Reviewer’s report

Title: Effect of ambient temperature on emergency department visits in Shanghai, China: a time series study

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Reviewer: Jeremy Hess

Reviewer’s report:

Thank you for the opportunity to review this manuscript, a retrospective study of associations between ambient temperature and emergency department visits in Shanghai, China, over a six-year period. The topic of associations between temperature and emergency department visits has been addressed in several settings but not in middle-income countries such as China, so this paper will be a welcome addition to the literature.

The authors have articulated their research question clearly and their methods are appropriate and generally well-described. The article is well written, and the title accurately reflects the study’s focus. The abstract needs some revision but overall adequately summarizes the approach and results. The paper itself needs some significant revisions, and would be strengthened with additional information regarding the population studied, exposure data, and the choice of outcome. Their study would also be strengthened by more rigorous comparison with other studies of similar relationships in the literature and by clarification of the practical implications of their findings.

Per the journal’s convention, I have divided my comments into several categories to facilitate revision.

Major Compulsory Revisions:

1. One major strength of this study is its sample size. However, the reader needs more information about sample demographics. They state that the sample is drawn from the 5.92 million Shanghai residents who participate in basic social medical insurance, also referred to as pension insurance elsewhere in the paper. Readers unfamiliar with the Chinese health care system will wonder about the general demographic profile of this sample. Moreover, more information regarding sample demographics will help readers determine how generalizable the findings may be. The reader is left with many questions about the constitution of the sample, i.e., does it include children? Are all individuals in the sample pensioners, i.e. retired? This has implications for generalizability to a working-age population and possible occupational exposures. The authors should present basic sample demographics in Table 1 and characterize the sample in relation to the rest of the Chinese population in the text.

2. More information is also needed about the exposure data. The authors note that weather data are from a single station but do not provide information about
where that station is located, whether there are any missing data, and how representative weather data from this station are for the geographic area from which their population sample was drawn.

3. Another exposure concern relates to the issue of ozone. Importantly, the study controls for other criterion air pollutants but not ozone. It would be helpful for the authors to comment on this choice and the possible implications for their analysis.

4. The authors should also provide an explanation of why they chose mean temperature as the exposure rather than maximum or minimum temperature, and why they controlled for humidity instead of evaluating a synthetic measure such as humidex or apparent temperature. These are important analytic choices that may be entirely justified but the reasoning needs to be explained.

5. The primary outcome in this study is an emergency department (ED) visit for any cause. It would be helpful if the authors could provide a definition of an ED visit and the associated day. Does it start at midnight and go for 24 hours? This will be helpful in understanding the analysis of lag structures.

6. Also, it would be helpful to know why the authors chose all-cause ED visits as their primary outcome. Many of the cases seen in EDs are not temperature-sensitive. It is reasonable to choose all-cause visits as the initial outcome and then explore more temperature-sensitive outcomes, but the authors might want to comment on this choice. If the authors have access to chief complaints or discharge diagnoses, however, they may also want to analyze major subsets of outcomes, e.g. cardiac or respiratory complaints, to give a sense of how the exposure-outcome association may change based on the outcome being considered.

7. On page 4 the authors state that “Other studies have focused specifically on ED data.” They should start a new paragraph at this point and elaborate further on the findings reported in the studies cited in order to orient the reader more fully. They should, for instance, list the outcomes for which there were same-day effects found in the (Basu et al. 2012) reference. The authors should also include a review by Ye et al. published in 2011 in Environmental Health Perspectives (http://ehp.niehs.nih.gov/1003198/). It would also be helpful if the authors would report on the magnitude of the effects reported in other studies and then compare these effects with their results in the Discussion section.

Minor Essential Revisions:

1. It would be helpful to the reader if the authors would provide more information on ED use in Shanghai, as ED utilization patterns and the populations that tend to use the ED differ widely around the world.

2. The authors do not say anything about institutional ethics board review of their study. Can the authors comment on whether the study was reviewed?

3. In the Conclusion the authors state that “…these findings suggest that
preventive programs targeting high risk subgroups may reduce the impact of ambient temperature on population health.” They make a similar statement in the Abstract. While these statements may be true, the analysis does not specifically support them, as the analysis did not identify high-risk subgroups, nor did it identify outcomes wherein preventive programs have any proven efficacy. The authors should rephrase this statement and consider what the true implications of their findings may be for public health and what the findings add to our knowledge base regarding ambient temperature and ED visits.

Discretionary Revisions

1. It would be helpful, but not compulsory, to know if there have been any assessments of Shanghai’s urban heat island to help the reader get a sense of the magnitude of any exposure misclassification.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:

I declare that I have no competing interests.