Reviewer’s report

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

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Reviewer: Gerard G Hoek

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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 neighborhoods; 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. Points that are not well discussed include:
   a. What is behind the traffic exposure –age relationship
   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.
   c. Studies on SES and air pollution in Europe e.g. Sweden and a modelling study in London (Tonne and coworkers).
   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.

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.
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.

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.

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.

Minor comments
1. Improve labeling 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.
2. Put the legends in table 1 below the table, not in the table
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)
4. Give more detail on the geo-coding method
5. Is it correct that traffic data were available for all roads, including minor roads. If so, add how this was achieved (must be modeling) and motivate why in the continuous traffic variables you focused on high traffic roads and thus had variables that consisted from about 50% of subjects having no value.
6. Add that this is about traffic exposure at home, not while commuting e.g. in the first sentence of the discussion
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.
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).

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.

Declaration of competing interests:
I declare that I have no competing interests.