

Assessing Spatial Patterns of Heat-Related Health Burdens in the Prague Metropolitan Area

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INTRODUCTION

Episodes of extremely high temperatures are associated with an increased risk of mortality, particularly during extreme events that exceed local acclimatization thresholds. However, the impact is not evenly distributed across populations: the elderly and children are particularly vulnerable due to physiological and socioeconomic factors.

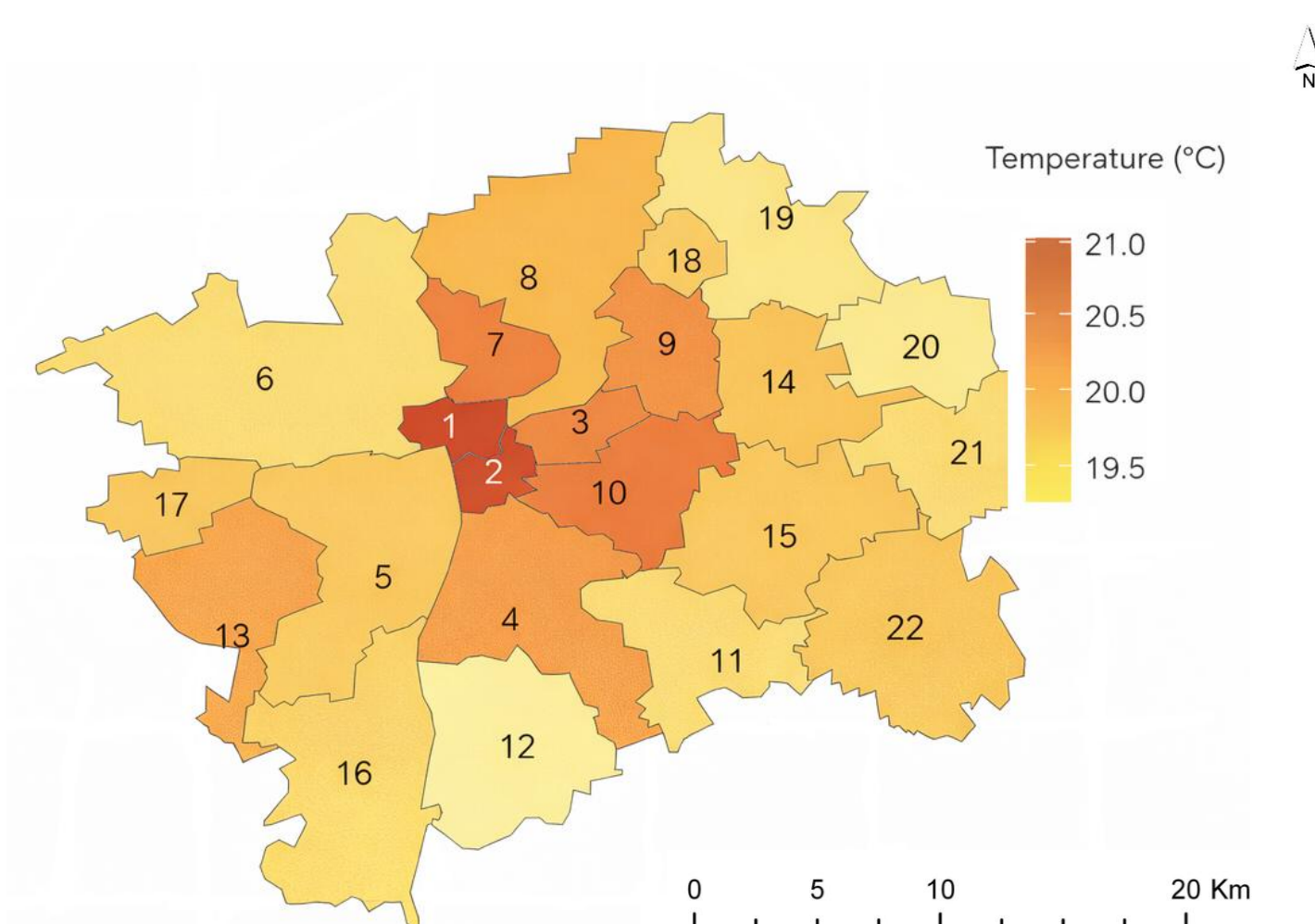
This study employed ambulance callout and mortality data from 2014-2019 to assess **intra-city variation in heat vulnerability by cause, age group, and gender** across districts of Prague, Czech Republic.

DATA AND METHODS

Data

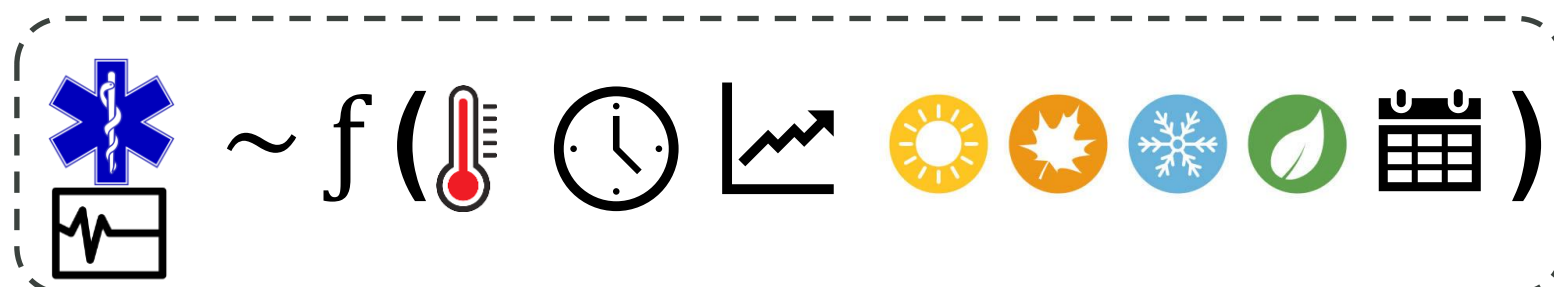
Study period:	2014-2019
Temperature data:	UrbClim model data (300 m) (hourly data => daily mean temperature)
Health data (daily):	Mortality => place of residence of the deceased Morbidity (Ambulance callout) => real location
Categories:	Age (0-29, 30-64, 65+) Sex (Female, Male) Cause (Overall, Cardiovascular, Respiratory)

Mean Summer Temperature



Two-stage meta-regression design

Stage I:



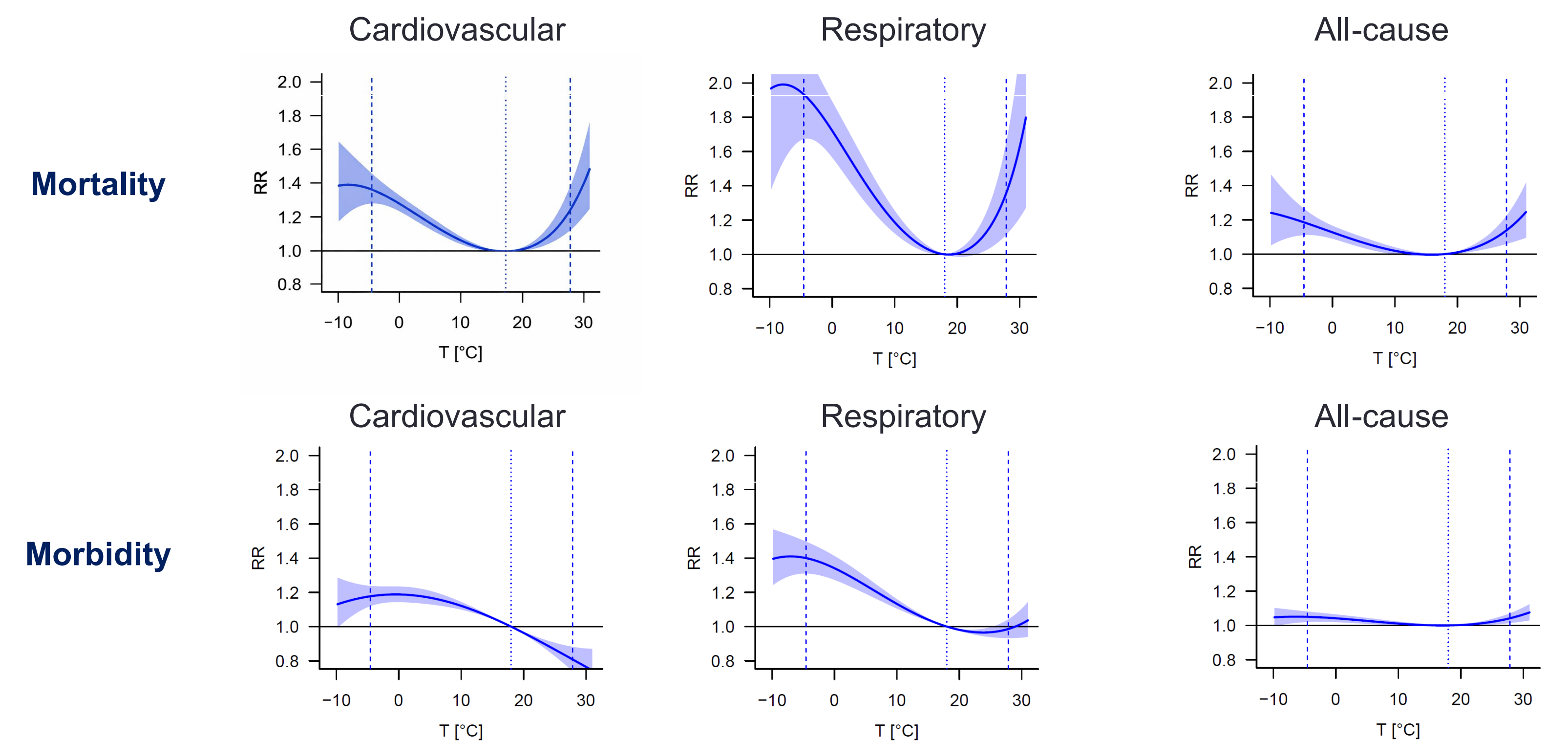
Distributed Lag Non-linear Model (DLNM)
District-specific exposure-response curves

Stage II:

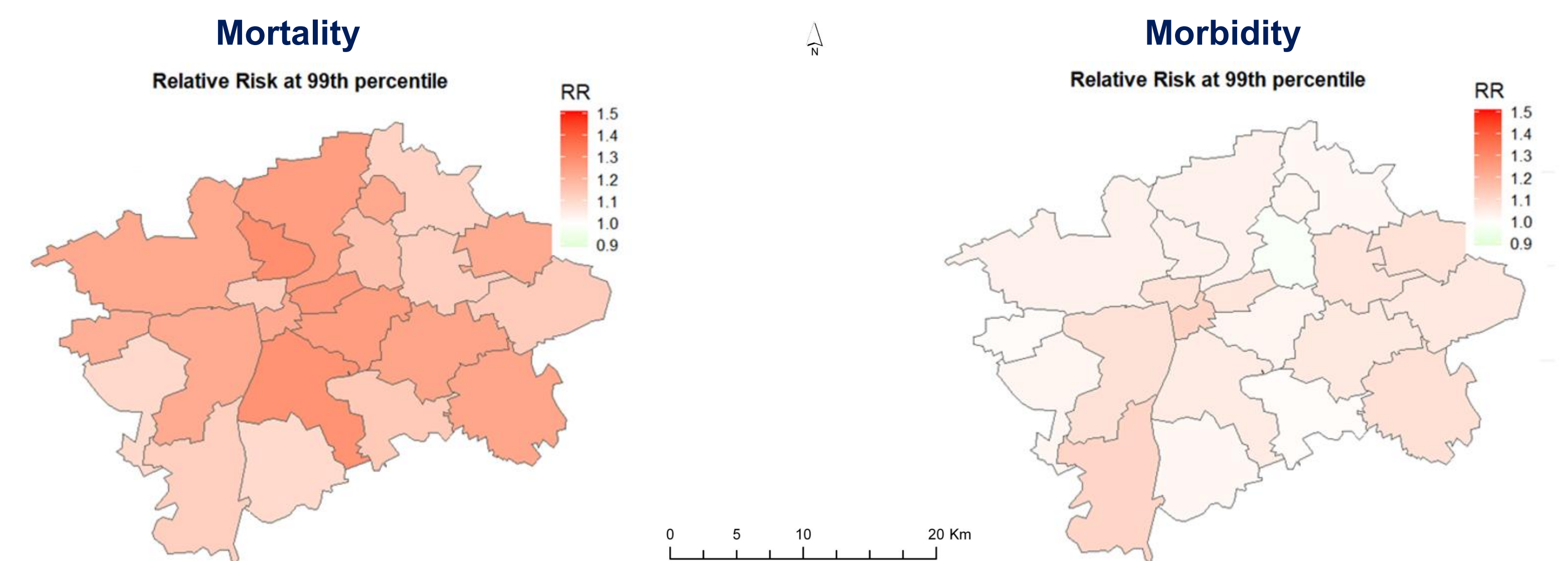
$$\text{District-specific effect} = \text{Overall citywide effect} + \text{District-specific deviation}$$

Meta-Regression (mixmeta R package)
Pooled exposure-response curve adjusted for heterogeneity and "random" effects

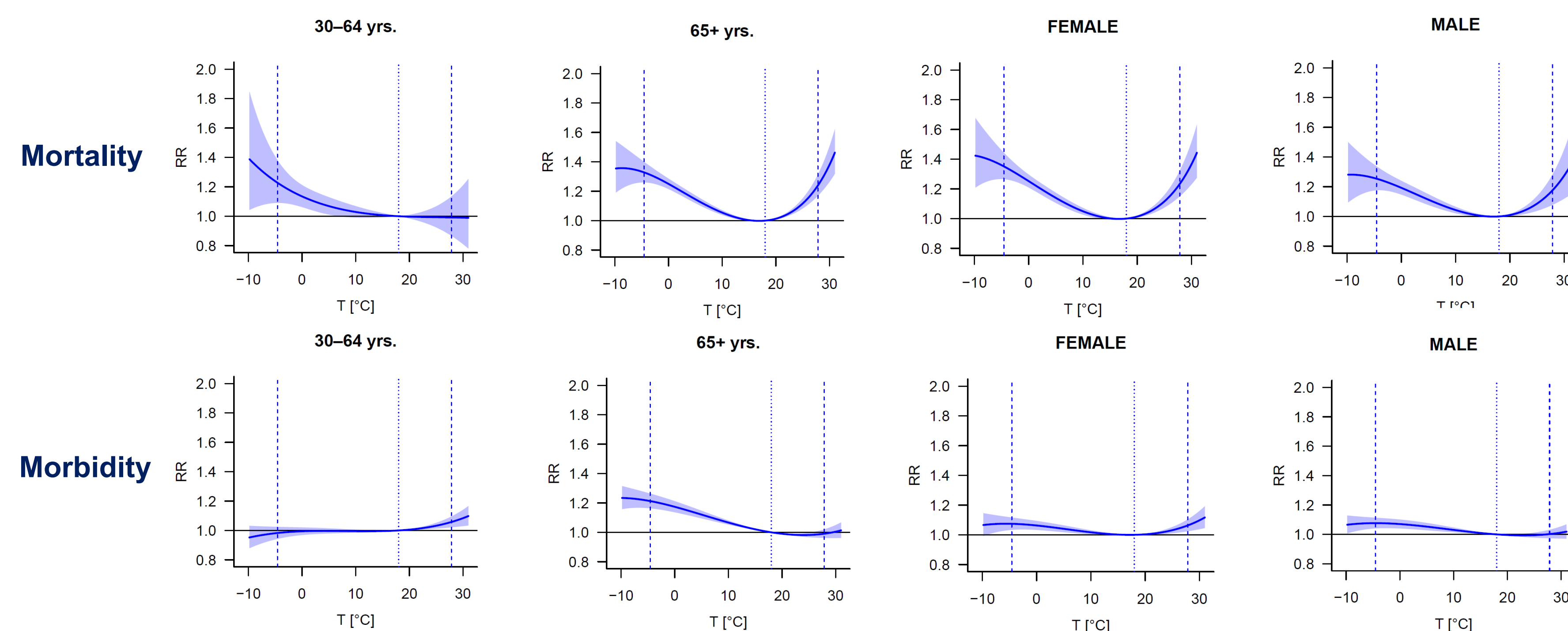
Cause-specific relative risks of mortality and morbidity associated with heat



Heat-related risks of all-cause mortality and morbidity



RESULTS



CONCLUSIONS

- The results show that both **morbidity** and **mortality** data indicate an **increased risk at high temperatures** for both **genders** and for **overall** and **respiratory** cases.
- Across age groups, the **younger population** exhibits the **highest risk for morbidity**, whereas the **elderly** are at the **greatest risk for mortality**.
- In addition, disease-specific analyses revealed a **decrease in cardiovascular cases at higher temperatures**, supporting **increased out-of-hospital mortality during heat events**.
- Spatial analysis of summer temperatures reveals that **central and southern Prague** experience the **highest temperatures**, likely due to the **urban heat island effect**. However, **district-specific risks do not directly correlate with temperature patterns**.
- In a follow-up analysis, we will investigate additional factors, such as socio-economic variables and healthcare access, to better understand district-specific heat vulnerability.

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