



# Green Heart Project Announces STUDY RESULTS

The first-of-its-kind Green Heart Project in Louisville reached an exciting milestone in late August. Project leaders announced initial clinical results that support the study's main hypothesis: Increased urban greening decreases the risk of heart disease.

Heart disease is driven in large part by inflammation, which was lowered 13-20 percent in residents whose neighborhoods received thousands of new trees and shrubs. The additional planting in these areas more than doubled the number of trees and shrubs that were present before the project. The Nature Conservancy raised \$8.7 million in private donations and contributed scientific knowledge, important partnerships, and ongoing support for the greening intervention throughout the first six-year period of the project.

“Like many of the big, important projects we work on, Green Heart is a multi-partner, multi-year effort,” says David Phemister, TNC’s Kentucky state director. “This work has not been easy—whether planting the trees or conducting the health study—and it is beyond gratifying to see such positive results.”

A reduction in study area residents’ general inflammation, measured via a blood marker called high-sensitivity C-reactive protein (hsCRP), is associated with a decreased risk of cardiovascular disease. This blood marker is an even stronger indicator of heart attack risk than cholesterol levels. Therefore, a reduction in the levels of hsCRP is a robust indicator of a decrease in the risk of heart disease in study participants living in the greened area. The investigators speculate that

this reduction in inflammation may be related to the ability of trees to decrease the levels of air pollution.

“These results were unexpected,” says Aruni Bhatnagar, director of the University of Louisville’s Christina Lee Brown Envirome Institute and the study’s principal investigator. “We were very surprised to see these results so early. If you decrease levels of pollution, though, it doesn’t take years to see improvement. I remember my junior colleague when he first did the calculation; he couldn’t believe what he found.”

Many partners joined together to bring the Green Heart Louisville Project to life, including the University of Louisville, TNC, Washington University in St. Louis, Louisville Grows, Hyphae Design Laboratory, the U.S. Forest Service, and others.

“I am so grateful for the generous donors to this project and to our many partners, most especially Dr. Bhatnagar and his colleagues at the Envirome



Institute,” Phemister says. “Their vision and hard work are huge reasons we are celebrating these results and looking forward to many more.”

Thanks to the support of TNC’s donors and an important partnership with the environmental nonprofit Louisville Grows, the South Louisville study area received more than 8,000 mature trees and shrubs. The National Institute of Environmental Health Sciences (NIEHS) provided a \$3 million grant for the associated health study. Researchers gathered detailed measurements of tree coverage and levels of air pollution as well as biological materials such as blood, urine, hair, and nail samples and survey data from each of the study’s 745 participants. One area of South Louisville received trees and shrubs, while the rest of the study area did not. To analyze the study’s results, University of Louisville researchers compared health data for participants in the greened area to those in the control area after the trees were added.

“We found that before the plantings, there were similar rates of hsCRP among residents in the study,” Bhatnagar says. “As a result of the greening, these rates went down in residents who lived where we planted trees, and did not go down in residents in the control area. What we found was a dramatic difference. This was such a large, difficult study. To see all of these things fall into place is just incredible.”

Chris Chandler, TNC’s Cities and Strategic Partnerships Director for the Global Equitable Conservation Team, led TNC Kentucky’s role in the Green Heart Louisville project for six and a half years and continued consulting project leaders. A certified arborist, Chandler remembers talking with Christy Brown years before the study began. Brown, who would later become a major donor for the project, shared her new vision for health and her hope that TNC would expand our science to connect the environmental influences to the health of communities. She then introduced Chandler and Phemister to Bhatnagar.

“We just started dreaming,” says Chandler. “Aruni shared the research he was doing in his lab, and why he thought a rigorous approach to taking nature to neighborhoods could bring new science to the world.”

The Nature Conservancy was the right partner for Brown and Bhatnagar’s vision. Not only could TNC contribute funding and project implementation support; it also has a network with projects in more than 70 cities around the world, some of which are eager to test and validate Green Heart’s results in their own communities. The NIEHS has provided an additional \$4.6 million to continue the Louisville project for the next five years.

“I never lost sleep at night, thinking, ‘What if the science doesn’t work?’” Chandler says. “At the end of the day, even if the science had failed, the community will have benefits well into the future. I am so proud of that.”