This guideline and supporting information has been prepared with reference to the following:


UK Newborn Screening Programme Centre. www.ich.ucl.ac.uk/newborn/standards

### Screening

**In preterm infants, blood testing should be performed on day 6 and repeated at 36-40 weeks gestational age?**

Revised UK guidelines published in April 2005 (see above) made this recommendation, but with the proviso that it should be kept under review. A study (Korada, 2008) compared baseline readings of thyroid stimulating hormone (TSH) in 2238 preterm infants with second samples taken from 2039 infants. No infant with a normal TSH concentration on first sampling was found to have a reading of > 10mU/l on second sampling. The authors concluded that repeat sampling may not be required with a lower screening threshold of 6 mU/l.


**Evidence Level: IV**

### Immediate management

**Infants with congenital hypothyroidism have an increased incidence of other abnormalities?**

A study of registry data in the US (Kumar, 2009) showed that children with congenital hypothyroidism had a significantly increased risk of congenital renal and urological anomalies (OR 13.2; 95% CI 10.6-16.5). The other significantly increased defects in congenital hypothyroidism were cardiac, gastrointestinal, and skeletal. Analysis of matched data confirmed an increase of congenital renal and urologic anomalies (OR 4.8; 95% CI 3.7-6.3).


**Evidence Level: IV**

### Treatment

**A starting dose of 10 mcg/kg/d of thyroxine is appropriate? Do higher dose regimens result in adverse effects on memory, attention or behaviour?**

"What constitutes optimal TH therapy is not yet certain" (Rose, 2006). This dose is at the lower end of the range recommended by current American Academy of Pediatrics guidelines (Rose, 2006). These advise a starting dose of 10-15 mcg/kg/d, depending on the severity of the initial hypothyroidism. When a higher starting dose (12-17 mcg/kg/d) is used, serum T4 normalises in 3 days and TSH returns to the target range within 2 weeks (Bakkar, 2002). However, “evaluation of cognitive outcome is important after use of this increased dose” (Rose, 2006).

A cohort based follow up study of 49 young adults with early treated congenital hypothyroidism compared these with 41 matched sibling controls (Oerbeck, 2005). At age 20, those subjects given high dose (>7.8 mcg/kg/d) therapy displayed no adverse effects on higher order
cognitive skills, compared to those on low dose (<7.8 mcg/kg/d) treatment. The high dose group did, however, exhibit significant differences on some measures of memory, attention (distractibility) and behaviour. The authors concluded that their findings supported the use of higher dose treatment, but acknowledged that only 12 of their 49 subjects had been given doses of >10 mcg/kg/d, and that "definite answers to the outcome in high dose treatment groups await further studies".

The largest study to date looking at these outcomes was a systematic review of 14 cohort studies in 1321 patients (Hrytsiuk, 2002). This concluded that "The evidence for an effect of starting dose...on cognitive development, growth, or behavior is too weak to justify recommendations in favor of high- or standard-dose regimens."

The most severely hypothyroid infants are at risk for a 5-20 point decrease in IQ, and may benefit from a starting dose of 12-17 mcg/kg/d (LaFranchi, 2007).

A Cochrane Systematic Review of a single trial in 47 infants (Ng, 2009) concluded that there was insufficient evidence with which to answer this question.


LaFranchi SH, Austin J. How should we be treating children with congenital hypothyroidism? J Pediatr Endocrinol Metab 2007;20:559-78

Ng SM, Anand D, Weindling AM. High versus low dose of initial thyroid hormone replacement for congenital hypothyroidism. Cochrane Database of Systematic Reviews 2009, Issue 1. Art. No.: CD006972


Evidence Level: III

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