Author’s response to reviews

Title: Socioeconomic position and health status of people who live near busy roads: the Rome Longitudinal Study (RoLS)

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Version: 2 Date: 25 June 2010

Author’s response to reviews:

We thank both reviewers for their suggestions. We think that the paper has improved with regards quality and interest.

Answers to the first reviewer (Michael Jerrett)

Background

1. MJ: “Para 2 – statement that traffic is by far the most relevant source of air pollution is not accurate when it refers to the American Cancer Society and Harvard 6 cities studies – the biggest component of pollution in these studies comes from power plants and industry an the US Midwest.”

Authors: We agree and we modified the paragraph saying that traffic is “a relevant source of AP in cities”.

2. MJ: “Main point is that traffic is growing quickly and other sources are tending to decline, so the relative contribution of traffic to air pollution compared to other sources is growing. Also need to cite Jerrett et al. 2009a and b (two papers in EHP, one on mortality and one on asthma using individual measures of exposure).”

Authors: Agree with the point and we cited the paper on mortality

3. MJ: “Need to follow through on the HEI panel – don’t just mention this, but give the main conclusion”

Authors: We gave the main conclusion of the HEI panel here, and eliminated its conclusion from the discussion.

Methods

MJ: “p.5 was this composite indicator of SEP validated against individual
samples – hard to know how well this performs without some validation?

Authors: The indicator has been validated, and we added information and references on that.

MJ: “Need to mention how many links have traffic data – what percentage – to give readers some idea of how good and complete traffic counts are. Particularly important because poor numbers of counts could lead to biased measures of traffic and exposure error.

Authors: We added information on the completeness of traffic counts.

MJ: “On the health data, is this a universal system offering population-wide estimates or are there some exclusions for people not in the health care system. Again important for readers to know this to assess the sample and potential biases.”

Authors: We indicated that the National Health Service in Italy provides medical care to all people, without exclusions.

MJ: “p. 8 Did you control for clustering in the small census areas of the study to take account for likely non independence of the sample by proximity? Some GEE cluster estimation should be used as a sensitivity analysis.

Authors: We re-performed the analyses taking account of clustering within census blocks with robust variance estimate. As result, the standard errors of the estimates became wider although the main results remained the same. GEE was not used because the large size of our data set.

Results

MJ: “Health characteristics – could you take accidents out of the assessment since these might be associated with traffic accidents that you would not really want in your analysis?

Authors: We took accidents out of the total hospitalizations (table 3); however, as suggested by the other reviewer, we eliminated from Table 4 data on hospitalisations.

Discussion

MJ: “The authors have found similar results to those in the Netherlands. There is also another study by Buzzelli and Jerrett – cited in the Jerrett commentary that found an unexpected association between higher pollution and higher dwelling values that could be cited. The authors need to push themselves to explain why Rome and the Netherlands would be different – it seems that it is linked to the dwelling values and the higher incomes of older established residents.

While the authors have not found the inverse association by SEP, they have found that more elderly are generally more exposed. This is another kind of environmental injustice that should be couched this way. Recent paper by Jane
Clougherty using some of these demographic groups to conduct environmental justice analysis."

Authors:
Thank you very much for the indication of the paper by Buzzelli and Jerrett. We think that the value of dwellings is the key of the explanation of the relationship between SEP and exposure to traffic in Rome. The value of dwellings is much higher in the city centre than in the suburbs, and the prices grown and are still growing. According to the 2001 Census of the population, in Rome 63% of the families owns the flat where they live. More than a difference in monthly disposable income we think that is a question of urbanization of the city. In the 1960s, years characterised by the boom of the economy, it was still easy to buy a place in the centre of the city. Now young couples cannot afford it, unless they are of a very high SEP. This explains the different age distribution and SEP distribution by area of Rome.

Although it is true that elderly residents are victim of environmental injustice in terms of air pollution exposure, we would not push onto this, because those who do not live in the city centre can be victims in many other perspectives.

Answers to the reviewer 2
Reviewer: Gerard G Hoek
Reviewer's report:
Comments to the authors:
The authors report on the relationships between socio-economic position, traffic exposures and hospitalization in Rome using data from a large part of the Rome population. Key findings are that traffic exposures are not higher among poorly educated and in low SES neighbourhoods; traffic exposures are higher among the old. Because of the size of the population and the linking of a variety of data, the paper makes an interesting contribution to the literature. It is useful also as it documents that the relationship between SES and traffic exposure is not that simple.

Major comments
1. The paper can be improved when more focus is put both in the Results and Discussion on the key table in the paper (Table 4) and less on the descriptive tables 1 / 3, which show more well-known relationships. In the discussion of Tables 1/3 in the Results section remove repletion of a lot of numbers in the text.

Authors: We agree on this and we have deleted several redundant numbers from the text and we now focus on table 4 (and on the new table 5, see below).
Points that are not well discussed include:

a. What is behind the traffic exposure – age relationship
Authors: we have indicate in the discussion that the historical urbanization process in Rome is related to a selective residence of elderly people in more polluted areas.

b. Whether it is individual or area-level (or both) that drive the associations with traffic exposure? Table 4 suggests it is mostly area-level, since mutual adjustment affects area-level OR marginally whereas the education variable is strongly decreased (opposite to a statement by the authors). The conclusion should read ‘live in a high SES area’ instead of have a high SES.
Authors: we specified in the discussion that is an area driven association and we were more careful in phrasing results with area based SEP

c. Studies on SES and air pollution in Europe e.g. Sweden and a modelling study in London (Tonne and coworkers).
We have mentioned in the text the study in Oslo

d. Page 13 describes the key finding as an “inverse” association. However it is more J-shaped, as the high SES area have lower exposures than the medium and medium-high though still higher than the low.
We eliminated that phrase and left at the beginning of the discussion a more clear description of the results.

2. I find the inclusion of hospitalization as an independent variable along with other predictors to explain traffic exposure confusing. It is also not clear that adjustment for confounding has been achieved sufficiently. Please split table 4 in two tables with health excluded from Table 4 and reported in a new Table 5 with health as the dependent variable. Conclusions probably do not change but will be easier to interpret.
Authors: To avoid the confusion the referee was mentioning, we eliminated from table 4 the hospitalisations, and from the results and discussion sections the comments on that.

3. It would be interesting to see whether the overall association between especially area SES and individual education and traffic exposure holds in a stratified analysis, where you stratify by area of the city. This will allow more conclusions about the mechanisms, e.g. it seems possible that individual choice may play more of a role in smaller more similar areas.
Authors: Thank you for this suggestion. We performed a stratified analysis considering two areas of the city. We found the results interesting, and we presented them on a new table (Table 5).

4. Both in the Introduction and Discussion the issue of potential (residual) confounding should be discussed. The findings in Rome suggest that if anything relationships between traffic and health might be underestimated instead of overestimated as usually suggested.

Authors: we deleted from the text the results about the association with hospitalization and the issue of residual confounding does not apply.

5. The paper is much stronger in presenting and discussing the traffic exposure – SES relationship than the traffic- health exposure. Either the latter should be improved or alternatively removed from the paper. E.g. OR's are very small; only one has a significant association; how about residual confounding e.g. by smoking.

Authors: We removed the traffic – health condition from the paper and concentrated on the traffic-SEP relationship.

Minor comments
1. Improve labelling of Table 4 by adding that the second column is from a multiple regression model including all variables in the plus gender. The current label is not exact, e.g. the age coefficients in the table are not age-adjusted.

Authors: we changed the labels in the tables.

2. Put the legends in table 1 below the table, not in the table

Authors: we changed table 1.

3. The text on the composite variable is not clear, e.g. what was the unit: the individual (suggested by yes/no) or the census block (% with a certain characteristic)

Authors: we better explained in the text that the unit of observation was the census block.

4. Give more detail on the geo-coding method

Authors: we specified the method we used in the text.

5. Is it correct that traffic data were available for all roads, including minor roads. If so, add how this was achieved (must be modelling) and motivate why in the continuous traffic variables you focused on high traffic roads and thus had
variables that consisted for about 50% of subjects having no value.

Authors: we added information on traffic data.

6. Add that this is about traffic exposure at home, not while commuting e.g. in the first sentence of the discussion

Authors: we added in the discussion this point

7. Discussion on distance decay p. 12. Please notice the distance decay depends heavily on the building structure. For open terrain, air pollution decreases rapidly in the first 100m and then gradually until ~400-500m. However within compact European cities, there may not be much gradients after the first 50 meter.

Authors: We left this reference here. The point is that Rome is not so compact as other European city are.


Authors: actually it was 13 (HEI report)

9. I am not sure the discussion on page 14 on new cohort studies is fitting here (other endpoints). I am not sure the WHI study is the most complete. Effect estimates are controversial (letter to the editor).

Authors: we wrote about new cohort studies, because our wish is to follow-up this study population to assess the relationship between traffic exposure and morbidity/mortality.