Author's response to reviews

Title: Aboriginal premature mortality within South Australia 1999-2006: a cross-sectional analysis of small area results

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Author's response to reviews: see over
Dear Roxane,

Re: MS: 1172155371498621
Aboriginal premature mortality within South Australia 1999-2006: a cross-sectional analysis of small area results

Thank you for the opportunity to revise this paper in light of the helpful comments made by you and your reviewers. I realise now in my rush to submit the paper before Christmas a number of careless errors on my part made your task unnecessarily difficult and I apologise for that. Each of the comments are italicised below together with details of our action and response to each.

**Editorial Request 1:**
Further consideration of your manuscript is conditional on improvement of the English used. Please ensure particular attention is paid to the abstract.
A number of changes have been made to the abstract and main text to improve clarity and readability.

**Reviewer 1: David Thomas**
Major compulsory revisions
1. Table 4 was omitted and needs to be included
   Table 4 is now included.

2. Clarify exactly what is used to calculate ISRD in this analysis. If there was more than one option available, why did the authors choose the one chosen? And what are the implications and limitations of this estimate? This is important as in some versions of ISRD, it can include the % of the area population who are Aboriginal.

The ABS Socio Economic Indexes For Areas (SEIFA) provide two relevant options for measuring area level disadvantage from the Australian Census 2006. One of these is the Index of Relative Socio-Economic Disadvantage (IRSD) and it does include Indigenous
status as an input to the underlying factor analysis. However, the IRSD it is the best Index to use, at least for South Australian analyses because of its predictive validity. IRSD is used extensively in the Social Atlases for Australia (including South Australia and Aboriginal analyses) and the South Australian summary population health series. The other relevant index, Index of Relative Socio-Economic Advantage and Disadvantage, has been examined but does not work well in South Australia because we have relatively few regional centres of substantial mass, nor does the index work well for remote Aboriginal communities.

3. The authors should provide some estimate of accuracy of Aboriginal in SA death records. The whole analysis hinges on this, and the single sentence in the discussion is insufficient.

An addition to the Discussion refers to relevant work by the ABS which not only describes the amount of under-coverage in SA death records (around 14%) but refers to technology that will help address this problem. In short, full coverage of Aboriginal deaths will increase the premature mortality rate among Aboriginal South Australians but how this extra loss will be distributed within the state remains unknown.

4. The interpretation in the discussion should be strengthened and better linked to the literature, both around Aboriginal mortality and disadvantage and disadvantage in other international settings. The authors have only tested 2 area-level predictors. Is this enough? What is left out? Are these the most appropriate? There is no discussion of how these two area-level factors might operate to cause increased mortality, and the related literature. Some of the discussion on page 11 is imprecise, mixing up individual and area-level variables – which have different meanings and answer different questions, and would eventually require multi-level modeling to unpack.

Unfortunately, our current administrative records only allow reference to the two area level variables used and this is clearly stated in the paper’s aim. The Discussion is expanded in several areas to address the other issues raised:

- Explicit comparisons to national analyses of Aboriginal mortality by area disadvantage and remoteness is included;
- The effect of disadvantage and remoteness on mortality outcomes is illustrated using the example of road traffic accidents;
- Other individual level variables are not currently available for analysis. Our intention was to broach the topic of using linked data which will not only improve our coverage but may also provide individual level data. Clearly the text did not make this clear and is now amended to refer to additional information we hope to access in time. We agree such information will require multi-level analysis.

5. The conclusion needs to be re-written. It includes imprecise sentences (the second) not justified by the data in the paper, and unsupported statements (the opening phrase of the third).

The second sentence is amended to directly reflect the results of the analysis and the opening phrase of the third sentence is removed.

Minor compulsory revisions

6. Appendix 1 was omitted and needs to be included

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1 J Glover Public Health Information Development Unit, personal communication 4 March 2011
Appendix 1 is now included and details outcomes and attributes at an area level.

7. Include a very brief introduction for international readers about Aboriginal Australians, their health, mortality and why this work is important
   This is now included in the opening of the Background section.

8. Authors should clarify whether people who identified as Torres Strait Islander were included or not as Aboriginal.
   The Method section is amended to clarify that Torres Strait Islanders are included in our definition of Aboriginal.

9. p.5 line 7-8 It is not clear to me why these SLAs were collapsed. Please clarify. The current sentence is unclear. I assume something due to the boundary changes.
   Yes, boundary changes did occur part way through the observed period. While population figures reflect the changes, the death records do not and this necessitated the collapse of three areas into one as it was at the beginning of the observation period. An amendment to the Method section makes this clearer.

10. Why did the authors choose low series population estimates on page 5? What are the implications of this choice? Any sensitivity analyses considered (discretionary)?
    11. How many SLAs with nominal population and no ISRD rank were omitted (p.5)? And so how many deaths from these omitted?
    Previous Aboriginal population projections were based on Census 2001 and included three series: High, Medium and Low. The Low Series estimates aligned very closely with revised population estimates based on Census 2006 and were adopted for this analysis. I also reran the analyses using 2006 population estimates by SLA and age only. This resulted in negligible (non-significant) change to the results, including the multivariate models.

11. Doesn’t ABS now use ASGC not ARIA for remoteness? How many SLAs would change remoteness categories if ASGC were used?
    The ABS ASGC Remoteness classification is based on the Accessibility/Remoteness index of Australia (ARIA+), the measure used in this paper. An additional reference is offered for interested readers.

12. SA residents are not defined (p.6). Please define. There is no mention of how deaths in other jurisdictions were dealt with, only those overseas. Please describe.
    The deaths included were people who usually resided in South Australia. Deaths of people who died in another jurisdiction or overseas but usually resided in SA are included in the SA data. The Results (Deaths) section is now amended to remove confusion on this.

13. Please also describe populations by age.
    The section for Population has been moved to the front of the Results and a description by age included within that.

14. p.7. line 9. The proportions of YLL occurring in … should read The proportions of YLL from deaths at ages 0 to 54…
    This change has been made.
15. The authors should look for collinearity between remoteness and ISRD as this could cause problems for the model. This issue is considered using variance inflation factors (an upper limit of 10) which is now explicitly included in the Method section and Table 4 includes the relevant results.

16. I am a little concerned about an remoteness squared being in the interaction term but no remoteness squared term (only remoteness) being in the model. In arriving at the reported model, a remoteness squared predictor term was included in the iterations trialled. Retaining the term added no meaningful explanatory power to the model while adding unwarranted complexity so it was removed.

17. p.9 line 2. ‘The rate of early death’ This is imprecise and should be re-written. This is reworded to explicitly refer to the outcome measure used, that is years of life lost.

18. In the same para, there are not ‘multiple gaps’ but the gap is different in different settings. This paper would suggest predictably so, by remoteness and local area deprivation. The wording is amended to refer to a range of premature mortality outcomes in lieu of multiple gaps. The following paragraphs in the text now expand on the differences by area remoteness and socio-economic disadvantage.

19. The last para on page 9 is not strong. The opening sentence is not true for the observed results – only the modeled lines. If you want to explain where the SLAs are with low observed or modeled outcomes are clustered, this should be in the results not introduced here. Table 3 indicates Aboriginal outcomes were ‘best’ in Quintiles 1 to 3 in Regional areas of the state. The text is amended to remove confusion on this point.

Discretionary revisions

20. ‘Close the Gap’ has a quite complex genealogy involving its political uses in advocacy and by governments and politicians. It encompasses more than just describing mortality gaps. None of this would be apparent to international readers. The Background section is amended to scope the difference in life expectancy between Aboriginal/non-Aboriginal in Australia and the reference the political commitment to ‘Closing the Gap’ strategy.

21. Results section on Population more logically precedes the section on Premature Mortality. As the different premature mortality in part reflects the different age and remoteness distribution of the two populations. ‘Population’ has been moved to the front of the Results section.
Reviewer 2: Yuejen Zhao
Minor Essential Revisions

1. *I will question the appropriateness of Chi-square test for analysing YLL*

The original version compared the proportionate distribution of YLL summarised in Table 2 using the Marascuilo procedure in the hope it made interpreting the data easier. While I consider it appropriate to use this approach, if it is contentious I am happy to remove it and have done so in the revised text.

2. *I suggest the result section should start with a general description of the population*

‘Population’ has been moved to the front of the Results section.

3. *There is no description of the method for calculating standard error for YLL*

YLL point estimates are taken from the life table referenced (and 3% p.a. time discounting applied) which is an accepted practice in the literature and burden of disease studies. I assume then, the comment refers to the standard error and 95% CIs for the Standardised YLL Ratio (SYLLR).

The original table included incorrect figures from a working file and the reviewer correctly spotted the mistake in reporting confidence intervals that were too narrow. The figures are now amended to show corrected confidence intervals. The standard errors for area disadvantage and remoteness SYLLRs were calculated using Stata 11.1 ‘table’ function in which standard error of the mean SYLLR for the cell is represented by sd/sqrt(n).

4. *Table 4 seems missing from the manuscript*

Table 4 is now included.

5. *This paper tried to use the association between regional health statistics and socioeconomic measures to indicate individual level association between health, remote residence and socioeconomic status. The problem is that this may be caused by ecological fallacy, and should be addressed in discussion.*

This is correct and the point is now explicitly addressed in amendments to the Discussion section.

The revised manuscript submitted through the website includes each of the above items as ‘tracked’ changes. The paper’s Figure, Tables and Appendix have also been removed from the main file and resubmitted as separate files.

I hope you agree the paper is now much improved and sincerely thank you for your assistance with this. Please do not hesitate to let me know of any remaining questions or queries.

Yours Sincerely

David Banham
Principal Research Officer