Reviewer’s report

Title: Cancer survival for Aboriginal and Torres Strait Islander Australians: a national study of survival rates and excess mortality.

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Reviewer: Bruce K Armstrong

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General comment

This paper makes an important contribution to measuring differences in cancer survival between Indigenous and non-Indigenous Australians and the determinants of cancer survival. The results will be of interest both in Australia and elsewhere, especially in wealthy countries that have an important indigenous minority population. Methodologically, it has the potential to contribute to understanding of differences between results obtained using relative and cause-specific survival analysis; although little of this potential is realised in this paper.

Specific comments

Major

1. Page 6, para 1. To the extent that death certificates are a major source of Indigenous identification, survival of Indigenous cancer patients will be biased downwards in this analysis. A high level of identification is asserted (page 12, para 3) but it is also stated that misclassified Indigenous cases would comprise about 0.2% of the non-Indigenous group (page 13, para 1) and that 0.6% of the whole group were Indigenous (page 9, para 2). On the face of it, this suggests that 25% of Indigenous were misclassified as non-Indigenous, which provides substantial scope for bias. The problem of misclassification is also highlighted by this 0.6% figure; while age distribution difference would be an important contributing factor, it may not be easy to rationalise 0.6% with the estimated 2% of the Australian population that identifies as Indigenous. While the authors may have addressed this issue thoroughly in their 2011 paper (reference 3), it also requires some critical discussion here. At the very least, it would be important to know what proportion of the study population was identified as Indigenous solely on the basis of identification on a death certificate.

2. Page 14, para 2. This statement is arguable, and no substantiation is provided for it: “Improvements in cancer diagnosis, treatment and support services that have been successful in improving cancer outcomes for most Australians in recent years have apparently been less effective for Indigenous people”. A major influencer of cancer survival, which has changed over time, has been left out; that is, over diagnosis of cancer due to mass screening (which will increase as screening intensity and population coverage increases). By definition, the
over-diagnosed cancers will experience 100% cause specific and relative 5-year survival. The impact of such cancers could be readily assessed by a sensitivity analysis in which the most likely to be relevant cancers (breast, colorectal and prostate) are analysed separately from the remaining cancers.

Minor essential

3. Abstract, Conclusion: This statement “… but these factors do not fully explain their survival disadvantage …” needs more adequate justification through argument and reference in the discussion or should be stated more cautiously “… are thought not to fully explain …” perhaps.

4. Page 9, para 3. The fact that most of the difference in survival between Indigenous and non-Indigenous patients appeared during the first year of diagnosis is interesting, but it is not discussed. It should be. Part of that discussion should also consider whether this may be indicative of the bias due to Indigenous identification only by death certificate. It is presumably the case that once a disease like cancer is diagnosed the identification of the patient as Indigenous in records other than the death certificate will increase with longer survival.

5. Page 9, para 4. It is said here, with reference only to Figure 1, that “cause-specific survival [was] slightly higher than relative survival”. 1 and 5 year survival differences between cause-specific and relative survival should be cited here numerically, ideally with 95% CIs.

6. Page 12, para 2. This statement requires substantiation, at least with a relevant reference “It is plausible that misclassified Indigenous cases had better survival than those correctly classified as Indigenous, perhaps because those incorrectly classified had better social, economic and environmental circumstances than those correctly classified as Indigenous …”

7. Table 2. I suggest “… five-year relative survival …”.

8. Tables 3 and 4. No explanation is offered for apparent equality in the Indigenous and non-Indigenous hazard rates in the 5th year after diagnosis. At least, this observation requires acknowledgement, it is at best a little strange, and some discussion would be desirable.

9. Page 9, para 4. The following statement is at least of methodological interest: “For specific cancer sites, the cause specific survival rate was similar to the relative survival rate for most sites but very different for some; differences were greater for Indigenous than non-Indigenous cases (see additional file 1).” The authors should give some thought to the large discrepancies between cause-specific and relative survival for some cancers and offer some explanations and, perhaps, consideration of the implications for these two different approaches to estimating the same statistic.

Discretionary
None

**Level of interest:** An article of importance in its field

**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