Is heat stress more indicative of summer mortality than temperature alone?

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Extreme high temperatures are associated with elevated human mortality risks. This is evidenced by a typically U- or J-shaped relationship between daily temperature and mortality found for most places in the world where data exist. However, high temperature is not the only contributor to heat stress. Humidity is also an important factor because it affects evaporation of sweat, which is crucial for cooling the human body in hot environments. Although various heat stress metrics, many of which are a combination of atmospheric temperature and humidity based on different physiological assumptions, have been developed to estimate heat stress, the relationship between these metrics and mortality remains unclear.

In this study, the relationships between seven heat stress metrics — wet bulb temperature, apparent temperature, discomfort index and swamp cooler temperatures at four different efficiencies [1] — and mortality are systematically assessed using well-established Distributed Lag Non-linear Models (DLNMs) [2]. The predictive powers of these metrics, as well as that of daily mean temperature, are compared for the summer season at global locations in 39 countries, where sufficient meteorological and health data are available [3]. The results of this study provide new information as to which of these metrics are most indicative of summer mortality in different locations, and whether the 'best-fit' heat stress metric for a location gives a substantially different mortality estimate compared to the commonly used daily mean temperature. These results have important implications for heat-health impact monitoring, developing national and international heat-health action plans, as well as for projecting future heat-related mortality under different climate change scenarios.

References:

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