

US air pollution deaths nearly halved between 1990 and 2010

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Air pollution in the U.S. has decreased since about 1990, and a new study conducted at the University of North Carolina at Chapel Hill now shows that this air quality improvement has brought substantial public health benefits. The study, published in the journal [*Atmospheric Chemistry and Physics*](#), found that deaths related to air pollution were nearly halved between 1990 and 2010.

The team's analyses showed that deaths related to [air pollution exposure](#) in the U.S. decreased by about 47 percent, dropping from about 135,000 deaths in 1990 to 71,000 in 2010.

These improvements in [air quality](#) and [public health](#) in the U.S. coincided with increased federal air quality regulations, and have taken place despite increases in population, energy and electricity use, and vehicle miles traveled between 1990 and 2010.

"We've invested a lot of resources as a society to clean up our air," said Jason West, professor of environmental sciences and engineering at the UNC Gillings School of Global Public Health and study co-author. "This study demonstrates that those changes have had a real impact with fewer people dying each year due to exposure to [outdoor air pollution](#)."

The study was led by Yuqiang Zhang, a former postdoctoral researcher at the UNC Gillings School and at the Environmental Protection Agency and current research scientist at the Duke University Nicholas School of the Environment, and in collaboration with West and several scientists at

the EPA.

This study supports results from a small number of other recent studies that also showed similar and marked reductions in air pollution-related deaths, but this study is unique in its use of a 21-year computer simulation and ability to estimate air pollution deaths each year.

Zhang, West and colleagues analyzed concentrations of two pollutants, known as PM_{2.5} and ozone, from a 21-year computer simulation of air pollution across the U.S. PM_{2.5} are very small particles suspended in the air that come from power plants, motor vehicles, industries, and some commercial and residential sources. The diameter of such small particles is less than 2.5 micrometers, which is about 3 percent of the diameter of a human hair.

They then related the declining concentrations of PM_{2.5} and ozone to the geographical areas in which people live and the causes of death in those areas, using data from the Centers for Disease Control and Prevention, to estimate deaths from air pollution during the period. They estimated deaths from ischemic heart disease, chronic obstructive pulmonary disease, lung cancer and stroke related to PM_{2.5}, and from respiratory disease for ozone.

"These health improvements likely have continued beyond 2010 as we observe that air pollutant concentrations have continued to decrease," said Zhang.

The team plans to use other datasets to analyze air pollution deaths since 2010.

Still, despite clear improvements, air pollution remains an important public health issue in the U.S. The estimated 71,000 deaths in 2010 translates to 1 of every 35 deaths in the U.S. - that's as many deaths as

we see from all traffic accidents and all gun shootings combined.

"Even though we've seen some tangible success, there are still people dying, and a public health challenge remains going forward," West said. "New federal policies curtailing [air pollution](#) regulations likely will slow the improvement in air quality or possibly make air quality worse."

Provided by University of North Carolina at Chapel Hill

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