Advice

- An assessment of the appropriateness of the timing of the blood sample is necessary before making any dosage adjustments.
- An assessment of compliance is essential before changing a dose regimen based on observation of a lower than expected concentration.
- Always assess the clinical status of the patient before increasing or decreasing the dose.
- After a change in dose, take another sample once the patient has achieved a new steady state (which may be up to five half-lives for the drug) or earlier if toxicity is suspected.
- For medicines with long half-lives, concentrations may be measured before reaching a new steady state in order to detect potentially toxic accumulation earlier (e.g. amiodarone, perhexiline and sirolimus).
- Medicines other than those included in Table D.11 may be monitored by selected laboratories, although clinical benefit is yet to be established. These include clozapine, isoniazid, lamotrigine, methotrexate, sotalol, teicoplanin, warfarin (to confirm resistance), mycophenolate mofetil, rifampicin, oxypurinol, procainamide, HIV protease inhibitors and non-nucleoside reverse transcriptase inhibitors (efavirenz, nevirapine).

Table D.11 Optimal concentration ranges for selected medicines

Medicine	Therapeutic range		Toxic concentration	Time to steady state	Comments
	Gravimetric units	Molar units (SI)			
Analgesics					
Paracetamol	10–30 microgram/mL	66–199 micromol/L	>195 microgram/mL 4 hours after ingestion. 100 microgram/L 4 hours after ingestion for those with alcohol-induced liver impairment on enzyme inducers or with HIV/AIDS	10–20 hours	Paracetamol levels are only indicated in cases of overdose. The time of ingestion must be obtained in order to assess whether the level is toxic or non-toxic
Salicylate	150–300 mg/L (anti-inflammatory) 300–400 mg/L (rheumatic fever)	1.0–2.5 micromol/L	>3.6 micromol/L (>500 mg/L)	5–7 days	Dose and urinary pH–dependent half-life
Anticonvulsants					**To monitor seizure control and sedation**
Carbamazepine	6–12 mg/L	20–40 micromol/L	>15 mg/L	7–10 days	Induces its own metabolism. Pre-dose testing not as critical with slow-release formulations
Phenobarbitone	10–40 mg/L (adult) 10–30 mg/L (child)	45–180 micromol/L (adult) 45–135 micromol/L (child)	>40 microgram/mL	14–20 days	
Phenytoin	Trough Total: 10–20 mg/L Unbound: 1–2 mg/L	Trough total: 40–80 micromol/L	>20 mg/L	5–7 days	Non-linear pharmacokinetics. Monitor adverse effects
Valproate	50–100 mg/L (up to 150 mg/L in some patients)	350–700 micromol/L	in some patients from >100 mg/L	3–5 days	Poor correlation between concentration and effect. Monitoring useful to confirm toxicity or assess compliance