Reviewer's report

Title: Bayesian Spatial Analysis of Demographic Survey Data. An Application to Childhood Diseases in Zimbabwe.

Version: 3 Date: 13 December 2014

Reviewer: Mikiko Terashima

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<Major Compulsory Revisions>
I do not think the orientation of the paper was sufficiently changed and it still reads as a statistical methodology paper. It is a well written, quality paper and the findings are relevant and valuable. However, if the author does not wish to change this, I think he should consider submitting the manuscript to other journals oriented toward applied statistical methods or spatial epidemiology. This is not a criticism on the quality of the research. It is more of the fit with the journal audience. The description of model specification with 9 equations are too long and unnecessary to describe what he has found. Tables 4 and 8 should be omitted and described briefly in the text as they distract the readers from the central focus on the paper (that should be).

The figures (graphs) are also too many to demonstrate non-linearity in some factors. One or two would suffice. Moreover, the whole section in Lines 92-111 in Background belong to Methodology. By including these in the background, this paper still looks like it is about a methodology.

Case in point: In the Methods section of the Abstract, it say “Bayesian semi-parametric regression models were used…” which requires a plain explanation. “Such semi-parametric regression models allow joint analysis of non-linear effects of continuous covariates, spatially structured variation, unstructured heterogeneity, and other fixed effects on child diseases” will not really explain to the audience what he means. Each component—joint analysis, non-linear effects, spatially structured variation, unstructured heterogeneity in particular—needs to be described in a non-technical way.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.