

Breathing Dust and Soot Raises Risk of Stroke

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Short-term exposure to low levels of particulate air pollution may increase the risk of stroke or mini-stroke, according to new research conducted in Texas that suggests current exposure standards are not sufficient to protect the public. Stroke is the third leading cause of death in the United States.

The study examined particulate air pollution in the southeast Texas community of Corpus Christi where there is a large petroleum and petrochemical industry presence.

The results showed what the researchers called "borderline significant associations" between same day and previous day exposures to fine particulate matter and risk of ischemic strokes.

Ischemic (is-skeem-ic) stroke occurs when an artery to the brain is blocked. In the study, researchers identified ischemic strokes and also transient ischemic attacks, or TIA, sometimes called mini strokes, that often lead to a stroke later. Findings suggest that recent exposure to fine particulate matter may increase the risk of these types of stroke events specifically.

Particulate matter is a combination of fine solids such as dirt, soil dust, pollens, molds, ashes, and soot; and aerosols that are formed in the atmosphere from gaseous combustion by-products such as volatile organic compounds, sulfur dioxide and nitrogen oxides. Particulate pollution comes from such diverse sources as factory and utility smokestacks, vehicle exhaust, wood burning, mining, construction activity, and agriculture.

"The vast majority of the public is exposed to ambient air pollution at the levels observed in this community or greater every day, suggesting a potentially large public health impact," said Lynda Lisabeth, lead author and assistant professor in the University of Michigan School of Public Health, where the research is based.

Despite the fossil fuel industry in the area, fine particulate matter exposures were low relative to other regions of the country, the researchers said probably because of the proximity to the coast and prevailing wind patterns.

Lisabeth stressed that the association requires further study in other areas with varying climates and alternative study designs.

Ischemic stroke is by far the most common kind of stroke, accounting for about 88 percent of all strokes. Stroke can affect people of all ages, including children.

Many people with ischemic strokes are 60 or older, and the risk of stroke increases as people age. At each age, stroke is more common in men than women, and it is more common among African-Americans than white Americans.

For this study, researchers looked at data from the Brain Attack Surveillance in Corpus Christi Project, a population-based stroke surveillance project designed to capture all strokes in Nueces County, Texas.

Ischemic stroke and TIA cases between 2001 and 2005 were identified using trained staff and later verified by neurologists.

Daily historical air pollutant and meteorological data were obtained for the same time period from the Texas Commission on Environmental Quality's Monitoring Operations database.

Data on fine particulate matter and ozone from a centrally located monitor in Corpus Christi located upwind of the local industrial facilities was used in the study. The majority of stroke and TIA cases were found to be located upwind of local chemical plants and refineries.

Some research has shown that particulate air pollution is associated with acute artery vasoconstriction and with increased thickening of the blood, which may enhance the potential for blood clots. Similar associations were also seen with ozone, another type of air pollution.

This study confirms earlier research showing that exposure to fine particle matter air pollution increases a person's risk for hospital admission for cardiovascular and respiratory diseases.

The study, "Ambient Air Pollution and Risk of Ischemic Stroke and TIA," will be published in the July 2008 issue of *Annals of Neurology* <http://www.interscience.wiley.com>, the official journal of the American Neurological Association.