

Changes to eGFR Calculation and Reference Ranges

SUMMARY:

Effective March 11, 2014, all laboratories in the Methodist Health System are changing to a new equation (CKD-EPI) to calculate the estimated GFR (eGFR) at the recommendation of the Chronic Kidney Disease Epidemiology Collaboration. The new equation replaces the existing MDRD equation (from the Modification of Diet in Renal Disease study), which is only validated for eGFR less than 60 mL/min/1.73 m².

The new CKD-EPI equation is as accurate as the MDRD equation in the subgroup of patients with eGFR less than 60 ml/min and is substantially more accurate in the subgroup with eGFR greater than 60 ml/min. The new equation will allow reporting numerical eGFR values above 60, thus helping clinicians to more accurately state chronic kidney disease. **The normal range will be changed to equal to or greater than 90 mL/min/1.73 m² from the current range of equal to or greater than 60.** Neither the new equation nor the old equation has been validated in children less than 18 years, or in some racial or ethnic subgroups, including Hispanics.

DISCUSSION:

GFR is usually accepted as the best overall index of kidney function. Normal GFR varies according to age, sex and body size. In young adults, it is approximately 120-130 mL/min/1.73 m² and declines with age.

- In most healthy people, the normal GFR is 90 mL/min/1.73 m² or higher.
- A result of 60-90 mL/min/1.73 m² without kidney damage may be normal in some people (such as the elderly and infants).
- A result of 60-89 mL/min/1.73 m² for three months or more, along with kidney damage (such as persistent protein in the urine), indicates the person has early kidney disease.
- When the GFR is <60 mL/min/1.73 m² for three months or more, chronic kidney disease (CKD) is present.

MONITORING PROGRESSION OF CHRONIC KIDNEY DISEASE (CKD):

The level of GFR and its magnitude of change over time are vital to:

- Detecting kidney disease.
- Understanding the severity of kidney disease.
- Making decisions about diagnosis, prognosis and treatment.

A decrease in GFR precedes the onset of kidney failure. Therefore, a persistently reduced GFR is a specific diagnostic criterion for chronic kidney disease (CKD). Below 60 mL/min/1.73 m², the prevalence of complications of CKD increases, as does the risk of cardiovascular disease.

Current guidelines recommend using eGFR to monitor progression of CKD. Clinicians should not rely on monitoring serum creatinine to detect the level and rate of CKD progression. For example, for a 50 year-old white male:

- A change in serum creatinine from 1.0 to 2.0 mg/dl **reflects a decline in GFR of 46 mL/min/1.73 m².**
- Whereas a further increase in serum creatinine level from 2.0 to 3.0 mg/dL, **reflects a further decline of only 14 mL/min/1.73 m².**

STAGES OF CHRONIC KIDNEY DISEASE AND CLINICAL ACTION PLANS

STAGE	DESCRIPTION	GFR	CLINICAL ACTION PLAN
1	Kidney damage with normal or ↑GFR	≥ 90	Diagnosis and treatment, treatment of comorbid conditions, slow progression, CVD risk reduction
2	Kidney damage with mild ↓GFR	60-89	Estimating progression
3	Moderate ↓GFR	30-59	Evaluating and tracking complications
4	Severe ↓GFR	15-29	Preparation for kidney replacement therapy
5	Kidney failure	≤ 15	Kidney replacement therapy

The NKF recommended that clinical laboratories should be using the CKD-EPI equation to report estimated GFR (Becker RN, Vassalotti JA. A software upgrade: CKD testing in 2010. *Am J Kidney Dis.* 2010;55(1):8-10.

The National Kidney Disease Education Program has not, as of current date (Feb., 2014) fully endorsed the CKD-EPI equation, but does recommend its use for laboratories which report eGFR above 60 mL/min/1.73 m².

A good website for the calculator is <http://www.nephromatic.com/egfr.php>

Please contact Dr. Tom Williams at (402)354-4540 or 888-432-8980 with any questions or comments.