

Researchers find link between air pollution and heart disease

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Credit: Alfred Palmer/Wikipedia

Researchers from the Johns Hopkins Bloomberg School of Public Health have found a link between higher levels of a specific kind of air pollution in major urban areas and an increase in cardiovascular-related hospitalizations such as for heart attacks in people 65 and older.

The findings, published in the November issue of *Environmental Health Perspectives*, are the strongest evidence to date that coarse particulate matter - airborne pollutants that range in size from 2.5 to 10 microns in diameter and can be released into the air from farming, construction projects or even wind in the desert - impacts public health. It has long been understood that particles smaller in size, which typically come from automobile exhaust or power plants, can damage the lungs and even enter the bloodstream. This is believed to be the first study that clearly implicates larger particles, which are smaller in diameter than a human hair.

"We suspected that there was an association between coarse particles and health outcomes, but

we didn't have the research to back that up before," says study leader Roger D. Peng, PhD, an associate professor of biostatistics at the Bloomberg School. "This work provides the evidence, at least for cardiovascular disease outcomes. I don't feel like we need another study to convince us. Now it's time for action."

The researchers also studied respiratory diseases but did not find a correlation between high levels of coarse particles and hospitalizations for those illnesses.

For the national study, Peng and his colleagues studied data from an [air monitoring network](#) set up by the U.S. Environmental Protection Agency (EPA) in 110 large urban counties in the United States and linked it to Medicare data on hospitalizations in those same areas from 1999 to 2010. The hospitalizations covered people ages 65 and older.

Counties were included in the study if they had more than 20,000 Medicare enrollees in 2010 and had equipment that monitored fine and coarse particles for at least 200 days of the study. Over the time period, there were 6.37 million cardiovascular and 2.51 million respiratory emergency hospitalizations over the 110 counties.

The researchers found that on days when coarse particle levels were higher, cardiovascular hospitalizations were also higher that same day. They did not find a correlation in the following days.

As part of the Clean Air Act, the EPA more closely regulates finer particles, which are more likely to come from manmade sources. States work to reduce those levels through various mechanisms, including stronger car emissions standards or adding scrubbers to coal-fired power plants. In some areas, coarse particles may be more difficult to reduce, as they can come from natural sources.

The coarse particles enter the respiratory tract and can trigger systemic health problems, though the mechanism is not fully understood.

The findings varied by geographic region. While there were higher concentrations of coarse particles found in the western United States, there were more cardiovascular events requiring hospitalization in the eastern United States.

"Just because the particles are the same size doesn't mean they are made of the same material," Peng says. "It's possible that the chemical composition of the particles in the east could make them more toxic."

Peng says that EPA's monitoring network is not designed to measure coarse particles and they may need a national monitoring network for particles of that size. In the past, he says, the EPA has proposed tighter regulations on coarse particles, but they were never finalized, in part because there wasn't enough evidence.

"It's worth revisiting given this new data," he says.

More information: "Ambient Coarse Particulate Matter and Hospital Admissions in the Medicare Cohort Air Pollution Study, 1999-2010" was written by Helen Powell, Jenna R. Krall, Yun Wang, Michelle L. Bell and Roger D. Peng.

Provided by Johns Hopkins University Bloomberg School of Public Health

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