: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases, by body region, Australia 2002–03 to 2012–13**

Year	Head and neck			Trunk			Shoulder and upper limb			Wrist and hand		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	8,811	350	356	9,460	376	379	11,469	458	456	1,008	40	39
2003–04	9,670	375	382	10,213	395	392	12,114	473	466	1,029	40	41
2004–05	10,872	410	409	10,810	407	406	12,463	473	476	1,122	43	43
2005–06	12,279	448	439	11,606	422	420	12,970	479	485	1,220	45	45
2006–07	13,822	488	471	12,528	440	435	13,960	501	496	1,403	50	47
2007–08	14,745	505	504	13,017	444	450	14,233	497	506	1,385	48	49
2008–09	16,081	535	541	13,850	458	465	15,035	510	517	1,422	48	51
2009–10	17,752	570	580	14,897	477	481	15,997	527	527	1,534	50	54
2010–11	20,268	629	622	16,447	509	498	17,346	550	539	1,909	60	56
2011–12	21,958	659	666	17,161	514	516	17,897	549	550	1,948	60	59
2012–13	22,916	665	715	17,955	519	534	18,288	540	561	2,110	62	61

*(continued)*

**Table C6 (continued): Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases, by body region, Australia 2002–03 to 2012–13**

Year	Hip and lower limb			Ankle and foot			Other injuries		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	24,891	989	980	724	29	29	595	24	22
2003–04	26,078	1,009	986	749	29	30	657	25	24
2004–05	25,970	976	991	788	30	31	684	26	25
2005–06	27,160	987	996	870	32	32	717	26	27
2006–07	28,417	998	1,002	949	34	33	711	25	29
2007–08	29,253	999	1,007	1,011	35	35	827	28	31
2008–09	30,117	997	1,013	1,066	36	36	1,039	34	33
2009–10	31,407	1,006	1,018	1,123	37	37	1,058	34	35
2010–11	33,704	1,044	1,024	1,218	39	39	1,260	39	37
2011–12	34,761	1,042	1,030	1,272	39	40	1,394	42	40
2012–13	34,717	1,006	1,035	1,340	40	42	1,378	40	42

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C7: Case counts, age-standardised rates and modelled rates per 100,000 population for head injury cases due to falls, by age group, Australia 2002–03 to 2012–13**

Year	65–74 years			75–84 years			85+ years		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	1,619	122	131	3,508	395	395	3,196	1,163	1,166
2003–04	1,781	134	139	3,762	409	423	3,555	1,261	1,254
2004–05	2,045	152	148	4,291	456	453	3,878	1,321	1,348
2005–06	2,299	169	157	4,724	491	486	4,540	1,462	1,449
2006–07	2,419	173	166	5,283	541	520	5,241	1,599	1,557
2007–08	2,559	179	176	5,509	557	557	5,748	1,670	1,674
2008–09	2,761	186	187	5,852	586	596	6,402	1,781	1,799
2009–10	3,004	194	198	6,399	629	639	7,126	1,889	1,934
2010–11	3,386	211	210	7,159	693	684	8,363	2,116	2,079
2011–12	3,601	216	223	7,616	727	732	9,227	2,232	2,234
2012–13	3,773	215	236	7,792	739	784	9,900	2,280	2,402

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C8: Case counts and percentages due to falls, by nature of injury and age group, Australia 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>
Fracture	6,250	6,557	8,365	11,660	13,008	7,634	2,408
Open wound	757	1,016	1,541	2,424	3,168	2,286	839
Intracranial injury	488	619	847	1,176	1,261	713	188
Superficial injury	575	770	1,163	1,895	2,262	1,403	439
Unspecified nature of injury	724	924	1,364	2,021	2,387	1,533	469
Other injuries	1,133	1,058	1,243	1,547	1,537	816	236
<b>Total</b>	<b>9,927</b>	<b>10,944</b>	<b>14,523</b>	<b>20,723</b>	<b>23,623</b>	<b>14,385</b>	<b>4,579</b>
<b>Percentage of all falls cases</b>							
Fracture	63	60	58	56	55	53	53
Open wound	8	9	11	12	13	16	18
Intracranial injury	5	6	6	6	5	5	4
Superficial injury	6	7	8	9	10	10	10
Unspecified nature of injury	7	8	9	10	10	11	10
Other injuries	11	10	9	7	7	6	5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table C9: Case counts and rates per 100,000, hip fracture cases, by sex and age group, Australia 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>	<b>Total</b>
Men	379	535	765	1,250	1,344	792	209	5,274
Women	669	995	1,677	3,029	3,815	2,486	863	13,534
People	1,048	1,530	2,442	4,279	5,159	3,278	1,072	18,808
<b>Age-specific rates per 100,000 population</b>								<b>Age-standardised rate<sup>(a)</sup></b>
Men	72	142	281	650	1,238	2,077	2,780	375
Women	126	254	544	1,205	2,171	3,073	3,706	654
People	99	199	421	964	1,815	2,754	3,480	536

(a) Age-standardised to the 30 June 2001 Australian population.

**Table C10: Case counts, age-standardised rates and modelled rates per 100,000 population for hip fracture cases due to falls, by sex, Australia 2002–03 to 2012–13**

Year	Men			Women			People		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	3,825	404	407	11,356	727	725	15,181	602	602
2003–04	4,022	411	405	11,861	743	719	15,883	613	596
2004–05	4,110	404	403	11,647	710	713	15,758	589	591
2005–06	4,310	405	401	11,730	692	707	16,040	579	585
2006–07	4,466	403	398	12,042	690	701	16,508	575	580
2007–08	4,539	393	396	12,356	692	695	16,895	571	575
2008–09	4,527	378	394	12,476	679	690	17,003	557	570
2009–10	4,717	378	392	12,949	684	684	17,666	559	565
2010–11	5,232	403	390	13,415	687	678	18,647	570	560
2011–12	5,349	395	388	13,639	681	673	18,988	562	554
2012–13	5,274	371	386	13,534	660	667	18,808	539	549

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C11: Case counts, age-standardised rates and modelled rates per 100,000 population for hip fracture cases due to falls, by age group, Australia 2002–03 to 2012–13**

Year	65–74 years			75–84 years			85+ years		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	1,921	146	146	6,497	731	732	6,763	2,460	2,456
2003–04	1,985	150	145	6,759	734	720	7,139	2,531	2,444
2004–05	1,936	145	145	6,854	722	709	6,968	2,374	2,431
2005–06	1,947	144	145	6,605	683	698	7,488	2,411	2,418
2006–07	1,924	139	145	6,692	681	687	7,892	2,407	2,406
2007–08	2,090	147	144	6,658	671	676	8,147	2,366	2,393
2008–09	2,051	140	144	6,604	655	666	8,348	2,323	2,381
2009–10	2,151	141	144	6,660	651	656	8,855	2,348	2,369
2010–11	2,366	149	144	6,716	646	645	9,565	2,420	2,357
2011–12	2,404	145	144	6,831	650	635	9,753	2,360	2,344
2012–13	2,578	148	143	6,721	632	625	9,509	2,190	2,332

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).



**Table C12: Case counts, age-standardised rates and modelled rates per 100,000 population for all other fracture cases due to falls, by sex, Australia 2002–03 to 2012–13**

Year	Men			Women			People		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	5,310	523	529	17,738	1,196	1,186	23,048	919	915
2003–04	5,744	552	548	18,738	1,235	1,216	24,482	953	939
2004–05	6,194	578	567	19,236	1,240	1,247	25,430	964	964
2005–06	6,515	583	588	20,052	1,261	1,279	26,567	978	989
2006–07	7,147	619	609	21,332	1,312	1,311	28,480	1,018	1,015
2007–08	7,482	625	630	21,948	1,318	1,345	29,430	1,023	1,041
2008–09	7,777	629	653	23,595	1,379	1,379	31,372	1,058	1,068
2009–10	8,604	671	676	24,850	1,415	1,414	33,454	1,094	1,096
2010–11	9,600	719	701	26,468	1,461	1,450	36,068	1,140	1,125
2011–12	10,101	727	726	27,936	1,497	1,487	38,037	1,161	1,154
2012–13	10,793	742	752	28,811	1,497	1,525	39,604	1,166	1,184

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C13: Case counts, age-standardised rates and modelled rates per 100,000 population for selected fractures due to falls, Australia 2002–03 to 2012–13**

Year	Skull fractures			Lumbar spine and pelvis fractures			Forearm fractures			Wrist fractures		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	783	31	31	4,343	172	173	5,205	208	207	137	5	6
2003–04	829	32	33	4,597	177	178	5,481	214	208	145	6	6
2004–05	915	35	35	4,926	185	182	5,440	207	210	160	6	6
2005–06	999	37	37	5,211	188	187	5,496	205	211	177	7	6
2006–07	1,150	41	39	5,493	192	192	5,901	214	213	199	7	7
2007–08	1,197	42	41	5,775	195	197	5,879	208	214	196	7	7
2008–09	1,273	43	43	6,109	200	202	6,253	215	216	220	8	8
2009–10	1,399	46	46	6,513	207	207	6,652	222	218	206	7	8
2010–11	1,499	47	48	6,901	211	213	7,018	226	219	299	10	8
2011–12	1,659	51	51	7,484	222	218	6,997	218	221	271	8	9
2012–13	1,753	52	54	7,807	223	224	7,162	214	223	342	10	9

*(continued)*

**Table C13 (continued): Case counts, age-standardised rates and modelled rates per 100,000 population for selected fractures due to falls, Australia 2002–03 to 2012–13**

Year	Femur fractures (excluding hip fracture)			Lower leg fractures			Thorax fractures			Shoulder and upper arm fractures		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	1,262	50	50	3,145	126	124	2,492	99	102	3,905	156	155
2003–04	1,338	52	50	3,333	131	127	2,815	109	105	4,078	159	158
2004–05	1,268	48	51	3,373	129	129	2,871	108	108	4,325	164	162
2005–06	1,438	52	52	3,485	130	132	3,061	112	111	4,431	163	165
2006–07	1,485	52	53	3,568	130	135	3,316	117	114	4,749	170	169
2007–08	1,535	53	54	3,776	135	138	3,320	114	118	4,937	172	172
2008–09	1,765	59	55	3,951	137	141	3,533	118	121	5,072	171	176
2009–10	1,763	57	56	4,254	143	144	3,815	123	124	5,383	177	180
2010–11	1,759	55	57	4,672	152	147	4,195	131	128	5,846	185	184
2011–12	1,877	57	58	4,878	153	150	4,320	131	131	6,202	190	187
2012–13	1,930	56	59	4,854	147	153	4,775	140	135	6,352	189	191

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C14: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases by selected external causes, Australia 2002–03 to 2012–13**

Year	Slip, trip, stumble			Other fall on same level			Unspecified fall			All other falls		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	19,963	794	779	10,001	397	403	16,456	654	656	10,538	420	421
2003–04	20,740	805	795	11,438	443	425	17,246	667	666	11,086	432	433
2004–05	21,469	811	812	11,881	446	449	17,696	664	676	11,663	443	445
2005–06	22,813	836	830	13,184	478	473	18,383	667	687	12,442	458	458
2006–07	23,264	826	847	14,327	503	500	20,572	721	697	13,627	487	471
2007–08	24,573	849	865	15,137	516	527	21,035	715	708	13,726	478	485
2008–09	25,347	851	884	15,738	520	556	22,699	748	719	14,826	500	499
2009–10	27,347	890	903	18,443	589	587	22,584	719	731	15,394	504	513
2010–11	30,200	949	922	20,828	642	619	24,399	749	742	16,725	529	528
2011–12	31,788	968	942	22,114	659	653	24,599	731	754	17,890	546	543
2012–13	32,775	963	962	23,517	677	689	24,327	697	765	18,085	534	558

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C15: Case counts and rates per 100,000, hospitalised fall injury cases, for residents of residential aged care, by sex and age group, Australia 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>	<b>Total</b>
Men	186	326	654	1,118	1,730	1,189	371	5,574
Women	188	438	1,101	2,723	4,994	4,340	1,828	15,612
People	374	764	1,755	3,841	6,724	5,529	2,199	21,186
<b>Age-specific rates per 100,000 population</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>	<b>Age-standardised rate<sup>(a)</sup></b>
Men	5,857	6,886	9,245	10,220	13,469	14,603	14,638	8,309
Women	6,546	8,459	10,570	12,307	14,410	15,166	14,724	9,566
People	6,184	7,708	10,034	11,617	14,155	15,042	14,710	9,037

(a) Age-standardised rates were calculated using population estimates derived from the AIHW report series *Residential aged care in Australia*, see Box 1.5.

**Table C16: Case counts and rates per 100,000, hospitalised fall injury cases for residents at home in the community, by sex and age group, Australia 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>	<b>Total</b>
Men	1,884	2,143	2,732	3,572	3,435	1,789	400	15,955
Women	2,859	3,621	5,058	7,572	8,346	4,624	1,376	33,456
People	4,743	5,764	7,790	11,144	11,781	6,413	1,776	49,411
<b>Age-specific rates per 100,000 population</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>	<b>Age-standardised rate<sup>(a)</sup></b>
Men	362	575	1,032	1,970	3,589	5,965	8,025	1,228
Women	542	937	1,697	3,303	5,915	8,846	12,658	1,982
People	453	759	1,384	2,714	4,975	7,796	11,201	1,655

(a) Age-standardised rates were calculated using population estimates derived from the AIHW report series *Residential aged care in Australia*, see Box 1.5.

**Table C17: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases, by place of residence and sex, Australia 2002–03 to 2012–13**

Year	Residential aged care						At home in the community					
	Men			Women			Men			Women		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	2,323	5,006	5,355	8,464	6,366	6,545	7,602	842	850	20,032	1,559	1,561
2003–04	2,744	5,633	5,653	9,727	6,941	6,877	8,382	903	883	21,517	1,643	1,601
2004–05	3,123	6,157	5,967	10,218	7,055	7,226	8,738	908	917	21,809	1,627	1,642
2005–06	3,406	6,531	6,299	11,175	7,815	7,593	9,594	956	952	23,193	1,683	1,685
2006–07	3,906	6,876	6,650	12,244	8,240	7,978	10,489	1,006	988	24,471	1,722	1,728
2007–08	4,021	7,130	7,020	12,459	8,467	8,383	11,041	1,022	1,026	25,543	1,752	1,773
2008–09	4,231	7,260	7,410	13,189	8,744	8,808	11,468	1,026	1,065	26,837	1,790	1,818
2009–10	4,535	7,504	7,823	13,820	9,007	9,255	12,611	1,085	1,106	28,469	1,844	1,865
2010–11	5,419	8,486	8,258	15,349	9,867	9,724	14,204	1,176	1,149	31,003	1,945	1,913
2011–12	5,629	8,557	8,718	15,655	10,095	10,218	15,147	1,204	1,193	32,617	1,984	1,962
2012–13	5,574	8,326	9,203	15,612	9,579	10,736	15,955	1,208	1,238	33,456	1,972	2,013

*Notes*

1. Age-standardised rates were calculated using population estimates derived from the AIHW report series *Residential aged care in Australia*, see Box 1.5.
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C18: Case counts, age-standardised rates and modelled rates per 100,000 population for hip fracture cases, by place of residence and sex, Australia 2002–03 to 2012–13**

Year	Residential aged care						At home in the community					
	Men			Women			Men			Women		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	897	1,734	2,004	3,301	2,363	2,483	1,820	210	207	5,299	412	417
2003–04	1,066	2,012	2,026	3,707	2,574	2,497	1,896	212	207	5,677	433	415
2004–05	1,189	2,207	2,047	3,737	2,561	2,510	1,918	207	208	5,580	414	413
2005–06	1,220	2,196	2,069	3,865	2,572	2,524	2,068	213	208	5,605	405	411
2006–07	1,339	2,139	2,092	4,031	2,406	2,538	2,072	204	208	5,697	398	409
2007–08	1,336	2,346	2,114	4,108	2,648	2,551	2,136	203	208	5,986	408	406
2008–09	1,269	2,055	2,137	4,147	2,676	2,565	2,190	201	209	6,003	397	404
2009–10	1,329	2,016	2,160	4,167	2,503	2,579	2,287	202	209	6,260	402	402
2010–11	1,501	2,203	2,183	4,430	2,503	2,593	2,493	211	209	6,493	404	400
2011–12	1,502	2,130	2,207	4,364	2,641	2,607	2,713	220	209	6,660	402	398
2012–13	1,507	2,098	2,231	4,190	2,454	2,621	2,533	194	209	6,742	394	396

*Notes*

1. Age-standardised rates were calculated using population estimates derived from the AIHW report series *Residential aged care in Australia*, see Box 1.5.
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C19: Case counts, age-standardised rates and modelled rates per 100,000 population for head injury cases, by place of residence and sex, Australia 2002–03 to 2012–13**

Year	Residential aged care						At home in the community					
	Men			Women			Men			Women		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	513	1,230	1,284	1,313	964	1,073	1,427	158	167	2,382	186	182
2003–04	624	1,349	1,406	1,602	1,241	1,195	1,665	179	178	2,440	187	194
2004–05	742	1,557	1,539	1,785	1,344	1,332	1,864	191	190	2,767	207	207
2005–06	842	1,713	1,685	2,052	1,575	1,483	2,091	208	203	3,155	229	221
2006–07	1,025	2,109	1,845	2,426	1,776	1,653	2,388	229	216	3,394	239	236
2007–08	1,101	1,924	2,020	2,565	1,821	1,841	2,540	233	231	3,636	249	252
2008–09	1,182	2,137	2,212	2,845	1,946	2,051	2,694	240	246	3,958	264	269
2009–10	1,370	2,370	2,421	3,154	2,120	2,285	3,021	259	263	4,380	283	287
2010–11	1,695	2,731	2,651	3,721	2,801	2,546	3,376	279	281	4,958	310	307
2011–12	1,830	2,839	2,903	3,914	2,693	2,836	3,759	299	299	5,455	331	328
2012–13	1,818	3,000	3,178	4,066	2,688	3,160	4,027	307	319	5,656	332	350

*Notes*

1. Age-standardised rates were calculated using population estimates derived from the AIHW report series *Residential aged care in Australia*, see Box 1.5.
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).



**Table C20: Case counts and rates per 100,000 hospitalised fall injury cases, by remoteness of usual residence and age group, 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+</b>	<b>Total<sup>(a)</sup></b>
Major cities	6,604	7,418	10,127	14,792	31,471	70,412
Inner regional	2,084	2,192	2,848	3,914	7,517	18,555
Outer regional	952	1,068	1,294	1,752	3,132	8,198
Remote	127	121	128	140	295	811
Very remote	67	62	53	67	74	323
<b>Age-specific rates per 100,000 population</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+</b>	<b>Age-standardised rate<sup>(b)</sup></b>
Major cities	990	1,509	2,662	4,901	10,612	3,061
Inner regional	900	1,274	2,237	4,065	8,585	2,549
Outer regional	884	1,341	2,289	4,276	8,821	2,627
Remote	999	1,362	2,184	3,472	8,880	2,540
Very remote	1,156	1,683	2,525	4,494	6,961	2,671

(a) Discrepancies with totals are due to rounding in component figures.

(b) Age-standardised to the 30 June 2001 Australian population.

**Table C21: Case counts and rates per 100,000, hip fracture and head injury cases, by remoteness of usual residence and age group, Australia 2012–13**

<b>Hip fractures</b>	<b>Age group</b>					<b>Total</b>
	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+</b>	
<b>Case counts</b>						
Major cities	691	984	1,654	2,926	6,678	12,933
Inner regional	219	332	527	917	1,988	3,983
Outer regional	122	187	250	427	913	1,899
Remote	18	26	25	34	67	170
Very remote	6	12	14	21	19	72
<b>Age-specific rates per 100,000 population</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+</b>	<b>Age-standardised rate<sup>(a)</sup></b>
Major cities	104	200	435	969	2,252	541
Inner regional	95	193	414	952	2,270	534
Outer regional	113	235	442	1,042	2,571	599
Remote	142	293	427	843	2,017	531
Very remote	104	326	667	1,408	1,787	Could not be calculated

*(continued)*

**Table C21 (continued): Case counts and rates per 100,000, hip fracture and head injury cases, by remoteness of usual residence and age group, Australia 2012–13**

Head fractures	Age group					Total
	65–69	70–74	75–79	80–84	85+	
<b>Case counts</b>						
Major cities	1,205	1,619	2,390	3,546	7,684	16,444
Inner regional	330	407	578	805	1,540	3,660
Outer regional	171	212	278	340	641	1,642
Remote	29	22	30	26	67	174
Very remote	18	18	10	7	11	64
<b>Age-specific rates per 100,000 population</b>						<b>Age-standardised rate<sup>(a)</sup></b>
Major cities	181	329	628	1,175	2,591	689
Inner regional	142	237	454	836	1,759	488
Outer regional	159	266	492	830	1,805	527
Remote	228	248	512	645	2,017	545
Very remote	311	489	476	469	1,035	584

(a) Age-standardised to the 30 June 2001 Australian population.

**Table C22: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases for residents of Major cities, by type of injury, Australia 2002–03 to 2012–13**

Year	All fall-related injuries			Hip fractures			Head injuries		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	37,919	2,219	2,210	10,100	588	587	5,612	328	333
2003–04	40,622	2,318	2,287	10,543	597	582	6,224	355	360
2004–05	42,484	2,362	2,367	10,525	579	577	7,029	391	389
2005–06	44,637	2,407	2,450	10,458	556	572	7,908	426	420
2006–07	49,259	2,581	2,536	11,009	566	567	9,042	473	454
2007–08	51,349	2,607	2,625	11,418	568	563	9,749	493	491
2008–09	53,413	2,631	2,717	11,186	540	558	10,534	517	530
2009–10	58,290	2,788	2,812	11,736	547	553	11,844	562	573
2010–11	64,578	2,986	2,911	12,354	558	548	13,794	634	619
2011–12	67,514	3,029	3,013	12,610	552	544	14,806	659	669
2012–13	70,412	3,061	3,119	12,695	541	539	15,943	689	722

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C23: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases for residents of Inner regional areas, by type of injury, Australia 2002–03 to 2012–13**

Year	All fall-related injuries			Hip fractures			Head injuries		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	12,106	2,341	2,360	3,200	620	644	1,637	317	320
2003–04	13,006	2,447	2,400	3,569	671	638	1,699	320	340
2004–05	12,962	2,366	2,441	3,389	617	632	1,945	356	360
2005–06	14,630	2,577	2,483	3,731	654	627	2,314	408	382
2006–07	14,831	2,530	2,525	3,639	617	621	2,512	428	405
2007–08	15,174	2,499	2,568	3,671	599	615	2,569	422	430
2008–09	16,533	2,639	2,612	3,820	602	609	2,924	467	456
2009–10	16,875	2,609	2,656	3,887	594	604	3,092	479	483
2010–11	18,404	2,733	2,702	4,219	619	598	3,364	499	513
2011–12	19,269	2,756	2,748	4,157	588	593	3,771	539	544
2012–13	18,555	2,549	2,795	3,925	534	587	3,555	488	577

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C24: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases for residents of Outer regional areas, by type of injury, Australia 2002–03 to 2012–13**

Year	All fall-related injuries			Hip fractures			Head injuries		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	5,860	2,539	2,512	1,640	718	676	894	388	407
2003–04	5,899	2,513	2,529	1,526	657	668	1,001	427	418
2004–05	6,044	2,550	2,546	1,548	662	661	1,028	434	429
2005–06	6,423	2,620	2,563	1,591	655	653	1,132	462	441
2006–07	6,502	2,542	2,580	1,612	632	646	1,145	448	452
2007–08	6,648	2,519	2,597	1,532	584	638	1,241	470	465
2008–09	7,189	2,653	2,614	1,692	627	631	1,277	472	477
2009–10	7,270	2,597	2,632	1,773	637	624	1,315	471	490
2010–11	7,585	2,621	2,649	1,740	605	616	1,444	500	503
2011–12	8,146	2,733	2,667	1,913	646	609	1,566	527	516
2012–13	8,198	2,627	2,685	1,868	599	602	1,639	527	530

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C25: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases for residents of Remote areas, by type of injury, Australia 2002–03 to 2012–13**

Year	All fall-related injuries			Hip fractures			Head injuries		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	656	2,767	2,589	146	630	607	106	447	451
2003–04	592	2,500	2,626	139	601	609	111	461	469
2004–05	583	2,410	2,665	142	601	610	103	425	488
2005–06	668	2,756	2,704	151	647	612	129	534	507
2006–07	676	2,668	2,743	139	567	614	137	537	527
2007–08	762	2,886	2,783	146	561	615	155	587	548
2008–09	826	3,041	2,824	182	684	617	162	597	570
2009–10	808	2,870	2,866	159	588	619	173	616	593
2010–11	894	3,079	2,907	190	666	620	181	625	617
2011–12	797	2,678	2,950	173	601	622	173	584	642
2012–13	811	2,540	2,993	167	531	624	172	545	667

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C26: Case counts, age-standardised rates and modelled rates per 100,000 population for hospitalised fall injury cases for residents of Very remote areas, by type of injury, Australia 2002–03 to 2012–13**

Year	All fall-related injuries			Hip fractures <sup>(a)</sup>		Head injuries		
	Cases	Rate	Modelled rate	Cases	Rate	Cases	Rate	Modelled rate
2002–03	192	1,848	1,762	49	497	33	326	332
2003–04	151	1,449	1,820	49	484	28	273	341
2004–05	207	2,203	1,880	46	486	42	464	351
2005–06	212	2,158	1,941	44	456	38	379	361
2006–07	183	1,739	2,005	46	438	35	338	372
2007–08	222	2,128	2,071	58	574	43	395	383
2008–09	230	2,161	2,139	45	445	38	363	394
2009–10	220	2,062	2,209	47	434	39	376	405
2010–11	256	2,308	2,282	63	585	49	431	417
2011–12	279	2,418	2,357	65	623	50	444	429
2012–13	323	2,671	2,434	72	642	72	584	441

(a) Modelled rates could not be produced because the model did not converge.

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).



**Table C27: Case counts and percentages inward transfer separations, by nature of injury and age group, Australia 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>
Fracture	773	904	1,290	1,835	2,116	1,120	354
Open wound	23	22	65	112	110	91	34
Intracranial injury	76	138	179	194	222	88	10
Superficial injury	18	27	58	81	109	68	24
Unspecified nature of injury	20	34	56	94	106	79	18
Other injuries	87	94	88	126	109	72	20
<b>Total</b>	<b>997</b>	<b>1,219</b>	<b>1,736</b>	<b>2,442</b>	<b>2,772</b>	<b>1,518</b>	<b>460</b>
<b>Percentage of all falls cases</b>							
Fracture	78	74	74	75	76	74	77
Open wound	2	2	4	5	4	6	7
Intracranial injury	8	11	10	8	8	6	2
Superficial injury	2	2	3	3	4	4	5
Unspecified nature of injury	2	3	3	4	4	5	4
Other injuries	9	8	5	5	4	5	4
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table C28: Case counts and rates per 100,000, fall-related rehabilitation and related care separations, by sex and age group, Australia 2012–13**

<b>Case counts</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85–89</b>	<b>90–94</b>	<b>95+</b>	<b>Total</b>
Men	1,246	1,536	1,965	2,667	3,112	1,498	361	12,385
Women	2,023	2,745	4,251	6,670	7,381	3,850	1,051	27,971
People	3,269	4,281	6,216	9,337	10,493	5,348	1,412	40,356
<b>Age-specific rates per 100,000 population</b>								<b>Age-standardised rate<sup>(a)</sup></b>
Men	238	407	723	1,387	2,867	3,928	4,801	871
Women	381	701	1,378	2,653	4,200	4,760	4,513	1,419
People	310	557	1,071	2,105	3,691	4,493	4,584	1,177

(a) Age-standardised to the 30 June 2001 Australian population.

**Table C29: Case counts, age-standardised rates and modelled rates per 100,000 population by other types of fall-related separations, Australia 2002–03 to 2012–13**

Year	Inward transfers			Fall-related follow-up care			'Other fall-related' separations			'Tendency to fall' separations <sup>(a)</sup>		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	6,239	248	267	13,143	521	608	17,256	686	673	-	-	-
2003–04	7,275	282	273	15,825	611	660	18,034	699	696	-	-	-
2004–05	7,340	276	279	22,077	827	716	18,779	709	719	-	-	-
2005–06	7,970	290	286	23,411	850	778	20,301	742	743	-	-	-
2006–07	8,626	305	292	26,828	945	844	22,108	784	768	16,828	592	572
2007–08	9,081	311	299	24,429	835	917	22,604	779	794	18,010	615	616
2008–09	9,212	306	306	29,634	985	995	24,020	805	821	19,256	637	663
2009–10	9,623	310	313	33,904	1,095	1,080	25,431	825	848	21,607	694	713
2010–11	10,110	314	320	37,567	1,174	1,173	27,579	866	877	24,947	776	767
2011–12	10,603	320	327	39,395	1,192	1,273	31,203	950	906	28,087	844	826
2012–13	11,144	326	335	40,356	1,179	1,382	34,123	1,006	937	30,325	887	889

(a) Data only available from 2006–07 onwards.

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C30: Case counts, age-standardised rates and modelled rates per 100,000 population, by type of fall-related rehabilitation and related care separations, Australia 2002–03 to 2012–13**

Year	Other orthopaedic follow-up			Other surgical follow-up			Care involving use of rehabilitation			Person awaiting admission		
	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate	Cases	Rate	Modelled rate
2002–03	264	11	21	873	35	37	10,618	421	491	1,388	55	62
2003–04	548	21	22	958	37	36	12,565	486	540	1,754	68	62
2004–05	822	31	24	1,028	39	34	18,462	692	594	1,765	66	63
2005–06	851	31	25	870	32	33	19,888	723	653	1,802	64	64
2006–07	827	29	26	990	35	32	23,015	812	718	1,996	69	64
2007–08	842	29	27	766	26	31	20,926	716	790	1,895	63	65
2008–09	987	32	29	883	29	30	25,850	861	869	1,914	62	65
2009–10	996	32	30	812	26	29	30,172	977	955	1,924	60	66
2010–11	987	31	32	930	29	28	33,429	1,047	1,051	2,221	67	67
2011–12	768	23	34	948	29	27	35,274	1,069	1,155	2,405	71	67
2012–13	674	20	36	1,051	31	26	36,140	1,058	1,271	2,491	71	68

*Notes*

1. Rate is age-standardised to the 2001 Australian population (per 100,000).
2. Results for 2012–13 are likely to have been affected by the narrowing of Victorian policy on admissions. Modelled rate is the predicted rate of injury based on modelling data to 2011–12, and projecting the trend to 2012–13 (see Box 1.1 and Appendix A: Data issues).

**Table C31: Patient days for fall-related care, by sex and age group, Australia 2012–13**

<b>Patient days for fall-related care<sup>(a)</sup></b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+</b>	<b>Total</b>
Men	40,443	48,150	70,977	97,355	174,673	431,598
Women	55,183	78,937	129,922	217,872	471,905	953,819
People	95,626	127,087	200,899	315,227	646,578	1,385,417
<b>All patient days<sup>(b)</sup></b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+ years</b>	<b>Total</b>
Men	1,261,870	1,234,815	1,276,151	1,250,282	1,370,525	6,393,643
Women	1,061,764	1,112,999	1,250,642	1,415,051	2,141,372	6,981,828
People	2,323,635	2,347,815	2,526,794	2,665,334	3,511,903	13,375,481
<b>Fall-related care as percentage of all patient days (%)</b>	<b>65–69</b>	<b>70–74</b>	<b>75–79</b>	<b>80–84</b>	<b>85+</b>	<b>Total</b>
Men	3.2	3.9	5.6	7.8	12.7	6.8
Women	5.2	7.1	10.4	15.4	22.0	13.7
People	4.1	5.4	8.0	11.8	18.4	10.4

(a) Sum of patient days for three types of record: fall injury cases, fall injury inward transfers and fall-related rehabilitation and related care.

(b) Data source: *Australian hospital statistics 2012–13* (AIHW 2014a).

**Table C32: Patient days by type of fall-related hospitalisations, Australia 2002–03 to 2012–13**

Year	Number of fall cases	Patient days			Total patient days for fall-related care <sup>(a)</sup>
		Fall cases	Inward transfer separations	Fall related rehabilitation and related care separations	
2002–03	56,958	457,518	82,917	296,607	1,037,245
2003–04	60,510	487,505	97,273	340,946	1,126,028
2004–05	62,709	498,649	95,328	457,590	1,251,972
2005–06	66,822	515,056	106,230	466,301	1,288,093
2006–07	71,790	540,885	119,406	510,871	1,371,769
2007–08	74,471	564,820	123,996	503,404	1,392,928
2008–09	78,610	579,281	127,457	535,488	1,443,035
2009–10	83,768	589,655	135,295	569,871	1,495,731
2010–11	92,152	620,677	138,044	595,037	1,554,769
2011–12	96,391	628,956	137,679	631,047	1,598,794
2012–13	98,704	616,192	142,258	626,967	1,586,630
<b>Total</b>	<b>842,885</b>	<b>6,099,194</b>	<b>1,305,883</b>	<b>5,534,129</b>	<b>15,146,994</b>

(a) Sum of patient days for three types of record: fall injury cases, fall injury inward transfers and fall-related follow-up care.

**Table C33: Mean total length of stay per case for hospitalised fall injury, by sex, Australia 2002–03 to 2012–13**

Year	Men			Women		
	Cases	Patient days	Mean length of stay	Cases	Patient days	Mean length of stay
2002–03	15,652	231,461	14.8	41,306	605,581	14.7
2003–04	16,784	249,616	14.9	43,726	676,108	15.5
2004–05	18,038	295,907	16.4	44,670	755,653	16.9
2005–06	19,500	312,801	16.0	47,322	774,786	16.4
2006–07	21,362	340,828	16.0	50,426	830,222	16.5
2007–08	22,481	352,345	15.7	51,990	839,875	16.2
2008–09	23,570	364,949	15.5	55,040	877,277	15.9
2009–10	25,597	386,570	15.1	58,171	908,251	15.6
2010–11	28,992	417,122	14.4	63,160	936,636	14.8
2011–12	30,422	437,723	14.4	65,969	959,959	14.6
2012–13	31,735	431,598	13.6	66,969	953,819	14.2
<b>Total</b>	<b>254,133</b>	<b>3,820,920</b>	<b>15.0</b>	<b>588,749</b>	<b>9,118,167</b>	<b>15.5</b>

# Glossary

Definitions in the Glossary contain an identification number from the Metadata Online Registry (METeOR). METeOR is Australia's central repository for health, community services and housing assistance metadata, or 'data about data'. It provides definitions for data for health and community services-related topics and specifications for related national minimum data sets (NMDs), such as the NMDs that form the basis of this report. METeOR can be viewed on the AIHW website at <[www.aihw.gov.au](http://www.aihw.gov.au)>. For further information on the terms used in this report, refer to the definitions in the *National health data dictionary*, version 16 (AIHW 2012b).

**activity when injured:** The type of activity being undertaken by a person at the time of injury. METeOR identifier: 391320.

**acute:** Having a short and relatively severe course.

**acute care:** See **care type**.

**acute care hospital:** See **establishment type**.

**admitted patient:** A patient who undergoes a hospital's admission process to receive treatment and/or care. This treatment and/or care is provided over a period of time and can occur in hospital and/or in the person's home (for **hospital-in-the-home** patients). METeOR identifier: 268957.

**age-standardisation:** A set of techniques used to remove, as far as possible, the effects of differences in age when comparing two or more populations.

**care type:** The care type defines the overall nature of a clinical service provided to an admitted patient during an episode of admitted patient care, or the type of service provided by the hospital for boarders or posthumous organ procurement (care other than admitted care). METeOR identifier: 491557.

Admitted patient care consists of the following categories:

- acute care
- rehabilitation care
- palliative care
- geriatric evaluation and management
- psychogeriatric care
- maintenance care
- newborn care
- other admitted patient care—this is where the principal clinical intent does not meet the criteria for any of the above.

Care other than admitted care includes:

- posthumous organ procurement
- hospital boarder.

**episode of care:** The period of admitted patient care between a formal or statistical admission and a formal or statistical separation, characterised by only one care type (see **care type** and **separation**). METeOR identifier: 491557 (Care type), METeOR identifier: 268956 (episode of admitted patient care).



**establishment type:** Type of establishment (defined in terms of legislative approval, service provided and patients treated) for each separately administered establishment. METeOR identifier: 269971.

**external cause:** The environmental event, circumstance or condition as the cause of injury, poisoning and other adverse effect. METeOR identifier: 514295.

**hospital:** A health care facility established under Commonwealth, state or territory legislation as a hospital or a free-standing day procedure unit and authorised to provide treatment and/or care to patients. METeOR identifier: 268971.

**Inpatient:** See **admitted patient**. METeOR identifier: 268957.

**International Classification of Diseases and Related Health Conditions (ICD):** The World Health Organization's internationally accepted classification of diseases and related health conditions. The 10th revision, Australian modification (ICD-10-AM) is currently in use in Australian hospitals for admitted patients.

**length of stay:** The length of stay of an overnight patient is calculated by subtracting the date the patient is admitted from the date of separation and deducting days the patient was on leave. A same-day patient is allocated a length of stay of 1 day. METeOR identifier: 269982.

**mode of admission:** The mechanism by which a person begins an episode of admitted patient care. METeOR identifier: 269976.

**mode of separation:** Status at separation of person (discharge/transfer/death) and place to which person is released (where applicable). METeOR identifier: 270094.

**patient days:** The total number of days for all patients who were admitted for an episode of care and who separated during a specified reference period. A patient who is admitted and separated on the same day is allocated 1 patient day. METeOR identifier: 270045.

**principal diagnosis:** The diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the health care establishment. METeOR identifier: 514273.

**private hospital:** A privately owned and operated institution, catering for patients who are treated by a doctor of their own choice. Patients are charged fees for accommodation and other services provided by the hospital and relevant medical and paramedical practitioners. Acute care and psychiatric hospitals are included, as are private free-standing day hospital facilities. See also **establishment type**.

**public hospital:** A hospital controlled by a state or territory health authority. Public hospitals offer free diagnostic services, treatment, care and accommodation to all eligible patients. See also **establishment type**.

**same-day patient:** An admitted patient who is admitted and separated on the same date.

**separation:** An episode of care for an **admitted patient**, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation).

Separation also means the process by which an admitted patient completes an episode of admitted patient care either by being discharged, dying, transferring to another hospital or changing type of care.

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## Related publications

This report, *Trends in hospitalisations due to falls by older people, Australia 2002–03 to 2010–12*, is the second report that the AIHW has produced. These two reports extend work previously published in the six-edition series *Hospitalisations due to falls by older people, Australia*. These reports can be downloaded free from the AIHW publications website <<http://www.aihw.gov.au/publications/>>. The website also includes information on ordering printed copies.

The following AIHW publications relating to falls by older Australians might also be of interest:

- AIHW: Karmel R, Lloyd J and Anderson P 2008. Movement from hospital to residential aged care. Data linkage series no. 6. Cat. no. CSI 6. Canberra: AIHW.
- AIHW 2012. Residential aged care in Australia 2010–11: a statistical overview. Aged care statistics series no. 36. Cat. no. AGE 68. Canberra: AIHW.
- AIHW: Bradley C 2013. Trends in hospitalisations due to falls by older people, Australia 1999–00 to 2010–11. Injury research and statistics series no. 84. Cat. no. INJCAT 160. Canberra: AIHW.
- AIHW: Tovell A, Harrison JE & Pointer S 2014. Hospitalised injuries in older Australians 2011–12. Injury research and statistics series no. 90. Cat. no. INJCAT 166. Canberra: AIHW.
- AIHW 2015. Osteoarthritis: musculoskeletal fact sheet. Arthritis series no. 22. Cat. no. PHE 186. Canberra: AIHW.



This report presents trends in fall related hospital care for people aged 65 and older from 2002–03 to 2012–13. There was a decrease in the rate of hip fractures due to falls (~2% per year) between 2002–03 and 2012–13. In contrast, falls resulting in head injuries increased at a particularly high rate (7% per year).

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