Reviewer's report

Title: Particulate matter air pollution and respiratory symptoms in subjects having either asthma or chronic obstructive pulmonary disease: a European multicentre panel study

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Reviewer: Isabella Annesi-Maesano

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In this multicenter study the authors found positive associations between the concentrations of coarse particles and the prevalence of respiratory symptoms, as recorded in a 6-month diary, in 36 patients with predominantly mild to moderate asthma or COPD drawn from 4 panels in four European cities. No consistent associations were observed between fine and ultrafine particle number concentrations, nitrogen dioxide and respiratory health effects.

Major comments

Although this paper is based on a rather small sample, it has a strong potential of a substantial contribution to the current knowledge. Indeed, this study adds to the limited existing evidence on respiratory health effects due to ambient PM in the susceptible population of asthma and COPD patients. In this respect, the diary constitutes a great strength of this project. As a result from the RUPIOH project funded by the EC, this study involves amongst the best experts in the field of the health impact of air pollution in Europe. The analysis was done very cautiously and according to the state of the art. The paper covers as well a lot of potential limitations in order to defend the study results. The paper is written in an elegant style and to the point. As a consequence, the article is clear.

However, this paper has also the following weaknesses:

As previously said the size of the study population is small and to me this fact with the population selection constitute the major problem of this study. Overall there are 136 patients from 4 panels of patients, which might diminish the statistical power of the study and (obviously) prevents the generalization of the results. More important, this impinges the separation of COPD from asthma and relative considerations on possible different effects of PM on the two conditions, which would have been of interest. Yet, the known underlying mechanisms suggest that the effects could be different because of the different pathophysiology of the diseases. Recent data indicate that COPD is a more systemic disease than asthma, which could have consequence on PM penetration. And from the clinical point of view, it is also well-known that symptoms appear differently and with a different lag in the two conditions. By mixing the conditions, the effects of the fine and ultrafine PM could have been diluted. To sum up, were some relationships lacking because of the small
sample, because of the taking into account of different conditions together and of similar lags…? Interestingly, the authors have restricted the analysis of the effects of ozone and PM to asthmatics. However, these data were not shown and this reasoning could not be brought up in the case of COPD because of the few number of COPD patients in two towns. Analyses restricted to the different populations of asthmatics (and COPD patients? if possible) should be provided and their results should be compared to those from the general analyses. Successively, the criteria for selecting the patients are not perfectly clear to me even going to the two references indicated by the authors. Are they standardized? COPD at 35 years do not exist, thereafter the two populations of patients differ. To this problem, it has to be added that in the Netherlands, patients were selected on the basis of the “relic” term of CNSLD that mix COPD and asthma together and probably include also other conditions. To me, the facts mentioned above challenge the results and need to be better discussed. The discussion needs to be more cautious. The statistical analysis suggested above has to be added.

The second concern I have is about the use of a two-pollutant model. The authors say that “The robustness of the findings was evaluated by fitting two pollutant models in a sensitivity analysis.”. And successively, they say “Furthermore, the magnitude of the associations increased when we applied a two-pollutant model for PM10-2.5 and PM2.5 in lag 1 (data not shown).” without showing the results. What about the other lags? What is the correlation between PM10-2.5 and PM2.5? Overall, this is not clear to me and need to be clarified. And it would be useful to see the results.

Lastly, a study of the links between the limitation in activities and dyspnea symptoms would be of interest.

Minor comments

The authors have to address the fact that their work contributes also to the literature on health effects of PM in respiratory patients.

The authors have to clarify that the analysis restricted to asthmatics was also performed for PM. This becomes clear only reading the discussion.

**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.

**Declaration of competing interests:**

No COI