

Material from Lancet SA Newsletter - Compiled by: Dr David Rambau - February 2011

NEW eGFR calculation at Lancet Kenya

We have introduced a new prediction equation called eGFR(CKD-EPI). This replaces the MDRD equation, as it is substantially more accurate than MDRD equation at levels > 60 mL/min. It will be automatically applied on all creatinine results done at Lancet Kenya countrywide.

Prediction Equation

The previously recommended eGFR(MDRD) equation had major limitations of imprecision as well as systematic underestimation (bias) of GFR at levels greater than 60 mL/min. The latter lead to limiting reportable values to > 60 mL/min.

The Lancet Group of Laboratories has introduced a new prediction equation that replaces the MDRD equation called eGFR(CKD-EPI). The latter equation is as accurate as the MDRD equation at GFR levels < 60 mL/min and substantially more accurate than MDRD equation at levels > 60 mL/min.

eGFR (CKD-EPI) is a product of a multicentre Chronic Kidney Disease-Epidemiological Collaboration. It is based on the same MDRD 4 variables i.e. serum creatinine, age, sex and race.

However, van Deventer, HE published in Clinical Chemistry (2008) that, unlike African Americans, South African blacks do not require a correction factor for their estimated eGFR. Therefore, Lancet Group do not apply a correction factor for the reported eGFR.

The correction factor for blacks, as recommended by CKD-EPI collaborators is

1.159, i.e. reported eGFR x 1.159 = corrected eGFR. (see interpretation table)

Limitations of eGFR(CKD-EPI)

1. Extremes of body size may yield inaccurate estimates, e.g. Obesity and pregnancy.
2. It is currently limited to 18 - 85 years of age.
3. Oedematous state.
4. Not fulfilling steady state conditions e.g. recent creatinine changes due to meat ingestion and acute kidney failure. eGFR is
5. Only reliable under steady state conditions, i.e. stable creatinine concentration for > 4 days.

About Creatinine

Creatinine is formed from creatine in muscle and released into the blood stream at a fairly constant rate within an individual.

The main determinant of the amount of creatinine released into the circulation is muscle mass. The main route of creatinine excretion is glomerular filtration with renal tubular secretion and gastrointestinal losses providing minor excretory routes. The notable variable of, which may transiently affect the serum creatinine concentration, is cooked meat.

The latter has been shown to increase pre-prandial creatinine levels from 81 umol/L to 101 umol/L 2 hours post-prandially and 99 umol/L 4 hours postprandially. Therefore, serum creatinine concentration is mainly the function of muscle mass and glomerular filtration.

An individual with a stable renal function, without meat intake, would have creatinine variability not exceeding 4% in contrast to massive between individual creatinine variations. This renders population based creatinine reference intervals insensitive in detecting renal impairment. Creatinine becomes the best tool for detecting renal changes if creatinine concentrations are compared within the same individual over time.

Creatinine Clearance

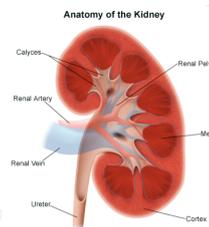
This concept is based on a theoretical volume of plasma which has been cleared completely of creatinine during its passage through the kidneys. This is associated with problems such as inaccurate urine collection and volume measurement, tubular secretion of creatinine and overestimation of creatinine clearance. The overestimation is increased in renal failure.

National Kidney Foundation; Disease Outcomes Quality Initiative stated in Ann Intern Med 2003; 139: 137 147, the following:

1. Estimates of GFR are the best overall indices of kidney function.
2. GFR should be estimated from a prediction equation.
3. Clinical laboratories should report an estimate of GFR using prediction equation, in addition to reporting serum creatinine.
4. Measurement of creatinine clearance using timed urine collections (e.g. 24 hours) does not improve the estimate of GFR.

Interpretation of eGFR(CKD-EPI): STAGES OF CHRONIC KIDNEY DISEASE

Stage	Description	eGFR(mL/min/1.73 m2)
Normal	Normal GFR with no evidence of kidney damage.	> 89
1	Normal or Increased GFR with evidence of kidney damage.	> 89
2	Kidney damage with mild decreased GFR	60 - 89
3	Moderately decreased GFR	30 - 59
4	Severely decreased GFR	15 - 29
5	Kidney failure	< 15



Main Laboratory / Headquarters
5th Avenue Office Suites
Opp. Traffic HQ - Upper Hill
5th Ngong Avenue | Ngong Road | Switchboard:
0703 061 000
Landlines: 020 273 5123, 271 6701 | 020
2508456, 271 6697
Mobile: 0729 111110, 0736 493100
Email: info@lancet.co.ke
Website: www.lancet.co.ke



M0462

PATHOLOGISTS LANCET KENYA BRANCHES

LANCET- MOMBASA

Biashara Building,
Tel: 0721 143 766

LANCET- KISUMU

WEDCO Centre on Oginga Odinga Street
Tel: 0726 838773

LANCET- THIKA

Thika Arcade
Tel: 020262 2633/ 0717414684

LANCET- EASTLEIGH

Alliance Medical Centre Madina Shopping
Mall Avenue Tel: 0717 414682

LANCET GA

Within Zenith Medical Centre
Tel: 0726 995 860

Prof. NELSON AWORI CENTRE

Next to Nairobi Hospital Tel: 0726 839341

LANCET- BURUBURU

Buruburu service point behind Misora
Tel: 0717414708

LANCET GARISSA

Mabruk House
Mobile: 0704 819 799

LANCET- ELDORET

KVDA Plaza
Tel: 0714 403 655

LANCET- PARKLANDS

Park Place , 1st floor
Tel: 0708727628

LANCET MALINDI

At Tawfiq Hospital
Mobile: 0721 143 766/

Mombasa - Links Plaza

Links Road, Nyali
Mobile: 0722 355 796