Author's response to reviews

Title: From the parents' perspective: a user-satisfaction survey of immunization services in Guatemala

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Author's response to reviews: see over
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Dear Dr. Dalumpines and Reviewers,

Thank you for reviewing our manuscript. We very much value your comments and suggestions and believe that our work has truly benefited from the review. Please find below responses to all comments.

As requested, we are uploading to your website a clean version of the manuscript as well as one with the changes highlighted.

Thank you again for the consideration of our article, and please do not hesitate to contact me if you need any additional information.

Best regards,

Dr. Martha Velandia-Gónzalez on behalf of all co-authors

Reviewer comment, page 3: “change “about” to “on.”

Authors’ response: Thank you. We agree that this change is appropriate and have modified the article accordingly.

Reviewer comment, Page 4: “Reference each statement of fact.”

Authors’ response: We have now included a source for this information. We have also renumbered the references throughout the article to reflect the inclusion of the new source.

Reviewer comment, Page 6: “More information is needed about the method described in this sentence. What sample spaces were excluded, if any, and why? Was the sample space selected with PPES methods?”

Authors’ response: No sample samples were excluded. As with the primary sampling units, the samples spaces were selected using the PPES method. We agree that more explanation is needed regarding the methodology, and we have now made these points explicit in the manuscript.

Reviewer comment, Page 6: Why not document both card-based vaccinations and recall?
Authors’ response: Reviewing vaccination cards is known to be a more accurate means of verifying immunization status than is parental recall, and the reviewer is right to imply that this is a limitation of the study. The decision was made at the country level to not review vaccination cards. We address this limitation on pages 13-14 of the manuscript: “More significantly, participants provided responses based on memory and interviewers did not verify these answers against the child’s vaccination card. Results are thus subject to respondent and recall bias, which may be more important for caregivers of older children….”

**Reviewer comment, Page 7:** Clarify further the criteria for exclusion... discuss limitations of these exclusions in the appropriate section of the manuscript.

Authors’ response: The phrase “otherwise considered unreliable” is indeed vague, and we thank the reviewer for calling it to our attention. We have revised the manuscript to make the exclusion criteria more transparent. As stated, a supervisor reviewed all surveys on the day of completion for completeness (all questions answered) and internal consistency (lack of contradictory responses). Upon encountering omissions or errors, supervisors called participants to clarify the issue. If the participant could not be reached or if the issue could not be clarified, the survey was excluded from the study.

It is important to note that participants provided interviewers with their telephone numbers but not their names, and that those operating the study were the sole guardians of this information in order to guarantee the anonymity of participants. We have now clarified this point in the revised manuscript.

**Reviewer comment, Page 8:** Any adjustment of the standard errors for clustering by PSU? If not, the analysis should be re-run as such, or a clear rationale for not doing so provided.

Authors’ comment: The analysis was conducted taking the survey sampling methodology into consideration. In the sample size calculation, a design effect of 2 had been assumed.

We have now included the above information in the manuscript. Thank for the suggestion. We agree that this aspect of the methodology should have been better explained.

**Reviewer comment, Page 11:** Could this be due to how the Sample Spaces were selected? Any differences between low and high coverage areas?

This is a valuable point. Samples spaces were selected from the primary sampling units, which, in turn, were selected from the low- and high-coverage areas. These areas were chosen among Guatemala’s 22 departments based on coverage rates, poverty indicators, and data from the 2008-2009 Survey on Infant and Maternal Health. Because there is a well-known association between poverty and lack of access to health services, differences between low- and high-coverage areas likely underlie the association between low-
coverage areas and long distances to health centers.

**Reviewer comment, Page 12:** “who were”

Authors’ response: We agree that this change makes the sentence clearer. Thank you for the suggestion.

**Reviewer comment, Page 12:** “Could this be a recall bias?”

Authors’ response: Yes, we believe that the association between age and vaccination status is at least in part related to recall bias, and we address this point on page 14: “Results are thus subject to respondent and recall bias, which may be more important for caregivers of older children.” However, we have added an additional sentence to the limitations section of the manuscript to ensure that this point is well understood. It is also notable that the higher relative risk for undervaccination in children aged >1 year is likely related to the fact that the number of vaccines required for a child to be fully vaccinated increases with age. Thank you for the observation.

**Reviewer comment, Page 13:** How are you defining the term factor differently than barriers? Are not factors associated with undervaccination also barriers? Please clarify.

Authors’ response: We understand the cause for confusion and have added some information in the methodology section on page 7 to make the distinction clearer. We have also changed the language on page 13 from factors to “risk factors.” Below is an explanation of our logic.

Factors related with undervaccination are those for which we could establish an association. These include the age, occupation, education, and marital status of the child’s caregiver as well as the child’s age; they are presented in Table 4. In contrast, we consider barriers to be those reasons that participants identified as direct causes for which their children had not in the past or could not in the future be vaccinated. Examples of barriers include “lack of vaccines” or “having been denied service due to the lack of medical personnel.”

**Reviewer comment, Page 13:** “Might be helpful to also include an analysis about the children within the 12-23 month age group, as these children should have had all vaccinations (apart from boosters) and the recall period is shorter.”

Authors’ response: Data stratified by age (0-12 months, 12-23 months, 24-35 months, etc.) are presented in Table 4. In fact, there is no appreciable difference in vaccination status between children aged 0-12 months and children aged 12-23 months. This finding is presented on page 12 and discussed on page 14. We have modified the language in both sections to make it clear that children aged 2 years (24 months and older) are those with higher relative risks of undervaccination, and this finding is now more fully discussed on page 14.
Reviewer comment, Page 15: “I do not believe this striking result was included in the Results section. Only 2.2% reporting their child was vaccinated in a recent campaign should be emphasized and explored as to reasons.”

This finding is reported in the results section on page 10, and related data are provided on page 13 under the “communication strategies” section: “A total of 587 (48.4%) participants said they had recently heard of a vaccination campaign and 683 (57.2%) said they took advantage of campaigns.”

We believe the reviewer is correct that that this finding warrants further explanation. Unfortunately, the reasons for the population’s lack of participation in campaigns are incompletely understood. We have modified the discussion section accordingly.

Reviewer comment, Page 16: “As mentioned, subject to recall bias... look at younger children... or stratify analysis for younger vs. older children.”

This finding is indeed subject to recall bias. However, as explained elsewhere, questions on service quality refer to the participant’s last contact with the health system. Of course, older children (e.g., age 3 years) are likely to have less contact with the health system than are younger children (e.g., age 6 months), but the impact of recall bias here is probably not as significant as it is on other aspects of the survey, such as parental recall of vaccines received. Regardless, we agree that this point should be emphasized. We have thus added a sentence to the limitations section on page 14 to ensure that the effects of recall bias are well understood.

Additional Editorial Request: Please add a statement in your manuscript that national officials of Guatemala’s National Immunization Program confirm this is a public health operational evaluation which does not require ethics approval.

Authors’ response: Please see statement on page 7.

Additional author comments:

We would like to note that Dr. Ana E. Chévez has decided to withdraw herself from the group of co-authors. Her decision to do so was based on the terms of her latest job description, which preclude her from participating in studies of this type. We have included her contributions in the “acknowledgments” section of the article.