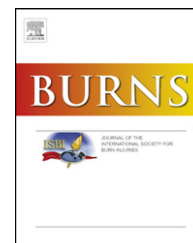


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## Urban compared with rural and remote burn hospitalisations in Western Australia

Janine Duke<sup>a,\*</sup>, Suzanne Rea<sup>b,d,e</sup>, James Semmens<sup>a</sup>, Fiona Wood<sup>a,b,c,d,e</sup>

<sup>a</sup> Centre for Population Health Research, Centre Curtin Health Innovation Research Institute, Curtin University, Perth, WA, Australia

<sup>b</sup> Burn Injury Research Unit, School of Surgery, University of Western Australia, Perth, WA, Australia

<sup>c</sup> The McComb Research Foundation, Royal Perth Hospital, Perth, WA, Australia

<sup>d</sup> Burn Service of Western Australia, Royal Perth Hospital, Perth, WA, Australia

<sup>e</sup> Burn Service of Western Australia, Princess Margaret Hospital, Perth, WA, Australia

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### ABSTRACT

**Aim:** To compare the incidence, temporal trends and cause of burn hospitalisations between urban, rural and remote regions in Western Australia, 1983–2008.

**Methods:** De-identified linked hospital morbidity and mortality records for all persons hospitalised for an index burn in Western Australia were analysed 1983–2008. Annual age-specific incidence and age standardised rates were estimated. Poisson regression analyses were used to estimate temporal trends in hospital admissions by urban, rural and remote region.

**Results:** Of 23,450 burn-related hospital admissions 1983–2008, 14,007 (59.7%) were in urban, 5442 (23.1%) rural and 4021 (17.2%) remote hospital regions. Hospitalisation rates were higher in rural (Incidence rate ratio (IRR), 95% CI: 1.5, 1.4–1.6) and remote (IRR, 95%CI: 2.1, 2.0–2.2) regions compared to urban. Age-standardised rates of burn hospital admissions declined from 1983 to 2008 for each region with 26-year declines of 56% (95% CI: 51–60) for remote, 71% (95% CI: 68–73) for rural, and 9% (95% CI: 4–14) for admissions in urban regions. Scald was the most common cause for urban admissions while flame the most common cause for rural and remote burn admissions.

**Conclusions:** Significant differences in the incidence, and cause of burn were identified between urban, rural and remote regions in Western Australia.

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Burns are preventable injuries and various prevention initiatives have been employed in Australia, including legislative changes to building codes mandating installation of mains powered smoke detectors in new properties and those undergoing major renovations from 1997, tap water

temperature strategies and improved safety standards in the labelling and testing of fabrics. Current research in Western Australia has shown a decline for the population in hospital admissions for burn for the period of 1983–2008 [1]. While our results are consistent with other another international

\* Corresponding author at: Centre for Population Health Research, Curtin Health Innovation Research Institute, Curtin University, GPO Box U1987, Perth, WA 6845, Australia. Tel.: +61 9266 4341; fax: +61 8 9266 1866.

E-mail address: [j.duke@curtin.edu.au](mailto:j.duke@curtin.edu.au) (J. Duke).

Abbreviations: CI, confidence interval; ICD 9CM, International classification of disease, ninth revision, clinical modified; ICD 10AM, International classification of disease, tenth revision, Australian modified; IRR, incidence rate ratio; IQR, interquartile range; Max, maximum; Min, minimum.

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research [2], they do differ with findings of other studies estimating increases [3,4] or no change in acute burn hospitalisations [5].

Western Australia is the largest state of Australia encompassing approximately one third of the Australian continent, and is geographically diverse. The population of Western Australia is approximately 2.25 million, of whom 3.3% are of Aboriginal or Torres Strait status, and 77% of people live in or around Perth, the capital city, 16% in rural and 7% in remote regions. There are six hospitals in the metropolitan area providing emergency services, two specialist burn trauma hospitals (paediatric and adult) in the city of Perth, and the Western Australia Country Health Service provides health services to approximately half a million people living in rural and remote regions, over an immense 2.5 million square kilometre area.

Limited research is available on direct comparisons of urban, rural and remote burn patients with respect to demographics, cause, severity of burn or outcomes in Australia [6], and other developed countries [7–10]. As part of a larger epidemiological project of burn hospitalisations in Western Australia during the period 1983–2008 [1], the purpose of this report is to present a detailed comparison of the incidence, temporal trends and causes of burn hospitalisations between urban, rural and remote regions.

## 1. Methods

Study data were obtained from the Western Australia Data Linkage System, a validated record linkage system that systematically links administrative health data from core datasets for Western Australians [11]. Approval was granted from Curtin University, Western Australian Department of Health Human Research Ethics Committees and Western Australian Aboriginal Health Information and Ethics Committee. A de-identified extraction of all hospital morbidity records and mortality records for all persons admitted to hospital for a burn in Western Australia with an index burn for the period of 1 January 1983 to 31 December 2008 were identified [1]. An index burn was defined by primary and additional diagnosis ICD codes 940–949 (ICD9-CM) and T20–T31 (ICD10-AM). Burn depth was identified using 5th digit of ICD9-CM and 3rd digit of ICD10-AM codes.

Aboriginal status was classified by record of Aboriginal or Torres Strait Islander status on any admission record. Comorbidity was estimated using the Charlson Comorbidity Index [12] using additional diagnosis fields with a five-year look back period [13] and the variable ‘any comorbidity’ (Charlson Comorbidity Index Score > 0: yes/no) was generated. Age at admission was grouped (0–4, 5–15, 16–24, 25–44, 45–64, 65 years and older) and geographic regions of admissions were defined according to Western Australia Department of Health hospital areas. Urban hospitalisations were those that occurred in the north and south metropolitan areas of the municipality of Perth (population (pop.) 1.7 million). Rural admissions were those occurring in the Great Southern (pop. 55,000/40,500 km<sup>2</sup>), South West (pop. 141,000/24,000 km<sup>2</sup>), Wheatbelt (pop. 70,000/155,000 km<sup>2</sup>) and Midwest (pop. 65,000 persons/500,000 km<sup>2</sup>) regions. Remote admissions were

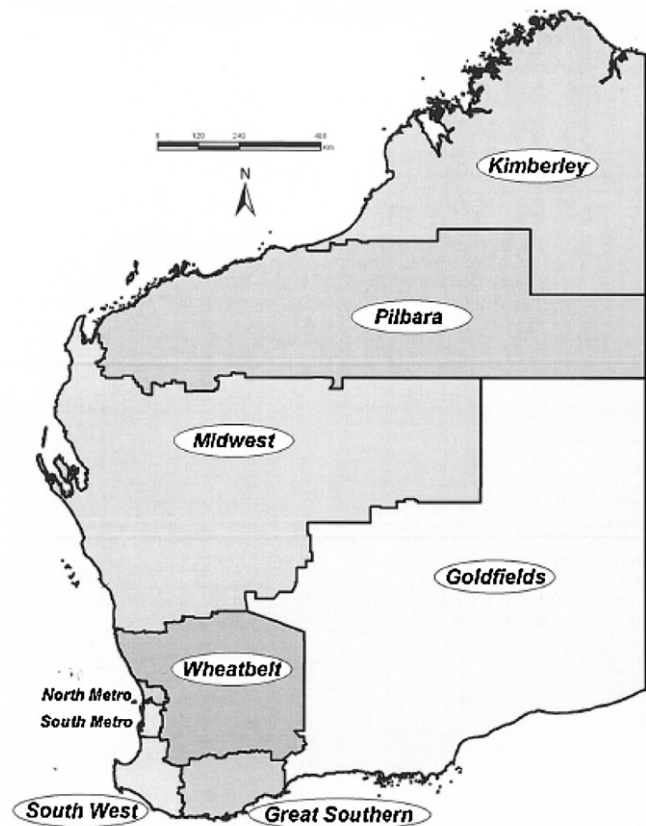


Fig. 1 – Map of Western Australia health regions.

those in the Pilbara (pop. 47,000/645,000 km<sup>2</sup>), Kimberley (pop. 34,000/415,000 km<sup>2</sup>) and the Goldfields (pop. 59,000/830,000 km<sup>2</sup>) regions (Fig. 1).

Chi squared, Wilcoxon rank sum or Kruskal–Wallis tests were performed where appropriate with the level of significance set at 0.05. Annual age-specific incidence rates were estimated for urban, rural and remote regions using Western Australia population estimates from 1983 to 2008. The incident rates were then age-standardised using the direct method with Australian 2001 Population as weights, enabling comparisons of incidence rates between the years. Multivariate Poisson regression analysis was used to investigate the association of burn admissions rates with sex, age, Aboriginality, geographic region of admissions and calendar period, with inclusion of burn characteristics and comorbidity in mortality analysis. Separate Poisson regression models were constructed for each geographic region to examine 26-year temporal trends by gender and Aboriginal status and cause of burn. Temporal trends for hospitalisations for burns of Total Body Surface Area (TBSA) <10%, 10–19%, and 20% and greater were estimated for the period 2000–2008. Deaths during hospitalisation for index burn and patient and demographic characteristics were compared across regions. Western Australia population estimates from 1983 to 2008 stratified by 5-year age group, gender and Aboriginal status were based on 5-yearly census data and estimates for inter-censal periods. These data were included in the Poisson regression modeling as an exposure variable indicating the annual

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