Reviewer's report

Title: Associations between Air Temperature and Cardio-Respiratory Mortality in the Urban Area of Beijing, China: A Time-Series Analysis

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Reviewer: Daniela D'Ippoliti

Reviewer's report:

Major Compulsory Revisions

Even if the paper is well written, however some assumptions in the analysis make it difficult a clear interpretation of the results. The authors performed their main analysis considering the whole study period for the whole range of temperature. Then they applied two different temperature variables for exposure (2-day average and 15-day average mean temperature) and interpreted the findings as “heat effect” and “cold effect” respectively. This approach is not properly right because in this case the estimates represent only the average effect of temperature on 2 or 15 days while they attributed the “cold effect” to the inverse association founded, and this is simply an artifact. Furthermore, considering the whole range of temperature, the effect could be underestimated in each case.

Furthermore the authors investigated the lagged effect of temperature up to 29 days for the whole study period, warm and cold period and reported the RR of mortality in association with an IQR increase of temperature. Also in this case it is difficult to separate and to interpret the heat and cold effect for the whole study period considering an unique IQR of temperature.

For all these considerations, we suggest to the authors to report their analysis for the two periods separately.

The authors founded similar results for respiratory causes using 2-day and 15-day exposure. In this case they defined this as an “heat effect” in both cases (line 23 regression results section; fig. 2 and table 3 RR=0.859 15-day as “heat effect”), but they found the same results in the cold period (table 4 RR=0.884 15-day cold period). These results suggest that in the cold period for decrease in temperature mortality for respiratory causes decreases. These finding somewhat surprising and hard to interpret, and show an opposite relationship when compared with findings of other studies in the literature where a declining temperature is associated to an increase in respiratory mortality.

If this is the case for Beijing, the authors should discuss the plausibility of these findings.

Therefore the authors should revise the analysis and discuss more in dept the interpretability of their results and main conclusions.
Minor Essential Revisions

1. Authors should give a more exhaustive description about the population of Beijing in table 1, for instance including the age-structure. The figures in the daily deaths for each cause (ranging from 7 to 40 for respiratory and cardio-respiratory respectively) seems to be low for a population of about 9,500,000 persons.

2. In the analysis of the lagged effects the authors reported the RR for IQR of increase in temperature, without describing the values of the percentiles. They should include the 25th and 75th percentile of temperature in table 2.

3. In the text, when the authors described the analysis with PDL models, they should add that the estimates are reported RR for IQR of increase in temperature, while in the first part they expressed results as RR of mortality per 5°C increase/decrease in temperature.

4. In the section Results, the authors stated that for the age group 15-64 years the seasonal pattern is “no obvious”. This statement is unclear, and it would be interesting to know these results because the effects on younger populations are little known in the literature.

5. The authors selected the temperature breakpoint at 23 °C only by visual inspection, but this value could be confirmed with a more rigorous approach (i.e. segmented regression).

6. In the Discussion, the authors should discuss and give hypothesis to explain their results for respiratory mortality.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests