**Author’s response to reviews**

**Title:** Estimating levels of HIV testing coverage and use in Prevention of Mother-to-Child Transmission among Women of Reproductive age in Zambia

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**Author’s response to reviews:**

Responses to Reviewer’s Comments:

Reviewer #1:

**Abstract Methods**

* Please include year of survey

Response: Zambia Demographics and Health Survey (ZDHS 2014) included in line 36-37.

* Typo: cross section study should presumably be cross-sectional study?

Response: This has been adjusted in line 36.

**Abstract Results:**

* Out of 15,388 women in the study, 12,413 reported ever tested for HIV. Please include the % in ()

Response: 12413 (80.6%) included in Lines 44 and 185.

* "….among adult women compared to the young women". It's not obvious how "adult women" and "young women" are defined. It would be better to say "testing coverage was higher among women aged A-B years compared to women aged C-D years"
* Social class of women was observed to be strongly associated with optimal uptake of HIV testing

[\text{AOR} \ 6.6, \ 95\% \ CI \ 3.04-14.14; \ p<0.001]. \ It's \ not \ clear \ from \ this \ sentence \ which \ classes \ you \ were \ comparing, \ and \ which \ one \ had \ the \ higher \ odds. \ Better \ to \ rephrase \ as \ "women \ in \ X \ social \ class \ had \ 6.6 \ times \ the \ odds \ of \ having \ ever \ tested \ compared \ to \ women \ in \ Y \ social \ class \ (95\%CI:)

Response: This has been adjusted in line 47-49.

Main paper

Results:

- In table 1, you report wealth quintiles which means divided into 5 categories, but there are only 3 categories. Shouldn't it therefore be tertile (or whatever the correct term is)?

Response: This has been adjusted in line 47-48.

- In the abstract Results, you referred to "Social Class" but there is no variable for social class in table 1. Did you mean Wealth Tertile? Later on you seem to refer to the same variable as "high, median and low economic status". It is important to be consistent. Perhaps you could consistently refer to it as Socio-economic status? In any case, it should have the same term in the abstract results and in Table 1 and in Results text

Response: This has been adjusted in entire document socio-economic status has been used consistently.

- The "Mode of HIV test" categories are confusing. What is "personal initiated"? At first I thought you meant personnel-initiated as in provider-initiated? But perhaps you meant client-initiated? I am also not clear what you mean by "test was offered"? Could you describe this as provider-initiated? It's also not clear what "Test was required" means? Required by who?

Response: This has been adjusted in Table 1 (Provider-initiated testing; Client-Initiated testing, Other). Other includes those that where neither provider or client initiated, e.g. Relatives or husband initiating for HIV testing.
Table 2 states proportion but percentages are reported

Response: This has been adjusted in Table 2, proportion replaced with percent.

Why does the following text come before the sub-heading "Testing coverage" - shouldn't it come afterwards since it is about testing coverage? : Out of the total of 15,388 women in the study, 12,413 reported ever tested for HIV in the ZDHS. Of those who tested for HIV, 12,100/12,413 (98%) received their HIV test results. (See table 2).

Response: This has been adjusted in line 188-209

Not clear why the variables listed in table 1 are not the same as those in table 2?

Response: This has been adjusted in table 1 and 2, Place of delivery, ANC included PMTCT and ANC included HIV test offered in ANC added to table

Please shorten the title of table 3

Response: This has been adjusted in table 3

Table 3 - why is mode of HIV test not included (it is included in table 1)?

Response: Mode of HIV test included in table 3

"Uptake of HIV testing was observed to be high among the older women compared to the young women" - which age groups are you comparing against which? Could you be more precise by stating the age-groups in this sentence?

Response: This has been adjusted in line 228-229

Furthermore, high economic status of women was found to be strongly associated with optimal uptake of HIV testing [AOR 6.6, 95% CI 3.04-14.14; p<0.001]. Please indicate in this sentence which category you are comparing against.
Response: This has been adjusted in line 239-240

Discussion

- "We observed an overall increase in reported uptake of HIV testing among child bearing women" - an increase of from what to what?

Response: This has been adjusted in line 264-265.

Reviewer #2:

Abstract - Results

1. Page 2, lines 42-43: Which social class of women is associated with optimal uptake of HIV testing? Authors should clarify.

Response: This has been adjusted in lines 48-49

Introduction

2. I understand that this paper is about HIV test coverage among women in reproductive age group and PMTCT use during ante-natal period. However, introduction part of paper only covers PMTCT use during ante natal period. HIV test coverage among women in reproductive age group is not discussed by authors in introduction section of the paper.

Response: This has been adjusted in the Introduction

3. Authors can mention the aim of their study in last paragraph of introduction section of the paper.

Response: This has been adjusted in the Introduction in lines 112-113.

4. Page 4: There is repetition of infant mortality rate and under 5 mortality rate in line 16-17 and 27-28. These figures can be mentioned only once.

Response: This has been adjusted, mentioned only in one place in lines 101-102.
Methods

5. How data on HIV test was ascertained from women who participated in this study?

Response: Dried blood samples were collected from eligible women interviewed and were tested at the laboratory.

5. Did exclusion of these 1023 women who did not have data on HIV test, lead to bias in study results?

Response: This has been adjusted: Yes, the exclusion of 1023 women could potentially lead to bias in the study. Considering that this study estimated testing coverage among women of reproductive age these women could not contribute any information on the estimates. However, the huge sample size (15,388) is enough to provide valid estimates. This non-participation potential bias has been mentioned as one of the limitations of this study.

6. Page 6, line 19-20: What is the difference between ANC included PMTCT and ANC included HIV test? Authors can explain these terms.

Response: PMTCT package includes interventions provided to a women during pregnancy such as maternal education, Prevention and treatment of STIs, Malaria (IPT), ultra-sound scans for foetal defect detection and one of them is HIV testing and treatment (Option B+) which considering the focus of this study estimating HIV coverage we wanted the HIV testing to come out independently, meanwhile estimating the general PMTCT coverage in ANC.

7. Page 6, line 45-47: Which tests were used by authors to check co linearity and correlation between ANC included HIV test or not and ANC covered PMTCT? And what were the results of those tests?

Response: This has been adjusted in line 252-259

8. Page 6, line 16-18: There are only three categories mentioned as per wealth quintile. Is it wealth quintile or quantile?

Response: This is Wealth Tertile. This has been adjusted in entire document socio-economic status has been used consistently in place of wealth tertile for clear understanding.
9. Which statistical software was used for analysis?
Response: STATA version 14.0, included in line 165.

Results

9. Page 7, line 28-29: 32% is mentioned twice
Response: This has been adjusted in line 181.

10. Page 8-9, Table 2: Rather than showing "No" and "Yes" for HIV testing, "Total number (n)" and "tested for HIV- number, percentage with 95%CI" can be shown in table for better understanding.
Response: Understand your concern, though this standard format for bivariate analysis table was considered for different schools of thought and backgrounds considering the international platform.

11. Page 9, Table 2: I could not understand why confidence interval could not be constructed due to stratum with single sampling unit.
Response: Confidence intervals for HIV test offered in ANC and Place of delivery were omitted by the software because for whatever possible reason standard errors could not be calculated. The output did not include CI for these particular variables.

12. Page 9, line 25-29: The title should be HIV testing coverage during ANC as it only describes about HIV tests in 6461 women in ANC. Why denominator is 6461 when describing the HIV test in ANC services? Does that mean only 6461 out of 15,388 women have used ANC facilities and the rest never used ANC facilities? Also does it imply that out of total 12413 women tested for HIV, only 6139 women were tested during ANC and rest were tested due to some other reasons. Authors can clarify this issue in their paper.
Response: This has been adjusted in line 187. 6461 women reported having HIV test documented in ANC. About 9,100 women reported being pregnant and not everyone ended up in the facility for ANC as facility delivery is low in Zambia. Furthermore, some women in the survey reported having miscarriages and others abortions. It is a possible though not certain, that even though these women may not have tested in ANC, their testing elsewhere was related to pregnancy and reproduction.
13. Page 9, Table 3: Test of significance used is not required to be mentioned in title, as it is mentioned in footnotes
Response: This has been adjusted in table 3.

14. Page 9-10, Table 3: Rather than showing "No" and "Yes" for HIV testing, "Total number (n)" and "tested for HIV- number, percentage with 95%CI" can be shown in table for better understanding.
Response: Understand your concern, though this standard format for bivariate analysis table was considered for different schools of thought and backgrounds considering the international platform.

15. Page 9-10, Table 3: I could not understand why confidence interval could not be constructed due to stratum with single sampling unit
Response: Confidence intervals for HIV test offered in ANC and Place of delivery were omitted by the software because for whatever possible reason standard errors could not be calculated. The output did not include CI for these particular variables.

16. Page 10, Table 3: No need to mention that p value < 0.05 is significant in footnotes, as it is already mentioned in methods
Response: This is adjusted in all the tables.

17. Page 10, line 52: What are the criteria to define ‘optimal HIV uptake’? Authors can clarify.
Response: Optimal in this context refers to the “peak” HIV testing has attained in Zambia from the lower testing uptakes documented in the previous years as shown in the discussion. If this is not fitting it can be removed.

18. Page 11, Table 4: Marital status, place of residence and ANC covered HIV PMTCT were found to be significantly associated with HIV test in bi-variable analysis. Why these variables were not included in multi-variable analysis?
Response: Principally being significant at univariate, the variables “Marital status”, “place of residence”, “ANC included HIV test” and “ANC covered PMTCT” were included in the multi-variable regression using a stepwise regression they were no longer significant and were dropped in the final model. Only “Age”, “Socio-economic status” of woman and “ANC included HIV test” were the only explanatory variables in the final model, statistically significant.

20. Page 11, Table 4: p values reported are from regression analysis or from Pearson's chi-square test?

Response: P values reported are from Regression Analysis. End note on Table 4 was wrongly placed, it was meant for Table 3.

Discussion

21. Page 12, line 15-16: It is mentioned that overall increase is observed in uptake of HIV. It is not understood, this increase is compared to which year or levels. Though overall around 80% of women had undergone HIV test as per this study, authors have reported that the findings are consistent with 90% tested for HIV.

Response: This has been adjusted in line 259-261.

22. Authors have discussed only HIV test during ANC in discussion section. I believe this paper deals with HIV test among women in reproductive age group, and not only HIV testing among pregnant women. Authors should discuss about other opportunities, apart from ANC where women were tested for HIV. As such authors have reported that only 6139 women were tested for HIV during ANC, out of total 12413 women tested for HIV.

Response: This has been done in line 253-262.

23. Page 13, line 27: How women not attending would bring selection bias in the study, as mentioned? Authors can clarify.

Response: The exclusion of 1023 women could potentially lead to bias in the study. Considering that this study estimated testing coverage among women of reproductive age these women could not contribute any information on the estimates, though these women were selected as participants in the survey. What. However, the huge sample size (15,388) is enough to provide
valid estimates. This non-participation potential bias has been mentioned as one of the limitations of this study.