TRICORE

THERAPEUTIC DRUG MONITORING OPTIMAL SPECIMEN COLLECTION TIMES

The goal of therapeutic drug monitoring (TDM) is to ensure appropriate drug dosing by monitoring the concentration of drug within a patient's body, at specific time points, to determine if the drug concentration falls within a known therapeutic range. TDM is typically performed for drugs with narrow therapeutic ranges in order to avoid sub-therapeutic and/or potentially toxic levels.

Unless concerned for toxicity, TDM should be performed **after a drug has reached steady-state concentration**, which typically takes 5-7 half-lives. For some drugs (such as aminoglycoside antibiotics) both trough (pre-dose) and peak (post-dose) measurements are useful. For most drugs only trough measurements are needed. Trough samples should be collected at steady state just **before** a dose is given. Drugs with a long half-life (>24hr) have more flexibility in draw time. See below for estimated half-lives and sample collection times for common medications.

If toxicity is suspected, samples may be drawn at any time. Some drugs are recommended to be tested before steady state is reached to avoid accumulation of toxic concentrations.

DRUG CLASS	DRUG	ESTIMATED HALF-LIFE*	COLLECTION TIME
Antibiotics: Aminoglycosides	Amikacin	2 hrs	**Trough**: <30 min prior to dose **Peak**: 30 mins after intravenous infusion or 60 min after bolus injection
	Gentamicin	2 hrs	
	Tobramycin	2 hrs	
Antibiotics: Glycopeptides	Vancomycin	5-6 hrs	**Trough**: <30 min prior to dose **Peak**: 1-2 hrs after completion of infusion
Antiepileptic	Carbamazepine (Tegretol)	12-17 hrs	**Trough**: immediately prior to next dose
	Phenytoin (Dilantin)	IV: 10-12 hrs Oral: 7-44 hrs	**Trough**: immediately prior to next dose
	Phenobarbital	3-4 days	**Trough**: immediately prior to next dose
	Primidone (Mysoline)	10-15 hrs	**Trough**: immediately prior to next dose
	Valproate	6-20 hrs	**Trough**: immediately prior to next dose
Cardiac Glycoside	Digoxin	30-45 hrs	**Trough**: at least 8 hrs after last dose or immediately prior to next dose
Thymoleptic/ Mood Stabilizing	Lithium	16-38 hrs	**Trough**: 12 hrs after dose or immediately prior to next dose
Immunosuppressant	Cyclosporine	6-27 hrs	**Trough**: 12 hrs after dose or immediately prior to next dose
	Tacrolimus	12-30 hrs	**Trough**: 12 hrs after dose or immediately prior to next dose
	Sirolimus	46-86 hrs	**Trough**: 12 hrs after dose or immediately prior to next dose

* Estimated half-lives based on healthy adults with unimpaired renal and liver function.
Estimated half-life and collection times should be used in conjunction with clinical judgement of the healthcare team.

REFERENCES

Baselt, Randall C. *Disposition of Toxic Drugs and Chemicals in Man*, 2nd edition.

Moffat, Osselton, Widdop, Watts. *Clarke's Analysis of Drugs and Poisons*, 4th edition.

Murphy, John E. *Clinical Pharmacokinetics*, 6th edition.

Rifai, Nader. *Tietz Textbook of Clinical Chemistry and Molecular Diagnostics*. 6th edition.