Reviewer's report

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

Version: 1 Date: 13 October 2009

Reviewer: Gerard Rushton

Reviewer's report:

1. Is the question posed by the authors well defined?
   Yes, although the question is defined as an exploratory question of defining the physical/environmental and human factors that contribute to spatial variations in neural tube defects rates in this region.

2. Are the methods appropriate and well described? In general the methods are appropriate although, as noted below, the implementation of the kernel density estimation method—described in this paper as the “Rushton circles” method is not correct. This problem can easily be fixed although some analyses will need to be repeated with the new results.

3. Are the data sound? Yes, the raw data on births and defects at the village level appear to be sound.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition? Yes.

5. Are the discussion and conclusions well balanced and adequately supported by the data? Yes.

6. Are limitations of the work clearly stated? Yes, briefly, at the end of the paper.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished? Yes.

8. Do the title and abstract accurately convey what has been found? Yes.

9. Is the writing acceptable? There are problems of grammar and expression. Some professional editing is needed before publication.

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.

Comments on the cartographic choices for the Figures
1. Figure 1. I suggest the scale be in kilometers as it is in remaining figures.
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.
3. Figure 3. Title should be Rushton circles not Ruston circling and the legend for Figure 3a should
4. Figure 4 is clear and effective.
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.
6. Figure 6. The three numbers in the bottom left corner are confusing. Should be deleted.
7. Figure 7 (e) should read “Coefficients for number of doctors”
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.