Health effects of air pollution components, noise and socio-economic status ("HERMES")

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HERMES
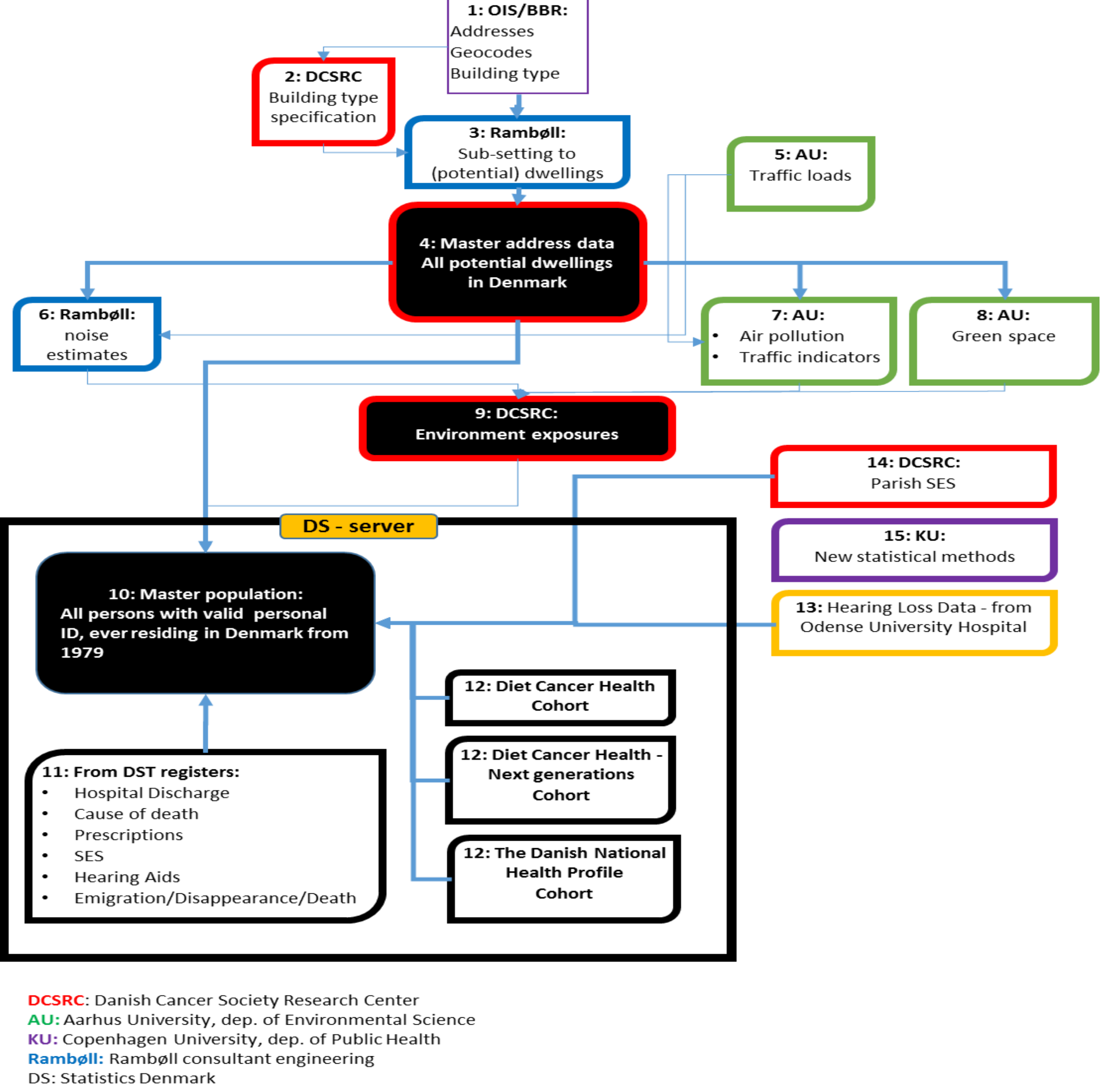*God of transportation, roads and travelers*
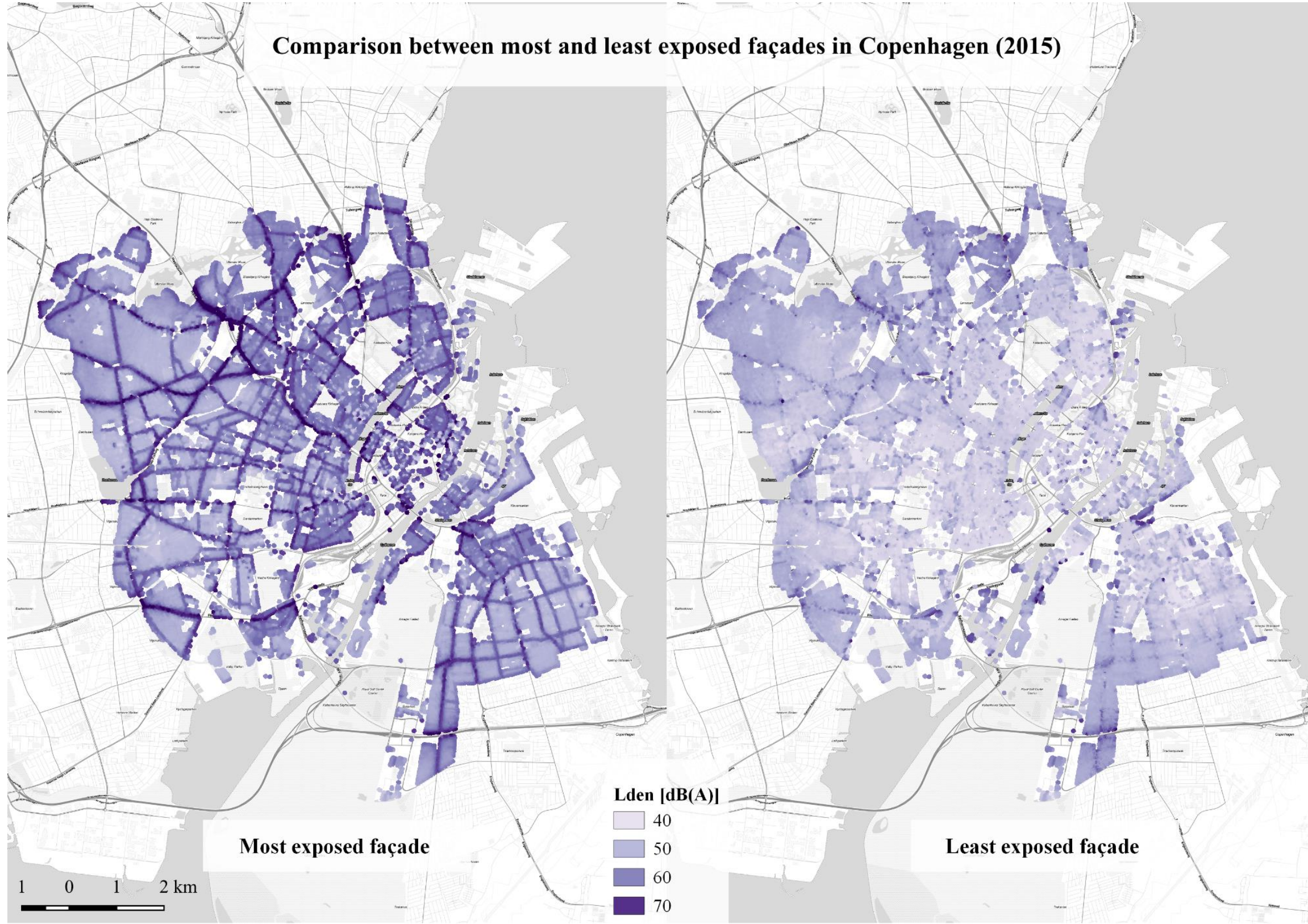
INTRODUCTION

This poster presents three areas which have been in focus during the first 10 months of HERMES:

- Data collection
- Development of a model to calculate ultrafine particles
- Development of a statistical method to separate independent effects of correlated air pollutants

DATA COLLECTION

DCSRC: Danish Cancer Society Research Center
AU: Aarhus University, dep. of Environmental Science
KU: Copenhagen University, dep. of Public Health
Rambøll: Rambøll consultant engineering
DS: Statistics Denmark

NOISE, GREEN SPACE AND INCOME

Comparison between most and least exposed façades in Copenhagen (2015)

Noise (L_{den}, dB) by green space and income at parish level

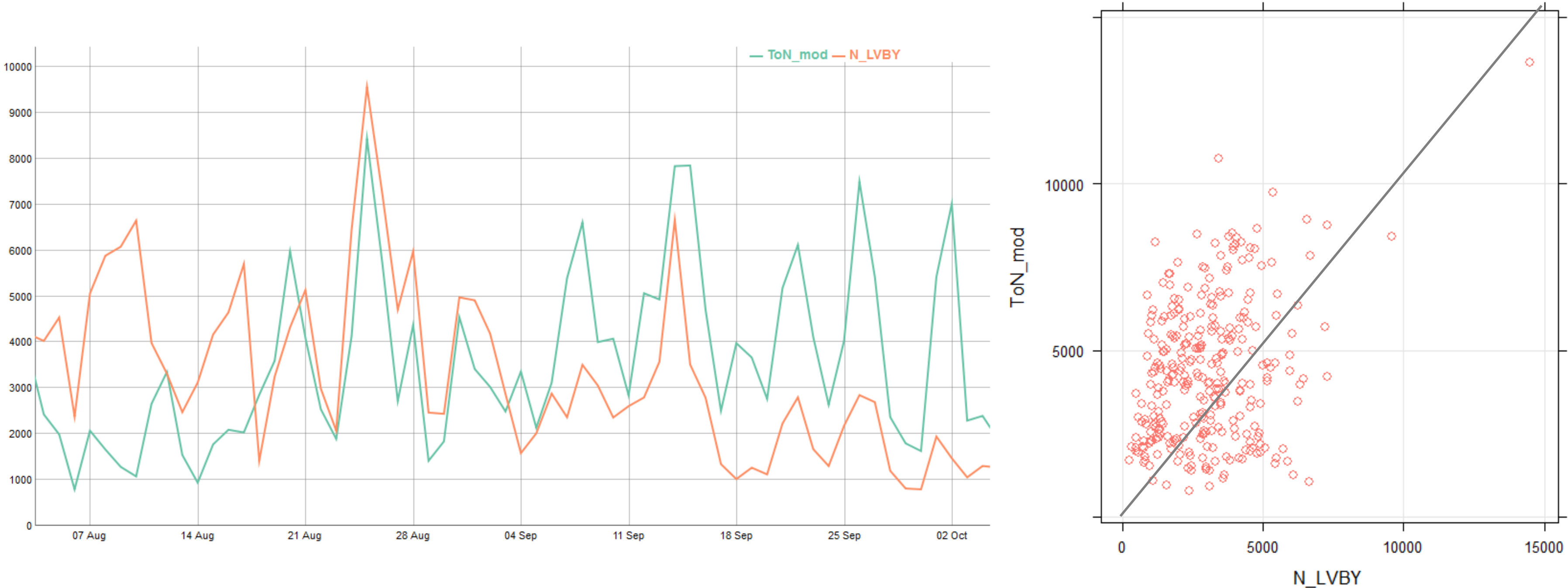| Parish proportion	$N_{persons}$	Median, L_{den}, dB	
		Most exposed facade	Least exposed facade
Low income			
Q1	692,653	53.4	44.3
Q2	683,027	54.8	44.0
Q3	695,132	55.8	44.7
Q4	690,661	58.5	46.3
Green space			
Q1	690,090	60.2	46.1
Q2	691,389	55.2	46.6
Q3	688,474	52.8	44.9
Q4	691,520	54.1	41.1
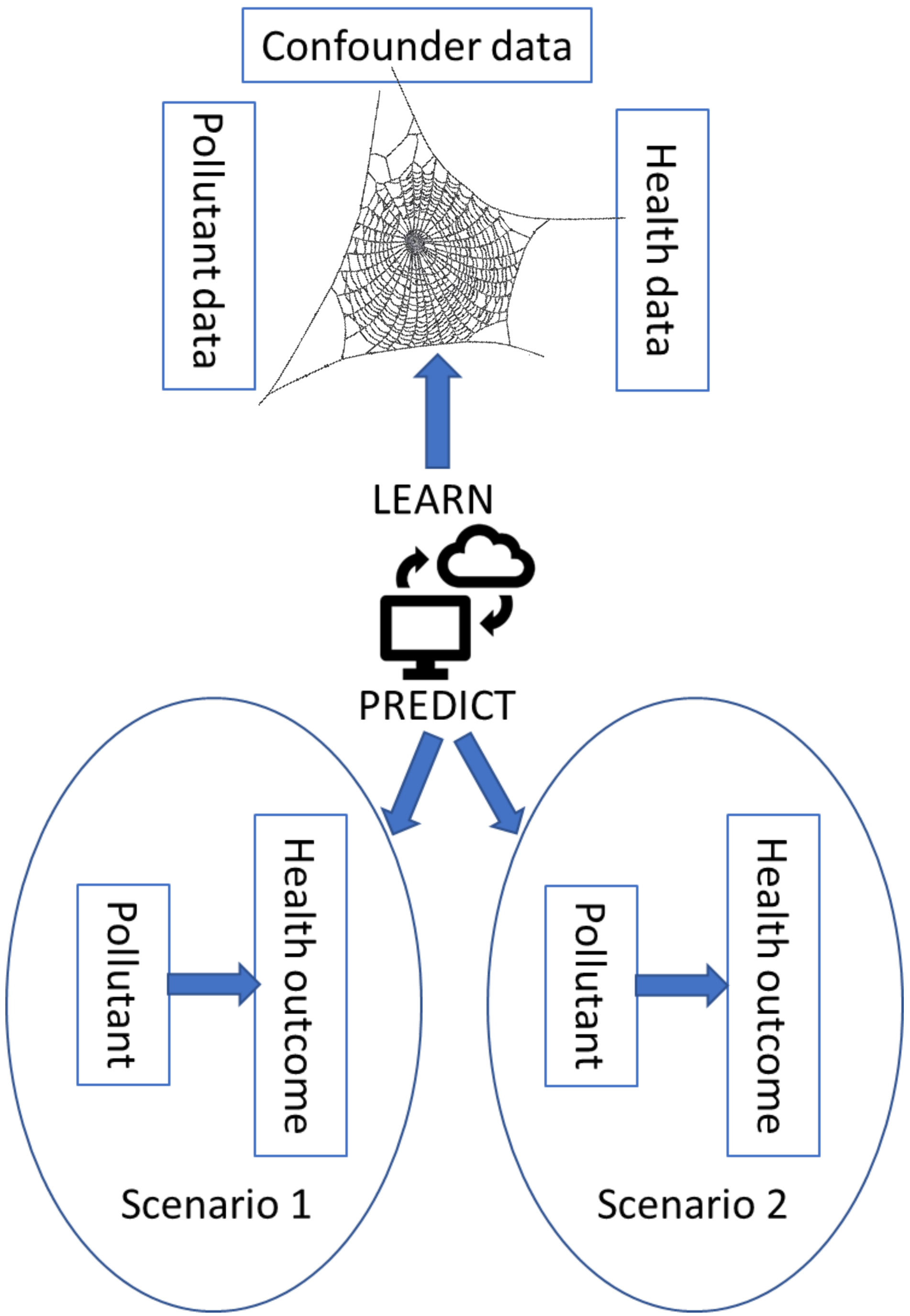
MODELLING ULTRAFINE PARTICLES

- We implement the aerosol dynamics module "M7" in our models.
- Emission database based on methods from EU-TRANSPHORM
- First model test runs for aitken mode, one monitoring station and 2016
- Further tests are ongoing

Size range in nm	Soluble, i.e either seasalt, pure H_2SO_4 or other PM, coated with H_2SO_4	Insoluble, i.e non coated PM
< 10	nucleation (H_2SO_4)	
10 – 100	aitken (H_2SO_4, BC, OC, dust)	aitken (BC, OC, dust)
100 - 1000	accumulation (H_2SO_4, BC, OC, ss, dust)	accumulation (BC, OC, dust)
> 1000	coarse (H_2SO_4, BC, OC, ss, dust)	coarse (dust)

Calculated (ToN_mod) and measured (N_LVBY) daily averages of total particle number (10-100nm) concentration at a rural station in Denmark for a period in 2016. Units #/cm³.

NEW STATISTICAL METHOD

Confounder data

Pollutant data

Health data

LEARN

PREDICT

Scenario 1 — Pollutant → Health outcome

Scenario 2 — Pollutant → Health outcome