LEVOTHYROXINE

Indication	• Management of thyroid hormone deficiency[1] as a replacement or supplementation in patients with primary (thyroidal), secondary (pituitary), tertiary (hypothalamic) congenital or acquired hypothyroidism[2] • Prescribe under specialist paediatric endocrinology guidance[3]

ORAL

Presentation	• Tablet: 50 microgram o Commercially compounded product not available due to limited stability
Dosage (starting dose)[1-3]	• 5–15 microgram/kg daily (or as specified by specialist paediatric endocrinologist)
Preparation (if dose rounding NOT preferred)	• Place 50 microgram tablet into enteral syringe and add 5 mL water for injection[2] • Shake vigorously until evenly dispersed (may take up to 2 minutes) o *Concentration now equal to 10 microgram in 1 mL* • Reduce volume to prescribed dose and administer immediately o Do not allow solution to settle prior to administration
Preparation (if dose rounding preferred)	• If preferred (at SMO discretion), round dose to nearest half or whole tablet o If tablet halved, use a tablet cutter • Place tablet/tablet portion into enteral syringe and add 1–5 mL of water for injection • Shake vigorously until evenly dispersed (may take up to 2 minutes) • Administer the entire contents of the enteral syringe o Do not allow solution to settle prior to administration
Administration	• Oral/OGT/NGT on an empty stomach at the same time each day[1] o Either 30 minutes prior to feed or two hours after feed[1] (food impairs absorption) or other calcium or iron containing medication

Special considerations	• Multiple brands available that are not interchangeable.[1,4] Do not change brands without specialist paediatric endocrinology advice • Contraindications o Known hypersensitivity to levothyroxine[2,4] o Untreated hyperthyroidism[3] o Untreated primary or secondary adrenal insufficiency[4] • Cautions o Hypopituitarism and adrenal insufficiency: risk of acute adrenal crisis if used without glucocorticoid replacement[2,3] o If central hypothyroidism suspected, confirm ACTH sufficiency before levothyroxine commenced o Cardiovascular disorders: risk of arrhythmias[2,3] • If continuing after discharge, involve pharmacist in early discharge planning and education
Monitoring	• ECG until dosing stabilised[1] • TFTs as per specialist paediatric endocrinology guidance o Generally, within 1 to 2 weeks post commencement of therapy, then fortnightly until TSH has normalised[2] o Ideally, check TFT pre-dose, or 4 or more hours post administration • Adjust dose to maintain T4 concentration in the upper normal range and thyroid TSH concentration in the normal range[2]
Compatibility	• Not applicable
Incompatibility	• Not applicable

Interactions	• Separate by at least 2 hours from drugs that are known to impair absorption (e.g. calcium supplements, iron, multivitamin supplements)[2] • Phenytoin, phenobarbital, carbamazepine: may increase hepatic degradation of levothyroxine therefore increasing levothyroxine requirements[4] • Corticosteroid clearance (e.g. dexamethasone) may be increased in hyperthyroid and decreased in hypothyroid patients due to changes in administration, dosage or discontinuation of levothyroxine[4] o Corticosteroid dosage may require adjustment[4] o Discuss with pharmacist in conjunction with specialist paediatric endocrinology
Stability	• Tablet o As per manufactures instructions. Protect from light[4] • Dispersed solution o Light sensitive o Give immediately and discard remainder[2]
Side effects	• Overreplacement can cause manifestations of hyperthyroidism[3] • Circulatory: tachycardia[1], arrhythmias[1], idiopathic intracranial hypertension[1] • Digestive: diarrhoea[1], excessive weight loss/poor weight gain[1] • Musculo-skeletal: prolonged over-treatment can cause premature craniosynostosis and acceleration of bone age[2] • Nervous: tremor[1] flushing[1]
Actions	• Increases metabolic rate and involved in the regulation of cell growth and differentiation[4] • Tissue deiodination converts T4 to T3, the active metabolite[2]
Abbreviations	ACTH: adrenocorticotropic hormone, ECG: electrocardiogram, NGT: nasogastric tube, OGT: orogastric tube, SMO: most senior medical officer, TFT: thyroid function tests, TSH: thyroid stimulating hormone, T3: triiodothyronine, T4: thyroxine
Keywords	thyroid, endocrine deficiency TFT, hypothyroid, thyroidal, thyroxine, newborn bloodspot test, NBST, Guthrie card, neonatal screening test, NNST, thyroid function test, levothyroxine

The Queensland Clinical Guideline *Neonatal Medicines* is integral to and should be read in conjunction with this monograph. Refer to the disclaimer. Destroy all printed copies of this monograph after use.

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