Research spotlight

Updating the eGFR equation for kidney function

Background

- The estimated glomerular filtration rate (eGFR) algorithm included a race adjustment based on a false assumption that Black patients have higher muscle mass, overestimating kidney function in Black patients.
- The algorithm was designed by researchers to estimate kidney function, but has been misapplied as a hard cutoff in clinical workflows.
- The clinical use of the race-based eGFR algorithm led to delayed diagnosis, referrals, and transplant eligibility for Black patients.

> "A race variable used in an algorithm is faulty scientifically. The faultiness lies in race as a sociopolitical, and not a biological variable."
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> **— Sophia Kostelanetz, MD, MPH**
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> *Health Equity Lead, Department of Medicine, Office of Community Health and Health Equity, One Brooklyn Health*

Findings

- In response to growing concerns about race-based clinical algorithms used in healthcare decision-making and systems, the National Kidney Foundation (NKF) and the American Society of Nephrology (ASN) formed a joint Task Force in 2020 to evaluate the use of race in eGFR equations.
- The CKD-EPI research team, led by the same scientists who developed the original eGFR equations, recognized these concerns and conducted new studies to assess alternatives without the use of race.
- Upon review of 26 approaches for the estimation of GFR, the NKF-ASN Task Force provided key recommendations. For example:
    - **Endorsement of the CKD-EPI 2021 race-neutral equation**: "For US adults, we recommend immediate implementation of the CKD-EPI creatinine equation refit without the race variable in all laboratories in the US because it does not include race in the calculation and reporting, included diversity in its development, is immediately available to all laboratories in the US, and has acceptable performance characteristics and potential consequences that do not disproportionately affect any one group of individuals."
    - **Measuring cystatin C when feasible to improve precision:** "We recommend national efforts to facilitate increased, routine, and timely use of cystatin C,

especially to confirm eGFR in adults who are at risk for or have CKD, because combining filtration markers (creatinine and cystatin C) is more accurate and would support better clinical decisions than either marker alone. If ongoing evidence supports acceptable performance, the CKD-EPI eGFR–cystatin C (eGFRcys) and eGFR creatinine–cystatin C (eGFRcr-cys_R) refit without the race variables should be adopted to provide another first-line test, in addition to confirmatory testing."

Lessons learned

- ✔ The adoption of the CKD-EPI 2021 eGFR equation leads to more timely diagnosis of kidney disease, access to nephrology care, and more equitable transplant listing for Black patients.
- ✔ Additionally, the Organ Procurement and Transplantation Network (OPTN) now prohibits the use of any race-based variables in eGFR calculations based on the evidence of inequities. For example:
    - A study in the Journal of General Internal Medicine found that none of 64 Black patients with an eGFR of 23 mL/min were referred for transplant evaluation—though their eGFR would have fallen below the 20 mL/min referral threshold if the race adjustment were removed.
    - A study in the American Journal of Transplantation found that race-neutral eGFR calculations helped Black kidney transplant candidates regain an average of 2.7 years of waiting time.
- ✔ Healthcare institutions can analyze their own data to quantify the impact of this change—for example, by measuring how many years earlier a patient becomes eligible for transplant listing with the race-neutral compared to the previous race-based formula.
- ✔ De-implementing race-based eGFR algorithms and replacing them with the race-neutral equations opens the door to more equitable care for all patients and sets the precedent for critically examining every time race is used in clinical decision-making.

> "Measuring the harm and understanding the impact hyper-locally, for your own population served and patients within your facility, is critical to understanding the opportunity for impact."
>
> **— Sophia Kostelanetz, MD, MPH**
> *Health Equity Lead, Department of Medicine, Office of Community Health and Health Equity, One Brooklyn Health*

Citations

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