SMURBS

SMart URBan Solutions for air quality, disasters and city growth

component: **Health**
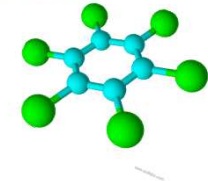
Dr. Pavel Čupr, Ph.D.,   Prof. Dr. Jana Klánová Ph.D.

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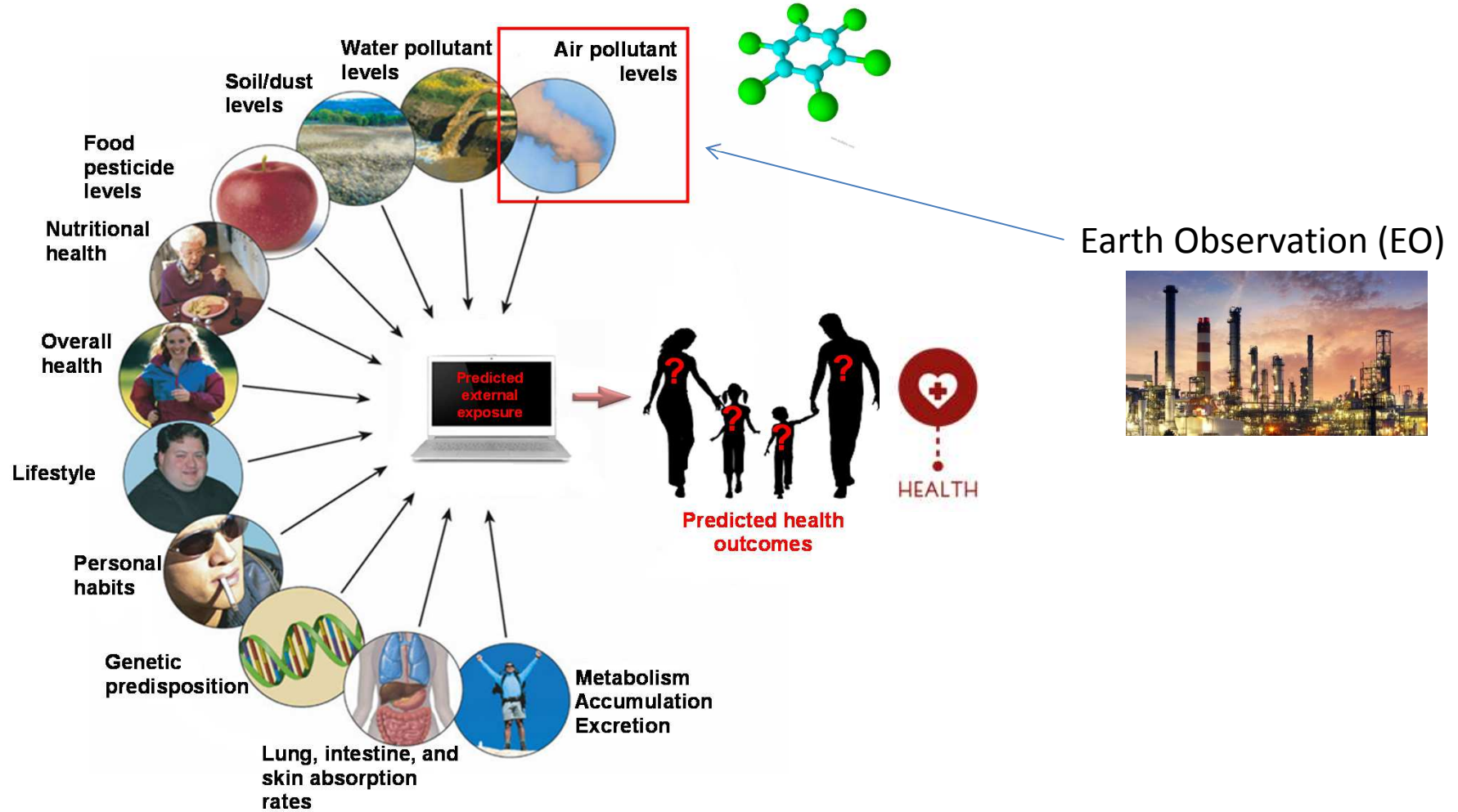ERA-PLANET Kick off meeting, 9-11 October, 2017, Rome, Italy

Context and motivation (1)

- High-priority EU: to improve citizens' health and well being

- SDG (Sustainable Development Goal): Make cities and human settlements safe and sustainable

- Chemical pollution induced potential health impacts

- Inhalation exposure pathways is one of the most important exposure routs

- Needs: to assess/predict the air pollution health impacts

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Context and motivation (2)

Approach and expected outcome

- General concept:

Data collection for selected cities: (support by WP2)

- long-term monitoring data of Air Quality (AQ)

- Human health status (health outcomes)

- Population characteristic

- Implementation of the predictive model (WHO, Relative Risk approach - RR)

- Expected outcome:
- Tools for assessment of the health impacts of air pollution from different sources in a given population supporting policy-makers in evaluating risks and taking appropriate action
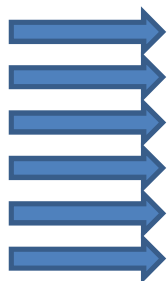- EO in health case studies

Consortium assets

LEAD Partner: JSI (WP5)
Start Month: M19 (- M36)
MU, HZG, SU, NSCR, CNRS, JSI, ROSA

Pilot City, Test Bed, Case Study

Location	Type*	Pressure/Study focus					Observation method/platforms				
		AQ	Disaster	Urban growth	Health	Migration	Remote Sensing	In-situ	Modeling	Sensors/ UAVs	Citizen Observ.
Athens, GR	PC	X	X		X	X	X	X	X	X	X
Thes/niki, GR	TB	X			X			X		X	
Stockholm, SE	PC	X			X			X	X		
La Paz, BO	PC/FL	X			X			X	X		
Naijing, CN	CS/FL	X			X			X	X		
Brno, CZ	TB/CS	X			X			X		X	

* Explanation of labels

PL - Pilot City: implementing an integrated plan of a series of solutions to one or more of the pressures addressed

TB - Test Bed: testing or demonstrating specific, targeted solutions

CS - Case Study: conducted to address complicated and high-priority EU issues based on past data or case wise approaches

FL – Follower City: observing, interacting and contributing to the exploitation of the smart city concept of SMURBS

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State-of-the-art: tools

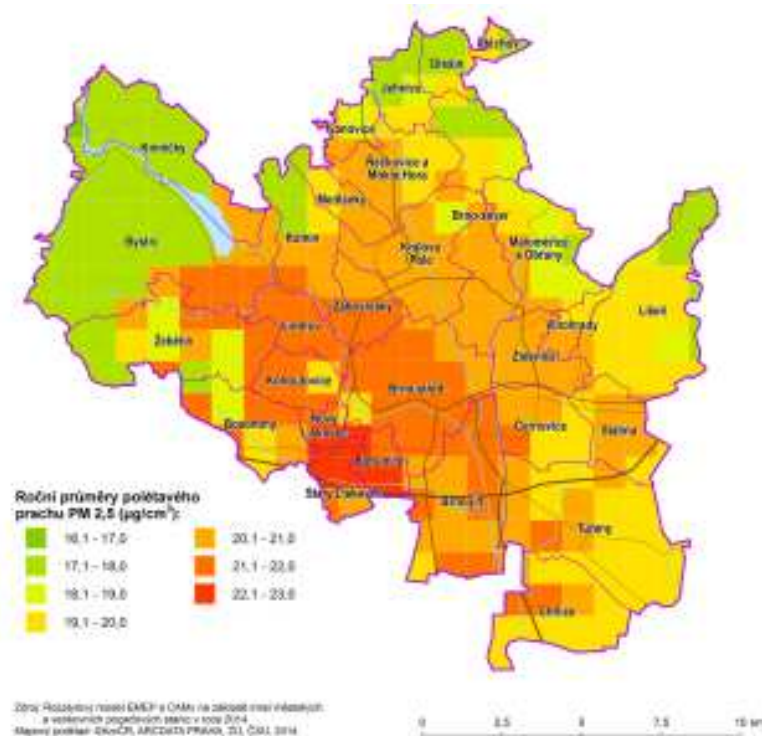- Available measurements:

-Air Pollutant concentrations

(Long term measurements, detail spatial resolutions)

Outdoor X Indoor

- Specific examples (MU – CZ): GENASIS environmental information system (www.genasis.cz) Cooperation with iGOSP

Roční průměry polétavého prachu PM 2,5 (µg/cm³):

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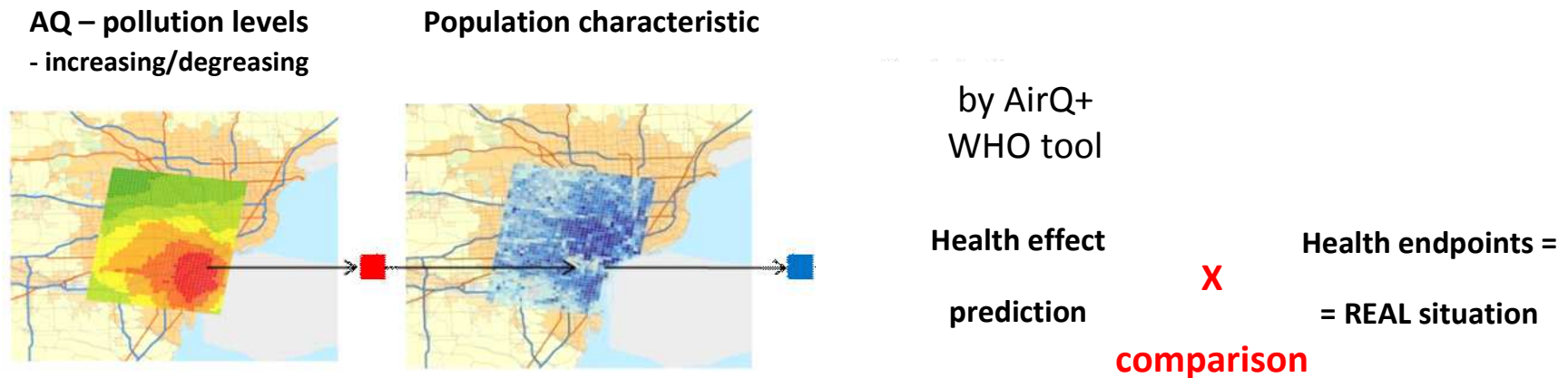
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State-of-the-art: tools

- Databases – National Institute of Health Information and Statistic (Human health outcomes)

- Population characteristic

- AirQ+ tool   WHO tool for prediction of the health impacts of air pollution - makers in evaluating risks and taking appropriate action

- Integration in some mobile application (CLAIRE, or TREASURE,…)

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Progress beyond the state-of-the-art

- Planned implementation in cities

AQ – pollution levels
- increasing/degreasing

Population characteristic

by AirQ+
WHO tool

Health effect   **X**   **Health endpoints =**

prediction   **= REAL situation**

comparison

- Selection of relevant pollutants
- Selection of Health endpoints and indicators (for all cities)

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SMURBS — SMART URBAN SOLUTIONS
HEALTH

WHO AirQ+ SW tool

AIR POLLUTANTS:
- PM2.5
- PM10
- NO2
- ozone
- black carbon

TYPES OF EXPOSURE AND HEALTH ENDPOINTS HANDLED BY AirQ+

	Health outcome	Ambient air pollution — Long-term					Ambient air pollution — Short-term				Household air pollution — Long-term
		PM2.5	PM10	NO2	O3	BC	PM2.5	PM10	NO2	O3	Solid fuel use
Mortality	Mortality, all (natural) causes	x	x			x	x		x	x	
	Mortality, ALRI (children 0-4)	x									x
	Mortality, COPD (adults 30+)	x									
	Mortality, COPD (women 30+)										x
	Mortality, COPD (men 30+)										x
	Mortality, IHD (adults 30+)	x									
	Mortality, IHD (women 30+)										x
	Mortality, IHD (men 30+)										x
	Mortality, LC (adults 30+)	x									
	Mortality, LC (women 30+)										x
	Mortality, LC (men 30+)										x
	Mortality, Stroke (adults 30+)	x									
	Mortality, Stroke (women 30+)										x
	Mortality, Stroke (men 30+)										x
	Mortality, respiratory diseases				x					x	
	Mortality, CVDs									x	
	Postneonatal infant mortality, all-cause		x								
Prevalence/incidence	Prevalence of bronchitis in children		x								
	Prevalence of bronchitis symptoms in asthmatic children aged 5-14			x							
	Incidence of chronic bronchitis in adults		x								
	Incidence of asthma symptoms in asthmatic children							x			
Hospital admissions	Hospital admissions: CVD (including stroke)						x				
	Hospital admissions, CVD (without stroke)									x	
	Hospital admissions: respiratory diseases						x	x		x	
RADs/work days lost	Work days lost, working age population only						x				
	Restricted activity days (RADs)						x				
	Minor restricted activity days (MRADs)									x	

Acronyms: Acute lower respiratory disease (ALRI), chronic obstructive pulmonary (COPD), Ischaemic heart disease (IHD), lung cancer (LC), cardiovascular diseases (CVD), restricted activity days (RADs), minor restricted activity days (MRADs), particulate matter less than 2.5 microns (PM2.5), particulate matter less than 10 microns (PM10), nitrogen dioxide (NO2), ozone (O3), black carbon (BC)

Deliverables

- M35 (D5.3) Outline results from the health case studies and report on EO synergies with existing health studies to address

- M35 (D7.8) EO4health – White paper establishing the strong potential of exploitin EO synergies in support of health policies.

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"Take-home" message

Expected outcomes:

- Integration of the tool for assessment of the health impacts of air pollution from different sources in a given population supporting policy-makers in evaluating risks and taking appropriate action

- This tool will be tested to link the external human exposures to specific health endpoints and indicators in the:
  - case studies, pilot city, test bed

- Outcomes answer - <u>how EO will add value to health relevant assessments</u> and analysis, and what is the contribution of SMURBS-smart city approach to this.

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