World Health Organization (2016): 7 million deaths attributable to the joint effects of household and ambient air pollution in 2012

**Air pollution-related mortality**: stronger associations have been reported in *diabetic subjects*

**Heat-related mortality**: stronger associations have been reported in *elderly subjects*

Health effects might be exacerbated in *susceptible subgroups* exposed to the same levels of exposure as the whole population
Objective

Study of the individual effect modifiers of the association between environmental exposures and mortality

Association between exposure to air pollution, heat and mortality
- according to individual characteristics and preexisting medical conditions
- using national administrative databases

Introduction
Materials & Methods
Discussion
• National Register, National database for cause of death statistics (Statbel)
  
  Available individual information: date and cause of death, date of birth, gender, municipality and exact address of residence at the time of death, date of moving to the last address, etc…

• Pharmaceutical, Health care and Population databases (IMA-AIM)
  
  Available individual information: medication prescription, health care use of both ambulatory and hospital care, socioeconomic characteristics, etc…
Data availability - study period

Preexisting medical conditions before death:
2 to 7 years of available information
Population of interest

- people of all ages
- who died from natural causes between 2010 and 2015
- and residing in 9 big Belgian cities: Bruxelles, Anvers, Gand, Louvain, Bruges, Charleroi, Mons, Liège and Namur

Case-crossover design
Indicators for individual preexisting medical conditions:

- Information for each subject within the 1st, 2nd, … 7th year before death

- **Pharmaceutical database**
  - ATC codes selected to indicate hypertension, COPD, asthma, diabetes, heart diseases, thrombosis, cardiovascular affections etc…
  - Defined Daily Dose per ATC code

- **Health care database**
  - Interventions for ischemic diseases, diabetes, renal failure
• **Daily** exposure based on **spatial interpolation** of available **observations**
  - **Air pollution**
    PM$_{2.5}$, PM$_{10}$, O$_3$, NO$_2$, BC, provided by Irceline
  - **Meteorological data**
    temperature, precipitations, relative humidity
    provided by RMI

• **Greenness** (% **tree cover**) yearly image from MODIS VCF,
  **Land cover** from CORINE Land Cover (2012)

• Exposure based on the **geographical coordinates** (X,Y) of the residence at the time of death
Population selection

Period 2010 – 2015:

- N = 642,901

Target municipalities:

- N = 337,124

Natural and known cause of death:

- N = 307,877

Population of interest

- Available geographical coordinates:
  - N = 304,483

IMA-AIM data coupling, SCRA
Limitations / Strengths

- Individual information rather rudimentary
- Variables used as proxies

+ Large population samples, national study
  + possibility of reconstructing each individual’s medical history for a period up to 7 years preceding the final outcome
+ Cost-efficient
+ Standardized data collection
The use of **national administrative databases** is a cost-efficient method to investigate public health issues.

This work will

- allow the identification of specific **susceptible populations** at risk
- help to determine the impact of medical conditions on mortality related to heat and air pollution
- improve understanding health-environment **interactions** related to mortality
Contact

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