

Therapeutic Drug Monitoring Unit

Title: Guideline for Therapeutic Drug Monitoring of Anti-Seizure Medication

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Authors: Sharon Allen-Phillips

Authorised By: Sharon Allen-Phillips and Petros Kampanis

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Guideline for Therapeutic Drug Monitoring of Anti-Seizure Medication

Anti-Seizure Medication	Ideal Sampling Time	Sample Volume (mL)	Time To Steady-State (Days)	Reference Range (mg/L)
Brivaracetam	Immediately before oral dose	0.2	1 to 2	0.2 to 2.0
Carbamazepine	Immediately before oral dose	0.2	2 to 4 ^A	4 to 12
Carbamazepine epoxide (pharmacologically active metabolite of carbamazepine)	Immediately before oral dose	0.2	7 ^A	Up to 2.3
Clobazam	Immediately before oral dose	0.2	7 to 10	30 to 300 (µg/L)
Desmethyl Clobazam (Pharmacologically active metabolite of clobazam)	Immediately before oral dose	0.2	7 to 10	300 to 3000 (µg/L)
Clonazepam	Immediately before oral dose	0.2	3 to 10	20 to 70 (µg/L)
Eslicarbazepine	Immediately before oral dose	0.2	3 to 4	3 to 35
Ethosuximide	Immediately before oral dose	0.2	8 to 12	40 to 100
Felbamate	Immediately before oral dose	0.2	3 to 5	30 to 60
Free Carbamazepine	Immediately before oral dose	0.5	2 to 4 ^A	1 to 3
Free Lamotrigine	Immediately before oral dose	0.5	3 to 8	1 to 7
Free Phenobarbital	Immediately before oral dose	0.5	15 to 30	5 to 18
Free Phenytoin	Immediately before oral dose	0.5	6 to 21	1 to 2
Free Valproic Acid	Immediately before oral dose	0.5	2 to 4	5 to 10
Gabapentin	Immediately before oral dose	0.2	1 to 2	2 to 20
Lacosamide	Immediately before oral dose	0.2	2 to 3	10 to 20
Lamotrigine	Immediately before oral dose	0.2	3 to 8	3 to 15
Levetiracetam	Immediately before oral dose	0.2	1 to 2	12 to 46
10-Hydroxycarbamazepine (pharmacologically active oxcarbazepine)	Immediately before oral dose	0.2	2 to 3	3 to 35
Phenobarbital	Immediately before oral dose	0.2	15 to 30	10 to 40
Perampanel	Immediately before oral dose	0.2	10 to 19	200 to 1000 (µg/L)
Phenytoin	Immediately before oral dose	0.2	6 to 21	10 to 20
Pregabalin	Immediately before oral dose	0.2	1 to 2	2 to 8
Primidone	Immediately before oral dose	0.2	2 to 5	5 to 10
Rufinamide	Immediately before oral dose	0.2	1 to 2	30 to 40

Anti-Seizure Medication	Ideal Sampling Time	Sample Volume (mL)	Time To Steady-State (Days)	Reference Range (mg/L)
Stiripentol	Immediately before oral dose	0.2	1 to 3	4 to 22
Tiagabine	Immediately before oral dose	0.2	1 to 2	20 to 200 (µg/L)
Topiramate	Immediately before oral dose	0.2	4 to 7	5 to 20
Valproic Acid	Immediately before oral dose	0.2	2 to 4	50 to 100
Vigabatrin	Immediately before oral dose	0.2	1 to 2	2 to 36
Zonisamide	Immediately before oral dose	0.2	9 to 12	10 to 40

^A If carbamazepine is being introduced for the first time, steady-state is only achieved after 20 days of treatment due to autoinduction.

- Carbamazepine, eslicarbazepine, gabapentin, lacosamide, levetiracetam, pregabalin, rufinamide, tiagabine, valproic acid and vigabatrin exhibit significant diurnal variation, sampling time in relation to dose is critical.
- During therapy with primidone, monitoring of only the active metabolite phenobarbital is recommended in most circumstances.

All tests are available for blood (plasma or serum) and saliva. All anti-seizure medication assays are available as total plasma or serum concentrations or as free non-protein-bound concentrations.