Reviewer's report

**Title:** Measles vaccination coverage estimates from surveys, clinic records, and immune markers in oral fluid and blood: A Population-based cross-sectional study

**Version:** 3  **Date:** 24 June 2013

**Reviewer:** Baohui Yang

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Re: 'Measles vaccination coverage estimates from surveys, clinic records, and immune markers in oral fluid and blood: A Population-based cross-sectional study'

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BMC Public Health
Research article

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Reviewer: Dr Baohui Yang

- Major Compulsory Revisions

1. The method section is not sufficiently clear.

   Method, 1st paragraph: the nature and quality of the sampling frame DSS is not described (what is the coverage of the targeted children group by this sampling frame? Is the information accurate in the sampling frame?)

   Method, 2nd paragraph: are there any measures taken to ensure the quality of the matching of selected children and the EPI records? What is the proportion of undoubted match? This will have direct effect on the within child agreement between the CARD only and CARD+HISTORY method with EPI method. Poor within child agreement could partly be due to poor matching quality.

   Method 4th paragraph: how the children were selected for collecting blood samples? Since they were only selected from 4 unions (supposedly none random), they are no longer representative of the original population of the 8 unions. Are they selected due to convenience or other consideration. The results from this group may not be generalisable to the 8 unions.

   Method 5th paragraph: Is it reasonable to assume that seroprotection in OF and blood was vaccine induced in this setting? If not, then seroprotection may not be appropriate as a indicator for vaccination rate. This needs to be reviewed by expert in the immunology field.
Method 6th paragraph: the author needs to add some description on the measurements they analysed, such as the prevalence estimates with 95% CIs, correlation between vaccination rate and associated factors, prevalence ratios and within-child agreement of the six indicators.

My major concern is that the data were not weighted to account for non-response in the main sample and each sub-set of the main sample used for different indicator. And the survey design and a necessary post-stratification weighting were not taken into account in the data analysis.

Sample needs to be weighted to the targeted population profile when comparing prevalence estimates.

Prevalence estimates may not be sound due to lack of post stratification weighting of the sample to the targeted children population (by union, age, sex?). Especially the blood samples were collected from children from 4 unions, and no description was given about any difference in the characteristics of the 4 unions compared with the other 4 unions. The sample selection was not described. All these could lead to biased prevalence estimates along with other factors, leading to invalid comparison of prevalence estimates using the 6 methods.

In relation to measurement for within-child agreement, analysis using unweighted sample can be acceptable. However, no Kappa was provided, no direct % of agreement provided. No measurement for within-child agreement between Blood method with the “gold standard” or the maternal report method. This is important to assess the implications of these methods.

2. Recommendation of using the method for table 2 to generate adjustment when comparing indicators from different method be removed.

Discussion paragraph 4: I don’t think the method of using the prevalence ratios in table 2 to adjust prevalence estimates across indicators is appropriate in this setting, because the underlying sample is not representative, these ratios depends on the blood testing quality, EPI records quality, cards keeping quality, the matching quality of EPI records to children. These ratios were based on log binomial modelling, in reality the ratio could be associated the underlying prevalence. The ratios in the first row are not significantly different from 1 at 5% significance level, except card+history compared with Serum (may be marginally significant). Generating a valid and reliable matrix of these ratios in real world is constrained by many factors at the time, will be highly setting specific. It is not a likely solution for valid comparison between indicators using this method. Maybe table 2 with within-child agreement measures added may highlight the difference and call for more study on validity study either on vaccination rate, or on immunity- vaccination rate and immunity may be different due to the effectiveness of vaccine, and the serum marker under testing.

Presentation of within-agreement measurement between Serum and card+history/maternal report/epi...
- Minor Essential Revisions
  none
- 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:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
'I declare that I have no competing interests