Reviewers report

Title: Development of an Environmental Health Tool Linking Chemical Exposures, Physical Location and Lung Function

Version: 0 Date: 03 Jan 2019

Reviewer: Fuyuen Yip

Reviewers report:

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Rohlman et al. summarizes the feasibility of the Exposure, Location and Lung Function (ELF) tool as a novel environmental health assessment tool. The authors provide an interesting overview of a small pilot study of 10 participants who wore wristbands that collected PAHs and provided spirometry measurements three times a day during the seven-day study period. The objective of this paper was to summarize the overall feasibility of ELF as an environmental health tool. Overall, the information is interesting and an important contribution to the field of exposure assessment; however, I think that there is opportunity for them to help provide more information on the 'use case' of the tool.

Please see some of my thoughts below:

Introduction:

The authors provide a clear background on the development of the ELF and the need for improved personal exposure assessment for mixtures. One aspect that is less clear, however, is if there was interest among the community members to differentiate indoor vs. outdoor exposures? Or if the key focus was only outdoor PAH exposures? Does the GPS data assist in discerning indoor vs. outdoor exposures? Some additional information would be helpful. There is brief mention in L181 regarding exposure to indoor pollutants, but it would be important to include language in a subsequent section so that the reader can understand how indoor exposures were assessed in addition to the outdoor exposures.

Materials and Methods:

- Some additional information regarding the nature and frequency of participant training on spirometry would be helpful.

- In the recruitment of study participants, it may be helpful to provide some additional definitions for the eligibility criteria. For example, in L161, is 'asthma diagnosis' defined
as currently having asthma or ever having asthma? And did the case definition include specific asthma severity levels? For 'non-smoker', does this refer to a current non-smoker or an individual who has never smoked? Based on Table 1, it is surmised that the definition is current non-smoker, but some additional clarification would be helpful, especially for future efforts in interpreting spirometry results.

- For the performance of spirometry (L169 - L171), what type of feedback do the participants receive to ensure that the readings are successful?

- When did the participants provide feedback via telephone interview (L174) - was it at the end of the study period?

- There is a detailed summary provided on ELF Geospatial Analyses, with focus on outdoor air pollutant exposures. Perhaps some information can be added on how indoor exposures were also assessed and analyzed?

- How were the list of target PHAs selected?

Results:

- Table S3

  o For the "driving" variable, what does an average of 0.2 represent? Would it be more appropriate to treat this solely as a dichotomous variable (0/1), or were the decimal values also used in the analysis? Would this variable be treated similarly as the Wildfire smoke density variable?

  o Please check spelling

- Are there any preliminary results available regarding time spent indoors vs. outdoors?

- Were any data collected regarding possible indoor sources of PAHs (e.g., do they live with a smoker?)

Discussion:

- The work suggests that the ELF can be a novel environmental health tool and has the capability to bring together environmental exposure and respiratory health data. It would be helpful, as part of the "proof-of-concept" discussion, to also have the authors help further address how the data collected could assist in improving one's understanding of exposures and linking that to sources (e.g., translation of Figure 2 into possible "action"). Inclusion of other potential limitations of the work, namely, other aspects in addition to the fact that current correlations are dependent on stationary air monitoring networks, would also help to strengthen the discussion.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Unable to assess

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
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Not relevant to this manuscript

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