

# Black adults at risk for Alzheimer's disease live in more polluted areas, study finds

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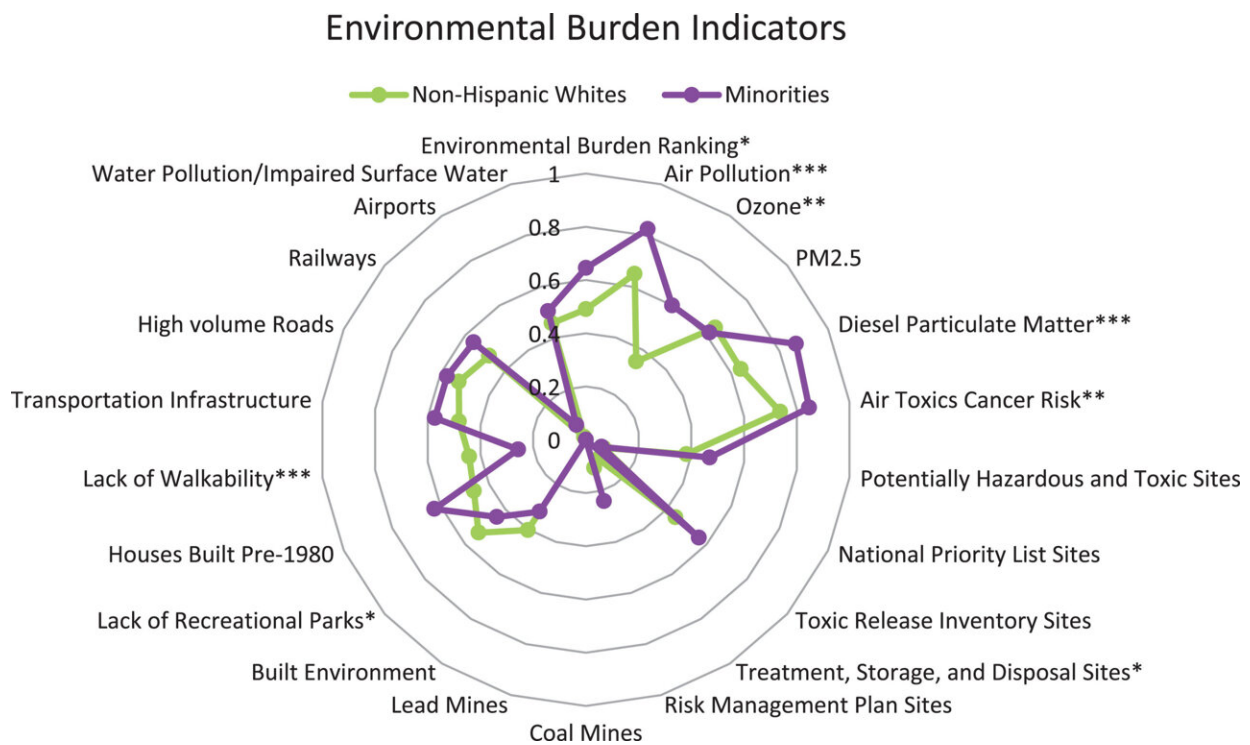


Figure portrays the mean values of all Environmental Burden indicators by race/ethnicity. Credit: *Journal of Alzheimer's Disease Reports* (2024). DOI: 10.3233/ADR-240020

A study by Duke and Columbia Universities finds older, non-white adults are more likely to live in areas with higher air pollution and near toxic disposal sites, among or environmental injustices, potentially

underlying their cognitive health.

"A lot of money has been spent on understanding the genetics and pathological characterization of Alzheimer's disease," said P. Murali Doraiswamy, MBBS, FRCP, a professor of psychiatry and behavioral sciences at Duke University's School of Medicine, and senior author of the study.

"But we still don't have a good way to quantify the dozens of environmental risks for the disease and how they may interact together."

The results add to a growing area of research exploring the connections between environmental factors and brain health, racial injustices, and aging, and suggests looking at a patient's address may be just as important for care providers to consider as listening to their heart or ordering a brain scan.

The results were [published](#) May 14 2024 in the *Journal of Alzheimer's Disease Reports*.

## **Location and brain health**

Where someone lives can influence their brain health. Middle-aged women [get a cognitive boost](#) when residing in areas with more trees, flowers, parks and other green spaces, whereas living in [poorer neighborhoods](#) with [more polluted air](#) elevates risks for and rates of Alzheimer's disease.

These are piecemeal examples, though.

"An all-encompassing snapshot tying multiple [environmental factors](#) and resources available based on where someone lives to neurodegenerative disorders, like Alzheimer's disease, has not been explored as well," said

Alisa Adhikari, a clinical research associate in Dr. Doraiswamy's lab and the study's first author.

## Race and place on the mind

107 participants aged 55—95 with [mild cognitive impairment](#) living in or around New York City, NY or Durham, NC were recruited to study the effectiveness of computerized cognitive training therapies, such as [crossword puzzles](#) and brain games, on slowing dementia progression over 78 weeks.

To get a fuller sense of how place, race, and the mind influence each other, co-author Adaora Nwosu pulled in data from the Center for Disease Control's [Environmental Justice Index](#) (EJI). The EJI provides location-specific information about 36 environmental and social burden indicators such as neighborhood walkability and access to [green spaces](#), diesel exhaust, air, water and noise pollution levels, as well as the likelihood of living in older homes with greater exposure to lead or asbestos.

Non-white participants, mainly Black enrollees, were found to face higher environmental burdens.

"Minorities had greater exposure to ozone, diesel, [particulate matter](#), carcinogenic air toxins, lack of recreation of parks, and proximity to toxic disposal sites," Adhikari said, which she says explains, in part, the higher environmental burden scores.

Older non-white adults also scored much worse on social vulnerability metrics, such as more likely to live in older homes within [poorer neighborhoods](#), which the authors suggest may be a result of past injustices.

There were no connections found, however, between race, location, and measures of cognitive decline likely due to all participants actively taking medicine and doing brain training exercises to curb neurological symptoms, as part of the study's original research design.

Analysis of the EJI data also revealed that adults from the New York City site tended to live in areas with markedly higher pollution compared to counterparts in Durham, which may have impacted or accelerated their decline even before enrolling in treatment.

"This was eye-opening for us," Dr. Doraiswamy said. "We tend to treat all sites and all subjects in a clinical trial as homogeneous with regards to environmental exposures. Moving forward, this type of metric may prove useful to help us better study how environmental exposures impact clinical trial outcomes."

## **Zip codes as part of a checkup**

Dr. Doraiswamy described the findings as a "pilot study," and as such, his team is now planning for a larger, national study with thousands of participants that includes more objective neurodegeneration measurements like MRI brain scans to better assess [cognitive health](#) over time.

"The intent is not to substitute for clinical history or a [blood test](#) or require this for entry into a research study," Dr. Doraiswamy said. "It's just that with clinical history, there's no way of measuring objectively what kind of a neighborhood exposures a person has unless you actually go and visit every single patient's home and take measurements with a sensor and so on and so forth."

Ultimately, the team hopes that this study will spur more collaborations between clinical and environmental researchers to mitigate racial

injustices and ensure everyone has access to a brain healthy environment.

**More information:** Alisa Adhikari et al, Characterizing Neighborhood Vulnerabilities in Mild Cognitive Impairment using the Environmental Justice Index, *Journal of Alzheimer's Disease Reports* (2024). [DOI: 10.3233/ADR-240020](https://doi.org/10.3233/ADR-240020)

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