



Do sudden air temperature and pressure changes affect cardiovascular morbidity and mortality?

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Previous studies have shown that sudden changes in weather (usually represented by air temperature and/or pressure) are associated with increases in daily mortality. Little is understood about physiological mechanisms responsible for the impacts of weather changes on mortality, and whether similar patterns appear for morbidity as well. Relatively little is known also about differences in the magnitude of the mortality response in provincial regions and in cities, where the impacts may be exacerbated by air pollution effects and/or heat island.

The present study examines the effects of sudden air temperature and pressure changes on morbidity (represented by hospital admissions) and mortality due to cardiovascular diseases in the population of the Czech Republic (approx. 10 million inhabitants) and separately in the city of Prague (1.2 million inhabitants). The events are selected from data covering 1994-2009 using the methodology introduced by Plavcová and Kyselý (2010), and they are compared with the datasets on hospital admissions and daily mortality (both standardized to account for long-term changes and the seasonal and weekly cycles). Relative deviations of morbidity/mortality from the baseline were averaged over the selected events for days D-2 (2 days before a change) up to D+7 (7 days after), and their statistical significance was tested by means of the Monte Carlo method. The study aims at (i) identifying those weather changes associated with increased cardiovascular morbidity/mortality, separately in summer and winter, (ii) comparing the effects of weather changes on morbidity and mortality, (iii) identifying whether urban population of Prague is more/less vulnerable in comparison to the population of the whole Czech Republic, (iv) comparing the effects for different cardiovascular diseases (ischaemic heart diseases, ICD-10 codes I20-I25; cerebrovascular diseases, I60-I69; hypertension, I10; atherosclerosis, I70) and individual population groups (by age and gender), and (v) identifying physiological mechanisms which play roles in deteriorating health conditions of vulnerable population groups.

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