

# Neighborhoods with more green space may mean less heart disease

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People who live in leafy, green neighborhoods may have a lower risk of developing heart disease and strokes, according to new research published in the *Journal of the American Heart Association*, the Open

Access Journal of the American Heart Association/American Stroke Association.

In this study, the first of its kind, researchers from the University of Louisville investigated the impact of neighborhood greenspaces on individual-level markers of stress and cardiovascular disease risk.

Over five-years, blood and urine samples were collected from 408 people of varying ages, ethnicities and socioeconomic levels, then assessed for biomarkers of blood vessel injury and the risk of having cardiovascular disease. Risk was calculated using biomarkers measured from blood and urine samples. The participants were recruited from the University of Louisville's outpatient cardiology clinic and were largely at elevated risk for developing cardiovascular diseases.

The density of the greenspaces near the participants' residences were measured using the Normalized Difference Vegetation Index (NDVI), a tool that indicates levels of vegetation density created from satellite imagery collected by NASA and USGS. Air pollution levels were also assessed using particulate matter from the EPA and roadway exposure measurements.

Researchers found living in areas with more green vegetation was associated with:

- lower urinary levels of epinephrine, indicating lower levels of stress;
- lower urinary levels of F2-isoprostane, indicating [better health](#) (less oxidative stress);
- higher capacity to repair blood vessels.

They also found that associations with epinephrine were stronger among women, [study participants](#) not taking beta-blockers—which reduce the

heart's workload and lower blood pressure—and people who had not previously had a heart attack.

"Our study shows that living in a neighborhood dense with trees, bushes and other green vegetation may be good for the health of your heart and blood vessels," said Aruni Bhatnagar, Ph.D., lead study author and professor of medicine and director of the University of Louisville Diabetes and Obesity Center. "Indeed, increasing the amount of vegetation in a neighborhood may be an unrecognized environmental influence on cardiovascular health and a potentially significant public health intervention."

The findings were independent of age, sex, ethnicity, smoking status, neighborhood deprivation, use of statin medications and roadway exposure.

Previous studies have also suggested that neighborhood greenspaces are associated with positive effects on overall physical and psychosocial health and well-being, as well as reduced rates of death from cardiovascular and respiratory diseases, and improved rates of stroke survival, according to Bhatnagar. However, these reports are largely limited by their reliance on self-reported questionnaires and area-level records and evaluations, said Bhatnagar.

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