Use of Race in Clinical Diagnosis and Decision Making: Overview and Implications

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ISSUE BRIEF

Introduction

Despite race being a socio-political system of categorization without a biologic basis, race has historically and continues to play a role in medical teaching and clinical decision making within health care. Race permeates clinical decision making and treatment in multiple ways, including: (1) through providers' attitudes and implicit biases, (2) disease stereotyping and clinical nomenclature, and (3) clinical algorithms, tools, and treatment guidelines. While some diseases have higher prevalence among individuals with certain genetic ancestry, genetic ancestry is poorly correlated with commonly used social racial categories. The use of race to inform clinical diagnoses and decision making may reinforce disproven notions of race as a biological construct and contribute to ongoing racial disparities in health and health care. This brief provides an overview of the role of race in clinical care and discusses the implications for health and health care disparities and efforts to advance health equity.

Background: Use of Race to Explain Health Differences

Despite there being no biologic basis to race, the medical and scientific community have used race to explain differences in disease prevalence and outcomes. The Western concept of race arose as a system of hierarchical human categorization (https://physanth.org/about/position-statements/aapa-statement-race-and-racism-2019/) to support European colonialization, oppression, and discrimination of non-European groups. Within U.S. medical curricula, the concept of race led to theories of biological inferiority of people of color and White supremacy, which fueled an array of atrocities in medicine including forced sterilization efforts (https://ihpi.umich.edu/news/forced-sterilization-policies-us-targeted-minorities-and-those-disabilities-and-lasted-21st) targeting Black and Native American women, the use of

Henrietta Lacks' cells for scientific research (https://www.nature.com/articles/d41586-020-02494-z) without consent or acknowledgement, and the infamous Tuskegee Syphilis study (https://www.scielo.br/j/csp/a/TP955nqPnmywZT69VYXnsVh/?lang=en&format=pdf), among others. Although research has since disproven the existence of universal biologic differences by race, some recent scientific studies continue to suggest that genetic differences between racial groups may explain differences in health outcomes. For example, an article (https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.00598) published in 2020 originally suggested that unknown or unmeasured genetic or biological factors may be contributing to increased severity of COVID-19 illness among Black people, although the article was later revised (https://www.healthaffairs.org/do/10.1377/hblog20200630.939347/full/) to clarify that the difference is most likely explained by societal factors. Recent research (https://journals.lww.com/epidem/Abstract/2022/01000/Explaining_the_Variance_in_Cardiovascular_Disease.4.aspx) further suggests that measures of demographic characteristics and socioeconomic position may be more effective than genetic characteristics in explaining disparities in cardiovascular disease between Black and White adults.

There have been growing calls (https://www.instituteforhealingandjustice.org/executivesummary) against using race as a factor to explain health differences without acknowledging the role of racism. Contemporary science has demonstrated that race is a social category (https://www.scientificamerican.com/article/race-is-a-social-construct-scientists-argue/) with no basis in biology. Race is a poor proxy for genetic ancestry (https://physanth.org/about/position-statements/aapa-statement-race-and-racism-2019/) and large genetic studies (https://sitn.hms.harvard.edu/flash/2017/science-genetics-reshaping-race-debate-21st-century/) have demonstrated more variation within defined racial groups (intra-racially) than there are between different racial groups (inter-racially). Within the medical and scientific community, there have been longstanding critiques (https://www.acpjournals.org/doi/10.7326/0003-4819-125-8-199610150-00008?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200pubmed) of using racial classifications in diagnosis and treatment of disease. Recently, there have been calls (https://www.healthaffairs.org/do/10.1377/hblog20200630.939347/full/) for research studies and guidance (https://jamanetwork.com/journals/jama/fullarticle/2783090) in the medical community to name and examine the role of racism versus race as a key driver of health inequities (https://www.healthaffairs.org/do/10.1377/hblog20200630.939347/full/) to avoid perpetuating disproven understandings of biologic differences by race.

Although race is not tied to biologic differences, understanding differences in health and health care by race and ethnicity remains important for identifying and addressing disparities in health and health care that stem from racism and social and economic inequities. Complete and accurate race and ethnicity data (https://www.kff.org/policy-watch/advancing-health-equity-requires-more-better-data/) is key for identifying disparities and taking action to address them.

However, there are longstanding gaps and limitations in racial and ethnic data within health care. In addition to deficiencies in survey and administrative data, many institutions report gaps in electronic health record (EHR) data on race (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4441665/pdf/11606_2014_Article_3102.pdf), with substantial misclassification of self-reported race and preferred language. The largest discrepancies (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5342943/pdf/40615_2016_Article_283.pdf) between EHR demographic data and self-reported data are among individuals who identify as Hispanic.

Race in Clinical Decision-Making and Treatment

Provider Bias and Discrimination

A significant and longstanding body of research (https://www.nap.edu/catalog/12875/unequal-treatment-confronting-racial-and-ethnic-disparities-in-health-care) suggests that provider and institutional bias and discrimination are drivers of racial disparities in health, contributing to racial differences in diagnosis, prognosis, and treatment decisions. Prior work (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4542848/pdf/hpu294.pdf) suggests that providers historically were more likely to perceive individual patient factors rather than provider or health system influences as causes for health disparities. For example, studies (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4638275/) have found that providers view Black patients as less cooperative with medical treatment and that providers associate Hispanic patients with noncompliance and risky behavior. A 2015 systematic review of published studies showed that most health care providers appear to have implicit bias (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4638275/pdf/AJPH.2015.302903.pdf) in terms of positive attitudes towards White people and negative attitudes towards people of color. While some studies (https://onlinelibrary.wiley.com/doi/10.1111/acem.13214) have found no link between bias and provider treatment behaviors, others have demonstrated that provider bias correlates with poorer patient-provider interactions (https://www.sciencedirect.com/science/article/abs/pii/S0277953617303039?via%3Dihub) and is associated with disparities in pain management and empathy. Providers who endorse false beliefs about biological differences (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4843483/) by race report lower pain for Black patients compared to White patients, which has been linked to systematic undertreatment for pain (https://www.pnas.org/content/113/16/4296) of Black patients. Similarly, compared to White patients in emergency departments, Hispanic and Asian patients are less likely to receive pain assessments (https://journals.lww.com/lww-medicalcare/Abstract/2019/12000/Racial_Ethnic_Disparities_in_Pain_Treatment_.2.aspx) and appropriate pain medication.

Research also shows that patients report being treated unfairly because of their race/ethnicity while accessing health care. For example, a 2020 KFF/the Undefeated survey (https://www.kff.org/racial-equity-and-health-policy/report/kff-the-

undefeated-survey-on-race-and-health/) of adults found that Black and Hispanic adults are more likely than White adults to report they were personally treated unfairly because of their race and ethnicity while getting health care in the past year. Black adults also are more likely than White adults to report negative experiences with health care providers, including feeling a provider did not believe they were telling the truth, being refused a test or treatment they thought they needed, and being refused pain medication. In addition, Black and Hispanic adults are more likely than their White counterparts to say it is difficult to find a doctor who shares their background and experiences and one who treats them with dignity and respect.

Disease Stereotyping and Nomenclature

Some medical training approaches and materials use imprecise labels (https://www.nejm.org/doi/full/10.1056/NEJMms2025768) conflating race and ancestry, portray diseases through racial stereotypes, and rely on racial heuristics (i.e., mental shortcuts or associations) for teaching clinical diagnosis. Preclinical lectures and clinical vignettes for teaching use nonspecific labels (e.g., Black instead of Nigerian/Haitian and Asian instead of Chinese/Vietnamese/Pakistani) and may misuse race as a surrogate for genetic ancestry. In some cases, they inappropriately use race as a proxy for differences in socioeconomic status, health behaviors (such as diet), or other factors that may influence access to health care or risk of disease. In addition, lecture materials commonly present racial differences in disease burden without historical or social context, which may contribute to students connecting diseases with certain racial groups and ascribing differences to genetic predisposition. For example, preclinical lecturers often teach that recurrent lung infections in White individuals are indicative of cystic fibrosis, which may result in missed diagnoses of cystic fibrosis among Black patients. The hereditary condition glucose-6-phosphate dehydrogenase (G6PD) deficiency (https://rarediseases.info.nih.gov/diseases/6520/glucose-6-phosphate-dehydrogenase-deficiency), which can cause severe anemia, affects individuals of all racial and ethnic backgrounds, with highest prevalence in Africa, the Middle East, and certain parts of the Mediterranean and Asia. However, lecturers and board materials teach students to have higher clinical suspicion for diagnosis of this deficiency in Black patients. In nearly all medical learning resources, Lyme disease is depicted predominantly on White skin (https://www.thelancet.com/action/showPdf?pii=S1473-3099%2820%2930639-3) and is often diagnosed much later (https://link.springer.com/article/10.1007/s11606-021-07129-1) when the disease has progressed to arthritic stages (https://www.nejm.org/doi/full/10.1056/NEJMp1915891) among Black patients. Other examples of connecting race to disease exist in medical textbooks. For example, Black skin is more commonly used (https://www.statnews.com/2020/07/21/dermatology-faces-reckoning-lack-of-darker-skin-in-textbooks-journals-harms-patients-of-color/) to depict sexually transmitted diseases. A recently recalled textbook (https://www.insidehighered.com/news/2017/10/23/nursing-textbook-pulled-over-stereotypes) for nursing students published in 2017 suggested that there were racial differences in how patients experience and respond to pain. The text described Black patients as reporting “higher pain intensity than other

cultures," Hispanic patients as having wide expression of pain ("some are stoic and some are expressive"), Asian patients as valuing "stoicism as a response to pain," and Native American patients as being "less expressive both verbally and nonverbally." Beyond teaching materials, medical board examinations (https://www.tandfonline.com/doi/full/10.1080/10401334.2016.1268056?casa_token=lug5hpdtQ4UAAAAA%3Ayw7TcfVX_fKvHttRDOsyzk5ZXai4ezeXfNUnhDjEsggwIe848MJqTv1FCFjGmRkKf9oFe0cZYAIIlqh8) often test students based on race-based guidelines and heuristics.

Some disease names use racial or geographic terms that link diseases to certain groups or communities. For example, congenital dermal melanocytosis was formerly referred to as "Mongolian spot." Similarly, Down syndrome was first described as "Mongolism" by a 19th century British physician who believed that patients with the genetic disorder resembled individuals of Mongolian descent. As another example, vancomycin infusion reaction (https://www.nejm.org/doi/full/10.1056/NEJMp2031891) was formerly called "Red Man syndrome," evoking racist connotations against Indigenous American people. Clinical nomenclature has shifted towards more descriptive language, although in some cases, disease naming is tied to place of discovery. Disease names incorporating geography may still perpetuate racist-xenophobic sentiment. In 2015, the World Health Organization noted associating disease names with geography may result in backlash (https://www.who.int/news/item/08-05-2015-who-issues-best-practices-for-naming-new-human-infectious-diseases) towards members of particular ethnic communities. This experience was seen in the recent use of the label "China virus" for the COVID-19 virus, which has been associated with an increase (https://journals.sagepub.com/doi/full/10.1177/1090198120957949) in public anti-Asian sentiment (https://ajph.aphapublications.org/doi/10.2105/AJPH.2021.306154) and Asian hate crimes (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7364747/pdf/12103_2020_Article_9545.pdf), as well as an increase in depressive symptoms (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7936603/pdf/10903_2021_Article_1167.pdf) among individuals identifying with multiple Asian subgroups. Moreover, a recent KFF survey of Asian community health center patients (https://www.kff.org/coronavirus-covid-19/issue-brief/asian-immigrant-experiences-with-racism-immigration-related-fears-and-the-covid-19-pandemic/) found that one in three felt more discrimination based on their racial/ethnic background since the COVID-19 pandemic began in the U.S. and 15% said they had been accused of "spreading or causing COVID-19."

Use of Race in Clinical Algorithms, Tools, and Guidelines

While some diseases have higher prevalence among individuals with certain genetic ancestry, the practice of using race within clinical calculators and screening metrics may contribute to health disparities. Today, clinical calculators across multiple specialties assign differential risk for certain diseases or conditions based on race. Prior work (https://www.nejm.org/doi/pdf/10.1056/NEJMms2004740?articleTools=true) has identified a

range of examples of clinical calculators that use race (Appendix Table 1). One of the most well-known examples of this practice is within nephrology, where separate measures of kidney function (i.e., estimated glomerular filtration rates, eGFRs) are applied to Black patients compared to non-Black patients. However, similar examples are seen across medicine. For example, a common calculator used to predict success of vaginal birth after Cesarian (VBAC) section had a correction factor for both Black and Hispanic race (https://www.nejm.org/doi/full/10.1056/NEJMms2004740) that decreases the success of VBAC for Black and Hispanic patients by 67% and 68% respectively. This tool may bias providers into disproportionately counseling these patients towards undergoing a Cesarian section. Similarly, pulmonary function tests have a race correction factor, East Asian race is considered a major risk factor for neonatal jaundice, and a different Body Mass Index threshold is used to recommend diabetes testing among asymptomatic Asian and Pacific Islander patients. Given that race is an extremely inconsistent proxy for genetic ancestry, this use of race within clinical calculators may lead to both undertreatment and overtreatment of racialized individuals, and delays in diagnosis and clinical care.

Research shows that some clinical tools may be less effective or misused for certain populations. For example, pulse oximeters have low accuracy (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808260/pdf/nihms-1659369.pdf) in measuring oxygen saturation in darker skin and are three times as likely to miss low oxygen levels in Black patients compared to White patients. Such discrepancies may contribute to delayed intervention and increased mortality for Black patients with COVID-19. In pediatrics, findings suggest that jaundice measurement tools (i.e., bilirubinometer for measurement of transcutaneous bilirubin) have varied reliability (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0172058) based on skin color, with underestimates of risk in lighter skin and overestimates in darker skin tone. Overestimates of bilirubin using transcutaneous measurements may result in unnecessary follow-up blood work (an invasive process for infants), increases in follow-up visits and commute to clinics, and increased infant caregiver distress. In lower resource settings where serum bilirubin measurement is unavailable and transcutaneous bilirubinometry continues to be the primary method for infant monitoring, underestimates of risk may result in delayed intervention for the life-threatening condition neonatal kernicterus, while overestimates of risk for hyperbilirubinemia may result in unnecessary prolonged hospital stays and treatment (https://jamanetwork.com/journals/jamapediatrics/fullarticle/191624). In dermatology, the dearth of images (https://pdf.sciencedirectassets.com/271821/1-s2.0-S0277953618X00057/1-s2.0-S0277953618300790/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEBgaCXVzLWVhc3QtMSJHMEUCIHiFE1oNr%2BhMWRzs17s%2B44ReU%2FJetakybq0aNPkMCNBxAiEAkMd1NAyxm9i5cPXRgjtJq9p%2FpVEOVNN0N9%2BgEbTl9zMqgwQIwf%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FARAEGgwwNTkwMDM1NDY4NjUiDCQeAg9rOg9fhwvXbSrXA4oZqSvsFXjQPyHT%2F0lo91PIo01D%2Bo5lL6zC5e%2F8LtjAiCmJSkjaGxQdWiCuWwdHw276M9ahtVVEPS25w2eVdRi3GcvzR7FLzlN25HDpNWTRE1eU7eNQb%2FQ8DNkLiR%2FcxVHz3lTZ9EYnyItAbNvaX6ZtaRmrwou9oJflb9MwvTGuOy2DkUJ3DpCzQ%2Br8ATvUwX5M%2FWD2nkb%2FeTa4rPX8xJgMcTW5%2

BF36ORGEI8TnGOSyUBbFnlQjV3XBEIS4PNNXZ%2FnWKOFziClDejnbXGuYJcJfcUdFXg7vHZ9ujVkE%2FEKc7HPkEIvR6ArqGIP1L7yHmvPOtXuV0xd0CIJ5jCB7ubjN%2Blb%2BX3loKw4%2FphbvAq9VzhMtDkL5lDdPkRBkgCPybqePQE2vsf8adMSgIqNQOjdk4bkY7bfXdD5bljO3o8Ux31WRYzqLpnNeaNTGXkC5YRoKxyAxcQ1JdLagvBqOuRj5qWbXpkKMfR%2Fb1YCg8mpn5SDvzLSeodCO2tx28ZmN2RMMBRNfOjey08dlpceJozE3JZTy5kuEsvQZdcGwRTOiSReEdhfmS%2BQBBuGwCoy%2FWoH624uEROupt%2FIU%2BAzcAC82zoueD1%2FTpp04mixEopn63zby5UA6NzDhgaWMBjqlAUaJLWGju6CpSmXNMqd5HqF5mlIXT%2Bq8XWBYzh6F7u6TqZJcz0F6cEf8%2BhBdh8LX51gkbtsAMBMkz8Gz1IA0O5P8moCWGTPDKZO%2BrstHpHhwjYEaBc6Ek1lKwL01vlV%2B9ANujJBul4INvbcXa1AeRCYAyVbTKarWldVHq3EHiFGx98jlgdFHnQhk1DO3pIFXftAoYi5iiun9%2B%2F%2BJSUJgykXT1qe2nA%3D%3D&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20211108T162838Z&X-Amz-SignedHeaders=host&X-Amz-Expires=300&X-Amz-Credential=ASIAQ3PHCVTYSIZURLV4%2F20211108%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Signature=371c13a20f56ec2938c8b685ce18aa5ce3f513bcc903e917a81f845e504fa0ae&hash=21220fa164d81703027ed382454c055021595c7be755e199f2bbff56a3d0a464&host=68042c943591013ac2b2430a89b270f6af2c76d8dfd086a07176afe7c76c2c61&pii=S0277953618300790&tid=spdf-96f9c3cc-c918-47aa-91f4-ebe351478113&sid=f5e633ea72a6c945854b9576bd5221f355dagxrqa&type=client) depicting lesions on dark skin in medical and dermatologic textbooks and lack of representation of providers with darker skin (https://jamanetwork.com/journals/jamadermatology/fullarticle/2652680) in the specialty may result in reduced clinician ability to identify life-threatening dermatological presentation on people of color (e.g., sepsis, cellulitis, or severe drug reactions to medications). Skin cancer (https://www.aad.org/media/stats-skin-cancer), while less common in Black and Hispanic patients, is often diagnosed later with subsequently lower survival rates. Fitzpatrick skin type (FS) is the most commonly used skin type classification system in dermatology. It was originally designed to describe the likelihood of skin to burn from UV light exposure but is misused (https://cdn.mdedge.com/files/s3fs-public/Ware%20SOC%20CT105002077.PDF) by many providers to describe skin color as a proxy for race.

Preventing against racial bias will be important as use of artificial intelligence and algorithms (https://jamanetwork.com/journals/jama/article-abstract/2756196) to guide clinical decision-making continue to expand. The health care system is increasingly using artificial intelligence and algorithms to guide health decisions. Research (https://jamanetwork.com/journals/jama/article-abstract/2756196) has shown that these algorithms may have racial bias because the underlying data on which they are trained may be biased and/or may not reflect a diverse population. For example, one study (https://www.science.org/doi/10.1126/science.aax2342) found that an algorithm designed to identify patients with complex health needs resulted in Black patients being assigned the same level of risk as White patients despite being sicker. This unintended bias occurred because of underlying racial bias in how the algorithm was designed, implemented, and interpreted—the algorithm used health care costs to predict health care needs, but Black patients have lower health care costs in part because they face greater barriers to accessing health care. Other examples

have found that skewed dermatological datasets result in less accurate models (https://medcitynews.com/2021/07/study-shows-skewed-dermatological-datasets-result-in-less-accurate-models/) and decreased ability to diagnose skin conditions among darker skin tones. However, research (https://www.nature.com/articles/s41591-020-01192-7) also suggests that carefully designed algorithms can mitigate bias (https://jamanetwork.com/journals/jama/article-abstract/2756196) and help to reduce disparities in care.

Race-based Pharmacological Prescribing Guidelines

Race also factors into some medication prescribing decisions, but the use of race is often based on limited evidence from small studies and may result in inappropriate dosing and treatment. In 2005, the U.S. Food and Drug Administrative approved the drug BiDil as a race-specific drug to treat heart failure among African Americans. It was subsequently critiqued for misguided marketing (https://www.healthaffairs.org/doi/10.1377/hlthaff.w5.455?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200pubmed) due to using race as a proxy for genotype, which was not evaluated in the study from which conclusions were drawn, although it remains approved as a race-based drug today. There are additional examples of race-based prescribing guidelines. For example, hydrochlorothiazide is recommended as first line hypertension therapy for Black patients based on Joint National Committee (JNC) Hypertension guidelines (https://thepafp.org/website/wp-content/uploads/2017/05/2014-JNC-8-Hypertension.pdf), as opposed to ACE inhibitor therapy for all other groups due to presumed inefficacy (https://pubmed.ncbi.nlm.nih.gov/29808707/) of these agents among Black patients. Eltrombopag, a drug used to treat thrombocytopenia, has a lower recommended starting dose for East Asian patients compared to all other patients. Similarly, the Food and Drug Administration recommends a lower starting dose for Crestor (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5675025/) (a statin, used to lower lipid levels) for Asian patients based on a gene that confers metabolic variability, despite the understanding that this gene may be prevalent among any population. There has been ongoing discussion around race-based dosing and the utility of race-based genetic screening for drugs such as warfarin (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4513254/?report=reader) (commonly used for anticoagulation therapy) and abacavir for HIV (https://academic.oup.com/cid/article/48/3/365/306147) treatment. Medical community viewpoints on race-based prescribing vary. For example, a study of American cardiologists (https://kff4-my.sharepoint.com/personal/michellet_kff_org/Documents/Documents/Callier%20SL,%20Cunningham%20BA,%20Powell%20J,%20McDonald%20MA,%20Royal%20CDM.%20Cardiologists'%20Perspectives%20on%20Race-Based%20Drug%20Labels%20and%20Prescribing%20Within%20the%20Context%20of%20Treating%20Heart%20Failure.%20Health%20Equity.%202019%20May%2022;3(1):246-253.%20doi:%2010.1089/heq.2018.0074.%20PMID:%2031289785;%20PMCID:%20PMC6608680.) found that many providers believe race-based drug labels in treatment of heart

failure may help prescribe effective medications sooner, while others expressed concerns that considering race could potentially harm patients by resulting in some patients not receiving the drug.

The use of race in the emerging field of pharmacogenomics has come under increasing scrutiny. Pharmacogenomics (https://jamanetwork.com/journals/jama/fullarticle/2775792) explores the relationships between genes and drug effects and is viewed as a way to potentially personalize medical therapy. Pharmacogenomics research often uses race to guide decisions about genetic screening prior to using certain drugs to prevent against adverse drug events based on the assumption that certain racial categories may have high or low prevalence of certain genes. Proponents argue that race-based targeting in the field of pharmacogenetics is useful to propel personalized medicine for patient care at the individual level. However, critiques of race-specific therapies (https://www.researchgate.net/publication/7508937_Racializing_Drug_Design_Implications_of_Pharmacogenomics_for_Health_Disparities) express concerns around attempting to address health disparities through commercial drug development versus examining upstream structural factors that may explain differences in treatment response. Moreover, as noted, genetic variation within certain racial/ethnic groups can exceed variation across racial/ethnic categories, suggesting limited utility of this approach and that it may run counter to personalized medicine by treating people based on groupings that have limited genetic association. Current work has limited representation from communities of color, resulting in less extrapolatable (https://jamanetwork.com/journals/jama/fullarticle/2775792), premature recommendations for clinical screening for diverse communities. In addition, inequities across the continuum of drug development and clinical trial participation (https://pubmed.ncbi.nlm.nih.gov/34677579/) and evaluation may exacerbate existing disparities in medication access for communities of color, including decreased access to novel, high-cost medications and lower-cost generic therapies.

Implications

The use of race within clinical decision making and treatment may reinforce disproven concepts of racial biology and exacerbate health inequities. Race continues to permeate medical teaching and clinical decision making and treatment in multiple ways, including: (1) through providers' attitudes and implicit biases, (2) disease stereotyping and nomenclature, and (3) clinical algorithms and treatment guidelines. Racial bias among providers may contribute to poorer quality of care and worse health outcomes. Racial stereotyping of disease and use of race in clinical algorithms and treatment guidelines may lead to errors in clinical diagnosis and management (overtreatment or undertreatment and other delays in clinical care), which may perpetuate and potentially worsen health disparities. Moreover, continued use of race as a biological concept limits examination and understanding of social drivers of health inequities, including racism, and contributes to ongoing racial bias and discrimination among providers.

There have been growing efforts within the medical community to re-evaluate and revise practices around the use of race within clinical care and efforts to move towards race-conscious (https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32076-6/fulltext) (as opposed to race-based) medicine. In 2020, the American Medical Association (AMA) adopted new policies to recognize race as a social construct (https://www.ama-assn.org/press-center/press-releases/new-ama-policies-recognize-race-social-not-biological-construct) and, as part of these policies, encourages medical education programs to recognize the harmful effects of using race as a proxy for biology in medical education through curriculum changes that explain how racism results in health disparities. In September 2020, the House Ways and Means Committee announced a Request for Information around the misuse of race in clinical care. The Agency for Healthcare Research and Quality (AHRQ) similarly announced in March 2021 a Request for Information (https://www.federalregister.gov/documents/2021/03/05/2021-04509/request-for-information-on-the-use-of-clinical-algorithms-that-have-the-potential-to-introduce) on the use of clinical algorithms that have the potential to introduce racial/ethnic bias into healthcare delivery. A subsequent Ways and Means final report released in October 2021 (https://waysandmeans.house.gov/sites/democrats.waysandmeans.house.gov/files/documents/Fact%20Versus%20Fiction%20Clinical%20Decision%20Support%20Tools%20and%20the%20%28Mis%29Use%20of%20Race%20%282%29.pdf) found that professional societies suggest more research (with evaluation of unintended consequences of removing race correctors) is needed before decisions can be made, as a growing number of institutions have removed race from clinical calculators. For example, in the past year-and-a-half, Mass General Brigham hospital, the University of Washington, Vanderbilt University, and NYC Health and Hospitals have all removed race corrections from kidney function estimates. The UC Davis School of Medicine (https://health.ucdavis.edu/health-news/newsroom/uc-davis-drops-race-based-reference-ranges-from-a-standard-kidney-test/2021/05) also eliminated race-based reference ranges from renal function estimates, followed shortly by UCSF's release of a new approach (https://www.ucsf.edu/news/2021/10/421546/ucsf-leads-national-effort-improve-racial-equity-kidney-medicine) to estimate kidney function without race. Moreover, both the American Society of Nephrology and National Kidney Foundation have outlined approaches (https://www.nejm.org/doi/full/10.1056/NEJMoa2102953?query=featured_home) to diagnose kidney disease without race. In November 2021, the New York City Department of Health launched a Coalition to End Racism in Clinical Algorithms (https://www1.nyc.gov/site/doh/about/press/pr2021/health-department-launches-cerca.page), pledging to end race adjustment in at least one clinical algorithm and to create plans for evaluation of racial inequities and patient engagement. Additionally, some commonly used medical calculators have made use of race correction factors (https://www.mdcalc.com/race)optional, while others have removed them entirely (see Appendix Table 1). In contrast, other institutions have held off on making changes to clinical calculators or guidelines, noting potential downstream implications (https://hms.harvard.edu/news/rethinking-race-kidney-function) for other aspects of clinical care and management.

Looking ahead, continued education of health care providers and students to eliminate beliefs of biologic differences by race, improving pedagogy around distinctions between race and genetic ancestry, and reducing racial bias and discrimination will be important, as will efforts to increase the diversity of our health care workforce. Moreover, continued careful evaluation of how race factors into clinical decision-making through clinical guidelines, tools, and algorithms will be important for mitigating biased decision making, particularly as the use of artificial intelligence and machine-driven algorithms to guide clinical decisions expand.

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APPENDIX (HTTPS://WWW.KFF.ORG/REPORT-SECTION/USE-OF-RACE-IN-CLINICAL-DIAGNOSIS-AND-DECISION-MAKING-OVERVIEW-AND-IMPLICATIONS-APPENDIX/)

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