Reviewer's report

Title: Health impact assessment of particulate pollution in Tallinn using fine spatial resolution and modelling techniques

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Reviewer: Ferran Ballester

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This manuscript presents the results of a comprehensive health impact assessment (HIA) in Tallinn, Estonia. Authors go from spatial estimation of air pollution levels to economic impacts through mortality and morbidity (including years of life lost) impact of particulate air pollution in Tallinn.

Studies on HIA of air pollution have been carried out in other cities and in multicity and even global reports. Novelty in this manuscript is comprehensiveness in the method and its application in a less studied region. The manuscript is interesting and may serve as an orientation for other HIA studies; however, I must make several comments.

The introduction is too long. In some bibliographical reference quoted, such as the one for Kunzli et al, almost the whole abstract of the article is transcribed. This introduction should be revised and reduced where possible.

In the introduction, at the end of page 2, authors state that “a number of HIA findings confirm that air pollution has an important ‘role’ in causing premature mortality”. By nature (they are not etiologic studies) HIA do not confirm causality, but they are more oriented to evaluate or estimate potential effects, applying the evidence from epidemiology and other areas of research.

Authors use standard methods from Apheis project and from WHO-Europe to perform HIA calculations. However, the threshold value for calculating excesses is not clear. Authors should clarify that. Also, when presenting health indicators at study, authors should present the indicators depending on short and long term exposure in a clearer way.

Exposure assessment data and methods are not well presented. First of all, authors should show the descriptives of the particulate air pollution levels from the 3 monitoring stations. Secondly, the authors should indicate which is the temporal resolution of the sources of information used (traffic, heating data, etc). Thirdly, authors should show which indicator of error or difference they are using to validate the results of the PM modelled. How has the percentual difference of the measured and modelled PM 2.5 been calculated? Part of the collected information in this section should be included in results: levels of pollution in the three monitoring stations, validation of the PM modelled estimations,....

On the other hand, the explanation of the calculus of the economic impact needs
further clarification. Terms such as ‘statistical value of life’ and ‘value of statistical life’, are sometimes confused and therefore may lead to error. I was surprised by the amount that the authors use to assess the cost of a day of work lost (10 €). I have looked for information and I have found that the average monthly net salary in Estonia is about 456 euro, which is undoubtedly very little compared to the developed countries, but is more than the authors established.

Regarding HIA results, Provided the difference in data for size and structure of the population of the different sections, the authors should present the results in the form of adjusted rates, and not as absolute numbers as in figure 2. This figure adds little since the highest number of YLL will be a function of the number of inhabitants of each section. On the contrary of what authors say in page 13, critical issues, end of the first paragraph, age structure plays an important role in mortality rates.

In the Conclusions section, at the end of the first paragraph, authors assign a different role in long and short term effects to the different PM, PM2.5 and PM10, respectively. In my opinion, results from this study do not support this statement, which is here derived form the available relative risks, more than from tested epidemiological evidence.

In the same section, second paragraph, authors propose informing people suffering from chronic diseases about the air quality in different regions. Are the authors proposing for a change in the address of these people? This could be little affordable from an individual point of view, and efforts should be directed to improve the situations in the more polluted sections.

The authors should include a list of acronyms at the beginning of the manuscript to help in the understanding of some parts of the text (for instance: EHIF)

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.