

Poor neighborhoods linked to elevated dementia risk and faster brain aging

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Living in a poorer neighborhood is linked to accelerated brain aging and increased dementia risk early in life, regardless of income level or education, a Duke University-led study finds.

The study, which appears March 14 in *Alzheimer's & Dementia*, suggests that targeting disadvantaged neighborhoods for dementia prevention programs and encouraging clinicians to consider a patient's address could help lower [dementia risk](#).

"If you want to prevent dementia, and you're not asking someone about their neighborhood, you're missing information that's important to know," said clinical neuropsychologist Aaron Reuben, Ph.D., who led the study as a postdoctoral scholar in the joint lab of Duke University psychology and neuroscience professors Avshalom Caspi, Ph.D., and Terrie Moffitt, Ph.D.

Dementia 'blue zones'

Alzheimer's disease is the most common form of dementia, a neurological disorder that robs people of their memories and cognitive skills. An estimated 58 million people around the world today have dementia, which is [on course to triple to 150 million](#) by 2050.

Despite the expected rise of cases and the immense emotional and financial toll dementia takes on individuals and families, there are no cures or effective medicines.

Researchers are now looking instead to prevent rather than treat dementia through lifestyle changes, like diet and exercise.

Though opting for more vegetables or bike rides may help strengthen [brain health](#) and resilience, Reuben was curious if where people live predicts their future dementia risk better than any combination of individual choices.

"I wanted to understand if there was a geographic patterning to dementia the way there is to longevity, like blue zones," Reuben said, referring to

regions where residents appear to live longer than average. "A lot of individual choices, like what you eat, what you do for fun, or who you spend time with, are constrained by where you live."

Poor neighborhoods beget dementia risk

Reuben and his colleagues at Duke, as well as collaborators at the University of Michigan, Michigan State University, the University of Otago (NZ), and the University of Auckland, looked at the [medical records](#) and addresses of 1.41 million New Zealanders to search for patterns.

The team looked at how well-off or disadvantaged each New Zealander's address was on a scale from one to ten, using information from the national census on average income, employment, and [education levels](#), as well as transportation accessibility and other related factors.

Similar to smaller-scale studies of people in the United States and England, Reuben and his team found that those residing in the most disadvantaged areas had a 43% increased risk of developing dementia over 20 years of observation.

Reuben said the finding still begged the question whether biological signs for neighborhood-associated neurodegeneration could be seen earlier in adulthood, long before people would show up in clinics with memory complaints.

Accelerated brain aging

Reuben and his team then analyzed data from the Dunedin Study, which has tracked nearly 1,000 New Zealanders since birth, documenting their psychological, social, and physiological health, including brain scans,

memory tests, and cognitive self-assessments in adulthood.

Reuben found that study members living in disadvantaged neighborhoods across adulthood had measurably poorer brain health as early as age 45, regardless of their own personal income or education.

"It's not just what personal resources you have, it's also where you live that matters," said Caspi.

Poorer brain health was seen across a number of measurements, such as fewer or smaller nerve cells in the brain's information processing areas and less efficient communication between cells across the brain, as well as more atrophy, and potentially, microbleeds.

Study members living in poorer neighborhoods also had visibly older brains at 45 when the researchers looked at MRI scans, with individuals from the most disadvantaged neighborhoods having brains that appeared three years older than expected given their chronological age. They also scored worse on memory tests and reported more problems with everyday cognitive demands, like following conversations or remembering how to navigate to familiar places.

Addressing location for dementia prevention

These results indicate that living in a disadvantaged neighborhood is a risk factor for dementia, Reuben says. How poorer neighborhoods might increase someone's risk is still unclear, but it could be the result of a number of things associated with deprived areas, such as worse air quality, lower levels of daily social interactions, higher levels of stress, and less walkability.

Combating increased dementia risk stemming from disadvantaged neighborhoods, however, may be simple and low-cost. Community-

focused interventions, such as targeting dementia prevention programs to underserved neighborhoods, or developing [vacant lots into pocket parks](#), might help direct resources where they are most needed.

For now, though, Reuben argues that just factoring in someone's neighborhood early-on is critical to catch and curb accelerated brain aging and dementia risk.

"If you want to truly prevent dementia, you've got to start early, because 20 years before anyone will get a diagnosis, we're seeing dementia's emergence," Reuben said. "And it could be even earlier."

More information: Dementia, Dementia's Risk Factors and Premorbid Brain Structure are Concentrated in Disadvantaged Areas: National Register and Birth-Cohort Geographic Analyses,, *Alzheimer's & Dementia* (2024). [DOI: 10.1002/alz.13727](https://doi.org/10.1002/alz.13727)

Provided by Duke University

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