

Study of US seniors strengthens link between air pollution and premature death

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Credit: Peter Griffin/public domain

A new study of 60 million Americans—about 97% of people age 65 and older in the United States—shows that long-term exposure to airborne fine particulate matter (PM_{2.5}) and ozone increases the risk of premature death, even when that exposure is at levels below the National Ambient Air Quality Standards (NAAQS) currently established by the

U.S. Environmental Protection Agency.

The Harvard T.H. Chan School of Public Health researchers found that men, blacks, and low-income populations had higher risk estimates from PM2.5 [exposure](#) compared with the national average, with blacks having mortality risks three times higher than the national average.

The results showed that if the level of PM2.5 could be lowered by just 1 microgram per cubic meter (ug/m^3) nationwide, about 12,000 lives could be saved every year. Similarly, if the level of ozone could be lowered by just 1 part per billion (ppb) nationwide, about 1,900 lives would be saved each year.

The study will be published in the June 29, 2017 issue of the *New England Journal of Medicine*.

"This is a study of unprecedented statistical power because of the massive size of the study population. These findings suggest that lowering the NAAQS for [fine particulate matter](#) will produce important public health benefits, especially among self-identified racial minorities and people with low incomes," said Francesca Dominici, principal investigator of this study and professor of biostatistics at Harvard Chan School and co-director of the Harvard Data Science Initiative.

The researchers examined Medicare claims records of 60 million Americans 65+ over a seven-year period, representing 460 million person-years of follow-up. They also estimated [air pollution](#) levels at each 1 kilometer grid for the entire U.S. upon which the claims data could be overlaid and interpreted.

To do this, the Harvard Chan researchers leveraged the results of an exposure prediction model developed by doctoral student Qian Di and Joel Schwartz, professor of environmental epidemiology and the study's

senior author. The exposure prediction model leverages satellite-based measurements and a computer simulation of air pollution.

By relying on this well-validated prediction model, the team was able to include subjects who live in unmonitored and less-populated areas so that the effects of air pollution on all 60 million people could be analyzed regardless of whether they lived in urban, suburban, or rural areas.

"This study shows that although we think [air quality](#) in the United States is good enough to protect our citizens, in fact we need to lower pollution levels even further," said Schwartz.

More information: "Air Pollution and Mortality in the Entire Medicare Population," Qian Di, Yan Wang, Antonella Zanobetti, Yun Wang, Petros Koutrakis, Christine Choirat, Francesca Dominici, Joel D. Schwartz, *New England Journal of Medicine* (2017). [DOI: 10.1056/NEJMoa1702747](#)

Provided by Harvard T.H. Chan School of Public Health

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