Calculating Renal Function (Creatinine Clearance) When Monitoring Direct Oral Anticoagulants (DOACs) For Safe and Effective Dosing Of Patients

1) Use blood results from within the last month and bodyweight (BW) from within the last year (unless obvious significant weight loss/gain).

2) Use **ACTUAL bodyweight** to calculate creatinine clearance (CrCl).

3) Use the Cockcroft-Gault (CG) equation to estimate CrCl, to reduce the risk of over and under-coagulation:


   NB. For primary care: EMIS users, the inbuilt CrCl calculator will correctly calculate renal function using actual bodyweight for patients on DOACs (but may not be accurate for initiating a DOAC). For SystmOne, use the MD+CALC formula. For Vision, use the inbuilt CrCl calculator.

4) Do not use estimated glomerular filtration rate (eGFR) which may overestimate renal clearance, especially in elderly patients with low body weight/ body mass index.

5) Seek specialist advice from the local anticoagulation service for:
   - extremes of bodyweight < 50kg or > 120kg as drug level monitoring may be required *(at initiation of treatment and if clinically indicated)*
   - patients on dialysis and patients with a CrCl <15ml/min as DOACs are contraindicated
   - heart failure patients with fluid overload- use dry weight/ euvoalaemic estimate
   - patients with extensive amputations, or neurological diseases (eg spina bifida, multiple sclerosis) and myopathy that may result in profound muscle loss.

6) Monitor renal function in line with the following recommendations:
   **more frequent monitoring if clinically indicated/advised by specialist or concomitant nephrotoxic medications are prescribed**

<table>
<thead>
<tr>
<th>Creatinine Clearance (CrCl)</th>
<th>Frequency of Monitoring**</th>
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<tbody>
<tr>
<td>&gt; 60ml/min</td>
<td>Every 12 months</td>
</tr>
<tr>
<td>30 to 60ml/min and/or aged &gt;75 years and/or frail†</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>&lt; 30ml/min</td>
<td>At least every 3 months <em>(dabigatran is contra-indicated)</em></td>
</tr>
<tr>
<td>&lt;15ml/min</td>
<td>All DOACs contraindicated - refer</td>
</tr>
</tbody>
</table>

±EHRA/ESC guidance 2018 recommends 6 monthly renal, liver function (LFT) and haemoglobin (Hb) monitoring for elderly and frail patients. See clinical frailty scale: [https://www.cgakit.com/fr-1-rockwood-clinical-fraility-scale](https://www.cgakit.com/fr-1-rockwood-clinical-fraility-scale)

† Note previous trends if chronic kidney disease (CKD): More frequent monitoring may be needed in people with previous variable or erratic renal function, and less frequent monitoring may be needed for those with stable results: [https://cks.nice.org.uk/chronic-kidney-disease](https://cks.nice.org.uk/chronic-kidney-disease)


**Approval date**: September 2019, updated December 2019  
**Review date**: December 2021 (or earlier if indicated)

South East London Area Prescribing Committee. A partnership between NHS organisations in South East London: Bexley, Bromley, Greenwich, Lambeth, Lewisham and Southwark Clinical Commissioning Groups (CCGs) and GSTFT/KCH/SLAM/ Oxleas NHS Foundation Trusts/Lewisham & Greenwich NHS Trust

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7) Refer to the individual drug summary of product characteristics (SPCs) concerning DOAC dosing for stroke prevention in non-valvular atrial fibrillation (NVAF):

Apixaban: https://www.medicines.org.uk/emc/search?q=%22apixaban%22
Dabigatran: https://www.medicines.org.uk/emc/search?q=dabigatran
Edoxaban: https://www.medicines.org.uk/emc/search?q=edoxaban
Rivaroxaban: https://www.medicines.org.uk/emc/search?q=rivaroxaban

And/or the British National Formulary: www.bnf.org or BNF Publications app.

References:

- Electronic medicines compendium (summary of product characteristics SPC) for apixaban, dabigatran, edoxaban, rivaroxaban (www.medicines.org.uk)

Online references accessed 25/09/2019 unless specified