

An aerial photograph of a city, likely Salt Lake City, Utah, showing a dense urban area with various buildings and structures. In the background, a range of mountains is visible, partially obscured by a thick, hazy layer of air pollution (inversion) that blankets the valley. The sky is a pale, overcast blue. The overall scene is dimly lit, suggesting a winter day.

# Hazardous Pollutant: Dangers of Soot Confirmed in New Scientific Study

**EPA** *criticized for not updating air pollutant standards despite scientific evidence supporting PM 2.5's health risks.*

*A winter inversion blankets the Wasatch Front in this January 15, 2004 photo.*

*Photo by Dan Pope, KSL.*



Photo by Mark A. Philbrick, BYU C. Arden Pope III is an environmental economist and epidemiologist at Brigham Young University.

The prospect of better public health, and even longer lives, is up in the air. Stronger national standards on fine particulate matter could prevent 35,700 premature deaths and save Americans \$281 billion per year, according to a recent report. Earth Justice, the American Lung Association, and Clean Air Task Force published the November 16 report in conjunction with a petition they filed recently against the Environmental Protection Agency for failing to meet its deadline to revisit the standard.

Fine particulate matter (otherwise known as PM 2.5 or more commonly as soot) is a mixture of solid and liquid particles that derives largely from diesel vehicles and equipment as well as coal-fired power plants. According

to the EPA, soot is formed when tailpipe and smokestack emissions—including sulfur dioxide and nitrogen oxides (both of which are classified as hazardous under the Clean Air Act)—mix with other chemicals in the atmosphere. While not considered a hazardous pollutant by EPA standards, there's been a growing amount of scientific evidence supporting PM 2.5's health risks, including respiratory and heart diseases, aggravation of asthma, and diabetes.

That was corroborated in early 2009, when Researchers at Brigham Young University examined changes in life expectancy in 51 metropolitan areas. The BYU team compared life-span figures with improvements in air quality in each region from

the early 1980s to the late 1990s.

After controlling for smoking, socioeconomic factors and other variables, the scientists found that each decrease of 10 micrograms of pollutant particles per cubic meter of air was associated with an increase of more than seven months in average life expectancy.

Over all, life expectancy increased by an average of two years and eight months in the areas studied. Drawing on data from this and other studies, the researchers estimated that five months of the increase was attributable strictly to improvements in air quality.

"This is a large, nationwide natural experiment," said C. Arden Pope III, a professor of economics at B.Y.U. and the

lead author of the study, which was published in *The New England Journal of Medicine*.

"We did an intervention—improved air quality—and the question is, 'Did we get a return?'" Pope said. "The bottom line is yes, it looks like we did. Our efforts to clean up the air are helping."

But the challenge is formidable. PM 2.5 is so fine (about 1/30 the width of a human hair) that it bypasses our usual mechanisms to dispel irritating air particles, like coughing and sneezing. Even just a few hours of exposure can aggravate lung disease, asthma attacks, or acute bronchitis, the report's authors say.

Exposure has led to incidents of missing school and work, and even emergency visits to the hospital.

The report, citing previous studies, says that children are highly vulnerable to getting sick from PM 2.5 because much of their respiratory systems are still developing, and because they spend more time outdoors than do adults. The report also points out that elders and diabetics—who are more prone to heart or lung disease—are at risk, as are low-income groups, which "often live closer to the sources of soot pollution and have less access to medical care."

Given these findings over recent years, the report's authors argue that the EPA

should save lives and money by strengthening its standard without further delay. The EPA, which is mandated under the Clean Air Act to revise pollutant standards every five years, last set its standard for PM 2.5 in October 2006—and is now overdue for revision.

The environmental groups behind the report and the petition are now asking the courts to impose a September 2012 deadline for the EPA to come up with the new standard.

The general onslaught of recent Congressional action to undercut the EPA's authority to regulate under the Clean Air Act might help to explain the agency's delays. According to an August 2011 Congressional Research Service report, there are at least six EPA regulations currently under consideration that would impose tougher air pollution standards on coal-fired power plants. The proposed regulations are being met with strong resistance from electric utility groups, Edison Electric Institute (EEI) chief among them, which calls the EPA's proposals a "regulatory train wreck." The National Mining Association and the American Legislative Exchange Council, an influential lobbying group, have similarly criticized the EPA proposals.

The primary anti-EPA regulation argument made by industry is related to cost. One of the proposals under

consideration, the Utility Maximum Achievable Control Technology, would require power plants to install better scrubbing and filtering equipment. Industry groups like EEI have argued that such a regulation could impede electric generating capacity and system reliability. According to one analysis, however, many of the industry impact assessments grossly inflate the EPA's own estimated costs of compliance. For example, the EPA projects that complying with the utility proposal would cost the industry about \$10.9 billion annually, while the average consumer would see bills go up by about \$3 to \$4 per month.

This cost to industry might be sizeable. By comparison, Americans could save an estimated \$218 billion in health costs just with a stronger standard on soot.

"There's room for improvement," Pope said, "but it's worth pursuing."

**Find out more:**

- U.S. Environmental Protection Agency, <http://www.epa.gov/>
- Brigham Young University environmental economist and epidemiologist C. Arden Pope, <http://fhssfaculty.byu.edu/Pages/es/>