

How Low Should We Go? New Health Research on Low-level Ambient Air Pollution

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Levels of ambient air pollution have declined significantly over the last decades in North America, Europe, and in other high-income regions. Nonetheless, epidemiologic studies continue to report associations of air pollution with adverse health effects in the general population at these lower levels of exposure. Recently some studies have found associations at levels below current ambient air quality standards and guidelines. In order to inform future regulation, disease burden estimation and risk assessment, it is important to know whether adverse effects continue to be observed as levels of air pollution decline still further, and what the shape of the exposure-response function is at those low levels. These issues are currently major sources of uncertainty in air quality standards decisions.

Large populations are needed for such studies in order to accurately estimate air pollution effects at low exposure levels. There are increasing opportunities to study air pollution effects in very large study populations, via consortia combining existing cohorts, or by using data obtained from, for example, administrative databases, such as the census or health insurance programs. Very large studies have the advantage of increased statistical power and are generally more representative of the general population – two important features lacking in many current (smaller) cohort studies – that are of critical importance for use in burden and risk assessments. However, very large studies need to address other major methodologic challenges. Critical study design considerations include reliable exposure information including an assessment of exposure measurement error, and approaches to control for important confounders in the absence of such data at the individual level. The symposium will present results of three studies investigating the health effects of low-level exposure in very large populations in the US, Canada, and Europe, address their strengths and weaknesses, and discuss implications for future risk assessment and regulation.

The topic is of scientific interest and directly relevant to risk assessors and policy makers; therefore, we expect it would appeal to a broad audience at ISEE. The emerging scientific evidence for effects at levels below current air quality standards, provides a continuing impetus for lower standards. The topic is timely because of ongoing deliberations of the new PM and O₃ U.S. National Ambient Air Quality Standards, World Health Organization Air Quality Guidelines, and the Fitness Check of the EU Ambient Air Quality Directives, which are expected to be completed late 2019/early 2020.