

One million premature deaths linked to ozone air pollution

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A student goes to school wearing a mask to protect him from the smoke that blankets the city of Palangka Raya, Central Kalimantan. Credit: Aulia Erlangga/CIFOR

Scientists at the University of York's Stockholm Environment Institute (SEI) have released new figures showing long-term exposure to ozone air pollution is linked to one million premature deaths per year due to respiratory diseases - more than double previous estimates.

In 2010, long-term outdoor exposure to [ozone](#) air pollution contributed to about one million premature respiratory deaths globally – approximately one in five of all respiratory deaths.

This is substantially larger (125 per cent) than previous estimates of the global health impacts of ozone (0.4 million premature respiratory deaths).

Published in the journal *Environmental Health Perspectives*, findings were based on results from a recent US analysis of the association of long-term [ozone exposure](#) and respiratory mortality in 670,000 adults. This is a substantially larger number of study participants and observed deaths than a previous estimate from 2003, on which previous global ozone health impact calculations have been based.

Ozone is formed in the atmosphere from emissions of pollutants such as nitrogen oxides from vehicles, organic compounds from solvent use, and methane from agriculture. Once formed, ozone can stay in the atmosphere for weeks and travel long distances from [emission](#) sources, across countries and continents.

The largest number of ozone-attributable respiratory deaths was from Asia, accounting for about 79 per cent of the total one million global estimated deaths.

India accounted for about 400,000, and China for about 270,000. Africa, Europe and North America each had between 50,000 and 60,000 ozone-attributable deaths, with fewer in Latin America and Oceania.

Chris Malley, Researcher at the University of York's Stockholm Environment Institute and lead author of the study, said: "This study highlights that exposure to ozone may make a substantially greater contribution to the global burden of disease than previously thought.

"There is a degree of uncertainty in these estimates because the concentration-response function we used is based on analysis from the United States. We don't know whether the relationship is the same in other regions, such as in India and China, where the prevalence of other risk factors for [respiratory diseases](#) varies considerably.

"We also estimated people's ozone exposure using a global atmospheric chemistry transport model, which means that we could not account for differences in ozone exposure at small geographic scales."

The analysis grew out of SEI's Initiative on Low Emission Development Pathways, which includes the development of a "benefits calculator" to help policy-makers and planners assess the potential benefits of undertaking measures that reduce air pollution.

SEI's Policy Director Johan C.I. Kuylenstierna, co-author of the study and a member of the CCAC Scientific Advisory Panel, said: "Our colleagues from countries such as Ghana, Peru, Nigeria and Bangladesh have highlighted the importance of air pollution impacts on health as a motivation for reducing emissions.

"The key in reducing ozone [exposure](#) lies in addressing the sources of [pollution](#), given that many people, particularly in the poorest and most vulnerable populations, cannot easily relocate.

"To reduce [ozone pollution](#), you need to control emissions of different precursors from many different sources. This includes emissions from road transport, household energy use, as well as methane emissions from agriculture.

"Due to the long-range transport of ozone, it is important to realise that action is needed on local, national, regional and global scales. That means that regional cooperation is needed to solve the problem."

More information: Updated Global Estimates of Respiratory Mortality in Adults ≥ 30 Years of Age Attributable to Long-Term Ozone Exposure. *Environ Health Perspect*; [DOI: 10.1289/EHP1390](https://doi.org/10.1289/EHP1390)

Provided by University of York

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