

Combating an invisible killer: New WHO air pollution guidelines recommend sharply lower limits

By [Laura Corlin](#)

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Air pollution is the world's fourth leading cause of death, contributing to [about 13 premature deaths](#) every minute. The gases and tiny particles [can travel](#) deep into your lungs, enter your bloodstream and damage your cells.



New Delhi has had days with air pollution levels nearly 30 times the old World Health Organisation guidelines. Source: | Sajjad Hussain/AFP via Getty Images



Gas-powered cars and diesel trucks create urban air pollution that can cause problems even when it's not visible. | Source: Kena Betancur/View press/Corbis via Getty Images.

Even when you can't see air pollutants, and even when their levels are below legal limits set by many countries worldwide, they can cause serious health problems that affect multiple organ systems in people of all ages. Air pollution levels that seem low are now linked to dangerous health outcomes such as low birth weight, respiratory problems, heart disease and Alzheimer's disease.

A lot has changed in scientists' understanding of these health risks in recent years. That's why the [World Health Organisation](#) announced on 22 September 2021, that it is tightening its recommended limits for almost every pollutant. The [new global air quality guidelines](#) reflect an overwhelming scientific consensus that countries need to more aggressively limit air pollution and protect everyone's health.

As [an epidemiologist at Tufts University](#) who studies the health effects of air pollution, I recognise the damage air pollutants can cause. I also recognise the inequities in who is most exposed to poor air quality.

Risks to lungs, heart and other body systems

The new air quality guidelines are the WHO's first update since 2005, and major scientific, medical and public health societies support the [ambitious implementation of the new guidelines](#).

The WHO cut in half its recommended limit for exposure to PM2.5, tiny particles commonly produced by cars, trucks, and airplanes and a major component of [wildfire smoke](#), lowering the average maximum exposure from 10 micrograms per cubic meter per year to five.



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It also tightened the limits for gaseous air pollutants like nitrogen dioxide that are produced when fossil fuels are burned by vehicles and power plants. The WHO now recommends limiting nitrogen dioxide to one-quarter of the previous level, from 40 to 10 micrograms per cubic meter.

Lowering PM2.5 levels by five micrograms per cubic meter per year could result in major health benefits.

Research shows that each five micrograms per cubic meter increase in exposure to PM2.5 during pregnancy is associated with a [4% increased likelihood](#) of having a baby with low birth weight. In adulthood, five micrograms per cubic meter per year exposure is associated with a [13% increased likelihood of heart events](#), like heart attacks and cardiovascular-related deaths; a [4% increased likelihood of lung cancer](#); and more than a [twofold increased likelihood of Alzheimer's disease](#).

Lowering the health burden associated with air pollution exposure like this could [save \\$5tn annually](#) in health-related costs and \$225bn in labour productivity, according to World Bank estimates.

Reducing the drivers of air pollution can also help fight another global crisis - climate change. That's because some air

pollutants directly contribute to global warming, and some of the solutions for reducing air pollution reduce greenhouse gas emissions.

No country's pollution limits come close

The new guidelines are based on hundreds of scientific studies that reflect recent advances in scientists' ability to quantify how much air pollution people are exposed to in different contexts, and in their ability to study larger groups of people over longer periods of time in more places around the world.

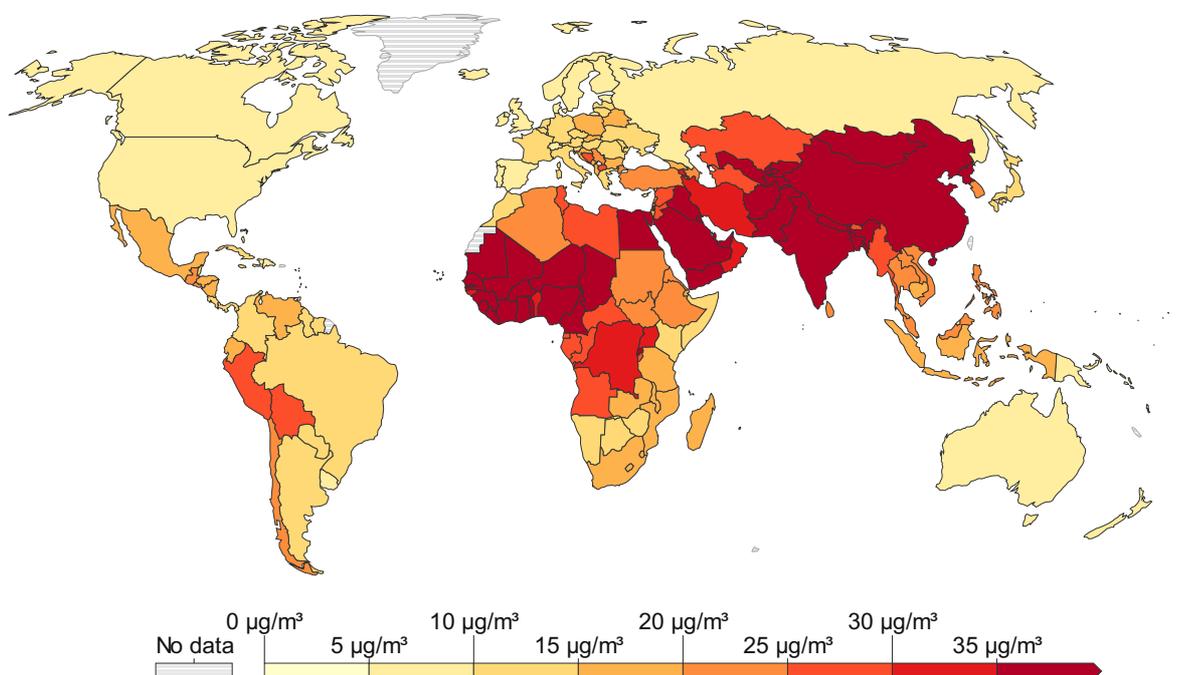
These studies show that exposure to even very low levels of air pollution is associated with premature death, and that there [does not seem to be a safe exposure level](#).

[Over 90% of people worldwide](#) are exposed to levels of PM2.5 that exceed even the old WHO guidelines.

Exposure to particulate matter air pollution, 2019

Population-weighted average level of exposure to concentrations of suspended particles measuring less than 2.5 microns in diameter (PM2.5). Exposure is measured in micrograms of PM2.5 per cubic meter ($\mu\text{g}/\text{m}^3$).

Our World
in Data



Data source: World Health Organization - Global Health Observatory (2024)

OurWorldInData.org/air-pollution | CC BY

Note: The WHO's Air Quality Guidelines suggest annual average PM2.5 exposure should be less than $5 \mu\text{g}/\text{m}^3$ in order to minimize the impacts of PM2.5 on human health.

In some places, like India, the yearly average PM2.5 concentration is [nearly 12 times higher](#) than the new WHO levels. Moreover, no country has legal air quality standards that meet the new WHO recommendations.

In the United States, the National Ambient Air Quality Standards [are 2.4 times higher](#) than WHO's recommended level for yearly average PM2.5 exposure and roughly 10 times higher for yearly average nitrogen dioxide.

Inequity in pollution exposure is a problem

Not everyone is equally protected by the existing air quality laws: [Nearly 97 million people](#) in the United States live in counties with air pollution concentrations above the National Ambient Air Quality Standards.

Globally and locally, the people who bear the greatest burden of exposure to air pollution are generally those producing the least amount of air pollution.

For example, in the United States, studies have found that people who identify as Black and Hispanic inhale [about 60% more air pollution](#) than they are responsible for based on their consumer behavior. In contrast, people who identify as non-Hispanic white inhale about 17% less pollution than their consumer behavior would suggest.

While the United States cut yearly average PM2.5 concentrations by 41% and yearly average nitrogen dioxide concentrations by 53% between 2000 and 2020, the people and places most exposed to air pollution in the 1980s [are still the most exposed today](#).



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Masego Mafata 20 Sep 2021



Ways to improve air quality for everyone

Countries can improve their air quality by moving to cleaner sources of energy and cutting out fossil fuels, which are a major source of PM2.5. Electric vehicles can help reduce traffic-related air pollution.

Investing in more equitable air pollution monitoring networks that capture real-time air quality levels can help recognize risks. And policymakers worldwide can use the new evidence-based recommendations to develop and enforce air quality policies that protect public health and the environment.

The disparities in air pollution exposure are [often linked to structural racism](#), such as [historic redlining](#) and locating polluting industries and [freeways](#) in low-income or predominantly Black or Hispanic neighborhoods. The [result shows up in the communities' health](#). The new WHO air quality guidelines could help governments set limits on average air pollution exposure that better protect everyone's health.

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