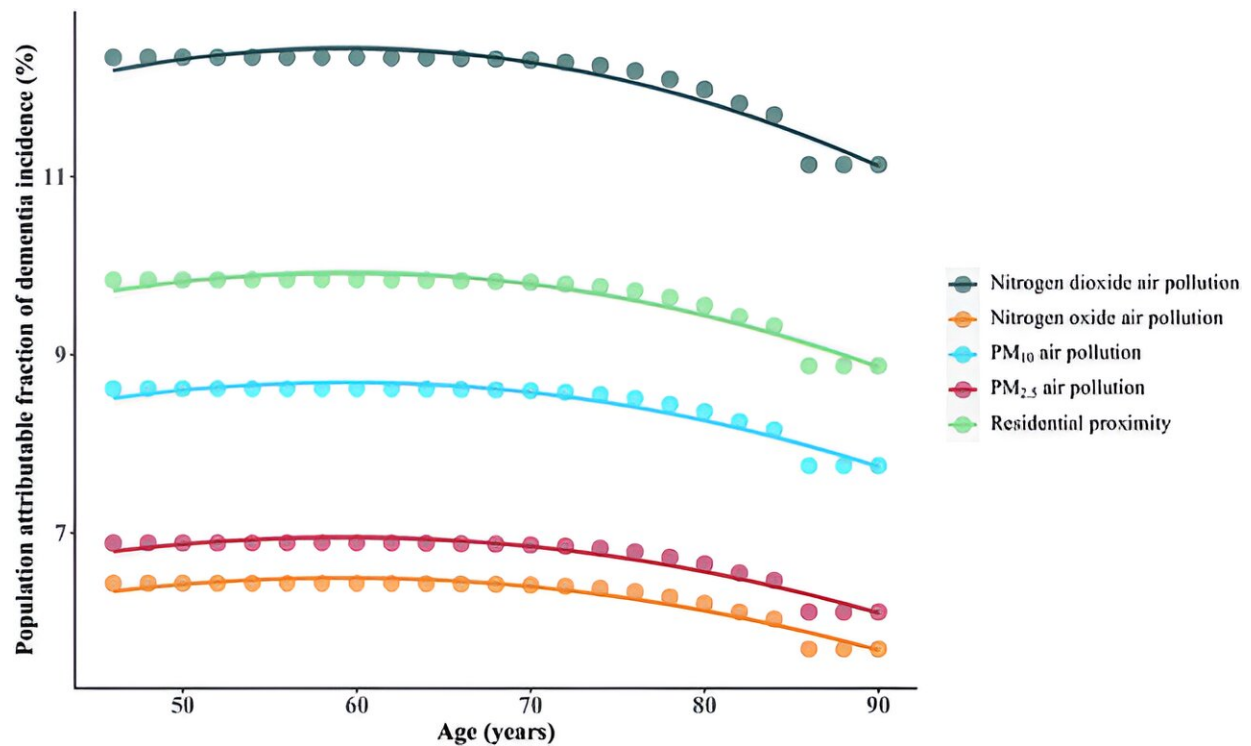


Proximity to traffic linked to increased dementia risk and brain structural changes

October 24 2023



Population attributable fraction of all-cause dementia incidence of residential proximity and traffic-related air pollution exposures. We defined residential proximity ($\leq 1,000$ m) and nitrogen oxide pollution ($\geq 44.0 \mu\text{g}/\text{m}^3$) based on sample distribution, and nitrogen dioxide pollution ($\geq 20.0 \mu\text{g}/\text{m}^3$), PM₁₀ pollution ($\geq 15.0 \mu\text{g}/\text{m}^3$), and PM_{2.5} pollution ($\geq 10.0 \mu\text{g}/\text{m}^3$) based on interim targets established by WHO air quality guidelines. Fitted Cox regression models with age as the time scale were used to estimate the attributable fraction for each exposure, further controlling for sex, ethnic background, education, current smoking, alcohol intake, physical activity, obesity, depressed mood, hypertension, diabetes, stroke, and coronary heart disease. Dots represent point

estimates, while lines and shadows represent fitted smooth splines. Credit: *Health Data Science* (2023). DOI: 10.34133/hds.0091

Living near major roadways correlates with a higher incidence of dementia and alterations in brain structure, largely due to traffic-related air pollution, according to a study conducted in China and the UK. The research, recently published in *Health Data Science*, sheds new light on the public health implications of traffic-related pollution and dementia, a growing concern worldwide.

"Prior research has hinted at the neurological risks associated with living near major roads, but the underlying mechanisms remained unclear," said Fanfan Zheng, lead author and professor at the School of Nursing, Peking Union Medical College, Chinese Academy of Medical Sciences. "Our study delves into the relationship between residential proximity to major roads and [dementia risk](#), zeroing in on the role of traffic-related pollutants."

Boasting a robust design, the study analyzed data from 460,901 participants over a median follow-up of 12.8 years. Dementia cases were sourced from the UK Biobank and verified, offering a more reliable dataset than patient-reported diagnoses. The study also stratified cases by type of [dementia](#), allowing for a comprehensive analysis.

As an extension of the UK Biobank study, brain MRI scans were conducted, revealing changes in brain structures related to Alzheimer's disease at the pre-symptomatic stage. The study also controlled for genetic risks and other significant dementia factors.

"Our findings establish a consistent link between living close to [heavy traffic](#) and elevated dementia risk, with traffic-related air pollution,

particularly [nitrogen dioxide](#) and PM2.5, being the primary drivers," commented Wuxiang Xie, associate professor at Peking University Clinical Research Institute, Peking University First Hospital. "This suggests that mitigating air pollution could be a viable strategy to reduce the dementia risk associated with traffic exposure."

Interestingly, the study found no association between long-term traffic noise pollution and dementia, contrary to previous research.

Moreover, the study discovered that proximity to traffic was consistently linked to smaller volumes in brain structures associated with Alzheimer's disease.

"Future studies should focus on validating the impact of reducing traffic-related [pollution](#) on dementia biomarkers and incidence," said Chenglong Li, the study's first author. "Our ultimate goal is to prevent a significant number of dementia cases at the pre-symptomatic stage by eliminating exposure to heavy traffic and its resultant pollutants."

More information: Chenglong Li et al, Relationships of Residential Distance to Major Traffic Roads with Dementia Incidence and Brain Structure Measures: Mediation Role of Air Pollution, *Health Data Science* (2023). [DOI: 10.34133/hds.0091](https://doi.org/10.34133/hds.0091)

Provided by Health Data Science

Citation: Proximity to traffic linked to increased dementia risk and brain structural changes (2023, October 24) retrieved 2 May 2024 from <https://medicalxpress.com/news/2023-10-proximity-traffic-linked-dementia-brain.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.