Reviewer’s report

Title: The association between daily concentrations of air pollution and visits to a psychiatric emergency unit: A case-crossover study

Version: 0 Date: 13 Sep 2017

Reviewer: Vivian C. Pun

Reviewer's report:

Review of "The association between daily concentration of air pollution and visits to a psychiatric emergency unit: A case-crossover study"

The paper provides a case-crossover analysis of the association between short-term exposure to air pollution and psychiatric emergency visits in Sweden. The study objective is not novel as there has been existing literature on similar topic. The findings are mostly insignificant and inconsistent, especially when the authors only had very limited information on the psychiatric emergency visits that hindered the authors from carrying out more in-depth analyses. I acknowledge the authors for being transparent about the many study limitations in the discussion. Nevertheless, the main question remains as whether there is any new evidence from the current study that can add to the current knowledge on the association between air pollution and mental health, which I don't think so.

Specific comments:

* Can the author elaborate on the representativeness or generalization of the study population to the entire Gothenburg population? Did the authors have additional information on the psychiatric visits (e.g., age, gender) that can be used in the effect modification analysis? Although the authors listed these as limitations later in the discussion, it would be better to put such information in the method section as well.

* Why the authors opt for case-crossover analyses versus time-series analysis? Although both have their pros and cons, but in general time-series analysis tends to provide more precise risk estimates than those from the case-crossover study.

* Did the authors control for days of week in the models?

* I can see from Figure 1 that there were some gaps in PM10 and O3 levels. How the authors handled missing data is unclear, and need to be clarified further. I would suggest the authors to impute the missing data.
I would use IQR instead of 10ug/m3 across all air pollutants, so you would not unrealistically inflate the effect estimates for PM10 to 10 when the normal fluctuation was about 6, or deflate that for O3.

Had the authors considered modeling the 3- to 7-days moving averages or cumulative lag exposure, as the association of psychiatric visits with air pollution maybe semi-chronic, as shown in Pun VC, Manjourides J, Suh H. Association of Ambient Air Pollution with Depressive and Anxiety Symptoms in Older Adults: Results from the NSHAP Study. Environ Health Perspect. 2016;125(3):342-348 (also a good reference to cite).

Minor comments:

* Define acronyms e.g., "OECD", "GDP" in the beginning.

* Please use punctuation properly. Long sentences need to be separated by comma, or else it is difficult to read.

* Be caution when using the causal language because this type of study cannot answer such causal question. You may want to temper the causal language throughout the manuscript (e.g., change "acute effect of air pollution on worsening of mental health" on line 10 to "association between acute exposure to air pollution and mental ill health").

Level of interest
Please indicate how interesting you found the manuscript:

An article whose findings are important to those with closely related research interests

Quality of written English
Please indicate the quality of language in the manuscript:

Needs some language corrections before being published

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?
4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal