## PEER REVIEW HISTORY



## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | Exposure to hot and cold temperatures and ambulance attendances in Brisbane, Australia: A time series study |
| **AUTHORS** | Lyle R Turner, Des Connell and Shilu Tong |

## VERSION 1 - REVIEW

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| **REVIEWER** | Liz Hanna<br><br>Convenor:<br>Climate Change Adaptation Research Network - Human Health<br><br>Fellow:<br>National Centre for Epidemiology & Population Health,<br>The Australian National University, |
| **REVIEW RETURNED** | 20/04/2012 |

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| **GENERAL COMMENTS** | Congratulations. Good work.<br>Readers may not be familiar with the temperature ranges found in Brisbane.<br>Please provide temp ranges eg for the summer & winter months, av Tmax & Tmin. This will enable readers to contextualize the population response to temperature, as optimal climate zones vary between climates. |

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| **REVIEWER** | Katrin Burkart, Dr. rer. nat.<br><br>Department of Geography, Climatological Section<br>Faculty of Science<br>Humboldt-Universitaet zu Berlin<br><br>I declare not to have any competing interests |
| **REVIEW RETURNED** | 03/05/2012 |

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| **GENERAL COMMENTS** | This is a highly important and well-composed manuscript. Indeed, research on heat /cold effects on morbidity in general and ambulance attendance in particular is rather scarce. Therefore, I strongly appreciate the authors attempt to approach this research question. The data set is extensive and the statistical approach is adequate. Nonetheless, there are two aspects on which, I believe, the authors should further elaborate.<br><br>First, ambulance data is highly sensitive towards confounding influences. Thus, model adjustment is of foremost importance and a quite challenging task when analysing morbidity data. So far, we learn from the manuscript, that the authors adjusted for humidity, air |

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| | pollution, trend, season, day of the week and holiday. However, there is no information on how the authors choose the confounder variables (have other possible confounders also been tested?). Additionally, it might be interesting for the reader to see the unadjusted model outputs (possibly in a supplementary file). Moreover, temperature, humidity and air pollution parameters are often highly correlated thus resulting in multicollinearity. This possible problem is not at all elucidated or discussed in the paper. Here, it might be advisable to test for multicollinearity and choose single air pollution parameters which are integrated in the models. For considering humidity, it might be sensible to use an apparent temperature such as the Heat Index or Wind Chill Index, the Physiological Equivalent Temperature (PET) or the Universal Thermal Climate Index (UTCI). |

**VERSION 1 – AUTHOR RESPONSE**

Reviewer #1
Comment 1: Readers may not be familiar with the temperature ranges found in Brisbane. Please provide temp ranges; e.g., for the summer & winter months, av Tmax & Tmin. This will enable readers to contextualize the population response to temperature, as optimal climate zones vary between climates.
[Response:] We have included average maximum and minimum values for both summer and winter into the text as suggested (p 8).

Reviewer #2:
Comment 1: First, ambulance data is highly sensitive towards confounding influences. Thus, model adjustment is of foremost importance and a quite challenging task when analysing morbidity data. So far, we learn from the manuscript, that the authors adjusted for humidity, air pollution, trend, season, day of the week and holiday. However, there is no information on how the authors choose the confounder variables (have other possible confounders also been tested?).
[Response:] We chose these confounders because, in the literature, they are regarded as major factors which are likely to confound the assessment of the relationship between exposure to extreme temperature and health outcomes (eg, mortality and morbidity) (Refs). .

Comment 2: Additionally, it might be interesting for the reader to see the unadjusted model outputs (possibly in a supplementary file).
[Response:] We have added the unadjusted model outputs in a supplementary table as the reviewer suggested.
Comment 3: Moreover, temperature, humidity and air pollution parameters are often highly correlated thus resulting in multicollinearity. This possible problem is not at all elucidated or discussed in the paper. Here, it might be advisable to test for multicollinearity and choose single air pollution parameters which are integrated in the models. For considering humidity, it might be sensible to use an apparent temperature such as the Heat Index or Wind Chill Index, the Physiological Equivalent Temperature (PET) or the Universal Thermal Climate Index (UTCI).
[Response:] In the revision, we've included correlations for temperature, humidity and air pollutants in Table 2. These independent variables had a weak or moderate correlation each other. In terms of utilising other temperature measures such as apparent temperature or heat index, recent work (Barnett et al. 2010, Hajat and Kosatky 2010) has found that there exists little difference in effect estimates using various temperature measures. Hence we decided to incorporate temperature and humidity separately.

We are grateful for being given the opportunity to revise our manuscript, and look forward to further communications.

Sincerely,
Lyle Turner, Des Connell, Shilu Tong

References

Barnett AG, Tong S, Clements ACA. What measure of temperature is the best predictor of mortality. Environ Res 2010;110: 604–611.

Hajat S, Kosatky T. Heat-related mortality: a review and exploration of heterogeneity. J Epidemiol Community Health. 2010;64: 753–760.

**VERSION 2 – REVIEW**

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| **REVIEWER** | Katrin Burkart, Dr. rer. nat.<br><br>Department of Geography, Climatological Section<br>Faculty of Science<br>Humboldt-Universitaet zu Berlin<br><br>I declare not to have any competing interests |
| **REVIEW RETURNED** | 23/05/2012 |

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| **GENERAL COMMENTS** | I agree with the revisions |