



News & Trends

Short-Term Exposure To Fine Particulate Air Pollution Increases Risk Of Heart Attack For Those With Clogged Arteries

A one- or two-day rise in air pollution causes a significant increase in the risk of unstable angina and heart attacks for people who have significant coronary artery blockage, according to a study announced on Nov. 30.

"For people who have blockage in their arteries -- whether they know it or not -- relatively modest increases in air pollution are associated with measurable and significant increases in one of these heart disease events," said C. Arden Pope, an epidemiologist at Brigham Young University (BYU) and lead author on the study. He also has published several studies on the health effects of air pollution over the past two decades.

For this study, the researchers linked detailed daily measures of air pollution gathered from monitoring sites in northern Utah with a registry of more than 12,000 heart patients built over 12 years by cardiologists at LDS Hospital in Salt Lake City. Pope and study co-authors from the hospital were able to compare levels of pollution on the days preceding the patients' hospital visits with their personal health characteristics. This approach eliminated the impact of other risk factors such as smoking or obesity, the researchers said. The level of detail considered by the study allows cardiologists like study co-author Dr. Jeffrey L. Anderson to make specific recommendations for their patients.

"For those of us with patients who have significant coronary artery disease, the message is that they probably shouldn't be out and about during periods of air pollution," said Anderson, associate chief of cardiology at LDS Hospital as well as professor of internal medicine at the University of Utah School of Medicine.

The type of pollution cited in the study is fine particulate matter (PM_{2.5}), airborne particles 2.5 micrometers in diameter and smaller. According to EPA, PM_{2.5} can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. Pope's study showed that a daily increase of 10 micrograms per cubic meter in fine particulate matter air pollution is accompanied by a 4.5 percent increased risk of having unstable angina or a heart attack. During winter inversions, Utah can see levels as high as 100 micrograms per cubic meter, Pope said.

Although the effect may seem small, the findings have significant public health impact because exposure to fine particulate matter is widespread in urban environments and essentially involuntary, Pope said. "We all have to breathe the air."

In further explanation of the broad application of these findings, study co-author Benjamin D. Horne pointed out that coronary disease is very common. "Although some people have advance warning through chest pain and other indications, unfortunately about half of people who are at the greatest risk

from air pollution's effects actually have silent, undiagnosed coronary disease, and their first sign or symptom of disease is an acute event such as a heart attack," said Horne, director of cardiovascular epidemiology at LDS Hospital.

Horne suggested preventive measures such as improving public air quality warning systems, educating the public about the American Heart Association's recommendations for activity restrictions for those at higher risk and educating the public about improving filtration of their indoor air. He also pointed out that any efforts to improve air quality would be beneficial.

The study, "Ischemic Heart Disease Events Triggered by Short-Term Exposure to Fine Particulate Air Pollution," was published online before print in *Circulation* on Nov. 13. Additional information on the study can be found at <http://circ.ahajournals.org>.

Additional information on particulate matter can be found at <http://www.epa.gov/oar/particlepollution>.

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