The NEW ENGLAND JOURNAL of MEDICINE

Perspective

FEBRUARY 10, 2022

Racial Biology and Medical Misconceptions

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In 2016, Hoffman et al. documented ongoing racial misconceptions held by medical students and residents.[1] The authors showed a series of statements concerning biologic differences between groups described as "Blacks" and "Whites" to three groups of "White" people: participants with no medical training, medical students at the University of Virginia (UVA), and UVA residents. Participants were asked to determine whether statements such as "Blacks' skin is thicker than Whites'" were true or false; in this example, 58% of the lay public and 25 to 42% of the UVA medical students and residents responded "true." The study showed that multiple false beliefs were shared by the public and medical trainees, and it received widespread acclaim for bringing attention to this problem.

A closer reading of the article, however, reveals the true depth of the challenge: throughout the introduction and discussion, the terms "Black" and "White" are used as if they referred to true biologic entities, not the socially defined groups these terms actually identify. Therein lies the largest racial misconception still operative in the medical community: socially defined races continue to be viewed as if they are accurate reflections of biologic variation within our species (see box for further reading). Socially defined racial categories rely on several characteristics in addition to genetic ancestry, including physical appearance, culture, language, and religion. They are historically contextual, such that definitions of "Blackness" in America vary by region and over time: in 1910, in Alabama you were defined as Negro if you had a single great-grandparent of African ancestry, whereas in Michigan, two great-grandparents was the rule. In the Caribbean, any European ancestry at all was enough to define someone as White. Native American "race" is defined by the cultural criterion of membership in a tribe; race can change according to affiliation.

In the 20th century, biologic-anthropologic and population-genetic analyses of human variation demonstrated conclusively that anatomically modern humans do not have biologic races. Since human biologic variation is driven by genetic drift (random variation in allele frequency associated with ancestral lineages) and uncorrelated selection pressures, physical traits cannot be used to delineate racial groups. Traits such as skin color, tooth size, bone density, presence of hemoglobin S, and craniofacial measurements do not map to socially defined racial categories.

Further complicating the issue of socially defined race is the challenge of population admixture: owing to chattel slavery and colonialism in America, persons

Further Reading on Medical Misconceptions about Race.

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of primarily African descent and the groups included in the ethnic category "Hispanic" come from multiple ancestries with substantial regional variation. For example, though the mean proportion of European ancestry among African Americans is approximately 16%, the proportion exceeds 30% in some states.[2] In addition, a growing number of persons socially defined as "Black" in the United States are from various African nations. These individuals have little or no European admixture. Finally, although populations differ in the frequency of alleles that may predispose people to a given disease, no population is devoid of a disease. Strong emphasis on disease associations with particular populations, reinforced by test questions and "classic" vignettes, runs the risk of delaying diagnosis and resulting in inadequate care.

The modern science of human biologic variation is not well understood by biomedical scientists and clinical physicians, and such material is not typically required in undergraduate curricula or medical training — hence the persistence of racist assumptions in medicine. Epidemiologic data are fundamental to the preclinical curriculum: since various populations are affected by various disease states in varied proportions, educators describe most disease entities in terms of the gender ratio among affected patients, the typical age at onset, and often, associations with socially defined races. Historically, these associations do not account for cultural and social determinants of health, such as poverty and access to care. Though some institutions are attempting to correct the framework for the presentation of race, deeper issues regarding the validity of scientific knowledge concerning human biologic variation still require attention.

Linking socially defined race to disease is rarely neutral and has a long history. Take, for example, the frequently cited association between keloids and African descent. According to UpToDate, "Keloids have been reported in 5 to 16 percent of individuals of Hispanic and African ancestry."[3] The cited reference is a review article that does not provide experimental data; the upper limit, 16%, is derived from a published, but not peer-reviewed, discussion at a 1931 dermatology meeting that invoked observations of Congolese mine workers. Interestingly, at that same meeting, a researcher (Naegeli) reported that a population study in Swiss adults revealed that 13.3% had keloids. The clinical relevance of this disparity (16% vs. 13.3%) is questionable. Of note, in October 2021, Dr. Deyrup provided the authors of the UpToDate keloids article with data demonstrating the weakness of the association between socially defined race and keloid formation; in January, the sentence quoted above was deleted. However, as of January 19, 2022, the association between socially defined race and keloids is retained in the genetics section of the article.

The racialization of disease is propagated in textbooks and reinforced through medical licensing exams and the test-prep industry: a 2011 evaluation of the 8th edition of *Robbins and Cotran Pathologic Basis of Disease*, a widely used medical school textbook, found that of 31 statements linking African ancestry with disease, 17 could not be confirmed by the literature and 3 were directly contradicted (related to squamous-cell carcinoma, malignant tumors of the liver and biliary tract, and malignant hypertension and accelerated nephrosclerosis).[4] In 2017, an examination of the use of race and ethnicity in the UWorld Step 1 QBank, a popular test-prep resource, showed variation in whether a racial or ethnic descriptor was central to the correct interpretation of a question or merely incidental: whereas the descriptor "White/Caucasian" was central in only 7.4% of questions,

for Native Americans, race was "diagnostic" 100% of the time.[5]

So how do we solve this deeply ingrained problem? To assess the validity of the scientific data, physicians need a better understanding of the modern science of human biologic diversity. We believe a course in biologic anthropology focused on this topic should be highly recommended for medical school admission, and the Medical College Admission Test should assess basic knowledge of human biologic variation and social definitions of race. For programs that decide against a course requirement, a reading list about human biologic variation and its discordance with socially defined race could be compiled. As others have argued, the preclinical curriculum must reinforce an understanding of socially defined versus biologic race concepts — perhaps in courses that many medical schools now offer on health disparities.

An audio interview with Dr. Graves is available at NEJM.org

Given the long history of racialization of medicine, ongoing training regarding human biologic variation and disease will be necessary to correct generations of misinformation. Symposia and grand-rounds presentations about the cultural determinants of health disparities, the confounding contributions of population admixture, and the potential harm of associating socially defined race with disease entities will help physicians remove the "racial glasses" through which they first see patients and help them focus on finding more meaningful underlying diagnoses. Textbook editors and authors must carefully evaluate the scientific validity and clinical relevance of their material.[4]

Ultimately, medical trainees will model what they see in their instructors and attending physicians. We suggest that such a sea change is a crucial step toward the eventual adoption of individualized medicine, in which clinicians appreciate real causal factors so they can better tailor patient care.

Disclosure forms provided by the authors are available at NEJM.org.

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This article was published on February 5, 2022, at NEJM.org.

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DOI: 10.1056/NEJMp2116224

Beyond Diversity — Time for New Models of Health

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Despite the ability to collect and analyze far richer health data than ever before, public health and medical experts have failed to use that information to develop new conceptual models for health. Although data from research inform clinical decision making, many possibilities suggested by health data are lost when we insist on fitting those data into our existing health constructs rather than building new constructs on their basis. The challenge is to ensure that the full range of what we know — from genomics to the social determinants of health for each person — is available, valued, and understood, which may necessitate the development of new models of health and illness. But though the accumulation of new evidence may warrant a paradigm shift, the human tendency is to hold on to our familiar conceptual models even when new data urge us to develop alternative ones.

Health data for Hispanic or Latinx people, who account for nearly one fifth of the U.S. population, provide a platform for reconceptualizing health and risk factors. Contrary to expectations, Hispanic people with many known health risk factors (low income, low educational levels, lack of health insurance, diabetes, and excess weight) live longer than non-Hispanic White people in the United States; have higher rates of diabetes but lower rates