

Measures for cleaner air

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Many measures have been introduced around the world with the aim of reducing outdoor air pollution and concomitantly improving public health. These efforts include, for example, the regulation of industrial emissions, the establishment of low emission zones and the subsidies for public transport, as well as restrictions on the use of wood and coal for heating in private households. The link between these actions and improved air quality and health seems obvious, but it is actually very difficult to quantify their effects. "It's quite a challenge to evaluate the introduction of a measure like the low emission zone," says Jacob Burns from the Institute for Medical Information Processing, Biometry and Epidemiology (IBE) at the LMU's Pettenkofer School of Public Health.

The negative effects of air pollution on [public health](#) linked to cardiovascular and respiratory diseases, among others, are well established. But whether measures designed to improve outdoor [air quality](#) actually reduce the concentration of pollutants and mitigate their effects on public health is less clear. "It's important to remember how many factors influence both air quality and the relevant health conditions," says Burns. "Levels of energy consumption in industry, transport and domestic households all play a substantial role in air pollution levels, as does the weather," he points out. And with respect to health, the risk of developing [cardiovascular disease](#), to cite one example, is influenced not only by particulate matter and other pollutants we breathe in, but also by numerous genetic, physiological and social risk factors. "This illustrates how difficult it can be to attribute changes in air pollutant concentrations, numbers of individuals admitted to hospitals, or mortality rates to any single measure."

These difficulties are reflected in the new review published in the *Cochrane Library*. Cochrane is a network of more than 13,000 researchers, whose primary aim is to improve the quality of the scientific

knowledge base upon which [policy decisions](#) relevant to human health are based. The authors of the new study, led by Professor Eva Rehfuess' research group from the IBE at the Pettenkofer School of Public Health, provide the first systematic review aiming to identify and critically appraise all studies that evaluate the impact of measures aiming to improve air quality. The study considers 38 specific measures, ranging from those to reduce traffic, to the regulation of industrial emissions and opportunities for cleaner and more efficient household heating systems.

"For the most part, the studies that we reviewed show either positive or unclear effects. But these studies differ so much from one another that we could not, with confidence, draw general conclusions about what works and what does not work," Burns explains. The LMU epidemiologists emphasize, however, that this is not an argument against such interventions. Indeed, the authors explicitly note that "it is important to emphasize that lack of evidence of an association is not equivalent to evidence of no association." For them, the more important message is that "the methods of evaluation in this area must be improved, so that decision-makers have a reliable basis on which to base their policy choices," says Rehfuess.

In this study, the LMU researchers make a number of specific recommendations—in particular with respect to the design of future studies in this area, but some of which also directed at policymakers. "At the moment," says Rehfuess, "many studies are conducted retrospectively. Ideally, the evaluation could be incorporated into the planning and introduction of the measure."

Provided by Ludwig Maximilian University of Munich

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