Cockcroft-Gault equation is the standard method for estimating creatinine clearance (CrCl) and drug dose adjustment in adults. It is recommended by the manufacturers of all Direct Oral Anticoagulants (DOACs - apixaban, dabigatran, edoxaban and rivaroxaban) for determining kidney function of patients when prescribing these agents. Studies have demonstrated that use of the Cockcroft-Gault equation allows appropriate dosing of DOACs and minimises the risk of over anticoagulation. Estimated glomerular filtration rate (eGFR) should not be used, as data suggests this can lead to inappropriate dosing in up to 50% of patients.

**Cockcroft-Gault Equation**

<table>
<thead>
<tr>
<th>Creatinine Clearance (ml/min) = (140 – Age) x Weight (kg) x constant</th>
<th>Serum Creatinine (µmol/L)</th>
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<tbody>
<tr>
<td>Constant = 1.23 for male and 1.04 for female</td>
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</table>

The Cockcroft-Gault equation estimates CrCl using the patient’s age, weight, gender and serum creatinine. Inaccuracies in estimating CrCl with the equation are noted in extremes of bodyweight, especially in those who are obese.

**Current CrCl calculators embedded within GP IT systems do not give a reliable estimate of CrCl for the adjustment of DOAC doses and should not be used.**

We recommend use of the MD+CALC Cockcroft-Gault equation which recognises the need to adjust for bodyweight in obese individuals and will calculate a modified estimate of CrCl with a range that is based on ideal bodyweight (IBW) to adjusted body weight (ABW). This can be accessed using the link: https://www.mdcalc.com/creatinine-clearance-cockcroft-gault-equation or it can be downloaded as an app to an apple device or android app.

Always check the default units are correct when entering weight, serum creatinine and height. These can be changed using the drop down list if needed.

**Use the following as a guide:**

a) **Underweight** (BMI <18.5 kg/m²) individuals: estimate CrCl using actual body weight (box 1)

b) **Normal or overweight** (BMI ≥18.5 and <30 kg/m²) individuals: estimate CrCl using actual body weight (box 1)

c) **Obese or morbidly obese** (BMI ≥ 30 kg/m²) individuals: estimate a CrCl range using IBW and ABW that define the lower and upper boundaries (box 2). If the difference crosses over a DOAC dosing threshold, then assess bleeding and thrombosis risk to decide on suitable dose

If you have concerns about dose adjustments for DOACs based on estimating renal function using Cockcroft-Gault, please seek advice from your local anticoagulant service.
References