

We thank the reviewers for re-reviewing the paper and confirming that the original comments had been appropriately addressed. We describe below how we have further revised the paper based on the new comments. All page/line numbers refer to the tracked manuscript.

## **Reviewer #2**

**The authors are commended for their detailed and careful appraisal of reviewer comments. The revised manuscript reflects a diligent and persuasive response.**

**In particular, concerns regarding the choice of scale (both spatial and temporal) have been addressed. The further analyses, at smaller scale and over periods of days rather than months, are reasonable efforts to test the robustness of the conclusion. Temperature-injury associations considering anomalies based on mean monthly temperatures have been supplemented with sensitivity analyses that consider other plausible anomalies. The coefficients of these additional models are reported to be ‘generally not significant’. The authors report their efforts to reconsider associations at a county (rather than state) level, but note that doing so for the full model was not feasible due to computational challenges. This should be noted among the limitations as variations at the level of small area units could provide more informative data relevant to the questions posed.**

We have added this issue as a limitation of the current analysis, and as a potential for future research (P. 20, Lines 513-521).

**Regarding concerns relating to context: The authors acknowledge that a study at this scale cannot capture the effects of local circumstances on injury rates but argue the value of the endeavour to consider effects at a broader level. The authors consider our previous comments to have related to effect modification. In fact, both effect modification and confounding are likely to be relevant. Poor housing quality, for instance, acts both to increase exposure to high temperatures (while being an independent risk factor for injury); and, to amplify the stress on individuals for any given ambient temperature. It is noted that the limitations section acknowledges the likelihood of confounding.**

This exchange may simply reflect our specific choices of terminology. To reflect this point, in addition to the earlier addition on confounding, the above-mentioned addition to the limitations section now specifies, in non-jargon terminology, that the impacts of anomalous temperature may depend on socioeconomic, environmental, infrastructure and health/social care factors (P. 20, Lines 515-521).

**We raised concerns regarding the masking of effects using very broad categories of injury. The authors provide an example of how this concern can be addressed providing an analysis that disaggregates road transport injuries in place of all transport injuries. We recommend such an analysis alongside others that are manageable within the means of the data available is incorporated in the manuscript.**

We have added these materials to the revised paper (P. 20, Lines 521-527 and Extended Data Figure 5).

**We noted several errors in the use of ICD codes and related terms in the original manuscript. These are now addressed.**

No action needed.

**We were concerned regarding the exclusion of Hawaii and Alaska from the analyses. We accept the explanation provided which is now incorporated in the manuscript.**

No action needed.

**We note that the authors have changed the unit increase from +1 degrees to +2 degrees, in line with the comparisons made commonly in the climate change literature. They offer to include other increments. We suggest +1.5 degrees, given the Paris undertaking, and the interest many governments have regarding the differences in impacts between 1.5 and 2 degrees of warming.**

We have changed the main results to +1.5°C with results for +2°C presented as Extended Data and summarised in the main paper (P. 5, Lines 113-116 and Extended Data Figures 3 and 4).

### **Reviewer #3**

#### **Remarks to the Author:**

**General comments: I thank the authors for their careful and attentive responses to my comments.**

**I have just a few comments remaining:**

**L205. Should be  $\log(\text{death rate}_{\{\text{state-time}\}})$ .**

Indeed, and we have corrected (P. 14, Line 362).

**L238-239. "or state ICAR random effects was constrained to sum to zero".**

**Penalized complexity priors (see Simpson et al, 2017, Statistical Science) would be a better choice for variance components.**

We realise that penalized complexity (PC) priors are increasingly popular due to a number of factors including that they allow probability mass at zero. However, using them requires a prior view of the size of the random effects and hence of each standard deviation. Putting aside that this sort of prior view is somewhat subjective, once we go beyond models that have one or two random effects to a complex/multi-dimensional model such as ours (with eleven sets of random effects), it creates a real challenge in deciding what combinations of distributions are appropriate and how to avoid spurious choices. We showed in the last set of revisions that our results are robust to alterations to the parameters of the current prior. We have nonetheless added the issue of choice of priors, including the potential to use PC priors, as a "limitation" of the Bayesian models in general (PP. 20-21, Lines 527-532).

**I do think it's difficult to understand the implications of modelling at one temporal and one spatial scale versus another. Here the authors chose month and state.**

**The authors could look at county level analysis for a restricted number of states.**

We could attempt this analysis. However, its findings would not be comparable with the main analysis because in the main analysis the effects of temperature are informed by data from all states. As also suggested by the Editors' we have therefore not done so. We have a long-term research agenda on computational feasibility of spatial analyses for a large number of units and inevitably will return to this topic once that advances.

### **Editors' comments**

**In the course of your revisions, we would like for you to please include the additional +1.5 degree increment as suggested by reviewer 2. However, we do not feel that you need to present the county-level analysis as suggested by Reviewer 3. We also feel that the figure you have provided to justify the use of "transport" as an unsplit category might be useful for readers. Might I suggest you include a brief sentence about this in the methods and include the figure you have supplied in your response to reviewers as an Extended Data figure.**

We have done all of these. Specifically, as above we now present main results based on +1.5°C with results for +2°C presented as Extended Data and summarised in the main paper. We also mention the

issue of sub-categories using the example of road transport (P. 20, Lines 521-527) along with the corresponding figure (Extended Data Figure 5).

**Although when we move forward with the paper, I will send you all of our formatting requirements. For now, please might you restructure the abstract to the format of a Letter. The abstract can be up to 200 words and should be referenced appropriately and contiguously with the references in the main paper.**

We have followed this format for the abstract and would be happy to further adjust as needed; it is currently 197 words long.

**Additional references beyond 40 should only be available in the methods and should run continuously from those in the main text.**

We have done so.

**You may have up to 4 main figures and up to 10 Extended Figures--up to you, but might I suggest including the figures for either 2+ or 1.5+ degree changes as Extended Figures, unless these can be displayed adequately in the same figures.**

We have moved the previous Figure 3 to Extended Data. The results for +2°C are also presented as two Extended Data Figures (3 and 4) as showing them side by side would make the figures harder to follow and interpret.

**We do not allow for Supplementary Figures, please rename Supplementary Figures as Extended Data. You may have unlimited numbers of Supplementary Tables, which will be available to readers as an unedited pdf from the online version of the paper.**

We have changed all the supplementary materials to Extended Data as they are relatively small, stand-alone sources of information.