Our comments are found in line with the reviewer comments and are highlighted.

Reviewer 1

The manuscript is very well written! The authors provided sufficient background information and I was able to easily follow the study design. I have several general comments:

1) The authors did not mention if the vaccines given to the children were preserved with thimerosal. In the US, thimerosal was taken out from many vaccines. Nevertheless, some of the multiple vaccines are still preserved with thimerosal. What is the case for Peru?

   It is important to point out that mercury levels related to thimerosal exposure from vaccines has a half-life of 4-6 days and is non detectable 30 days after vaccination according to research in infants and children [1, 2]. Results are similar for influenza vaccines [3]. Thus, the comment by the reviewer is somewhat overstated as hair mercury assessment reflects a 1-2 month exposure window and we exclude children who received vaccine in the past 20 days. Regardless, in Peru, thiomersal has been phased out from all vaccines except for the flu vaccine, similar to the US. As this exposure was not mentioned in the manuscript we have added these details to the first paragraph of the introduction (lines 70-72).

2) It would have been nice for the authors to identify the children who were sampled during the baseline study and the follow-up study and undertake a separate analysis from the whole, randomized group.

   We agree with the reviewer that performing the analysis on a randomized group would be ideal, but the sample size of children with baseline and follow-up data was not sufficient for this to be feasible.

3) A clarification is needed as to what constitutes the native and non-native group. Listing the communities is not enough. Are the authors referring to the indigenous tribes being the native group? What is the origin of the non-native group?

   In our introduction of native communities included in the study, we are referring to indigenous communities that are recognized by the Peruvian National government as an indigenous community. For clarification, we have added a clarification that the native communities refer to communities with indigenous individuals to the Methods 2.2 section (line 132).

4) The shift in antibodies response with age is puzzling, which raises the question if the authors can say with certainty that environmental conditions and mercury, in particular, affect the immune response of the study group. I suggest the authors approach this conclusion cautiously. For instance, in sentences like the one on line 561-562, use “has potential” instead of “influence”.

   Unfortunately, our study design is only able to evaluate one immune assessment per individual and a maximum of two time points of mercury exposure. Our prior analysis demonstrated that mercury exposure taken at one time point in this region reflects long term (at least 12 months) exposure with greater than 90% accuracy. Therefore, it is likely that the changing effect is related to longer-term exposure. We agree with the reviewer that the current study design is limited to definitely detect shifts; however, by dividing children into the younger and older age groups we are able to show differences in certain age ranges. We agree being more cautious and have incorporated such language in our conclusion, i.e., “This cross-sectional study identified that mercury exposure separately and in combination with nutritional status has the potential to influence child immune response in the ACR”.
