

Air pollution below EPA standards linked with higher death rates

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A new study by researchers at Harvard T.H. Chan School of Public Health found that death rates among people over 65 are higher in zip codes with more fine particulate air pollution (PM2.5) than in those with lower levels of PM2.5. It is the first study to examine the effect of soot particles in the air in the entire population of a region, including rural areas. The harmful effects from the particles were observed even in areas where concentrations were less than a third of the current standard set by the Environmental Protection Agency (EPA).

"Most of the country is either meeting the EPA standards now, or is expected to meet them in a few years as new power plant controls kick in," said senior author Joel Schwartz, professor of environmental epidemiology. "This study shows that it is not enough. We need to go after coal plants that still aren't using scrubbers to clean their emissions, as well as other sources of particles like traffic and wood smoke."

The study appears online June 3, 2015 in *Environmental Health Perspectives*.

Previous studies have linked both short- and long-term exposure to PM2.5 with increased mortality, through mechanisms such as heart disorders, increased blood pressure, and reduced lung function.

The researchers used satellite data to determine particle levels and temperatures in every zip code in New England. This allowed them to examine the effects of PM2.5 on locations far from monitoring stations, and to look at the effects of short-term exposures and annual average exposures simultaneously. They analyzed health data from everyone covered by Medicare in New England - 2.4 million people - between 2003 and 2008 and followed them each year until they died.

They found that both short- and long-term PM2.5 exposure was significantly associated with higher

[death rates](#), even when restricted to zip codes and times with annual exposures below EPA standards. Short-term (two-day) exposure led to a 2.14% increase in mortality per 10 µg/m³ increase in PM2.5 concentration, and long-term (one-year) exposure led to a 7.52% increase in mortality for each 10 µg/m³ increase.

"Particulate air pollution is like lead pollution, there is no evidence of a safe threshold even at levels far below current standards, including in the rural areas we investigated," said Schwartz. "We need to focus on strategies that lower exposure everywhere and all the time, and not just in locations or on days with high particulate levels."

More information: "Low-Concentration PM2.5 and Mortality: Estimating Acute and Chronic Effects in a Population-Based Study," Lihua Shi, Antonella Zanobetti, Itai Kloog, Brent A. Coull, Petros Koutrakis, Steven J. Melly, and Joel D. Schwartz, *Environmental Health Perspectives*, online June 3, 2015, [DOI: 10.1289/ehp.1409111](https://doi.org/10.1289/ehp.1409111)

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