



How Cities Can Harness the Public Health Benefits of Urban Trees

Trees are a valuable tool for improving public health in America's cities. They reduce harmful pollutants and mitigate summer air temperatures. And when residents are in close proximity to parks, it has been shown to have both physical and mental health benefits. Yet as the scientific case for the benefits of urban trees has grown stronger in recent decades, public investment in them has decreased. This paper proposes that one novel way to increase funding is to more closely link the goals and funding of the health sector with those of municipal urban forestry agencies.

For more detail on the issues raised here, read *The Nature Conservancy's white paper* at: nature.org/trees4health

Declining Investment, Dwindling Urban Tree Canopy

Cities are losing approximately four million trees each year, or 1.3 percent of the total urban tree stock.¹ The biggest reason for the decline is disinvestment. Among U.S. cities with populations of 100,000 or more, per capita tree canopy investment fell from \$7.70 in 1974 to \$5.53 just 12 years later. In the more than 30 years since, per capita spending has risen only slightly to \$5.83. That level of investment represents just 0.3 percent of overall municipal budgets.

There are four major causes of disinvestment. First is a lack of public knowledge about the importance of urban forestry. This often translates to a view that urban forestry is a “nice to have” rather than a critical investment. The second is public concern about things like fallen trees causing power outages and untended parks as a potential magnet for criminal activity. These

concerns can often be addressed by following established best practices, but limited financial resources play a role.

Another major reason for declining investment is government silos. While a range of municipal departments benefit from urban forestry, it's usually just one agency — such as the forestry office within the department of parks and recreation — that is responsible for tree planting and maintenance.

For example, the health department might want to make tree planting part of its heat mitigation plans, or frontline transportation department workers may identify tree-planting opportunities, but these departments often lack the authority to plant. Even if they have authority, they may lack the necessary funds, particularly since tree planting is not likely to be included in the metrics on which their performance is measured.

We assume here that the additional \$1.87 needed to return to the 1974 per capita investment level of \$7.70 would be sufficient to maintain the existing urban tree stock. According to The Nature Conservancy's *Planting Healthy Air* report, additional investment of \$5.87 per person would be needed to expand urban forestry to high-priority places for cooling or cleaning the air.² This hypothetical total additional per capita investment of \$7.74 would more than double current urban forestry spending, but still leave it well below 1 percent of the average budget in American cities of 100,000 or more.

The Business Case for Urban Forestry

Trees bring benefits that range from increasing property values to helping manage stormwater by partially offsetting the effects of more intense rains associated with climate change. Following, however, we will focus on the link between a more robust urban tree canopy and better public health outcomes.

Urban trees reduce concentrations of particulate matter, the most damaging type of air pollution. One study of 10 U.S. cities found that urban trees remove enough particulate matter to reduce annual health impacts by amounts ranging from \$1.1 million in Syracuse, N.Y., to \$60.1 million in New York City.³

In Louisville, Ky., a research team planted three rows of mature serviceberries, pine, cypress and cedar trees in the front yard of St. Margaret Mary Elementary School. Air quality was monitored pre- and post-planting, and 60 students and 20 adults agreed to take part in the study. An initial analysis found that study participants had increased immune system functioning and lower inflammation levels and, under certain conditions, particulate matter levels were 60 percent lower behind the buffer than on the open side of the front yard.

Another study in Los Angeles found that the more parks that were within 500 meters of a home, the lower children's body mass index was at age 18.⁴ Multiple studies have found



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Trees have a tremendous mental and physical health benefit for city dwellers. One study that looked at air pollution benefits alone found that urban trees remove enough particulate matter to reduce annual health costs by amounts ranging from \$1.1 million in Syracuse, N.Y., to \$60.1 million in NYC.

that more time spent in nature decreases stress levels and improves mental focus.

And in Oklahoma City, municipal leaders found that greening their city was an important factor in improving overall public health. As part of an initiative led by Mayor Mick Cornett, city residents collectively sought to lose a million pounds, and looked to urban nature as a solution.

“I challenged my city to get fit, and as we all grew healthier as a community, we began looking to urban green space — parks, bike lanes, shady walking paths — to encourage people to be more active,” says Cornett, mayor of Oklahoma City since 2004. “Nature has helped us meet our goal.”

Trees also mitigate summer air temperatures. Heat waves kill more people than any other weather-related source of mortality in the U.S., and they are likely to grow more intense due to climate change. Thanks to the shade they provide and water they release into the atmosphere, trees reduce summer air temperatures by an average of 2–4° Fahrenheit, although under some circumstances the cooling effect can be even larger.⁹

Improved public health outcomes have a tangible economic impact. An Analysis Group study conducted for a new white paper authored by the Group, The Nature Conservancy and the Trust for Public Land, investigates the benefits of municipal tree planting and care. The analysis of 27 U.S. cities found that in 2015 dollars, there were \$13.2 million in avoidable air pollution-related costs and \$11.9 million in avoidable time missed from work on an annual basis. Savings from eliminating these costs would cover an estimated 12.5 percent of the cost of the tree planting and maintenance needed to expand urban forestry. Another study suggests that savings from avoidable health-related costs could be as high as 30 percent in Miami, 23 percent in New York City and 19 percent in Los Angeles.

Realizing the Public Health Potential

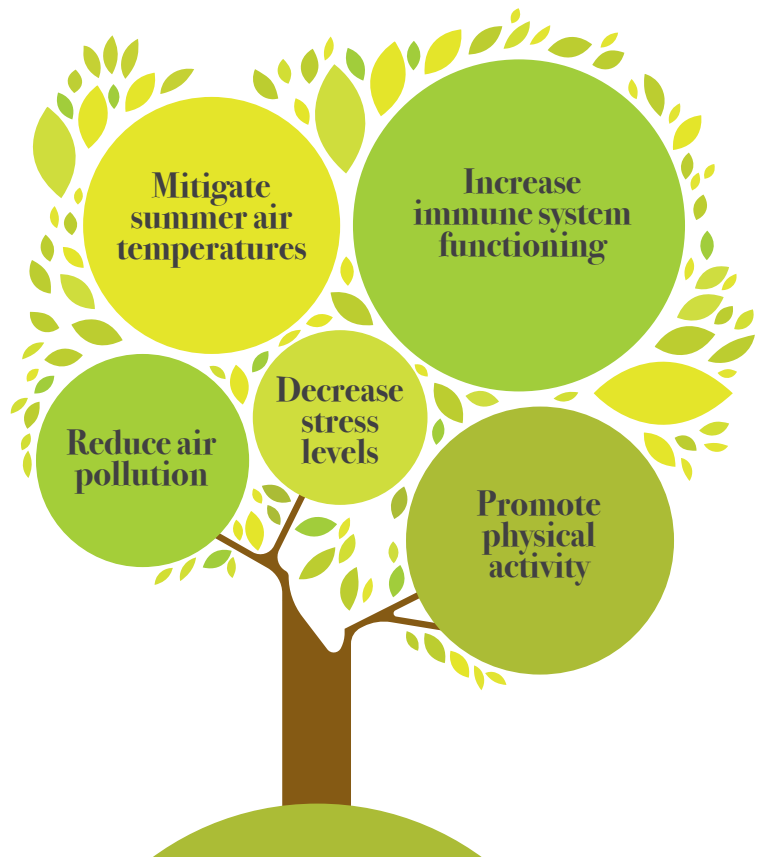
Cities can take a number of actions to expand the urban tree canopy. Minimum open space or maximum building lot coverage ratios for new development can be established by code, and policies can be implemented to create incentives for private tree planting. Ballot initiatives have been a successful tool for funding urban forestry. Since 1988, initiatives in 43 states have had a 75 percent approval rate and generated \$75 billion. Dedicated revenue streams and debt financing are additional options for funding tree planting and maintenance.

Another important action is breaking down municipal government silos. Coalitions that integrate public works, environmental protection, parks and recreation, energy and input from other areas of municipal government can serve as liaisons between departments or coordinators of efforts to ensure effective, efficient greening policies.

Comprehensive sustainability plans are another tool for making linkages between the actions of various departments and their alignment with a coherent vision. They can help balance a range of concerns and be used to better illustrate the connection between greener cities and public health.

Most importantly, funding for trees and parks should be linked to achieving health goals and objectives. To the extent

Health Benefits of Urban Nature



that urban trees reduce health costs, public and private entities that benefit should contribute to closing the urban forestry funding gap.

The federal government accounts for 29 percent of all U.S. health care spending and the states contribute another 17 percent. A transparent mechanism should be developed to transfer money from federal and state health agencies to local urban forestry agencies based on the degree to which urban forestry reduces the state and federal agency costs and helps the health agencies achieve their mission.

Municipal forestry agencies must of course be monitored to ensure they deliver the promised health benefits. In turn, the monitoring and verification of tangible improvements in public health outcomes can make local grant applications more attractive to federal and state agencies.

On the private side, the ability of urban forestry to reduce absenteeism and thereby boost productivity is of interest to all employers. But its ability to improve overall wellness is particularly appealing to health insurers.

Given the growing strength of the scientific case for The public health benefits of urban trees, it makes sense to link health sector goals and funding with those of urban forestry agencies.

A current study that is a collaboration between Kaiser Permanente and researchers from the Universities of Illinois and Nevada is examining more than four million Kaiser policyholders in Northern California to quantify the health benefits from urban trees in economic terms. It will measure proximity to and amount of tree canopy around the subscribers' homes and correlate them with their health utilization and cost data. The results will both quantify the health benefits of existing trees and improve the ability to estimate the impact of additional urban forestry investment on public health outcomes and costs.

This piece was developed and written by the Governing Content Studio, with information and input from The Nature Conservancy.

Endnotes

1. Nowak, D.J. and E.J. Greenfield, Trees and impervious cover change in U.S. cities. *Urban Forestry & Urban Greening*, 2012. 11: p. 21-30.
2. McDonald, R.I., et al., Planting Healthy Air: A global analysis of the role of urban trees in addressing particulate matter pollution and extreme heat. 2016, The Nature Conservancy: Arlington, VA, www.nature.org/healthyair
3. Nowak, D.J., et al., Modeled PM 2.5 removal by trees in 10 U.S. cities and associated health effects. *Environmental Pollution*, 2013. 178: p. 395-402.
4. Wolch, J., et al., Childhood obesity and proximity to urban parks and recreational resources: A longitudinal cohort study. *Health & Place*, 2011. 17: p. 207-214.
5. McDonald, R.I., et al., Planting Healthy Air: A global analysis of the role of urban trees in addressing particulate matter pollution and extreme heat. 2016, The Nature Conservancy: Arlington, VA., www.nature.org/healthyair

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Just as quantifying the health benefits of urban forestry will put municipal agencies in a better position to win state and federal grants, demonstrating improved public health outcomes could help urban forestry attract more philanthropic support. Nearly \$30 million was donated to the health sector in 2015, compared to just over \$10 billion to the broad category of environment and animal welfare, of which urban forestry is just a small subset.

Conclusion

This paper proposes ways to fund additional investments that will allow cities to properly maintain existing trees and reap significant public health benefits by expanding the urban tree canopy. Even with the additional public investments proposed here, urban forestry would still comprise less than one percent of the average budget in U.S. cities with populations greater than 100,000.

Given the growing strength of the scientific case for the public health benefits of urban trees, it makes sense to link health sector goals and funding with those of urban forestry agencies. To achieve this goal, city mayors will need to invest the time and effort needed to educate the public about the tangible public health benefits trees bring and the economic benefits that flow from improved public health. In addition, leaders must complete the difficult political work needed to break down municipal government silos and facilitate various agencies working together to ensure effective and efficient policies.

A green urban future is within our grasp if policymakers and others decide now to make the affordable investments that will make it a reality.