Australian Government
Australian Institute of Health and Welfare

Flinders UNIVERSITY

Hospitalised injury and socioeconomic influence in Australia

2015–16

AIHW

Australian Government
Australian Institute of Health and Welfare

Injury Research and Statistics Series
Number 125

Hospitalised injury and socioeconomic influence in Australia

2015–16

Australian Institute of Health and Welfare
Canberra
Cat. no. INJCAT 205

The Australian Institute of Health and Welfare is a major national agency whose purpose is to create authoritative and accessible information and statistics that inform decisions and improve the health and welfare of all Australians.

This publication is part of the Australian Institute of Health and Welfare's Injury research and statistics series. A complete list of the Institute's publications is available from the Institute's website www.aihw.gov.au.

ISSN 2205-510X (Online)
ISSN 1444-3791 (Print)
ISBN 978-1-76054-559-8 (Online)
ISBN 978-1-76054-560-4 (Print)

Suggested citation

AIHW: Pointer SC 2019. Hospitalised injury and socioeconomic influence in Australia, 2015–16. Injury research and statistics series no. 125. Cat. no. INJCAT 205. Canberra: AIHW.

Any enquiries relating to copyright or comments on this publication should be directed to:
Australian Institute of Health and Welfare
GPO Box 570
Canberra ACT 2601
Tel: (02) 6244 1000
Email: info@aihw.gov.au

Published by the Australian Institute of Health and Welfare

This publication is printed in accordance with ISO 14001 (Environmental Management Systems) and ISO 9001 (Quality Management Systems). The paper is sourced from sustainably managed certified forests.

MIX
From responsible sources
FSC® C017269

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 for any amendments.

Contents

Summary

This report examined the associations between socioeconomic status (SES) and hospitalised injury in Australia. It looks at the association between SES and hospitalised injury cases in the most recent data year available (2015–16) and at this association, over time, by age, sex and Indigenous status and by a selection of external causes of injury. The external causes of injury included were *Transport crash*, *Accidental drowning and submersion*, *Accidental poisoning*, falls, injury due to thermal causes, *Intentional self-harm* and injuries due to *Assault*.

Overall, the results demonstrated a strong association between SES and hospitalised injury: for those living in the most disadvantaged areas, rates of hospitalised injury were highest, and for those living in the most advantaged areas, rates of injury hospitalisation were lowest. Generally, rates of injury decreased in line with increasing advantage. There were, however, exceptions to this in cases of *Accidental drowning and submersion* and fall-related injuries.

In cases of *Accidental drowning and submersion,* the strength of the association between SES and injury hospitalisations was weaker for more advantaged areas. For cases of hospitalised fall-related injury, there was no association between rates of injury and increasing SES advantage.

Variations in the association between SES and injury hospitalisations occurred by age and by sex for cases of all-cause injury, *Transport crash*, *Accidental drowning and submersion* and fall-related injury. With respect to sex, for cases of fall-related injury, the association between injury and SES was much weaker for females, and to some extent for males.

With respect to age, there was variation by SES in the rates of injury for all-cause injury, *Transport crash*, *Accidental drowning and submersion* and fall-related injury. For example, the association between injury and SES was weakest in the youngest 2 age groups in these 4 injury categories. Those aged 65 and over demonstrated an inverse relationship between rates of all-cause and fall-related injury and SES. (That is, rates of all-cause and fall-related injury increased with increasing SES advantage). In addition, there was no clear association between *Transport crash* injury rates and SES.

In relation to Indigenous Australians, for all-cause hospitalised injury and all but 1 external cause, at least 40% to 50% of Indigenous people were in the most disadvantaged SES group. The exception to this was for incidences of *Accidental drowning and submersion,* where the largest proportion of Indigenous cases were found in the second-most disadvantaged group (48%). Note that Indigenous people are not distributed evenly across the SES groups examined, which will affect the patterns seen.

Over the period, the rate of hospitalised injury increased for both the highest (most disadvantaged) and lowest (most advantaged) SES groups. A consistent downward trend was identified for 2 external causes: decreases in the annual rate of injury due to thermal causes and *Assault* were found. However, there was no consistency in the trends over time among the other external cause categories examined.

Changes in rates over time varied considerably by SES group and by age. The most consistent finding was an increase in average annual rates of injury for the oldest age group (those aged 65 or over) in every external cause category examined, for both the highest and the lowest SES groups.

1 Introduction

The aim of this report is to examine the associations between hospitalised injury and socioeconomic status in Australia.

Only a small proportion of all injuries result in admission to a hospital. For each hospital admission, many more cases presenting to emergency departments are not admitted or are seen by a general practitioner. A larger number of generally minor cases do not receive medical treatment. In addition, a smaller number of severe injuries that quickly result in death go unrecorded in terms of hospital separations but are captured in mortality data. Although injury cases admitted to hospital comprise a small proportion of the number of cases of injury, they account for a large proportion of the estimated costs of injury. These types of injuries are the focus of this report.

Injury and socioeconomic influence

Injury is a leading cause of morbidity, disability and premature mortality in Australia (AIHW 2016; AIHW: Pointer 2018). Socioeconomic status (SES) is an important determinant of injury, however, the relationship between SES and injury has been shown to vary. Very little research on the relationship between injury and SES has been undertaken in Australia and only a small number of international studies and reviews have been published.

According to the World Health Organization (WHO) 'The existence of differences in the health status of people from different socioeconomic groups is not a new phenomenon' (Laflamme et al. 2009). Within Australia, and in the rest of the world, socioeconomic factors, including associated disadvantage, are important determinants of health. In general, the higher people's incomes and education, the healthier they are and this phenomenon is often referred to as the 'social gradient of health'. The better off people are, the more they are able to afford better food and housing, better health care, and healthy activities and pursuits. People from poorer social or economic circumstances are known to be at greater risk of poor health, have higher rates of illness, disability and death, and live shorter lives than those who are more advantaged (AIHW 2018).

Laflamme et al (2009) report that, among studies looking at the relationship between SES and injury mortality, strong associations were present showing that people with low SES tended to die by injury to a greater extent than those with high SES. The effect was found for many causes of injury, including transport crashes, intentional self-harm, interpersonal violence, unintentional poisoning and burns. A relationship between injury morbidity and SES was also identified—but it was less consistent than the relationship identified in mortality studies.

Other reviews and studies have examined the relationship between SES and injury in children and young people. Birken and MacArthur (2004) reviewed studies on the relationship between SES and injury in children throughout Britain and Wales. Evidence was reported demonstrating the link between low SES and higher rates of injury mortality for falls, unintentional poisoning, pedal cycle crashes, burns and drownings. Similar results were found with respect to the relationship between SES and injury morbidity. Birken and MacArthur (2004) concluded that '…the inverse relationship between socioeconomic level and injury morbidity and mortality is pervasive, persistent and profound'.

However, the relationship between low SES and injury morbidity has not always been consistently found. A large population survey by Fang et al (2014) in China found that the associations between SES and hospitalised child injuries varied by severity of injury.

Additional analyses demonstrated that the associations between SES and injuries also varied by type and severity of injury, and across different life stages.

This report examines the association between hospitalised injury and SES to see whether the social gradient seen in other health measures exists for injury. The report will look at the strength of any association, as well as any variances due to age, sex or Indigenous status, for a range of external causes of injury. Trends over time will also be examined.

How is SES measured?

One of the complicating factors identified by researchers examining the relationship between SES and injury is in the measurement of SES itself. SES is a complex concept that can be measured at multiple levels (for example, at an individual or area level). A variety of indicators such as education, occupation and income can be used individually or in combination to define a person's socioeconomic position. In Australia, much of the research examining SES is based on the Australian Bureau of Statistics (ABS) area-based Index of Relative Socio-economic Disadvantage (IRSD) (ABS 2013).

The IRSD is a ranking, based on geographic areas, used to stratify the population by socioeconomic status. The index is compiled from information collected in the Census of Population and Housing and identifies the socioeconomic conditions of Australian geographic areas by measuring aspects of disadvantage. The IRSD scores each area by summarising attributes of their populations, such as low income; low educational attainment; high unemployment; and jobs in relatively unskilled occupations. Areas can then be ranked by their IRSD score and are classified into groups based on their rank.

Commonly, the population is divided into 5 socioeconomic groups or quintiles, of roughly equal proportions, based on the level of disadvantage of their current residence. The IRSD commonly describes the population living in the 20% of areas with the greatest overall level of disadvantage as 'living in the lowest socioeconomic areas' or the 'lowest socioeconomic group'. The 20% at the other end of the scale—the top fifth—is described as the 'living in the highest socioeconomic areas' or the 'highest socioeconomic group'.

The following labels for each socioeconomic group have been used throughout this report:

1—Lowest most disadvantaged

2—Second most disadvantaged

3—Middle

4—Second least disadvantaged

5—Highest least disadvantaged.

It is important to understand that the IRSD reflects the overall or average socioeconomic position of the population of an area; it does not show how individuals living in the same area might differ from each other in their socioeconomic position. Importantly, socioeconomic scores for each geographical area are calculated based on the socioeconomic characteristics of the entire population and may not accurately reflect levels of socioeconomic disadvantage in the Indigenous population. It is also the case that Indigenous people are unevenly distributed in socioeconomic groups.

This report presents charts of proportions of hospitalised injury cases within socioeconomic areas by Indigenous status to provide information on the general pattern and variation by SES. However, a comprehensive analysis of the association between socioeconomic status and Indigenous status is beyond the scope of this report. More detailed information on the impact of socioeconomic status on Indigenous health and welfare can be found in *Australian*

Burden of Disease Study: fatal burden of disease in Aboriginal and Torres Strait Islander people 2010 (AIHW 2015), along with a discussion of relevant methodological issues.

Data source

This report uses data from the National Hospital Morbidity Database (NHMD) covering the period 1 July 2007 to 30 June 2016. The NHMD includes records of nearly all episodes in which a person was admitted to hospital in Australia. Details of the criteria used to select records are listed below. In this report, the term *hospitalised injury* refers to an injury which resulted in the person being admitted to hospital on the same day or after 1 or more nights' stay in a hospital bed.

This report uses estimates of cases of hospitalised injury derived from hospital separations. Injury cases are estimated as the number of injury separations, excluding those records where the patient was transferred from another hospital. (These transfers from other hospitals are omitted to reduce over-counting of cases—see 'Appendix A: Data issues' for details).

Which hospitalised injuries were included?

Injury hospitalisations that met all of the following criteria were included in this report:

- hospital separations occurring in Australia from 1 July 2007 to 30 June 2016
- principal diagnoses in the ICD-10-AM range S00–T75 & T79 using ICD-10-AM—but excluding any with a Z50 *Care involving use of rehabilitation procedures* appearing in any additional diagnosis field
- mode of admission was not a transfer from another acute hospital (see 'Appendix A: Data issues' for details).

Diagnosis and external cause information for the hospital separations reported here were coded according to several editions of ICD-10-AM that were current during parts of the period 2007 to 2016.

In some tables, rates are accompanied by a rate ratio. The rate ratio is equal to the rate for people living in each SES area, divided by the rate for people from all SES areas combined. If the rate ratio is greater than 1, then the rate for people living in a particular SES area was higher than the rate for people from all SES areas combined.

Important terms relating to the data used in this report are summarised in Box 1.1, and further information on data and methods is provided in 'Appendix A: Data issues'.

In tables and charts, unless stated otherwise:

- age is calculated at the date of admission
- in tables by age group and sex, separations for which age and sex were not reported were included in totals
- the association between hospitalised injury and SES is presented in tables and charts throughout this report. If there was no relationship between injury hospitalisations and SES, we would expect to see equal proportions of hospitalised injury cases in each SES category: that is, 20% of injury hospitalisations would fall into each SES group
- rates were age-standardised as detailed in 'Appendix A: Data issues'
- trends were analysed using Poisson regression, as described in Berry and Harrison (2006). See also 'Appendix A: Data issues'

- the use of the terms ‘significant’ or ‘significantly’ throughout this report indicates an outcome that was statistically significant (p = 0.05 or less).

Structure of this report

Chapter 2 presents information on the relationship between SES and hospitalised injury. The chapter explores SES by age and by sex, as well as by a number of external causes of injury.

Chapter 3 presents trends in hospitalised injury by SES (the number and rate of separations and estimated cases over time, by age and by sex).

Appendix A: Data issues provides summary information on the data used in the report; notes on the presentation of data; the population estimates used to calculate population rates; and analysis methods.

Supplementary tables providing additional data underpinning some charts in the report are available online https://www.aihw.gov.au/reports/injury/hospitalised-injury-and-socioeconomic-influence-in/data.

Box 1.1: Summary of terms relating to hospitalised injury and injury deaths

Statistics on admitted cases 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 cases are based on information provided at the end of the cases’ 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 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 **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.

The **injury separation records** included in this report are those that have a principal diagnosis code in the ICD-10-AM range S00–T75 or T79. Whenever a patient has a principal or additional diagnosis of an injury or poisoning, an external cause code should be recorded. This includes records where the main reason for the episode in hospital was a recent injury, such as a fracture, laceration or burn to any part of the body, or poisoning. It also includes a small number of episodes mainly due to complications of surgical and medical care or due to sequelae present a year or more after injury, or other late effects.

(continued)

Box 1.1 (continued): Summary of terms relating to hospitalised injury and injury deaths

Records are included whether caused unintentionally ('accidents') or intentionally (*Intentional self-harm*, or *Assault*). Records where intent was not determined are also included. Throughout this report, records with a principal diagnosis of S00–T75 or T79 are included in the totals of tables unless otherwise indicated, even if they lack an external cause or have a first-reported external cause code of complications of surgical and medical care, or codes describing the sequelae of external causes. These records meet the principal diagnosis definition of community injury, but lack a meaningful external cause.

Injury cases are estimated as the number of injury separations, less those records where the mode of admission was 'Admitted patient transferred from another hospital'. These transfers are omitted to reduce over-counting. The criteria for injury cases retain a small number of records with a first external cause code that is invalid or refers to a sequelae (late effect) or complication of care. These cases are reported as 'other or missing' in tables of external causes.

2 SES and injury morbidity

This section presents information on cases of hospitalised injury by SES group and compares rates and proportions of cases across SES groups by selected external causes. The lowest SES group represents the areas containing the 20% of the population with the most disadvantage and the highest SES group represents the areas containing the 20% of the population with the least disadvantage. If the proportions of hospitalised injury cases are not equally distributed between the SES groups, this suggests that there is an association between SES and injury. The nature and strength of the association is discussed in the text.

All-cause injury hospitalisations

SES by sex and age

In 2015–16, rates of all-cause hospitalised injury varied across SES groups in a manner consistent with the concept of a 'social gradient of health' (Table 2.1). Lower rates of hospitalised injury were associated with the highest (most advantaged) SES groups for both males and females and, as SES disadvantage increased, so did rates of hospitalised injury.

Within the lowest (most disadvantaged) SES group, males had higher rates of hospitalised injury than females (2,595 and 1,869 cases per 100,000 population, respectively). Males also had higher rates than females in each of the other SES groups.

Table 2.1: Injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	62,318	57,735	56,417	52,017	48,354	281,346
Cases per 100,000[b]	2,595.4	2,400.0	2,375.5	2,198.0	2,065.6	2,327.0
Rate ratio	1.1	1.0	1.0	0.9	0.9	
Females						
Cases	50,348	46,779	45,225	42,641	40,756	228,565
Cases per 100,000[b]	1,869.4	1,720.5	1,700.0	1,641.9	1,532.7	1,659.9
Rate ratio	1.1	1.0	1.0	1.0	0.9	
Persons[c]						
Cases	112,669	104,515	101,645	94,660	89,110	509,920
Cases per 100,000[b]	2,244.7	2,071.9	2,049.2	1,930.5	1,808.4	2,002.5
Rate ratio	1.1	1.0	1.0	1.0	0.9	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.1 shows the proportion of injury cases for males and females, by SES group. Among males, a larger proportion (22%) of hospitalised injury cases lived in areas classified as the lowest SES group, compared with 17% for the highest SES group. A similar result was found for females, however, the proportions of female hospitalised injury cases living in areas classified as being the highest and second-highest SES groups were the same (18%).

Figure 2.1: Proportion of hospitalised injury cases, by socioeconomic group and sex, Australia, 2015–16

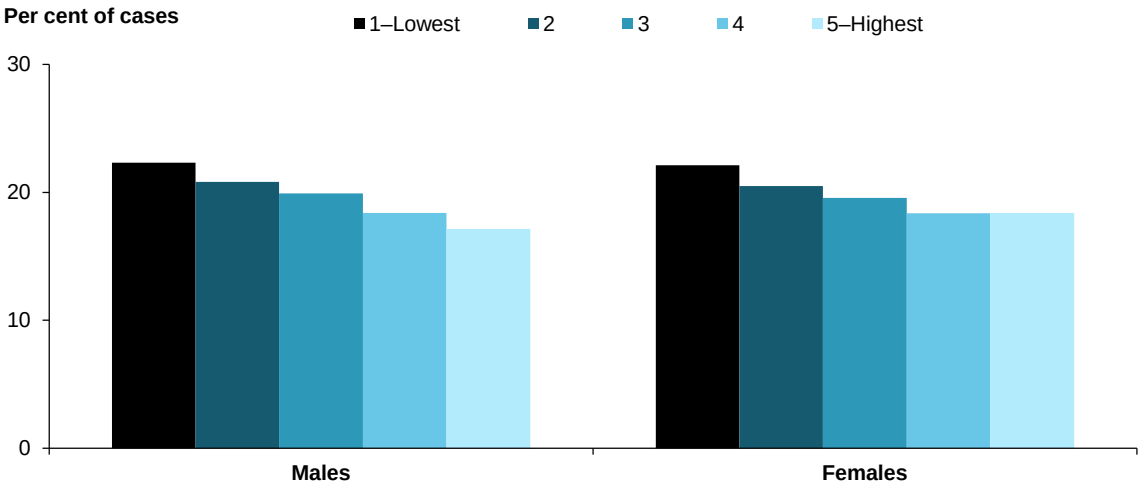


Figure 2.2 shows the proportion of injury cases in each SES group by age group. In each age group, a larger proportion of hospitalised injury cases occurred in the lowest SES group. However, a strong association—supporting a social-gradient-of-health view of injury and SES—was only apparent in 2 of the 6 age groups: for those aged 15–24 and 45–64. In these 2 age groups, for each subsequent decrease in socioeconomic status there was a corresponding increase in the proportion of hospitalised injury cases.

For each of the other age groups, while the largest proportion of cases occurred in the lowest SES groups, compared with the highest SES groups, there was variation in-between. For example, among the youngest age group there was little difference between the second most disadvantaged (19.2%) and the second most advantaged (19.5%) SES groups in terms of the proportion of hospitalised injury cases.

Figure 2.2: Proportion of hospitalised injury cases, by socioeconomic group and age, Australia, 2015–16

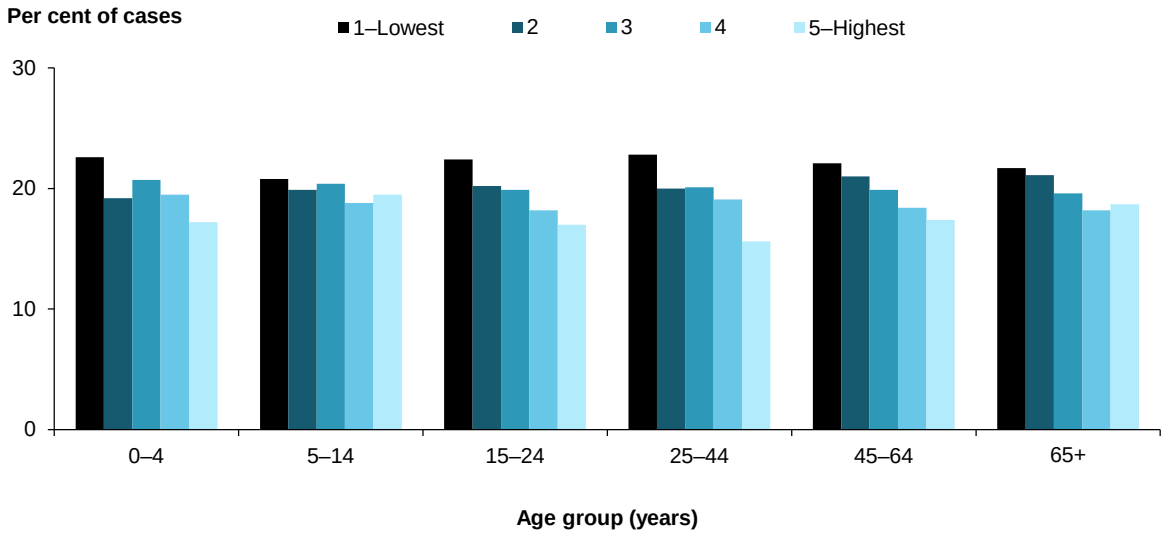
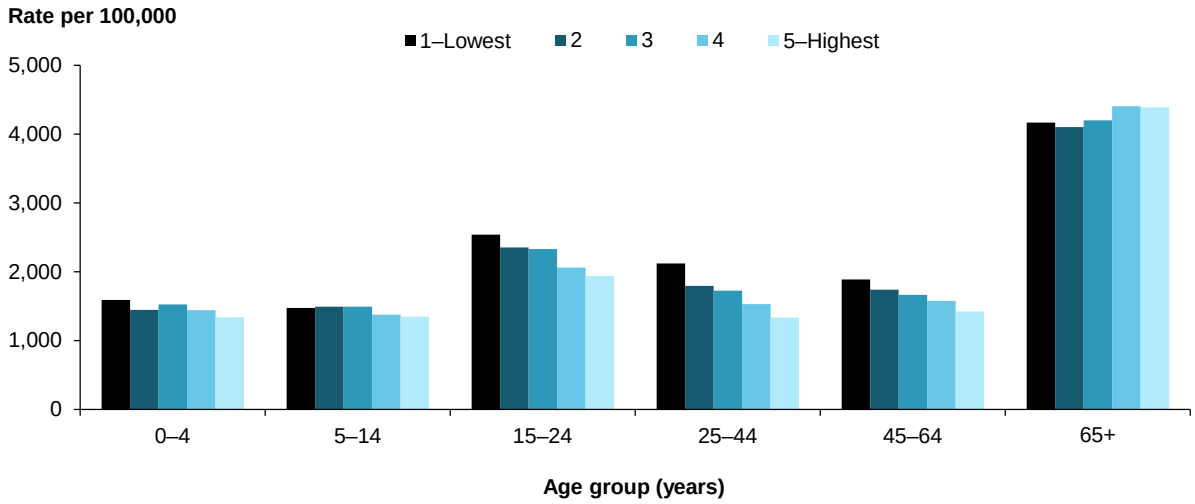


Figure 2.3 shows the age-specific rates of hospitalised injury by SES. After adjusting for the age of the population, the direction of the association between hospitalised injury and SES group can be clearly seen in 3 of the 6 age groups: those aged 15–24, 25–44 and 45–64. However, the pattern was not consistent within the remaining 3 age groups. For example, among those 65 and over, rates of hospitalised injury were higher with increasing advantage.

Figure 2.3: Age-specific rates of injury, by socioeconomic group, Australia, 2015–16

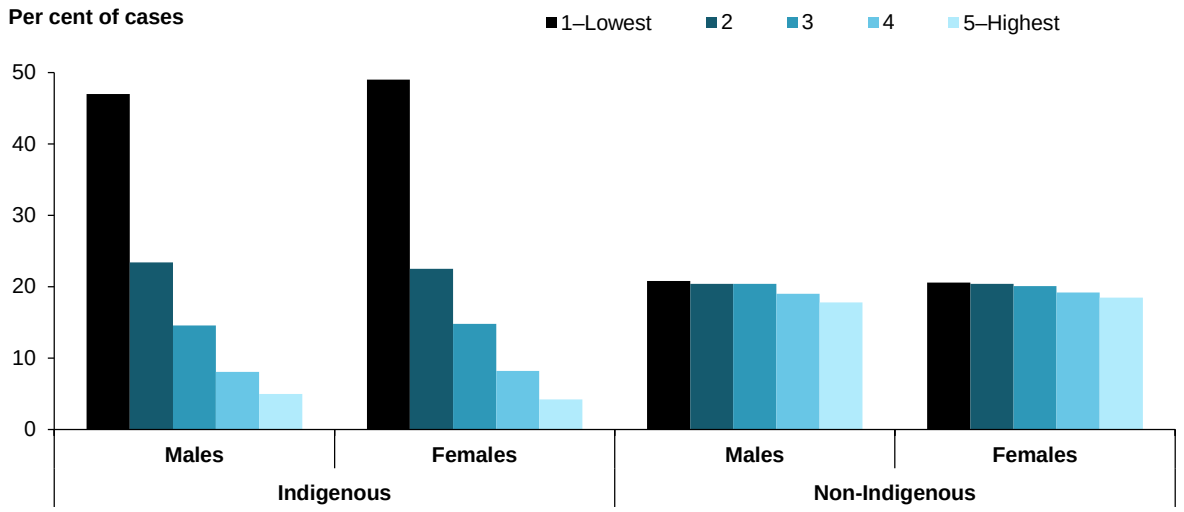


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES by Indigenous status

The proportions of hospitalised injury cases by SES group, by sex and by Indigenous status, is shown in Figure 2.4. Almost half of all Indigenous males (47%) and females (49%) hospitalised as a result of an injury are living in the most disadvantaged SES areas. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.4: Proportion of hospitalised injury cases, by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



Transport crash injury

This section presents information on cases admitted to hospital as a result of an unintentional *Transport crash* injury. It includes cases where the first-reported external cause code was in the ICD-10-AM range V00–V99 (Transport accidents).

SES by sex and age

In 2015–16, rates of *Transport crash* injury were highest (287 cases per 100,000 population) for cases living in the lowest (most disadvantaged) SES group and lowest (201) for those in the highest (most advantaged) SES group (Table 2.2). This was true for both males and females, although the direction of the association was not consistent for females living in the second and third SES groups. For example, among females the rate of *Transport crash* injury in the second lowest SES group was lower (176 cases per 100,000) than that of the third SES group (180).

Within the lowest (most disadvantaged) SES group, males (8,922 cases per 100,000 population) had higher rates of *Transport crash* injury compared with females (4,539 cases). Males also had higher rates than females in each of the other SES groups.

Table 2.2: *Transport crash* injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	8,922	8,529	8,469	7,509	6,478	40,647
Cases per 100,000[b]	380.9	361.9	360.0	313.8	273.4	343.0
Rate ratio	1.1	1.1	1.0	0.9	0.8	
Females						
Cases	4,539	4,267	4,328	4,003	3,195	20,807
Cases per 100,000[b]	190.1	177.6	179.8	164.2	129.6	170.7
Rate ratio	1.1	1.0	1.1	1.0	0.8	
Persons[c]						
Cases	13,461	12,796	12,797	11,512	9,673	61,454
Cases per 100,000[b]	286.5	270.3	270.1	239.0	200.8	257.0
Rate ratio	1.1	1.1	1.1	0.9	0.8	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.5 shows the proportion of *Transport crash* injury cases in each SES group for males and females. There was very little difference between males and females in terms of their respective *Transport injury* crash SES profiles. For both sexes, larger proportions of cases occurred in the lowest (most disadvantaged) SES group, compared with the highest (most advantaged) SES group. However, the proportion of cases within the second and third SES groups did not differ for either sex, suggesting that the association between SES and *Transport crash* injury was not as strong in these categories of socioeconomic disadvantage.

Figure 2.5: Proportion of *Transport crash* injury cases, by socioeconomic group and sex, Australia, 2015–16

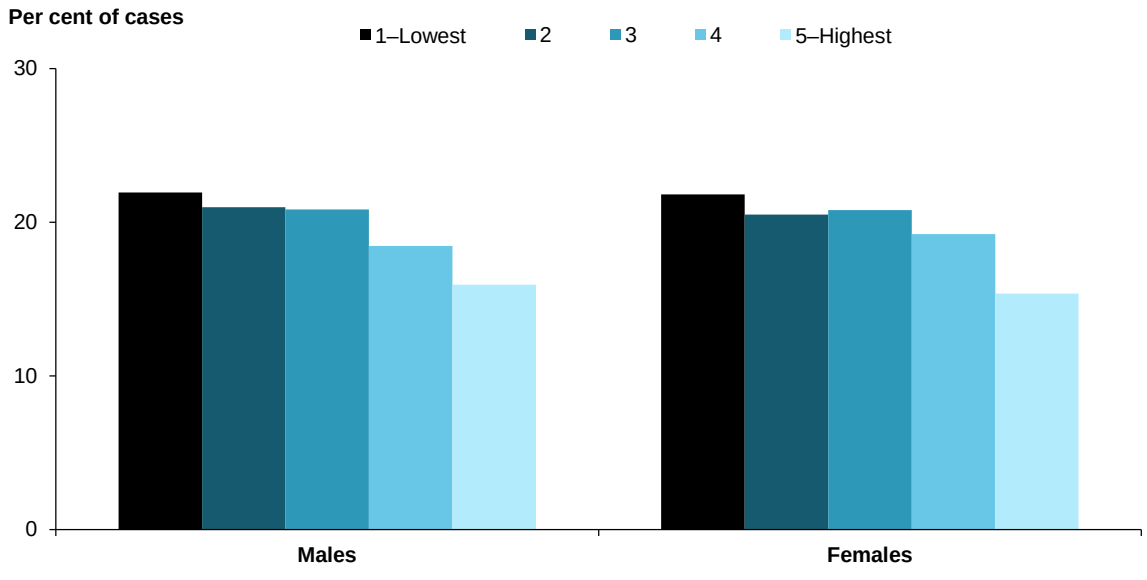


Figure 2.6 shows the proportion of *Transport crash* injury cases in each SES group, by age group. In 3 of the age groups (0–4, 15–24 and 25–44) a larger proportion of *Transport crash* injury cases occurred in the lowest (most disadvantaged) SES group, compared with the highest SES group. In the other 3 age groups, the largest proportions of *Transport crash* injury cases occurred in the second SES group (for those aged 5–14 and 65 or over), or the third SES group (for those aged 45–64). For all age groups, the smallest proportions of *Transport crash* injury cases occurred in the highest (most advantaged) SES group.

Figure 2.6: Proportion of *Transport crash* injury cases, by socioeconomic group and age, Australia, 2015–16

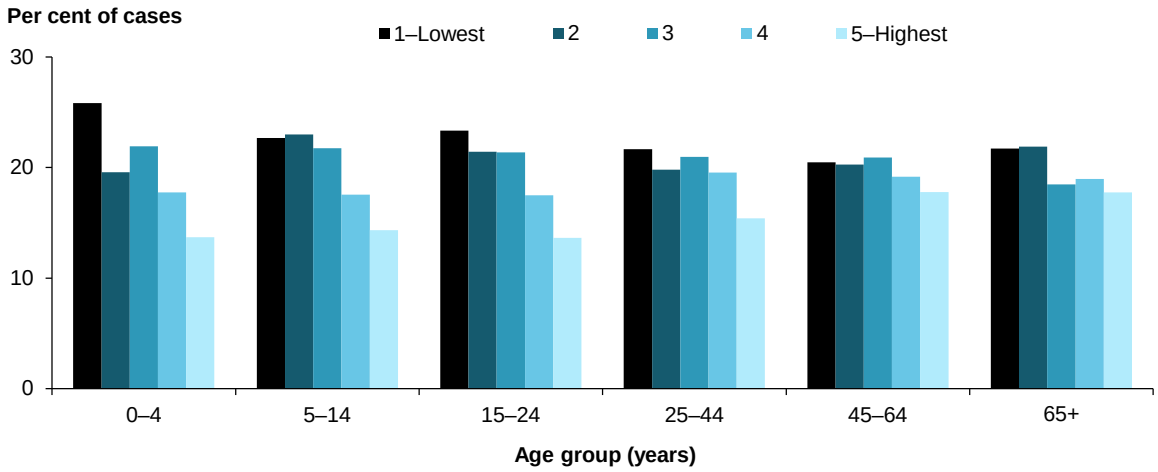
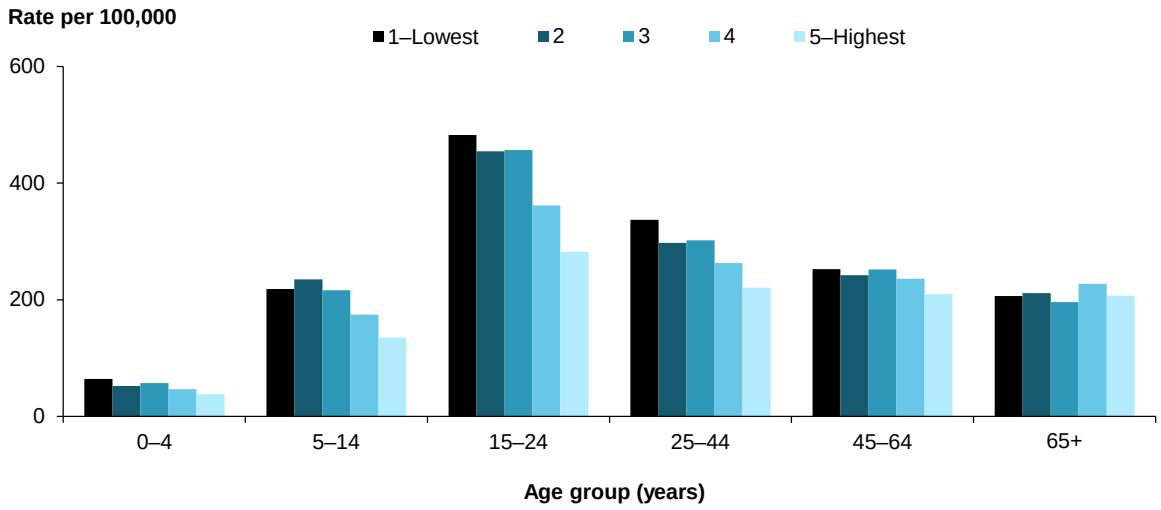


Figure 2.7 shows the age-specific rates of hospitalised *Transport crash* injury by SES group. Generally speaking, an association between *Transport crash* injury and SES group can be seen in 3 of the 6 age groups (0–4, 15–24, 25–44), with the highest rate of *Transport crash* injury occurring in the lowest SES group and the lowest rate in the highest SES group. However, within these age groups, *Transport crash* injury rates did not show a smooth gradient from lowest to highest SES group. (For example, for all 3 groups there was very little difference between the second and third SES groups for the rate of *Transport crash* injury).

For 2 of the other age groups—those aged 5–14 and 45–64—the highest rate of *Transport crash* injury occurred in SES groups other than the lowest (most disadvantaged). Among those aged 65 or over, there was no apparent relationship between *Transport crash* injury rates and SES group.

The most consistent finding for all age groups—other than those aged 65 or over—was a lower rate of *Transport crash* injury occurring for the highest (most advantaged) SES group.

Figure 2.7: Age-specific rates of *Transport crash* injury cases, by socioeconomic group, Australia, 2015–16

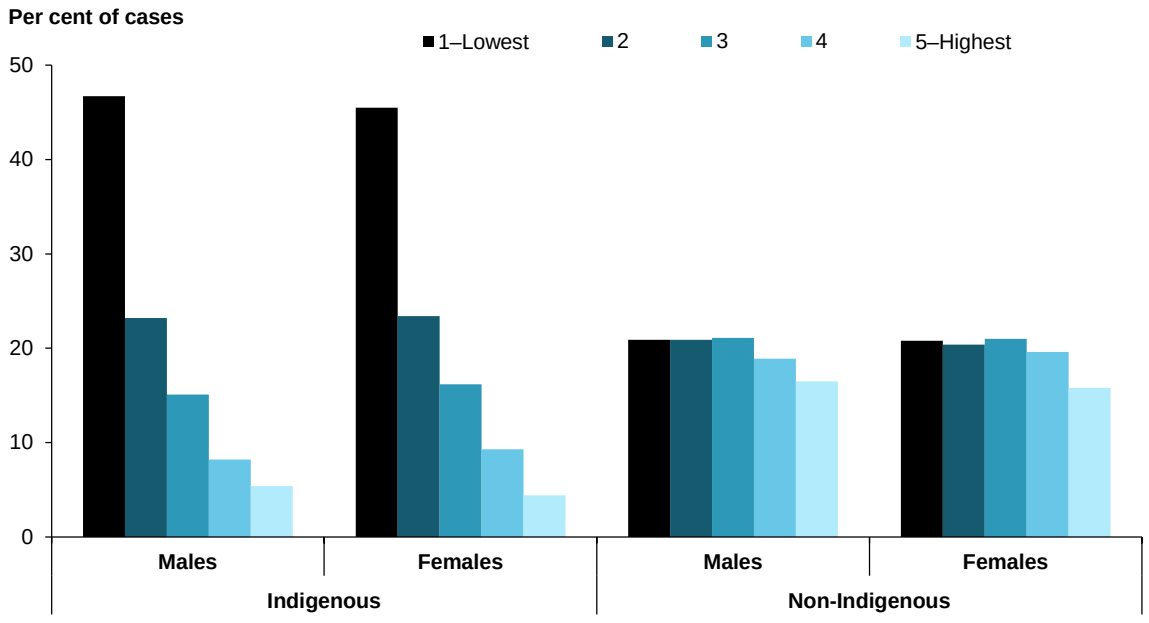


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES by Indigenous status

The proportion of *Transport crash* injury cases by SES group, by sex and by Indigenous status is shown in Figure 2.8. Almost half of all Indigenous males (47%) and females (49%) hospitalised as a result of *Transport crash* injury are living in the most disadvantaged SES areas. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.8: Proportion of *Transport crash* injury cases, by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



Accidental drowning and submersion

This section presents information on cases admitted to hospital as a result of unintentional drowning and submersion. It includes cases where the first-reported external cause code was in the ICD-10-AM range W65–W74 (*Accidental drowning and submersion*).

SES by sex and age

In 2015–16, rates of *Accidental drowning and submersion* were highest (at 3.2 cases per 100,000 population) for cases living in the lowest (most disadvantaged) SES areas (Table 2.3). Unlike the results for all-cause injury, the rates of *Accidental drowning and submersion* were the same in the second highest (most advantaged) SES groups. This was true for males and females.

Within the lowest SES group, males (3.8 cases per 100,000 population) had higher rates of *Accidental drowning and submersion* injury compared with females (2.6). Males also had higher rates than females in each of the other SES groups.

Table 2.3: *Accidental drowning and submersion* injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	91	85	78	68	69	410
Cases per 100,000[b]	3.8	3.6	3.3	2.9	3.0	3.5
Rate ratio	1.1	1.1	0.9	0.8	0.9	
Females						
Cases	60	46	41	38	36	242
Cases per 100,000[b]	2.6	2.0	1.8	1.7	1.6	2.1
Rate ratio	1.2	1.0	0.9	0.8	0.7	
Persons[c]						
Cases	151	131	119	106	105	652
Cases per 100,000[b]	3.2	2.8	2.5	2.3	2.3	2.8
Rate ratio	1.1	1.0	0.9	0.8	0.8	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.9 shows the proportion of *Accidental drowning and submersion* cases in each SES group for males and females. Among males, a larger proportion of *Accidental drowning and submersion* cases (22%) occurred in the lowest (most disadvantaged) SES group. This was also true for females (25%), who also had the smallest proportion of cases of *Accidental drowning and submersion* in areas classified as being the highest (most advantaged) SES group. In contrast, the smallest proportions of male cases of *Accidental drowning and submersion* were equally represented in the 2 highest (most advantaged) SES groups.

Figure 2.9: Proportion of *Accidental drowning and submersion* injury cases, by socioeconomic group and sex, Australia, 2015–16

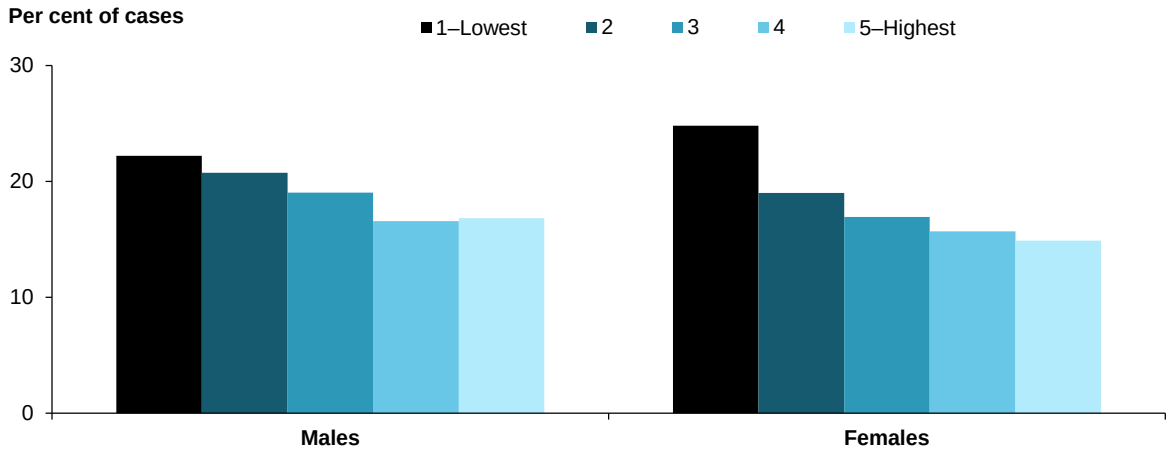


Figure 2.10 shows the proportion of *Accidental drowning and submersion* cases in each SES group, by age group. Small case numbers make interpretation of the results difficult in all but the youngest age group. For example, there were fewer than 30 cases in each SES group, by age, in all but the 0–4 age group. As a result, comments are confined to the youngest group (248 cases in total). Among those aged 0–4, the largest proportion of cases occurred in the lowest (most disadvantaged) SES group (25%), while the smallest proportions of cases of *Accidental drowning and submersion* were equally represented in the 2 highest (most advantaged) SES groups.

Figure 2.10: Proportion of *Accidental drowning and submersion* injury cases, by socioeconomic group and age, Australia, 2015–16

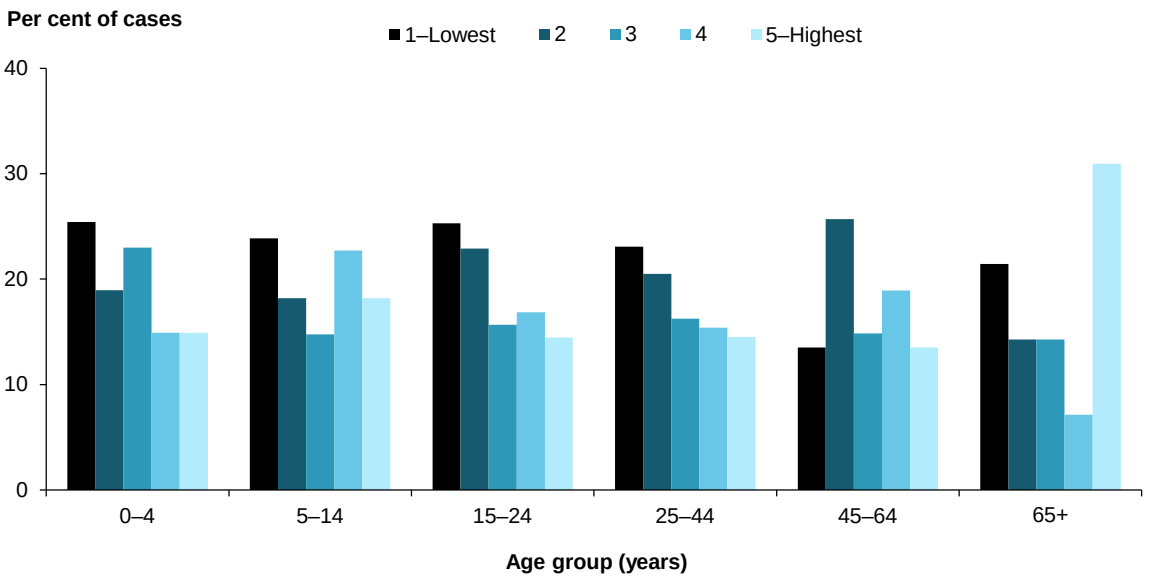
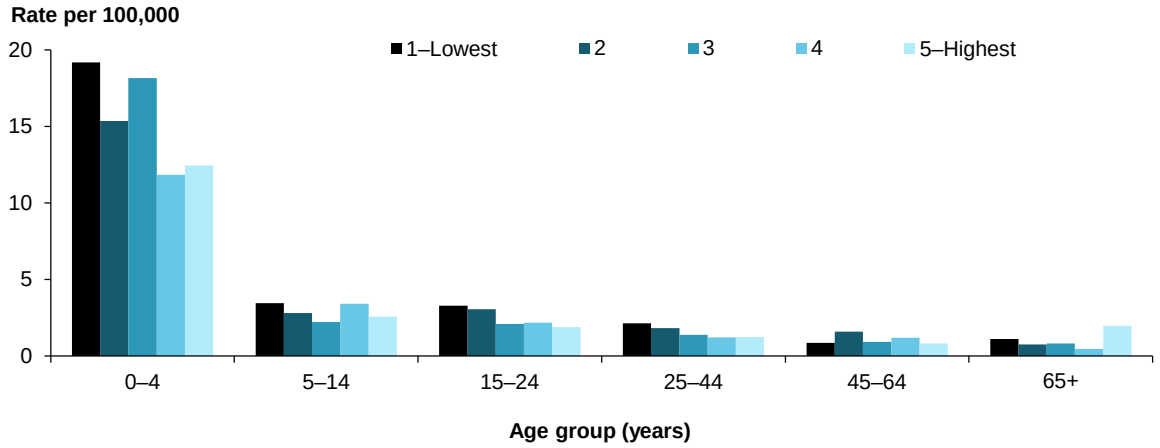


Figure 2.11 shows the age-specific rates of *Accidental drowning and submersion* cases by SES group. Among those aged 0–4, the highest rates of *Accidental drowning and submersion* injury occurred in the lowest (most disadvantaged) SES group (19 cases per 100,000 population). However, the lowest rates occurred in the fourth most advantaged SES group. Coupled with a higher rate of *Accidental drowning and submersion* injury in the third

SES group compared with the second, this suggests that the association between SES and *Accidental drowning and submersion* injury is more complex.

Figure 2.11: Age-specific rates of *Accidental drowning and submersion* injury cases, by socioeconomic group, Australia, 2015–16

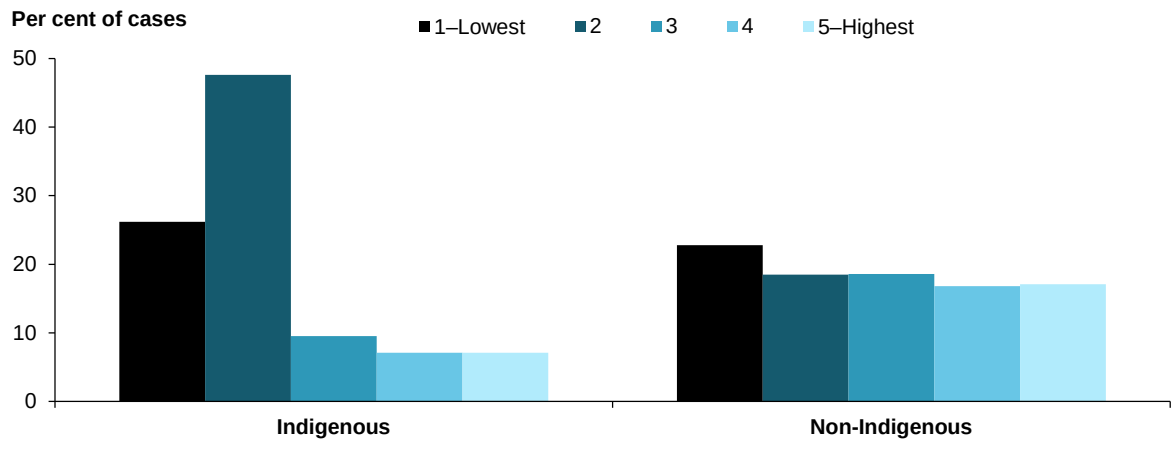


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES by Indigenous status

The proportion of *Accidental drowning and submersion* injury cases by SES group and Indigenous status is shown in Figure 2.12. Due to small case numbers, it was not feasible to present data by sex. There were very few (42) *Accidental drowning and submersion* cases among Indigenous people in 2015–16, compared with 596 cases for non-Indigenous people. Among Indigenous Australians, a larger proportion (48%) of cases occurred in areas classified as the second most disadvantaged SES group, compared with 7% for the highest SES group. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.12: Proportion of *Accidental drowning and submersion* injury cases, by socioeconomic group and Indigenous status, Australia, 2015–16



Accidental poisoning

This section presents information on cases admitted to hospital as a result of an unintentional poisoning injury. It includes cases where the first-reported external cause code was in the ICD-10-AM range X40–X49 (*Accidental poisoning by and exposure to noxious substances*).

SES by sex and age

In 2015–16, rates of *Accidental poisoning* injury varied across SES groups in a manner consistent with the concept of a social gradient of health (Table 2.4). Lower rates of *Accidental poisoning* injury were associated with the highest or most disadvantaged SES groups for both males and females, and as SES disadvantage increased, so did rates of *Accidental poisoning* injury.

Within the lowest (most disadvantaged) SES group, males (60 cases per 100,000 population) had higher rates of *Accidental poisoning* injury compared with females (51 cases). Males also had higher rates than females in each of the other SES groups, although the difference in rates was not as high as in other external cause categories.

Table 2.4: *Accidental poisoning* injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	1,441	1,271	1,142	1,061	809	5,885
Cases per 100,000[b]	59.9	52.6	47.5	44.0	34.3	48.8
Rate ratio	1.2	1.1	1.0	0.9	0.7	
Females						
Cases	1,266	1,180	1,023	914	730	5,190
Cases per 100,000[b]	51.3	47.8	41.4	37.2	29.7	41.7
Rate ratio	1.2	1.1	1.0	0.9	0.7	
Persons[c]						
Cases	2,707	2,451	2,166	1,975	1,539	11,076
Cases per 100,000[b]	55.6	50.3	44.5	40.6	32.0	45.3
Rate ratio	1.2	1.1	1.0	0.9	0.7	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.13 shows the proportion of *Accidental poisoning* injury cases in each SES group for males and females. There was very little difference between males and females in terms of their respective *Accidental poisoning* SES profiles. For both sexes, larger proportions of cases occurred in the lowest (most disadvantaged) SES group, compared with the highest (most advantaged) SES group. With each successive increase in advantage there was a corresponding decrease in the proportion of *Accidental poisoning* injury cases in each SES group, suggesting a strong association between *Accidental poisoning* and SES.

Figure 2.13: Proportion of *Accidental poisoning* injury cases, by socioeconomic group and sex, Australia, 2015–16

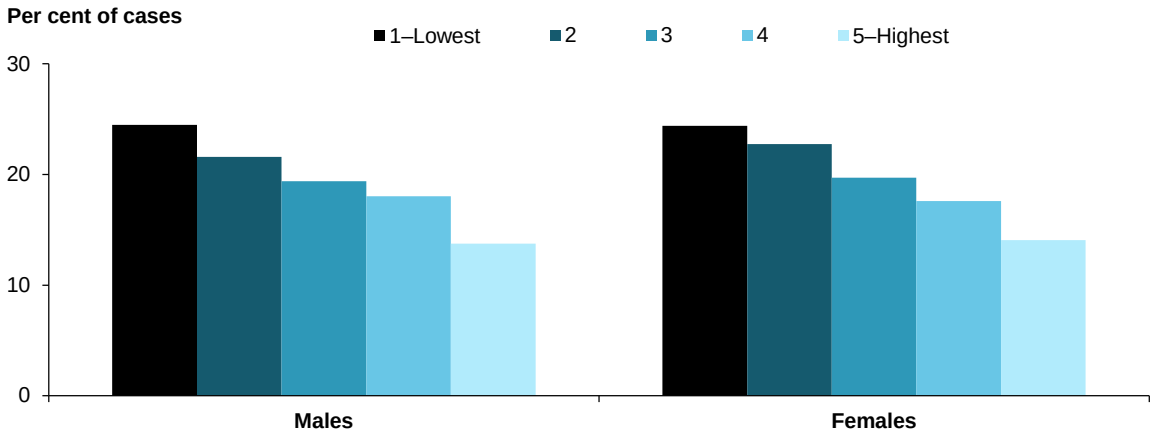


Figure 2.14 shows the proportion of *Accidental poisoning* injury cases in each SES group by age group. The distribution of *Accidental poisoning* injury cases by SES groups was very similar in each age group, with the largest proportion of cases in the lowest (most disadvantaged) SES group and the smallest proportions in the most advantaged group. The exception was seen for the 15–24 age group, where the smallest proportion of *Accidental poisoning* injury cases occurred in the fourth highest (second most advantaged) SES group.

Overall, the strongest association between *Accidental poisoning* injury and SES group was seen among the 2 oldest age groups. In each of the other age groups, the association between *Accidental poisoning* injury and SES group was not as strong, particularly for the lower SES groups among the youngest groups. (For example, there was very little difference in the proportion of *Accidental poisoning* injury cases between the second and third SES groups for those aged 0–4 and 5–14).

Figure 2.14: Proportion of *Accidental poisoning* injury cases, by socioeconomic group and age, Australia, 2015–16

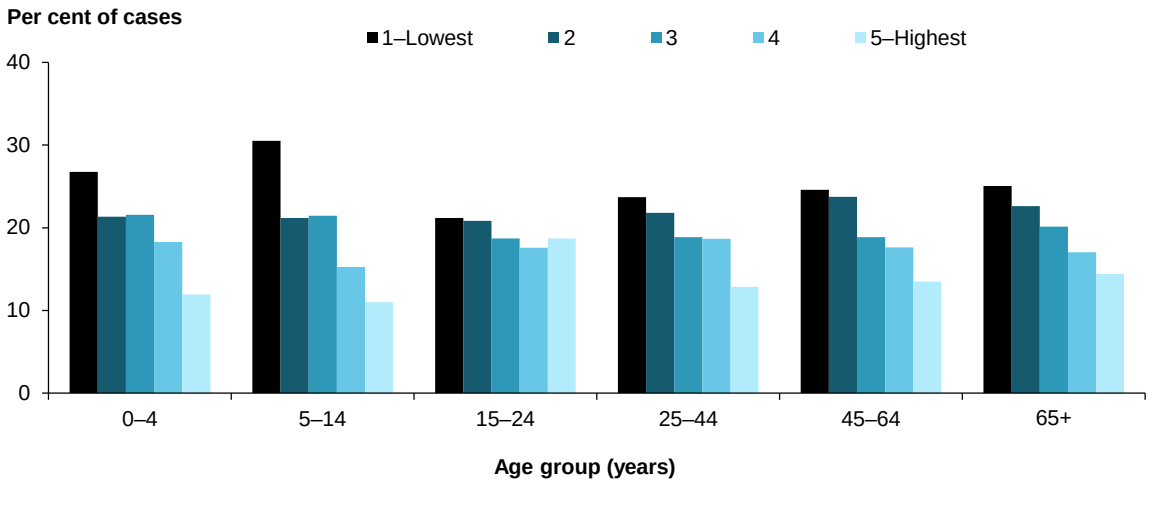
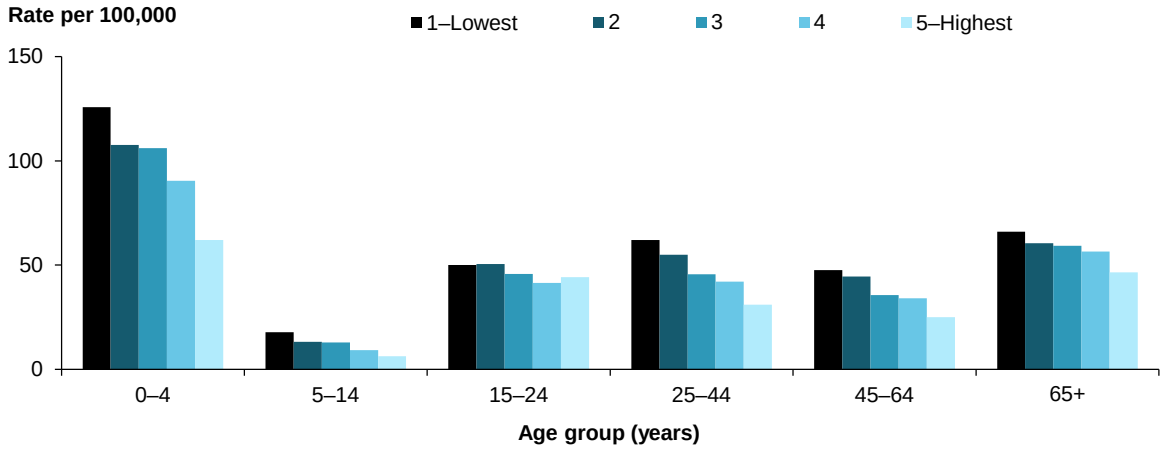


Figure 2.15 shows the age-specific rates of *Accidental poisoning* injury by SES group. An association between the rate of *Accidental poisoning* injury and SES group was seen in all

but the 15–24 age group. In each of the other age groups, the highest rates of *Accidental poisoning* injury occurred in the areas classified as most disadvantaged, with rates decreasing in each successive SES group.

Among those aged 15–24, the highest rate of *Accidental poisoning* injury (51 cases per 100,000) occurred in the second lowest (second most disadvantaged) SES group and the lowest rate occurred in the fourth highest (second most advantaged) SES group.

Figure 2.15: Age-specific rates of *Accidental poisoning* injury, by socioeconomic group and age, Australia, 2015–16

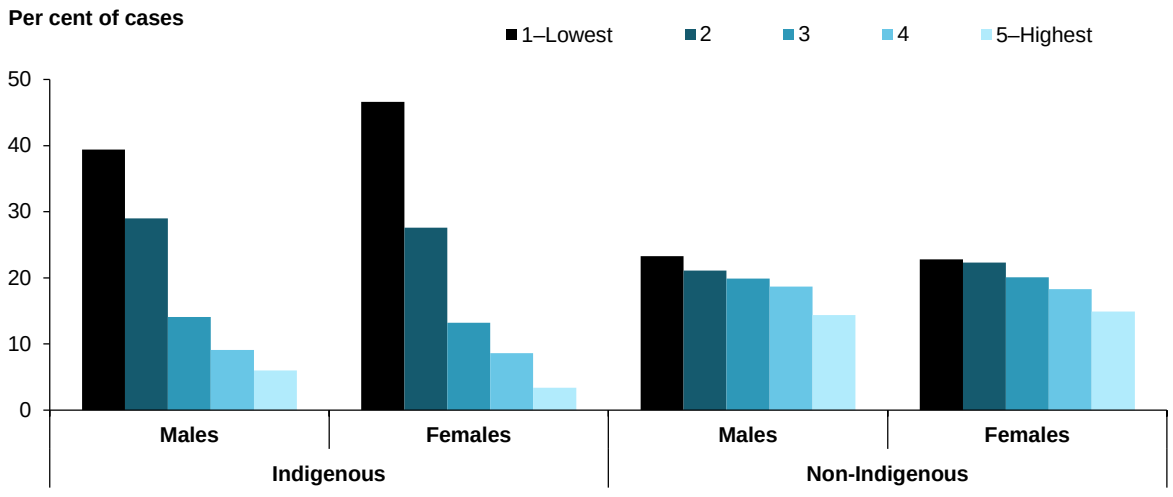


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES and Indigenous status

The proportion of *Accidental poisoning* injury cases by SES group, by sex and by Indigenous status, is shown in Figure 2.16. Almost half (47%) of all Indigenous females and 39% of males hospitalised as a result of an *Accidental poisoning* injury were living in the most disadvantaged SES areas. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.16: Proportion of *Accidental poisoning* injury cases, by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



Falls

This section presents information on cases admitted to hospital as a result of an unintentional fall. It includes cases where the first-reported external cause code was in the ICD-10-AM range W00–W19 (*Falls*).

SES by sex and by age

In 2015–16, rates of fall-related injury varied by SES group, suggesting a more complex association between hospitalised fall-related injury and socioeconomic status (Table 2.5). Like the previous external cause categories, the raw counts of fall-related injury cases evidenced an association with SES group as predicted by the social gradient of health: higher case numbers were seen in more disadvantaged SES groups and lower case numbers were seen in more advantaged SES groups. However, when adjusted for age and sex, the association is much weaker.

For all fall-related injury cases, the highest rate of injury occurred in the lowest (most disadvantaged) SES group but the lowest rate of fall-related injury co-occurred in the second and fifth SES groups. For males, the highest rate occurred in the lowest (most disadvantaged) SES group and the lowest rate occurred in the highest (most advantaged) SES group, but there was no gradual decline with successive increases in SES group. Among women, the highest rate of fall-related injury occurred in the fourth most advantaged SES group and the lowest rate occurred in the second most disadvantaged group.

Within the lowest (most disadvantaged) SES group, females had higher rates of fall-related injury than males (836 and 764 cases per 100,000 population, respectively). Females also had higher rates than males in each of the other SES groups.

Table 2.5: Fall-related injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	19,814	18,188	17,908	16,994	16,638	90,631
Cases per 100,000[b]	764.2	708.1	724.3	719.6	696.9	721.7
Rate ratio	1.1	1.0	1.0	1.0	1.0	
Females						
Cases	24,687	23,710	23,057	21,752	21,692	115,929
Cases per 100,000[b]	835.5	807.1	829.0	838.5	815.6	802.5
Rate ratio	1.0	1.0	1.0	1.0	1.0	
Persons[c]						
Cases	44,501	41,898	40,965	38,746	38,330	206,560
Cases per 100,000[b]	807.3	765.1	784.8	787.9	764.9	770.8
Rate ratio	1.0	1.0	1.0	1.0	1.0	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.17 shows the proportion of fall injury cases in each SES group for males and females. There was very little difference between males and females in terms of their respective fall-related injury SES profiles. For both sexes, larger proportions of cases lived in the lowest (most disadvantaged) SES group, with the proportions gradually reducing as SES advantage increased (although the steepness of the decline was not as great as in previous external cause categories).

Figure 2.17: Proportion of fall-related injury cases, by socioeconomic group and sex, Australia, 2015–16

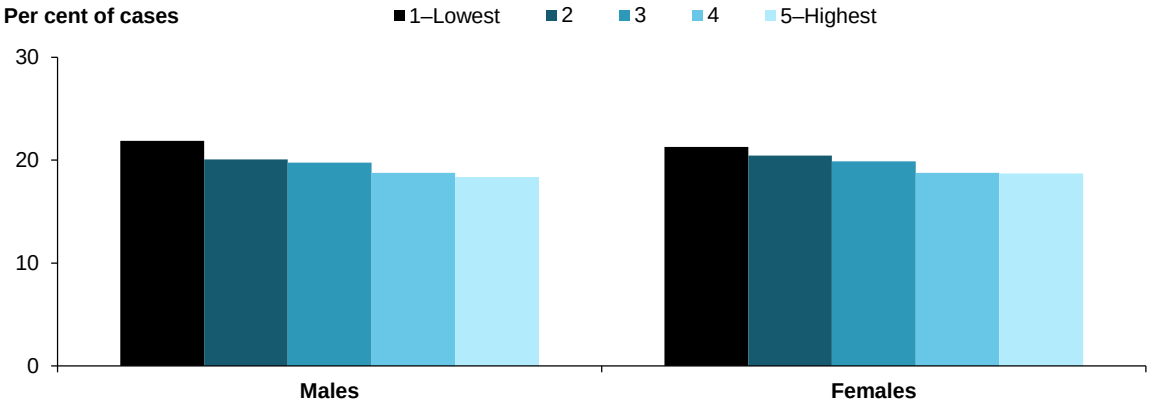


Figure 2.18 shows the proportion of fall-related injury cases in each SES group by age group. There appears to be less of an association between fall-related injuries and SES group by age. Only 2 of the 6 age groups demonstrated a strong association: those in the 15–24 and 45–64 age groups. For the 2 youngest age groups there was no discernible pattern. Among those aged 25–44 and 65 or over, a larger proportion of fall-related injury cases was found in the lowest (most disadvantaged) SES group and a smaller proportion of fall-related injury cases in the highest (most advantaged) SES group for those aged 25–44.

Figure 2.18: Proportion of fall-related injury cases, by socioeconomic group and age, Australia, 2015–16

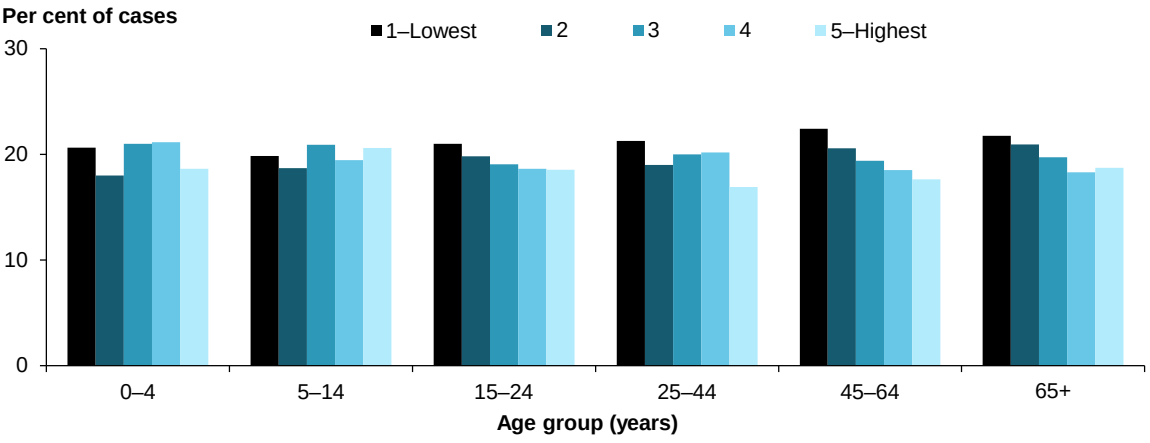
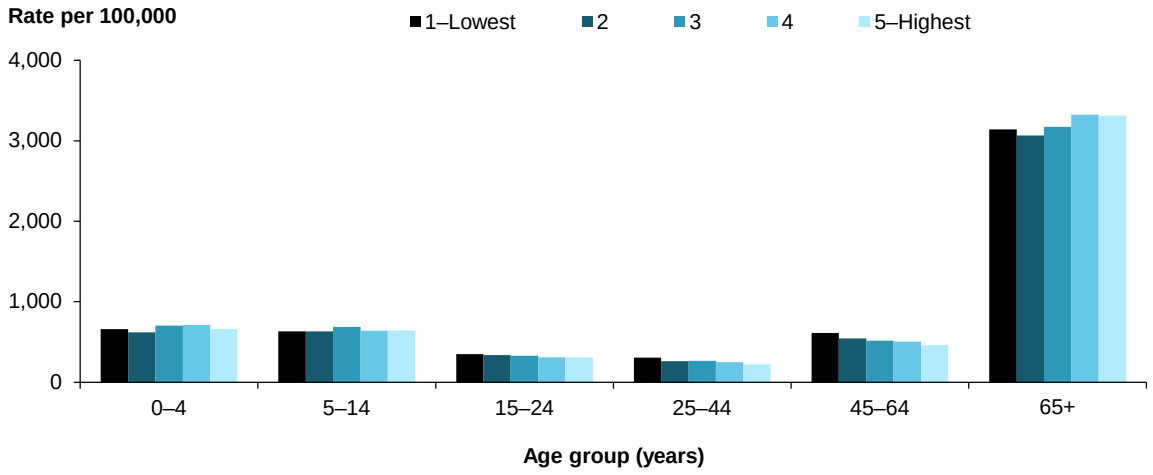


Figure 2.19 shows the age-specific rates of hospitalised fall-related injury by SES group. The association between fall-related injuries and SES group seen by proportion in the 65+ age group above fails to materialise after adjustment for age. In the 65+ category, the highest rates of injury occurred in the top two most advantaged SES groups, 3,325 and 3,314 cases per 100,000 for the second highest and highest SES categories, respectively.

An association between the rate of fall-related injury and SES group was apparent in 3 of the remaining 5 age groups. For those in the 15–24, 25–44 and 45–64 age groups the highest rate of fall-related injury occurred in the lowest (most disadvantaged) SES group and those rates decreased with increasing advantage. There was no appreciable association between the rate of fall-related injury and SES group for the 2 youngest age groups.

Figure 2.19: Age-specific rates of fall-related injury cases, by socioeconomic group and age, Australia, 2015–16

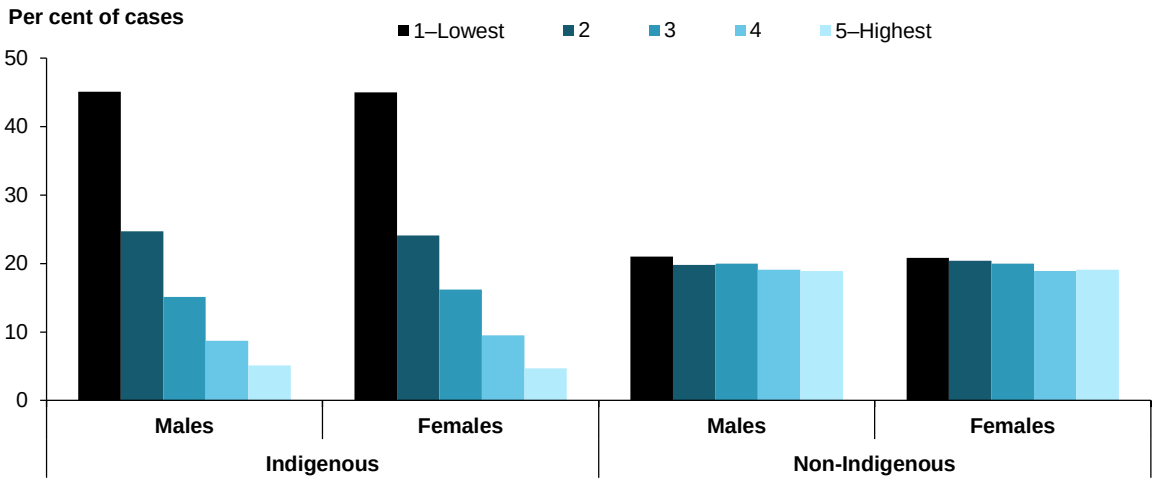


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES and Indigenous status

The proportion of fall-related injury cases by SES group, by sex and by Indigenous status is shown in Figure 2.20. Almost half of all Indigenous males (45%) and females (45%) hospitalised as a result of a fall-related injury were living in the most disadvantaged SES area. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.20: Proportion of fall-related injury cases by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



Thermal causes of injury

This section presents information on cases admitted to hospital as a result of an unintentional thermal cause. It includes cases of *Exposure to smoke, fire and flames* (ICD-10-AM X00–X09) or *Contact with heat and hot substance*s (X10–X19)—collectively these are referred to as 'thermal causes'. Burns are the injury that usually (although not always) results from thermal causes.

SES by sex and age

In 2015–16, rates of injury due to thermal causes of varied across SES groups in a manner consistent with the concept of a social gradient of health (Table 2.6). Lower rates of injury due to thermal causes were associated with the highest or most advantaged SES groups for both males and females and, as SES disadvantage increased, so did rates of injury due to thermal causes.

Within the lowest (most disadvantaged) SES group, males (43 cases per 100,000 population) had higher rates of injury due to thermal causes compared with females (24). Males also had higher rates than females in each of the other SES groups.

Table 2.6: Thermal causes of injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	1,021	902	684	605	427	3,719
Cases per 100,000[b]	42.5	38.0	28.7	25.2	18.2	31.1
Rate ratio	1.4	1.2	0.9	0.8	0.6	
Females						
Cases	581	475	387	359	310	2,171
Cases per 100,000[b]	24.4	20.2	16.1	15.0	12.8	18.1
Rate ratio	1.3	1.1	0.9	0.8	0.7	
Persons[c]						
Cases	1,602	1,377	1,071	964	737	5,890
Cases per 100,000[b]	33.5	29.2	22.4	20.1	15.5	24.6
Rate ratio	1.4	1.2	0.9	0.8	0.6	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.21 shows the proportion of injury due to thermal causes cases in each SES group for males and females. There was very little difference between males and females in terms of their respective SES profiles. For both sexes, larger proportions of cases lived in areas classified as most disadvantaged, compared with the most advantaged areas. With each successive increase in advantage there was a corresponding decrease in the proportion of cases of injury due to thermal causes in each SES group, suggesting a strong association between thermal causes of injury and SES.

Figure 2.21: Proportion of thermal causes of injury cases, by socioeconomic group and sex, Australia, 2015–16

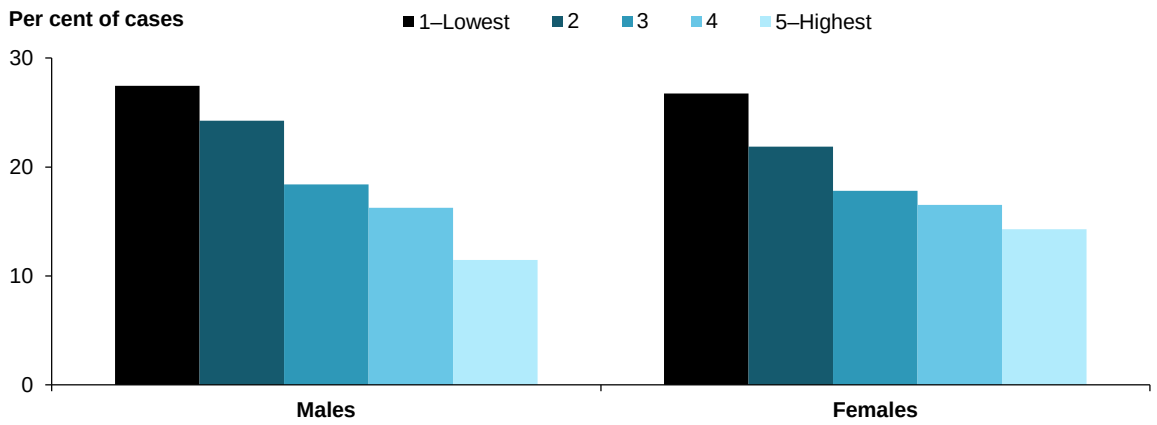


Figure 2.22 shows the proportion of injury cases due to thermal causes in each SES group, by age group. For each age group, the largest proportion of thermal causes of injury cases occurred in areas classified as most disadvantaged. In all age groups other than those aged 65 or over, the smallest proportions of thermal causes of injury cases occurred in the highest (most advantaged) SES groups. A strong association between thermal causes of injury cases and SES group was evident in almost all age groups, but in the 5–14 age group the strength of that relationship for more advantaged SES groups was much weaker.

Figure 2.22: Proportion of thermal causes of injury cases, by socioeconomic group and age, Australia, 2015–16

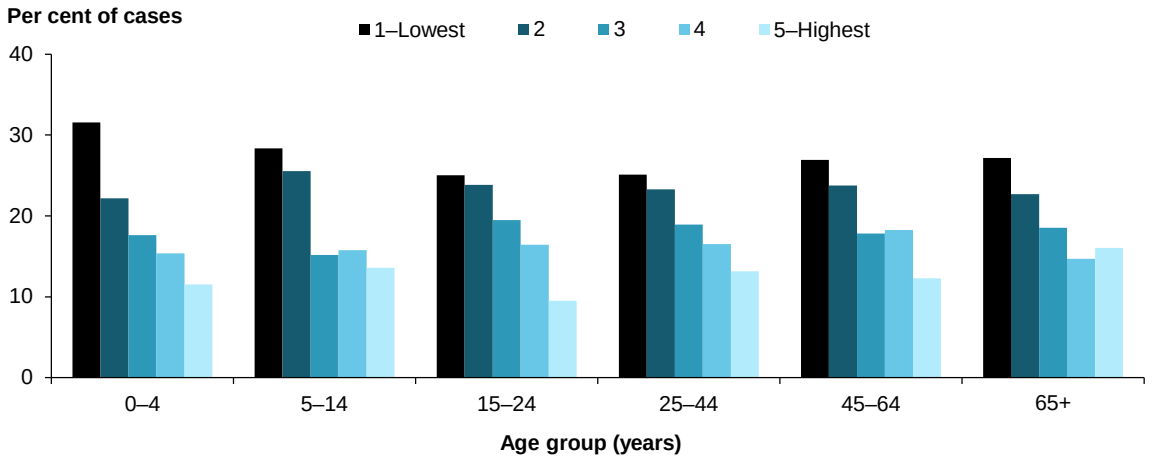
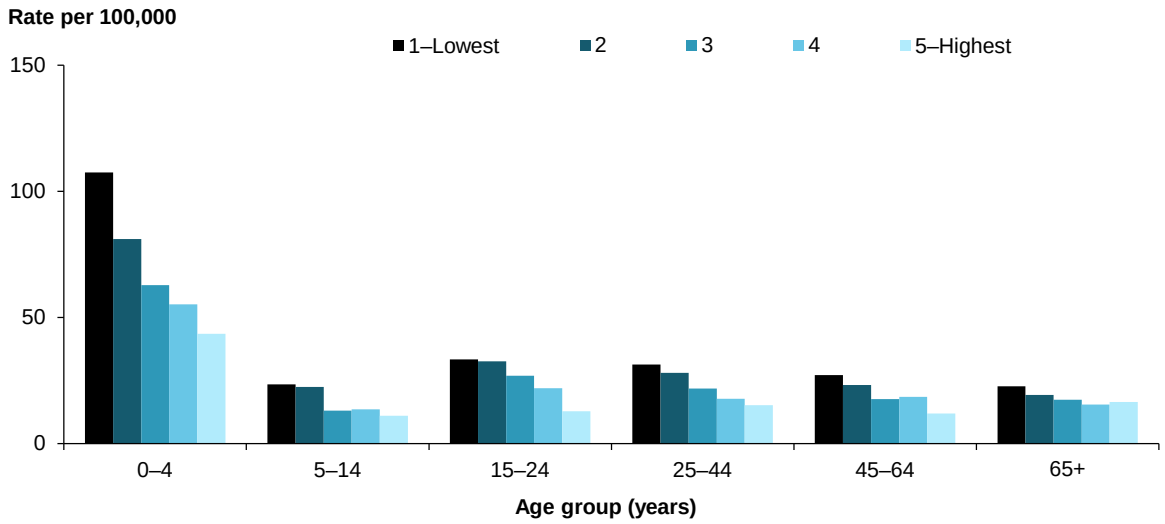


Figure 2.23 shows the age-specific rates of thermal causes of injury cases by SES group. After adjustment for age, a strong association between thermal causes of injury and SES group is seen in nearly all age groups, particularly among those aged 0–4. The rate of thermal causes of injury among those aged 0–4 was highest (108 cases per 100,000) in areas classified as most disadvantaged, decreasing steadily to the highest (most advantaged) SES group, where the rate was 43 cases per 100,000.

Figure 2.23: Age-specific rates of thermal causes of injury cases, by socioeconomic group and age, Australia, 2015–16

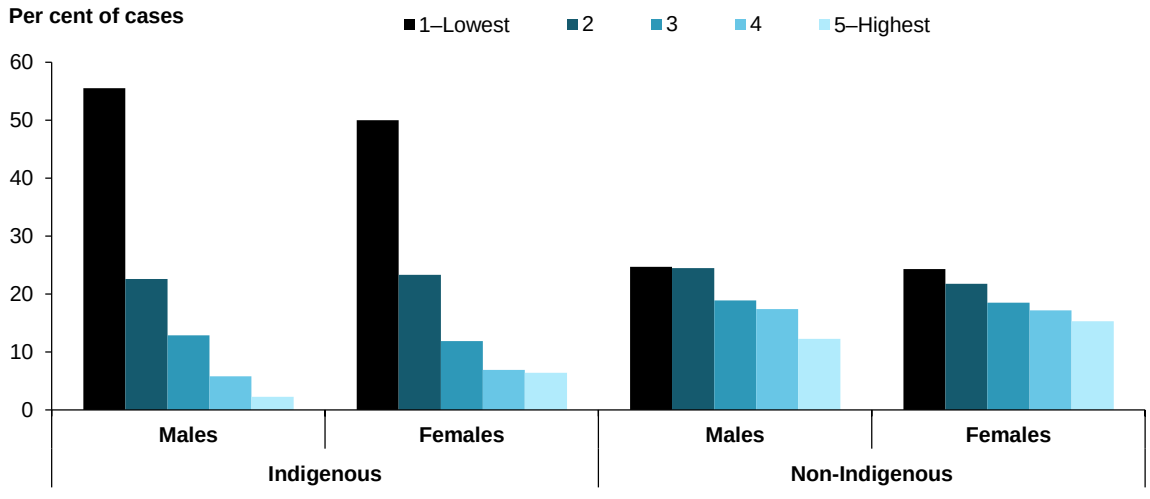


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES and Indigenous status

The proportion of thermal causes of injury cases by SES group, by sex and by Indigenous status is shown in Figure 2.24. Just over half of all Indigenous males (56%) and females (50%) hospitalised as a result of a thermal cause were living in the most disadvantaged SES areas. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.24: Proportion of thermal causes of injury cases, by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



Intentional self-harm

This section presents information on cases admitted to hospital as a result of injury due to *Intentional self-harm*. It includes cases where the first reported external cause code was in the ICD-10-AM range X60–X84 (*Intentional self-harm*). This section includes attempts to suicide, as well as cases where people have intentionally hurt themselves, but not necessarily with the intention of suicide—for example, acts of self-mutilation. Cases of *Intentional self-harm* are presented in aggregate for ages up to and including 14. For more information on the analysis of *Intentional self-harm* presented, see 'Appendix A: Data issues'.

SES by sex and age

In 2015–16, rates of *Intentional self-harm* injury varied across SES groups in a manner consistent with the concept of a social gradient of health (Table 2.6). Lower rates of *Intentional self-harm* were associated with the highest or most disadvantaged SES groups for both males and females, and as SES disadvantage increased, so did rates of *Intentional self-harm*.

Within the lowest (most disadvantaged) SES group, females (213 cases per 100,000 population) had higher rates of *Intentional self-harm* injury compared 124 cases for with males. Females also had higher rates than males in each of the other SES groups.

Table 2.7: *Intentional self-harm* injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	2,864	2,495	2,240	1,876	1,420	11,264
Cases per 100,000[b]	124.4	105.9	95.0	77.6	60.1	95.3
Rate ratio	1.3	1.1	1.0	0.8	0.6	
Females						
Cases	4,828	4,394	3,854	3,671	2,971	20,006
Cases per 100,000[b]	212.7	191.5	165.6	153.2	124.6	171.3
Rate ratio	1.2	1.1	1.0	0.9	0.7	
Persons[c]						
Cases	7,693	6,890	6,094	5,548	4,391	31,273
Cases per 100,000[b]	167.7	148.0	129.8	115.1	92.2	132.8
Rate ratio	1.3	1.1	1.0	0.9	0.7	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.25 shows the proportion of *Intentional self-harm* injury cases in each SES group for males and females. There was very little difference between males and females in terms of their respective SES profiles. For both sexes, larger proportions of *Intentional self-harm* injury cases occurred in the lowest (most disadvantaged) SES group, compared with the highest (most advantaged) SES group. With each successive increase in advantage, there

was a corresponding decrease in the proportion of *Intentional self-harm* injury cases in each SES group—suggesting a strong association between *Intentional self-harm* injury and SES.

Figure 2.25: Proportion of *Intentional self-harm* injury cases, by socioeconomic group and sex, Australia, 2015–16

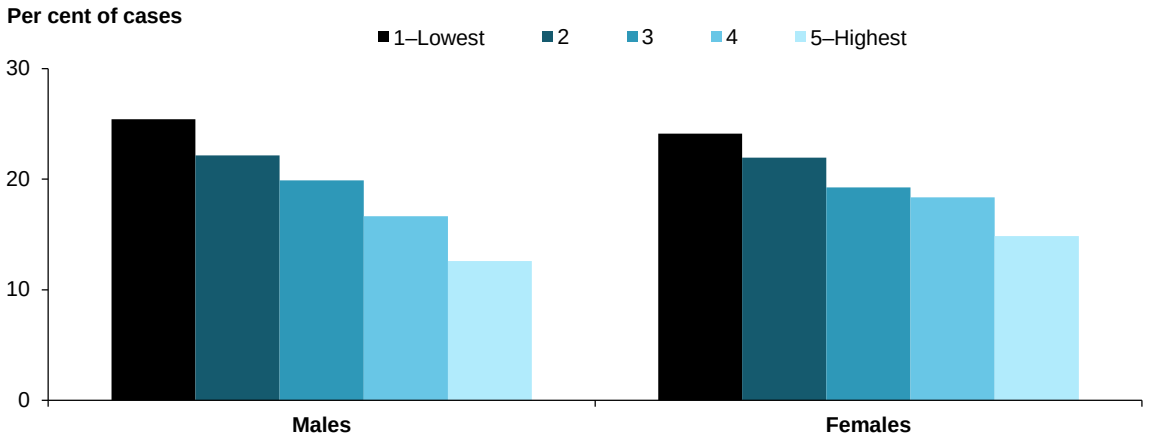


Figure 2.26 shows the proportion of *Intentional self-harm* injury cases in each SES group by age group. Three of the 5 age groups (15–24, 25–44, 45–64) have larger proportions of cases in the lowest (most disadvantaged) SES groups and smaller proportions in the most advantaged groups. For the youngest and oldest groups, the largest proportion of *Intentional self-harm* injury cases occurred in the second lowest (most disadvantaged) SES group. All groups evidenced a strong association between *Intentional self-harm* injury and SES.

Figure 2.26: Proportion of *Intentional self-harm* injury cases, by socioeconomic group and age, Australia, 2015–16

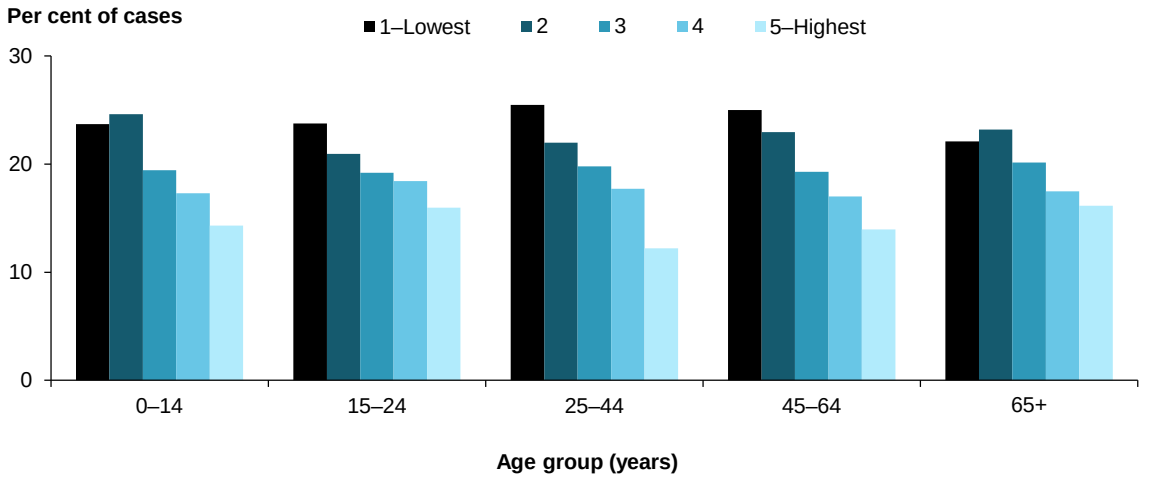
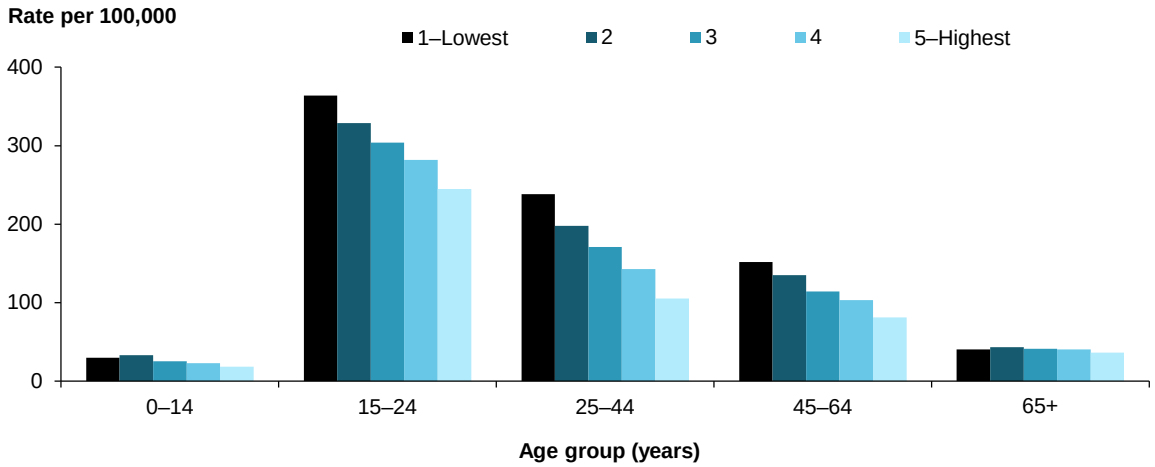


Figure 2.27 shows the age-specific rates of injury due to *Intentional self-harm,* by the SES of area of usual residence. An association between *Intentional self-harm* and SES group can be seen in 3 of the 5 age groups (15–24, 25–44, 45–64), with the highest rate of *Intentional self-harm* injury occurring in the lowest SES group and the lowest rate in the highest SES group. With each successive increase in SES group there was a corresponding decrease in the proportion of *Intentional self-harm* injury cases, suggesting a strong association between *Intentional self-harm* and SES.

For those in the 0–14 age group, a weaker association between *Intentional self-harm* and SES group was evident. The highest rate of *Intentional self-harm* injury occurred in the second lowest SES group and declined with each successive SES group. For those aged 65 or over, there was little evidence of an association between *Intentional self-harm* and SES.

Figure 2.27: Age-specific rates of *Intentional self-harm* injury cases, by socioeconomic group and age, Australia, 2015–16

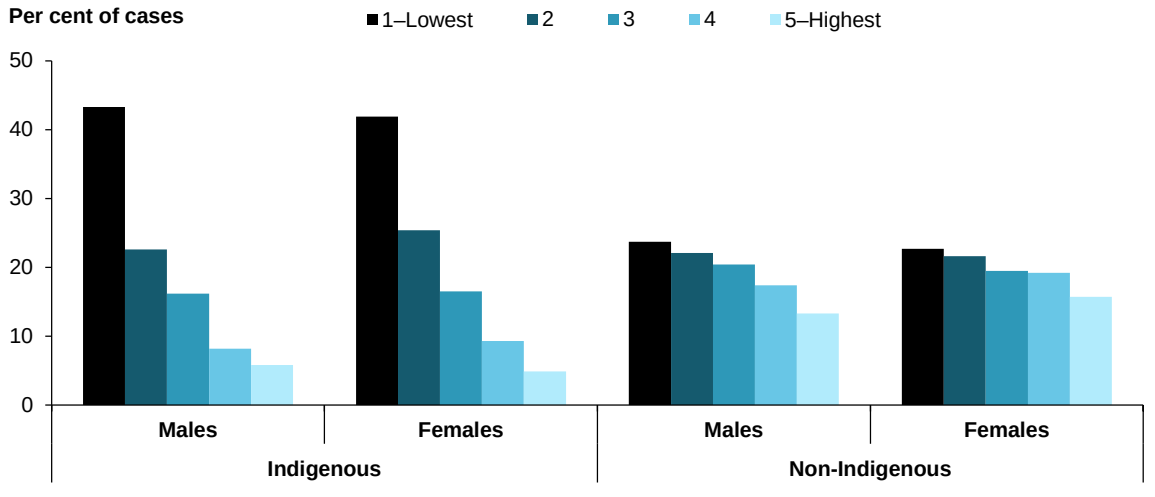


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES and Indigenous status

The proportion of *Intentional self-harm* injury cases by SES group, by sex and by Indigenous status, is shown in Figure 2.28. Almost half (43%) of all Indigenous females and 42% of males hospitalised as a result of an *Intentional self-harm* injury were living in the most disadvantaged SES area. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.28: Proportion of *Intentional self-harm* injury cases, by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



Assault

This section presents information on cases admitted to hospital as a result of injury due to intentional *Assault*. It includes cases where the first-reported external cause code was in the ICD-10-AM range X85–Y09 (*Assault*) and Y35–Y36 (*Legal intervention and operations of war*).

SES by sex and age

In 2015–16, rates of *Assault* injury varied across SES groups in a manner consistent with the concept of a social gradient of health (Table 2.8). Lower rates of *Assault* injury were associated with the highest or most disadvantaged SES groups for both males and females and, as SES disadvantage increased, so did rates of *Assault*.

Within the lowest (most disadvantaged) SES group, males (176 cases per 100,000 population) had higher rates of *Assault* injury compared with females (135). Males also had higher rates than females in each of the other SES groups.

Table 2.8: *Assault* injury cases, by socioeconomic group and sex, Australia, 2015–16

	Socioeconomic group					
	1–Lowest	2	3	4	5–Highest	Total[a]
Males						
Cases	4,236	2,859	2,388	1,946	1,360	13,351
Cases per 100,000[b]	186.2	123.5	102.2	80.6	58.0	114.2
Rate ratio	1.6	1.1	0.9	0.7	0.5	
Females						
Cases	2,995	1,442	1,088	816	472	7,031
Cases per 100,000[b]	135.3	63.6	46.7	33.5	19.7	60.5
Rate ratio	2.2	1.1	0.8	0.6	0.3	
Persons[c]						
Cases	7,231	4,301	3,476	2,762	1,832	20,382
Cases per 100,000[b]	160.9	93.7	74.5	57.1	38.7	87.4
Rate ratio	1.8	1.1	0.9	0.7	0.4	

(a) Total includes cases for which the SES group was not able to be determined.

(b) Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

(c) Persons includes cases for which sex was not reported.

Figure 2.29 shows the proportion of *Assault* injury cases in each SES group for males and females. A strong associated between *Assault* injury cases and SES group can be seen for both sexes. For females in particular, a very high proportion (43%) of *Assault* injury cases occurred in the lowest (most disadvantaged) SES group compared with 7% for the highest SES group.

Figure 2.29: Proportion of *Assault* injury cases, by socioeconomic group and sex, Australia, 2015–16

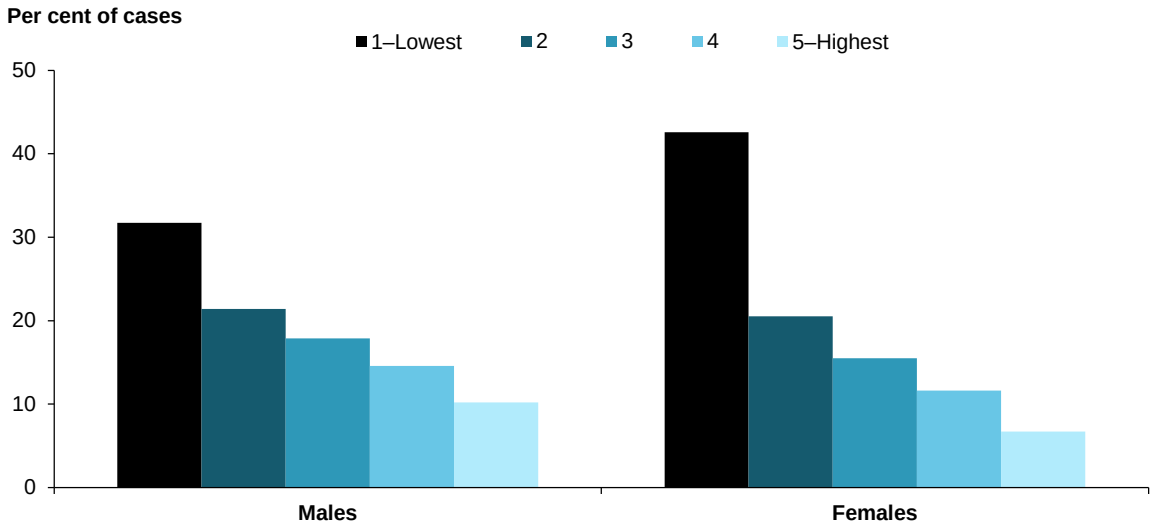


Figure 2.30 shows the proportion of *Assault* injury cases in each SES group by age group. There was a very strong association between *Assault* injury cases and SES group in each age category. The largest proportion of *Assault* injury cases occurred in the lowest (most disadvantaged) SES group, decreasing with each increase in SES group, other than for children aged 0–4. For very young children (0–4), the smallest proportion of *Assault* injury cases occurred in the fourth (second most advantaged) SES group.

Figure 2.30: Proportion of *Assault* injury cases, by socioeconomic group and age, Australia, 2015–16

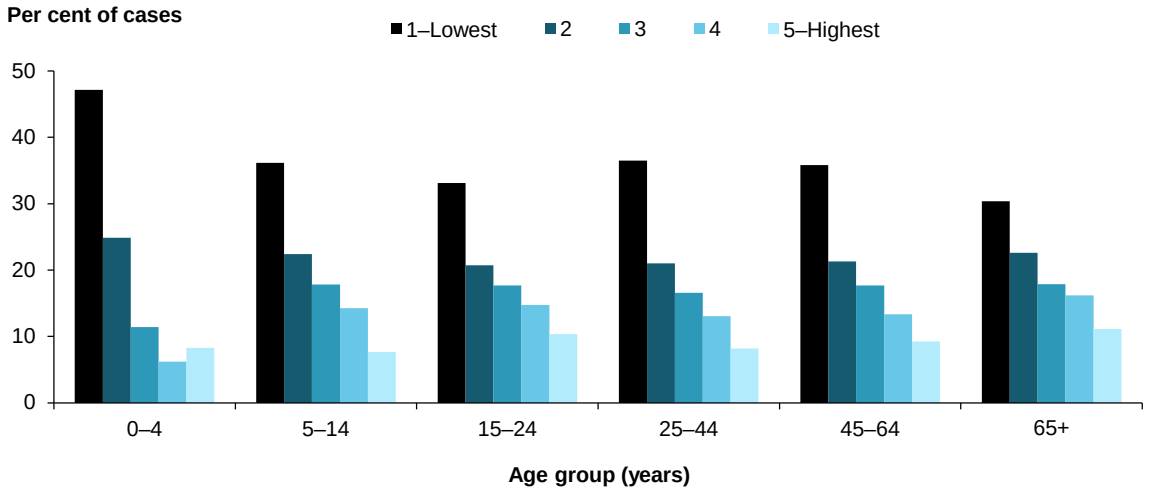
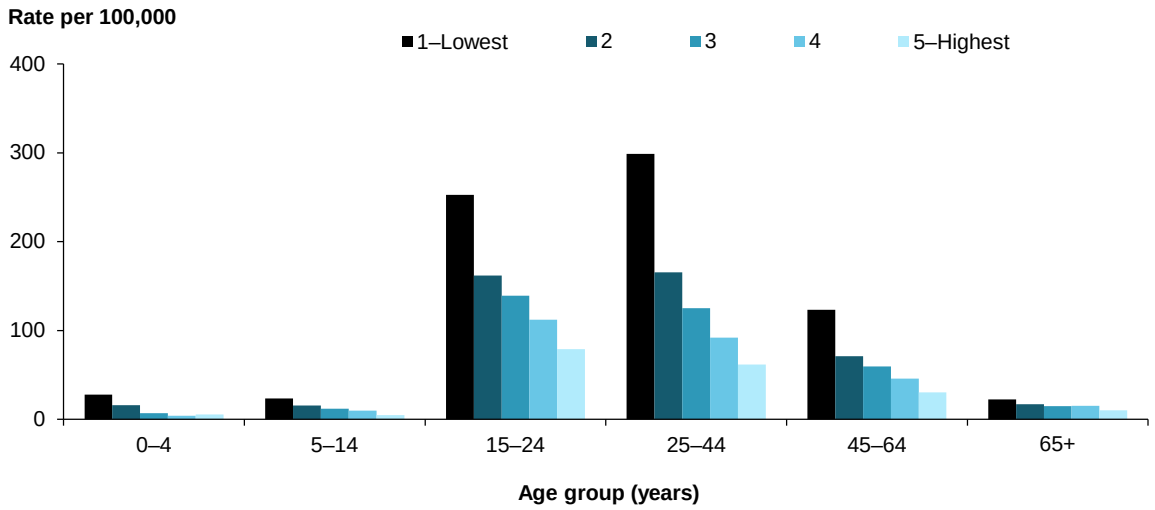


Figure 2.31 shows the age-specific rates of *Assault* injury by SES group. The association between *Assault* injury and SES group was seen in all age groups, with the highest rates of injury occurring in areas classified as most disadvantaged. With each successive increase in advantage there was a corresponding decrease in the proportion of *Assault* injury cases in each SES group.

Figure 2.31: Age-specific rates of *Assault* injury cases, by socioeconomic group and age, Australia, 2015–16

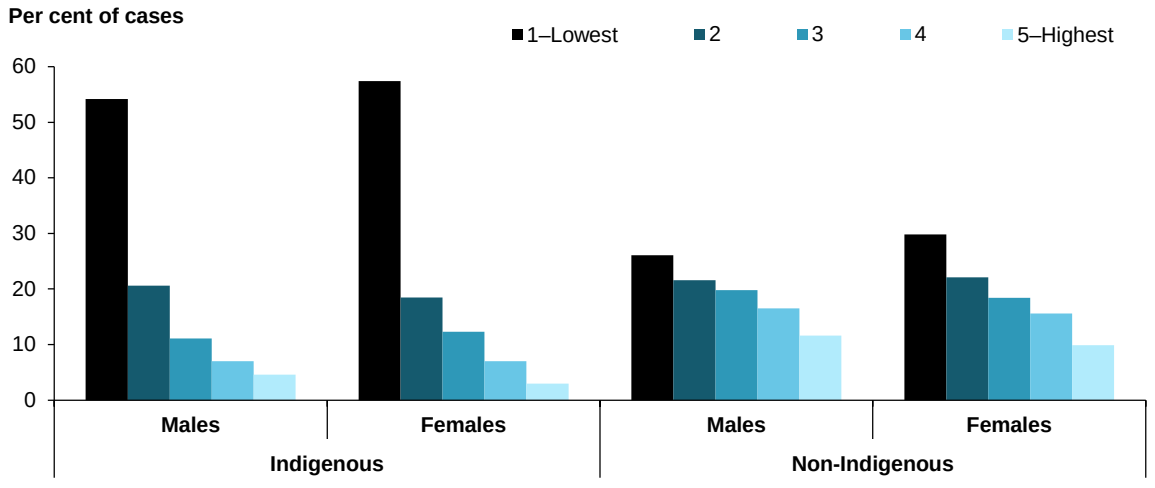


Note: Rates are directly age-standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined. Therefore, the total standardised rates for analyses by socioeconomic status groups differ from rates calculated by state or territory.

SES and Indigenous status

The proportion of *Assault* injury cases by SES group, by sex and by Indigenous status, is shown in Figure 2.32. More than half (57%) of all Indigenous females and 54% of males hospitalised as a result of an *Assault* injury were living in the most disadvantaged SES areas. However, as Indigenous people are unevenly distributed across the socioeconomic groups, these differences may largely reflect the different living circumstances of Indigenous people.

Figure 2.32: Proportion of *Assault* injury cases, by socioeconomic group, sex, and Indigenous status, Australia, 2015–16



3 Trends over time

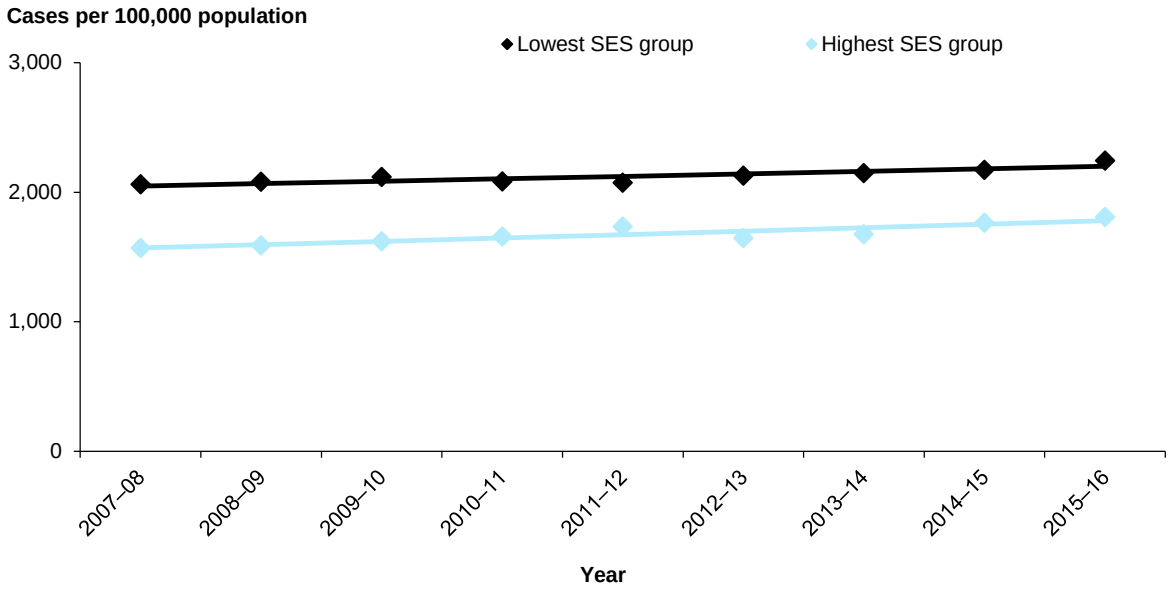
This chapter looks at changes over time in the rate of hospitalised injury by 2 of the 5 SES groups: the lowest (most disadvantaged) and the highest (most advantaged) groups. In addition to looking at changes over time in the rates of hospitalised injury by SES group, this section also looks at changes over time by age group and by selected external cause categories, where numbers permit.

All-cause hospitalised injury

An analysis of the changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups for hospitalised injury is shown in Figure 3.1. Rates of hospitalised injury were higher in each year for those in the most disadvantaged group compared with the most advantaged group.

Rates of hospitalised injury have increased over time for both the lowest and highest SES groups. For the lowest (most disadvantaged) SES group, rates of hospitalised injury have increased significantly (0.9% per year) over time, from 2,060 cases per 100,000 in 2007–08 to 2,245 cases per 100,000 in 2015–16. For the highest (most advantaged) SES group, rates of hospitalised injury have also increased significantly over time, from 1,568 cases per 100,000 in 2007–08 to 1,808 cases per 100,000 in 2015–16. The rise in the modelled rate was steeper than the rise for the lowest SES group, averaging 1.6% per year.

Figure 3.1: Modelled age-standardised rates of injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

An analysis of hospitalised injury rates by age group over the 9-year period reveals variation according to age in both the lowest and highest SES groups. Figure 3.2 shows the annual percentage change in rate of hospitalised injury for 6 age groups among the lowest and highest SES groups.

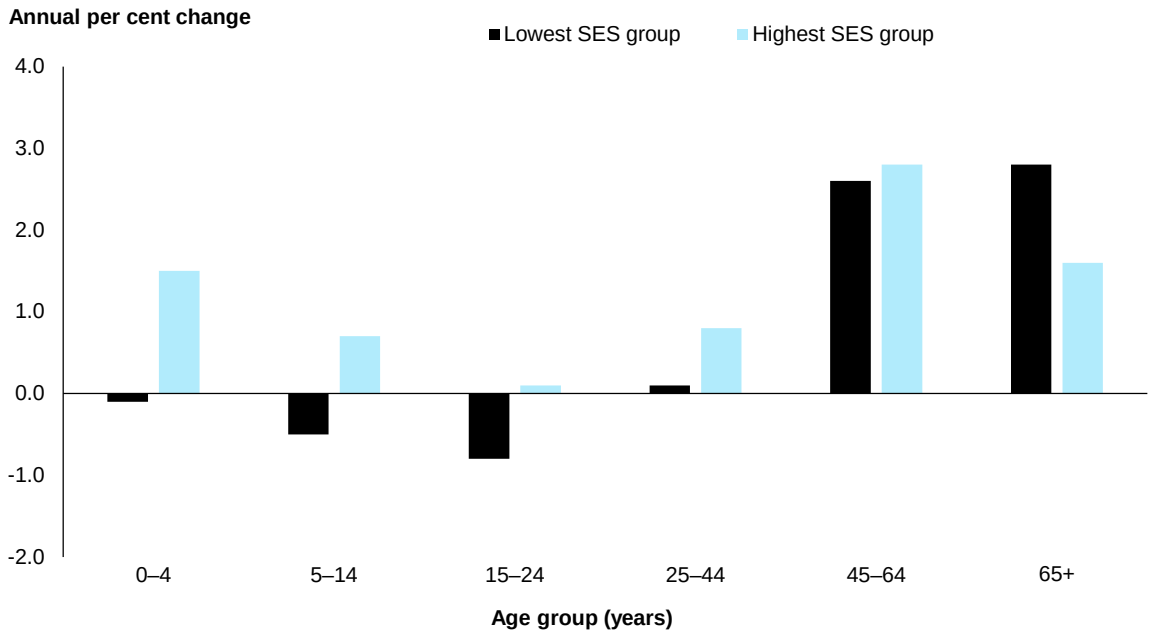
For those in the lowest (most disadvantaged) SES group:

- rates of hospitalised injury increased in the 3 oldest age groups (only the small rise in rates for those aged 25–44 was not statistically significant, at 0.1% per year)
- the largest increase in the rate of hospitalised injury over the period—3% per year—occurred for those aged 65 or over
- rates of hospitalised injury decreased in the 3 youngest age groups (only the small decline in rates for those aged 0–4 was not statistically significant, at 0.1% per year).

For those in the highest (most advantaged) SES group:

- rates of hospitalised injury increased in every age group (only the small rise in rates for those aged 15–24 was not statistically significant, at 0.1% per year)
- the largest increase in the rate of hospitalised injury over the period occurred in those aged 45–64, at 3% per year.

Figure 3.2: Annual percentage change in rates of hospitalised injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



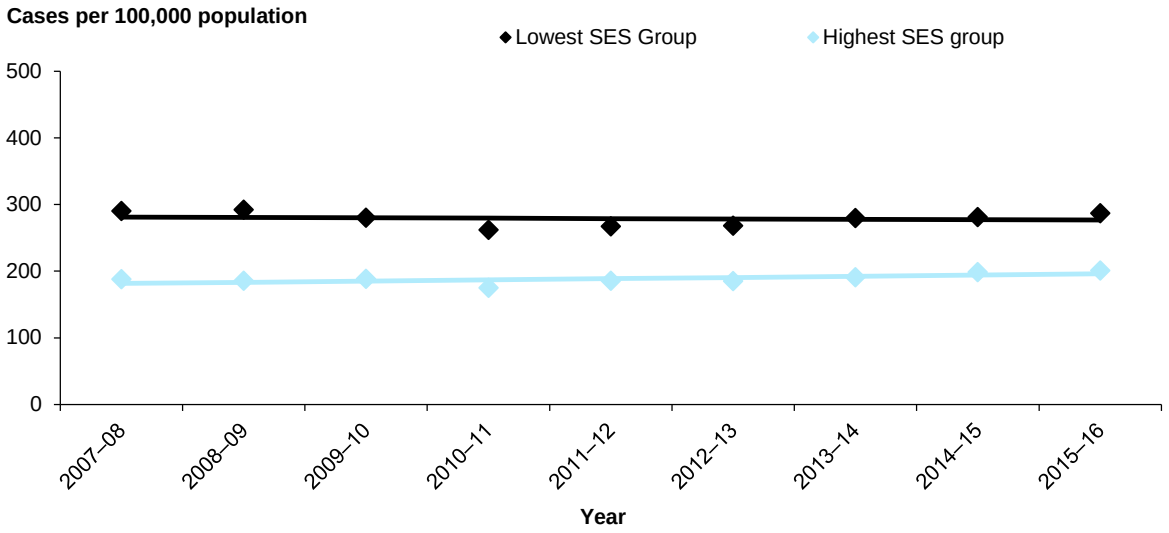
Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

Transport crash injury

An analysis of the changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups for hospitalised *Transport crash* injury is shown in Figure 3.3. Rates of *Transport crash* injury were higher in each year for those in the most disadvantaged group, compared with the most advantaged group.

Rates of *Transport crash* injury for those in the lowest (most disadvantaged) SES group did not change significantly over the period. In contrast, there was an increase in the rate of *Transport crash* injury among those in the highest (most advantaged) SES group over the period. The rate of injury increased from 188 cases per 100,000 in 2007–08 to 201 cases per 100,000 in 2015–16. The rise in the modelled rate averaged 1.0% per year and was statistically significant.

Figure 3.3: Modelled age-standardised rates of *Transport crash* injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

An analysis of *Transport crash* injury rates by age group over the 9-year period reveals variation according to age in both the lowest and highest SES groups. Figure 3.4 shows the annual percentage change in rate of *Transport crash* injury for 6 age groups among the lowest and highest SES groups.

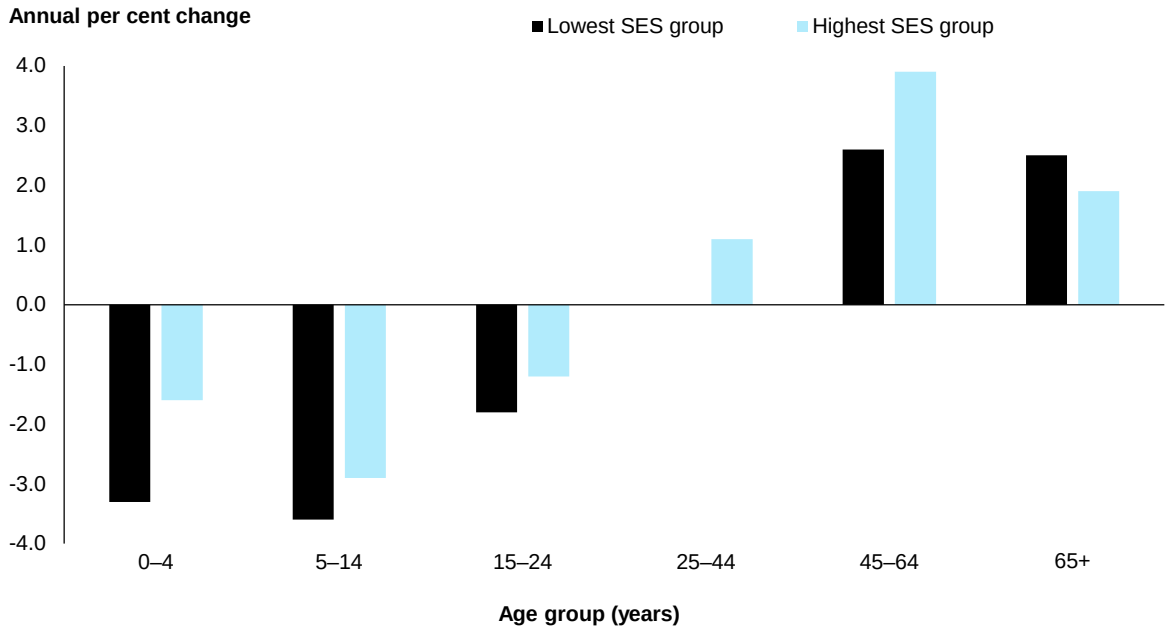
For those in the lowest (most disadvantaged) SES group:

- rates of *Transport crash* injury increased in the 2 of the 6 age groups. The average increase per year in the 2 oldest groups was 2.6% for those aged 45–64 and 2.5% for those aged 65 or over
- in contrast, rates of *Transport crash* injury among the 3 youngest age groups decreased significantly over the period. For those in the 0–4 age group, rates of *Transport crash* injury decreased by an average of 3.3% per year; the decrease was slightly larger (3.6% per year) for those in the 5–14 age group; and smaller (at 1.8% per year) for those aged 15–24.

For those in the highest (most advantaged) SES group:

- significant annual increases in *Transport crash* injury rates were seen in the 3 oldest age groups. Among those aged 45–64, the average increase per year was 3.9%.
- in the youngest age groups, significant decreases in the annual average rate of *Transport crash* injury were seen the 5–14 and 15–24 age groups (at 2.9% and 1.2% per year, respectively)
- the decrease of 1.6% per year in *Transport crash* injury rates among those aged 0–4 was not statistically significant.

Figure 3.4: Annual percentage change in rate of hospitalised *Transport crash* injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



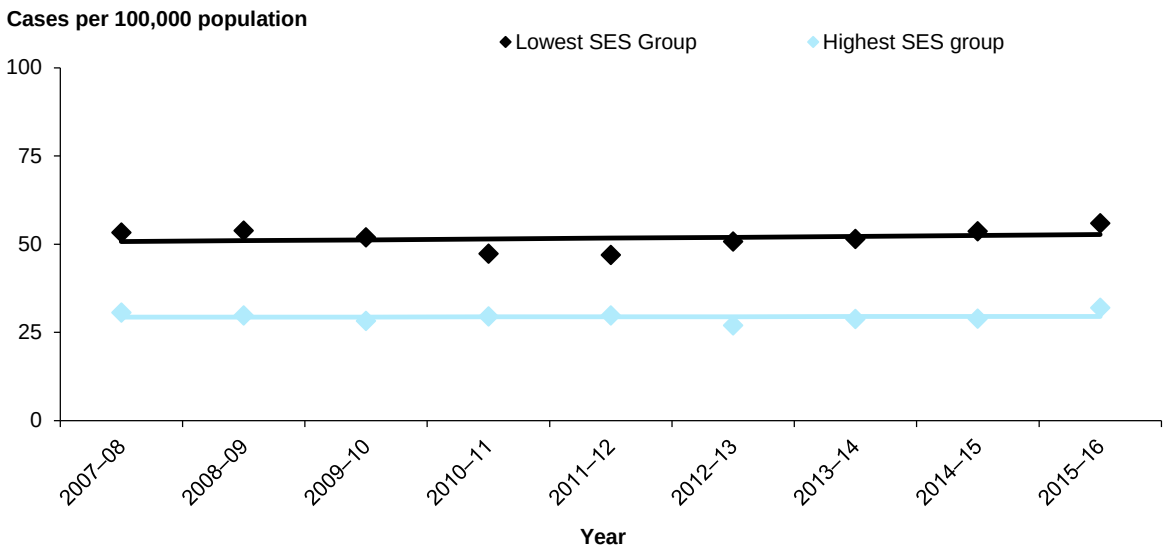
Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

Accidental poisoning

An analysis of the changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups for hospitalised *Accidental poisoning* injury is shown in Figure 3.5. Rates of *Accidental poisoning* injury were higher in each year for those in the most disadvantaged group compared with the most advantaged group.

Rates of *Accidental poisoning* injury for those in the lowest (most disadvantaged) and highest (most advantaged) SES groups showed no significant change over the period. Rates in both groups showed an average annual increase of less than 1% per year.

Figure 3.5: Modelled age-standardised rates of *Accidental poisoning* injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

An analysis of *Accidental poisoning* injury rates by age group over the 9-year period reveals variation according to age in both the lowest and highest SES groups. Figure 3.6 shows the annual percentage change in rate of *Accidental poisoning* injury for 6 age groups among the lowest and highest SES groups.

For those in the lowest (most disadvantaged) SES group:

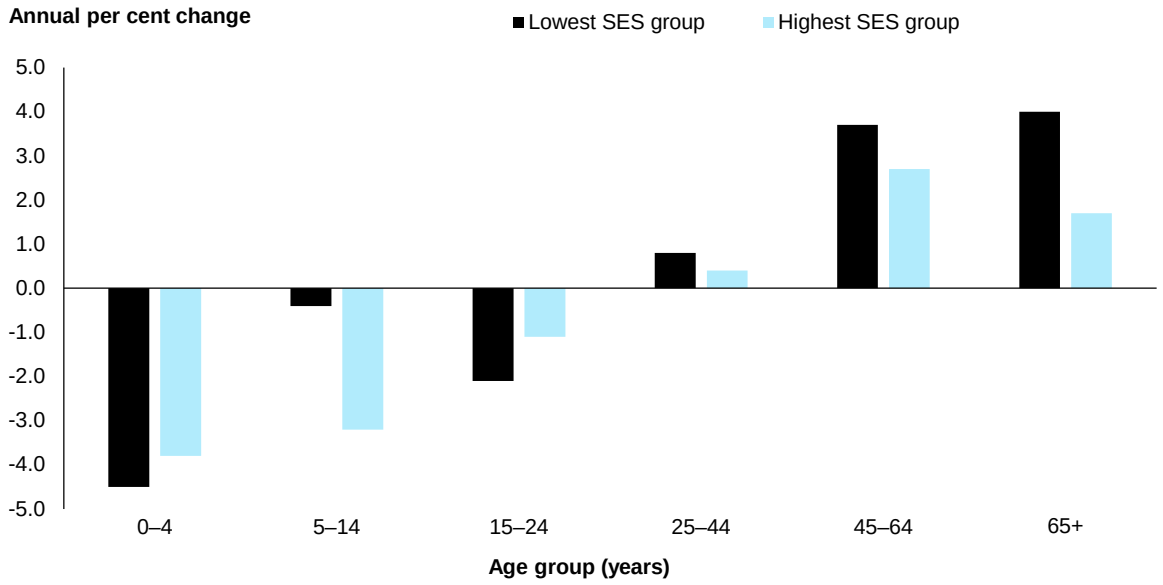
- rates of *Accidental poisoning* injury increased in the 3 oldest age groups; only the small rise in rates for those aged 25–44 (0.8% per year) was not statistically significant
- the largest increase in the rate of *Accidental poisoning* injury among the most disadvantaged—4% per year—occurred for those aged 65 or over
- rates of *Accidental poisoning* injury decreased in the 3 youngest age groups, with the steepest decline in rates (4.5% per year) seen among those aged 0–4 who were the most disadvantaged.

For those in the highest (most advantaged) SES group:

- rates of *Accidental poisoning* injury increased in the 3 oldest age groups; only the small rise in rates for those aged 25–44 (0.4% per year) was not statistically significant
- among the most advantaged, the largest increase in the rate of *Accidental poisoning* injury over the period occurred in the 45–64 age group, at 3% per year
- rates of *Accidental poisoning* injury decreased in the 3 youngest age groups, with the steepest decline in rates (4% per year) occurring for the 0–4 age group.

It should be noted that there were small case numbers (fewer than 100 cases per year) in both the lower and higher SES groups among those aged 5–14.

Figure 3.6: Annual percentage change in rate of hospitalised *Accidental poisoning* injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



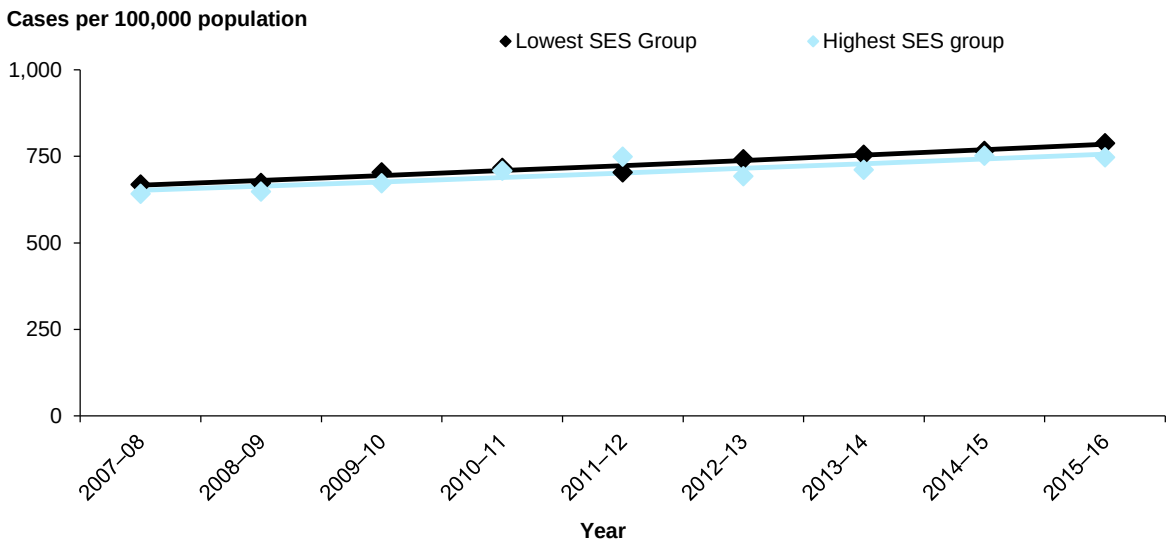
Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

Falls

An analysis of the changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups for hospitalised fall-related injury is shown in Figure 3.7. Unlike the previous external causes of injury categories examined, the rates of fall-related injury were similar between the most disadvantaged and advantaged groups for the whole period.

Rates of fall-related injury have increased over time for both the lowest and highest SES groups. For the lowest (most disadvantaged) SES group, rates of fall-related injury have increased over time, from 669 cases per 100,000 in 2007–08 to 789 cases per 100,000 in 2015–16. The rise in the modelled rate averaged 2.1% per year and was statistically significant. For the highest (most advantaged) SES group, rates of fall-related injury have increased over time, from 642 cases per 100,000 in 2007–08 to 748 cases per 100,000 in 2015–16. The rise in the modelled rate averaged 1.9% per year and was also statistically significant.

Figure 3.7: Modelled age-standardised rates of hospitalised fall-related injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

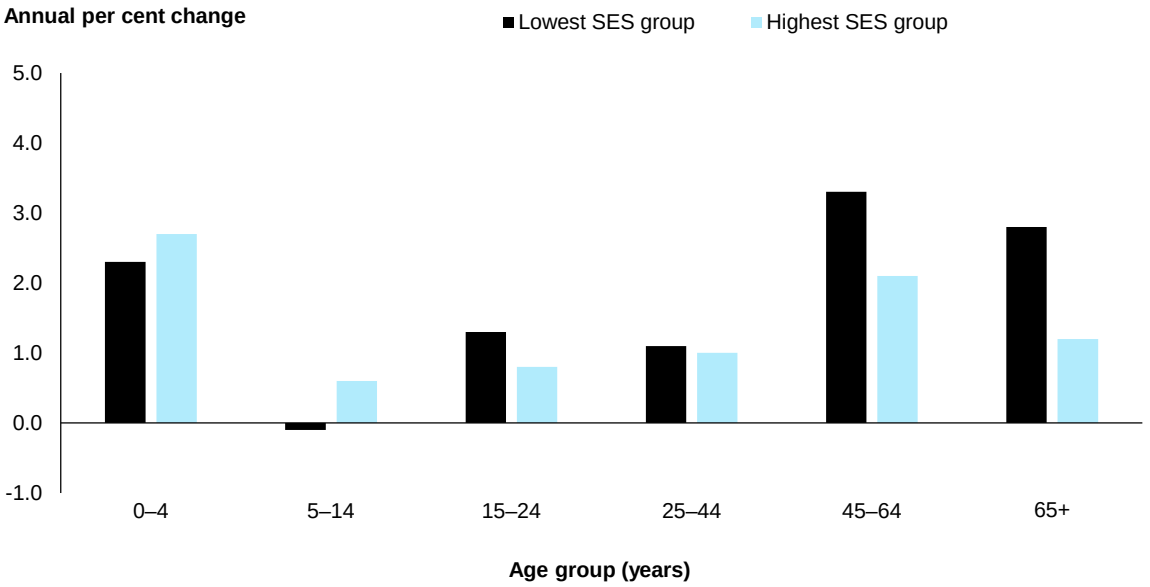
Figure 3.8 shows the annual percentage change in rate of fall-related injury for 6 age groups among the lowest and highest SES groups. An analysis of fall-related injury rates by age group over the 9-year period reveals increases all but the 5–14 age group, for both the lowest and highest SES groups.

For those in the lowest (most disadvantaged) SES group:

- the largest increase in the rate of fall-related injury occurred among those aged 45–64, at 3% per year
- the rate of fall-related injury decreased in only the 5–14 age group; for those aged 0–4, a decrease of 0.1% per year was not statistically significant.

For those in the highest (most advantaged) SES group, the largest increase in the rate of fall-related injury over the period occurred for those aged 0–4, at 3% per year.

Figure 3.8: Annual percentage change in rate of hospitalised fall-related injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



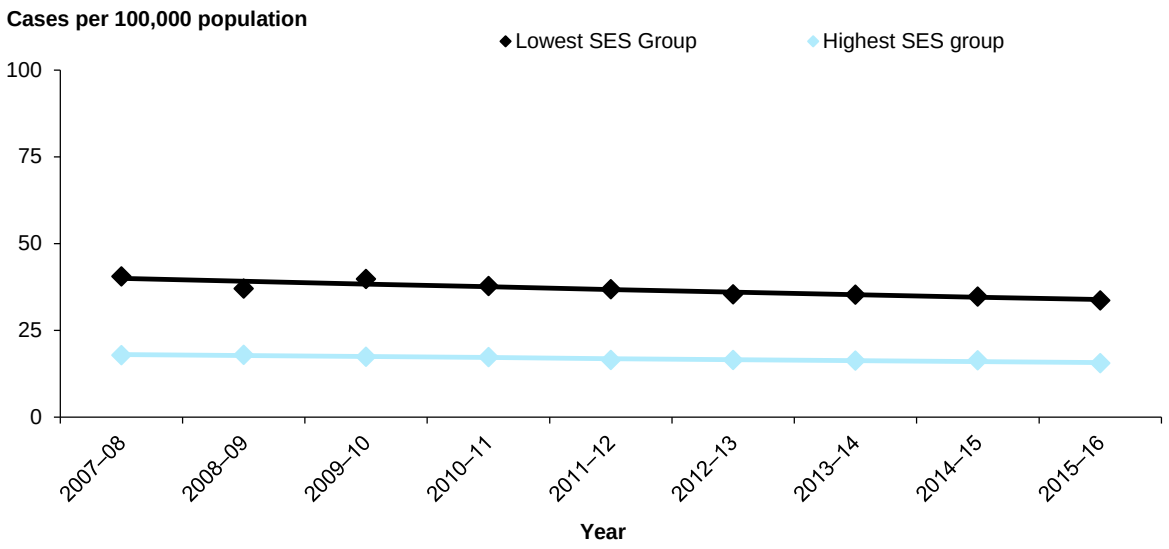
Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

Thermal causes of injury

An analysis of the changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups for cases of injury due to thermal causes is shown in Figure 3.9. Rates of injury due to thermal causes were higher in each year for those in the most disadvantaged group, compared with the most advantaged group.

Rates of injury due to thermal causes have decreased over time for both the lowest and highest SES groups. For the lowest (most disadvantaged) SES group, rates of injury due to thermal causes have decreased from 40 cases per 100,000 in 2007–08 to 34 cases per 100,000 in 2015–16. The drop in the modelled rate averaged 2% per year and was statistically significant. For the highest (most advantaged) SES group, rates of injury due to thermal causes have also decreased over time from 18 cases per 100,000 in 2007–08 to 16 cases per 100,000 in 2015–16. The drop in the modelled rate was not as steep as the drop for the lowest SES group, averaging 1.7% per year and was also statistically significant.

Figure 3.9: Modelled age-standardised rates of hospitalised thermal causes of injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

An analysis of injury due to thermal causes rates by age group over the 9-year period reveals variation according to age in both the lowest and highest SES groups. Figure 3.10 shows the annual percentage change in rate of injury due to thermal causes for 4 age groups among the lowest and highest SES groups. Due to small cases numbers, analyses on the 2 older age groups were not undertaken.

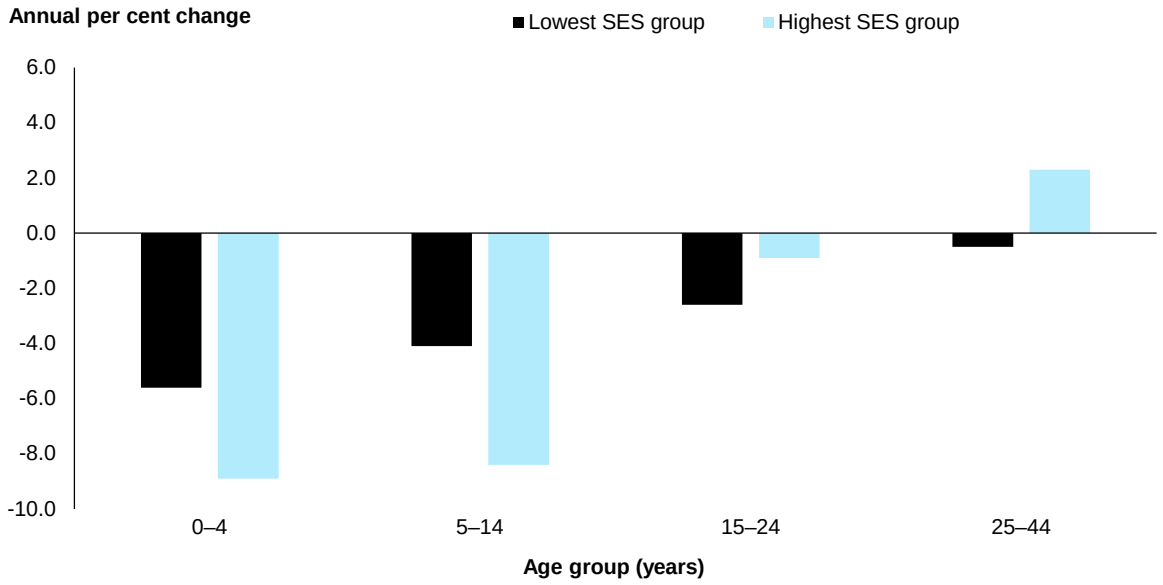
For those in the lowest (most disadvantaged) SES group:

- rates of injury due to thermal causes decreased in each of the age groups examined
- the largest decrease in the rate of injury due to thermal causes among the most disadvantaged over the period occurred in the 0–4 age group, at 6% per year.

For those in the highest (most advantaged) SES group:

- rates of injury due to thermal causes decreased in each of the age groups examined except for those aged 25–44, who showed a 2% increase per year
- the largest decrease in the rate of injury due to thermal causes among the most advantaged over the period occurred in the 0–4 age group, at 9% per year.

Figure 3.10: Annual percentage change in rates of hospitalised thermal causes of injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



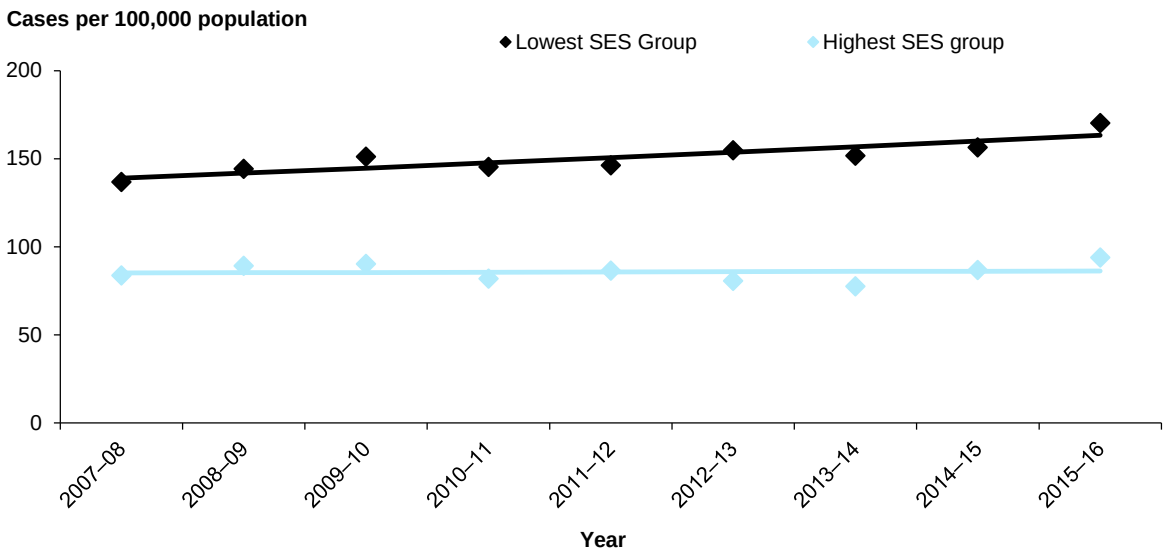
Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

Intentional self-harm

For hospitalised *Intentional self-harm* injury, an analysis of changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups is shown in Figure 3.11. Rates of *Intentional self-harm* injury were higher in each year for those in the most disadvantaged group compared with the most advantaged group.

Rates of *Intentional self-harm* injury have increased over time for the lowest SES group but not for the for highest. For the lowest (most disadvantaged) SES group, rates of *Intentional self-harm* injury have increased from 137 cases per 100,000 in 2007–08 to 170 cases per 100,000 in 2015–16. The rise in the modelled rate averaged 2.0% per year and was statistically significant. For the highest (most advantaged) SES group, rates of *Intentional self-harm* injury evidenced a slight (0.2%) increase in the average annual rate but this was not statistically significant.

Figure 3.11: Modelled age-standardised rates of hospitalised *Intentional self-harm* injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

An analysis of *Intentional self-harm* injury rates, by age group, over the 9-year period reveals variation according to age in both the lowest and highest SES groups. Figure 3.12 shows the annual percentage change in rate of *Intentional self-harm* injury among the lowest and highest SES groups for 5 age groups (see Appendix A: Data issues for notes on age restrictions).

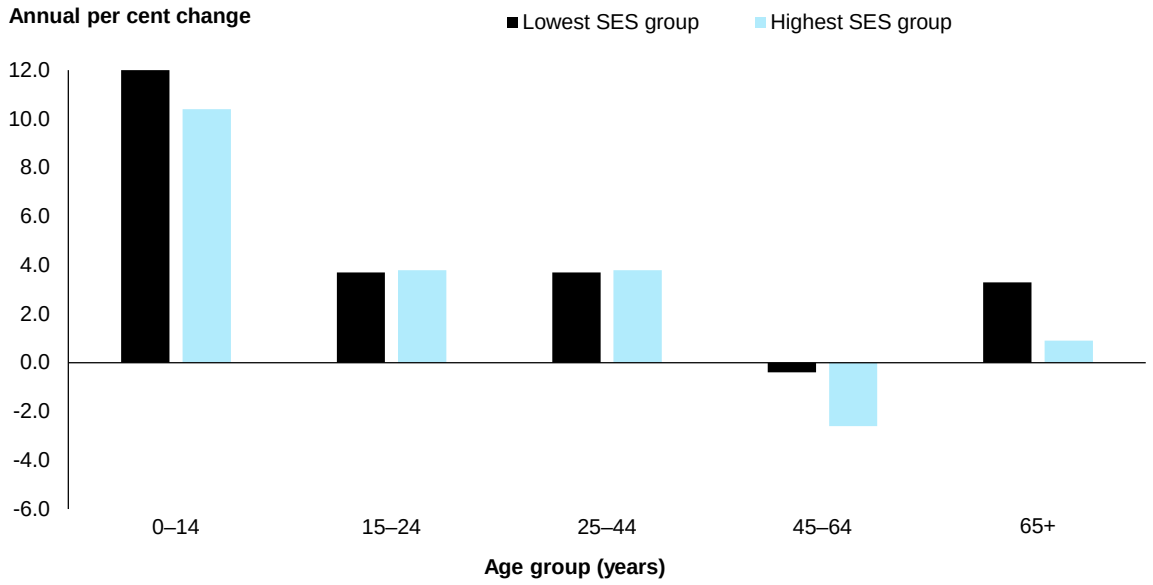
For those in the lowest (most disadvantaged) SES group:

- rates of *Intentional self-harm* injury increased in each of the age groups examined except for those aged 45–64, who showed a 0.4% decrease per year
- the largest increase in the rate of *Intentional self-harm* injury over the period occurred in the 0–14 age group, at 12% per year.

For those in the highest (most advantaged) SES group:

- rates of *Intentional self-harm* injury also increased in every age group except for those aged 45–64, who showed a 3% decrease per year
- the largest increase in the rate of *Intentional self-harm* injury over the period occurred in the 0–14 age group, at 10% per year.

Figure 3.12: Annual percentage change in rate of hospitalised *Intentional self-harm* injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



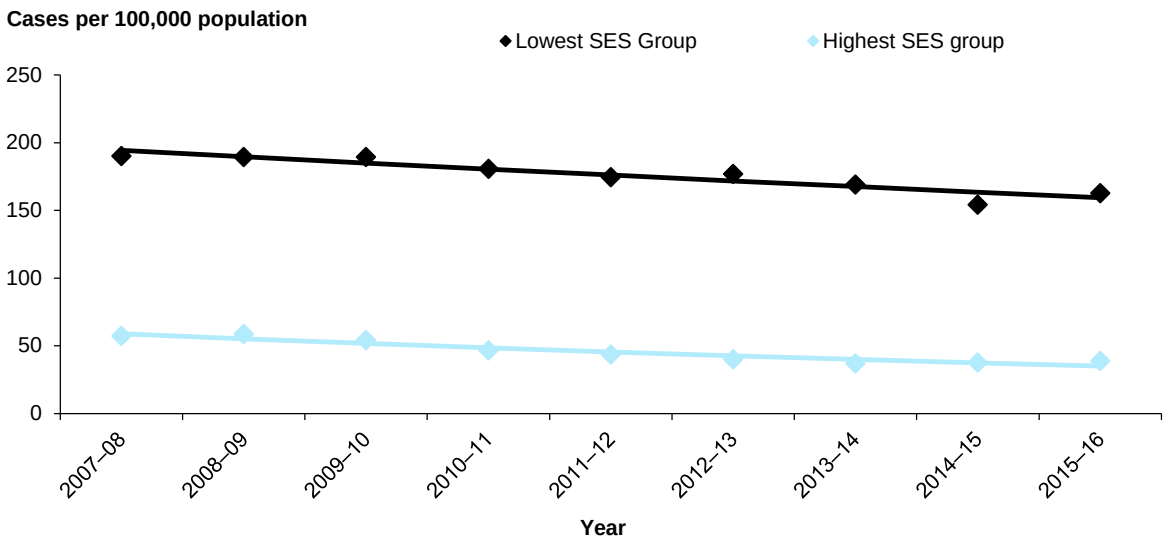
Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

Assault

An analysis of the changes over time for the lowest (most disadvantaged) and highest (most advantaged) SES groups for hospitalised *Assault* injury is shown in Figure 3.13. Rates of *Assault* injury were much higher in each year for those in the most disadvantaged group compared with the most advantaged group.

Rates of *Assault* injury have decreased over time for both the lowest and highest SES groups. For the lowest (most disadvantaged) SES group, rates of hospitalised *Assault* injury have decreased from 190 cases per 100,000 in 2007–08 to 163 cases per 100,000 in 2015–16. The drop in the modelled rate averaged 2.4% per year and was statistically significant. For the highest (most advantaged) SES group, rates of hospitalised *Assault* injury have also decreased over time, from 57 cases per 100,000 in 2007–08 to 39 cases per 100,000 in 2015–16. The drop in the modelled rate for this group was steeper than the drop for the lowest SES group, averaging 6.3% per year and statistically significant.

Figure 3.13: Modelled age-standardised rates of *Assault* injury, by lowest and highest SES groups, Australia, 2007–08 to 2015–16



Note: The solid line represents the modelled rate from 2007–08 to 2015–16. The filled symbols represent the observed age-standardised rate value for each year.

An analysis of hospitalised *Assault* injury rates by age group over the 9-year period reveals variation according to age in both the lowest and highest SES groups. Figure 3.14 shows the annual percentage change in rate of hospitalised *Assault* injury for 4 age groups among the lowest and highest SES groups. Due to small cases numbers, analyses were not undertaken on the 0–4 age group or on those aged 65 or over.

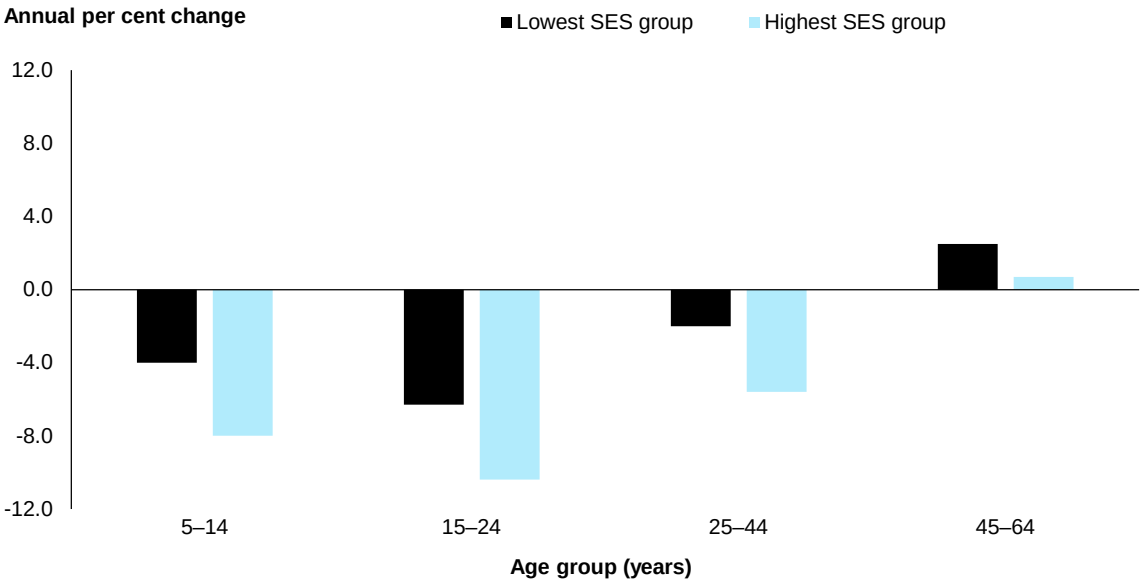
For those in the lowest (most disadvantaged) SES group:

- rates of hospitalised *Assault* injury decreased significantly in 3 out of the 4 age groups examined
- for the most disadvantaged in the 45–64 age group, rates of *Assault* injury increased by an average of 2.5% per year over the period
- the largest decrease in rates of *Assault* occurred among those aged 15–24, with an average decrease of 6.3% per year.

For those in the highest (most advantaged) SES group:

- rates of *Assault* injury also decreased in every age group among the most advantaged, except those aged 45–64, for whom rates increased by 0.7% increase per year (not statistically significant)
- the largest decrease was seen in the 15–24 age group, with an annual average decrease in rates of *Assault* injury of 10.4% per year.

Figure 3.14: Annual percentage change in rates of hospitalised *Assault* injury, by lowest and highest SES groups and age, Australia, 2007–08 to 2015–16



Note: Age-specific rates are standardised using populations by socioeconomic status groups, which do not include persons in areas for which the socioeconomic status could not be determined.

4 Discussion

The aim of this report was to examine the associations between socioeconomic status and injury hospitalisations in Australia. In doing so, the report looked at the effects of SES on hospitalised injury cases in the most recent data year and on the effects of SES, over time, by age, sex, Indigenous status and by a selection of external causes of injury.

Overall, the results demonstrated a strong association between SES and hospitalised injury. For those living in the most disadvantaged areas, rates of all-cause hospitalised injury were highest, and for those living in the most advantaged areas, rates of all-cause hospitalisation were lowest. Additionally, rates of injury decreased in line with increasing advantage. Among the 7 external cause categories examined, the rate of injury for each type of external cause was also highest in the most disadvantaged areas. However, rates in 2 external cause categories—*Accidental drowning and submersion* and fall-related injury—did not follow the usual pattern. In cases of *Accidental drowning and submersion,* the strength of the association between SES and injury hospitalisations was weaker for more advantaged areas. For cases of hospitalised fall-related injury, there was no association between rates of injury and increasing advantage. The lowest rate of fall-related injury co-occurred in the second most disadvantaged and the most advantaged SES groups.

Variations by age and sex

Variations were seen by age, by sex and by SES for of all-cause injury cases, *Transport crash*, *Accidental drowning and submersion* and fall-related injuries.

Sex

With respect to sex, for cases of fall-related injury, the association between injury and SES was much weaker for females and, to some extent, for males. For females, the lowest rate of fall-related injury occurred in the second lowest (most disadvantaged) SES group, not in the most advantaged group as suggested by a social gradient of health model. For males there was evidence of a gradual decline in rates of fall-related injury with increasing advantage, but only from about the third (middle) SES group. Among females there was no consistent pattern.

Age

In 4 categories examined, all-cause injury, *Transport crash*, *Accidental drowning and submersion* and fall-related injury, there was variation in the rate of injury by SES by age group. In some cases, patterns of increasing rates of injury with increasing disadvantage were clearly seen in some of the age groups, but in others this was not the case:

- For children in the 2 youngest age groups (0–4 and 5–14) there was a weak association between rates of injury in the 4 categories and SES. No clear gradient of decreasing rates of injury with increasing advantage was evident.
- For the 3 ‘middle aged’ groups (15–24, 25–44, and 45–64) there was a clear association between injury rates for all-cause injury, *Transport crash*, and fall-related injury. (Case numbers for *Accidental drowning and submersion* injury were too small for meaningful analysis).
- Those aged 65 or over demonstrated an inverse relationship between rates of all-cause injury and fall-related injury and SES. That is, rates of all-cause and fall-related injury

increased with increasing SES advantage. In addition, there was no clear association between *Transport crash* injury rates and SES. (Case numbers for *Accidental drowning and submersion* injury were too small for meaningful analysis).

Indigenous status

For all cases of hospitalised injury and all but 1 external cause, at least 40% to 50% of Indigenous Australians were in the most disadvantaged SES group. The exception to this was for incidences of *Accidental drowning and submersion,* where the largest proportion of Indigenous cases was found in the second most disadvantaged group (48%). Note that while patterns for Indigenous people were relatively consistent for across all external causes (with the exception noted above), these differences may largely reflect the different living circumstances of Indigenous people (that is, Indigenous people are not distributed evenly across each of the SES groups examined).

Trends over time

Over the 9-year period, the rate of hospitalised injury increased for both the highest (most disadvantaged) and lowest (most advantaged) SES groups (Table 4.1). The average increase in the rate of injury per year was highest for the lowest SES group (1.6%) compared with the highest SES group (0.9%). An increase in injury rates across both SES groups was seen for only 1 other external cause: falls. An annual average increase of 2% per year was seen for fall-related injuries in both the highest and lowest SES groups.

A consistent downward trend was identified for 2 external causes: decreases in the annual rate of injury due to thermal causes and *Assault* were found. For thermal cause injuries, rates decreased each year on average by 2% for the highest and lowest SES groups. The average annual decrease in rates of *Assault* injury was much larger among the most advantaged group, with an average drop of 6% per year compared with just 2% per year for the most disadvantaged group.

There was no consistency in the trends over time among the other external cause categories. For rates of *Transport crash* injury, a small (1%) rise among the lowest SES group was not seen in the highest SES group; conversely, a rise in the annual average rate of *Intentional self-harm* injury among the highest SES group was not seen for the lowest SES group.

Table 4.1: Summary of trends over time for selected external causes, by lowest and highest SES groups, Australia, 2007–08 to 2015–16

	Lowest SES group (most disadvantaged)		Highest SES group (most advantaged)	
	Direction of trend	% change per year	Direction of trend	% change per year
All injury	↑	0.9	↑	1.6
Transport crash	—	0.2	↑	1.0
Accidental poisoning	—	0.5	—	0.1
Falls	↑	2.1	↑	1.9
Thermal causes	↓	2.1	↓	1.7
Intentional self-harm	↑	2.0	—	0.2
Assault	↓	2.4	↓	6.3

Note: The symbol '—' indicates no significant change.

Changes in rates over time by SES group and by age varied considerably. The most consistent finding was an increase in annual average rates of injury for the oldest age group—those aged 65 or over—in every external cause category examined for both the highest and lowest SES groups. For those aged 65 or over, the change in the most disadvantaged groups was stronger for all external cause categories. For example, among cases of *Accidental poisoning,* an annual average rate of change of 4% for those aged 65 or over who were disadvantaged was twice the rate of change of those aged 65 or over who were advantaged (2%). Among children aged 0–4, decreases in rates of injury due to *Transport crash*, *Accidental poisoning* and injury due to thermal causes were found for the highest and lowest SES groups, while fall-related injury showed an increase for both groups.

Appendix A: Data issues

Data sources

The data on hospital separations are from the Australian Institute of Health and Welfare's National Hospital Morbidity Database (NHMD). Comprehensive information on the quality of the data for 2015–16 is available in *Admitted patient care 2015–16: Australian hospital statistics 2015–16* (AIHW 2017) and in previous editions covering the 2007–08 to 2014–15 period. Nearly all injury cases admitted to hospitals in Australia are included in the NHMD data reported.

Diagnosis, procedure and external cause data for 2015–16 were reported to the NHMD by all states and territories using the 9th edition of the International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian modification (ICD-10-AM) (ACCD 2014). Data from 2007–08 to 2014–15 were coded to earlier editions of 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 up to those aged 85 or over) were used as the standardising population throughout the report (ABS 2003). Data from other sources, mostly based on ERPs, were used as denominators for rates by Indigenous status (see 'Rates', below).

Selection criteria

This report is intended to describe the population incidence of injuries newly occurring that resulted in admission to a hospital. This section describes the criteria that were used to select cases to achieve this purpose.

Period

This report is restricted to admitted-patient episodes that ended in the period 1 July 2014 to 30 June 2015 for the single-year analyses, and to admitted-patient episodes that ended in the period 1 July 2014 to 30 June 2015 for the trend analyses. Selection was based on the financial year of separation, but choice of this time period is arbitrary. Use of calendar year would result in different rates, particularly where case numbers were small.

Injury

Injury separations were defined as records that contained a principal diagnosis in the ICD-10-AM range S00–T75 or T79 using 'Chapter XIX: Injury, poisoning and certain other consequences of external causes' codes (ACCD 2014). Nearly all injury separations were thought to be included in the data analysed, representing minimal risk of sampling error.

Estimating incident cases

Each record in the NHMD refers to a single episode of care in a hospital. Some injuries result in more than 1 episode in hospital and, hence, more than 1 NHMD record.

This can occur in 2 main ways:

- a person is admitted to 1 hospital, then transferred to another or has a change in care type (for example, from acute to rehabilitation) within the 1 hospital
- a person has an episode of care in hospital, is discharged home (or to another place of residence) and is then admitted for further treatment for the same injury, to the same hospital or to another one.

The NHMD does not include information designed to enable the set of records belonging to an injury case to be recognised as such. Hence, there is potential for some incident injury cases to be counted more than once, which occurs when a single incident injury case results in 2 or more NHMD records being 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 for this report makes use of the 'Mode of admission' variable, which indicates whether the current episode began with a transfer from another acute care hospital. Episodes of this type are likely to have been preceded by another episode that also met the case selection criteria for injury cases, so are omitted from our estimated case counts.

This procedure should largely correct for over-estimation of cases due to transfers, but will not correct for over-estimation due to re-admissions.

Adjusting for changes to rehabilitation coding

A change in coding practice for ICD-10-AM *Z50 Care involving the use of rehabilitation procedures* has necessitated a change to the standard record inclusion criteria for AIHW injury surveillance reports of hospital admitted injury cases. The change applies to episodes that ended on 1 July 2015 or later. For details of the change, see 'Box 4.2' in *Admitted patient care 2015–16: Australian hospital statistics* (AIHW 2017).

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

In order to minimise the effect of the coding change on the estimation of injury occurrence and trends, a change to the case estimation method used in AIHW injury surveillance was required. Records with Z50 as either the principal diagnosis or as an additional diagnosis are now omitted in data years both before and after the coding change. The change to data prior to 2015–16 amounts to an adjustment of less than 0.1% of records. Where injury trends are presented by principal diagnosis for years prior to 2015–16, data will not be directly comparable for already published reports.

Rates

Age-standardisation

Cases per 100,000 population are reported as directly age-standardised rates based on the Australian population as at 30 June of the year of interest. The Australian population as at 30 June 2001 was used as the reference population. Age-standardisation of rates enables valid comparison across years and/or jurisdictions without being affected by the differences in age distributions.

Estimated change in rates over time

Estimated trends in rates of separations were reported as annual percentage change, obtained using Poisson regression modelling using Stata 13 (StataCorp 2013).

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

Population-based rates of injury tend to have a similar value in 1 year to the next. Exceptions to this can occur (for example, due to a mass-casualty disaster) but are unusual in Australian injury data. Some year-to-year variation and other short-run fluctuations are to be expected, due to unknown and essentially random factors, and so small changes in rates over a short period normally do not provide a firm basis for asserting that a trend is present.

However, the period covered by this report is long enough for noteworthy changes to occur. The fundamental questions arising from a series of annual estimates of population-based rates are whether they show a statistically significant rise or fall over the period and, if so, the average rate of change. Analysis in this report is limited to those characteristics of change.

For each type of injury for which estimates of change were made:

- age-adjusted annual case numbers were obtained by multiplying age-adjusted unscaled rates by the Australian population in the corresponding year
- Poisson regression, a method suitable for count-based data, was run with the adjusted case numbers as the dependent variable; year (as an integer, from 0 to the number of years of data) as an independent variable; and annual population as the exposure. The relevant outputs are a modelled rate for each year and a model-based estimate of average annual change in rate and its 95% confidence interval (CI).

Interpretation: if the 95% CI around the point estimate for trend is entirely above zero then the rates have tended to rise; if the 95% CI is entirely below zero then the rates have tended to fall; otherwise it cannot be said with useful confidence that the age-standardised rates have tended to rise or to fall in the period considered.

Population denominators

General population

Where possible, rates were calculated using the final ERP as at 31 December in the relevant year as the denominator (for example, 31 December 2006 for 2006–07 data). Where tables of 31 December ERPs were not available, but tables of 30 June ERPs were available, population denominators were calculated as the average of 30 June estimates for adjacent years.

Indigenous population

Separation rates by Indigenous status were directly age-standardised, using the projected Indigenous population (low series) as at 30 June 2014. The population for non-Indigenous Australians was based on the ERP as at 30 June 2014, based on 2011 Census data.

Rates for Indigenous Australians in this report are only reported by financial year. Hence, all rates were calculated using, as the denominator, the final estimate of the estimated resident Indigenous population as at 31 December for the relevant period (for example, 31 December 2006 for 2006–07 cases). Since estimates of resident Indigenous populations are only provided for 30 June, estimates for 31 December are calculated by adding 2 consecutive 30 June estimates and dividing by 2 (for example, the estimate for 31 December 2006 is calculated by adding estimates for 30 June 2006 and 30 June 2007 and dividing by 2).

SEIFA population

Data on SES groups are defined using the ABS's Socio-Economic Indexes for Areas 2011 (SEIFA 2011 [ABS 2013]). SEIFA 2011 data are generated by the ABS using a combination of 2011 Census data such as income; education; health problems/disability; access to internet; occupation/ unemployment; wealth and living conditions; dwellings without motor vehicles; rent paid; mortgage repayments; and dwelling size. Composite scores are averaged across all people living in areas and defined for areas based on the Census collection districts.

However, they are also compiled for higher levels of aggregation. The SEIFAs are described in detail on the ABS website https://www.abs.gov.au.

The SEIFA Index of Relative Socio-Economic Disadvantage (IRSD) is one of the ABS's SEIFA indexes. The relative disadvantage scores indicate the collective SES of the people living in an area, with reference to the situation and standards applying in the wider community at a given point in time. A relatively disadvantaged area is likely to have a high proportion of relatively disadvantaged people. However, such an area is also likely to contain people who are not disadvantaged, and people who are relatively advantaged.

Separation rates by SES were generated by the AIHW using the IRSD scores for the SA2 of usual residence of the patient reported or derived for each separation. The '1—Lowest' group represents the areas containing the 20% of the national population with the most disadvantage, and the '5—Highest' group represents the areas containing the 20% of the national population with the least disadvantage. These SES groups do not necessarily represent 20% of the population in each state or territory. Disaggregation by SES group is based on the area of usual residence of the patient, not the location of the hospital.

The following labels for each socioeconomic group have been used throughout this report:

1—Lowest most disadvantaged

2—Second most disadvantaged

3—Middle

4—Second least disadvantaged

5—Highest least disadvantaged.

This report also uses SEIFA groupings to examine the broad association between Indigenous status and socioeconomic disadvantage. A more comprehensive analysis would require use of the 2011 Indigenous Relative Socioeconomic Outcomes (IRSEO) index (Biddle 2013), which more accurately reflects levels of socioeconomic disadvantage in the Indigenous population. Additional information about the IRSEO and the association between SES and Indigenous status can be found in *Australian Burden of Disease Study: fatal burden of disease in Aboriginal and Torres Strait Islander people 2010* (AIHW 2015).

Indigenous status

In this report, the terms 'Indigenous' and 'Non-Indigenous' are 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. There were 7,717 cases in 2015–16 with Indigenous status recorded as *Not stated*.

From 2010–11 onwards, Indigenous status information within hospital separations data from all jurisdictions were of sufficient quality for statistical reporting purposes (AIHW 2013). An

AIHW study found that an estimated 88% of Indigenous cases were correctly identified in Australian public hospital admission records in 2011–12.

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.

Quality of Indigenous status data

The AIHW report *Indigenous identification in hospital separations data: quality report* (AIHW 2013) presents the latest findings on the quality of Indigenous identification in hospital separations data in Australia, based on studies conducted in public hospitals during 2011. Private hospitals were not included in the assessment. The results of the study indicate that, overall, the quality of Indigenous identification in hospital separations data was similar to that achieved in a previous study (AIHW 2010). However, the survey for the 2013 report was performed on larger samples for each jurisdiction/region and is therefore considered more robust than the previous study.

The report recommends using data from all jurisdictions in national analyses of Indigenous admitted-patient care for data from 2010–11 onwards.

Ascertainment of intentional self-harm

According to inclusion notes in ICD-10-AM, cases should be assigned codes in the range X60–X84 if they were purposely self-inflicted poisoning or injury, intentional self-harm or attempted intentional self-harm (NCCC 2012). Determining whether an injury is due to intentional self-harm is not always straightforward. Cases may appear to be intentional self-harm, but inconclusiveness of available information may preclude them being coded as such. In this situation, the case can be coded to an 'undetermined intent' category—for example, Y30 *Falling, jumping or pushed from a high place, undetermined intent* or Y32 *Crashing of motor vehicle, undetermined intent*.

Some cases may choose not to disclose that their injuries resulted from intentional self-harm, or may be unable to do so due to the nature of the injuries, or because their motives were ambiguous.

In very young children, ascertaining whether an injury was due to intentional self-harm can be difficult and may involve a parent or caregiver's perception of the intent. Ability to form an intention to inflict self-harm, and to understand the implications of doing so, requires a degree of maturity that is absent in infancy and early childhood.

It is not possible to differentiate between acts of self-injury and acts of self-harm with suicidal intent within the NHMD, but it is likely that an unknown proportion of cases of intentional self-harm are self-injurious in nature rather than suicidal in intent.

Such sources of uncertainty about the assignment of intent limit the certainty of any estimates of intentional self-harm based on routine hospital data, particularly for children. For these reasons, in this report, cases of intentional self-harm are presented in aggregate for ages up to and including 14 years.

Data quality statement: National Hospital Morbidity Database

The National Hospital Morbidity Database (NHMD) is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals. The data supplied are based on the National Minimum Data Set (NMDS) for Admitted patient care and include demographic, administrative and length of stay data, as well as data on the diagnoses of the cases, the procedures they underwent in hospital and external causes of injury and poisoning.

The purpose of the NMDS for Admitted patient care is to collect information about care provided to admitted cases in Australian hospitals. The scope of the NMDS is episodes of care for admitted cases in all public and private acute and psychiatric hospitals, free-standing day hospital facilities, and alcohol and drug treatment centres in Australia. Hospitals operated by the Australian Defence Force, corrections authorities and in Australia's off shore territories are not in scope but some are included.

The reference period for this data set is 2007–08 to 2015–16. The data set includes records for admitted patient separations between 1 July 2007 and 30 June 2016.

A complete data quality statement for the NHMD is available online at https://meteor.aihw.gov.au/.

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 written by Sophie Pointer at the AIHW National Injury Surveillance Unit (NISU) at Flinders University, with assistance from James Harrison and Stacey Avefua.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
CI	Confidence interval
IRSD	Index of Relative Socio-Economic Disadvantage
SEIFA	Socio-Economic Indexes for Areas
SES	socioeconomic status
WHO	World Health Organization

Symbols

p	probability

Glossary

METeOR is AIHW's Metadata Online Registry and 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 (NMDSs). METeOR can be viewed on the AIHW website at https://meteor.aihw.gov.au/.

acute: Having a short and relatively severe course.

acute care: See **care type**.

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

additional diagnosis: A condition or complaint either coexisting with the principal diagnosis or arising during the episode of admitted-patient care, episode of residential care or attendance at a health-care establishment. METeOR identifier: 514271.

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 cases). METeOR identifier: 268957.

age-standardisation: A set of techniques used to remove, as far as possible, the effects of differences in age when comparing 2 or more populations.

burden of disease and injury: The quantified impact of a disease or injury on an individual or population, using the **disability-adjusted life year** (DALY) measure.

care type: The care type defines the overall nature of a clinical service provided to an admitted patient during an episode of care (admitted 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:

- 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.

disease: A broad term that can be applied to any health problem, including symptoms, diseases, injuries and certain risk factors, such as high blood cholesterol and obesity. Often used synonymously with 'condition', 'disorder' or 'problem'.

episode of care: The period of admitted-patient care between a formal or statistical admission and a formal or statistical separation, characterised by only 1 care type (see **Care type** and **Separation**). METeOR identifier: 491557 (Care type). METeOR identifier: 268956 (Episode of admitted-patient care).

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

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

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.

principal diagnosis: The diagnosis established, after study, to be chiefly responsible for occasioning an episode of admitted-patient care. METeOR identifier: 514273.

private hospital: A privately owned and operated institution, catering for cases who are treated by a doctor of their own choice. Cases 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.

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 cases.

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 stay beginning or ending in a change of type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care either by being discharged, dying, transferring to another hospital or changing type of care.

separation rate: The total number of episodes of care for admitted cases divided by the total number of persons in the population under study. Often presented as a rate per 10,000 or 100,000 members of a population. Rates may be crude or standardised.

separations: The total number of episodes of care for admitted cases, which can be total hospital stays (from admission to discharge, transfer or death) or portions of hospital stays beginning or ending in a change of type of care (for example, from acute to rehabilitation) that cease during a reference period. METeOR identifier: 270407.

References

ABS (Australian Bureau of Statistics) 2003. Population by age and sex, Australian states and territories, 2001: Census edition final. ABS cat. no. 3201.0. Canberra: ABS.

ABS 2013. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011. ABS cat. no. 2033.0. Canberra: ABS.

ACCD (Australian Consortium for Classification Development) 2014. The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM), 9th edn. Tabular list of diseases and alphabetic index of diseases. Adelaide: Independent Hospital Pricing Authority.

AIHW (Australian Institute of Health and Welfare) 2010. Indigenous identification in hospital separations data: quality report. Health services series no. 35. Cat. no. HSE 85. Canberra: AIHW.

AIHW 2013. Indigenous people identification in hospital separations data: quality report. Cat. no. IHW 90. Canberra: AIHW.

AIHW 2015. Australian Burden of Disease Study: fatal burden of disease in Aboriginal and Torres Strait Islander people 2010. Australian Burden of Disease Study series no. 2. Cat. no. BOD 2. Canberra: AIHW.

AIHW 2016. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. BOD 4. Canberra: AIHW.

AIHW 2017. Admitted patient care 2015–16: Australian hospital statistics. Health services series no.75. Cat. no. HSE 185. Canberra: AIHW.

AIHW 2018. Australia's health 2018. Australia's health series no. 16. AUS 221. Canberra: AIHW.

AIHW: Pointer SC 2018. Trends in hospitalised injury, Australia 1999–00 to 2014–15. Injury research and statistics series no. 110. Cat. no. INJCAT 190. Canberra: AIHW.

Berry JG & Harrison JE 2006. A guide to statistical methods for injury surveillance (revised). Injury technical paper series no. 5. Cat. no. INJCAT 72. Adelaide: AIHW.

Biddle N 2013. Socioeconomic outcomes. Paper 13. Indigenous Population Project: 2011 Census report. Canberra: Centre for Aboriginal Economic Policy Research.

Birken CS & MacArthur C 2004. Socioeconomic status and injury risk in children. Paediatric Child Health, 9(5)323–5.

Fang X, Jing R, Zeng G, Linnan HW, Zhu X & Linnan M 2014. Socioeconomic status and the incidence of child injuries in China. Social Science and Medicine 102:33–40. 02:33–40. doi: 10.1016/j.socscimed.2013.11.022.

Laflamme L, Burrows S & Hasselberg M 2009. Socioeconomic differences in injury risks: a review of findings and a discussion of potential countermeasures. Copenhagen: WHO Regional Office for Europe. Viewed March 2016, http://www.euro.who.int/Document/E91823.pdf.

NCCC (National Casemix and Classification Centre) 2012. The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM), Australian Classification of Health Interventions (ACHI) and Australian Coding Standards (ACS), 8th edn. Wollongong: University of Wollongong.

StataCorp 2013. Stata statistical software: release 13. College Station, TX: StataCorp LP.

List of tables

List of figures

List of boxes

This report examined the associations between socioeconomic status and injury morbidity in Australia and looked at the effects of SES on hospitalised injury cases by age, sex, Indigenous status and by a selection of external causes of injury. Overall, the results showed that the effects of SES varied. Generally speaking, rates of hospitalised injury were higher among people from the lowest (most disadvantaged) SES category compared with rates among people from the highest (most advantaged) SES category.

aihw.gov.au

AIHW

Stronger evidence,
better decisions,
improved health and welfare