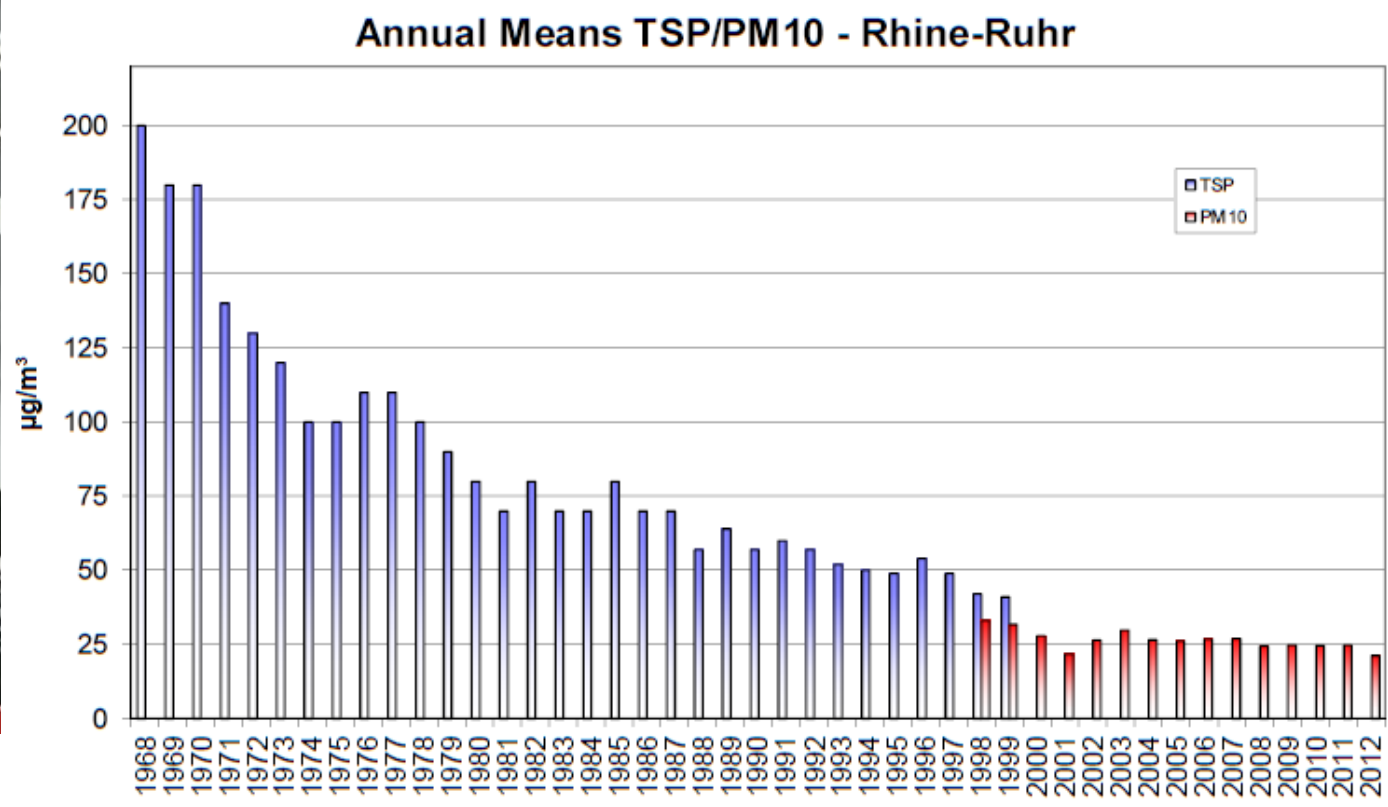
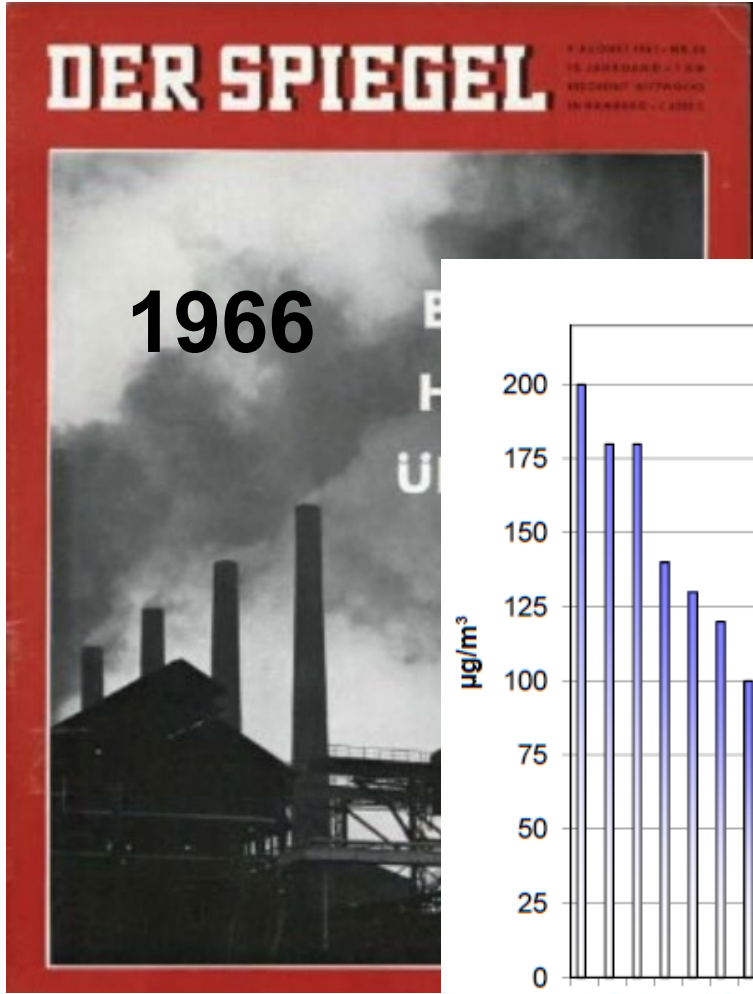


Advancing clean air and air pollution research in Europe

Barbara Hoffmann MD MPH
Heinrich-Heine-University of Düsseldorf, Germany

HEI Annual Conference
Boston
April 30, 2023



The European Union *A Regional Air Quality Snapshot*

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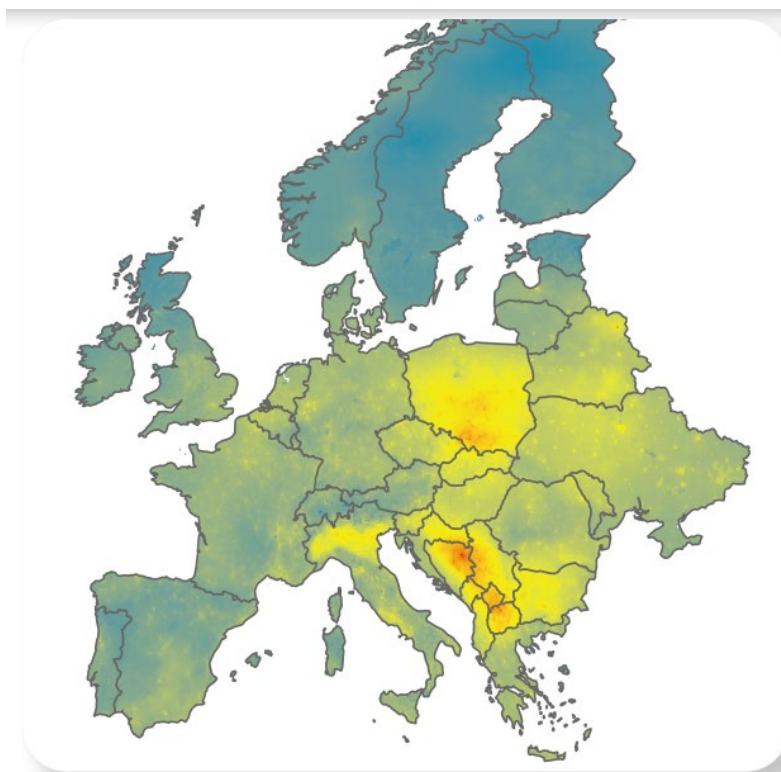
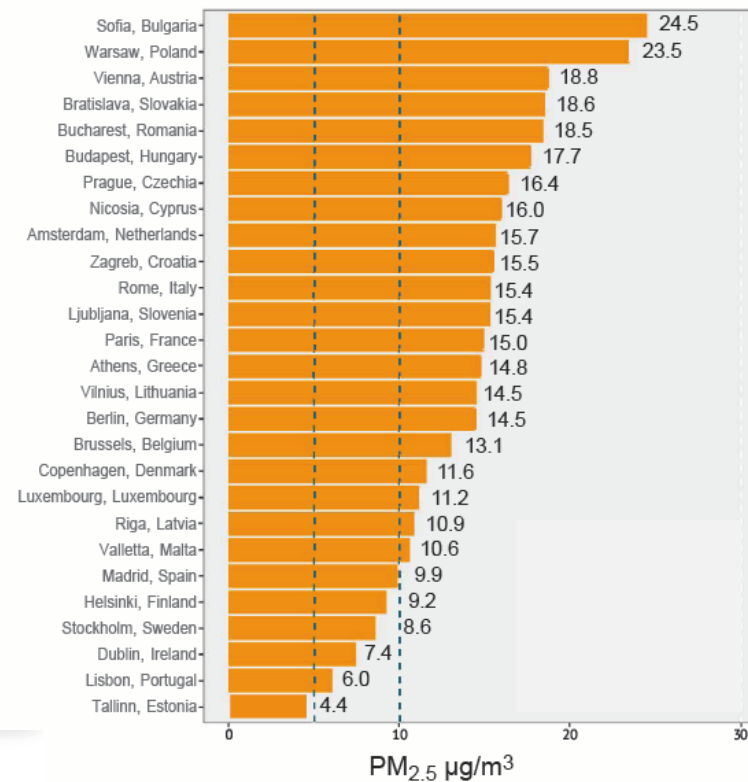


FIGURE 1: Population-weighted annual average $PM_{2.5}$ exposures in 2019

Annual $PM_{2.5}$ Exposure in EU Capital Cities in 2019



HEI's role in advancing clean air in Europe

- 1. Funding policy-relevant research**
- 2. Supporting capacity building**
- 3. Communicating science to policy makers**

1. HEI Research Program targeted at low concentration levels



Research & Funding

- > Research & Funding
- > Research & Review Processes
- > Ongoing Research
- > **Funding Opportunities**
- > Current Investigators
- > Quality Assurance
- > Data Access & Transparency
- > Databases

14-3 Assessing Health Effects of Long-term Exposure to Low Levels of Ambient Air Pollution

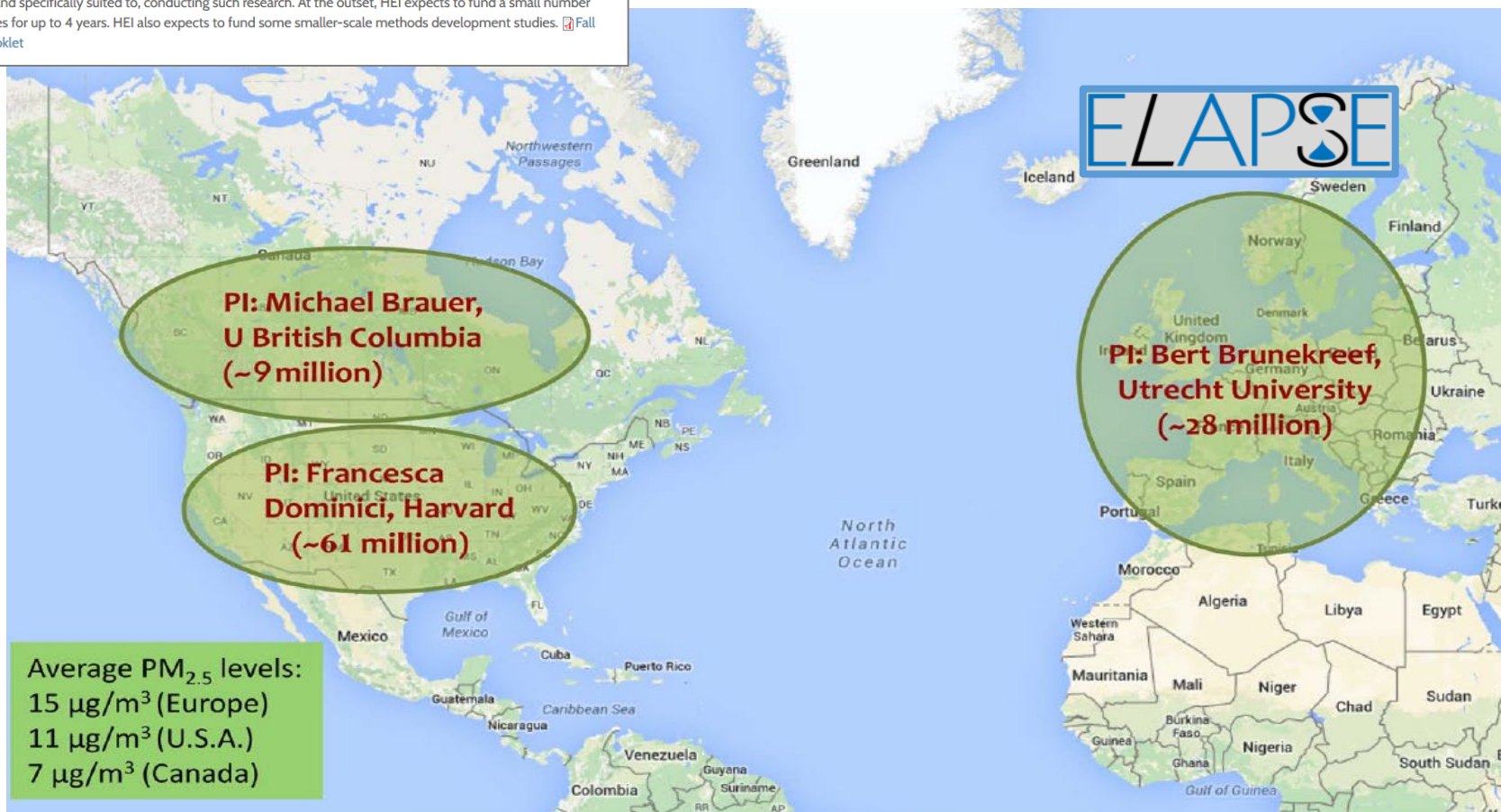
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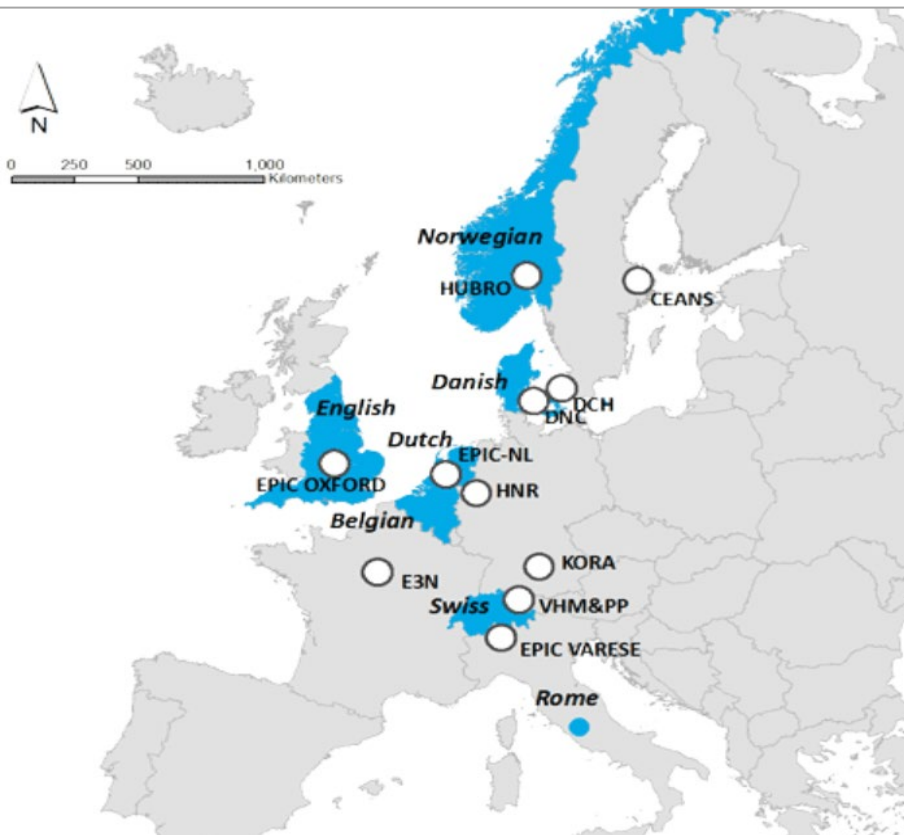
Number: RFA 14-3

2014

HEI is seeking to fund studies to assess health effects of long-term exposure to low levels of ambient air pollution, including studies to evaluate all-cause and cause-specific mortality and morbidity endpoints. RFA 14-3 solicits studies to analyze and evaluate exposure-response function(s) for PM_{2.5} and other pollutants at levels currently prevalent in North America, Western Europe and other high-income regions and related questions about adverse health effects at low levels of ambient air pollution. In addition, RFA 14-3 solicits studies to develop methods required for, and specifically suited to, conducting such research. At the outset, HEI expects to fund a small number of large studies for up to 4 years. HEI also expects to fund some smaller-scale methods development studies. Fall 2014 RFA booklet

1. Down to what levels can we observe long-term health effects?
2. What does the exposure-response function look like at the low end of exposure?



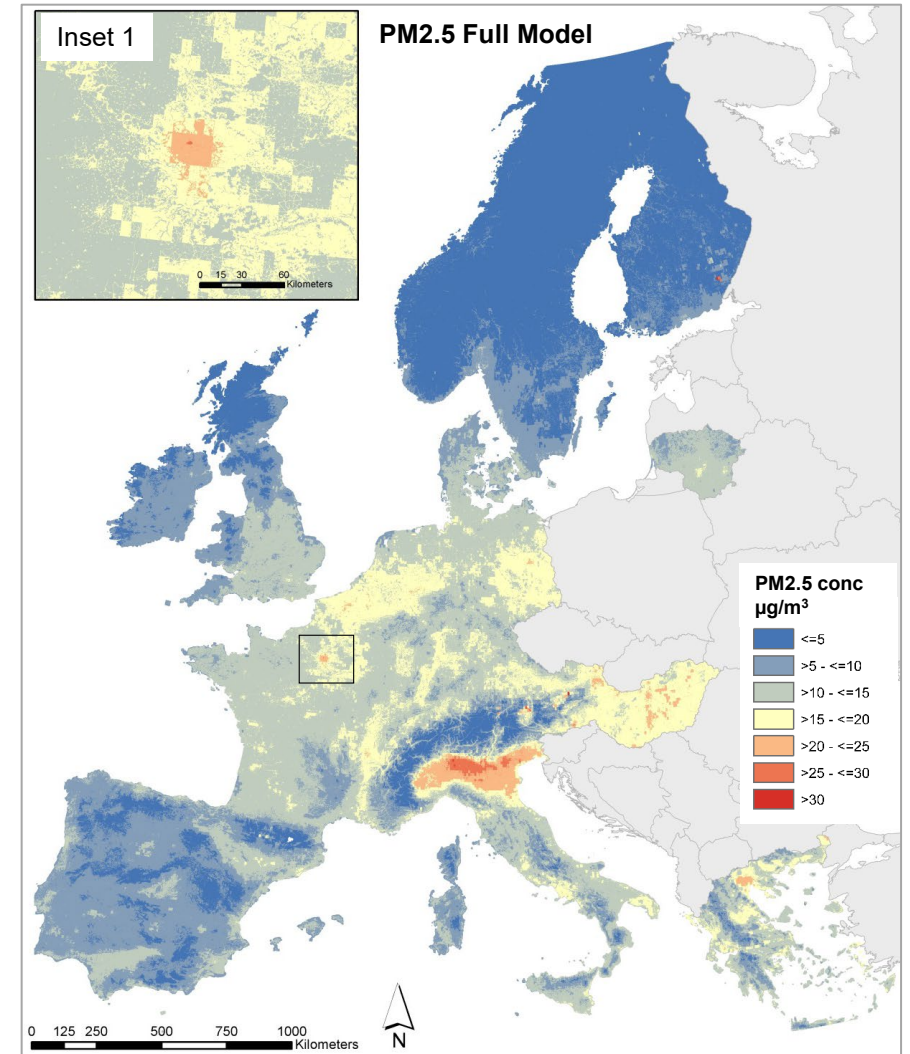


- **Part 1:** Pooling eight European cohorts (mostly from prior ESCAPE study) with extensive individual-level data (N = 393,000; 7.5 Mill person years)
- **Part 2:** Seven separate large administrative cohorts from seven countries in Europe (N = 28 Mill)

Europe-wide **hybrid** land use regression models (100x100 m)

Year 2010 pollutant concentrations from Airbase and ESCAPE

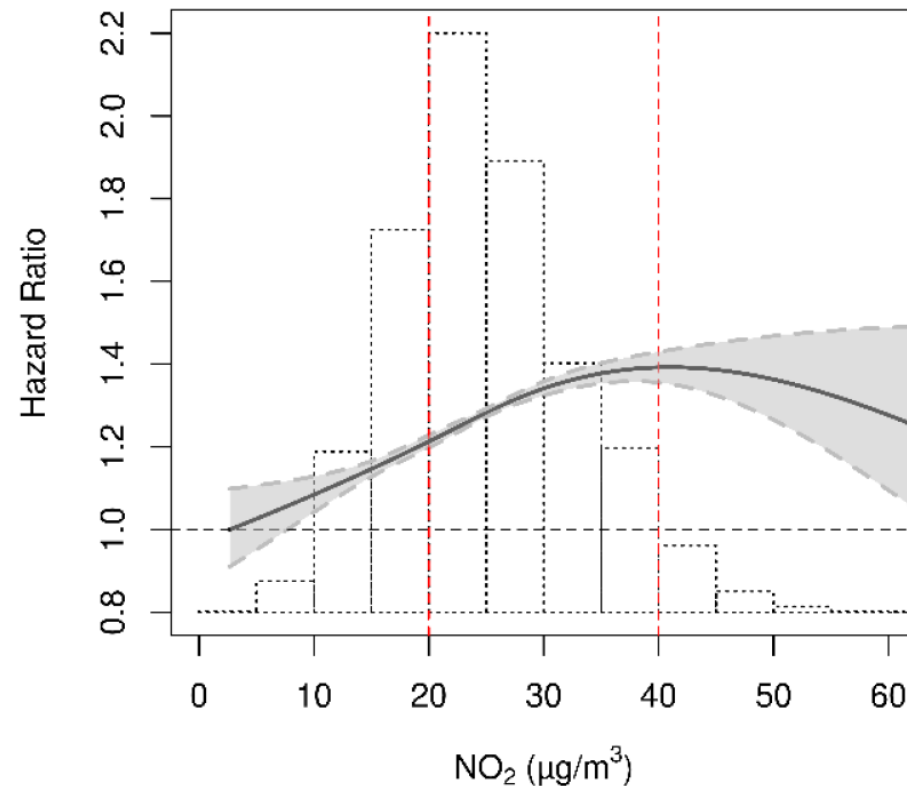
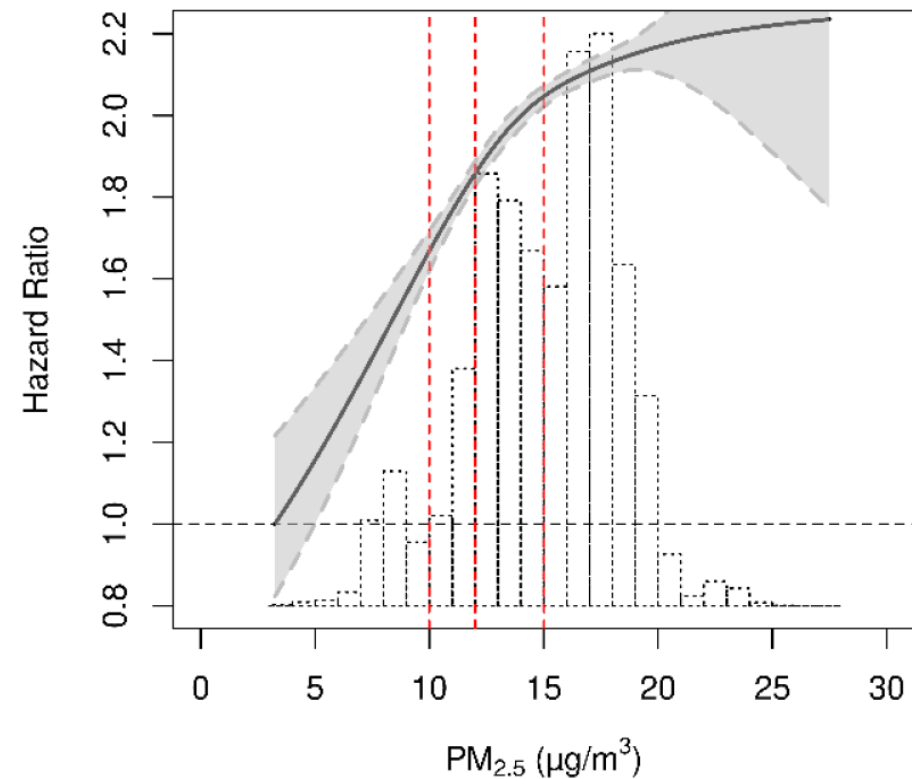
Land use and road data, **satellite** observations and **dispersion model**





Natural mortality

Pooled Cohort – PM_{2.5} and NO₂



Results - highlights

- Effects down to lowest observed levels
- No threshold
- Effect sizes higher than previously estimated
- Effect sizes higher at lower end of exposure



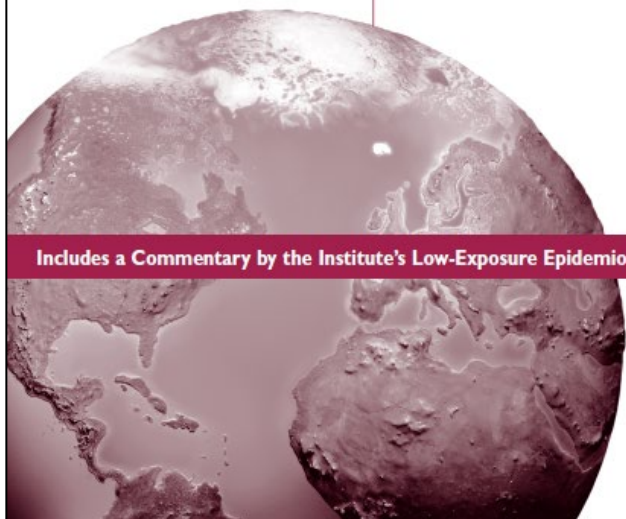
RESEARCH REPORT

HEALTH EFFECTS INSTITUTE

Number 208
September 2021

Mortality and Morbidity Effects of Long-Term Exposure to Low-Level PM_{2.5}, BC, NO₂, and O₃: An Analysis of European Cohorts in the ELAPSE Project

Bert Brunekreef, Maciej Strak, Jie Chen, Zorana J. Andersen, Richard Atkinson, Mariska Bauwelinck, Tom Bellander, Marie-Christine Boutron, Jørgen Brandt, Iain Carey, Giulia Cesaroni, Francesco Forastiere, Daniela Focht, John Gulliver, Ole Hertel, Barbara Hoffmann, Kees de Hoogh, Danny Houthuijs, Ulla Hvidtfeldt, Nicole Janssen, Jeanette Jørgensen, Klea Katsouyanni, Matthias Ketzel, Jochem Klompaker, Norun Hjertager Krog, Shuo Liu, Petter Ljungman, Amar Mehta, Gabriele Nagel, Bente Oftedal, Göran Pershagen, Annette Peters, Ole Raaschou-Nielsen, Matteo Renzi, Sophia Rodopoulou, Evi Samoli, Per Schwarze, Torben Sigsgaard, Massimo Stafoggia, Danielle Vienneau, Gudrun Weinmayr, Kathrin Wolf, and Gerard Hoek



Includes a Commentary by the Institute's Low-Exposure Epidemiology Studies Review Panel

ISSN 1041-5505 (print)
ISSN 2688-6855 (online)



HEI Research Report: Health Effects at Low Air Pollution Levels in Europe across Europe Informing Europe's Air Quality Policy

October 12, 2021 CEST

October 12 from 3 to 5 PM CEST | 9 to 11 AM ET

Watch the webinar

A new Health Effects Institute Research Report by Bert Brunekreef at Utrich University of Applied Sciences, The Netherlands, and colleagues presents results from a large-scale study of exposures to low concentrations of ambient air pollution and several health outcomes among people living in 10 European countries. The study included a population of about 28 million participants across Europe. The study was funded through a combination of grants from the European Union, the United States, and other countries. The study found that even at low levels of air pollution, there were significant health effects, including increased mortality and morbidity. This webinar presented results from the European study, discuss their strengths and weaknesses, and how they can inform air quality policies. The new results will inform the revision of the European Air Quality Directive, which is slated for 2022.



2. Capacity - HEI Program on SE Europe



Virtual Workshop on Air Pollution and Health in Southeast Europe

June 8, 2021 to June 9, 2021 CEST

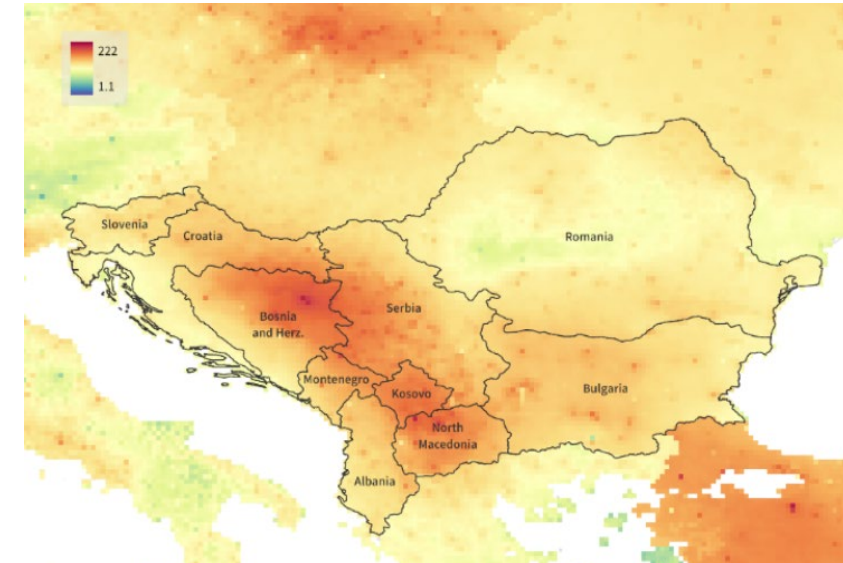
As fine particulate matter (PM_{2.5}) levels in Southeast Europe have remained higher than in those of Western Europe for decades, public and governmental interest in the topic increases, and the demand for data and evidence on air pollution levels and trends as well as health effects is growing. In an effort to focus the discussions related to air quality and health, the Health Effects Institute (HEI), the International Society for Environmental Epidemiology (ISEE), the European Respiratory Society (ERS), the Medical University of Plovdiv, Bulgaria, and environmental health institutions in Serbia jointly hosted a virtual workshop on June 8-9, 2021 (1-4 PM CET) to review the status of current evidence on the health effects of air pollution in the Southeast European region and its interlinkage to current policy debate and actions. The workshop is part of the larger HEI project in Southeast Europe funded by the Clean Air Fund.

Read the workshop summary and key r
Session recordings are now available t

Workshop on
Air Quality and Health
in Bulgaria

June 14, 2022
In-person & online

20:54 / 4:19:43



New State of Global Air special report on air quality and health in

TRENDS IN AIR QUALITY AND HEALTH IN BULGARIA
A STATE OF GLOBAL AIR SPECIAL REPORT

TRENDS IN AIR QUALITY AND HEALTH IN THE REPUBLIC OF SERBIA
A STATE OF GLOBAL AIR SPECIAL REPORT

HEI

HEI

Citation: Health Effects Institute, 2022, Trends in Air Quality and Health in the Republic of Serbia: A State of Global Air Special Report, Boston, MA: Health Effects Institute.
ISSN 2578-6881 © 2022 Health Effects Institute

3. Communication to policy makers in the EU



Revision of the EU Ambient Air Quality Directive (AAQD)



EU Clean Air Policy Milestones 2020 to 2023

EU Parliament forms position

Fitness Check
(published in Nov 2019)

Expert consultation
(on monitoring, modelling, plans) EEA Air Quality Briefings 2022

Council discussions of legislative proposal
(air quality - revision of EU rules)

Council Conclusions

WHO Guidelines publication
(postponed to II/2021)

Targeted consultation
Impact Assessment
(air quality – revision of EU rules)

Submission of Second National Air Pollution Control Programmes begins

NEC Implementation Report
(Commission Communication)

Zero Pollution Action Plan



EEA Air Quality Report 2020

EEA Air Quality Briefings 2021

EEA Air Quality Briefings 2022

EEA Air Quality Briefings 2023

Inception Impact Assessment
(revising the Air Quality Directive)

WHO Guidelines publication
(22 September 2021)

Adoption: legislative proposal
(air quality - revision of EU rules)

4th EU Clean Air Forum
(location to be determined)

Second Clean Air Outlook
(Commission Report)

Public consultation
(air quality - revision of EU rules)

Review Gothenburg Protocol
(Air Convention)

3rd EU Clean Air Forum
(18 & 19 November in Madrid)

Third Clean Air Outlook
(Commission Report)



Joint Conference in Brussels in 2020



Briefing for EU MEPs

Main points

- Substantial BoD and economic impact in EU
- No observable threshold
- Abatement measures work
- Current EU regulations not in line with scientific evidence



ERJ 2020



EDITORIAL
AIR POLLUTION



CrossMark

Air pollution and health: recent advances in air pollution epidemiology to inform the European Green Deal: a joint workshop report of ERS, WHO, ISEE and HEI

Barbara Hoffmann¹, Nathalie Roebbel², Sophie Gumy², Francesco Forastiere³, Bert Brunekreef⁴, Dorota Jarosinska⁵, Katherine D. Walker⁶, Annemoon M. van Erp⁶, Robert O'Keefe⁶, Dan Greenbaum⁶, Martin Williams^{7,+}, Michal Krzyzanowski³, Frank J. Kelly³, Michael Brauer⁸, Hans Bruyninckx⁹ and Hanna Boogaard⁶

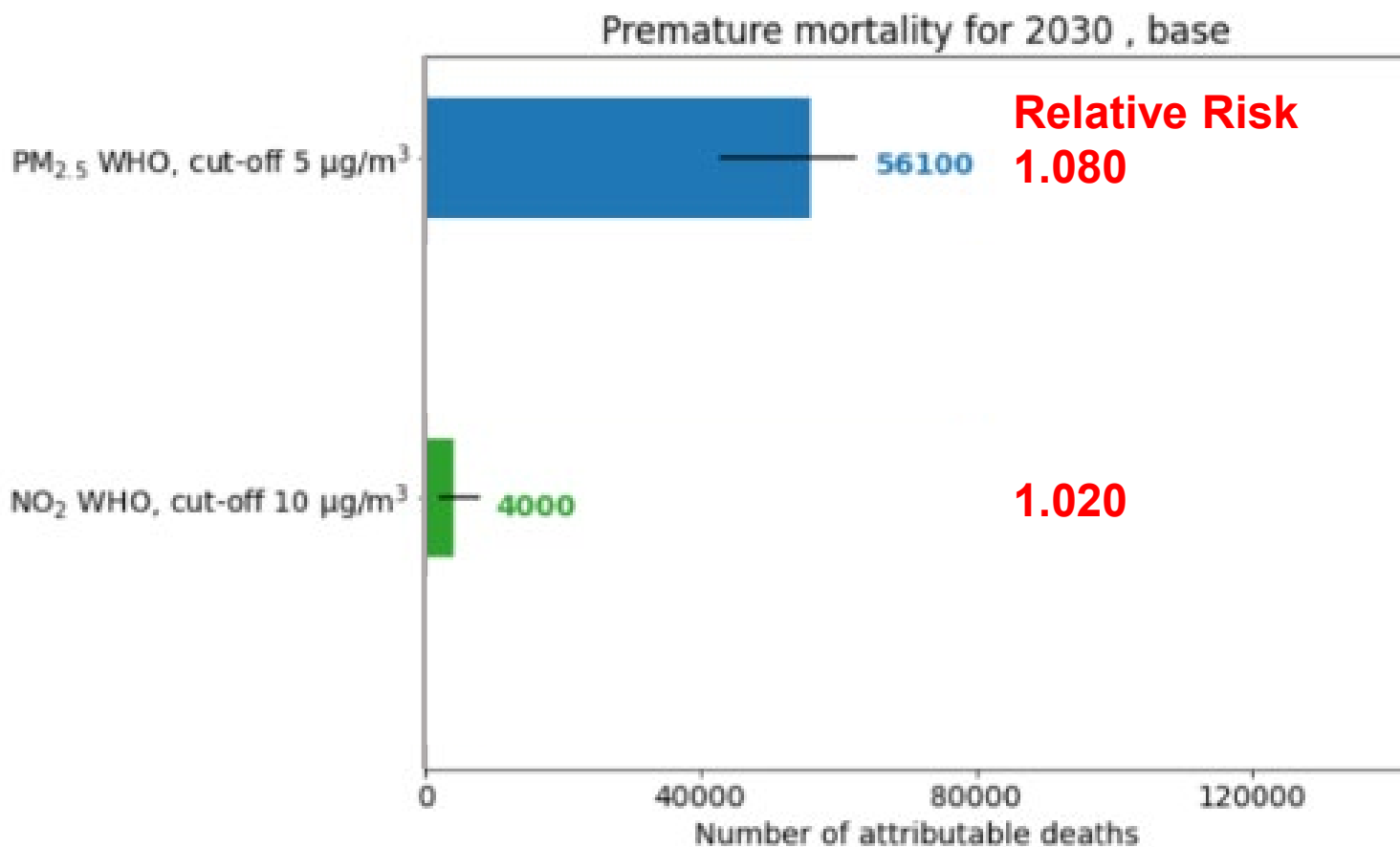
January 21-22, 2020

Square Brussels Convention Centre,
Coudenberg 3, 1000 Brussels, Belgium



www.ersnet.org

Impact assessment – burden of disease



Commentary

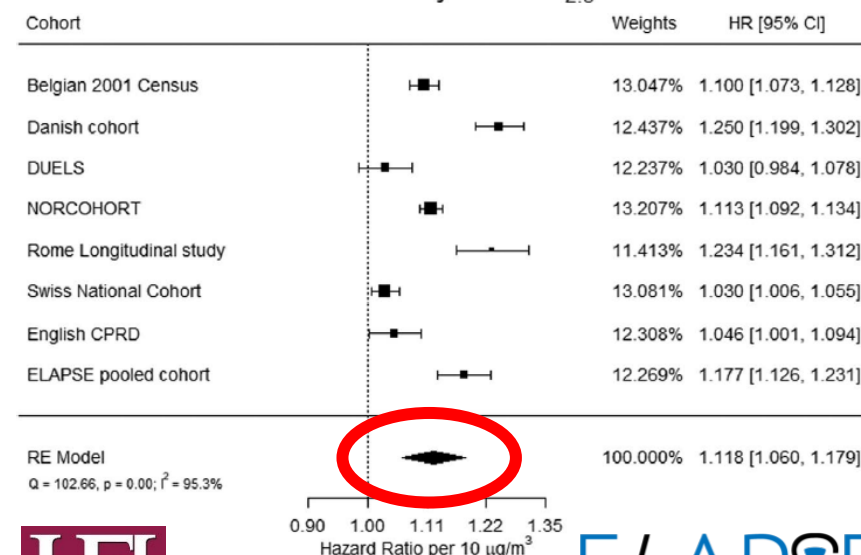
OPEN

Benefits of future clean air policies in Europe

Proposed analyses of the mortality impacts of PM_{2.5} and NO₂

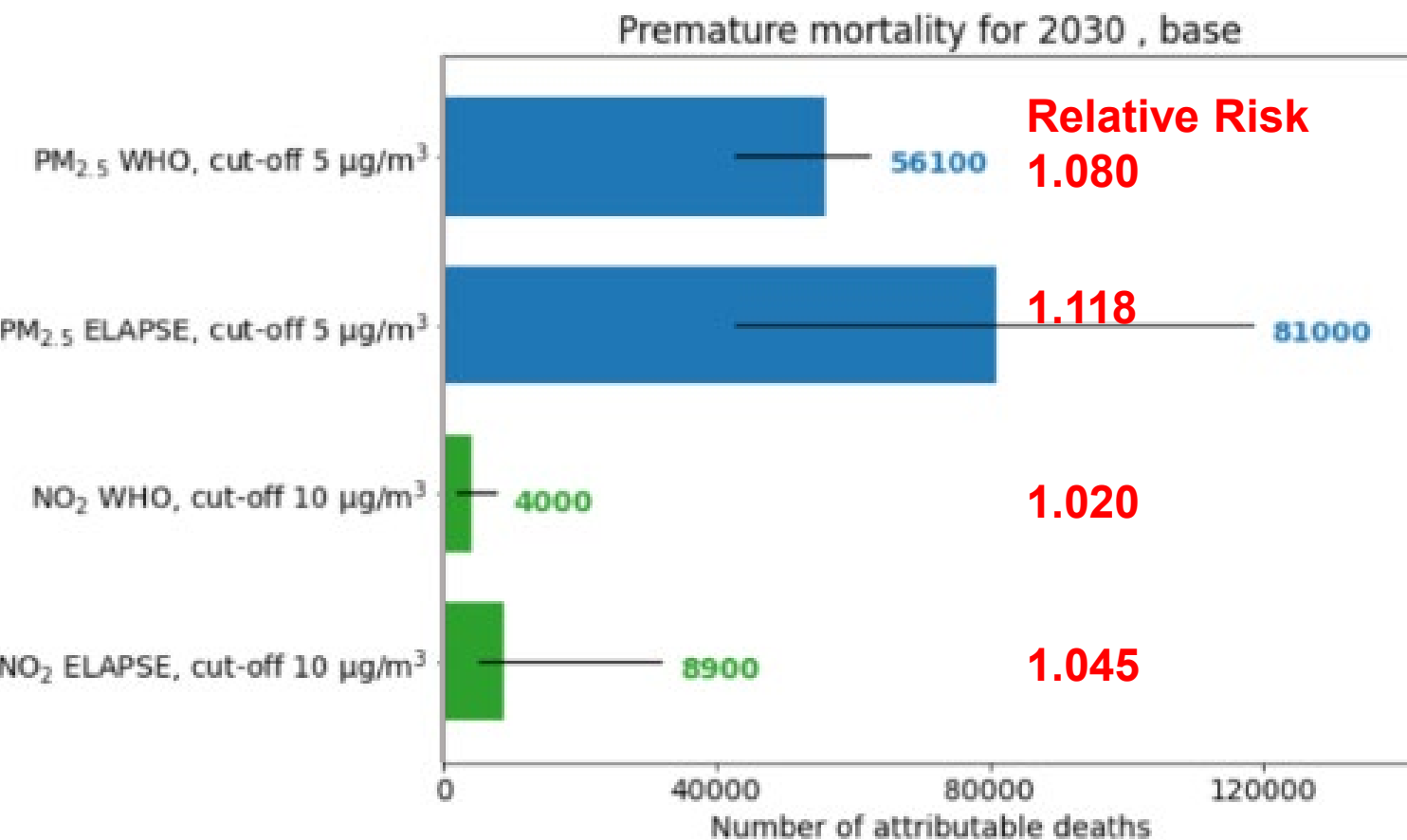
Barbara Hoffmann^a, Bert Brunekreef^b, Zorana J. Andersen^c, Francesco Forastiere^d, Hanna Boogaard^{a*}

Total mortality and PM_{2.5}



RR=1.118

Impact assessment – burden of disease



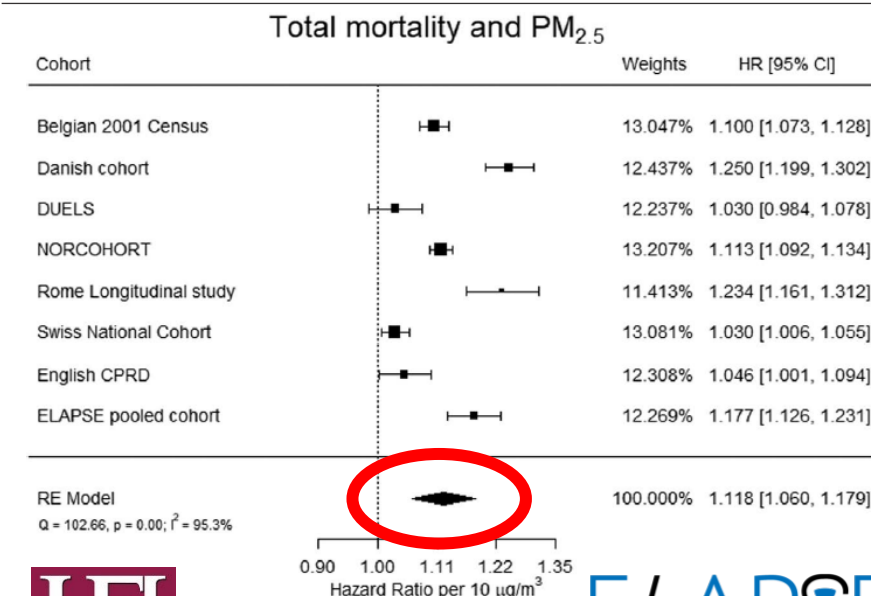
Commentary

OPEN

Benefits of future clean air policies in Europe

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Barbara Hoffmann^a, Bert Brunekreef^b, Zorana J. Andersen^c, Francesco Forastiere^d, Hanna Boogaard^{a*}



RR=1.118

Proposed Ambient Air Quality Directive – some highlights

Pollutants*	2021 WHO Guidelines	EU Current Limit values	EU new proposed Limit values
PM _{2.5} (year)	5 µg/m ³	25 µg/m ³	10 µg/m ³
NO ₂ (year)	10 µg/m ³	40 µg/m ³	20 µg/m ³
O ₃ (long-term)	60 µg/m ³ (peak season)	-	100 µg/m ³ (annual, long-term objective)

- Average exposure reduction obligation for annual PM_{2.5} and NO₂ (25% every 10 years)
- Regular review
- Monitoring, supersites (including UFP, BC, ammonia, oxidative potential, PM composition)
- Deduction of PM from natural sources
- Access to justice and compensation of damage



CLEAN AIR IN EUROPE FOR ALL

AIR POLLUTION AND HEALTH: TAKING STOCK OF THE PROPOSED REVISION TO THE AMBIENT AIR QUALITY DIRECTIVE

MAY 24, 2023

Thon Hotel EU, Rue de la Loi 75, Brussels, Belgium

08:30 Registration
09:00

OPENING AND KEYNOTE

CHAIRS OF THE WORKSHOP:

Zorana J Andersen and Barbara Hoffmann, European Respiratory Society (ERS)
Hanna Boogaard, Health Effects Institute (HEI) and International Society of Environmental Epidemiology (ISEE) Europe

09:00 Opening address
09:30 Virginijus Sinkevičius, European Commissioner for Environment, Oceans and Fisheries (invited)

Opening Address

Maria Neira, WHO Geneva (video address)

Opening address

Javi Lopez, EU Parliament, Rapporteur for the AAQD (video address)



European Parliament

Briefing for EU MEPs



<https://www.healtheffects.org/meeting/brussels-meeting-air-pollution-and-health-taking-stock-proposed-revision-ambient-air-quality>

Where are we now in Europe?



1966



1994



2023

Thank you

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hhu Heinrich Heine
Universität
Düsseldorf

