



Supporting Information

Supplementary methods and results

**This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.**

Appendix to: Varghese B, Hansen A, Mann N, et al. The burden of occupational injury attributable to high temperatures in Australia, 2014–19: a retrospective observational study. *Med J Aust* 2023; doi: 10.5694/mja2.52171.

Supplementary methods

Estimation of YLD for occupational injuries

Two data sources were used for Years of Life Lost due to Disability (YLD) estimations of the burden of occupational injury. To avoid double counting of occupational injury, these were: (1) workers' compensation claims data (which cover 'severe injuries' requiring admission to hospital and 'non-severe injuries' requiring medical attention but not hospitalisation); and (2) hospital separations for injuries which occurred while the patient was working and not covered by workers' compensation. Workers' compensation claims data for 1 July 2014 to 30 June 2019 were obtained from the Safe Work Australia National dataset for compensation-based statistics.¹ Hospital separations data for the study period were obtained from the Australian Institute of Health and Welfare (AIHW) National Hospital Morbidity Database.² YLD calculations are based on estimated time in less than full health because of disease or injury and a disability weight that reflects the severity of non-fatal health loss (from 0 = perfect health to 1 = equivalent to death).³ Workers' compensation data were aggregated by injury, and time off work (by injury category) was used as a proxy for estimating health loss. Disability weights were derived from the Global Burden of Disease (GBD) 2013 study.⁴ The disability weights are fixed for a given injury and severity, but the severity of injuries within injury categories can vary. Consequently, the GBD weights were adjusted using a severity adjustment factor, time off work divided by the mean time off work for an injury in that category. The final weight used to calculate the YLD was the 'severity-adjusted health loss', or: GBD 2013 disability weight \times severity adjustment factor. Author Nick Mann calculated YLD and aggregated YLD for each category of injury by multiplying the point prevalence of the injury (the number of people with an occupational injury and its consequences), the severity-adjusted health loss, and the duration of the consequences (in years).

References

1. Safe Work Australia. National dataset for compensation-based statistics 3rd edition (Revision 1). 15 Nov 2021. <https://www.safeworkaustralia.gov.au/doc/national-dataset-compensation-based-statistics-3rd-edition-revision-1> (viewed Jan 2023).
2. Australian Institute of Health and Welfare. National Hospitals Data Collection. 15 Nov 2021. <https://www.aihw.gov.au/about-our-data/our-data-collections/national-hospitals-data-collection> (viewed Jan 2023).
3. Australian Institute of Health and Welfare. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2018 (Cat. no. BOD 29). 24 Nov 2021. <https://www.aihw.gov.au/reports/burden-of-disease/abds-impact-and-causes-of-illness-and-death-in-aus/summary> (viewed Jan 2023).
4. Global Burden of Disease Study 2013 collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015; 386: 743-800.

Figure 1. Australia: mean annual temperatures (°C), 2014–19, by Statistical Area Level 2 (SA2)

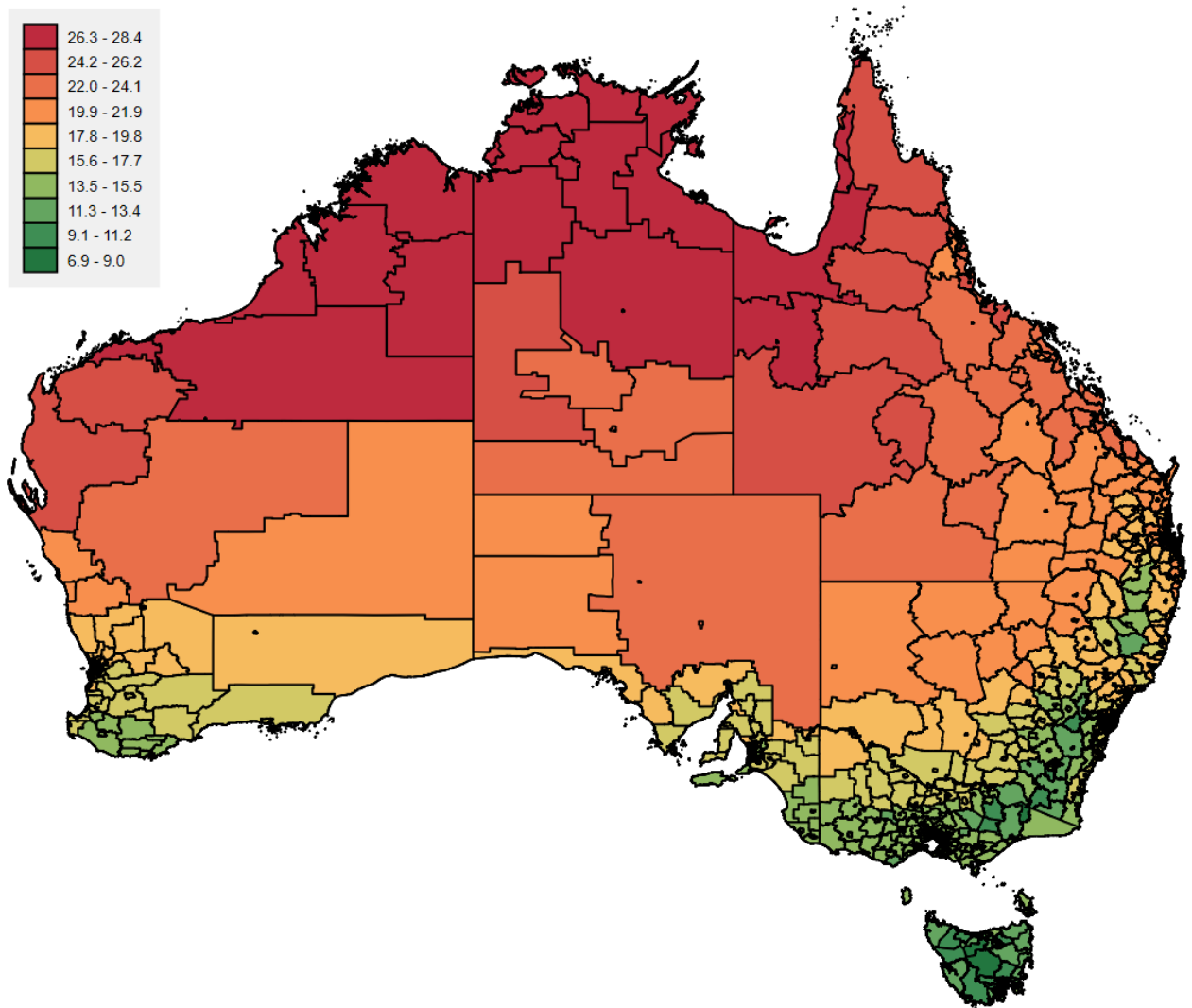


Table 1. Sensitivity analyses by varying modelling choices (reference temperature, exposure period, data source, uncertainty analysis, shape of the exposure-response curve, and exposure metric)

Modelling choices	Heat-attributable disability-adjusted life years (DALYs)	Heat-attributable DALYs as proportion of occupational injury DALYs
Reference temperature		
Main model (annual mean temperature as reference)	967	2.3%
Using median temperature	775	1.8%
Using most frequent temperature	1060	2.5%
Exposure period		
Main model (mean annual mean temperature, 2014–19)	967	2.3%
2014 annual mean temperature	852	2.0%
2015 annual mean temperature	1063	2.7%
2016 annual mean temperature	944	2.2%
2017 annual mean temperature	1019	2.4%
2018 annual mean temperature	952	2.2%
Exposure data source		
Main model (Bureau of Meteorology 5 km data)	967	2.3%
ECMWF re-analysis v5 2 m temperature	931	2.2%
Uncertainty analysis		
Relative risk (RR)	967	2.3%
Lower 95% confidence interval of RR	769	1.8%
Upper 95% confidence interval of RR	1303	3.0%
Shape of the exposure–response curve		
Main model (log-linear)	967	2.3%
Non-linear: quadratic	982	2.3%
Non-linear: cubic	983	2.3%
Exposure metric		
Main model (annual mean temperature as reference)	967	2.3%
Annual mean maximum temperature	901	2.1%
Annual mean minimum temperature	931	2.2%

ECMWF = European Centre for Medium-Range Weather Forecast (<https://www.ecmwf.int/en/forecasts/dataset/ecmwf-reanalysis-v5>).