



# AMINOGLYCOSIDE DOSING AND MONITORING RECOMMENDATIONS IN PATIENTS ON PEDIATRIC SERVICE LINES

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### Amikacin Dosing

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### Laboratory Monitoring

Useful links:

[Pharmacokinetics Webpage](#)

[Pharmacokinetic Review \(Adult\)](#)

[Pharmacokinetic Review \(Pediatric\)](#)

Gentamicin/tobramycin		
Patient Population/Unit/Service	Empiric Dosing Recommendations	Timing of Initial Serum Concentrations
NICU	<p><u>0-4 weeks and less than 1200 g:</u> 2.5 mg/kg/dose IV q24h</p> <p><u>Less than 7 days and 1200-2000 g:</u> 2.5 mg/kg/dose IV q18h</p> <p><u>Less than 7 days and more than 2000 g:</u> 2.5 mg/kg/dose IV q12h</p> <p><u>7 days or older and 1200-2000 g:</u> 2.5 mg/kg/dose IV q12h</p> <p><u>7 days or older and more than 2000 g:</u> 2.5 mg/kg/dose IV q8h</p> <p><u>ECMO or cooling:</u> 2.5 mg/kg/dose IV q18h</p> <p><u>Peritoneal dialysis:</u> 2.5 mg/kg/dose IV q24h</p>	<ul style="list-style-type: none"> <li>• Serum concentrations generally not necessary for 36-48 hour sepsis evaluations, unless at risk for renal insufficiency</li> <li>• Peak and trough concentrations around 3<sup>rd</sup> dose</li> <li>• <u>ECMO or cooling:</u> trough prior to 2<sup>nd</sup> dose</li> <li>• <u>For PD:</u> check trough prior to 2<sup>nd</sup> dose</li> </ul>
PICU	<p><u>Treatment, normal renal function:</u> 3.5 mg/kg IV q12h</p> <p><u>Synergy (for endocarditis):</u> 1 mg/kg/dose IV q12h</p> <p><u>ECMO:</u> 2.5 mg/kg/dose IV q12h</p> <p><u>Acute renal insufficiency (CrCl less than 30):</u> 2.5 mg/kg IV q12h</p> <p><u>CRRT:</u> 3.5 mg/kg IV q12h</p> <p><u>HD:</u> 2.5 mg/kg IV x1 post dialysis</p>	<ul style="list-style-type: none"> <li>• <u>Treatment, synergy:</u> peak and trough concentrations around the 3<sup>rd</sup> dose</li> <li>• <u>ECMO, acute renal insufficiency, CRRT:</u> check trough prior to 2<sup>nd</sup> dose</li> <li>• <u>HD:</u> check trough 2 hours after next dialysis session</li> </ul>

Gentamicin/tobramycin		
Patient Population/Unit/Service	Empiric Dosing Recommendations	Timing of Initial Serum Concentrations
CHC (PCTU and 11W)	<p><u>Normal renal function, renal dysfunction, ECMO:</u> 2.5 mg/kg/dose IV q12h</p> <p><u>Peritoneal dialysis:</u> 2.5 mg/kg/dose IV q24h</p> <p><u>Synergy (for endocarditis):</u> 1 mg/kg/dose IV q12h</p>	<ul style="list-style-type: none"> <li>Check trough prior to 2<sup>nd</sup> dose for open chest prophylaxis, ECMO, or in patients with poor renal function (i.e., increased SCr and/or decreased UOP)</li> <li>Check trough prior to 3<sup>rd</sup> dose for rule-out sepsis evaluation, synergy, and NEC</li> <li><u>For PD:</u> check trough prior to 2<sup>nd</sup> dose</li> </ul>
Cystic Fibrosis Patients	<p><u>Traditional daily dosing for children less than 5 years OR who have failed to achieve once daily goals in the past:</u> 3.3 mg/kg/dose IV q8h</p> <p><u>High dose, extended interval (“once daily”) for children 5 years and older:</u> 10 mg/kg/dose IV q24h</p>	<ul style="list-style-type: none"> <li><u>Traditional daily dosing:</u> peak and trough concentrations around the 3<sup>rd</sup> or 4<sup>th</sup> dose</li> <li><u>High dose, extended interval:</u> 3-hour peak and 10-hour random concentrations after 2<sup>nd</sup> dose</li> <li>Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available</li> </ul>
PH/PBM	<p><u>&lt;18 years:</u> 7.5 mg/kg/dose IV q24h</p> <p><u>≥18 years:</u> 5 mg/kg/dose IV q24h</p>	<ul style="list-style-type: none"> <li>Used for empiric double coverage for gram negatives</li> <li>If concern for renal dysfunction: check trough prior to 2<sup>nd</sup> repeat dosing</li> <li>If continuing past 48 hours: 3-hour peak and 10-hour random concentrations after 2<sup>nd</sup> dose</li> <li>Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available</li> </ul>
<p>General dosing for children, <b>EXCEPT</b> in the following situations:</p> <ul style="list-style-type: none"> <li>Cystic fibrosis</li> <li>PH/BMT</li> <li>NICU patients</li> <li>PICU patients</li> <li>CHC patients</li> </ul>	<p><u>Normal Renal Function:</u> <u>Traditional dosing:</u> 2.5 mg/kg/dose IV q8h</p> <p><u>Synergy (for endocarditis):</u> 1 mg/kg/dose IV q8h</p> <p><u>Renal Dysfunction:</u> <u>Acute renal insufficiency (CrCl less than 30):</u> 2.5 mg/kg IV q12h</p> <p><u>Peritoneal dialysis:</u> 2.5 mg/kg/dose IV q24h</p> <p><u>Hemodialysis:</u> 2.5 mg/kg/dose IV x1 post dialysis</p>	<ul style="list-style-type: none"> <li><u>Traditional dosing:</u> peak and trough concentrations around the 3<sup>rd</sup> or 4<sup>th</sup> dose</li> <li><u>Synergy:</u> trough concentrations prior to the 3<sup>rd</sup> or 4<sup>th</sup> dose</li> <li><u>For PD:</u> check trough prior to 2<sup>nd</sup> dose</li> <li><u>For HD:</u> check trough 2 hours after next dialysis session</li> </ul>

Amikacin		
Patient Population/ Unit/Service	Dosing Recommendations	Timing of Initial Serum Concentrations
<b>Cystic Fibrosis Patients</b>	<p><u>Traditional dosing for children less than 5 years OR who have failed to achieve once daily goals in the past:</u> 10 mg/kg/dose IV q8h</p> <p><u>High dose, extended interval (“once daily”) for children 5 years or older:</u> 25 mg/kg/dose IV q24h</p>	<ul style="list-style-type: none"> <li>• <u>Traditional daily dosing:</u> peak and trough concentrations around the 3<sup>rd</sup> or 4<sup>th</sup> dose</li> <li>• <u>High dose, extended interval:</u> 3-hour peak and 10-hour random concentrations after 2<sup>nd</sup> dose</li> <li>• Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available</li> </ul>
<b>PH/PBM</b>	<p><u>&lt;18 years:</u> 20 mg/kg/dose IV q24h</p> <p><u>≥18 years:</u> 15 mg/kg/dose IV q24h</p>	<ul style="list-style-type: none"> <li>• Used for empiric double coverage for gram negatives in patients who have been on broad spectrum antibiotics ≥10 days</li> <li>• If concern for renal dysfunction: check trough prior to 2<sup>nd</sup> repeat dosing</li> <li>• If continuing past 48 hours: 3-hour peak and 10-hour random concentrations after 2<sup>nd</sup> dose</li> <li>• Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available</li> </ul>
<p><b>General dosing for children with normal renal function, <u>EXCEPT</u> in the following situations:</b></p> <ul style="list-style-type: none"> <li>• Cystic fibrosis</li> <li>• PH/BMT</li> <li>• NICU</li> <li>• CHC patients</li> <li>• ECMO</li> <li>• Renal dysfunction</li> </ul>	<p><u>Traditional dosing:</u> 7.5 mg/kg/dose IV q8h</p>	<ul style="list-style-type: none"> <li>• <u>Traditional daily dosing:</u> peak and trough concentrations around the 3<sup>rd</sup> or 4<sup>th</sup> dose</li> </ul>

Gentamicin/Tobramycin Goals	Traditional Dosing		Extended-Interval Dosing		
	Goal peak	Goal Trough	Goal Peak	Goal Trough	18-hr level
Gram positive synergy	3-5 (1 mg/kg) N/A (3 mg/kg)	<1	Do not use EIDA		
NICU	5-8	<2	Doesn't use EIDA		
Non-CF gram-negative infections	6-10	<1	20-30	<0.25	<1
Cystic fibrosis	10-12	<1.5	20-40	<0.25	<1

Amikacin Goals	Traditional Dosing		Extended-Interval Dosing		
	Goal peak	Goal Trough	Goal Peak	Goal Trough	18-hr level
Non-CF gram-negative infections	25-35	<6	40-60	<1	<4
Cystic fibrosis	25-40 (q8h) 40-60 (q12h)	<6 <6	80-120	<1	<4

Baseline Monitoring	Ongoing Lab Monitoring	Ongoing Drug Levels
<ul style="list-style-type: none"> <li>Serum Creatinine</li> <li>Urine Output</li> </ul>	<ul style="list-style-type: none"> <li><b>Serum creatinine</b> <ul style="list-style-type: none"> <li><u>ICU</u>: every 1-3 days</li> <li><u>Floor</u>: every 3-5 days</li> </ul> </li> <li><b>Urine output</b> - daily</li> </ul>	<ul style="list-style-type: none"> <li><b>Aminoglycoside peaks</b> <ul style="list-style-type: none"> <li>Not needed for most 36-48 hour rule outs unless cultures turn positive</li> <li><u>ICU</u>: after 3<sup>rd</sup>-4<sup>th</sup> dose if GNR + culture</li> <li><u>Floor</u>: after 3<sup>rd</sup>-4<sup>th</sup> dose if GNR + culture</li> <li><u>High dose, extended interval</u>: 3-hour peak and 10 hour random concentrations after 2<sup>nd</sup> dose</li> </ul> </li> <li><b>Aminoglycoside troughs</b> <ul style="list-style-type: none"> <li>Not needed for most 36-48 hour rule outs, unless at risk for or presence of renal insufficiency or cultures turn positive</li> <li><u>ICU</u>: dosing per level for changing renal function or every 2-3 days</li> <li><u>Floor</u>: every 5-7 days</li> <li><u>Hem/Onc</u>: twice weekly</li> </ul> </li> <li><b>Aminoglycoside high dose extended interval</b> <ul style="list-style-type: none"> <li><u>18 hour levels</u>: every 5-7 days after therapeutic levels achieved</li> </ul> </li> </ul>

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The recommendations in this guide are meant to serve as treatment guidelines for use at Michigan Medicine facilities. If you are an individual experiencing a medical emergency, call 911 immediately. These guidelines should not replace a provider's professional medical advice based on clinical judgment, or be used in lieu of an Infectious Diseases consultation when necessary. As a result of ongoing research, practice guidelines may from time to time change. The authors of these guidelines have made all attempts to ensure the accuracy based on current information, however, due to ongoing research, users of these guidelines are strongly encouraged to confirm the information contained within them through an independent source.

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