Author’s response to reviews

Title: Morbidity burden of respiratory diseases attributable to ambient temperature: a case study in a subtropical city in China

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Version: 3 Date: 23 Sep 2019

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Dear editors:

We appreciate your and the reviewers’ comments on our manuscript entitled (previous title; title has been edited in manuscript) "Moderate hot, rather than extreme hot, is mainly responsible for temperature-related excess outpatient visits for respiratory diseases: a case study in a subtropical city in China" (ENHE-D-18-00434R2). Those comments have helped us revise and improve our manuscript. Revisions are highlighted in red in the revised manuscript. Also, the new version of the manuscript has undergone comprehensive English language editing. We hope that the revision is acceptable and look forward to hearing from you soon. The point to point responses to the reviewers’ comments are as follows:

Comments from reviewer #2:
1. Responses to some of the questions were not convincing or addressed very well (e.g., Q1 & Q7).

Q1. "The hospital is one of the first-class hospitals in Dongguan." How many hospitals are in the city? What is the proportion of patients in this hospital to all patients in the city? Are the patients a representative sample of all patients in the city? Did all the patients live in the city before visiting the hospital so that they had the exposure to the heat?

RESPONSE: Thanks. There are 24 hospitals in Dongguan city. However, we were unable to examine all respiratory cases at all hospitals in Dongguan. Consequently, there was no way to calculate the proportion of patients in this hospital relative to all patients in the city and assess the representation of patients in our study. This is a limitation of this study and is mentioned in the Discussion section of the revised manuscript. The revised section of the manuscript reads: "Additionally, hospital visit data were gathered from one single hospital, which may limit the generalizability of our research findings." Due to medical insurance policy restrictions and convenience, patients living in other cities are more likely to go to hospitals in Guangzhou and Shenzhen which offer high-quality medical care. Most of the patients in our study were local residents.

Q7. Line 56, p 12-13: "We postulated that hot temperatures generally occur during daytime, and younger people outdoor and may be less aware of body temperature changes hot ambient temperatures than elderly." The interpretation of more burden from cold for older people is not convincing. Was it because that for certain conditions, e.g. COPD, most of the patients were older? Indeed, the findings regarding the impacts of cold on health of older people in the city have not been sufficiently addressed in Discussion.

RESPONSE: Thanks for the valuable comment. We revised the following sentences in the Discussion section: “On the contrary, we found that, for the elderly, the attributable fractions of total respiratory diseases, bronchiectasis, and asthma were caused by cold temperatures. The possible reasons are that respiratory diseases are highly prevalent among the elderly, and exposure to cold temperatures may increase the risk of developing pulmonary vascular resistance and thromboses [41,42]. Also, airway neutrophils, macrophages, and the levels of respiratory inflammation were increased in patients residing in cold environments. Thus, bronchospasm was easily aggravated in patients with asthma, and airway obstruction was easily aggravated in COPD [43].

2. The changes in the numbers in responding to questions 3 and 4 reduced the reliability of the data and results.

RESPONSE: Thanks. We apologize for these mistakes. We revised the definition of temperature range prior to peer review; however, we did not modify all the results. To address these errors, we have completely revised the manuscript.
3. The title and conclusions of the paper need tweaks, given there will be more extreme heat events and the higher relative risks from extremely hot days (I assume this is also the case in the study city). The interpretation of results and statement in the conclusion ("The younger populations were easily affected by hot temperature, while the elderly was more vulnerable to cold temperature.") need revision. The notion of "easily affected" in the above sentence and other parts of the paper is not clear at all. The authors did not define "easily," and it is not clear how the authors could conclude this.

RESPONSE: Thank you for this comment. We have revised the title to read "Morbidity burden of respiratory diseases attributable to ambient temperatures: a case study in a subtropical city in China." Our study conclusion was also revised to read: "Younger individuals were at increased risk following exposure to hot temperatures, whereas the elderly was more susceptible to cold temperatures."