



## **Management of Vitamin D Deficiency, Insufficiency and Maintenance in Children**

Profound vitamin D deficiency in children results in reduced absorption of calcium which can manifest as rickets, disturbance in growth and hypocalcaemia.<sup>1</sup>

In November 2014, NICE issued Public Health guidance<sup>2</sup> which aims to increase supplement use to prevent vitamin D deficiency among at-risk groups including:

- infants and children aged under 5
- pregnant and breastfeeding women, particularly teenagers and young women
- people over 65
- people who have low or no exposure to the sun, for example, those who cover their skin for cultural reasons, who are housebound or confined indoors for long periods
- people with darker skin, for example, people of African, African-Caribbean or South Asian family origin.

Risk factors for vitamin D deficiency/ insufficiency in children include:

- Maternal vitamin D deficiency
- Malabsorption e.g. cystic fibrosis, short bowel
- Taking certain medications e.g. anticonvulsants
- Obesity

### **Patients who require referral for specialist management**

Specialist advice may be required in the following patient groups

<b>Patient group</b>	<b>Advice</b>
Children with medical conditions currently under the care of a paediatrician or tertiary specialist	Please seek advice from the relevant consultant who will advise or initiate treatment
Children whose symptoms or vitamin D levels have not responded to adequate treatment	Please refer to paediatrician for further advice
Children with poor compliance despite trial of appropriate formulations	IM treatment may be advised after review by paediatrician

**Measurement of serum vitamin D should be performed only when the clinical picture suggests vitamin D deficiency, particularly if there are risk factors for deficiency e.g. they have symptoms of deficiency, they are considered to be at particularly high risk of deficiency (for example, they have very low exposure to sunlight) or there is a clinical reason to do so (for example, they have osteomalacia).<sup>2</sup> Routine screening of high risk groups is not indicated.**

For convenience, paediatric reference ranges and definitions of deficiency used here are the same as for adults as per the NOS guidance.<sup>3</sup> Any child who is suspected to be hypocalcaemic secondary to vitamin D deficiency should be urgently referred to secondary care.

### **Definitions**

(25OHD = 25-hydroxy Vitamin D)

<b>25OHD Level</b>	<b>Status</b>	<b>Action</b>
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<b>&lt;30 nmol/L (&lt;12µg/L)</b>	<b>Deficient</b>	<b>Treatment Required</b>
<b>30-50 nmol/L (12-20µg/L)</b>	<b>Insufficient</b>	<b>Vitamin D Supplementation</b> n.b. there is no clinical evidence to support routine treatment for patients. However treatment may be appropriate in those patients with risk factors AND with accompanying signs and symptoms.
<b>Over 50 nmol/L (20µg/L)</b>	<b>Sufficient for almost whole population<sup>3</sup></b>	<b>Lifestyle advice</b>

When deficiency or insufficiency is diagnosed, treat as below and use the Read code:  
**C28 vitamin D deficiency**

## Treatment for Vitamin D deficiency, maintenance and insufficiency<sup>†</sup>

Age	Deficiency i.e. less than 30 nmol/L (12µg/L) – see under “Preparations” for treatment duration	Maintenance and Insufficiency i.e. 30-50 nmol/L (12-20µg/L)
1 to 6 months	3,000IU colecalciferol daily	400-600 units daily [all ages]
6 months-12 years	6,000IU colecalciferol daily	
12 to 18 years	10,000IU colecalciferol daily	

† - Doses listed above are as per Children’s BNF 2014-15 [not listed in 2015-16 edition].

### Preparations

High-strength licensed preparations are now available and there should be no need to use “Specials”.

At the time of writing, preparations include:

*Fultium-D3 drops*<sup>®</sup>. 3 drops = 200 units. Treatment of deficiency 0-2 years: 400-1000 units daily, 2 years -11 years: 400-2000 units daily, 12-18 years: 400-4000 units daily. All for up to 12 weeks.

*Invita D3 25,000 IU oral solution*<sup>®</sup>: 1 ampoule = 25,000units. One ampoule once every 2 weeks for 6 weeks

*THORENS 10 000 I.U. /ml oral drops, solution*<sup>®</sup>. Treatment of deficiency 0-18 years 2000 IU/day (10 drops) for 6 weeks

Other preparations for maintenance: both Abidec<sup>®</sup> and Dalivit<sup>®</sup> drops contain 400 units per 0.6ml dose. While Abidec drops also contain arachis oil which is absent in Dalivit, the latter contains 5000units vitamin A per 0.6ml dose. A graduated dropper is provided with Abidec; for Dalivit 14 drops = 0.6ml dose.

### NICE recommends vitamin D supplementation for all children aged between 1 and 5 years.<sup>2</sup>

IM ergocalciferol is not routinely recommended.

Infants taking more than 500ml of formula milk will not need Vitamin D supplementation

### Healthy Start vitamins (<http://www.healthystart.nhs.uk/>)

Pregnant women, women with a child under 12 months and children aged from six months to four years who are receiving Healthy Start vouchers are entitled to free Healthy Start vitamins. However, in certain circumstances vitamin supplements may be provided to infants under six months old getting Healthy Start vouchers, if healthcare professionals consider that their vitamin stores are likely to be low and that the supplements would benefit them.

The daily dose of five drops contains:

- 233 micrograms of vitamin A [approx. 800 units]
- 20 milligrams of vitamin C
- 7.5 micrograms [300 units] of vitamin D3.

Consult <http://www.nhs.uk/Service-Search/Healthy-start-vitamins/LocationSearch/348> for nearest local source; Healthy Start vitamins are NOT prescribable by GPs.

### Calcium supplementation for children with vitamin D deficiency

Calcium supplementation may be required in those who are hypocalcaemic, or evidence of a poor dietary intake. (reference: cBNF)

### Monitoring requirements

- Do not routinely re-test vitamin D levels. Only re-test if clinically necessary.
- All patients having therapy for vitamin D deficiency require a plasma calcium test one month after initiation of treatment.

## References

1. 'Clinical Review – Diagnosis and management of vitamin D deficiency', BMJ 2010; 340: 142-147  
<http://www.bmj.com/content/340/bmj.b5664>
2. NICE guideline PH 56: Vitamin D: increasing supplement use in at-risk groups  
<http://www.nice.org.uk/guidance/ph56>
3. Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management . National Osteoporosis Society. <http://www.nos.org.uk/document.doc?id=1352>

*Originally based on local guidelines produced in Bolton PCT, HMR PCT, CMFT and East Lancashire PCT.*

## Changes from previous version

- Reference from DH 2012 updated to NICE 2014. Groups are identical except that teenagers and young women are explicitly stated within pregnant and breastfeeding women
- Dose regimes simplified [weekly dose no longer included]. Children's BNF 2014/15 used for reference as detail absent from 2015/16 edition
- Licensed preparations now included, with doses for treatment of deficiency where available.
- Scientific Advisory Committee on Nutrition [SACN] consultation 22<sup>nd</sup> July to 23<sup>rd</sup> September 2015 suggests deficiency is below 25nmol/L but level left at 30 herein to accord with NOS guidance for adults  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/447402/Draft\\_SACN\\_Vitamin\\_D\\_and\\_Health\\_Report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/447402/Draft_SACN_Vitamin_D_and_Health_Report.pdf)
- NICE PH56 recommendation that all children 1-5 receive supplementation included
- Healthy Start references checked and still correct