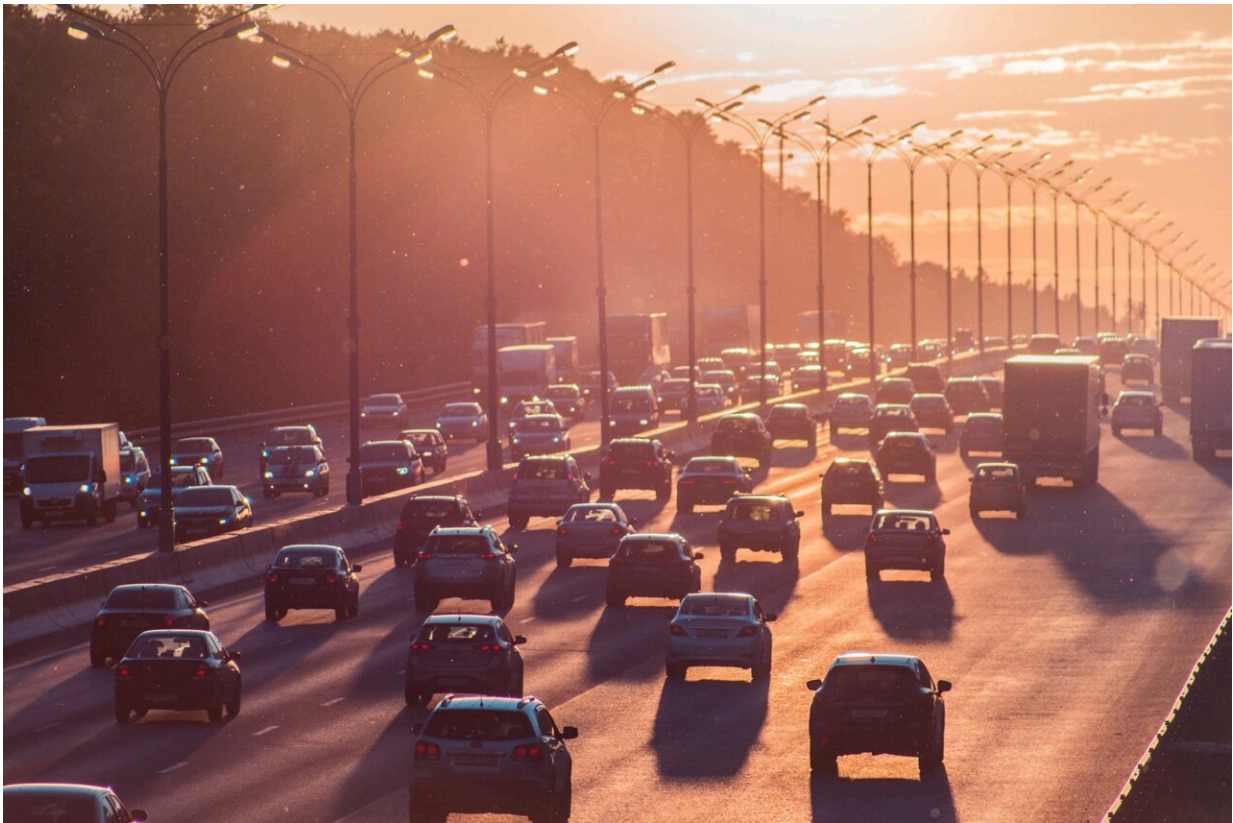


Traffic-related air pollution linked to more signs of Alzheimer's in brain

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Credit: Unsplash/CC0 Public Domain

People with higher exposure to traffic-related air pollution were more likely to have high amounts of amyloid plaques in their brains associated with Alzheimer's disease after death, according to a study published in

the February 21, 2024, online issue of *Neurology*. Researchers looked at fine particulate matter, PM_{2.5}, which consists of pollutant particles of less than 2.5 microns in diameter suspended in air.

The study does not prove that air pollution causes more amyloid plaques in the brain. It only shows an association.

"These results add to the evidence that [fine particulate matter](#) from traffic-related air pollution affects the amount of amyloid plaque in the brain," said study author Anke Huels, Ph.D., of Emory University in Atlanta. "More research is needed to investigate the mechanisms behind this link."

For the study, researchers examined the brain tissue of 224 people who agreed to donate their brains at death to advance research on dementia. The people had died at an average age of 76.

Researchers looked at the traffic-related air pollution exposure based on the people's home address in the Atlanta area at the time of death. Traffic-related PM_{2.5} concentrations are a major source of ambient pollution in [urban areas](#) like the metro-Atlanta area where most donors lived. The average level of exposure in the year before death was 1.32 micrograms per cubic meter (µg/m³) and 1.35 µg/m³ in the three years before death.

Researchers then compared pollution exposures to measures of the signs of Alzheimer's disease in the brain: amyloid plaques and tau tangles. They found that people with higher exposures to air pollution one and three years before death were more likely to have higher levels of [amyloid plaques](#) in their brains.

People with 1 µg/m³ higher PM_{2.5} exposure in the year before death were nearly twice as likely to have higher levels of plaques, while those

with higher exposure in the three years before death were 87% more likely to have higher levels of plaques.

Researchers also looked at whether having the main gene variant associated with Alzheimer's disease, APOE e4, had any effect on the relationship between air pollution and signs of Alzheimer's in the brain. They found that the strongest relationship between air pollution and signs of Alzheimer's was among those without the gene variant.

"This suggests that [environmental factors](#) such as air pollution could be a contributing factor to Alzheimer's in patients in which the disease cannot be explained by genetics," Huels said.

A limitation of the study is that researchers only had the home address of people at the time of their death for measuring air pollution, so it's possible that [pollution](#) exposure may have been misclassified. The study also involved mainly white people who were highly educated, so the results may not be representative of other populations.

More information: Grace M. Christensen et al, Association of PM 2.5 Exposure and Alzheimer Disease Pathology in Brain Bank Donors—Effect Modification by APOE Genotype, *Neurology* (2024). DOI: 10.1212/WNL.0000000000209162

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