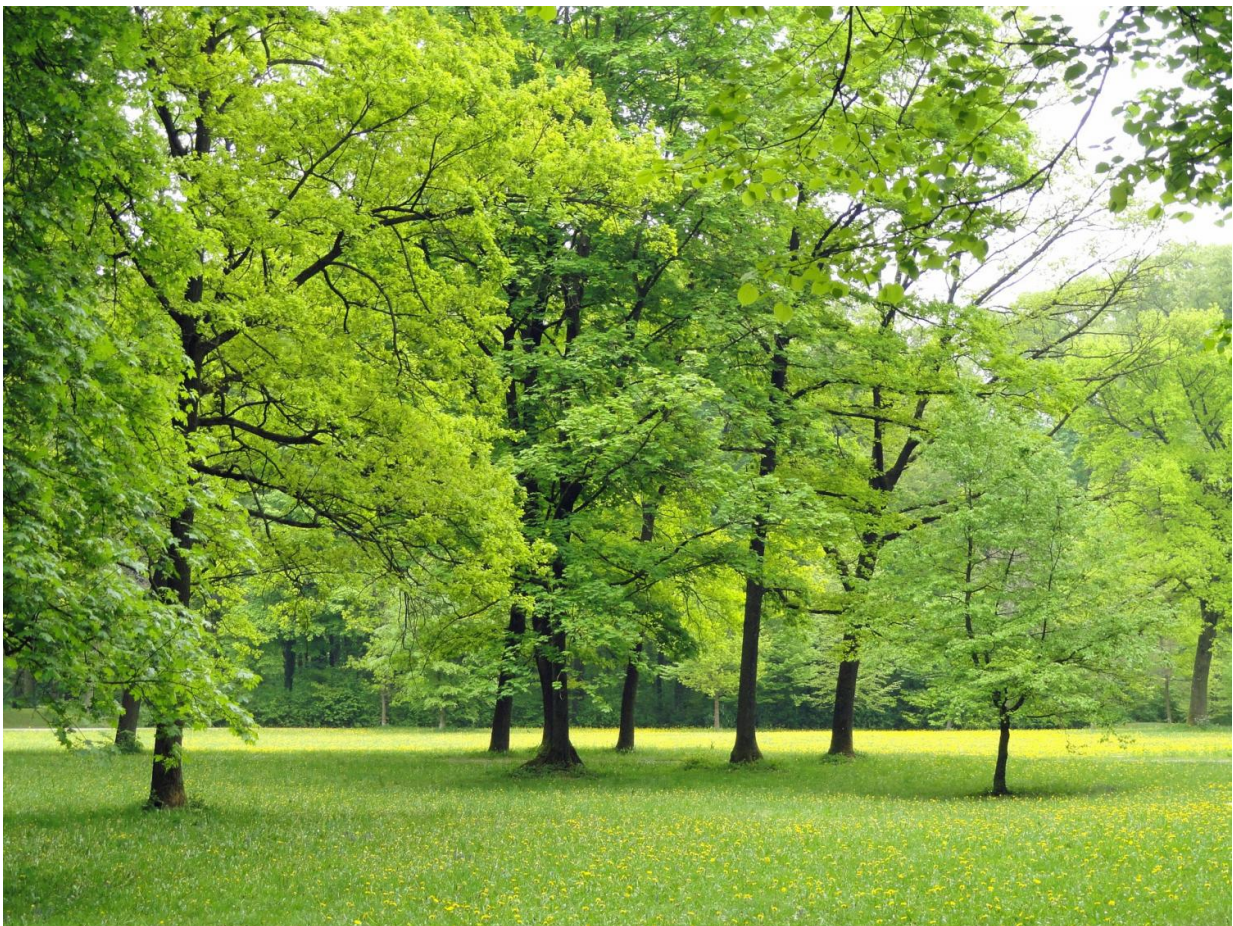


Increasing urban greenery could have prevented at least 34,000 US deaths over two decades

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Increasing greenery in US urban areas may substantially reduce mortality of all causes, according to a new study led by Boston University School of Public Health researchers.

Published in the journal *Frontiers in Public Health*, the nationwide study found that increasing green vegetation in large, metropolitan areas could have prevented between 34,000-38,000 deaths, based on data from 2000-2019. The study also showed that overall greenness in metro areas has increased in the past 20 years, by nearly 3 percent between 2000-2010 and 11 percent between 2010-2019.

The study builds upon well-established research on the [health benefits](#) of greenness by providing a quantitative value to the potential impact of urban greening initiatives on [mortality](#).

"We've known that living in greener areas can have a positive impact on our physical and mental health, but there is a lack of data on how changes in greenness distribution can affect death rates across the country," says study lead author Paige Brochu, a Ph.D. student in the Department of Environmental Health. "Our study quantifies the impact of greenness expansion in urban areas and shows how increasing green vegetation could potentially add to a person's life expectancy. Policymakers and urban planners can use this information to support local climate action plans and ensure that those plans include greening initiatives."

For the study, Brochu and colleagues utilized publicly available population data from the US Census, mortality data from Centers for Disease Control WONDER system and greenness data from NASA's Landsat satellites to conduct a nationwide health impact assessment that estimated increased green vegetation impact on all-cause mortality among adults 65 and older in 35 large US metropolitan areas. The study period focused on three distinct time periods across a 20-year span:

2000, 2010, and 2019. Using the Normalized Difference Vegetation Index (NDVI), a widely used metric that estimates the quantity of green vegetation, the researchers calculated that 34,080-38,187 elderly deaths—or about 15 to 20 deaths per 10,000 seniors—could have been prevented between 2000-2019 with a 0.1 increase in NDVI across all 35 [metropolitan areas](#).

They estimated that overall greenness increased by 2.86 percent between 2000-2010, and 11.11 percent from 2010-2019, with the largest regional increase observed in the South (from .40 percent in 2000 to .47 percent in 2019).

Brochu notes that greening may not be feasible in all cities, due to differences in climate, water sources, urbanization, and landscape, but city planners can use the study findings to examine local changes in greenness over time and develop an appropriate and effective climate action plan in their cities.

"Increasing greenness in an arid climate in the Southwest is different from increasing greenness in an urban area in the Pacific Northwest," says Brochu. "If an area's climate makes it difficult to plant lush trees, urban planners can use this greenness data as a starting point and consider other types of vegetation that may be more realistic for their local climate."

"One of the primary questions that urban planners ask is where should they implement greening, and can we quantify the impact of greening initiatives for them—because there is a cost for tree planting campaigns or shrubbery planting," says study senior author Dr. Kevin Lane, assistant professor of environmental health. "Being able to target which areas would have the highest reduction in mortality can justify these campaigns, not only as a mitigation measure, but as a way to directly improve health."

A component of this assessment also informed a case study on the health impacts of inequitable greenery distribution in Louisville, Kentucky, which was published in the 2020 report of [The Lancet Countdown](#) on climate and health. The case study estimated that a small increase in greening could have prevented 400 deaths among adults 55 and older in the Louisville metro area.

The researchers hope to further explore local changes in greenness distribution across other urban areas, and how these changes may have informed cities' climate action plans. This analysis could also be replicated globally, thanks to the satellite-based NDVI measurements, says Lane.

"One of the great benefits of using satellite-based measures is that we can compare US mortality health impact assessments to those done in Europe and other areas, so that we can understand the global impacts of mortality," Lane says. "This work will enable us to quantify whether a potential adaptation strategy for [climate](#) change could have impacts not just in our urban areas, but all over the world."

At SPH, the study was co-authored by Dr. Patrick Kinney, Beverly A. Brown Professor of Urban Health and Dr. Marcia Pescador Jimenez, assistant professor of epidemiology. The study was also co-authored by Dr. Peter James of Harvard Pilgrim Health Care and Harvard T.H. Chan School of Public Health.

More information: Paige Brochu et al, Benefits of Increasing Greenness on All-Cause Mortality in the Largest Metropolitan Areas of the United States Within the Past Two Decades, *Frontiers in Public Health* (2022). [DOI: 10.3389/fpubh.2022.841936](https://doi.org/10.3389/fpubh.2022.841936)

Provided by Boston University School of Public Health

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