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Misrepresenting Race — The Role of Medical Schools in Propagating Physician Bias

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Conceptions of race have evolved and become more nuanced over time. Most scholars in the biologic and social sciences converge on the view that racism shapes social experiences and has biologic consequences and that race is not a meaningful scientific construct in the absence of context.[1-3] Race is not a biologic category based on innate differences that produce unequal health outcomes. Rather, it is a social category that reflects the impact of unequal social experiences on health. Yet medical education and practice have not evolved to reflect these advances in understanding of the relationships among race, racism, and health. More than a decade after the Institute of Medicine (IOM, now the National Academy of Medicine, or NAM) issued its report *Unequal Treatment*, racial/ethnic disparities in the quality of care persist, and in some cases have worsened.[4] Such inequalities stem from structural racism, macrolevel bias intrinsic in the design and operations of health care institutions, and implicit bias among physicians.[4,5] The majority of U.S. physicians have an implicit bias favoring White Americans over Black Americans, and a substantial number of medical students and trainees hold false beliefs about racial differences.[6-9]

These widespread problems are reflected in the fact that race is one of the most entrenched and polarizing topics in U.S. medical education. Efforts to advance health equity in medical education have ranged from implicit-bias training to supplementary curricula in structural competency, cultural humility, and antiracism.[10-12] Researchers have highlighted the domains of misuse of race in medical school curricula and their potential role in propagating physician bias.[13-15] In examining more than 880 lectures from 21 courses in one institution's 18-month preclinical medical curriculum, we found five key domains in which educators misrepresent race in their discussions, interpretations of race-based data, and assessments of students' mastery of race-based science.

Indeed, in all the authors' home institutions we found similar misrepresentations of race.[15] Social medicine or equivalent courses discuss race in a nuanced manner, but misrepresentations arise in all other courses, including organ-system blocks and basic science classes. Consideration of these five domains in the preclinical curricula (Table 1) inform our recommendations for correcting content that may reinforce or instill race-based biases (Table 2).

FOUNDATIONS: SEMANTICS

Finding a shared language for discussing race and health disparities is an important first step in transforming the use of race in medicine. Commonly, the lectures still referenced antiquated labels such as "Caucasian" or used social racial labels such as "Black," "African American," and "Asian" in an inconsistent way to convey biologic information. For example, lecturers used "African American" to describe anyone with African ancestry, disregarding differences between first- and second-generation immigrants from the Caribbean or Africa and those whose ancestors were enslaved in the United States. The category "African American" is a socially and politically meaningful identity for many people, but not for all people of African descent. Moreover, it is a poor proxy for

Table 1. Misrepresentation of Race in Preclinical Curricula.

Domain	Description	Representative Examples
Semantics	Using imprecise and nonbiologic labels that inaccurately conflate race and ancestry	Widespread use of "Caucasian," "Black," "African American," and "Asian" as labels to denote biologic differences between patients Describing a Nigerian patient as "African American" in a clinical vignette
Prevalence without context	Presenting racial/ethnic differences in disease burden without contextualization	Teaching students that "Black" patients have higher rates of asthma than "White" patients, without reference to the effects on asthma prevalence of residential segregation and unequal access to high-quality housing and health care[16] Teaching students that "Black" patients have higher rates of hospital readmission, without any discussion of the underlying causes of these disparities
Race-based diagnostic bias	Presentation of links between racial groups and particular diseases	Priming students to view sickle cell disease as affecting only Black people, rather than as common in populations at risk for malaria[17,18]
Pathologizing race	The tendency to link minorities with increased disease burden	In a slide showing the incidence of 13 types of brain tumors in Black patients and White patients, using the title "Incidence rates are higher among Blacks than among Whites," even though 10 of the tumors occurred more frequently in White patients
Race-based clinical guidelines	Teaching of guidelines that endorse the use of racial categories in the diagnosis and treatment of diseases	Teaching students to use different first-line antihypertensive drugs in Black patients than in White patients, without any exposure to literature that questions these practices and misleading interpretations of information[19-21]

genetic difference, since it lumps together persons with immediate or distant ancestors from eastern, western, southern, and northern Africa despite considerable genetic differences among these populations and despite any mixed ancestry from elsewhere.[25,26]

Discussions of race often touch on the complex ideas of ethnicity and ancestry. "Ethnicity" refers to social groupings that are based on some combination of shared language, history, religion, and culture. Ethnic groups often overlap with racial groups, particularly in contexts where racial groups have shared historical experiences (e.g., enslavement) and in the U.S. Census categorization of races. Although ethnicity may reflect cultural and biologic lineages of inheritance, it, like race, is a poor proxy for ancestry.[3] The NAM therefore recommends using a combined question to capture the social categories of race/ethnicity and using a set of granular categories (e.g., country of origin) to approximate ancestry (Table 2).[22]

PREVALENCE WITHOUT CONTEXT

Racial/ethnic differences in burden of disease are often presented without any context, which primes learners to attribute these differences exclusively to genetic predisposition. One representative example from the curriculum we examined was the presentation of the disproportionate burden of type 2 diabetes among the U.S. Akimel O'odham (also known as Pima) people, without sufficient explanation of historical and social causes. Despite high degrees of genetic similarity, the Akimel O'odham living in Mexico have significantly lower rates of type 2 diabetes and obesity than those living in the United States.[27] A historical insult, not a genetic predisposition, explains this pattern.[27,28] Historically, many members of U.S. Akimel O'odham communities were master water engineers, and the tribe lived off the Gila River and had only one documented case of diabetes.[29,30] Because of the expansion of Euro-American settlement, their livelihood was threatened by the diversion of the Gila and Salt Rivers and the construction of the Gila and Roosevelt Dams.[31] Afterward, the U.S. military gave them calorie-dense, nutrient-poor surplus foods such as white flour, cheese, refined sugar, lard, and canned food. This program did not offer fresh produce until 1996.[32] The Akimel O'odham have since sought increased access to and protection of their water sources, and their efforts led to the Arizona Water Settlement Act of 2004 and ongoing local actions for water rights.[31] Providing such context in medical school would equip students to distinguish disparate environmental exposures from inherited genetic differences.

Table 2. Recommendations for Improving the Use of Race in Medicine.*

Recommendation	Key Suggestions for Improvement	Resources
Standardize language used to describe race/ethnicity.	Use granular ethnicity or ancestry (e.g., country of origin) to discuss genetic predisposition to disease. Avoid using imprecise language to approximate ancestry, such as "Asian" or "African American," when discussing genetic predisposition to disease. Use categories that reflect societal norms for defining populations in discussing unequal treatment or unequal burden of disease attributable to bias and structural racism. Use combined race/ethnicity rather than just race. The responses to the recommended 1-question format that combines race and ethnicity are Native American or Alaska Native; Asian; Black or African American; Hispanic or Latino; Native Hawaiian or Other Pacific Islander; White; and Multi (select multiple options above). Avoid the use of outdated terms, such as "Caucasian," that do not reflect current societal norms in defining race or approximate ancestry.	National Academy of Medicine (Institute of Medicine)[22]: Template of Granular Ethnicity Category Lists and Coding Schemes with Rollup to the OMB Race and Hispanic Ethnicity Categories, and OMB Race and Hispanic Ethnicity Categories according to a one- and two-question format
Appropriately contextualize racial/ethnic differences in disease burden.	Carefully consider whether the population categories used in a study or lecture represent true genetic differences due to ancestry. When discussing genetic susceptibility, avoid the use of race as the sole reason for differences in disease burden between populations. To approximate ancestry, instead use granular ethnicity (e.g., country of origin). Always consider structural and social determinants of disease when discussing the causes of unequal disease burden. Consider the socioeconomic and political differences between population categories and trends over time of the disease burden in the context of historical insults such as slavery and residential segregation, as well as the environmental influences of migration.	Stonington et al.[12]; Bailey et al.[23]
Generate and impart evidence-based medical knowledge when it comes to race.	Incorporate best practices regarding the use and interpretation of race/ethnicity in human subjects training programs, such as CITI. Involve funding agencies and medical journals in reinforcing these best practices. Reform board examinations (e.g., USMLE) to avoid testing students on race-based clinical guidelines and racial heuristics.	Ripp and Braun[24]; Vyas et al.[1]

* OMB denotes Office of Management and Budget, CITI Collaborative Institutional Training Initiative, and USMLE U.S. Medical Licensing Examination.

RACE-BASED DIAGNOSTIC BIAS

The use of racial terms to describe epidemiologic data perpetuates the belief that race itself puts patients at risk for disease, and this belief is the basis for race-based diagnostic bias. Rather than presenting race as correlated with social factors that shape disease, or acknowledging race as an imperfect proxy for ancestry or family history that may predispose one to disease, the educators we observed portrayed race itself as an essential — biologic — causal mechanism. Lecturers frequently connected diseases to particular racial groups. For example, we found that students are primed to perceive cystic fibrosis as a disease of White people, which may lead to overlooking this diagnosis in a Black patient. Similarly, students are primed to view sickle cell disease as affecting only Black people, rather than as common in populations at risk for malaria. (Table 1).[17,18]

PATHOLOGIZING RACE

In addition to linking particular race/ethnicities with particular diseases, it is common to link minorities with pathology in general — to pathologize race. With rare exception, educators highlighted increased disease burden exclusively in marginalized racial/ethnic groups. Race was also misused as a proxy for genetic difference, socioeconomic status, or behavioral risk factors. The cumulative effect of overrepresenting minorities as high-risk is the creation of an im-

plicit link between race and predisposition to disease, which reinforces the view that race/ethnicity disparities in health stem from innate racial differences. This representation contributes to stigma and unequal treatment of minority patients, concretizes race-based hierarchies, and obfuscates the role of racism in producing health outcomes.

Educators routinely pathologized race, describing poor health outcomes for minority patients without referencing research on racism's effects on health. For example, a lecture presented "race-and-ethnicity–adjusted life expectancy" without explaining how race/ethnicity affects life expectancy. Such lectures are missed opportunities to discuss the relationships among race, racism, and health outcomes — discussions that are essential if trainees are to comprehend health inequity.[33] Structural racism, such as policies that segregate neighborhoods by race, creates differential opportunities for education, employment, and optimal health.[34,35] Chronic exposure to racial discrimination also negatively affects health, contributing to race/ethnicity disparities in health and mortality.[23,36,37] Students are rarely exposed to such research or its implications.

RACE-BASED CLINICAL GUIDELINES

Race-based clinical guidelines are a predictable outcome of the inaccurate use and interpretation of race. These guidelines are taught to medical students and physicians without information about their origin and evidentiary basis.

Research conducted with a flawed understanding of race informs flawed guidelines. Pervasive in medicine, such guidelines endorse the use of racial categories in the diagnosis and treatment of common conditions such as hypertension and pediatric urinary tract infections, despite their grounding in misguided scientific inquiry and interpretation of data.[1,19,20]

A critical example to highlight given its relevance to preclinical curricula is the upward adjustment for persons designated as Black or African American in estimating the glomerular filtration rate (GFR), which raises the threshold for concern for Black patients only. A patient with one Black parent and one White parent and whose creatinine level is 2.8 mg per deciliter would have an estimated GFR of 18 ml per minute per 1.73 m^2 if identified as White and 21 ml per minute per 1.73 m^2 if identified as Black. As a White patient, she would qualify to be added to the waiting list for a kidney transplant, but as a Black patient she would not — a distinction that magnifies well-established racial and ethnic disparities in renal transplant referrals.[38] If the patient identified as both races or mixed race, the clinician would be left to make the binary choice.

Exacerbation of health care disparities stemming from this correction factor is not limited to nonreceipt of indicated care, such as early referrals to a nephrologist or the transplant list, but can also manifest as the receipt of contraindicated care, such as continuation of metformin or receipt of intravenous contrast during imaging procedures. Yet race-based GFR calculation remains in both medical curricula and practice, despite these problems and evidence calling its validity into question.[1] Routine use of race correction will not solve these problems. Instead, clinicians need to attend carefully to each patient, their possible genetic risk factors, and other relevant variables before interpreting a test and making treatment recommendations.

These guidelines use race as a biologic marker for disease or a proxy for genetic predisposition and perpetuate the notion that race is a biologic category. There may be relevant physiological differences among humans that correlate with ancestral background; however, these differences do not correlate well enough with the social categories of race/ethnicity to justify their teaching and use in medicine. This lack of correlation, however, does not imply that race should not be used in medicine or medical education. Unequal treatment in health care due to structural and unconscious racism can be measured and eliminated only if we continue to discuss race.

RECOMMENDATIONS

It is not surprising that curricular content in medical schools consistently reinforces the notion of race-based biologic differences[15]: this tendency reflects entrenched societal beliefs and institutional norms. And students may enter medical school already holding common misconceptions about race/ethnicity. But this very ubiquity argues for acting to reshape our use of race in the medical school curriculum and aim-

ing to impart the most accurate and current science and knowledge about the social structures affecting health.

Rather than oversimplifying conversations about factors affecting disease prevalence, diagnosis, and treatment, medical educators can impart an adequate and accurate understanding of the complexity of these relationships. Human biologic variation certainly exists, but in evaluating differences we need to use categories that are more granular and specific than race/ethnicity. Biologic variation is not categorical, based on one perceived phenotypic attribute, but rather clinal, reflecting minor gradations of difference in myriad phenotypic attributes.[39,40] When biologic differences are noted between socially constructed categories of race/ethnicity, further inquiry into their causes is required, including evaluating variation within and between more granular categories that better approximate ancestry, as well as differences attributable to migration patterns or environmental exposures. An emphasis on inherent biologic differences by categorical race/ethnicity misrepresents the root causes of illness and distracts from structural racism and the sociopolitical and historical underpinnings of health inequities. To change this emphasis, we offer three recommendations (Table 2).

First, we can standardize the use of language for describing race/ethnicity in teaching, research, and clinical practice. The IOM report *Standardization of Race, Ethnicity, and Language* provides evidence-based guidelines for doing so.[22] Standardizing our use of race is foundational to an evidence-based framework for combating physician bias, since there remains obvious confusion about race as a biomedical term. When discussing disparities in health and health care that result from bias and structural racism, we recommend using the updated combined racial/ethnic categories proposed by the NAM. Granular ethnic categories that account for country of origin are better suited for discussions of genetic predisposition. However, these discussions should also encompass social context, to avoid reinforcing the inaccurate and harmful concept of distinct biologic races. Greater emphasis should be placed on the social determinants of health.[41,42]

Second, in appraising research studies and in teaching, we should consider upstream contributors to racial/ethnic differences in burden of disease. Training in structural competence equips learners to understand how social, political, and historical forces and structures affect health.[43] Students should understand how structural and institutional racism, coupled with interpersonal discrimination, negatively affects policing, the criminal justice system, health care, education, food security, housing, and employment.[11,23,44-46] Applying such considerations in examining epidemiologic patterns of disease facilitates a holistic understanding of health disparities that emphasizes the dynamic interplay between our biology and the environment.[47-49] Integrating into the curriculum research that elucidates these structural and social determinants of health may help students to understand why some racial/ethnic groups have increased prevalence of certain diseases and to later apply this knowledge to patient care.[50,51]

Such work also helps contextualize race-based screening guidelines. Insofar as such guidelines contribute to mitigating the disproportionate burden of disease in marginalized communities, they are key components in advancing health equity. But it's important to recognize that racial/ethnic disparities are defined in terms of social, not biologic, classifications, and therefore such guidelines aim to address outcomes derived from social, not genetic, factors. Further research is needed to define disparities using categories that better approximate ancestry to inform guidelines that account for and mitigate disease risk due to genetic predisposition.

Finally, we can change the way we use race to generate and assess medical knowledge. Researchers should strive to discern in their analyses what race is being used as a proxy for — biologic markers or social and structural contributors to disease. Training programs for human-subjects research, such as the Collaborative Institutional Training Initiative, can teach researchers when and how best to use and interpret race/ethnicity in designing and analyzing their studies. Funding agencies and medical journals can also reinforce best practices in using and interpreting racial/ethnic categories.[52-54]

A common argument for the imprecise use of race in the medical curriculum is that board examinations test students on race-based guidelines and racial heuristics.[24] Such exams can be

reformed, but in the interim, the way we impart medical knowledge matters. If educators discuss the antecedents of disease comprehensively, students will be able to strategically recognize race-based patterns on such exams without perceiving them as absolute or a result of biologic differences.

Medical education and research are intertwined and jointly responsible for perpetuating misunderstandings of race. Students carry such misinformation with them into the clinic, where their implicit biases and misconceptions perpetuate disparities in health care. We are not arguing that race is irrelevant, and our framework is not meant to trigger discussion of the advantages and disadvantages of using race in medicine; rather, we wish to provide evidence-based guidelines for defining and using race in generating and imparting medical knowledge. Race, though not a biologic concept, can be a starting point from which to generate hypotheses about environmental exposures and social processes that produce disparities in health outcomes. It is also vital to use race/ethnicity to measure and mitigate unequal treatment attributable to structural and individual implicit biases. Discussing race and naming racism are essential to promoting an antiracist culture. Rather than abandoning the use of race in medicine, we believe we should transform the way it is used, embracing a more rigorous, multidisciplinary, and evidence-based understanding of how race, racism, and race-based science contribute to inequities in health and health care.

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