JAMA Network Open

Invited Commentary | Environmental Health

Historical Structural Barriers and Cardiovascular Inequities

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This study by Deo and colleagues[1] investigates the associations between historical neighborhood redlining and major adverse cardiovascular events (MACE) among veterans in the United States. Redlining is a discriminatory practice in which services and investments are withheld from neighborhoods because of the racial or ethnic composition of the residents; these neighborhoods often are characterized by having significant numbers of low-income residents. The study[1] followed up a large cohort of veterans for 4 years and found that living in a redlined neighborhood was associated with long-term adverse outcomes, such as myocardial infarction, other MACE, and subsequent mortality when adjusting for demographics, social vulnerability, and comorbidity burden. Cardiovascular events generally occur as a result of disease progression over the course of time. Even sudden events, such as ischemic stroke caused by plaque ruptures, are the result of years of plaque build up. Accumulated exposures to poverty, pollution, and other adverse social impacts are increasingly found to decrease life expectancy and put individuals at higher risk for chronic diseases.[2] These adverse exposures are associated with where individuals are born, raised, and continue to live; thus, neighborhood redlining is a clear place to begin investigating associations with cardiovascular events.

The findings from Deo and colleagues[1] are similar to previous studies that have shown that living in redlined neighborhoods is associated with other chronic diseases, such as coronary artery disease and chronic kidney disease. Deo and colleagues[1] investigated redlining and MACE in the Veterans Health Administration, which is a capitated system. Therefore, unlike other studies, the study by Deo and colleagues[1] takes into account health care barriers, like cost. The identification of an association between historical neighborhood redlining and MACE in veterans further supports the impact that long-term structural barriers have on clinical outcomes, above and beyond traditional risk factors, such as age. The results by Deo and colleagues[1] add to the foundation of understanding of the impact that the environments in which people live can have on their health. Moreover, this study provides the opportunity for researchers, policy makers, and clinicians to use these data in meaningful ways to create actionable movements to decrease disparities.

We highlight 2 points that require further attention if we are to truly address structural barriers and health inequities: first, the incorporation of redlining in clinical practice as a measure of structural barriers and an independent correlate of poor outcomes and second, the need to consider that these structural barriers are not static and can change over time. We must move beyond describing structural inequities to providing opportunities for clinicians to intervene on these measured adverse social determinants of health (SDOH), such as neighborhood redlining.

It is unfortunately common to observe disparities in cardiovascular events in the United States. To better understand these disparities, it is essential to take a multilevel approach. Generally the focus tends to be more on the patient, followed by clinicians and the health care system; however, as demonstrated by Deo and colleagues,[1] there is a need to consider environment as well. Examining neighborhood and built-environment factors, such as historical redlining, is a prudent first step to investigating these observed health disparities in cardiovascular diseases, and it provides opportunities to improve clinical care. It is important to note that Deo and colleagues[1] provide a method to consider redlining in conducting observational data analyses and that redlining assessment is distinct from assessing rurality status using geocoding.

While redlining is no longer legal, the long-term impact of this practice is still experienced. Redlining neighborhoods is a longitudinal adverse exposure that creates disparities and negative

outcomes over the course of time. When Deo et al[1] adjusted for commonly accepted risk factors, like age, race, sex, social vulnerability, and comorbidities, the associations remained statistically significant but were markedly attenuated, which suggests that more than just current neighborhood environment may be causing these disparities. This study by Deo et al[1] raises questions on how clinicians can screen for and triage patients experiencing these disparities, especially when studies[3] have shown that triaging based on race or other demographics has exacerbated racial inequities by disproportionately denying care to Black patients? One recommendation is to use correction factors[4] based on Area Deprivation Index (ADI) or historically redlined neighborhoods, as the study by Deo and colleagues[1] would suggest. These correction factors would be added to the triage scores of patients based on highly disadvantaged neighborhoods, such as historically redlined neighborhoods.[4] These patients could then be prioritized for certain treatments and other services, which would target structural inequities rather than simply triaging based on race or other sociodemographic characteristics.

This system of screening for redlining, triaging, and then ultimately matching SDOH resources is a possible avenue for clinicians to improve care for these disadvantaged populations. This awareness can lead to action that may prove beneficial and even life-saving. Clinicians have the ability to advocate for their patients in a way that could increase access to assistance programs. Furthermore, clinicians can participate in social prescribing for disadvantaged patients.[5] Social prescribing is a practice in which clinicians refer patients to resources available within their community to support their health and well-being. It is not only the responsibility of the clinicians; health care practices and health systems must provide clinicians with support for practicing in a manner that addresses structural inequities. Generating lists of local agencies and supporting community health groups is also the responsibility of the system, so patients are provided with the necessary support to improve their health.

The study by Deo and colleagues[1] is an excellent starting point for understanding how living in redlined neighborhoods is associated with risk of MACE. This foundational knowledge presents researchers with opportunities to dive deeper to explore the root causes of cardiovascular disease that could in turn point to improved treatment. Furthermore, these findings present clinicians and health care systems with an opportunity to screen patients who may be at higher risk for MACE so that they can triage and target treatments appropriately. Ultimately, these findings present policy makers with evidence of the persistent harmful outcomes associated with redlining neighborhoods and point to the need to undo the harms that these historical practices have and continue to have in furthering health disparities.

ARTICLE INFORMATION

Published: July 11, 2023. doi:10.1001/jamanetworkopen.2023.22673

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Conflict of Interest Disclosures: Dr Bosworth reported grants from Sanofi, Boehringer Ingelheim, Novo Nordisk, Be Better Therapeutics, Otsuka, Novartis, Improved Patient Outcomes, Esperion, Pfizer, and the Elton John Foundation paid to Duke University and personal fees from Walmart and VIDYA outside the submitted work. No other disclosures were reported.

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