<table>
<thead>
<tr>
<th>DRUG</th>
<th>HALF LIFE (approx) (HOURS)</th>
<th>TIME TO STEADY STATE</th>
<th>SAMPLE TIMING</th>
<th>TARGET RANGE</th>
<th>COMMENTS</th>
</tr>
</thead>
</table>
| DIGOXIN            | Adults 38-77              | 6-13 days            | At least 6 hours after last dose | 0.8 – 2.0 μg/L | 1) Half life increased in renal and/or CCF  
2) Hypokalaemia potentiates toxicity |
| PHENYTOIN*         | ADULTS 20-40 But highly variable and dependent on dose | Variable 1-2 weeks (dose dependent) | Trough sample | 5 – 20 mg/L (Albumin-adjusted) | 1) Half life increased in chronic hepatic dysfunction  
2) Bioavailability varies between manufacturers |
| PRIMIDONE          | Adults 10-12              | 2-2.5 days           | No range for parent drug    | Measure Phenobarbitone |
| SODIUM VALPROATE   | Adults 6-17               | 3 days               | Immediately                 | 50 – 100 mg/L          | Not routinely available May be used to assess compliance |
|                    | Children 4-14             | 2 days               | Before Oral                 | 4 – 12 mg/L            | Threshold for toxicity may be reduced in multiple anticonvulsant therapy¹ |
| CARBAMAZEPINE      | Adults and children 5-27  | 2 weeks or more (1 week after adjusted dose) | Before Oral | 10 – 40 mg/L          | Alkaline urine may increase the rate of elimination |
| PHENOBARBITONE     | Adults 50-120             | 10-25 days           | Aim for: 0.6 – 0.8 mmol/L normally 0.8 – 1.0 mmol/L if patient has relapsed previously on Li or has sub-syndromal symptoms | 1) Half life increased in renal dysfunction  
2) Note that not all tablet preparations are slow release² |
|                    | Infants/Children 40-70    | 8-15 days            | 12- 14 hours post dose      | 10 – 20 mg/L           | 1) Half-life reduced by up to 50% in smokers  
2) Half life increased in hepatic failure |
| LITHIUM            | Adults 14-24 (up to 36 in the elderly) | 2-4 days           | Oral Dosing: 6-7 hours after slow release preparation | 10 – 20 mg/L           | 1) Half-life reduced by up to 50% in smokers  
2) Half life increased in hepatic failure |
| THEOPHYLLINE       | Adults (>16yrs): 8.7 (mean average) | 2 days           | 6 days                       | 10 – 20 mg/L           | 1) Half-life reduced by up to 50% in smokers  
2) Half life increased in hepatic failure |
|                    | Neonates 30               | 6 days               | 2 hours after syrup         | 10 – 20 mg/L           | 1) Half-life reduced by up to 50% in smokers  
2) Half life increased in hepatic failure |
|                    | Premature 30              | 5 days               |                              |                       |                                          |
|                    | Full term 24              |                      |                              |                       |                                          |

* See additional notes on Phenytoin reporting
Phenytoin reporting.

All phenytoin results are reported in the following panel, with an Adjusted Phenytoin value, calculated using the Scheiner-Tozer equation (see below) to take into account the effect of protein binding.

<table>
<thead>
<tr>
<th>Albumin</th>
<th>…</th>
<th>g/L</th>
<th>(35-50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenytoin</td>
<td>…</td>
<td>mg/L</td>
<td>(5-20)</td>
</tr>
<tr>
<td>Adjusted Phenytoin</td>
<td>…</td>
<td>mg/L</td>
<td>(5-20)</td>
</tr>
</tbody>
</table>

Albumin-adjusted phenytoin is a better guide to biologically active phenytoin than total levels when albumin is reduced. Interpret results with caution if albumin less than 20g/L or in the presence of other factors that may influence phenytoin binding (e.g., other highly protein-bound drugs, uraemia, hepatic impairment and pregnancy).

Scheiner-Tozer Equation

To adjust to an albumin concentration of 40g/L:

\[
\text{Adjusted Phenytoin} = \frac{\text{Phenytoin}}{(\text{Alb} \times 0.9) + 0.1} \\
\]

Telephoning Raised Phenytoin Levels

Adjusted phenytoin greater than 25 mg/L will be phoned.

References

see also
3) NICE guidelines for bipolar disorder (July 2006)

For Lamotrigine, Gabapentin, Topiramate and Vigabatrin see: Syva Drug Monitor Vol 2: issues 2, 5 and 10