Reviewer’s report

Title: Long-term exposure to air pollution and hospitalization for dementia

Version: 0 Date: 27 Apr 2019

Reviewer: Devon Payne-Sturges

Reviewer's report:

Thank you for the opportunity to review the manuscript, "Long-term exposure to air pollution and hospitalization for dementia ". This is a well written article assessing the relationship between annual average ambient air pollutant concentrations at residential address and the risk of hospitalizations for dementia. The authors address a critical issue for the scientific community as the evidence of brain impacts of air pollution is increasing. This manuscript should be accepted with minor revision based on my very few comments below:

1. Under Methods, the authors do not appear to have captured smoking history (including living with someone who smokes) of the study population, nor is smoking mentioned as possible confounder. Authors should address this in the discussion of study limitations.

2. The novel aspect of this study is the evaluation of dementia subtypes. However the authors should state explicitly how they defined "dementia hospitalizations overall". I assume it is defined as hospitalizations for any of the dementia subtypes…but that is not clearly stated.

3. The air pollution exposure assignment has serious limitations. One estimate representing the annual average for the year 2010 is assumed to represent air pollution exposures for study subjects followed from 2001 through 2013. The authors barely address this limitation. There is one sentence regarding one of the pollutants, NO2. Discussion of this limitation needs to be expanded. For example are there any long term air monitoring reports by the Italian government that show steady levels of all of target air pollutants in Rome? Have there been any major air pollutant regulations during the study period that may have impacted local air quality? How would the authors improve the exposure assignment if they could?

4. Related to the air pollution exposure measures are the assumptions about residential location. Authors didn't discuss the possibility of study subjects moving within Rome area during the study period. Was this information captured? If not or not utilized, how changing residential location within the study area could impact the exposure assignment should be addressed in the discussion.
5. For Table 3, authors should include as a footnote the relevant national and/or EU air pollution standards for PM10, PM2.5, NO2, and O3.

6. For table 4, it would help the reader if the authors also BOLDED or used and asterisk* to denote which results were statistically significant.

7. The conclusion section is quite brief. The authors miss an opportunity to address the public health and policy implications of their findings. What's the big picture?

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