Reviewer's report

Title: The striking geographical pattern of gastric cancer mortality in Spain: environmental hypotheses revisited

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Reviewer: Vincent Plagnol

Reviewer's report:

From a statistical point of view I trust that the authors have done a proper analysis, and that the conclusions are valid. However, I have questions I would like to see answered before recommending the paper for publication. Here are my concerns, ranked by order of importance:

1- First, the data in this paper relate to cancer death rate, but the discussion and the main message really concern incidence. The authors discuss this discrepancy very briefly in the discussion, but it is not enough. Most importantly, the quality of health care can vary from region to region: I would not be overly surprised if differences in health care and early cancer diagnosis could generate a geographic variability comparable to what is shown here. Do the authors have any data to support a rather uniform death rate conditionally on having the disease?

2- I think the relevance of these Bayesian smoothed estimates should be made clear earlier in the paper, probably in the background section. This is a key contribution of the work, and right now one has to wait for the third paragraph of the discussion to understand the point of the approach.

3- In the methods, I suppose that the expected death rate is the number of gastric cancer deaths? First, even though this seems quite obvious, could it be made clearer in the text? Second, where did the authors obtain the gastric cancer death rate by age group? I could not find it in reference 13 and I would like to know where to find these. By the way, there is a typo in the html link to reference 13.

4- For clarity, in the last paragraph of the background section, could the authors write "gastric cancer mortality rates" rather than simply "mortality rates". And maybe precise that we are looking at, if I got this right, deaths per year and 100,000 individuals? This may seem obvious to the authors, but not necessarily to the reader (not to me...).

5- In the title of Table 2, could it be stated that this is a list of cities with a high mortality rate? Having the selection criteria in small prints at the end of the table is not ideal, and some mention in the title would help understand why all the RR's are greater than 1. I see this is stated in the text but if there is a title for Table 3 then it should be made more informative.
Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.