Estimated Glomerular Filtration Rate (eGFR) Changes

Update Calculation to the CKD-EPI 2021 Creatinine Equation

Go-Live June 24, 2025

NorDx System-Wide

Why change?

AACC/NKF Guidance Document on

Improving Equity in Chronic Kidney Disease Care

Why change?

AJKD

Special Report

A Unifying Approach for GFR Estimation: Recommendations of the NKF-ASN Task Force on Reassessing the Inclusion of Race in Diagnosing Kidney Disease

Cynthia Delgado, Mukta Baweja, Deidra C. Crews, Nwamaka D. Eneanya, Crystal A. Gadegbeku, Lesley A. Inker, Mallika L. Mendu, W. Greg Miller, Marva M. Moxey-Mims, Glenda V. Roberts, Wendy L. St. Peter, Curtis Warfield, and Neil R. Powe

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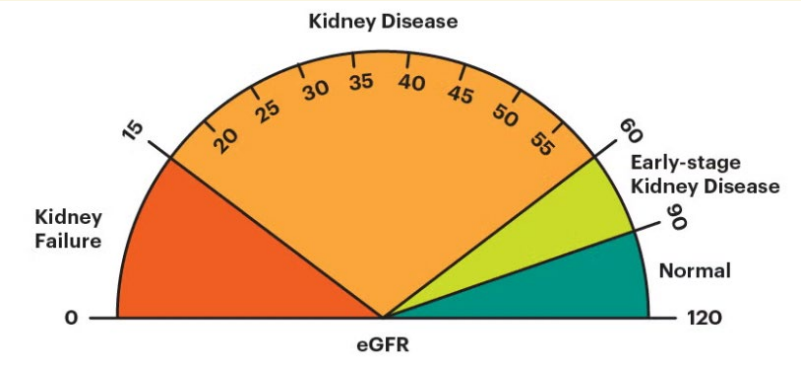
Recommendation 1

The Task Force recommends for US adults (>85% of whom have normal kidney function) that the CKD-EPIcr_R equation that was developed without the use of the race variable be implemented immediately, including in all laboratories. In addition to not including race in the calculation and reporting, it included diversity in its development, is immediately available to all laboratories in the United States, and has acceptable performance

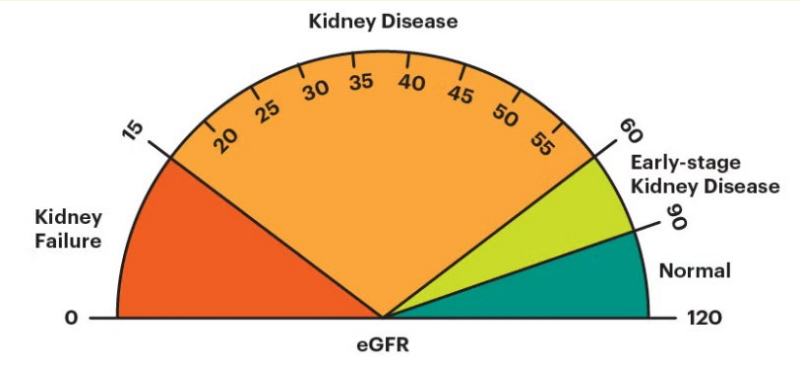
Why change?



Stage	Description	eGFR	Kidney Function
1	Possible kidney damage (e.g., protein in the urine) with ***normal*** kidney function	90 or above	90-100%
2	Kidney damage with ***mild loss*** of kidney function	60-89	60-89%
3a	***Mild to moderate*** loss of kidney function	45-59	45-59%
3b	***Moderate to severe*** loss of kidney function	30-44	30-44%
4	***Severe loss*** of kidney function	15-29	15-29%
5	Kidney ***failure***	Less than 15	Less than 15%

- Per the National Kidney Foundation, the 2021 CKD-EPI equation is more accurate than the MDRD study in higher levels of eGFR.
- It has been developed using a much broader data set and much broader array of eGFRs than either of the old MDRD formulae.
- The CKD-EPI equations are modeled to *measured* GFR markers using age and sex as variables for two slope splines of creatinine measurement.

Why change?



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- The new equation will report all values that will calculate from 0 – 200 mL/min/1.73 m^2.
- Single reference range >59.
- All adults 18 years and older.
- Reported in whole numbers.
- Interpretation will become a gradient rather than a threshold.

In adults, the normal eGFR number is usually more than 90. eGFR declines with age, even in people without kidney disease. See chart below for average estimated eGFR based on age.

Age (years)	Average eGFR
20–29	116
30–39	107
40–49	99
50–59	93
60–69	85
70+	75

Updates to the Calculation

Clinical Chemistry 68:4
511–520 (2022)

Special Report

National Kidney Foundation Laboratory Engagement Working Group Recommendations for Implementing the CKD-EPI 2021 Race-Free Equations for Estimated Glomerular Filtration Rate: Practical Guidance for Clinical Laboratories

W. Greg Miller,[a,*] Harvey W. Kaufman ,[b] Andrew S. Levey,[c] Joely A. Straseski,[d] Kelly W. Wilhelms,[e] Hoi-Ying (Elsie) Yu,[f] J. Stacey Klutts,[g] Lee H. Hilborne,[b] Gary L. Horowitz,[c] John Lieske ,[h] Jennifer L. Ennis,[i] James L. Bowling,[j] Mary Jane Lewis,[k] Elizabeth Montgomery,[k] Joseph A. Vassalotti,[l] and Lesley A. Inker[c]

Updates to the Calculation

Pre-June 24, 2025:

- $MDRD_{(race\ removed)}$ – Equation adjusted in 2005

MDRD Study Equation

eGFR =
175 x $(S_{Cr})^{-1.154}$ x
$(age)^{-0.203}$ x
0.742 [if female] x
~~1.212 [if Black]~~

Abbreviations / Units

eGFR (estimated glomerular filtration rate) = mL/min/1.73 m^2

S_{cr} (standardized serum creatinine) = mg/dL

age = years

- Not recommended for patients <18 years.
- Not recommended for patients >70 years.
- Not intended for reporting eGFR values >60.

Post-June 24, 2025

- $CKD\text{-}EPI\ 2021_{(race\ removed)}$ – Equation introduced in 2021

CKD-EPI Creatinine Equation (2021)

Formula

Expressed as a single equation:

eGFR =
142^{*}
$\min(\text{standardized } S_{cr}/K, 1)^{\alpha *}$
$\max(\text{standardized } S_{cr}/K, 1)^{-1.200 *}$
$0.9938^{Age *}$
1.012 [if female]

Abbreviations / Units

eGFR (estimated glomerular filtration rate) = mL/min/ 1.73 m^2

S_{cr} (serum creatinine) = mg/dL

K = 0.7 (females) or 0.9 (males)

α = -0.241 (females) or -0.302 (males)

min = indicates the minimum of S_{cr}/K or 1

max = indicates the maximum of S_{cr}/K or 1

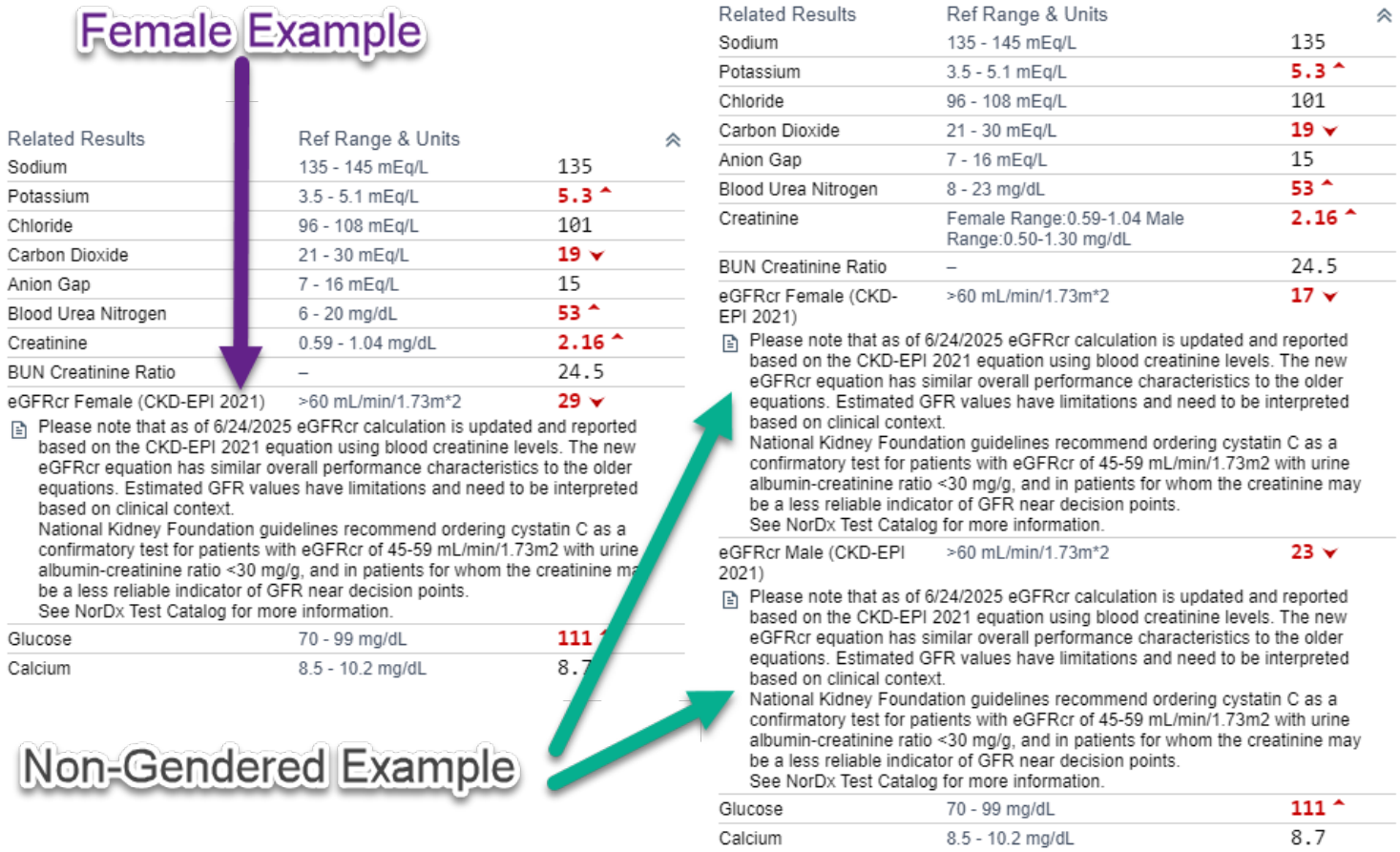
Changes to Result Display for Gender

- Pre-June 24,2025 state – eGFR is displayed as one result and uses patient's gender in the background
- When a patient gender is non-binary, or if responses in Epic for gender do not match, the eGFR calculation defaults to using the Female calculations and flagging rules
- Example of current state in Results Review

Blood Urea Nitrogen	6 - 20 mg/dL	53 ^
Creatinine	0.50 - 1.30 mg/dL	2.16 ^
BUN Creatinine Ratio	–	24.5
Glucose	70 - 99 mg/dL	168 ^
Per ADA guidelines these ranges are for fasting glucose only		
Protein	6.4 - 8.3 g/dL	5.4 v
Albumin	3.5 - 5.1 g/dL	2.7 v
Globulin	2.0 - 3.5 g/dL	2.7
Albumin/Globulin Ratio	–	1.0
Bilirubin	<=1.2 mg/dL	10.8 ^
Calcium	8.5 - 10.2 mg/dL	8.7
Alkaline Phosphatase	40 - 129 U/L	107
AST	8 - 48 U/L	55 ^
ALT	7 - 55 U/L	37
EGFR (MDRD)	>60.0 mL/min/1.73m(2)	32 v
This test has multiple limitations. Please see www.NorDx.org.		

Changes to Result Display for Gender

- Post-June 24, 2025 state – eGFR are displayed as a gendered result
- When a patient gender is non-binary, unknown, or if responses in Epic for gender do not match, both Male and Female eGFR calculations display for providers to determine which result better fits the patient
- Examples of results to the right

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