

MEMORANDUM

TO: All Physicians

FROM: Katalin Banki, M.D., Director of Core Laboratory *KB*
Stephen Gwilt, Supervisor, Core Laboratory

DATE: January 26, 2016

RE: Cystatin C with Estimated GFR

The Core Laboratory at Upstate Medical University Downtown campus will offer serum cystatin C level with an estimated GFR, starting February 2, 2016.

Background:

Cystatin C is a small cysteine proteinase inhibitor that is produced by all nucleated cells and filtered freely in the glomeruli. Similarly to creatinine, elevated serum cystatin C levels indicate decreased GFR.

Serum creatinine remains the primary assay for initial assessment of the GFR. However, in certain circumstances cystatin C is a more reliable marker of GFR (Ref.1), as it is not affected by body mass, diet, drugs, infections, or inflammation. However, uncontrolled hyperthyroidism, rapid cell turnover and steroid therapy are reported to increase its serum level, independent of kidney function.

In a recent meta-analysis, cystatin C-based eGFR was a better predictor of clinical outcomes, including death from any cause, death from cardiovascular causes and end-stage renal disease (Ref.2).

The estimated GFR will be calculated by the 2012 CKD-EPI cystatin C equation for patients between 18-90 years-of-age. The calculation does not require ethnic data. Numeric values are reported up to 120 mL/min/1.73 m².

$$eGFR = 133 \times \min(S_{cys}/0.8, 1)^{-0.499} \times \max(S_{cys}/0.8, 1)^{-1.328} \times 0.996^{Age} \times 0.932 \text{ [if female]}$$

Useful:

- In obese or malnourished patients, in children and in the elderly
- To validate the diagnosis of chronic kidney disease with an eGFR_{creat} 45–59 mL/min/1.73 m² and without albuminuria/other markers of kidney disease
- When precision is required for dosing (due to narrow therapeutic or toxic range) and/or estimates may be unreliable with creatinine (e.g., due to low muscle mass)

Memorandum: Cystatin C with Estimated GFR

Method: Particle-enhanced immunoturbidimetric assay, traceable to an international reference standard, by Roche.

Performed: 24/7

Turn-around Time: STAT: 90 minutes
Routine: 4 hours

Reference Ranges: Serum Cystatin C: 0-3 months 0.81–2.32 mg/L
4–11 months 0.65–1.49
1-50 years 0.50-1.25
>50 years 0.64-1.44
eGFR_{cys}: >60 mL/min/1.73 m²

References:

1. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney inter., Suppl.* 2013; 3: 1-150.
2. Shlipak, MG et al.: Cystatin C versus Creatinine in Determining Risk Based on Kidney Function *N Engl J Med* 2013; 369:932-43.