



Quantifying the health impacts of ambient air pollutants: methodological errors must be avoided

Peter Morfeld · Thomas C. Erren

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Dear Editor,

Assessing how much ambient air pollution contributes to premature deaths in Europe (Héroux et al. 2015) is certainly important. However, while the public health and policy challenge of air pollution is beyond dispute, the quantitative results may be not.

Key results by Héroux and colleagues relied on a transformation of RR estimates (given in their Table 1) into numbers of premature deaths (reported on in the section “Application of HRAPIE recommendations and implications for European Union air policy”). However, this approach relies on a methodological error (Greenland 1999). Greenland showed that a calculation based on RR estimates, as performed in the EU research project, does estimate excess cases numbers—but it does not estimate the number of premature cases or etiological cases. He illustrated the underlying problem with an application of occupational epidemiology to compensation decisions. We note that his statistical arguments apply to environmental studies too. Importantly, Greenland showed that the difference between the number of excess cases and the number of premature cases can be substantial and he wrote that this “methodological error has become a social problem”. In this vein, estimated numbers of premature deaths

to be related to long-term PM_{2.5} and short-term O₃ in year 2010 cannot be justified by the analyses the authors relied upon. That this methodological error is becoming somewhat pervasive (Erren and Morfeld 2011) is also evinced by recent analyses (Lim et al. 2012), referenced by Héroux et al. (2015). The formulas on p. 2237 support that the arguments of Greenland apply: Lim and colleagues relied exclusively on excess case statistics which do not allow to “calculate the proportion of deaths or disease burden caused by specific risk factors”. Calculations of years of life lost due to exposure potentially suffer from similar problems (Morfeld 2004).

Héroux and colleagues concluded: “The project results provide the scientific basis for formulating policy actions to improve air quality and thereby reduce the burden of disease associated with air pollution in Europe”. To factually arrive at such much needed empirical basis, methodological errors must be addressed and avoided. Disconcertingly, ignoring possible impacts of identified errors may jeopardize important burden-of-disease research.

Compliance with ethical standards

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

P. Morfeld (✉)

Institute for Occupational Epidemiology and Risk Assessment (IERA) of Evonik Industries, Rellinghauser Str. 1-11, 45128 Essen, Germany
e-mail: peter.morfeld@evonik.com

P. Morfeld · T. C. Erren

Institute and Polyclinic for Occupational Medicine, Environmental Medicine and Prevention Research of Cologne University, Kerpener Str. 62, 50937 Cologne, Germany
e-mail: Tim.Erren@Uni-Koeln.de

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