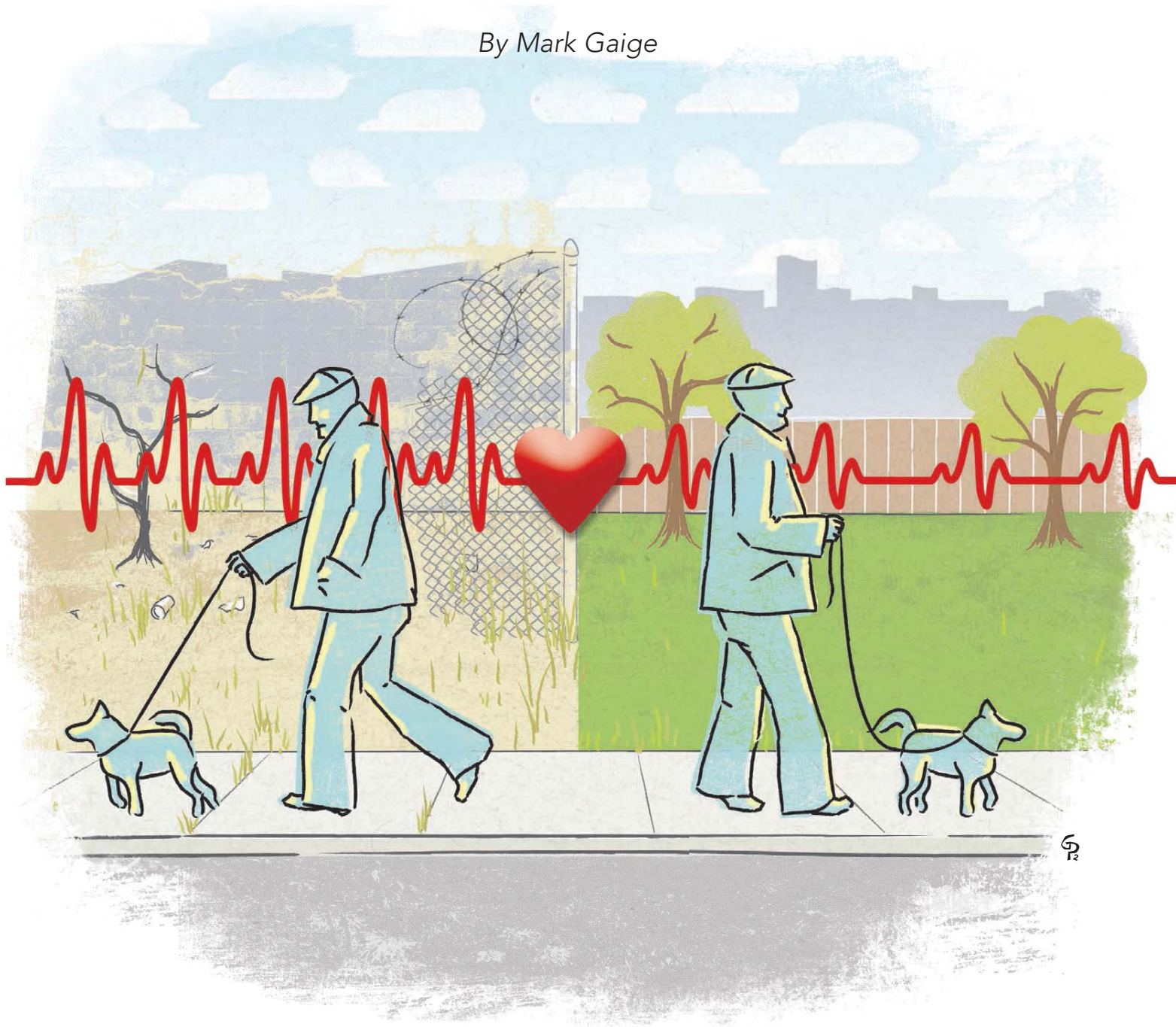


The Power of Green?

By Mark Gaige



A recent study finds that being near greened vacant lots lowers the heart rates of neighborhood residents.

The greening of vacant lots may be associated with biologic reductions in stress, according to a new study from the Perelman School of Medicine. Residents who walked near newly greened vacant lots had significantly lower heart rates than those who walked near blighted vacant lots.

The goal of the study “was to scientifically explore the connection between city environments and stress,” says its lead author, Eugenia C. South, M.D., M.H.S.P., a physician in the Department of Emergency Medicine. “We used heart rate as a physiologic marker of acute stress, and the reduction we found suggests a biological link between urban blight reduction strategies – like vacant lot greening – and reductions in stress.” The study, published online by the *American Journal of Public Health*, is the first known walking trial in a neighborhood in which a physiological marker was measured in real time for residents in their own communities.

To measure the stress response in study participants in two randomly selected Philadelphia neighborhoods, the researchers fitted them with heart-rate monitors with GPS as they went on a prescribed walk around their neighborhoods. Some vacant lots in one neighborhood randomly received a greening treatment, while the other neighborhood served as a control and received no treatment. Participants walked past vacant lots before the greening treatment of randomly selected lots and then three months after the treatment. The greening treatment, performed by the Pennsylvania Horticulture Society, is a low-cost environmental improvement that includes cleaning and removing debris, planting grass and trees, and installing a low wooden post-and-rail fence.

The average reduction in heart rates attributable to the walkers’ being in view of the greened lots was more than five beats per minute (bpm) lower than when the walkers were near the lots that had not been greened. In contrast, at the control site, there was minimal change in heart rate between the pre-time and post-time period when walking past control lots. In a second analysis, the total net reduction of heart rate when walkers were near and in view of greened vacant lots was more than 15 bpm. Walks ranged from about 1,500 to 2,000 feet in length.

These data support the conclusion that proximity to greened lots results in lower heart rates than proximity to trash-strewn lots. In response to an acute stressor, the body activates the sympathetic nervous system, which results in the release of epinephrine; that in turn increases heart rate. Thus, higher heart rates at unexpected moments and because of urban blight, which can be ubiquitous in some city neighborhoods, can be inferred to be evidence of stress. Changing heart rate has been used in a few previous studies to evaluate responses to acute stress, although primarily in indoor laboratory settings.

The current research builds on previously published findings by South and her colleagues, which found that residents living near greened vacant lots feel safer than those near sites that were not greened. “Our hypothesis in the earlier published work was that transforming vacant lots from being overrun with weeds and filled with trash to a clean and green space may make it difficult for people to hide weapons and conduct illegal activities such as drug use in or near the space,” says South. The lower heart-rate response the researchers found in the newly published study “may be tied to residents’ feeling safer and experiencing less stress from their environment.”

The study’s senior author is Charles C. Branas, Ph.D., professor of epidemiology and director of Penn’s Urban Health Lab. The research on greening urban lots, he says, “provides an important scientific impetus for urban planners and city officials to take relatively low-cost steps toward improving health

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for their residents.” In his view, future trials that dynamically measure additional biological information – such as cortisol levels (another marker of stress) and blood pressure – are now warranted to advance understanding of the relationship between stress and blighted urban environments. An earlier *Penn Medicine* (Spring 2013) presented Branas’s belief that greened lots “may do much more than just lessen crime and gun use in a neighborhood,” thus removing a threat to health. The greening projects may also help reverse “the unhealthy hunkering down of whole communities” by drawing people back more fully into their neighborhoods.

The other co-authors on the recent study are Michelle C. Kondo, Ph.D., who did her postdoctoral work at Penn and is now with the U.S. Department of Agriculture, and Rose A. Cheney, Ph.D., a Penn demographer. ▽