Reviewer's report

Title: Monitoring HIV prevalence: moving towards improved validity and resource saving by replacing antenatal HIV surveillance estimates with prevention of mother-to-child HIV transmission programme estimates

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Reviewer: Andrea Kim

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General comments:
1. It is encouraging to see that Ethiopia is seriously considering new, cost-effective approaches for monitoring HIV surveillance among the general population. The use of PMTCT data for HIV surveillance among pregnant women is appropriate in countries with good coverage and uptake rates; however, there are also additional steps that countries should follow to ensure that the data are of good quality and not biased before fully transitioning from an AHS surveillance system to a PMTCT-based surveillance system. The authors may wish to request a copy of the draft WHO guidance on assessing the utility of PMTCT data for HIV surveillance among pregnant women for more information to help refine this paper and as a resource for future analysis around this activity in Ethiopia.

2. Given the methodologic issues listed in the specific comment section, the authors may want consider re-running all trend analysis for AHS and PMTCT on consistent sites over at least 3 rounds to verify statements made on declining HIV prevalence trends. Also, they may want to compare dual AHS/PMTCT sites to evaluate data quality for both approaches. Finally, they may want to re-frame the paper as preliminary analysis in advance of a more formal assessment to evaluate whether Ethiopia is ready to transition to PMTCT-based surveillance.

Major compulsory revisions
1. Background, 2nd paragraph, 2nd sentence. Please clarify whether the DHS estimates that are reported are for the entire country or for women only? If making comparisons to AHS, it would be good for the comparison group to be representative to AHS (e.g. females in the general population or pregnant females).

2. Methods, 4th paragraph (The AHS reports), 4th paragraph: It is stated that HIV prevalence in the city was 4.6% in 1998 and 21.2% in 1995. First, it is confusing to see the prevalence for 1998 before 1995 – usually the earlier year comes first. Second, please clarify that this is not city prevalence but HIV prevalence among pregnant women attending ANC in Addis. Also, when assessing trends it is advised that only consistent sites, over three or more rounds of AHS, are used to monitor trends in HIV prevalence. Given this, how many sites is the 4.6% prevalence based on and how many sites is the 21.2% prevalence based on? If not consistent sites, you cannot be certain that this is a true increase, given that
the addition of new sites may have been from higher prevalence areas.

3. Results, 2nd paragraph: The first two sentences should be combined into one sentence. Also it is not clear whether the numbers reported for the PMTCT programme are for Addis only or beyond Addis. Given that you are comparing HIV prevalence between PMTCT, AHS, and a cross-sectional survey, you will want to make sure that the catchment area is the same for all three. If the catchment is Addis for AHS, it should also be Addis for PMTCT and for the cross-sectional survey. This may already be the case, but should be clearly stated in the methods.

4. Results, 2nd paragraph, last sentence. As discussed in bullet 6 above, when making assumptions about trends, only consistent sites should be used. Please clarify whether this decline was noted in consistent sites.

5. Results, 3rd paragraph, second sentence. Same comment as above in bullet 9.

6. Results, 4th paragraph: Is this Addis only sites or beyond Addis? Again, when making comparisons between the three approaches, you will want to make sure the catchment area is the same.

7. Results, 5th paragraph: Is this comparison for Addis only sites? Also, you may want to comment in the discussion section about the limitations in comparing different samples where eligibility for inclusion in the samples may differ. For example, for AHS, only women who attend the ANC for the first visit of that pregnancy are eligible to participate; whereas for PMTCT, the visit number may not matter. Also, typically there is an age-limit for AHS (15-49), whereas PMTCT may not have this age limit.

8. Discussion, 1st paragraph, 4th sentence. We can only determine statistical significance on trends when comparing consistent sites over time. Similarly, when making comparisons in trends between PMTCT and AHS data, the same sites need to be compared (e.g. this would be ANC facilities that participate in AHS and also have PMTCT programs).

9. Discussion, 2nd paragraph, 3rd to last sentence (“Ethiopia is one of the countries…”): As discussed above, please clarify whether the 4.7% in DHS represents women only or not. Women only (or pregnant women) would be the most appropriate comparison group.

10. Conclusion, 1st paragraph, 2nd sentence: Concluding that PMTCT data are valid for HIV surveillance is a strong statement to make at this stage. I believe this analysis was a good first exercise to assess the situation on the ground and can guide next steps in formally assessing whether Ethiopia is ready to transition. The formal assessment requires a full data quality assessment of PMTCT data (multiple rounds), comparison of HIV testing quality in PMTCT sites, and assessing non-consent bias in PMTCT data. These steps, as well as criteria that need to be met before transitioning to a PMTCT-based surveillance system, are outlined in the upcoming WHO guidance on assessing the utility of PMTCT data for HIV surveillance.

Minor essential revisions
1. Abstract, methods section: Please specify that “survey” was a cross-sectional survey in health facilities from the catchment area.

2. Abstract, methods section: The number 565 months in the context of 5 years is confusing. Can you clarify that this is 565 facility-months or something similar to that so that it is clear what you are referring to?

3. Background, 1st paragraph, 5th sentence: I would not conclude that AHS has little public health benefit as AHS has been the backbone of HIV surveillance in resource-constrained settings for many decades and has provided important information on HIV trends. Instead, you may wish to state that it has little individual-level benefits for the reasons you state earlier in that sentence.

4. Background, 3rd paragraph, last sentence: Please delete Kenya since you are not discussing Kenya in this paper.

5. Methods, 5th paragraph, 6th sentence: Please insert “One” before “Hundred”.

**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