Reviewer’s report

Title: GIS and Environmental Epidemiology: spatial analysis of the effects of traffic-related air pollution on population respiratory health

Version: 1 Date: 31 August 2010

Reviewer: Shelley Green

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Review of EH 1568821879430283: GIS and Environmental Epidemiology: spatial analysis of the effects of traffic-related air pollution on population respiratory health

Major Compulsory Revisions:

General Review: This is an interesting paper which adds to the literature important information about the effects of living near a busy road on respiratory symptoms and lung function. The data collected in 1991-1993 included important information on lung function and allergies. The paper is fairly well written, but it needs some editing because the English language (not the first language of the authors, I presume) is not always clear or up to the standards of an English language journal. Please be consistent when indicating periods or commas in numbers. The methods section does not clearly state which road or roads were considered busy roads for this study. It seems from the Figure 1 legend that the Tosco-Romagnola highway was the only busy road used in this analysis. It that is the case, it should be clearly stated in the Methods background section. The authors should include some details about the highway, such as the number of vehicles passing through each day. Figure 3 makes it look like people are actually living on the highway. Are there homes right next to the highway? The authors should at least describe the orientation of the highway to the prevailing winds. It would also be interesting to know whether the construction of the new highway between 1988 and 1991 had an effect on the exposure to air pollutants from the highway. If exposure was reduced, was there a difference in symptom reporting between the first and second surveys? This could be part of the discussion.

Specific Comments:

Page 5, Background: The information about the air pollution in the three zones used in the first study (1985-1988) is probably not necessary. It would be more informative to give information about pollution near the Tosco-Romagnola highway before and during the second survey, since the current study focuses on that highway. Also, how did the construction of the new highway affect air pollution levels? Were there a total of 3866 subjects used in the second survey, or was that the number in the first survey? How were the study subjects selected?
Page 6: Was the total sample size for the current study 2841, or was it 3866, 2841 of which were investigated with the extended protocol? The authors state that the annual means of the air pollution measurements decreased between the two surveys. Where were these measurements made? Were they near the highway?

Page 6, Exposure assessment: Please define the “main road.” I assume you mean the Tosco-Romagnola highway. Can you give an estimate of the number of vehicles that pass by per day and the type of vehicles such as cars and trucks? Also please specify whether the cars are powered by diesel or gasoline, or both fuels. Can you classify subjects as living upwind or downwind of the highway? You may describe “vectorial cartographical” as simply “vector” data. What are civic numbers? Are they the same as street numbers in the United States (eg numbers on houses and commercial buildings?) For United States audiences you may refer to civic numbers as street numbers, if that is the case.

Page 8: What does walking in “plain” mean? Do you mean on level ground? Please define FVC and VC. Please define “smoking habits” (eg. never, former, current, ETS exposed).

Page 9: Please define airways obstruction more clearly. Do you mean that if the observed FEV1/FVC% was less than 70%, the subject was defined as having airways obstruction? When describing the wheal, do you mean one or more wheal of at least 3mm or 5mm? In the last paragraph, what working exposure did you examine? Please spell out OR.

Page 10: What work exposures examined?

Page 11: Did you perform a trend test for any of the results reported in Table 4?

Page 13: The “main road” should be specified here (Tosco-Romagnola highway), What occupational exposure did you examine?

Page 14: It would be informative to mention the geographic locations of the previous studies documented in the discussion, since air pollution levels vary across countries and cities.

Page 17: What do you mean when you say you do not adopt a metric scheme for civic numbers? Were you able to match the civic numbers in the subjects’ addresses with locations on the map you used for geocoding? I think the answer is “yes” but you should make it very clear, because this is a strength of your study. (you state “exact correspondence of civic numbers to related buildings).

Minor Essential Revisions:

Table 1: What is working exposure?

Tables 2 and 3 and 4: In the heading you should indicate “Distance of residence to the highway”.
Table 3: Add the words “bronchial reactivity” to slope_log.

Discretionary Revisions:

Perform separate analyses for subjects living upwind or downwind of the highway.

If only one highway was used to determine exposure, it would be interesting to perform separate analyses for subjects living upwind or downwind of the highway. Actual exposure may be substantially different for those living on different sides of the highway.

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

**Quality of written English:** Needs some language corrections before being published

**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.