Effects of temperature extremes on hospital admissions for cardiovascular diseases

The thesis compares differences in the impacts of warm and cold days on both excess mortality and hospitalizations for individual cardiovascular diseases (CVDs) in Prague and a selected rural region (southern Bohemia – JČ) consisting of the Jihočeský kraj and Vysočina districts in the period 1994–2009. Population size and age structure are similar in the two regions. The differences are compared between selected population groups (men and women; < 65 and 65+ years). Value of the 90% (10%) percentile of daily mean air temperature in summer (winter) during the period were used for the definition of warm (cold) days for each region separately. The excess mortality and hospitalizations were determined as the difference from standardized daily counts of death and hospital admissions, adjusted for epidemics of influenza/acute respiratory infections, long-term changes, and for annual and weekly cycles of mortality and hospitalizations.

Generally higher relative excess CVD mortality on warm days was identified in Prague, while for cold days we found higher excess mortality in south Bohemia. In contrast to mortality, weak excess CVD hospitalizations were observed for both warm and cold days. Significant ($p = 0.05$) excess hospitalizations were observed for chronic CVDs. Different responses of individual CVDs to heat/cold stress were observed, which are probably caused by the different nature of each CVD and different physiological processes induced by high/low ambient temperatures.

The regional differences between Prague and south Bohemia indicate influence of the urban heat island effect and lower altitude of Prague on heat-stress together with other factors such as prolonged exposure to air pollution, a different lifestyle, and a different structure of the population (e.g. in education, employment) in urban/rural regions, which may result in different vulnerability to temperature extremes.

**Keywords:** mortality, hospital admission, morbidity, cardiovascular disease, heat and cold stress, urban and rural differences, the Czech Republic