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Impacts of temperature extremes on cardiovascular morbidity and mortality in the Czech Republic

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Elevated mortality associated with high ambient temperatures in summer represents one of the main impacts of weather extremes on human society. Increases in cardiovascular mortality during heat waves have been reported in many European countries; much less is known about which particular cardiovascular disorders are most affected during heat waves, and whether similar patterns are found for morbidity (hospital admissions). Relatively less understood is also cold-related mortality and morbidity in winter, when the relationships between weather and human health are more complex, less direct, and confounded by other factors such as epidemics of influenza/acute respiratory infections.

The present study analyses relationships between temperature extremes and cardiovascular morbidity and mortality. We make use of the datasets on hospital admissions and daily mortality in the population of the Czech Republic (about 10.3 million) over 1994-2009. The data have been standardized to remove the effects of the long-term trend and the seasonal and weekly cycles. Periods when the morbidity/mortality data were affected by epidemics of influenza and other acute respiratory infections have been removed from the analysis. We use analogous definitions for hot and cold spells based on quantiles of daily average temperature anomalies, which allows for a comparison of the findings for summer hot spells and winter cold spells. The main aims of the study are (i) to identify deviations of mortality and morbidity from the baseline associated with hot and cold spells, (ii) to compare the hot- and cold-spell effects for individual cardiovascular diseases (e.g. ischaemic heart disease I20-I25, cerebrovascular disease I60-I69, hypertension I10, aterosclerosis I70) and to identify those diagnoses that are most closely linked to temperature extremes, (iii) to identify population groups most vulnerable to temperature extremes, and (iv) to compare the links to temperature extremes for morbidity and mortality.