



MONASH
University

BURNS REGISTRY
OF AUSTRALIA
AND NEW ZEALAND
(BRANZ)

ANNUAL REPORT
2020/21



CONTENTS

FOREWORD	3	PRE-HOSPITAL MANAGEMENT OF BURN INJURIES	29
YEAR AT A GLANCE	4	Burns First Aid Treatment	30
ABOUT THIS REPORT	5	Referral Source to Burns Service	31
BACKGROUND	6	How Long Did it Take for Burns Patients to be Admitted to a Specialist Burn Service?	31
Overview of the Burns Registry of Australia and New Zealand (BRANZ)	6	BURN SERVICE PERFORMANCE	33
Inclusion and Exclusion Criteria	7	Wound Assessment	34
Data Methodology and Quality Assurance	7	Theatre Admissions	34
BRANZ SPECIAL FOCUS REPORT – COVID-19	8	Physical Functioning Assessment	35
Registry Data	9	Enteral and Parenteral Feeding	36
PATIENT DEMOGRAPHICS	11	Renal Impairment	36
Burns Patient Numbers in BRANZ	12	Positive Blood Cultures	36
Age and Gender Profile of Patients Registered by BRANZ	13	Multi-drug Resistant Organisms	37
Ethnicity Distribution of Patients Registered by BRANZ	15	Pain Assessment	37
Funding Profile of Patients Registered by BRANZ	16	Diagram Use in Burn Size Assessment	37
Geographic Profile of Patients Registered by BRANZ (Australian Sites Only)	16	Malnutrition Risk Screening	38
BURN INJURY EVENT DATA	17	Formula Use in Fluid Requirement Estimation	38
Cause of Injury	18	Venous Thromboembolism Prophylaxis	38
Accelerant Use (Flame Injuries Only)	22	Weight Recorded and Weight Loss	39
Place of Injury	22	HOSPITAL OUTCOMES FOLLOWING BURN INJURY	40
Activity at Time of Injury	23	ICU Admissions	41
Injury Intent	23	ICU Length of Stay	41
Day and Time of Injury	24	Mechanical Ventilation in ICU	41
INJURY SEVERITY	25	Hospital Length of Stay	42
Percentage Total Body Surface Area (%TBSA)	26	Discharge Disposition (For Patients Surviving to Discharge)	45
Burn Depth	27	In-Hospital Deaths	45
Inhalation Injury	27	Readmissions	45
Drug and Alcohol Involvement	28	APPENDICES	46
		APPENDIX A Figure and Table Headers	47
		APPENDIX B Investigators and Staff	48
		APPENDIX C Hospitals with Ethics Committee Approval	48
		APPENDIX D Publications and Presentation List for 2020/21	49
		APPENDIX E Criteria for Specialised Burns Treatment	50

Any enquiries or comments regarding this publication should be directed to:

Lincoln Tracy

Department of Epidemiology and Preventive Medicine

Monash University

553 St Kilda Road, Melbourne Victoria 3004

Phone: +61 3 9903 0288

Email: anzba.registry@monash.edu

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Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia.

FOREWORD

This 12th Annual report provides a summary of data entered for 3,484 paediatric and adult patients with acute burn injury admitted to Australian and New Zealand burn Services in the 12 months to June 30th 2021.

All Australian and New Zealand burn services submit data to this registry, which captures quality of care and associated outcomes. The registry thus provides valuable information to identify high performing units and outliers, and acts as a resource for quality improvement activities at the service level.

This year, the special focus report is on the effects of the COVID 'lockdown' restrictions in place across Australian and New Zealand on acute admissions to our burn services. During these times, the observed patterns and incidence of burn injury varied across jurisdictions: public health messaging directed to 'stay on the sofa and keep safe' and appeals to avoid further burdening emergency and health workers, appear to have been effective in at least one jurisdiction.

This was not the case in Victoria, which experienced the most restrictive and prolonged lockdowns, and contributed the bulk of admissions during lockdown periods. While numbers of admissions were comparable to preceding years, patients admitted during lockdowns were more likely to have suffered flame burns, and be more severely injured, with increased likelihood of admission to intensive care and prolonged length of stay. This significant increase in demand at a time when hospitals were already experiencing severe capacity and staffing shortages placed an added burden on health systems significantly stressed by the pandemic. Burn injury is frequently preventable: data provided by the registry continues to support burns prevention campaigns and messaging from community, clinicians and public health groups.

It is widely understood that many of the important outcomes related to quality of burn care go beyond the question of survival, and are longer term. Quality of life after burn injury is heavily impacted by pain and scarring outcomes, which in turn are influenced by treatment factors in the acute phase of care. We are therefore pleased to be partnering with the Victorian Agency for Health Information to conduct a long-term outcome study involving burns patients of the Alfred and Royal Children's Hospital in Melbourne - A Pilot Study of Patient-Reported Outcome Measures in the Victorian Burns Population. The results of this trial of centralised follow-up via either telephone interview or on-line survey will be used to inform implementation of a national program to routinely collect patient reported outcomes in the longer term. This information is vital if we are to gain a meaningful understanding of the burden of burn injury, and efficacy of the care provided to our patients.

The Burns Registry of Australia and New Zealand is a vital resource for understanding burn injury and its outcomes - through research, prevention and quality of care improvement. I commend this report to you.

Heather Cleland



Chair
BRANZ Steering Committee

Jeremy Rawlins

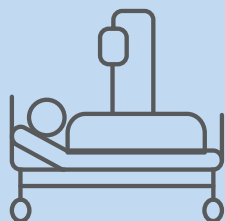


President
Australian and New Zealand Burns Association

This year, the special focus report is on the effects of the COVID 'lockdown' restrictions in place across Australian and New Zealand on acute admissions to our burn services.

YEAR AT A GLANCE

PATIENT



3,484 patients admitted to a burns service in 2020/21
(3,367 in 2019/20)

30 years
median age

37%
occurred on weekend

67%
male

MECHANISM



198 patients had major burns in 2020/21
(a 14% decrease from the 230 in 2019/20)

40%
of adult burns were
due to a flame

49%
of paediatric burns
were due to a scald

3%
of burns were the result
of intentional self-harming

PRE-HOSPITAL MANAGEMENT

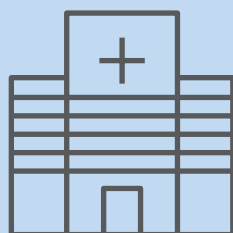


26% | 43%
of children | of adults
did not receive the
recommended first aid
treatment for burn injuries

15%
of children were
transported to a
BRANZ hospital
directly from
the scene

25%
of adults were
transported to a
BRANZ hospital
directly from
the scene

IN-HOSPITAL OUTCOMES



77%
underwent at least one
burn wound management
procedure in theatre
(78% in 2019/20)

10%
admitted to ICU
(10% in 2019/20)

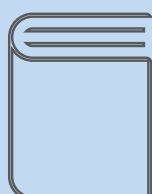
67 hours
Median ICU stay
(69.1 hours in 2019/20)

3.9 days
Median hospital stay
(4 days in 2018/19)

31 deaths
(32 deaths in 2019/20)

12%
of patients with a burn
exceeding 20% TBSA
died (14% in 2019/20)

ACADEMIC OUTPUTS SUPPORTED BY BRANZ DATA



11
peer-reviewed
publications

1
conference presentation
accepted from abstract

8
external requests for
BRANZ data to be used
in ethics-committee
approved research
projects; 8 requests
approved

ABOUT THIS REPORT

This is the twelfth annual report prepared for public release by the Burns Registry of Australia and New Zealand (BRANZ). Data collected during the period of July 1st 2020 to June 30th 2021 from 17 specialist burn services in Australia and New Zealand are reflected in this report with a particular focus on the profile, treatment, and in-hospital outcomes of burns admissions in the 2020/21 financial year. Comparisons with previous years are also presented. As data continue to be updated for new and historic patients in the BRANZ, slight differences in case numbers are expected when compared with previous reports. Where appropriate, data has been compared with the American Burn Association's National Burn Repository (NBR) report of data from 2009 to 2018¹.

1. American Burn Association. National Burn Repository 2019 Update: Report of data from 2009-2018. Chicago, IL, USA.

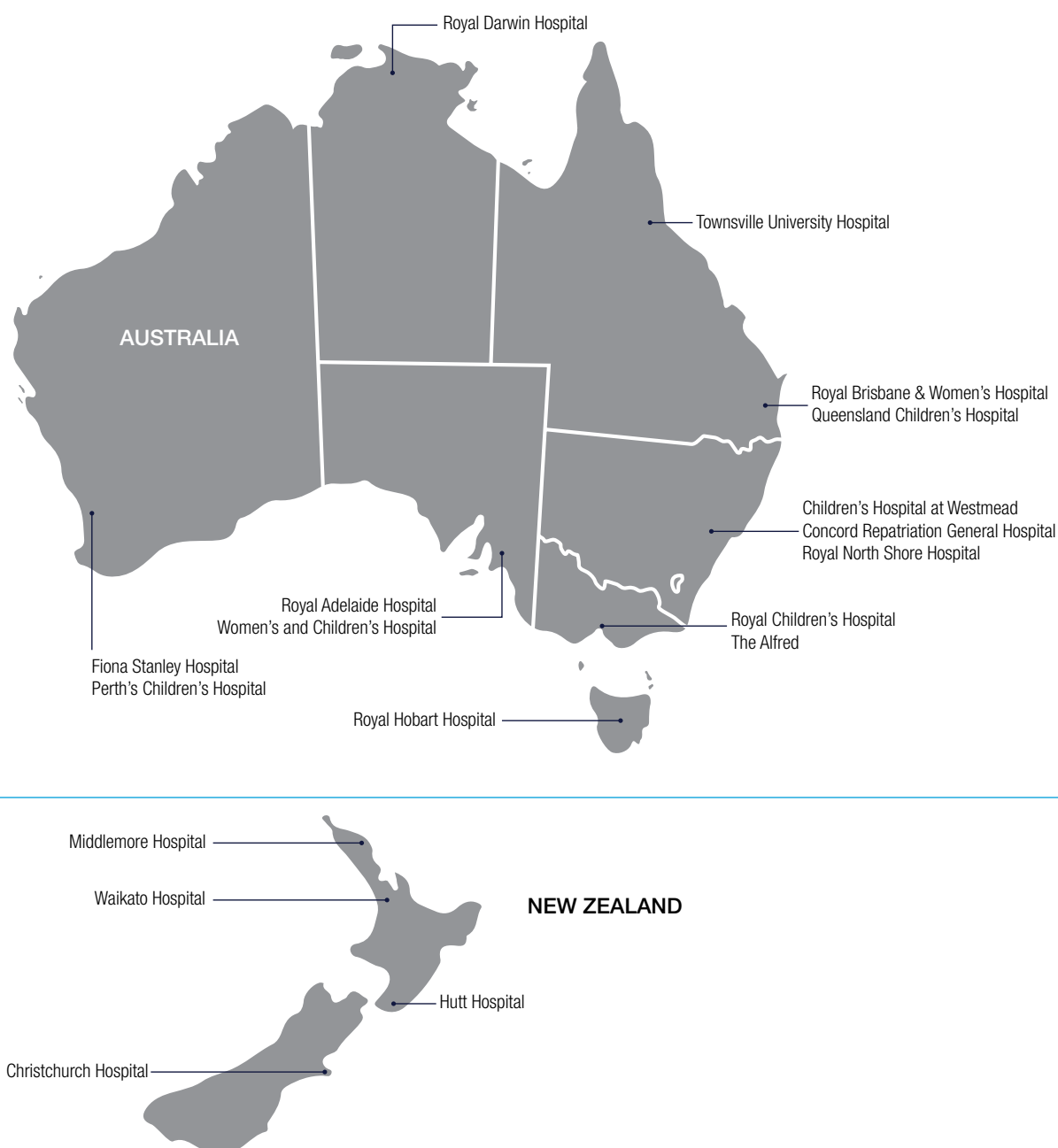
BACKGROUND

OVERVIEW OF THE BURNS REGISTRY OF AUSTRALIA AND NEW ZEALAND (BRANZ)

The Burns Registry of Australia and New Zealand (BRANZ) is a clinical quality registry that captures epidemiological, quality of care, and in-hospital outcome data for adult and paediatric burns patients treated in Australian and New Zealand. The Registry is a collaboration between the Australian and New Zealand Burn Association (ANZBA) and Monash University, Department of Epidemiology and Preventive Medicine (DEPM).

Since July 2016, all 17 specialist burn services in Australia and New Zealand have contributed data to the Registry (Figure 1). An 18th burn service began contributing data in July 2019.

Figure 1 – Contributing Hospitals across Australia and New Zealand



INCLUSION AND EXCLUSION CRITERIA

The BRANZ captures data about all first admissions to an Australian or New Zealand specialist burn service within 28 days of injury where a burn is the principal reason for admission and any of the following criteria are met:

- The patient is admitted to hospital for a period of 24 hours or more; OR
- The patient is admitted to hospital for less than 24 hours but requires a burn wound management procedure in theatre; OR
- The patient dies within 24 hours of presentation to the specialist burn service.

The Registry also collects data on all readmissions to a specialist burn service that occur within 28 days of discharge from the initial admission.

Desquamating skin conditions such as Stevens-Johnson Syndrome and Toxic Epidermal Necrolysis (TENS) are excluded from the Registry. Extravasation injuries are also excluded from the Registry.

DATA METHODOLOGY AND QUALITY ASSURANCE

Data collection is the responsibility of the participating services. Patient data are retrieved from 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.

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, services 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 service is also provided in the quarterly reports to enable individual services to track their data completeness relative to other participating services.

BRANZ SPECIAL FOCUS REPORT

– COVID-19

REGISTRY DATA

The 2020/21 reporting period saw the continued implementation of restrictions, lockdowns, and stay at home orders in an effort to manage COVID-19 in Australia and New Zealand. This period was characterised by the drive for 'COVID-zero', and lockdown restrictions being imposed in response to COVID-19 case numbers. There was significant variation in lockdown frequency and duration across jurisdictions during the reporting period, with the state of Victoria experiencing the greatest duration of days in lockdown. The nature and intensity of restrictions also varied across jurisdictions, ranging from mask mandates and density restrictions to travel limits, stay at home orders, and curfews in some locations.

From July 2020 to June 2021, there were 3,484 patients recorded by the BRANZ. Of these, 283 patients were admitted during a lockdown period (8% of all admissions). Overall, the number of burn injuries that occurred during lockdowns was lower compared with the same time periods in previous reporting years, except for in Victoria and the first lockdown in Western Australia (see Table 1).

Table 1 – Number of Burn Injuries that Occurred During Each Stay-at-Home Order Compared to Previous Years.

	PRE-COVID PERIOD	COVID PERIOD
New Zealand		
Lockdown 1 (22 days)	30	26
New South Wales		
Lockdown 1 (22 days)	44	34
Lockdown 2 (6 days)	15	11
Queensland		
Lockdown 1 (2 days)	< 5	< 5
Lockdown 2 (2 days)	< 5	< 5
Lockdown 3 (2 days)	< 5	< 5
Northern Territory		
Lockdown 1 (4 days)	5	< 5
Western Australia		
Lockdown 1 (6 days)	9	13
Lockdown 2 (4 days)	5	< 5
Lockdown 3 (6 days)	12	6
Lockdown 4 (2 days)	< 5	< 5
South Australia		
Lockdown 1 (6 days)	7	6
Lockdown 2 (4 days)	5	< 5
Victoria		
Lockdown 1 (94 days)	133	137
Lockdown 2 (5 days)	< 5	5
Lockdown 3 (14 days)	19	27
Tasmania	-	-

Note: there were no stay at home orders for Tasmania during the 2020/21 reporting period.

Table 2 presents the profile of cases admitted during 2020/21 by lockdown status. Most patients admitted during a lockdown period were male, and the median age of patients admitted during a lockdown was 31 years. Compared with admissions during non-lockdown periods, the proportion of admissions for burn injury occurring in the home was higher – 70% versus 63%. Nearly half (45%) of patients admitted during a lockdown period had a flame burn as the primary cause of injury. Patients admitted during a lockdown period had a shorter median time to admission compared with those admitted outside of lockdown, 15 hours and 37 hours respectively. For admissions during a lockdown period, the proportion of patients admitted to ICU was almost twice as high (17%) as the admissions that occurred outside of a lockdown period (9%). Patients admitted during lockdown had a longer median length of stay (6 days) compared with patients admitted outside of a lockdown period (4 days).

Table 2. Profile of Cases Between July 1 2020 and June 30 2021 by Lockdown Status

	NO LOCKDOWN RESTRICTION (N = 3201)	LOCKDOWN RESTRICTION IN PLACE (N = 283)	P-VALUE
Male	2126 (66%)	196 (70%)	0.33
Age, median (IQR) years	30 (11-49)	32 (16-50)	0.45
TBSA			
< 5%	2051 (67%)	162 (59%)	0.03
5 – 9.9%	544 (18%)	57 (21%)	
10 – 19.9%	315 (10%)	40 (14%)	
≥ 20%	160 (5%)	18 (7%)	
Wound assessment	3073 (97%)	277 (99%)	0.01
Depth recorded	2956 (96%)	272 (98%)	0.12
Place of injury			0.07
Home	1887 (63%)	183 (70%)	
Place for recreation	241 (8%)	13 (5%)	
Trade and service area	181 (6%)	14 (5%)	
Other residence	199 (7%)	13 (5%)	
Street and highway	177 (6%)	7 (3%)	
Industrial and construction area	107 (4%)	8 (3%)	
Farm	79 (3%)	11 (4%)	
Other place	126 (4%)	13 (5%)	
Primary cause of burn injury			<0.001
Flame	982 (31%)	134 (45%)	
Scald	1087 (34%)	99 (33%)	
Contact	638 (20%)	30 (10%)	
Other	481 (15%)	34 (11%)	
Unintentional injury	2988 (93%)	264 (93%)	0.97
Time to admission, median (IQR) hours	37 (5 – 157)	15 (3 – 96)	<0.001
ICU admission	292 (9%)	47 (17%)	<0.001
LOS (days), median (IQR)	4 (1 – 9)	6 (2 – 13)	<0.001

Note: Data presented as frequency (percentage), unless otherwise specified.

Abbreviations: ICU, Intensive care unit; IQR, Interquartile range; LOS, Length of stay; TBSA, Total Body Surface Area.

PATIENT DEMOGRAPHICS

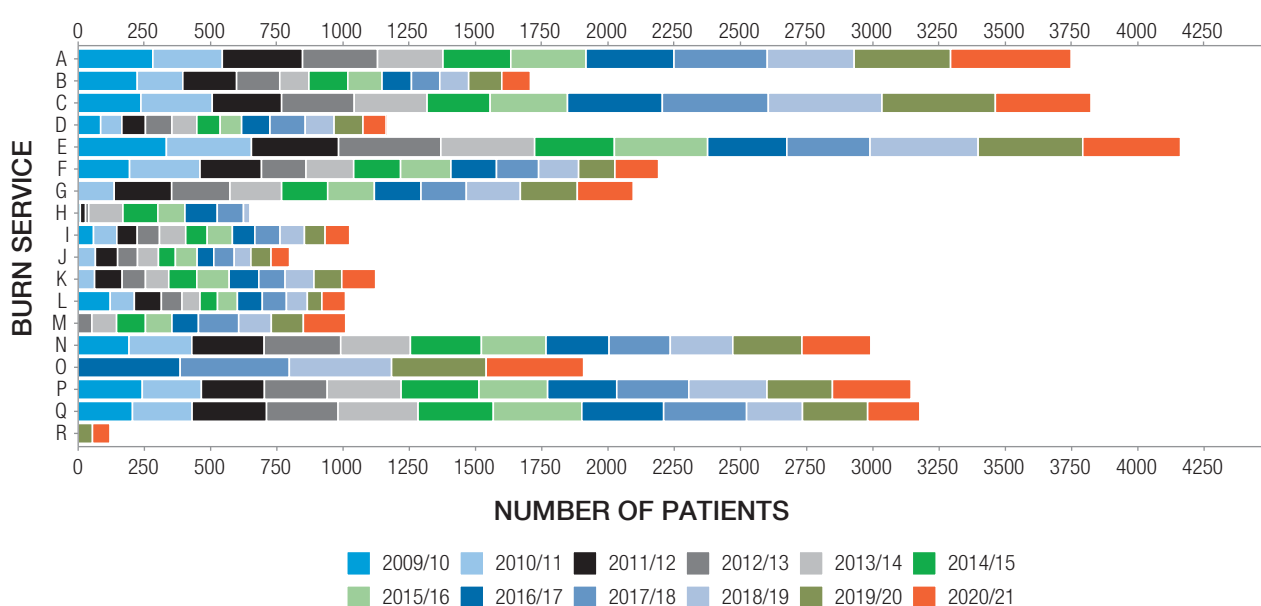
BURNS PATIENT NUMBERS IN BRANZ

The number of patients registered by the BRANZ during each reporting period from July 2009 to June 2021, along with the number of services contributing data to the registry, are reported in Table 3. An upward trend in the number of patients registered each year was observed from July 2009 to June 2012 as more services began contributing to the registry. The number of patients remained relatively stable from July 2012 to June 2015, before another upward trend occurred as the final specialist service began contributing data. There was a decrease in the number of registered patients during the 2018/19 reporting period; this is likely due to one service not submitting data in 2019 for administrative reasons. The number of patients admitted to each service from July 2009 to June 2021 are presented in Figure 2.

Table 3 – Number of Registered BRANZ Patients by Reporting Period, 2009/10 to 2020/21

	CONTRIBUTING SERVICES	PATIENTS
2009/10	12	2,182
2010/11	15	2,497
2011/12	15	2,814
2012/13	16	2,779
2013/14	16	2,850
2014/15	16	2,778
2015/16	16	2,918
2016/17	17	3,323
2017/18	17	3,475
2018/19	17	3,357
2019/20	17	3,367
2020/21	17	3,484

Figure 2 – Number of Registered BRANZ Patients by Service and Reporting Period, 2009/10 to 2020/21



AGE AND GENDER PROFILE OF PATIENTS REGISTERED BY BRANZ

Within BRANZ, age at the time of burn injury is calculated using the date of birth and the date of injury. Patients are classified as either paediatric patients (15 years of age and under) or adult patients (16 years of age and older) based on their age at the time of burn injury. The proportion of paediatric patients registered by the BRANZ increased from July 2009 to June 2015, before declining from July 2015 to the end of the current reporting period (Table 4). The average age of registered patients from July 2009 to June 2021 was 32 (standard deviation [SD] = 23.5) years.

Table 4 – Demographic Profile of Registered BRANZ Patients, 2009/10 to 2020/21

	TOTAL	PAEDIATRIC PATIENTS (0-15 YEARS)			ADULT PATIENTS (≥ 16 YEARS)		
	NUMBER	NUMBER	%	AGE MEAN (SD)	NUMBER	%	AGE MEAN (SD)
2009/10	2,182	587	26.9	3.8 (4.4)	1,595	73.1	40.5 (18.2)
2010/11	2,497	770	30.8	4.3 (4.6)	1,727	69.2	39.5 (17.9)
2011/12	2,814	894	31.8	4.3 (4.5)	1,920	68.2	41.5 (18.6)
2012/13	2,779	875	31.5	4.4 (4.5)	1,904	68.5	41.2 (18.3)
2013/14	2,850	1,028	36.1	4.2 (4.5)	1,822	63.9	41.6 (18.0)
2014/15	2,778	1,018	36.6	4.3 (4.5)	1,760	63.4	42.6 (18.4)
2015/16	2,918	962	33.0	4.3 (4.4)	1,954	67.0	41.8 (18.1)
2016/17	3,323	994	29.9	4.2 (4.5)	2,328	70.1	42.6 (18.7)
2017/18	3,475	1,004	28.9	4.3 (4.5)	2,469	71.1	42.7 (18.1)
2018/19	3,357	931	27.7	4.2 (4.4)	2,426	72.3	42.9 (18.3)
2019/20	3,367	924	27.4	4.3 (4.4)	2,443	72.6	43.2 (17.8)
2020/21	3,484	1,009	28.9	4.6 (4.7)	2,474	71.0	43.2 (18.3)
TOTAL	32,335	9,987	30.9	4.2 (4.5)	22,348	69.1	42.0 (18.3)

Age data was missing for one patient registered by the BRANZ during the 2020/21 reporting period. Of the 3,483 patients with age data, 1009 were paediatric patients and 2,474 were adult patients. The number of paediatric and adult patients admitted to each designated burn service during the 2020/21 reporting period are presented in Figure 3.

Figure 3 – Number of Paediatric and Adult Registered BRANZ Patients by Service, 2020/21

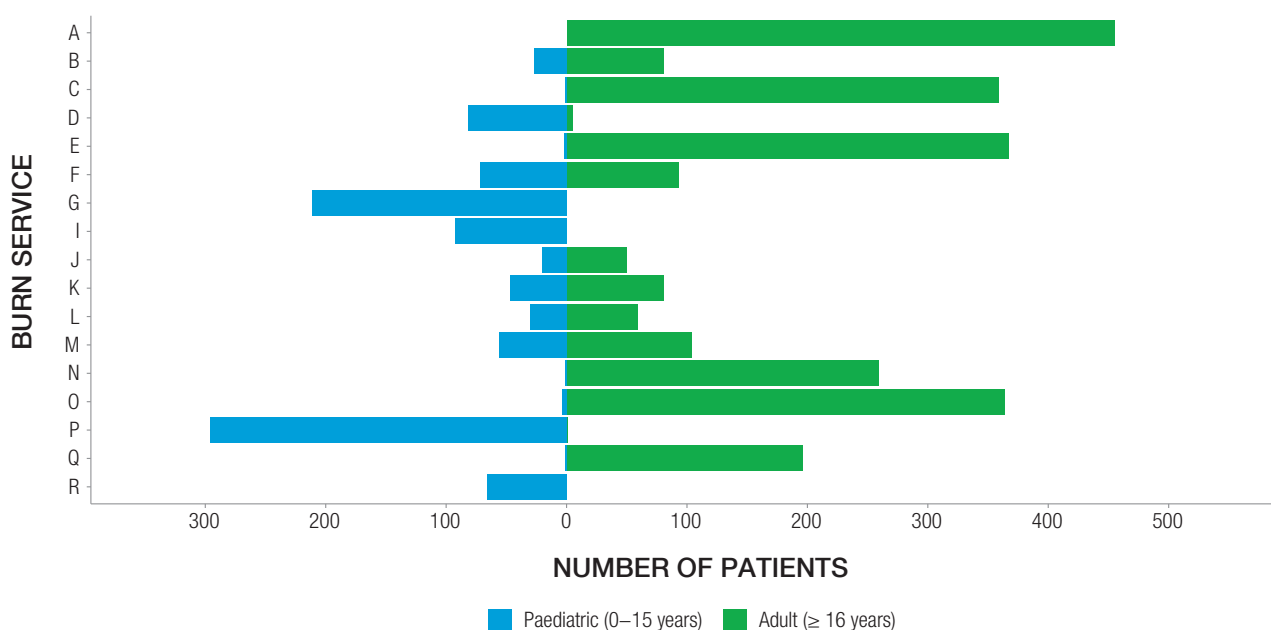
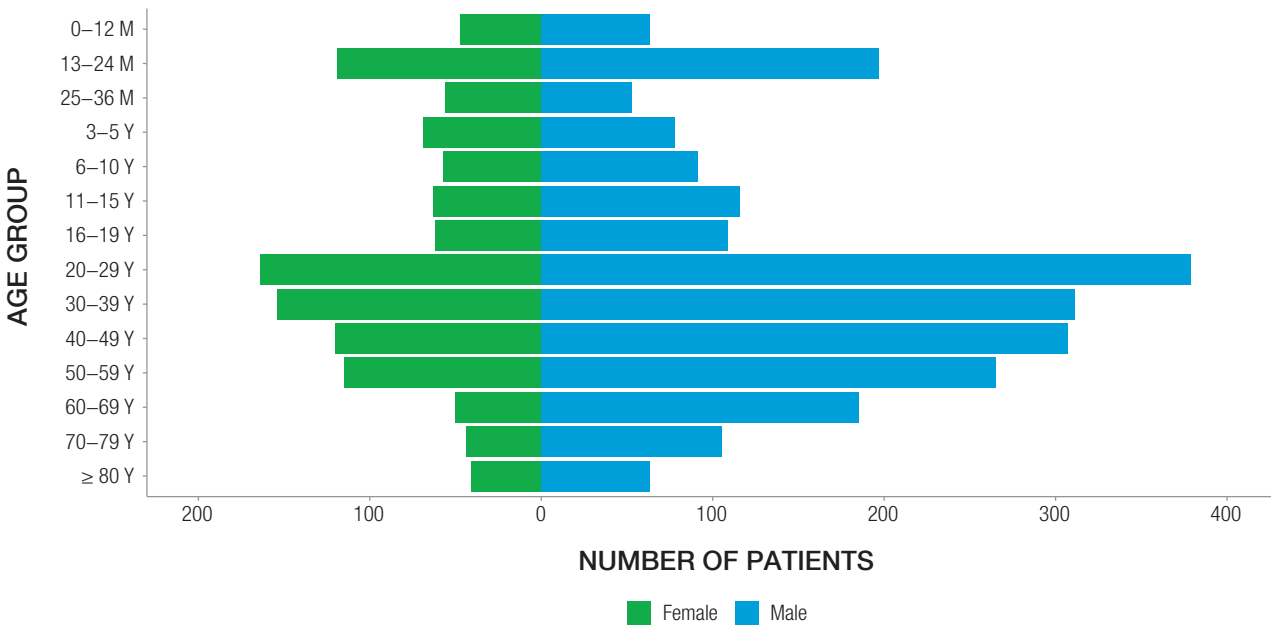


Figure 4 shows the distribution of patients by gender for BRANZ registered patients from July 2020 to June 2021. Approximately two thirds of all cases were males, and males represented the majority of cases in all age groups. Thirty-one percent (31%) of all paediatric cases were aged one to two years, while 22% of all adult cases were aged 20 to 29 years. These findings are consistent with previous BRANZ reporting periods. These figures are also consistent with data from the NBR, where admissions in males are predominant and the adult burn incidence declines with age².

Figure 4 – Number of Registered BRANZ Patients by Age Group and Gender, 2020/21



2. American Burn Association. National Burn Repository 2019 Update: Report of data from 2009-2018. Chicago, IL, USA.

ETHNICITY DISTRIBUTION OF PATIENTS REGISTERED BY BRANZ

Australian services routinely collect the patient's country of birth, whereas New Zealand services record patient ethnicity. Within the BRANZ, ethnicity is defined as the ethnic group, or groups, which a person identifies with or feels they belong to. Ethnicity is a measure of cultural affiliation, as opposed to race, nationality, or citizenship. Therefore, the data are reported separately for the New Zealand and Australian burn services. In 2020/21, the BRANZ recorded 2,961 admissions to Australian burn services and 523 admissions to New Zealand burn services.

Region of birth data were missing for 25 cases at Australian burn services during the 2020/21 reporting period. Where the region of birth data was complete, the majority of cases admitted to Australian burn services were born in Australia (Table 5).

Ethnicity data were missing for 71 New Zealand cases during the 2020/21 reporting period. Where data were complete, the majority of cases admitted to New Zealand burn services were New Zealanders not of Māori descent (Table 5). A further 36% of cases were New Zealand Māori.

Table 5 – Region of Birth and Ethnicity Data for Patients Admitted to Australian and New Zealand Burn Services, 2020/21

AUSTRALIAN SERVICES			NEW ZEALAND SERVICES		
REGION OF BIRTH	NUMBER	%	ETHNICITY	NUMBER	%
Australian Peoples	2,360	80	New Zealander	227	50
North-West European	130	4	New Zealand Māori	164	36
Southern and Central Asian	76	3	Samoan	23	5
South-East Asian	72	3	Tongan	13	3
Southern and Eastern European	72	3	Cook Island Māori	9	2
New Zealand Peoples	58	2	Pacific Island NEC	9	2
North-East Asian	55	2	Australian	7	2
North African and Middle Eastern	32	1	Pacific Island NEC	< 5	< 1
Sub-Saharan African	30	1			
People of the Americas	27	1			
Oceanian (other)	24	1			

NEC = not elsewhere classified.

Australian burn services also collect data to identify whether or not the patient identified as Aboriginal, South Sea Islander, or Torres Strait Islander. Patients are recorded as an Australian Aboriginal if they are indigenous to the Australian continent, identify as Aboriginal, and are accepted as such by the community which they are associated with. A similar definition is used for patients of Torres Strait Islander descent, should they be indigenous to the Torres Strait Islands.

Indigenous status data were missing for 79 registered Australian patients during the 2020/21 reporting period. Where the Indigenous status data were complete, 10.2% of cases identified as Aboriginal and Torres Strait Islander.

Table 6 displays the number and rate of burn injury resulting in a burn service admission per 100,000 people for Aboriginal and Torres Strait Islander and non-Indigenous individuals during the 2020/21 reporting period. The rate of admission to Australian burn services for the Aboriginal and Torres Strait Islander population was more than three times the rate of the non-Indigenous population. The higher rate of burn injuries in the Aboriginal and Torres Strait Islander population is consistent with previous Annual Reports.

Table 6 – Number and Rate of Burn Injury per 100,000 People by Indigenous Status, 2020/21

INDIGENOUS STATUS	NUMBER	RATE
Aboriginal and Torres Strait Islander	224	29.1
Non-Indigenous	2,049	8.8
TOTAL	2,281	9.4

Estimated resident population data obtained from the Australian Bureau of Statistics³.

FUNDING PROFILE OF PATIENTS REGISTERED BY BRANZ

Most cases admitted to Australian burn services were funded by the Australian Health Care Agreement (“Medicare”; n = 2,269, 79.9%). A further 10.4% of admissions to Australian burns services were funded through private health insurance schemes and 7.6% (n = 215) were covered under the relevant workers compensation scheme in each state or territory. Examples of other sources of funding in cases admitted to Australian burn services were compulsory third party motor vehicle insurance, the Department of Veterans Affairs, correctional facilities, and reciprocal health care agreements.

Ninety-nine percent (99%) of cases admitted to New Zealand burn services were funded by the Accident Compensation Corporation (n = 518) which is the comprehensive, no-fault personal injury insurance scheme for all New Zealand residents and visitors to the country. The other source of funding for cases admitted to New Zealand burn services was the Surgical Services Contract (n < 5).

GEOGRAPHIC PROFILE OF PATIENTS REGISTERED BY BRANZ (AUSTRALIAN SITES ONLY)

Consistent with previous years, over half (56%) of burn injury events resulting in burns admissions to Australian burn services occurred in major cities according to the Australian Bureau of Statistics Classification of Remoteness⁴. A further 39% occurred in regional Australia, and five percent in remote areas. Compared to major Australian cities, the rate of burn injury per 100,000 people is higher in regional and remote areas. The rate of burn injury was higher in Indigenous people for each remoteness region, with the exception of very remote Australia.

Table 7 – Rate of Burn Injury per 100,000 People by Australian Remoteness Area, 2020/21

REGION	INDIGENOUS		NON-INDIGENOUS		COMBINED	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
Major Cities of Australia	60	24.7	947	7.1	1,007	18.6
Inner Regional Australia	27	17.4	470	12.4	497	5.0
Outer Regional Australia	60	46.9	295	19.7	355	29.5
Remote Australia	23	57.2	61	28.9	84	28.3
Very Remote Australia	23	29.0	15	22.5	38	12.9
TOTAL	193	29.4	1,788	9.3	1,981	21.5

Estimated resident population data obtained from the Australian Bureau of Statistics⁵

4. Australian Bureau of Statistics. 1216.0 - Australian Standard Geographical Classification. 2005.

5. <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3218.02016/17?OpenDocument> and <https://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/2075.0Main%20Features202016?opendocument&tabname=Summary&prodno=2075.0&issue=2016&num=&view=>

BURN INJURY EVENT DATA

CAUSE OF INJURY

In 2020/21, most patients sustained a scald burn (34%) closely followed by flame burn (32%). The top three causes of burn injury (flame burns, scalds, and contact burns) accounted for 85% of all injuries. Recent data from the American Burn Association's National Burn Repository also identified scalds and flame burns as the most common aetiology, accounting for 72% of burns between them⁶. 'Other' causes of burn injuries include radiant heat, electrical burns, and burns due to pressurised air or gas.

The most common cause of burn injury amongst paediatric patients was scalds (49%), followed by contact (24%), flame (11%), and friction burns (11%). Scalds were the most common cause of injury across all paediatric age groups (Table 8). This is consistent with previous reporting periods.

Table 8 – Primary Cause of Burn Injury in Registered BRANZ Paediatric Patients, 2020/21

PRIMARY CAUSE	0-12 M	13-24 M	25-36 M	3-5 Y	6-10 Y	11-15 Y	TOTAL	%
Scald	59	226	52	64	60	35	496	49
Contact	35	60	28	27	28	61	239	24
Flame	< 10	< 10	< 10	25	31	45	111	11
Friction	< 10	15	20	26	20	20	105	11
Chemical	< 10	< 10	< 10	< 10	< 10	< 10	16	1
Radiant Heat	< 10	< 10	< 10	< 10	< 10	< 10	18	1
Electrical	< 10	< 10	< 10	< 10	< 10	< 10	13	1
Pressurised gas/air	< 10	< 10	< 10	< 10	< 10	< 10	< 10	1
Other cause	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 1
TOTAL	110	313	109	146	148	178	1,004	100

The most common cause of burn injury amongst adult patients was flame burns (41%), followed by scalds (28%) and contact burns (17%). (Table 9). Flame burns were the most common cause of injury in patients aged 16-79 years; scalds were the most common cause of injury in patients aged 80 years and older (Table 9).

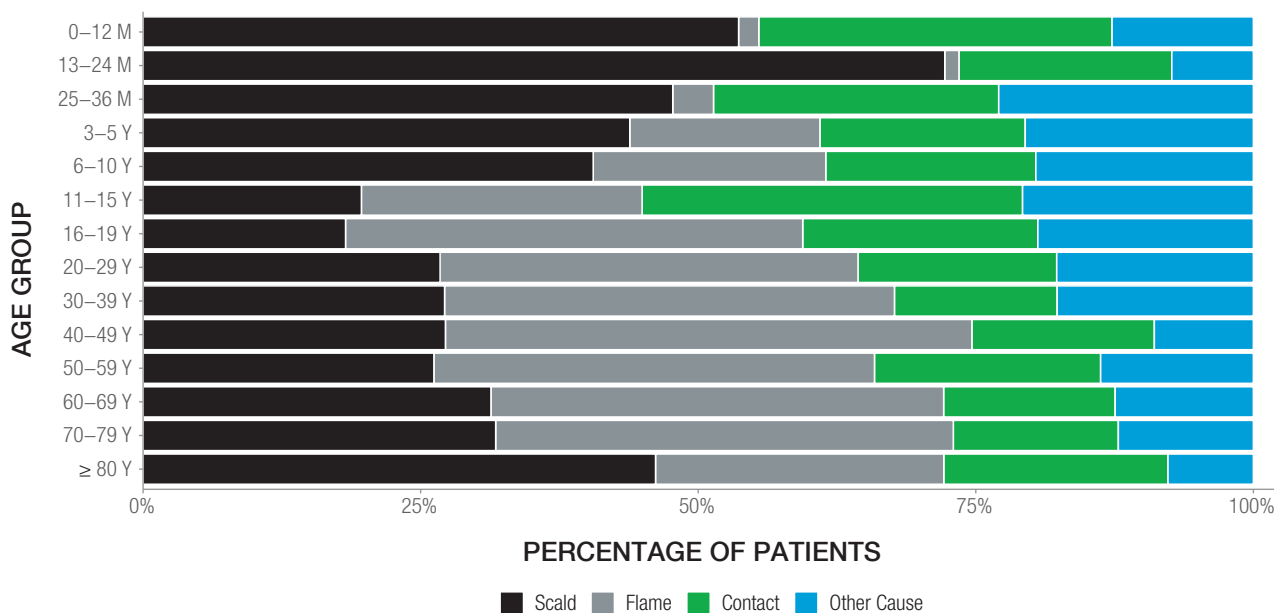
Table 9 – Primary Cause of Burn Injury in Registered BRANZ Adult Patients, 2020/21

PRIMARY CAUSE	16-19 Y	20-29 Y	30-39 Y	40-49 Y	50-59 Y	60-69 Y	70-79 Y	≥ 80 Y	Total	%
Flame	70	204	188	202	150	95	61	27	997	41
Scald	31	145	126	116	99	73	47	48	685	28
Contact	36	97	68	70	77	36	22	21	427	17
Chemical	11	37	41	16	22	19	< 10	< 10	155	6
Friction	16	30	22	< 10	< 10	< 10	< 10	< 10	90	4
Radiant Heat	< 10	< 10	< 10	< 10	17	< 10	< 10	< 10	55	2
Electrical	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	30	1
Cooling	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	< 1
Other cause	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 1
Pressurised gas/air	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	11	< 1
TOTAL	170	542	464	426	378	233	148	104	2,465	100

6. American Burn Association. National Burn Repository 2019 Update: Report of data from 2009-2018. Chicago, IL, USA.

The change in the distribution of the primary cause of burn injury by age group is perhaps best visualised by Figure 5. Scalds account for the majority of burns in children under the age of three years, at which point there is an increase in flame burns. It is not until the age of 60 when there is an upward trend in the proportion of scalds and a decline in the proportion of flame burns.

Figure 5 – Primary Cause of Injury for Registered BRANZ Patients by Age Group, 2020/21



The most common sub-causes of paediatric and adult burn injuries are shown in Tables 10 and 11. These sub-causes accounted for 76% of all paediatric cases and 67% of all adult cases. In paediatric cases, hot beverages were the most common sub-cause (19%), followed by food (liquid or solid) (10%). In adult cases, flames from a campfire, bonfire, or burn off were the most common sub-cause, followed by scalds from fat or oil. The most common sub-causes of burn injury in both adult and paediatric patients have been consistent each year.

Table 10 – Primary Sub-cause of Burn Injury in Registered BRANZ Paediatric Patients, 2020/21

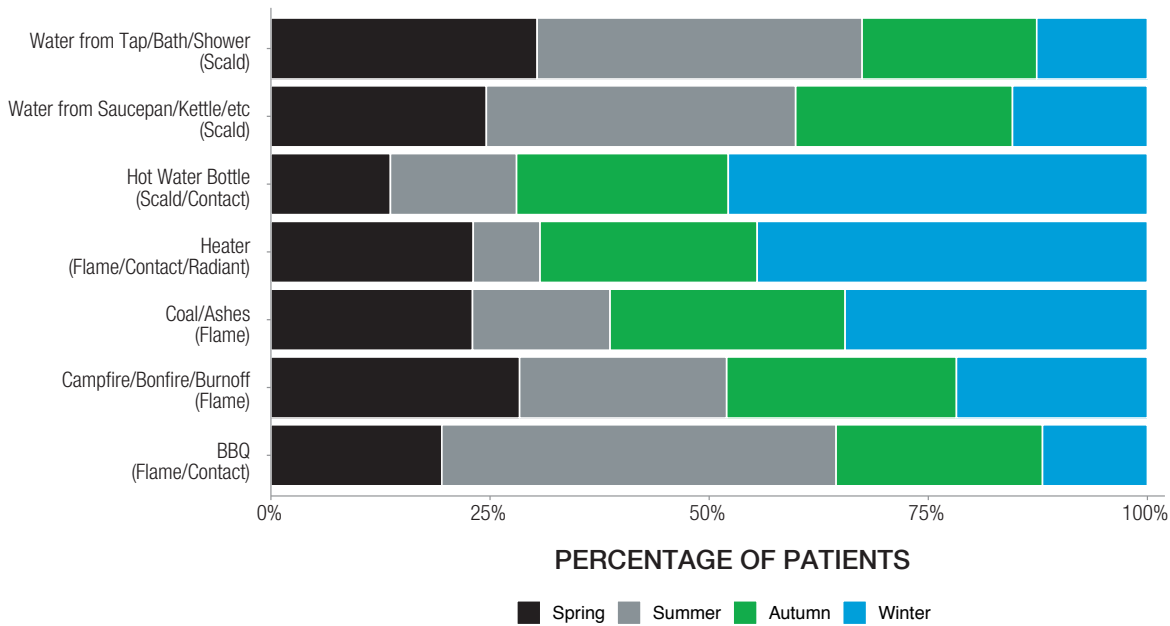
PRIMARY CAUSE	SUB-CAUSE	NUMBER	%
Scald	Hot beverages (e.g. tea, coffee)	196	19
Scald	Food (liquid or solid)	99	10
Scald	Water from saucepan, kettle, jug, billy, or urn	91	9
Contact	Vehicle exhaust	63	6
Contact	Coals or ashes	58	6
Flame	Campfire, bonfire, or burn off	47	5
Friction	Treadmill	47	5
Scald	Fat or oil	31	3
Friction	Vehicle or motorbike	26	3
Friction	Other	19	2
Flame	Lighter or matches	16	2
Contact	Hot/Metal	15	2
Contact	Iron	15	2
Scald	Water from basin or sink or bucket	15	2
Scald	Water from hot water bottle	15	2

Table 11 – Primary Sub-cause of Burn Injury in Registered BRANZ Adult Patients, 2019/20

PRIMARY CAUSE	SUB-CAUSE	NUMBER	%
Flame	Campfire, bonfire, or burn off	321	13
Scald	Fat or oil	153	6
Scald	Water from saucepan, kettle, jug, billy, or urn	145	6
Flame	Other source	127	5
Chemical	Alkali	119	5
Contact	Coals or ashes	90	4
Scald	Food (liquid or solid)	89	4
Contact	Vehicle exhaust	73	3
Flame	Lighter or matches	70	3
Flame	Vehicle engine parts	70	3
Flame	Other source	69	3
Friction	Vehicle or motorbike	64	3
Flame	Gas or gas bottle	63	3
Contact	Hot metal	60	3
Scald	Water from hot water bottle	51	2

Examining the impact of the changing seasons on burn cause can help guide burns prevention strategies and resource utilisation. Whether the burn occurred during summer, autumn, winter, or spring months was determined using the date of injury. Patterns of seasonal variations were mainly observed in relation to burn injuries caused by heaters, hot water bottles, and barbeques. That is, a greater number of burns caused by heaters and hot water bottles have occurred in the winter months, while a greater number of burns involving barbeques occur in the summer months. In contrast, there are some injury causes that do not display seasonal variation. For example, scalds by water from a saucepan, bottle, etc. occur in similar numbers regardless of the season.

Figure 6 – Seasonal Trends in Burn Injury Cause for Registered BRANZ patients, 2020/21



ACCELERANT USE (FLAME INJURIES ONLY)

An accelerant was used to ignite or enhance the flame in 62% of flame burn cases during the 2020/21 reporting period. Petrol was the most common accelerant, used in 53% of flame burns involving an accelerant.

PLACE OF INJURY

The place of injury for all cases registered during the 2020/21 reporting period are presented in Tables 12 and 13. Almost two-thirds of burn injuries occurred in the home, consistent with previous reporting years.

Table 12 – Place of Burn Injury in Registered BRANZ Paediatric Patients, 2020/21

PLACE OF INJURY	NUMBER	%
Home or usual residence	732	76
Place for recreation	80	8
Other residence	55	6
Street and highway	38	4
Farm	15	2
Trade and service area	10	1
Industrial and construction area	< 5	< 1
Other specified place	32	3
TOTAL	963	100

Excludes missing data.

Table 13 – Place of Burn Injury in Registered BRANZ Adult Patients, 2020/21

PLACE OF INJURY	NUMBER	%
Home or usual residence	1,337	58
Trade and service area	185	8
Place for recreation	174	8
Other residence	157	7
Street and highway	146	6
Industrial and construction area	114	5
Other specified place	107	5
Farm	75	3
Other specified place	100	4
TOTAL	2,318	100

Excludes missing data.

For burn injuries that occurred in the home, 44% of paediatric burns and 30% of adult burns occurred in the kitchen. The second most common area for paediatric burns was the living room, playroom, or family room (18%). For adults, it was the garden or yard (26%). This distribution reflects the differences in the primary cause of injury between paediatric and adult burns patients.

ACTIVITY AT TIME OF INJURY

The five most common activities resulting in burn injuries for adult and paediatric patients during the 2020/21 reporting period are presented in Table 14. These figures are similar to the previous reporting period. Playing, being near a person cooking, or participating in another leisure activity were the most common activities at the time of injury in paediatric patients. The most common activities resulting in a burn injury in adults were participating in a leisure activity, cooking, and working for income. This is consistent with previous reporting periods.

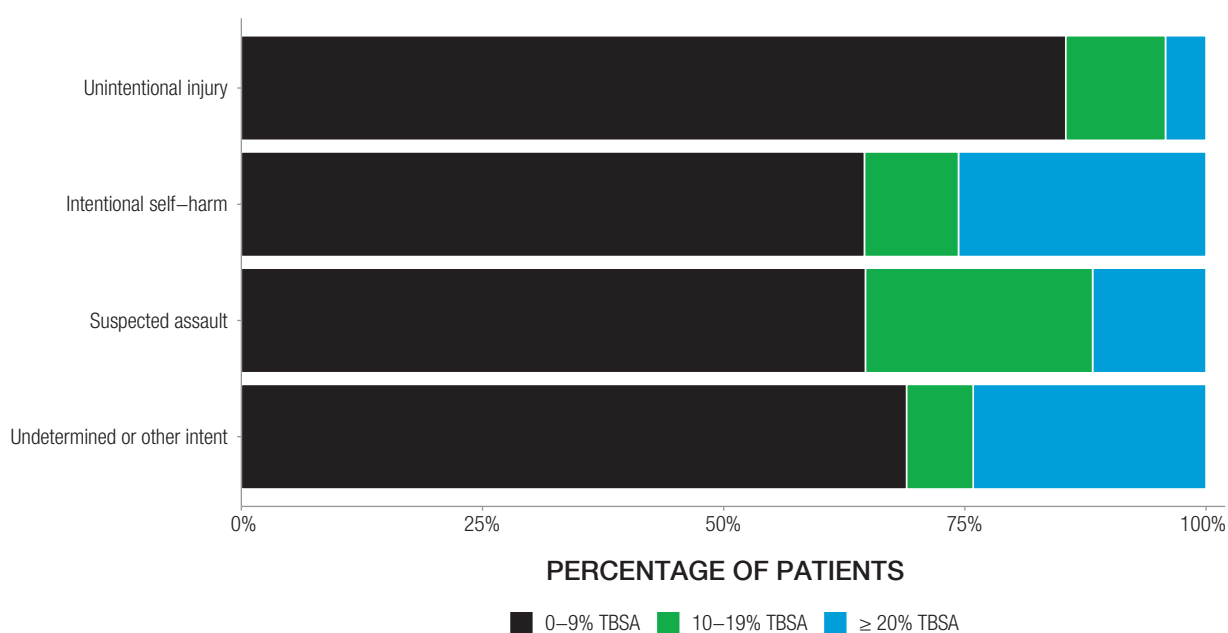
Table 14 – Five Most Common Activities at Time of Injury in Registered BRANZ Patients, 2020/21

PAEDIATRIC PATIENTS (0-15 YEARS)			ADULT PATIENTS (≥ 16 YEARS)		
ACTIVITY	NUMBER	%	ACTIVITY	NUMBER	%
Playing	295	30	Leisure activity	463	20
Near person cooking	271	28	Cooking	419	18
Leisure activity	198	20	Working for income	349	15
Eating or drinking	45	5	Sleeping or resting	193	8
Cooking	30	3	Other specified activity	127	5

INJURY INTENT

Within BRANZ, the injury intent is recorded as the option that best characterises the potential intent in the occurrence of injury on the basis of the information available at the time it is recorded. During the 2020/21 reporting period the majority of burns patients (94%) sustained their injury during unintentional events. Intentional self-harm accounted for three percent of all cases. The remaining cases included suspected assault or the intent was undetermined or other. Compared to unintentional burn injuries, a higher proportion of intentional self-harm injuries were greater than 20% TBSA (26% versus 4%).

Figure 7 – Injury Intent by Burn Size for Registered BRANZ Patients, 2020/21



A smaller proportion of burn injuries in Aboriginal and Torres Strait Islander patients were unintentional (87%) compared to non-Indigenous Australians (95%). A greater proportion of burn injuries in Aboriginal and Torres Strait Islander arose through suspected assault (7%) compared to non-Indigenous Australians (2%).

DAY AND TIME OF INJURY

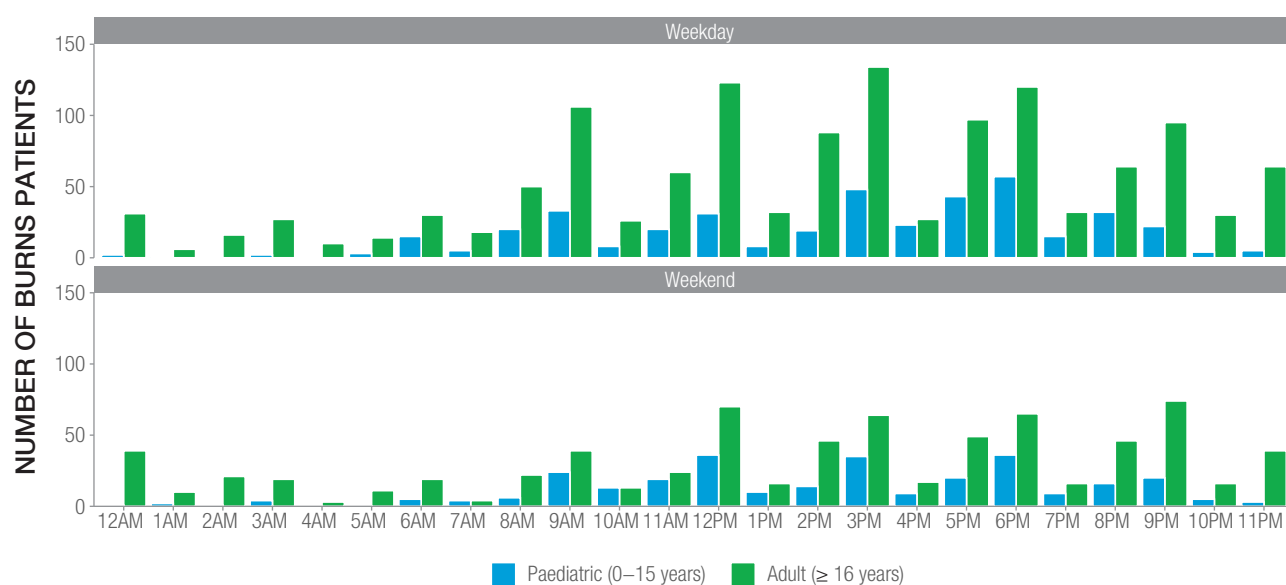
Consistent with other types of trauma, burn injuries occurred more frequently on weekends (37% of patients). The greatest proportion of injuries occurred on a Saturday (21%; Table 15).

Table 15 – Burn Injuries Occurring on Each Day of the Week, 2020/21

DAY	NUMBER	%
Monday	425	12
Tuesday	395	11
Wednesday	423	12
Thursday	435	13
Friday	511	15
Saturday	718	21
Sunday	576	17

Of the cases with a known time of injury, 16% occurred between the hours of 12AM and 6AM, and 21% occurred between 4PM and 7PM, while 14% occurred between 9PM and 12AM.

Figure 8 – Time of Injury for Registered BRANZ Patients, 2020/21



*Excludes patients where time of injury is unknown
Injuries occurring at midnight are entered as 23:59 the preceding day or 00:01 the following day*

INJURY SEVERITY

PERCENTAGE TOTAL BODY SURFACE AREA (%TBSA)

A burn less than 5% TBSA was recorded for 66% of cases, and a burn less than 10% TBSA was recorded in 84% of cases. This is consistent with previous Annual Reports. For paediatric patients, 90% of patients sustained a burn of less than 10% TBSA, while less than 2% sustained a burn greater than 20% TBSA. Two percent (2%) of adult cases involved a burn affecting 50% or more of the TBSA.

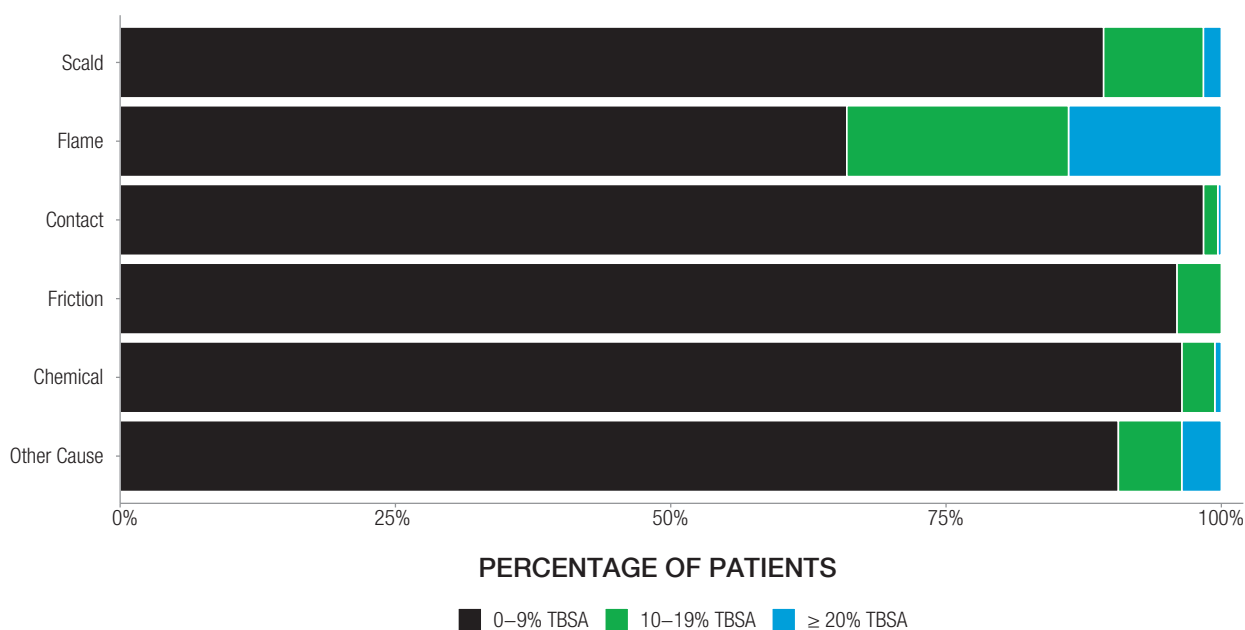
Table 16 – Percentage Total Body Surface Area Burned by Age Group, 2020/21

% TBSA CATEGORY	PAEDIATRIC PATIENTS (0-15 YEARS)		ADULT PATIENTS (≥ 16 YEARS)	
	NUMBER	%	NUMBER	%
0-4.9%	627	62	1,601	66
5-9.9%	201	22	399	16
10-19.9%	76	8	279	11
20-49.9%	17	2	123	5
≥ 50%	< 5	< 1	37	2

Excludes patients where TBSA data was missing or not stated.

The distribution of burn injury cause varied according to the primary cause of the burn (Figure 9). For example, 98% of contact burns were less than 10% TBSA. In contrast, a third of flame burns exceeded 10% TBSA.

Figure 9 – Percentage Total Body Surface Area Burnt by Injury Cause, 2020/21



The median burn size for Aboriginal and Torres Strait Islander patients was 3%, as was the median burn size for non-Indigenous patients. Larger burns were more common in non-Indigenous Australian patients compared to Aboriginal and Torres Strait Islander patients.

Table 17 – Percentage Total Body Surface Area Burnt by Indigenous Status, 2020/21

% TBSA CATEGORY	ABORIGINAL AND TORRES STRAIT ISLANDER		NON-INDIGENOUS	
	NUMBER	%	NUMBER	%
0-4.9%	131	66	1,341	68
5-9.9%	40	20	342	17
10-19.9%	14	7	214	11
20-49.9%	13	7	90	3
≥ 50%	< 5	1	21	1

BURN DEPTH

As described in previous Annual Reports, updates to the BRANZ database implemented in July 2010 allowed for greater accuracy of reporting burn depth. The BRANZ reports on burn depth by documenting the presence of injuries involving superficial, mid-dermal, deep dermal, and full thickness burns. Note that it is possible for a patient to have burns of multiple depths.

Burn depth was recorded for 96% of admissions during the 2020/21 reporting period. This is consistent with previous reporting periods. Of these, 39% had superficial burns, 51% had mid-dermal burns, and 42% had deep dermal burns. A full thickness burn was documented for 37% of cases, which is consistent with the previous reporting period (37% in 2019/20). Of the cases with a full thickness burn, the size of the full thickness burn area was known in 88% of cases. For the cases where the size of the full thickness burn area was known, 89% of patients had full thickness burns on less than 10% of their body, while 6% of patients had full thickness burns on 20% or more of their body.

INHALATION INJURY

Burns to the oropharynx and upper airway can result in swelling and possible airway obstruction within the first few hours after injury. Inhalation injury is suspected on the basis of a history of mechanism of injury, smoke exposure, clinical presentation, and diagnostic investigations. Inhalation injuries are associated with increased morbidity and mortality. Inhalation injuries are more common in adults compared to paediatric patients; documentation of an inhalation injury was recorded for 5% of adult patients and 1% of paediatric patients. A higher proportion of inhalation injuries in adults is consistent with flame being the most common cause of burn injury in adults. Fifteen percent (15%) of patients who sustained an inhalation injury died during their admission, which is an increase on the previous reporting period (12% in 2019/20). An inhalation injury is recorded in the BRANZ if it is documented in the patient's medical record. There is currently no consensus globally or across BRANZ sites for diagnostic criteria and classification of severity of inhalation injuries⁷.

7. Tracy LM, Dyson K, Le Mercier L, Cleland H, McInnes JA, Cameron PA, Singer Y, Edgar DW, Darton A, & Gabbe BJ. Variation in documented inhalation injury rates following burn injury in Australia and New Zealand. *Injury*. 2020;51(5):1152-1157.

DRUG AND ALCOHOL INVOLVEMENT

Nine percent (9%) of adult cases for the 2020/21 reporting period did not have a valid response to the documented suspicion of drug or alcohol involvement field. Where data were valid, 21% of cases had clinical documentation indicating there was confirmation or suspicion of alcohol and/or drugs contributing to the patient sustaining the burn injury. This is consistent with the previous reporting period.

Routine testing of blood for alcohol or drug involvement is not uniform across BRANZ participating services. Therefore, the information collected by BRANZ is based on medical record documentation of suspicion of, or known, alcohol and/or drug involvement. This includes instances where there was confirmed or suspicion of alcohol and/or drugs contributing to the patient sustaining the burn injury; as well as children who were burnt as an indirect result of the parent or caregiver being under the influence of drugs and/or alcohol.

PRE-HOSPITAL MANAGEMENT OF BURN INJURIES

BURNS FIRST AID TREATMENT

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 sustaining the injury reduces the area and depth of the burn⁸.

There are three data fields relating to burns first aid treatment in the registry. The first question asks “Was any first aid applied to the burn wound?” with the possible responses being “yes”, “no”, and “not stated/inadequately described”. If patients received first aid, a follow-up question asks “Was the first aid applied 20 minutes of cool running water within three hours of injury?” with the same three responses. A free text field is also available to document any additional information regarding first aid. Based on the responses to these questions, patients were categorised into one of three comparator groups: (1) no first aid, (2) non-gold standard first aid – where first aid was applied but not 20 minutes of cool running water within three hours of injury, and (3) gold standard first aid – where cool running water was applied to the burn injury for at least 20 minutes within three hours of injury.

Consistent with the previous reporting period, 79% of all cases during the 2020/21 reporting period were reported to have received some kind of first aid following the burn injury. A higher proportion of paediatric patients received some form of first aid than adult and older adult patients, which is consistent with previous reporting periods. Gold standard first aid was applied in 74% of paediatric cases and 60% of adult cases.

Table 18 – Documented Standard of First Aid Following Burn Injury by Age Group, 2020/21

	PAEDIATRIC PATIENTS (0-15 YEARS)		ADULT PATIENTS (≥ 16 YEARS)	
	NUMBER	%	NUMBER	%
No first aid	122	13	525	24
Inadequate first aid	123	13	325	15
Gold standard first aid	687	74	1,310	60

A smaller proportion of Aboriginal and Torres Strait Islander patients received gold standard first aid following burn injury compared to non-Indigenous Australians. Similarly, a greater proportion of Aboriginal and Torres Strait Islander Australians did not receive any first aid for the for their burn injury compared to non-Indigenous Australians.

Table 19 – Documented Standard of First Aid Following Burn Injury by Indigenous Status, 2020/21

	ABORIGINAL AND TORRES STRAIT ISLANDER		NON INDIGENOUS AUSTRALIANS	
	NUMBER	%	NUMBER	%
No first aid	59	29	374	20
Inadequate first aid	31	15	276	15
Gold standard first aid	112	56	1,188	65

8. Bartlett N, Yuan J, Holland AJ et al. Optimum duration for cooling an acute scald contact burn injury in a porcine model. *Journal of Burn Care & Research*. 2008;29(5):828-834.
 Cuttle L, Kempf M, Liu PY et al. The optimum duration and delay of first aid treatment for deep partial thickness burns. *Burns*. 2010;36(5):673-679.
 Wood FM, Phillips M, Jovic T et al. Water first aid is beneficial in humans post-burn: Evidence from a bi-national cohort study. *PLoS One*. 2016;11(1):e0147259.
 Yuan J, Wu C, Holland AJ et al. Assessment of cooling on an acute scald burn injury in a porcine model. *Journal of Burn Care & Research*. 2007;28(3):514-520.

REFERRAL SOURCE TO BURNS SERVICE

Consistent with previous Annual Reports, approximately half of both the paediatric and adult patients were transferred to a specialist burn service via another hospital. Sixteen percent (16%) of paediatric and 25% of adult patients arrived at the burns service directly from the scene via ambulance (Table 20).

Table 20 – Referral Source to Burns Service for Registered BRANZ Patients by Age Group, 2020/21

	PAEDIATRIC PATIENTS (0-15 YEARS)		ADULT PATIENTS (≥ 16 YEARS)	
	NUMBER	%	NUMBER	%
Scene via ambulance	156	16	611	25
Other hospital	526	52	1,094	44
General practitioner	59	6	166	7
Self-presentation	121	12	183	7
Emergency department	0	0	72	3
Outpatients	125	12	294	12
Other source	22	2	54	2

HOW LONG DID IT TAKE FOR BURNS PATIENTS TO BE ADMITTED TO A SPECIALIST BURN SERVICE?

The time taken for burns 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 specialist burn services across Australia and New Zealand, and the geographical size and distances required to travel to a burns service and mode of transfer, identifying a standardised acceptable transfer time for benchmarking has been challenging in some states. The BRANZ therefore collects data on the length of time taken to admission from time of injury. This data will assist in developing acceptable timeframes for admission of patients to a specialist burn service, identify if pre-burn service care was appropriate, and monitor outcomes of care where there have been delays.

It is recognized that delayed admission may constitute appropriate care for specific injuries and in specific environments. The median (IQR) time from injury to admission to a BRANZ hospital was 39 (5-214) hours for paediatric patients and 30 (5-139 hours) for adult patients. This is an increase compared to the previous reporting period for both paediatric patients (22 [4-142] hours) and consistent with the previous reporting period for adult patients (31 [6 -135] hours).

The initial treatment of burns patient is critical for reducing the risk of complications, poor long-term outcomes, and mortality. The ANZBA advocates that referring hospitals consult with the burn service as soon as possible to assist with the initial treatment plan and in triaging the patients requiring transfer. A burn size greater than 20% TBSA in adult cases and greater than 15% TBSA in paediatric cases can be considered as a major burn.

Figures 10 and 11 show the median time from injury to admission for major paediatric and adult cases for each reporting year. The median values for time to admission for both paediatric and adult cases have remained consistent over the life of the registry.

For adult cases with a burn affecting at least 20% TBSA, 41% of patients arrived at a specialist burn service directly from the scene within 2 hours of injury, and 88% arrived directly from the scene within 7 hours of injury. In paediatric cases transferred directly from the scene to a specialist burn service with a burn of at least 15% TBSA, 87% of cases arrived within 2 hours of injury and 93% of cases arrived within 3 hours of injury.

Figure 10 – Time to Admission for Major Paediatric Burns by Reporting Period, 2009/10 to 2020/21

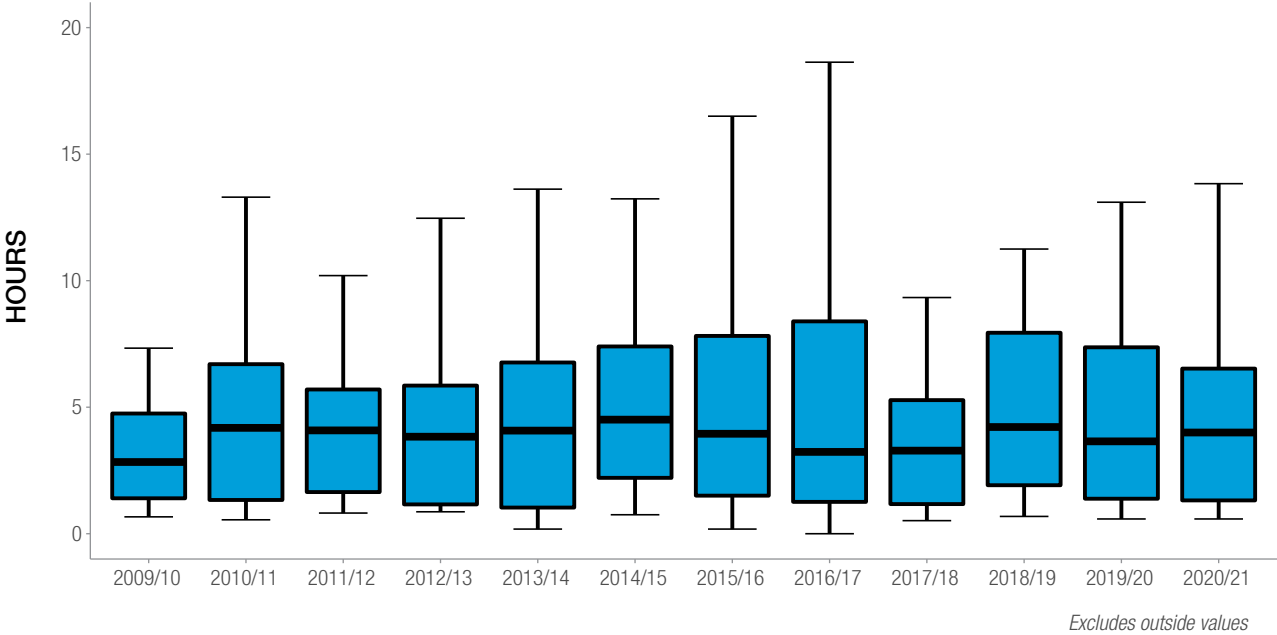
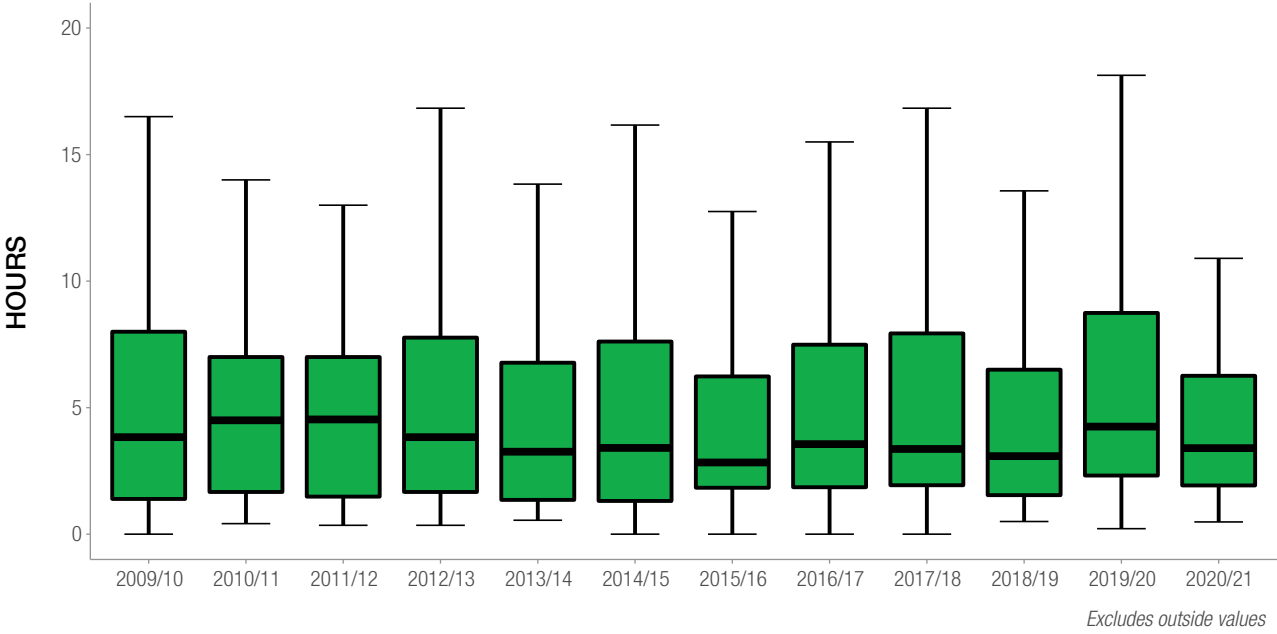


Figure 11 – Time to Admission for Major Adult Burns by Reporting Period, 2009/10 to 2020/21



BURN SERVICE PERFORMANCE

The following pages provide information on the various process and outcome indicators collected by the registry. The first process and outcome indicators were implemented in 2009. A major review and revision of quality indicators in 2016 resulted in a revised and extended quality indicator dataset⁹.

WOUND ASSESSMENT

The definitive burn wound assessment is defined as the burn assessment documented by a senior burns clinician within 72 hours of admission. A definitive wound assessment was documented within 72 hours of admission in 92% of paediatric cases and 99% of adult cases in the 2019/20 reporting period. Compared with the previous reporting period, the paediatric figure has remained consistent and the adult figure has increased (97% in 2019/20). For paediatric cases, the burn registrar recorded the burn wound assessment within 72 hours of admission in 56% of cases, followed by the burns consultant (12%), burn care nurse coordinator or nurse practitioner (9%), and burns fellow (3%). For adult cases, the burn wound assessment was completed by the burns consultant in 35% of cases, the burns registrar in 32% of cases, the burns fellow in 7% of cases, and burns care nurse coordinator or nurse practitioner in 4% of cases.

THEATRE ADMISSIONS

The BRANZ collects data on whether patients underwent a burn management procedure in theatre to better understand wound management practices within Australia and New Zealand. This understanding will serve as a foundation to identify best practices in the surgical management of burn injuries. Note that each patient may have multiple burn wound management procedures, but data is only collected for the first surgical episode of a particular wound closure procedure (e.g., use of dermal reconstructive product, use of skin cell product, etc.). It is possible that multiple procedures are performed in the same theatre episode.

Sixty-eight percent (68%) of all cases underwent at least one burn wound management procedure in an operating theatre during the 2020/21 reporting period, which is consistent with the previous reporting period. The proportion of paediatric patients who underwent a burn wound management procedure in theatre (68.4%) was similar to that of adult patients (68.2%). Usually a greater proportion of adult patients undergo a burn wound management procedure in theatre.

Table 21 outlines the percentages of paediatric and adult patients that underwent particular burn wound management procedures in theatre. There are age-related differences in the proportion of patients undergoing different procedures. For example, debridement and skin grafting is more common in adult patients compared to paediatric patients, while undergoing a dressing change in theatre is more common in paediatric patients compared to their older counterparts.

9. Gong J, Singer Y, Cleland H, Wood F, Cameron P, Tracy LM, & Gabbe BJ. Driving improved burns care and patient outcomes through clinical registry data: A review of quality indicators in the Burns Registry of Australia and New Zealand. *Burns* 2021; 47(1):1553-1561.

Table 21 – Burn Wound Management Procedures by Age Group, 2019/20

PROCEDURES RELATING TO DEBRIDEMENT	PAEDIATRIC PATIENTS (0-15 YEARS)		ADULT PATIENTS (≥ 16 YEARS)	
	NUMBER	%	NUMBER	%
Debridement only	266	34	494	26
Debridement and temporary skin closure product e.g. Biobrane™	73	9	304	16
Debridement and dermal reconstructive product e.g. Integra™ or other biodegradable temporising matrix	14	2	41	2
Debridement and skin cell product	100	13	152	8
Debridement and skin grafting	370	48	1371	72
Debridement and temporary skin closure with cadaver skin	11	1	106	6
OTHER PROCEDURES				
Dressing change in theatre only	97	13	22	1
Escharotomy, fasciotomy, amputation	0	0	14	1
Other procedure	27	4	49	3

For cases where a full thickness burn was recorded, 73% of paediatric cases and 86% of adult cases underwent debridement and skin grafting. Compared to previous reporting periods, this represents a slight increase for paediatric patients and is consistent for adult patients.

The median (IQR) time from injury to first grafting was 11 (8-16) days for paediatric cases, which is consistent with the previous year. The median (IQR) time from injury to first grafting was 7 (4-11) days for adult patients, which is consistent with previous reporting periods.

PHYSICAL FUNCTIONING ASSESSMENT

Rehabilitation following burn injury requires a coordinated approach from a specialised multi-disciplinary team to minimise the consequences of burns, such as scarring, contractures and loss of function¹⁰. Allied health burn clinicians are responsible for assessing burns patients and commencing rehabilitation as early as possible, ideally in the acute treatment phase. The registry collects data on whether patients with a length of stay greater than 48 hours have a physical functioning assessment by a physiotherapist or occupational therapist within 48 hours of admission.

Of the paediatric patients who had a length of stay exceeding 48 hours in the 2020/21 reporting period, 58% received a physical functioning assessment within 48 hours of admission. This is a decrease compared with the previous reporting period (63% in 2019/20). Ninety-three percent (93%) of adult patients with a length of stay exceeding 48 hours received a physical functioning assessment within 48 hours of admission, an increase on the previous reporting period (95% in 2019/20).

10. Australian and New Zealand Burns Association & Joanna Briggs Institute. Burn Trauma Rehabilitation: Allied Health Professional Allied Health Practice Guidelines. Philadelphia, PA; 2014.

ENTERAL AND 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 abnormalities¹¹, and in reducing the risk of gastrointestinal dysfunction. The registry collects data on whether patients with major burns receive supplemental nutrition within 24 hours of arrival at the burn service.

Ninety-one percent (91%) of paediatric patients with major burns commenced enteral or parenteral nutrition within 24 hours of admission, which is an increase on the previous reporting period (85% in 2019/20). Seventy-five percent (75%) of adult patients with major burns commenced enteral or parenteral nutrition within 24 hours of admission, which is consistent with the previous reporting period.

RENAL IMPAIRMENT

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 injury¹². Calculating RIFLE criteria¹³ from serum creatinine and estimated glomerular filtration rate (eGFR) is a quantifiable and valid measure of renal function, and an indication of prognosis. A negative change in excess of 25% of eGFR relative to a baseline measurement is considered indicative of a risk of kidney injury as per the RIFLE criteria. The registry collects data on baseline (within 24 hours of admission) and lowest (within 72 hours of admission) values eGFR and can subsequently identify the risk of kidney injury as per the RIFLE criteria. While acute renal impairment may be an indicator of suboptimal resuscitation, there are significant difficulties with establishing baseline renal function in burns patients.

Of the patients with at least two valid data points for eGFR, 5% of paediatric cases and 2% of adult cases were deemed to be at risk of kidney injury and failure during the 2020/21 reporting period. This figure is unchanged for both paediatric and adult patients since the previous reporting period.

POSITIVE BLOOD CULTURES

Bloodstream infection is associated with increased risk of mortality in burns patients¹⁴. Blood cultures are used to detect infections that may spread through the bloodstream of patients such as bacteraemia and septicaemia. The registry collects data on if blood cultures were collected for patients during their admission and whether these cultures were positive or negative.

A blood culture was collected during 10% of paediatric admissions and 13% of adult admissions, which is consistent with the previous reporting period. Where blood cultures were collected, positive cultures were identified for 16% of paediatric cases (an increase from 13% in 2019/20) and 15% in adult cases (a decrease from 17% in 2019/20).

11. Wasiak J, Cleland H, Jeffery R. Early versus delayed enteral nutrition support for burn injuries. Cochrane Database Syst Rev. 2006;(3):CD005489.

12. 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. Journal of burn care & research. 2010;31(1):83-92.

13. Kidney Health Australia. The eGFR Calculator 2019 [Available from: <https://kidney.org.au/health-professionals/detect/calculator-and-tools>].

14. Patel BM, Paratz JD, Mallet A et al. Characteristics of bloodstream infections in burn patients: An 11-year retrospective study. Burns. 2012;38(5):685-690.

MULTI-DRUG RESISTANT ORGANISMS

The presence of multi-drug resistant organisms (MDROs) can be an indicator of hand hygiene practices and the overuse of antibiotics. The registry collects data on four MDROs: Methicillin-resistant *Staphylococcus Aureus* (MRSA), Vancomycin-resistant *Enterococcus*, Carbapenem-resistant *Pseudomonas*, and Carbapenem-resistant *Enterobacter*.

During the 2020/21 reporting period, 3% of paediatric patients had a positive swab for MRSA while less than 1% of cases had a positive swab for each of the other three MDROs. The proportion of paediatric patients with a positive swab for MRSA was lower compared to the previous reporting period (4% in 2019/20), while results for the remaining MDROs were consistent with the previous reporting period.

For adult patients, 2% of cases had a positive swab for MRSA, a decrease from the 3% reported in the previous year. Consistent with previous reporting periods, less than 1% of adult patients had a positive swab for each of the other three MDROs.

PAIN ASSESSMENT

Pain is often the most frequent complaint following burn injury. The assessment of pain is vital in determining the most effective management. Early intervention minimises the risk of long-term sequelae such as chronic pain. As a sign of good quality care, it is reasonable to expect that a patient who has been admitted for a burn injury should have an assessment of their pain within 24 hours of admission. The pain assessment should be completed using one of the following validated tools: the short-form McGill questionnaire¹⁵, the short- or long-form of the Brief Pain Inventory¹⁶, the Pain Disability Index¹⁷, a numeric rating scale, a verbal descriptor scale, a pain thermometer, a visual analogue scale, or a pictorial pain scale such as the FACES pain scale.

Eighty-nine percent (89%) of paediatric patients received a validated pain assessment within 24 hours of admission, which is unchanged since the 2019/20 reporting period. Ninety-six percent of adult patients received a validated pain assessment during the same period, a slight decrease on the 97% reported during 2019/20.

DIAGRAM USE IN BURN SIZE ASSESSMENT

Specialised burn care includes an accurate estimation of the percentage TBSA burned. The percentage TBSA of the burn is used to determine the severity of the burn and accurately calculate the fluid resuscitation requirements. The Lund Browder chart¹⁸ and the Wallace rule of nines diagram¹⁹ are accepted tools used in the estimation of TBSA percentage. The registry collects data on whether an accepted tool was accurately used to calculate the size of the burn without restriction; that is, all patients should have a response to this data field.

Seventy-one percent (71%) of all patients in the 2020/21 reporting period had their burn size assessed using an accepted tool, an increase from the 69% of patients in 2019/20. Sixty-five percent (65%) of paediatric patients had their burn size assessed using a Lund Browder chart or Wallace rule of nines diagram during the current reporting period, a slight increase from the 64% reported in 2019/20. Seventy-four percent (74%) of adults had their burn size appropriately assessed, an increase on the 70% reported in the previous year. For adult patients with a burn size of 5% TBSA or greater, 78% had their burn size assessed using a diagram; this increased to 81% in adult patients with a burn size of >10% TBSA. For adults with a length of stay between 0 and 3 days, a lower proportion (65%) had a diagram used in burn size assessment. When examining these factors in paediatric patients, the use of burn diagram assessment remained unchanged.

15. Melzack R. The short-form McGill Pain Questionnaire. *Pain*. 1987;30(2):191-7.

16. Cleeland CS, Ryan KM. Pain assessment: Global use of the Brief Pain Inventory. *Annals of the Academy of Medicine, Singapore*. 1994;23(2):129-38.

17. Tait RC, Chibnall JT, Krause S. The Pain Disability Index: psychometric properties. *Pain*. 1990;40(2):171-82.21.

18. Lund CC, Browder NC. The estimation of areas of burns. *Surgery Gynecology and Obstetrics*. 1944;79:352..

19. Victorian Adult Burns Service. Wallace Rule of Nine – Adults 2019 [Available from: <https://www.vicburns.org.au/burn-assessment-overview/burn-tbsa/rule-of-nine/>].

MALNUTRITION RISK SCREENING

A significant proportion of patients admitted to hospital are at risk of malnutrition. Each year, patients in Australian hospitals experience more than 5,400 episodes of hospital-acquired malnutrition, which have been associated with increased hospital length of stay and associated healthcare costs²⁰. For patients with burn injuries, malnutrition is associated with a range of complications and can delay wound healing and closure.

Malnutrition screening of all patients is recognised best practice. It identifies vulnerable patients who are, or may be, at risk of malnutrition to enable the commencement of a preventive management plan. In Australia, malnutrition risk screening of all patients on admission is a key performance measure for all healthcare organisations, including those housing burns services²¹. This information aligns with the Australian Commission on Safety and Quality in Health Care's National Safety and Quality Health Service Standards (second edition), in particular the Comprehensive Care Standard 7, to support the delivery of safe patient care²².

Where patients have a length of stay exceeding 24 hours, the registry collects data on whether the patient was screened for the risk of malnutrition within 24 hours of admission. During the 2020/21 reporting period, 60% of paediatric patients and 80% of adult patients with a length of stay exceeding 24 hours had a malnutrition risk assessment completed within 24 hours of admission. Compared with previous reporting period, this has remained consistent for paediatric patients, but has decreased for adult patients (84% in 2019/20).

FORMULA USE IN FLUID REQUIREMENT ESTIMATION

Specialised burn care includes an accurate estimation of fluid resuscitation requirements in severe burns. Adequate fluid resuscitation remains a cornerstone of quality early burn care, as it restores circulating blood volume, preserves vital organs, and maintains tissue perfusion. The registry collects data on whether there was evidence or documentation that an accepted formula (either the modified Parkland formula²³ or the modified Brooke formula²⁴) were used to estimate the fluid resuscitation requirements of patients with major burns within 24 hours of admission to the burns service.

In the 2020/21 reporting period there was evidence that an accepted formula was used in 97% of paediatric patients and 99% of adult patients with a major burn. These are both increases compared with the previous year (89% and 98% for paediatric and adult patients, respectively).

VENOUS THROMBOEMBOLISM PROPHYLAXIS

Venous thromboembolic events (e.g., deep venous thrombosis, pulmonary emboli) are a significant risk for all hospitalised patients, but burns patients are at a theoretically higher risk of having such an event²⁵. Venous thromboembolic prophylaxis is used in adult burns patients to prevent venous thrombosis and pulmonary embolism. Commonly prescribed medications for venous thromboembolism prophylaxis include enoxaparin, heparin, and warfarin. The registry collects data on whether prophylaxis was prescribed for patients over the age of 16. Seventy percent (70%) of adult patients received venous thromboembolism prophylaxis during the 2020/21 reporting period, consistent with the previous year.

20. Independent Hospital Pricing Authority. Activity Based Funding Admitted Patient Care 2015-16, acute admitted episodes, excluding same day.

21. Australian Commission on Safety and Quality in Health Care. Selected best practices and suggestions for improvement for clinicians and health system managers: Hospital-acquired complication 13 – Malnutrition. Available from <https://www.safetyandquality.gov.au/sites/default/files/migrated/Malnutrition-detailed-fact-sheet.pdf>.

22. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards, Second edition. Available from <https://www.safetyandquality.gov.au/sites/default/files/migrated/National-Safety-and-Quality-Health-Service-Standards-second-edition.pdf>.

23. Haberal M, SAbali AES, Karakayali H. Fluid management in major burn injuries. *Indian J Plast Surg*. 2010;43:S29-36.

24. Zodda D. Calculated decisions: Parkland formula for burns. *Emerg Med Pract*. 2018;20:S1-2.

25. Pannucci CJ, Obi AT, Timmins BH, Cochran AL. Venous Thromboembolism in Patients with Thermal Injury: A Review of Risk Assessment Tools and Current Knowledge on the Effectiveness and Risks of Mechanical and Chemical Prophylaxis. *Clinics in plastic surgery*. 2017;44:573-81.

WEIGHT RECORDED AND WEIGHT LOSS

Weight loss following burn injury can affect patient outcomes in terms of healing potential and rehabilitation outcomes. Extended length of stay is associated with weight loss and associated poorer outcomes²⁶. In severe burn injury, some degree of weight loss may be unavoidable. It is necessary to develop an understanding of treatment factors that minimise weight loss and the degree to which weight loss and loss of lean body mass is avoidable. The registry collects data on whether patients with a length of stay exceeding 14 days have their weight recorded within three to five days of their admission (to account for the significant fluctuations in weight due to fluid resuscitation within the initial 72 hours after injury) and whether their weight is then recorded on a weekly basis.

For paediatric patients with a length of stay exceeding two weeks during the 2020/21 reporting period, their weight was recorded within three to five days of admission in 93% of cases (an increase from 86% of cases in the previous reporting period) and recorded on a weekly basis for 67% of cases (an increase from 58% reported in the previous year). Twenty-three percent (23%) of paediatric patients lost weight during their hospital admission in the 2020/21 reporting period, a decrease from the 35% reported during the 2019/20 reporting period. The median amount of weight lost by paediatric patients in the 2020/21 reporting period was 1.7kg.

For adult patients with a length of stay exceeding two weeks during the 2020/21 reporting period, their weight was recorded within three to five days of admission in 60% of cases (a decrease from 61% in the previous reporting period) and recorded on a weekly basis for 40% of patients (consistent with the previous reporting period). Fifty-five percent (55%) of adult patients lost weight during their admission in the 2020/21 reporting period; the median amount of weight lost was 3kg.

26. Khorasani EN, Mansouri F. Effect of early enteral nutrition on morbidity and mortality in children with burns. *Burns*. 2010;36(7):1067-71.

HOSPITAL OUTCOMES FOLLOWING BURN INJURY

This section describes the hospital outcomes of burn care, including ICU admissions, complications during the episode of care, length of stay, discharge disposition, and readmissions.

ICU ADMISSIONS

Critical care management and mechanical ventilation may be required after burn injury²⁷. An ICU admission was recorded in five percent of paediatric cases (a decrease from the 6% reported in the previous year) and 12% of adult cases (an increase compared to the 11% reported in the previous year). Fifty percent (50%) of major paediatric burns were admitted to the ICU during the current reporting period (an increase from 44% in 2019/20), while 79% of major adult burns patients were admitted to the ICU (an increase from 76% in 2019/20).

ICU LENGTH OF STAY

The median (IQR) ICU length of stay for paediatric patients during the 2020/21 reporting period was 64 (24-168) hours, which is consistent with the previous reporting year. For adults, the median ICU length of stay was 72 (28-228) hours, an increase on the 70 (28-200) hours reported in the previous year.

MECHANICAL VENTILATION IN ICU

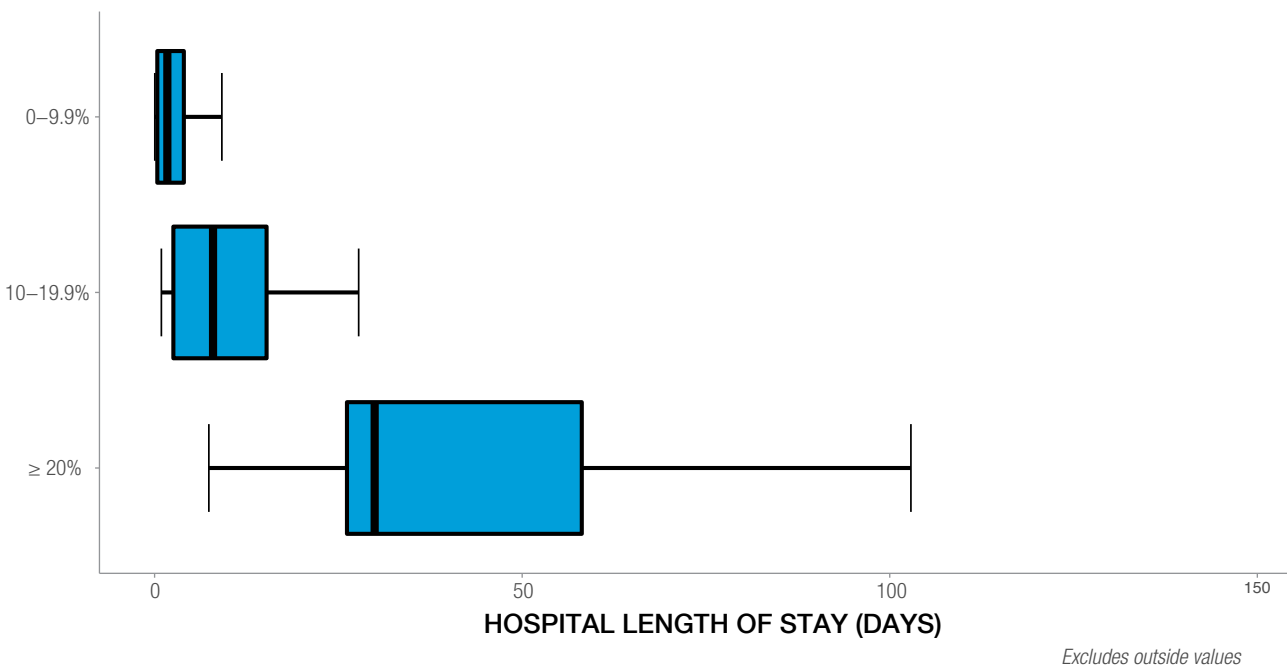
During the 2020/21 reporting period 56% of paediatric patients who were admitted to the ICU were placed on mechanical ventilation, spending a median (IQR) of 72 (15-190) hours on the ventilator. The proportion of paediatric patients placed on a ventilator is decreased compared with the previous reporting period (65% in 2019/20) but the median time spent on a ventilator is an increase from the previous year (median 58 hours in 2019/20). Seventy-percent (70%) of adult patients admitted to the ICU received mechanical ventilation, a decrease from the 78% reported in the previous year. The median (IQR) time spent on a ventilator by adult patients was 58 (21-197) hours, consistent with the previous year (58 [18-176] in 2019/20).

27. Palmieri TL. What's new in critical care of the burn-injured patient? Clinics in plastic surgery. 2009;36(4):607-15
Wang Y, Tang HT, Xia ZF, Zhu SH, Ma B, Wei W, et al. Factors affecting survival in adult patients with massive burns. Burns. 2010;36(1):57-64

HOSPITAL LENGTH OF STAY

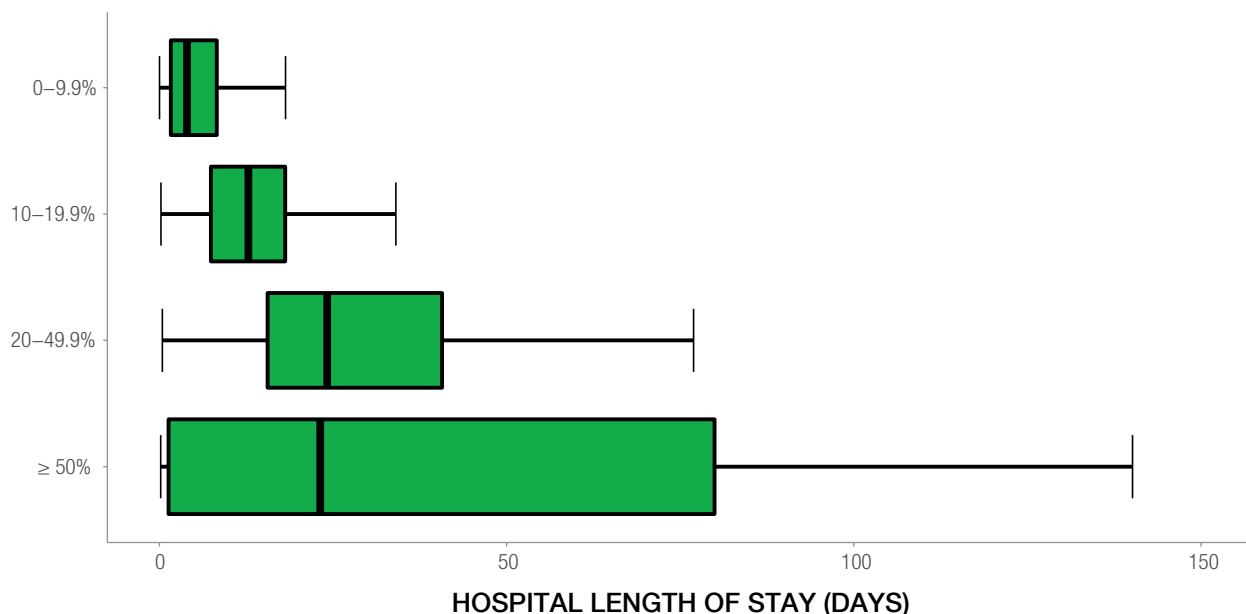
The length of admission is associated with increased case complexity, and is impacted by treatment protocols²⁸. All cases were included in the length of stay analysis. The median (IQR) hospital length of stay for all patients was 4 (2-9 days), consistent with the previous reporting period. Paediatric patients (median [IQR] 2 [1-6] days) had a shorter median length of stay compared to adult patients (5 [2-11] days). These values have remained consistent over the previous reporting periods. Figures 12 and 13 show the distribution in hospital length of stay by %TBSA group for paediatric and adult burns patients for the 2020/21 reporting period. In both cases the hospital length of stay increases with increasing TBSA. The median hospital length of stay for adult patients with a burn affecting at least 50% TBSA is similar to that for a 20-49.9% TBSA burn due to the shorter stays for patients who die in hospital as a result of their injuries (Figure 14). Seven adult patients with a burn affecting less than 10% TBSA died in hospital during the current reporting period.

Figure 12 – Distribution of Hospital Length of Stay by TBSA Group in Paediatric Burns Patients, 2020/21



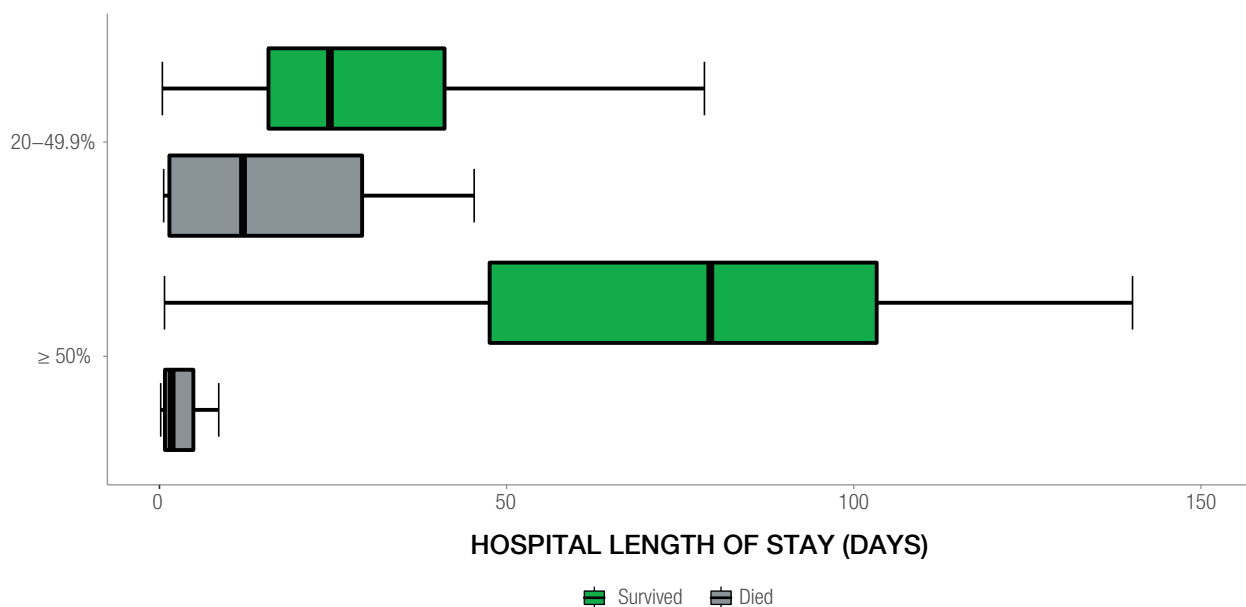
28. Pereira C, Murphy K, Herndon D. Outcome measures in burn care. Is mortality dead? Burns. 2004;30(8):761-71.

Figure 13 – Distribution of Hospital Length of Stay by TBSA Group in Adult Burns Patients, 2020/21



Excludes outside values

Figure 14 – Distribution of Hospital Length of Stay by TBSA Group and Mortality Status in Adult Major Burns Patients, 2020/21



Excludes outside values

In adult patients, the predicted length of stay by %TBSA for burns between ten and 50% is one day per %TBSA burned²⁹. Figure 15 shows the relationship between the size of the burn and the mean length of stay, increasing in one percent units of burn size, in adults over the current reporting period. The error bars represent the standard deviation of the length of stay, while the blue line represents the expected length of stay based on the one day per percentage of TBSA burned theory. The significantly longer error bar for patients with 26% TBSA burns is due to the large variation in the median length of stay for these patients, which ranged from less than 24 hours to approximately 4 months. The majority of cases the registry data is consistent with the notion of the length of stay increasing by one day for each additional percentage of body surface area burned. The actual length of stay data deviates from the expected data for burns greater than 35% TBSA. This may relate to the association between %TBSA, mortality, and length of stay presented in Figure 14.

29. Related to Gillespie R, Carroll W, Dimick AR, et al. Diagnosis-related groupings (DRGs) and wound closure: roundtable discussion. J Burn Care Rehabil. 1987;8:199-209.

Figure 15 – Burn Size and Mean Length of Stay in Adult Burns Patients, 2020/21

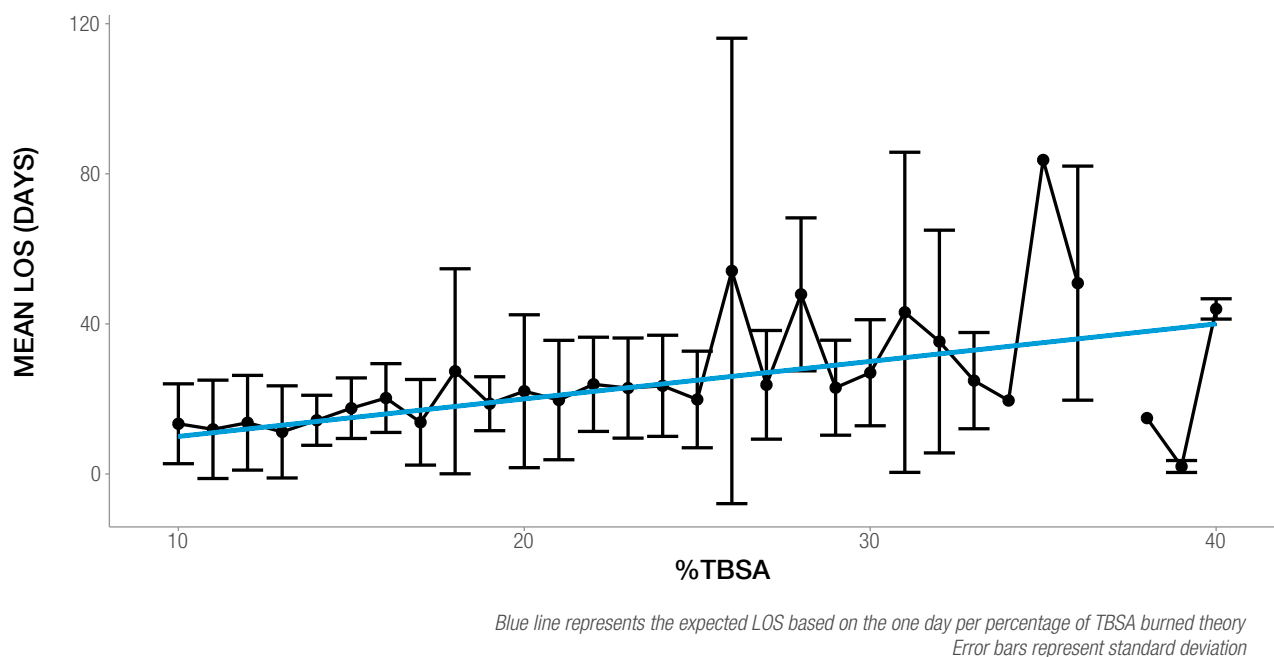
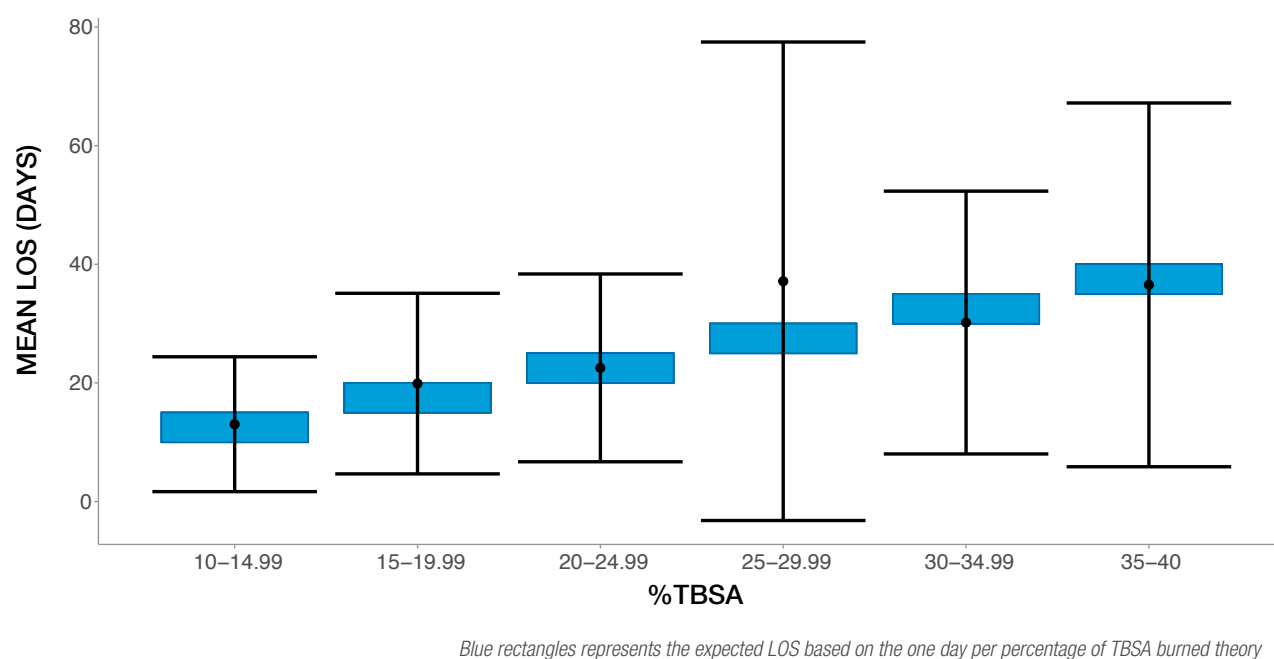


Figure 16 shows the relationship between the size of the burn and the mean length of stay, increasing in five percent units of burn size, in adults over the past year. The error bars represent the standard deviation of the length of stay, while the blue rectangles represent the predicted length of stay based on the one day per percentage of TBSA burned theory. During 2020/21 the median length of stay fell within the ‘target’ range for burns under 25% TBSA, at which point the median in-hospital length of stay exceeded the ‘target’ range. This is a change compared to the previous reporting period, where the length of stay for burns >25% TBSA was below the ‘target’ range.

Figure 16 – Burn Size Groups and Mean Length of Stay in Adult Burns Patients, 2019/20



DISCHARGE DISPOSITION (FOR PATIENTS SURVIVING TO DISCHARGE)

Most patients (83%) were discharged to their home or usual place of residence during the 2020/21 reporting period. This observation has been consistent for the duration of the registry. Very few patients (~1% per year) left against medical advice.

Table 22 – Discharge Disposition for Surviving BRANZ Patients, 2020/21

	NUMBER	%
Home or usual residence	2878	83
Hospital in the Home	170	5
Other acute hospital	124	4
Inpatient rehabilitation facility	63	2
Other healthcare accommodation	53	2
Left against medical advice	37	1
Psychiatric hospital or unit	18	1
Another BRANZ hospital	14	< 1
Statistical discharge	< 5	< 1
Other destination	11	3

IN-HOSPITAL DEATHS

In-hospital mortality following burn injury are uncommon in high-income countries such as Australia and the United States. One percent of patients died in-hospital during the 2020/21 reporting period, consistent with the previous reporting period. The proportion of patients who died increased with increasing burn size. Of the 40 patients with a burn of 50% TBSA or greater, 16 (42%) died. Of the patients who died, 57% had an inhalation injury.

The registry records the reason for death for patients who die in-hospital. Multi-system organ failure was the most common cause of death during the 2020/21 reporting period (43%), followed by burns shock (33%).

Of the patients who died during their hospital stay during the 2020/21 reporting period, active treatment was not commenced in 39% of patients, a decrease from the previous reporting period (45% in 2019/20). Active treatment was commenced but later ceased for a further 39% of cases. For patients who died in-hospital and where the length of stay was known during the 2020/21 reporting period, 26% of patients died within 24 hours of admission.

READMISSIONS

During the 2020/21 reporting period 123 paediatric cases (16%) were readmitted to a specialist burns service within 28 days of discharge. Of these cases, 76% were reported as being a planned readmission. This pattern is consistent with previous reporting years. This is reflective of the common practice and workflow 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 lower for adults. Only five percent (5%) of adult cases experienced a readmission within 28 days of discharge. In contrast to the paediatric patients, 53% of these cases were reported as 'unplanned' for wound healing issues or wound infection (a decrease from 56% in 2019/20). 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 arose from an unexpected complication. We hope that poor outcomes in terms of readmission may be able to be linked to processes of care, which can be improved in the future.

APPENDICES

APPENDIX A FIGURE AND TABLE HEADERS

List of Figures

Figure 1	Hospitals with Specialist Burn Services Across Australia and New Zealand
Figure 2	Number of Registered BRANZ Patients by Service and Reporting Period, 2009/10 to 2020/21
Figure 3	Number of Paediatric and Adult Registered BRANZ Patients by Service, 2020/21
Figure 4	Number of Registered BRANZ Patients by Age Group and Gender, 2020/21
Figure 5	Primary Cause of Injury for Registered BRANZ Patients by Age Group, 2020/21
Figure 6	Seasonal Trends in Burn Injury Cause for Registered BRANZ patients, 2020/21
Figure 7	Injury Intent by Burn Size for Registered BRANZ Patients, 2020/21
Figure 8	Time of Injury for Registered BRANZ Patients, 2020/21
Figure 9	Percentage Total Body Surface Area Burnt by Injury Cause, 2019/20
Figure 10	Time to Admission for Major Paediatric Burns by Reporting Period, 2009/10 to 2020/21
Figure 11	Time to Admission for Major Adult Burns by Reporting Period, 2009/10 to 2020/21
Figure 12	Distribution of Hospital Length of Stay by TBSA Group in Paediatric Burns Patients, 2020/21
Figure 13	Distribution of Hospital Length of Stay by TBSA Group in Adult Burns Patients, 2020/21
Figure 14	Distribution of Hospital Length of Stay by TBSA Group and Mortality Status in Adult Burns Patients, 2020/21
Figure 15	Burn Size and Mean Length of Stay in Adult Burns Patients, 2020/21
Figure 16	Burn Size Groups and Mean Length of Stay in Adult Burns Patients, 2020/21

List of Tables

Table 1	Number of burn injuries that occurred during each stay-at-home order compared to previous years
Table 2	Profile of cases between July 1 2020 and June 30 2021 by lockdown status
Table 3	Number of Registered BRANZ Patients by Reporting Period, 2009/10 to 2020/21
Table 4	Demographic Profile of Registered BRANZ Patients, 2009/10 to 2020/21
Table 5	Region of Birth and Ethnicity Data for Australian and New Zealand Service Patients, 2020/21
Table 6	Number and Rate of Burn Injury per 100,000 People by Indigenous Status, 2020/21
Table 7	Rate of Burn Injury per 100,000 People by Australian Remoteness Area, 2020/21
Table 8	Primary Cause of Burn Injury in Registered BRANZ Paediatric Patients, 2020/21
Table 9	Primary Cause of Burn Injury in Registered BRANZ Adult Patients, 2020/21
Table 10	Primary Sub-cause of Burn Injury in Registered BRANZ Paediatric Patients, 2020/21
Table 11	Primary Sub-cause of Burn Injury in Registered BRANZ Adult Patients, 2020/21
Table 12	Place of Burn Injury in Registered BRANZ Paediatric Patients, 2020/21
Table 13	Place of Burn Injury in Registered BRANZ Adult Patients, 2020/21
Table 14	Five Most Common Activities at Time of Injury in Registered BRANZ Patients, 2020/21
Table 15	Burn Injuries Occurring on Each Day of the Week, 2020/21
Table 16	Percentage Total Body Surface Area Burned by Age Group, 2020/21
Table 17	Percentage Total Body Surface Area Burnt by Indigenous Status, 2020/21
Table 18	Documented Standard of First Aid Following Burn Injury by Age Group, 2020/21
Table 19	Documented Standard of First Aid Following Burn Injury by Indigenous Status, 2020/21
Table 20	Referral Source to Burns Service for Registered BRANZ Patients by Age Group, 2020/21
Table 21	Burn Wound Management Procedures by Age Group, 2020/21
Table 22	Discharge Disposition for Surviving BRANZ Patients, 2020/21

APPENDIX B INVESTIGATORS AND STAFF

BRANZ Investigators

Professor Belinda Gabbe
Professor Peter Cameron
Miss Heather Cleland
Dr Lincoln Tracy

Staff

Ms Mimi Morgan
Ms Samara Rosenblum
Ms Monica Perkins
Ms Ancelin McKimmie

Steering Committee Members

Natalia Adanichkin	Amy Jeeves
Kathy Bicknell	Roy Kimble
Margaret Brennan	Rochelle Kurmis
Peter Cameron	Carl Lisec
Daniel Carroll	Tracey Perrett
Andrew Castley	Linda Quinn
Anne Darton	Rebecca Schrale
Dale Forbes	Yvonne Singer
Bronwyn Griffin	Marcus Wagstaff
Kathryn Heath	Richard Wong She
Darren Hopkins	Fiona Wood

APPENDIX C 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. All 18 specialist burns services have ethics approval to submit data to BRANZ. Of these sites, six sites treat paediatric patients only, six sites treat adult patients only, and six sites treat both paediatric and adult patients.

Service	Location	Treats
The Alfred Hospital	Melbourne, Victoria	Adults
The Royal Children's Hospital	Melbourne, Victoria	Paediatrics
Perth Children's Hospital	Western Australia	Paediatrics
Fiona Stanley Hospital	Perth, Western Australia	Adults
Royal North Shore Hospital	New South Wales	Adults
Concord General Repatriation Hospital	New South Wales	Adults
Children's Hospital at Westmead	New South Wales	Paediatrics
Women's & Children's Hospital	Adelaide, South Australia	Paediatrics
Royal Adelaide Hospital	Adelaide, South Australia	Adults
Royal Brisbane and Women's Hospital	Queensland	Adults
Queensland Children's Hospital	Queensland	Paediatrics
Townsville University Hospital	Queensland	Paediatrics
Royal Hobart Hospital	Hobart, Tasmania	Adults & Paediatrics
Royal Darwin Hospital	Darwin, Northern Territory	Adults & Paediatrics
Middlemore Hospital	Auckland, New Zealand	Adults & Paediatrics
Christchurch Hospital	Christchurch, New Zealand	Adults & Paediatrics
Waikato Hospital	Hamilton, New Zealand	Adults & Paediatrics
Hutt Hospital	Hutt, New Zealand	Adults & Paediatrics

APPENDIX D PUBLICATIONS AND PRESENTATION LIST FOR 2019/20

During the 2020/21 reporting period, BRANZ data was presented in the 11 peer-reviewed manuscripts and included in 1 conference presentation. Note that some reports, publications, and presentations listed below may overlap with prior or subsequent annual reports given that outputs may be accepted and then finalised (published/presented) across subsequent financial years.

ARTICLES

Moussa, A., Lo, C.H., & Cleland, H. (2021). Burn wound excision within 24 h: A 9-year review. *Burns*, 47(6): 1300-1307.

Perkins, M., Abesamis, G.M.M., Cleland, H., Gabbe, B.J., & Tracy, L.M. (2021). Association between gender and outcomes of acute burns patients. *Australian and New Zealand Journal of Surgery*, 91(1-2): 83-88.

Tracy, L.M., Cameron, P.A., Singer, Y., Earnest, A., Wood, F., Cleland, H., & Gabbe, B.J. (2021). Venous thromboembolism prophylaxis practice and its effect on outcomes in Australia and New Zealand burns patients. *Burns & Trauma*, tkaa044.

Gong, J., Singer, Y., Cleland, H., Wood, F., Cameron, P., Tracy, L.M., & Gabbe, B.J. (2021). Driving improved burns care and patient outcomes through clinical registry data: A review of quality indicators in the Burns Registry of Australia and New Zealand. *Burns*, 47(1): 14-24.

Connolly, S.C., Bertinetti, M., Teague W.J., Gabbe, B.J., & Tracy, L.M. (2021). Sunburn Injuries Admitted to Burn Services in Australia and New Zealand. *JAMA Dermatology*, 157(6): 729-731. Tracy, L.M., Cleland, H., Cameron, P.A., & Gabbe, B.J. (2021). Pain assessment following burn injury in Australia and New Zealand: Variation in practice and its association on in-hospital outcomes. *Australasian Emergency Care*, 24(1): 73-79.

Tracy, L.M., Dyson, K., Le Mercier, L., Cleland, H., McInnes, J.A., Cameron, P.A., Singer, Y., Edgar, D.W., Darton, A., & Gabbe, B.J., (2020). Variation in documented inhalation injury rates following burn injury in Australia and New Zealand. *Injury*, 51(5): 1152-1157.

Ryder, C., Mackean, T., Hunter, K., Towers, K., Rogers, K., Holland, A.J.A., & Ivers, R. (2020). Factors contributing to longer length of stay in Aboriginal and Torres Strait Islander children hospitalised for burn injury. *Injury Epidemiology*, 7; 52.

Tracy, L.M., Singer, Y., Schrale, R., Gong, J., Darton, A., Wood, F., Kurmis, R., Edgar, D., Cleland, H., & Gabbe, B.J. (2020). Epidemiology of burn injury in older adults: An Australian and New Zealand perspective. *Scars, Burns & Healing*, 6: 1-11.

Tracy, L.M., Dyson, K., Le Mercier, L., Cleland, H., McInnes, J.A., Cameron, P.A., Singer, Y., Edgar, D.W., Darton, A., & Gabbe, B.J., (2020). Variation in documented inhalation injury rates following burn injury in Australia and New Zealand. *Injury*, 51(5): 1152-1157.

Tracy, L.M., Edgar, D.W., Schrale, R., Cleland, H., & Gabbe, B.J., on behalf of the BRANZ Adult Long-Term Outcomes Pilot Project participating sites and working party (2020). Predictors of itch and pain in the 12 months following burn injury: Results from the Burns Registry of Australia and New Zealand (BRANZ) Long-Term Outcomes Project. *Burns & Trauma*, 8; tkz004.

CONFERENCE PRESENTATIONS

Tracy LM, Kurmis R, Nicholls C, & Gabbe BJ. Early enteral nutrition following major burn injury in adults [Oral Presentation]. Australasian Trauma Society Virtual Conference – Trauma Care in a Pandemic and Beyond. 30 October 2020.

APPENDIX E 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% of total body surface area (TBSA);
- Burns greater than 5% TBSA in children;
- Full-thickness burns greater than 5% TBSA;
- Burns to special areas (i.e., face, hands, feet, genitalia, perineum, and major joints);
- Electrical burns;
- Chemical burns;
- Burns with an associated inhalation injury;
- Circumferential burns of the limbs or chest;
- Burns in the very young, very old, or pregnant;
- Burns in people with pre-existing medical disorders that could complicate management, prolong recovery, or increase mortality;
- Burns associated with major trauma; and
- Non-accidental burns

Burns Registry of Australia and New Zealand, Monash University

Requests for information from the registry are welcome.

Requests should be made to:

Burns Registry of Australia and New Zealand
Pre-Hospital Emergency and Trauma Research Unit
School of Public Health and Preventive Medicine

Monash University
553 St Kilda Rd, Melbourne Vic 3004
Phone: +61 3 9903 0288
Email: anzba.registry@monash.edu

monash.edu/medicine/sphpm/branz