Reviewer’s report

Title: Early-life exposure to PM2.5 and Risk of Asthma Clinical Encounters among Children in Massachusetts: A Case-Crossover Analysis

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Reviewer: S Maio

Reviewer's report:

The present manuscript concerns an important topic related to the effect of PM2.5 low levels on asthma clinical encounters. The manuscript is of interest but some aspects have to be taken into account.

Major revisions:

- Statistical analyses, page 6, lines 130-131: The authors reported that "referent days were randomly selected 7 days before or after the clinical event"; maybe the referent days are too close to the clinical event; the authors should consider a possible long term effect of the exposure to PM2.5. Have the authors tried to choose the referent day at the same weekdays within the same month and year as the day of the event?

The authors reported that "Changes in residency were not problematic because the index date and the referent date were only 7 days apart". But, at page 5, lines 98-99, the authors reported that "Children who did not have the same zip code at the time of their clinical encounter and at birth were excluded from the study". Thus, changes in residence are not a problem related to the choose of the referent date, 7 days apart.

- Statistical analyses, page 6, line 133: have the authors tried to analyse a cumulative exposure (lag 0-2)?

- Statistical analyses, page 7, lines 146-147: this sentence is not clear; could the authors specify what means the "fully adjusted model"?. Have the authors run a model adjusting for all the variables instead of stratifying for them?

What is the meaning of the interaction term? Do it analyse the effect modification of the variables reported in table 3?
- Statistical analyses: a 5 µg/m3 increase was used in the analyses; considering that the mean PM2.5 concentration is 8.8 µg/m3 and the median is 7.8 µg/m3, an increase of 5 µg/m3 could hide the PM2.5 effect. Have the authors tried to use the interquartile range or a smaller increase?

- Statistical analyses: the analyses in the subgroup of children 5-9 yrs were reported in the supplemental material. The results are quite different from the ones on the whole sample and they are reported in the Results and Discussion sections. Why did the authors not insert the tables in the main manuscript? Moreover, have the authors analyzed the subgroups of age 0-4 yrs?

The analyses seem to suggest a different susceptibility according to age, that it is currently not considered in the analyses.

Minor revisions:
- Background, page 4, lines 83-88: in this paragraph, the authors reported a summary of the analyses, instead it should be better to clearly report the 2 aims of the manuscript.

- Exposure assessment, page 5: the clinical encounters were collected between January 2001 and September 2009. I suppose that the daily PM2.5 concentration was modeled for the same period, in order to link the event happened in a specific period with the PM2.5 concentration of the same period. If so, please, specify it.

- Statistical analyses, page 6, lines 138-139: have the authors controlled also for the "influence epidemics"? They could be an important factor related to the asthma exacerbations.

- Results, page 7, line 152: please, add "during pregnancy" after "were non-smokers".

- Table 3, legend: please, specify that the p-value is referred to the interaction terms.

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