

Air pollution and mortality: Global study reveals persistent health risks despite declining pollutant levels

September 5 2024



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Even when air pollutant concentrations decrease, the health risks posed by these pollutants can remain consistently high. This is the conclusion

of an international study conducted under the leadership of researchers from Helmholtz Munich.

A global research network examined data from 380 cities to assess how the effects of air pollution on mortality have changed between 1995 and 2016. The central finding: although concentrations of air pollutants such as particulate matter (PM₁₀, PM_{2.5}) and nitrogen dioxide (NO₂) have decreased, the associated health risks have hardly changed. [The study](#) is published in *The Lancet Planetary Health*.

For their investigation, the researchers utilized data from the Multi-Country Multi-City (MCC) Collaborative Research Network, an international collaboration of various research teams. Their goal is to better understand the relationships between environmental stressors—factors that can be harmful to living organisms—climate, and health.

"The enormous amount of data available through the network has enabled us to analyze the health impacts of air pollution on a global scale over an extended period and to track trends," says Maximilian Schwarz, a scientist at the Institute of Epidemiology at Helmholtz Munich and the lead author of the study.

Many factors could be the cause

According to the study, the risk of mortality has not significantly changed during the period under review—despite lower [pollutant](#) concentrations.

Schwarz attributes this finding to various factors: "These include the [aging population](#) in many regions, the fact that older people tend to be more health-compromised than younger individuals, and that the sources and composition of air pollutants may have changed."

Furthermore, the study reveals differences in the impacts depending on geographic region and when analyzing the simultaneous influence of various pollutants on mortality.

The study focuses on pollutants that are regulated by [legal limits](#), such as [particulate matter](#) in the PM₁₀ and PM_{2.5} size classes, as well as NO₂. "Due to the data available, we were unable to investigate the impact of other potentially relevant pollutants," says Schwarz.

These include, for example, [ultrafine particles](#), which are suspected to have a greater impact on human health than larger particles. "Our study underscores the global need for more comprehensive and expanded monitoring. Additionally, existing data must be made available for scientific use," Schwarz continues. This is necessary to investigate new research questions more precisely.

Health policy relevance

The director of the Institute of Epidemiology, Prof. Dr. Annette Peters, emphasizes that national and international efforts to improve [air quality](#) must align more closely with the stricter recommendations of the World Health Organization (WHO).

"The 2021 updated WHO air quality guidelines are further validated by the current study. The planned revision of air quality limits at the European level is an essential step to better manage the health risks posed by air pollution," says Peters.

More information: Maximilian Schwarz et al, Temporal variations in the short-term effects of ambient air pollution on cardiovascular and respiratory mortality: a pooled analysis of 380 urban areas over a 22-year period, *The Lancet Planetary Health* (2024). [DOI: 10.1016/S2542-5196\(24\)00168-2](#)

Provided by Helmholtz Association of German Research Centres

Citation: Air pollution and mortality: Global study reveals persistent health risks despite declining pollutant levels (2024, September 5) retrieved 6 September 2024 from <https://medicalxpress.com/news/2024-09-air-pollution-mortality-global-reveals.html>

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