The spatial mortality distribution of an urban population in the Czech Republic, 2001-2011

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Abstract:

Population mortality and morbidity conditions, its spatial, structural and temporal distribution and monitoring are important concerns in epidemiology and public health policy. Research outcomes serve as a starting point in order to address health inequality interventions in both structural and spatial context. Similar to other CEE and EU countries, the population of the Czech Republic is also being strongly affected by processes of urbanization and demographical changes since several decades.

The aim of the paper is to evaluate structural and spatial mortality distribution of selected Czech city/town populations within the inter-censual period of 2001-2011. The paper is part of the author´s Charles University Grant Foundation post-gradual project interest. The project builds on the concept of the UCL *INEQ-CITIES* study, applying new advanced statistical methods based on the principles of *generalized mixed modelling*, taking into account inner variance heterogeneity, spatial structure as well as interdependence (autocorrelation) of analyzed spatial units (in literature often termed as *Bayesian mapping methods*).

Figure 1: Selected cities/towns and their geographical location wihin the Czech Republic.

Figure 2: Standardized mortality rates by gender and causes of death, selected Czech cities/towns, 2001-2011.

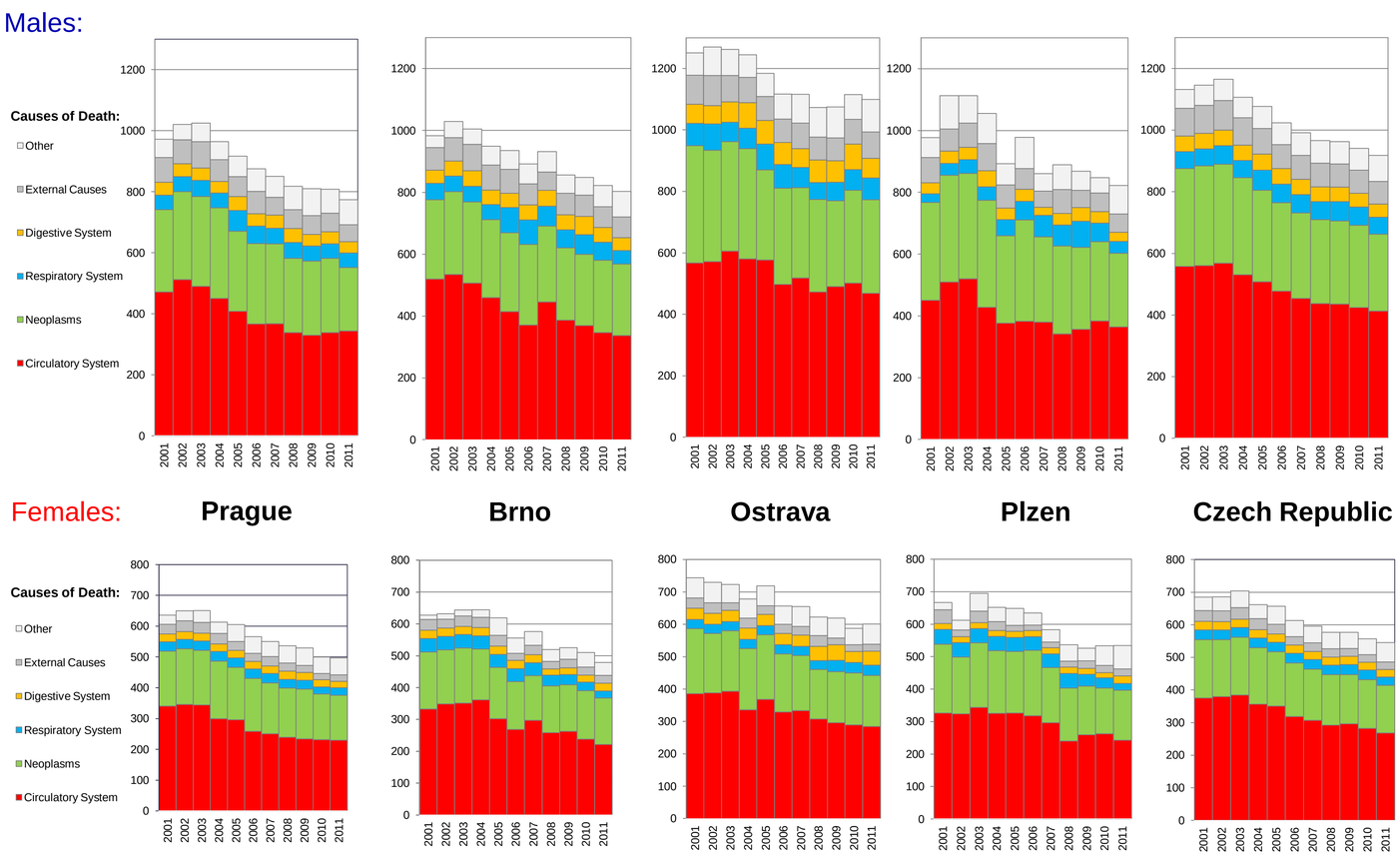


Figure 3: Spatial distribution of the all-causes mortality, smoothed standardized mortality ratios (sSMR), Capital City of Prague, 2001-2005, 2007-2011.

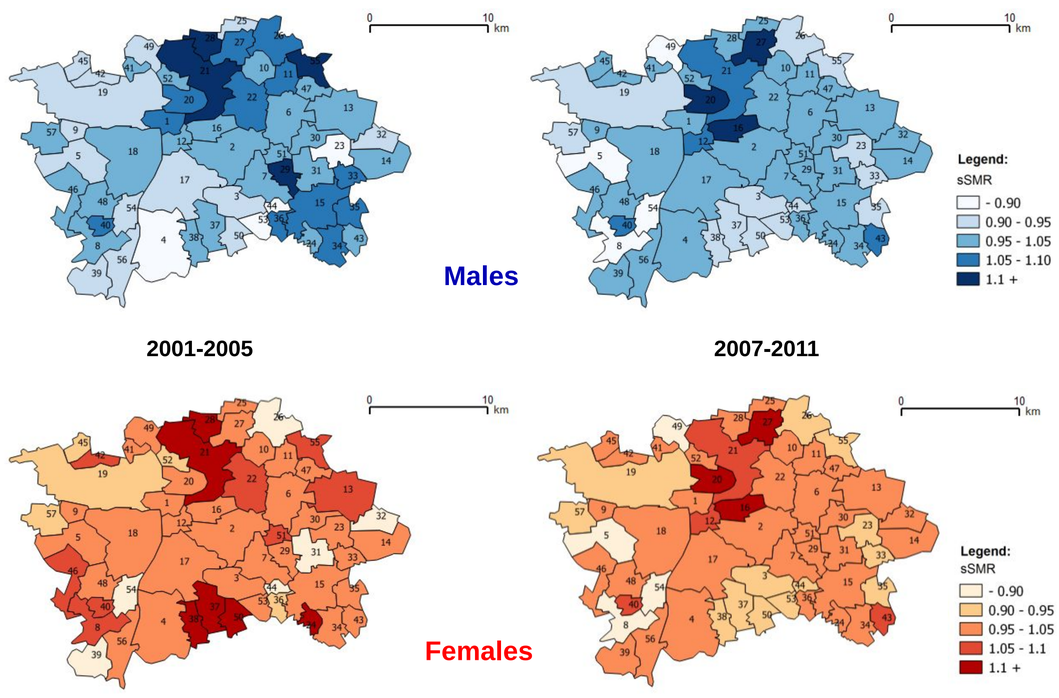
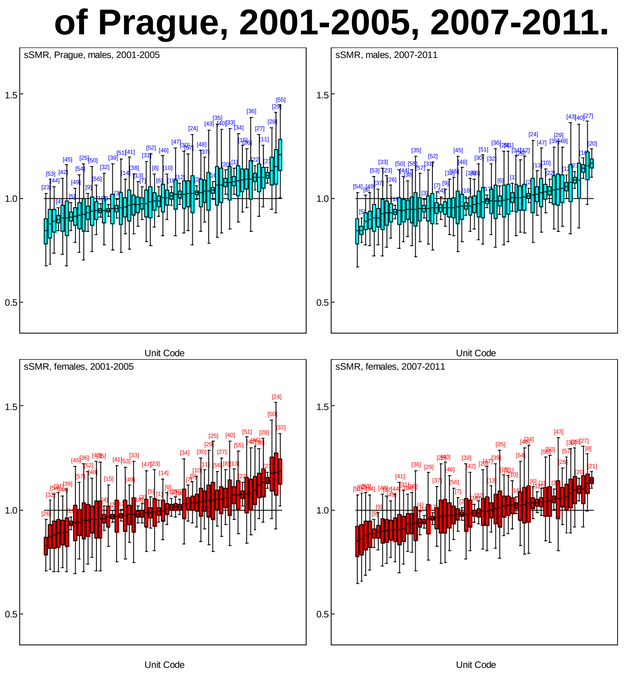


Figure 4: Smoothed standardized mortality ratios (sSMR) by gender, all-causes mortality, districts of the Capital City of Prague, 2001-2005, 2007-2011.



Methods:

The age-standardized mortality rates for leading causes of death within each year of the analyzed period were constructed for selected largest cities/towns of the Czech Republic separately for both genders and compared to the general Czech population (European Standard Population, 1970). In the case of the Capital City of Prague, disposable data allowed for the standardized mortality ratios construction on the intra-population level of districts for both genders within two 5-year inter-censual periods. Subsequently, Bayesian hierarchical disease mapping methods were applied in order to smooth the ratios and obtain their 95% credible intervals *(Poison-Gamma model).*

Results and Conclusion

Mortality conditions have improved since the turn of the century in the Czech Republic. The major improvement was due to the further reduction in the circulatory system mortality. However, the intensity and temporal changes in these conditions are significantly different between the largest Czech towns. The population of the Capital City of Prague has the best mortality conditions within all the analyzed urban structures. However, further mortality analysis of this population from the spatial context has revealed significant areas with different level of the all-cause mortality. Especially people living in the northern part of the city have poorer mortality conditions within both genders and the whole inter-censual period.

The research project done for GAUK 860213 Charles University Grant Foundation.