Actualities on Environment and health

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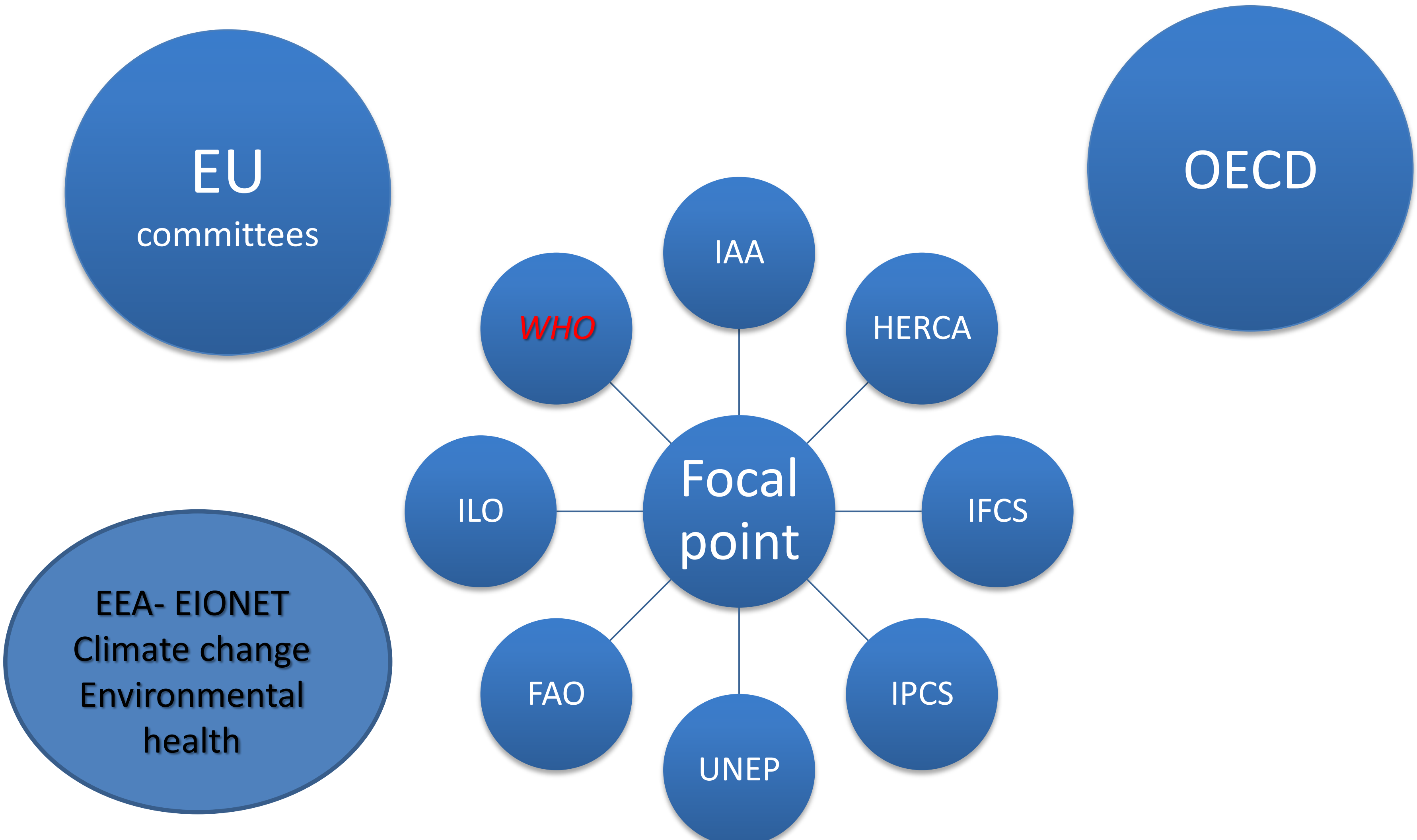
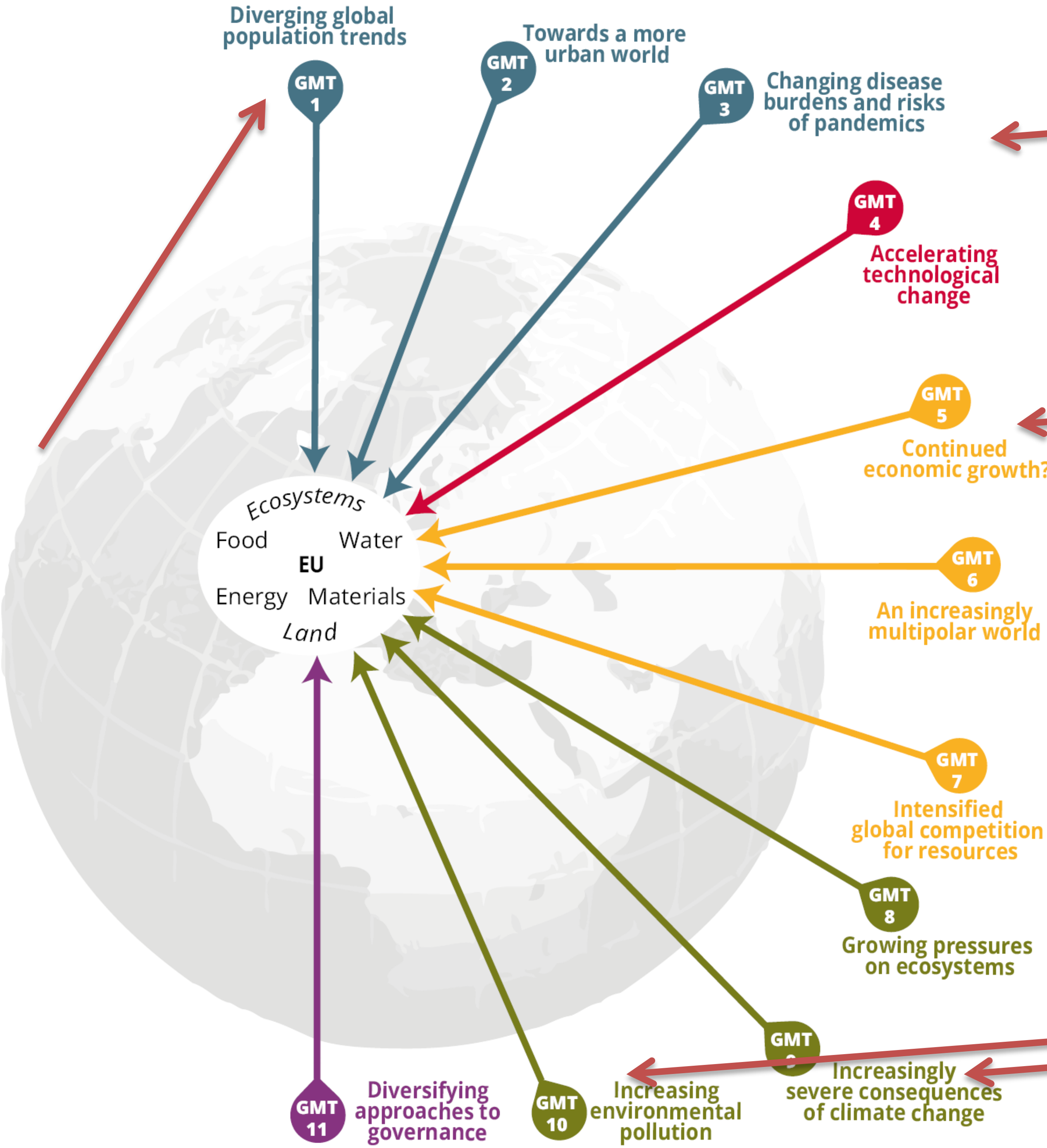
National Public Health Institute

International responsibilities of the NPHI



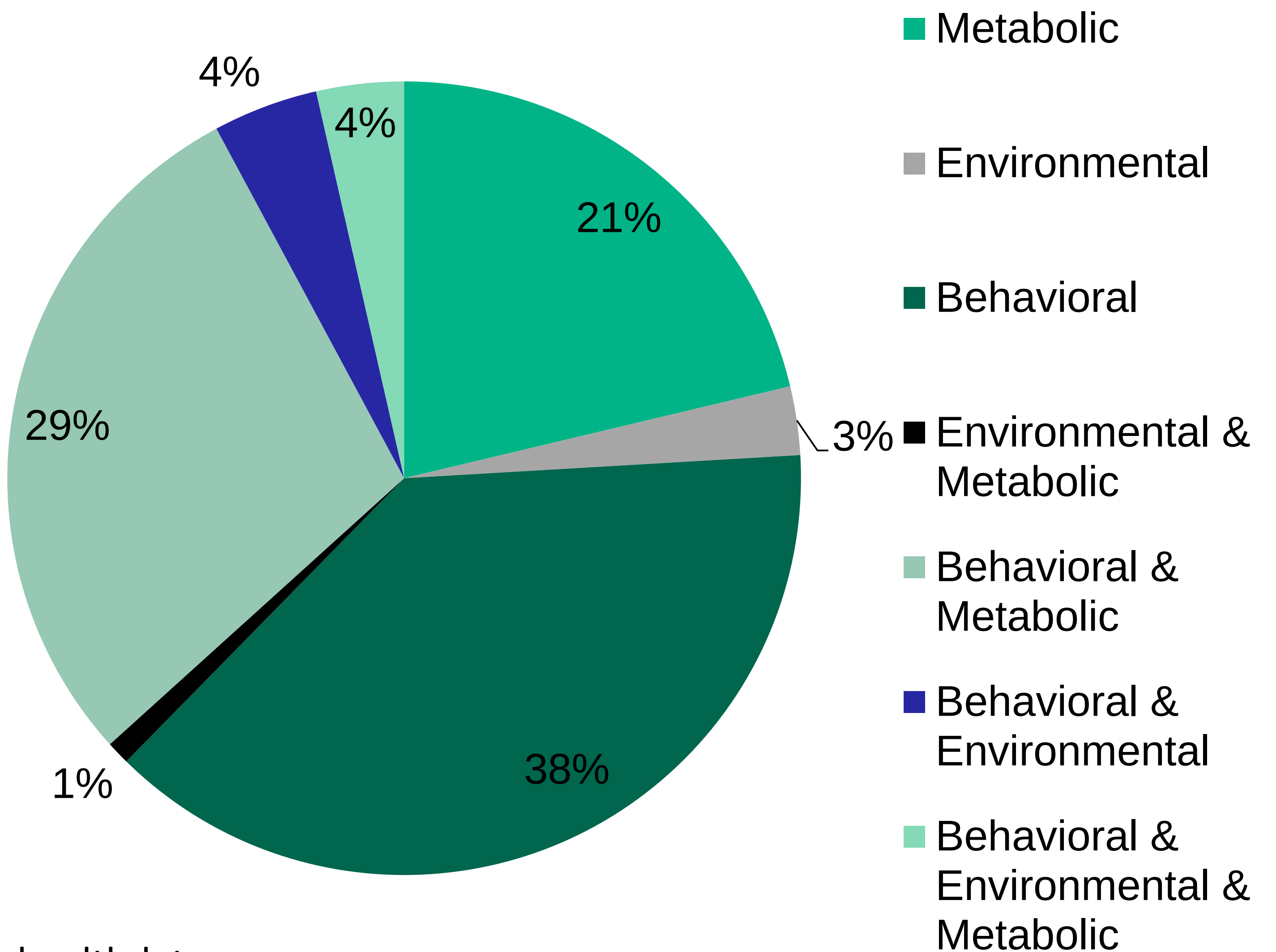


SOER 2015 — The European environment — state and outlook 2015

A comprehensive assessment of the European environment's state, trends and prospects, in a global context.

3. Changing disease burden

Percent of DALYs attributable to Global Burden of Disease risk factors, Hungary, 2015



Data source: healthdata.org

GMT9: Increasingly severe consequences of climate change

Climate change

Climate change could be the biggest global health threat of the 21st century (Lancet and University College London Institute for Global Health Commission, 2009, Managing the health effects of climate change, The Lancet, Vol. 373, No. 9676, p1690–1733).

In the last decade EU countries experienced varied weather conditions including an increase of weather events such as periods of extreme heat and cold, heavy rainfall and flooding, in some cases followed by a mosquito invasion.

What are the facts and predictions?

The rise in global mean surface temperature will likely be in the range of 0.3°C to 0.7°C for the period 2016–2035 (relative to 1986–2005) and 0.3°C to 4.8°C for 2081–2100, as stated by the Intergovernmental Panel On Climate Change. The most vulnerable areas of Europe are Southern Europe and the entire basin of the Mediterranean Sea, where the mutual impact of a considerable increase in temperature and decrease in precipitation will affect areas already subject to water shortage.

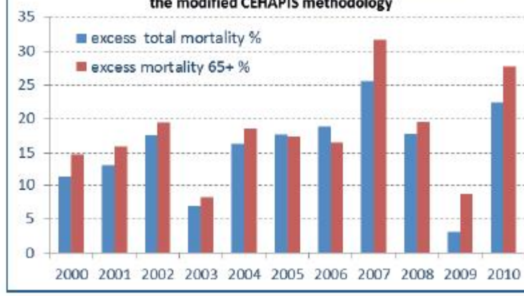
Four main areas can be distinguished regarding the health impacts of climate change. The first group of effects is directly caused by weather events, the most important being the health impacts of heat waves and extreme weather events. Indirect effects are vector and food borne diseases and allergies caused by airborne allergens – in these cases the changes in climate sensitive environmental systems contribute to the occurrence of different diseases.

There is an increasing body of evidence to support the view that climate change will have an impact on human health, and that it will contribute to disease and premature deaths. Climate change will affect the health of millions of people, especially those with a low adaptive capacity.

The primary concern in Europe is linked to heat-related morbidity and mortality, due to increases in annual temperature and extremes of heat. These issues are also influenced by socio-economic changes due to population growth and the ageing of the population. In Member States, it is estimated that mortality increases by 1–4% for each one degree rise in temperature, meaning that heat related mortality could rise by 30,000 deaths per year by the 2030s and by 50,000 to 110,000 deaths per year by the 2080s.

If we would like to understand the health impacts of climate change and identify potential policy actions we have to study the complex relationship between the natural, man-made and social environments and human health. For this purpose we used a combination of the modified and ecosystems-enriched Drivers, Pressures, State, Exposure, Effects, Actions or DPSEEA model (Figure 1).

Fig 3 Excess mortality due to heat waves in the total population and in the age group of 65+ in Budapest, 2000-2010 computed by the modified CEHAPIS methodology



Indicators on heat-waves, especially on excess mortality have been developed by the WHO (figure 3). A tool for the analysis of excess mortality is also available for use by European countries. Harmonised data collection is recommended to gather information on the effectiveness of climate change adaptation policies and programmes.

Key messages

All EU Member States should prepare national climate change strategies focusing both on mitigation and adaptation measures.

Housing, energy and spatial policies should be aligned to these strategies.

The village block in Budapest, Hungary, before and after renovation

Complete insulation of the houses, a more efficient heating system and a solar collector system for the production of hot water led to reduction of CO_2 emissions and an increase in the value and living quality of the properties.

This leaflet was produced by the FRESH consortium under a project funded by the European Environmental Agency in 2014. More information is available at www.eea.europa.eu/ehwb

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„Expect the Unexpected" –

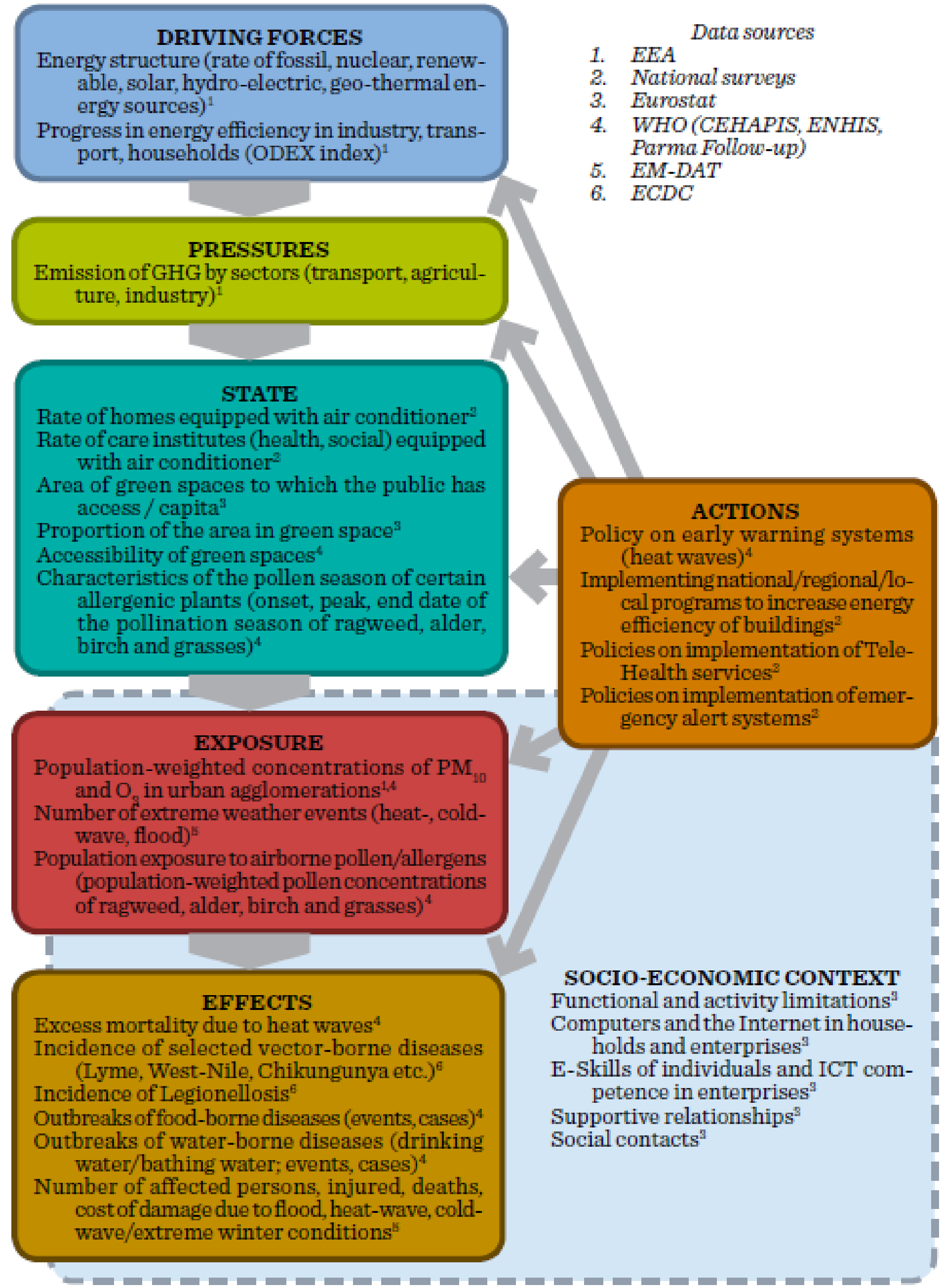
Climate Change Impacts

Szeged 2017

ISBN 978 – 963 – 12 – 8415–7

Climate change, environment, health and well being[31]

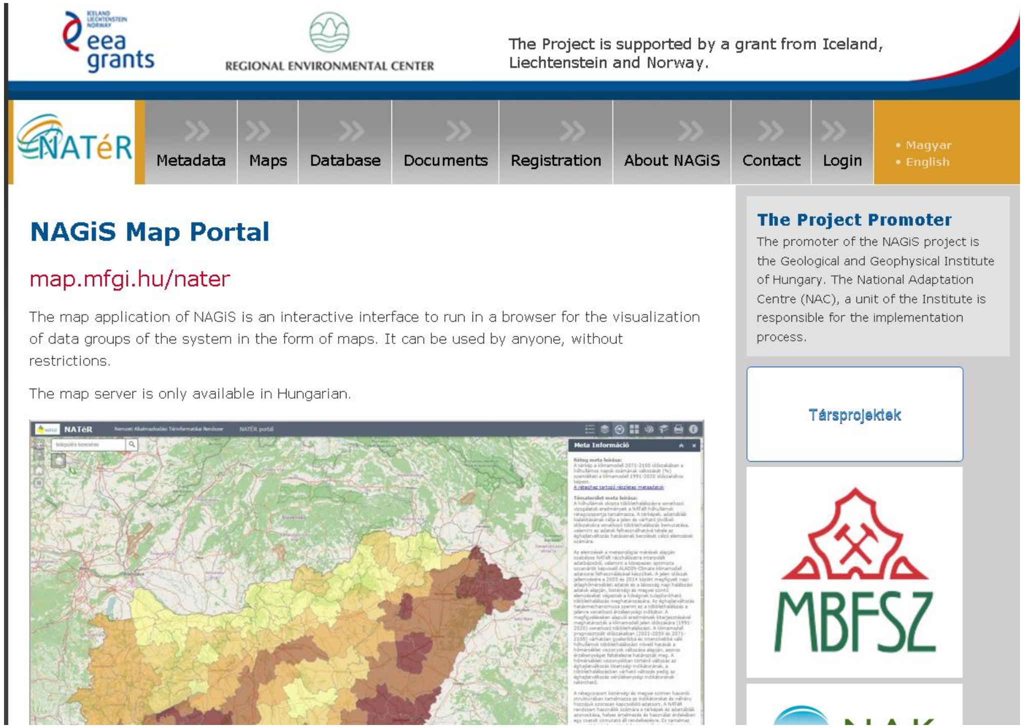
Anna Paldy, Tibor Malnasi and Janos Bobvos*

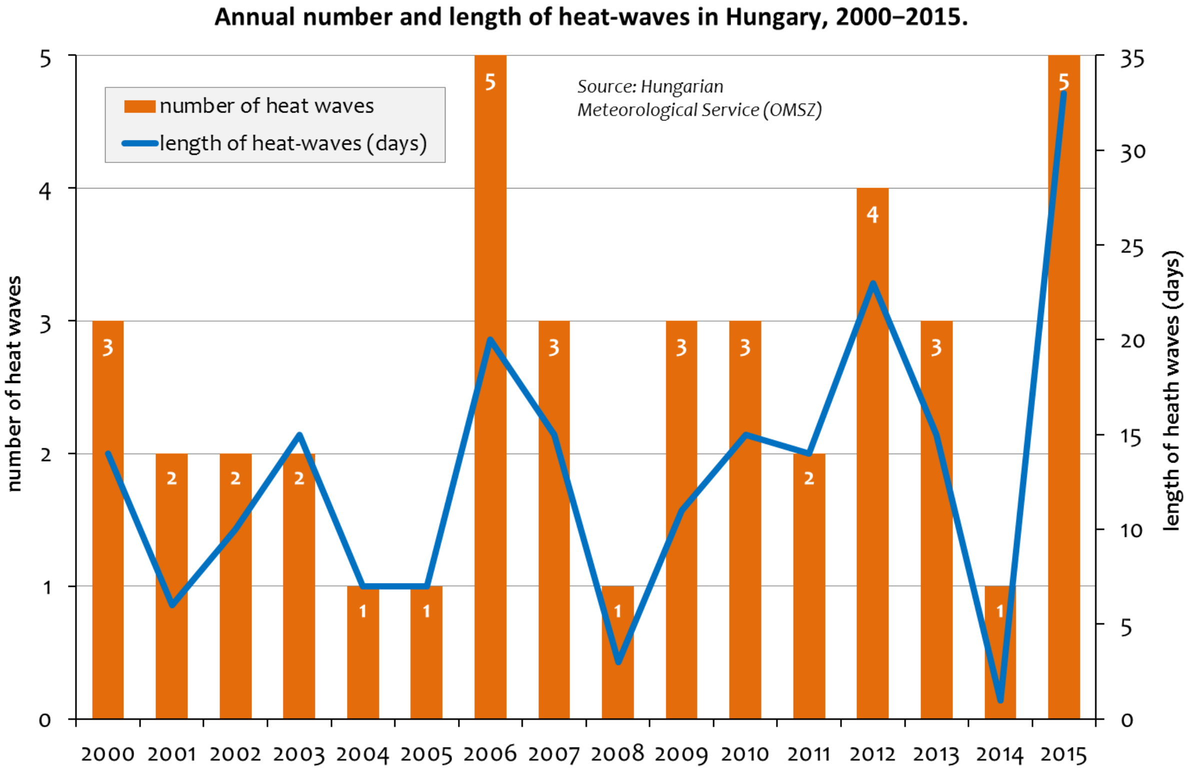


Application of modified DPSSEA model for climate change

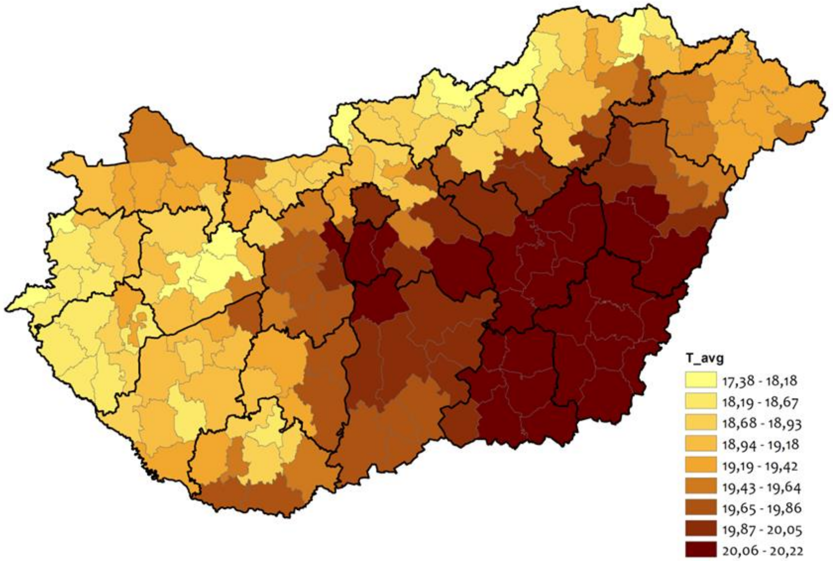
Health effects of climate change – contribution to NAGIS

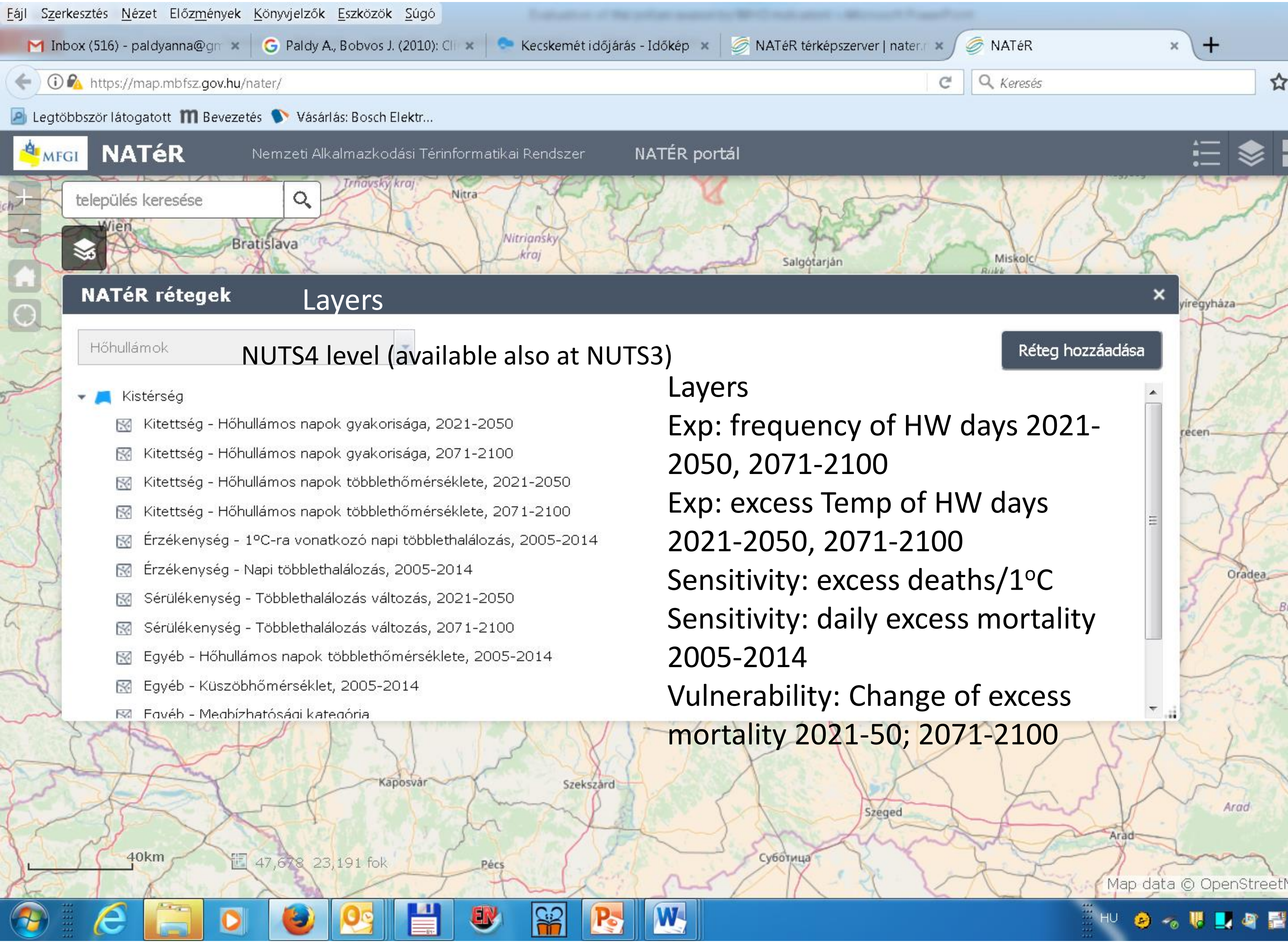
EEA Grant CRIGIS project 2015: development of heat wave related indicators – contribution to the development of **NAGIS map portal**





Mean temperature during the summer period, 2005-2014





Layers

NUTS4 level (available also at NUTS3)

Layers

Exp: frequency of HW days 2021-2050, 2071-2100

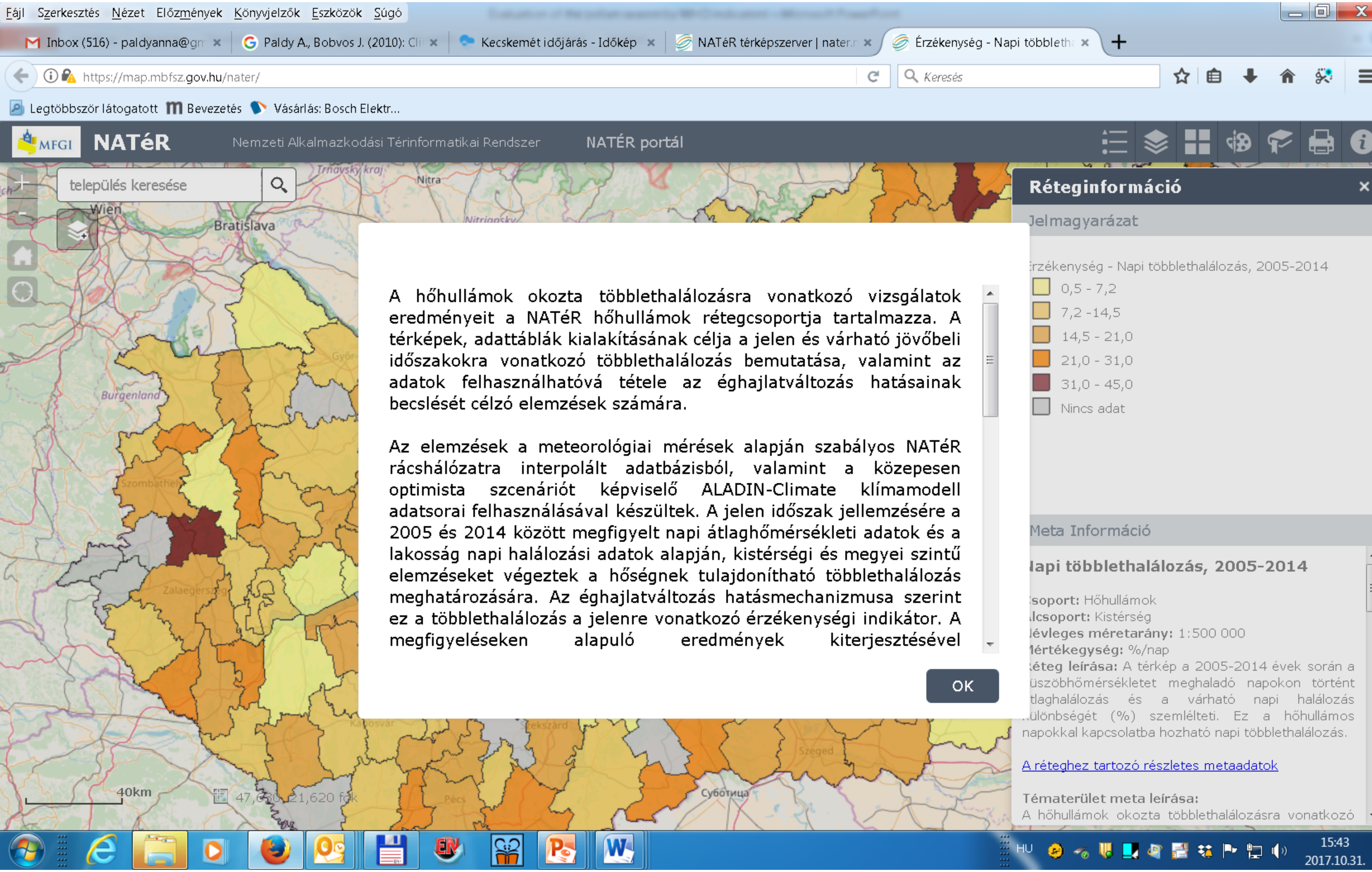
Exp: excess Temp of HW days 2021-2050, 2071-2100

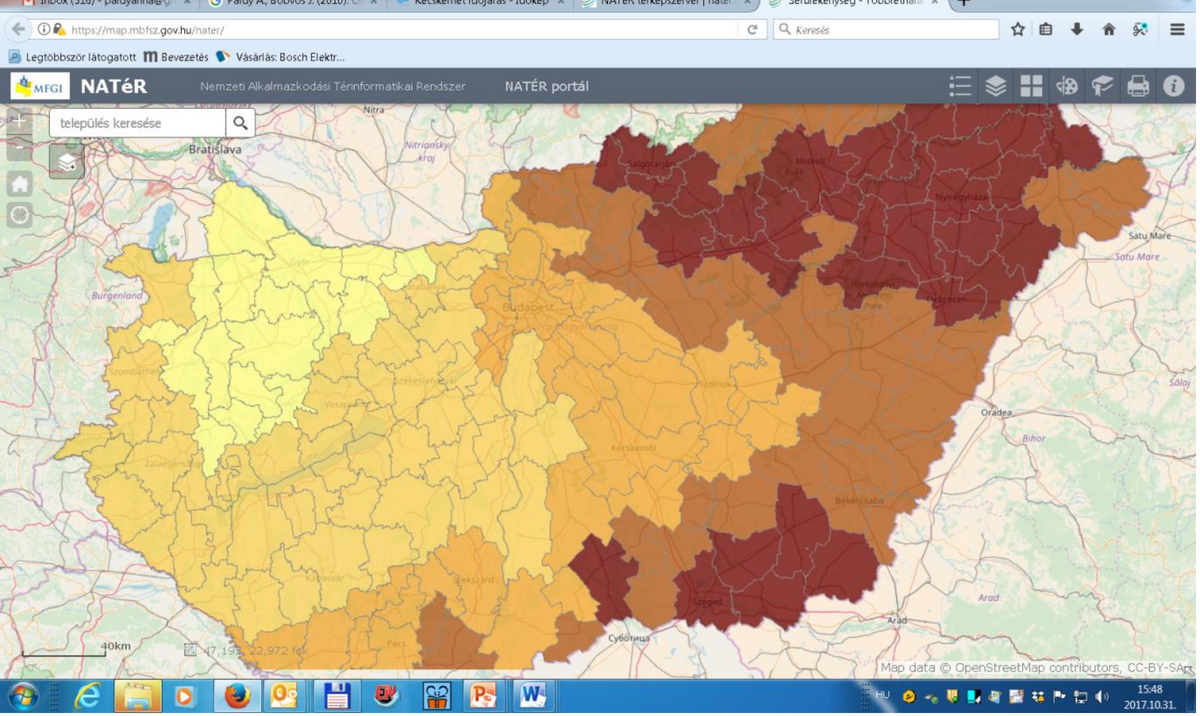
Sensitivity: excess deaths/1^{o}C

Sensitivity: daily excess mortality 2005-2014

Vulnerability: Change of excess mortality 2021-50; 2071-2100

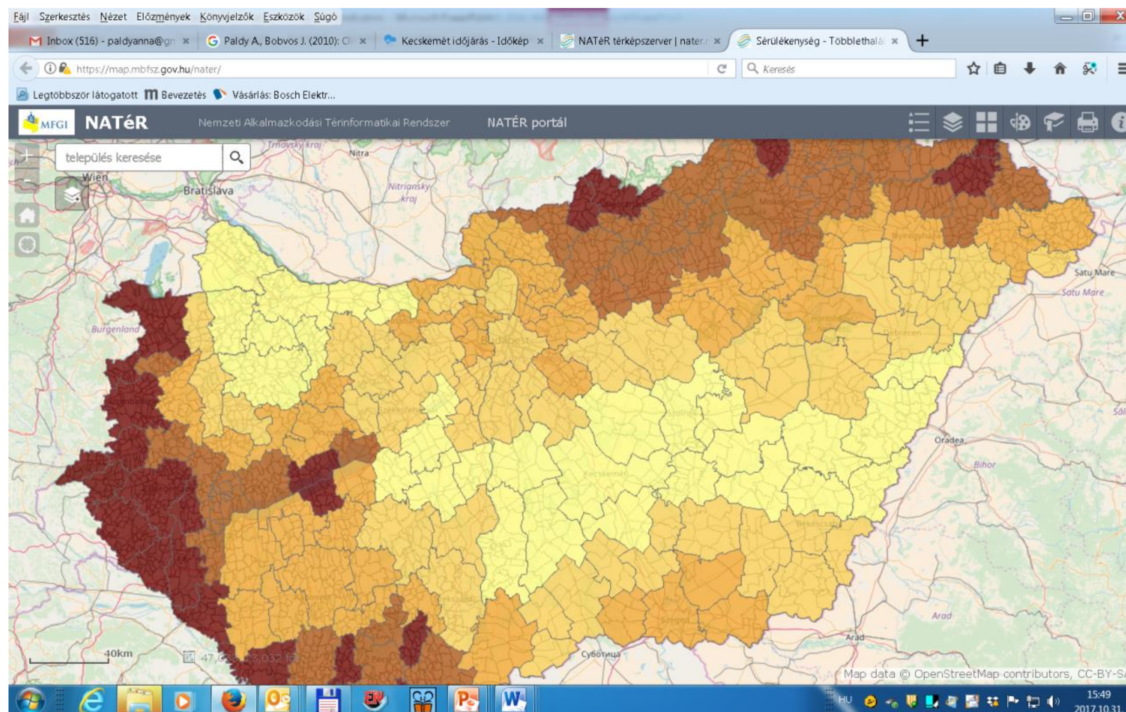
Daily excess mortality 2005-2014



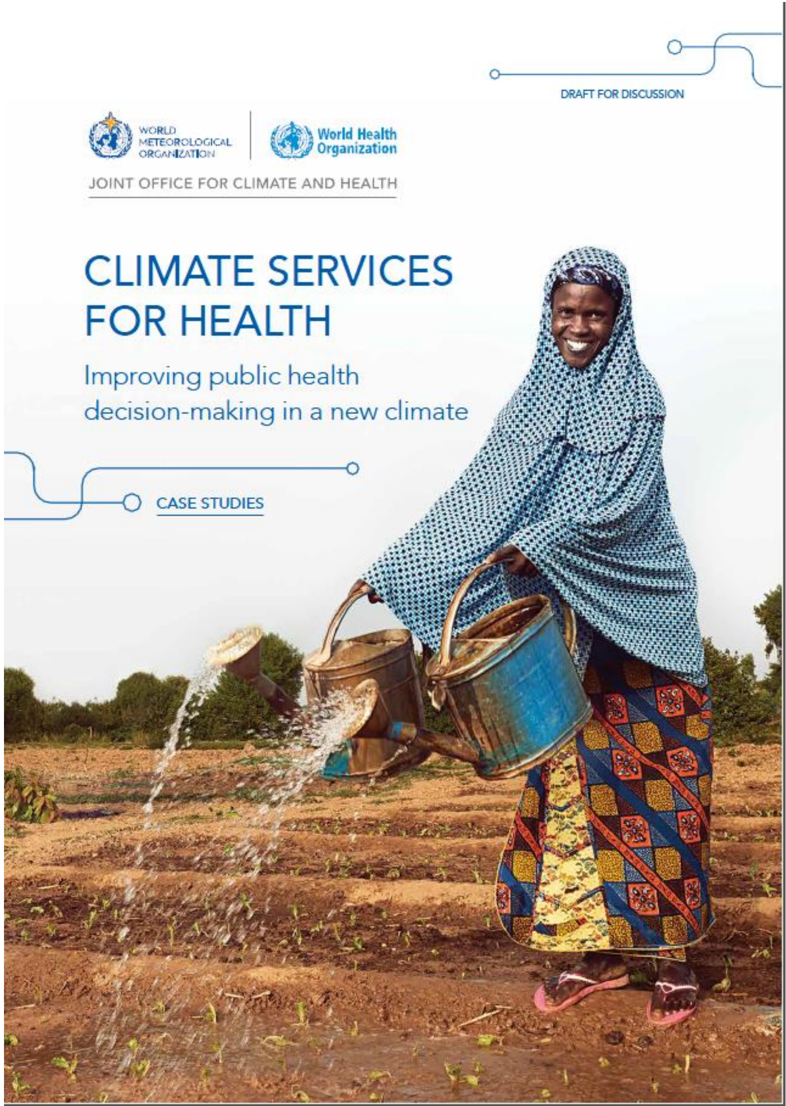


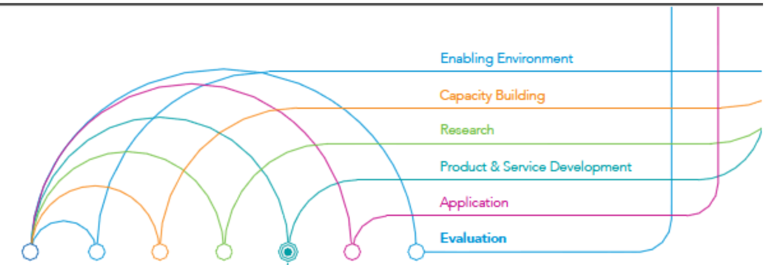
Vulnerability:
Change of excess mortality due to heat waves
2021-50
~ 150%

Vulnerability: Change of excess mortality due to heat waves
2071-2100
~ 600%



WMO/WHO Climate services for health
Case studies: Climate –specific pollen indicators





CHAPTER 5

CO-DEVELOPMENT AND DELIVERY OF HEALTH-TAILORED CLIMATE PRODUCTS AND SERVICES

GOAL to collaboratively design and create tailored information products that are integrated and interoperable to user specifications, which provide decision-makers and communities with timely and relevant information to manage health risks specific to climate and weather.

Tailored climate products are most frequently the result partnerships that process and present climate data or information, either alone or in combination with other types of data or information, in such a way that makes the information usable for a specific purpose. Climate services, on the other hand, refer to the needs-driven processes that bring about the production and delivery of climate information relevant for managing climate sensitive health risks.

The transformation and translation of climate information products to useful tailored climate-informed health decision tools often involves the development of a combination of separate but interlinked products, which are needed to forecast health risks or produce early warnings. Each product must have a sufficient degree of quality, reliability, usability, suitability and responsiveness to changing needs. The degree to which these criteria are met determines how, and if, the information can be further applied, and whether health decision-makers will trust the information enough to use it confidently for decision-making. Health decision tools which use climate information to understand and predict health risks commonly fall into the following categories:

Figure 5.2
Common health tailored climate products

CASE STUDY 5.F

INDICATORS

CLIMATE-SPECIFIC POLLEN INDICATORS AND POPULATION EXPOSURE MONITORING TOOLS TO BETTER MANAGE THE ALLERGY SEASON IN HUNGARY

Authors: J. Bobvos, A. Páldy, B. Fazekas, G. Mányoki, D. Magyar (National Institute of Environmental Health, Budapest, Hungary), A. Egorov, D. Dalbokova, C. Gapp (WHO European Centre for Environment and Health, Bonn Office).

CONTEXT

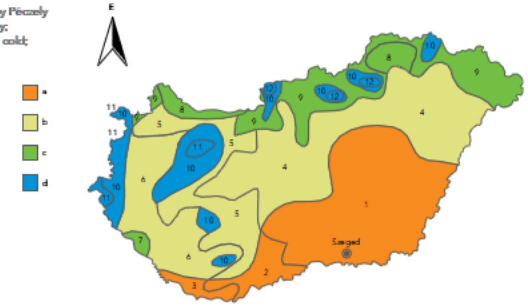
The 4th Assessment Report of IPCC (30) states that climate change has caused an earlier onset of the spring pollen season in the northern hemisphere. It is reasonable to conclude that allergenic diseases caused by pollen, such as allergic rhinitis, have experienced some concomitant change in seasonality. There is limited evidence that the length of the pollen season has also increased for some species. Furthermore the EU Strategy on adaptation to climate change *(31)* highlights that climate change might potentially increase the seasonality and duration of allergic disorders such as hay fever or asthma with implications for direct costs in terms of care and medicines, as well as lost working hours. The 5th Assessment Report of IPCC *(32)* stated that warmer conditions generally favour the production and release of airborne allergens. Progressively increasing temperatures may modify the global pollen load *(33)*. Adaptation measures identified to date include aeroallergen monitoring and forecasting. Therefore it is of high importance to evaluate the pollen exposure of populations living in different geographical and climatic regions in order to adjust information and adaptive measures.

NEW APPROACHES

The WHO European Centre for Environment and Health (WHO/ECEH), with the contribution of Member States, has developed climate-related indicators as part of the CEHAPIS project.[a] Four allergen plants were selected as indicators: alder (Alnus sp.); birch (Betula sp.); grasses (Poaceae sp.); ragweed (Ambrosia sp.). These provoke high sensitization rates, have fairly broad geographical and temporal coverage in the European flowering season (i.e. spring to autumn). The indicator set is based on daily airborne pollen emission measurements in continuous volumetric samplers (e.g. Hirst type, Burkard) with standard methods. Use of data from existing monitoring stations, located in different climatic regions of a given country is recommended. Each climatic zone needs to be characterized with a sufficient number of stations placed in populated areas. The number of inhabitants living in a radius of 10–30 km of the monitoring stations should be noted for weighting purposes.

a Climate Change, Environment and Health Action Plan and Information System (CEHAPIS) is co-funded by EC DG Sanco SPC 2007WHO03.

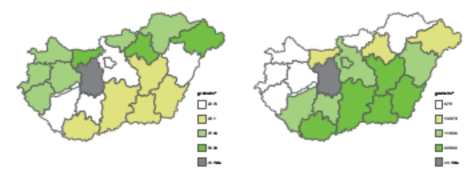
Figure 5.11 Climatic regions by Péczely (26) in Hungary: (a: warm and dry; b: moderate warm; c: moderate cold; d: cold and wet).



A software tool has been elaborated with the contribution of the National Institute of Environmental Health (NIEH) Hungary *(34)*. The software enables calculation of the start and end, duration (days), severity of the pollen period (annual sum and daily maximum of pollen grains (grains/m³) of the current and previous pollen seasons. To characterize the exposure further, population-weighted indicators can be computed: (i) proportion of days (%) with allergenic concentration of pollen (≥30 grains/m³); (ii) average exposure to the pollen (gr/m³); (iii) duration of the pollen season (days).

The software was tested using ragweed pollen data for the period of 2000–2013 of the Hungarian Aerobiological Network run by the National Institute of Environmental Health. The meteorological data were provided by the Hungarian Meteorological Service. Figure 5.11 shows the climatic regions within Hungary *(35)*; Figure 5.12 displays the effect of weather variability on the population-weighted pollen exposure.

Figure 5.12 Ragweed: Population-weighted average pollen concentration (grains/m3). Left_ extreme dry summer 2007. Right: extreme wet summer 2010.



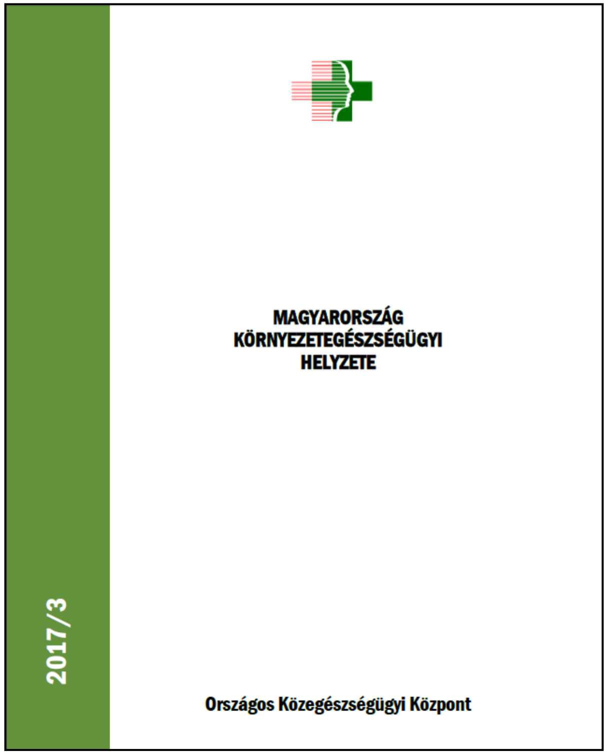
ACKNOWLEDGEMENTS

World Health Organization
REGIONAL OFFICE FOR Europe

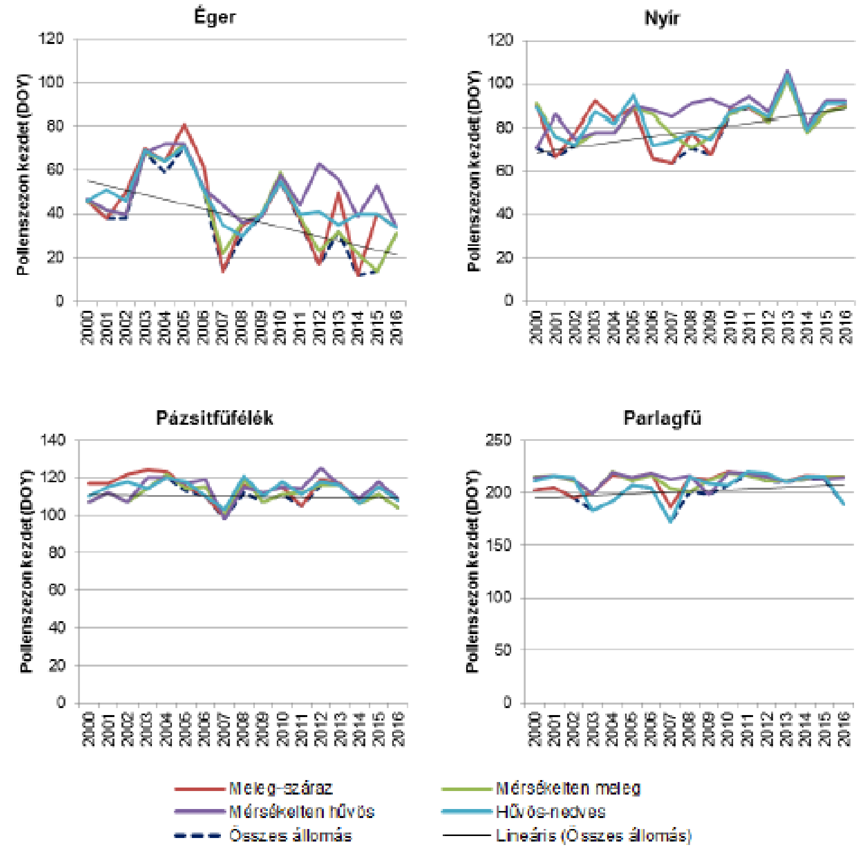
BENEFITS AND LESSONS

The software is used by the National Public Health Center (NPHC, formely NIEH). The results are communicated for the health care system, especially to the allergologists and general practitioners, to help adjust health care for allergenic patients in the short and long term. The results can be used by the agricultural sector to optimize summer weed (especially ragweed) eradication programmes to reduce exposure. The NPHC plans to disseminate the software at the international level, and to make it freely downloadable from its website.

Use of the indicators: Environmental health situation of Hungary



Change of the onset of pollen season of the 4 indicator plant species by climatic regions in Hungary 2000-2016.



87. ábra. A klímaspecifikus növényindikátorok pollenszezon kezdetének alakulása Magyarország egyes klímarégióiban, 2000. és 2016. között.

Az éger pollenszezonjának hossza bár jelentősen változik évente, összességében emelkedő tendenciát mutat. A nyír, valamint a parlagfű pollenszezon hossza az utóbbi években csökkent, a pázsitfüveké nem változott jelentősen.

Climate Change

Copernicus Climate Change Service

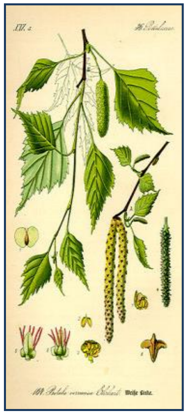
- Target sectors

- European Health: Contribution of NPHI to the development indicators of pollen – allergy topic

Allergenic plant species and climate

- The impact of climate change on allergenic plants can be monitored by indicator allergenic plant species
- The indicator describe the seasonal pattern and severity of measured pollen concentrations of the four allergenic plant species:

alder birch grasses ragweed



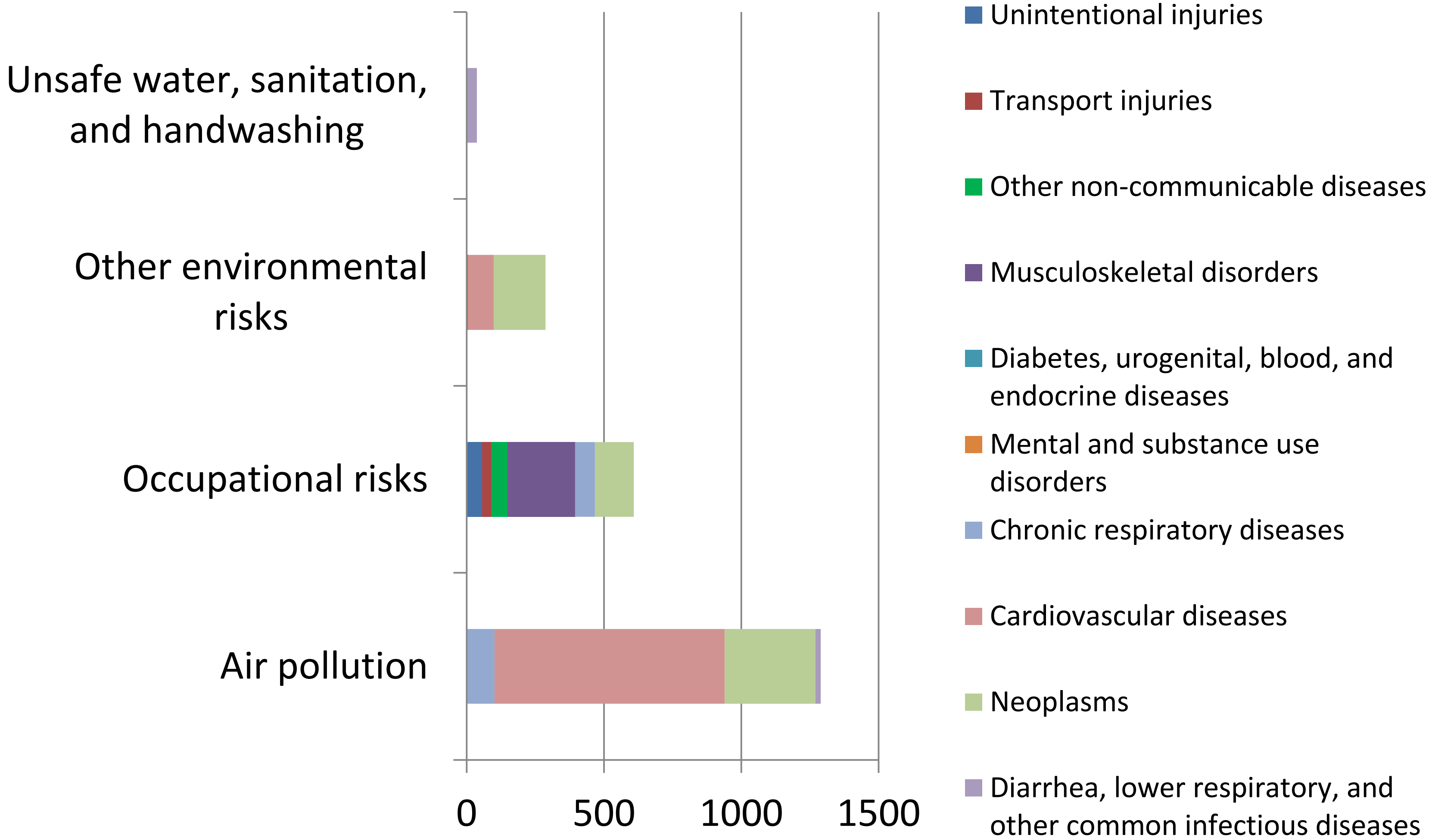
European Commission

Copernicus Europe's eyes on Earth

IMPLEMENTED BY ECMWF

GMT 10: Increasing environmental pollution – health impacts:

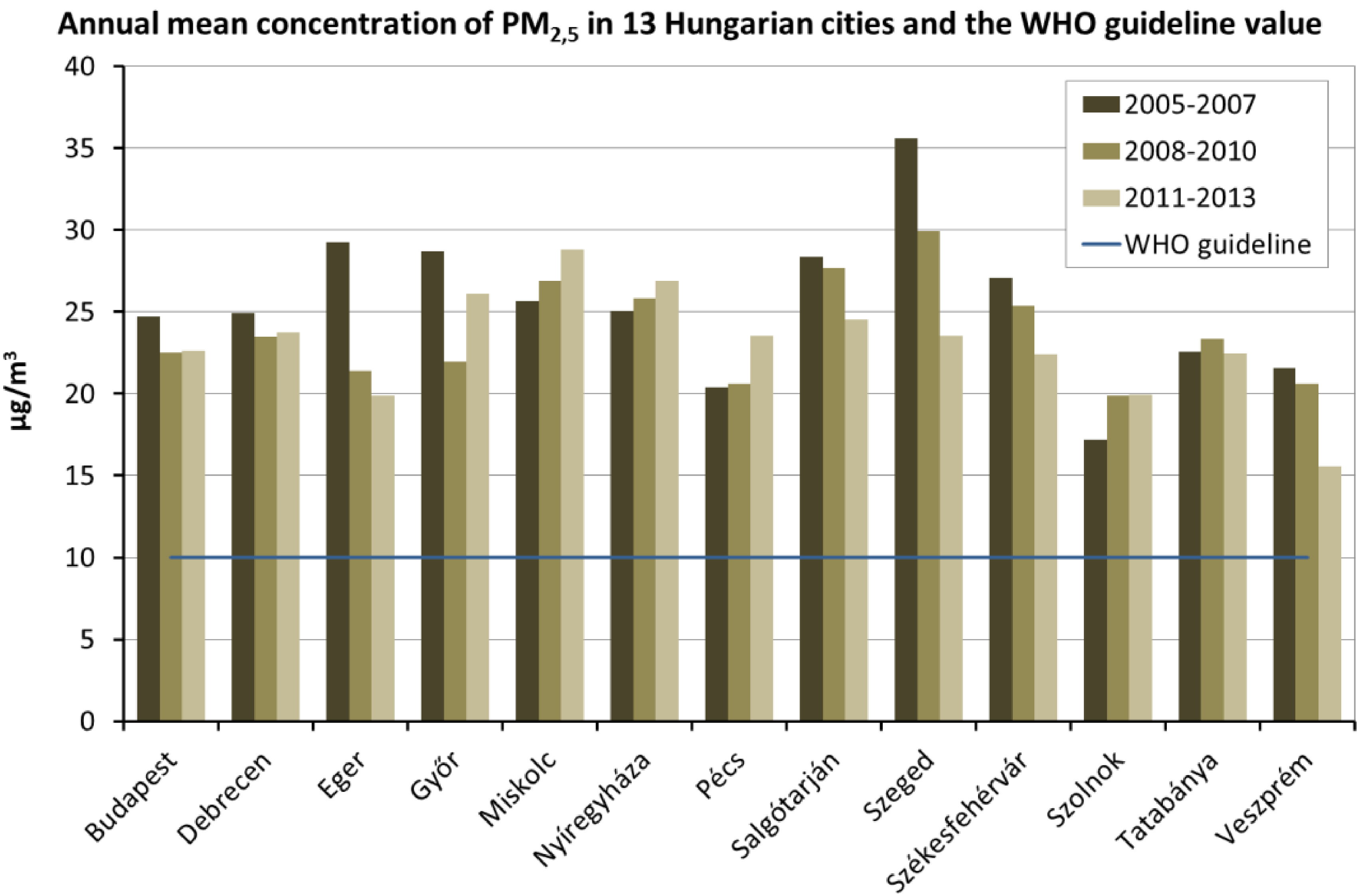
Years Lived with Disability per 100,000 due to environmental risk factors, Hungary, both sexes, 50-69 years, 2015



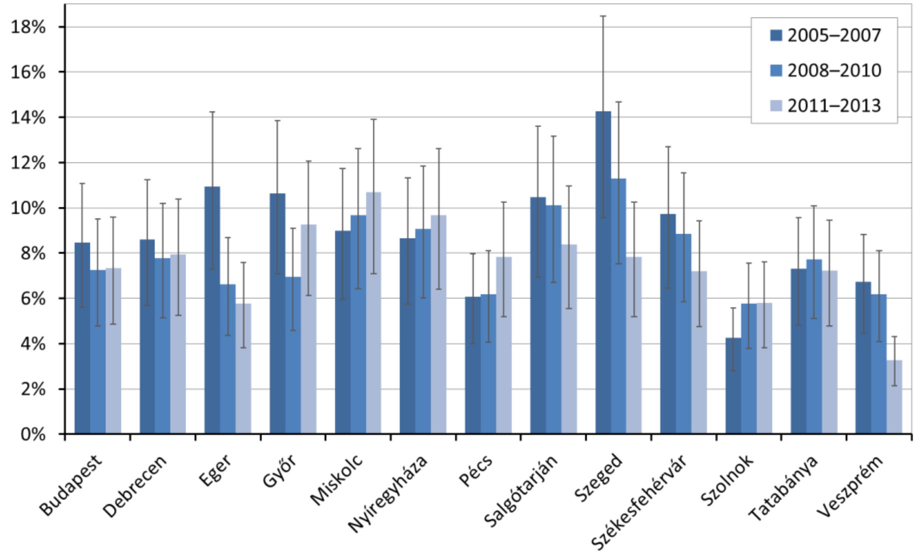
Data source: healthdata.org

Health impact assessment of air pollution in Hungary 2005–2013.
calculated by AirQ+ 1.0 developed by WHO/Euro 2016.

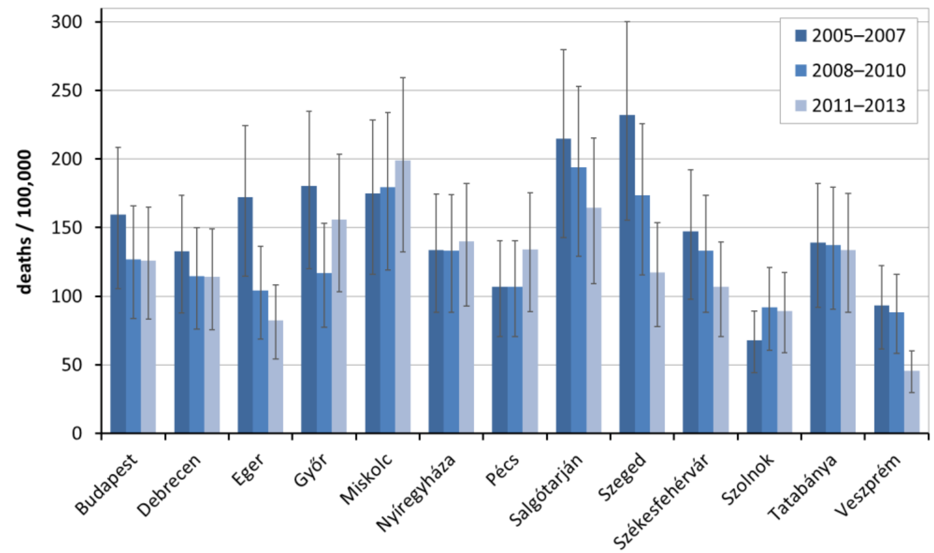
$PM_{2,5}$
Long-term effects



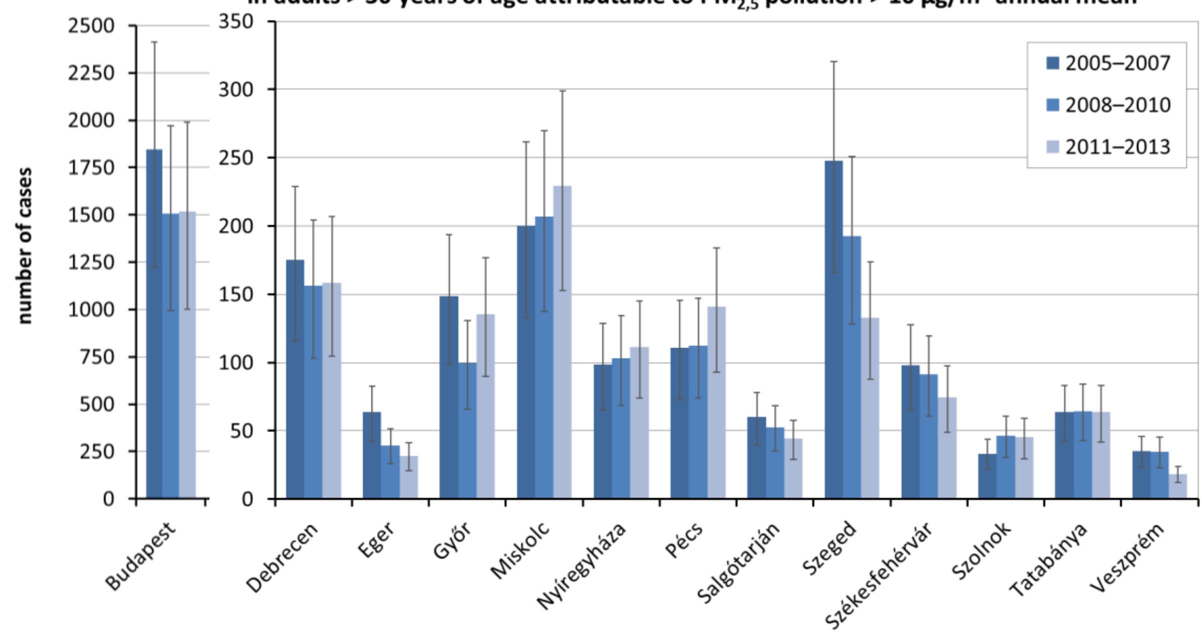
Estimated proportion of mortality due to all natural causes of death (ICD-10: A00–R99) in adults above 30 years of age attributable to $PM_{2,5}$ pollution > 10 μg/m³ annual mean concentration



Estimated number of deaths / 100,000 population at risk due to all natural causes of death (ICD-10: A00–R99) in adults > 30 years of age attr. to $PM_{2,5}$ pollution > 10 μg/m³ annual mean



Estimated number of deaths due to all natural causes of death (ICD-10: A00–R99) in adults > 30 years of age attributable to $PM_{2,5}$ pollution > 10 μg/m³ annual mean

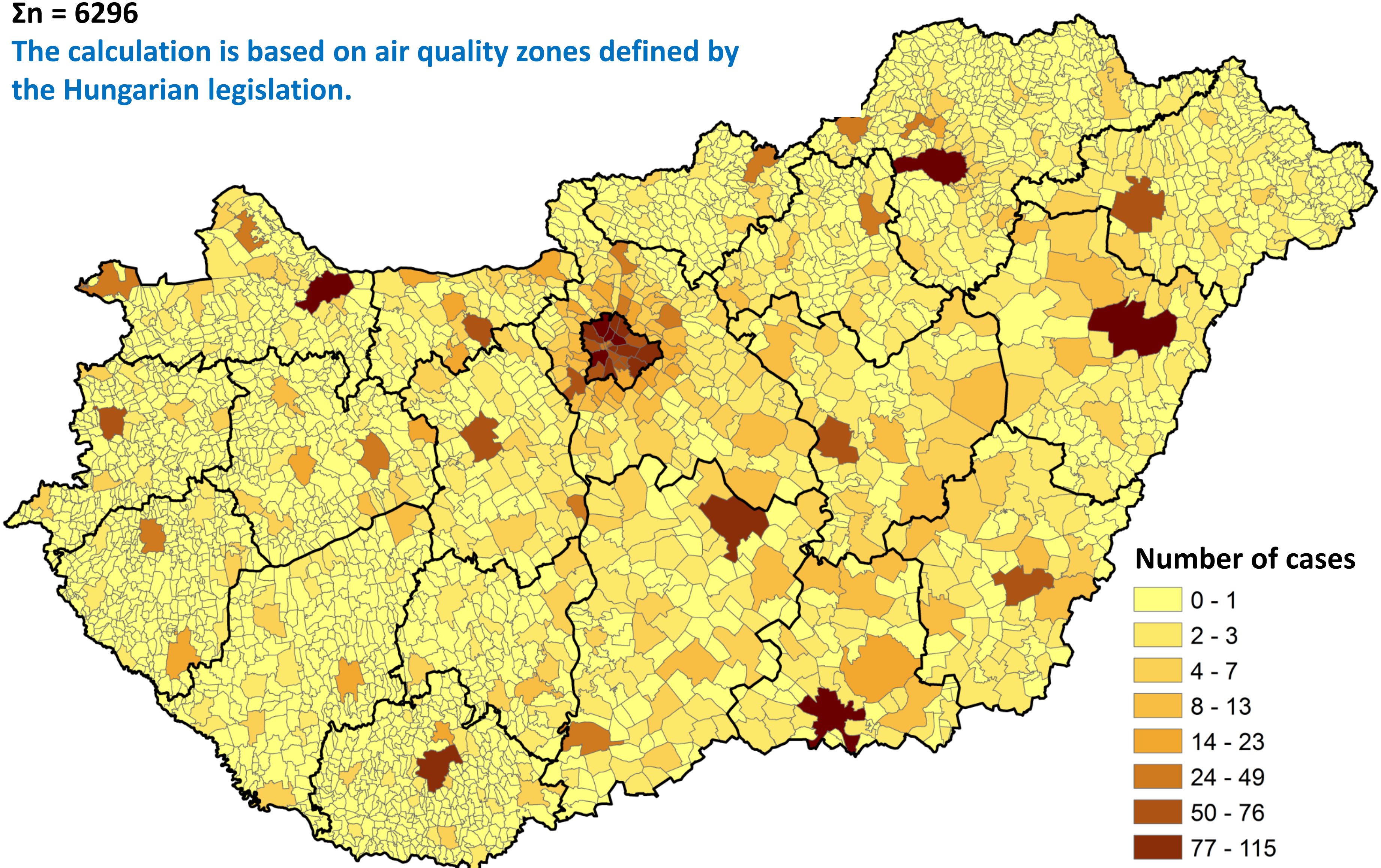


Method: log-linear, RR = 1.062 (95%CI: 1.04; 1.083)

Mortality due to all natural causes of death (ICD-10: A00–R99) > 30 years of age attributable to $PM_{2,5}$ > 10 µg/m³, 2009–2013.

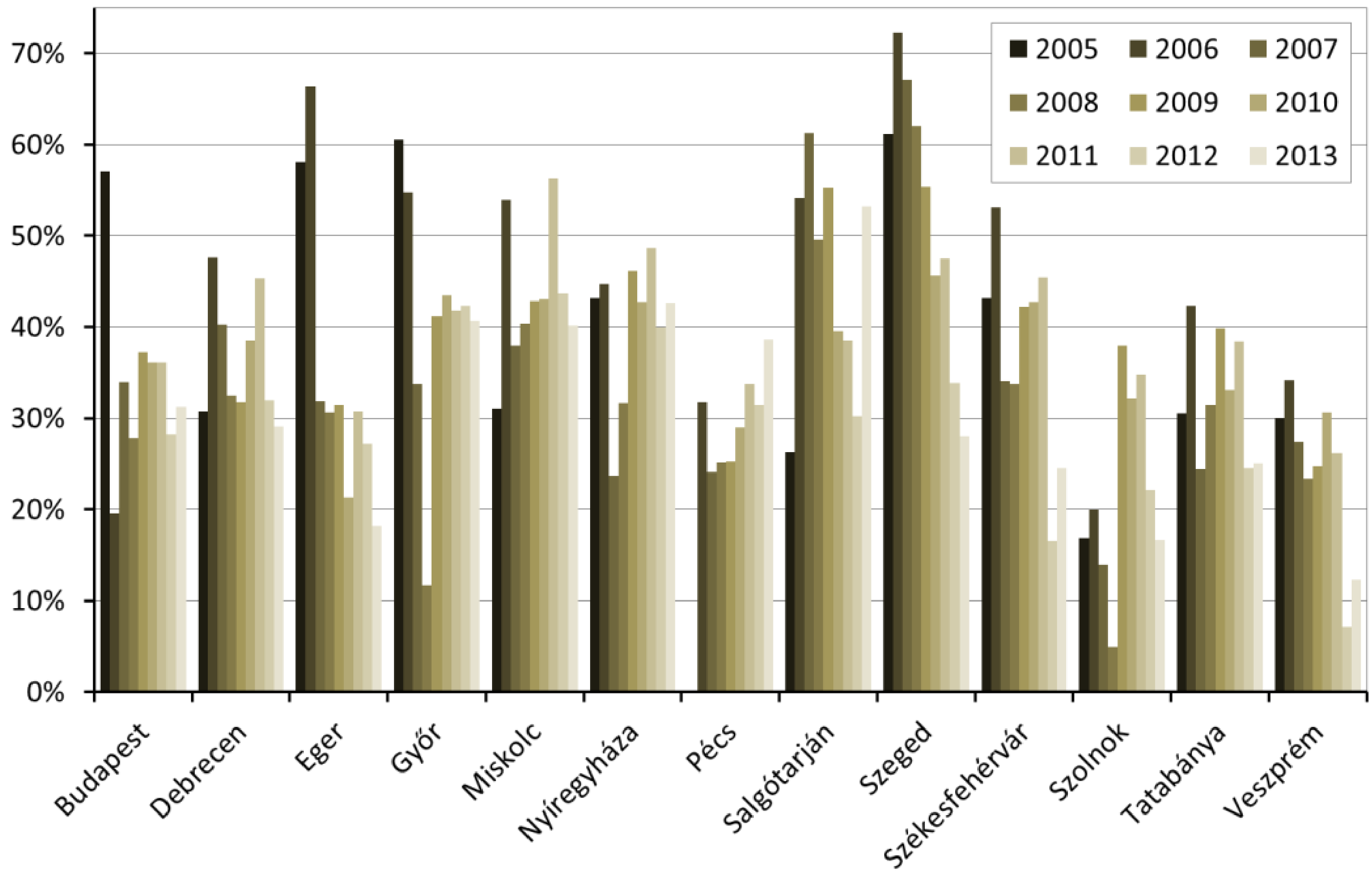
Σn = 6296

The calculation is based on air quality zones defined by the Hungarian legislation.

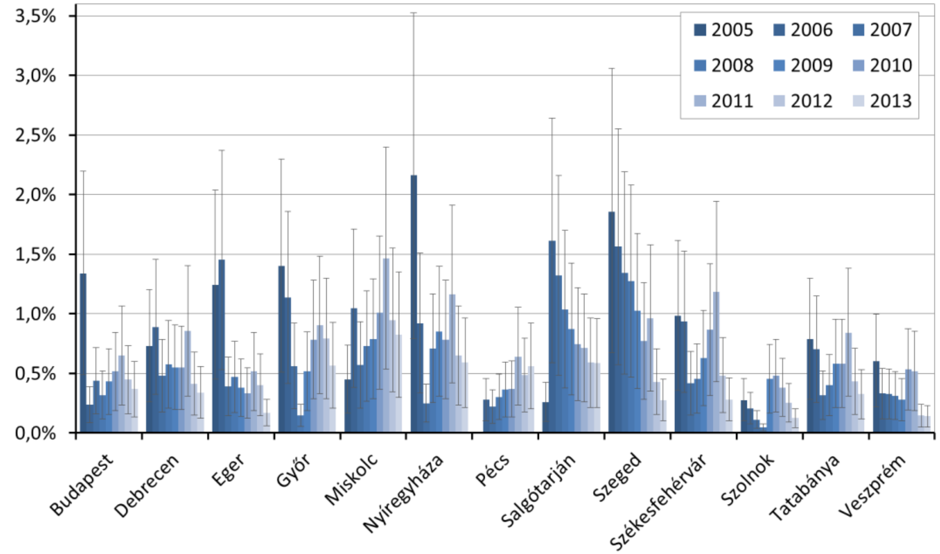


$PM_{2,5}$
Short-term effects

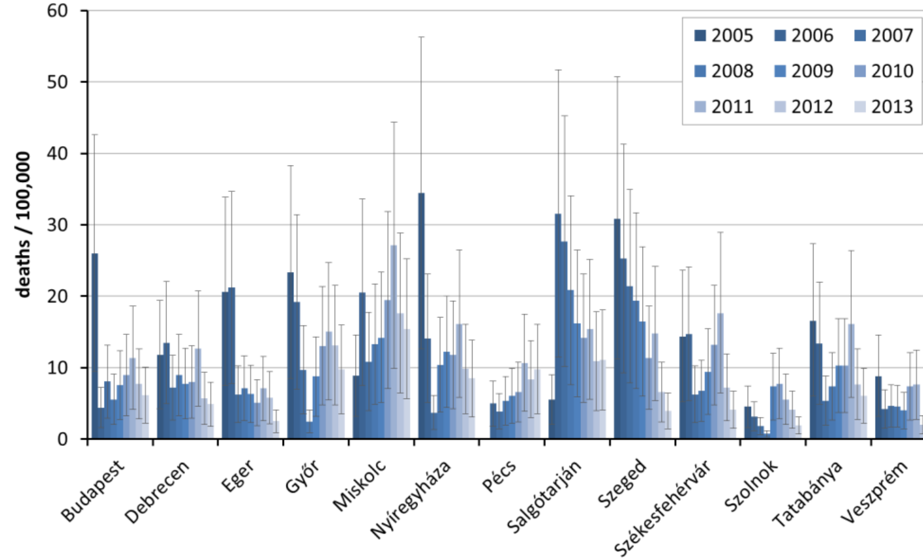
Rate of days exceeding 25 µg/m³ daily mean $PM_{2,5}$ concentration in 13 Hungarian cities, 2005–2013.



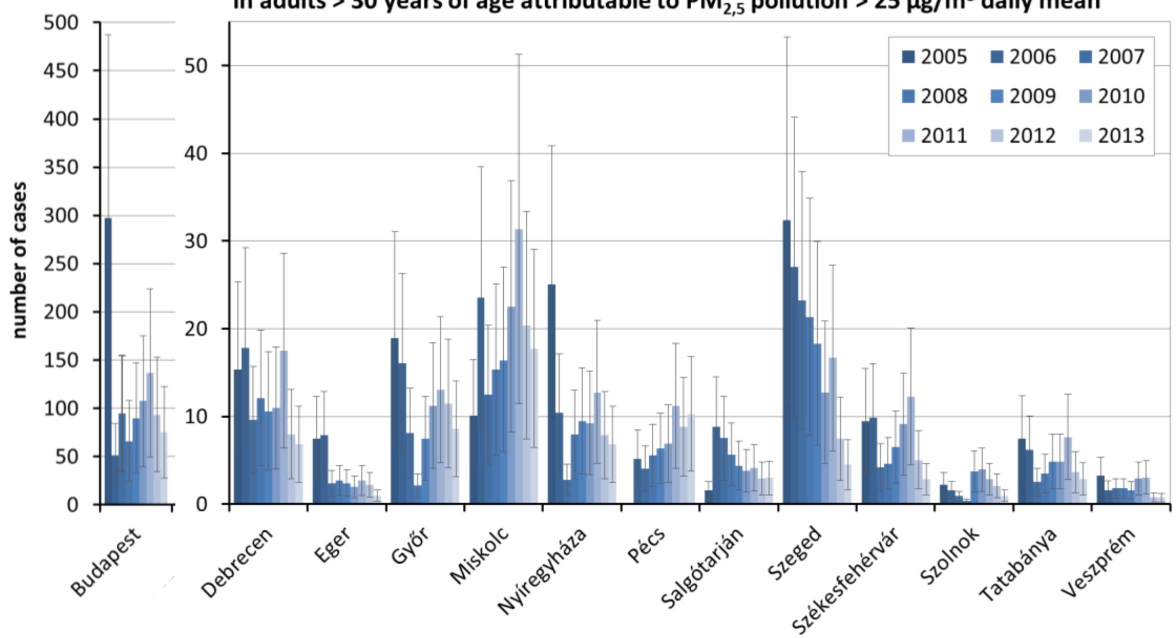
Estimated proportion of mortality due to all natural causes of death (ICD-10: A00–R99) in adults above 30 years of age attributable to $PM_{2,5}$ pollution > 25 µg/m³ daily mean concentration



Estimated number of deaths / 100,000 population at risk due to all natural causes of death (ICD-10: A00–R99) in adults > 30 years of age attr. to $PM_{2,5}$ pollution > 25 µg/m³ daily mean



Estimated number of deaths due to all natural causes of death (ICD-10: A00–R99) in adults > 30 years of age attributable to $PM_{2,5}$ pollution > 25 µg/m³ daily mean



Method: log-linear, RR = 1.0123 (95%CI: 1.0045; 1.0201)

Thank you
for
your attention!