

PRESCRIBING IN RENAL IMPAIRMENT: INTRODUCTION TO THE RENAL DOSING TABLES V2.1

Scope of this guidance

This guideline and associated dosage adjustment tables are intended for use in the management of community infections only. The dosage tables contain simplified information for use of either eGFR or CrCl value.

Clinical judgement should be used alongside any estimates derived from equations or suggested dose adjustments. This guideline does not apply to pregnant patients, critically ill patients where renal function is changing rapidly or those with acute kidney injury. Caution should be used when prescribing in dehydrated or oedematous patients. For further information on dosing in renal impairment, please consult the product SPC on www.hpra.ie.







Specialist advice should be sought to identify suitable alternative agents if the drug to be prescribed is cautioned or contraindicated in the renal prescribing tables.

The National Medicines Information Centre (NMIC) clinical enquiry answering service is available to prescribers in Ireland for further information about the use of specific medicines in renal impairment. Contact details for the NMIC are available [here](#).

Checking renal function is an important component of antimicrobial stewardship and safe prescribing

- Several commonly prescribed antimicrobials do require dose adjustment in moderate to severe renal impairment.
- Many antimicrobials do not need dose adjustment in mild renal impairment. It is important not to undertreat infections.
- Checking renal function and adjusting antimicrobial dose or treatment regimen when appropriate:
 - optimises clinical outcome
 - prevents avoidable early discontinuation of antimicrobial therapy due to toxicity and adverse drug reactions
 - limits the selection of antimicrobial resistant strains.

5 Stages Of Kidney Disease

Stage 1	Stage 2	Stage 3A	Stage 3B	Stage 4	Stage 5
GFR \geq 90	89 \geq GFR \geq 60	59 \geq GFR \geq 40	44 \geq GFR \geq 30	29 \geq GFR \geq 15	GFR $<$ 15
					
Normal or high function	Mildly decreased function	Mild to moderately decreased function	Severely decreased function	Kidney failure	

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How to make dose adjustments in renal impairment

- Prior to prescribing, review recent estimates of renal function alongside the past pattern.
- If renal impairment is considered likely on clinical grounds, renal function should be checked before prescribing any drug which requires dose modification. Note that patients > 65 years of age are likely to have some degree of renal impairment.
- Estimated glomerular filtration rate (eGFR) and creatinine clearance (CrCl) are two estimates of renal function available to prescribers.

- **eGFR (calculated by MDRD or CKD-EPI formula, units: ml/min/1.73m²):**
 - usually calculated and reported by the laboratory when reporting renal function.
 - appropriate for most adult patients of average build and height and most drugs.
 - most likely to be inaccurate in people at extremes of body type (e.g. patients with limb amputations, severely malnourished and morbidly obese individuals).

- **CrCl (calculated by Cockcroft-Gault formula, units: ml/min):**
 - For the antibiotics listed on this website, creatinine clearance (CrCl) calculated using the Cockcroft-Gault equation should be used to determine dosage adjustments, as opposed to eGFR, in the following clinical situations:

- | |
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| <ol style="list-style-type: none">1. Elderly patients (aged 75 year and older)2. Patients at extremes of muscle mass (BMI <18kg/m² or >40kg/m²) |
|--|

- CrCl can be calculated using applications such as MDCalc (<https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation>)
 - If patient is overweight/obese, enter height to allow automatic calculation of adjusted body weight or ideal body weight as appropriate.
 - See the next page for a worked example using MDCalc

Use eGFR OR calculated CrCl figure to direct to relevant dosing column in renal dosing tables

Click below to access the renal dosing tables:

- [Antibacterial](#)
- [Antiviral](#)
- [Antifungal](#)
- [Anthelmintic](#)

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MDCalc worked example

How to calculate Cockcroft-Gault CrCl using the MDCalc application

Example: consider two patients, patient A and B:

Patient	Sex	Age (years)	Weight (kg)	Creatinine (µmol/L)	Height (cm)
A	M	40	80	100	180
B	M	40	80	100	160

The parameters should be filled into the website <https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation> as shown below and the results will display.

The calculator tell us the patient is of normal weight and therefore uses the Ideal Body weight	The calculator tells us the patient is overweight and therefore uses the adjusted body weight
Do you choose the CrCl value that uses the original equation, the adjusted weight or interpret the range?	
In most cases, the second answer (circled in the images above) which takes into account the patients height is the most accurate measure of renal function.	
<ul style="list-style-type: none"> - Ideal body weight should be used to calculate the CrCl. - Where the patient's actual body weight is less than their ideal body weight, actual body weight should be used instead. - For obese patients ideal body weight can be used, but some experts have suggested that an adjustment factor of 40% be applied to the patient's excess weight over their ideal weight i.e. adjusted ideal body weight = $[IBW + (0.4 \times ABW - IBW)]$. Clinical judgement is needed, e.g. if a patient's excess weight is due to high muscle mass not excess body fat, ABW should be used. - Others have proposed the use of a CrCl range for drug dosing purposes, with the lower boundary defined by using IBW in the C&G equation and the upper boundary by using actual body weight 	

Note: The MDCalc application uses the following:

Weight Category	BMI	Calculation Method
Underweight	BMI <18.5	Calculation uses actual/total body weight (i.e., no adjustment)
Normal weight	BMI 18.5-24.9	Calculation uses ideal body weight, range uses actual body weight
Overweight / obese	BMI ≥25	Calculation uses adjusted body weight, range uses ideal body weight