

GENTAMICIN: Dosing and monitoring in children

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Gentamicin Dosing (except for endocarditis – see separate dosing below)

For obese children use Adjusted Body Weight for dosing
 (See Appendix 1 for calculation)

Table 1: INFANTS and CHILDREN (1 month – 18 years)

A Normal, stable renal function <i>Estimated creatinine clearance >90mL/min/1.73m²</i>	B Possible mild-moderate renal impairment <i>Estimated creatinine clearance 50 – 90mL/min/1.73m²</i>
<p style="text-align: center;">7mg/kg (max 500mg) every 24 hours</p> <p>MONITORING:</p> <ul style="list-style-type: none"> Do a trough level 2-4 hours before the 2nd dose Record blood sampling time on the request form and administration chart GIVE the next dose (no need to wait for a result before administering the next dose) Interpret the result of the assay before giving the 3rd dose <p style="text-align: center;">See table 3 for interpretation of levels and dose adjustment</p> <p>Target trough level < 1 mg/L</p>	<p style="text-align: center;">7mg/kg (max 500mg) every 24 hours</p> <p>MONITORING:</p> <ul style="list-style-type: none"> Do a trough level 2-4 hours before the 2nd dose Record blood sampling time on the request form and administration chart Send sample to biochemistry immediately CHECK the result BEFORE giving the next dose DELAY the next dose of gentamicin until the level is < 1mg/L <p style="text-align: center;">See table 3 for interpretation of levels and dose adjustment</p> <p>Target trough level < 1 mg/L</p>
C Moderate renal impairment (and haemofiltration patients) <i>Estimated creatinine clearance 20 – 50mL/min/1.73m²</i>	D Severe renal impairment (and peritoneal dialysis patients) <i>Estimated creatinine clearance <20mL/min/1.73m²</i>
<p style="text-align: center;">5mg/kg every 24 hours</p> <p>MONITORING:</p> <ul style="list-style-type: none"> Do a trough level 2-4 hours before the 2nd dose Record blood sampling time on the request form and administration chart Send sample to biochemistry immediately CHECK the result BEFORE giving the next dose DELAY the next dose of gentamicin until the level is < 1mg/L <p style="text-align: center;">See table 3 for interpretation of levels and dose adjustment</p> <p>Target trough level < 1 mg/L</p>	<p style="text-align: center;">2.5mg/kg STAT</p> <p>MONITORING:</p> <ul style="list-style-type: none"> Check level every 24 hours until <1mg/L Repeat 2.5mg/kg stat dose when levels < 1mg/L <p>Target trough level < 1 mg/L</p>
<p>Note: Treatment should not be continued beyond 7 days without discussing with a microbiologist. The risk of nephrotoxicity and ototoxicity increases with prolonged courses.</p>	

Table 2: NEONATES (under 28 days admitted to RACH Ward)

Chronological age (not gestational)	Dose
< 7 days (normal renal function*)	5mg/kg every 36 hours
≥ 7 – 28 days (normal renal function*)	5mg/kg every 24 hours
MONITORING: Target trough level < 1 mg/L	
<ul style="list-style-type: none"> Do a trough level 2-4 hours before the 2nd dose Record blood sampling time on the request form and administration chart Send sample to biochemistry immediately CHECK the result BEFORE giving the next dose <p style="text-align: center;">See table 3 for interpretation of levels and dose adjustment</p>	
<p>*If renal impairment or decreased urine output (defined as <1mL/kg/hour in neonates):</p> <ul style="list-style-type: none"> Do a trough level 2-4 hours before the following dose Record blood sampling time on the request form and administration chart Send sample to biochemistry immediately CHECK the result BEFORE giving the next dose DELAY the next dose of gentamicin until the level is < 1mg/L <p style="text-align: center;">See table 3 for interpretation of levels and dose adjustment</p>	

Gentamicin synergistic dosing for ENDOCARDITIS

The Primary Treatment Centre (cardiology) guideline should be followed. Obtain the guideline along with a dosing/level history for the patient from the PTC

If a decision needs to be made please follow the guideline from PIER below, until advice/guidelines from the primary treatment centre is obtained.

<https://www.piernetwork.org/guidelines.html>

Prescribing

- Prescribe on Antibiotics requiring therapeutic drug monitoring page of the paediatric drug chart
- Indicate on the Acute antimicrobial prescription pages that the patient is on gentamicin signpost to Antibiotics requiring therapeutic drug monitoring page

Administration

Follow MEDUSA [injectable medicines guide](#) (Paediatric section) for current guidance on administration of IV Gentamicin. Follow link, or access via Pharmacy intranet pages.

For patients on intermittent furosemide, doses should be spaced out as far as possible from doses of gentamicin.

Interpretation of gentamicin levels and dosing adjustment

Before interpreting levels, consider the following:

- Was the blood sample taken at the correct time, and is it a true trough specimen?
- Was the blood sample taken from the IV line used to infuse gentamicin?
- Has the patient's renal function or hydration status deteriorated or improved?
- Was the dose calculated using an estimated body weight?

CAUTION: renal function and gentamicin levels may require more frequent monitoring in patients receiving other nephrotoxic drugs e.g. acyclovir, ciclosporin, NSAIDs. If possible, avoid administration of gentamicin with other ototoxic drugs e.g. furosemide

TARGET TROUGH LEVEL IS < 1 mg/L

Avoid prolonged periods (more than 8 hours) when trough levels are below 1 mg/L

Avoid prolonged periods (more than 48 hours) when trough levels are above 1 mg/L

Trough level	Action
< 1 mg/L	<ul style="list-style-type: none"> • For neonates, continue the same dose and frequency • For group A, continue the same dose every 24 hours. Re-check levels and renal function twice-weekly • For groups B & C, continue the same dose every 24 hours. Re-check level 2 – 4 hours before the 3rd dose. If this is also < 1 mg/L, continue at the same dose every 24 hours and re-check gentamicin levels and renal function twice-weekly.
1 – 2 mg/L	<ul style="list-style-type: none"> • Re-check level every 6 hours until level < 1 mg/L. Then re-prescribe at the same dose but increase the dosing interval by 12 hours. • Re-check the levels 2-4 hours before the following dose is due, and ensure level is < 1 mg/L before the dose is given.
> 2 mg/L	<ul style="list-style-type: none"> • Re-check level every 12 hours until level < 1 mg/L. Then re-prescribe at the same dose but increase the dosing interval by 12 – 24 hours. • Re-check the levels 2 hours before the following dose is due, and ensure level is < 1 mg/L before the dose is given.
> 1 mg/L for > 48 hours	<ul style="list-style-type: none"> • For neonates, reduce dose to 2.5mg/kg and re-prescribe when level is < 1 mg/L • For infants and children, follow dosing instructions for group D.

Table 3: Interpretation of gentamicin levels and dosing adjustments

References

1. Paediatric Innovation, Education and Research Network (PIER). Gentamicin dosing in children. Last updated 21/02/2018
2. UKMi & NPPG. How should medicines be dosed in children who are obese? Published September 2018.

Appendix 1: Calculations

1. Calculating Adjusted Body Weight (AdjBW)

$$\text{AdjBW} = \text{IBW} + 0.35(\text{TBW} - \text{IBW})$$

IBW = Ideal body weight; TBW = Total body weight

2. Calculating Ideal Body Weight

$$\text{IBW} = \text{BMI}_{50} \times (\text{height in m})^2$$

BMI₅₀ = BMI at the 50th centile of a BMI chart for a child of that age

3. Calculating estimated creatinine clearance

$$\text{CrCl} = \frac{k \times \text{height (cm)}}{\text{Serum creatinine (micromol/L)}}$$

k = 30 (under 1 year old)

k = 40 (over 1 year old)