Reviewer's report

Title: Demographic and circumstantial accounts of fatal burn injuries in Cape Town. A register based cross-sectional study

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Reviewer: Marc Jeschke

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Major

1. This appears to be a retrospective review of observational registry data collected over the period 2001-4. This should be clarified and reflected in the title, as this study may not really be what might be expected from a cross-sectional study, where a subset population would be observed at a single time-point.

2. The authors state that 2001 census data has been used and extrapolated to the time-period studied, in such a way as to allow the information gathered on 1024 flame, scald and contact burn deaths to be applied to the Cape Town city population overall. Incidence rates of burn deaths in 100,000 person-years are subsequently derived. This method has inherent limitations and possible loss of accuracy. That the data has been handled in this way and merged with 2001 census data should be mentioned in the abstract. Was any corroboration of the findings possible from any other sources? (e.g. reported deaths from fire in census or police data)

3. The use and extrapolation of this census data, with inherent limitations and possible confounding factors, may well be transferred and amplified when used in the study and analysis as presented here. This should be given further consideration in the discussion.

4. Consider revising the first sentence in materials and methods (p.4) regarding cross-sectional analysis. Also, are all types of burns (electrical, chemical?) and all burns in Cape Town actually reported in the study? Electrical and chemical burns are not mentioned in the data sources description (p. 5) but electrocutions are mentioned in results (p.7), so presumably this data is included separately in NIMSS?

5. Further details should be provide regarding how registry data was collected – for example, Was this data collected at admission to hospital or at post-mortem? Was any consideration given to deaths not transported to hospital? Were in-hospital deaths also included in the registry? Consideration should be given in the discussion to the possibilities of omitted and missing data for the population studied.

6. Were patients treated at private Cape Town hospitals, likely from higher socio-economic groups and a different range of ethnic backgrounds, also included in the registry and study?

7. Figure 1 as referenced on p.6 does not relate well to the preceding text and
should be presented in results rather than materials.

8. Figure 1 y-axis label should probably read burn fatality rate, rather than burn rate, which implies incidence of burns rather than burn deaths. The data also appears to have been categorized according to the text to set age groups and should therefore be plotted as a bar chart according to these groups rather than as a plot that implies continuous data. Consider representing this data as annual fatality rates for each year studied.

9. As stated on p.6, the analysis relies on actuarial model to determine the population (denominator) at each age for the overall population. As stated, this would be expected to change over the study period. Further details should be provided regarding the assumptions made in this model, and any inherent drawbacks and confounding factors considered in detail in the discussion.

10. Please justify why White/Asian population groups were combined in the data analysis.

11. Non-accidental injury is not covered and should be considered particularly with regards to children. Further consideration of the limitations of the registry data collected should be given and details provided of how this was determined. How reliable is the data regarding mechanism of injury?

12. Table 1 does not include any data on White & Asian children. Even if these figures are low, they should be included for completeness. It is also not clear what message should be taken from the data presented here and this should be clarified by the authors. It may be more appealing to present this data, at least partially, in a figure to allow easier visual comparison.

13. What the data in table 1 represents (presumably relative-risk or fatality rates in 100,000 person-years plus confidence intervals) should be stated alongside the table. That these values rely very heavily on population estimates may limit the validity of any conclusions drawn on these findings.

14. Table 2 The M:F ratio of 0.6 in black children aged 3-6, implying a lower rate in males does not correlate entirely with the text on p.8. (later discussed on p.9). Data for White & Asian children, preferably separated, would be usefully included as the implication from the text is that these ethnic groups do not suffer burn fatalities. A statistical comparison with these groups might then also be provided.

15. P.8 Please explain the significance or meaning of an inverted U-shaped distribution. A bi-modal distribution in children is described earlier in the text.

16. Is it possible that the denominator (child population) is being over-estimated in the model used and so lowering the rate seen in children? The low overall rate also depends on how child age groups are categorized.

17. Consider revising p.8 2nd paragraph ‘overall childhood burn rate’ as the data studied refers to burn fatalities rather than the incidence of burns and burn injury per se.

18. P.9 Consider revising the description of findings at the start of the 2nd paragraph as these do not correlate entirely with table 2. That black and colored males are at greatest risk of fatal burns cannot be directly derived from table 2 and is this in comparison to females or to other ethnic groups?
19. Figure 2. Further details should be given as to how time of day of burn fatality was obtained - Does this represent the time reported on the scene, or time of death at hospital or attendance?

Minor
1. An explanation of the abbreviation NIMSS (p.5) should be provided in the text in addition to the abstract.
2. Please clarify the last sentence in the first background paragraph.
3. Separate short summaries for each figure and table presented would be usefully included to enhance their appeal and clarify their significance.
4. Table 3 should include an explanation of what the figures represent (% proportions) and should include at least a line separating males and female results to enhance clarity.

Discretionary
1. No data is presented relating to burn injury rather than fatality, or any information regarding burn-related morbidity or the prevalence of burn victims in the population. These considerations could be usefully reviewed in the discussion in order to make suggestions on improving the current registry system, similar to the mentioned short-coming of not separating burn mechanisms when collecting registry data.
2. A brief explanation of person-years at the start of results would be useful to include.
3. The authors may wish to consider presenting some of the data as absolute number of cases rather than incidence rates. (for example ref. p.8 US National Burn Repository 2007 Report – American Burn Association)
4. As stated, data for Whites & Asians should be included, including in Table 2. Could the low rates found in these groups be explained in any other way besides socioeconomic or risk behavior –such as reporting issues or treatment at centers not reporting data? Such factors should be considered further in the discussion.
5. Absolute number of cases at each age group may be usefully included, as well as how this data correlates with similar collected data (eg National Burn repository) were number of cases (rather than death) is also greatest in the 20-30 male age group.
6. Recreational drug use might be considered in the discussion in addition to alcohol use. The authors may also wish to consider analyzing place of injury, socioeconomic, and housing situation, and the way it relates to risk of burn fatality as stated earlier in the text.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable
**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**
I declare that I have no competing interests