



CrossEU



<https://crosseu.eu/>

CSA1 #HEAT

Overview

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UK participants in this project are co-funded by UK Research and Inn*ation (UKRI).

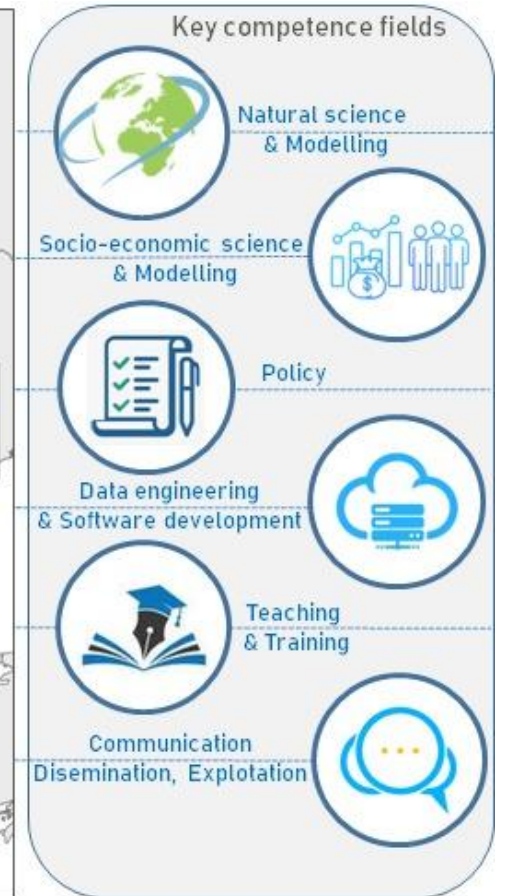
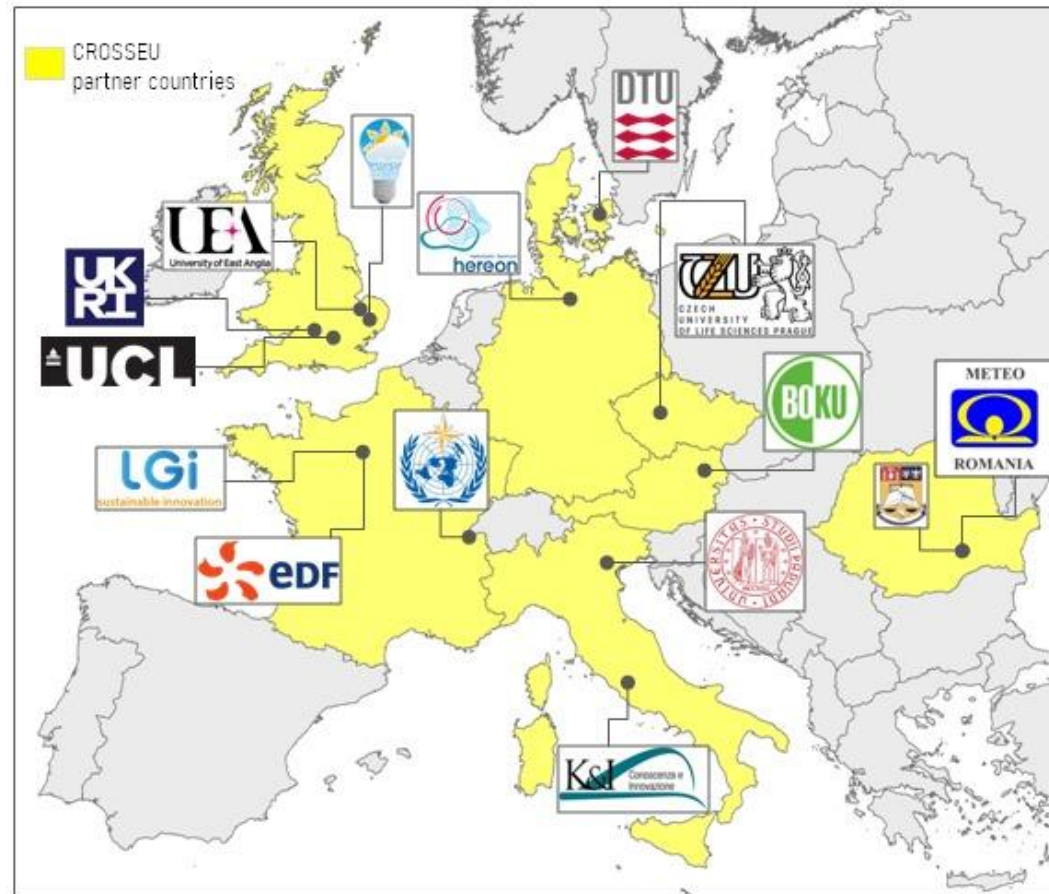


UK Research
and Innovation

Consortium

Socio-economic risks of
climate change in Europe

HORIZON-CL5-2022-D1-01-
02-two-stage



STLs

STL case studies (CS).

IS: Main impacted sectors (**Migration, Social justice, Finance and Insurance** are relevant for all the case studies);

C: main CC Sensitive Systems; lead partners in **bold**;

PP: Project Partners

CS	IS	C	PP
#1 HEAT	Health	Urban, Rural	CZU , Hereon, ANM, WMO, DTU, K&I
#2 DROUGHT	Agriculture, Food security, Water Energy, Forestry, Biodiversity, Tourism	Rural	ANM, BOKU, UEA, WMO, Hereon, UNIPD
#3, #4 STORM	Agriculture, Transport, Health, Tourism, Biodiversity, Water, Energy	Urban, Coast, Mountain	DTU, UNIPD, K&I, BOKU, Hereon
#5 SNOW	Tourism, Forestry, Transport	Mountain, Rural	ANM, UB, K&I, BOKU, Hereon
#6 INDIRECT	Agriculture, Water, Biodiversity, Health, Energy	Urban, Rural, Mountain	UB, ANM, K&I, BOKU, CZU, DTU, Hereon
#7 INDIRECT	Energy	Urban, Rural	WEMC, DTU, EDF, K&I, Hereon
#8 SPILLOVER	Agriculture	Urban, Rural	UCL, ANM, K&I, Hereon, UNIPD, UB

2. Developing the user interface - Teal

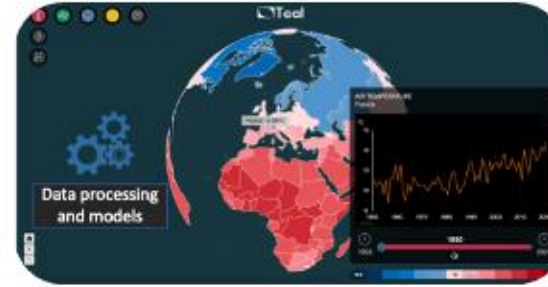
Integrates:

- Graphical user interface
- Database
- Visualisation – maps
- Data analysis – charts
- Downloads
- Data
- Charts
- Chatbot
- **User selected parameters**
- **PDF generation**

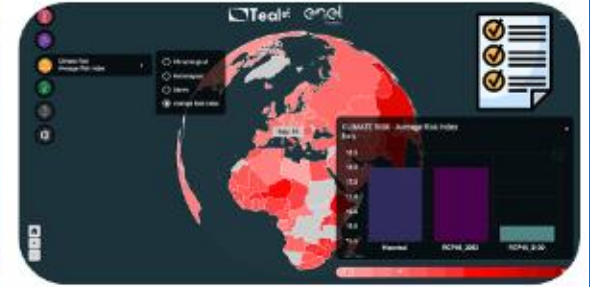
<https://tealtool.earth/>



1. Enter relevant info: e.g. storyline/sector, location, climate hazard/event, ...

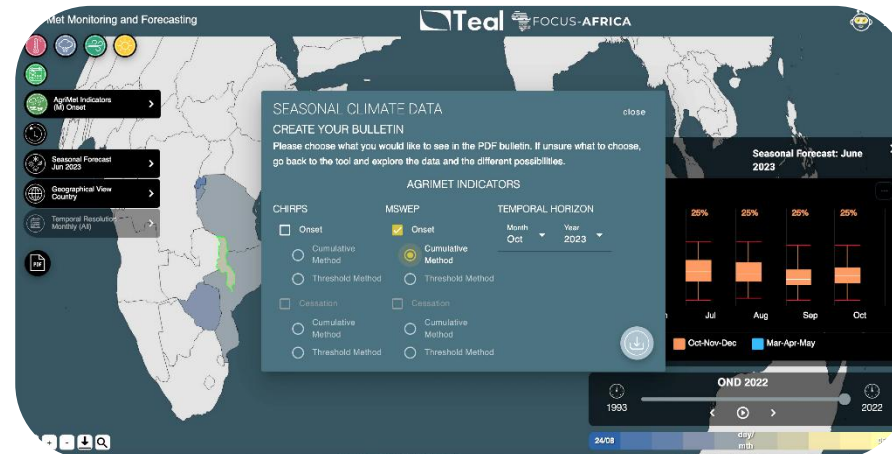


2. Combine biophysical data with integrate assessment models, to produce socio-economic indicators



3. Visualise socio-economic indicators, including data and briefs (pdf files) with mitigation and adaption options

Wireframe of the CROSSEU DSS based on the Teal tool.



Teal dialogue box

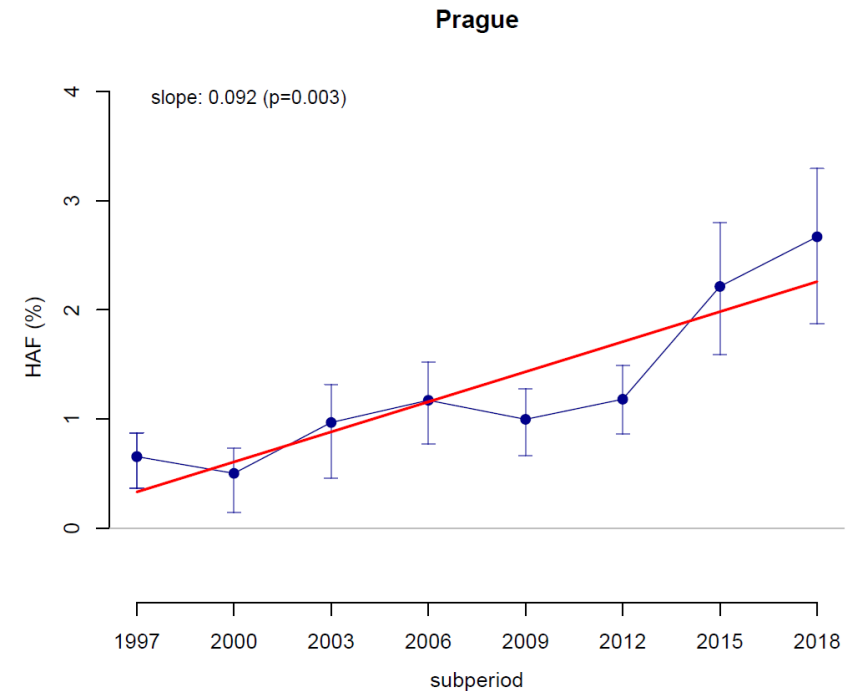
STORYLINE #HEAT CSA1 - CZE



Faculty of
Environmental Sciences

Challenges. Rationale

- **Heatwaves**
- The major climate hazard regarding the impact on human health in Europe.
- Increasing frequency and intensity of heatwaves in Europe.
- Increasing impact of heatwaves on excess mortality in the Czech Republic over the past 4 decades.



Trend in heat-attributable mortality fraction (HAF %) in Prague, Czech Republic

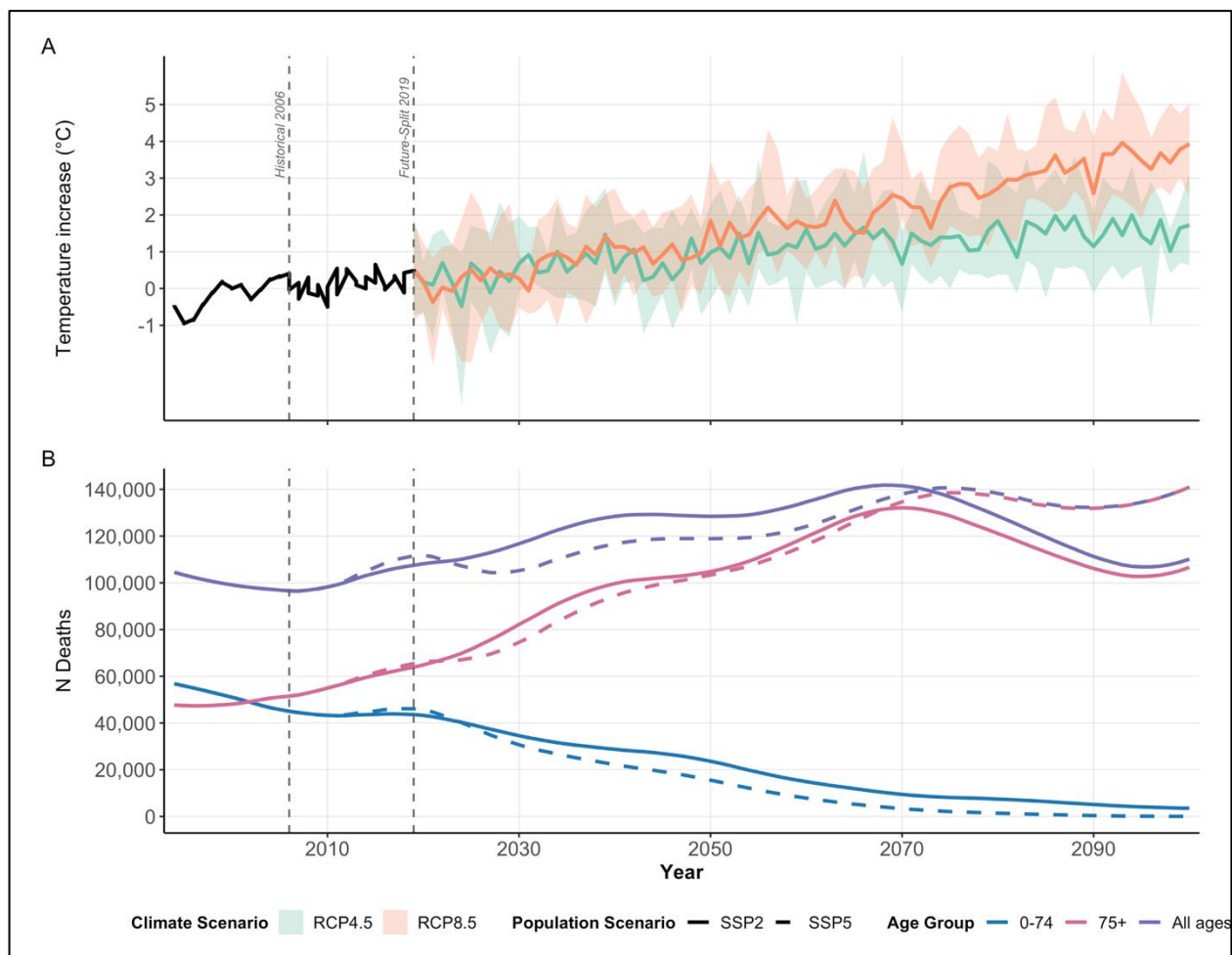
Objectives

- Quantify the future impacts of heat(waves) on excess mortality at the NUTS 3 level.
- Assess the role of different socioeconomic and demographic scenarios (SSP storylines) in the impact estimates.
- Identify regions most vulnerable to increasing frequency and intensity of heatwaves in the future.

Data

- **Climate data** – daily mean temperature
 - ERA5 reanalysis (25 km) - observations
 - EURO-CORDEX (12.5 km) RCP scenarios (4.5 and 8.5) – ensemble of 9 model simulations selected based on the consortium consensus (WP1)
- **Population data**
 - population and mortality rate projections developed by EUROSTAT (EUROPOP2019) and the International Institute for Applied Systems Analysis (IIASA – SSP storylines)
- **Health data**
 - daily mortality data 1994–2019 divided to 14 NUTS 3 regions **in the Czech Republic**
=> used **for developing the modelling framework**
 - weekly mortality data for the **UK and EU** at the NUTS 3 level
=> will be used for **transferability and upscaling of the modelling framework => DSS**

Data

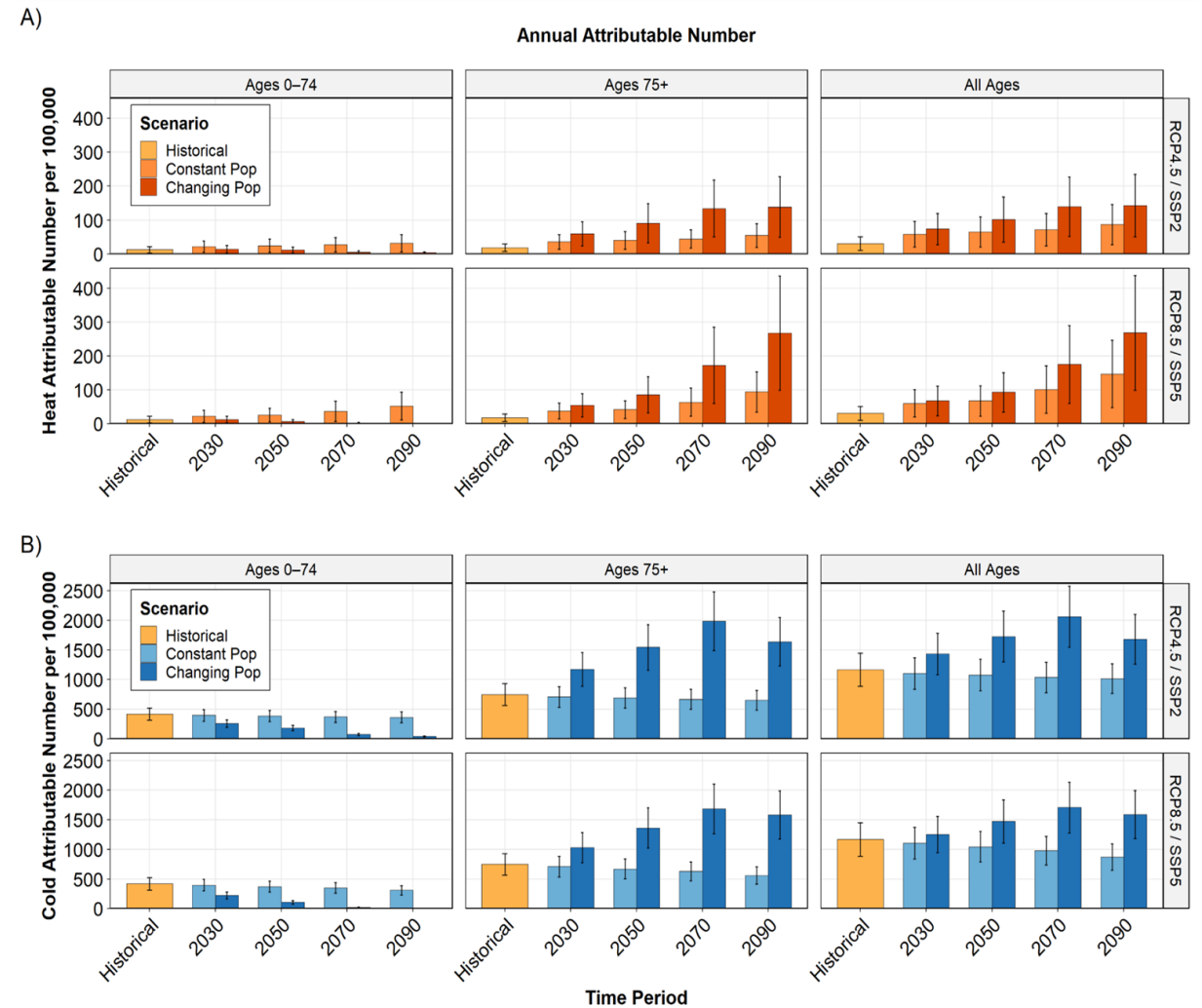
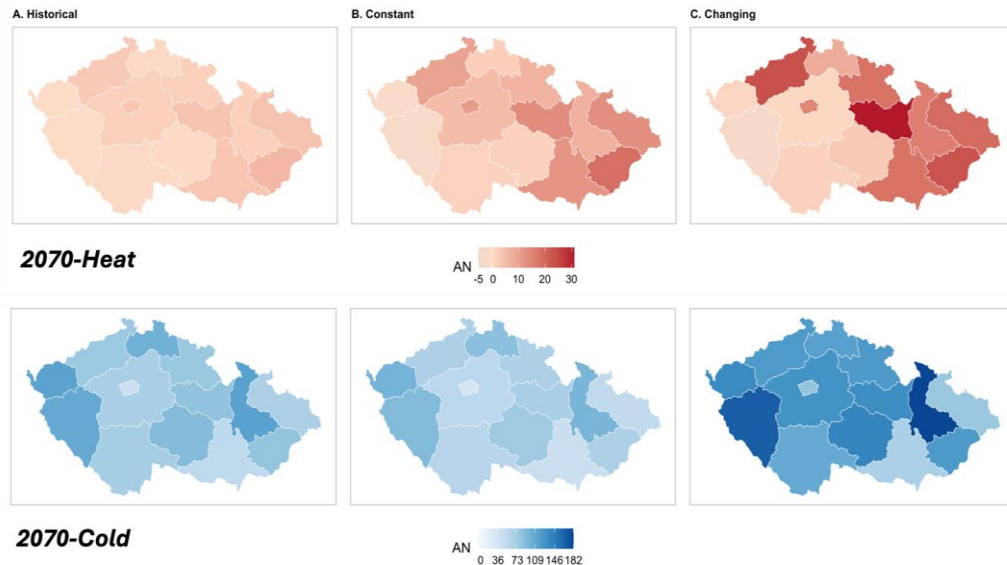


A) **Deviation of annual daily mean temperature** in the Czech Republic under RCP 4.5 and RCP 8.5 scenarios compared to the historical period (1994–2005)

B) **The annual number of deaths in the Czech Republic**, according to SSPs population projections (2020–2100)

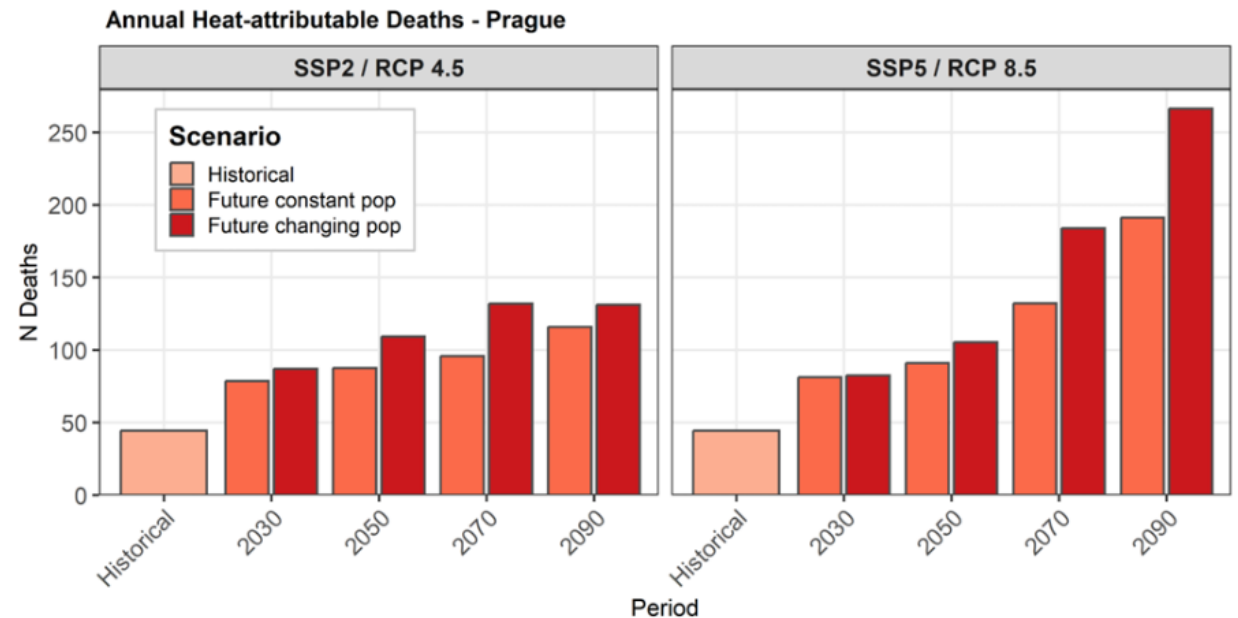
Results

- Constant pop => Temp only
- Changing pop => Temp + pop. aging
- Population aging greatly amplifies future temperature-related mortality in the Czech Republic**



Results - Prague

- Constant pop => Temp only
- Changing pop => Temp + pop. aging
- **Population aging greatly amplifies future temperature-related mortality** in the Czech Republic



Up to **250 annual heat-related deaths** in Prague by 2090s

Resilience to urban heat

- Prague, November 20, 2024
- A participative workshop with stakeholders
- HORIZON EU projects CROSSEU and CARMINE
- Main goals:
 - To identify the main CC challenges in Prague/Czech Republic
 - To discuss heat-related socioeconomic risks
 - To assess the feasibility of selected heat-adaptation strategies
- **31 participants (8 online), about 10-15 people joined all activities**
- Different sectors: academia, policy/decision makers, public health sector



CrossEU



CARMINE

co-create climate resilience



During the Workshop

Workshop 1 – Mapping and Scoping

Activity 1: Climate Change risks and drivers

- Facilitator supervise the activity, remove the duplicate, take note on how many times a risk has been mentioned
- Identify related drivers: group discussion
- Multiple types of drivers can be behind one risk. Connect the risks and drivers by drawing arrows
- E.g. Risk: "Damage of infrastructure" → Economic driver: "Risk of investment in risk prevention"
- Legal driver: "poor planning"
- One facilitator will take note of the measures on the PESTLE wheel
- One facilitator will moderate the discussion ensuring the note taker has enough time to capture the relevant inputs. Don't hesitate to pause the discussion or ask for clarification.



Analýza a řešení
socioekonomických a
environmentálních rizik spojených
s dopady přírodních hrozeb
a extrémních projevů
změny klimatu
v urbanizovaném prostředí

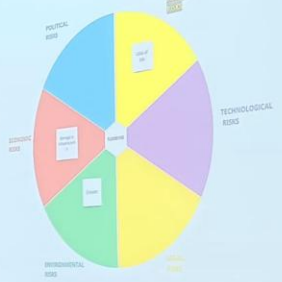


Figure 1: Example of mapping CC challenge and risks using the PESTLE wheel

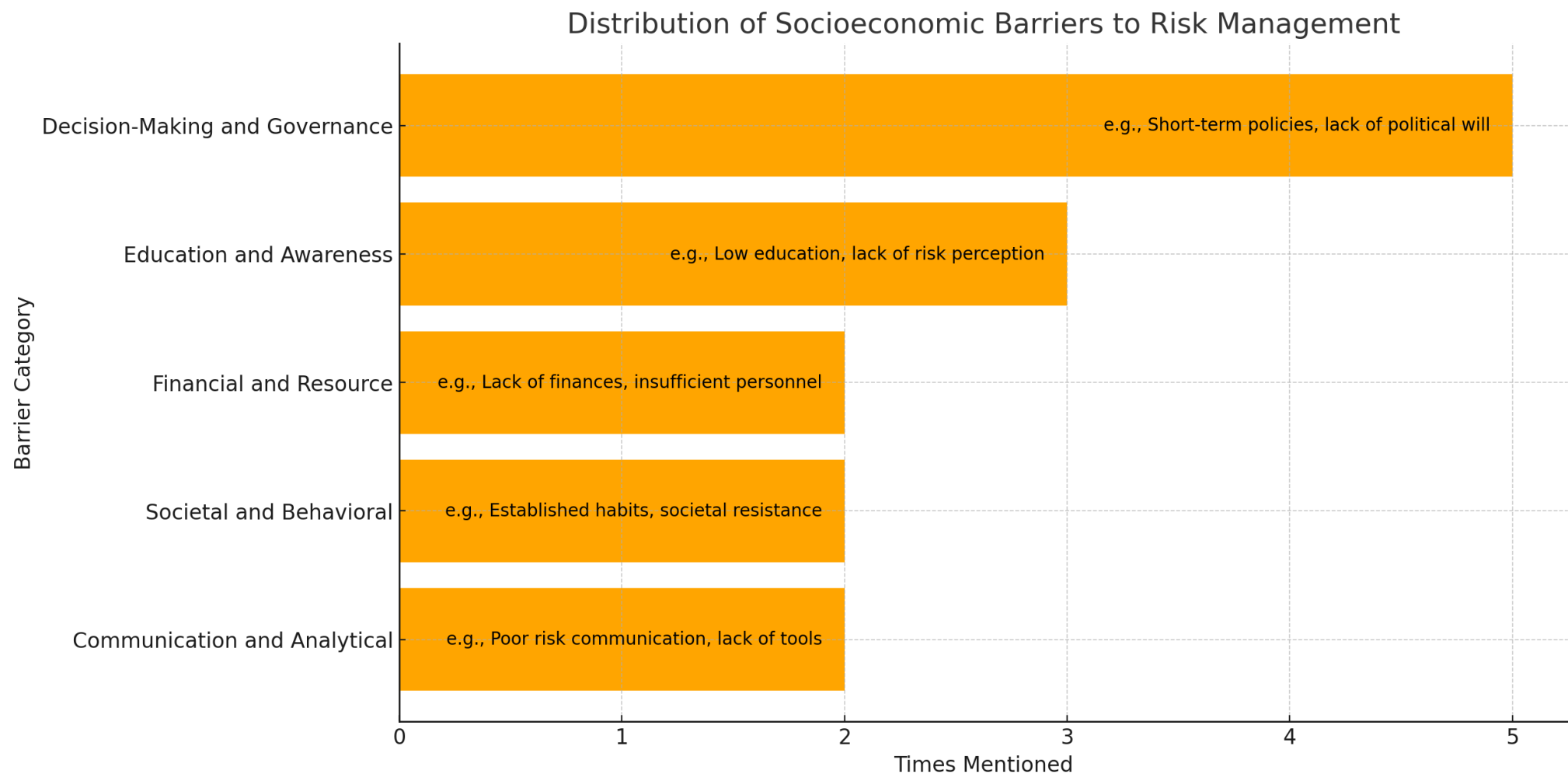
Konstatační setkání a participativní workshop "Odolnost městského prostředí vůči horku" 20.11.2024 PIC

Prague, November 20, 2024

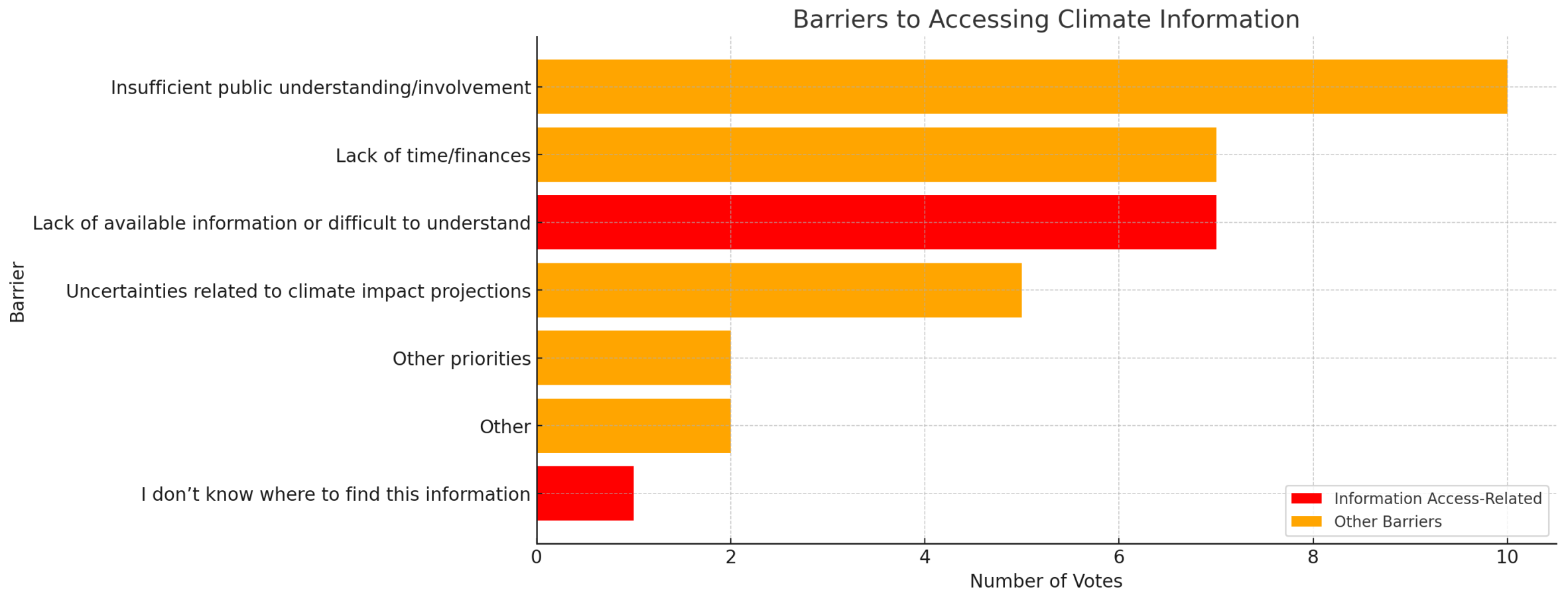
Heat-Related Socio-Economic Risks

Economy & Work	Health & Society	Environment & Energy	Infrastructure & Housing
Higher costs for individuals	Higher mortality risk	Harmful air conditioning effects	Heat damages infrastructure
Lack of funding	Impact on vulnerable groups	Higher cooling costs	Transport issues
Lower productivity	More aggression & violence	More energy use	Unfit housing
Lower work efficiency	More diseases & heat stress	More water consumption	
More social inequality	Poor sleep quality		
	Social isolation		
	Decreased attention		

Barriers to Efficient Risk Management



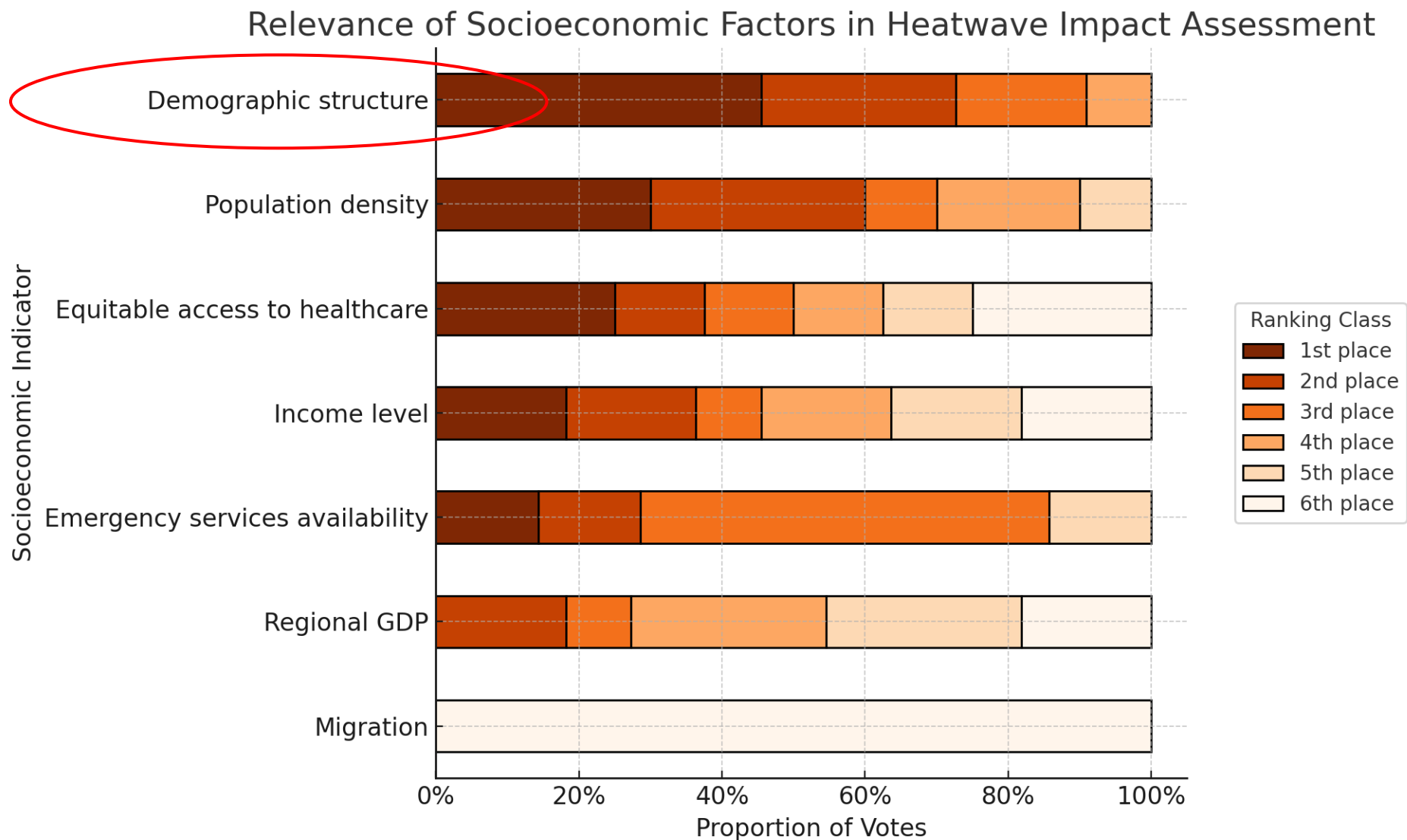
Barriers to Accessing Climate Information



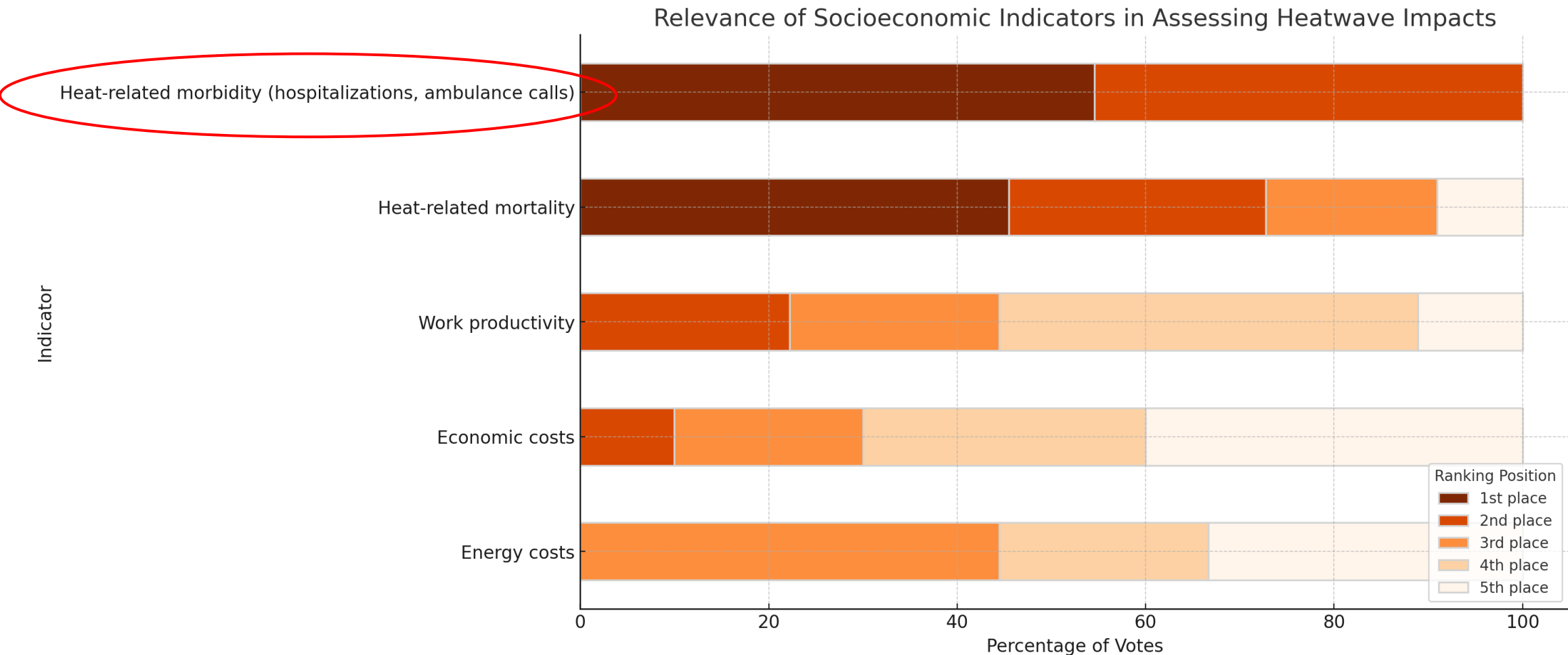
Solutions & Next Steps

- **Make heatwaves a political priority** – we know what is going on, policymakers must act urgently.
- **Raise awareness & educate** the public on heatwave risks.
- **Enforce legal climate policies** with clear action plans.
- **Improve government coordination** and institutional cooperation.
- **Provide financial incentives** for businesses and communities – investors are not motivated to implement adaptation solutions.
- **Enhance data collection & accessibility** for informed decision-making.

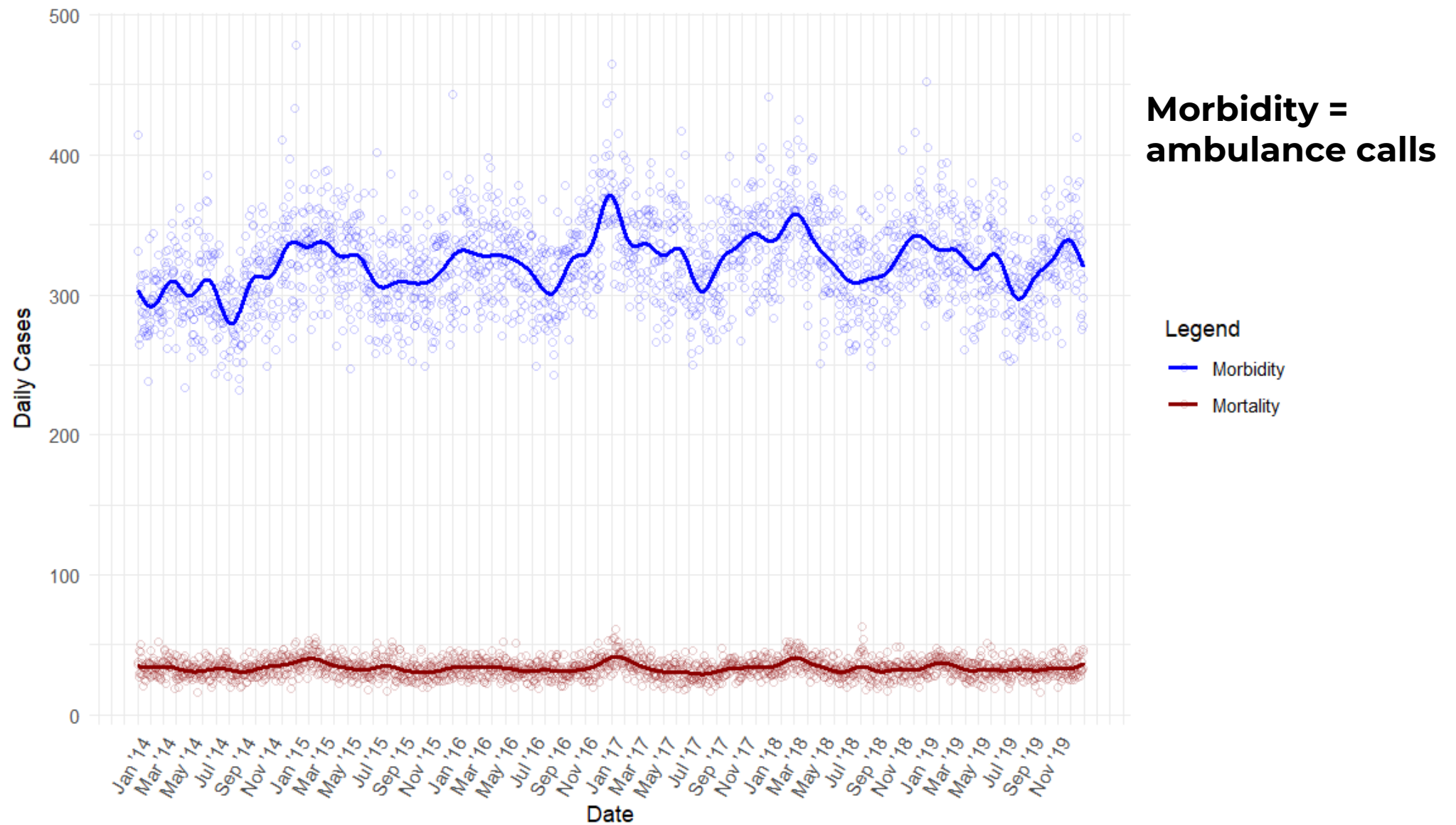
Relevant Socio-Economic Factors



Relevant Socio-Economic Risks

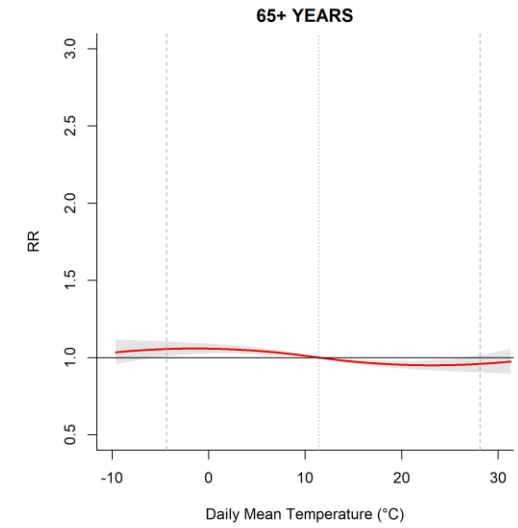
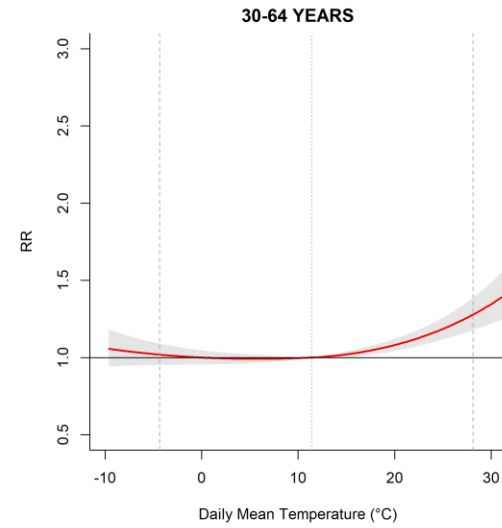
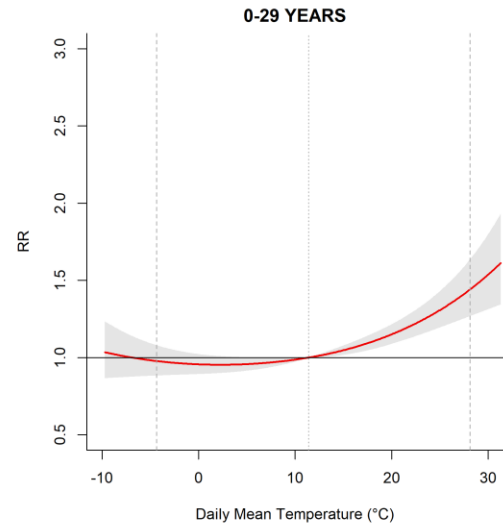


Temporal trends in daily mortality and morbidity in Prague

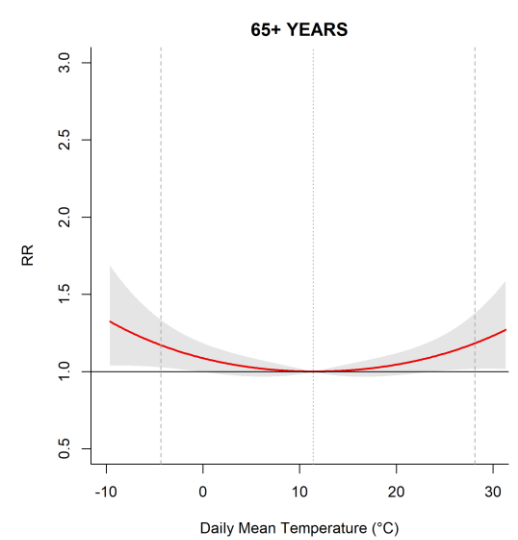
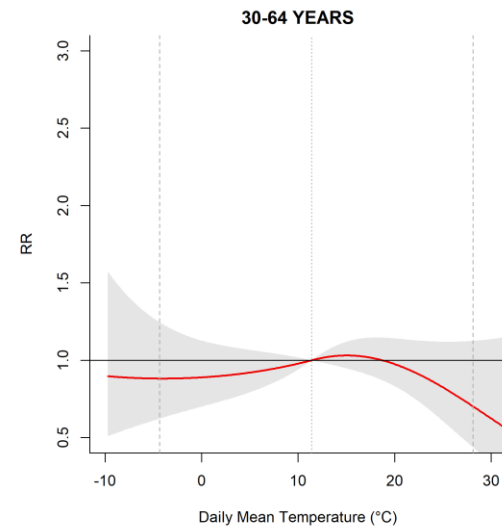


Age-specific relative risks

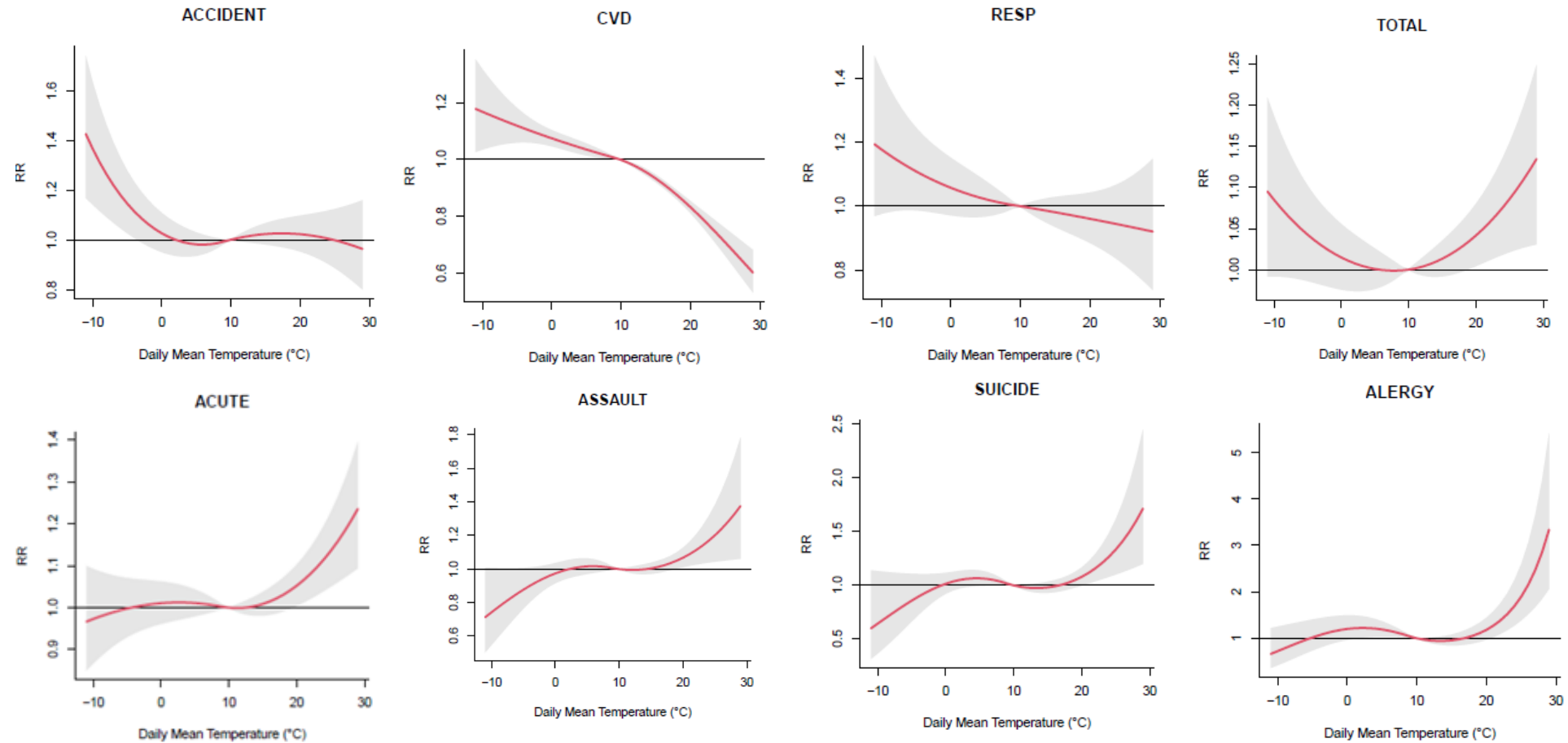
Morbidity



Mortality

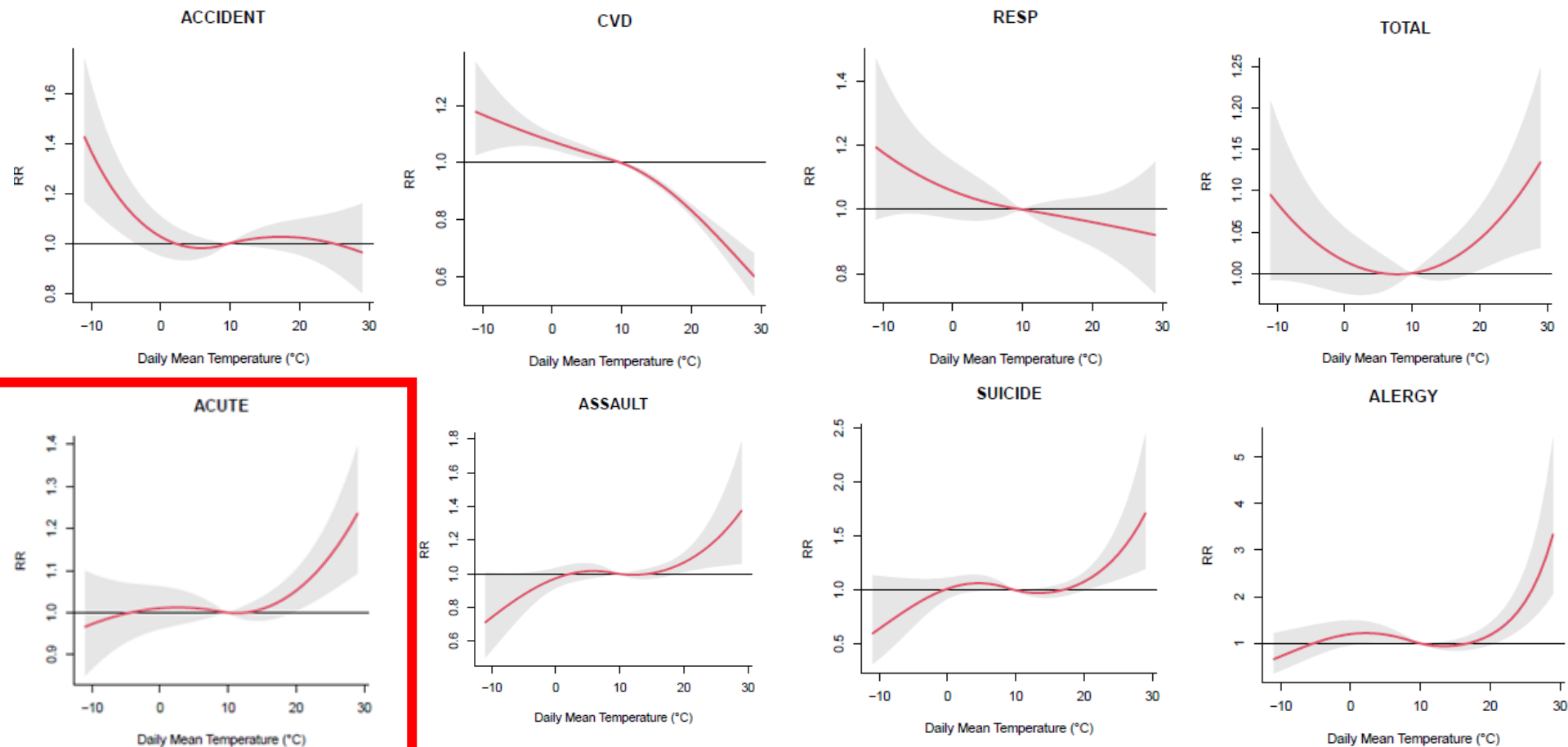


Relative risks of ambulance calls: Prague 2014–2020



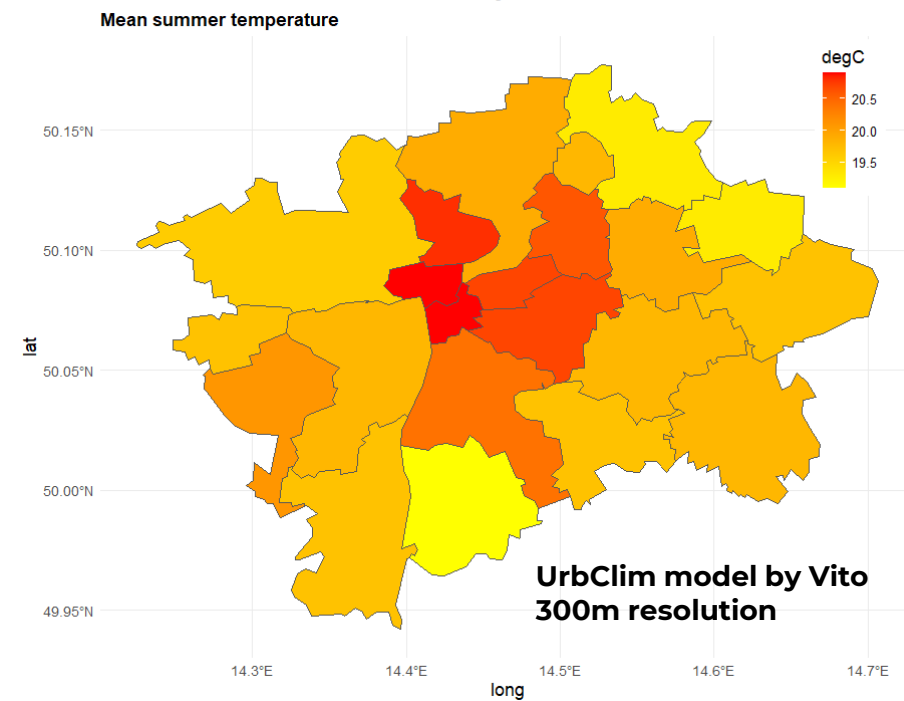
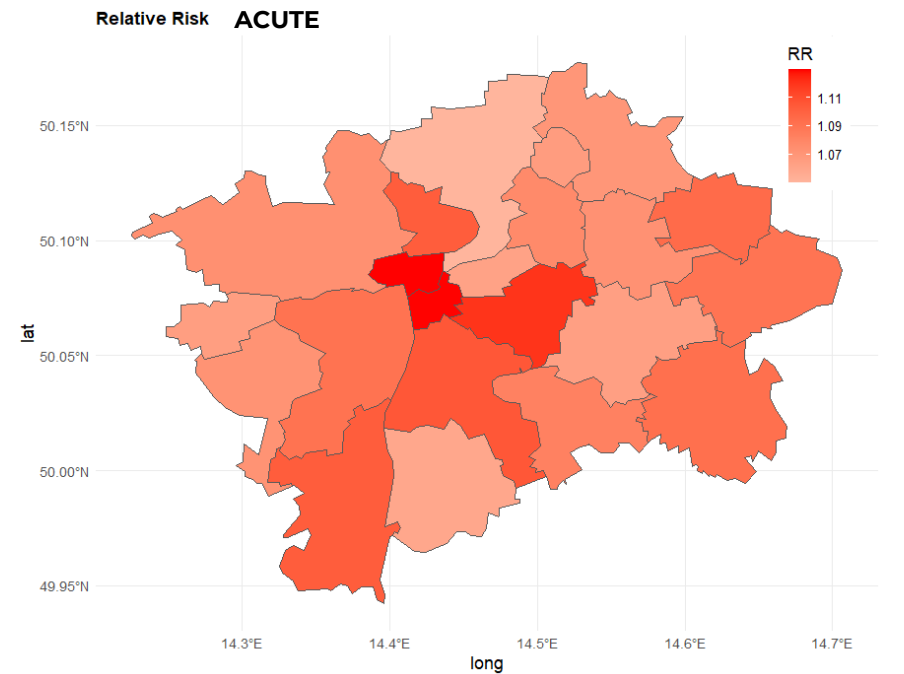
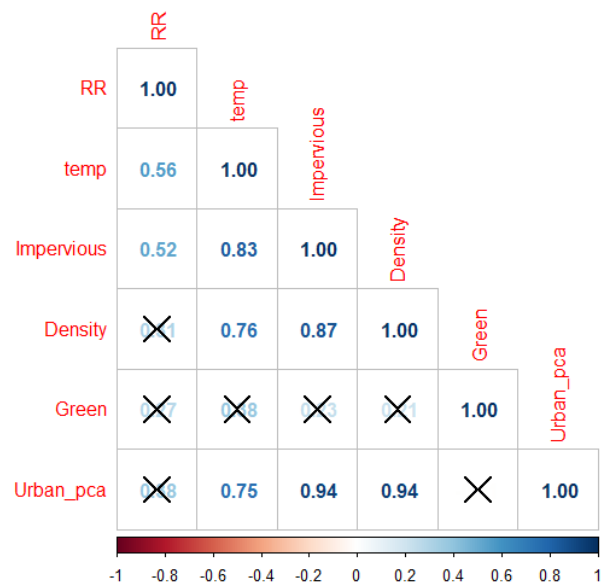
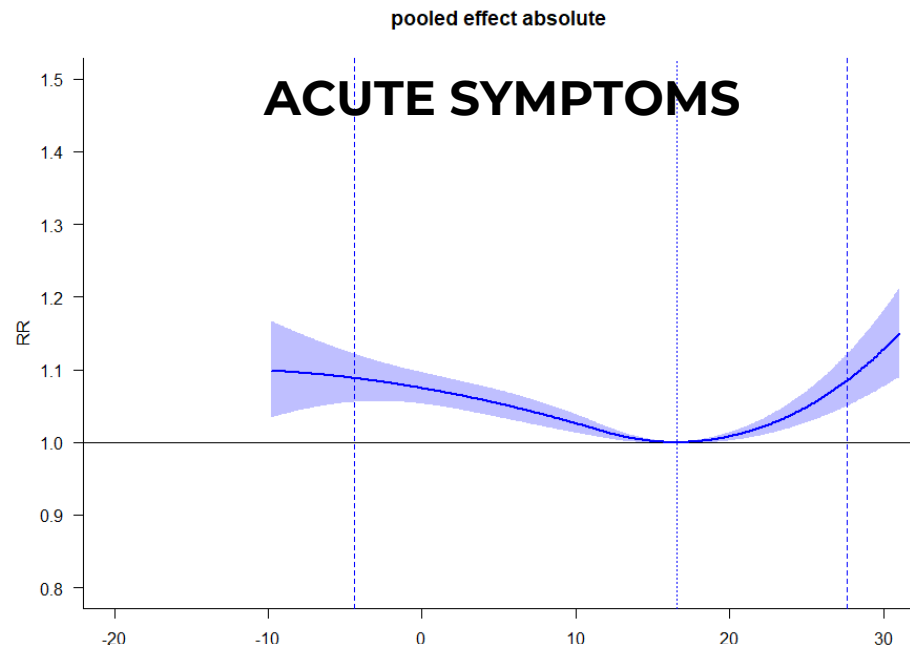
Tugba Dogan(in prep)

Relative risks of ambulance calls: Prague 2014–2020

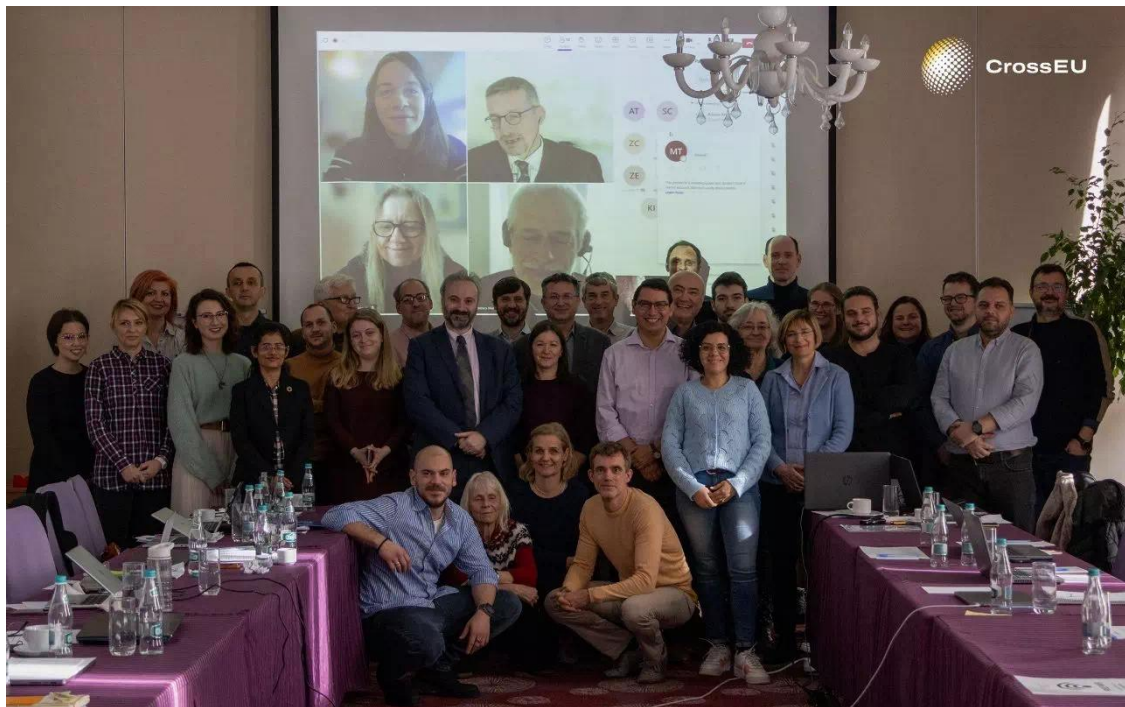


Tugba Dogan(in prep)

Křeče, bezvědomí, bolest, nevolnost, zhoršení stavu atd.



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