Correspondence: response to Burkart et al. Lancet 2021

Title: Estimating global mortality burden attributed to non-optimal temperatures.

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Burkart et al. (2021) presented an ambitious study of global mortality burden attributable to non-optimal temperatures within the Global Burden of Disease (GBD) framework.[1] The authors reported that 3% of deaths globally could be attributed to non-optimal temperatures in 2019, with 2.4% for cold and 0.6% for heat. While estimates of heat-mortality burden are broadly consistent with current literature, substantial differences exist for the contribution of cold when compared to recent assessments at global and regional scales.[2–4] We believe that these differences are the result of critical methodological limitations in Burkart et al. (2021), mainly the failure to adequately address the complexities of temperature-mortality

relationships, likely resulting in an underestimation of the impacts. The authors only accounted for the effects on the same day (i.e. lag 0), while substantial epidemiological evidence shows the presence of lagged effects of temperature (up to 3 weeks for cold) and/or mortality displacement.[5] Additionally, the applied method does not account for seasonality or long-term trends, strong confounders in this analysis.[5] See Figure 1 for an illustration of the markedly different results from the two approaches using data from Greater London (UK). A critical lens needs to be applied to any analytic framework, to ensure its suitability and to increase confidence in the results. The analyses by Burkhart et al. (2021) would have benefited from incorporating methodological developments over the last 20 years in climate epidemiology. Providing robust and reliable estimates of the burden of non-optimal temperatures are increasingly important in a changing climate.

References:

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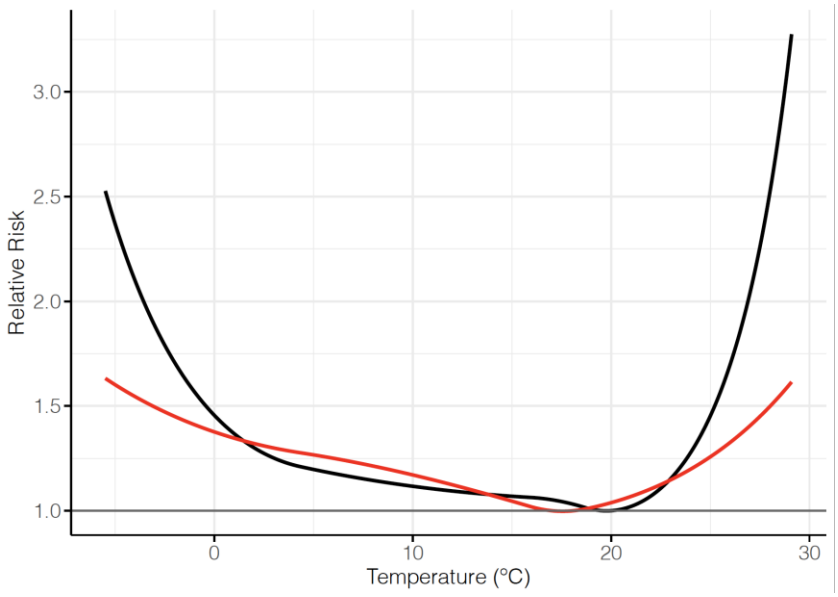

Figure 1. Comparison between temperature-mortality association estimated with different modelling approaches for London (1990-2012) (red: mortality risk at lag 0 and not accounting for seasonality or long-term trends, similar to Burkart et al. 2021; black: overall cumulative risk up to 21 lags, similar to Zhao et al. 2021 accounting for long-term and seasonal trends).