Reviewer's report

Title: Cost-effectiveness and cost utility analysis of new pneumococcal conjugate vaccines in children of Peru

Version: 1 Date: 28 December 2012

Reviewer: Carlos A Castañeda-Orjuela

Reviewer's report:

The topic is relevant for BMC readers and it is encouraging to see economic evaluations of vaccine policy options originating from the countries in which those policies are under consideration. However, the paper has some technical issues that should be resolved before publication decision. Overall, I feel it is most important to correct the transparency of the model, and the reporting of incremental ratios. Further the paper discussion would be strengthening with greater emphasis on the local data inputs to the model and the comparison with similar studies.

- Major Compulsory Revisions

The author must respond to these before a decision on publication can be reached. For example, additional necessary experiments or controls, statistical mistakes, errors in interpretation.

1. Background, last paragraph: The study aim should be clearly stated. If the study is a national level the initial scope is at national level and not the regional one.

2. Background, last paragraph: The following sentences could move to the discussion. ‘Although this is purely a modeling exercise, with all its caveats, it is a critical tool for decision makers because it is the only way to merge different evidences in order to generate one analysis for decision-making purposes. Dissemination of this information will contribute to evidence-based decision-making about the introduction of new vaccines in Latin America.’

3. Methods. The authors should describe better the model and the input used. This version of the paper shows a ‘nontransparent model’. A great effort should be made to the reader can understand the model working.

4. Methods, ‘modeling approach’ section. First sentence: does the model only evaluated the health economic impact’? What about the epidemiological impact?.

5. Methods, ‘modeling approach’ section, why do you choose a monthly-cycle Markov model. An individual was to risk of multiple event in the same year?. If you have annual probabilities (i.e. annual incidence rates), What approach, used to adjust it to monthly probabilities?

6. Table 1. Define better the perspective, which payers?

7. Table 1. What is the reference and the values for considering the cross
protection. The same value of cross protection applies for PCV7 and PCV10.

8. Table 1. It is not logic that the price of PCV-7 (US$ 20.00) was higher than the other two vaccines. I know that at the present PCV-7 is out of market, but in economic terms to do comparisons you need to assume an inferior price or remove it of the analysis.

9. Table 1. Reference for immunity duration. 9 years is a very wide range.

10. Table 1. I suggest that all the parameters and assumptions of the cost-effectiveness and cost utility analyses should showed in this table including the base case and the ranges of additional analyses.

11. Methods. Model inputs. Epidemiological burden. Supplementary data should be summarized to be presented in the parameters table in the main text of the paper. You could show the range of occurrence and fatality data, putting together all the age ranges.

12. Methods. Model inputs. Epidemiological burden. All the information required validation. You should describe better the source information of the occurrence data, and the proportion due to S.pneumoniae and NTHi.

13. Methods. Model inputs. Epidemiological burden. Last sentence. I do not agree with the estimation methods of burden of NTHi. SIREVA data is a passive surveillance system. Although this data presents valuable information, the tendency analysis (with linear regression), based in data from six years is a miscalculation. I think that a better calculation could use a average. Additionally SIREVA reports isolates, but you cannot assume that those proportions correspond with occurrence data. Did you use a 38% as the proportion of invasive disease caused by NTHi?

14. Methods. Model inputs. Economic Burden. Why you have a lot of differences between the three scenarios? How many are the proportion of population attended in each scenario?

15. Methods. Model inputs. Economic Burden. The sequels’ costs are considered annually?

16. Methods. Model inputs. Vaccine efficacy assumptions. This section is very hard. It not clear the source of the information, the differences between vaccines, and the strength of the information used into the model. It is an important weakness of this version that not collaborates with the transparency of the model.


18. Methods. Model inputs. Vaccine efficacy assumptions. Vaccine efficacy against AOM. Why you took the same effectiveness against AOM for PCV7 and PCV13. It is necessary to adjust it by some increase in coverage.

19. Methods. Cost-effectiveness analysis. Why did you use different coverage rates to each alternative?

20. Methods. Scenario analysis. Herd effect was equally considered for three vaccines?
21. Methods. Scenario analysis. What happen if you include a more relevant scenaries like non-effect of PCV-10 against AOM due to NTHi.

22. Methods. Were did you take the QALYs weights. Do you have national weight to evaluate preferences in this population?. I think that in developing countries where the population have a important mortality due to infectious disease the analysis with years of life saved (YLS), or disability adjusted life years (DALYs) are better options.

23. Result. Table 2. If the time horizont was the life expectancy why you only show the results of the fist ten years?. How are the result after the first 10 ten years?

24. Results Tables 3, 5, and 6. Why are different between the QALYs and YL averted reported in table 3 and the values used to construct the ICER. Is it related to difference in the observation period (life expectancy vs. 10 years period), or using discount rates?

25. Results Tables 5 and 6. Why the LYG are higher than QALYs to each vaccine. If YLs are considered within the QALYs the avoided burden considering QALY should be higher.

26. Results. Costs. All the costs should correspond to the same base year. You have treatment cost in 2009 currency and vaccine prices in 2012 currency.

27. Results. Cost utility and cost-effectiveness analysis. The approach of reporting the results of each possible pairwise comparison is not appropriate. The comparison of all vaccines against no vaccination is not appropriate. The 4 strategies (no vaccination, PCV7, PCV10, PVC13) are mutually exclusive and should be assessed together in the 'competing choice' framework. Tables 5 and 6 should be reconstructed using this logic. You should arrange the alternatives of the lesser to most costly (using net costs) and the columns would show Total Cost, Total Effect (QALY or LY), Incremental Cost, Incremental Effect, and Incremental Cost-effectiveness Ratio (where the incremental values are compared to the next most effective EFFICIENT strategy. When one intervention is more costly end less effective it should not be included in the comparison.

28. Result. Sensitivity analysis. Did you have sensitivity analysis by each parameter by each vaccine?, because in Figure 1 you report parameter to all vaccine together, and it is important to evaluate the sensitivity by vaccine, especially when exits uncertainty at the vaccine level.

29. Discussion. The authors need to review more widely the literature about the health economic evaluation in countries similar to Peru (i.e. Castañeda-Orjuela et al. / Vaccine 30 (2012) 1936–1943, Sartori, et al J Epidemiol Community Health; 2012 Mar;66(3):210-7, Muciño-Ortega et all, Value Health. 2011 Jul-Aug;66(3):210-7, and Ureña et al. Vaccine. 2011 Jul 12;29(31):4963-72, inter alia), to compare your model and results. With the additional review the authors could make a strongest discussion about the validity and implication of their results.

30. Discussion. Additional more in depth discussion is required about the validation of the model parameter and results. You could compare your data,
obtained by the model, with the official records, for example with the mortality report by syndromes considered.

31. Discussion. The authors should considerer that based many parameters obtained by experts opinion, does not guaranty the validated of their results and it is not mention in the discussion as a limitation of the study.

- Minor Essential Revisions

The author can be trusted to make these. For example, missing labels on figures, the wrong use of a term, spelling mistakes.

1. Tittle: It should be: Cost-effectiveness and cost-utility analyses of three pneumococcal conjugate vaccines in children of Peru, because the study present 2 analysis, and the PCV-7 isn’t a new vaccine.

- Discretionary Revisions

None

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

**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