

Hypertension risk rises closer to major roadways

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Living near a major roadway, such as an interstate, was associated with an elevated risk of high blood pressure in a new study drawing on data from the Women's Health Initiative study. Credit: Michael Cohea/Brown University

A new study in the *Journal of the American Heart Association* reports a significant association between living near a major roadway and the risk of high blood pressure.

The Brown University-led analysis of data from 5,400 post-menopausal

women in the San Diego metropolitan area found that women who lived within 100 meters of a highway or major arterial road had a 22-percent greater risk of [hypertension](#) than women who lived at least 1,000 meters away. In a range of intermediate distances, hypertension risk rose with proximity to the roadways.

Put in epidemiological terms, a 58-year-old woman in the study who lived close to a major road had the [blood pressure](#) risk of a 60-year-old woman who lived far from one. The elevated risks reported in the study statistically account for a wide range of confounding [cardiovascular risk factors](#) including age, demographics, health, and lifestyle and even local fast food availability.

Hypertension is an underlying factor for some cardiovascular diseases. For that reason, the increased likelihood of hypertension reported in the new study may help explain prior findings of associations between proximity to major roadways and cardiovascular diseases such as stroke. A few studies, mostly in Europe, have also tested the association between roadway proximity and hypertension, but results have been mixed.

"I think in the United States this study does tip the scale in favor of being concerned about the urban environment and how we develop our cities and our transportation systems," said study corresponding author Gregory Wellenius, assistant professor of epidemiology in the Brown University School of Public Health. "There are a lot of new developments going up right near highways. One has to start thinking about what are the associated health effects with that."

Assessing the association

The study data comes from the Women's Health Initiative, a study funded by the National Heart Lung and Blood Institute that enrolled tens

of thousands of participants in the mid 1990s including more than 5,600 in San Diego County. The study gathered data on a wide variety of personal health and demographic measures, including where participating women lived, their blood pressure and other key attributes.

Wellenius, lead author and graduate student Kipruto Kirwa, and their co-authors took this dataset and used mapping software to measure the distance from each woman's home to a major roadway. They also consulted a database to determine each neighborhood's abundance of supermarkets and fast-food restaurants to determine who lived in a so-called "food desert" where unhealthy food options were relatively many and healthier ones relatively few.

They then looked at the association between the prevalence of [high blood pressure](#) and distance from the highway (in ranges of less than or exactly 100 meters, between 100 and 200 meters, 200 to 1,000 meters and more than 1,000 meters).

In three levels of analysis, the researchers controlled for more and more possible confounding factors. In all, they controlled for age, ethnicity, smoking status, education, household income, cholesterol, body-mass index, diabetes history, physical activity level, and local food quality.

After all that, they found the odds of hypertension were 1.22 to 1 for those living closest, 1.13 to 1 for those between 100 and 200 meters, and 1.05 to 1 for those between 200 and 1000 meters from a major roadway. These odds are indexed such that 1 represents the prevalence risk of those living more than 1,000 meters from a major roadway.

Wellenius acknowledged that because the study only measured who had hypertension and where they lived at one moment in time, it does not necessarily show a causal link. The study also does not shed light on what specifically about proximity to the road could cause hypertension. It

could be airborne pollutants or noise or both—or something else. But prior studies have shown specific physiological effects from pollution and noise that could have direct causal relevance to cardiovascular disease.

Wellenius cautioned that hypertension, even when treated, still carries an elevated risk of [cardiovascular disease](#). The best policy, he said, is therefore prevention.

"The public health message is that we need to take into consideration the health of the population when planning neighborhoods, when planning transportation systems, and when deciding where new highways are going to go, and how we might be able to mitigate traffic or its effects," Wellenius said.

Provided by Brown University

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