

SPECIAL FOCUS REPORT: HOLIDAY BURNS

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REPORT #1

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ABOUT THIS REPORT

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EXECUTIVE SUMMARY

- The BRANZ contains data on 509 burn injuries occurring on Christmas Day, New Year's Eve, and New Year's Day. These are three of the six busiest days of the year for burn injuries.
- New South Wales (1.6% of all burns presenting to hospitals within that jurisdiction) and Victoria/Tasmania (1.4%) had the greatest proportion of burn injuries occurring over the holiday period.
- The greatest number of injuries occurred between 12pm and 1pm on Christmas Day, between 11pm and midnight on New Year's Eve, and between 12am and 1am on New Year's Day.
- More barbeque-related burns occurred on Christmas Day, while burns from campfires, bonfires, burnoffs, and fireworks were more common on New Year's Eve and New Year's Day.
- The average burn size was 6.5%; seven percent of patients had a burn affecting at least 20% of their body. The average hospital stay for a patient burned on a holiday was 7.7 days.

BACKGROUND

Seasonal trends in burn injuries have been reported [1], along with peaks and troughs throughout individual days [2]. Anecdotal evidence from clinicians suggests holiday periods are busy time in burn services, with often reduced staff numbers met with increases in the number of admitted patients. As the end of the year approaches, clinicians anticipate an increase in the number of burn injuries occurring, particularly in the last week of December.

The aim of this project was to understand how many and what type of burn injuries occur over the Christmas and New Year period (specifically, on Christmas Day, New Year's Eve, and New Year's Day). We hypothesise there will be a greater number of burn injuries occurring over this period compared to other stages during the year.

METHODS

BURNS REGISTRY OF AUSTRALIA AND NEW ZEALAND (BRANZ)

The BRANZ is a bi-national clinical quality registry collecting epidemiological, management, and in-hospital outcome data from 18 hospitals across Australia and New Zealand. Patients admitted to one of these 18 hospitals with a burn injury within 28 days of injury are included in the registry, provided (a) the admission lasts for more than 24 hours, or (b) the admission lasts for less than 24 hours but the patient undergoes a burn wound management procedure in theatre. All in-hospital deaths within 24 hours of admission are included in the registry. The burn injury can be the primary reason for admission, or if it requires a consult from the burns service. Transfers from other hospitals are included irrespective of the time from injury. The BRANZ does not include medical conditions such as Steven Johnson syndrome and toxic epidermal necrolysis, or extravasation injuries.

CASE SELECTION

For the purposes of this report, data were extracted for patients with an acute admission meeting BRANZ inclusion criteria that occurred between July 1 2009 and June 30 2022. Admissions with an unknown date of injury or date of admission were excluded.

DATA MANAGEMENT AND ANALYSIS

The day, month, and year were extracted from the date of injury. Burn services were grouped by jurisdiction: New South Wales, New Zealand, Queensland, South Australia/Northern Territory, Victoria/Tasmania, and Western Australia.

Age at the time of injury was calculated as a continuous variable (i.e., age in months/years) and categorised as per BRANZ Annual reports [1]. Gender was recoded as a binary variable (male = 1, female or intersex/indeterminate = 0). The primary cause of injury was categorised as flame, scald, contact, or other cause (e.g., friction, chemical, electrical, radiant heat, etc.). The top 12 subcauses (e.g., scald from a hot beverage) were identified. The activity when the injury occurred was categorised as leisure activity or playing, cooking or preparing food/drink, near a person preparing food/drink, driving or passenger in vehicle, sleeping/resting, self-harming, or other activity. Injury intent was recoded as a binary variable (unintentional injuries = 1, all other known intents = 0). The place where the injury occurred was coded as the patient's home or usual residence, a place for recreation, street or highway, or other specified place. Suspected alcohol and/or drug involvement was recoded as a binary variable (any suspected alcohol and/or drug involvement = 1, no alcohol nor drugs involved = 0). The total body surface area (TBSA) burned was presented as a continuous value (i.e., 0-100) and categorised as < 5%, 5-9.9%, 10-19.9%, and ≥ 20%. The body region affected by the burn was categorised as head (including face, eyes, and scalp), neck, chest/trunk, upper limb, hands, buttock/perineum, lower limb, and feet. Discharge disposition was recoded as a binary variable (discharged to home or usual residence = 1, all other known dispositions [including death] = 0). Hospital length of stay (LOS) was calculated using date and time of admission and discharge data.

The number of burn injuries occurred are presented by hour of injury, day of injury, month of injury, year of injury, and jurisdiction of admitting hospital. The top 10 most frequent dates of injuries were ranked (by both the total and average number of burn injuries occurring on each day). The demographic, injury event, injury severity, management, and in-hospital outcomes of patients who sustain their injuries on Christmas Day, New Year's Eve, or New Year's Day were aggregated and described using summary statistics (frequencies and percentages for categorical variables, mean and standard deviation or median and interquartile range for continuous variables [depending on the skewness of the data]). These data were presented as 'holiday burns' as a collective, and by individual day.

RESULTS

FREQUENCY OF HOLIDAY BURNS

There were 38,953 burn injuries occurring between July 1 2009 and June 30 2022 recorded by the BRANZ. Christmas Day, New Year's Eve, and New Year's Day account for three of the top six 'busiest' days of the year with regards to the total and average number of burn injuries occurring each day, with 509 burns injuries occurring across these three days (1.3% of all injuries; Table 1).

TABLE 1: TOP 10 MOST FREQUENT DATES OF INJURY

Rank	Date	Total Burns	Average Burns
1	December 31	191	14.69
2	January 1	171	13.15
3	July 1	157	12.08
4	June 6	154	11.85
5	January 26	152	11.69
6	December 25	147	11.31
7	July 15	142	10.92
8	June 13	141	10.85
9	September 5	140	10.77
T10	April 24	138	10.62
T10	June 10	138	10.62

Total and average rank is same for listed dates. All listed dates occurred 13 times.

New South Wales (1.6%) and Victoria/Tasmania (1.4%) had the greatest proportion of burn injuries occurring over the holiday period (Table 2), although the proportion of burns occurring over the holiday burns was highly consistent for all jurisdictions.

TABLE 2: NUMBER OF HOLIDAY BURNS BY JURISDICTION OF BURN SERVICE(S)

	Total Burns	Holiday Burns	Christmas Day	New Year's Eve	New Year's Day
NSW	9989	155 (1.6%)	38 (0.4%)	71 (0.7%)	46 (0.5%)
NZ	5568	72 (1.3%)	25 (0.4%)	24 (0.4%)	23 (0.4%)
QLD	3062	38 (1.2%)	9 (0.3%)	17 (0.6%)	12 (0.4%)
SA/NT	7453	80 (1.1%)	30 (0.4%)	23 (0.3%)	27 (0.4%)
VIC/TAS	6317	87 (1.4%)	26 (0.4%)	28 (0.4%)	33 (0.5%)
WA	6564	77 (1.2%)	19 (0.3%)	28 (0.4%)	30 (0.5%)

Although the exact number of burn injuries has fluctuated over the duration of the registry, in terms of raw numbers there has been an increase in the number of injuries recorded since 2009 (Table 3). However, it is important to note that this increase may in part be due to the number of services contributing data to the BRANZ, which has also fluctuated over time.

TABLE 3: NUMBER OF BURN INJURIES OCCURRING ON CHRISTMAS DAY, NEW YEAR'S EVE, AND NEW YEAR'S DAY, 2009 – 2022

Year	December 25	December 31	January 1
2009	8	11	---
2010	5	14	< 5
2011	5	12	12
2012	21	12	16
2013	9	11	13
2014	11	9	13
2015	13	8	12
2016	10	13	12
2017	14	19	15
2018	15	17	20
2019	8	27	18
2020	14	22	10
2021	14	16	10
2022	---	---	18

Christmas Day, New Year's Eve, and New Year's Day were all in the top 20% of days for the average number of burn injuries (Figure 1). June had the greatest proportion of days in the top quintile (43.3%; Figure 2). December had the fifth greatest proportion of days in the top quintile (22.6%).

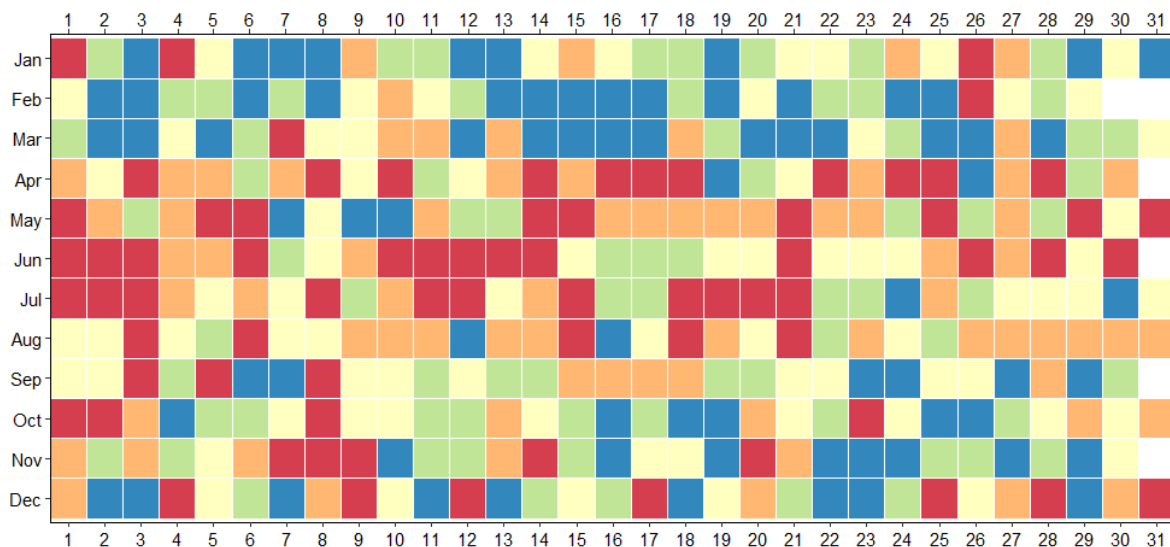


Figure 1. Average number of burn injuries occurring each day of the calendar year, grouped into quintiles. Blue and green indicate a smaller average number of burn injuries occurring on a particular date, while orange and red indicates a higher average number of burn injuries occurring on a particular date.

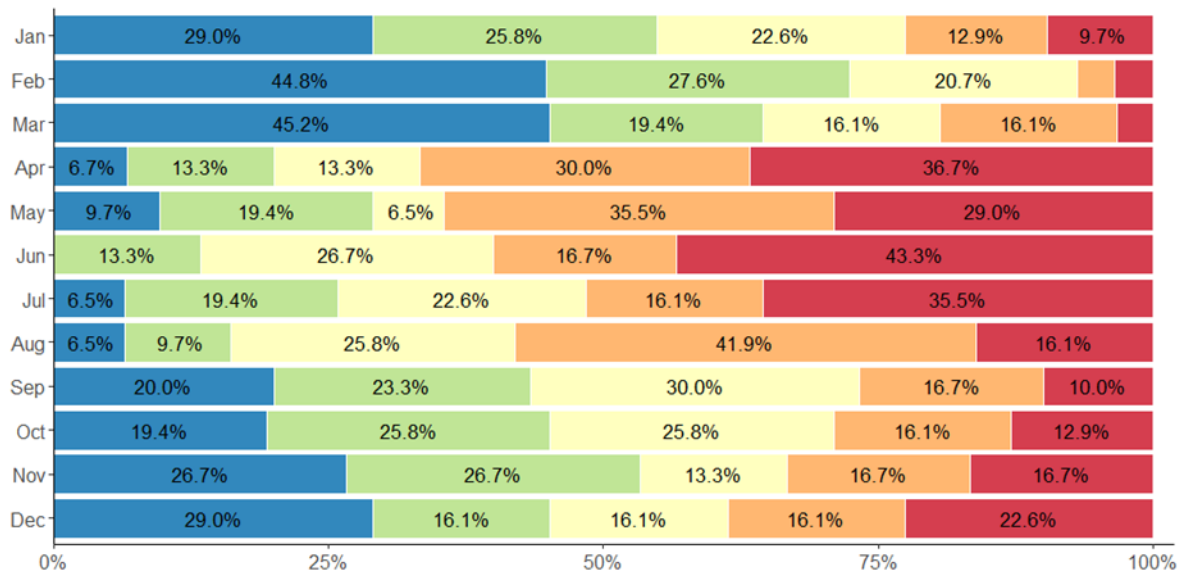


Figure 2. Proportion of days in each average burn injury quintile for each calendar month. Blue and green indicate a smaller average number of burn injuries occurring on a particular date, while orange and red indicates a higher average number of burn injuries occurring on a particular date. Values < 5% are suppressed.

TIMING OF HOLIDAY BURNS

The greatest number of injuries occurred between 12pm and 1pm on Christmas Day, between 11pm and midnight on New Year's Eve, and between 12am and 1am on New Year's Day (Figure 3).

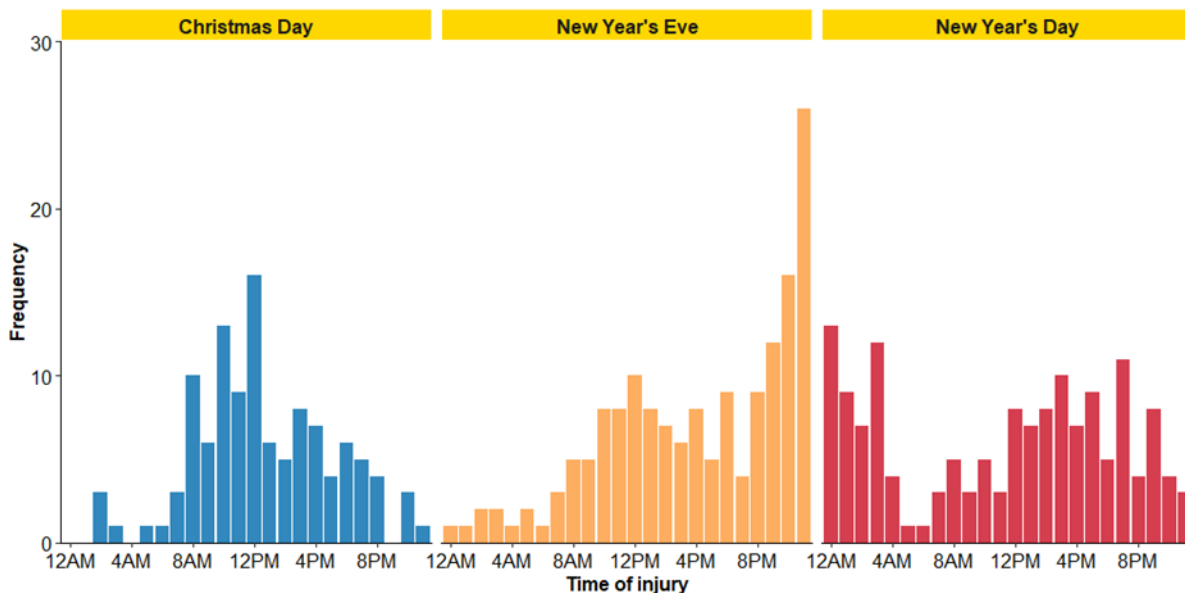


Figure 3. Number of burn injuries occurring during the holiday period per hour of the day.

CHARACTERISTICS OF PATIENTS WITH HOLIDAY BURNS

The demographic characteristics, injury details, and in-hospital management of patients with holiday burns are presented in Table 4. The average age of patients with holiday burns was 32 years, with patients burned on Christmas being older than patients burned on New Year's Day. The 20-29 years age group accounted for the greatest proportion of patients. Seventy percent of patients were male. The greatest proportion of holiday burns were caused by a flame (41.2%). However, the specific cause of injury varied: More barbeque-related burns occurred on Christmas Day, while burns from campfires, bonfires, burnoffs, and fireworks were more common on New Year's Eve and New Year's Day. (Figure 4). The greatest proportion of burns on Christmas Day were sustained while cooking or preparing food/drink, while the

greatest proportion of burns on New Year's Eve and New Year's Day were sustained during leisure activities. Ninety-four percent of injuries were unintentional. Eighty-eight percent of burns on Christmas Day occurred in the home or usual place of residence; this figure fell on New Year's Eve and New Year's Day as the proportion of burns occurring in a place for recreation increases. Five percent of patients had suspected drug and/or alcohol involvement contributing to their injury. The average burn size was 6.5%; seven percent of patients had a burn affecting at least 20% of their body. Four percent of patients had an inhalation injury. Seventy-three percent of patients underwent a burn wound management procedure in theatre; 63% of these required a skin graft. Nine percent of patients were admitted to the intensive care unit (ICU) during their hospital stay; a greater proportion of patients injured on New Year's Eve or New Year's Day were admitted to ICU. Eighty-five percent of patients were discharged to their home or usual residence. The average hospital LOS for a patient burned on a holiday was 7.7 days.

Table 4: Demographic characteristics, injury details, and in-hospital management of patients with holiday burns

	Holiday Burns	Christmas Day	New Year's Eve	New Year's Day
Burn injuries	509	147	191	171
Age, mean (SD) years	32.3 (22.7)	35.1 (25.0)	33.7 (22.3)	28.4 (20.5)
Age group				
0-12 M	11 (2.2%)	< 5	< 5	< 5
13-24 M	37 (7.3%)	15 (10.2%)	9 (4.7%)	13 (7.6%)
25-36 M	18 (3.5%)	5 (3.4%)	8 (4.2%)	5 (2.9%)
3-5 Y	18 (3.5%)	7 (4.8%)	6 (3.1%)	5 (2.9%)
6-10 Y	27 (5.3%)	7 (4.8%)	8 (4.2%)	12 (7.0%)
11-15 Y	20 (3.9%)	6 (4.1%)	8 (4.2%)	6 (3.5%)
16-19 Y	24 (4.7%)	< 5	14 (7.3%)	8 (4.7%)
20-29 Y	99 (19.4%)	18 (12.2%)	33 (17.3%)	48 (28.1%)
30-39 Y	71 (13.9%)	17 (11.6%)	30 (15.7%)	24 (14.0%)
40-49 Y	66 (13.0%)	16 (10.9%)	29 (15.2%)	21 (12.3%)
50-59 Y	48 (9.4%)	25 (17.0%)	12 (6.3%)	11 (6.4%)
60-69 Y	29 (5.7%)	9 (6.1%)	16 (8.4%)	< 5
70-79 Y	31 (6.1%)	15 (10.2%)	11 (5.8%)	5 (2.9%)
≥ 80 Y	10 (2.0%)	< 5	< 5	< 5
Male	355 (69.7%)	102 (69.4%)	140 (73.3%)	113 (66.1%)
Primary cause of injury				
Flame	209 (41.2%)	52 (35.6%)	89 (46.6%)	68 (40.0%)
Scald	137 (27.0%)	45 (30.8%)	42 (22.0%)	50 (29.4%)
Contact	105 (20.7%)	32 (21.9%)	38 (19.9%)	35 (20.6%)
Other cause	56 (11.0%)	17 (11.6%)	22 (11.5%)	17 (10.0%)
Activity when injury occurred				
Leisure activity or playing	205 (40.3%)	41 (27.9%)	85 (44.5%)	79 (46.2%)
Cooking or preparing food/drink	91 (17.9%)	47 (32.0%)	19 (9.9%)	25 (14.6%)
Near person preparing food/drink	33 (6.5%)	12 (8.2%)	8 (4.2%)	13 (7.6%)
Driving or passenger in vehicle	20 (3.9%)	6 (4.1%)	8 (4.2%)	6 (3.5%)
Sleeping or resting	17 (3.3%)	8 (5.4%)	< 5	5 (2.9%)
Self-harming	16 (3.1%)	< 5	7 (3.7%)	6 (3.5%)
Other activity	127 (25.0%)	30 (20.4%)	60 (31.4%)	37 (21.6%)

Unintentional injury	474 (93.5%)	141 (96.6%)	176 (92.6%)	157 (91.8%)
Place where injury occurred				
Home or usual residence	280 (65.9%)	105 (87.5%)	102 (63.7%)	73 (50.3%)
Place for recreation	75 (17.6%)	9 (7.5%)	26 (16.2%)	40 (27.6%)
Street or highway	25 (5.9%)	< 5	11 (6.9%)	13 (9.0%)
Other place	45 (10.6%)	5 (4.2%)	21 (13.1%)	19 (13.1%)
Alcohol/drug involvement	16 (4.8%)	< 5	8 (6.2%)	< 5
TBSA, mean (SD) %	6.5 (9.8%)	5.8 (7.0%)	6.4 (10.0%)	7.4 (11.3%)
TBSA group				
< 5%	286 (58.4%)	80 (56.7%)	113 (60.8%)	93 (57.1%)
5-9.9%	116 (23.7%)	38 (27.0%)	39 (21.0%)	39 (23.9%)
10-19.9%	55 (11.2%)	15 (10.6%)	22 (11.8%)	18 (11.0%)
≥ 20%	33 (6.7%)	8 (5.7%)	12 (6.5%)	13 (8.0%)
Inhalation injury	21 (4.1%)	5 (3.4%)	10 (5.3%)	6 (3.5%)
Managed in theatre	367 (72.7%)	109 (75.2%)	141 (74.6%)	117 (68.4%)
Received a skin graft†	231 (62.9%)	63 (57.8%)	93 (66.0%)	75 (64.1%)
Admitted to ICU	45 (8.9%)	8 (5.5%)	19 (9.9%)	18 (10.5%)
Discharged to home	430 (84.5%)	125 (85.0%)	161 (84.3%)	144 (84.2%)
Hospital LOS, mean (SD) days	7.7 (13.4%)	7.0 (12.5)	7.4 (12.6)	8.5 (15.0)

Data presented as frequency (percentage) unless otherwise specified. Excludes missing data.

†Percentage is calculated relative to the number of patients who were managed in theatre.

ICU = intensive care unit; LOS = length of stay; M = months; SD = standard deviation; TBSA = total body surface area; Y = years.

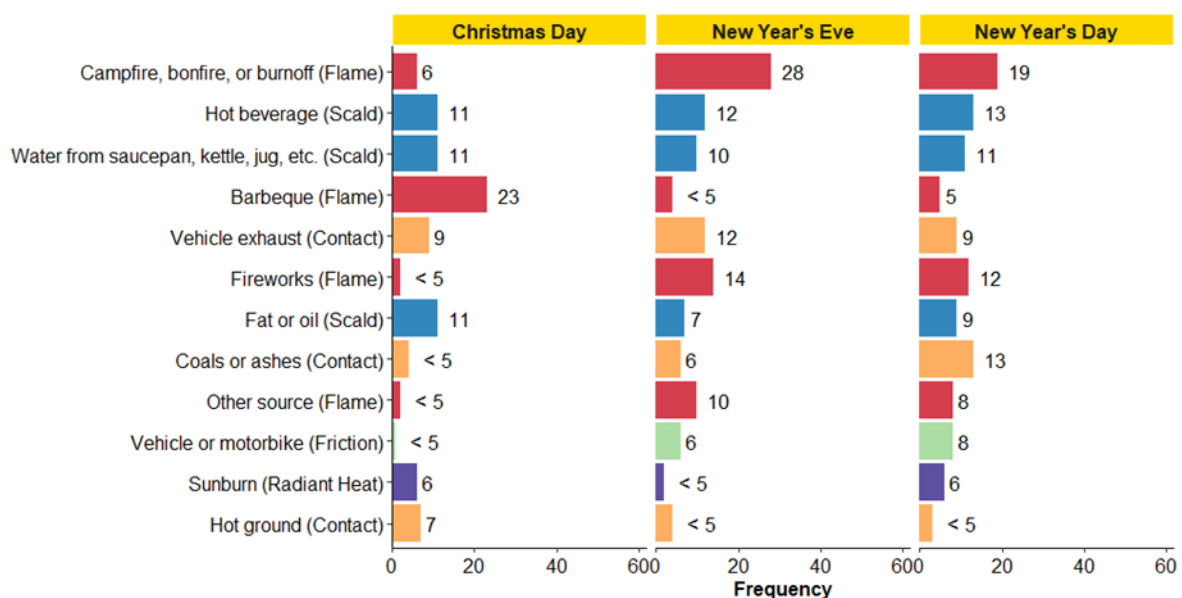


Figure 4. Top 12 burn injury subcauses during the holiday period.

The greatest proportion of patients had burns to their lower limbs (47.4%), hands (44.3%), and upper limbs (37.2%; Figure 5).

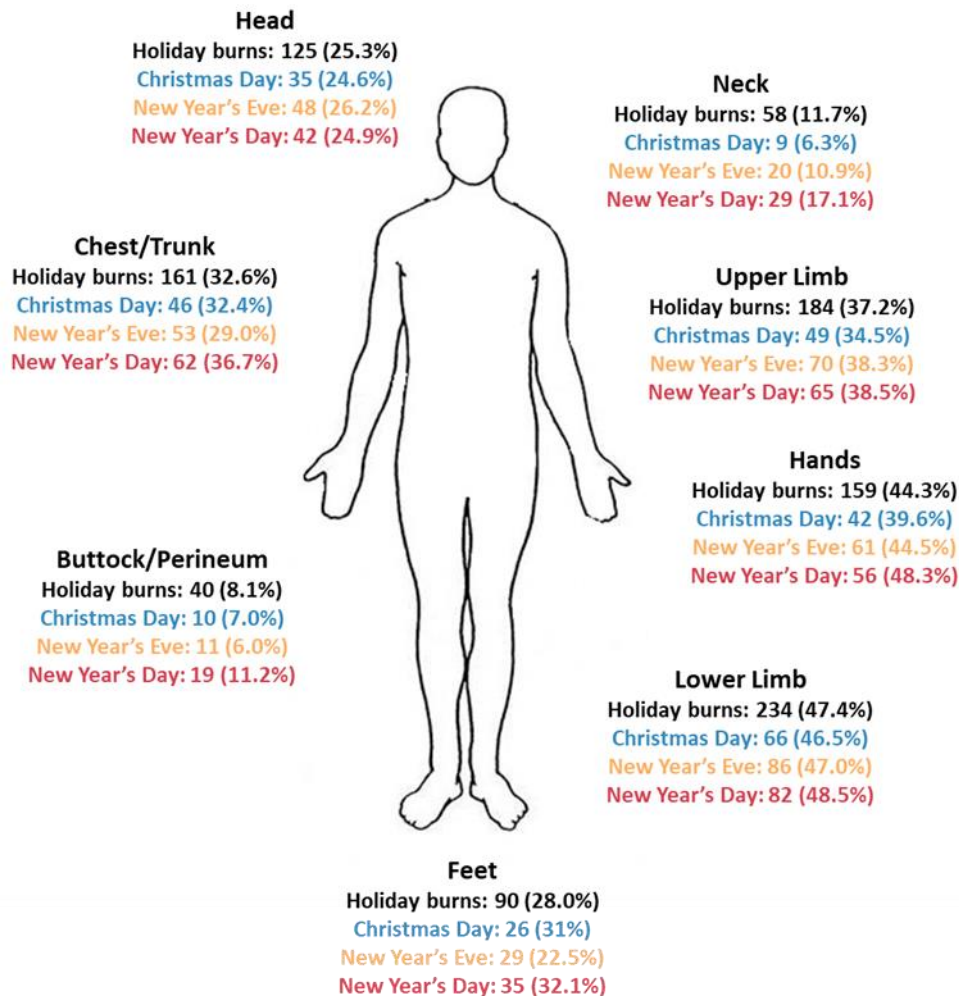


Figure 5. Body regions affected by burns sustained during the holiday period. Burns could affect more than one body area. Excludes missing data.

CONCLUSIONS

The holiday period is one of, if not the, busiest times of the year for burns services, due to the large number of injuries that occur in the week between Christmas and New Year's Day. Burns injuries can cause significant disruptions both to the immediate holiday period and for years to come, with many injuries requiring years of medical, surgical, and psychological rehabilitation. As the majority of burns during the holidays arise through unintentional means, this period represents a golden opportunity to exercise caution and prevent such injuries from occurring.

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