

Is Home Where the Heart Is?

The Role of Neighborhood in Heart Failure Risk

See Article by Akwo et al

The proverb “Home is where the heart is” has many meanings and interpretations. However, its meaning certainly incorporates the idea that a home is more than the bricks and mortar of a house, and a neighborhood is more than a cluster of houses situated near one another. Rather, home and neighborhood are places that are intimately tied to our emotions, our social networks, and even our physical health, in particular our heart health. The notion that the places we live have an impact on cardiovascular health is not new. In 1973, Harburg et al¹ linked residence in high- versus low-stress neighborhoods of Detroit with increased risk of hypertension. Building on this research, Haan et al² reported an association between living in an impoverished region and increased all-cause mortality, independent of demographic, individual socioeconomic, and behavioral factors. The landmark study by Diez Roux et al³ in 2001 found that even after controlling for personal income, education, and occupation, living in a disadvantaged neighborhood is associated with an increased incidence of coronary heart disease. Since then, many continue to build on our understanding of neighborhood stress as an independent predictor of cardiovascular health.

The outstanding article by Akwo et al⁴ in this issue of *Circulation: Cardiovascular Quality and Outcomes* makes several key contributions to our understanding of the role of neighborhood in health, specifically the risk of heart failure. Key among them is that they took a much-needed look at the association of neighborhood characteristics and risk of heart failure in a population with low socioeconomic status. By conducting this study in a predominantly low socioeconomic status population, the potential for bias from individual socioeconomic status is reduced, allowing for a direct interpretation of associations of neighborhood aspects with heart failure incidence. In fact, the inclusion of individual income and education in the models reported in the current article showed only a modest attenuation of the direct effect of more severe neighborhood deprivation and increased risk of heart failure incidence. The careful and unique population prospective cohort approach taken by Akwo et al⁴ further establishes that there indeed is something unique about neighborhoods.

This focus on an underserved population increases the article’s relevance to broad public health goals such as the American Heart Association 2020 impact goals to improve the cardiovascular health of all Americans by 20% by 2020.⁵ The American Heart Association metrics for cardiovascular health incorporate 2 key domains: health factors (blood glucose, blood pressure, and total cholesterol) and health behaviors (diet, physical activity, smoking, and body mass index). Although there is a strong scientific basis for the impact of these individual-level factors on cardiovascular health, work such as that of Akwo et al⁴ provides an

Wayne Rosamond, PhD,
MS
Anna Johnson, PhD,
MSPH

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

Correspondence to: Wayne Rosamond, PhD, MS, Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, 123 W Franklin St, Suite 410, Chapel Hill, NC 27516. E-mail wayne_rosamond@unc.edu

Key Words: Editorials ■ heart failure ■ residence characteristics ■ risk factors

© 2018 American Heart Association, Inc.

argument of additional contribution of contextual metrics such as neighborhood conditions, particularly in underserved populations. It seems reasonable to consider that to achieve bold goals such as a 20% improvement in cardiovascular health in all Americans, a better understanding of the elements of one's neighborhood that contribute to these health factors and behaviors is severely needed. One might argue that neighborhood metrics themselves could be added to future definitions of cardiovascular health.

An important methodologic challenge addressed by Akwo et al⁴ is how best to measure and define neighborhood. Akwo et al⁴ used census tracts as proxies for neighborhood, a reasonable and commonly used approach. Previous studies have found that census tracts are a robust indicator of the contextual components relating to health and that they provide distinct, complementary information to individual-level indicators.⁶ Debate continues, however, on the best method for defining residential environments and what an index of neighborhood deprivation really does (and does not) measure. There are many ways to conceptualize a neighborhood, some of which may not be captured by commonly available data resources. The neighborhood deprivation index used by Akwo et al⁴ incorporates 11 census tract-level variables in the domains of social indicators, wealth and income, education, and occupation, making excellent use of available data resources. Future work may consider broadening the definition of neighborhood to include factors such as the built environment, access to fresh food, crime levels, excess noise, traffic density, air quality, local public smoking policies, and other social and physical stressors in our residential environments. However, complete and valid data on many of these factors are scarce. Possible areas for future work in advancing options for defining neighborhood suggested by Diez Roux and Mair⁷ include greater use of spatial analysis using geographic information system simulation techniques that provide metrics characterizing the built environment and land use. Discrete event simulation modeling of complex systems to create different scenarios may yield new insights into what kind of new data are needed to continue to refine and improve the definition.

Another important contribution of the current study is that it measured risk directly through event analysis of incident heart failure cases. As accurately noted by Akwo et al⁴, using medical claims data to classify heart failure events has limitations in terms of validity and in its ability to differentiate heart failure subtypes. However, this method provides an efficient method of capturing events diagnosed in the outpatient setting, where a considerable proportion of events are identified, treated, and managed.

Yet another contribution of the article by Akwo et al⁴ is that it challenges us to consider what types of interventions can be developed at the neighborhood level to reduce the burden of heart failure. As the authors note, such upstream measures designed to address the physical, social, and emotional stressors of disadvantaged residential environments have the most potential reverse the growing burden of heart failure in the United States. Work by Akwo et al⁴ challenges us to think of new ways to broaden our definition of neighborhood to better characterize and respond to the complex systems and underlying mechanisms of the effect of home on heart.

DISCLOSURES

None.

AFFILIATION

From the Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill.

FOOTNOTES

Circ Cardiovasc Qual Outcomes is available at <http://circoutcomes.ahajournals.org>.

REFERENCES

1. Harburg E, Erfurt JC, Chape C, Hauenstein LS, Schull WJ, Schork MA. Socioecological stressor areas and black-white blood pressure: Detroit. *J Chronic Dis*. 1973;26:595–611.
2. Haan M, Kaplan GA, Camacho T. Poverty and health. Prospective evidence from the Alameda County Study. *Am J Epidemiol*. 1987;125:989–998.
3. Diez Roux AV, Merkin SS, Arnett D, Chambless L, Massing M, Nieto FJ, Sorlie P, Szklo M, Tyroler HA, Watson RL. Neighborhood of residence and incidence of coronary heart disease. *N Engl J Med*. 2001;345:99–106. doi: 10.1056/NEJM200107123450205.
4. Akwo EA, Kabagambe EK, Harrell FE, Blot WJ, Bachmann JM, Wang TJ, Gupta DK, Lipworth L. Neighborhood deprivation predicts heart failure risk in a low-income population of blacks and whites in the southeastern United States. *Circ Cardiovasc Qual Outcomes*. 2018;11:e004052. doi: 10.1161/CIRCOUTCOMES.117.004052.
5. Lloyd-Jones DM, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, Van Horn L, Greenlund K, Daniels S, Nichol G, Tomaselli GF, Arnett DK, Fonarow GC, Ho PM, Lauer MS, Masoudi FA, Robertson RM, Roger V, Schwamm LH, Sorlie P, Yancy CW, Rosamond WD; American Heart Association Strategic Planning Task Force and Statistics Committee. Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association's strategic Impact Goal through 2020 and beyond. *Circulation*. 2010;121:586–613. doi: 10.1161/CIRCULATIONAHA.109.192703.
6. Diez-Roux AV, Kiefe CI, Jacobs DR Jr, Haan M, Jackson SA, Nieto FJ, Paton CC, Schulz R, Roux AV. Area characteristics and individual-level socioeconomic position indicators in three population-based epidemiologic studies. *Ann Epidemiol*. 2001;11:395–405.
7. Diez Roux AV, Mair C. Neighborhoods and health. *Ann N Y Acad Sci*. 2010;1186:125–145. doi: 10.1111/j.1749-6632.2009.05333.x.

Is Home Where the Heart Is?: The Role of Neighborhood in Heart Failure Risk Wayne Rosamond and Anna Johnson

Circ Cardiovasc Qual Outcomes. 2018;11:

doi: 10.1161/CIRCOUTCOMES.117.004455

Circulation: Cardiovascular Quality and Outcomes is published by the American Heart Association, 7272
Greenville Avenue, Dallas, TX 75231

Copyright © 2018 American Heart Association, Inc. All rights reserved.

Print ISSN: 1941-7705. Online ISSN: 1941-7713

The online version of this article, along with updated information and services, is located on the
World Wide Web at:

<http://circoutcomes.ahajournals.org/content/11/1/e004455>

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Circulation: Cardiovascular Quality and Outcomes* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the [Permissions and Rights Question and Answer](#) document.

Reprints: Information about reprints can be found online at:
<http://www.lww.com/reprints>

Subscriptions: Information about subscribing to *Circulation: Cardiovascular Quality and Outcomes* is online at:
<http://circoutcomes.ahajournals.org/subscriptions/>