Author's response to reviews

Title: Assessing Local Determinants of Neural Tube Defects in the Heshun Region, China

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Many thanks for reviewers’ comments. We made revisions accordingly, which are highlighted in red.

Editorial Board:

Q0. The authors should also consider the known amounts of fumonisins in the grain in this geographic area. This may be very important.

**Response to Q0:** we added an explanation to this at the end of section “Methods/Determinants of NTD and their proxies”.

Reviewer 1

Major Compulsory Revisions
Q1_1. In abstract: the results should provide main findings about the identified proxy variables or determinants, and their effects on NTD.

**Response to Q1_1:** added.

Q1_2. Some contents in the “Discussion” part should be moved to the results. For example, the description of relationship between NTD rate and each proxy variables (for each figure).

**Response to Q1_2:** We discussed the implications of the results figure by figure, we feel that the current form may avoid the possible duplication of contents in two sections of result and discussion.

Q1_3. The limitations and strengths of this study should be clearly stated in Discussion.

**Response to Q1_3:** we added a new (the second) paragraph after Figure 2 and revised the last paragraph of the paper.

Q1_4. The main identified determinants should be summarized in Conclusion part.
Response to Q1_4: added in the last paragraph of the Conclusion section.

Minor Essential Revisions
Q1_5. at the beginning of the Method of Abstract, “Prevalence NTD rate” should be “NTD prevalence rate”.

Response to Q1_5: corrected.

Q1_6. In figure 2C, “NTBD” should be “NTD”.

Response to Q1_6: corrected.

Discretionary Revisions
Q1_7. First sentence of Background could be left out without substantial loss to the reader.

Response to Q1_7: deleted.

Q1_8. Title: I suggest “Shanxi Province” be added in the title.

Response to Q1_8: added.

Reviewer 2

Major Compulsory Revisions
I find the discussion of the choice of which villages were included and excluded from the circles from which the rate of birth defects were estimated is confused and not acceptable. No explanation is given for why villages with less than five births were excluded. The reason for using the circles method, which is a common kernel density estimation method, is to strengthen the quantity of evidence from which the spatial estimates are made. So, there is no reason to exclude any village in the first place. This paragraph notes that 56 villages had small numbers of births and were not included in the rate estimates of the circle. The authors evidently do not want the same village to contribute to the rate estimation of more than one grid location, but, in kernel density estimation methods for which the Rushton circle method is an example, it is precisely the overlapping of the circles that leads to the valid estimation of the spatially continuously defined rate estimates. This part of the analysis should be completed without excluding any villages and without making any adjustments for the overlapping of the circles. The conceptual model is that any one village exists in a spatial field of influence.

Response: We added an explanation for the choice in the second paragraph after Figure 2.

Comments on the cartographic choices for the Figures
Q2_1. Figure 1. I suggest the scale be in kilometers as it is in remaining figures.

Response to Q2_1: corrected.

Q2_2. Figure 2 should use circles located at the villages that are proportional in area to the numbers depicted. The scale of the circles will probably need to be adjusted for each of the maps to convey the geographical distribution of the variation in the numbers and the legends on the three maps in this figure should note this.

Response to Q2_2: We are not very sure the reviewer’s suggestion. In this study, the classification is Natural breaks (Jenks) in ArcMap, described as ‘Classes are based on natural groupings inherent in the data. ArcMap identifies break points by picking the class breaks that best group similar values and
maximize the differences between classes. The features are divided into classes whose boundaries are set where there are relatively big jumps in the data values.

Q2_3. Figure 3. Title should be Rushton circles not Ruston circling and the legend for Figure 3a should

**Response to Q2_3: corrected.**

Q2_4. Figure 4 is clear and effective.

**Response to Q2_4: thanks**

Q2_5. Figure 5. These maps should use a continuous field depiction of the rates to match the conceptualization of the disease rate as continuously distributed across the area.

**Response to Q2_5: corrected.**

Q2_6. Figure 6. The three numbers in the bottom left corner are confusing. Should be deleted.

**Response to Q2_6: removed.**

Q2_7. Figure 7 (e) should read “Coefficients for number of doctors”

**Response to Q2_7: corrected.**

Q2_8. Figure 8 numbers in lower left corner should be deleted. This figure is mis-labeled as Figure 7. There are two Figure 7s in the version I am reviewing.

**Response to Q2_8: done**