MICHIGAN MEDICINE
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AMINOGLYCOSIDE DOSING AND MONITORING RECOMMENDATIONS IN PATIENTS ON PEDIATRIC SERVICE LINES

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	0-4 weeks and less than 1200 g: 2.5 mg/kg/dose IV q24h Less than 7 days and 1200-2000 g: 2.5 mg/kg/dose IV q18h Less than 7 days and more than 2000 g: 2.5 mg/kg/dose IV q12h 7 days or older and 1200-2000 g: 2.5 mg/kg/dose IV q12h 7 days or older and more than 2000 g: 2.5 mg/kg/dose IV q8h ECMO or cooling: 2.5 mg/kg/dose IV q18h Peritoneal dialysis: 2.5 mg/kg/dose IV q24h	• Serum concentrations generally not necessary for 36-48 hour sepsis evaluations, unless at risk for renal insufficiency • Peak and trough concentrations around 3rd dose • ECMO or cooling: trough prior to 2nd dose • For PD: check trough prior to 2nd dose
PICU	Treatment, normal renal function: 3.5 mg/kg IV q12h Synergy (for endocarditis): 1 mg/kg/dose IV q12h ECMO: 2.5 mg/kg/dose IV q12h Acute renal insufficiency (CrCl less than 30): 2.5 mg/kg IV q12h CRRT: 3.5 mg/kg IV q12h HD: 2.5 mg/kg IV x1 post dialysis	• Treatment, synergy: peak and trough concentrations around the 3rd dose • ECMO, acute renal insufficiency, CRRT: check trough prior to 2nd dose • HD: check trough 2 hours after next dialysis session

Gentamicin/tobramycin		
Patient Population/Unit/Service	**Empiric Dosing Recommendations**	**Timing of Initial Serum Concentrations**
CHC (PCTU and 11W)	Normal renal function, renal dysfunction, ECMO: 2.5 mg/kg/dose IV q12h Peritoneal dialysis: 2.5 mg/kg/dose IV q24h Synergy (for endocarditis): 1 mg/kg/dose IV q12h	• Check trough prior to 2nd dose for open chest prophylaxis, ECMO, or in patients with poor renal function (i.e., increased SCr and/or decreased UOP) • Check trough prior to 3rd dose for rule-out sepsis evaluation, synergy, and NEC • For PD: check trough prior to 2nd dose
Cystic Fibrosis Patients	Traditional daily dosing for children less than 5 years OR who have failed to achieve once daily goals in the past: 3.3 mg/kg/dose IV q8h High dose, extended interval ("once daily") for children 5 years and older: 10 mg/kg/dose IV q24h	• Traditional daily dosing: peak and trough concentrations around the 3rd or 4th dose • High dose, extended interval: 3-hour peak and 10-hour random concentrations after 2nd dose • Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available
PH/PBM	<18 years: 7.5 mg/kg/dose IV q24h ≥18 years: 5 mg/kg/dose IV q24h	• Used for empiric double coverage for gram negatives • If concern for renal dysfunction: check trough prior to 2nd repeat dosing • If continuing past 48 hours: 3-hour peak and 10-hour random concentrations after 2nd dose • Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available
General dosing for children, EXCEPT in the following situations: • **Cystic fibrosis** • **PH/BMT** • **NICU patients** • **PICU patients** • **CHC patients**	*Normal Renal Function:* Traditional dosing: 2.5 mg/kg/dose IV q8h Synergy (for endocarditis): 1 mg/kg/dose IV q8h *Renal Dysfunction:* Acute renal insufficiency (CrCl less than 30): 2.5 mg/kg IV q12h Peritoneal dialysis: 2.5 mg/kg/dose IV q24h Hemodialysis: 2.5 mg/kg/dose IV x1 post dialysis	• Traditional dosing: peak and trough concentrations around the 3rd or 4th dose • Synergy: trough concentrations prior to the 3rd or 4th dose • For PD: check trough prior to 2nd dose • For HD: check trough 2 hours after next dialysis session

Amikacin		
Patient Population/ Unit/Service	**Dosing Recommendations**	**Timing of Initial Serum Concentrations**
Cystic Fibrosis Patients	Traditional dosing for children less than 5 years OR who have failed to achieve once daily goals in the past: 10 mg/kg/dose IV q8h High dose, extended interval ("once daily") for children 5 years or older: 25 mg/kg/dose IV q24h	• Traditional daily dosing: peak and trough concentrations around the 3rd or 4th dose • High dose, extended interval: 3-hour peak and 10-hour random concentrations after 2nd dose • Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available
PH/PBM	<18 years: 20 mg/kg/dose IV q24h ≥18 years: 15 mg/kg/dose IV q24h	• Used for empiric double coverage for gram negatives in patients who have been on broad spectrum antibiotics ≥10 days • If concern for renal dysfunction: check trough prior to 2nd repeat dosing • If continuing past 48 hours: 3-hour peak and 10-hour random concentrations after 2nd dose • Check doses from recent previous admissions; initiate most recent therapeutic dose; discuss with pharmacy if previous dose not available
General dosing for children with normal renal function, EXCEPT in the following situations: • **Cystic fibrosis** • **PH/BMT** • **NICU** • **CHC patients** • **ECMO** • **Renal dysfunction**	Traditional dosing: 7.5 mg/kg/dose IV q8h	• Traditional daily dosing: peak and trough concentrations around the 3rd or 4th dose

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

• Serum Creatinine
• Urine Output
	• **Serum creatinine**
	  ○ ICU: every 1-3 days
	  ○ Floor: every 3-5 days
	• **Urine output** - daily
		• **Aminoglycoside peaks**
		  ○ Not needed for most 36-48 hour rule outs unless cultures turn positive
		  ○ ICU: after 3rd-4th dose if GNR + culture
		  ○ Floor: after 3rd-4th dose if GNR + culture
		  ○ High dose, extended interval: 3-hour peak and 10 hour random concentrations after 2nd dose
		• **Aminoglycoside troughs**
		  ○ Not needed for most 36-48 hour rule outs, unless at risk for or presence of renal insufficiency or cultures turn positive
		  ○ ICU: dosing per level for changing renal function or every 2-3 days
		  ○ Floor: every 5-7 days
		  ○ Hem/Onc: twice weekly
		• **Aminoglycoside high dose extended interval**
		  ○ 18 hour levels: every 5-7 days after therapeutic levels achieved

Antimicrobial Subcommittee Approval: N/A	Originated: 02/2021
P&T Approval: 10/2016	Last Revised: 07/2021

Revision History:
7/21: Updated PH/PBM dosing recommendations