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Hospitalised burn injuries Australia 2013–14

Flinders UNIVERSITY

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Hospitalised burn injuries Australia

2013–14

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Abbreviations

ABS	Australian Bureau of Statistics
ACHI	Australian Classification of Health Interventions
AIHW	Australian Institute of Health and Welfare
ANZBA	Australian New Zealand Burns Association
ARIA	Accessibility/Remoteness Index of Australia
ASGC	Australian Standard Geographical Classification
BRANZ	Burns Registry of Australia and New Zealand
ERP	estimated resident population
HTTL	high threat to life
ICD-10-AM	International statistical classification of diseases and related health problems, 10th revision, Australian modification
ICU	intensive care unit
LOS	length of stay
METeOR	Metadata Online Registry (AIHW)
MLOS	mean length of stay
NCCH	National Centre for Classification in Health
NHMD	National Hospital Morbidity Database
NISU	National Injury Surveillance Unit
NMDS	National Minimum Data Set
SLA	Statistical local area
TBSA	total body surface area

Summary

The aim of this report is to describe cases of burn injury requiring hospitalisation in Australia from 1 July 2013 to 30 June 2014. While burn injuries make up a small fraction (1%) of all hospitalisations for injury, they are often the most serious and can result in numerous repeat admissions and long lengths of stay.

In 2013–14 there were 5,430 cases of hospitalised burn injury. About two-thirds were male (3,654 cases). The highest rate of burn injury was in the youngest age group (0–4) for both boys (75 cases per 100,000 population) and girls (51 cases per 100,000 population).

Aboriginal and Torres Strait Islander people made up 9% of all burn cases and had a higher rate of hospitalisation (58 cases per 100,000 population) than other Australians (22 cases per 100,000 population). Burn cases were more common in the youngest Indigenous age group (0–4) as for the overall population.

Most burn cases had burns of partial thickness of the skin (70%, 3,269 cases) or full thickness (23%, 1,070), rather than to the top layer of skin only. About one-fifth (21%, 1,158 cases) of burns were to the wrist and hand but body region burned varied by age. In very young children burns to the trunk (21%) were also common, while older Australians (aged 65 and over) had the highest proportion of burns to the hip and lower limb (22%).

Severity

The average length of stay for all burn cases was 7 days; it was longer for older Australians aged 65 and over at 13 days. About 5% (246 cases) of hospitalised burn cases spent time in an intensive care unit with an average length of stay of 141 hours per case.

In 2013–14, 48 burn victims died in hospital (29 males and 19 females). Over half (56%) of these deaths occurred among older Australians aged 65 and over (27 cases). Of those that died in hospital, 27 cases had full thickness burns to more than 50% of total body surface area.

About 16% (850 cases) of hospitalised burn cases were considered high threat to life (HTTL). Larger proportions of cases among adults aged 25–44 and 45–64 were HTTL (34% and 20% of cases respectively). The average length of stay was much higher for HTTL cases at 17 days. More than 4 out of 5 HTTL burn cases (84%) had sustained a full skin thickness burn injury.

Causes

This report looked at 3 main cause groups of burns: *Exposure to smoke, fire and flames*, *Contact with heat and hot substances* and other external causes of burns. *Contact with heat and hot substances* accounted for almost half of all cases (45%). *Exposure to smoke, fire and flames* was the main cause of burn cases in adulthood with 78% of cases occurring in those aged 15–64. In contrast, *Contact with heat and hot substances* was the cause of 37% of burn cases among children aged under 10. Other external causes of injury such as explosions and contact with electrical transmission lines resulted in higher proportions of HTTL cases and more severe burns as measured by thickness of burn.

1 Introduction

This report describes cases of thermal injury or burns requiring hospitalisation in Australia from 1 July 2013 to 30 June 2014. It uses data for episodes of admitted patient care that were due to burn injuries from dry sources (such as fire or flame) and wet sources (such as scalds) (see Box 1.1). Injuries are described according to the types and causes of burns.

Burn injuries can be devastating, particularly burns that are large or involve areas such as the face or hands. Treatment of burn patients is expensive, complex, and resource intensive (Ahn & Maitz 2012, Cleland et al. 2016). After an initial period of acute care, burn patients may have long periods of rehabilitation and multiple outpatient visits. Survival is often dependent on the surface area of the body burned and the availability of specialised treatment at burn centres. Survivors of severe burns have long-term physical and psychosocial consequences due in part to the trauma of the injury event.

Burn classification

Burn injuries are classified by thickness and size (Knaysi et al. 1968), both of which contribute to determining the overall severity of a burn (see Box 1.2).

Thickness

The thickness of a burn reflects the depth of injury to skin layers. There are 3 levels of thickness:

- Erythema—these burns cause damage to the first or top layer of skin. The burn site will be red and painful.
- Partial thickness—includes damage to the first and second skin layers. The burn site will be red, peeling, blistering and swelling with clear or yellow-coloured fluid leaking from the skin. The burn site is very painful.
- Full thickness—involves damage to both the first and second skin layers, plus the underlying tissues, muscle, bone and organs. The burn site generally appears black or charred with white exposed fatty tissue or bone. Yellow in the wound is likely to be exposed muscle tissue. The nerve endings are generally destroyed and so there is little or no pain experienced at the site of the full-thickness burn. However, surrounding partial thickness burns will be very painful.

Size

The size of a burn is measured as a percentage of total body surface area (TBSA) that partial thickness or full thickness burns affect. There are a number of methods to determine TBSA, the most common of which is the 'Rule of nines' (Knaysi et al. 1968). The 'Rule of nines' is a method for quickly assessing the area of the body covered by burns in order to assist calculation of the amount of intravenous fluid to be given. The body is divided into areas of skin comprising approximately 9% each of the total body surface. These are as follows:

- each arm = 9%
- the head = 9%

- each leg = 18%
- the back of the torso = 18%
- the front of the torso = 18%
- with the external genitalia making up the final 1%.

The rule is not applicable to children whose body proportions change with age, where a 'Rule of sevens' is more appropriate. (In younger children the head represents a greater proportion of the TBSA.)

Severity

Whether a burn is considered 'severe' varies depending on the size, thickness, location on the body as well as the age of the victim. One measure of the severity of an injury is the likelihood that a patient with that injury will die in hospital. The National Injury Surveillance Unit (NISU) uses a method which identifies patients with a predicted mortality risk of about 6% or higher as having a high threat to life (HTTL) (Stephenson et al. 2003). Injuries of this severity are likely to have a large impact on the patient, often with persisting problems and ongoing need for health-care services.

Burns Registry of Australia and New Zealand

The Australian and New Zealand Burns Association (ANZBA) in conjunction with the Monash University Department of Epidemiology and Preventive Medicine has developed a clinical quality register, the Burns Registry of Australia and New Zealand (BRANZ), to collect epidemiological and clinical data on patients admitted with acute burn injury to Australian and New Zealand specialist burn units.

ANZBA has developed a list of criteria for referral or transfer to a specialist burns unit that includes cases of:

- burns greater than 10% TBSA
- burns greater than 5% TBSA in children
- full thickness burns greater than 5% TBSA
- burns of special areas—face, hands, feet, genitalia, perineum, major joints and circumferential limb or chest
- burns with inhalation injury
- electrical burns
- chemical burns
- burns with pre-existing illness
- burns associated with major trauma
- burns at the extremes of age—young children and the elderly
- burn injury in pregnant women
- non-accidental burns.

In practice the BRANZ does not achieve 100% capture of records of all burn patients referred to a specialist unit and not all people presenting to hospital with a burn who meet the criteria would be referred. In 2013–14, 15 of the 17 BRANZ sites (12 out of 13 Australian sites and 3

of the 4 New Zealand sites) contributed data with 2,656 cases entered into the database (ANZBA 2014).

It is not currently possible to identify patients in the National Hospital Morbidity Database (NHMD) used for this report who were treated in a specialist burn unit. It is possible that there will be differences between the burn injury population included in the BRANZ and the patients included in the current study, so the data in this report may differ from the data that the BRANZ reported.

Methods and data sources

This report uses data from the NHMD covering the period 1 July 2013 to 30 June 2014 to provide information on burn injuries among people in Australia.

Diagnosis and external cause information for the hospital separations reported here were coded according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) (NCCH 2012). It comprises classifications of diseases and external causes of injuries and poisoning, based on the World Health Organization's version of ICD-10. The ICD-10-AM classification is hierarchical, with 20 summary disease chapters that are divided into more specific disease groupings.

The report does not include burn cases that presented to the emergency departments of Australian hospitals, unless admitted to hospital, or cases who only visited general practitioners. Data from the former is available in the National Non-admitted Patient Emergency Department Care database but further investigation of its usefulness and limitations is needed before routine reporting. Deaths which occur as a result of burn injuries are only included where the person died in hospital after an admission. According to the Australian Bureau of Statistics (ABS) Causes of Death data, there were 77 deaths due to *Exposure to smoke, fire and flames* (59 cases) and *Contact with heat and hot substances* (18 cases) in 2014 (ABS 2016).

Burn injury case estimation

In order to prevent the high number of admissions for burn patients causing an overestimation of case numbers, 2 procedures were carried out for the purposes of this report. Case numbers were estimated by excluding separations where *Mode of admission* was not a transfer from another acute hospital, and separations were selected only where *Urgency status* was 'emergency'. These procedures are intended to correct for overestimation of cases due to transfers, and correct for overestimation due to readmissions (see 'Appendix A: Data issues' for details).

What data are reported?

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

- hospital separations occurring in Australia from 1 July 2013 to 30 June 2014
- principal diagnosis in the ICD-10-AM range T20–T31 using Chapter XIX *Injury, poisoning and certain other consequences of external causes* codes
- mode of admission was not a transfer from another acute hospital
- urgency status was 'emergency' (see 'Appendix A: Data issues' for details).

Important terms regarding the data used in this report are summarised in boxes 1.1 to 1.4 and further information on data and methods is provided in 'Appendix A: Data issues'. Other information boxes are found in relevant areas in the report.

In tables and charts, unless stated otherwise:

- The patient's age is calculated at the date of admission.
- In tables by age group and sex, cases or separations for which age and sex were not reported were included in totals.
- Rates were age-standardised as detailed in 'Appendix A: Data issues'.

Structure of this report

Chapter 2 provides an overview of hospitalised burn injury in Australia. The information provided includes number of burn cases by age and sex, causes of burn injury and descriptions of the burn injuries themselves. The chapter also includes information about the location of the injury event and the incidence in the Aboriginal and Torres Strait Islander population.

Chapter 3 provides information on burn severity including causes of severe burns, lengths of stay and HTTL cases.

Chapter 4 provides more detailed information on the causes of burn injury.

Chapter 5 describes the procedures used in the treatment of burn injuries in hospitals.

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

Appendix B: Additional tables consists of tables underpinning selected figures presented in the report.

Box 1.1: External causes of burn

The main focus in this report is on the **Other external causes of accidental injury (W00–X59)** section of Chapter XX *External causes of morbidity and mortality, Exposure to smoke, fire and flames* (X00–X09) and *Contact with heat and hot substances* (X10–X19) which include:

Exposure to smoke, fire and flames (X00–X09)

- Exposure to uncontrolled fire in building or structure (X00)
- Exposure to uncontrolled fire, not in building or structure (X01)
- Exposure to controlled fire in building or structure (X02)
- Exposure to controlled fire, not in building or structure (X03)
- Exposure to ignition of highly flammable material (X04)
- Exposure to ignition or melting of nightwear (X05)
- Exposure to ignition or melting of other clothing and apparel (X06)
- Exposure to other specified smoke, fire and flames (X08)
- Exposure to unspecified smoke, fire and flames (X09).

(continued)

Box 1.1 (continued): External causes of burn

Contact with heat and hot substances (X10–X19)

- Contact with hot drinks, food, fats and cooking oils (X10)
- Contact with hot tap-water (X11)
- Contact with other hot fluids (X12)
- Contact with steam and hot vapours (X13)
- Contact with hot air and gases (X14)
- Contact with hot household appliances (X15)
- Contact with hot heating appliances, radiators and pipes (X16)
- Contact with hot engines, machinery and tools (X17)
- Contact with other hot metals (X18)
- Contact with other and unspecified heat and hot substances (X19).

Other external causes of burn injury, within ICD-10-AM but outside the range described, are described in this report under the category 'other external causes'. For example, people can suffer burn injuries as a result of car accidents, exposure to electricity, as a result of being struck by lightning, and through acts of intentional self-harm and assault.

Box 1.2: ICD-10-AM classification of types of burns

The ICD-10-AM group *Burns* (T20—T31) includes 3 categories:

- *Burns of external body surface, specified by site* (T20–T25)
- *Burns of eye and internal organs* (T26–T28)
- *Burns of multiple and unspecified body regions* (T29–T31).

With the exception of *Burns of eye and internal organs*, most of the subdivisions of these categories provide information about the thickness of the burn. For full thickness burns within the range T20–T25, and T29, an indication of the total body surface involved by percentage is provided with an additional diagnosis using T31 *Burns classified according to extent of body surface involved*. For example, a full thickness burn on the hand covering less than 10% would be coded as T23.3 *Full thickness burn of wrist and hand* and would be accompanied by an additional diagnosis T31.0 *Burns involving less than 10% of body surface*.

Box 1.3: Summary of terms relating to hospitalised injury

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

(continued)

Box 1.3 (continued): Summary of terms relating to hospitalised injury

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 in the ICD-10-AM range T20–T31. In general, whenever a patient has a principal or additional diagnosis of an injury or poisoning, an external cause code should be recorded. More specifically for burn diagnoses, burns of external body surface are coded by site and thickness. Patients with a diagnosis in the range T20–T25 and T29 must also be given a supplementary code classifying the extent of body surface involved in full thickness burns.

Records are included whether caused unintentionally ('accidents') or intentionally (intentional self-harm, or assault). Records where intent was not determined are also included.

A **procedure** is a clinical intervention that is surgical in nature, carries an anaesthetic risk, requires specialised training and/or requires special facilities or services available only in an acute care setting. Procedures therefore encompass surgical procedures and non-surgical investigative and therapeutic procedures, such as X-rays. Patient support interventions that are neither investigative nor therapeutic (such as anaesthesia) are also included.

In 2013–14, procedures were recorded using the 8th edition of the Australian Classification of Health Interventions (ACHI) (NCCH 2012).

The **mean length of stay** (MLOS) is the average number of days each patient stayed in hospital. This is calculated by dividing the total number of patient days for **injury separations** by the number of **injury cases,** estimated as above. Patients who were admitted and discharged from hospital on the same day are counted as staying for 1 day.

Injuries can be classified according to the likelihood that a patient with that injury will die in hospital. The method used refers to cases with a predicted mortality risk of about 6% or higher as having a **high threat to life** (HTTL) (Stephenson et al. 2003). Injuries of this severity are likely to have a large impact on the patient, often with persisting problems and ongoing need for health-care services.

Box 1.4: Indigenous reporting

In this report, the terms 'Aboriginal and Torres Strait Islander people' and 'Indigenous people' are used to refer to people identified as such in Australian hospital separations data and population data collections. 'Other Australians' includes separations for which the Indigenous status was not reported as well as those for persons identified as not of Aboriginal or Torres Strait Islander origin.

Separations for which Indigenous status was 'not stated' have been included in the 'other Australians' category. There were 117 burn-related separations (1.5%) in 2013–14 with Indigenous status recorded as 'not stated'.

The report *Indigenous identification in hospital separations data – 2013 quality report*, (AIHW 2013) presented 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 report recommends that the data for all jurisdictions are used in analysis of Indigenous hospitalisation rates, and for hospitalisations in total in national analyses of Indigenous admitted patient care for data from 2010–11 onwards.

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

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

2 Overview of hospitalised burn injury in 2013–14

Burns accounted for 8,055 hospital separations due to injury and poisoning for public and private hospitals in Australia during the financial year 2013–14. Excluding inward transfers and cases where *Admission urgency status* was not reported to be 'emergency', there were an estimated 5,430 discrete hospitalised burn cases, or 1.2% of all injury cases for 2013–14 (Table 2.1). Twice as many males than females were hospitalised as a result of a burn injury.

Table 2.1: Key indicators for hospitalised burn cases, Australia, 2013–14

Indicator	Males	Females	Persons
Estimated hospitalised burn cases	3,654	1,776	5,430
Percent of all injury cases	1.4	0.9	1.2
Age-standardised rate/100,000 population	31.6	15.4	23.5

Over the last 10 years there has been an average of 5,700 cases of hospitalised burns in each year (Figure 2.1). The number and age-standardised rate of hospitalised burn injury was slightly lower in 2013–14 compared to previous years.

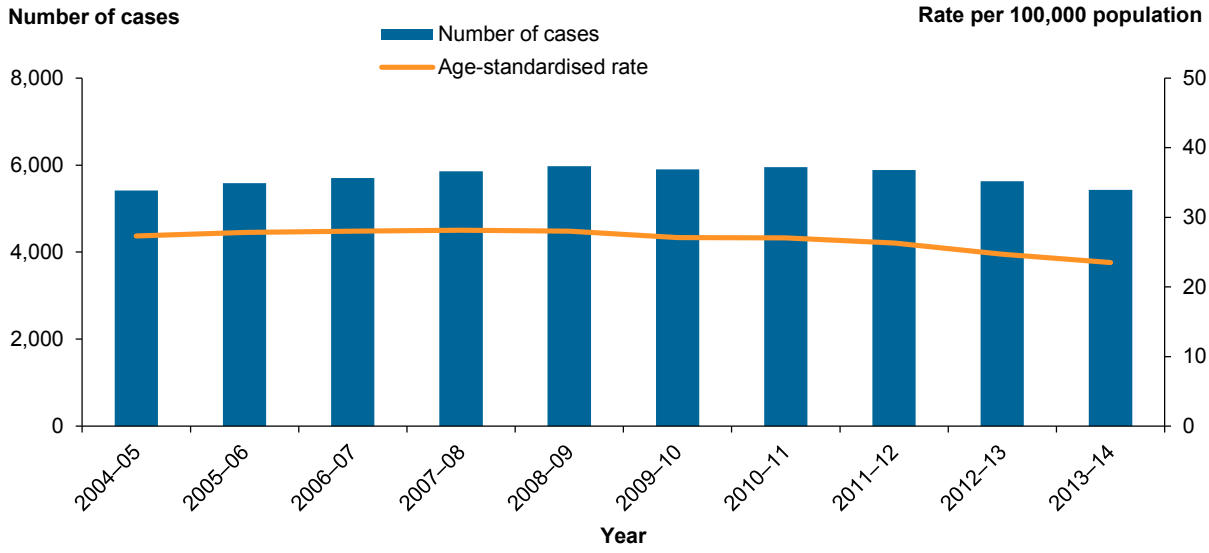


Figure 2.1: Number and age-standardised rate of hospitalised burn cases, Australia, 2004–05 to 2013–14

Age and sex

The largest proportion of hospitalised burn cases (30%) occurred in the group aged 25–44 (Table 2.2). Taken together, children aged under 10 accounted for the next largest proportion of hospitalised burn cases (22%). The distribution of burn cases by age group was similar for males and females with the largest proportions at age 25–44 (32% and 27% respectively) (Table 2.2). Girls aged under 10 had a higher proportion of burn cases than boys in the same age group, 27% compared to 20%.

Table 2.2: Hospitalised burn cases, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	Number	%	Number	%	Number	%
0–4	584	16.0	377	21.2	961	17.7
5–9	158	4.3	97	5.5	255	4.7
10–14	132	3.6	61	3.4	193	3.6
15–24	661	18.1	230	13.0	891	16.4
25–44	1,151	31.5	485	27.3	1,636	30.1
45–64	683	18.7	341	19.2	1,024	18.9
65+	285	7.8	185	10.4	470	8.7
Total	**3,654**	**100**	**1,776**	**100**	**5,430**	**100**

The highest rate of burn injury was in the youngest age range (0–4) for both boys (75 cases per 100,000 population) and girls (51 cases per 100,000 population) (Figure 2.2).

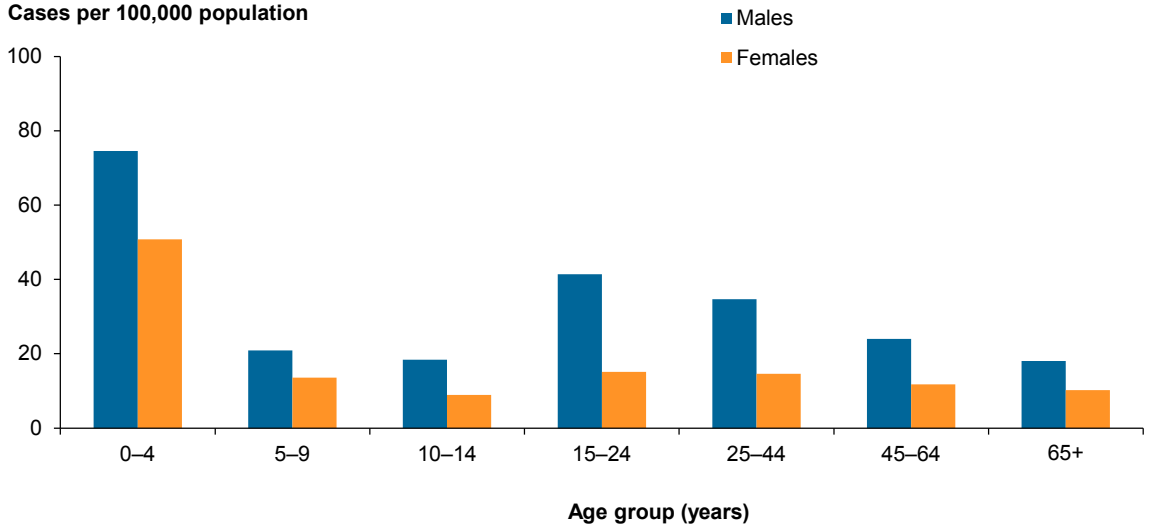


Figure 2.2: Age-specific rates of hospitalised burn cases, by sex, Australia, 2013–14

Causes of burn injury

There were 3 major groups of external causes of burn injury: *Contact with heat and hot substances*, *Exposure to smoke, fire and flames* and other external causes of burn injury. The latter category contains a number of external cause codes from other major external cause groupings such as transport and poisoning.

Contact with heat and hot substances accounted for almost half of all cases (45%) (Table 2.3). This category includes burns due to spilling hot drinks, foods, fats and cooking oils, or coming into contact with hot tap water or other hot liquids, as well as touching hot cooking or heating appliances. *Exposure to smoke, fire and flames* accounted for 29% of hospitalised burn injuries and the remaining 26% were due to other external causes such as explosion of gas or other materials and exposure to electrical current. The mechanism of injury and characteristics of hospitalised burn cases within each of these 3 external cause types are discussed in more detail in Chapter 4.

Table 2.3: Type of external cause for hospitalised burn cases, by sex, Australia, 2013–14

	Males		Females		Persons	
Type of external cause	Number	%	Number	%	Number	%
Exposure to smoke, fire and flames	1,227	33.6	353	19.9	1,580	29.1
Contact with heat and hot substances	1,396	38.2	1,037	58.4	2,433	44.8
Other external causes of burn injury	1,031	28.2	386	21.7	1,417	26.1
Total	**3,654**	**100**	**1,776**	**100**	**5,430**	**100**

Contact with heat and hot substances caused the majority of burns among females (58%) but not in males (38%). In contrast, males had higher proportions of burns due to *Exposure to smoke, fire and flames* and other external causes of burn injury compared to females (Table 2.3).

The distribution of causes of burn injury showed distinct differences by age group (Table 2.4). *Exposure to smoke, fire and flames* was the main cause of burn cases in adulthood with 78% of cases occurring in those aged 15–64. About 10% of burns in children aged under 10 occurred as a result of *Exposure to smoke, fire and flames*. In contrast, *Contact with heat and hot substances* was the cause of 37% of burn cases among children aged under 10. The age groups most affected by other external causes of burn injury were similar to those burn cases due to *Exposure to smoke, fire and flames*.

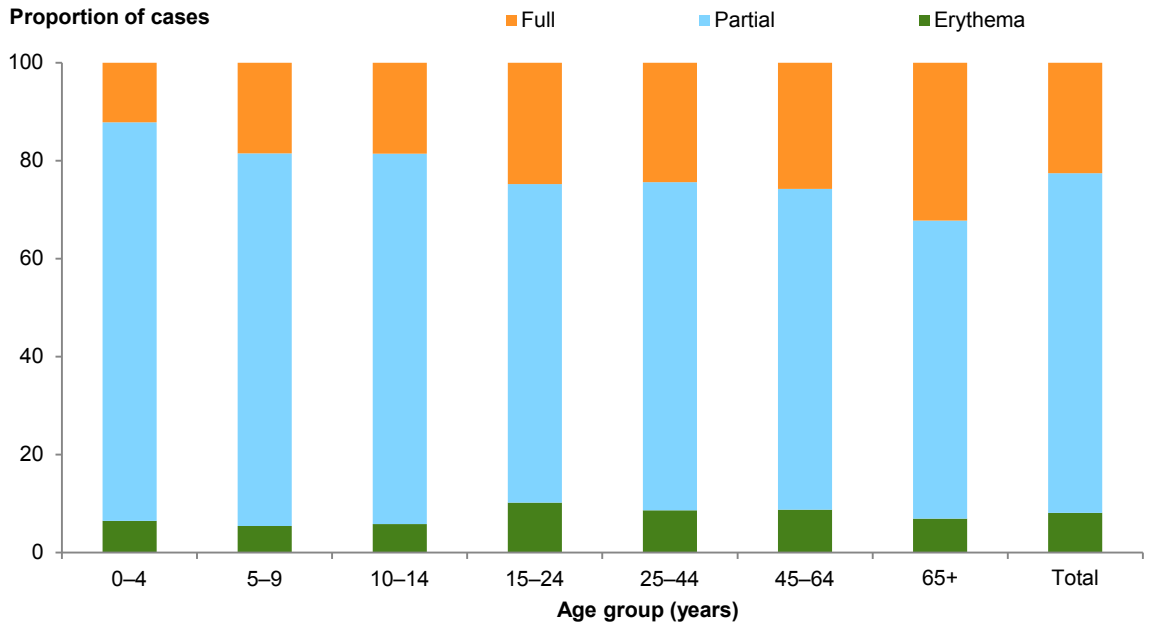
Table 2.4: Type of external cause for hospitalised burn cases, by age, Australia, 2013–14

	Exposure to smoke, fire and flames		Contact with heat and hot substances		Other external causes of burn injury	
Age group	Number	%	Number	%	Number	%
0–4	108	6.8	758	31.2	95	6.7
5–9	60	3.8	148	6.1	47	3.3
10–14	57	3.6	84	3.5	52	3.7
15–24	331	20.9	284	11.7	276	19.5
25–44	586	37.1	535	22.0	515	36.3
45–64	316	20.0	396	16.3	312	22.0
65+	122	7.7	228	9.4	120	8.5
Total	**1,580**	**100**	**2,433**	**100**	**1,417**	**100**

Thickness and size of burn injury

Of the 5,430 hospitalised burn cases, 88% (4,756 cases) had information on the thickness of the burn wound. Of the 674 cases without information on the thickness of the burn, 451 cases were burns of the eye or internal organs, for example the respiratory tract where thickness is not coded, and the remaining 223 cases were missing. Few burn cases had burns classified as erythema (8%, 386 cases), a not unexpected result as minor burns are generally treated in the emergency department, by a general practitioner, or with first aid at home. The majority of burn cases had a classification of partial thickness (70%, 3,297 cases). The remaining 1,073 cases (23%) had full thickness burns.

The majority of burns in all age categories were partial thickness burns (Figure 2.3). Adults had the largest proportions of full thickness burns with the highest proportion (32%) among those aged 65 and over.



Note: A total of 444 cases had unspecified thickness burns.

Figure 2.3: Proportion of hospitalised burn cases, by thickness of burn and age, Australia, 2013–14

Of the 1,073 cases with a full thickness burn injury, 89% involved burns of less than 10% TBSA (Table 2.5). Due to the small number of cases of children aged under 15 who were hospitalised in 2013–14 for full thickness burns of 10% or more TBSA, these cases have been presented in a combined 0–14 age group.

Table 2.5: Full thickness hospitalised burn cases, by surface area and age, Australia, 2013–14

	Total Body Surface Area							
	Less than 10%		10–19%		20% or greater		Total	
Age group	No.	%	No.	%	No.	%	No.	%
0–14	168	17.6	11	18.6	6	9.7	185	17.2
15–24	182	19.1	4	6.8	6	9.7	192	17.9
25–44	300	31.5	24	40.7	21	33.9	345	32.2
45–64	199	20.9	8	13.6	19	30.6	226	21.1
65+	103	10.8	12	20.3	10	16.1	125	11.6
Total	**952**	**100**	**59**	**100**	**62**	**100**	**1,073**	**100**

Body region

Approximately one-fifth (21%, 1,158 cases) of burns in 2013–14 were burns to the wrist and hand (Table 2.6). The hip and lower limb was the next most frequently burnt body region at 17% (928 cases), followed by 15% each for burn to the trunk (830 cases) and shoulder and upper limbs (811 cases). Percentages for body region injured were similar for both sexes (data not shown).

An analysis by age group shows differences in the region of the body burned (Table 2.6). In the youngest age group (0–4), a quarter (26%) of all burn cases involved the wrist and hand followed by burns to the trunk (21%). In contrast, children aged 5–9 had a larger proportion of burns to the trunk (27%) and hip and lower limb (19%). Children aged 10 and over and adults to 64 had very similar profiles of body region burned with wrist and hand, shoulder and upper limb, and hip and lower limbs combined accounting for the largest proportion of body regions burned in each of the age groups: 10–14 (57%), 15–24 (57%), 25–44 (55%), and 45–64 (55%).

The pattern of body region injured in older Australians (aged 65 and over) was different again, with the highest proportion of burns to the hip and lower limb (22%) followed by burns to the trunk (17%) and ankle and foot (17%).

Table 2.6: Hospitalised burn cases, by body region and age, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Body region injured	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Head and neck	96	10.0	24	9.4	28	14.5	115	12.9	208	12.7	107	10.4	41	8.7	619	11.4
Trunk	200	20.8	69	27.1	28	14.5	103	11.6	218	13.3	130	12.7	82	17.4	830	15.3
Shoulder and upper limb	152	15.8	31	12.2	33	17.1	145	16.3	265	16.2	142	13.9	43	9.1	811	14.9
Wrist and hand	251	26.1	30	11.8	33	17.1	193	21.7	370	22.6	210	20.5	71	15.1	1,158	21.3
Hip and lower limb	85	8.8	48	18.8	43	22.3	169	19.0	272	16.6	209	20.4	102	21.7	928	17.1
Ankle and foot	126	13.1	39	15.3	18	9.3	87	9.8	144	8.8	121	11.8	81	17.2	616	11.3
Eye and adnexa	23	2.4	3	1.2	6	3.1	39	4.4	86	5.3	47	4.6	17	3.6	221	4.1
Respiratory tract	1	0.1	1	0.4	0	0.0	10	1.1	19	1.2	16	1.6	10	2.1	57	1.0
Other internal organs	19	2.0	6	2.4	1	0.5	21	2.4	40	2.4	24	2.3	17	3.6	128	2.4
Multiple and unspecified body regions	8	0.8	4	1.6	3	1.6	9	1.0	14	0.9	18	1.8	6	1.3	62	1.1
Total	**961**	**100**	**255**	**100**	**193**	**100**	**891**	**100**	**1,636**	**100**	**1,024**	**100**	**470**	**100**	**5,430**	**100**

Remoteness of usual residence

Living in remote regions has been shown to be a risk factor for injury (AIHW: Pointer 2015). People are exposed to different environments depending on whether they live in metropolitan areas or country towns. Environmental risk factors for burn injury can be more prominent in rural and regional areas and include exposure to different occupational (for example, hot farm machinery, back burning) and recreational (for example, campfires) hazards (Hyland et al. 2015). Hyland and others (2015) found that children from rural areas sustain more severe burns and spend longer in hospital than children in metropolitan regions.

Close to 3,000 hospitalised burn cases were sustained by residents of *Major cities* (Table 2.7). These cases accounted for more than half of all hospitalised burn cases. Just over 4% of burn injuries were sustained by residents of *Very remote* regions. The age-standardised rate of hospitalised burn cases increased in line with increasing remoteness, from 18 cases per 100,000 *Major cities* residents to 102 cases per 100,000 *Very remote* residents.

Table 2.7: Hospitalised burn cases by remoteness of usual residence, Australia, 2013–14

	Remoteness of usual residence				
Indicators	**Major cities**	**Inner regional**	**Outer regional**	**Remote**	**Very remote**
Estimated hospitalised burn cases	2,939	1,105	802	247	226
Per cent of hospitalised burn cases	54.1	20.3	14.8	4.5	4.2
Age-standardised rate/100,000 population	17.7	27.6	41.0	75.7	101.7

Note: Information on remoteness of usual residence was not available in 111 cases.

Aboriginal and Torres Strait Islander people

A total of 480 hospitalised burn cases were recorded for Aboriginal and Torres Strait Islander people in 2013–14 (Table 2.8). These accounted for 9% of hospitalised burn cases overall. The age-standardised rate for burn injuries in Indigenous people was 58 cases per 100,000 population compared to 22 cases per 100,000 for other Australians. Rates were higher for males than for females in both population groups.

Table 2.8: Key indicators for hospitalised burn cases, Aboriginal and Torres Strait Islander people and other Australians, Australia, 2013–14

	Indigenous			Other Australians		
Indicators	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Estimated hospitalised burn cases	298	182	480	3,356	1,594	4,950
Per cent of hospitalised burn cases	5.5	3.4	8.8	61.8	29.4	91.2
Age-standardised rate/100,000 population	71.4	45.4	58.4	29.9	14.2	22.1

For Indigenous males, the largest proportion of burn cases was in the youngest age group (30%); this was also the case among Indigenous females (31%) (Table 2.9). This contrasts sharply with the proportion of burn cases by age group among other Australians where the largest proportions were in males and females aged 25–44, 32% and 27% respectively.

Table 2.9: Hospitalised burn cases, by age, sex, Aboriginal and Torres Strait Islander people and other Australians, Australia, 2013–14

	Indigenous		Other Australians	
	Number	%	Number	%
Males				
0–4	89	29.9	495	14.7
5–9	34	11.4	124	3.7
10–14	25	8.4	107	3.2
15–24	47	15.8	614	18.3
25–44	69	23.2	1,082	32.2
45–64	30	10.1	653	19.5
65+	4	1.3	281	8.4
Total males	*298*	*100*	*3,356*	*100*
Females				
0–4	57	31.3	320	20.1
5–9	13	7.1	84	5.3
10–14	13	7.1	48	3.0
15–24	25	13.7	205	12.9
25–44	54	29.7	431	27.0
45–64	18	9.9	323	20.3
65+	2	1.1	183	11.5
Total females	*182*	*100*	*1,594*	*100*
Total cases	**480**		**4,950**	

The rate of hospitalised burn injury was higher in each age category for Aboriginal and Torres Strait Islander people compared with other Australians (Figure 2.4). The highest rate of burn injury was in the youngest age range (0–4) for both Indigenous (174 cases per 100,000 population) and other Australians (56 cases per 100,000 population).

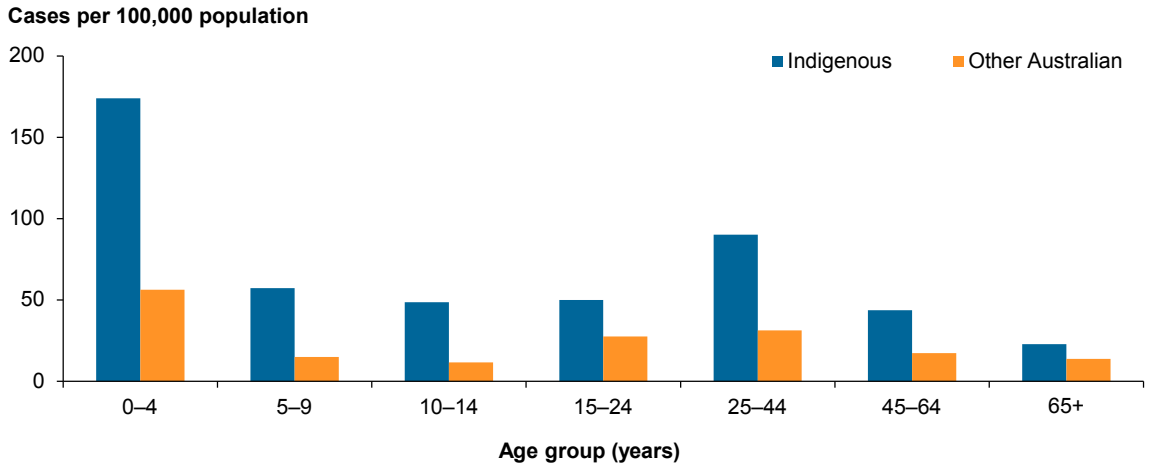


Figure 2.4: Age-specific rates of hospitalised burn cases, by sex, Aboriginal and Torres Strait Islander people and other Australians, Australia, 2013–14

Cases of burn injury by Indigenous status showed very little difference between Aboriginal and Torres Strait Islander people and other Australians with respect to the thickness of burn suffered (Table 2.10).The largest proportion of burn cases for both Aboriginal and Torres Strait Islander people (69%) and other Australians (69%) were partial thickness.

Table 2.10: Hospitalised burn cases, by thickness of burn and Indigenous status, Australia, 2013–14

	Indigenous		Other Australians	
Thickness of burn	**Number**	**%**	**Number**	**%**
Erythema	28	6.7	358	8.3
Partial	288	68.9	3,009	69.4
Full	102	24.4	971	22.4
Total	**418**	**100**	**4,338**	**100**

Note: Total excludes cases with missing thickness of burn information
(Aboriginal and Torres Strait Islander = 50 cases, Other Australians = 401 cases).

The body region burned among Indigenous people and other Australians is shown in Table 2.11. Proportions of body regions burned were similar to other Australians, other than for burns of the ankle and foot. A higher proportion of Indigenous people sustained burns to the ankle and foot (17%) compared to Other Australians (11%).

Table 2.11: Hospitalised burn cases, by body region burned and Indigenous status, Australia, 2013–14

	Indigenous		Other Australians	
Body region injured	**Number**	**%**	**Number**	**%**
Head and neck	45	9.4	574	11.6
Trunk	86	17.9	744	15.0
Shoulder and upper limb	62	12.9	749	15.1
Wrist and hand	100	20.8	1,058	21.4
Hip and lower limb	76	15.8	852	17.2
Ankle and foot	81	16.9	535	10.8
Eye and adnexa	13	2.7	208	4.2
Respiratory tract	3	0.6	54	1.1
Other internal organs	7	1.5	121	2.4
Multiple and unspecified body regions	7	1.5	55	1.1
Total	**480**	**100**	**4,950**	**100**

The distribution of causes of burn injury was similar for both Indigenous people and other Australians (Table 2.12). The largest proportion of burns for both population groups were due to *Contact with heat and hot substances*, 44% and 45% for Indigenous people and other Australians respectively.

Table 2.12: Hospitalised burn cases, by cause of burn and Indigenous status, Australia, 2013–14

	Indigenous		Other Australians	
Type of external cause	**Number**	**%**	**Number**	**%**
Exposure to smoke, fire and flames	156	32.5	1,424	28.8
Contact with heat and hot substances	212	44.2	2,221	44.9
Other external causes	112	23.3	1,305	26.4
Total	**480**	**100**	**4,950**	**100**

Place and activity

Just over a third (36%) of all burn cases had no information on place of occurrence (Table 2.13). For both males (39%) and females (52%), the majority of burns were sustained within the home environment. Among males, 133 burn injuries occurred in industrial and construction areas, compared to just 3 cases among females.

Table 2.13: Hospitalised burn cases, by place of occurrence and sex, Australia, 2013–14

	Males		Females		Persons	
Place of occurrence	**Number**	**%**	**Number**	**%**	**Number**	**%**
Home	1,422	38.9	927	52.2	2,349	43.3
Residential institution	19	0.5	20	1.1	39	0.7
School, other institution & public administration area	36	1.0	49	2.8	85	1.6
Sports and athletics area	21	0.6	1	0.1	22	0.4
Street and highway	145	4.0	45	2.5	190	3.5
Trade and service area	168	4.6	77	4.3	245	4.5
Industrial and construction area	133	3.6	3	0.2	136	2.5
Farm	75	2.1	14	0.8	89	1.6
Other specified place of occurrence	224	6.1	79	4.4	303	5.6
Unspecified place of occurrence	1,411	38.6	561	31.6	1,972	36.3
Total	**3,654**	**100**	**1,776**	**100**	**5,430**	**100**

A much higher proportion of cases occurred within the home for children aged under 10 compared with other age groups (Table 2.14).

Table 2.14: Hospitalised burn cases, by place of occurrence and age, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Place of occurrence	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Home	638	66.4	146	57.3	85	44.0	243	27.3	596	36.4	400	39.1	241	51.3	2,349	43.3
Residential institution	1	0.1	0	0.0	2	1.0	5	0.6	9	0.6	3	0.3	19	4.0	39	0.7
School, other institution and public administration area	9	0.9	0	0.0	6	3.1	4	0.4	17	1.0	31	3.0	18	3.8	85	1.6
Sports and athletics area	0	0.0	2	0.8	3	1.6	6	0.7	8	0.5	1	0.1	2	0.4	22	0.4
Street and highway	11	1.1	6	2.4	4	2.1	51	5.7	65	4.0	40	3.9	13	2.8	190	3.5
Trade and service area	16	1.7	2	0.8	3	1.6	86	9.7	85	5.2	48	4.7	5	1.1	245	4.5
Industrial and construction area	1	0.1	0	0.0	1	0.5	25	2.8	69	4.2	36	3.5	4	0.9	136	2.5
Farm	2	0.2	7	2.7	2	1.0	21	2.4	24	1.5	21	2.1	12	2.6	89	1.6
Other specified place of occurrence	48	5.0	14	5.5	11	5.7	63	7.1	98	6.0	57	5.6	12	2.6	303	5.6
Unspecified place of occurrence	235	24.5	78	30.6	76	39.4	387	43.4	665	40.6	387	37.8	144	30.6	1,972	36.3
Total	**961**	**100**	**255**	**100**	**193**	**100**	**891**	**100**	**1,636**	**100**	**1,024**	**100**	**470**	**100**	**5,430**	**100**

Two-thirds (66%, 638 cases) of burn injuries among very young children (aged 0–4) occurred in the home and the kitchen was the most common location (32%, 203 cases) (Figure 2.5). Among all burn cases the proportion of burns that occurred in the kitchen was 28% (647 cases).

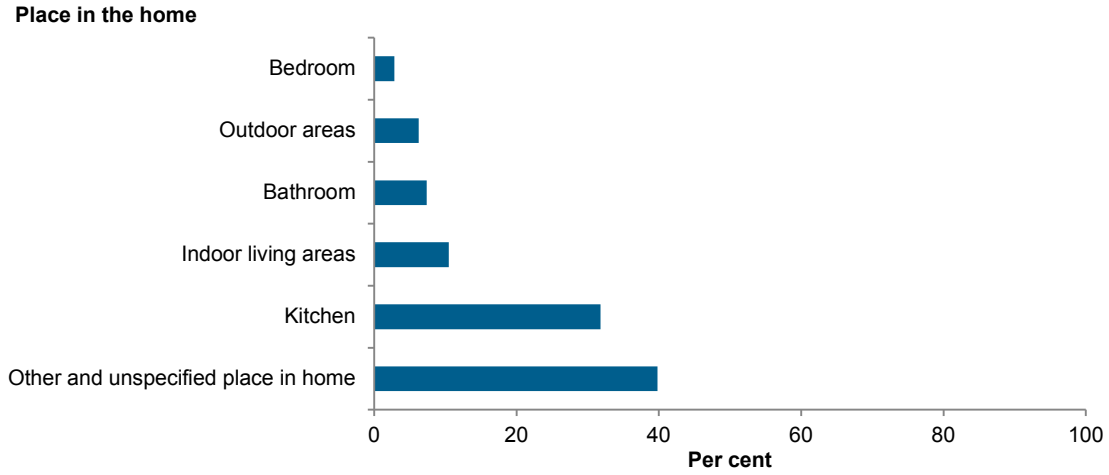


Figure 2.5: Proportion of hospitalised burn cases by place of occurrence in the home, children aged 0–4, Australia, 2013–14

Over half (56%, 3,054 cases) of all burn cases had missing or unspecified activity at the time of the injury. The highest proportion of missing or unspecified activity information (84%) was for young children aged 0–4. Among adults of working age (15–64 years), just under half (48%, 1,696 cases) of all burn cases had missing or unspecified activity information, while 16% (580 cases) cases were working for income when the burn injury occurred. Only a third (34%, 200 cases) of these cases had a specific industry recorded (Figure 2.6), with construction having the largest proportion of burn cases (27%, 53 cases).

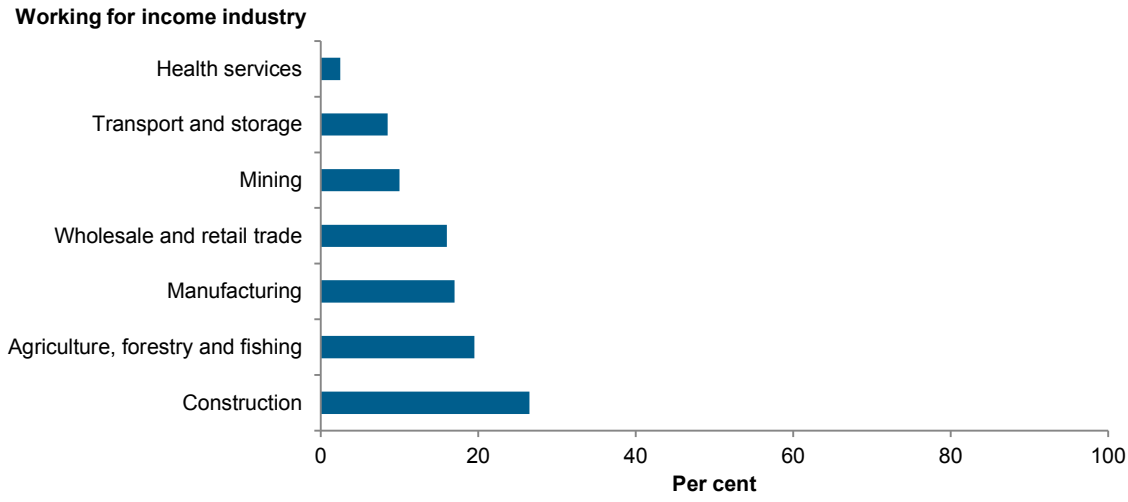


Figure 2.6: Proportion of hospitalised burn cases with activity working for income, by specified industry, ages 15–64, Australia, 2013–14

3 Severity of burn injury

This chapter presents an analysis of hospitalised burn cases in terms of length of stay and HTTL status, examining the effects of thickness and size of burn injury. In addition, for patients who were admitted to an intensive care unit (ICU), information on length of stay in ICU is also provided.

Burns patients often have multiple admissions, often on non-consecutive days, for treatment. Mean length of stay in this section is calculated by dividing the total number of patient days for hospitalised burn separations by the estimated number of burn cases. (See 'Appendix A: Data issues' for more information.)

Length of stay

Mean length of stay (MLOS) was 7 days for all hospitalised burn cases in 2013–14, totalling more than 35,000 patient days for 5,430 cases (Table 3.1). The MLOS was similar for males (7 days) and females (6 days).

Table 3.1: Length of stay for hospitalised burn cases: case counts, total patient days, and mean length of stay, Australia, 2013–14

	Males			Females			Persons		
Age group	Cases	Total patient days	MLOS	Cases	Total patient days	MLOS	Cases	Total patient days	MLOS
0–4	584	2,288	3.9	377	1,923	5.1	961	4,211	4.4
5–9	158	793	5.0	97	474	4.9	255	1,267	5.0
10–14	132	696	5.3	61	390	6.4	193	1,086	5.6
15–24	661	3,628	5.5	230	1,238	5.4	891	4,866	5.5
25–44	1,151	7,134	6.2	485	2,691	5.5	1,636	9,825	6.0
45–64	683	5,989	8.8	341	2,200	6.5	1,024	8,189	8.0
65+	285	3,829	13.4	185	2,081	11.2	470	5,910	12.6
Total	**3,654**	**24,357**	**6.7**	**1,776**	**10,997**	**6.2**	**5,430**	**35,354**	**6.5**

A rise in MLOS is evident in hospitalised burn cases among older Australians, for both males and females (Figure 3.1). The MLOS for older Australians aged 65 and over (13 days) was 3 times that of children in the youngest age group (4 days).

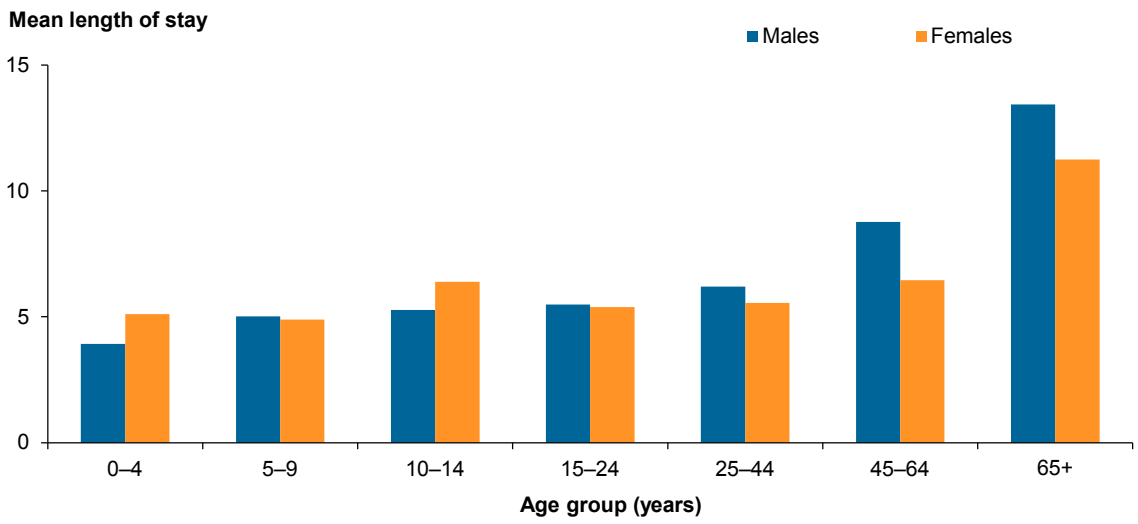


Figure 3.1: Mean length of stay for hospitalised burn cases, by sex, Australia, 2013–14

Intensive care

This section presents information on the numbers of hours that burn patients stayed in an ICU. If a patient's episode involves more than 1 period in an ICU, then the total number of hours in ICU are summed for reporting. Additional information about data on ICUs can be found in 'Appendix A: Data issues'.

In 2013–14, 246 (5%) of hospitalised burn cases spent time in an ICU; three-quarters (184 cases) were male (Table 3.2). Just under 34,000 hours were spent in ICU at an average length of stay of 141 hours per case.

Table 3.2: Number of hospitalised burn cases with a stay(s) in ICU, by sex, Australia, 2013–14

	Males	Females	Persons
Cases that involved a stay in ICU	184	62	246
Total hours in ICU	24,511	9,364	33,875
Average length of stay (hours)	138	151	141

The more severe the burn, in terms of thickness, the longer the amount of time hospitalised burn cases spent in ICU. Patients with full thickness burns spent an average of 230 hours in ICU compared to 79 and 69 hours on average respectively for partial thickness and erythema burns. Similarly, hospitalised burn cases likely to be HTTL (191 hours) spent 4 times as long on average in ICU compared to low threat to life cases (48 hours).

Deaths

In 2013–14, 48 people died in hospital as a result of a burn (29 males and 19 females). Half (50%, 27 cases) of these deaths occurred among older Australians (aged 65 and over). There were no deaths among burns victims less than 15 years of age. Of those who died in hospital, 27 cases had full thickness burns to more than 50% TBSA. Fifteen deaths occurred as a result

of *Exposure to smoke, fire and flames*, 6 due to *Contact with heat and hot substances*, and 6 were due to *Intentional self-harm by smoke, fire and flames*.

High threat to life

In 2013–14, 16% of hospitalised burn cases were relatively high threat to life cases (Table 3.1). HTTL cases were most common in the 25–44 and 45–64 age groups, accounting for 34% and 20% of cases respectively (Table 3.3). Just under 10% of HTTL cases were in very young children aged 0–4.

Table 3.3: Threat to life for hospitalised burn cases by age group, Australia, 2013–14

	Threat to life					
	High threat to life		Low threat to life		Total	
Age group	Number	%	Number	%	Number	%
0–4	76	8.9	885	19.3	961	17.7
5–9	36	4.2	219	4.8	255	4.7
10–14	22	2.6	171	3.7	193	3.6
15–24	146	17.2	745	16.3	891	16.4
25–44	287	33.8	1,349	29.5	1,636	30.1
45–64	174	20.5	850	18.6	1,024	18.9
65+	109	12.8	361	7.9	470	8.7
Total	**850**	**100**	**4,580**	**100**	**5,430**	**100**

Length of stay

As expected, the MLOS of stay was much higher for HTTL cases at 17 days compared with 7 days for all hospitalised burn cases, with almost 15,000 patient days for just 850 cases (Table 3.4). There was no difference between males and females with respect to MLOS.

Table 3.4: Mean length of stay (days) for hospitalised burn cases by threat to life and sex, Australia, 2013–14

	Males			Females			Persons		
Threat to life	Cases	Total patient days	MLOS	Cases	Total patient days	MLOS	Cases	Total patient days	MLOS
High threat to life	597	10,419	17.5	253	4,314	17.1	850	14,733	17.3
Low threat to life	3,057	13,938	4.6	1,523	6,683	4.4	4,580	20,621	4.5
Total	**3,654**	**24,357**	**6.7**	**1,776**	**10,997**	**6.2**	**5,430**	**35,354**	**6.5**

Children aged 0–4 with HTTL burn injuries were hospitalised for an average of 8 days, twice as long as all burn cases in that age group (4 days). In 3 other age groups, 5–9, 15–24 and 25–44, the MLOS was 3 times that of all burn cases in their respective age groups (data not shown).

Overall, the highest MLOS for HTTL burn cases for males and females was among older Australians aged 65 and over (23 days each) (Figure 3.2). MLOS for HTTL cases among girls aged 5–9 was particularly high with an average of 17 days.

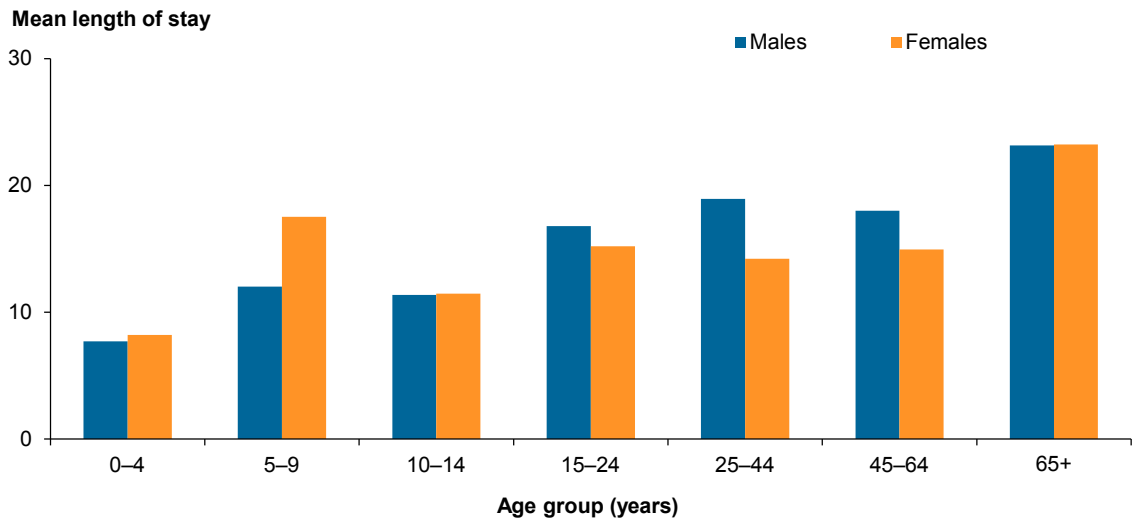


Figure 3.2: Mean length of stay for HTTL hospitalised burn cases, by sex and age, Australia, 2013–14

Body region

The hip and lower limb (21%) had the highest proportion of HTTL hospitalised burn cases by body region, followed closely by the shoulder and upper limb (20%) (Table 3.5). In comparison, burn cases involving the wrist and hand (10%), ankle and foot (5%), and eye and adnexa (3%) had low proportions of HTTL cases. Nearly all hospitalised burn cases involving the respiratory tract were HTTL (54 of 57 cases) (Table 3.5).

Table 3.5: Threat to life for hospitalised burn cases by body region injured, Australia, 2013–14

	Threat to life					
	High threat to life		Low threat to life		Total	
Body region injured	Number	%	Number	%	Number	%
Head and neck	92	10.8	527	11.5	619	11.4
Trunk	154	18.1	676	14.8	830	15.3
Shoulder and upper limb	166	19.5	645	14.1	811	14.9
Wrist and hand	83	9.8	1,075	23.5	1,158	21.3
Hip and lower limb	176	20.7	752	16.4	928	17.1
Ankle and foot	44	5.2	572	12.5	616	11.3
Eye and adnexa	26	3.1	195	4.3	221	4.1
Respiratory tract	54	6.4	3	0.1	57	1.0
Other internal organs	35	4.1	93	2.0	128	2.4
Multiple and unspecified body regions	20	2.4	42	0.9	62	1.1
Total	**850**	**100**	**4,580**	**100**	**5,430**	**100**

Inhalation burn injuries are described as complex and difficult to diagnose (ANZBA 2014). Burns to the respiratory tract can result in swelling, possible airway obstruction and have a high rate of mortality. In a 5-year period BRANZ identified a small number of documented inhalation burn cases (113 adult cases), 46% of whom died (ANZBA 2014). In a study of burn patients in Western Australia, Bartley and others (2008) found this type of burn injury had a 6.3% mortality rate compared to 1% for all burn injuries.

Thickness and size of burn injury

More than 4 out of 5 HTTL burn cases (84%) in 2013–14 had sustained a full thickness burn injury (Table 3.6). Only 1% of HTTL cases had a superficial burn.

Table 3.6: Threat to life for hospitalised burn cases by thickness, Australia, 2013–14

	Threat to life					
	High threat to life		Low threat to life		Total	
Thickness of burn	Number	%	Number	%	Number	%
Erythema	8	1.0	378	9.5	386	8.1
Partial	120	15.3	3,177	80.0	3,297	69.3
Full	655	83.7	418	10.5	1,073	22.6
Total	**783**	**100**	**3,973**	**100**	**4,756**	**100**

Note: Total excludes cases with missing thickness information, High threat to life = 45 cases, Low threat to life = 406 cases.

The relationship between the size of the burn injury and the HTTL status of the patient is shown in Figure 3.3. As TBSA increased in size the proportion of HTTL cases also increased. All burn injuries with TBSA values 50% and over were HTTL and have been excluded from Figure 3.3.

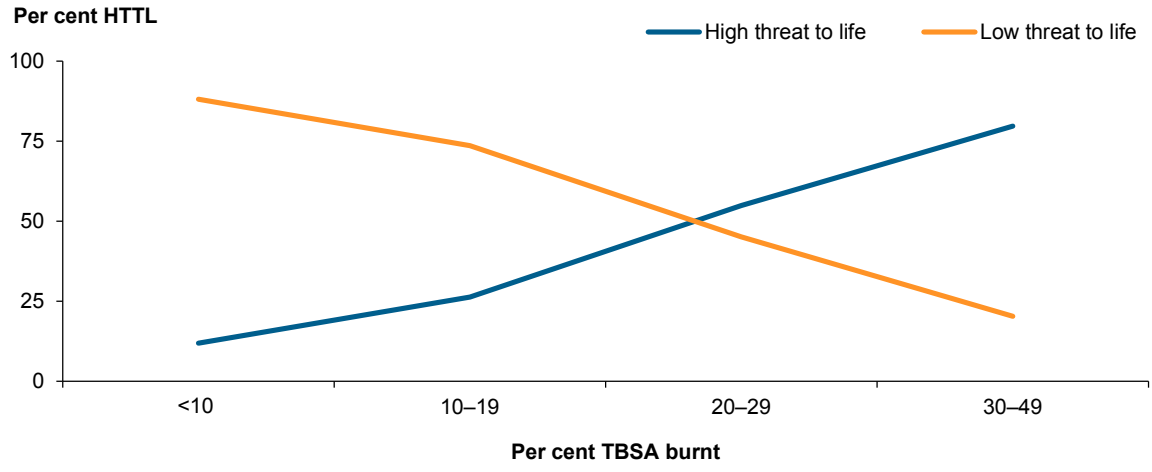


Figure 3.3: Proportion of HTTL hospitalised burn cases by proportion of TBSA burn, Australia, 2013–14

4 Causes of burn injuries

This chapter describes the external causes of burn injuries. The 2 main external cause categories are described first followed by causes of burns that fall outside these categories.

Exposure to smoke, fire and flames

There were 1,580 hospitalised burn cases due to *Exposure to smoke, fire and flames,* accounting for about a third of all hospitalised burn cases in Australia during 2013–14 (Table 4.1). *Exposure to smoke, fire and flames* was more common among males than females with rates of burn injury about 3 times that of females.

Table 4.1: Key indicators for *Exposure to smoke, fire and flames* hospitalised burn cases, Australia, 2013–14

Indicator	Males	Females	Persons
Estimated *Exposure to smoke, fire and flames* injury cases	1,227	353	1,580
Per cent of all hospitalisations for burn injury	33.6	19.9	29.1
Age-standardised rate/100,000 population	10.6	3.1	6.9

Age and sex

The largest proportion of burn cases due to Exposure to smoke, fire and flames occurred among those aged 25–44 (37%) (Table 4.2). Males and females have broadly similar patterns of burn injuries due to *Exposure to smoke, fire and flames* by age group with the largest proportion of cases occurring in the 25–44 age group (Table 4.2). A smaller proportion of cases occurred in younger age groups for both males and females. The biggest point of difference in the proportion of burn cases between males and females occurred among those aged 15–24 with a much higher proportion of males (23%) hospitalised compared with females (14%).

Table 4.2: Hospitalised burn cases due to *Exposure to smoke, fire and flames*, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	Number	%	Number	%	Number	%
0–4	69	5.6	39	11.0	108	6.8
5–9	40	3.3	20	5.7	60	3.8
10–14	42	3.4	15	4.2	57	3.6
15–24	282	23.0	49	13.9	331	20.9
25–44	462	37.7	124	35.1	586	37.1
45–64	248	20.2	68	19.3	316	20.0
65+	84	6.8	38	10.8	122	7.7
Total	**1,227**	**100**	**353**	**100**	**1,580**	**100**

An analysis of rate of burn injury due to *Exposure to smoke, fire and flames* shows rates of injury for males higher than females at all ages (Figure 4.1). The difference in rate of injury between males and females was most pronounced in those aged 15–24 where the rate ratio of males (18 cases per 100,000 population) to females (3 cases per 100,000 population) was 6:1.

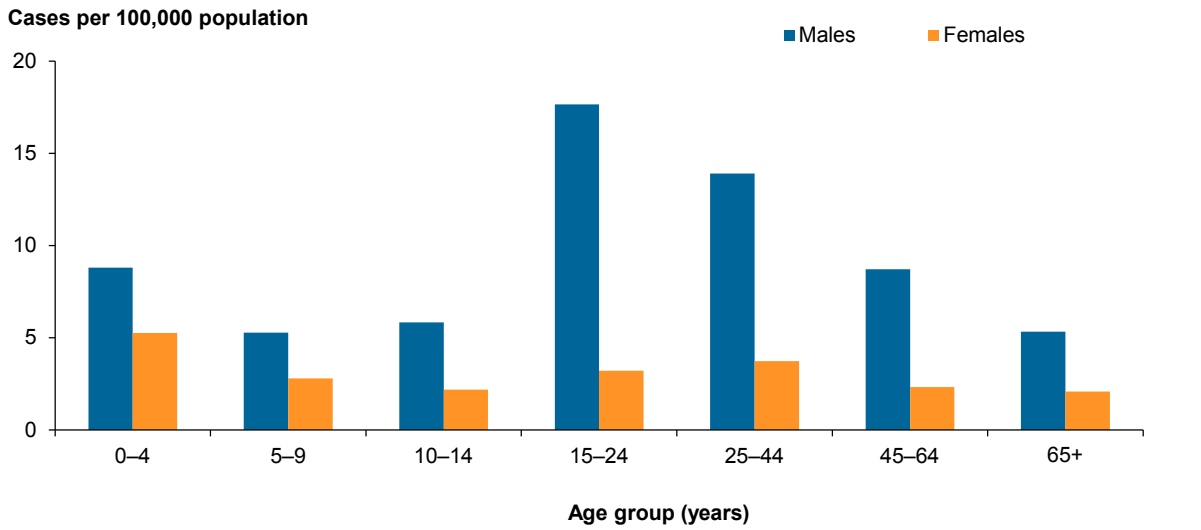


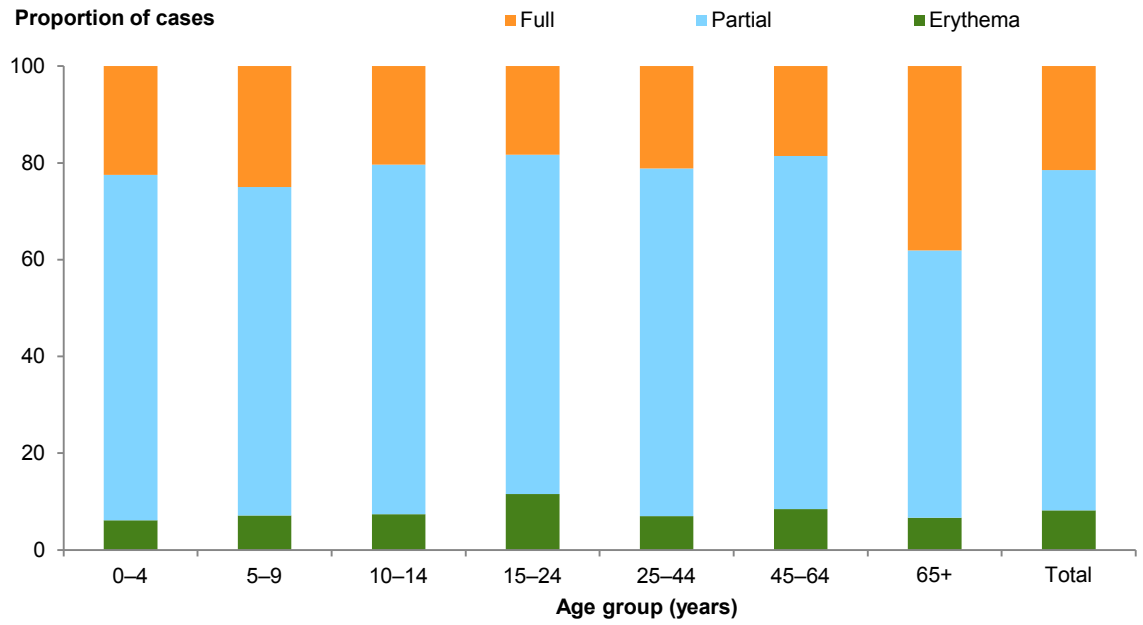
Figure 4.1: Age-specific rates of hospitalised burn cases due to *Exposure to smoke, fire and flames*, by sex, Australia, 2013–14

Of the 1,580 burn cases due to *Exposure to smoke, fire and flames*, the majority (1,551) had information about the body region burned. Almost a quarter of those cases (23%; 363 cases) resulted in burns to the wrist and hand regions of the body. An analysis by age group shows differences in the region of the body burned (Table 4.3). In the two youngest age groups, the proportion of cases with burns to the wrist and hand and ankle and foot were large compared to burns to other body regions. The highest proportion of ankle and foot burns were among children aged 0–4 (39%) compared with all other age groups. While the proportion of burns to the wrist and hand remained large in other age groups, burns to the shoulder and upper limb as well as head and neck were also common.

Table 4.3: Hospitalised burn cases due to *Exposure to smoke, fire and flames,* by body region and age group, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Body region injured	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Head and neck	5	4.8	8	13.6	14	25.0	63	19.4	101	17.6	55	17.6	16	13.3	262	16.9
Trunk	10	9.5	7	11.9	4	7.1	28	8.6	67	11.7	28	8.9	9	7.5	153	9.9
Shoulder and upper limb	5	4.8	7	11.9	12	21.4	51	15.7	101	17.6	49	15.7	16	13.3	241	15.5
Wrist and hand	38	36.2	13	22.0	8	14.3	75	23.1	139	24.3	65	20.8	25	20.8	363	23.4
Hip and lower limb	5	4.8	9	15.3	11	19.6	65	20.0	90	15.7	71	22.7	27	22.5	278	17.9
Ankle and foot	41	39.0	13	22.0	5	8.9	29	8.9	48	8.4	22	7.0	17	14.2	175	11.3
Eye and adnexa	1	1.0	1	1.7	0	0.0	6	1.8	12	2.1	10	3.2	7	5.8	37	2.4
Respiratory tract	0	0.0	1	1.7	1	1.8	3	0.9	8	1.4	4	1.3	2	1.7	19	1.2
Other internal organs	0	0.0	0	0.0	1	1.8	5	1.5	6	1.0	8	2.6	1	0.8	21	1.4
Multiple and unspecified body regions	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	1	0.3	0	0.0	2	0.1
Total	**105**	**100**	**59**	**100**	**56**	**100**	**325**	**100**	**573**	**100**	**313**	**100**	**120**	**100**	**1,551**	**100**

There were similar proportions of full, partial and erythema level burns in each age group as a result of burns due to *Exposure to smoke, fire, and flames* (Figure 4.2). Partial thickness burns were the most common in each age group. The proportion of burn cases with full thickness burns was higher among older Australians aged 65 and over (38%) compared to all burn cases due to *Exposure to smoke, fire and flames* (21%).



Note: A total of 99 cases had unspecified thickness burns.

Figure 4.2: Proportion of hospitalised burn cases due to *Exposure to smoke, fire and flames*, by thickness of burn and age, Australia, 2013–14

External causes

About half of all *Exposure to smoke, fire and flames* burn cases were caused by *ignition of highly flammable material* (26%) and *controlled fire, not in building or structure* (25%) (Table 4.4). *Ignition of highly flammable material* includes ignition of gasoline, kerosene and petrol while *Controlled fire, not in building or structure* includes campfires. The proportion of males (28%) burned as a result of *ignition of highly flammable material* was almost twice that of females (16%).

Table 4.4: Hospitalised burn cases due to *Exposure to smoke, fire and flames*, type of exposure and sex, Australia, 2013–14

	Males		Females		Persons	
Type of exposure	**Number**	**%**	**Number**	**%**	**Number**	**%**
Uncontrolled fire in building or structure	51	4.2	16	4.5	67	4.2
Uncontrolled fire, not in building or structure	50	4.1	15	4.2	65	4.1
Controlled fire in building or structure	94	7.7	46	13.0	140	8.9
Controlled fire, not in building or structure	306	24.9	91	25.8	397	25.1
Ignition of highly flammable material	349	28.4	55	15.6	404	25.6
Ignition or melting of nightwear	2	0.2	2	0.6	4	0.3
Ignition or melting of other clothing and apparel	40	3.3	11	3.1	51	3.2
Other specified smoke, fire and flames	208	17	71	20.1	279	17.7
Unspecified smoke, fire and flames	127	10.4	46	13	173	10.9
Total	**1,227**	**100**	**353**	**100**	**1,580**	**100**

In the two youngest age groups, *controlled fire, not in building or structure* was the cause of the largest proportion of burn cases, 62% and 33% respectively (Table 4.5). In contrast, among all other age groups, other than the oldest, the main cause of *Exposure to smoke, fire and flames* burn injuries was the *Ignition of highly flammable material*. For older Australians (aged 65 and over) the largest proportion of *Exposure to smoke, fire and flames* burn cases were due to *Other specified smoke, fire and flames* causes (21%) followed by *ignition of highly flammable material* (20%).

Table 4.5: Hospitalised burn cases due to *Exposure to smoke, fire and flames*, type of exposure and age group, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Type of exposure	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Uncontrolled fire in building or structure	1	0.9	4	6.7	2	3.5	6	1.8	25	4.3	20	6.3	9	7.4	67	4.2
Uncontrolled fire, not in building or structure	0	0.0	0	0.0	0	0.0	9	2.7	25	4.3	22	7.0	9	7.4	65	4.1
Controlled fire in building or structure	4	3.7	3	5.0	3	5.3	22	6.6	58	9.9	33	10.4	17	13.9	140	8.9
Controlled fire, not in building or structure	67	62.0	20	33.3	15	26.3	94	28.4	141	24.1	50	15.8	10	8.2	397	25.1
Ignition of highly flammable material	4	3.7	8	13.3	19	33.3	101	30.5	162	27.6	86	27.2	24	19.7	404	25.6
Ignition or melting of nightwear	1	0.9	0	0.0	0	0.0	2	0.6	0	0.0	1	0.3	0	0.0	4	0.3
Ignition or melting of other clothing and apparel	1	0.9	6	10.0	4	7.0	2	0.6	14	2.4	14	4.4	10	8.2	51	3.2
Other specified smoke, fire and flames	19	17.6	8	13.3	7	12.3	57	17.2	107	18.3	55	17.4	26	21.3	279	17.7
Unspecified smoke, fire and flames	11	10.2	11	18.3	7	12.3	38	11.5	54	9.2	35	11.1	17	13.9	173	10.9
Total	**108**	**100**	**60**	**100**	**57**	**100**	**331**	**100**	**586**	**100**	**316**	**100**	**122**	**100**	**1,580**	**100**

Type and severity

The most severe *Exposure to smoke, fire and flames* burns, in terms of thickness, occurred as a result of *controlled fire, not in building or structure* (26%) followed by i*gnition of highly flammable material* (19%) (Table 4.6). Burn cases due to *Ignition or melting of other clothing and apparel* resulted in either partial or full thickness burns.

Table 4.6: Hospitalised burn cases due to *Exposure to smoke, fire and flames*, by thickness of burn and age, Australia, 2013–14

	Thickness of burn							
	Erythema		Partial		Full		Total	
Type of exposure	No.	%	No.	%	No.	%	No.	%
Uncontrolled fire in building or structure	3	2.5	37	3.6	21	6.7	61	4.2
Uncontrolled fire, not in building or structure	3	2.5	53	5.1	6	1.9	62	4.2
Controlled fire in building or structure	29	24.2	77	7.5	21	6.7	127	8.7
Controlled fire, not in building or structure	23	19.2	274	26.6	81	25.8	378	25.8
Ignition of highly flammable material	25	20.8	304	29.5	61	19.4	390	26.6
Ignition or melting of nightwear	0	0.0	2	0.2	2	0.6	4	0.3
Ignition or melting of other clothing and apparel	0	0.0	25	2.4	23	7.3	48	3.3
Other specified smoke, fire and flames	29	24.2	161	15.6	62	19.7	252	17.2
Unspecified smoke, fire and flames	8	6.7	97	9.4	37	11.8	142	9.7
Total	**120**	**100**	**1,030**	**100**	**314**	**100**	**1,464**	**100**

Note: A total of 99 cases had unspecified thickness burns and are excluded from the total.

Overall, 18% of burns due to *Exposure to smoke, fire and flames* were HTTL. The largest proportion (26%) of HTTL cases were caused by *ignition of highly flammable material*, followed by *controlled fire, not in building or structur*e (21%) (Figure 4.3).

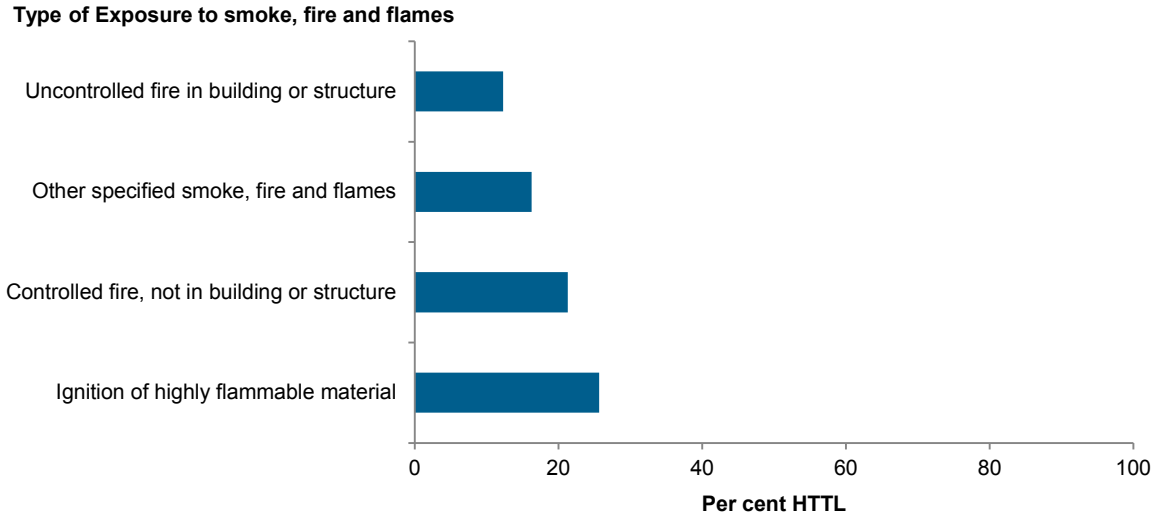


Figure 4.3: Proportion of HTTL hospitalised burn cases due to selected *Exposure to smoke, fire and flames*, Australia, 2013–14

Contact with heat and hot substances

There were 2,433 hospitalised burn cases due to *Contact with heat and hot substances* accounting for 45% of all hospitalised burn cases in Australia during 2013–14 (Table 4.7). The proportion of females (58%) with burns due to *Contact with heat and hot substances* was greater than that of males (38%), however the rate of injury was higher among males.

Table 4.7: Key indicators for *Contact with heat and hot substances* hospitalised burn cases, Australia, 2013–14

Indicator	Males	Females	Persons
Estimated *Contact with heat and hot substances* injury cases	1,396	1,037	2,433
Per cent of all hospitalisations for burn injury	38.2	58.4	44.8
Age-standardised rate/100,000 population	12.0	9.0	10.5

Age and sex

Overall, the largest proportion of burns due to *Contact with heat and hot substances* occurred in children aged 0–4 (31%) (Table 4.8). Males and females have a similar pattern of burn injuries due to *Contact with heat and hot substances* by age group.

Table 4.8: Hospitalised burn cases due to *Contact with heat and hot substances*, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	**Number**	**%**	**Number**	**%**	**Number**	**%**
0–4	462	33.1	296	28.5	758	31.2
5–9	87	6.2	61	5.9	148	6.1
10–14	50	3.6	34	3.3	84	3.5
15–24	173	12.4	111	10.7	284	11.7
25–44	294	21.1	241	23.2	535	22.0
45–64	215	15.4	181	17.5	396	16.3
65+	115	8.2	113	10.9	228	9.4
Total	**1,396**	**100**	**1,037**	**100**	**2,433**	**100**

An analysis of rates of burn injury due to *Contact with heat and hot substances* shows rates of injury for males and females similar at all ages other than 0–4 (Figure 4.4). For children aged 0–4 rates of injury were higher among boys (59 cases per 100,000) compared to girls (40 cases per 100,000). In the next age group, 5–9, the difference in rate of injury between boys (12 cases per 100,000) and girls (9 cases per 100,000) was negligible in comparison.

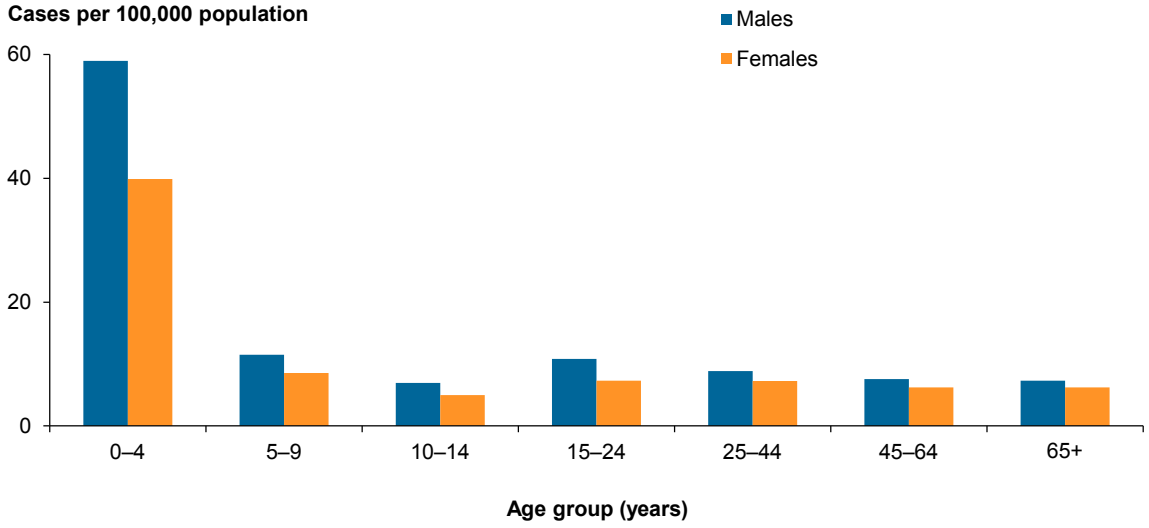


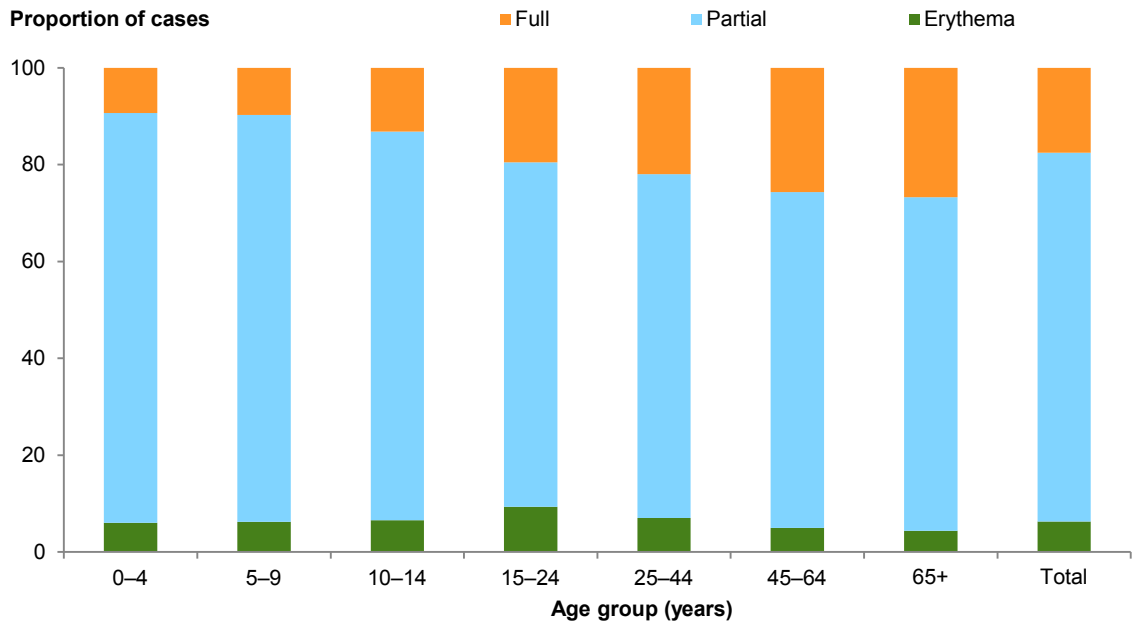
Figure 4.4: Age-specific rates of hospitalised burn cases due to *Contact with heat and hot substances*, by sex, Australia, 2013–14

Of the 2,400 cases due to *Contact with heat and hot substances* burns with information on body region, the most common regions burned were the wrist and hand (22%, 518 cases) and trunk (21%, 509 cases). An analysis by age group showed that among children in the 3 youngest age groups, large proportions of cases sustained injuries to the upper body regions including the head and neck, trunk, and shoulder and upper limbs (Table 4.9). For children aged 0–4 (54%), 5–9 (59%) and 10–14 (45%), an average of half of all cases had upper body burns. In contrast, cases of burns of the wrist and hand due to *Contact with heat and hot substances* were more common in older age groups other than 65+. In older Australians (aged 65 and over) hip and lower limb burns were more common (26%).

Table 4.9: Hospitalised burn cases due to *Contact with heat and hot substances*, by body region and age group, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Body region injured	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Head and neck	86	11.5	13	8.8	5	6.0	23	8.2	50	9.6	19	4.9	10	4.4	206	8.6
Trunk	176	23.5	56	38.1	19	22.6	51	18.1	86	16.5	72	18.5	49	21.7	509	21.2
Shoulder and upper limb	141	18.8	17	11.6	14	16.7	44	15.6	79	15.2	52	13.3	15	6.6	362	15.1
Wrist and hand	189	25.2	8	5.4	15	17.9	61	21.6	123	23.6	89	22.8	33	14.6	518	21.6
Hip and lower limb	70	9.3	27	18.4	21	25.0	60	21.3	99	19.0	83	21.3	58	25.7	418	17.4
Ankle and foot	76	10.1	21	14.3	8	9.5	35	12.4	70	13.4	66	16.9	52	23.0	328	13.7
Eye and adnexa	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.3	1	0.4	2	0.1
Respiratory tract	6	0.8	2	1.4	0	0.0	6	2.1	10	1.9	5	1.3	3	1.3	32	1.3
Other internal organs	5	0.7	3	2.0	2	2.4	2	0.7	4	0.8	3	0.8	5	2.2	24	1.0
Multiple and unspecified body regions	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Total	**750**	**100**	**147**	**100**	**84**	**100**	**282**	**100**	**521**	**100**	**390**	**100**	**226**	**100**	**2,400**	**100**

Partial thickness burns were most common for *Contact with heat and hot substances* in each age group (Figure 4.5).The proportion of full thickness burns was greater in each successive age group with the largest proportion in those aged 65 and over (27%).



Note: A total of 142 cases had unspecified thickness burns.

Figure 4.5: Proportion of hospitalised burn cases due to *Contact with heat and hot substances*, by thickness of burn and age, Australia, 2013–14

External causes

Just over a third of all burn cases due to *Contact with heat and hot substances* were caused by *Contact with hot drinks, food, fats and cooking oils* (Table 4.10). *Contact with other hot fluids* was the cause of a further 23% of these burn cases. Among females the largest proportion of burns were due to *Contact with hot drinks, food, fats and cooking oils* (42%); this was also a leading cause among males although the proportion of cases was lower (32%). Burns due to *Contact with hot tap water* accounted for about 10% of burns for both males and females.

Table 4.10: Hospitalised burn cases due to *Contact with heat and hot substances*, type of contact and sex, Australia, 2013–14

	Males		Females		Persons	
Type of contact	**Number**	**%**	**Number**	**%**	**Number**	**%**
Hot drinks, food, fats and cooking oils	448	32.1	434	41.9	882	36.3
Hot tap-water	130	9.3	98	9.5	228	9.4
Other hot fluids	294	21.1	268	25.8	562	23.1
Steam and hot vapours	54	3.9	19	1.8	73	3.0
Hot air and gases	7	0.5	1	0.1	8	0.3
Hot household appliances	118	8.5	77	7.4	195	8.0
Hot heating appliances, radiators and pipes	103	7.4	54	5.2	157	6.5
Hot engines, machinery and tools	98	7.0	16	1.5	114	4.7
Other hot metals	24	1.7	5	0.5	29	1.2
Other and unspecified heat and hot substances	120	8.6	65	6.3	185	7.6
Total	**1,396**	**100**	**1,037**	**100**	**2,433**	**100**

In each age group, the largest proportion of burn cases occurred due to *Contact with hot drinks, food, fats and cooking* (Table 4.11). For children aged 0–4, 40% of burn injuries due to *Contact with heat and hot substances* occurred as a result of *Contact with hot drinks, food, fats and cooking oils*. Burns as a result of *Contact with hot heating appliances, radiators and pip*es accounted for a larger proportion of hospitalisations among older Australians (aged 65 and over) compared to all other age groups.

Table 4.11: Hospitalised burn cases due to *Contact with heat and hot substances*, type of contact and age group, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Type of contact	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Hot drinks, food, fats and cooking oils	304	40.1	55	37.2	31	36.9	120	42.3	181	33.8	118	29.8	73	32	882	36.3
Hot tap-water	86	11.3	12	8.1	9	10.7	12	4.2	43	8.0	37	9.3	29	12.7	228	9.4
Other hot fluids	171	22.6	46	31.1	21	25	59	20.8	130	24.3	92	23.2	43	18.9	562	23.1
Steam and hot vapours	8	1.1	1	0.7	2	2.4	13	4.6	30	5.6	15	3.8	4	1.8	73	3.0
Hot air and gases	0	0.0	0	0.0	0	0.0	0	0.0	4	0.7	3	0.8	1	0.4	8	0.3
Hot household appliances	82	10.8	10	6.8	0	0.0	16	5.6	40	7.5	32	8.1	15	6.6	195	8.0
Hot heating appliances, radiators and pipes	44	5.8	3	2.0	2	2.4	14	4.9	35	6.5	29	7.3	30	13.2	157	6.5
Hot engines, machinery and tools	18	2.4	10	6.8	11	13.1	20	7.0	27	5.0	24	6.1	4	1.8	114	4.7
Other hot metals	8	1.1	1	0.7	1	1.2	8	2.8	5	0.9	4	1.0	2	0.9	29	1.2
Other and unspecified heat and hot substances	37	4.9	10	6.8	7	8.3	22	7.7	40	7.5	42	10.6	27	11.8	185	7.6
Total	**758**	**100**	**148**	**100**	**84**	**100**	**284**	**100**	**535**	**100**	**396**	**100**	**228**	**100**	**2,433**	**100**

Hot drinks (44%) accounted for the largest proportion of burns due to *Contact with hot drinks, food, fats and cooking oils*, followed by hot fat and cooking oils (36%). An analysis by age group showed that the majority of burns due to *Contact with hot drinks, food, fats and cooking oils* in children aged 0–4 were due to hot drinks (77%) (Figure 4.6). Burns due to hot fat and cooking oils were more common among those aged 25–44 (64%).

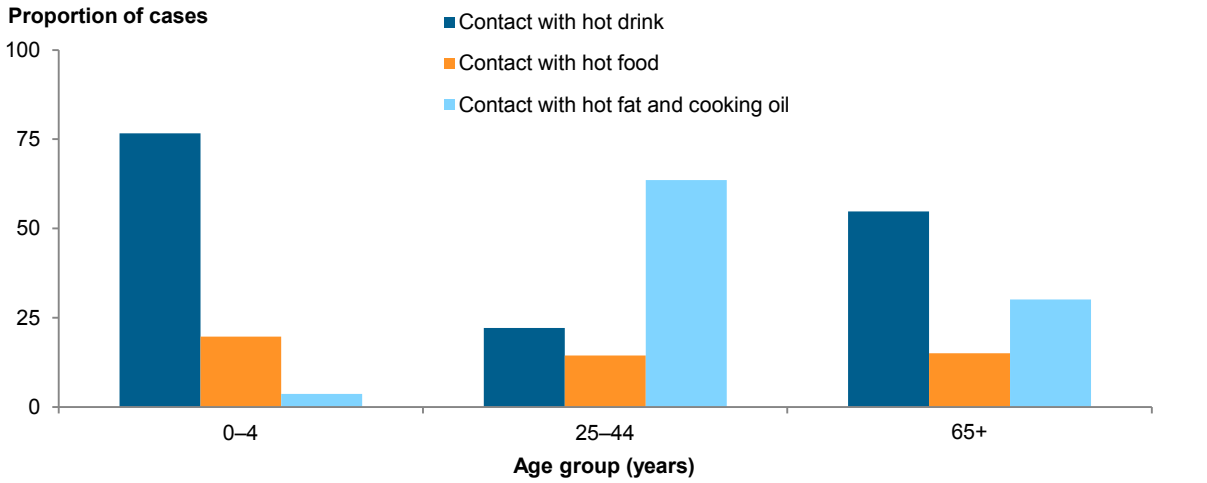


Figure 4.6: Proportion of hospitalised burn cases due to selected types of *Contact with heat and hot substances*, by age, Australia, 2013–14

Type and severity

Full thickness burn cases were commonly caused as a result of *Contact with hot drinks, food, fats and cooking oils* (28%) followed by other hot fluids (14%) (Table 4.12). Just over half (52%, 48 cases) of all *Contact with heat and hot substances* burns due to hot engines, machinery and tools were full thickness burns.

Table 4.12: Hospitalised burn cases due to *Contact with heat and hot substances*, by type of contact and thickness of burn, Australia, 2013–14

	Thickness of burn							
	Erythema		Partial		Full		Total	
Type of contact	No.	%	No.	%	No.	%	No.	%
Hot drinks, food, fats and cooking oils	53	37.1	664	38.6	109	27.5	826	36.6
Hot tap-water	13	9.1	177	10.3	28	7.1	218	9.7
Other hot fluids	35	24.5	439	25.5	56	14.1	530	23.5
Steam and hot vapours	6	4.2	50	2.9	10	2.5	66	2.9
Hot air and gases	1	0.7	5	0.3	1	0.3	7	0.3
Hot household appliances	11	7.7	127	7.4	42	10.6	180	8.0
Hot heating appliances, radiators and pipes	12	8.4	88	5.1	45	11.4	145	6.4
Hot engines, machinery and tools	4	2.8	41	2.4	48	12.1	93	4.1
Other hot metals	1	0.7	17	1.0	8	2.0	26	1.2
Other and unspecified heat and hot substances	7	4.9	111	6.5	49	12.4	167	7.4
Total	**143**	**100**	**1,719**	**100**	**396**	**100**	**2,258**	**100**

Overall, 11% of burns due to *Contact with heat and hot substances* were HTTL, fewer than the proportion (18%) due to *Exposure to smoke, fire and flames*. The proportion of HTTL cases by specific types of *Contact with heat and hot substances* is presented in Figure 4.7. A third (85 cases) of the HTTL cases were due to *hot drinks, food, fats and cooking oils* and 18% (47 cases) were due to *other hot fluids*.

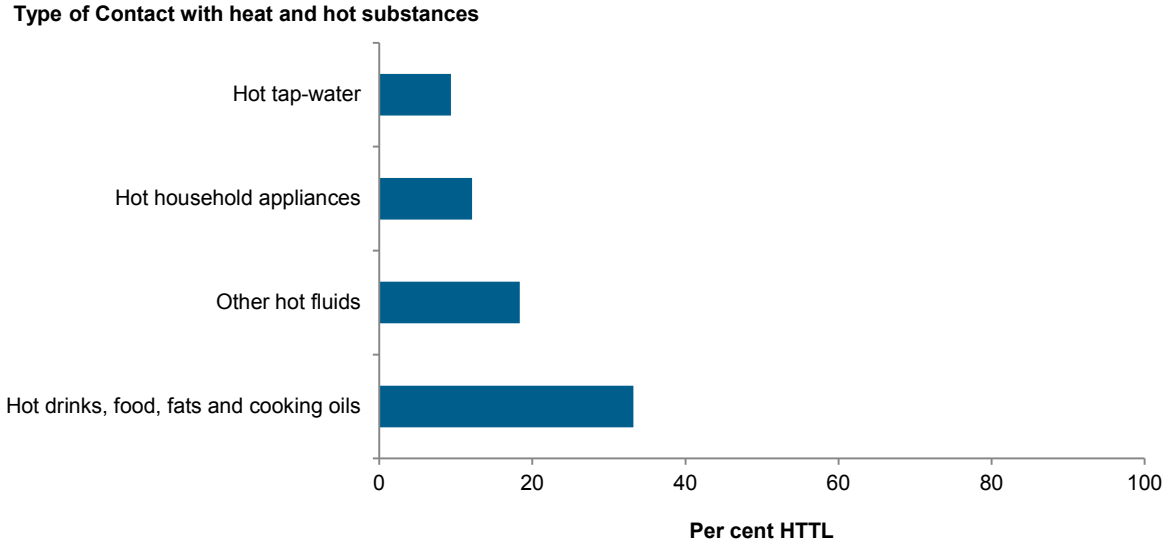


Figure 4.7: Proportion of HTTL hospitalised burn cases due to selected *Contact with heat and hot substance*, Australia, 2013–14

Other external causes of burn injury

This section presents an overview of hospitalised burn cases due to causes not covered in the 2 previous sections on *Exposure to smoke, fire and flames* and *Contact with heat and hot substances*. Cases of burns due to other external causes (1,417 cases) are coded to a number of other external cause categories including transport accidents, poisonings and other unintentional causes (Table 4.13).

A third of all hospitalised burn cases due to other external causes were within the broad category of 'other unintentional causes' of injury. This category includes, for example, *Explosion of other materials (W40)* and *Exposure to other specified electric current (W86)*. Included among the poisoning by other substances category are burn cases due to swallowing caustic substances. These specific types of other external causes of hospitalised burn cases are examined in more detail in this section.

Table 4.13: Hospitalised burn cases due to other external causes, type of cause and sex, Australia, 2013–14

	Persons	
External cause	**Number**	**%**
Transport crashes	198	14.0
Poisoning, pharmaceuticals	7	0.5
Poisoning, other substances	363	25.6
Falls	11	0.8
Other unintentional causes	465	32.8
Intentional self-harm	91	6.4
Assault	80	5.6
Undetermined intent	155	10.9
Other or missing	47	3.3
Total	**1,417**	**100**

There were 1,417 hospitalised burn cases due to other external causes accounting for about a quarter (26%) of all hospitalised burn cases in Australia during 2013–14 (Table 4.14). As a proportion of all burn cases, the proportion of males (28%) with burns due to other external causes was greater than that of females (22%) as was the rate of injury, 9 cases per 100,000 population compared with 3 cases per 100,000 population, for males and females respectively.

Table 4.14: Key indicators for hospitalised burn cases due to other external causes of injury, Australia, 2013–14

Indicator	Males	Females	Persons
Estimated other external causes of hospitalised burn cases	1,031	386	1,417
Per cent of all hospitalisations for burn injury	28.2	21.7	26.1
Age-standardised rate/100,000 population	8.9	3.3	6.1

Age and sex

Overall, just over a third (36%) of all cases due to other external causes of burn injury occurred in those aged 25–44. Males and females have a similar pattern of burn injuries due to other external causes by age group (Table 4.15). The greatest proportions of other external cause burn cases were among those aged 25–44 for both males (38%) and females (31%).

Table 4.15: Hospitalised burn cases due to other external causes of injury, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	Number	%	Number	%	Number	%
0–4	53	5.1	42	10.9	95	6.7
5–9	31	3.0	16	4.1	47	3.3
10–14	40	3.9	12	3.1	52	3.7
15–24	206	20.0	70	18.1	276	19.5
25–44	395	38.3	120	31.1	515	36.3
45–64	220	21.3	92	23.8	312	22
65+	86	8.3	34	8.8	120	8.5
Total	**1,031**	**100**	**386**	**100**	**1,417**	**100**

An analysis of rate of burn injury due other external causes shows higher rates of injury for males than females in each age group (Figure 4.8). Among males, the highest rate of burns due to other external causes occurred among those aged 15–24 (13 cases per 100,000 population); more than twice that of females (5 cases per 100,000 population).

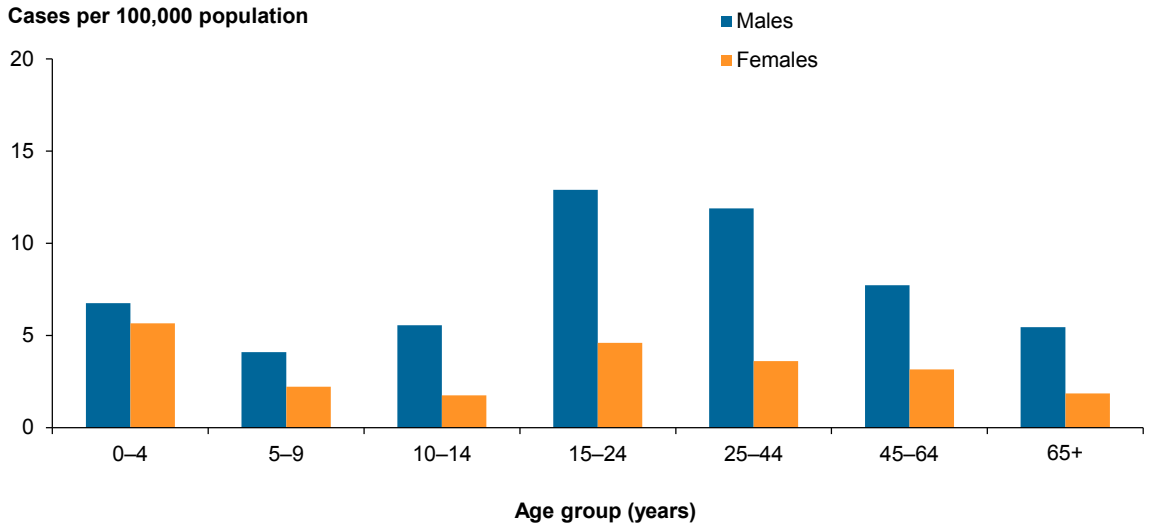


Figure 4.8: Age-specific rates of hospitalised burn cases due to other external causes of injury, by sex, Australia, 2013–14

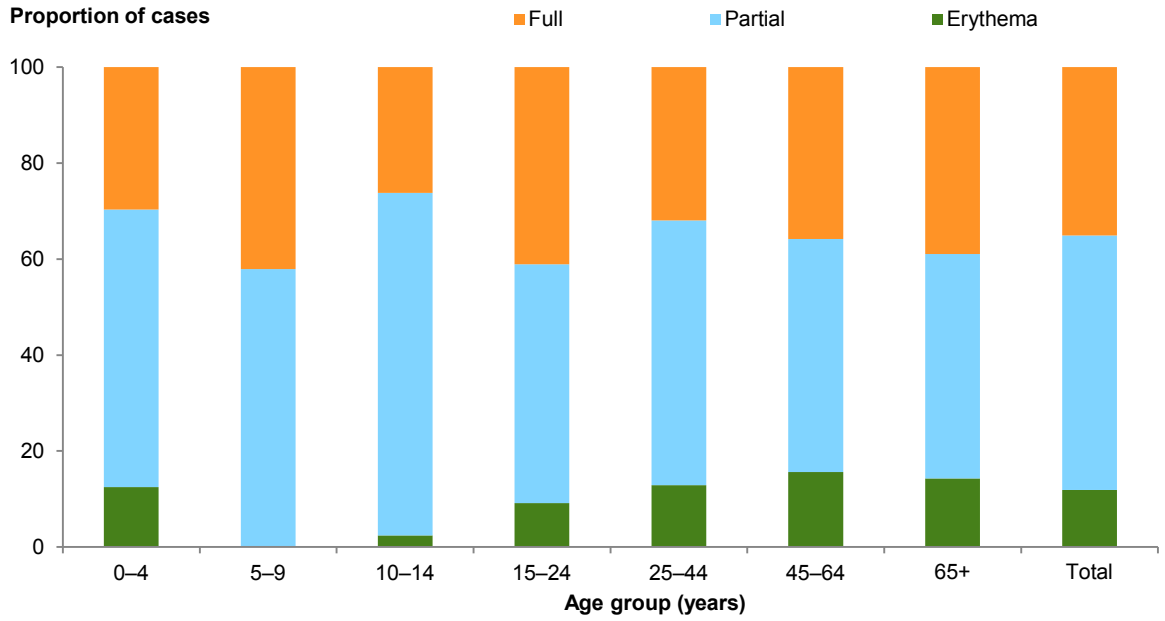
Of the 1,417 burn cases due to other external causes, 1,258 had information about the body region burned. The most common body regions burned were the wrist and hand (22%, 277 cases) and hip and lower limb (18%, 232 cases) (Table 4.16). Other external causes of burns also resulted in the highest proportions of respiratory tract burns (6%, 77 cases).

An analysis by age group showed variation in the most common body region burned by age group (Table 4.16). The wrist and hand was the most common body region burned in those aged 0–4 (29%), 15–24 (23%) and 25–44 (24%), while hip and lower limb burns were more common in those aged 5–9 (26%) and 10–14 (23%). Among older Australians (aged 65 and over) the trunk (22%) was the most common body region burned.

Table 4.16: Hospitalised burn cases due to other external causes, by body region and age group, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Body region injured	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Head and neck	5	6.0	3	6.5	9	19.1	29	11.8	57	12.5	33	12.0	15	14.0	151	12.0
Trunk	14	16.9	6	13.0	5	10.6	24	9.8	65	14.3	30	10.9	24	22.4	168	13.4
Shoulder and upper limb	6	7.2	7	15.2	7	14.9	50	20.4	85	18.6	41	15.0	12	11.2	208	16.5
Wrist and hand	24	28.9	9	19.6	10	21.3	57	23.3	108	23.7	56	20.4	13	12.1	277	22.0
Hip and lower limb	10	12.0	12	26.1	11	23.4	44	18.0	83	18.2	55	20.1	17	15.9	232	18.4
Ankle and foot	9	10.8	5	10.9	5	10.6	23	9.4	26	5.7	33	12.0	12	11.2	113	9.0
Eye and adnexa	0	0.0	0	0.0	0	0.0	4	1.6	7	1.5	5	1.8	2	1.9	18	1.4
Respiratory tract	13	15.7	3	6.5	0	0.0	12	4.9	22	4.8	15	5.5	12	11.2	77	6.1
Other internal organs	1	1.2	0	0.0	0	0.0	2	0.8	2	0.4	6	2.2	0	0.0	11	0.9
Multiple and unspecified body regions	1	1.2	1	2.2	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	3	0.2
Total	**83**	**100**	**46**	**100**	**47**	**100**	**245**	**100**	**456**	**100**	**274**	**100**	**107**	**100**	**1,258**	**100**

Burns due to other external causes were among the most severe, with high proportions of full thickness burns in each age group (Figure 4.9). The proportion of full thickness burns was higher in every age category compared to burns due to *Exposure to smoke, fire and flames* and *Contact with heat and hot substances*. For example, among those aged 65 and over, 39% of burn cases due to other external causes were full thickness compared to 27% of burns due to *Contact with heat and hot substances* and 38% of burns due to *Exposure to smoke, fire and flames*. The highest proportion (42%) of full thickness burn cases due to other external causes occurred among children aged 5–9.



Note: A total of 210 cases had unspecified thickness burns.

Figure 4.9: Proportion of hospitalised burn cases due to other external causes, by thickness of burn and age, Australia, 2013–14

Hospitalised burn cases due to transport accidents were more common among those aged 15–24 (67 cases) and 25–44 (63 cases) (Table 4.17). The largest number of burn cases due to poisoning by other substances occurred in those aged 25–44 (130 cases); this age group also had the largest number of burn cases due to other unintentional causes.

Table 4.17: Hospitalised burn cases due to other external causes, type of cause and age group, Australia, 2013–14

	0–4		5–9		10–14		15–24		25–44		45–64		65+		Total	
Type of cause	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Transport crashes	10	10.5	17	36.2	8	15.4	67	24.3	63	12.2	29	9.3	4	3.3	198	14.0
Poisoning, pharmaceuticals	2	2.1	0	0.0	0	0.0	0	0.0	1	0.2	2	0.6	2	1.7	7	0.5
Poisoning, other substances	34	35.8	8	17	5	9.6	58	21.0	130	25.2	96	30.8	32	26.7	363	25.6
Falls	0	0.0	0	0.0	1	1.9	3	1.1	2	0.4	2	0.6	3	2.5	11	0.8
Other unintentional causes	29	30.5	13	27.7	26	50.0	92	33.3	178	34.6	94	30.1	33	27.5	465	32.8
Intentional self-harm	0	0.0	0	0.0	1	1.9	17	6.2	36	7.0	29	9.3	8	6.7	91	6.4
Assault	3	3.2	2	4.3	3	5.8	15	5.4	40	7.8	13	4.2	4	3.3	80	5.6
Undetermined intent	16	16.8	7	14.9	8	15.4	23	8.3	57	11.1	27	8.7	17	14.2	155	10.9
Other or missing	1	1.1	0	0.0	0	0.0	1	0.4	8	1.6	20	6.4	17	14.2	47	3.3
Total	**95**	**100**	**47**	**100**	**52**	**100**	**276**	**100**	**515**	**100**	**312**	**100**	**120**	**100**	**1,417**	**100**

Common specific causes from categories of other external causes of burn injury are presented in Table 4.18. For burn cases due to poisoning by other substances almost all were coded to *Accidental poisoning by and exposure to other and unspecified chemicals and noxious substances* (96%). This includes corrosive aromatics, acids and caustic alkalis which can produce 'chemical burns' through skin contact, swallowing or inhalation.

Among the other unintentional causes of hospitalised burn cases, a third were caused by explosions of other materials (32%) while *Explosion and rupture of gas cylinder* (21%), *Exposure to other specified electric currents* (23%), and *Exposure to electric transmission lines* (6%) accounted for a further 52% combined.

Cases caused by intentional self-harm and assault were infrequent and no additional information is available on the specific methods of harm.

Table 4.18: Hospitalised burn cases due to other external causes, by common specific cause, Australia, 2013–14

	Males		Females		Persons	
Type of cause	**Number**	**% of subtotal**	**Number**	**% of subtotal**	**Number**	**% of subtotal**
Transport crashes						
Motorcycle rider injured in non-collision transport accident (V28)	54	37.2	8	15.1	62	31.3
Car occupant injured in non-collision transport accident (V48)	13	9.0	9	17.0	22	11.1
Subtotal all transport crash cases	*145*		*53*		*198*	
Poisoning, other substances						
Accidental poisoning by and exposure to other and unspecified chemicals and noxious substances (X49)	265	96.0	84	96.6	349	96.1
Subtotal all poisoning, other substances cases	*276*		*87*		*370*	
Other unintentional causes						
Explosions of other material[(a)]	113	30.5	25	26.6	138	31.7
Explosion and rupture of gas cylinder (W36)	76	20.5	17	18.1	93	21.3
Exposure to electric current[(b)]	80	21.6	27	28.7	107	24.5
Exposure to electric transmission lines (W85)	26	7.0	2	2.1	28	6.4
Subtotal all other unintentional causes	*371*		*94*		*436*	
Intentional, self-harm						
Intentional self-harm by smoke, fire and flames (X76)	36	67.9	19	50.0	55	60.4
Intentional self-harm by other specified means (X83)	14	26.4	13	34.2	27	29.7
Subtotal all intentional, self-harm causes	*53*		*38*		*91*	

(continued)

Table 4.18 (continued): Hospitalised burn cases due to other external causes, by common specific cause, Australia, 2013–14

Type of cause	Males		Females		Persons	
	Number	% of subtotal	Number	% of subtotal	Number	% of subtotal
Assault						
Assault by smoke, fire and flames (X97)	26	45.6	5	21.7	31	38.8
Assault by steam, hot vapours and hot objects (X98)	19	33.3	13	56.5	32	40.0
Subtotal all assault causes	*57*		*23*		*80*	
Undetermined intent						
Exposure to smoke, fire and flames, undetermined intent (Y26)	70	68.0	17	32.7	87	56.1
Contact with steam, hot vapours and hot objects, undetermined intent (Y27)	25	24.3	25	48.1	50	32.3
Subtotal all undetermined intent causes	*103*		*52*		*155*	
All other external causes	**26**		**39**		**65**	
Total other external causes of burns	**1,031**		**386**		**1,417**	

(a) Includes *Explosion and rupture of boiler* (W35), *Explosion and rupture of pressurised tyre, pipe or hose* (W37), *Explosion and rupture of other specified pressurised devices* (W38), *Discharge of firework* (W39), and *Explosion of other materials* (W40).

(b) Includes *Exposure to other specified electric current* (W86) and *Exposure to unspecified electric current* (W87).

Type and severity

Transport crashes (51%) and intentional self-harm (56%) injuries resulted in the most severe burns with just over half of all burns due to these causes resulting in full thickness burns (Figure 4.10).

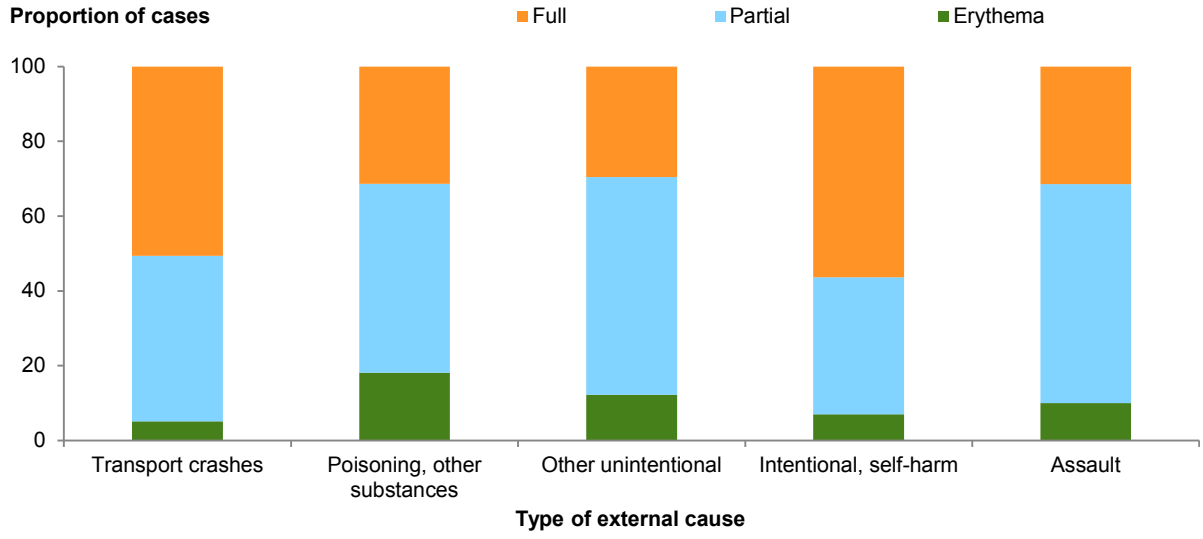


Figure 4.10: Proportion of hospitalised burn cases due to selected types of other external cause, by thickness of burn, Australia, 2013–14

Overall, 22% of burns due to other external causes were HTTL, the highest proportion of HTTL cases of the external causes of burns presented in this report. The proportion of HTTL cases by specific types of other external causes of burns is presented in Figure 4.11. Of the 317 HTTL cases, 78 (25%) were due to transport crashes. Four specific causes of burn cases due to other unintentional causes accounted for 79% of HTTL burn cases in this category: *Explosion of other materials* (30%, 32 cases), *Explosion and rupture of gas cylinder* (19%, 18 cases), *Exposure to smoke, fire and flames, undetermined intent* (19%, 17 cases), and *Exposure to other specified electric current* (12%, 12 cases).

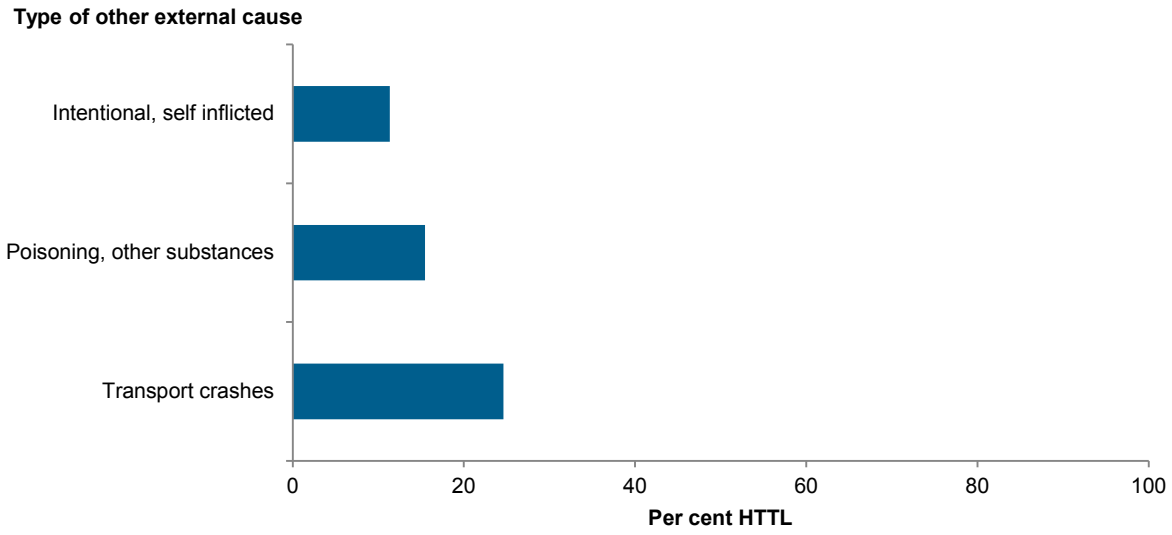


Figure 4.11: Proportion of HTTL hospitalised burn cases due to selected types of other external cause, Australia, 2013–14

5 Procedures

This chapter presents information on the procedures and other interventions provided during episodes of admitted patient care (hospitalisations) for burn patients. Procedures can include surgical (operating room) procedures, non-operating room procedures (for example, dialysis), procedures of a patient support nature (for example, general anaesthesia) and other interventions (for example, physiotherapy and other allied health interventions) (see Box 5.1).

Significant advances have been made in burn treatment and care in recent years (Rowan et al. 2015). Despite improvements, the treatment of severe burns can still result in prolonged periods of acute care, rehabilitation and multiple outpatient visits. Treatment in the acute phase of partial and full thickness burns involves early excision, dressing and grafting, all of which can involve multiple admissions to hospital. Post-acute care can involve multiple surgical procedures and physiotherapy to improve movement and reduce scarring.

One or more procedures can be reported for each separation, but procedures are not undertaken for all hospital admissions, so only some of the separation records include procedure data. This chapter's focus is on episodes of care (separations), not cases. For more information about procedure coding in hospital data see 'Appendix A: Data issues'.

Box 5.1: Summary of burn injury treatment and care

Burn injury wound care and treatment is a specialised area that includes early resuscitation, infection management, wound excision and coverage, and fluid management. The type of care and treatment received depends on the severity of the burn injury, taking into account size and depth (ANZBA 2014).

Generally speaking **wound dressing** and **debridement** occur within 24 to 48 hours after injury. Debridement refers to the surgical excision of dead, damaged or infected tissue to improve the healing potential of the remaining healthy tissue. Patients with more extensive burns often also require temporary coverage with an **allograft**, **xenograft** or synthetic skin graft. Allograft and xenograft skin grafts are temporary biological dressings sourced from human (cadaver) or animal donors.

Once a wound has been debrided and dressed, patients with less severe burns are discharged from hospital to return several days later for more permanent treatment in the form of a **skin graft,** if needed.

The most commonly used type of skin graft is a **split skin graft**. A split skin graft is a skin graft that is taken from an unaffected site on the patient that can include the epidermis and part or all of the dermis. Its thickness depends on the donor site and the needs of the patient. Split skin grafts are often carried out as day surgical procedures especially for full thickness burns of less than 10%.

Overview

There were 23,889 procedures reported for the 8,055 burn injury separations in 2013–14 (Table 5.1). The number of procedures per burn injury separation ranged from 0 (36%, 2,899 separations) to 50 (14 separations). There was a mean of 3 procedures per burn injury

separation. There was little difference in the number of procedures recorded for males and females or for the different age groups (data not shown).

The most common procedure types listed in hospitalised burn separations for both males and females were from the ACHI chapters *Non-invasive, cognitive and other interventions, not elsewhere classified* (60% of all procedures), followed by *Dermatological and plastic procedures* (34%) and *Procedures on the respiratory system* (2.6%, see Table 5.1). *Non-invasive, cognitive and other interventions* procedures include health assessments, diagnostic tests, counselling, therapeutic interventions, anaesthesia and allied health interventions such as physiotherapy.

Table 5.1: Total number of procedures listed in burn injury separations, by sex, Australia, 2013–14

	Males		Females		Persons	
ACHI procedure groups	**Sum**	**%**	**Sum**	**%**	**Sum**	**%**
Non-invasive, cognitive and other interventions, NEC	10,026	59.6	4,346	61.4	14,372	60.2
Dermatological and plastic procedures	5,770	34.3	2,455	34.7	8,225	34.4
Procedures on respiratory system	478	2.8	138	2.0	616	2.6
Procedures on musculoskeletal system	245	1.5	43	0.6	288	1.2
Procedures on digestive system	80	0.5	30	0.4	110	0.5
Procedures on nose, mouth and pharynx	51	0.3	9	0.1	60	0.3
Procedures on cardiovascular system	42	0.2	9	0.1	51	0.2
Procedures on eye and adnexa	39	0.2	5	0.1	44	0.2
Procedures on urinary system	28	0.2	11	0.2	39	0.2
Procedures on nervous system	19	0.1	2	0.0	21	0.1
Imaging services	11	0.1	10	0.1	21	0.1
Dental services	13	0.1	1	0.0	14	0.1
Procedures on ear and mastoid process	8	0.0	1	0.0	9	0.0
Radiation oncology procedures	1	0.0	6	0.1	7	0.0
Gynaecological procedures	0	0.0	3	0.0	3	0.0
Procedures on breast	0	0.0	3	0.0	3	0.0
Procedures on blood and blood-forming organs	1	0.0	1	0.0	2	0.0
Procedures on male genital organs	2	0.0	0	0.0	2	0.0
Obstetric procedures	0	0.0	2	0.0	2	0.0
Procedures on endocrine system	0	0.0	0	0.0	0	0.0
Total	**16,814**	**100**	**7,075**	**100**	**23,889**	**100**

Notes

1. See Box 5.1 and Appendix A for notes on definitions and data limitations.
2. NEC: Not elsewhere classified.

The most common *Non-invasive, cognitive and other interventions, not elsewhere classified* procedures were allied health interventions (2,978 procedures) including physiotherapy (806 procedures), pharmacy (800 procedures), social work (701 procedures) and occupational therapy (671 procedures). Anaesthesia procedures were also common with 1,139 procedures listed under general anaesthesia.

Procedures classed as *Non-invasive, cognitive and other interventions, not elsewhere classified* were recorded at a rate of 178 per 100 burn injury separations. Age-specific rates of these

procedures were lowest for children and young people and generally were higher in older age groups (Figure 5.1). Rates of *Dermatological and plastic procedures* tended to be the same regardless of age group at a rate of 102 per 100 burn injury separations. *Procedures on the respiratory system* were less common at a rate of 8 per 100 burn injury separations.

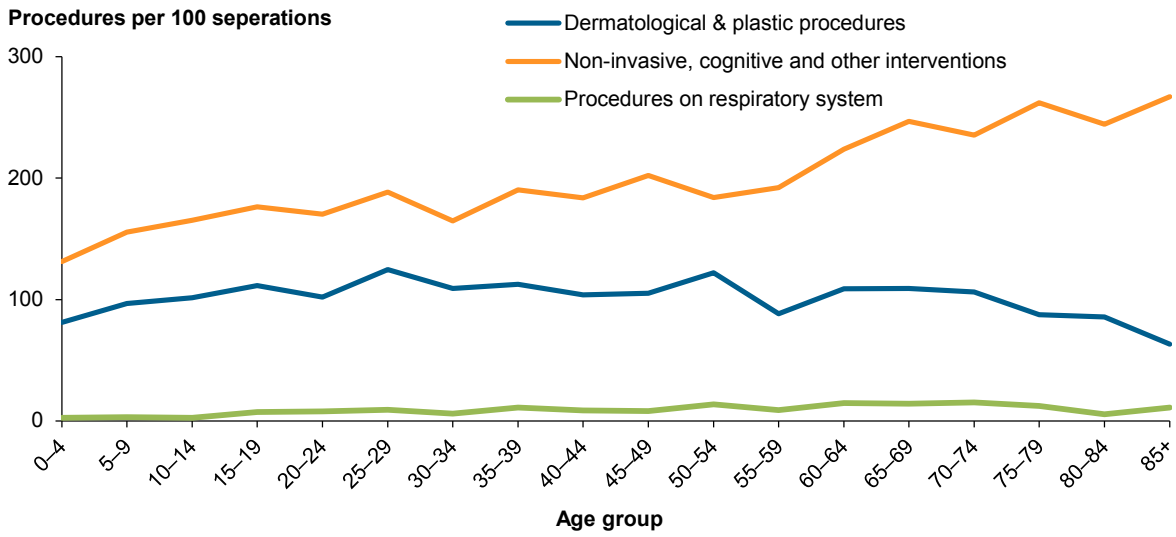


Figure 5.1: Age-specific rates per 100 burn injury separations by selected ACHI procedure group, Australia, 2013–14

Debridement of burn was the most common (28%) procedure of burn injury separations that had at least 1 procedure recorded (Table 5.2). Various types of split skin grafts accounted for over a third of all procedures. Just over 1,000 allograft, xenograft or synthetic skin grafts were carried out in 2013–14.

Table 5.2: Common *Dermatological and plastic procedures* for burn injury separations, Australia, 2013–14

ACHI procedure name	Number	% of all dermatological & plastic procedures
Debridement of burn	2,284	27.8
Split skin graft to burn of other sites	1,751	21.3
Split skin graft to burn of specific sites	1,263	15.4
Allograft, xenograft or synthetic skin graft	1,022	12.4
Dressing of burn	876	10.7
Full thickness skin graft to burn	130	1.6
Split skin graft to granulating burn site	115	1.4
Release of skin and subcutaneous tissue	85	1.0
Revision of burn scar or contracture	23	0.3
All other dermatological and plastic procedures combined	676	8.2
Total	**8,225**	**100**

Notes

1. There were 2,899 separations with no procedure code recorded.
2. See Box 5.1 and Appendix A for notes on definitions and data limitations.

The type and number of *Dermatological and plastic procedures* differed little by age group other than for children. Separations for burns among children aged 0–14 had a higher proportion of debridement and dressing procedures (60%) compared to all ages separations (42%) (Table 5.3).

Table 5.3: Common *Dermatological and plastic procedures* for burn injury separations, children 0–14, Australia, 2013–14

ACHI procedure name	Number of procedures	%
Debridement of burn	605	34
Dressing of burn	456	26
Split skin graft to burn of other sites	384	22
Split skin graft to burn of specific sites	222	12
Full thickness skin graft to burn	42	2
Split skin graft to granulating burn site	26	1
Allograft, xenograft or synthetic skin graft	20	1
Release of skin and subcutaneous tissue	17	1
Revision of burn scar or contracture	6	0

Note: See Box 5.1 and Appendix A for notes on definitions and data limitations.

The result of an analysis of burn-specific procedures by whether the patient was admitted to and separated from the hospital on the same date or overnight is shown in Table 5.4. Debridement was a common procedure for both groups with about 30% of separations having a procedure related to wound care. Patients remaining in hospital for more than 1 day had more burn dressing procedures (12%) compared to those separating on the same day (8%). This is reflective of the practice of ongoing and multiple dressing changes required for severe burn wounds. In contrast, separations lasting a single day had more instances of procedures using allograft, xenograft or synthetic skin grafts (17%) compared to longer stay separations (13%). This is consistent with allograft, xenograft or synthetic skin grafts being used as temporary dressings for wounds prior to split skin grafting after a period of several days.

Table 5.4: Common *Dermatological and plastic procedures* for burn injury separations, by same-day status, Australia, 2013–14

Same-day			Overnight		
ACHI procedure name	**Number of procedures**	**%**	**ACHI procedure name**	**Number of procedures**	**%**
Debridement of burn	429	29	Debridement of burn	1,855	30
Split skin graft to burn of other sites	296	20	Split skin graft to burn of other sites	1,455	24
Split skin graft to burn of specific sites	261	18	Split skin graft to burn of specific sites	1,002	16
Allograft, xenograft or synthetic skin graft	251	17	Allograft, xenograft or synthetic skin graft	771	13
Dressing of burn	119	8	Dressing of burn	757	12
Full thickness skin graft to burn	61	4	Release of skin and subcutaneous tissue	79	1
Split skin graft to granulating burn site	38	3	Split skin graft to granulating burn site	77	1
Release of skin and subcutaneous tissue	6	0	Full thickness skin graft to burn	69	1
Revision of burn scar or contracture	4	0	Revision of burn scar or contracture	19	0

Note: See Box 5.1 and Appendix A for notes on definitions and data limitations.

Appendix A: Data issues

Data sources

The data on hospital separations were drawn from the Australian Institute of Health and Welfare's (AIHW) National Hospital Morbidity Database (NHMD). Comprehensive information on the quality of the data for 2013–14 is available in *Admitted patient care 2013–14: Australian hospital statistics* (AIHW 2015) and in the data quality statement in this appendix. Nearly all injury cases admitted to hospitals in Australia are thought to be included in the NHMD reported data.

In 2013–14, diagnoses and external cause of injury and poisoning were recorded using the 8th edition of the *International statistical classification of diseases and related health problems, 10th revision, Australia modification* (ICD-10-AM) (NCCH 2012).

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, 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 another one.

As described in the introduction, the treatment and care of burn patients is one type of injury that often results repeated admissions resulting in multiple records in the NHMD for the same person as a result of a single burn event.

Information in the NHMD enables this problem to be reduced, though not eliminated. The approach used by NISU in the majority of its reports makes use of the *Mode of admission* variable (METeOR identifier: 269976), which indicates whether the current episode began with inward transfer from another acute care hospital. Episodes of this type (inward transfers) are likely to have been preceded by another episode that also met the case selection criteria for injury cases, so are omitted from our estimated case counts.

This procedure should largely correct for overestimation of cases that are due to transfers, but will not correct for overestimation that is due to repeated admissions. In order to correct for overestimation of cases, this report includes only episodes which have been assigned an *Admission urgency status* of 'emergency' (METeOR identifier: 269986).

The *Admission urgency status* element within the NHMD has 3 status values: *emergency*, *elective* and *urgency status not assigned*. According to the guidelines for use an emergency admission occurs if 1 or more of a list of clinical conditions is applicable such that the patient required admission within 24 hours. The conditions include things such as being at risk of serious morbidity or mortality and requiring urgent assessment and/or resuscitation; or suffering from suspected acute organ or system failure.

Elective admissions and episodes where urgency status has not been assigned are characterised by conditions where treatment could be delayed by at least 24 hours and include scheduled admissions and readmissions. By including only episodes with an urgency of admission status of 'emergency', case estimates are more likely to capture the first acute presentation to hospital for a burn injury.

Length of stay

Mean length of stay is calculated by dividing the total number of patient days for injury separations by the estimated number of injury cases. Patients who were admitted and discharged from hospital on the same day are counted as staying for 1 day.

Note that length of stay as presented in this report does not include some patient days potentially attributable to injury. In particular, it does not include days for most aspects of injury rehabilitation, which were difficult to assign correctly without information enabling identification of all admitted episodes associated with an injury case.

Rates

All age-specific rates in this report were calculated using, as the denominator, the final estimated resident population (ERP) as at 31 December 2013. Direct standardisation was used to age-standardise rates using the Australian population in 2001 as the standard (ABS 2003).

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. This method was used to produce denominators for rates by remoteness of usual residence. Australian ERPs for 30 June 2001 (persons, by 5-year age groups to the same oldest group present in the population denominator data) were used as the standardising population throughout the report (ABS 2003).

Classification of remoteness area

Data on geographical location of the patient's usual residence and of the hospital location are defined using the Australian Bureau of Statistics (ABS) Australian Statistical Geography Standard (ASGS). Data on remoteness area of usual residence are defined using the ABS's ASGS Remoteness Structure 2011 (ABS 2011).

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

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

The reported areas are defined as the following ranges of the index:

- *Major cities* (for example, Sydney, Geelong, Gold Coast), ARIA index 0 to 0.2
- *Inner regional* (for example, Hobart, Ballarat, Coffs Harbour), ARIA index >0.2 and ≤2.4
- *Outer regional* (for example, Darwin, Cairns, Coonabarabran), ARIA index >2.4 and ≤5.92
- *Remote* (for example, Alice Springs, Broome, Strahan), ARIA index of >5.92 and ≤10.53
- *Very remote* (for example, Coober Pedy, Longreach, Exmouth), ARIA index >10.53.

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

Intensive care

Data for hours in intensive care units are required to be reported by public hospitals that have either an approved level 3 adult ICU or an approved paediatric ICU. Information on ICU hours was also provided for private hospitals in Victoria, Queensland, Western Australia and South Australia. Hence, the hours in ICU will be under-reported in this report because not all private hospital ICUs reported ICU hours.

A level 3 adult ICU must be capable of providing complex, multisystem life support for an indefinite period; be a tertiary referral centre for patients in need of intensive care services; and have extensive backup laboratory and clinical service facilities to support the tertiary referral role. It must be capable of providing mechanical ventilation, extracorporeal renal support services and invasive cardiovascular monitoring for an indefinite period; or care of a similar nature.

A paediatric ICU must be capable of providing complex, multisystem life support for an indefinite period; be a tertiary referral centre for children needing intensive care; and have extensive backup laboratory and clinical service facilities to support this tertiary role. It must be capable of providing mechanical ventilation, extracorporeal renal support services and invasive cardiovascular monitoring for an indefinite period to infants and children less than 16 years of age; or care of a similar nature.

Procedure coding

The ACHI classification is divided into 20 chapters by anatomical site, and within each chapter by a 'superior' to 'inferior' (head to toe) approach (NCCH 2012). These subchapters are further divided into more specific procedure blocks, ordered from the least invasive to the most invasive. The blocks, which are numbered sequentially, group the very specific procedure information.

The procedure information is presented using 2 methods of grouping procedures based on the ACHI procedure classification:

- ACHI procedure chapters—these 20 groups provide information aggregated at the ACHI chapter level
- ACHI procedure blocks—these 1,412 categories describe procedures at a specific level. Detailed information is presented for the *Dermatological and plastic procedures* block.

Confidentiality and reliability of data

The AIHW operates under a strict privacy regime which has its basis in Section 29 of the *Australian Institute of Health and Welfare Act 1987* (AIHW Act) and the *Privacy Act 1988* (Privacy Act).

Section 29 of the AIHW Act requires that confidentiality of data relating to persons (living and deceased) and organisations be maintained. The Privacy Act governs confidentiality of information about living individuals.

As well as the protection offered by the AIHW Act and the Privacy Act, personal information that the AIHW holds is covered by a range of other Commonwealth, state and territory legislation.

The AIHW is committed to reporting that maximises the value of information released for users while being statistically reliable and meeting the legislative requirements described above. To ensure the confidentiality of its data, the AIHW has a range of policies, protocols and processes in place—the AIHW Policy on reporting to manage confidentiality and reliability (AIHW Confidentiality Policy) is one important example, as it deals with how data should be reported to ensure confidentiality.

AIHW Confidentiality Policy, a summary

The AIHW Confidentiality Policy contains 7 guidelines to assist those working with data to apply it to their outputs.

Guideline 1

It is AIHW policy that if the data being considered have already been released publicly at the granularity AIHW intends to release, further confidentialisation is not required.

Guideline 2

Cells in tables where the value of the cell is the same as a row/column/wafer total (that is, all other cells in the row, column or wafer are 0) generally lead to disclosure of an additional attribute. It is AIHW policy that these cells need to be confidentialised unless the attribute that would be disclosed is deemed to be non-sensitive in the context of the data being published.

Guideline 3

It is AIHW policy that data on organisations must be confidentialised if 1 organisation contributes more than 85% of the total, or 2 organisations more than 90%, unless the attribute that would be disclosed is deemed to be non-sensitive in the context of the data being published or the organisation(s) have given consent to release.

Guideline 4

It is AIHW policy that guidelines 2 and 3 need to be applied so as to ensure that attribute confidentiality is maintained within tables and across tables within the same release. That is, when assessing whether a cell needs to be confidentialised, consideration needs to be given to whether there are other cells in that table, or other tables in the release, which may require consequential confidentialisation.

Guideline 5

Rates, averages and other statistics based on denominators of less than 100 are usually not reliable and it is AIHW policy that they should generally not be reported.

Guideline 6

It is AIHW policy that if data suppliers or clients require additional suppression rules be applied to an AIHW release in order to manage confidentiality or reliability, then these should be applied. Where such additional rules are applied they should be described in the release, and it should be noted that this approach is required by the data supplier.

Guideline 7

It is AIHW policy that, if a client wishes to be provided with data output (for example, tables) at a more detailed level than any of the above guidelines would allow, then they may apply to be provided output against which some or all of the above guidelines are not applied. Provision of this more detailed output would be subject to the client signing a confidentiality undertaking and agreeing that any publication of information (including in online data cubes) based on output released to them will comply with this policy.

Errors, inconsistencies and uncertainties

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

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

Data Quality Statement: National Hospital Morbidity Database

This section provides a summary of key issues relevant to interpretation of the NHMD for 2013–14.

A complete data quality statement for the NHMD is available online at <http://meteor.aihw.gov.au/content/index.phtml/itemId/611030>.

Summary of key issues

- The NHMD is a comprehensive data set that has records for all separations of admitted patients from essentially all public and private hospitals in Australia.
- A record is included for each separation, not for each patient, so patients who separated more than once in the year have more than 1 record in the NHMD.
- For 2013–14, almost all public hospitals provided data for the NHMD. The exception was a mothercraft hospital in the Australian Capital Territory. The great majority of private hospitals also provided data, the exceptions being the private day hospital facilities in the Australian Capital Territory, and the single private free-standing day hospital facility in the Northern Territory.
- There is apparent variation between states and territories in the use of statistical discharges and associated assignment of care types. For example, for public hospitals, the proportion of separations ending with a statistical discharge varied from 0.9% to 3.9% across states and territories.
- Variations in admission practices and policies lead to variation among providers in the number of admissions for some conditions.
- Caution should be used in comparing diagnosis, procedure and external cause data over time, as the classifications and coding standards for those data can change over time.

Appendix B: Additional tables

Table B.1: Age-specific rates of hospitalised burn cases, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	**Number**	**Rate**	**Number**	**Rate**	**Number**	**Rate**
0–4	584	74.5	377	50.8	961	63.0
5–9	158	20.9	97	13.6	255	17.3
10–14	132	18.4	61	8.9	193	13.8
15–24	661	41.4	230	15.1	891	28.6
25–44	1,151	34.7	485	14.6	1,636	24.6
45–64	683	24.0	341	11.7	1,024	17.8
65+	285	18.1	185	10.2	470	13.8
All ages	**3,654**	**31.5**	**1,776**	**15.2**	**5,430**	**23.3**

Table B.2: Age-specific rates of hospitalised burn cases due to *Exposure to smoke, fire and flames*, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	**Number**	**Rate**	**Number**	**Rate**	**Number**	**Rate**
0–4	69	8.8	39	5.3	108	7.1
5–9	40	5.3	20	2.8	60	4.1
10–14	42	5.8	15	2.2	57	4.1
15–24	282	17.7	49	3.2	331	10.6
25–44	462	13.9	124	3.7	586	8.8
45–64	248	8.7	68	2.3	316	5.5
65+	84	5.3	38	2.1	122	3.6
All ages	**1,227**	**10.6**	**353**	**3.0**	**1,580**	**6.8**

Table B.3: Age-specific rates of hospitalised burn cases due to *Contact with heat and hot substances*, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	**Number**	**Rate**	**Number**	**Rate**	**Number**	**Rate**
0–4	462	59.0	296	39.9	758	49.7
5–9	87	11.5	61	8.5	148	10.1
10–14	50	7.0	34	5.0	84	6.0
15–24	173	10.8	111	7.3	284	9.1
25–44	294	8.9	241	7.3	535	8.1
45–64	215	7.6	181	6.2	396	6.9
65+	115	7.3	113	6.2	228	6.7
All ages	**1,396**	**12.0**	**1,037**	**8.9**	**2,433**	**10.4**

Table B.4: Age-specific rates of hospitalised burn cases due to other external causes of injury, by age and sex, Australia, 2013–14

	Males		Females		Persons	
Age group	**Number**	**Rate**	**Number**	**Rate**	**Number**	**Rate**
0–4	53	6.8	42	5.7	95	6.2
5–9	31	4.1	16	2.2	47	3.2
10–14	40	5.6	12	1.8	52	3.7
15–24	206	12.9	70	4.6	276	8.9
25–44	395	11.9	120	3.6	515	7.8
45–64	220	7.7	92	3.2	312	5.4
65+	86	5.5	34	1.9	120	3.5
All ages	**1,031**	**8.9**	**386**	**3.3**	**1,417**	**6.1**

Glossary

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

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

acute: Having a short and relatively severe course.

acute care: Acute care is care in which the clinical intent or treatment goal is to:

- cure illness or provide definitive treatment of injury
- perform surgery
- relieve symptoms of illness or injury (excluding palliative care)
- reduce severity of an illness or injury
- protect against exacerbation and/or complication of an illness and/or injury which could threaten life or normal function
- perform diagnostic or therapeutic procedures. See Care type. METeOR identifier: 270174.

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

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

admission urgency status 'emergency': An emergency admission is an admission of a patient for care or treatment which, in the opinion of the treating clinician, is necessary and admission for which should occur within 24 hours. METeOR identifier: 269424.

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.

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. METeOR identifier: 491557 (Care type), METeOR identifier: 268956 (Episode of admitted patient care).

erythema: Area of persistent redness.

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

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

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

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

length of stay (LOS): The length of stay of a patient, excluding leave days, measured in days. Formula: LOS = Separation date minus Admission date minus Total leave days. The calculation is inclusive of admission and separation dates. METeOR identifier: 269982.

mode of admission: The mechanism by which a person begins an episode of care, as represented by a code. METeOR identifier: 269976.

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

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

procedure: A clinical intervention that is surgical in nature, carries a procedural risk, carries an anaesthetic risk, requires specialised training and/or requires special facilities or equipment available only in an acute care setting. METeOR identifier: 514040.

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

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 patients 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.

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This report provides information on cases of burn injury requiring hospitalisation in Australia. While burn injuries make up a small fraction (1%) of all hospitalisations for injury, they are often the most serious and result in numerous re-admissions and long lengths of stay. In 2013–14 there were 5,430 cases of hospitalised burn injury of which about two-thirds were male. Almost half of all cases (45%) were caused by contact with heat and hot substances such as hot drinks, food, fats and cooking oils.