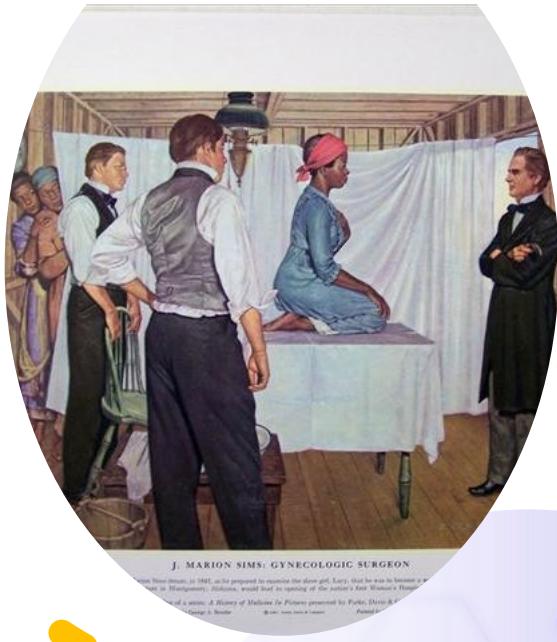
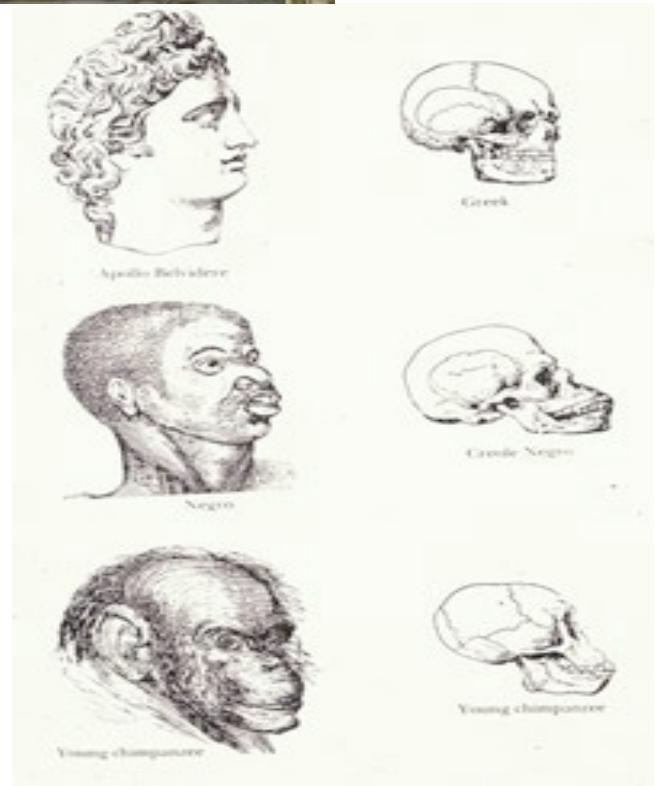


The Historical & Ideological Origins of Race-based Algorithms

Dorothy Roberts, JD, FCPP
George A. Weiss University Professor of
Law & Sociology
Director, Penn Program on Race, Science &
Society
University of Pennsylvania



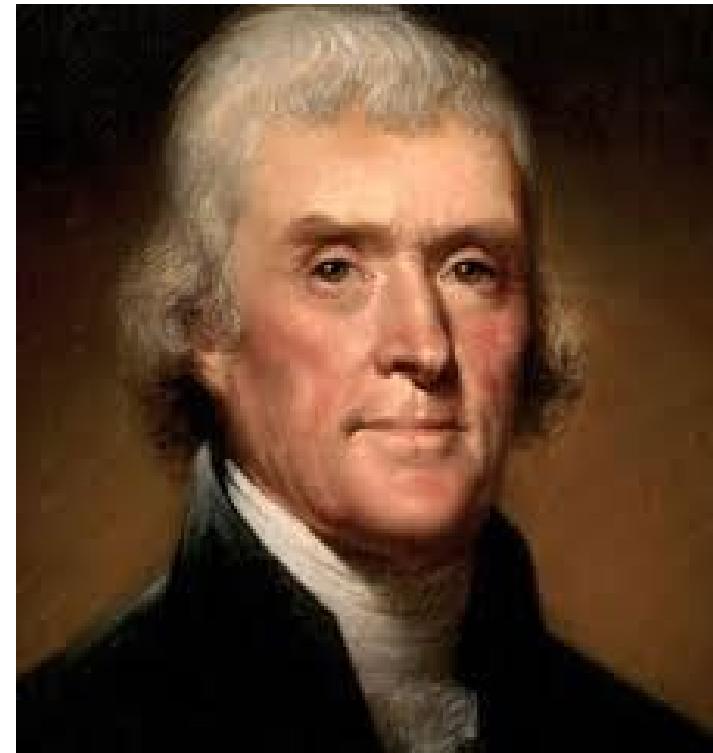
The Scientific Invention of Race/ The Racial Invention of Science



Thomas Jefferson, Racial Scientist

“The real
distinctions
nature has
made” ...

“a powerful
obstacle to the
emancipation of
these people.”



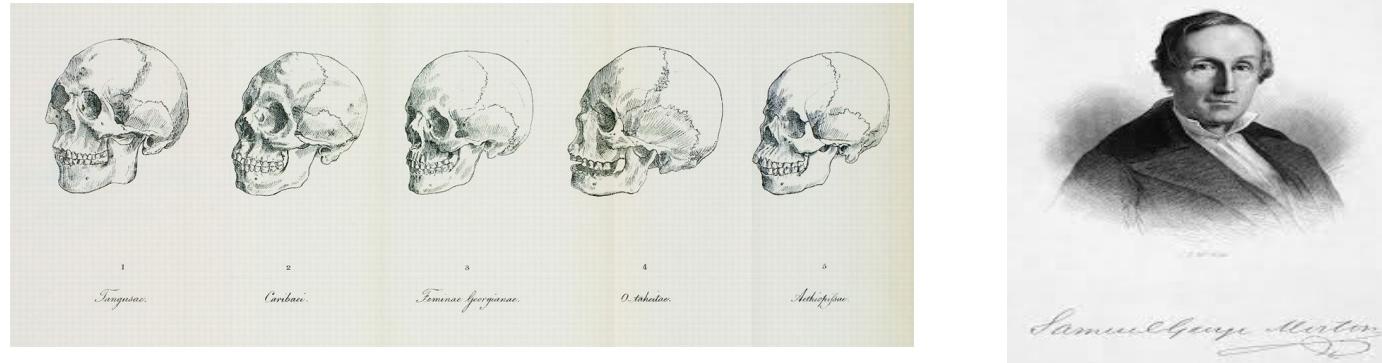
Louis Agassiz' (1807-1873): Harvard Zoologist

- “There are upon earth different races of men, inhabiting different parts of its surface, which have different physical characteristics”...
- So scientists have “the obligation to settle the relative rank among the races, the relative value of characters peculiar to each, in a scientific point of view”...
- And concluded: “Social equality I deem at all times impracticable. It is a natural impossibility flowing from the very character of the negro race” – “indolent, playful, sensuous, imitative, subservient.”



Samuel Morton (1799-1851); Penn Medical School

Crania Americana (1839)



- Europeans: “highest intellectual endowments”
- Mongolians: “ingenious, imitative, highly susceptible of cultivation”
- Native Americans: “averse to cultivation; restless, revengeful, fond of war”
- Ethiopians: “joyous, flexible, indolent, lowest grade of humanity”



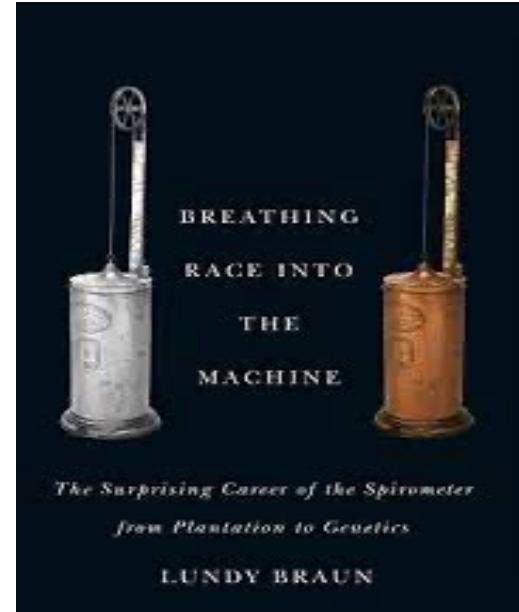
Racial Concept of Disease

Dr. Samuel Cartwright, *The Report on the Diseases and Peculiarities of the Negro Race* (1851).

- *Drapetomania* (“the disease that causes Negroes to run away”)
- *Dysaesthesia Aethiopis* or “Rascality”
- *Negro Consumption*
- *Frambaesia* or “Yaws”
- *Pulmonary Congestion*
- *Scrofula*
- *Bilious and Adynamic Fevers*

Race embedded in medical technology

Spirometer
(invented 1846):
“correction” for
presumed racial
differences in
lung capacity





The NEW ENGLAND
JOURNAL of MEDICINE



MEDICINE AND SOCIETY

Race Correction and the X-Ray Machine — The Controversy over Increased Radiation Doses for Black Americans in 1968

Itai Bavli, Ph.D., and David S. Jones, M.D., Ph.D.

“The belief that Black people have denser bones, more muscle, or thicker skin led radiologists and technicians to use higher radiation exposure during x-ray procedures.”

Vyas, D. A., Eisenstein, L. G., & Jones, D. S., "Hidden in plain sight—reconsidering the use of race correction in clinical algorithms," *New England Journal of Medicine* (2020)

Table 1. Examples of Race Correction in Clinical Medicine.*

Tool and Clinical Utility	Input Variables	Use of Race	Equity Concern
Cardiology			
The American Heart Association's Get with the Guidelines®-Heart Failure Risk Score ¹⁰ (https://www.ahajournals.org/gwghf-heart-failure-risk-score)	Systolic blood pressure Blood urea nitrogen Sex Age History of COPD Race: Black or nonblack	Adds 3 points to the risk score if the patient is identified as nonblack. This addition reflects the estimated probability of death (higher scores predict higher mortality).	The original study envisioned using this score to "increase the use of recommended therapy and reduce racial and ethnic disparities in health care delivery." However, the study did not find race to be a significant predictor of death, and the use of race to predict death was not recommended. The use of race in this calculator is likely to contribute to racial bias in clinical decision making.
Cardiac surgery ¹¹			
The Society of Thoracic Surgeons Short Term Risk Calculator ¹² (https://riskstcalc.cts.org/)	Operation type Age and sex Race: African American, Asian, American Indian/Alaskan Native, Hispanic, Latino or Spanish ethnicity; white race is the default setting BMI	The risk score for operative mortality and major complications increases (in some cases, by as much as 10%) if the patient is black. Identification as another nonwhite race does not significantly increase the risk score for death, but it does increase the risk score for major complications such as renal failure, stroke, and prolonged ventilation.	When used preoperatively to assess a patient's risk, these calculations could steer minority patients, despite higher risk, away from these procedures.
Nephrology			
Estimated glomerular filtration rate (eGFR) ¹³ (https://www.kidney.org/~/media/assets/patients/ckd-epr/ckd-epr-calculator/ckd-epr-calculator.pdf)	Serum creatinine Age Race: black vs. white or other	The MDRD equation reports a higher eGFR for patients of African American race compared to white race, even if the patient is identified as black. This adjustment is reflected in the eGFR calculator, which is set for sex (0.742 if female).	Both equations report higher eGFR values (given the same creatinine measurement) for patients identified as black, suggesting bias in the equations. These higher eGFR values may delay referral to specialist care or listing for kidney transplantation.
Estimates glomerular filtration rate on the basis of a measurement of serum creatinine.			
Organ Procurement and Transplantation Network: Kidney Donor Risk Index (KDRI) calculator¹⁴ (https://optn.transplant.hrsa.gov/resource/kidney-calculator-calculator.pdf)	Age Hypertension, diabetes Serum creatinine level Cause of death (e.g., cerebrovascular accident) Prior transplant Cardiac death Hepatitis C Weight HLA matching Donor sex En bloc transplantation Donor race: African American Race: African American	The KDRI calculator includes a modest race correction (by a factor of 1.05) for patients identified as black. This correction is larger than the correction for African American race in the MDRD equation.	Use of this tool may reduce the pool of African American donors in the United States. Since African-American patients are more likely to receive kidneys from available donors, reducing the pool of available kidneys, the KDRI could exacerbate the racial disparity in access to kidney transplantation.
Estimates the predicted risk of donor kidney graft failure, which is used to predict viability of potential kidney donor. ¹⁵			
Obstetrics			
Vaginal Birth after Cesarean (VBAC) Risk Calculator ¹⁶ (https://mnmunetwork.bsc.gwu.edu/BirthPlan/CFMFU/VBGBirthCalc/vbgbirth.html)	Age BMI Prior vaginal delivery Prior VBAC Medical indication for cesarean section African American race Hispanic ethnicity	The African-American and Hispanic correction factors subtract from the estimated risk of uterine rupture if the patient is identified as black or Hispanic. The decrement in risk for African American race is almost as large as the benefit from prior vaginal delivery (0.888) or prior VBAC (1.003).	The VBAC score predicts a lower chance of success if the person is identified as black or Hispanic. This may dissuade clinicians from offering trials of labor to people of color.
Estimates the probability of successful vaginal birth after cesarean and provides the user with this estimate to counsel people who have to decide whether to have a trial of labor rather than undergo a repeat cesarean section.			
Urology			
STOKE Score ¹⁷⁻¹⁹	Sex Acute onset of pain Risk of pain in black Nausea or vomiting History of UTI Age >12 months Maximum temperature >39°C Female child self as black (fully or partially) Female child uncircumcised male Other fever source	Produces a score on a 13-point scale, with a higher score indicating a higher risk of UTI. This adjustment is the same for all race groups.	By systematically reporting lower risk for black patients than for all nonblack patients, this calculator may contribute to aggressive evaluations of black patients.
Predicts the risk of a ureteral stone in patients who present with flank pain.			
Urinary tract infection (UTI) calculator²⁰ (https://uticalc.pitt.edu/)	Sex Acute onset of pain Risk of pain in black Nausea or vomiting History of UTI Age >12 months Maximum temperature >39°C Female child self as black (fully or partially) Female child uncircumcised male Other fever source	Assigns a lower likelihood of UTI if the child is black (i.e., reports a roughly 2.5-times lower risk of UTI if they do not describe themselves as black).	By systematically reporting lower risk for black children than for all nonblack children, this calculator may contribute to delaying definitive diagnostic testing for black children presenting with symptoms of UTI.
Estimates the risk of UTI in children 2-23 mo of age to inform decisions about when to pursue urine testing for definitive diagnosis.			
Oncology			
Rectal Cancer Survival Calculator ²¹ (https://www.sitemanmro.org/spp/rectal/index.htm?rmp=rectalcalculator)	Age and sex Race: white, black, other Grade Stage Surgeon history	White patients are assigned a regression coefficient of 1.0, while higher stage patients (depending on stage) are assigned to black patients (1.18-1.72).	The calculator predicts that black patients will have a lower survival rate than white patients, reflecting race bias in treatment decisions. Clinicians should be aware of this bias when intervening to patients with lower predicted survival.
Estimates conditional survival 1-5 yr after diagnosis.			
National Cancer Institute Breast Cancer Risk Assessment Tool (https://brkrisktool.cancer.gov/)	Current age, age at menarche, and age at first live birth First-degree relatives with breast cancer Prior benign biopsies, atypical biopsies Race: white, black, Asian, Hispanic/Latino, Asian American, unknown	The calculator returns lower risk estimates for women who are African American, Asian, or Asian American (e.g., Chinese).	Though the model is intended to help conceptualize risk and guide screening decisions, this calculator may contribute to aggressive screening among some groups of nonwhite women.
Estimates 5-yr and lifetime risk of developing breast cancer, for women without prior history of breast cancer.			
Breast Cancer Surveillance Consortium Risk Calculator ²² (https://tools.bccs-ssc.org/)	Age Race/ethnicity: white, black, Asian, Hispanic, Latino, other/multiple races, unknown BRCA1/2 mutation status First-degree relative with breast cancer Pathology results from prior biopsies	The coefficients rank the race/ethnicity categories in the following descending order: white, Asian American, Indian, black, Hispanic, Asian.	Returns lower risk estimates for all nonwhite race/ethnicity categories, potentially reducing the likelihood of close surveillance in these patients.
Estimates 5- and 10-year risk of developing breast cancer in women with no previous diagnosis of breast cancer, with or without prior breast augmentation, or prior mastectomy.			
Endocrinology			
Osteoporosis Risk SCORE (Simple Calculated Osteoporosis Risk Estimation) ²³ (https://www.mayoclinic.org/osteoporosis-risk-score-calculator-31617)	Rheumatoid arthritis History of fracture Estrogen use Race: black or not black	Assigns 5 additional points (maximum score of 50, indicating highest risk) if the patient is identified as nonblack.	By systematically lowering the estimated risk of osteoporosis in black patients, SCORE may contribute to racial bias in clinical decision making, further evaluation (e.g., DXA scan) in black patients, and potentially delaying diagnosis and intervention.
Determines whether a woman is at low, moderate, or high risk for bone loss and guides decisions about screening with DXA scan.			
Fracture Risk Assessment Tool (FRAX) ²⁴ (https://www.shef.ac.uk/FRAX/FRAXCalculator.aspx)	Age and sex Weight and height Prior major or minor hip fracture Current smoking Current alcohol use Secondary osteoporosis Alcohol and tobacco drinks per day Femoral neck bone mineral density	The U.S. calculator returns a lower fracture risk if a female patient is identified as black (by a factor of 0.50 for Asian (0.50), Hispanic (0.33). Estimates are provided for Native American patients or for multiracial patients.	The calculator reports 10-yr risk of major osteoporotic fracture for black women as less than half that for white women with identical risk factors. For white women with identical risk factors, black women have a higher risk. Women with a family history of fractures have a higher risk for nonwhite women, which may delay intervention with osteoporosis therapy.
Estimates 10-yr risk of a hip fracture or other major osteoporotic fracture on the basis of patient demographic and risk-factor profile. Calculators are country-specific. ²⁵			
Pulmonology			
Pulmonary function tests ²⁶	Age and sex Height Race/ethnicity	In the U.S., spiroometers use correction factors for persons labeled as black (10-15%) or Asian (4-6%).	Inaccurate estimates of lung function may result in the misclassification of disease severity. For example, in African American minorities (e.g., in asthma and COPD), >

* BIRADS denotes Breast Imaging Reporting and Data System, COPD Chronic Obstructive Pulmonary Disease, and MDRD Modification of Diet in Renal Disease.

c. D. Roberts

Are oximeters racially biased? White as the standard



The NEW ENGLAND
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CORRESPONDENCE

Racial Bias in Pulse Oximetry Measurement

December 17, 2020

N Engl J Med 2020; 383:2477-2478

DOI: 10.1056/NEJMc2029240

Metrics

67 Citing Articles

Letters

Related Articles

TO THE EDITOR:

Oxygen is among the most frequently administered medical therapies, with a level that is commonly adjusted according to the reading on a pulse oximeter that measures patients' oxygen saturation. Questions about pulse oximeter technology have been raised, given its original development in populations that were not racially diverse.^{1,2} The clinical significance of potential racial bias in pulse oximetry measurement is unknown.

TO THE EDITOR

Throughout 2020, the global movement for racial equality has led many to reflect on their own biases. While combating racism is vital in every setting, we must also preserve nomenclature in science so that it remains a tool to be wielded in the discovery of truth. Phrases such as "racial bias" and "structural racism" are commonplace in the social sciences literature, but they should be used with caution in scientific study. If the findings of the study by Sjoding et al.¹ are correct, they establish a diagnostic inaccuracy, owing to darker skin color, not a racial bias. The term "racial bias" always refers to decisions that are influenced by a person's race. Medical devices such as pulse oximeters are blind to color and cannot exhibit such a bias. It is worrisome that the study findings have been disseminated across social media as proof of "structural racism in health care."² Imprudent use of such terms will inevitably further erode the trust of some Black patients and will contribute to, rather than help to remedy, concerns regarding racism in Western medicine.

Thomas Whitehead-Clarke, M.B., B.S.

“But we aren’t racist”

New York Times, Oct. 18-19, 2018

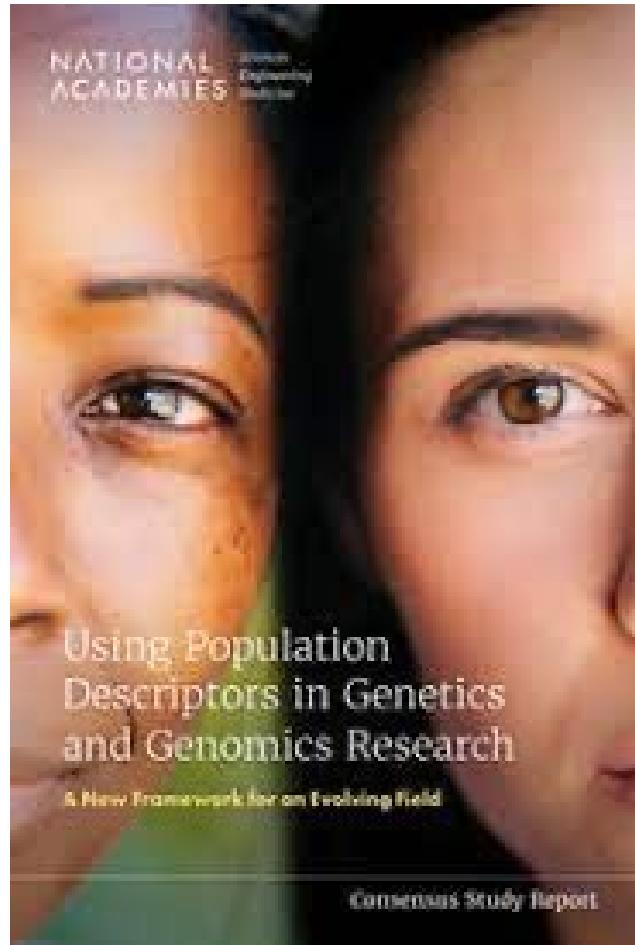
Geneticists Criticize Use of Science by White Nationalists to Justify ‘Racial Purity’



White nationalists gathered in a room in New York, Oct. 13, 2018. The white-nationalist movement — which includes alt-right, traditionalist and neo-Nazi groups — has been on the rise in the United States and Europe.

Racism produces race
(not the other way
around)

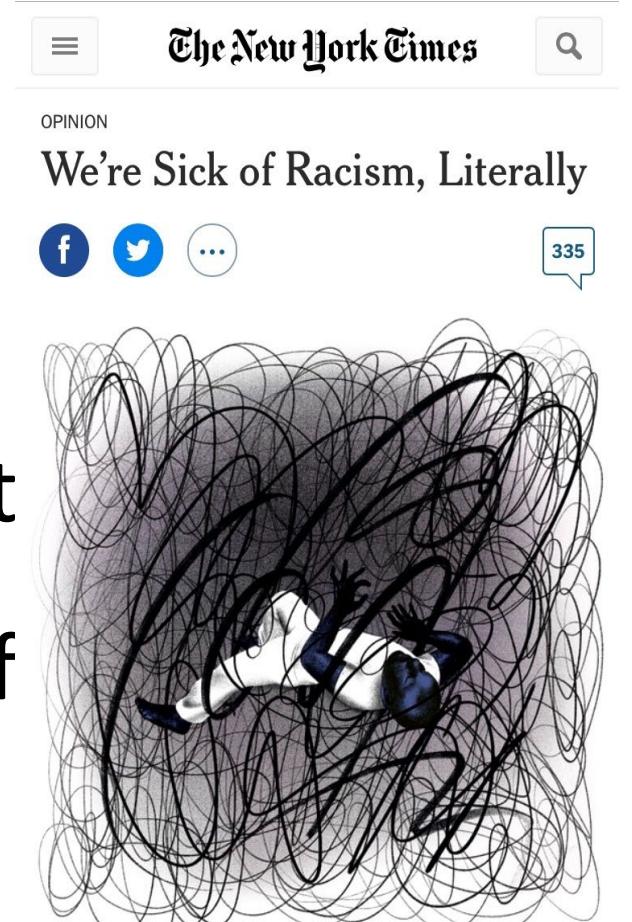
- Conclusion 4-1: Race is neither useful nor scientifically valid as a measure of the structure of human genetic variation.
- Recommendation 1: Researchers should not use race as a proxy for human genetic variation.



Embodying Racism

“Race is not a biological category that naturally produces health disparities because of genetic differences. Race is a political category that has staggering biological consequences because of the impact of social inequality on people’s health”

Fatal Invention, 129



ANGIE WANG

By DOUGLAS JACOBS
NOVEMBER 11, 2017

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HEALTH

Changing the equation: Researchers remove race from a calculator for childbirth

By Katie Palmer June 3, 2021

This Issue

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Viewpoint
June 6, 2019

Reconsidering the Consequences of Using Race to Estimate Kidney Function

Nwamaka Denise Eneanya, MD, MPH^{1,2}; Wei Yang, PhD³; Peter Philip Reese, MD, MSCE^{1,3}

➤ Author Affiliations
JAMA. 2019;322(2):113-114. doi:10.1001/jama.2019.5774

NEWS RELEASE 18-JUL-2022

Race-based spirometry equations may miss emphysema

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1. Race-based spirometry equations may miss emphysema

Findings suggest race-specific interpretations of spirometry may be normalizing structural racial inequities in respiratory health

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Evaluating the Impact and Rationale of Race-Specific Estimations of Kidney Function: Estimations from U.S. NHANES, 2015–2018

Jennifer W. Tsai, MD, MEd^{1,2}, Jessica P. Cerdeña, MPhil^{1,2}, William C. Goedel, PhD⁴, William S. Asch, MD, PhD¹, Vanessa Grubbs, MD, MPH¹, Mallika L. Mendo, MD, MBA⁵, Jay S. Kaufman, PhD^{1,3}

¹ Department of Emergency Medicine, Yale University School of Medicine, New Haven, CT
² Yale University School of Medicine, New Haven, CT
³ Department of Pathology and Cell Biology, Yale University, New Haven, CT
⁴ Division of Nephrology, Department of Internal Medicine, Yale University, New Haven, CT
⁵ Division of General Internal Medicine, Department of Medicine, University of California, San Francisco, CA
⁶ Division of Nephrology, Department of Internal Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA
⁷ Department of Epidemiology, Institute of Occupational Health, McGill University, Montréal, Québec, Canada

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ABSTRACT

Background: Standard equations for estimating glomerular filtration rate (eGFR) employ race modifiers, systematically inflating eGFR for Black patients. Such inflation is clinically important because eGFR thresholds of 60, 30, and 20 mg/min/1.73 m² guide kidney disease management. Because adjustment of eGFR in Black Americans may thereby affect their clinical care, In this study, we analyze area extrapolate

WHYY  

Using race to diagnose anemia in pregnancy led to poor birth outcomes for Black patients, study shows

By Sojourner Ahébée · August 21, 2021

A doctor holds a stethoscope on a pregnant person's belly. (VadimGuzhva/Bigstock)

For years, national medical guidelines have **defined anemia differently for patients who are Black**. Notably, over the years researchers and clinicians have observed significantly lower levels of iron in Black

Race-based diagnostics harm patients

c. Dorothy Roberts

Racial discrimination

Black Former N.F.L. Players Say Racial Bias Skews Concussion Payouts

The players say doctors use two scales — one for Black athletes, one for white — to determine eligibility for dementia claims.



Najeh Davenport's 2019 neurocognitive exam found that his executive functioning was diminished enough to qualify for compensation. The N.F.L. appealed the award and said that when his scores were recalculated accounting for race, he was ineligible for a payout. Jeffery Salter for The New York

≡ The New York Times

2021 N.F.L. Season > Week 6 Takeaways No Gruden, No Prob

Plan Filed to Scrap Race as Factor in N.F.L. Concussion Settlement

The revised agreement eliminates race as a consideration in evaluating dementia claims by former players.



By **Ken Belson**

Oct. 20, 2021

c. Dorothy Roberts



- Race correction shows a failure to recognize race-based medicine's harms.... I marvel that doctors aren't worried that race correction might contribute to African Americans' higher rate of end-stage kidney disease.
- Race correction shows a failure to understand the meaning of race and its connection to racism historically and today.
- The persistence of race correction shows an unwillingness from some in medicine to change.

THE LANCET

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18, JANUARY 02, 2021

Abolish race correction

Dorothy E Roberts 

Published: January 02, 2021 •