Reviewer’s report

Title: Penicillin resistance and serotype distribution of Streptococcus pneumoniae in Ghanaian children less than six years

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Reviewer: Kim Hare

Reviewer’s report:

Review: ‘Penicillin resistance and serotype distribution of Streptococcus pneumoniae in Ghanaian children less than six years'

BMC Infectious Diseases Research article

GUIDELINES

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When assessing the work, please consider the following points:

1. Is the question posed by the authors well defined? Yes
2. Are the methods appropriate and well described? Yes
3. Are the data sound? Yes
4. Does the manuscript adhere to the relevant standards for reporting and data deposition? Yes
5. Are the discussion and conclusions well balanced and adequately supported by the data? No, not entirely
6. Are limitations of the work clearly stated? No
7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished? Yes
8. Do the title and abstract accurately convey what has been found? Yes
9. Is the writing acceptable? Needs editing and tightening (a copy with tracked changes will be attached)

Level of interest

- An article whose findings are important to those with closely related research interests

Quality of written English

- Not suitable for publication unless extensively edited

The English is of acceptable quality but needs to be tightened and the text shortened. There is too much repetition. See the attached Word document with
tracked changes.

Statistical review

Is it essential that this manuscript be seen by an expert statistician?

- No, the manuscript does not need to be seen by a statistician.

I have commented on the incorrect 95% CIs in Table 1.

Reviewer’s report

This is an interesting article with important results informing pneumococcal vaccination in Ghana. While worthy of publication, many issues need first to be resolved. The most important is probably the small number of children <2 years old, this being the main target group for pneumococcal conjugate vaccines. This limitation needs to be addressed.

Some of the other more important revisions are listed. However, suggested minor or discretionary revisions were too many to list, therefore a copy of the manuscript with tracked changes will be attached.

Major Compulsory Revisions

1. Oxacillin is a screening test, so there is no need to refer to these results in the Abstract or Discussion.

2. The authors need to be consistent with abbreviations, i.e. PCV13 (or PCV-13) throughout the paper.

3. There was a lot of detail on climate in the Methods (first paragraph). Since this was not further discussed, I suggest it be removed (see attached file).

4. The second paragraph of Methods describes the sampling of children 2-4 years from nurseries and 4-6 years from kindergartens. However, the Results include children <2 years of age (Tables 1 and 2). Where were these children from?

5. The final paragraph of Results describes the higher coverage of PCV13 in children 0-2 years old. This age group is the main target group for vaccination with pneumococcal conjugate vaccines. The small number of children in this age group is a major limitation of this paper which has not been mentioned and needs to be addressed by the authors.

6. I am not convinced by the argument that geographical location is an important determinant of pneumococcal colonization (second paragraph of Discussion). The authors need to further analyse or explain the age distributions, and also comment on environmental risk factors, socioeconomic indicators, etc. before they can make this claim.

7. I am also not convinced that penicillin resistance is increasing (Abstract conclusions, third paragraph of Discussion and final conclusions). The data presented suggest that it may be but are not conclusive. If the authors are sure about this, they need to present the evidence more clearly.
8. Figure 2 is a duplication of the data in Table 3 and should be removed.
9. In Table 1, 95% CIs need to be calculated using the exact method.
10. Age groups need to be properly defined in Tables 1 and 2.
11. Table 2 is too long – few readers will be interested in this level of detail. I suggest combining serotypes below PPV23 into ‘Other’ or ‘Serotypes not included in any vaccine’.
12. Table 3 headings need clarification, and columns for oxacillin resistant and penicillin susceptible isolates should probably be removed, leaving the data for penicillin nonsusceptible (intermediate resistant) and resistant pneumococci. The susceptible column is misleading as it does not include the oxacillin susceptible isolates that did not have MIC determined.
13. There is confusion with respect to the % of isolates that were penicillin intermediate resistant (nonsusceptible). The text (Results paragraph three) and Table 3 indicate that 288 isolates were tested for oxacillin, and 44% (128/288) were resistant. It is reported in the Abstract that 45% of isolates were penicillin nonsusceptible (130/288 in Table 3 and paragraph three of the Discussion). However, in the Results (paragraph three) it says 60 plus 57 (=117) of the oxacillin resistant isolates were penicillin intermediate resistant (41%). However, an additional 13 isolates were tested. Should the % of isolates that were penicillin nonsusceptible actually be 43% (130/301)?
14. I would suggest adding lines to indicate PCV7 and PPV23 serotypes in Figure 1 (it looks like serotypes are in this order anyway). Also one heading is in capital letters while the other is not.
15. The conclusion needs to be rewritten after addressing the above points, and to avoid repetition.

Minor Essential Revisions
See attached Word document with tracked changes.

Discretionary Revisions
See attached Word document with tracked changes.

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

**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 declare that I have no competing interests