

## Black-White Disparities: More Than Just Race

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*“... ill and unfit choice of words wonderfully obstructs the understanding.”*

— *Novum Organum Scientiarum* (published in 1650), Francis Bacon

The 1997 standards of the US Office of Management and Budget provide guidance for the minimum number of categories for collecting and reporting data on race and ethnicity.<sup>1</sup> These race and ethnicity categories are important for programmatic and policy decisions at the federal, state, and local levels. They help us assess disparities in health and health care. Naturally, when black-white disparities in health are observed or other health disparities are noted by race, they are termed racial disparities and often attributed to race. But what is race, what does the attribution to race mean, and how should it inform actions needed to address the elimination of disparities? Two lines of reasoning provide help in answering these questions.

First, it is now widely accepted that race is a social, cultural, political, and legislative construct. It is neither a biological variable nor a construct grounded in the “empiricism of modern biology.”<sup>2</sup> Nevertheless, racial categories are invaluable in biomedical research that seeks a greater understanding of the social, environmental, economic, geographic, and cultural factors that drive disparities in outcomes in specific population groups.<sup>3</sup> More important, there are clearly biological determinants that differ among people of different self-identified race or ethnicity. Many of these factors remain incompletely understood and may reflect epigenetic, metabolomic, proteomic, and other mechanisms in continuous interaction with

individual, social, environmental, and structural factors.<sup>4</sup> As Bonham et al have correctly pointed out, the imprecise use of these categories in biomedical research, especially in genomics research, has the potential to lead to confusion and miscommunication as well as perpetuate the “misguided notions that discrete genetic groups exist.”<sup>4</sup> Words matter, and as Francis Bacon put it, the “ill and unfit choice of words wonderfully obstructs the understanding.” In health disparities attribution, we need words and terminology that lead to a greater understanding and inform necessary action.

Second, racial categories are heavily confounded by income, education, socioeconomic status, neighborhood characteristics, perceived racism, environmental exposures, access to health care, and other social determinants of health.<sup>5,6</sup> Although rigorous studies are typically designed to control for these confounders, the issue of residual confounding remains problematic.<sup>7</sup> For example, in the case of socioeconomic status (SES) and health in blacks and whites, Kaufman et al identified 4 potential sources of residual confounding and concluded that the effect of residual confounding is to “bias interpretation of data toward the conclusion of independent racial/ethnic group effects.”<sup>7</sup> Thus, even in studies that control for confounding, the attribution of disparities to race may be in error. When not in error, the attribution of health disparities to race leaves us with limited options for proven effective interventions for addressing race, per se, in strategies to reduce or eliminate disparities.

### Modifiable Root Causes of Disparities

To make further progress in research efforts to address health disparities, it is important for us to pay attention to the root causes that shape health outcomes and related disparities.<sup>8,9</sup> Identifying modifiable root causes provides a starting point for interventions likely to succeed in eliminating disparities. It is in this regard that the study published in this issue of the *Journal of the American Heart Association (JAHA)* is instructive.<sup>10</sup> The study subjects were participants from the PRIME-GGAT (Pharmacogenomic Resource to Improve Medication Effectiveness Genotype Guided Antiplatelet Therapy) study. In this prospective cohort of adults, aged  $\geq 18$  years, undergoing percutaneous coronary interventions (PCIs) and followed up for up to a year, Cai et al set out to examine the black-white

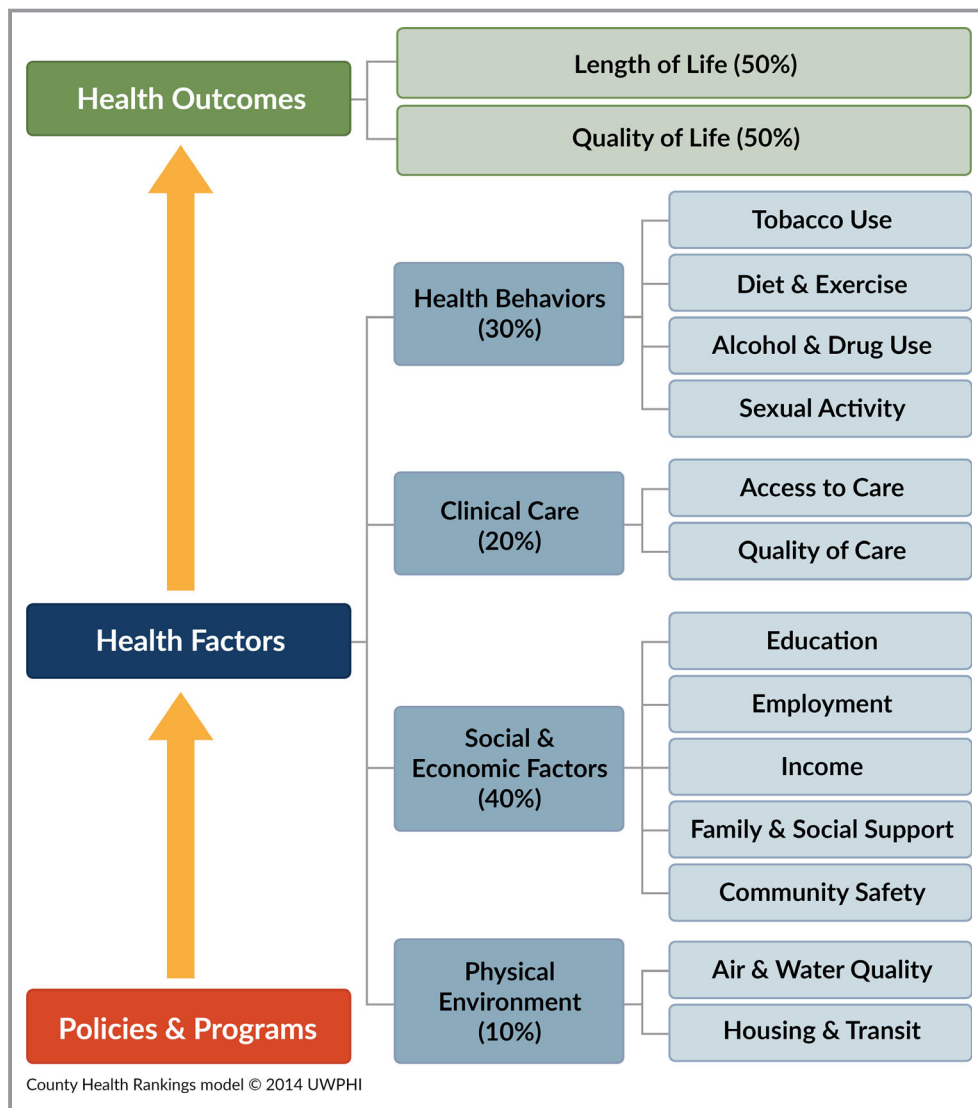
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**Figure.** The many factors that play a role in determining an individual's health outcomes. Reproduced with permission from the University of Wisconsin Population Health Institute. County Health Rankings & Roadmaps, 2019, <http://www.countyhealthrankings.org>.

racial disparities in the risk of major adverse cardiovascular events (MACEs) and major hemorrhage (HEM) after PCI.<sup>10</sup> MACE outcomes were defined as a composite of all-cause mortality, nonfatal myocardial infarction, nonfatal ischemic stroke, transient ischemic attack, and stent thrombosis. HEM outcomes were defined as a composite of intracranial hemorrhage and/or gastrointestinal and other hemorrhage that cause substantial hemodynamic compromise requiring treatment.<sup>10</sup> Adjudication of MACE and HEM outcomes was performed by independent cardiologists.

More important, Cai et al<sup>10</sup> performed sequential cumulative adjustment analyses to identify the clinical and nonclinical factors contributing to disparities. They explored the influence of several factors across 6 domains including demographics, SES, comorbidities, coronary heart disease

(CHD) severity, treatment received during PCI, and medication use at follow-up. Their primary findings included a near 2-fold statistically significant higher incident rate in blacks for MACE (34.1% versus 18.2% per 100 person-years;  $P<0.001$ ) and for HEM (17.7% versus 10.3% per 100 person-years;  $P=0.02$ ), with corresponding incident rate ratios of 1.9 and 1.7 for MACE and HEM, respectively.<sup>10</sup> Most important, black race was not significantly or independently associated with outcomes after adjustment for clinical (comorbidities and CHD severity) and nonclinical (socioeconomic) factors; rather, differences in SES, comorbidities, and CHD severity accounted for the black-white differences.<sup>10</sup>

These findings are important. They demonstrate that what appears at first glance as black-white racial disparities in post-PCI complications are not caused by race, but actually

**Table.** Framework for Eliminating Cardiovascular Health Disparities

| Domain                          | Elements   |
|---------------------------------|--|
| A. Strategic imperatives        | <ol style="list-style-type: none"> <li>1. Accelerate health impact in disparate populations</li> <li>2. Advance policy and systems change</li> <li>3. Form strategic multidisciplinary partnerships</li> <li>4. Expand community-based participatory research and research translation</li> <li>5. Collect healthcare data by race, ethnicity, and disparities indicators</li> <li>6. Ensure a diverse clinical and public health workforce</li> </ol>   |
| B. Focal areas                  | <ol style="list-style-type: none"> <li>1. Access to health care</li> <li>2. Quality of health care delivered</li> <li>3. Patient preferences, healthcare use, and adherence</li> <li>4. Culture, lifestyles, and personal behaviors</li> <li>5. Regulations, policies, and systems of care</li> <li>6. Geographic and environmental influences</li> <li>7. Income and educational levels</li> <li>8. Prejudice, discrimination, and bias</li> <li>9. Psychosocial stressors</li> <li>10. Biology, genomics, and gene-environment interactions</li> </ol> |
| C. Major public health settings | <ol style="list-style-type: none"> <li>1. Communities, cities, counties, regions, and states</li> <li>2. Schools and colleges</li> <li>3. Work sites of small and large businesses</li> <li>4. Hospitals, clinics, physicians' offices, and emergency departments</li> <li>5. Faith-based settings (eg, churches, synagogues, and mosques)</li> <li>6. Centers for training health professions</li> </ol>  |

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attributable to preventable, treatable, or controllable root causes within clinical and nonclinical domains. The findings show that black-white differences in SES and CHD severity underlie the excess MACE in blacks, whereas SES, clinical comorbidities, and CHD severity account for greater risk of HEM in blacks. The results also demonstrate that black-white disparities in outcomes caused by differences in treatment received can be attenuated with implementation of similar treatment protocols. In fact, specific interventions at multiple levels across clinical and nonclinical domains will be invaluable in efforts to reduce and eliminate disparities in cardiovascular outcomes. To be successful, however, the magnitude and intensity of these interventions need to be tailored to the magnitude and extent of the differences in underlying clinical and nonclinical factors.

## Upstream, Midstream, and Downstream Factors

The underlying clinical and nonclinical factors are part of myriad variables that play a role in determining an individual's health outcomes (Figure),<sup>11</sup> and in the case of PCI, the extent of postprocedural complications. A recent National Academy of Sciences, Engineering, and Medicine workshop report highlighted the upstream, midstream, and downstream factors that represent a continuum between the social determinants of health (upstream), nonclinical social needs (midstream), and clinical (downstream) factors.<sup>12</sup> A greater burden of clinical cardiovascular and cardiometabolic disease and risk factors as well as clinical comorbidity in blacks compared with whites constitute "downstream" factors that predispose to a greater risk of complications and adverse cardiovascular outcomes in blacks.<sup>13–15</sup> The nonclinical social needs as well as social determinants of health, including educational attainment, employment, income, family and social support, and community safety, constitute the upstream factors that address the root causes of health disparities, especially at the population level (Figure).<sup>11</sup> Not surprisingly, Cai et al<sup>10</sup> demonstrated that it is the combination of SES, clinical comorbidities, and CHD severity, and not black race, that were the key contributors to the racial disparities in HEM. Similarly, SES and CHD severity were the 2 key contributors to racial disparities in MACE.<sup>10</sup>

## A Framework for Action

In 2005, 6 strategic imperatives and a framework for action were proposed as a way forward for eliminating disparities in cardiovascular health (Table).<sup>16</sup> The key elements of the framework remain highly relevant today as they were nearly a decade and a half ago. The framework called for innovative and comprehensive interventions built on a foundation of sound clinical and public health science and the formation of strategic partnerships with communities, community-based organizations, state and local governments, and public and private partners from both health and nonhealth sectors.<sup>16</sup> To make this framework relevant for addressing black-white disparities in MACE and HEM in patients undergoing PCI, additional emphasis on strategies and tactics for the downstream clinical factors become important.<sup>11,12</sup>

## Conclusions

Black-white disparities in cardiovascular outcomes are commonly caused by identifiable root causes that manifest at the patient, provider, health system, and broader socioeconomic and environmental levels. Factors at each of these levels are

complex, interact, and are often heavily influenced by long-standing lifestyle, behavioral, or institutionalized practices. Carefully tailored, multifaceted implementation strategies that use proven-effective interventions at multiple levels are required for successful and sustained reduction and elimination of these cardiovascular health disparities. In the process, continued collection and reporting of self-reported race, ethnicity, ancestry, and the social determinants of risk and outcomes for cardiovascular disease will be invaluable for clinical practice and research.<sup>17,18</sup>

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## Disclosures

None.

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