Author’s response to reviews

Title: Chronic effects of ambient air pollution on respiratory morbidities among Chinese children: a cross-sectional study in Hong Kong

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Author's response to reviews: see over
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Dear Dr. Dalumpines,

Thank you for your e-mail dated the 13th December, 2013 offering us the opportunity to further revise our manuscript. The article has now been revised according to the editor’ comments point-by-point as contained in this letter.

Thank you very much for considering the publication of this manuscript. We look forward to your advice.

With best wishes,

Yang GAO
I think there needs to be some more work on the manuscript before publication. Specifically this cross-sectional study has a number of serious limitations which need further explanation in the discussion. It is not sufficient to say, for example, there might have been exposure misclassification or one cannot establish temporal course of events, without explaining this in relation to the study. The authors need to..

1. Explain how exposure misclassification could have affected the results and how this would have impacted on interpretation.

Our response: we have added the following explanations in the last paragraph in the Discussion part to further discuss the influence of exposure misclassification on the study’s validity:

“Exposure misclassification may inevitably exist and bias our findings most likely towards the null, like other studies using ambient air monitoring data as a proxy of personal exposure levels [31]. As individual exposures among children living in the same district can vary largely due to influences from diverse micro-environmental and personal factors, such as different air pollution levels at home and different physical activity levels. Though we controlled for several potential household and behavioural factors, the bias could not be entirely corrected.”

2. Explain how recall bias might have affected results (as above).

Our response: we have added the following explanations in the last paragraph in the Discussion part to further discuss the influence of recall bias on the study’s validity:

“Recall bias may be unavoidable with self-reported retrospective data. For example, parents were more likely to recall severe respiratory conditions than mild ones, and recent episodes than old ones. Such bias may have introduced misclassification of diseases and resulted in underestimations of the adverse health effects [31].”

3. Explain the potential for selection bias and confounding with the comparison between HP and LP districts (for example HP districts might be poorer, have poorer nutrition, get less exercise etc etc)... need to consider this in relation to poorer respiratory health.

Our response: we agree that some district-specific characteristics may confound the relationship between air pollution and respiratory health when performing...
between-district comparisons. We collected and controlled for individual socioeconomic status and physical activity in this study, and therefore such geographical differences might not be a major threat to the internal validity of the study. In addition, Hong Kong is a well-developed area, medians for monthly household income in the three study districts ranged from $2,564 to $3,333 (HK$20,000 to HK$26,000). Poor nutrition is rare and related with other factors than poverty.

4. Need to explain a little more on how districts were classified and then how clusters were sampled. This is better but still not clear.

Our response: we have revised the description of district selection in the first paragraph in the Method part as follows:

“Given that PM10 is the major pollutant in Hong Kong and existing evidence suggests that PMs may be the most relevant air pollutant causing children’s respiratory morbidities through long-term exposure [11,15-16], three districts, labelled as low-pollution district (LPD), moderate-pollution district (MPD) and high-pollution district (HPD), were then selected from ten districts with urban general air monitoring stations based on the rank of their annual means for PM10 over the previous 10 years: LPD and HPD were the districts with the lowest and highest PM10 values respectively to maximise the difference in exposure levels. MPD was decided as its PM10 annual mean was nearest to the average of those in LPD and HPD.”

5. Length of time living in the districts needs further comment (e.g. is there much internal migration in the regions)?

Our response: Internal migration in Hong Kong is not common, especially for Chinese families with children. We have added the following explanations in the last paragraph in the Discussion part to further comment on this:

“Unlike those in western countries, most families having children in Hong Kong do not prefer moving in order to create a stable environment for their children’s growth, as shown in this study that only 5.6% of the participants (149/2641) had ever moved from one district to another over the past 12 months. Thus, the confounding effect of the length of living time might not be a major threat to this study.”
6. Change multivariate to multivariable in text.

Our response: We have made changes in text accordingly.

7. The results should be carefully considered in the light of other research into ambient air pollution and child respiratory health (there has been a lot of research in this area including meta-analyses)... what is new/ novel about this study?

Our response: we conducted a quick search in “Medline” and “Embase” using keywords of “air pollution”, “child”, “respiratory”, “meta-analysis”, and “systematic review” for relevant articles published after 2000. We read and selected one most relevant to this study and added the following comments in the third paragraph in the Discussion part:

“A meta-analysis involving four cross-sectional studies in China on the relationship between long-term exposure to ambient air pollution and child respiratory symptoms and diseases indicated that an increase of per µg/m3 annual mean for PM10 could increase the likelihood of respiratory morbidity by 0.44% (S.E. 0.02) [27].”

8. The conclusions are rather weak (e.g. providing advice to policy makers etc). Clearly explain what is the new evidence from this study.

Our response: we have revised the paragraph of Conclusion as follows:

“In conclusion, we have confirmed certain adverse effects on child respiratory health from exposure to ambient air pollution in a Chinese urban setting. The adverse effects observed for PM10 appear to be stronger than other pollutants. Girls were more vulnerable to NO2 than boys. Our findings may be transferable to other developing countries characterized by similar air pollution patterns to China. Along with an introduce of PM2.5 as a routine monitoring air pollutant in some big cities of China in 2013, the relatively high level of ambient air pollution and its health impact have been recently received unprecedented attentions from the Chinese public. There is an urgent call for the government to take effective actions to reduce air pollution level. Our findings can provide some evidence for professionals and policy-makers to improve air quality, in particular PM10 and NO2, to protect the health of the children.”