Disparities in health care and health outcomes are largely the consequences of historical and contemporary structural inequities, which act in complex, mutually reinforcing ways upon communities and individuals. The implementation of clinical protocols holds potential to standardize medical care and treatment for all. However, the true impact of such policy changes can be known only through ongoing assessment.

In this issue of *JAMA Network Open*, Hsia et al\(^1\) sought to determine whether efforts to improve access, treatment, and outcomes for patients with ST-elevation myocardial infarction (STEMI) by means of cardiac care regionalization were associated with widened or narrowed disparities between minority and nonminority communities at the zip code level across the state of California. Access was defined as admission to a hospital with percutaneous coronary intervention (PCI) capability; treatment was defined as receiving coronary angiography or PCI (as clinically indicated) the day of admission or at any time during hospitalization; and outcomes were defined as all-cause mortality at 30, 90, or 365 days. Minority communities were defined as those zip codes wherein the share of Black or Hispanic residents were in the top tertile of the overall California distribution.\(^1\)

The investigators employed a quasi-experimental, population-based approach using observational study data to measure the differential outcomes associated with regionalization among different communities and included 139,494 patients with STEMI from 2006 to 2015. Importantly, data were included from local emergency medical service (EMS), zip code–level population statistics from the 2010 US Census, and hospital facility records.\(^1\) There might be a limit to the improvements in access to PCI as their analysis determined that regionalization was associated with slightly improved access to PCI-capable hospitals regardless of race. However, in minority communities the improvement in access was 28.9% less when compared to nonminority communities. Regionalization was also associated with improvements in same-day PCI and in-hospital PCI, but patients in minority communities experienced only 33.3% and 15.1% of those benefits, respectively. Only White patients in nonminority communities experienced mortality improvement after regionalization.\(^1\)

Initiatives that might potentially advance health equity by narrowing health disparities often contend with labyrinthine structural barriers. A 4-tiered measurement framework has been proposed to help to set standards and benchmarks for realizing health equity.\(^2\) The framework comprises measurements in the realms of access (Level 1), transitions of care (Level 2), quality of care (Level 3), and socioeconomic/environmental impact (Level 4).\(^2\) Applying this framework to health equity interventions is intended to identify priorities and achieve greater impact. We will apply it here to explore the disparate benefits of STEMI regionalization and the possible structural, institutional, and interpersonal causes for the observed disparities.

In the framework, Level 1 measures access.\(^2\) The work of Hsia et al\(^1\) revealed that STEMI regionalization in California did not yield more equitable access. One potential explanation for this offered by the investigators is the difference in EMS use in minority communities vs nonminority communities. By using EMS, patients can be more quickly routed to PCI-capable hospitals for STEMI. However, the knowledge that EMS may be expensive and require out-of-pocket payment can deter patients and their families from calling EMS. Minority communities in the study had higher percentages of individuals receiving Medicaid, lower median per capita income, and higher...
proportions of inhabitants living in low-income zip codes; these factors can translate into disparate PCI access.

Level 2 of the framework refers to transitions of care, which broadly includes whether patients will be offered services equitably as they transit the health care system. In the analysis, receipt of same-day PCI or PCI during the hospital stay constitutes a measure of transitions. Patients with STEMI from minority communities were less likely to receive same-day PCI or PCI during their hospital stay even after gaining access to a hospital with PCI capability. Potential explanations for this disparity could be both institutional and interpersonal. STEMI regionalization facilitates access to hospitals that perform PCI but does not ensure that these hospitals are of comparable quality or ability. Prior investigations have shown that low-quality hospitals care for disproportionate shares of minority patients.

Interpersonal factors, such as practitioner bias and medical mistrust, might have also contributed to disparities in the receipt of PCI. Hsia et al demonstrated the downward trend in the receipt of PCI in Black and Hispanic patients compared with White patients within the same communities. The literature has described differential treatment recommendation based on patient race alone, even with identical presenting symptoms—the selection for cardiac catheterization is one example. These findings suggest that patient race can be a factor associated with the likelihood of receiving standard of care treatment. Practitioner bias in treatment decision-making is an important factor in health disparities. Additionally, the exploitation of Black Americans was normative in medical institutions for most of US history; Black individuals were routinely subjected to nonconsensual, nontherapeutic research. As a result, minority patients may be more likely to decline procedures offered to them.

Level 3 assesses the quality of care, which was measured by 30-day, 90-day, and 1-year mortality rates in this analysis. Only White patients living in nonminority communities experienced a survival benefit after cardiac care regionalization. This result highlights the likely impact of the social determinants of health, including structural and interpersonal racism. Minority communities had less favorable socioeconomic and demographic profiles than the nonminority communities. Structural racism—the totality of ways in which societies foster racial discrimination through mutually reinforcing systems of housing, education, employment, earnings, benefits, credit, media, health care, and criminal justice—underlie these disparities. At the interpersonal level, racial and ethnic differences in mortality in nonminority communities likely reflect, in part, the well-documented negative effects of the everyday discrimination perceived by minorities on their health outcomes. The persistence of intracommunity mortality disparities by race—even when comorbidities and major social determinants of health such as housing quality, income level, employment status, educational attainment, food security, personal safety, environmental quality, and recreational opportunities are interracial comparable—lends credence to the postulation that racism itself is a social determinant of health and a fundamental cause of health disparities.

Measures of socioeconomic and environmental impact (Level 4) evaluate the effect of interventions on communities, beyond the level of individual patients. For example, STEMI regionalization may contribute to the closure of smaller hospital centers without PCI capability, which can cause untoward effects on noncardiac community health, employment opportunities, and per capita income. Although Hsia et al did not explicitly analyze socioeconomic and environmental measures, they deftly conveyed the results of an intervention that was associated with some benefit but also with a paradoxical exacerbation of extant disparities in STEMI care in minority communities.

Structural and policy changes that can advance health equity in the US must frequently contend with systemic inequities woven into the country’s very fabric, many of which persist in muted or mutated form still today. The methodological design of the analysis of Hsia et al helped to elucidate some of the complex associations among health disparities, health care policies, structural inequities, and community-level and individual-level impacts. More analyses with these similar aims are warranted to continue to advance the aims of health equity.
ARTICLE INFORMATION
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REFERENCES