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Changes in heat-attributable deaths in Prague, Czech Republic, over 1982–2019

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Studies projecting the impacts of future climate change on temperature-mortality relationships suggest increasing heat-related mortality in most regions of the world. On the contrary, a reduced risk of heat-related mortality has been observed in many countries over the last decades, suggesting a positive effect of technological development and improved health care systems. However, most of the studies show that the decline in vulnerability of populations to heat has abated in the early 2000s and further decreasing trend is unlikely.

In this study, we analysed temperature-mortality relationships in Prague, Czech Republic during 1982–2019. The study was restricted to five warmest months (May–September). To investigate possible changes in the temperature–mortality relationship, the study period was divided in four decades (1980s to 2010s). Conditional Poisson Regression coupled with the Distributed Lag Non-Linear Model (DLNM) was run separately in each decade, to derive decade-specific temperature–mortality associations. A stratum indicator variable composed of year, month, and day of the week was used to control for long-term, seasonal trends and weekly effects. The DLNM approach was applied in order to analyse delayed effects of temperature on mortality. The attributable number of deaths (AD) and the attributable fraction (AF %) of total May–September deaths on hot days was calculated from the model’s outputs, separately for each decade. Hot days were defined as days with daily mean temperature larger than the 95th percentile of the decade-specific May–September distribution.

We observed a quadratic trend shape in the number of deaths attributable to heat; maximum in the 2010s and minimum in the 1990s. The total number of heat-attributable deaths increased from ≈ 500 to almost 900 per decade between the 1980s and the 2010s, which corresponds to the fraction of 0.90 and 1.75 %, respectively, of the total number of deaths in a warm season.