

**ONCE DAILY GENTAMICIN DOSING AND MONITORING IN ADULTS  
POLICY**

**QUESTIONS AND ANSWERS**

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## 1. How to I calculate a gentamicin dose?

The online calculator is the preferred method for dosage calculation. It is accessible via FirstPort.

*(Follow the following links to access:*

***Firstport > Applications > MEDED > Drugs and prescribing > pharmacy calculators)***

The gentamicin calculator can also be accessed via the 'Antimicrobial companion App' available via Android Play Store and the Apple App store. (Select NHS Lanarkshire)

Before prescribing gentamicin, check that all sections of the cardex and the prescribing chart to ensure that at least 24 hours will have elapsed since the patient last received a dose.

After correctly entering the required patient details (age, height, weight, sex and creatinine) a complete treatment plan is populated for your patient. The dose, dosing interval and sampling information will all be clearly displayed. This can be printed out to help you prescribe accurately on the cardex and accompanying prescription chart (only available via meded calculator). The online calculator automatically uses maximum body weight to calculate creatinine clearance in those patients who are obese. It will also automatically round creatinine up to a minimum of 60micromoles/L, for those patients whose creatinine result is below this cut off. These are common causes of dosing errors when manual calculation is used.

If Firstport is not available the Antimicrobial Companion App should be used to calculate the gentamicin dose

## 2. How do I prescribe gentamicin on the cardex?

Gentamicin should be prescribed in the parenteral section of the cardex. The dose should be written 'as per chart' and no time should be circled. The actual dose and time should be written on the accompanying 'prescribing, administration and monitoring' chart.

Nursing staff should check the cardex and any other prescription charts at EVERY drug round.

The IV daily review section of the cardex should be completed daily to assess the ongoing need for gentamicin. The indication should also be documented in the allocated space on the cardex.

### **3. Can I give a dose of gentamicin without knowing my patient's renal function**

**e.g. in severe sepsis when following Sepsis 6 where antibiotics are required to be given within 1 hour?**

The policy gives guidance on what to do in this situation. If creatinine is not known give a dose of 5mg/kg (maximum 400mg) or, if the patient has a history of chronic kidney disease 5, give 2.5mg/kg (maximum 180mg) on the advice of senior medical staff. Use actual body weight for calculating the dose, up to a maximum of 400mg. Please note this should only be done in exceptional circumstances, most in-patients will have creatinine available.

### **4. How do I know if my patient has chronic kidney disease 5?**

If patients have any significant past medical history of chronic renal impairment, caution should be exercised. Generally these patients will have recent creatinine results on the labs system that can be used to estimate their usual renal function. Any patients who have creatinine clearance less than 10ml/minute or an estimated glomerular filtration rate (eGFR) of less than  $15\text{ml/min}/1.73\text{m}^2$  should be deemed as having chronic kidney disease 5. If you are unsure seek the advice of senior medical staff or pharmacy.

## **5. How should gentamicin be administered?**

The prescribed dose of gentamicin should be diluted in a 100mL bag of sodium chloride 0.9% and given over 30 minutes. This is to ensure peak concentrations in the body are reached early which is more beneficial to patients with severe sepsis.

## **6. When do I take levels?**

For patients with a creatinine clearance greater than or equal to 21ml/min a level should be taken 6-14 hours after the start of the first dose. Early sampling allows the next dose to be administered without delay. For patient with a creatinine clearance less than 21ml/min, a trough level should be checked after the first dose i.e. 24 hours after the start of the infusion. Renal function should be checked daily and levels checked at least every 2 days. In patients with unstable renal function, daily monitoring may be required.

Please ensure that the exact time of sampling is recorded on the 'prescribing, administration and monitoring' chart and on the sample request form.

## **7. What do I do when the level is back?**

Any levels taken should be followed up and a plan clearly documented in the patient's medical notes, the cardex and the prescription chart. Verbal communication of the plan should also be given to the nurse looking after the patient.

If creatinine clearance is  $\geq 21$  ml/min and treatment is to continue, plot the gentamicin concentration on the graph shown below & reassess the dose/dosing interval as indicated.

If creatinine clearance is  $< 21$  ml/min and treatment is to continue, give a further dose once the measured concentration is  $< 1$  mg/L.

The graph should not be used if the patient's renal function has changed significantly i.e. 15-20% change. Contact pharmacy for further advice on how to manage these patients. In patients with stable renal function levels should be checked at least every two days.

### **8. What other monitoring is needed while my patient is prescribed gentamicin?**

Gentamicin is nephrotoxic. Creatinine should be checked daily and the patient monitored for signs of renal toxicity (increase in creatinine or decrease in urine output). Seek advice if renal function is unstable (change in creatinine of >15-20%) and consider an alternative antibiotic.

Ototoxicity can also occur in patients treated with gentamicin. Patients should be monitored for new tinnitus, dizziness, poor balance, hearing loss or oscillating vision. For this reason treatment with gentamicin should only be continued longer than 3 days on microbiology advice. Any patient continuing on gentamicin for more than 3 days should be educated on ototoxicity and provided with the information leaflet 'Gentamicin and your ears'. Toxicity is associated with prolonged aminoglycoside use (usually >10 days but may be >72 hours and is secondary to drug accumulation within the inner ear. It is independent of drug concentration. Stop treatment if ototoxicity is suspected therapy. If gentamicin continues for > 7 days, consider referring to audiology for assessment.

### **9. Can I use the creatinine clearance calculated by the gentamicin calculator for drug dosage adjustments in renal impairment?**

No, the creatinine clearance calculated by the gentamicin calculator is based maximum body weight. Drug dosage adjustments are made using creatinine clearance calculated using ideal body weight. The IBW Creatinine Clearance calculator calculates the renal function

based on Ideal body weight. This can then be used for dosage adjustment in renal impairment. Follow guidance in *The Renal Drug Handbook* or drug SPC for dose reduction recommendations in renal impairment.

## **10. What is the difference between ABW, IBW and MBW and when should I use each one?**

*\*The online calculator is the safest method of determining a patient's creatinine clearance, initial gentamicin dose and dosing interval and monitoring requirements as it automatically adjusts for extremes of body weight\**

Actual body weight (ABW) is the exact weight of the patient when they are weighed. It is used along with creatinine clearance to determine an appropriate initial gentamicin dose.

Ideal body weight (IBW) is calculated using the following formulae:

*Males: 50kg + 2.3kg for each inch above 5 ft*

*Female: 45.5kg + 2.3kg for each inch above 5 ft*

This is thought to be the maximum 'healthy' body weight for a person depending on their height. It should only be used if manual calculation of MBW is required.

Maximum body weight (MBW) is IBW plus 20%. ( $MBW = IBW \times 1.2$ )

For patients on gentamicin, creatinine clearance is calculated using the Cockcroft Gault equation. Patients actual weight is used unless the patient's weight is equal to or higher than maximum body weight. If a patient's weight is equal to or higher than maximum body weight then maximum body weight should be used in the equation instead of actual weight.

The online calculators choose the correct weight for the patient and so these should always be used where available.

## **11. Where can I find more information?**

A copy of the gentamicin policy, the 'prescribing, administration and monitoring' chart, the online calculator calculator and a link to the Gentamicin Learnpro module are all available on the NHSL FirstPort intranet via the medical education link below:

<http://www.medednhsl.com/meded/start/welcome.asp>

LearnPro modules on the new policy are also available at:

<https://nhs.learnprouk.com/>.

To access the modules follow the following steps:

- Once logged into Learnpro click 'More learning' on top right of page
- Click on CPD heading
- Scroll down and tick 'NES: GaV – gentamicin GG+C and vancomycin' module
- Save at top of screen
- Click 'Learn' and go to CPD section to see new module added  
Module is green and red GaV
- Once in module access Gentamicin icon (GGC guidance – red)