

## Study: Cleaner air adds 5 months to US life span

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A new study by researchers at Brigham Young University and Harvard School of Public Health shows that average life expectancy in 51 U.S. cities increased nearly three years over recent decades, and approximately five months of that increase came thanks to cleaner air.

"Such a significant increase in life expectancy attributable to reducing air pollution is remarkable," said C. Arden Pope III, a BYU epidemiologist and lead author on the study in the Jan. 22 issue of the *New England Journal of Medicine*. "We find that we're getting a substantial return on our investments in improving our air quality. Not only are we getting cleaner air that improves our environment, but it is improving our public health."

The research matched two sets of data from 51 cities across the nation: changes in air pollution between about 1980 and about 2000; and residents' life expectancies during those years. The scientists applied advanced statistical models to account for other factors that could affect average life spans, such as changes in population, income, education, migration, demographics and cigarette smoking.

In cities that had previously been the most polluted and cleaned up the most, the cleaner air added approximately 10 months to the average resident's life. On average, Americans were living 2.72 years longer at the end of the two-decade study period; up to five months, or 15 percent, of that increase came because of reduced air pollution. Other studies show that these gains are likely coming from reductions in the

cardiovascular and cardiopulmonary disease that typically accompany air pollution.

"There is an important positive message here that the efforts to reduce particulate air pollution concentrations in the United States over the past 20 years have led to substantial and measurable improvements in life expectancy," said study co-author Douglas Dockery, chair of the Department of Environmental Health at Harvard School of Public Health.

Pope and Dockery have teamed with other researchers on landmark studies published in the early 1990s that revealed the negative health effects of particulate air pollution known as "PM2.5" - tiny pollutants smaller than 2.5 microns in diameter, smaller than 4/100 the width of a human hair. The Environmental Protection Agency used those and related studies as the basis for tightening air pollution standards in 1997.

The latest study evaluated the impact of resulting decreases in particulate pollution on average life spans in cities for which air pollution data were available. In fact, researchers had to build life expectancy data for the 214 counties that are part of the study's 51 metropolitan areas.

"Life expectancy is the single most comprehensive summary of how people's longevity is affected by factors like air pollution that cause early death," said co-author Majid Ezzati, associate professor of international health at Harvard School of Public Health. "We were able to use routine mortality statistics to track longevity in all cities over a long period of time and analyze how it has been influenced by changes in air pollution."

The analysis found that for every decrease of 10 micrograms per cubic meter of particulate pollution in a city, its residents' average life expectancy increased by more than seven months. During the 1980s and 1990s the average PM2.5 levels in the 51 U.S. cities studied dropped

from 21 to 14 micrograms per cubic meter. In cities such as Pittsburgh and Buffalo, the decrease was closer to 14 micrograms per cubic meter.

The research also observed gains in life expectancy even in cities that initially had relatively clean air but had further improvements in air quality, suggesting the continuing benefits to ongoing efforts to reduce air pollution.

The researchers emphasized that there are other important and often overlapping factors that influence life expectancy, but this study demonstrated that improvements in air quality can contribute to significant and measurable improvements in life expectancy.

Source: Brigham Young University

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