

Letterkenny University Hospital - LUH Antimicrobial Prescribing Policy/Guidelines: Assessing Renal Function

Assessing Renal Function

1. Published information on the effects of renal impairment on drug elimination has historically been stated in terms of [Creatinine Clearance \(CrCl\)](#), calculated using [Cockcroft & Gault](#) equation, as a surrogate for GFR.
2. The iCM system reports renal function as **eGFR (estimated glomerular filtration rate)** normalised to a body surface area of 1.73m^2 , calculated using the CKD-EPI equation.
3. Although the two measures of renal function are NOT interchangeable, for most drugs and for most adult patients of average build and height, eGFR (rather than CrCl) can be used to determine dosage adjustments.
4. The BNF now uses **eGFR** for dose reduction for **most** (but not all) drugs. **Exceptions** to the use of eGFR, where calculation of [creatinine clearance](#) (Cockcroft & Gault equation) is recommended, include:
 - Elderly patients aged 75 years and over.
 - Patients at extremes of muscle mass (BMI less than $18\text{kg}/\text{m}^2$ or greater than $40\text{kg}/\text{m}^2$).Nephrotoxic drugs and drugs with a narrow therapeutic index that are mainly renally excreted. The BNF doesn't specify which drugs but examples might include (these are also specified in the [dosing table](#)):
 - Aminoglycosides (e.g. Amikacin, Gentamicin, Tobramycin)
 - Vancomycin
 - Fosfarnet
 - Ganciclovir
 - Valganciclovir
5. Using serum creatinine to derive eGFR has a number of limitations; serum creatinine levels are dependent on muscle mass and diet, therefore estimates should be interpreted with caution in certain individuals (e.g. elderly patients, body builders, amputees, in muscle-wasting disorders and vegans) - estimates will be higher or lower than the true value.
6. Creatinine-derived measurements are also **not** useful in periods of **rapidly changing renal function** (e.g. critical care) or in patients with Acute Kidney Injury (AKI).
7. In principle, in the acutely critically ill patient with AKI, antimicrobials with wide therapeutic indices and minimal safety concerns e.g. beta lactams should/may be given at full dose for the first 24-48h. Regular monitoring of renal function is advised in acutely ill patients to ensure drug use and dosing is appropriate.
8. Dosing should be assessed on an individual patient basis, balancing risk versus benefit, and taking urine output and clinical picture into account.

[Cockcroft and Gault Equation](#) ([click here](#) to access an online calculator)

Creatinine Clearance (CrCl) (ml/min)

Calculate Ideal Body Weight (IBW) in kg (see below)

If actual body weight < IBW, use actual body weight in this equation

$$\frac{(140 - \text{age}) \times (\text{IBW in kg}) \times N}{\text{Serum creatinine (micromol/L)}}$$

Serum creatinine (micromol/L)

N = 1.23 males & 1.04 females

Ideal Body Weight (IBW) (kg) =

Male:

50kg + (2.3kg x inches over 5 feet) **OR** 50kg + (0.9kg x cm over 152cm)

Female:

45.5kg + (2.3kg x inches over 5 feet) **OR** 45.5kg + (0.9kg x cm over 152cm)