Author's response to reviews

Title: Exploring Associations Between Multipollutant Day Types And Asthma Morbidity: Epidemiologic Applications Of Self-Organizing Map Ambient Air Quality Classifications

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Dear Editor-in-Chief,

I am writing to resubmit our revised manuscript entitled, “Exploring Associations Between Multipollutant Day Types And Asthma Morbidity: Epidemiologic Applications Of Self-Organizing Map Ambient Air Quality Classifications”. Understanding multi-pollutant exposure effects on human health is an area of growing interest. This manuscript is the follow up work for “Using self-organizing maps to develop ambient air quality classifications: a time series example” (Environmental Health 2014, 13:56). Here we apply SOM in order to conduct an epidemiologic analysis of pediatric asthma and multiple air pollutants. This manuscript describes original work and is not under consideration by any other journal. All authors approved the manuscript and this submission and declare no competing interests. Please see below for our responses to peer review:

Reviewer's report:
Interesting work but not always easy to follow; perhaps adding an appendix about how the maps are produced would help the reader. (I realize there is a reference).

A DETAILED DESCRIPTION OF THE SOM ALGORITHM AND ITS IMPLEMENTATION HAVE BEEN ADDED TO AN APPENDIX. (WE NOTE THIS DESCRIPTION IS PROVIDED IN PREVIOUS WORK REFERENCED IN MANUSCRIPT.)

As I am insufficiently familiar with the techniques used, I trust a statistician will be asked to review this as well. The concentration deviations in figure 2 are given as percentages. It would really help to add a table showing how high exactly the concentrations are in each of the nine categories.

A TABLE WITH RequestED SUMMARY STATISTICS HAS BEEN ADDED.

The authors are very cautious in their interpretation which I really liked. They also added a figure with effect estimates for individual pollutants showing almost all of them were associated with asthma in their data. I think it would be a useful addition to include PM2.5 and ozone in their analysis of the effects in figure 4. That would more directly let the traditional and the new approach compete with each other....

FIG 4 PRESENTS EFFECT ESTIMATES FOR SOM CATEGORIES CREATED USING: CO, NO2, NOX, O3, SO2, PM2.5 EC, PM2.5 OC, PM2.5 NH4, PM2.5 NO3, AND PM2.5 SO4. WE CHOSE NOT TO INCLUDE MEASURES OF TOTAL PM2.5 AND PM10 IN THE DATA USED FOR SOM CATEGORY DEVELOPMENT BECAUSE INCLUSION WOULD HAVE UNFAIRLY WEIGHTED PROFILES TOWARDS PARTICULATE MIXTURES. HOWEVER, GIVEN EXPECTED INTEREST IN TOTAL PM WE HIGHLIGHT FIGURE 3 AS IT PROVIDES BOXPLOTS OF PM10 AND PM25 CONCENTRATIONS BY SOM CATEGORY.

Thank you very much for your time and consideration.

Sincerely,

John Pearce, PhD