

Update on Race-Adjusted Clinical Algorithms: 2024

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Disclosures

Leo Gordon Eisenstein, M.D., faculty for this educational activity, has no relevant financial relationships with ineligible companies to disclose, and has indicated that the presentation or discussion will not include off-label or unapproved product usage.

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Learning objectives

- Examine the role of advocacy and organizing in the campaign to re-assess race-adjusted clinical algorithms
- Review various levers of institutional change, including: federal agencies, medical specialties' professional associations, and municipal public health departments
- Explore an application of the “Healing ARC” a framework for reparative justice in healthcare

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Black Lives Matter

- HMS Racial Justice Coalition, 2015
 - Medical school leadership
 - Recruitment
 - Curriculum
- *Race: social construct, or proxy for genetic difference*



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The NEW ENGLAND JOURNAL of MEDICINE

MEDICINE AND SOCIETY

Debra Malina, Ph.D., *Editor*

**Hidden in Plain Sight — Reconsidering the Use
of Race Correction in Clinical Algorithms**

Darshali A. Vyas, M.D., Leo G. Eisenstein, M.D., and David S. Jones, M.D., Ph.D.

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Class action lawsuit?

Anthony Randall: waiting more than five years for a kidney

Bringing a lawsuit against:

- Cedars-Sinai hospital, where he is listed as a transplant patient
- UNOS, the nonprofit organization that operates the U.S. transplant system.
- Asking a federal court to allow him to represent a class of 27,500 Black U.S. patients, who he argues have been similarly disadvantaged.



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Congressional action

Evidence-based Practice Center Systematic Review Protocol
Project Title: *Impact of Healthcare Algorithms on Racial and Ethnic Disparities in Health and Healthcare*

- **Fall 2020:** Congressional request for evidence review examining the use of race/ethnicity within healthcare algorithms, their impact on health disparities, and potential solutions
- AHRQ commissioned evidence review with the aim of informing guidance to mitigate bias in healthcare algorithms

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KQ1: Algorithms shown to perpetuate disparities

Summary Evidence Map

Direction of Effect: (arrow direction)

- ↑ Increase
- ↓ Decrease
- ↔ No effect
- *Not reported



Clinical Category	Algorithm	Key Question	Study	Study Design ^a	Disparities in Health outcome ^b	Disparities in Access ^c	Disparities in Quality ^d
Kidney function measurement	eGFR ^e	KQ 2	Ahmed 2021 ²¹	Modelling ^d	*	↑	*
	eGFR ^e	KQ 2	Inker 2021 ²²	Modelling ^d	*	*	↑
	eGFR ^e	KQ 2	Casal 2021 ⁶¹	Modelling ^d	*	↑	↑
	eGFR ^e	KQ 2	Duggal 2021 ⁶²	Modelling ^d	↑	*	↑
	eGFR ^e	KQ 2	Hoening 2022 ⁶⁴	Modelling ^d	*	*	↑
	eGFR ^e	KQ 2	Inker 2021 ⁶³	Modelling ^d	*	*	↑
	eGFR ^e	KQ 2	Mahmud 2022 ⁶⁷	Modelling ^d	↑	*	*
	eGFR ^e	KQ 2	Miller 2021a ⁶⁸	Modelling ^d	*	*	↑
	eGFR ^e	KQ 2	Panchal 2022 ⁶⁹	Modelling ^d	↑	↑	*
	eGFR ^e	KQ 2	Shi 2021 ⁷¹	Modelling ^d	↑	*	*
	eGFR ^e	KQ 2	Tsai 2021 ⁷²	Modelling ^d	↑	*	*
	eGFR ^e	KQ 2	Yap 2021 ⁷⁴	Modelling ^d	*	*	↑
	eGFR ^e	KQ 2	Zelnick 2021 ⁷³	Modelling ^d	↑	*	↑
eGFR ^e	KQ 2	Coresh 2019 ⁷⁰	Modelling ^d	*	*	↑	
Kidney transplant allocation	Kidney Donor Index	KQ 2	Julian 2017 ⁷⁵	Modelling ^d	*	*	↑
	Revised KAS ^e	KQ 1	Zhang 2018 ⁵⁸	Pre-post	*	↓	*
Severity of illness scores for Crisis Standards of Care	SOFA	KQ 1	Miller 2021b ⁵¹	Modelling ^d	*	↑	*
	SOFA, LAPS2	KQ 1 and 2	Ashana 2021 ⁵⁹	Modelling ^d	↑	↑	*
	APACHE Iva, OASIS, SOFA	KQ 1	Sarkar 2021 ⁵⁴	Modelling ^d	↑	*	*
Prostate Cancer Risk	PCPT ^e	KQ 1	Carbanaru 2019 ⁵⁷	Modelling ^d	*	*	↓
	KPCC RC ^e	KQ 1	Presti 2021 ⁵³	Modelling ^d	*	*	↓

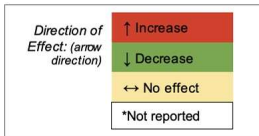
Source: Presentation by Kelley Tipton, MPH (ECRI) and Shazia M. Siddique, MD, MSHP (Penn School of Medicine), Racial Bias and Healthcare Algorithms Conference. March 2, 2023

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KQ1: Algorithms shown to perpetuate disparities

Evidence Map (Continued)

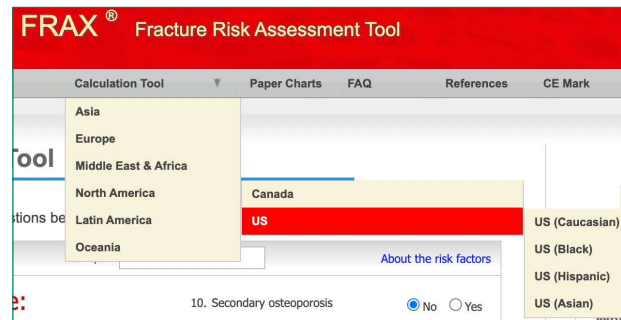


Clinical Category	Algorithm	Key Question	Study	Study Design ^a	Disparities in Health outcome ^b	Disparities in Access ^b	Disparities in Quality ^b
Liver transplantation	Donor Risk Index	KQ 2	Shores 2013 ³⁶	Modelling ^d	*	*	↑
Cardiovascular risk	ASCVD ^e	KQ 2	Weale 2021 ⁷³	Modelling ^d	*	*	↑
	Modified ASCVD ^e	KQ 2	Topel 2018 ⁷⁹	Modelling ^d	↑	*	*
	ASCVD ^e	KQ 2	Fairman 2020 ⁹⁴	Modelling ^d	↑	↑	*
	Pooled cohort equations ^e	KQ 2	Yadlowsky 2018 ⁹⁹	Pre-post	*	*	↑
	Framingham risk score ^e	KQ 2	Fox 2016 ⁸²	Modelling ^d	*	↑	*
Framingham risk score ^e	KQ 2	Drawz 2012 ⁸⁷	Modelling ^d	*	*	↑	
Lung Cancer Screening	USPSTF-2013	KQ 1	Pasquini 2021 ⁵²	Modelling ^d	*	↑	*
	USPSTF-2013	KQ 1	Han 2020 ⁵⁶	Modelling ^d	*	*	↑
USPSTF-2020	KQ 1	Landy 2021 ⁶⁶	Modelling ^d	↑	↑	*	
Lung Transplant Allocation	Lung Allocation System	KQ 1	Wille 2013 ⁹⁹	Pre-post	*	↓	*
Lung Function	GLI Spirometry Equation	KQ 2	Baugh 2022 ⁶⁰	Modelling ^d	*	*	↑
	GLI Spirometry Equation	KQ 2	Elmaleh-Sachs 2021 ⁴⁵	Modelling ^d	↑	*	*
Anticoagulation	Warfarin dosing algorithms ^c	KQ 2	Kimmel 2013 ⁸⁵	RCT	↑	*	*
	Warfarin dosing algorithms ^c	KQ 2	Limdi 2015 ⁸⁴	Prospective cohort	↑	*	*
	CHA ₂ DS ₂ -VASc	KQ 2	Kabra 2016 ⁸³	Modelling ^d	*	*	↑
Emergency Department Triage	HEART Pathway	KQ 1	Snively 2021 ⁵⁵	Pre-post	↔	*	↑
Other	Novel algorithm for high-risk care management	KQ 1 and 2	Obermeyer 2019 ⁸	Modelling ^d	*	↑	*
	Natural language processing algorithm	KQ 1 and 2	Thompson 2021 ⁸⁹	Modelling ^d	*	*	↑

Source: Presentation by Kelley Tipton, MPH (ECRI) and Shazia M. Siddique, MD, MSHP (Penn School of Medicine), Racial Bias and Healthcare Algorithms Conference. March 2, 2023

Professional Societies

- **NEJM 2020:** 13 race-adjusted algorithms identified
- **April 2023:** 11 of 13 have been changed
- **Outliers:**
 - Fracture Risk Assessment Tool
 - Society for Thoracic Surgeons



March 2023 development: PFT

AMERICAN THORACIC SOCIETY DOCUMENTS

Race and Ethnicity in Pulmonary Function Test Interpretation An Official American Thoracic Society Statement

Nirav R. Bhakta, Christian Bime, David A. Kaminsky, Meredith C. McCormack, Neeta Thakur, Sanja Stanojevic, Aaron D. Baugh, Lundy Braun, Stephanie Lovinsky-Desir, Rosemary Adamson, Jonathan Wiltonsky, Robert A. Wise, Sean D. Levy, Robert Brown, Erick Forno, Robyn T. Cohen, Meshell Johnson, John Balmes, Yolanda Mageto, Cathryn T. Lee, Refiloe Masekela, Daniel J. Weiner, Charlie G. Irvin, Erik R. Swenson, Margaret Rosenfeld, Richard M. Schwartzstein, Anurag Agrawal, Enid Neptune, Juan P. Wisnivesky, Victor E. Ortega, and Peter Burney; on behalf of the American Thoracic Society Committees on Pulmonary Function Testing and on Health Equity and Diversity

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY (ATS) WAS APPROVED BY THE ATS FEBRUARY 2023 AND ENDORSED BY THE EUROPEAN RESPIRATORY SOCIETY MARCH 2023

Key Conclusions and Recommendations

- PFT laboratories should adopt a race-neutral approach to PFT interpretation by reporting and interpreting results using average reference equations.

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NYC Coalition to End Racism in Clinical Algorithms



Michelle Morse, MD, MPH
Chief Medical Officer

Deputy Commissioner, Center for Health Equity and Community Wellness
New York City Department of Health and Mental Hygiene

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The Healing ARC framework

A reparative approach to institutional racism

1. *Acknowledgement*: the institution voices ownership and responsibility for inequities to the communities impacted
2. *Redress*: a compensatory step in addressing patients and communities harmed by institutional racism
3. *Closure*: explores community oversight as a means of ensuring fair restitution for inequities



A Reparative Approach

1. **Acknowledgment**
Voice responsibility
2. **Redress**
Take compensatory action
3. **Closure**
Ensure community agreement and oversight

Source: 11/18/2022 CERCA Meeting presentation by Bram Wispelwey, MD

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Next Steps: UNOS

UNOS Board of Directors,
June 2020:

Inclusion of a “modifier for patients identified as Black ... has led to a systemic underestimation of kidney disease severity for many Black patients. **Specifically in organ transplantation, it may have negatively affected the timing of transplant listing, or the date at which candidates qualify to begin waiting time for a transplant.**”

- By Jan 2024, transplant programs must:
- Assess their waiting lists
- Determine whether a race-neutral eGFR calculation shows Black patients should have qualified sooner to start gaining waiting time for a transplant
- **Submit waiting time modifications for Black candidates affected by race-inclusive eGFR calculations.**

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MDCalc: New Disclaimer

The screenshot displays two calculator pages from MDCalc. The left page is for 'CKD-EPI Equations for Glomerular Filtration Rate (GFR)' and the right page is for 'ASCVD (Atherosclerotic Cardiovascular Disease) 2013 Risk Calculator from AHA/ACC'. Both pages feature a red 'IMPORTANT' banner with updated disclaimers about race bias in the 2021 equations.

CKD-EPI Equations for Glomerular Filtration Rate (GFR) ☆
 Estimates GFR based on serum creatinine, serum cystatin C, or both.

IMPORTANT
 The 2021 CKD-EPI equation is now the recommended standard. This version does not include race, as do the 2009 and 2012 CKD-EPI creatinine and creatinine-cystatin C equations. [See here](#) for more on our approach to addressing race and bias on MDCalc. With the 2021 equation, for the same creatinine value, the 2021 equation will estimate a lower GFR for Black patients and a higher GFR for non-Black patients.

ASCVD (Atherosclerotic Cardiovascular Disease) 2013 Risk Calculator from AHA/ACC ☆
 Determines 10-year risk of heart disease or stroke.

IMPORTANT
 This calculator includes inputs based on race, which may or may not provide better estimates, so we have decided to make race optional. [See here](#) for more on our approach to addressing race and bias on MDCalc. For the same other inputs, this calculator estimates higher cardiovascular risk for African American patients.

Statement on Race: mdcalc.com/race

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Take-home messages

- Race is a social construct. The idea of the essential difference of the Black body has a rotten lineage in medicine, dating back to eugenics and justifications for slavery.
- Collective action and political organizing have a role in bringing about changes to medical practice.
- In addition to solving present-day problems of racial inequity, medicine as a field has a responsibility to pursue acknowledgement, redress, and closure with respect to past harms (The Healing ARC).

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Thank you!

Questions or feedback? Contact me at: leo.eisenstein@nychhc.org

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References

- Vyas, D. A., Eisenstein, L. G., & Jones, D. S. (2020). Hidden in plain sight—reconsidering the use of race correction in clinical algorithms. *New England Journal of Medicine*, 383(9), 874-882.
- Tipton, K., Leas, B. F., Flores, E., Jepson, C., Aysola, J., Cohen, J., ... & Siddique, S. M. (2023). Impact of Healthcare Algorithms on Racial and Ethnic Disparities in Health and Healthcare.
- Bhakta, N. R., Bime, C., Kaminsky, D. A., McCormack, M. C., Thakur, N., Stanojevic, S., ... & Burney, P. (2023). Race and ethnicity in pulmonary function test interpretation: an official American Thoracic Society statement. *American journal of respiratory and critical care medicine*, 207(8), 978-995.

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