

## 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	2	0.2-2.0
Carbamazepine	Immediately before an oral dose	0.2	4 <sup>A</sup>	4-12
Carbamazepine epoxide (pharmacologically active)	Immediately before an oral dose	0.2	4 <sup>A</sup>	up to 2.3
Clobazam	Immediately before an oral dose	0.2	7	30-300 (µg/L)
Desmethyl clobazam (pharmacologically active metabolite of clobazam)	Immediately before an oral dose	0.2	10	300-3000 (µg/L)
Clonazepam	Immediately before an oral dose	0.2	10	20-70 (µg/L)
Eslicarbazepine	Immediately before an oral dose	0.2	3	3-35
Ethosuximide	Immediately before an oral dose	0.2	12	40-100
Felbamate	Immediately before an oral dose	0.2	5	30-60
Free carbamazepine	Immediately before an oral dose	0.5	4	1-3
Free lamotrigine	Immediately before an oral dose	0.5	7	1-7
Free phenobarbital	Immediately before an oral dose	0.5	29	5-18
Free phenytoin	Immediately before an oral dose	0.5	21	1-2
Free valproic acid	Immediately before an oral dose	0.5	3	5-10
Gabapentin	Immediately before an oral dose	0.2	2	2-20
Lacosamide	Immediately before an oral dose	0.2	3	10-20
Lamotrigine	Immediately before an oral dose	0.2	7	3-15
Levetiracetam	Immediately before an oral dose	0.2	2	12-46
10-hydroxycarbamazepine (pharmacologically active metabolite of oxcarbazepine)	Immediately before an oral dose	0.2	3	3-35
Phenobarbital	Immediately before an oral dose	0.2	29	10-40
Perampanel	Immediately before an oral dose	0.2	20	Not established
Phenytoin	Immediately before an oral dose	0.2	21	10-20

Pregabalin	Immediately before an oral dose	0.2	2	2-8
Primidone	Immediately before an oral dose	0.2	4	5-10
Retigabine	Immediately before an oral dose	0.2	2	Not established
Rufinamide	Immediately before an oral dose	0.2	2	30-40
Stiripentol	Immediately before an oral dose	0.2	7	4-22
Tiagabine	Immediately before an oral dose	0.2	2	20-200 (µg/L)
Topiramate	Immediately before an oral dose	0.2	5	5-20
Valproic acid	Immediately before an oral dose	0.2	4	50-100
Vigabatrin	Immediately before an oral dose	0.2	2	2-36
Zonisamide	Immediately before an oral dose	0.2	15	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.