BURNS REGISTRY OF AUSTRALIA AND NEW ZEALAND

ANNUAL REPORT

1st July 2012 – 30th June 2013

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Foreword

The Burns Registry of Australia and New Zealand (BRANZ) – previously the Bi - National Burns Registry (BiNBR) - was launched in 2009 with the primary aim of improving the quality of burn care in Australia and New Zealand. This is our fourth annual report.

BRANZ is a collaboration between the Australian and New Zealand peak body for burn clinicians, the Australian and New Zealand Burn Association (ANZBA), and Monash University Department of Epidemiology and Preventive Medicine. Over the course of its development, the registry has been supported by government, professional and philanthropic organisations; and has received considerable in kind support from burns clinicians and Monash registry and academic staff. BRANZ has been initiated by clinicians, developed and managed by experts according to well defined processes, and governed by an inclusive and diverse steering committee composed of clinicians, registry experts, academics and other stakeholders. As a clinical quality registry with quality indicators relevant to burns embedded within the dataset, the registry is the first of its kind in burn care in the world.

In this report, data are presented for 2,720 burns patients treated at 15 burns units over the 12 month period from 1st July 2012 to 30th June 2013. Epidemiological information from the registry currently aids prevention campaigns and resource planning. As the size of the data set increases yearly, the effects of preclinical and hospital management can be analysed, and benchmarking of unit performance commenced. Participating units can download their own data and generate their own reports as required. The Registry continues to respond to requests for data for research, prevention, quality and educational purposes.

The value of a multicentre Australia and New Zealand wide registry is especially significant when examining treatment regimens for patients with severe burns (those greater than 20% Total Body Surface Area). These injuries are uncommon; however patients with severe burn injury are extremely costly to treat. Despite this, the effect of numerous treatment variables in this group of patients is unknown, and the evidence base in burn care is lacking. BRANZ data supports multicentre research projects which rely on adequate recruitment for meaningful results, and through our ability to benchmark outcomes according to units and their protocols, will make a considerable contribution to our understanding of the effects of treatment on outcomes.

Resourcing data entry continues to constitute a significant challenge for participating sites, especially for the smaller paediatric burns units. Data linkage development remains a priority for BRANZ and work is continuing on this and other projects including the electronic upload of hospital clinical coding data. We now have over four years of data and the next phase of development to review and refine the quality indicators is underway. The sourcing of sustainable funding to support ongoing quality assurance review and data analysis continues to be a significant focus for ANZBA. BRANZ is a major resource for directing, supporting and enhancing burn prevention and care initiatives, and I commend this latest report to you.

Heather Cleland

President, Australian and New Zealand Burn Association (ANZBA)
Chair, Steering Committee BRANZ

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Executive Summary

This is the fourth annual report from the Burns Registry of Australia and New Zealand (BRANZ). BRANZ provides valuable information on the incidence and aetiology of burn injury across Australia and New Zealand. The overall goal of the registry is to collect data on all burn patients admitted to BRANZ hospitals who meet the inclusion criteria. Improvements are made to the database as required to enhance data capture and quality.

Data are presented for 2,720 burns patients treated at 15 burns units over the 12 month period from 1st July 2012 to 30th June 2013. Consistent with data from the 2011-2012 year and that reported by the American Burn Association, National Burn Repository, 69 per cent of cases overall were adults, with males accounting for 68 per cent of all cases. Children aged 12 to 24 months accounted for 31 per cent of paediatric cases while 20 to 29 year olds accounted for 25 per cent of adult cases. Flame (36 per cent) and scald burns (36 per cent) were the primary cause of burn injury for all age groups. Scald burns were the predominant cause for paediatric patients accounting for 54 per cent of all burns followed by contact burns as the next most common aetiology (22 per cent) in paediatric patients.

For children 11 to 15 years of age, and adults 16 to 49 years of age, flame burn was the predominant cause. In the over 70 years age group, scalding was the predominant cause of burn. Nearly all burns were considered unintentional (95 per cent).

The data presented in this report indicates that for cases admitted to Australian burns units, 82 per cent were born in Australia, with seven per cent identified as Australian Aboriginal. For New Zealand cases, 60 per cent of these were classified as a 'New Zealander' with 21 per cent of these identified as New Zealand Maori. Most Australian cases were funded by the Australian Health Care Agreement (82 per cent) and with nine per cent of cases were funded by work injury compensation schemes. Most New Zealand cases (99 per cent) were funded under the Accident Compensation Corporation.

A burn of less than ten per cent Total Body Surface Area (TBSA) was recorded for 89 per cent of paediatric cases and 78 per cent of adult cases. Over 70 per cent of all cases underwent a burn wound management procedure in theatre. Fifty-seven per cent of paediatric cases and 65 per cent of adult cases required skin grafting, and is consistent with the 2011-12 annual report. This also signifies the importance of adequate initial burn assessment, management and referral to the appropriate burns units for definitive treatment of burns that meet the ANZBA endorsed referral criteria (Appendix 8).

The initial burn management data suggests that cool running water (considered the most appropriate management for burn injury) is the primary burn cooling strategy used in the majority of cases at the scene of injury (95 per cent). Alternative techniques that are considered ineffective or detrimental to burn wound recovery such as application of ice, aloe vera, butter and toothpaste were used at the scene of the burn injury for burn cooling in about 12 per cent of cases.

Approximately half of paediatric and adult cases were transferred to the burns unit from another hospital. The median (IQR) time from injury to admission to a BRANZ hospital was ten (three to 66)

hours for paediatric cases and 15 (four to 94) hours for adult cases. The median (IQR) length of stay (LOS) for paediatric cases (where LOS is less than 24 hours and excluding deaths) was five (two to nine) days and six (two to 12) days for adult cases. The overall in-hospital death rate was one per cent for hospitalised burn cases. The majority of cases (84 per cent) were discharged to their usual residence.

A total of 130 paediatric cases (15 per cent) were readmitted within 28 days of discharge and the majority (77 per cent) were reported as planned readmissions. A readmission was recorded for only six per cent of adult cases (n=103) although over half (61 per cent) of these cases were reported as 'unplanned'.

The hospital process and quality of care data presented in this report provides a baseline from which future monitoring of care can be undertaken. BRANZ continues to develop and ongoing improvements to data fields and definitions will be made over 2014 to improve data quality and interpretation.

About this report

This is the fourth annual report of the Burns Registry of Australia and New Zealand (BRANZ). Data collected during the period of 1st July 2012 and 30th June 2013 (Year 4) is summarised in this report. Fifteen of the 17 BRANZ sites (11 out of 13 Australian sites and all four of the New Zealand sites) contributed data with 2720 of cases entered in the fourth reporting year. A sixteenth site (Site J) has previously submitted and continues to submit data to the registry although no cases were recorded in this reporting period.

The sites that participated had Institutional Ethics Committee (IEC) approval and local resources for data collection that enabled them to contribute data to the registry. Of the sixteen BRANZ sites with ethics approval, six sites treat paediatric patients, five sites treat adult patients and five sites treat both paediatric and adult patients.

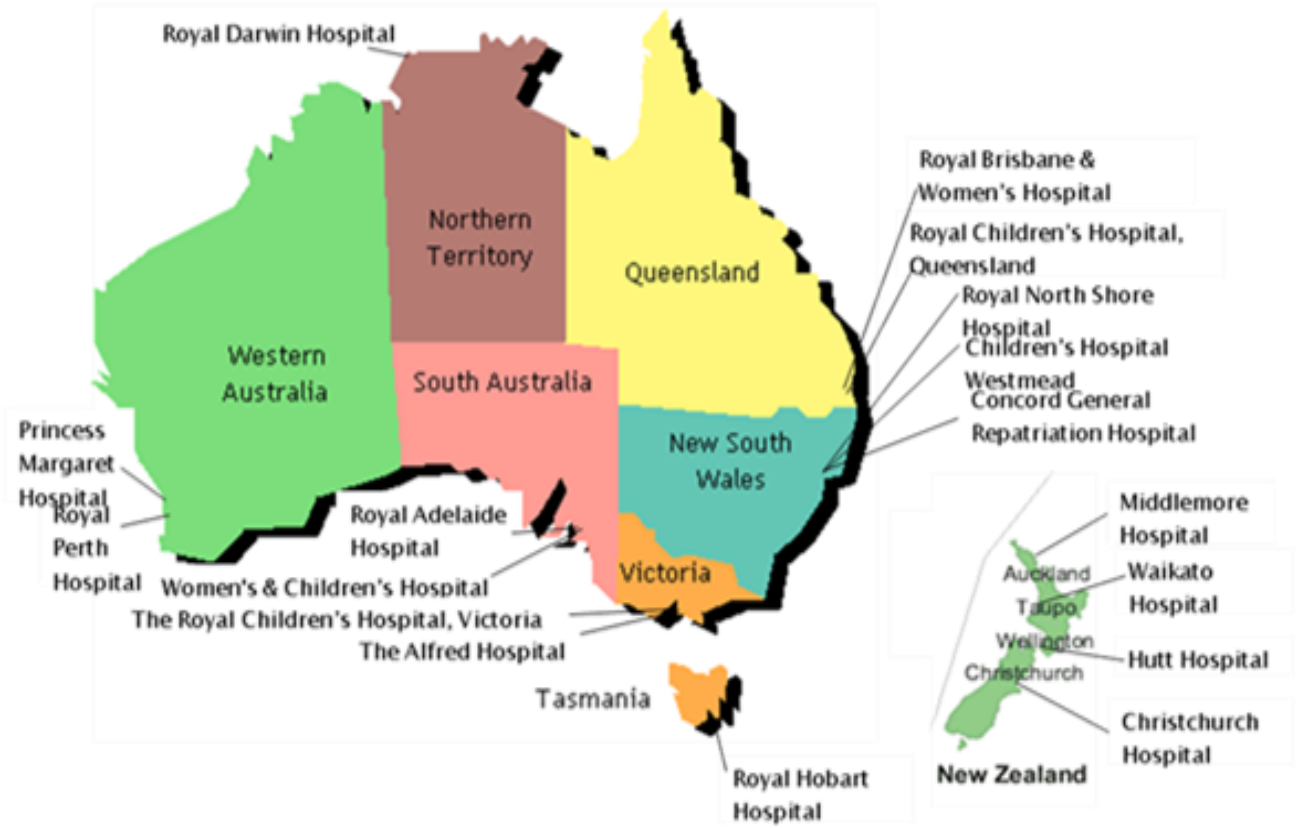
The report describes the registry, its achievements, and describes the profile, treatment and outcomes of burn unit admissions from 1st July 2012 to 30th June 2013. Quality of care data related to processes of care is also provided. Where appropriate, data has been compared to the 2009-10, 2010-11 and 2011-12 reporting periods. Where relevant, data has also been compared with the American Burn Association's National Burn Repository (NBR) 2014 [2] report of data from January 2004 to June 2013, as this is the only other burn database that reports comparable summary data.

About Burns Registry of Australia and New Zealand (BRANZ)

What is Burns Registry of Australia and New Zealand?

The Australian and New Zealand Burns Association (ANZBA) was formed in 1976 and incorporated in 1991 with the principal objective to encourage higher standards of both burn injury prevention and patient care through research and education. Australia and New Zealand (NZ) have regionalised burns care with 17 designated burns units across the two countries (Figure 1). The initial Bi-National Burns Registry was launched in 2004 with strong support from the ANZBA community. The registry was predominately an epidemiological data repository and was not able to meet the association's primary aim for the registry to improve quality of care. The revised Bi-National Burns Registry was launched in July 2009 and is now in its fifth year of operation and has been renamed Burns Registry of Australia and New Zealand (BRANZ). This clinical quality registry captures epidemiological, quality of care, and outcome data for adult and paediatric burn patients across Australian and New Zealand burn units. The project is a collaboration between the Australian and New Zealand Burn Association (ANZBA) and Monash University, Department of Epidemiology and Preventive Medicine (DEPM).

Figure 1: Designated burns units across Australia and New Zealand



The registry is an ANZBA initiative with additional funding from the Julian Burton Burns Trust (2008-2013), the Australian Commission on Safety and Quality in Health Care (2008-09), the Helen Macpherson Smith Trust (2010-2012), the Thyne Reid Foundation (2011-2013), the New Zealand Accident Compensation Corporation (2013-2014) and the Australasian Foundation for Plastic Surgery (2013-2014). Individual burns units have also contributed to co-funding the registry to ensure the ongoing sustainability of BRANZ.

Participating Burns Units

Only sites with Institutional Ethics Committee (IEC) approval and the ability to provide resources for local data collection submit data to BRANZ. For the fourth year of reporting (July 2012 to June 2013), 16 of the 17 BRANZ sites had obtained ethics approval and 15 sites contributed data to the fourth annual report. Appendix 5 summarises the participating BRANZ sites.

Aims

The overall purpose of the registry is to monitor burn injury incidence, burn injury causation and to identify objective and verifiable data on treatment, outcomes and quality of care with the principal objective to encourage higher standards of both burn injury prevention and patient care.

The specific aims of BRANZ are to:

i. Describe the epidemiology of burn injuries and inform the development of burn injury prevention strategies in Australia and New Zealand

ii. Monitor the type and quality of burn care management

iii. Establish the clinical outcomes of burn patients

iv. Improve service planning

v. Develop best practice clinical guidelines and initiatives

vi. Benchmark performance indicators on a state, national and international level.

Project Achievements

Review of quality indicators

Key quality of care indicators were developed for BRANZ to allow the quality of health care provided to burn patients to be monitored and benchmarked across services. Nineteen quality indicators are embedded within BRANZ: a systematic review of these indicators was commenced in Year 4 and will be completed in 2014-15.

Reporting

Quarterly reports are routinely produced and provide summary aggregate data from the registry. The quarterly reports have been updated to enable comparison of individual burn units for key indicators. Data completeness by site is now also included in the quarterly reports. Individual sites are not identified by name in these reports but provided with their own identifier code to enable them to evaluate their own data relative to other sites. Additional reporting functions have been generated to allow individual units to produce their own reports and download data for their unit-specific purposes.

External requests for data must comply with BRANZ Data Access Policy. The data request form and associated policies are publicly available on the internet at https://bi-nbr.registry.org.au. In the fourth year of reporting, there were 19 requests for data for purposes such as injury prevention, education, public awareness campaigns and collaborative work with Emergency Services.

Presentations

During the reporting period, BRANZ was presented at the following national and international meetings

- Australasian Association for Quality in Healthcare Conference Sep 2012; Cairns, Australia. *The Bi-National Burn Quality Registry*
- International Society for Burn Injury ASC Sep 2012; Edinburgh, UK. *The Bi-NBR – moving towards benchmarking*
- International Society for Burn Injury ASC Sep 2012; Edinburgh, UK. *The BEAM Study: Burns evaluation and mortality*
- ANZ Burn Association ASM Sep 2012; Hobart, Australia. *The Bi-NBR – Use of data to drive clinical improvement*
- ANZ Burn Association ASM Sep 2012; Hobart, Australia. *Multi centre data collection – trials and tribulations*

How does BRANZ operate?

Inclusion / Exclusion Criteria

i. All first admissions to an Australian or New Zealand Burns Unit where a burn injury is the principal reason for admission and the following criteria are met:
   a. The first admission is within 28 days of the burn injury
   b. All transfers from another hospital irrespective of the time of injury to admission
   c. The patient is admitted under the Burns Unit or admitted to another hospital unit but requires a Burns Unit consult

ii. Admission to hospital for greater than 24 hours ***or*** the patient is admitted for less than 24 hours but requires a burns management procedure in theatre; ***or*** the patient dies within 24 hours of presentation to BRANZ hospital

iii. All readmissions to the Burns Unit within 28 days of the date of discharge from the first admission

Desquamating skin conditions such as Stevens Johnson Syndrome and Toxic Epidermal Necrolysis (TENS) are excluded from the registry.

Data Capture

Data collection is the responsibility of participating Burn Units. BRANZ data collectors are listed in Appendix 4. Patient data are retrieved via medical records and existing hospital information systems and entered into the web-based database. International Classification of Disease version 10, Australian Modification (ICD-10-AM) diagnostic and procedural codes are predominantly retrieved electronically from hospital information systems, and submitted for uploading to BRANZ.

Registry Data Quality Assurance

To ensure all burns data coordinators and collectors designated to collect data for the registry are collecting data in a standardised manner, formal training sessions are held when data collectors commence work. 'Refresher' training sessions and ad hoc informal training sessions are available as required.

To maximise data completeness, sites run their own data completeness reports prior to the central extraction of data for the quarterly and annual reports. Manual checking of data occurs at each reporting deadline, and quality assurance review and checks for reliability and validity are planned to ensure BRANZ produces high quality data. Completeness of data by site is also provided in the quarterly reports to enable individual sites to track their data completeness relative to other participating sites.

Data Analysis

Number of Burn Cases

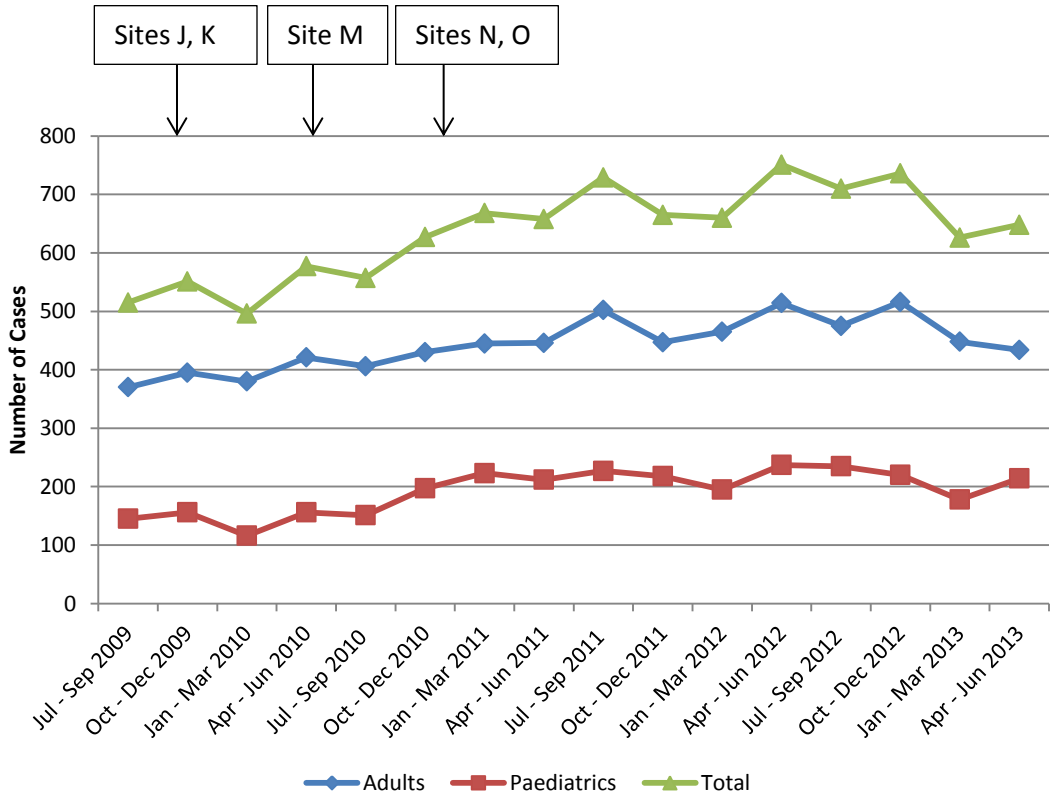
This section provides information about the number of patients admitted to a participating burns unit that met BRANZ inclusion criteria.

BRANZ burn cases

The total number of burn cases recorded on BRANZ for Year 4 (1st July 2012 to 30th June 2013) was 2,720, with 1,873 adult cases (16 years of age and older) and 847 paediatric cases (15 years of age and under).

For the reporting period, 15 sites submitted data to the registry. Of these sites, five sites treat paediatric patients, five sites treat adult patients and five sites treat both paediatric and adult patients (see Appendix 5). Figure 2 shows the numbers of adult cases and paediatric cases by quarter since the commencement of the registry in July 2009. Sites K, J, M, N and O commenced at different time points as identified in Figure 2 and the remaining sites commenced in July 2009. One paediatric site did not contribute data for the first quarter of Year 2, one paediatric site did not contribute data for two quarters of Year 3 and a third paediatric site has not contributed data consistently across all quarters. This limits the capacity to compare data about paediatric cases over time.

Figure 2: Reporting year trends in burn patients



Registry capture rate

Table 1 outlines the case numbers entered by each site by reporting year.

Table 1: Site case numbers per reporting year

Site	1 Jul 09 – 30 Jun 10	1 Jul 10 – 30 Jun 11	1 Jul 11 – 30 Jun 12	1 Jul 12 – 30 Jun 13	TOTAL
A	283	264	312	285	1144
B	237	269	263	274	1043
C	206	267	235	169	879
D	73	84	89	101	347
E	221	177	207	155	763
F	119	92	104	78	393
G	315	322	325	387	1349
H	183	237	272	287	979
I	249	223	240	238	950
J	9	0	19	0	28
K	55	85	75	83	298
L	209	226	281	270	986
M	2	65	84	75	226
N	0	62	105	88	255
O	0	137	217	220	574
P	0	0	0	10	10
Total	2161	2510	2828	2720	10224

Data Completeness

Appendix 1 outlines the completeness of each data item. Data not entered for an item or entered with the option of 'not stated/not adequately described', were defined as incomplete and were excluded from analysis for each of the relevant data items.

Demographic Profile of Hospitalised Burn Patients

Figures 3a and 3b show the age distribution by gender for paediatric and adult cases. Males represented 68 per cent of all cases which is consistent with the previous three reporting years, and also with the American Burn Association's National Burn Repository (NBR) data.

Almost a third (31 per cent) of paediatric cases were aged one to two years (33 per cent in 2011-2012), while a quarter of the adult cases were aged 20 to 29 years. These figures are consistent with the previous reporting year. They are also consistent with figures reported in the American National Burn Repository (American NBR) 2014 annual report, where children under the age of five accounted for 19 per cent of cases (compared to 22 per cent in BRANZ) and patients aged 60 or older represented 13 per cent of all cases (compared to 13 per cent in BRANZ).

Figure 3a: Age distribution by gender – Paediatric cases

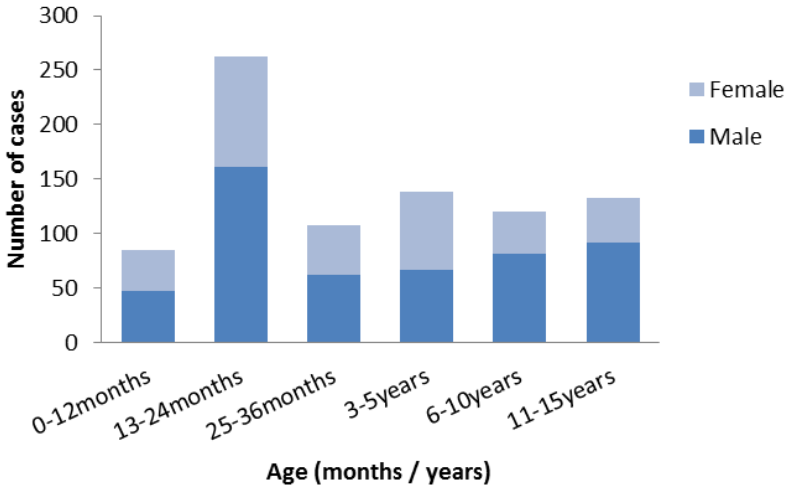
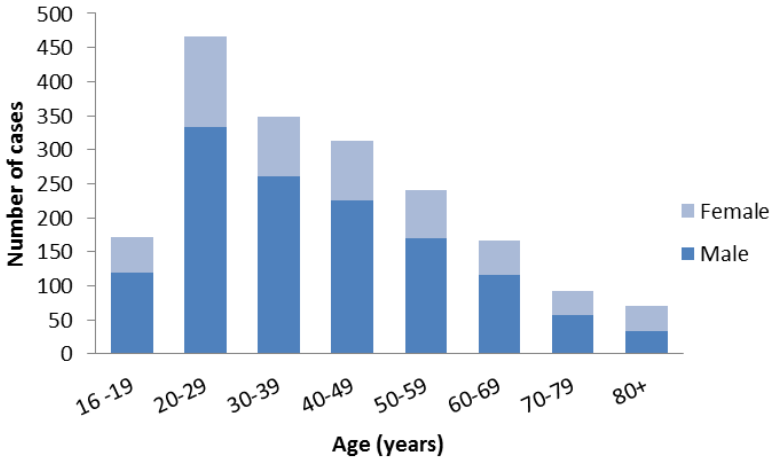


Figure 3b: Age distribution by gender – Adult cases



Australian hospitals routinely collect 'country of birth' whereas New Zealand hospitals record the 'ethnicity' of their patients. Therefore the data are reported separately for New Zealand and Australian burn centres (Table 2).

The majority of cases (82 per cent) admitted to Australian burn units were born in Australia. Indigenous Australians accounted for eleven per cent of paediatric cases and five per cent of adult cases born in Australia, which is consistent with the previous reporting years. There were 342 patients admitted to Australian burn units who were born overseas. These patients were born in Europe, Asia, North Africa and Middle Eastern countries.

Of the New Zealand burn admissions , 60 per cent were classified as a 'New Zealander' and 21 per cent of New Zealand admissions (n=60) were classified as New Zealand Maori. A further 117 patients were of other Oceanian descent, predominantly Samoan (n=23, eight per cent).

Table 2: Region of birth for Australian and Ethnicity by region for New Zealand Burn Units

Region of birth - Australian Units	N	%
Australia	1917	81.9
North West Europe	113	4.8
Southern and Eastern European	69	2.95
Southern and Central Asian	44	1.88
South East Asian	36	1.54
North African and Middle Eastern	35	1.5
New Zealander	37	1.58
North East Asia	43	1.84
Sub-Saharan Africa	21	0.9
Peoples of the Americas	10	0.43
Oceanian (other)	14	0.6
		100.0

Region of Ethnicity - New Zealand Units	N	%
New Zealander	172	59.5
Oceanian (other)	117	34.9
South East Asian	19	5.7
Southern and Central Asian	8	2.4
North West European	7	2.0
North Africa and Middle Eastern	*	0.9
Sub-Saharan African	*	0.6
North East Asian	5	1.5
Southern and Eastern Europe	*	0.6
		100.0

* Denotes less than five cases

Most cases admitted to Australian burn units were funded by the Australian Health Care Agreement (n=1,945, 82 per cent). A further nine per cent (n=211) were covered under the relevant workers compensation scheme in each State or Territory and six per cent (n=143) were through various private health insurance schemes. Examples of other sources of funding were third party motor vehicle insurance, department of Veterans Affairs, Department of Defence and reciprocal health care agreements. Most New Zealand cases were funded by the Accident Compensation Corporation (n=338, 99 per cent) which is the comprehensive , no-fault personal injury insurance scheme for all New Zealand residents and visitors to the country.

What Was the Cause and Location of the Events Leading to a Burn Injury?

This section outlines the cause of burn injury, the activities leading to injury, the places of injury, and the geographical region of the injury across Australia and New Zealand.

Burn Injury Cause

Consistent with previous years, flame and scald burns were the most common cause of burn injury. Flame burns accounted for 36 per cent, scalds for another 36 per cent and contact burns for fifteen per cent of all cases. The 2014 data from the American NBR also identified flame burns and scalds as the most common aetiology, however fire/flame related injuries were more common (44 per cent) than scald injuries (33 per cent) in the USA.

Tables 3a and 3b outline the cause of injury by paediatric and adult age groups and Figure 4a and 4b compares common burn causes across all age groups. Consistent with previous years, scald burns were the most common cause of injury for paediatric cases aged ten years or less. For the 11 to 15 year age group, flame burns were the most common cause of injury (n=53). Contact burns were the second most common injury accounting for 23 per cent of paediatric burn unit admissions. In the adult age range of 16 to 49 years, flame burn was the most common cause of injury and scald burns were the predominant cause of burn for those aged 70 years and over.

Table 3a: Primary cause of burn by Paediatric age group

Primary Cause of Burn	Paediatric Age Group (months & years)							
	0-12 months	13-24 months	25-36 months	3-5 years	6-10 years	11-15 years	Total	%
Scald	61	194	64	61	49	29	**458**	**54.3**
Contact	16	53	22	25	36	38	**190**	**22.5**
Flame	*	*	*	23	23	53	**110**	**13.0**
Friction	*	6	15	23	6	7	**58**	**6.8**
Chemical	*	*	*	*	-	*	**9**	**1.0**
Radiant Heat (no contact to source)	*	-	*	*	*	*	**11**	**1.3**
Electrical	-	*	-	*	*	*	**7**	**0.8**
Total	85	263	108	136	119	133	**853**	**100.0**

* Denotes less than five cases

Table 3b: Primary cause of burn by Adult age group

Primary Cause of Burn	Adult Age Group (years)									
	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Total	%
Flame	76	226	172	146	111	75	38	15	**859**	**46.0**
Scald	51	112	85	73	76	56	31	38	**522**	**27.9**
Contact	24	62	34	50	21	15	12	13	**231**	**12.4**
Chemical	7	26	25	20	19	10	*	*	**111**	**5.6**
Friction	10	25	10	8	6	*	*	*	**65**	**3.5**
Electrical	*	12	14	9	5	*	*	-	**47**	**2.5**
Radiant Heat (no contact to source)	-	*	5	*	*	5	*	*	**24**	**1.3**
Pressurised gas/air (non-flame)	-	-	*	*	-	-	*	-	**3**	**0.2**
Cooling	-	-	*	*	*	*	-	-	**2**	**0.1**
Total	171	467	347	313	241	165	92	71	**1867**	**100**

* Denotes less than five cases

Figure 4a: Frequency of Flame, Scald and Contact burns by Paediatric Age Group

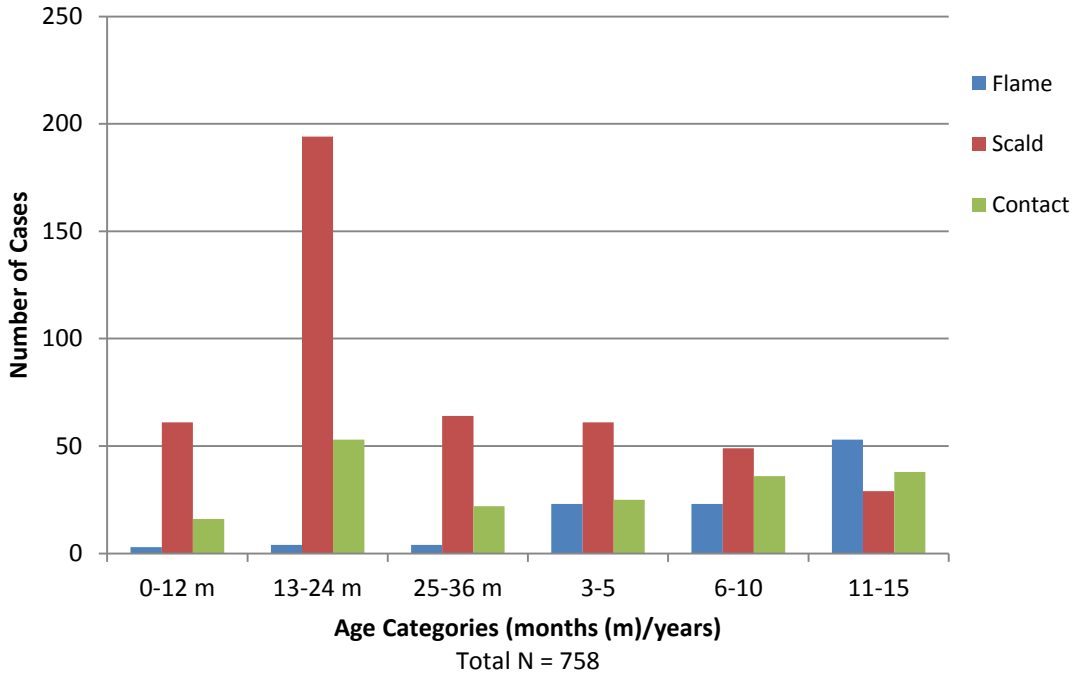
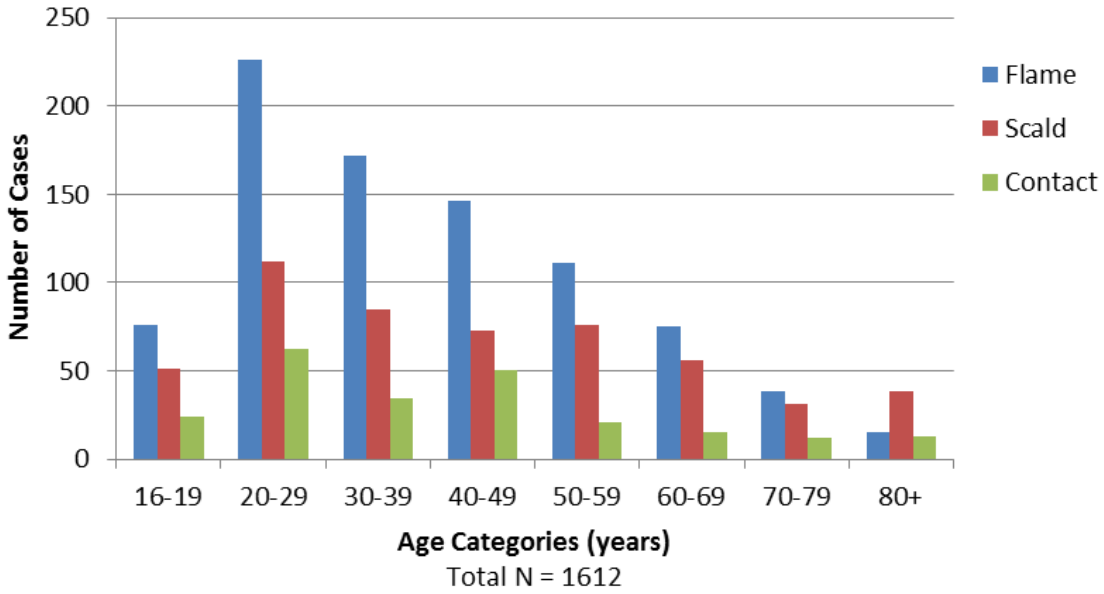


Figure 4b: Frequency of Flame, Scald and Contact burns by Adult Age Group



The most common sub-causes of paediatric and adult burn injuries are shown in Tables 4a and 4b. These sub-causes accounted for 75 per cent of paediatric cases and 68 per cent of all adult cases.

In paediatric cases, hot beverages were the most common cause of scald injury followed by water from a saucepan/kettle/jug/billy/urn/thermos and scald injury from food. In adult cases, flame burns resulting from a campfire, bonfire or burn-off was by far the most common sub-cause, followed by scalds due to fat/oil and scalds from water from saucepan/kettle/jug/billy/urn/thermos. The three most common sub-causes of burn injury in both adults and paediatrics have been consistent over the past four years.

In almost two-thirds (62 per cent) of flame burn cases, an accelerant was used to ignite/enhance the flame. Petrol was the most common accelerant used (46 per cent) followed by methylated spirits (13 per cent). Petrol has been the predominant accelerant and methylated spirits the second most common accelerant for all years of reporting by BRANZ.

Table 4a: Primary sub-causes of burn injury in paediatric cases

Cause	Sub Cause	N	%
Scald	Hot beverages	176	20.8
Scald	Water from saucepan /kettle/jug/billy/urn/ thermos	108	12.8
Scald	Food (liquid/solid)	71	8.4
Contact	Coals/Ashes	52	6.1
Contact	Vehicle Exhaust	47	5.5
Scald	Water from tap/bath/shower	39	4.6
Flame	Campfire/bonfire/burn off	38	4.5
Friction	Via treadmill	36	4.2
Flame	Lighter/matches	24	2.8
Scald	Fat/oil	21	2.5
Contact	Iron	11	1.3
Contact	Wood Heater	11	1.3
Scald	Water from basin/sink/bucket	9	1.0
Friction	Via Pushbike	9	1.0

Table 4b: Primary sub-causes of burn injury in adult cases

Cause	Sub-Cause	N	%
Flame	Campfire/bonfire/burn off	277	14.7
Scald	Fat/oil	134	7.3
Scald	Water from saucepan /kettle/jug/billy/urn/ thermos	105	5.6
Flame	Other	103	5.5
Chemical	Acid	76	4.0
Flame	BBQ	66	3.5
Scald	Hot beverages	58	3.0
Flame	Welder grinder	56	2.9
Flame	Lighter/matches	54	2.9
Flame	Source of flame unclear	54	2.9
Flame	Vehicle engine parts	52	2.7
Friction	Via vehicle/motorbike	48	2.6
Scald	Water from tap/bath/shower	47	2.5
Flame	Gas/gas bottle	46	2.4
Contact	Vehicle Exhaust	45	2.4
Scald	Food liquid/solid	44	2.3
Flame	Cigarette	41	2.2

Seasonal Trends

Using the date of injury it was determined if the burn occurred during summer, autumn, winter or spring to identify if trends in burn injury were evident and this data is presented in Figures 5a and 5b. A burn injury sub-cause was recorded in 1859 adult cases and 843 paediatric cases. Comparisons across the four years are included where possible.

Paediatric cases

Flame burns by campfire/bonfire/burn-off (n=18, 45 per cent), contact burns by coals/ashes (n=19, 44 per cent) and heater burns were more prevalent in winter (n=12, 44 per cent). Flame burns caused by lighters and matches were also more common in winter (n=11, 44 per cent) compared to summer (n=4, 16 per cent).

Burns caused by contact with a vehicle exhaust were more prevalent in summer (n=16, 40 per cent). These injuries were commonly sustained when riding or being a passenger on a motorbike/quad bike/trail bike and most patients (n=11) were between 11 and 15 years of age.

Treadmills pose a significant danger for children as friction burns can occur when the moving treadmill is touched. Friction burns by treadmill occurred more frequently in Summer and Spring collectively (n=19) compared to Autumn and Winter (n=12); the majority of patients were under five years of age (n=17; and 28 cases occurred in the home.

Adult cases

In adult cases, more than half of burns from hot water bottles (n=22, 56 per cent) and heaters (n=51, 57 per cent) occurred in the Winter, reflecting the higher levels of exposure in these cooler months. Heaters were inclusive of electric, wood, gas and any other heater types coded as 'heater'.

For Australian cases (n=257), the proportion of flame injuries caused by campfire/bonfire/burn-off was two-fold higher in autumn (n=85, 30 per cent) and winter (n=87, 31 per cent) compared to summer (n=43, 15 per cent) when open fires are less likely to occur during the fire danger season and restrictions on the use of open fires and flame sources. In contrast, for New Zealand cases, flame injuries by campfire/bonfire/burn-off occurred more frequent in Summer (n=10) and Autumn (n=8) compared to Winter (n=5). New Zealand Burns Units have previously launched burns prevention campaigns leading up to the summer months as people are more likely to undertake property maintenance and 'burn-offs' to clear their properties.

As would be expected, the incidence of flame burns involving barbeques was higher during Summer (n=49, 41 per cent) when people are more likely to cook outdoors. Intentional or accidental use of an accelerant as an ignition source (n=560, 36 per cent) was a consistent contributor to flame burn injury across all seasons; 35 per cent in Summer, 29 per cent in Autumn, 26 per cent in Winter and 28 per cent in Spring.

Figure 5a: Seasonal Trends by Paediatric Age Group

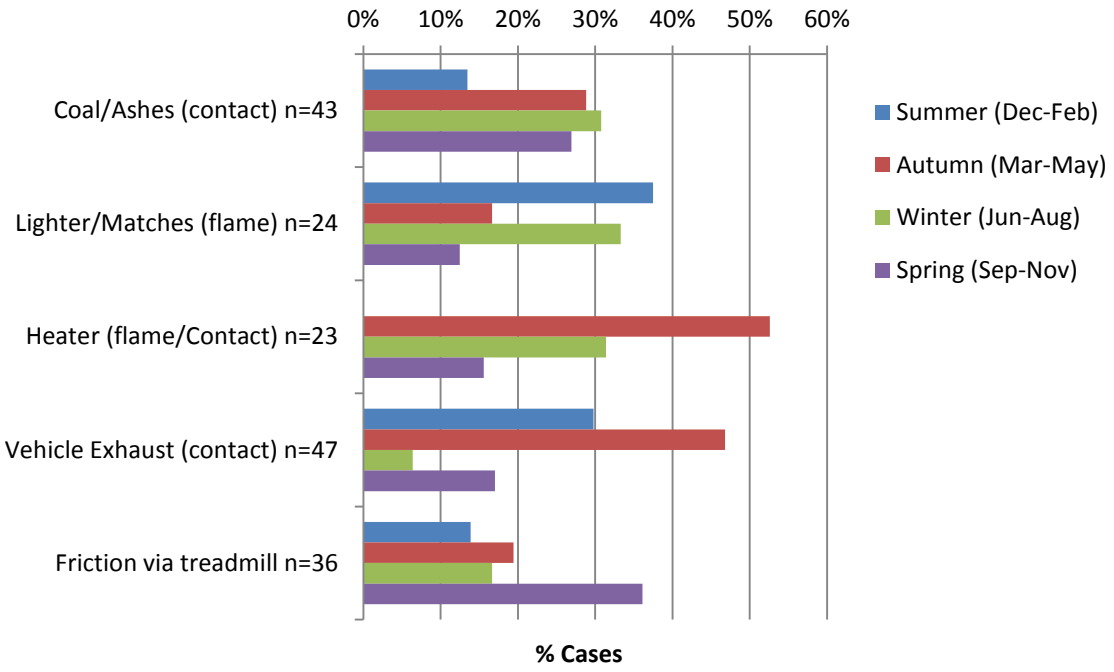
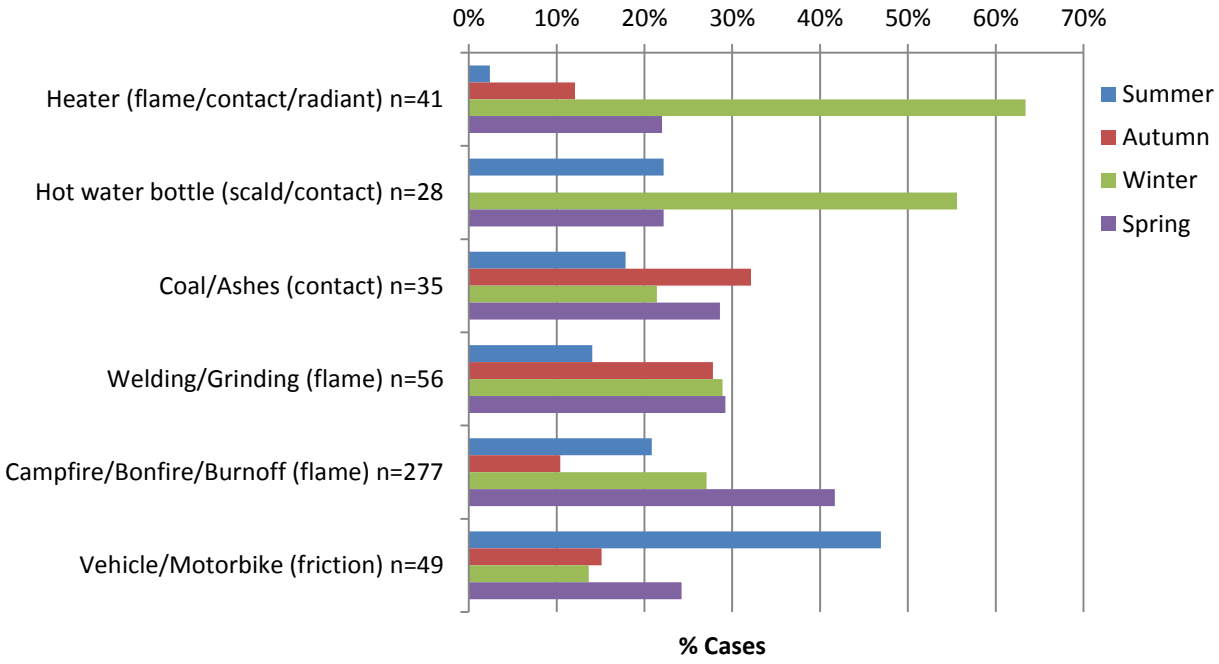


Figure 5b: Seasonal Trends by Adult Age Group



** "Heater" is inclusive of electric, wood, gas and any other heater types coded as 'heater'*

Examining the impact of the changing seasons on burn cause can help guide burns prevention strategies and resource utilisation. Seasonal variations in weather across Australia and New Zealand (e.g. 'wet' and 'dry' seasons in Northern Territory) and identification of possible bias in the type and severity of burn injuries admitted to individual burns units enables those units to target prevention strategies.

Intent, place and activity of injury

Consistent with previous reporting years the majority of burn patients (94 per cent) sustained their injury during accidental events. Intentional self-harm accounted for three per cent of all cases. The remaining cases were assaults, an event of unspecified intent or adverse effects or complications of medical treatment. Eighty three per cent of unintentional burn cases and fifty five percent of intentional self-harm cases sustained injuries that were in the lowest TBSA category (0-9%). The proportion of cases in the highest TBSA category (>50%) varied widely between the two groups. Seventeen per cent of intentional self-harm cases had injuries that were over 50% TBSA while the proportion of cases over 50% TBSA were less than one percent in the accidental group.

The most common place of injury was the home for both paediatric (77per cent) and adult cases (55 per cent) and this is consistent with all years of BRANZ reporting, and also with the 2014 data from the American NBR, where 73 per cent of admissions were due to burn injuries that occurred at home.

The burn occurred in the kitchen for 46 per cent of paediatric cases and 30 per cent of adult cases. The next most common places of injury for paediatric cases were the living room/playroom/family room (17 per cent) and the garden/yard (15 per cent). The garden/yard was the second most common place of injury for adult cases (29 per cent).

The places of injury for paediatric and adult cases are summarised in Tables 5a and 5b.

Tables 6a and 6b outline common activities being performed at the time of injury for paediatric cases and adult cases (where more than five cases). 'Playing' and being 'near a person preparing food or drink', were the most common activities at the time of injury for paediatric cases. Of the children two years of age and younger who sustained a scald injury (n=245), nearly half of these cases occurred whilst near a person preparing food or drink (49 per cent). This is consistent with the previous BRANZ annual reports.

Table 5a: Place of injury – Paediatrics

Place of injury	N	%
Home	628	77.2
Place for recreation	58	7.1
Other residence (e.g. friend's house)	56	6.9
Street and highway	22	2.7
School, other institution and public administrative area	13	1.6
Farm	13	1.6
Other specified place	11	1.4
Trade and service area	9	1.1
Sports or athletics area	*	0.4
Industrial and construction area	*	0.1

* Denotes less than five cases

Table 5b: Place of injury – Adults

Place of injury	N	%
Home	1000	55.3
Trade and service area	173	9.6
Place for recreation	153	8.5
Street and highway	135	7.5
Other residence (e.g. friend's house)	117	6.5
Industrial and construction area	96	5.3
Farm	55	3.0
School, other institution and public administrative area	24	1.3
Residential Institution	16	0.9
Other specified place	33	1.8
Sports or athletics area	8	0.4

Consistent with previous annual reports, participating in a leisure activity, cooking and working for income were the most common activities resulting in a burn injury in adults. Of the adults cases who were 'working for income' and there was a recorded activity at time of injury, almost half (n=129, 47 per cent) occurred in the 'Trade and service area', followed by the 'Industrial and construction area' (n=87, 31 per cent). These figures are very similar to the previous reporting year.

In the 20 to 29 years age group, leisure activities accounted for 44 per cent of burns and the place of injury was in the home or another person's residence (60 per cent). In the 60 years and over age group, the most common activity at the time of injury was cooking (25 per cent). This is consistent with the previous annual reports for BRANZ.

Table 6a: Activity at the time of injury - Paediatrics

Activity at the time of injury	N	%
Playing	276	34.5
Near person cooking	188	23.5
Leisure activity (excluding sporting activity)	143	17.9
Cooking	43	5.4
Eating/drinking	41	5.1
Bathing	40	5.0
Other specified activities	15	1.9
Driving	16	2.0
Sleeping/resting	8	1.0
Other vital activities	8	1.0

Table 6b: Activity at the time of injury - Adults

Activity at the time of injury	N	%
Leisure activity (excluding sporting activity)	366	20.0
Cooking	362	19.8
Working for income	275	15.0
Sleeping/resting	121	6.6
Household maintenance	106	5.8
Driving	96	5.2
Self- harming	73	4.0
Other specified activities	71	3.9
Vehicle maintenance	69	3.8
Bathing	59	3.2
Gardening	45	2.5
Eating/drinking	32	1.7
Other vital activities	28	1.5
Cleaning	28	1.5
Near person cooking	25	1.4
Suspected illegal activity	23	1.3
Other types of unpaid work	15	0.8
Playing	13	0.7
Leisure activity (excluding sporting activity)	366	20.0

Drug and/or alcohol involvement

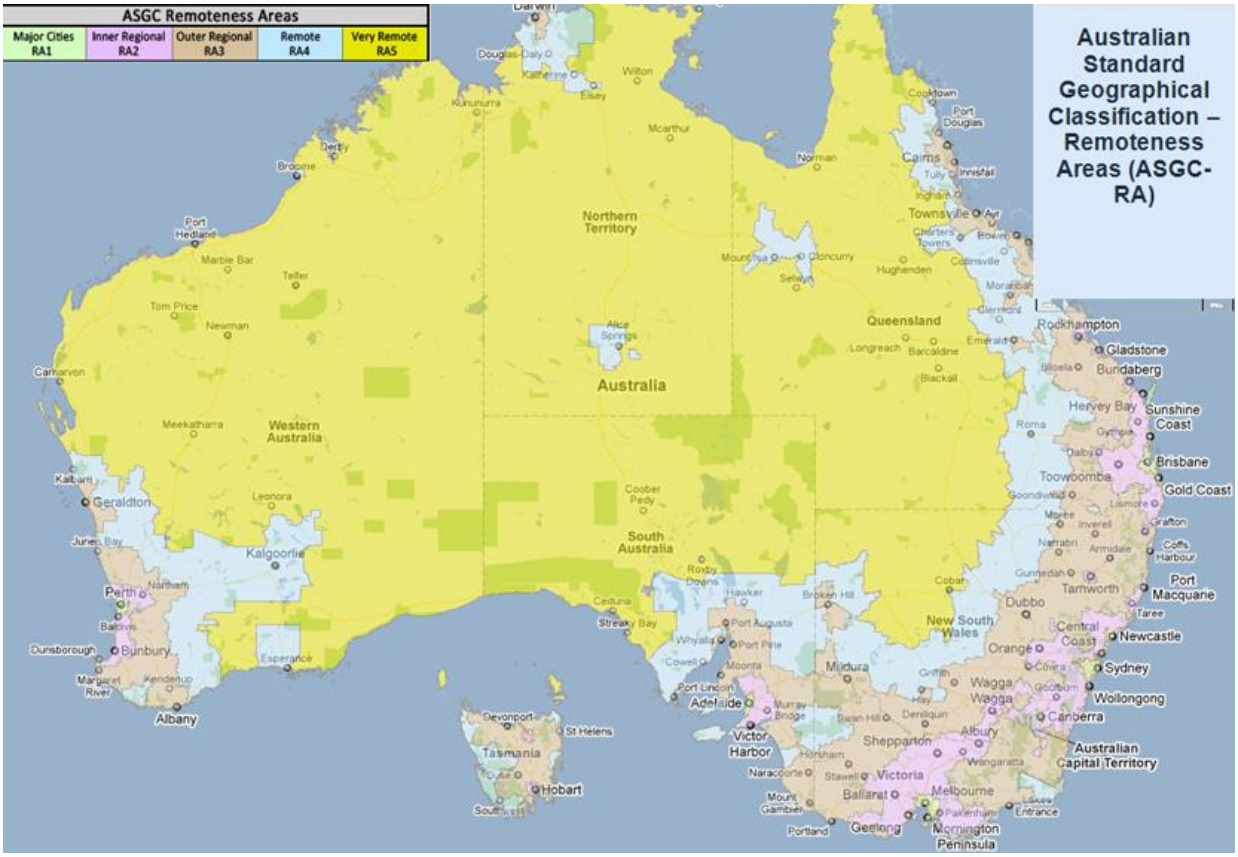
For the majority of cases (85 per cent), there was no documented suspicion of drug or alcohol involvement and this is consistent across with previous BRANZ annual reports. A documented suspicion of alcohol only without drug involvement was recorded in 12 per cent of cases, drugs without alcohol in two per cent of cases and a combination of drugs and alcohol was recorded in one per cent of cases. Blood testing for alcohol or drug involvement is not routinely conducted for all burn patients and therefore the information captured is based on medical record documentation of suspicion of, or known, alcohol or drug involvement.

Location of burn injury by region (Australian Sites)

Consistent with previous years, over half (57 per cent) of burns admissions to Australian units occurred in major cities according to the Australian Bureau of Statistics Classification of Remoteness [3]. A further 34 per cent occurred in regional Australia and nine per cent in remote areas. The rate of burn injury resulting in burn unit admission per 100,000 population is seven-fold higher for very remote areas compared to major cities. All burn units are located in major cities, highlighting the implications for transport and pre-hospital care, as well as for provision of rehabilitation. Table 7 shows the total rate of burn injury resulting in burn unit admission per 100,000 population, and the rate for non-indigenous and indigenous Australians. The rate of admission to Australian burn units is almost double for the Aboriginal and Torres Strait Islander population compared to the non-indigenous population. Overall, the rate of admission to Australian burn units was lower in 2012-13 compared to 2011-12, mostly due to lower rates of admission in outer regional, remote and very remote Australia.

Table 7: Total rate of injury per 100,000 population and the rate of burn injury in non-indigenous and indigenous Australians

Remoteness Category	Rate per 100,000 population		
	Total	Non-indigenous	Indigenous
Major cities of Australia	6.8	6.7	12.8
Inner regional Australia	6.8	6.8	3.9
Outer regional Australia	17.5	17.6	11.2
Remote Australia	24.5	25.6	18.7
Very remote Australia	49.2	53.5	45.2
Total rate of injury	8.4	8.1	15.4



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Burn Injury Severity

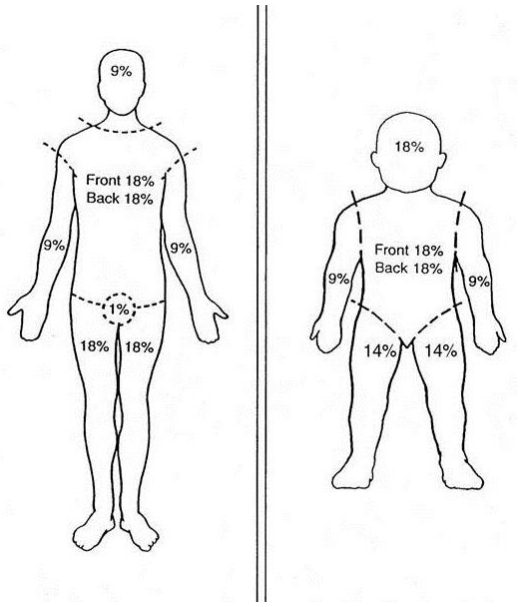
This section outlines the severity of burn by burn size (percentage total body surface area burnt, percentage TBSA), burn depth and the presence of an inhalation injury.

Total Burn Surface Area (per cent TBSA)

A burn of less than ten per cent TBSA was recorded for 82 per cent of adult and paediatric cases and this finding is consistent with all previous BRANZ annual reports. Seventy per cent of burn injuries reported to the American NBR in 2014 were less than ten per cent TBSA. Previous studies in the USA have shown that a high proportion of burn patients meeting criteria for admission to burn units are managed at non-burn unit hospitals. Therefore, the difference noted in the distribution of burn size between the American NBR and BRANZ could be due to greater compliance with guidelines for admission to a burn unit in Australia and New Zealand (Appendix 8).

Table 8: Percentage Total Body Surface Area Burnt – Paediatrics and Adults

% TBSA category	Paediatrics		Adults	
	N	%	N	%
0-9%	754	89.0	1473	78.4
10-19%	69	8.2	247	13.2
20-49%	22	2.6	125	6.7
≥ 50%	2	<1.0	33	1.8
TOTAL	847	100	1878	100



Rule of Nines – example of a burn assessment tool

For paediatric patients, 89 per cent sustained a burn of less than ten per cent TBSA and fewer than three per cent sustained a burn that was greater than 20 per cent TBSA. For adult patients, over three quarters (78 per cent) experienced a burn less than ten per cent TBSA and just over eight per cent sustained a burn that was greater than 20 per cent TBSA. Under two per cent of adults sustained a burn involving 50 per cent or greater of their TBSA. Table 8 shows the distribution of TBSA for paediatrics and adults cases.

Burn Depth

As described in previous annual reports, improvements in the BRANZ database from July 2010 allowed burn depth data to be more accurately recorded and therefore used for analysis. A burn depth was recorded for 87 per cent of cases. A full thickness burn was recorded in 20 per cent (n=450) of these cases. The percentage TBSA of the full thickness burn was documented for 84 per cent of these cases. Table 9 outlines the number of cases where the percentage TBSA for a full thickness burn was documented. The number of cases with coded full thickness burns over ten per cent TBSA (nine per cent) was consistent with previous years (seven per cent).

Table 9: Percentage of TBSA with full thickness burns

% Full Thickness TBSA	N	%
< 10 %full thickness	693	79.2
10-19%full thickness	79	9.0
20-49%full thickness	73	8.3
≥50% full thickness	30	3.4
Total	875	100

Inhalation injury

Inhalation injuries are complex and are suspected on the basis of a history of smoke exposure, clinical presentation and diagnostic investigations. Burns to the oropharynx and upper airway result in swelling and possible airway obstruction within the first few hours after injury. An inhalation injury is recorded if it is documented in the patient history. There is currently no agreed method across BRANZ sites for reporting of inhalation injuries given the challenges in recognising and diagnosing an inhalation injury, particularly in patients with less severe injuries or where the clinical consequences are delayed.

A documented inhalation injury was recorded for six per cent of adult cases (n=111) and less than one per cent of paediatric cases. Of the patients who died following their burn injury, 54 per cent had sustained an inhalation injury.

How were the burns patients managed prior to admission to the burns unit?

This section describes the pre-hospital phase and burn cooling response, the referral process and transfer times. Quality indicator data associated with the standard of care documented are also provided. Data from this and future reports will guide the establishment of suitable standards of care across Australia and New Zealand.

Burn Cooling

Burn cooling is critical in the initial first aid response to a burn injury. Applying cool running water to the burn for 20 minutes within three hours of the injury is considered best practice in terms of reducing the area of skin affected by the burn, the depth of the burn and for pain management [4-6]. While applying water for a longer period than 20 minutes can have an analgesic effect on small burns, the symptoms of hypothermia need to be monitored, particularly in larger burns [4, 5, 7, 8].

The proportion of cases that received burn cooling at the scene of injury was 76 per cent for paediatric cases, which was lower than the 86 per cent of paediatric cases who received burn cooling at the scene in the previous year. In adults, 65 per cent of cases received burn cooling at the scene of injury, which is consistent with the previous year (69 per cent). Of these cases that had documented burn cooling at the scene of injury, cool running water was used in 86 per cent of paediatric cases and 92 per cent of adult cases as shown in Table 11. The time from injury to application of water to the burn was within three hours of injury in 96 per cent of cases, which is similar to previous years. Twenty-six per cent of paediatric, and 37 per cent of adult cases, were cooled with water for more than 20 minutes. Tables 11 and 12 outline the nature of documented burn cooling completed at the scene of injury.

Table 11: Documented Burn cooling completed at the scene of injury

Scene of injury	Paediatrics		Adults	
	N	%	N	%
Cool running water applied	558	85.9	1122	91.6
Within three hours of injury ** of cases where cool running water applied*	529	94.8	1086	96.8

Table 12: Time of water application at the scene

Time of water application	Paediatrics		Adults	
	N	%	N	%
< 20 minutes	391	70.0	684	60.9
Greater than 20 minutes	146	26.2	411	36.6

Consistent with the previous year, the most common 'other' cooling techniques used at the scene of injury included; application of wet cloths such as towels, dressings and blankets and immersion in water where this was a bath, swimming pool, river, lake or the sea. Use of ice and ice packs, aloe vera, butter, and toothpaste were used in 12 per cent of cases that had burn cooling at the scene of injury however, these treatments are not recommended as effective or appropriate first aid for burn injury. The prevalence of use of these inappropriate methods of burn cooling has not changed since the previous year.

What was the referral source to the burns unit?

Consistent with previous annual reports, half of both the paediatric and adult cases were transferred to the burns unit from another hospital. Fifteen per cent of paediatric, and 26 per cent of adult, cases were directly transported from the scene of injury via ambulance to the burn unit. These figures are consistent with previous reporting years.

How long did it take for the burn patient to be admitted to a burns unit?

The time taken for a burn patient to be admitted from the scene of the burn injury to a BRANZ hospital significantly influences initial medical and surgical management of burn injuries. Given the centralised structure of burn care services across Australia and New Zealand, and the geographical size and distances required to travel to a burns unit, identifying a standardised acceptable transfer time for benchmarking has been challenging in some states. The registry therefore collects data on the length of time taken to admission from time of injury, and reasons admission to a burns unit is greater than two hours. This data will assist in developing an acceptable time frame for transfer to a BRANZ hospital, identify if pre burn unit care was appropriate and monitor outcomes of care where there have been transfer delays.

Figure 6: Time from injury to admission

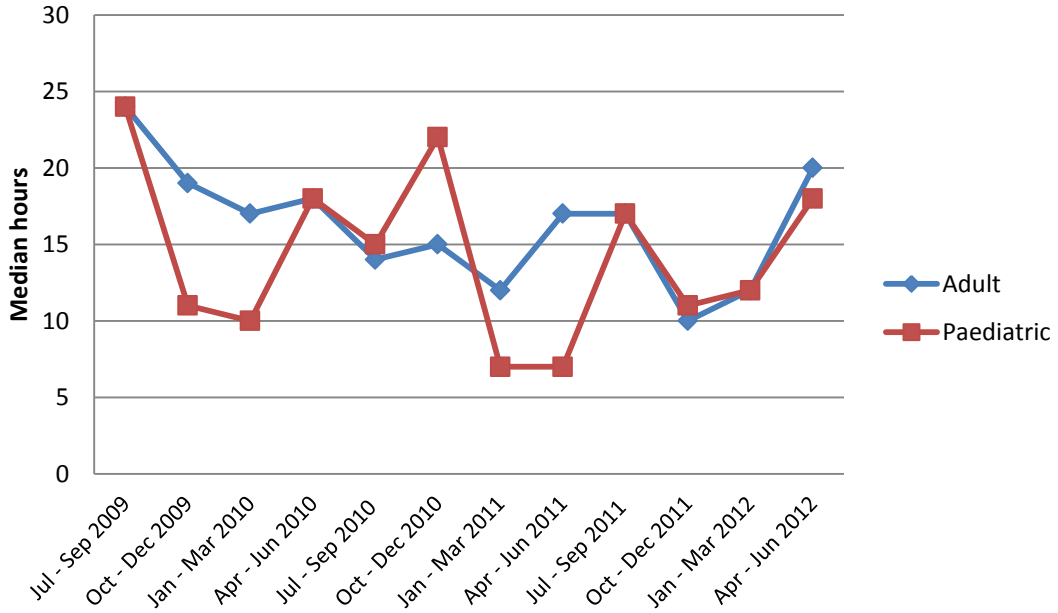


Figure 6 shows the median time from injury to admission for paediatric and adult cases. The median (IQR) time from injury to admission to BRANZ hospital was ten (3-66) hours for paediatric cases which was lower than that in the 2011-12 reporting year (16 hours). For adult cases the median (IQR) time from injury to admission was 16 (4-94) hours which is similar to the median time of 14 hours reported in the previous year.

The initial treatment of a burn patient is critical for reducing the risk of complications, poor long term outcomes and mortality. ANZBA advocate that referring hospitals consult with the burn unit as soon as possible to assist with the initial treatment plan and in triaging the patients requiring transfer. A burn size greater than 20 per cent TBSA in adult cases and greater than ten per cent TBSA in paediatric cases are considered major burns by ANZBA. In adult cases with a burn size greater than 15 per cent TBSA and who were referred from another hospital, the referring hospital made contact with the burn unit within one hour of injury in 55 per cent of cases, consistent with the 60 per cent of cases reported in 2011-12. For paediatric cases with a burn size greater than ten per cent TBSA, contact was made within one hour in 31 per cent of cases which has increased from 15 per cent in 2010-11 and 25 per cent in 2011-12.

For 55 per cent of patients transferred from another hospital, the reason for the delay in transfer was considered as a result of the geographical distance of the burn injury from the Burn Unit, and for 15 per cent of cases, the delay was attributed to transport issues. For 30 per cent of cases, the delay was as a result of the patient not presenting to the referral hospital in a timely manner, which is higher than the 16 per cent of delayed transfers attributed to this cause in 2011-12.

For adult cases transferred from the scene of injury to the Burn Unit with a burn size greater than 15 per cent TBSA, 63 per cent were received at BRANZ hospital within two hours of injury, lower than the 70 per cent of cases in the previous year. Ninety per cent of adult cases with a burn size greater than 15 per cent TBSA were transferred from the scene of injury to the Burn Unit within 6 hours. In paediatric cases with a burn size greater than ten per cent TBSA 71 per cent were received at BRANZ hospital within two hours of injury, and 95 per cent arrived within seven hours of injury.

Burn unit performance

The following section outlines burn unit performance and reports quality of care data for established processes of care. Data from this and future reports will be instrumental in developing standards of acceptable performance for burns care across the region.

Wound assessment

The definitive burn wound assessment is defined as the burn assessment documented by the most senior burns clinician within 72 hours of admission.

In 26 per cent of paediatric cases, and 26 per cent of adult cases, their definitive burn wound assessment was documented within 72 hours of admission to hospital. For paediatric cases, the burn registrar recorded the burn wound assessment within 72 hours of admission for 43 per cent of cases,

followed by the burn care nurse coordinator/or nurse practitioner (20 per cent), and 'other' clinicians (ten per cent). For adult cases, where assessment was documented within 72 hours, the person conducting the assessment was the burns fellow in 23 per cent of cases, the burns consultant for 18 per cent, and the burns registrar for 17 per cent of cases.

Senior Burns Clinician assessment

It is common practice that more serious burns are assessed and managed by a senior burn clinician. A senior burns clinician is defined as a surgeon with a minimum of two years' experience in a major burn unit with Emergency Management of Severe Burns (EMSB) certification, or a Burns Nurse Practitioner with EMSB certification.

For paediatric patients with major burns (greater than ten per cent TBSA), a senior burn clinician assessment was documented in 78 per cent of cases, compared to 87 per cent in 2011-2012 year and 79 per cent of cases in the 2010-11 year. This assessment was documented to have occurred within 24 hours of admission for 64 per cent of paediatric cases, which is consistent with previous reporting years (67 per cent in 2011-2012 and 69 per cent in 2010-2011).

For adult cases with major burns (greater than 15 per cent TBSA), a senior burn clinician assessment was documented in 83 per cent of cases. This assessment occurred within 24 hours of admission for 69 per cent of adult cases which is higher than that in the last reporting year (50 per cent in 2011-2012 and 75 per cent in 2010-2011).

Theatre for burn wound excision

Seventy-two per cent of all cases underwent at least one burn wound management procedure in theatre and this is consistent with previous reporting years.

Table 13 outlines the percentage of procedures conducted for paediatric and adult cases. One case may have multiple procedures recorded; percentages are reflective of total procedures recorded and not procedures per case. Data is collected only for the first time to theatre for a particular procedure.

The 'other' procedures were predominately primary wound closure, fasciotomy, amputation, free flaps and the application of dressing such as vac dressings.

Table 13: Percentage of burn wound management procedures

Procedure	Paediatrics cases		Adult cases	
	N	%	N	%
Debridement and skin grafting	307	49.7	920	51.1
Debridement and temporary skin closure product e.g. Biobrane™	105	17.0	372	20.7
Debridement only	88	14.4	320	17.8
Debridement and skin cell product (e.g. CEA)	91	0.5	159	8.8
Debridement and dermal reconstructive product e.g. Integra™	3	0.5	7	<0.5
Total	**594**		**1778**	
Other procedures not outlined above				
Dressing change in theatre only	15	2.4	12	0.7
Escharotomy	4	0.5	1	<0.5
Other	5	0.8	8	<0.5
Total	**24**		**21**	

Burn wound debridement and skin grafting was completed for 50 per cent of paediatric cases and 51 per cent of adult cases. For cases where a full thickness burn was coded, 81 per cent of paediatric cases and 84 per cent of adult cases underwent debridement and grafting. The median time to grafting from injury was 10.8 (6.6 - 14.8) days for paediatric cases, higher than the median of six days reported in the previous year. For adult cases, the median time to grafting from injury was 5.7 (3.0 - 9.9) days, which is similar to the median of six days reported in the previous year.

Physical functioning assessment

Rehabilitation following burn injury requires a coordinated approach from a specialised multi-disciplinary team to minimise complications from burns such as scarring, contractures and loss of function [9-11]. Dedicated allied health burn clinicians are responsible for assessing burns patients and commencing rehabilitation as early as possible. Of the paediatric patients who had burns greater than ten per cent TBSA and a stay in hospital for more than 24 hours (n=64), 86 per cent had documentation of a physical functioning assessment by a physiotherapist or occupational therapist within 48 hours of admission consistent with the previous reporting year. For adult patients, with burns greater than 15 per cent TBSA (n=210) and a stay in hospital for more than 24 hours, 88 per cent had documentation of a physical functioning assessment within 48 hours of admission, consistent with the previous reporting year.

Enteral / parenteral feeding

Burn injury increases the body's metabolic requirements. The early provision of an adequate supply of nutrients is considered crucial in reducing the effects of metabolic abnormalities [10, 12-14]. Of the paediatric cases with a burn greater than ten per cent TBSA (n=91), supplementary feeding (either enteral or parenteral) was documented as commencing within 24 hours of admission for 47 per cent of patients, lower than the 72 per cent reported in the previous year. For adult cases with a burn greater than 20 per cent TBSA (n=154), supplementary feeding was documented as commencing within 24 hours for 69 per cent of patients, which was higher than observed in the last reporting period (55 per cent).

In-hospital Outcome of Burn Injury

This section describes the hospital outcomes of burn care, including intensive care (ICU), complications during the episode of care, length of stay, discharge disposition and re-admissions.

ICU admissions

Critical care management and mechanical ventilation may be required after burn injury [15, 16]. An ICU admission was required for four per cent of paediatric cases and 15 per cent of adult cases which is consistent with previous reporting years. Of the paediatric cases with a burn greater than ten per cent TBSA, an ICU admission was required for 19 per cent of cases. For adult cases with a burn size greater than 20 per cent, an ICU admission was required for 31 per cent of cases. The median (IQR) length of stay in ICU was 44 (29-144) hours for paediatric cases compared to 86 (19-293) hours in 2011-12 and 54 (21-235) hours in 2010–11. For adult cases the median (IQR) ICU length of stay was 70 (31-163) hours compared to 50 (24-177) in 2011-2012 and 67 (31-192) in 2010-11.

The majority of patients (89 per cent) with a documented inhalation injury were admitted to ICU. The median (IQR) ICU length of stay increased for cases where an inhalation injury was documented to 141 (94-576) hours for paediatric cases and 77 (38–257) hours for adult cases.

The median (IQR) hours of ventilation for cases admitted to ICU was 17 (0-38) for paediatric cases and 23 (0-75) for adult cases. These numbers are consistent with the previous reporting period. The percentage of paediatric cases admitted to ICU with burns greater than ten per cent TBSA was 27 per cent which was less than in the 2011-12 reporting year when 67 per cent were admitted. However the number of adult cases admitted to ICU (63 per cent) was consistent with the previous year (59 per cent).

Renal impairment (eGFR)

Acute renal failure can develop during the early resuscitation stage in treating a burn injury and is associated with complications and poor outcomes in severe burn injury [17-20]. The estimated glomerular filtration rate (eGFR) is a quantifiable measure of acute renal failure. A negative change of >30 ml/min/1.73m2 of estimated GFR (eGFR) within 72 hours of admission is considered indicative of renal impairment.

Of the paediatric cases admitted to ICU, eGFR was recorded for only two patients and none were identified as having a negative change (>30 ml/min/1.73m2). For adult cases admitted to ICU, the eGFR was recorded for 73 per cent of cases (n=200). Of these, four cases (one per cent) were identified as having a negative change of >30 ml/min/1.73m2 of estimated GFR (eGFR) within 72 hours.

Blood cultures

Bloodstream infection is associated with increased risk of mortality in burn injured patients [21, 22]. A blood culture was collected during the inpatient stay in 26 per cent of adult cases (n=497) and 40 per cent of paediatric cases (n=339). This rate of blood culture collection is comparable to previous reporting years. The proportion of burns patients who underwent blood culture collection increased markedly with burns greater than 20 per cent TBSA where 69 per cent of adult, and 85 per cent of paediatric, cases had a blood culture taken. Eight per cent of adult cases (n=42) had a positive blood culture and this was comparable to previous reporting years where seven to nine per cent of cases had a positive blood culture. For paediatric cases, 14 per cent had a positive blood culture (n=46) which is lower than the 23 per cent of cases reported in the previous year.

Weight recorded and weight loss

Measuring the patients' weight is important for the initial fluid resuscitation of the burn patient and for monitoring weight loss. Weight loss following burn injury can affect patient outcomes in terms of healing potential and rehabilitation outcomes. Extended length of stay can be associated with weight loss and associated poorer outcomes [10, 13, 23].

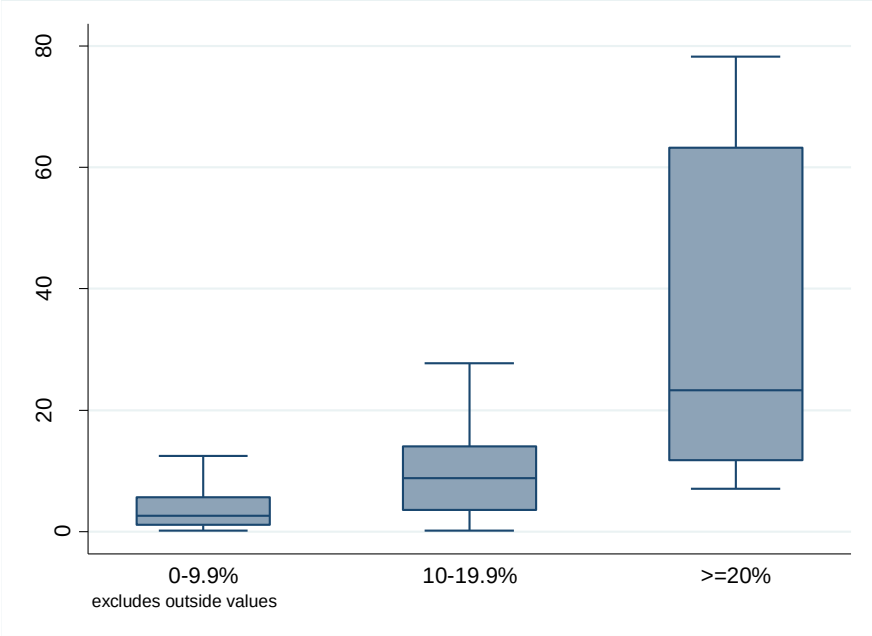
Of the paediatric patients with a length of stay greater than two weeks (eight per cent), 81 per cent had their weight measured and documented within three to five days of admission, and five per cent had a weekly weight documented during their admission. Weight loss was recorded for three paediatric patients. These numbers are similar to the last reporting period.

For adult cases with a length of stay greater than two weeks (15 per cent), 35 per cent had their weight measured and documented within three to five days of admission. A weekly weight was conducted and documented for 24 per cent of these patients. Weight loss was recorded in 74 per cent of these patients. The documented weight loss during the episode of admitted patient care ranged from 1 to 5 kg for paediatric cases and from 1 to 20 kg for adult cases. The documented median (IQR) weight loss 2.5 (1-4.5) Kg for paediatric cases was and 6 (3-6.5) Kg for adult cases.

Length of stay

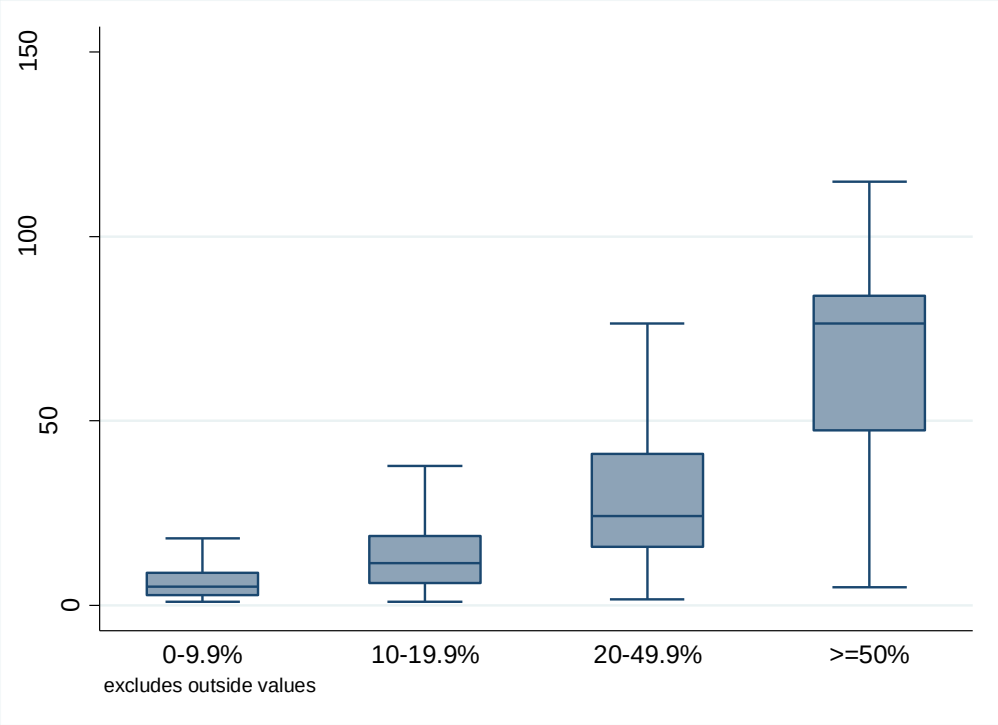
The length of admission is associated with increased complications and can impact on the outcomes for burn patients [24]. The length of stay for BRANZ analysis excluded cases that did not survive to discharge or where the LOS was less than 24 hours. Consistent with the 2011-2012 reporting year, the median (IQR) length of stay (LOS for paediatric patients was four (two to nine) days. Figure 7a shows the distribution of LOS by percentage TBSA grouping for paediatric patients.

Figure 7a: Distribution of the length of stay by percentage TBSA – Paediatric cases (excluding deaths)



The median (IQR) LOS for adult cases was five (two to eleven) days which is lower than the median length of stay reported in 2011-212 (seven days). Figure 7b shows the distribution of hospital length of stay by percentage TBSA for adults.

Figure 7b: Distribution of length of stay by percentage TBSA – Adults (excluding deaths)



Larger burns were associated with a greater hospital length of stay for both paediatric and adult cases. The average length of stay across BRANZ population was 11 days. Consistent with the Australian figures, the average length of stay reported in the 2012 American NBR was eight days for both males and females.

Deaths

Overall, 33 (1.2 per cent) patients died before hospital discharge. This in-hospital death rate was lower than the reported American NBR death rate of three per cent for males and females, most likely reflecting the differences in the distribution of burn size noted earlier between the registries.

The proportion of patients who died increased with burn size. Of the 35 patients who had a TBSA greater than 50 per cent, 19 (54%) died. Of the patients who died, an inhalation injury was present in 18 (54 per cent) cases. A reason for death was recorded for 89 per cent of cases, with multi-system organ failure (n=8) and sepsis (n=6) the most common reasons for death.

Of the 33 patients who died during their hospital stay, active treatment was not commenced for 4 of the cases and these patients received only palliative care. Active treatment was commenced and withdrawn for 22 of the patients who died during their hospital stay. Ten of the 33 patients died within 24 hours of admission and the cause of death was recorded as burns shock, cardiac cause or multi-system organ failure.

Discharge status

The majority of patients (84 per cent) were discharged to their usual residence and five per cent were discharged to Hospital in the Home (Table 14). Transfer to another acute hospital, or inpatient rehabilitation, were other common destinations on departure from hospital.

Table 14: Discharge Disposition

Discharge Disposition	N	%
Usual residence/ home	2297	84
Hospital in the Home	139	5.1
Other acute hospitals	65	2.4
Inpatient Rehabilitation	54	1.9
Died	33	1.2
Another BRANZ Hospital	18	0.7
Left against medical advice/ own risk	15	0.6
Other healthcare accommodation, unless usual place of residence	24	0.9
Psychiatric hospital	12	0.4
Statistical discharge – from leave	*	0.1
Other destination	58	2.1

Readmissions

A total of 130 paediatric cases (15 per cent) were readmitted within 28 days of discharge and the majority (77 per cent) were reported as planned readmission which is consistent with previous years. This is reflective of the common practice for paediatric patients to be discharged early and readmitted for planned acute burn wound management procedures such as skin grafting.

Consistent with past reporting years the readmission rate was less for adults. Only six per cent of adult cases (n=103) experienced a readmission within 28 days of discharge. In contrast to the paediatric patients, over half (61 per cent) of these cases were reported as 'unplanned' for reasons such as a non-healing wound or wound infection. For adult cases, it is more typical for patients to remain as inpatients until the majority of the acute burn wound management procedures are completed. Fewer cases have planned readmissions for acute burn management procedures. This outcome quality indicator was developed to identify cases where the readmission was unplanned or was as a result of an unexpected complication. It is hoped that poor outcomes in terms of readmission may be able to be linked to processes of care which can be improved in the future.

Limitations and Data Caveats

- Only cases meeting BRANZ inclusion criteria are included in reports.
- Only the first acute admission that meets BRANZ inclusion criteria for a new burn injury is included in reporting. Readmissions (within 28 days of discharge) are excluded except when reported separately in the final section. If a patient is transferred between BRANZ hospitals, only the initial admission is included.
- Each record in the database represents a new burn injury. If an individual sustains multiple burn injuries on different occasions, they are included as separate records.
- Only valid responses to data items are included in the analysis. Missing data and items that have been classified as 'not stated/inadequately described' are reported on for completeness but excluded from analysis. Data items recorded as 'not collected for this patient', 'not collected at this site' are identified separately in the completeness report.
- Numbers with values less than five have been replaced by an asterisk (*) as a privacy protection measure.
- Dataset changes were required during the 2009 to 2010 reporting year to improve data completeness and data quality, which limits detailed comparison with earlier BRANZ reporting years. Therefore, this report has largely focused on comparisons with the 2010-11 and 2011-12 reporting years.
- Reporting against the clinical quality indicators is limited by the fact that standards of acceptable care have yet to be developed for many of the quality indicators. Data from this report, and the current work being undertaken to review and validate the quality indicators, will be used to develop standards of acceptable quality of care performance that will be monitored and benchmarked in the future.
- While comparison of summary epidemiological data was possible, consideration of the different health systems and potential different development and governance processes of the registries is required when interpreting the comparison data.

Conclusion

The overall goal of BRANZ as a clinical quality registry is to identify variation in care and relate that to outcomes using risk adjustment to ensure correct comparisons. This information will then inform quality improvement projects that will result in improved consistency of delivery of evidence based care in specialist burn units in Australia and New Zealand.

Data are presented for 2,720 burn cases admitted to 15 of the 17 designated burn units across both Australia and New Zealand for the 12-month period July 2012 to June 2013. Consistent with the previous year, data completeness was 95 to 100 per cent for most core data items including the patient, burn event, admission, percentage TBSA, ICU and discharge details.

The demographic and aetiological profile of burn injury resulting in admission to Australian and New Zealand burn units was highly consistent with previous years. In particular, males aged 20 to 29 years were at high risk of sustaining a flame burn injury and children one year of age were at risk of sustaining a scald burn injury. These groups remain a high priority for injury prevention initiatives.

Cool running water was documented as being applied within three hours of injury for 90 per cent of all cases that received burn cooling at the scene of injury. Where an injury requiring admission to a burn unit occurred, the vast majority of burns were less than ten per cent TBSA. However, 72 per cent of all cases required theatre for a burn wound management procedure, indicating the severity of even the smaller burns and the importance of injury prevention campaigns.

While quality of care data is presented in this report, comparisons against an acceptable standard of performance and between units are not currently being performed. Current evaluation and validation of the quality indicators is currently underway and will inform revision of these indicators, and the basis for benchmarking of burn unit performance.

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Glossary

Burn Depth:	Burns are described according to the depth of injury to the skin layers and are classified into superficial dermal, mid-dermal, deep-dermal and full thickness burns [25].
Burn Injury classifications [25]	• Chemical – direct contact with chemicals • Contact - direct contact with hot objects • Electrical – direct contact with an electrical current • Flame – direct contact with open flame or fire • Flash – exposure to the energy produced by explosive material • Friction – rapid movement of a surface against the skin, e.g. treadmill, road surface • Radiation – exposure to solar energy, radiotherapy, laser • Radiant heat – heat radiating from heaters , open fire places • Scald - hot liquids such as hot water and steam, hot fats, oils and foods
Country of Birth:	Country in which the person was born [26].
Definitive burn wound assessment:	The burn assessment documented by the most senior burns clinician assessment within 72 hours of admission. This definition was developed by the registry's Steering Committee in an effort to standardise burn wound assessment data, particularly given the percentage TBSA can be estimated and documented by numerous clinicians at multiple time points following burn injury.
Enteral / parenteral feeding:	**Enteral** nutrition is commonly administered through a nasogastric tube placed via the nose. **Parenteral** nutrition is administered via a peripheral or central vein. Enteral and parenteral nutritional supports are used to provide nutrients on a temporary or permanent basis to patients who are unable to ingest or tolerate adequate nutrients or to tolerate an oral diet [10].

Estimated glomerular rate (eGFR):	*'The glomerular filtration rate measures how well kidneys filter the waste products and toxins from a patient's blood and is the best indicated of kidney function. It helps determine if there is any damage.'* [27] The eGFR (estimated Glomerular Filtration Rate) is a test used to screen for and detect early kidney damage and to monitor kidney status. It is a quantifiable measure of acute renal failure and routinely recorded in patients admitted to intensive care units across Australia and New Zealand.
Ethnicity:	The ethnic group or groups that a person identifies with or feels they belong to. Ethnicity is a measure of cultural affiliation, as opposed to race, ancestry, nationality or citizenship [28].
Full thickness burns:	The most severe classification of burn depth where all skin layers are destroyed, leaving no cells to heal the wound. Full thickness burns are likely to require surgical excision and skin grafting [25].
Inhalation injuries:	Burns to the oropharynx and upper airway result in swelling and possible airway obstruction within the first few hours after injury. Inhalation of toxic products of combustion can result in early systemic effects or delayed inflammation of distal airways and alveoli with impaired gas exchange. Inhalation injuries are associated with significant morbidity and increased mortality, but have no agreed diagnostic criteria [29].
Senior burn clinician:	A burn surgeon who is the head of the unit or a surgeon with a minimum of two years' experience in a major burn unit who has Emergency Management of Severe Burns (EMSB) certification; or a Burns Nurse Practitioner with Emergency Management of Severe Burns (EMSB) certification.
Per cent Total Body Surface Area (TBSA) burn:	The common measure of area of burns of the skin. The two most common assessment tools used to assess the burn size are the 'Lund and Browder' and 'Rule of Nines' chart. As a general guideline the size of a person's hand print (palm and fingers) is approximately one per cent of their TBSA [25].

Appendix 1: Data Completeness

Within each section, the level of completeness of each data item is defined according to whether or not the section had data entered, or by the input of the 'not stated/adequately described 'option. Where data were not entered for an item or the option of not stated/not adequately described or not applicable / not collected for at site or not collected for that patient was selected, data were excluded from the reported analyses.

All data items are listed according to how they are entered on the database. The data item will be expressed as a percentage of the total number of cases, or as percentage of the subset population if the data item is conditional on the response of another data item. For example, completeness of ICU data is only applicable to the patients who attended ICU.

Patient Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Date of Birth	2745 (100%)	-	2745
Date of Injury	2745 (100%)	-	2745
Time of Injury	2381 (86.7%)	364 (13.2%)	2745
Gender	2741 (99.9%)	4 (<1%)	2745
Ethnicity or Country of Birth	2699 (98.3%)	46 (1.7%)	2745
Residential Postcode	2732 (99.5%)	13 (<1%)	2745

Admission Section	Complete and valid response: n (%) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Date of Admission	2745 (100%)	-	2745
Time of Admission	2745 (100%)	-	2745
Fund	2735 (99.6%)	10 (<1%)	2745
Admission Type	2745 (100%)	-	2745
Referral Source	2745 (100%)	-	2745

Event Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Cause - Primary	2735 (99.6%)	10 (<1%)	2745
Accelerant	2719 (99.1%)	26 (9.4%)	2745
Accelerant Type	604 (98.7%)	8 (1.3%)	612
Explosion/Flash	2718 (99.0%)	27 (<1%)	2745
Activity when injured	2646 (96.4%)	99 (3.6%)	2745
Place of injury	2645 (96.4%)	100 (3.6%)	2745
Intent of injury	2730 (99.5%)	15 (0.5%)	2745
Event Postcode	2532 (92.2%)	213 (7.7%)	2745
Drug/Alcohol Involvement	2443 (89.0%)	302 (11%)	2745
Inhalation Injury	2744 (100%)	1 (<0.5%)	2745
Transfer Delay - Geographical	2157 (98.4%)	35 (1.6%)	2192
Transfer Delay - Patient Initiated	2140 (97.6%)	52 (2.4%)	2192
Transfer Delay - Transport-related	2143 (97.8%)	49 (2.2%)	2192
Transfer Delay – ED/OP managed	2147 (98.0%)	49 (2.2%)	2192

Burn Cooling Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Cooling Techniques	2601 (94.8%)	144 (5.2%)	2745
Cool Running Water	1883 (99.6%)	7 (<1%)	1890
Water Mins	1648 (97.1%)	49 (2.9%)	1697
Water Hours	1659 (97.7%)	38 (2.2%)	1697
Hydrogel	1872 (99%)	18 (1%)	1890
Other Cooling Techniques	1890 (100%)	-	1890

Burn Assessment Section (Burns Unit)	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
TBSA	2664 (97.1%)	80 (2.9%)	2744
Superficial	2289 (99.4%)	14 (0.6%)	2303
Mid dermal	2294 (99.6%)	9 <0.5%)	2303
Deep dermal	2288 (99.4%)	15 (0.7%)	2303
Full thickness	2275 (98.8%)	28 (1.2%)	2303
Assessed By	2617 (99.4%)	127 (4.6%)	2744
Assessed Date/Time	2664 (97.1%)	80 (2.9%)	2744

Assessment Quality Indicators Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Surgeon Assessment	2716 (98.9%)	29 (1.0%)	2745
Surgeon Assessment Date	1473 (100%)	-	1473
Surgeon Assessment Time	1473 (100%)	-	1473
Physical Function Assessment	180 (95.7%)	8 (4.2%)	188
Enteral /Parenteral Feeding	2712 (98.8%)	33 (1.2%)	2745

Inpatient Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
ICU Admission	2737 (99.7%)	8 (<1%)	2745
ICU Stay	303 (100%)	-	303
ICU Readmission	302 (99.7%)	-	303
Ventilation Hours	235 (100%)	-	235

Inpatient Quality Indicator Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Renal Impairment (eGFR)	289 (95.4%)	14 (4.6%)	303
Blood Cultures	2711 (98.8%)	34 (1.2%)	2745
Positive Swab on Admission	2720 (99.1%)	25 (0.9%)	2745

The renal impairment quality indicator is relevant to ICU patients only. The blood cultures data item relates to whether the patient had a positive blood culture result during the admission. The number of cases recorded as not collected for this patient is likely to be appropriate as blood cultures would not be completed unless clinically indicated.

**Note: Commencing December 2012, the 'positive swab on admission' question became a mandatory data item. A positive swab on admission is only applicable to sites that routinely swab on admission.*

Discharge Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Disposition	2734 (99.6%)	11 (<1%)	
Death Cause	35 (100%)	-	
Decision	32 (91.4%)	3 (8.6%)	35
Decision Date	28 (80%)	7 (20%)	35
Discharge Date	2739 (99.8%)	6 (<1%)	2745
Discharge Time	2739 (99.8%)	6 (<1%)	2745

'Decision' refers to the treatment decision made as in whether to withdraw or withhold medical treatment in the case of patients who died.

Discharge Quality Indicators Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total (n)
Weight Day 5	324 (79.8%)	82 (20.2%)	406
Weight Weekly	313 (77%)	93 (22.9%)	406
Weight Loss	104 (70.3)	44 (29.7%)	148

The weight loss quality indicators are relevant to patients with a length of stay of greater than two weeks only. A small number of cases were recorded as not being collected at a burns unit.

Appendix 2: Management Committee Membership

Belinda Gabbe	Monash University, DEPM	BRANZ Project Supervisor, Senior Research Fellow
Natalie Picton	Monash University, DEPM	BRANZ Project Coordinator
Jessica Callaghan	Monash University, DEPM	BRANZ Research Assistant
Mimi Morgan	Monash University, DEPM	Research Program Manager, Critical Care Division

Appendix 3: Reference & Steering Committee Membership

NAME	SITE	TITLE	Steering Committee	Reference Committee
Peter Cameron	Monash	Chief Investigator (Project Lead)	✓	
Belinda Gabbe	Monash	Chief Investigator (Project Supervisor)	✓	✓
Natalie Picton	Monash	Project Coordinator	✓	✓
Jessica Callaghan	Monash	Project Officer	✓	✓
Heather Cleland	VIC, Alfred	Head of Burns Unit / Acting Chair SC	✓	
Yvonne Singer	VIC, Alfred	Victorian State Burns Education Program Coordinator	✓	✓
Kathy Bicknell	VIC, RCH	Burns Co-ordinator	✓	✓
Michael Rudd	QLD, RBWH	Head of Burns Unit	✓	
Teresa Matthews	QLD, RBWH	Database Manager		✓
Roy Kimble	QLD, RCH	Head of Burns Unit	✓	
Lauren Harvey	QLD, RCH	Database Manager (mat leave Oct 12)		✓
James Scott	NSW, Concord	Clinical Nurse Specialist		✓
John Harvey	NSW, CH Westmead	Head of Burns Unit	✓	
Siobhan Connolly	NSW, SBIS	Burns Prevention & Education Officer		✓
Anne Darton	NSW, SBIS	Program Manager	✓	✓
Mihaela Lefter	TAS, Royal Hobart	Head of Burns Unit	✓	
Rebecca Schrale	TAS, Royal Hobart	Clinical Nurse Consultant, Burns	✓	✓
Sheila Kavanagh	SA, RAH	Clinical Nurse Consultant (ANZBA President)	✓	
Sally-Anne McRae	SA, RAH	Burns Nurse		✓
Darren Nesbitt	SA, RAH	Burns Nurse		✓
Kathryn Heath	SA, RAH	Allied Health Project Manager, Burns SA/ Senior Dietitian, Surgical Specialties		✓
Linda Quinn	SA, WCH	Burns - Advanced Clinical Practice Consultant	✓	
Fiona Wood	WA, RPH	Head of Burns Unit	✓	
Dale Edgar	WA, RPH	Senior Physiotherapist / McComb Clinical Research Manager (Past ANZBA President)	✓	
Joy Fong	WA, RPH	Clinical Nurse Consultant		✓

NAME	SITE	TITLE	Steering Committee	Reference Committee
Tania McWilliams	WA, Princess Margaret	Clinical Development Nurse		✓
Lisa Martin	WA, Princess Margaret	Clinical Research Nurse, McComb Foundation		✓
Alison Mustapha	NT, Royal Darwin	CNC Outpatient Burn Service	✓	✓
Margaret Brennan	NT, Royal Darwin	CNC Inpatient Burn Service	✓	✓
Tracey Perrett	NZ	National Burn Service Coordinator	✓	✓
Richard Wong She	NZ, Middlemore	Head of Burns Unit	✓	
Margaret Conaglen	NZ, Christchurch	Nurse Educator		✓
Hilary Neighbours	NZ, Hutt Valley	Associate Clinical Nurse Manager		✓
Deb Bates	Julian Burton Burns Trust	Manager, Projects and Programs	✓	

Appendix 4: BRANZ Data Collectors

NAME	STATE	SITE	TITLE
Helen Donaldson	VIC	Alfred	Burn Registry Nurse
Kathy Bicknell	VIC	Royal Children's	Burns CNC
Kelly Stockton	QLD	Royal Children's	Clinical Research Manager
TBA	QLD	Royal Brisbane & Women's	
James Scott	NSW	Concord	Burns CNS
Jackie Maitland	NSW	Royal North Shore	Burns receptionist
Anne Laguthaas	NSW	Westmead Children's	Data entry clerk
Rebecca Schrale	TAS	Royal Hobart	Burns CNC
Sally-Anne McRae	SA	Royal Adelaide	Burns Nurse
Darren Nesbitt	SA	Royal Adelaide	Burns Nurse
Lois Robinson	SA	Women's & Children's	Data entry clerk
Joy Fong	WA	Royal Perth	Burns CNC
Penelope Cox	WA	Royal Perth	Burns Nurse
Lisa Martin	WA	Princess Margaret	Research Nurse
Alison Mustapha	NT	Royal Darwin	Burns CNC OP
Margaret Brennan	NT	Royal Darwin	Burns CNC IP
Colin Picton	NT	Royal Darwin	Burns Nurse
Megan Hook	NT	Royal Darwin	Burns Nurse
Margaret Conaglen	NZ	Christchurch	Nurse Educator
Mandy Arnett	NZ	Christchurch	Ward Clerk
Hilary Neighbours	NZ	Hutt Valley	ACN Manager
Anne-Marie Yaxley	NZ	Hutt Valley	Burns Nurse
Stacey Bell	NZ	Hutt Valley	Paediatric Nurse
Lynne Walker	NZ	Waikato	CNS
Krystal Chaffe	NZ	Middlemore	Burns Nurse
Supra Pebberti	NZ	Middlemore	Ward Clerk

Appendix 5: BRANZ Hospitals with Ethics Committee Approval

Collection of potentially re-identifiable patient level data from each of the hospitals and health services is conducted under strict National Health and Medical Research Council guidelines and national and Victorian privacy legislation. Ethics committee approval for the registry was obtained from Monash University Human Research Ethics Committee.

Approval for burns data collection has also been actively sought from all BRANZ hospitals. Sixteen of the 17 burns units have ethics approval to submit data to BRANZ and the remaining site (Royal Brisbane and Women's Hospital in Queensland) is in the process of obtaining approval. For this reporting period, 15 sites contributed data (Table 15). Of these sites, five sites treat paediatric patients only, five sites treat adult patients only and five sites treat both paediatric and adult patients.

Table 15: Australian and New Zealand BRANZ Hospitals with Ethics Approval

Hospital	State/Country	Adults/Paediatrics
The Alfred	Victoria	Adults
Royal Children's	Victoria	Paediatrics
Princess Margaret	Western Australia	Paediatrics
Royal Perth	Western Australia	Adults
Royal North Shore[1]	New South Wales	Adults
Concord General Repatriation[1]	New South Wales	Adults
Children's Hospital Westmead[1]	New South Wales	Paediatrics
Women & Children's	South Australia	Paediatrics
Royal Adelaide	South Australia	Adults
Royal Children's	Queensland	Paediatrics
Royal Hobart	Tasmania	Adult/Paediatrics
Royal Darwin	Northern Territory	Adult/Paediatrics
Middlemore[2]	Auckland, NZ	Adults/Paediatrics
Christchurch[2]	Christchurch, NZ	Adult/Paediatrics
Waikato[2]	Hamilton, NZ	Adult/Paediatrics
Hutt[2]	Wellington, NZ	Adult/Paediatrics

[1] *NSW burns units form the NSW Statewide Burn Injury Service (SBIS).*

[2] *The National Burn Centre (NBC) at Middlemore hospital and the Regional Burn Units (Christchurch, Waikato, and Hutt) form the National Burn Service (NBS) for New Zealand.*

Appendix 6: Australia and New Zealand Burns Websites

Hospital/Unit/Service		Website
The Alfred Hospital	VIC	http://www.alfredhealth.org.au/burns_unit/
Royal Children's Hospital	VIC	http://www.rch.org.au/burns/clinical_information/
Victorian Burns Units	VIC	http://www.vicburns.org.au
Princess Margaret Hospital	WA	http://www.pmh.health.wa.gov.au/general/about_us/
Royal Perth Hospital	WA	http://www.rph.wa.gov.au/Burns_Department/
Royal North Shore Hospital	NSW	http://www.nslhd.health.nsw.gov.au/NSHLD_Hospitals/rns.html
Concord General Repatriation Hospital	NSW	http://www.slhd.nsw.gov.au/Concord/
Children's Hospital Westmead Hospital	NSW	http://www.chw.edu.au/prof/services/burns_unit/
NSW Statewide Burn Injury Service	NSW	www.aci.health.nsw.gov.au/networks/burn-injury
Women & Children's Hospital	SA	http://www.wch.sa.gov.au/services/az/divisions/psurg/burns/
Royal Adelaide Hospital	SA	http://www.rah.sa.gov.au/burns/
Royal Children's Hospital	QLD	http://www.qcmri.org.au/Research/Burns,TraumaandtheCriticallyIll/CentreforChildrensBurnsandTraumaResearch.aspx
Royal Brisbane & Women's Hospital	QLD	http://www.health.qld.gov.au/rbwh/services/burns.asp
Royal Hobart Hospital	TAS	http://www.dhhs.tas.gov.au/service_information/services_files/RHH
Royal Darwin Hospital	NT	http://www.health.nt.gov.au/Hospitals/Royal_Darwin_Hospital/
Middlemore Hospital	NZ	http://www.nationalburnservice.co.nz/
Christchurch Hospital	NZ	http://www.cdhb.govt.nz/nursing/surgical/ward20.htm
Waikato Hospital	NZ	http://www.waikatodhb.govt.nz
Hutt Hospital	NZ	http://www.huttvalleydhb.org.nz

Appendix 7: Report of Structural Quality Indicators

Structural quality indicators describe the attributes of a setting in which health care occurs. These include the resources available such as; adequacy of building, equipment, qualifications / availability of staff. Structural indicators are linked to a process of care that has a direct link to an outcome of care. The following structural indicators have been included in BRANZ and will be reported on an annual basis only. Data was received from 13 of the 17 sites (76 per cent response rate) and the questions required a yes/no response only.

STRUCTURAL QUALITY INDICATORS	Number of centers that responded	Yes (n)	Yes (%)
1. Is a Burns Surgeon available on call 24 hours?	13	11	85%
2. Is a Burns theatre available on a 24 hour basis?	13	11	85%
3. Is Multidisciplinary care provided within the burns unit?	13	13	100%
• Are weekly multidisciplinary team meetings conducted in the burns unit?	13	13	100%
4. Does your unit routinely complete infection surveillance swabs on admission?	13	9	69%

Appendix 8: ANZBA Referral Criteria

ANZBA
Australian & New Zealand Burn Association

Care • Prevention • Research • Education

Criteria for specialised burns treatment

The following criteria are endorsed by the Australian & New Zealand Burn Association in assessing whether burns require treatment in a specialised burns unit (ANZBA 2004):

- burns greater than 10 per cent of total body surface area (TBSA);
- burns of special areas—face, hands, feet, genitalia, perineum, and major joints;
- full-thickness burns greater than five per cent of TBSA;
- electrical burns;
- chemical burns;
- burns with an associated inhalation injury;
- circumferential burns of the limbs or chest;
- burns in the very young or very old, or pregnant;
- burns in people with pre-existing medical disorders that could complicate management, prolong recovery, or increase mortality;
- burns with associated trauma; and
- Non-accidental burns