Reviewer's report

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

Version: 1 Date: 29 November 2005

Reviewer: Lewis Pepper

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General
The topic is interesting and represents one of a few human studies examining the potential relationship between particulate and priority pollutants, putative oxidative stress, and respiratory dysfunction. The use of repeated measures in a well controlled environment (observation of pulmonary function studies) enhances the study's rigor. Although there is a fairly small study population, the reduction of intera-individual variability using repeated measures provides for reasonably adequate study power.

Specific Comments:

Methods:
Page 4
1. What is a former smoker? How long ago was their last cigarette?
2. Asthma group is healthier and younger than COPD.

Page 6
1. Diaries were mentioned on this page. How were diaries used in analyses or discussion?
2. Subjects selected based on living less than 2 Km from air monitoring site yet PM measured at only two ad hoc sites in Rome. No comment in discussion about this. Is there a potential bias? Is there a potential for clustering around the sites? Confounding? etc.?

Statistical Analysis
Page 8
1. Refers to dropouts and variable number of observations. How were missing observations addressed. Not imputed?
3. How is missing data addressed in the model?
4. Refr to STA reference xtreg.fe. Should be more along with reference, for audience not familiar with method. or example refer to Diggle, Zeger, Liang's text

Results:
Page 9
1. What does the statement "Nevertheless, the ambient PM...was elevated" mean? Compared to what?

Page 10
1. Is higher winter concordance typical? Windows closed versus open in spring? Indoor sources?

Page 11
1. What's lag 2? Why not include data in table?
2. Interesting issue about susceptibles. Identifies 5 subjects based on diary review (how were diaries reviewed?) or other symptom reports? No mention made of other symptom data. Data for the 5 is not reported. Should be reported and in a table after all this goes to the heart of the thesis.
3. Table 5's title is confusing. The text suggests that the discussion is only for the COPD panel although that is not mentioned in the table's title
Discussion
Page 12
1. First paragraph is confusing and not clear if there is a table where the data is found.
2. The list of identified shortcomings covers most limitations.
3. Low power may impact observations noted in other studies such as asthma O3 and others. Should spell out specific concerns.
4. Multiple comparisons is major issue and more space should be devoted to implications. For example how to address potential “false discovery rate”? Does this observation along with low power suggest that a followup study with larger panels and fewer exposure/outcome combinations might be useful? This is an ongoing issue with air-pollution studies in which the availability of the data makes multiple comparisons inevitable.

Page 14
1. Top of page you suggest that in asthma panel effect of PM 2.5-10 on FEV1. The data in Table 4 doesn't show an effect. Please change.

Conclusion
Page 15
Again, need to refer to limitations (multiple comparisons and power) when stating that results suggest. I'd also add the usual proviso that a followup study is need to address these shortcomings. I'd include suggested methods to address multiple comparisons as well as increase panel size. For example Benjamini Y, Hochberg Y. Controlling the false discovery rate: a practical and powerful approach to multiple testing. J R Statist Soc Ser B 1995; 57: 289–300 or something else. Add a few more recent citations for particulate as well as oxidative stress.

I discussed the statistical issues with a biostatistician.

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

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.