MAPPING THE COMFORT ZONE ACROSS THE UNITED STATES

Barnett, Adrian Gerard, *Queensland University of Technology, Australia*
Soares Magalhães, Ricardo Jorge, *University of Queensland, Australia*

Background and Aims: The risk of death increases on both cold and hot days. The "comfort zone" is the range of moderate temperatures where the risk of death is lowest. The comfort zone has previously been defined using the indoor temperatures at which people feel comfortable. We aimed to define empirical comfort zones by finding the cold and hot temperature thresholds beyond which the risk of death increases.
Methods: We estimated the comfort zone in 97 US cities for 14 years (1987–2000). We assumed a U-shaped association between daily mean temperature and risk of death in each city by using a linear spline with movable cold and hot thresholds. We controlled for dew point temperature and season. A Bayesian geostatistical model was used to map the thresholds and comfort zone over the contiguous US.
Results: The average cold threshold was a surprisingly low 34 °F, the average hot threshold was 74 °F, giving an average comfort zone width of 40 °F. The cold threshold was lowest in Wisconsin and Michigan, and highest in Florida. The hot threshold was lowest in Maine and Washington, and highest in Florida. The comfort zone was widest in South Dakota and its neighbouring states (over 60 °F), and was narrowest in California and Florida (under 15 °F). There was little difference by age group, with the under 65 year age group having an average comfort zone width only 2.5 °F wider than the over 74 year age group.
Conclusions: The comfort zone is highly variable across the United States, with cold climate states coping with the widest ranges in temperature. The warmest states had the narrowest comfort zones suggesting that populations in these areas will struggle most with the increase in extreme temperatures expected under global warming.