Reviewer's report

Title: Impact of ethnicity and socio-economic status on Staphylococcus aureus bacteremia incidence and mortality: a heavy burden in Indigenous Australians

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Reviewer: Rachel Gordon

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Title: Impact of ethnicity and socio-economic status on Staphylococcus aureus bacteremia incidence and mortality: a heavy burden in Indigenous Australians

Journal: BMC Infectious Diseases

Recommendation: Publication with minor revisions

This is a well-written paper that addresses the important issue of ethnic disparities in S. aureus bacteremia in Australia. Indigenous Australians are at higher risk for SAB than non-Indigenous Australians and this is true across all SES quintiles. Indigenous Australian's also are more commonly infected with CA-MRSA, which probably explains why their peak SAB incidence occurs at a younger age than the non-Indigenous population. As infections in Indigenous persons occur at a younger age, there is no increased mortality from SAB compared to non-Indigenous persons.

In this study, the authors can only postulate possible causes for these differences in incidence, such as crowded living conditions and inadequate hygiene facilities. However, I then find it interesting that the most advantaged Indigenous people had essentially the same risk as the most disadvantaged. You present quintiles, but were the absolute scores all just very low, which might explain this?

As the authors suggest, future studies should perhaps consider looking at other indices of SES. Also the heterogeneity of SES in particular areas should be evaluated. In some studies, people living in areas with more mixed SES are at higher risk for disease than those living in areas with lower, but more homogenous SES.

I commend the authors for addressing this issue as these data may serve as an impetus to increase and/or support S. aureus prevention strategies in the Indigenous population.

Revisions I would like the authors to consider before publication:
1) Background, Last paragraph: You make a good argument that the link between SES and SAB outcomes is unclear; however, I think you need a strong statement saying exactly what your study intends to do. You say that no study has ever looked at this before in a large national dataset… but you say this without clearly stating the purpose of your study. It should be more explicitly stated, not implied.

2) A limitation of this study is the categorization of probable cMRSA, probable eMRSA, and probable E-MRSA-15. Using antibiograms to categorize MRSA clones is unreliable. A good example is USA300 MRSA, a cMRSA clone that can have any of the antibiograms you described. PFGE or spa-typing would be preferred methods for identifying these strains; furthermore, SCCmec typing should have been used to determine that these isolates were SCCmec type IV (typical in cMRSA), which would further support that they were, in fact, cMRSA. I see that you use the word ‘probable’ before each of your MRSA categories because you understand this, but I think this limitation should be made more clear in the Discussion Section.

3) This is probably a minor point: A patient was considered to have a new SAB episode if they had a positive blood culture >14 days after the first culture. However, this is not accounting for ‘source control.’ If the patient had an infected device or undrained abscess or even osteomyelitis, a positive blood culture after 14 days would likely represent a breakthrough bacteremia as opposed to a new infection. It appears that you have these data. Was this accounted for in counting SAB events? I do not know if this impacted your numbers in any appreciable way, however.

4) There are a lot of missing data in table 1—sometimes as high as 10% for an ethnic category. Therefore, I would consider either not presenting data with a large proportion of missing values (e.g. IDU), conducting a sensitivity analysis supporting your comparison, or discussing this as a limitation of your study.

Minor Essential Revisions

Background

5) line 4: I would add ‘Australian’ or some other term before ‘Indigenous’ so it is clear what Indigenous population you are discussing.

6) When you mention USA300 in the 2nd paragraph, I would add something about USA300 being a dominant CA-MRSA clone, as some people may be unfamiliar with USA300.

7) 3rd paragraph, first sentence. When you write “In contrast to incidence…” I would specify the incidence of what… Do you mean the incidence of infection in general, of MRSA, what kind of MRSA…?

Results

8) 10th line down: “The non-Indigenous annual incidence was 10·7 and the age
standardized Indigenous annual incidence was 62·4 per 100,000 population with an age standardized incidence rate ratio (IRR) of 5·8 (95% CI 5·3, 6·3).”

In that sentence, both incidence rates were age standardized, I believe? You may want to add in another ‘age standardized.’

9) This comment also applies to the sentence above (and also potentially to the mortality ratio)# the comparison being made needs to be clear. Above the IRR is 5.8 and you are comparing Indigenous to non-Indigenous, which is not how it is worded—I would rewrite that sentence.

This is also an issue in the first paragraph of the discussion#switch the order of non-Indigenous and Indigenous.

Discussion

10) Where you discuss “impetigo”, I would consider writing “staphylococcal impetigo” as trimethoprim-sulfa is not the treatment of choice for streptococcal impetigo.

Conclusions

11) Please change “is” to “are” in the following sentence: “However, data showing an increased risk for SAB in Indigenous populations is more limited.”

Table 1

12) I don’t think it is necessary to distinguish when you use Fisher’s exact test from the chi-sq test…you already say that you use the appropriate test in the methods.

13) Mean values are usually presented with the SD.

Discretionary Revisions

14) Abstract: Generally abbreviations are not used in abstracts. I would consider writing out ‘SES’, ‘SAB’, and ‘IRR’ in full.

Background

15) line 9 (end first paragraph): If you capitalize ‘Central Australia’ should ‘northern’ also be capitalized? I believe this is probably correct, but just wanted to check.

16) Background, 2nd paragraph, 3rd line: I am not familiar with the term ‘health-hardware’. I would consider deleting it and writing, “…access to and use of washing and sanitation facilities…”

17) Last paragraph: consider saying “frequently linked” as opposed to “typically linked.”
Discussion

18) The first paragraph of the discussion is a bit anemic—I’d consider beefing it up a bit more.

Table 2

19) It may be worth mentioning that in the multivariable model, eMRSA and cMRSA were not associated with higher mortality compared to MSSA (but were in univariate).

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I have no competing interests