<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           | Immediately       | 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               | Immediately       | 50 – 100 mg/L                       | Not routinely available. May be used to assess compliance               |
| CARBAMAZEPINE      | Adults and children 5-27    | 2 weeks or more (1 week after adjusted dose) | Before Oral Dose | 4 – 12 mg/L                         | Threshold for toxicity may be reduced in multiple anticonvulsant therapy¹ |
| PHENOBARBITONE     | Adults 50-120               | 10-25 days           | 12-14 hours post dose | 10 – 40 mg/L                       | Alkaline urine may increase the rate of elimination                     |
|                    | Infants/Children 40-70      | 8-15 days            | 12-14 hours post dose | 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             |
| LITHIUM            | Adults 14-24 (up to 36 in the elderly) | 2-4 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                               |
| THEOPHYLLINE       | Adults (>16yrs): 8.7 (mean average) | 2 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                               |
|                    | Neonates Premature 30 Full term 24 | 6 days 5 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                               |

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

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