Author’s response to reviews

Title: Association of PM2.5 concentration with health center outpatient visits for respiratory diseases of children under 5 years old in Lima, Peru

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"The article describes a time series analysis based on weekly data on the health outcome and exposure to air pollution. There are two issues related to this analysis that I find worthy of discussion. The first is the choice of weekly data. I do understand that the outcome time series was available only weekly, thus daily analysis was not feasible. Even though the authors raised the study limitation in the article's discussion it should be noted that its results are not directly comparable to other studies based on daily data. The second issue is related to the model design. The authors have regarded local exposure to air pollution whilst two covariates were assigned to exposure, namely PM2.5 exposure and a dummy variable for each district, however the outcome variable is the sum of health events over the set of districts".

In effect the analysis is already done by district, in the sense that the inclusion of a dummy variable in the model essentially stratifies on district. The analysis then occurs within each of the 43 districts (within each year and each season), and the result for PM2.5 is a weighted average (with the weights being the number of visits in each district). The use of a dummy variable in the model for district is a more efficient way to take district level effects into account, rather than to create an observation for each district for each week/year/season, which would increase the size of data set 43 times, and require a 2nd stage meta-analysis to combined district-specific results. We have however added some district-specific results for the largest districts as supplemental material.

This text to this effect has been added to Methods.

"In my opinion, the correct model design would be a panel study model, whereby each district would be analyzed with respect to its own exposure assessed the same way as it has been described. I do understand that under this proposed model there may be an excess of zeroes, which could cause even
more overdispersion. Nevertheless, I think that such a model should be considered by the authors, even as a strategy for sensitivity analysis”.

See our comment above, with respect to district specific analyses.