Author's response to reviews

Title: Supply side dimensions and dynamics of integrating HIV testing and counselling into routine antenatal care: A facility assessment from Morogoro region, Tanzania

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Author's response to reviews: see over
Thank you for your recent email providing peer reviewer comments for the manuscript “Structural inputs for integrating HIV services into routine antenatal care: A mixed methods facility assessment from Morogoro region, Tanzania.” The peer reviewers have provided excellent feedback and we have made many changes in response to their comments. Please find below a description of these changes.

Reviewer 1

<table>
<thead>
<tr>
<th>#</th>
<th>Comments</th>
<th>Response to Comments</th>
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<tbody>
<tr>
<td>1</td>
<td>The question is well defined although their background literature on integration types and processes could benefit from beefing up. What is written on integration is too generic (overarching statements). More detail about integration in the background literature to capture an overall understanding of the concept particularly in HIV. A section on integration would be vital.</td>
<td>Thank you for your comment. We agree that our background section can be more succinct and specific, and have reorganized and added some additional information about integration as it pertains to our paper. Given the complexity of the topic and the large body of literature, we have also discussed HIV integration literature in the discussion section in the context of our findings.</td>
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<td>2</td>
<td>Some detail about the evolution of HIV treatment policies in Tanzania from opt in to current policy...the section from pg 3 line 94 to 99 leaves the reader hanging without the completion of this evolution alluded to on line 94.</td>
<td>Thank you for your reminder to elaborate more on PMTCT policies in Tanzania. We have included some additional information about the change from opt-in to opt-out testing and counselling as well as the more recent move towards integration of treatment into RCH services with option B+.</td>
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<td>3</td>
<td>Methods are appropriately describes however additional details (descriptors) about the health facilities could be provided eg how long have these facilities been in service, facility level, duration in HCT provision and integration? what is their catchment area? Some of this information could actually explain the skewness of human resources. Give information about the participating facilities eg catchment, level, duration as ANC/HIV providers.</td>
<td>Thank you for the suggestion to include background information on the health centers. We have added a section in our methods that provides additional background and also included a new table (see Table 3) with characteristics of the 18 health centers included in our study.</td>
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<td>4</td>
<td>Figures appear to be genuine and are informative. Figure two has the bar for “antiseptics” under the availability of</td>
<td>Thank you for your comment. We have revised the color scheme to</td>
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<td>HIV drugs. This should be rectified.</td>
<td>indicate more clearly that “antiseptics” is placed under the “availability of infection prevention supplies” category.</td>
<td></td>
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<td>5</td>
<td>Discussion and conclusions are well presented however the authors fail to acknowledge that indeed facilities do reorganized services in order to achieve integration (according to their findings facilities schedule different days for different services in order to provide all services in human resource constrained settings) however this re-organization often in advertently defeats the purpose of integration because women do not attend services daily and may ultimately lose out on other services. This finding is key and should be discussed.</td>
<td>Thank you for this point. We have added this in the discussion section in the paragraph on human resources and tried to draw out the supply side dynamics caused by the lack of structural inputs.</td>
</tr>
<tr>
<td>6</td>
<td>Discussion should be structured according to framework used with clear subtitles for space, supplies and human resources. Clear implication of human resource shortages and how they lead to reorganization (scheduling different days for activities) need to be discussed because of its impact on integration and missed opportunities.</td>
<td>Thank you for the suggestion. Currently, the discussion section follows the format of the results section, with a broader discussion of integration and implications on option B+ at the end.</td>
</tr>
<tr>
<td>7</td>
<td>Why is skewness more of a concern than shortages? Could the skewness of HR be as a result of facility level/catchment area? Duration in service hence more workers. This cannot be deduced since no description is given of the facilities. If authors believe skewness is more important they should indicate why?</td>
<td>Thank you for this comment. We have revisited this section and clarified that there is an overall lack of availability of health workers compared to the Ministry of Health staffing recommendations. Health workers are also distributed in ways that are problematic as per the data presented.</td>
</tr>
<tr>
<td>8</td>
<td>The abstract conclusion is too generic and does not specifically convey implications of findings. Findings such as low staffing, high workload leading to inadequate counseling messages, findings such as scheduling of activities on different days promote missed opportunities.</td>
<td>Thank you for the suggestion. The abstract has been edited to convey the implications of our findings in terms of impact on quality of care and integration.</td>
</tr>
<tr>
<td>9</td>
<td>Writing is acceptable if fullstops placed before references are acceptable for the journal. This has been done consistently throughout the document. Fullstops before references should be corrected through out the document unless this is the journals accepted format.</td>
<td>Thank you for the reminder about the journal’s format. We have edited the manuscript so that full stops are placed after references.</td>
</tr>
<tr>
<td>10</td>
<td>Figure 2 has not label and no key.</td>
<td>Thank you for the comment. We have added labels for axes in the figure. The different shades of black/grey indicate the three different categories of essential supplies and supplies, which are denoted on the horizontal axis.</td>
</tr>
<tr>
<td>11</td>
<td>Quotes on lines 282-286 and 294-295 should be separated from main text and italicized.</td>
<td>Thank you for the comment. The quotes have been separated from the main text.</td>
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<td>#</td>
<td>Comments</td>
<td>Response to Comments</td>
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<td>12</td>
<td>What do the authors mean by “in this foundation” line 70? Not clear needs clarity.</td>
<td>Thank you for this point. We have changed “in this foundation” to “inputs” for clarification.</td>
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<tr>
<td>13</td>
<td>Consistent grammar (tenses, plural and singular errors) need to be noted as listed below</td>
<td>Thank you for these comments. We have done additional copyediting to ensure consistency.</td>
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<tr>
<td></td>
<td>Line 63- lead not leads</td>
<td></td>
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<td></td>
<td>Line 113 entails- not entailed</td>
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<td></td>
<td>Line 121 delete one system</td>
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<td></td>
<td>Line 155- five distribs listed in the brackets but four mentioned in line 154</td>
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<td></td>
<td>155 what is the superscript I on kilosa indicating?</td>
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<td></td>
<td>Line 177 were not was</td>
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<td></td>
<td>Line 201 who not that</td>
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<td></td>
<td>Lines 300-305 tenses should be consistent was not is and were not are</td>
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<td></td>
<td>Line 324- use recall instead of name</td>
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<td></td>
<td>326- add percentage sign after 25.6</td>
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<td></td>
<td>line 362 add the between infrastructure and observation and between about and adequacy</td>
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<td>14</td>
<td>Line 405-406 mentions a policy change regarding test kits but does not elucidate on it. Reader is left hanging. Should clarify.</td>
<td>Thank you for the suggestion. We have included more information about the Bioline recall.</td>
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**Reviewer 2**

<table>
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<tr>
<th>#</th>
<th>Comments</th>
<th>Response to Comments</th>
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<tbody>
<tr>
<td>1</td>
<td>This paper has potential, but could be much stronger and more compelling with better use of the theoretical framework in conjunction with better utilization of what seems to be an enormous data set.</td>
<td>Thank you for the comment, which we have found to be very useful. We have clarified the reference to quality of care literature that delineates between structure, process, and outcomes for health care. We hope this clarifies why we focused on the data we included for this particular paper.</td>
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<td>The authors’ summation of Atun’s model and their own application of it require clarification; specifically:</td>
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<td>o The authors note that they have focused on service delivery – as one of the critical functions of a health system identified by Atun et al. It would be good to first outline what all 6 of the critical functions in Atun’s framework are, and specify why in the context of this work your focus was on service delivery and not the other functions.</td>
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<td>o Greater care is needed in describing Atun et al’s framework. Specifically, the authors suggest that the framework identifies’ elements of the health system and then, within each element, ‘distinguishes between structural inputs and functions’.</td>
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<td>o But there is semantic / definitional confusion between what the authors of this paper are calling ‘elements’ and what they call ‘functions’. For example, the authors call service delivery an ‘element’ and paraphrasing Atun et al, define integration as a process of adoption and assimilation into various elements, incorporating both ‘structural inputs’ and ‘functions’.</td>
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<td>o Yet in the original paper, Atun et al refer to service delivery as a ‘function’ (one of six) and suggest that understanding the impact of an intervention on that function requires understanding combinations of technologies (e.g. vaccines, drugs), inputs into service delivery, organizational changes and modifications in process...[p.106]</td>
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<td>o While the difference may appear semantic, the theoretical implications are significant, since in Atun’s description there is no sense of ‘dichotomy’ between the structural inputs and relational interactions in the process of ‘adoption and assimilation’. Rather, Atun et al specify that the value of their framework lies in understanding how the constituent parts: interact to collectively influence the extent, pattern and rate of adoption of an intervention within a health system (p.106; emphasis added)</td>
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While agreeing with the authors that it is difficult to capture the complexity of an intervention in totality, I am left wondering about the relevance of Atun et al’s framework to this particular piece of work – with it’s current specified focus on structural inputs only. Structural inputs are arguably the most obvious component of any intervention and to focus on this area is, in many respects, common sense. However, in light of the comments above, the paper may be more ‘gripping’ (and more relevant to an application

We sincerely appreciate the thoughtfulness and expertise of the reviewer’s observations. We realized that we had inadvertently referenced the incorrect Atun paper, which is easy to do since he is so prolific. We also felt that while this paper does comment on integration, it is not an in-depth health systems analysis of integration, but rather a facility assessment that describes current readiness with regards to HIV testing and counselling during antenatal care. With these considerations, we have edited our paper, in particular the background and discussion sections, to clarify our focus and analysis.

We certainly take on board the comments the reviewer has made for future analysis and research.
of Atun’s framework) if (in addition to clarifying the text describing the framework, and their own use of it) the authors could broaden the scope of the study/paper to include some of the organizational changes and relational shifts (drawing on the some 57 provider interviews listed in Table 3!) and reflect more systematically on the way these interacted with the structural inputs already detailed.

Alternatively – if the authors wish to keep things more simple, and focus exclusively on material readiness for integration, they should probably not adopt Atun’s framework, which clearly points to the way organizational and human decisions/relationships interact with material components to influence the ‘assimilation’ of integrated services.

Line 382: ‘Furthermore, a facility’s capacity and readiness to deliver integrated care does not necessarily lead to actual delivery of integrated care’ - I would agree, which is why consideration of Atun’s whole framework, not a select piece focusing only on material capability becomes so important. The authors do appear to have some data on this and could rework the paper to focus on these very interesting interactions.

3 One final general note worth considering is the fact that ‘structural inputs’ in some disciplinary traditions would be likely be interpreted as policy and legislative determinants and social norms, rather than the authors’ intended meaning of tangible ‘material’ inputs (space, staff, commodities) to local health facilities. Again, clarity around terminology is extremely important.

Thank you for this comment. While it is true that some disciplines interpret structural elements as broader determinants, we have cited quality of care literature that defines structural inputs as the context in which health care is provided (Donabedian 1988). Readers may also confuse material inputs with financial inputs.

4 There doesn’t appear to be an overall objective or guiding question for the study. In the background the authors state that the paper ‘seeks to assess the service delivery part of the broader concept’....but a clear study objective is lacking.

Related to this: on reading the results – it is unclear whether the authors’ interest lies at the facility level or the regional level? Depending on the answer, the authors should be careful in focusing their results on this level.

Thank you for these comments. We have taken the opportunity to clarify the objectives of the paper in the abstract and background sections.

Data are collected and results are reported at the facility level. As these included all the facilities in the majority of the districts in Morogoro region, we present results generalized to the regional level.

5 Line 134: 39% of health spending from Tanzanian govt and 38% from external sources...what happened to the other

Thank you for the comment. We have clarified the statement with
<table>
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<tr>
<th>23% (is it out of pocket?)</th>
<th>regards to financing.</th>
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<tbody>
<tr>
<td>Line 140 / 141: would be helpful to be more specific in describing ‘regions’ – i.e. is this the official administrative designation (like District or Province elsewhere)</td>
<td>Regions are administrative designations in Tanzania. This has been added in the methods section for clarification.</td>
</tr>
<tr>
<td>Line 154: spell out Jhpiego first time it is used.</td>
<td>While Jhpiego used to be an acronym, this is no longer the case.</td>
</tr>
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</table>

| 6 | It would be good to know more about how the authors synthesised their qualitative and quantitative findings (and in the results – whether there were any anomalies in the data) – as it would seem that Atun et al’s framework provides a good starting point for this? | Thank you for this suggestion. Qualitative and quantitative data were collected concurrently with research teams collectively reviewing both sets of data collection instruments. Qualitative findings emerged through team discussions that occurred at daily, midpoint, and endpoint debriefs. In particular, interview guides were modified after the midpoint debriefings to further explore emerging findings and clarify uncertainties in the data. Quantitative data tables were generated after data entry and cleaning and then were linked to the emerging qualitative findings. |

| 7 | The authors should provide a single summary table with the demographic characteristics of the 18 facilities (e.g. urban/rural/remote designation; catchment population; services provided; staffing levels; etc). | Thank you for this suggestion. We have added a table with information we collected about the characteristics of health facilities. Please see Table 3. |

| 8 | Lines 292-295 / Lines 340-348: these paragraphs are a good examples of ‘structural inputs’ intersecting with organizational / relational components to influence the assimilation of a health intervention. It would be good to see more of this kind of analysis in the paper -- and to see the Discussion focus on these intersections as interesting findings with potential analytical generalisability. | Thank you for the suggestion. We’ve found these comments extremely useful in highlighting aspects of our results that we previously overlooked. We have tried to bring them out more clearly. |

| 9 | Line 294/5: should quotation be in italics? | Thank you for the comment. We have edited the quotation to be in italics. |

| 10 | Line 307: ‘Skewed Staffing’ – this section would benefit from a brief table to help the reader visualize the breakdown. | Thank you for the suggestion. We have clarified the nature of our findings to emphasize that there is an overall shortage, as well as |
problems with distribution as substantiated by the data presented. We have stopped short of presenting a table, as another colleague is developing a paper focusing on overall human resources for health.

11 The discussion requires significant strengthening to improve clarity and organization.  

Thank you for the comment. We have sought to make the discussion section clearer.

12 References to Option B+ should be clarified for readers without an HIV-specific background.  

Thank you for the suggestion. We have included additional information about option B+ for clarification.

13 The placement of the limitations paragraph should be reconsidered as it is jarring and splits the authors’ reflections in its current location.  

Thank you for the comment. We would like to keep the limitations section as the second paragraph as a way of qualifying the results summarized in the first paragraph. This is a standard format that we have been following for all our papers, as we do not want to end the paper with limitations.

14 Line 359: Are the authors only interested in the integration of HIV testing – or a full package of PMTCT – into ANC? The background section to this study suggests the latter, but the discussion section is now stating the former.  

Line 381: ‘Our work was not however an in depth study focusing on integration’. The authors must clarify early in the paper what this is a study focusing on...I found this statement surprising given the early introduction to PMTCT policy.  

Thank you for the comment. This paper only examines integration of HIV testing and counselling into ANC, not the complete PMTCT intervention in MCH services, though we discuss the implications of our findings for the integration of the full PMTCT package. We have clarified this focus in the title, abstract, background, and discussion sections.

15 Line 386: While the authors clearly have a significant amount of data, the process by which this data was triangulated and compared remains unclear. Claiming triangulation requires describing in greater detail how this was done.  

Thank you for the comment. Additional information about data triangulation has been added to the methods section.

16 Location of reference numbers e.g.[18] in text needs to be before the period at the end of the sentence, not after, I think?  

Thank you for the comment. Full stops have been edited and are placed after references.

17 Line 77: suggest inserting ‘globally’ after (HIV/AIDS)  

Thank you for the suggestion. We have added “globally.”

18 Line 121: delete the duplicated ‘system’  

Thank you. The duplicated “system” has been deleted.

19 Line 214: Is ‘consensually’ correct? Suggest replacing with ‘derived (arrived at) by consensus’  

Thank you for the suggestion. We have changed the term to “by consensus.”
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<tr>
<td>1</td>
<td>1. Requesting copy editing: We recommend that you ask a native English speaking colleague to help you copyedit the paper. If this is not possible, you may need to use a professional language editing service. For authors who wish to have the language in their manuscript edited by a native-English speaker with scientific expertise.</td>
<td>Thank you for the recommendation. We have undertaken additional editing.</td>
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<tr>
<td>2</td>
<td>Please correctly format your references in the main body of the text (full stops should not appear before the references).</td>
<td>Thank you for the reminder about the journal’s preferred format. We have edited our references so that full stops appear after the references.</td>
</tr>
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<td>3</td>
<td>Please provide a copy of the questionnaire as an additional file.</td>
<td>We undertook a facility assessment using a range of data collection tools, including -facility checklist and in-charge interview covering staffing, supplies, infrastructure -provider quantitative survey -provider qualitative guide (two versions) -ANC exit interview (quantitative and qualitative) -ANC observation instrument Kindly clarify whether you would like us to include all these instruments or if you would like to prioritize one in particular.</td>
</tr>
<tr>
<td>4</td>
<td>Kindly move the funding info from the Competing interests to the Acknowledgements.</td>
<td>Thank you for the comment. We have moved the funding information to Acknowledgments.</td>
</tr>
<tr>
<td>5</td>
<td>Kindly use initials only to identify the authors in the Authors’ contributions.</td>
<td>Thank you for the comment. We have edited our authors’ contributions section accordingly.</td>
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Please see the updated manuscript in the uploaded file. If you have any further concerns or questions, please do not hesitate to contact me at sian@jhu.edu.

Thank you for your time and consideration. I look forward to hearing from you soon.

Best regards,

Selena An