

Vitamin D Deficiency (PIP)

Key Document code:	WAHT-TP-096	
Key Documents Owner:	Dr J West	Consultant Paediatrician
Approved by:	Paediatric Quality Improvement meeting	
Date of Approval:	9 th March 2024	
Date of review: This is the most current document and should be used until a revised version is in place	9 th March 2027	

The following guidance is taken from the Partners In Paediatrics (PIP)

Key amendments to this document

Date	Amendment	Approved by:
9 th March 2024	Document reviewed with no amendments	Paediatric Governance Meeting

Vitamin D 2018-20

VITAMIN D DEFICIENCY

Routine screening is not recommended

RECOGNITION AND ASSESSMENT

Symptoms and signs

Rickets

- Progressive bowing of legs (bowing of legs can be a normal finding in toddlers)
- Progressive knock knees
- Wrist swelling
- Rachitic rosary (swelling of the costochondral junctions)
- Craniotabes (skull softening with frontal bossing and delayed fontanelle closure)
- Delayed tooth eruption and enamel hypoplasia

Other symptoms or conditions associated with vitamin D deficiency

- Long-standing (>3 months), unexplained bone pain
- Muscular weakness (e.g. difficulty climbing stairs, waddling gait, difficulty rising from a chair or delayed walking)
- Tetany due to low serum calcium
- Seizures due to low serum calcium (usually in infancy)
- Infantile cardiomyopathy

Abnormal investigations

- Low serum calcium or phosphate, high alkaline phosphatase (\geq local age-appropriate reference range)
- Radiographs: showing osteopenia, rickets or pathological fractures

Chronic disease that may increase risk of vitamin D deficiency

- Chronic renal disease, chronic liver disease
- Malabsorption syndromes (e.g. coeliac disease, Crohn's disease, cystic fibrosis)

Bone diseases in children where vitamin D deficiency should be corrected before specific treatment is given

- Osteogenesis imperfecta
- Idiopathic juvenile osteoporosis
- Osteoporosis secondary to glucocorticoids, inflammatory disorders, immobility and other metabolic bone conditions

Serum 25-OHD		Vitamin D status	Manifestation	Management
nmol/L	ug/L			
<25	<10	Deficient	Rickets Osteomalacia	Treatment dose of vitamin D
25–50	10–20	Insufficient	Associated with disease risk	Prevention dose of vitamin D
50–75	20–30	Adequate	Healthy	Lifestyle advice
>75	>30	Optimal	Healthy	None

PREVENTION

Standard prevention doses

Age	Daily dose	Examples of preparations
<1 month	300–400 units	Abidec, Baby Ddrops [®] and 'Healthy Start' vitamins
\geq 1 month–18 yr	400–1000 units	Abidec, Baby Ddrops [®] , Sunvit D3 [®] , DLux oral spray, Vitabiotics vitamin D tablets

Treatment of deficiency

Age	Daily dose	Duration (weeks)
<6 month	1000 units	4–8
≥6 month–12 yr	6000 units	4–8
≥12–18 yr	10,000 units	4–8

INDICATIONS FOR REFERRAL TO SECONDARY CARE

- Repeated low serum calcium concentration with/without symptoms (irritability, brisk reflexes, tetany, seizures or other neurological abnormalities)
- Symptomatic: requires immediate referral to A&E
- Underlying complex medical disorders (e.g. liver disease, intestinal malabsorption)
- Deformities or abnormalities probably related to rickets
- Poor response to treatment despite good adherence (level of 25-OHD <50 nmol/L after 6 weeks of adherent therapy)
- Persisting low serum phosphate or low/high alkaline phosphatase

Administration

- All children who can swallow normal food can take the small *colecalfiferol available as 400, 1000, 10,000 and 20,000 unit capsule*. Children who have swallowing difficulties (aged <1 yr or disabled), a liquid preparation may be used but is less palatable e.g. Thorens solution 10,000 units/mL
- If non-compliant give larger dose less frequently:
 - aged 0–18 yr: Invita D3[®] solution 25,000 units once every 2 weeks for 6 weeks (3 doses)
 - aged 12–18 yr: colecalciferol capsule e.g. Plenachol[®] 20,000 units once every 2 weeks for 6 weeks (3 doses)
- Colecalciferol and ergocalciferol liquid preparation doses are equivalent
- If insufficient calcium intake, prescribe

MONITORING

- At end of treatment check bone profile, vitamin D
- If 25-OHD >50 nmol/L bone profile normal
- Give advice on safe sun exposure, oily fish, egg, vitamin D fortified food and prevention dose until growth complete
- If recommended nutritional intake of 400 units/day (10 microgram/day) unlikely to be met, give routine supplementation of vitamin D as multivitamin formulation e.g. healthy start vitamin drops. Patient groups include:
 - exclusively breastfed infant aged 1–6 months
 - aged 6 months–5 yr taking <500 mL formula feed/day
 - not spending substantial time outdoors
 - wearing concealing clothing
 - dark skin
- If 25-OHD <50 nmol/L:
 - consider poor compliance, drug interactions and underlying disease e.g. renal disease, liver disease and malabsorption
 - if poor compliance suspected, consider high-dose treatment if aged 12–18 yr (e.g. 300,000 units as single or divided dose)
- **If unimproved symptoms/signs despite satisfactory 25-OHD concentration: unlikely to be related to vitamin D deficiency**
- **Alfacalcidol should not be used for the treatment of simple vitamin D deficiency**