Reviewer's report

Title: Air pollution and lung function among susceptible adult subjects: a panel study

Version: 1 Date: 17 August 2005

Reviewer: Amanda Wheeler

Reviewer’s report:

General
I am concerned that the sample size for the 3 panels is limited and that no effort has been made to incorporate any confounding effects of medication usage apart from beta agonists in the asthmatic subjects. The use of a 'cross sectional time series regression fixed effect model' does not provide sufficient information as to how intra and inter subject correlations were controlled for. I feel that the meteorological data should be included within the model with a SPLINE fit. Other papers on air pollution and respiratory health have included up to a 5 day average which the authors may wish to consider. I have recommended that a statistician review the article as my own statistical analysis is limited. I agree with the authors that this is an interesting approach by including many repeated measurements but I do not believe that the analysis has incorporated this sufficiently.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Clarification should be provided on the time frame of the repeated measures, at this time it is unclear when the lung function testing occurred for each subject. This may influence the potential confounding factors of time of day and day of week. I am concerned about the ability to compare two different methods of spirometry made between the different disease categories. Were any tests of accuracy or precision made between the methods and other standard clinical methods? The decision to average the air pollution data collected in one location with high traffic and one in low traffic areas should be explained. Does this represent the estimated background air pollution levels for Rome? Are the sites representative of where the subjects are residing? The authors may want to consider selecting air pollution monitoring data that corresponds to the location closest to the subject's residence as many COPD patients are less mobile. Taking measurements in 3 homes for a side validation study - an explanation of what this is should be included. At this time it is unclear whether each disease group is represented in the home selection, what the housing types are, what factors could influence the indoor / outdoor ratios, whether the 3 homes are located in representative locations of where all subjects reside. Given the low flow rate of the PEM - SKC monitors data should be provided on the ability of the AAS method to detect metals. Data should also be provided on the comparability of the Dichotomous samplers and the PEMs. The authors suggest an association between exhaled Nitric Oxide and NO2, were subjects breathing NO2 scrubbed air prior to the tests as recommended by the American Thoracic Society guidelines? In the subset of analysis for the asthmatic subjects - factors that resulted in their being termed 'susceptible' should be investigated further. No data is provided as evidence of their increased susceptibility, this would be useful for future selection of subjects in similar research. Table 1 would benefit from including the breakdown of males and females as well as regular medication use. Table 2 should include the geometric mean given the usual nature of environmental data. Seasonal
IQR would also be useful. Table 4 and 5 might be better explained if shown in a graphical format with error bars indicating significance.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Cr is Chromium
NO in this format is Nitric Oxide
panel, routine, mild intermittent step do not need to be in italics

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Discretionary Revisions (which the author can choose to ignore)

The description 'ad hoc' is not typically used to describe monitoring that is set up for specific research.

**What next?**: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Level of interest**: An article whose findings are important to those with closely related research interests

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

**Statistical review**: Yes, but I do not feel adequately qualified to assess the statistics.

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