

Number of strokes increase as pollution levels rise

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Taxis in traffic. Credit: copyright American Heart Association

Higher pollution levels were linked to a higher total number of strokes, and researchers said it reaffirmed the growing evidence that climate change and overall air quality contributes to cardiovascular disease, according to research presented at the American Stroke Association's International Stroke Conference 2016.

The study, which used data from the United States and China, is one of the first to investigate the interaction between [air quality](#) and the number of [stroke](#) cases (prevalence) along with the potential effect of temperatures on the association.

Researchers used data from the two countries because they "are the world's two largest emitters of greenhouse gases and responsible for about one-third of global warming to date," said Longjian Liu, M.D., Ph.D., lead study author and an associate professor of epidemiology and

biostatistics at Drexel University in Philadelphia, Pennsylvania.

The team evaluated air quality data collected between 2010 and 2013 from 1,118 counties in 49 states in America and from 120 cities in 32 provinces in China. Particulate matter (PM) is the term for particles found in the air, including dust, dirt, smoke and liquid droplets. Particles less than 2.5 micrometers in diameter (PM_{2.5}) pose the greatest health risks due to their small size (1/30th diameter of a human hair and not visible to the human eye), is created from combustion from cars, power plants, forest fires and others.

Across the two countries, researchers found that the total number of stroke cases rose 1.19 percent for each 10 micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) increase of PM_{2.5}.

In addition, Liu said researchers found a significant regional variation in PM_{2.5} levels that was linked to the number of stroke cases. Overall, the southern region of America had the highest average annual PM_{2.5} while the West had the lowest - which correlates with the fact that people living in the South had the highest prevalence of stroke at 4.2 percent compared with those in the West who had the lowest at 3 percent, Liu said.

Researchers also found that temperature had an impact on air quality and risk of stroke.

"Seasonal variations in air quality can be partly attributable to the climate changes," he said. "In the summer, there are lots of rainy and windy days, which can help disperse air pollution. High temperatures create a critical thermal stress that may lead to an increased risk for stroke and other heat- and air quality-related illnesses and deaths."

Moreover, Liu added, "patients with stroke are in danger of dehydration

due to [high temperatures](#) in the summer, and are in danger of suffering from pneumonia, influenza and other respiratory diseases in winter. Women and the elderly also appear more vulnerable to stroke risk due to air quality and heat-related diseases."

Stroke is the fifth leading cause of death in the United States killing nearly 129,000 people every year, and is a leading cause of disability. Worldwide, the prevalence of stroke stood at 33 million, with 16.9 million people suffering their first stroke, and is the second-leading cause of global death behind heart disease.

Although patients cannot control air quality, Liu said, the findings provide evidence for policy makers and public health leaders to develop better models for monitoring and predicting climate changes so that patients can better protect themselves.

Provided by American Heart Association

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