MONASH University
Medicine, Nursing and Health Sciences
School of Public Health and Preventive Medicine

BI-NATIONAL BURNS REGISTRY

ANNUAL REPORT
YEAR 2

1st July 2010 – 30th June 2011

Table of contents

Table of contents 3

Introduction 5

Executive Summary 6

About this report 8

About The Bi-National Burns Registry 9

What is the Bi-National Burns Registry? 9

Participating burns units 9

Aims 9

Project achievements 10

How does the Bi-NBR operate? 11

Inclusion / Exclusion criteria 11

Data capture 11

Registry data quality assurance 11

Data analysis 12

The number of burn cases 12

Demographic profile of hospitalised burn patients 14

What was the cause and location of the events leading to a burn injury? 16

Burn injury severity 23

How were the burns patients managed prior to admission to the burns unit? 27

Burn unit performance 30

In-hospital outcomes of burn injury 34

Limitations and data caveats 41

Conclusion 42

Publications / Presentations 43

References 44

Glossary 47

Appendix 1: Data Completeness 49

Appendix 2: Management Committee membership 54

Appendix 3: Steering and Reference Committee Membership 55

Appendix 4: Hospitals with ethics committee approval 58

Appendix 5: Report of structural quality indicators 60

Appendix 6: ANZBA Referral Criteria 61

Appendix 7: Remoteness Areas 62

Sourced from: http://www.doctorconnect.gov.au/internet/otd/Publishing.nsf/Content/locator 62

Introduction

The Australian and New Zealand Burns Association (ANZBA) was formed in 1976 and incorporated in 1991 with the principal objective of encouraging 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).

Figure 1: Designated burns units across Australia and New Zealand

\The initial Bi-National Burns Registry (Bi-NBR) was launched in 2005 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 of improving quality of care.

ANZBA collaborated with Monash University in late 2007, to assist with registry enhancements. In 2008, an opportunity was provided to participate in a project funded by the Australian Commission on Safety and Quality in Health Care (ACSQHC) to test and validate the 'Draft Operating Principles and Technical Standards for Australian Clinical Quality Registries'[1]. Participation in this project came at a critical time and enabled the development of the registry as a clinical quality registry. The Bi-NBR clinical quality registry was launched in July 2009.

2008 - 2009 2010 2011

Executive Summary

This is the second annual report from the revised Bi-National Burns Registry (Bi-NBR.) The Bi-NBR 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 Bi-NBR hospitals who meet the inclusion criteria. Improvements are made to the database on an ongoing basis to enhance data capture and quality.

Data are presented for 2480 burn patients treated at 14 burns units over the 12 month period from 1 July 2010 to 30 June 2011. Consistent with data from the 2009-10 year and that reported by the American Burn Association, National Burn Repository, 70 per cent of cases overall were adults, with males accounting for 67 per cent of all cases. Children aged 12 to 24 months accounted for 34 per cent of paediatric cases while 20 to 29 year olds accounted for 27 per cent of adult cases. Flame (35 per cent) and scald burns (36 per cent) were the primary cause of burn injury for all age groups. For paediatric patients 10 years and under, scald burns were the predominant cause. For children 11 to 15 years of age, and 16 to 49 year old adults, flame burns were the predominant cause. In the 50-59 and over 70 years age groups, scald burns were the predominant cause. Nearly all burns were considered unintentional (93 per cent).

The data presented in this report indicates that for cases admitted to Australian burns units, 81 per cent were born in Australia, with 10 per cent identified as Australian Aboriginal. For New Zealand cases, 64 per cent were classified as a New Zealander with 38 per cent of these identified as a New Zealand Maori. Most Australian cases were funded by the Australian Health Care Agreement (82 per cent) while fewer than 10 per cent of cases funded by work injury compensation schemes. Most New Zealand cases (98 per cent) were funded under the Accident Compensation Corporation.

A burn of less than 10 per cent total body surface area (TBSA) was recorded for 80 per cent of all cases. Sixty-five per cent of paediatric cases and 71 per cent of adult cases underwent a burn wound management procedure in theatre. Sixty-four per cent of all cases going to theatre required skin grafting, which is consistent with the 2009-10 annual report and signifies the importance of adequate initial burn assessment, management and referral to the appropriate burns units for definitive treatment of burns which meet the ANZBA endorsed referral criteria (Appendix 7).

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 (90 per cent). Cool running water was documented as being applied for greater than twenty minutes within three hours of the burn for 37 per cent of all cases. 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 18 per cent of cases.

Almost half of paediatric and adult cases were transferred to the burns unit from another hospital. The median (IQR) time from injury to admission to the Bi-NBR hospital was nine (2-143) hours for paediatric cases and 14 (4-90) hours for adult cases. The median (IQR) length of stay (LOS) for paediatric patients (where LOS is > 24 hours and excluding deaths) was four (2-9) days and seven (3-14) days for adults. The overall in-hospital death rate was less than one per cent for hospitalised burn cases. The majority of cases (85 per cent) were discharged to their usual residence.

One hundred and thirty nine paediatric cases (18 per cent) were readmitted within 28 days of discharge and the majority (87 per cent) were reported as planned readmissions. A readmission was recorded for only five per cent of adult cases although over half (56 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. The Bi-NBR continues to develop, and ongoing improvements to data fields and definitions will be made over 2012 to improve data quality.

About this report

This is the second annual report of the revised Bi-National Burns Registry (Bi-NBR). Data collected during the period of 1st July 2010 and 30th June 2011 is summarised in this report. During this period 14 of the 17 Bi-NBR sites (11 out of 13 Australian sites and three out of four New Zealand sites) contributed data with 2,480 cases entered. Of the 14 sites, four sites treat paediatric patients only, five sites treat adult patients only and five sites treat both paediatric and adult patients. Two of these sites commenced data collection from October 2010 which was the start of the second quarter in year two. Only sites with Institutional Ethics Committee (IEC) approval to participate and a local data collector were able to contribute data to the registry.

The report describes the registry, its achievements, and describes the profile, treatment and outcomes of burn unit admissions from 1 July 2010 to 30 June 2011. Quality of care data related to processes of care is also provided. Where appropriate, data has been compared to the 2009-10 reporting period. Where relevant, data has also been compared with the American Burn Association's National Burn Repository (NBR) 2011 [2] report of data from January 2001 to June 2010, as this is the only other burn database that reports comparable summary data.

The Bi-NBR excludes burn patients that died before reaching hospital, or who died after discharge from hospital. Future plans to conduct a project linking to The National Coroner's Information System is under consideration to enable a more comprehensive profile of burn-related mortality in Australia and New Zealand.

About The Bi-National Burns Registry

What is the Bi-National Burns Registry?

The Bi-National Burns Registry (Bi-NBR) is a clinical quality registry capturing epidemiological, quality of care, and outcomes data for adult and paediatric burn patients across Australian and New Zealand burn units. The registry is a collaboration between the Australian and New Zealand Burn Association (ANZBA) and Monash University, Melbourne. The registry has been co-funded by ANZBA and the Julian Burton Burns Trust with additional funding received from the Australian Commission on Safety and Quality in Health Care (2008-09) and the Helen Macpherson Smith Trust (2010-11).

The 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.

Participating burns units

Only sites with Institutional Ethics Committee (IEC) approval and the ability to provide resources for local data collection submit data to the Bi-NBR. For the 2010-11 year, 14 of the 17 Bi-NBR sites (82 per cent) contributed data.

Aims

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

Key project outcomes achieved are summarised below:

Ethics approval obtained

For the first year of reporting, thirteen out of seventeen sites had obtained ethics approval to submit data to the Bi-NBR and by the second year this increased to sixteen sites. The primary Institutional Ethics Committee (IEC) approval was obtained from Monash University with the stipulation of individual site approval. Seeking site IEC approval to contribute data to the Bi-NBR has been pivotal in sites being able to participate. Sites individually applied for local ethics approval, with support from the Bi-NBR staff members.

Governance structure established

A formalised governance structure was established to oversee and develop the Bi-NBR. This includes a Management Committee (Appendix 1), Steering Committee (Appendix 2), Reference Committee (Appendix 3) and various sub-committees. Steering Committee membership includes burns clinical experts, consumer and funding body representation.

Database Development

Minor modifications to the Bi-NBR database were completed to improve user functionality and to ensure standardisation of data entered.

Reporting

Quarterly reports are routinely produced and provide summary aggregate data from the registry. 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 the Bi-NBR Data Access Policy. The data request form and associated policies are publicly available on the internet at www.bi-nbr.org. In the second year of reporting, there were 25 data requests. The majority were from Committee members for purposes such as injury prevention, education, public awareness campaigns, collaborative work with Emergency Services, and lobbying for burn clinical service funding. Other data requests were from research students, media and government departments.

Development of quality indicators

Key quality of care indicators were developed for the Bi-NBR to allow the quality of health care provided to burn patients to be monitored and benchmarked across services. Nineteen quality indicators are embedded within the Bi-NBR and reported in this report.

How does the Bi-NBR 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 admission

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. Patient data are retrieved via medical records and existing hospital information systems and entered into the web-based database on-site. A data collection form is used to assist this process. 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 to the Bi-NBR.

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. Annual '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. Routine quality assurance review and checks for reliability and validity are planned to ensure the Bi-NBR produces high quality data.

Data analysis

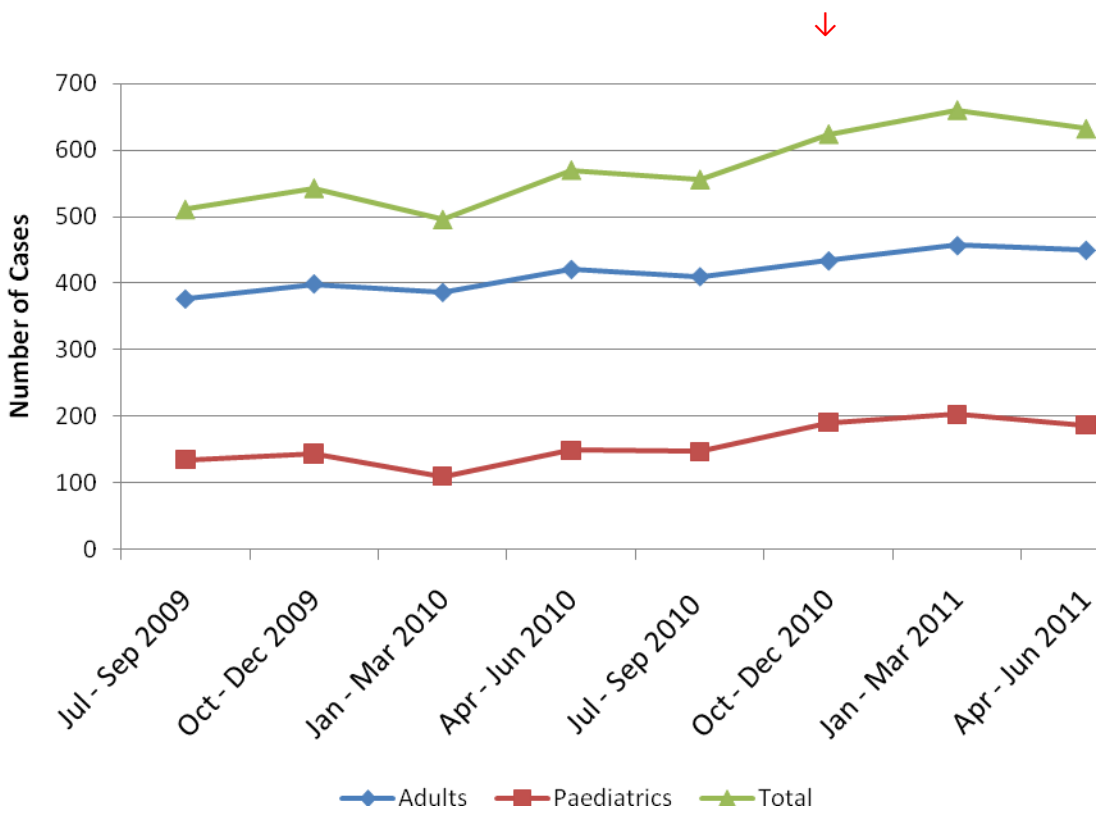
The number of burn cases

This section provides information about the number of patients admitted to a participating burns unit that meet the Bi-NBR inclusion criteria.

Bi-NBR burn cases

The overall number of burn cases recorded on the Bi-NBR for the year 1st July 2010 to 30th June 2011 was 2480, with 1725 adult cases (16 years of age and older) and 755 paediatric cases (15 years of age and under). Figure 2 shows the numbers of adult cases and paediatric cases by quarter since the commencement of the registry in 2009. The increased number of cases from October 2010 reflects where additional sites commenced data entry.

Figure 2: Quarterly trends in burn patients



Registry capture rate

From July 1st 2010, 14 sites were submitting data to the registry. A further site had originally commenced data submission but did not contribute for the 2010-11 reporting period. Of the 14 sites, four sites treat paediatric patients only, five sites treat adult patients only and five sites treat both paediatric and adult patients. Table 1 outlines the case numbers entered by each site by quarter. Two sites commenced data entry at the start of year two quarter two and were included in the analysis.

Table 1: Site case numbers per quarter

	2009-10				2010-11				
Site	**Jul-Sep 2009**	**Oct-Dec 2009**	**Jan-Mar 2010**	**Apr-Jun 2010**	**Jul- Sep 2010**	**Oct-Dec 2010**	**Jan-Mar 2011**	**Apr-Jun 2011**	**Total**
A	55	71	69	80	56	72	71	65	539
B	60	46	64	67	64	76	60	69	506
C	54	64	47	43	62	68	68	68	474
D	21	20	16	15	14	20	16	11	133
E	58	59	42	62	54	37	32	50	394
F	25	27	29	36	21	23	32	16	209
G	66	89	82	75	79	78	77	88	634
H	39	46	36	57	62	60	56	57	413
I	66	59	40	65	64	56	54	49	453
J	-	*	5	-	-	-	-	-	7
K	-	9	20	26	15	27	28	14	139
L	67	53	51	44	52	46	70	58	441
M	-	-	-	-	14	16	19	16	65
N	-	-	-	-	-	*	35	26	62
O	-	-	-	-	-	45	42	50	137
TOTAL	511	545	501	570	557	625	660	637	4,606

* Denotes less than five cases

Note: Site J was excluded from analysis due to small case numbers.

Demographic profile of hospitalised burn patients

Figures 3a and 3b show the age distribution by gender for paediatric and adult cases. Males represented 67 per cent of all cases which is consistent with the 2009-10 year and the American Burn Association, National Burn Repository (NBR) 2011 which reported that nearly 70 per cent of burn patient were men. One to two year olds accounted for almost 34 per cent of paediatric cases (37 per cent in 2009-10) and 20 to 29 year olds nearly 27 per cent of adult cases (25 per cent in 2009-10).

Figure 3a: Age distribution by gender – Paediatric cases

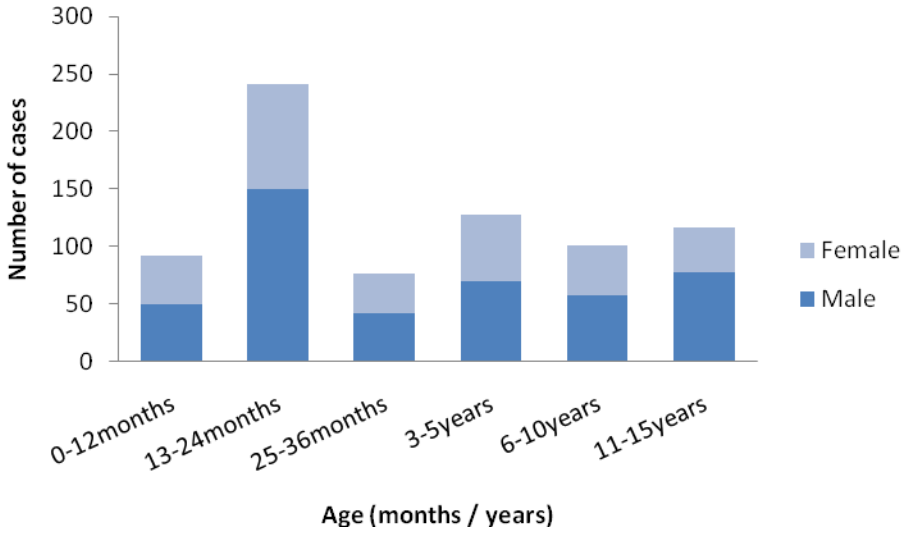


Figure 3b: Age distribution by gender – Adult cases

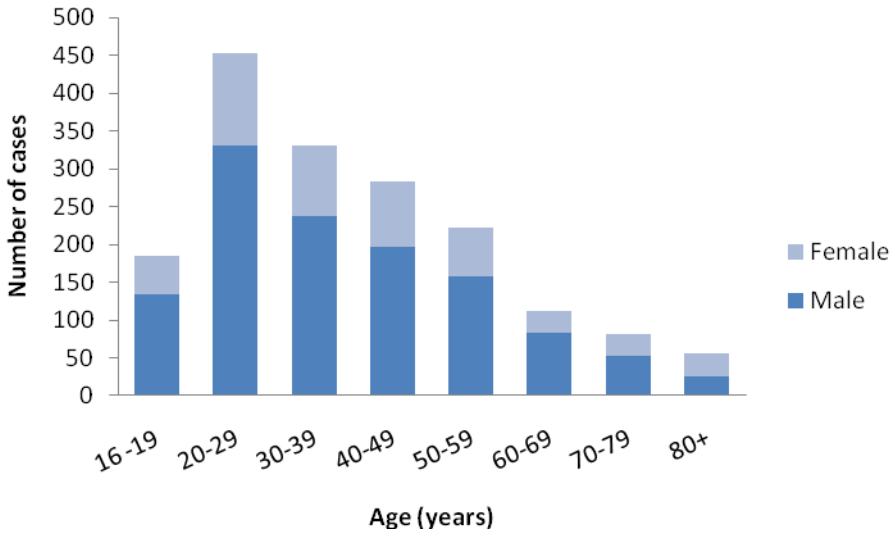


Table 2 outlines the region of birth for patients admitted to Australian units and the ethnicity by region for New Zealand units. The difference in reporting accounts for Australian hospitals routinely collecting 'country of birth' whereas New Zealand hospitals record the 'ethnicity' of their patients.

Of the patients admitted to Australian Burn Units, the majority of cases (81 per cent) were born in Australia. Aboriginal Australians accounted for 10 per cent (n=56) of paediatric cases and seven percent (n = 77) adult cases born in Australia which is consistent with th 2009-10 year (paediatrics patients 15 percent, adult patients seven per cent). There were 341 patients admitted to Australian burn units who were born overseas. These patients were evenly distributed between European, Asian, North African and Middle Eastern countries.

Of the New Zealand Burn Unit admissions, 64 per cent were classified as a "New Zealander", of which 93 (38 per cent) were New Zealand Maori. This is consistent with the 2009-10 reporting year. A further 74 (19 per cent) patients were of other Oceanian descent; predominantly Samoan (n=31, 42 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	1,493	81.4
North West Europe	96	5.2
Southern and Eastern European	57	3.1
New Zealand	39	2.1
South East Asian	36	2.0
North African and Middle Eastern	31	1.7
Southern and Central Asian	30	1.6
North East Asia	25	1.4
Sub-Saharan Africa	11	0.6
Peoples of the Americas	11	0.6
Oceanian (other)	5	0.3
		100.0

Region of Ethnicity - New Zealand Units	N	%
New Zealander	245	64.0
Oceanian (other)	74	19.3
Southern and Central Asian	19	4.9
South East Asian	14	3.6
Sub-Saharan African	8	2.0
North Africa and Middle Eastern	7	1.8
North West European	7	1.8
North East Asian	5	1.3
Southern and Eastern Europe	*	1.0
Peoples of the Americas	*	0.3
		100.**0**

* Denotes less than five cases

Consistent with 2009-10, the vast majority of cases admitted to Australian burn units were funded by the Australian Health Care Agreement (n=1,713, 82 per cent) with just under 10 per cent (n=186) covered under the workers compensation scheme in each state or territory. Most New Zealand cases were funded by the Accident Compensation Corporation (n=387, 98 per cent).

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 2009-10, flame and scald burns were the most common cause of burn injury. Flame burns accounted for 35 per cent, and scalds 36 per cent of all cases. This is consistent with the American NBR where fire/flame and scald burns accounted for 8 out of 10 reported burn causes.

Tables 3a and 3b outline the cause of injury by paediatric and adult age groups. Consistent with the 2009-10 reporting year scald burn was the most common cause of injury for paediatric cases aged 10 years or less. For the 11 to 15 years age group, flame burn was the most common cause of injury (n=47). Contact burns accounted for 21 per cent of paediatric burns. For adults 16 to 49 years of age, flame burn was the most common cause of injury. Scald burns were the predominant cause of burn in the 50 to 59 years group and for those aged 70 years and over (Table 3b).

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

Primary Cause of Burn	Paediatric Age Group (months & years)						Total	%
	0-12 months	13-24 months	25-36 months	3-5 years	6-10 years	11-15 years		
Scald	63	176	44	54	41	35	413	55.0
Contact	19	45	23	25	28	21	161	21.3
Flame	3	4	*	25	26	47	106	14.0
Friction	*	8	6	17	*	7	42	5.6
Chemical	*	5	*	*	*	*	16	2.1
Radiant Heat (no contact to source)	*	*	-	*	-	*	9	1.2
Electrical	-	*	-	*	*	*	6	0.7
Other	-	-	-	-	-	*	*	0.1
Total	92	241	76	128	101	116	754	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	91	218	166	128	73	47	23	11	757	44.0
Scald	38	111	72	82	77	40	39	25	494	28.2
Contact	32	67	53	37	33	11	12	14	259	15.0
Chemical	8	18	9	19	5	*	*	*	80	4.7
Friction	10	23	15	8	5	*	*	-	63	3.7
Electrical	*	6	12	*	*	*	-	*	30	1.7
Radiant Heat (no contact to source)	*	7	*	5	7	*	*	*	34	2.0
Other	*	*	-	*	5	*	*	-	12	0.7
Total	184	452	330	284	220	111	82	56	1719	100.0

* Denotes less than five cases

The ten most common sub-causes of paediatric and adult burn injuries are shown in Tables 4a and 4b. These ten sub-causes comprise 72 per cent of the sub-causes of injury for paediatric cases and 53 per cent of the 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. Flame injuries from campfire/bonfire/burn off increased to 37 cases from 21 in the 2009-10 year.

In adult cases, campfire/bonfire/burn-off causes of flame injury were the most common followed by scald from fat/oil and scald from water from a saucepan/kettle/jug/billy/urn/thermos. Chemical burns from alkali substances increased from 41 cases in the 2009-10 reporting year to 58 cases in 2010-11. However, there was some inconsistency with chemical burn coding and this will be reviewed.

Consistent to the 2009-10 reporting year, in the 16 to 49 year age group, flame burns accounted for 46 per cent of burn injuries. An accelerant was used to ignite/enhance the flame in over half (57 per cent) of these cases. Engine fuel (petrol/diesel/methanol) was again the most common accelerant used (66 per cent).

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

Cause	Sub Cause	N	%
Scald	Hot beverages (e.g. tea/coffee)	145	19.2
Scald	Water from saucepan/kettle/jug/billy/urn/thermos	108	14.3
Scald	Food (liquid/solid)	59	8.8
Contact	Coals/ashes	49	6.5
Flame	Campfire/bonfire/burn off	37	4.9
Scald	Water from tap/bath/shower	29	3.9
Friction	Friction via treadmill	26	3.5
Contact	Vehicle exhaust	26	3.5
Flame	Lighter/matches	26	3.5
Scald	Fat/oil	24	3.2

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

Cause	Sub-Cause	N	%
Flame	Campfire/bonfire/burn off	235	13.7
Scald	Fat/oil	128	7.5
Scald	Water from saucepan/kettle/jug/billy/urn/thermos	106	6.2
Flame	Other	73	4.2
Flame	Gas/gas Bottle	70	4.0
Flame	Flame source unclear	63	3.7
Chemical	Alkali	58	3.4
Flame	Lighter/matches	55	3.2
Flame	Vehicle engine/parts	54	3.1
Friction	Via vehicle/motorbike	51	3.0

Intent, place and activity of injury

The vast majority (93 per cent) of burn patients continue to sustain their injury during unintentional events. Consistent with the 2009-10 reporting year, intentional self-harm accounted for three per cent of all cases. In 31 per cent of intentional self harm cases, the TBSA was greater than 10%. The remaining cases were assaults, an event of unspecified intent, or adverse effects or complications of medical treatment.

The most common place of injury was the home for both paediatric (78 per cent) and adult cases (56 per cent). The burn occurred in the kitchen for 30 per cent of cases, and in the garden/yard for 20 per cent of all injuries sustained at the home. The place of injury is summarised in Tables 5a and 5b and is consistent with American burns cases, where 66 per cent of admissions occurred at home.

Table 5a: Place of injury – Paediatrics

Place of injury	N	%
Home (usual place of residence)	578	78.1
Place for recreation	60	8.1
Other residence (eg. friend's home)	55	7.4
Farm	16	2.1
Street and highway	10	1.4
School, other institution & public administrative area	7	1.0
Trade and service area	7	1.0
Other specified place	*	0.5
Sports or athletics area	*	0.3
Industrial and construction area	*	0.1
		100.0

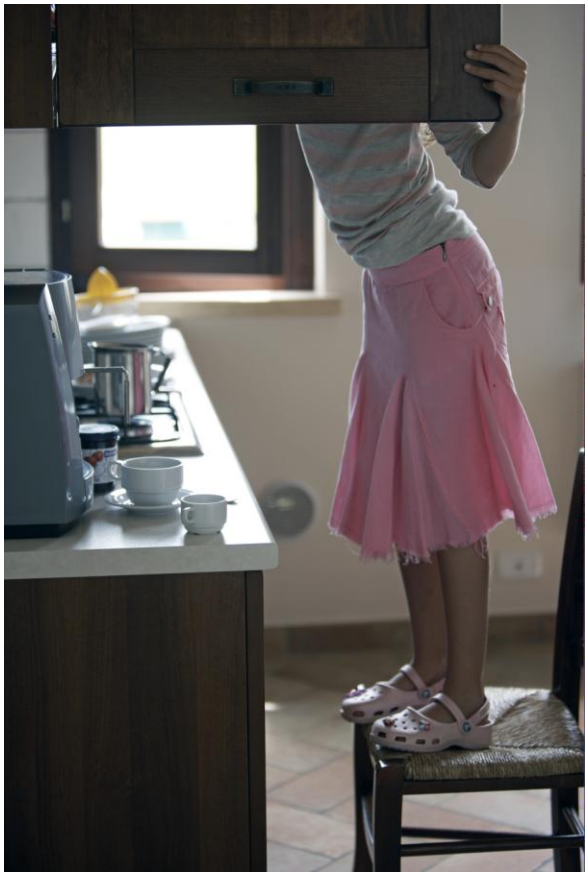
* Denotes less than five cases

Table 5b: Place of injury – Adults

Place of injury	N	%
Home (usual place of residence)	930	56.0
Trade and service area	159	9.6
Street and highway	149	9.0
Place for recreation	135	8.1
Other residence (eg. friend's home)	103	6.2
Industrial and construction area	90	5.4
Farm	39	2.4
Other specified place	21	1.2
School, other institution and public administrative area	15	0.9
Residential Institution	15	0.9
Sports or athletics area	6	0.3
		100.0

* Denotes less than five cases

Tables 6a and 6b outline the ten most common activities being performed at the time of injury for paediatric cases and adult cases. The ten most common activities account for 96 per cent of all paediatric, and 89 per cent of all adult injuries. Playing, and being near a person preparing food or drink, were the most common activities at the time of injury for paediatric cases. Most (96 per cent) two-year olds who sustained a scald injury (n=343) did so while near a person preparing food or drink. This is consistent with the 2009-10 reporting year.



Cooking or preparing food, participating in a leisure activity and working for income were the most common activities resulting in burn injury for adult cases. Consistent with the 2009-10 reporting year, flame burns sustained during a leisure activity in the home or other residence continued to account for a large percentage (40 percent) of burns in adults aged 20 to 29 years of age. In the 60 years and over age group, the most common activity at the time of injury was cooking (31 per cent), an increase of ten per cent compared to 2009-10.

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

Activity at the time of injury	N	%
Playing	268	36.2
Near person preparing food/drink	204	27.6
Cooking/preparing food/drink	53	7.2
Leisure activity(excluding sporting activity)	38	5.1
Eating/drinking	35	4.7
Bathing	33	4.5
Driving/Passenger	27	3.7
Other specified activity	24	3.2
Sleeping/resting	19	2.6
Other vital activities	11	1.5

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

Activity at the time of injury	N %	%
Cooking/preparing food	380	22.5
Leisure activity (excluding sporting activity)	305	18.1
Working for income	256	15.2
Driving/passenger	108	6.4
Sleeping/resting	102	6.1
Other specified activity	92	5.5
Self harming	71	4.2
Household maintenance	64	3.8
Vehicle maintenance	63	3.7
Gardening	59	3.5

Drug and/or alcohol involvement

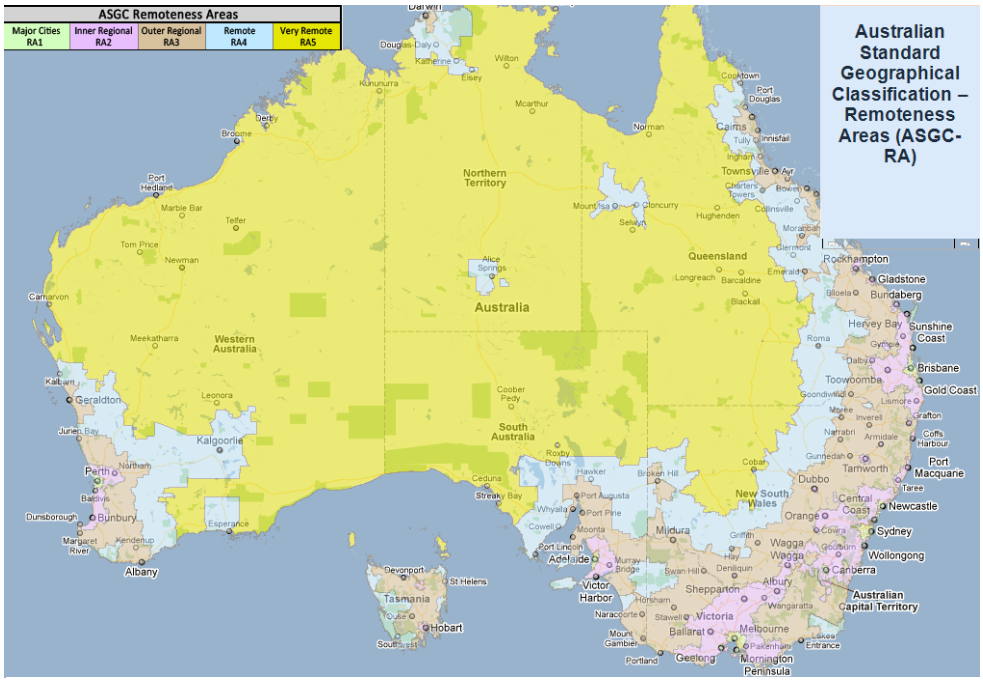
For the majority of cases (84 per cent), there was no documented suspicion of drug or alcohol involvement. Documented suspicion of alcohol involvement only was recorded in 13 per cent of cases with drugs only (1.4 per cent) and a combination of drugs and alcohol (1.8 percent) in less than two per cent 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. Further work is required to clarify the definition of suspicion of alcohol or drug involvement. Whether there is under reporting of drug or alcohol involvement in the medical record also requires further investigation.

Location of burn injury by region (Australian sites)

Consistent with the 2009–10 year, over half (57 per cent) of burns admissions to Australian units occurred in major cities according to the Australian Bureau of Statistic Classification of Remoteness [3] (Appendix 8). A further 34 per cent occurred in regional Australia and 9 per cent in remote areas. The rate per 100,000 population is almost ten times less in major cities than in very remote areas which comprise almost half indigenous Australians. Table 7 shows the total rate per 100,000 population, and the rate for non-indigenous and indigenous Australians. The indigenous population had three times the rate per 100,000 population of burn injury overall than the non-indigenous population.

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

Remoteness Category	Rate per 100,000 population		
	Total	Non-indigenous	Indigenous
Major cities of Australia	9.0	8.9	16.8
Inner regional Australia	7.7	7.7	7.7
Outer regional Australia	27.5	26.1	44.0
Remote Australia	22.3	20.5	8.1
Very remote Australia	90.3	85.4	95.7
Total rate of injury	11.0	10.5	32.4



Remoteness Areas (See Appendix 8)

Burn injury severity

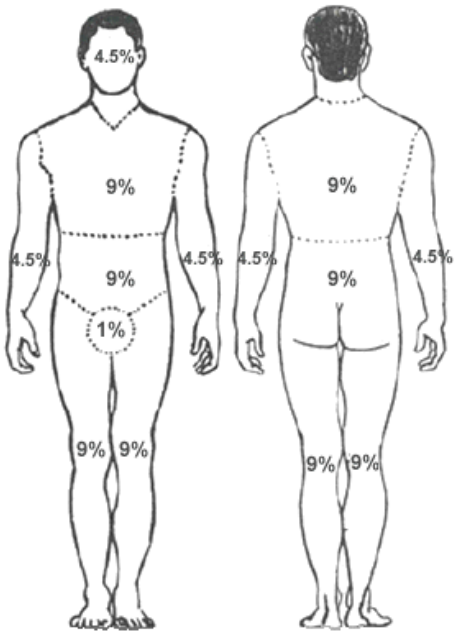
This section outlines the severity of burn by burn size (percentage total body surface area burnt, per cent TBSA), burn depth and the presence of an inhalation injury.

Total Body Surface Area (TBSA)

A burn less than ten per cent TBSA was recorded for 80 per cent of adult and paediatric cases. This finding is consistent with the 2009-10 year and the American NBR which reported that 70 per cent of admissions to US burn units had sustained an injury with a total burn size less than ten per cent. For paediatric patients, 87 per cent sustained a burn of less than ten per cent TBSA and fewer than three per cent sustained a burn greater than 20 per cent TBSA. For adult patients, over three quarters (78 per cent) experienced a burn less than ten per cent TBSA, with just over eight percent sustaining a burn greater than 20 per cent TBSA. Just over one percent of adults sustained a burn involving 50 per cent or greater of their TBSA. Table 8 outlines the percentage TBSA for paediatrics and adults cases.

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

Per cent TBSA group	Paediatrics		Adults	
	N	%	N	%
0-9%	660	87.3	1,339	77.6
10-19%	75	9.9	243	14.1
20-49%	16	2.1	124	7.2
≥ 50%	5	0.7	19	1.1
TOTAL	756	100.0	1725	100.0



Rule of Nines
Example of a burn assessment tool

Burn Depth

Improvements in the Bi-NBR database from July 2010 allowed burn depth data to be more accurately recorded in the Bi-NBR and therefore used for analysis. A burn depth was recorded for 97 per cent of cases. A full thickness burn was recorded for 15% (n=522) of cases. The percentage TBSA of the full thickness burn was documented for 95% of these cases. Table 9 outlines the number of cases where the percentage TBSA full thickness burn was documented. Comparison of depth with the 2009-10 reporting year is only possible using ICD-10 data. The number of cases with coded full thickness burns over 10 per cent (6.8 per cent) was comparable with the 2009-10 reporting year (9.0 per cent).

Table 9: Percentage of TBSA with full thickness burns

Per cent TBSA and full thickness	N	%
< 10 %full thickness	462	94.1
10-19 % full thickness	11	2.3
20-29% full thickness	6	1.2
30-39% full thickness	7	1.4
40-49% full thickness	*	0.4
50-59% full thickness	*	0.2
60-69% full thickness	*	0.2
70-79% full thickness	0	0
80-89% full thickness	0	0
≥90% full thickness	*	0.2
Total	491	100.0

* Denotes less than five cases

Inhalation injury

Inhalation injuries are complex, with significant morbidity and increased mortality. Burns to the oropharynx and upper airway result in swelling and possible airway obstruction within the first few hours after injury. A documented inhalation injury was recorded for seven per cent of adult cases and less than one per cent of paediatric cases. Of the patients who died following their burn injury, 50 per cent had experienced an inhalation injury.

Co-morbidities (pre-existing medical conditions)

ICD-10-AM data were received from 12 of the 14 sites contributing to this report. A decision was made to remove the ICD-10 block code; "Factors influencing health status"; for this report as it was determined that these codes were lifestyle factors and not true co-morbidities. As a result 613 co-morbidity codes were removed from analysis. At least one co-morbidity was coded for 425 cases with an overall total of 955 co-morbidities reported. The median (IQR) number of co-morbidities per case was three (2-6) which is consistent with 2009-10, three (2-5).

Consistent with the 2009-10 only three per cent of paediatric cases and 54 per cent of adult cases had co-morbidity recorded. Males accounted for 72 per cent of cases with co-morbid conditions, consistent with the overall burn gender distribution and with the 2009-10 year (67 per cent). A documented co-morbid condition more frequently recorded in the 50-59 year age group (18.0 per cent) followed by the 40-49 year old age group (14.2 per cent) and the 20-29 year old age group (13.7 per cent).

Table 10 shows the ten most common co-morbidities based on the ICD-10 chapter titles. The mental and behavioural disorders included mental and behavioural disturbance related to alcohol use/abuse/withdrawal in 31 per cent of these cases and related to illicit drugs in 13 per cent of cases. Primary hypotension (26 per cent) or hypotension unspecified (25 per cent) were the most common co-morbid diseases of the circulatory system. Diabetes (with or without associated conditions) accounted for 98 per cent of the endocrine, nutritional and metabolic co-morbid diseases. Further development of the ICD-10 data is required to gain consensus on the list of co-morbid conditions to be used for analysis of impact on burn recovery outcomes.

Table 10: Ten most common co-morbidities by ICD-10 Chapter title

Co-morbidity	N %	%
Mental and behavioural disorders	299	31.3
Diseases of the circulatory system	267	28.0
Endocrine, nutritional and metabolic diseases	164	17.2
Diseases of the nervous system	92	9.6
Diseases of the blood and blood-forming organs	52	5.5
Diseases of the Genitourinary system	37	4.0
Diseases of the digestive system	18	2.0
Neoplasms	10	1.0
Diseases of the respiratory system	9	0.9
Diseases of the musculoskeletal system	*	0.5

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 [9-11]. 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 [9, 10, 12, 13].

Consistent with the 2009-10 reporting year most of the paediatric cases (84 per cent) and 70 per cent of adult cases had documented burn cooling at the scene of the burn injury. Of these cases, cool running water was used in 90 per cent of both paediatric and adult cases. Water was documented as being applied to the burn within three hours of injury in 98 per cent of cases which is consistent with the 2009-10 reporting 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 (bath, swimming pool, river, lake or the sea). Use of ice and ice packs, aloe vera, butter, and toothpaste were used in 18 per cent of cases that had burn cooling at the scene of injury however, are not recommended as effective or appropriate first aid for burn injury. 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 cases	Adult cases
	N (%)	N (%)
Cool running water	542 (90.2%)	986 (90.5%)
Within three hours of injury	513 (97.3%)	953 (98.1%)

Table 12: Time of water application at the scene

Time of water application	Paediatrics cases	Adult cases
	N (%)	N (%)
< 20 minutes	387 (75%)	523 (57%)
≥ 20 minutes	128 (25%)	288 (43%)

What was the referral source to the burns unit?

Consistent with the last reporting period (2009-10), half of the paediatric cases and just under half of the adult cases (48 percent) were referred to the burns unit from another hospital. For paediatric cases, 18 per cent were directly transported from the scene of injury via ambulance to the burns unit compared to 30 per cent in the 2009-10 reporting year. For adult cases, 23 per cent of cases were directly transported from the scene of injury via ambulance compared to 32 per cent in the 2009-10 reporting year. Self-referral to the burns unit, where the injured person self-presented to the hospital emergency department, accounted for approximately 12 per cent of both paediatric and adult cases, higher than eight per cent in the 2009-10 reporting period.

Source: The Standard, Warrnambool, Photographer Angela Milne

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 Bi-NBR hospital is considered critical for the 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. The registry therefore collects data on the length of time taken to admission from time of injury, and reasons why admission to a burns unit is greater than two hours. This data will assist in developing an acceptable time frame for transfer to a Bi-NBR hospital, identifying if pre burn unit care was appropriate and monitoring outcomes of care where there have been transfer delays.

Figure 3: Time from injury to admission

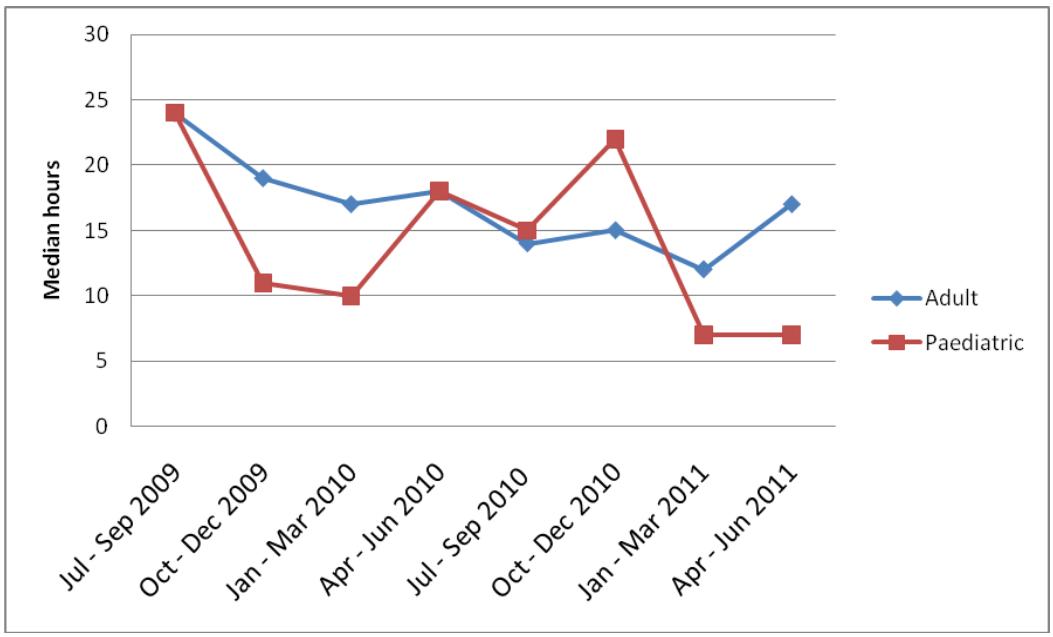


Figure 3 shows the median time from injury to admission for paediatric and adult cases. The median (IQR) time from injury to admission to the Bi-NBR hospital was nine (2-143) hours for paediatric cases which was consistent with the 2009-10 reporting year. For adult cases the median (IQR) time from injury to admission was 14 (4-90) hours, compared to eight (3-50) for the previous year. This could be as a result of fewer adult patients being directly transported from the scene of injury to the burn unit compared to the 2009-10 reporting period.

The initial treatment of a burn patient is critical for reducing the risk of complications, poor long term outcomes and mortality. ANZBA advocates that referring hospitals confer with the burn unit as soon as possible to assist with the initial treatment plan and in triaging the patients requiring transfer. A TBSA of greater than 15 per cent in adult cases and a TBSA of greater than ten per cent in paediatric cases are considered major burns by ANZBA requiring escalation of care. In adult cases with a TBSA of greater than 15 per cent referred from another hospital, the referring hospital made contact with the burn unit within one hour of injury in 52 per cent of cases. For paediatric cases with a TBSA of greater than 10 per cent, contact was made within one hour in 15 per cent of cases.

For 54 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. For 21 per cent of cases, the delay was attributed to transport issues and for 15 per cent of cases as a result of the patient not presenting to the referral hospital in a timely manner.

For adult cases transferred from the scene of injury to the burns unit with a TBSA of greater than 15% (n=61), 60 per cent were received at the Bi-NBR hospital within two hours of injury with only four cases transported greater than ten hours from injury. In paediatric cases with a TBSA of greater than ten per cent (n=29), 76 per cent were received at the Bi-NBR hospital within two hours of injury with all but one case transferred within ten 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 Total Body Surface Area (TBSA) burn size assessment documented by the most senior burns clinician within 72 hours of admission.

In 70 per cent of paediatric cases, and 68 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 47 per cent of cases, followed by the burn care nurse coordinator/or nurse practitioner (15.4 per cent), and the burn consultant (10 per cent). For adult cases, the burn registrar documented the burn wound assessment for 33 per cent of cases followed by an 'other' clinician (12.4 per cent) and the burn fellow (11.6 per cent). For 20 paediatric cases (2.6 per cent) and 78 (4.5 per cent) of adult cases, the wound assessment was documented prior to admission, either in the emergency department, referring hospital, or in outpatients.

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 Head of Unit or at least one surgeon with a minimum of 2 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 10 per cent TBSA), a senior burn clinician assessment was documented in 79 per cent of cases, compared to 65 per cent of cases in the 2009-10 year. This assessment was documented to have occurred within 24 hours of admission for 69 per cent of paediatric cases which was lower than the previous year (84 per cent).

For adult cases with major burns (greater than fifteen per cent TBSA), a senior burn clinician assessment was documented in 62 per cent of cases. This assessment occurred within 24 hours of admission for 75 per cent of adult cases which is consistent with the 2009-10 reporting year (71 per cent).

Theatre for burn wound excision

Improvements to the database from July 1st 2010 enabled burn wound management procedures to be captured in more detail and will enable greater comparisons across years in future reports. For the 2010-11 year, sixty five per cent of paediatric cases underwent a burn wound management procedure in theatre compared to 71 per cent in 2009-10. For adult cases, 71 per cent underwent a burn wound management procedure compared to 79 per cent in 2009-10.

Table 12 outlines the percentage of procedures conducted for paediatric and adult cases. One case may have multiple procedures recorded; therefore percentages are reflective of total procedures and not procedures per case. The other procedures were predominately primary wound closure, free flaps and application of dressing such as vac dressings. For 25 of these cases the 'other' procedure was the only wound management procedure completed.

Table 12: Percentage of burn wound management procedures

Procedure	Paediatrics cases		Adult cases	
	N	%	N	%
Debridement and skin grafting	253	52.0	885	69.0
Debridement and temporary skin closure product (e.g biobrane)	132	27.0	285	22.1
Debridement only	98	20.0	288	22.3
Debridement and skin cell product (e.g. CEA)	44	9.0	111	8.6
Debridement and dermal reconstructive product (e.g. integra)	0	0	5	0.4
Total	527		1574	
Other procedures not outlined above				
Dressing change in theatre only	58	73.4	18	19.2
Other	12	15.2	50	53.2
Escharotomy	9	11.4	17	18.1
Amputation	0	0	7	7.5
Fasciotomy	0	0	*	1.1
Escharotomy, Fasciotomy and Amputation	0	0	*	1.1
Total	169		92	

Burn wound debridement and skin grafting was completed for 52 per cent of paediatric cases and 69 per cent of adult cases. For cases with full thickness burns, 70 per cent of paediatric case and 82 per cent of adult cases had underwent debridement and grafting. The median time to grafting from injury was 11 (6-15) days for paediatric cases and seven (4-10) days for adult cases that were not transferred between Bi-NBR hospitals.

Of the paediatric cases that went to theatre for debridement and temporary skin closure product (n=23) 83 per cent subsequently went to theatre for skin grafting and 53 per cent of adult cases (n=86) had skin grafting at a later date.

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 [14-16]. Dedicated allied health burn clinicians are responsible for assessing burns patients and commencing rehabilitation as early as possible.

Of the paediatric patients with greater than ten per cent TBSA and stayed in hospital for more than 24 hours (n=73), 82 per cent had documentation of a physical functioning assessment by a physiotherapist or occupational therapist within 48 hours of admission. For adult patients, with greater than 15 per cent TBSA (n=173), 88 per cent had documentation of a physical functioning assessment within 48 hours of admission.

Enteral / parenteral feeding

Burn injury increases the body's metabolic requirements. The provision of an adequate supply of nutrients as close to the time of the burn injury is considered crucial in reducing the effects of metabolic abnormalities [15, 17-19].

Of the paediatric cases with a burn greater than ten per cent TBSA (n=73), supplementary feeding (either enteral or parenteral) was documented as commencing within 24 hours of admission for 74 per cent of patients. For adult cases with a burn greater than 20 per cent TBSA (n=113), supplementary feeding was documented as commencing within 24 hours for 70 per cent of patients.

In-hospital outcomes of burn injury

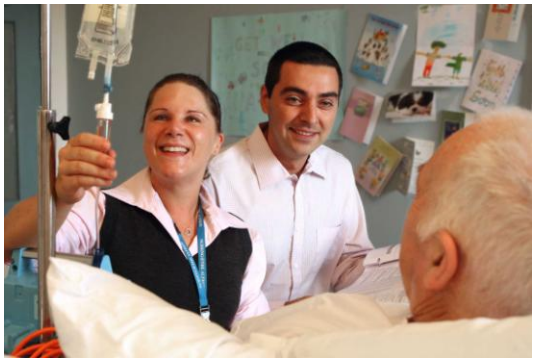
This section describes the hospital outcomes of burn care, including intensive care (ICU), complications during the episode of care, length of stay, discharge disposition and re-admissions.

ICU admissions

Critical care management and mechanical ventilation may be required after burn injury [20, 21]. An ICU admission was required for six per cent of paediatric cases and 14 per cent of adult cases which is consistent with the 2009-2010 reporting year. Of paediatric cases with a burn of greater than 20 per cent TBSA, an ICU admission was required for 74 per cent of cases. For adult cases with a TBSA burn greater than 20 per cent, an ICU admission was required for 68 per cent of cases. The median (range) length of stay in ICU was 43 (21-235) hours for paediatric cases compared to 95 (41-310) in the 2009–10 reporting period. For adult cases the median hours (IQR) was 67 (31-192) compared to 86 (38-288) in 2009-10. The majority of patients (93 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 175 (84-441) hours for paediatric cases and 86 (36–233) hours for adult cases.

The median (IQR) hours of ventilation for cases admitted to ICU was 74 (21-265) for paediatric cases and 48 (18-139) for adult cases. This was considerably lower for both paediatric and adult cases than in the 2009-10 reporting period. There were fewer cases admitted to ICU in 2010-11 with burns of greater than 10% TBSA in both paediatric (73 per cent) and adult cases (58 per cent) compared to the 2009-10 reporting period (paediatric 83 per cent, adult 72 per cent).

Renal impairment (eGFR)



Acute renal failure can develop during the early resuscitation stage when treating a burn injury and is associated with complications and poor outcomes in severe burn injury [22-25]. 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 indicates renal impairment.

Of the paediatric cases admitted to ICU, where eGFR was routinely measured (26 per cent), two cases (18 per cent) were identified as having a negative change of >30 ml/min/1.73m2 and possible issues with initial fluid resuscitation. For adult cases admitted to ICU, the eGFR was routinely collected for 74 per cent. Of these, two cases (1.7 per cent) were identified as having a negative change of >30 ml/min/1.73m2 of estimated GFR (eGFR) within 72 hours.

Complications

Table 13 outlines the number of instances of complications under ICD-10 chapter title experienced by admitted burn patients. Overall there were 1,751 complications coded with 1,592 adult cases. When reporting the complications an assumption has been made that the complication is related to the burn. This is particularly relevant for infections based complications. Bacterial, viral and other infectious agents were the most prevalent complications with streptococcus and staphylococcus (53 per cent) the most common complication coded in this category. Hypotension (30.0 per cent) and hypertensive disease (26 per cent) were the most common complications of the circulatory system. Other disorders of fluid, electrolyte and acid-base balance (66 per cent) and volume depletion (34 per cent) were the most common complication in the endocrine, nutritional and metabolic disease category.

Table 13: Ten most common complications by ICD-10 chapter

ICD-10 Complication description	N %	%
Bacterial, viral and other infectious agents	455	26.0
Diseases of the circulatory system	262	15.0
Endocrine, nutritional and metabolic diseases	151	8.6
Symptoms, signs and abnormal clinical and laboratory findings	138	8.0
Diseases of the genitourinary system	122	7.0
Diseases of the respiratory system	101	6.0
Diseases of the skin and subcutaneous system	100	5.7
Mental and behavioural disorders	98	5.6
Disease of blood and blood-forming organs	92	5.3
Factors influencing health status and contact with health services	85	5.0

Blood cultures

Bloodstream infections increase the risk of complications and mortality in burn injured patients [26, 27]. A positive blood culture was present for 33 (four per cent) paediatric cases and 35 (two per cent) adult cases. Admission swabs are not routinely conducted at all sites on admission (see Structural Indicators Appendix 5) Of the cases that had a swab conducted on admission and had a positive blood culture during their admission, nine paediatric cases and 12 adult cases had positive wound swabs taken on admission.

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 is a complication following burn injury that can affect patient outcomes in terms of healing potential and rehabilitation outcomes. Extended length of stay can be associated with weight loss and poorer outcomes [15, 18, 28].

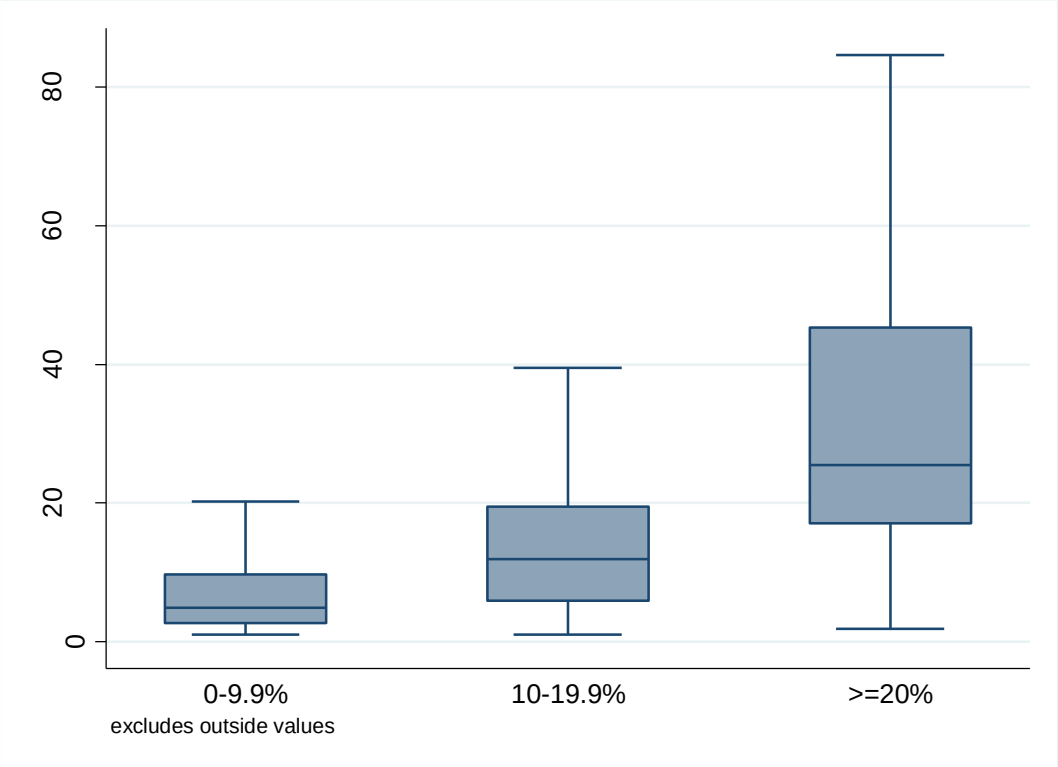
Of the paediatric patients with a length of stay greater than two weeks (7 per cent), 82 per cent had their weight measured and documented within three to five days of admission, and 60 per cent had a weekly weight documented during their admission. Where documented, weight loss was recorded for five paediatric patients.

For adult cases with a length of stay greater than two weeks (19 per cent), 41 per cent had their weight measured and documented within three to five days of admission. A weekly weigh was conducted and documented for 49 per cent of these patients. Where documented, weight loss was recorded in 27 (25 per cent) cases.

Length of stay

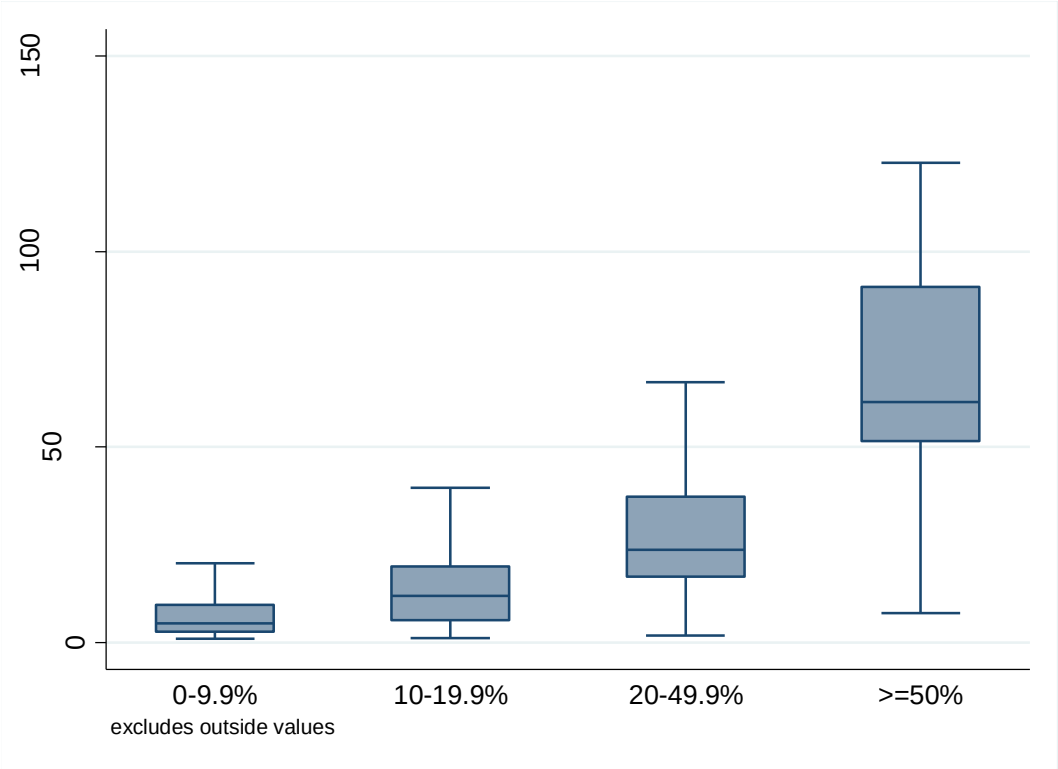
The length of admission can be associated with increased risk of complications and can impact on the outcomes for burn patients [29]. The length of stay for the Bi-NBR analysis excludes cases that did not survive to discharge or where the LOS was less than 24 hours. Consistent with the 2009-10 reporting years, the median (IQR) length of stay (LOS) for paediatric patients was four (2-9) days. Figure 4a shows the distribution of LOS by percentage TBSA grouping for paediatric patients.

Figure 4a: Distribution of the length of stay by percentage TBSA – Paediatric cases (excluding deaths)



The median (IQR) LOS for adult cases was seven (3-14) days which is consistent with 2009-10. Figure 4b shows the distribution of hospital length of stay by percentage TBSA for adults. As expected, larger burns were associated with a greater hospital length of stay. This was consistent for paediatric and adult cases. The American NBR recorded an average length of stay of nine days for both female and male cases. The average length of stay across the Bi-NBR population was 9.5 days.

Figure 4b: Distribution of length of stay by percentage TBSA – Adults (excluding deaths)



Deaths

Overall, 20 (0.8 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 3.6 per cent for females.

As would be expected, the likelihood of death increased with burn size. The death rate was 0.3 per cent for cases with a TBSA less than ten per cent. The death rate increased to 18 per cent in cases with a TBSA between ten and 49 per cent, and 50 per cent in cases with a TBSA greater than 50 per cent. This is consistent with the death rate reported in 2009-10.

Of the patients who died, an inhalation injury was present in 10 (50 per cent) cases. A reason for death was recorded for 95 per cent of cases with multi-system organ failure (n=6), burn shock (n=4) and acute myocardial infarct (n=4) the most common reason for death.

Discharge status

The majority of patients (82 per cent) were discharged to their usual residence (Table 14). There are different practices in terms of discharge planning across the burn centres including in the use of hospital in the home and inpatient rehabilitation. These different practices should be considered when interpreting this data.

Table 14: Discharge Disposition

Discharge Disposition	N %	%
Usual residence/ home	2,105	85.1
Other	92	3.7
Hospital in the Home	7	3.0
Inpatient Rehabilitation	63	2.6
Other acute hospitals	38	1.5
Another Bi-NBR Hospital	23	0.9
Other healthcare accommodation, unless usual place of residence	21	0.8
Left against medical advice/ own risk	21	0.8
Died	20	0.8
Psychiatric hospital	14	0.8
Statistical discharge	5	0.2

Readmissions within 28 days of Discharge

One hundred and thirty nine paediatric cases (18 per cent) were readmitted within 28 days of discharge and this data is consistent with 2009-10. The majority (87 per cent) were planned readmissions. 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 2009-10, the readmission rate was less for adults where only 87 (five per cent) cases recorded a readmission within 28 days of discharge. In contrast to paediatric cases over half (56 per cent) of these cases were reported as 'unplanned' readmissions 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 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 in the future.

Limitations and data caveats

- Only cases meeting the Bi-NBR inclusion criteria are included in reports.
- Only the first acute admission that meets the Bi-NBR 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 Bi-NBR 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. This has limited the ability to compare 2010-11 data with 2009-10 data in this report.
- 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 future reports 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.
- Participation remains a limitation of the Bi-NBR. Until there is near complete site participation, caution is required when using the registry data as it cannot provide definitive figures for monitoring the health care provided.

Conclusion

The overall goal of the Bi-NBR is to monitor burn injury incidence and causation and to encourage higher standards of patient care and inform burn injury prevention initiatives across Australia and New Zealand.

Data are presented for 2480 burn cases admitted to 14 of the 17 designated burns units across both Australia and New Zealand for the 12-month period July 2010 to June 2011. Data completeness is 95 to 100 per cent for the majority of core data items including the patient, burn event, admission, percentage TBSA, ICU and discharge details and continues to improve for all items.

Descriptive statistics were performed for the majority of data elements. Comparable to the 2009 -10 reporting period, epidemiological data indicate males aged 20 to 29 years are at high risk of sustaining a flame burn injury and children one year of age are at risk of sustaining a scald burn injury. Injury prevention initiatives should be targeted at these age groups and burn causes.

Cool running water was documented as being applied within three hours of injury for 98 per cent of all cases that received burn cooling at the scene of injury. Where an injury requiring admission to a burns unit occurred, the vast majority of burns were less than ten per cent TBSA. However, nearly three quarters of all cases required theatre for a burn wound management procedure, indicating the severity of even the smaller burns and importance of injury prevention campaigns.

The data presented was comparable to the 2009-2010 reporting period and suggests similarities in patient age, sex, burn cause, and place of injury with that reported in the American Burn Association, National Burn Repository.

While quality of care data was presented in this report, comparisons against an acceptable standard of performance are not possible until future annual reports. More detailed analysis of trends will also be possible as the volume of Bi-NBR cases and site participation increases. An executive summary is presented at the beginning of the report.

Publications / Presentations

Publications

Two Bi-NBR papers were submitted and accepted for publication to the International Journal of Burns in the 2010-2011 reporting year.

Watterson D, Gabbe B. J., Cleland H, Edgar D, Cameron P and Members of the Bi-NBR Steering Committee. (2012) Developing the first Bi-National clinical quality registry for burns—Lessons learned so far. Burns 38(1):52-60.

Watterson D, Cleland H, Darton A, Edgar D, Fong J, Harvey J, Kavanagh S, Perrett T, Singer Y, Tonkin C, Cameron P. (2011) Developing clinical quality indicators for a Bi-National Burn Registry: Burns 37(8):1296-308.

Presentations

The Bi-NBR is annually presented at the Australian and New Zealand Burns Association (ANZBA) Scientific meeting and was recently awarded the Best Scientific paper in Brisbane (2011). The Bi-NBR was also presented at other conferences and forums during the reporting period including the Victorian Burns First Aid forum.

References

[1] Australian Commission on Quality and Safety in Health Care. Operating Principles and Technical Standards for Australian Clinical Quality Registries. Available at: **http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/PriorityProgram-08_CQRegistries**. Accessed 20 June 2010.

[2] American Burn Association. National Burn Repository, 2011 Version 7. Available at: **http://www.ameriburn.org/2011NBRAnnualReport.pdf**. Accessed March 2012.

[3] Australian Bureau of Statistics. Australian Standard Geographical Classification (ASGC) correspondence file concording 2006 (POA) to 2006 Remoteness Areas (RA). In: Section AG, editor.2006.

[10] Bartlett N, Yuan J, Holland AJ, Harvey JG, Martin HC, La Hei ER, et al. Optimal Duration of Cooling for an Acute Scald Contact Burn Injury in a Porcine Model. J Burn Care Res. 2008;29.

[11] Yuan J, Wu C, Holland AJ, Harvey JG, Martin HC, La Hei ER, et al. Assessment of Cooling on an Acute Scald Burn Injury in a Porcine Model. J Burn Care Res. 2007;28.

[12] Cuttle L, Kempf M, Liu P-Y, Kravchuk O, Kimble RM. The optimal duration and delay of first aid treatment for deep partial thickness burn injuries. Burns. 2010;36:673-9.

[13] Cuttle L, Kempf M, Kravchuk OP, Phillips GE, Mill J, Wang X-Q, et al. The optimal temperature of first aid treatment for partial thickness burn injuries. Wound Repair Regen. 2008;16.

[14] Cuttle L, Pearn J, McMillan JR, Kimble RM. A review of first aid treatments for burn injuries. Burns. 2009;doi: 10.1016/j.burns.2008.10.011.

[15] Al-Mousawi AM, Mecott-Rivera GA, Herndon DN. Burn Teams and Burn Centers: The Importance of a Comprehensive Team Approach to Burn Care. Clin Plast Surg. 2009;36:547-54.

[16] Australian and New Zealand Burn Association. Burn Survivor Rehabilitation: Principles and Guidelines for the Allied Health Professional. Available at: **http://www.anzba.org.au/**. Accessed 17th January 2011.

[17] Jarrett M, McMahon M, Stiller K. Physical Outcomes of Patients With Burn Injuries - A 12 Month Follow-Up. Journal of Burn Care & Research. 2008;29:975-84.

[18] Wasiak J, Cleland H, Jeffery R. Early versus delayed enteral nutrition support for burn injuries (Review). Cochrane Database Syst Rev. 2006;Art. No.: CD005489.DOI: 10.1002/14651858.CD005489.pub2.

[19] Khorasani EN, Mansouri F. Effect of early enteral nutrition on morbidity and mortality in children with burns. Burns. 2010;doi:10.1016/j.burns.2009.12.05.

[20] Prelack K, Dylewski M, Sheridan R. Practical guidelines for nutritional management of burn injury and recovery. Burns. 2007;33:14-24.

[21] Palmieri T. What's New in Critical Care of the Burn-Injured Patient? Clin Plast Surg. 2009;36:607-15.

[22] Wang Y, Tang H-T, Xia Z-F, Zhu S-H, Ma B, Wei W, et al. Factors affecting survival in adult patients with massive burns. Burns. 2010;36:57-64.

[23] Mosier MJ, Pham TN, Klein MB, Gibran NS, Arnoldo BD, Gamelli RL, et al. Early Acute Kidney Injury Predicts Progressive Renal Dysfunction and Higher Mortality in Severely Burned Adults. J Burn Care Res 2010;31:83-92.

[24] Palmieri T, Lavrentieva A, Greenhalgh DG. Acute kidney injury in critically ill burn patients. Risk factors, progression and impact on mortality. Burns. 2010;36:205-11.

[25] Mitra B, Fitzgerald M, Cameron P, Cleland H. Fluid Resuscitation in Major Burns. ANZ J Surg. 2006;76:35-8.

[26] Latenser B. Critical care of the burn patient: The first 48 hours. Crit Care Med. 2009;37:2819-26.

[27] Guo F, Chen X-L, Wang Y-J, Wang F, Chen X-Y, Sun Y-X. Management of burns for over 80 per cent of total body surface area: A comparative study. Burns. 2009;35:210-4.

[28] Shupp JW, Pavlovich AR, Jeng JC, Pezzullo JC, Oetgen WJ, Jaskille AD, et al. Epidemiology of Bloodstream Infections in Burn-Injured Patients: A Review of the National Burn Repository. J Burn Care Res. 2010;31.

[29] Jacobs DG, Jacobs DO, Kudsk KA, Moore FA, Oswanski MF, Poole GV, et al. Practice Management Guidelines for Nutritional Support of the Trauma Patient. J Trauma. 2004;57.

[30] Pereira C, Murphy K, Herndon D. Outcome measures in burn care. Is mortality dead? Burns. 2004;30:761-71.

[31] New South Wales Health. Clinical Practice Guidelines: Burn Wound Management. Available at: **http://www.health.nsw.gov.au/gmct/burninjury/guidelines.asp**. Accessed 28 March.

[32] Australian Institute of Health and Welfare. METeOR Available at: **http://meteor.aihw.gov.au**. Accessed 9 May 2010.

[33] Gabbe B, Magtengaard K, Hannaford A, Cameron P. Is the Charlson Comorbidity Index Useful for Predicting Trauma Outcomes? Acad Emerg Med. 2005;12.

[34] Li B, Evans D, Faris P, Stafford D, Hude Q. Rosk adjustment performance of Charlson and Elixhauser comorbidities in ICD-9 and ICD-10 administrative databases. BMC Health Services Research. 2008;8.

[35] Kidney Health Australia. The eGFR Calculator (estimated Glomerular Filtration Rate). Available at: **http://www.kidney.org.au/HealthProfessionals/eGFRClinicalTools/tabid/632/Default.aspx**. Accessed 28 March.

[36] New Zealand Government. Statistics New Zealand. Available at: **http://www.stats.govt.nz/surveys_and_methods/methods/classifications-and-standards/classification-related-stats-standards/ethnicity/definition.aspx**. Accessed 28 March

[37] Carr J, Phillips B, Bowling W. The Utility of Bronchoscopy After Inhalation Injury Complicated by Pneumonia in Burn Patients: Results From the National Burn Repository. Journal of Burn Care & Research. 2009;30:967-74.

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 [30].
Burn Injury classifications [30]	• 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, eg 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 [31].
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 Bi-NBR Steering Committee in an effort to standardise burn wound assessment data, particularly given the per cent 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 [15].

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.'* [34] 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 [35].
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 [30].
Inhalation injuries:	Burns to the oropharynx and upper airway result in swelling and possible airway obstruction within the first few hours after injury. Inhalation injuries are complex, with significant morbidity and increased mortality [36].
Senior burn clinician:	The Head of 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 EMSB certification.
Total body surface area:	A percentage measure 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 [30].

Appendix 1: Data Completeness

Within each section, the level of completeness of each data item is defined as not entering that section or 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. Most data items are expressed as a percentage of the total number of cases. However, for many of the quality indicators or where a particular event (e.g. ICU, death) occurs, data items are expressed as a percentage of that event. E.g. ICU admission Dates only for ICU admissions.

Patient Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Date of Birth	2480 (100%)	-	2480 (100%)
Date of Injury	2480 (100%)	-	2480 (100%)
Time of Injury	2130 (85.9%)	350 (14.1%)	2480 (100%)
Gender	2103 (100%)	-	2480 (100%)
Ethnicity or Country of Birth	2442 (98.5%)	38 (1.5%)	2480 (100%)
Residential Postcode	2265 (91.3%)	215 (8.7%)	2480 (100%)

Admission Section	Complete and valid response: n (%) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Date of Admission	2480 (100%)	-	2480 (100%)
Time of Admission	2465 (99.4%)	15 (0.6%)	2480 (100%)
Fund	2474 (99.8%)	6 (0.2%)	2480 (100%)
Admission Type	2480 (100%)	-	2480 (100%)
Referral Source	2480 (100%)	-	2480 (100%)

Event Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Cause - Primary	2474 (99.8%)	6 (0.2%)	2480 (100%)
Accelerant	2460 (99.2%)	20 (0.8%)	2480 (100%)
Accelerant Type	523 (97.8%)	12 (2.2%)	535 (100%)
Explosion/Flash	2447 (98.7%)	33 (2.3%)	2480 (100%)
Activity when injured	2428 (97.9%)	52 (2.1%)	2480 (100%)
Place of injury	2403 (96.9%)	77 (3.1%)	2480 (100%)
Intent of injury	2471 (99.6%)	9 (0.4%)	2480 (100%)
Event Description	2480 (100%)	-	2480 (100%)
Event Postcode	2218 (89.4%)	262 (10.6%)	2480 (100%)
Drug/Alcohol Involvement	2090 (84.3%)	390 (15.7%)	2480 (100%)
Inhalation Injury	2480 (100%)	-	2480 (100%)
Transfer Delay - Geographical	2004 (99.4%)	12 (0.6%)	2016 (100%)
Transfer Delay - Patient Initiated	1991 (98.8%)	25 (1.2%)	2016 (100%)
Transfer Delay - Transport-related	1968 (97.6%)	48 (2.4%)	2016 (100%)

Burn Cooling Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Cooling Techniques	2296 (92.6%)	184 (7.4%)	2480 (100%)
Cool Running Water	1692 (99.0%)	17 (1.0%)	1709 (100%)
Water Mins	1426 (93.3%)	103 (6.7%)	1529 (100%)
Water Hours	1499 (98.0%)	30 (2.0%)	1529 (100%)
Hydrogel	1698 (99.4%)	11 (0.6%)	1709 (100%)
Other Cooling Techniques	1709 (100%)	-	1709 (100%)

Burn Assessment Section	Complete and valid	Not entered/not	Total

(Burns Unit)	response: n (per cent) eligible	stated/ inadequately described: n (per cent)	n (per cent)
TBSA	2328 (93.9%)	152 (6.1%)	2480 (100%)
Burn Depth	2395 (96.6%)	85 (3.4%)	2480 (100%)
Assessed By	2327 (93.8%)	153 (6.2%)	2480 (100%)
Assessed Date/Time	2294 (92.5%)	186 (7.5%)	2480 (100%)

Assessment Quality Indicators Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Surgeon Assessment	2468 (99.5%)	12 (0.5%)	2480 (100%)
Surgeon Assessment Date	1202 (100%)	-	1202 (100%)
Surgeon Assessment Time	1090 (90.7%)	111 (9.3%)	1202 (100%)
Physical Functioning Assessment	256 (98.8%)	3 (1.2%)	259 (100%)
Enteral /Parenteral Feeding	195 (98.0%)	4 (2.0%)	199 (100%)

Inpatient Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
ICU Admission	2480 (100%)	-	2480 (100%)
ICU Stay	279 (99.3%)	2 (0.7%)	281 (100%)
ICU Readmission	281 (100%)	-	281 (100%) 223 (100%)
Ventilation Hours	268 (95.4%)	13 (4.6%)	281 (100%)

Inpatient Quality Indicator Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Renal Impairment (eGFR)	189 (67.0%)	21 (7.5%)	282 (100%)
• *Not collected for this patient*	31 (11.0%)		
• *Not collected at this site*	41 (14.5%)		

Blood Cultures • *Not collected for this patient*	680 (27.4%) 1787 (72.1)	13 (0.5%)	2480 (100%)
Positive Swab on Admission • *Not collected for this patient* • *Not collected at this site*	59 (100%) 0 cases 0 cases 52 (81.3%) 7 cases 4 cases	-	59 (100%) 64 (100%)

The renal impairment quality indicator is relevant to ICU patients only. The blood culture data item relates to whether the patient had a positive blood culture 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. 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 (per cent)
Disposition	2475 (99.8%)	5 (0.2%)	2480 (100%)
Death Cause	19 (95.0%)	1 (5.0%)	20 (100%)
Decision	18 (90.0%)	2 (10%)	20 (100%)
Decision Date	19 (95.0%)	1 (5.0%)	20 (100%)
Discharge Date	2477 (99.9%)	3 (0.1%)	2480 (100%)
Discharge Time	2423 (97.7%)	57 (2.3%)	2480 (100%)

Discharge Quality Indicators Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Weight Day 5 • *Not collected at this site*	394 (93.0%) 4 cases (0.9)	26 (6.1%)	424 (100%)
Weight Weekly • *Not collected at this site*	381 (90.0%) 4 cases (0.9)	39 (9.1%)	424(100%)
Weight Loss	133 (76.9%)	40 (23.1%)	173 (100%)

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.

ICD-10-AM Section	Complete and valid response: n (per cent) eligible	Not entered/not stated/ inadequately described: n (per cent)	Total n (per cent)
Diagnoses	2,476 (99.8%)	4 (0.2%)	2480 (100%)
Procedures	2474 (99.7%)	6 (0.3%)	2480 (100%)

ICD-10 diagnoses and procedures data were received predominantly in electronic format from hospital administrative systems for 12 of the 14 sites that submitted data for this report.

Appendix 2: Management Committee membership

Belinda Gabbe	VIC	Monash University, DEPM	Bi-NBR Project Supervisor, Senior Research Fellow
Natalie Picton	VIC	Monash University, DEPM	Bi-NBR Project Coordinator
Dina Watterson	VIC	Monash University, DEPM	Bi-NBR Project Manager
Mimi Morgan	VIC	Monash University, DEPM	Research Manager, Critical Care Division
Paul Jennings	VIC	Monash University, DEPM	Research Fellow, Critical Care Division

Appendix 3: Steering and Reference 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	√	√
Dina Watterson	Monash	Project Officer	√	√
Paul Jennings	Monash	Researcher	√	√
Heather Cleland	VIC, Alfred	Head of Burns Unit (ANZBA Vice President)	√	
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	√	
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 Specialities		√
Linda Quinn	SA, WCH	Burns - Advanced Clinical Practice Consultant	√	
Fiona Wood	WA, RPH	Head of Burns Unit	√	

NAME	SITE	TITLE	Steering Committee	Reference Committee
Dale Edgar	WA, RPH	Senior Physiotherapist / McComb Clinical Research Manager	√	
Joy Fong	WA, RPH	Clinical Nurse Consultant		√
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	√	√
Jan Diwell	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	√	
Cynthia Banham	Consumer Rep		√	

Previous Members (during Reporting Period):

NAME	SITE	TITLE	Steering Committee	Reference Committee
Andrew Hannaford	Monash	Data Systems Analyst	√	√
Tim Pruyn	NSW, Concord	EN/ Data Entry officer		√
Prof Peter Maitz	NSW, Concord	Head of Burns Unit	√	
Aislinn (Ash) Carr	NZ, Middlemore	Burns CNS		√
Frances James	NZ, Middlemore	Senior Clinical Psychologist		√
Natasha Forster	SA, WCH	Burns Clinical Nurse		√
Phil Calvert	SA, WCH	Manager, Physiotherapy		√
Linda Quinn	SA, WCH	Burns - Advanced Clinical Practice Consultant		√
Sanjeev Khaurana	SA, WCH	Consultant Paediatric Surgeon	√	
Alex Manna	SA, WCH	Burns Clinical Nurse Specialist	.	√
Rochelle Kurmis	SA, RAH	Allied Health Project Manager, Burns SA/ Senior Dietitian, Surgical Specialities		√
Ian Mackie	SA, RAH	Burns Consultant	√	

NAME	SITE	TITLE	Steering Committee	Reference Committee
Belinda Wallis	QLD, RCH	Burns Prevention Researcher – RCH Burns and Trauma Research Group	√	√
Carolyn Hynes & Suzanne Land	TAS, Royal Hobart	Acting Clinical Nurse Consultant, Burns		√

Appendix 4: 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 initially obtained from the Monash University Human Research Ethics Committee.

Approval for burns data collection has also been actively sought from all Bi-NBR hospitals. By June 2011, 15 sites had commenced registry data submission; however one site was excluded from analysis due to low numbers. Of the 14 Burns Units, five sites treat paediatric patients (36 per cent) and eight sites treat adult patients (57 per cent).

Australian and New Zealand Bi-NBR Hospitals:

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

Note: *NSW burns units form the NSW Statewide Burn Injury Service (SBIS)*

The following sites did not submit data for the reporting period. One site did commence data collection, however was excluded from analysis due to low numbers.

	Hospital	State/Country	Adult/Paediatrics
1	Royal Brisbane & Women's	Queensland	Adults
2	Royal Children's Brisbane	Queensland	Paediatrics
3	Hutt Valley	Wellington, NZ	Adult/Paediatrics

Appendix 5: 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 and 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 the Bi-NBR and will be reported on an annual basis only. The data was requested from the 14 sites that contributed data to the Bi-NBR July 2010 – June 2011 and the questions required a yes/no response only.

STRUCTURAL QUALITY INDICATORS	Response rate (per cent)	(p) Yes
1. Is a Burns Surgeon available on call 24 hours?	79%	**90%**
2. Is a Burns theatre available on a 24 hour basis?	79%	**90%**
3. Is Multidisciplinary care provided within the burns unit?	79%	**100%**
• **Are weekly multidisciplinary team meetings conducted in the burns unit?**	79%	**100%**
4. Does your unit routinely complete infection surveillance swabs on admission?	**79%**	**55%**

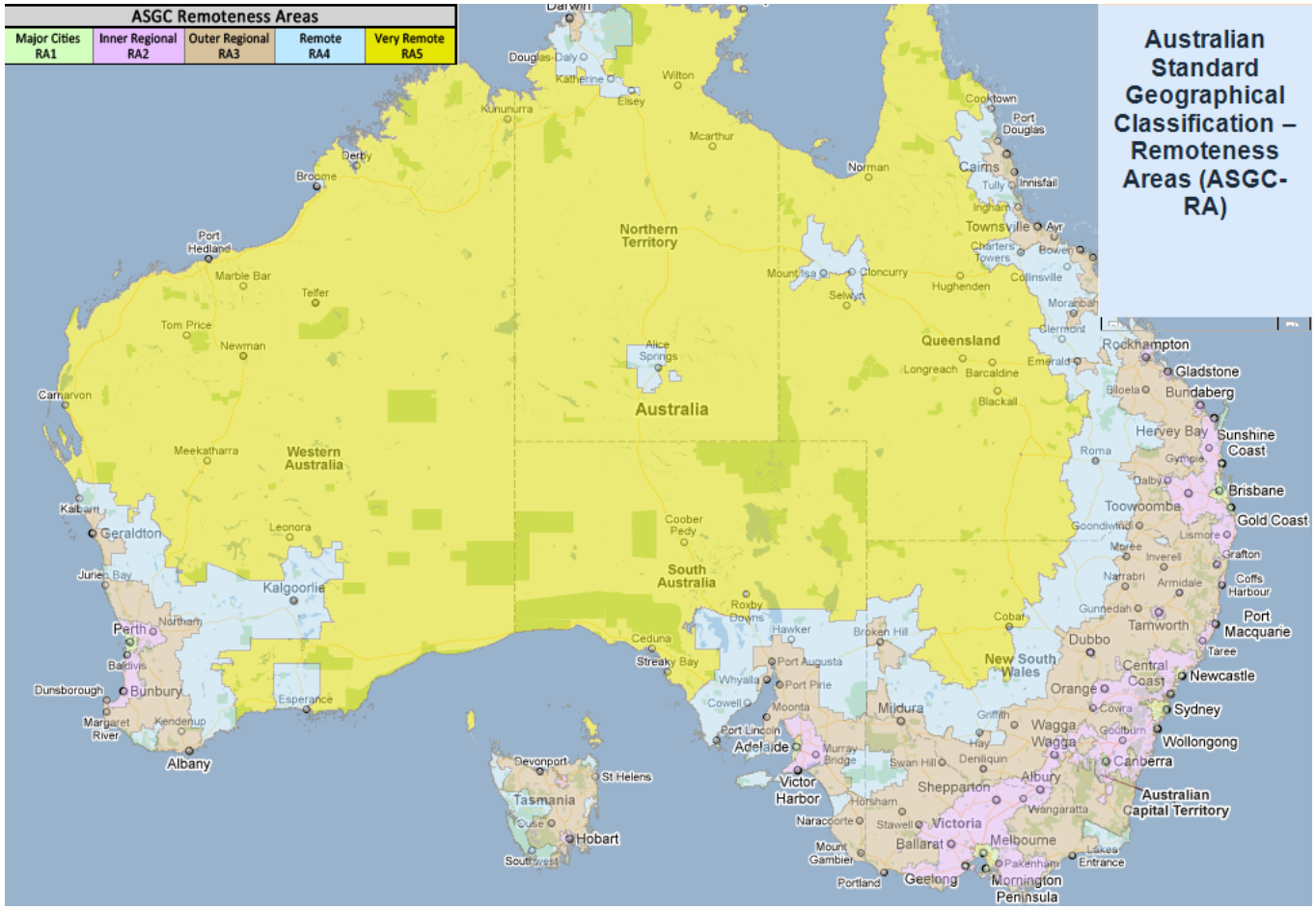
Appendix 6: ANZBA Referral Criteria

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 ten 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 women;
- 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.

Appendix 7: Remoteness Areas



Sourced from:

http://www.doctorconnect.gov.au/internet/otd/Publishing.nsf/Content/locator