Author's response to reviews

Title: Municipal mortality due to thyroid cancer in Spain

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Version: 3 Date: 12 December 2006

Author's response to reviews: see over
Dear sir,

We are very grateful to the reviewers for the time dedicated to our manuscript. We deeply appreciate all the comments and suggestions, in the sure knowledge that these will help improve the manuscript.

1. **Reviewer: Milena Maria Maule**

All the reviewer comments have been appropriately amended. We only want to mention two issues about Methods section:

3. **Paragraph 4, pag. 4, line 19:** change “a) the effects which vary in a structured manner in space (municipal heterogeneity)” to something like “a) the effects which vary in a structured manner in space (local spatially-structured variation)”

There was a mistake in the original sentence. When we were explaining the effects which vary in a structured manner in space, we were referring to “municipal contiguity” instead to “municipal heterogeneity”.

4. **Paragraph 5, pag. 4.** Consider explaining why using adjancency of municipal boundaries as the contiguity criterion is sensible, i.e. saying that geographically close areas may tend to have similar relative risks.

The adjacency criterion has been the most widely used method of modeling spatial correlation. It does not depend of an arbitrary selection of what we have considered a critical distance and, in theoretical terms, if there are changes in the RR spatial distribution, it is sensible to consider that changes are produced gradually as we move from one town to the next. We have also used different distance criteria for several causes of death and results were very similar to those obtained using the contiguity criterion.

2. **Reviewer: Pierre Goovaerts**

All comments have been amended as requested. We only want to mention three points:

14. **Page 5, line 5.** Write “A GIS was used to create municipal maps of SMRs, smoothed rates...”. It is unclear what the authors mean by “the distribution of the posterior probability”. Are they referring to the spatial distribution?

We have depicted the spatial pattern of the posterior probability of RR being greater than 1.

20. **Page 6, 2nd paragraph.** The authors must provide a justification for the choice of criteria used to select representative towns and cities.

In order to report information on the most representative towns and cities with excess TC mortality (Table 1), we have chosen the following criteria, as stated in the manuscript: (Obs – Exp) >= 2; Obs>=3; RR>1.2 y (P(RR)>1) >= 0.8. We decided to select these criteria in order to assure the existence of municipalities with highly consistent TC mortality, probably due to unknown genetic or environmental factors, and taking into account the relatively low mortality of this tumor.

24. **Page 6, line 19.** It is unclear what the authors mean by “unsmoothed SMRS”. They should also report the number of zero rates in the dataset.

This sentence has been suitably rephrased. The number of zero rates has been indirectly reported at the beginning of the Results section. We pointed out that TC cases were registered in 1041 towns and cities of all Spain’s 8077 municipalities.