

## Guidelines for Therapeutic Drug Monitoring of Antiepileptic Drugs

Antiepileptic Drug	Ideal sampling time	Sample volume (mL)	Time to steady-state (days)	Reference range (mg/L)
Brivaracetam	Immediately before an oral dose	0.2	1-2	0.2-2.0
Carbamazepine	Immediately before an oral dose	0.2	2-4 <sup>A</sup>	4-12
Carbamazepine epoxide (pharmacologically active)	Immediately before an oral dose	0.2	7 <sup>A</sup>	up to 2.3
Clobazam	Immediately before an oral dose	0.2	7-10	30-300 (µg/L)
Desmethyl clobazam (pharmacologically active metabolite of clobazam)	Immediately before an oral dose	0.2	7-10	300-3000 (µg/L)
Clonazepam	Immediately before an oral dose	0.2	3-10	20-70 (µg/L)
Eslicarbazepine	Immediately before an oral dose	0.2	3-4	3-35
Ethosuximide	Immediately before an oral dose	0.2	8-12	40-100
Felbamate	Immediately before an oral dose	0.2	3-5	30-60
Free carbamazepine	Immediately before an oral dose	0.5	2-4 <sup>A</sup>	1-3
Free lamotrigine	Immediately before an oral dose	0.5	3-8	1-7
Free phenobarbital	Immediately before an oral dose	0.5	15-30	5-18
Free phenytoin	Immediately before an oral dose	0.5	6-21	1-2
Free valproic acid	Immediately before an oral dose	0.5	2-4	5-10
Gabapentin	Immediately before an oral dose	0.2	1-2	2-20
Lacosamide	Immediately before an oral dose	0.2	2-3	10-20
Lamotrigine	Immediately before an oral dose	0.2	3-8	2.5-15
Levetiracetam	Immediately before an oral dose	0.2	1-2	12-46
10-hydroxycarbamazepine (pharmacologically active metabolite of oxcarbazepine)	Immediately before an oral dose	0.2	2-3	3-35
Phenobarbital	Immediately before an oral dose	0.2	15-30	10-40
Perampanel	Immediately before an oral dose	0.2	10-19	200-1,000 (µg/L)
Phenytoin	Immediately before an oral dose	0.2	6-21	10-20

Pregabalin	Immediately before an oral dose	0.2	1-2	2-8
Primidone	Immediately before an oral dose	0.2	2-5	5-10
Rufinamide	Immediately before an oral dose	0.2	1-2	30-40
Stiripentol	Immediately before an oral dose	0.2	1-3	4-22
Tiagabine	Immediately before an oral dose	0.2	1-2	20-200 (µg/L)
Topiramate	Immediately before an oral dose	0.2	4-7	5-20
Valproic acid	Immediately before an oral dose	0.2	2-4	50-100
Vigabatrin	Immediately before an oral dose	0.2	1-2	0.8-36
Zonisamide	Immediately before an oral dose	0.2	9-12	10-40

<sup>A</sup> 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, retigabine, 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 antiepileptic drug assays are available as **total** plasma or serum concentrations or as **free** non-protein-bound concentrations.