Reviewer's report

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

Version: 1 Date: 9 June 2013

Reviewer: Susan Morpeth

Reviewer's report:

Thank you for the opportunity to review this paper.

Abstract
1. In the abstract and in the discussion, the authors compare the vaccine coverage of their carriage strains by PCV-10 and PCV-13 to PPV-23. Coverage for invasive pneumococcal disease strains is more important than for carriage strains (because not all carriage strains are likely to cause invasive disease) which I think needs to be mentioned in order to give context to the discussion. Also, polysaccharide vaccine is not suitable for infants, the target group for vaccination, due to a lack of immunogenicity, and I think this is also relevant to this point. This could be expanded in the discussion and perhaps the comparison removed from the abstract. (Discretionary revision)

Introduction
2. This study aimed to generate baseline data to inform vaccine and treatment policy in Ghana, but it is not clear whether sampling from nurseries and kindergartens in two cities achieves this; how representative of all Ghanaian children is this population? What is the urban/rural divide in Ghana? What is the socio-economic structure of populations attending nurseries and kindergartens compared to those who do not attend? (Major revision)

Methods

Sampling and study design
3. The author state that the participants were selected from “A list of nurseries (2 to #4 years-old children) and kindergartens (#4 to #6 year-old children)” which implies that no children <2 years old were included. In the results, there are some children <2 years old. This needs clarification. Additionally, the exclusion of children <2 years old is expected to miss a significantly large proportion of the reservoir of pneumococcal carriage in Ghana, because the younger children are more likely to be carriers, and more likely to transmit. So I think this needs explaining in the study design, and discussing in the limitations section of the discussion.

4. Why were children with URTI symptoms excluded?
(Major revisions)
Results

5. The 32% carriage prevalence is fairly low – this could be due to the exclusion of most children < 2 years of age but also perhaps suggests a relatively privileged (urban kindergarten-attending) population?

6. 5% of pneumococcus carriers having multiple carriage is also low – this could also relate to the above points but could some cases of multiple carriage have been missed by the latex agglutination method performed on broth culture? These points could be included in the discussion.

(Discretionary revisions)

Antimicrobial resistance

7. There is no mention made of the meningitis vs non-meningitis EUCAST breakpoints, and it might not be clear to some readers that the non-meningitis breakpoints are being used. This could be clarified.

(Discretionary revision)

Vaccine coverage

8. How are there children aged 0-2 years included? Please see my comments above re sampling methods.

Discussion

9. The authors mention use of higher penicillin doses for pneumococcal disease treatment for meningitis if intermediate resistance is present, citing the CLSI guidelines. But they have used EUCAST for the susceptibility testing, not CLSI. CLSI only has an intermediate category for non-meningitis cases, stating that higher doses of penicillin can be used for non-meningitis cases.

(Major revision)

10. There could be some discussion of the limited time span of this baseline data. Fluctuations in baseline carriage prevalence can be missed with data from only a single time point.

(Major revision)

Figure 1

11. Instead of two graphs each stratified by gender, one graph stratified by location could suffice.

(Discretionary revision)

Table 2

12. Probably not necessary because the information is in figure 1 except for the age breakdown, but there are not enough numbers to break down by both serotype and age anyway.

(Discretionary revision)
General

13. Are any of the authors Ghanian? Was there any capacity building as part of this study to enable future surveillance post vaccine introduction? (Discretionary revision)

**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