POLICY STATEMENT Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy of Pediatrics

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Eliminating Race-Based Medicine

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Race-based medicine has been pervasively interwoven into the fabric of health care delivery in the United States for more than 400 years. Race is a historically derived social construct that has no place as a biologic proxy. In addition to valid measures of social determinants of health, the effects of racism require consideration in clinical decision-making tools in ways that are evidence informed and not inappropriately conflated with the limiting phenotype of race categorization. This policy statement addresses the elimination of race-based medicine as part of a broader commitment to dismantle the structural and systemic inequities that lead to racial health disparities.

In an address at the annual meeting of the Medical Committee for Human Rights in March of 1966, Dr Martin Luther King, Jr. said, "Of all the forms of inequality, injustice in health care is the most shocking and inhumane."[1] This oft cited quote presaged by nearly 4 decades the comprehensive and incontrovertible evidence documented in the Institute of Medicine's *Unequal Treatment* report that pervasive systemic inequities and historic structural barriers contribute directly to disparities disproportionately experienced by people of color in the health care system.[2] Race has been historically embedded into the foundations of health care in the United States for more than 400 years.[3] Race is a social, not a biologic, construct, and the use of race as a proxy for factors such as genetic ancestry is scientifically flawed.[4,5] Pediatricians may be unaware of this construct conflation. This policy statement specifically addresses race-based medicine, characterized as the misuse of race as a corrective or risk-adjusting variable in clinical algorithms or practice guidelines. The historic roots of race-based medicine and current reconsiderations are also discussed.

The role of race and racism in medicine has been vigorously debated.[6–11] Recognition of the determinative contribution of bias, whether implicit or explicit, to disparate and deleterious outcomes in a variety of settings, for a range of conditions, has been well chronicled.[12–20] Further, perceptions of physiologic differences based solely on racial phenotypes have long been intertwined and persist in the practice and teaching of medicine.[21,22] A 2016 study of White

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DOI: https://doi.org/10.1542/peds.2022-057998

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: Dr Heard-Garris has a financial relationship with XNY Genes, LLC. The other authors have indicated they have no potential conflicts of interest to disclose.

To cite: Wright JL, Davis WS, Joseph MM, et al. Eliminating Race-Based Medicine. *Pediatrics*. 2022;150(1):e2022057998

medical students and residents demonstrated that endorsement of false beliefs about the way in which Black people experience pain was associated with lower pain score assessments and inaccurate treatment recommendations for Black patients compared to White patients in mock clinical scenarios.[23,24]

Beginning in the late 16th and early 17th centuries, race and racism became the primary mechanism through which enslaved Africans, their descendants, and other people of color were systematically subjected to subordination and marginalization in the United States. The evolution of modern medicine, in this context, has not been immune from the historical influence of inequitable societal attitudes and an unjust belief in the validity of human hierarchy. Phenotypic difference was intentionally used by the colonists and their descendants to justify the institution of slavery, the seizure of native lands, and the establishment of political and economic advantage. Flawed science and unfounded evidence further fueled the codified existence of race-based medicine in many places across the health care landscape. Eliminating race-based medicine and moving toward race-conscious medicine[25] is an essential step on the journey to equitable health care and outcomes.

Background

In 2019, the American Academy of Pediatrics (AAP) policy statement "The Impact of Racism on Child and Adolescent Health" directly named racism as a social determinant of health and called out the fallacy of racial biology.[26] The statement definitively emphasized that race-based medicine serves to "solidify the permanence of race, reinforce the notions of racial superiority, and justify differential treatment on the basis of phenotypic differences." In 2020, the AAP Annual Leadership Forum passed a resolution, "Prohibit the Use of Race-Based Medicine," through which "the Academy shall end the practice of using race as a proxy for biology or genetics in all their education events and literature, and … require [that] race be explicitly characterized as a social construct when describing risk factors for disease with all presentations at AAP-sponsored conferences."[27] In 2021, the AAP Board of Directors and Executive Committee published a perspective reiterating the organization's high prioritization of and focused intent to operationalize the elimination of race-based medicine.[28]

One of the steps that the AAP has already undertaken to address race-based medicine was retirement of "Urinary Tract Infection: Clinical Practice Guideline for the Diagnosis and Management of the Initial Urinary Tract Infection (UTI) in Febrile Infants and Children 2 to 24 Months."[29,30] The guideline came under scrutiny when Kowalsky et al questioned the systematic differential care recommended for Black or non-White children.[31] The inclusion of race as a decision-making factor in the clinical algorithm was based on a theoretical lower risk of UTI for children of color. Review of the guideline's cited references reveals that not only is the risk theoretical, but it is based on a blood group antigen-linked uroepithelial cell adherence hypothesis that the study authors state "requires additional study to substantiate or refute."[32,33] Further examination of the literature regarding the adherence hypothesis finds some evidence for blood group phenotyping as a potential biomarker for UTI risk but nothing specifically aligning this risk with subjective racial identification.[34] In this case, race was inappropriately inserted as default biologic proxy in lieu of incompletely explained epidemiologic observation. The just approach is to confer equitable care to all young children regardless of race.

The Historic Roots of Race-Based Medicine

The origins of race-based medicine in the United States date back to the precolonial period and range from unproven hypothetical assumptions to outright cruel and inhumane practices. For example, Alabama physician J. Marion Sims, widely considered the father of modern gynecology, notoriously performed experimental vesico-vaginal fistula repair procedures on unanesthetized enslaved women.[35] He did so despite the availability and widespread use of ether, which he did employ with his White patients.[3] Sims' justification for this abusive practice was aligned with the broadly held belief in the medical community that, because of their thicker skin, Black people differentially experienced pain and were, therefore, more tolerant of surgical procedures, a concept espoused and published in 1851 by Sims' contemporary and fellow enslaver, Louisiana physician Samuel Cartwright.[36,37]

Another such example lies in the roots of race-based lung function assessment, which can be traced back to founding father Thomas Jefferson, considered an enlightened intellectual of the era. Jefferson wrote in his influential 1781 treatise "Notes on the State of Virginia" about differences in lung capacity between the enslaved and White colonists.[24,38] He remarked on the dysfunction of the pulmonary apparatus in Black individuals and that "among the real distinctions which nature has made is a lack of lung capacity."[24] Completely speculative, yet widely accepted, Jefferson's assertion remained

empirically unchallenged until the second half of the 19th century when Cartwright, drawing directly from Jefferson's unfounded hypothesis, performed rudimentary experiments using the enslaved on his plantation as subjects.[39] Cartwright concluded and published that lung capacity in Black individuals was 20% deficient and went on to further theorize that, because small lungs prevent Blacks from inhaling enough air that "forced labor is a way to vitalize the blood and correct the problem."[36,40] This pseudoscience served to reinforce the practice of slavery and to perversely justify its necessity to help the enslaved.

False Equivalency and Flawed Science: The Case for Eliminating Race-Based Medicine

Although the blatant philosophical and cognitively dissonant justifications for slavery and the conditions of the enslaved are stunning, what is even more remarkable is how so much of this framework has persisted for hundreds of years in the form of race-based medicine. Despite growing acceptance of the false equivalency of race as a biologic proxy, there are numerous examples throughout the 21st century practice of medicine in which the attempted application of race correction or race adjustment factors have manifest in differential approaches to disease management and disparate outcomes.[41] Race assignment is not an independent proxy for genetic difference. However, there is recognition that differential lived experiences, particularly those that contribute to adversity, can impact physiologic and developmental mechanisms and, therefore, must be carefully accounted for in the transformative unwinding of race-based medicine.[42–45]

A unifying definition for epigenetic events is the structural adaptation of chromosomal regions so as to register, signal, or perpetuate altered activity states.[46] Epigenetic induced changes of activity state can lead to combinations of genes that produce differential developmental outcomes.[46] Basic science work on the intergenerational elaboration of stress has elucidated that disruptive biological, physiologic, and neurodevelopmental mechanisms can manifest in utero and may persist in subsequent generational cohorts of the initially exposed.[47,48] The transmission of toxic stress across generations may sow the seeds of chronic disease development and contribute to the physiologic weathering described in some populations of color.[49,50,51] In other words, the impact of the trauma experienced by the enslaved and their descendants may be epigenetically embedded in ways yet to be completely understood.[52,53]

Further, transparency regarding the truth behind the intensity of ancestral admixture in the preemancipation United States is required. Recent analysis of genotype array data from more than 50 000 US research participants reveals an overrepresentation of women of African descent in the gene pool than would otherwise be expected based on the slave ship manifests that documented the forcible transatlantic exile of 12 million Africans known as the Middle Passage.[54] The biases in the gene pool toward enslaved African women and European men can, in part, be attributed to the well-documented sexual exploitation of enslaved women by their enslavers.[55–58] This overrepresentation, despite the relatively smaller proportion of women in the Middle Passage, points to this sordid practice as an accelerator of genetic admixture[53,59,60] and deflates any assertion that binary stratification based on the phenotypic presence of melanin, ie, the "one drop rule"[61,62] or "blood quantum rule,"[63] has any legitimate scientific validity as an independent biologic proxy measure.[22] This history regarding admixing helps explain why social terms such as race are less precise and do not always reliably match with genetics.

Race, as a social construct, does not represent shared genetic ancestry. It is, instead, a way of categorizing people on the basis of physical characteristics and geographic ancestry. The United States Census identifies 5 racial categories: White, Black, Asian, American Indian and Alaska Native, and Native Hawaiian and Pacific Islander. These racial categories, however, are not universal, because they vary between societies and have changed over time. Therefore, careful consideration of anthropologic, ecologic, economic, historic, and social science contributions is necessary if we are to unravel the complex milieu that constitutes the socially determined factors that frame health status and their attendant outcomes. An interdisciplinary approach that rigorously acknowledges the longstanding effects of intergenerationally transmitted trauma and the role that structural racism and differential lived experiences play in conferring risk and resilience is a necessary framework for future exploration aimed at the promise of equitable care delivery.[64–67]

Race-Based Guidelines Across the Medical Landscape

In addition to the aforementioned and now retired UTI clinical practice guideline,[28–31] there are several examples of race-based clinical algorithms or practice guidelines currently undergoing reexamination and reconsideration that deserve mention.

Staging of Chronic Kidney Disease

The most mature efforts to reconsider race correction as part of

clinical disease management have occurred in the calculation of estimated glomerular filtration rate (eGFR) in the assessment of renal function and the staging of chronic kidney disease (CKD).[68–71] Race as an independent variable was originally introduced into eGFR calculation on the basis of the unsubstantiated notion that the higher average serum creatinine concentrations seen in Black people is a result of more muscle mass.[72] The effective risk of this race adjustment is that Black patients with advanced clinical disease may experience delays in being referred to specialty care or transplantation on the basis of race assignment and eGFR calculation alone. Recent analysis of developmental data sets that have omitted race in eGFR calculation demonstrate that more accurate disease staging with smaller differences between Black and non-Black patients is possible.[73] Also, Black adults with CKD will be identified younger and at relatively earlier stages of disease.[74,75] A small but growing number of health systems across the country have already officially eliminated the race modifier from eGFR calculation.[76]

Lung Function Assessment

Racialization of the use of spirometry in the assessment of lung function has a long, tortuous history, as previously described.[23,36,38,39,40,77,78] The unsubstantiated assertions of deficient lung capacity in Black individuals by slave-holding medical professionals in the late 18th and early 19th centuries[36,37,40] persist today in the race norming that is programmed into spirometers.[79,80] In the United States, spirometers apply correction factors of 10% to 15% for individuals labeled Black and 4% to 6% for people labeled Asian.[76,81] Predictive reference equations have also been established for people from Hispanic backgrounds.[82] The ubiquitous application of pulmonary function testing (PFT) for respiratory illnesses like asthma and chronic obstructive pulmonary disease, conditions in which populations of color are clinically disproportionately represented, provide ample opportunity for thoughtful exploration to examine the validity of race and ethnic correction in use of the spirometer.

There is recognition that race does not adequately capture the interplay of individual and population-based exposures rooted in the social determinants that may influence lung health, nor does it begin to approximate ancestral contributions in the context of genetic admixture. Investigators have posited that more granular incorporation of ancestry into normative PFT equations may improve lung function estimates.[83] A recent study found that explicit inclusion of measures of adverse exposure reduce the effect size of race categorization and blunt the potential for inaccuracy of pathology detection on the basis of race-specific prediction alone.[84] Omitting the use of race in PFT is motivating researchers to creatively search for a better understanding of the etiologies of lung health disparities.[85,86] The scientific community is now critically working to unwind the race-based evolution of lung function assessment.

Atherosclerotic Cardiovascular Disease Risk

In 2020, the American Heart Association (AHA) issued an organizational declaration that structural racism is a fundamental driver of health disparities.[87] In its call to action, the AHA went on to further state that the task of dismantling racism requires advocating for policies and practices that eliminate inequities in health care with a commitment to internally examine and correct its own shortcomings.[86] The role of race as part of the calculation of atherosclerotic cardiovascular disease (ASCVD) risk has been identified as a reappraisal opportunity.

Based on practice guidelines developed and published by the American College of Cardiology and the AHA in 2013, the ASCVD Risk Estimator uses pooled race and sex-specific cohorts as the methodology through which to estimate 10-year susceptibility to the development of atherosclerosis.[88] The pooled cohort equation assigns race and uses an array of standard cardiovascular, behavioral, and lifestyle risk factors to estimate ASCVD risk. Critical analysis of estimator performance has revealed a 10-year increased risk differential as large as 22.8% for Black patients, the magnitude of which is described as "substantial and biologically implausible based on race alone."[89,90] The accuracy of the ASCVD Risk Estimator using the pooled cohort equation approach has been challenged on the basis of the statistical overfitting required because of the small sample size of Black patients in the original developmental cohorts. Investigators posit that this overestimation factor has ultimately led to a poorly calibrated tool for Black patients.[91,92]

One might argue that the ASCVD Risk Estimator may be protective in terms of potentially skewing early cardiovascular care toward Black patients. However, the inherent danger is directing differential treatment to Black versus White patients on the basis of a flawed phenotypic signal in the face of what might otherwise be identical underlying risk profiles. Incorporating race as proxy for the biological effects of differential lived experience is misplaced in this example. Moreover, the organized cardiovascular care community, having issued a clarion call to dismantle structural inequities, is well-positioned to consider removal of the race term in ASCVD risk

assessment as an important step toward achieving equity.

Vaginal Birth After Cesarean Delivery

The vaginal birth after cesarean (VBAC) clinical algorithm was designed to predict risk associated with offering a trial of labor to someone who has undergone a previous cesarean delivery. The VBAC calculator, which has been endorsed as a predictive tool by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, relies on specific factors such as age, BMI, and previous delivery history.[93] Race and ethnicity modifiers for women who identify as Black or Hispanic are also included, but they "correct" the calculation in a negative direction, signaling lower likelihood of successful VBAC. The evidence behind the inclusion of race or ethnicity in the VBAC calculator is rooted in thinly veiled racialized science. Late 19th-century medical descriptions of normative pelvic variation characterize the pelvic anatomy of non-White women with such terminology as "degraded or animalized arrangement seen in the lower races."[94] Even in 21st-century scientific literature, the residua of such characterization survives in the unsubstantiated hypothesis that race- and ethnicity-based variation in pelvic architecture is independently associated with lesser adequacy for successful vaginal delivery supporting a narrative of the white gynecoid pelvis as the standard.[95,96] This context influenced the inclusion of race and ethnicity as negative factors in the VBAC calculator, emphasizing the need for thorough reexamination. The National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network recently assessed the feasibility of using the VBAC calculator without race and ethnicity in the prediction model.[97] That study demonstrated that valid estimation is possible when race and ethnicity are eliminated and that the probability of a successful VBAC can indeed be reliably predicted. Of note, the investigators added a variable for treatment of chronic hypertension before or during pregnancy to the revised equation, an excellent example of incorporation of an important evidence-informed measure. In recent practice advisories, the American College of Obstetricians and Gynecologists has stated that a VBAC calculator score should not be a barrier to the consideration of a trial of labor after cesarean delivery.[98] The American College of Obstetricians and Gynecologists Committee on Clinical Practice Guidelines justifies its position by noting the higher likelihood of inaccuracy exists in the lower probability range precisely where race and ethnicity modifiers skew the original model.[99]

Finally, disparities in maternal morbidity and mortality are an escalating problem. In the United States, the maternal mortality rate for non-Hispanic Black women is 44 deaths per 100 000, which is 2.5 times that for non-Hispanic White women.[100] Similarly, the maternal mortality rate for American Indian women is 2.3 times than for non-Hispanic White women.[101] Surgery is a recognized contributor to maternal morbidity and mortality, and non-White women in the United States have persistently higher rates of cesarean delivery than White women. Any opportunity to objectively and safely promote vaginal birth and avoid unnecessary repeat cesarean delivery would result in more equitable obstetric care.

Recommendations

The AAP has committed to laying the foundation for pediatricians to acknowledge and consider the social determinants of health in supporting every child to reach their fullest potential.[102] The integration of health equity principles into practice is vital to address the structural and systemic inequities that drive disparities among children of color and minoritized populations in general. Race-based approaches to the delivery of clinical care are a tangible outgrowth of these long present inequities across the health care landscape. Whether at the professional society, institutional, or individual pediatrician level, the task at hand is dependent on transparent recognition, declared opposition, and active replacement of race-based medicine.[103] However, it is simply not enough to dismantle the processes through which race-based medicine has evolved. Balanced scientific discourse argues that, even in the face of insurmountable evidence that race is not a direct proxy for genetic difference, there is certainly a role for what race represents in terms of differential lived experiences and exposures.[42 104] Peeling back and rigorously sorting the social determinants of health, with integrity, is a core component of the necessary, transformative, and race-conscious discovery to which the scientific community must be accountable.[25 105] Now is the time to formally apply an equity lens to the development and reconsideration of all clinical decision-making tools, including clinical practice guidelines, clinical reports, policy statements, and technical reports.[106] Strategically, this is a mechanism through which organizations can tactically begin to incorporate antiracist principles into all of the work for which they are accountable and stimulate the creation of more equitable systems of care. It is through this lens that the following recommendations are framed:

American Academy of Pediatrics

- The AAP will critically examine all policies and practice guidelines for the presence of race-

based approaches in their development and deconstruct, revise, and retire, if necessary, all policies and practice guidelines that include race assignment as a part of clinical decision-making.
- The AAP will critically examine all policies and guidelines currently under development as well as consideration of all such future documents to ensure the exclusion of race assignment as part of clinical decision-making.
- The AAP will leverage the "Words Matter" document to ensure that all authors, editors, presenters, media spokespersons, and other content contributors recognize race as a social construct only and desist from any use, or its reference, as a biological proxy.[107]

Professional Organizations and Medical Specialty Societies

- All professional organizations and medical specialty societies should implement a process to identify and critically examine all organizational policies and practice guidelines that may incorporate race or ethnicity as independent variables or modifying factors within a reasonable timeframe.
- All professional organizations and medical specialty societies should advocate for the elimination of race-based medicine in any form.

Institutions

- Institutions should collaborate with learner-facing organizations such as the Accreditation Council on Continuing Medical Education, the Accreditation Council on Graduate Medical Education, the Association of American Medical Colleges, the Association of Medical School Pediatric Department Chairs, the Association of Pediatric Program Directors, the Council on Medical Student Education in Pediatrics, the Latino Medical Student Association, and the Student National Medical Association to expose new and lifelong learners to health equity curricular content, including a specific focus on the elimination of race-based medicine.
- Institutions should collaborate with academic health systems, schools of medicine, and other higher education entities in support of the research and scholarship necessary to deconstruct race-based medicine and proactively reframe clinical decision-making tools using valid, evidence-informed measures that incorporate the social determinants of health.

Pediatricians

- Pediatricians should seek health equity continuing medical education programming and incorporate content on the elimination of raced-base medicine as a component of lifelong learning and maintenance of certification.
- Pediatricians should assess their practices and clinical environments for race-based care delivery and eliminate race-based medicine in any form from their practices.

Summary

Racism has infiltrated and impacted health care delivery and outcomes in this country for more than 400 years. The inclusion of race in algorithms and guidelines that direct clinical practice explicitly acknowledges this connection. Although it will continue to be important to collect clinical data disaggregated by race and ethnicity to help characterize the differential lived experiences of our patients, unwinding the roots of race-based medicine, debunking the fallacy of race as a biologic proxy, and replacing this flawed science with legitimate measures of the impact of racism and social determinants on health outcomes is necessary and long overdue.

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ABBREVIATIONS

AAP: American Academy of Pediatrics
AHA: American Hospital Association
ASCVD: atherosclerotic cardiovascular disease
CKD: chronic kidney disease
eGFR: estimated glomerular filtration rate
PFT: pulmonary function testing
UTI: urinary tract infection
VBAC: vaginal birth after cesarean

REFERENCES

1. Dittmer J. The Medical Committee for Human Rights. *Virtual Mentor*. 2014; 16(9):745–748
2. Institute of Medicine, Board on Health Sciences Policy, Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. In: Smedley BD, Stith AY, Nelson AR, eds. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academies Press; 2002
3. Washington HA. *Medical Apartheid: The Dark History of Medical Experimentation on Black Americans from Colonial Times to the Present*. New York, NY: Doubleday; 2006
4. Smedley A, Smedley BD. Race as biology is fiction, racism as a social problem is real: Anthropological and historical perspectives on the social construction of race. *Am Psychol*. 2005;60(1):16–26
5. Mancilla VJ, Peeri NC, Silzer T, et al. Understanding the interplay between health disparities and epigenomics. *Front Genet*. 2020;11:903
6. Evans MK, Rosenbaum L, Malina D, Morrissey S, Rubin EJ. Diagnosing and treating systemic racism. *N Engl J Med*. 2020;383(3):274–276
7. Bailey ZD, Feldman JM, Bassett MT. How structural racism works - racist policies as a root cause of U.S. racial health inequities. *N Engl J Med*. 2021;384(8):768–773
8. Yearby R, Clark B, Figueroa JF. Structural racism in historical and modern US health care policy. *Health Aff (Millwood)*. 2022;41(2):187–194
9. Snipes SA, Sellers SL, Tafawa AO, Cooper LA, Fields JC, Bonham VL. Is race medically relevant? A qualitative study of physicians' attitudes about the role of race in treatment decision-making. *BMC Health Serv Res*. 2011;11:183
10. Zambrana RE, Williams DR. The intellectual roots of current knowledge on racism and health: relevance to policy and the national equity discourse. *Health Aff (Millwood)*. 2022;41(2):163–170
11. Braveman PA, Arkin E, Proctor D, Kauh T, Holm N. Systemic and structuralracism: Definitions, examples, health damages, and approaches to dismantling. *Health Aff (Millwood)*. 2022;41(2): 171–178
12. Goyal MK, Johnson TJ, Chamberlain JM, et al; Pediatric Care Applied Research Network (PECARN). Racial and ethnic differences in antibiotic use for viral illness in emergency departments. *Pediatrics*. 2017;140(4):e20170203
13. Nafiu OO, Mpody C, Kim SS, Uffman JC, Tobias JD. Race, postoperative complications, and death in apparently healthy children. *Pediatrics*. 2020;146(2):e20194113
14. Greenwood BN, Hardeman RR, Huang L, Sojourner A. Physician-patient racial concordance and disparities in birthing mortality for newborns. *Proc Natl Acad Sci USA*. 2020;117(35):21194–21200
15. Morden NE, Chyn D, Wood A, Meara E. Racial inequality in prescription opioid receipt—role of individual health systems. *N Engl J Med*. 2021;385(4):342–351
16. Johnson TJ. Intersection of bias, structural racism, and social determinants with health care inequities. *Pediatrics*. 2020;146(2):e2020003657
17. Sun M, Oliwa T, Peek ME, Tung EL. Negative patient descriptors: documenting racial bias in the electronic health record. *Health Aff (Millwood)*. 2022;41(2):203–211
18. Goyal MK, Kuppermann N, Cleary SD, Teach SJ, Chamberlain JM. Racial disparities in pain management of children with appendicitis in emergency departments. *JAMA Pediatr*. 2015;169(11):996–1002
19. Goyal MK, Johnson TJ, Chamberlain JM, et al; Pediatric Emergency Care Applied Research Network (PECARN). Racial and ethnic differences in emergency department pain management of children with fractures. *Pediatrics*. 2020;145(5):e20193370
20. Goyal MK, Drendel AL, Chamberlain JM, et al; Pediatric Emergency Care Applied Research Network (PECARN) Registry Study Group. Racial/Ethnic differences in ED opioid prescriptions for long bone fractures: trends over time. *Pediatrics*. 2021;148(5):e2021052481
21. Amutah C, Greenidge K, Mante A, et al. Misrepresenting race—the role of medical schools in propagating physician bias. *N Engl J Med*. 2021;(9): 872–878
22. Lujan HL, DiCarlo SE. The racist "one drop rule" influencing science: it is time to stop teaching "race corrections" in medicine. *Adv Physiol Educ*. 2021;45(3):644–650
23. Hoffman KM, Trawalter S, Axt JR, Oliver MN. Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. *Proc Natl Acad Sci USA*. 2016;113(16):4296–4301
24. Villarosa L. Myths about physical racial dierences were used to justify slavery—and are still believed by doctors today. Available at: https://www.nytimes.com/interactive/2019/08/14/magazine/racial-differences-doctors.html Published online August 14, 2019. Accessed January 30, 2022
25. Cerdeña JP, Plaisime MV, Tsai J. From race-based to race-conscious medicine: how anti-racist uprisings call us to act. *Lancet*. 2020;396(10257):1125–1128
26. Trent M, Dooley DG, Dougé J; Section on Adolescent Health; Council on Community Pediatrics; Committee on Adolescence. Committee on Adolescence. The impact of racism on child and adolescent health. *Pediatrics*. 2019;144(2):e20191765
27. Chomilo N. Prohibit the use of race-based medicine. Available at: https://collaborate.aap.org/alf/Documents/Prohibit%20the%20use%20of%20Race-Based%20Medicine.pdf. Published 2019. Accessed January 29, 2022
28. American Academy of Pediatrics Board of Directors and Executive Committee. AAP Perspective: Race-based medicine. *Pediatrics*. 2021;148(4):e2021053829
29. Roberts KB; Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatrics*. 2011;128(3):595–610
30. American Academy of Pediatrics. AAP publications reaffirmed or retired. *Pediatrics*. 2021;148(2):e2021052583
31. Kowalsky RH, Rondini AC, Platt SL. The case for removing race from the American Academy of Pediatrics clinical

practice guideline for urinary tract infection in infants and young children with fever. *JAMA Pediatr.* 2020;174(3):229–230

32. Shaw KN, Gorelick M, McGowan KL, Yakscoe NM, Schwartz JS. Prevalence of urinary tract infection in febrile young children in the emergency department. *Pediatrics.* 1998;102(2):e16
33. Hellerstein S. Recurrent urinary tract infections in children. *Pediatr Infect Dis.* 1982;1(4):271–281
34. Jantausch BA, Criss VR, O'Donnell R, et al. Association of Lewis blood group phenotypes with urinary tract infection in children. *J Pediatr.* 1994;124(6):863–868
35. Sims JM. On the treatment of vesicovaginal fistula. *Am J Med Sci.* 1852;45:226–246
36. Guillory JD. The pro-slavery arguments of Dr. Samuel A. Cartwright. *La Hist.* 1968;9(3):209–227
37. Haller JS Jr. The Negro and the Southern physician: a study of medical and racial attitudes 1800-1860. *Med Hist.* 1972;16(3):238–253
38. *Nineteenth-Century America*. New York, NY: Columbia University Press; 1985
39. Jefferson T. Notes on the State of Virginia. Boston, Lilly, and Wait, 1832. Available at: https://www.loc.gov/item/03004902/.pdf. Accessed January 30, 2022
40. Braun L. Race, ethnicity and lung function: A brief history. *Can J Respir Ther.* 2015;51(4):99–101
41. Cartwright SA. Report on the diseases and physical peculiarities of the negro race. *New Orleans Med Surg J.* 1851;VII:692–713
42. Vyas DA, Eisenstein LG, Jones DS. Hidden in plain sight – reconsidering the use of race correction in clinical algorithms. *N Engl J Med.* 2020;383(9):874–882
43. Burchard EG, Ziv E, Coyle N, et al. The importance of race and ethnic background in biomedical research and clinical practice. *N Engl J Med.* 2003;348(12):1170–1175
44. Cooper RS, Kaufman JS, Ward R. Race and genomics. *N Engl J Med.* 2003;348(12):1166–1170
45. Phimister EG. Medicine and the racial divide. *N Engl J Med.* 2003;348(12):1081–1082
46. Yearby R. Race based medicine, colorblind disease: how racism in medicine harms us all. *Am J Bioeth.* 2021;21(2):19–27
47. Bird A. Perceptions of epigenetics. *Nature.* 2007;447(7143):396–398
48. Hong JY, Lim J, Carvalho F, et al. Long-term programming of CD8 T cell immunity by perinatal exposure to glucocorticoids. *Cell.* 2020;180(5):847–861.e15
49. Dias BG, Ressler KJ. Parental olfactory experience influences behavior and neural structure in subsequent generations. *Nat Neurosci.* 2014;17(1):89–96
50. Heard-Garris NJ, Cale M, Camaj L, Hamati MC, Dominguez TP. Transmitting trauma: A systematic review of vicarious racism and child health. *Soc Sci Med.* 2018;199:230–240
51. Simons RL, Lei MK, Klopack E, Zhang Y, Gibbons FX, Beach SRH. Racial discrimination, inflammation, and chronic illness among African American women at midlife: support for the weathering perspective. *J Racial Ethn Health Disparities.* 2021;8(2):339–349
52. Geronimus AT, Hicken M, Keene D, Bound J. "Weathering" and age patterns of allostatic load scores among blacks and whites in the United States. *Am J Public Health.* 2006;96(5):826–833
53. Johnstone SE, Baylin SB. Stress and the epigenetic landscape: a link to the pathobiology of human diseases? *Nat Rev Genet.* 2010;11(11):806–812
54. Wright JL, Jarvis JN, Pachter LM, Walker-Harding LR. "Racism as a public health issue" APS racism series: at the intersection of equity, science, and social justice. *Pediatr Res.* 2020;88(5):696–698
55. Micheletti SJ, Bryc K, Ancona Esselmann SG, et al; 23andMe Research Team. 23andMe Research Team. Genetic consequences of the transatlantic slave trade in the Americas. *Am J Hum Genet.* 2020;107(2):265–277
56. Stevenson BE. What's love got to do with it?: Concubinage and enslaved women and girls in the antebellum south. In: Berry DR, Harris LM, eds. *Sexuality and Slavery: Reclaiming Intimate Histories in the Americas*. Athens, GA: University of Georgia Press; 2018:159–188
57. Chestnut MB. A Confederate woman's diary. Available at: https://wps.prenhall.com/wps/media/objects/172/176275/16_confe.HTM. Accessed February 1, 2022
58. Jennings T. "Us colored women had to go through a plenty": sexual exploitation of African-American slave women. *J Womens Hist.* 1990;1(3):45–74
59. Jacobs HA. In: Child LM, ed. *Incidents in the Life of a Slave Girl: Written by Herself.* London, England: Hodson and Son; 1862. Available at https://docsouth.unc.edu/fpn/jacobs/jacobs.html. Accessed February 23, 2022
60. Fortes-Lima C, Verdu P. Anthropological genetics perspectives on the transatlantic slave trade. *Hum Mol Genet.* 2021;30(R1):R79–R87
61. Bryc K, Durand EY, Macpherson JM, Reich D, Mountain JL. The genetic ancestry of African Americans, Latinos, and European Americans across the United States. *Am J Hum Genet.* 2015;96(1):37–53
62. Hollinger DA. The one drop rule and the one hate rule. *Daedalus.* 2005;134(1):18–28
63. Plecker WA. Virginia's attempt to adjust the color problem. *Am J Public Health (N Y).* 1925;15(2):111–115
64. Spruhan P. A legal history of blood quantum in federal Indian law to 1935. *S D Law Rev.* 2006;51(1):1–50
65. Heard-Garris N, Williams DR, Davis M. Structuring research to address discrimination as a factor in child and adolescent Health. *JAMA Pediatr.* 2018;172(10):910–912
66. Raphael JL, Oyeku SO. Implicit bias in pediatrics: an emerging focus in health equity research. *Pediatrics.* 2020;145(5):e20200512
67. Duffee J, Szilagyi M, Forkey H, Kelly ET; Council on Community Pediatrics, Council on Foster Care, Adoption and Kinship Care, Council on Child Abuse and Neglect, Committee on Psychosocial Aspects of the Child and Family Health. Committee on psychosocial aspects of child and family health. Trauma-informed care in child health systems. *Pediatrics.* 2021;148(2):e2021052579

68. Hardeman RR, Homan PA, Chantarat T, Davis BA, Brown TH. Improving the measurement of structural racism to achieve antiracist health policy. *Health Aff (Millwood)*. 2022;41(2): 179–186

69. Delgado C, Baweja M, Crews DC, et al. A unifying approach for GFR estimation: Recommendations of the NKF-ASN task force on reassessing the inclusion of race in diagnosing kidney disease. *Am J Kidney Dis*. 2022;79(2):268–288.e1

70. Delgado C, Baweja M, Burrows NR, et al. Reassessing the inclusion of race in diagnosing kidney diseases: An interim report from the NKF-ASN Task Force. *J Am Soc Nephrol*. 2021;32(6): 1305–1317

71. Feldman HI, Briggs JP. Race and the estimation of GFR: getting it right. *Am J Kidney Dis*. 2021;78(1):3–4

72. Diao JA, Inker LA, Levey AS, Tighiouart H, Powe NR, Manrai AK. In search of a better equation—performance and equity in estimates of kidney function. *N Engl J Med*. 2021;384(5):396–399

73. Eneanya ND, Yang W, Reese PP. Reconsidering the consequences of using race to estimate kidney function. *JAMA*. 2019;322(2):113–114

74. Inker LA, Eneanya ND, Coresh J, et al; Chronic Kidney Disease Epidemiology Collaboration. New creatinine- and cystatin C-based equations to estimate GFR without race. *N Engl J Med*. 2021; 385(19):1737–1749

75. Yan G, Nee R, Scialla JJ, et al. Estimation of black-white disparities in CKD outcomes: Comparison using the 2021 versus the 2009 CKD-EPI creatinine equations. *Am J Kidney Dis*. 2022:S0272-6386(21)01053-2

76. Meeusen JW, Kasozi RN, Larson TS, Lieske JC. Clinical impact of the refit CKD-EPI 2021 creatinine-based eGFR equation. *Clin Chem*. 2022;68(4) :534–539

77. Wiggins O. University of Maryland Medical System drops race-based algorithm—officials say harms black patients. Available at: https://www.washingtonpost.com/local/md-politics/maryland-hospital-black-diagnostic-test-kidneys/2021/11/17/e69edcfc-4711-11ec-b05d-3cb9d96eb495_story.html. Published online November 17, 2021. Accessed January 31, 2022

78. Lujan HL, DiCarlo SE. Science reflects history as society influences science: brief history of "race," "race correction," and the spirometer. *Adv Physiol Educ*. 2018;42(2):163–165

79. Braun L. *Breathing Race into the Machine: The Surprising Career of the Spirometer from Plantation to Genetics*. Minneapolis, MN: University of Minnesota Press; 2014

80. Braun L. Race correction and spirometry: why history matters. *Chest*. 2021;159(4):1670–1675

81. Braun L. Spirometry, measurement, and race in the nineteenth century. *J Hist Med Allied Sci*. 2005;60(2):135–169

82. Hankinson JL, Odencrantz JR, Fedan KB. Spirometric reference values from a sample of the general U.S. population. *Am J Respir Crit Care Med*. 1999;159(1):179–187

83. LaVange L, Davis SM, Hankinson J, et al. Spirometry reference equations from the HCHS/SOL (Hispanic Community Health Study/Study of Latinos). *Am J Respir Crit Care Med*. 2017;196(8): 993–1003

84. Kumar R, Seibold MA, Aldrich MC, et al. Genetic ancestry in lung-function predictions. *N Engl J Med*. 2010;363(4): 321–330

85. Baugh AD, Shiboski S, Hansel NN, et al. Reconsidering the utility of race-specific lung function prediction equations. *Am J Respir Crit Care Med*. 2022;205(7): 819–829

86. Bhakta NR, Kaminsky DA, Bime C, et al. Addressing race in pulmonary function testing by aligning intent and evidence with practice and perception. *Chest*. 2022;161(1):288–297

87. Anderson MA, Malhotra A, Non AL. Could routine race-adjustment of spirometers exacerbate racial disparities in COVID-19 recovery? *Lancet Respir Med*. 2021;9(2):124–125

88. Churchwell K, Elkind MSV, Benjamin RM, et al; American Heart Association. Call to action: Structural racism as a fundamental driver of health disparities: a presidential advisory from the American Heart Association. *Circulation*. 2020;142(24):e454–e468

89. Goff DC Jr, Lloyd-Jones DM, Bennett G, et al; American College of Cardiology/American Heart Association Task Force on Practice Guidelines. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2014;129(25 Suppl 2):S49–S73

90. Vyas DA, James A, Kormos W, Essien UR. Revising the atherosclerotic cardiovascular disease calculator without race. *Lancet Digit Health*. 2022;4(1):e4–e5

91. Vasan RS, van den Heuvel E. Differences in estimates for 10-year risk of cardiovascular disease in Black versus White individuals with identical risk factor profiles using pooled cohort equations: an in silico cohort study. *Lancet Digit Health*. 2022;4(1):e55–e63

92. Yadlowsky S, Hayward RA, Sussman JB, McClelland RL, Min YI, Basu S. Clinical implications of revised pooled cohort equations for estimating atherosclerotic cardiovascular disease risk. *Ann Intern Med*. 2018;169(1):20–29

93. National Heart, Lung and Blood Institute. Assessing cardiovascular risk: systematic evidence review from the Risk Assessment Work Group, 2013. Available at: https://www.nhlbi.nih.gov/sites/default/files/media/docs/risk-assessment.pdf Accessed February 1, 2022

94. National Institutes of Health, Consensus Development Conference Panel. National Institutes of Health Consensus Development conference statement: vaginal birth after cesarean: new insights March 8-10, 2010. *Obstet Gynecol*. 2010;115(6):1279–1295

95. Walrath D. Rethinking pelvic typologies and the human birth mechanism. *Curr Anthropol*. 2003;44(1):5–31

96. Vyas DA, Jones DS, Meadows AR, Diouf K, Nour NM, Schantz-Dunn J. Challenging the use of race in the vaginal birth after cesarean section calculator. *Womens Health Issues*. 2019;29(3):201–204

97. Hollard AL, Wing DA, Chung JH, et al. Ethnic disparity in the success of vaginal birth after cesarean delivery. *J Matern Fetal Neonatal Med*. 2006;19(8): 483–487

98. Grobman WA, Sandoval G, Rice MM, et al; Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Prediction of vaginal birth after cesarean delivery in term gestations: a calculator without race and ethnicity. *Am J Obstet Gynecol*. 2021;225(6):664.e1–664.e7

99. American College of Obstetricians and Gynecologists. Vaginal birth after cesarean delivery. ACOG Practice Bulletin No. 205. *Obstet Gynecol*. 2019;133(2): e110–e127

100. American College of Obstetricians and Gynecologists. Practice advisory — counseling regarding approach to delivery after cesarean and the use of a vaginal birth after cesarean calculator. Available at: https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2021/12/counseling-regarding-approach-to-delivery-after-cesarean-and-the-use-of-a-vaginal-birth-after-cesarean-calculator. Published online 2021. Accessed February 9, 2022

101. National Center for Health Statistics, Centers for Disease Control and Prevention. Maternal mortality rates in the United States, 2019. Available at: https://www.cdc.gov/nchs/data/hestat/maternal-mortality-2021/E-Stat-Maternal-Mortality-Rates-H.pdf. Accessed February 2, 2022

102. Petersen EE, Davis NL, Goodman D, et al. Racial/Ethnic disparities in pregnancy-related deaths—United States, 2007–2016. *MMWR Morb Mortal Wkly Rep*. 2019;68(35):762–765

103. Council on Community Pediatrics and Committee on Native American Child Health. Policy statement–health equity and children's rights. *Pediatrics*. 2010;125(4):838–849

104. Ward JV. *The Skin We're in: Teaching Our Teens to be Emotional Strong, Socially Smart, and Spiritually Connected*. New York, NY: Free Press; 2002

105. Borrell LN, Elhawary JR, Fuentes-Afflick E, et al. Race and genetic ancestry in medicine—a time for reckoning with racism. *N Engl J Med*. 2021;384(5): 474–480

106. Wright JL, Freed GL, Hendricks-Muñoz KD, et al; Committee on Diversity, Inclusion and Equity on behalf of the American Pediatric Society. Achieving equity through science and integrity: dismantling race-based medicine [published online ahead of print April 5, 2022]. *Pediatr Res*. 2022

107. Yaeger JP, Alio AP, Fiscella K. Addressing child health equity through clinical decision-making. *Pediatrics*. 2022;149(2): e2021053698

108. American Academy of Pediatrics. Words matter: AAP guidance on inclusive, anti-biased language. Itasca, IL: American Academy of Pediatrics; 2021. Available at: https://services.aap.org/en/about-the-aap/american-academy-of-pediatrics-equity-and-inclusion-efforts/words-matter-aap-guidance-on-inclusive-anti-biased-language. Accessed February 3, 2022