

Beaumont

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Therapeutic Drug Monitoring Blood Draw Timing

Document Type: Guideline

I. PURPOSE AND OBJECTIVE:

This guideline is provided to give instructions for the timing of blood collections when doing therapeutic drug monitoring.

II. PROCEDURE:

Therapeutic Drug Monitoring Blood Draw Timing

Drug	Time to Draw Trough	Time to Draw Peak	Usual Therapeutic Range
Amikacin ^{1,2}	Within 30 minutes prior to next dose	30 minutes after 30 minute IV infusion; immediately after 1 hour IV infusion; or 1 hour after IM injection	<p>Conventional Dosing: <u>Peak Levels:</u> Optimal: 20-30 mcg/mL Toxic: > 40 mcg/mL <u>Trough Levels:</u> Optimal: 4-10 mcg/mL</p> <p>Toxic: >10 mcg/mL Once-a-day/Extended Interval Dosing: <u>Peak Levels:</u> Optimal: 40-60 mcg/mL</p>

Drug	Time to Draw Trough	Time to Draw Peak	Usual Therapeutic Range
			Toxic Level: >30 mcg/mL Trough Levels: Optimal: < 4 mcg/mL Toxic: >4 mcg/mL
Carbamazepine ^{2,3,4}	Immediately before morning dose		Epilepsy: 4-12 mcg/mL Critical: >20 mcg/mL
Cyclosporine ^{2,5,6,7}	0 to 3 hours before the next scheduled dose	Not clinically used	Therapeutic: <u>Trough:</u> 100-400 ng/mL Critical: > 400 ng/mL <i>Depending on type of transplant and timing post-transplant</i>
Digoxin ^{2,8,9,10}	Immediately before next dose or at least 6-8 hours after last dose regardless of route of administration		Atrial Fibrillation: 0.8-2 ng/mL Heart Failure: 0.5-0.9 ng/mL Critical: >2.5 if <70 years old >2.0 if >70 years old
Flucytosine ^{2,11,12,13,14} (Ancobon) [®]		2 hours after an oral dose or 30 minutes after intravenous administration	Therapeutic: <u>Peak:</u> 30-80 mcg/mL Critical: ≥100 mcg/mL
Gentamicin ^{2,15,16}	Immediately before next dose	30 minutes after 30 minute IV infusion; immediately after 1 hour IV infusion; or 1 hour after IM injection	Conventional Dosing: <u>Peak:</u> 5-10 mcg/ml <u>Trough:</u> < 2 mcg/ml Critical: <u>Peak:</u> >20 mcg/ml <u>Trough:</u> > 2 mcg/ml Once-a-day/Extended Interval Dosing: <u>Peak:</u> 16-20 mcg/ml <u>Trough:</u> <0.5 mcg/ml Critical: <u>Peak:</u> >20 mcg/ml <u>Trough:</u> >2 mcg/ml

Drug	Time to Draw Trough	Time to Draw Peak	Usual Therapeutic Range
Lithium ^{1,2,17,18}	Immediately before next dose or More than 8-12 hours after dose.		Therapeutic: 0.6 - 1.2 mEq/L Critical: >2.0 mEq/L
Methotrexate ^{1,2}	Variable by method		Therapeutic level and toxic concentration vary depending on therapeutic approach
Phenobarbital ^{1,2,19}	Minimal peak-trough ration, exact time of sample not as important		Therapeutic: <u>Adults:</u> 20-40 mg/L Critical: >50 mg/L
Phenytoin ^{1,2,20,21}		4-8 hours after oral dose or 1 hour after IV dose	Therapeutic: <u>Total:</u> 10-20 mg/L <u>Free:</u> 1-2.5 mg/L <u>Neonate:</u> 8-15 mg/L Toxic (Total): >30 mg/L
Primidone ^{1,2}		Within 4 hours after dose	Therapeutic: <u>Adults:</u> 5-12 mg/L <u>Children (< 5 years old):</u> 7-10 mg/L Toxic: >15 mg/L
Quinidine ^{3,22}		Within 1 hour after PO dose of immediate release sulfate salt (82% Quinidine base) 3-6 hours after PO dose of gluconate salt (62 % Quinidine)	Therapeutic: 2-6 mg/L Critical: >6 mg/L
Streptomycin ²³	Immediately before next dose	Peak 60 min after IM/IV	Therapeutic: <u>Peak:</u> 15-40 mcg/mL <u>Trough:</u> <5 mcg/mL Toxic Levels: <u>Peak:</u> >40 mcg/mL <u>Trough:</u> >5 mcg/mL
Sirolimus ^{2,24,25}	0 to 3 hours before the next scheduled dose	Not clinically used	Therapeutic: <u>Trough:</u> 4-20 ng/mL Critical: >20 ng/mL Therapeutic ranges may vary by transplant

Drug	Time to Draw Trough	Time to Draw Peak	Usual Therapeutic Range
			type, concomitant immunosuppression, and timing post-transplant.
Tacrolimus ^{2,26,27}	0 to 3 hours before the next scheduled dose	Not clinically used	Therapeutic: <u>Trough:</u> 5-15 ng/mL Critical: >15 ng/mL Therapeutic ranges may vary by transplant type, concomitant immunosuppression, and timing post-transplant.
Theophylline ^{1,2,28}	Immediately before next dose	IV Bolus: 30 minutes after 30 minute IV infusion IV Continuous: 12-24 hours after start of infusion PO Immediate Release: 1 hour after dose PO Sustained Release: 4 hours after dose	Therapeutic: <u>Children:</u> 5-15 mcg/mL <u>Adult:</u> 10-20 mcg/mL Toxic: >25 mcg/mL
Tobramycin ^{1,2,29}	Immediately before next dose	30 minutes after 30 minute IV infusion; immediately after 1 hour IV infusion; or 1 hour after IM injection	Conventional Dosing: <u>Peak Levels:</u> Optimal: 5-10 mcg/mL Critical: > 12 mcg/mL <u>Trough Levels:</u> Optimal: < 2 mcg/mL Critical: >2.5 mcg/mL Once-a-day/Extended Interval Dosing: <u>Peak Levels:</u> Optimal: 16-20 mcg/mL Critical: > 20 mcg/mL <u>Trough Levels:</u> Optimal: < 0.5 mcg/mL Critical: > 2 mcg/mL
Vancomycin ^{1,2,30,31}	0 to 60 minutes before	1 hour after completion	Therapeutic:

Drug	Time to Draw Trough	Time to Draw Peak	Usual Therapeutic Range
	the next IV dose	of infusion	<u>Trough:</u> 10-20 mg/L <u>Peak:</u> No longer routinely monitored Critical: >25 mg/L
Valproate ³²⁻³⁵	Immediately prior to the morning dose. If unable draw morning levels, draw levels 12 hours post-dose.	N/A	Therapeutic: <u>Epilepsy:</u> 50-100 mcg/mL <u>Mania:</u> 85-125 mcg/mL (Depakote ER tablets) <u>Older adults:</u> 65-90 mcg/mL Critical: >150 mcg/mL
Voriconazole ³⁶⁻³⁸	30 minutes before next scheduled dose	N/A	Therapeutic: 2-5.5 mcg/mL Critical: >5.5 mcg/mL

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Approval Signatures

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Applicability

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