Phenytoin	
Description	Phenytoin is an anticonvulsant drug, effective in the treatment of tonic-clonic and partial seizures.
Indication	Therapeutic drug monitoring.
Additional Info	Phenytoin (aka Dilantin) has a narrow therapeutic index and the relationship between dose and plasma concentration is non-linear. Small dosage increases in some patients may produce large rises in plasma concentrations with acute and toxic side effects.
Concurrent Tests	N/A
Dietary Requirements	N/A
Interpretation	The therapeutic range for phenytoin is 5.0-20.0 mg/L (Pathology Harmony 2011) in a pre-dose serum/plasma sample. The half-life is 7-42 hours and the time to reach steady state is 7-35 days. Toxicity occurs at levels >20 mg/L and severe toxicity occurs at >35 mg/L. Phenytoin is highly protein-bound and hepatic metabolism can become saturated. The pharmacological effect is due to free phenytoin which crosses biological membranes to exert its effect at specific binding sites. Valproate can displace phenytoin from protein and give a higher free phenytoin level. Phenytoin is an enzyme inducer and can result in the increased hepatic clearance of other drugs, e.g. carbamazepine. Similarly carbamazepine can induce the metabolism of other drugs including phenytoin.
Collection Conditions	Plain serum (Sarstedt white top) sample required, pre-dose.
Frequency of testing	As required if toxicity is suspected. When titrating dose changes measure as frequently as every 12 hours depending on clinical condition and therapy particularly if given as i.v therapy. Measure at least 5 days after dosage change during initial dose optimisation. As required from then on.