

## Race, Health Care Algorithms, and Precision Health Equity

In 2020, the lethal force inflicted on George Floyd, Breonna Taylor, and Ahmaud Arbery, and that of COVID-19 in racial and ethnic communities, woke the United States, unearthing racism deeply engraved into the foundational bedrock of American society. Events reignited advocacy for the sanctity of Black human lives and elimination of centuries of structural injustice at a level not seen since the 1960s civil rights movement. Activism grew in medical schools and health care institutions, places entrusted to discover threats to restore and preserve human health. A target became race in clinical algorithms: logical arithmetic tools clinicians use to diagnose, prognosticate, and allocate medical care (1). Activists asserted that algorithms such as those used in diagnosing kidney disease are harming health rather than adding value or precision equity (1-3). Nearly overnight, arguably without comprehensively examining evidence, some institutions jettisoned use of race in algorithms (1), often by normalizing Black persons to a White population standard (for example, algorithms for glomerular filtration rate [GFR] estimation) and casting doubt on data contributed by Black persons in robust, ethnically representative studies (2). Now, 4 years later, in a review petitioned by members of the U.S. Congress, Siddique and colleagues (4) attempt to settle an impassioned debate on 1) whether use of race in clinical algorithms has affected racial and ethnic disparities and been harmful or beneficial to the health and medical care of people of color and 2) whether there are effective strategies to abate any identified harms.

To address these questions, unlike opinion and narrative reviews, Siddique and colleagues systematically searched 12 years of literature, used standardized criteria for in-scope studies, extracted outcomes data, and examined bias and attention to health equity. In their final analysis, which was qualitative in nature because of the heterogeneity in study designs, racial and ethnic populations, clinical conditions, settings, and outcome measures, the effect of algorithms was not consistent across 63 studies. Across many areas of medicine, some studies showed reductions in disparities, others perpetuation or exacerbation, and still others no effect on outcomes.

Despite appreciation of this ambitious task and diligence in applying rigorous methods, the quality of evidence found is disappointing. More than four fifths of the studies were designed as simulations. Modeling what might happen in clinical practice does not tell us what actually happens to patients when an algorithm is used in care where influences, including the behaviors of people or the system, may either protect or harm outcomes. Forecasting studies, useful for some purposes, are seductive because they are inexpensive and relatively quick to perform using existent data. However, projected outcomes are susceptible to

biases. Many studies are framed to uncover the negative versus the full range including positive or neutral impacts, and some negative results are likely to be filtered out by publication bias. Indeed, all and three quarters of studies for Key Questions 1 and 2, respectively, were deemed to have high or moderate risk of bias. Only one study was a randomized clinical trial. Barely a handful used a pre-post design as used in a recent analysis, disqualified from this review, of national comprehensive data finding no negative impact on disparities in rates of preemptive waitlisting or kidney transplantation after introduction in 1999 of race to kidney function equations (5). Relying on weak simulation study designs is hardly the type of evidence we strive to use to make important health policy decisions.

If inferences discovered in this body of literature hold true—forgiving weak study designs and other limitations such as study of only approximately 21 of 47 race-based algorithms in practice (6), not knowing how participant race was determined, excluding robust development studies addressing rationale and accuracy using gold standards (for example, measured GFR), and including mitigating strategies not accessible in practice—then clinical algorithms using race are tools that can have benefits as well as side effects, even within the same algorithm. These are important tradeoffs for which both clinicians and policymakers must be aware. Furthermore, multiple strategies to advance precision equity are possible.

As Dr. Martin Luther King Jr. epitomized, advocacy and nonviolent protest are important in educating a misinformed public and pivoting society in a just and equitable direction. However, blind advocacy and reflexive action, without attention to the careful synthesis of rigorous evidence described herein, create casualties in medical decision making and likely in patient outcomes. Two societies among the first to address race, the National Kidney Foundation and the American Society of Nephrology, used an evidence-based approach coupled with equity values to rescue misinformed jettisoning or removal of race from kidney function algorithms and recommended a new, equitable equation (7), one that recognizes the importance of including Black persons and those from other racial groups long excluded from research and the distributive effects of manipulating an algorithm on the number of people at different levels of disease severity who might experience a harmful or beneficial outcome. Reinforced by Siddique and colleagues, those of us in the medical profession owe such a balanced approach to our patients.

What should we do now? First, we should recognize that the quest for precision health equity is more than the symbolic, controversy-igniting, race-based clinical algorithms catalyzing this report. Our focus should not

be diverted from powerful upstream and downstream drivers that poison equitable health care or from infusing effective antidotes (8). These drivers include the way society has been structured for centuries (for example, inequitable distribution of resources), poor access to care for some racial and ethnic groups, environmental influences on genetic variation coupled with population migration (3), and the way people of color are often treated and feel in the physician-patient relationship, for which shared identity in that relationship is elusive given too few physicians of color in training, reflecting population demographics. Second, if we focus on clinical algorithms, or other decision-making processes in clinical practice, we should encourage, fund, and engage in higher-quality research than that described in this report in concert with the use of strong guiding principles (9), particularly for mitigating strategies such as replacing race with socioeconomic status, discrimination, skin color, or other variables. Third, this study highlights medicine's complexity and how crucial it is to engage professional society members, who best understand their specialties, to examine the history, science, and circumstances of conditions they treat and the nuances in how evidence is generated.

The aftershocks of 2020 continue with the use of race still being debated, reconsidered, and transformed in every corner of medicine. The National Academies of Science, Engineering, and Medicine are comprehensively assessing the use of race in biomedical science (10). In a perfect society, race should not matter. Let's hope all of these efforts achieve precision health equity with better care and outcomes for beleaguered communities too long harmed and neglected.

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