Reviewer's report

Title: Timeliness of Childhood Vaccine Uptake among children attending a Tertiary Health Service Facility-based immunisation clinic in Ghana

Version: 2 Date: 21 June 2013

Reviewer: Brendan Flannery

Reviewer's report:

This is a cross-sectional survey of vaccination history among children attending a hospital-based immunization clinic serving an urban area in Kumasi, Ghana. The authors are to be complimented for investigating timeliness of immunizations in their population.

Major Compulsory Revisions

1) Methods, second paragraph. Additional information is needed to describe the selection of subjects. Authors should provide enough information to determine whether the sample was a simple random sample (selected from a list of all children attending immunization services using a random number generator or block of numbers), a systematic sample (using a skip interval to enroll a target number of children) or a convenience sample (in which children were selected at random by the interviewer).

2) Methods, second paragraph. Additional information is needed to understand how timeliness was calculated. Was the date of birth subtracted from the date of receipt of each dose to calculate age in days at each dose? How were missing data handled?

3) Methods, last paragraph. For clarity, authors need to provide additional information on definitions of timeliness. The immunization schedule is provided in the Background but relevant information regarding the schedule is needed in this section for definitions. For example, OPV1 was recommended at 6 weeks (42 days). Doses received prior to 6 weeks of life were classified as "too early", those from 6-7 weeks of age as "on time", 8-9 weeks of age as "acceptable" and 10 weeks or older as "delayed".

4) Methods, last paragraph. The authors need to include analysis according to the age of the infant at the time of the study to interpret the data. What appears to be drop-out between doses 1, 2 and 3 may be due to smaller number of children eligible to receive each dose (as suggested by the percentages in the table of timeliness of vaccine uptake for specific vaccines). Authors should also address the question of drop-out in children old enough to have received more than one dose in the primary series.

5) Methods, last paragraph. How was timeliness for all doses defined (see Results, first sentence of 5th paragraph)
6) Results, 4th paragraph. Include numbers for infants who received BCG within 1 week of birth. Include additional information about newborns that did not receive BCG or OPV within 28 days of birth. What factors were associated with missed opportunities for vaccination?

7) Results, 5th paragraph, and Table entitled "Overall timeliness of vaccine administration." How was the 87.3% of children on time for all doses calculated? Table should be presented according to age categories for children included in study (for example, by adding columns for children <6 months, 6-11 months and 12 months of age or older).

8) Discussion. The cross-sectional survey provides information about the vaccine histories of children attending the immunization clinic, but it does not provide information about cohorts of children born at the hospital or among children born to women who attended ANC during pregnancy. Results may be representative of children attending the immunization clinic, but are not representative of children not attending the immunization clinic. It might have been expected that a high proportion of children attending the immunization clinic were born at the hospital, or that their mothers attended the ANC clinic at the same location. One might also expect that mothers attending this immunization clinic would be more likely to bring their children for immunizations according to the recommended schedule than mothers taking their children to smaller immunization clinics.

9) Discussion. Authors should justify their definition of timeliness. Why was a two-week period chosen following the recommended age? What is the significance of receiving measles or yellow fever 28 or more days after recommended age? Authors include comparison with other studies but should also refer to previous literature on timeliness of immunizations to support their definitions of timeliness in this study.

Minor Essential Revisions

1) "Acceptably early" may be easily confused with "too early" by the reader. Suggest either combining with "on time" and changing definition of on-time to 30 days, or referring to this category using a clearer term, such as "acceptable timing"

2) Tables are all labeled "Table 1"

**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