

Statement by ERS and ISEE

## **Need for Updated Health Information in the Impact Assessment to inform the revision of the EU Ambient Air Quality Directives**

Authors: Barbara Hoffmann, Hanna Boogaard, Zorana Jovanovic Andersen, Francesco Forastiere, Bert Brunekreef

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A revision of the EU Ambient Air Quality Directives are under development intending to provide better protection to the European population from adverse effects of air pollution. Within this process, health impact assessment (HIA) and cost-benefit analyses (CBA) are conducted for current air pollution exposure concentrations and different future air pollution exposure scenarios under various alternative regulations. As health outcomes, **mortality** as well as **a few selected morbidity outcomes** are being considered, based on 6 published systematic reviews commissioned by WHO underpinning the new global WHO Air Quality Guidelines (WHO 2021).

For the results of the HIA and CBA analyses to be most informative and the subsequent policy decisions truly evidence-informed, it is necessary to use the most relevant and up to date exposure-response-functions (ERFs) for estimating the health effects of air pollution. „Most relevant“ means that the estimates have to reflect the most recent and qualitatively best evidence that is available in Europe – and elsewhere - right now. Currently, the estimates from the most recent WHO systematic reviews are considered for HIA and CBA. These systematic reviews were published in 2020 and had study inclusion dates until October 2018. The WHO systematic reviews represent a global summary of the size of health effects for association of major air pollutants and mortality as well as morbidity. The morbidity outcomes in the WHO systematic reviews were limited to just a few outcomes (hospital admissions for asthma and myocardial infarction) and assessed only short-term exposure to several pollutants (NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub> and CO). Recent studies examining the shape of the associations between exposure to air pollutants (PM<sub>2.5</sub> and NO<sub>2</sub>) and all-cause mortality generally observed supralinear patterns - meaning steeper slopes at lower exposures. Thus, the global estimate from the WHO systematic reviews may underestimate the associations at the relatively low levels currently prevailing in many parts of Europe.

Several new large-scale cohort studies have been published after the WHO systematic reviews were completed. These newly published studies were mostly conducted at air pollution concentrations similar to those currently observed in Europe and have substantially increased the available evidence for long-term exposure to air pollution (NO<sub>2</sub>, PM<sub>2.5</sub>) and mortality. Potentially, these new studies may influence the summary effect estimates of the WHO systematic reviews. Hence, it would be important to take into consideration the newest evidence for the purpose of HIA and CBA, to make them most up to date and provide most correct estimates of the burden of air pollution and subsequent benefits of air pollution regulation.

One major new study is the large ELAPSE study (Effects of Low-Level Air Pollution – a Study from Europe), funded by the Health Effects Institute. This study was based on a large pooled analysis of cohort studies from 6 different European countries with close to 400,000 participants, and on very large administrative cohorts from 7 different European countries, with about 28 million participants. Notably, these recently published studies (Brunekreef et al. 2021; Strak et al. 2021; Staffoglia et al. 2022) are based on a state-of-the-art exposure assessment including fine-scale modeling and historical exposure information as well as extensive control of potential confounding by several factors, including smoking. It is currently by far the most important and largest air pollution study in Europe, but it could not be included in the WHO systematic reviews.

Moreover, several new studies including ELAPSE have estimated health effects on many important disease outcomes. Currently, the most recent comprehensive assessment of effects of air pollution on morbidity are the recommendations for HIA laid out in the WHO HRAPIE project (Health Risks of Air Pollution in Europe, 2013) which was based on studies published before 2013, i.e. more than 10 years ago. Since then, a wealth of new evidence has been produced and it will be important to check whether this new evidence will add to the HRAPIE recommendations, as has been done in individual countries. For example, the UK has undertaken a comprehensive assessment of morbidity outcomes, including stroke incidence, asthma incidence in children, and lung cancer incidence (<https://www.gov.uk/government/publications/air-pollution-a-tool-to-estimate-healthcare-costs>). The Swedish EPA has recently published a report (in Swedish only, but it will be translated in English shortly) assessing which morbidity impacts



of air pollution can be included in HIA. A similar effort has been undertaken in France ([AIR2014SA0156Ra-Sante.pdf](#)). At WHO, multiple efforts are underway to inform ERFs for morbidity outcomes for use in HIA, such as the Estimation of Morbidity from Air Pollution and its Economic Costs project (EMAPEC), and an active Global Air Pollution and Health - Technical Advisory Group (GAPH-TAG). The WHO has also plans for a WHO HRAPIE 2 report, but unfortunately, that project is only starting later in 2022 and will not produce any guidance until 2024. **Hence, these individual activities underscore the necessity and urgency to update existing HRAPIE recommendations for use in HIA for the AAQD.**

The European Respiratory Society (ERS) and the International Society of Environmental Epidemiology (ISEE) represent clinicians and other health care workers who work with respiratory patients affected by air pollution and experts in environmental epidemiology who conduct studies on health effects of air pollution. Many of these experts are already involved in the various WHO efforts listed above, ERS and ISEE are prepared to take the lead in providing updated ERFs relevant to the European policy-making process at short notice, in collaboration with authoritative agencies such as WHO and others.