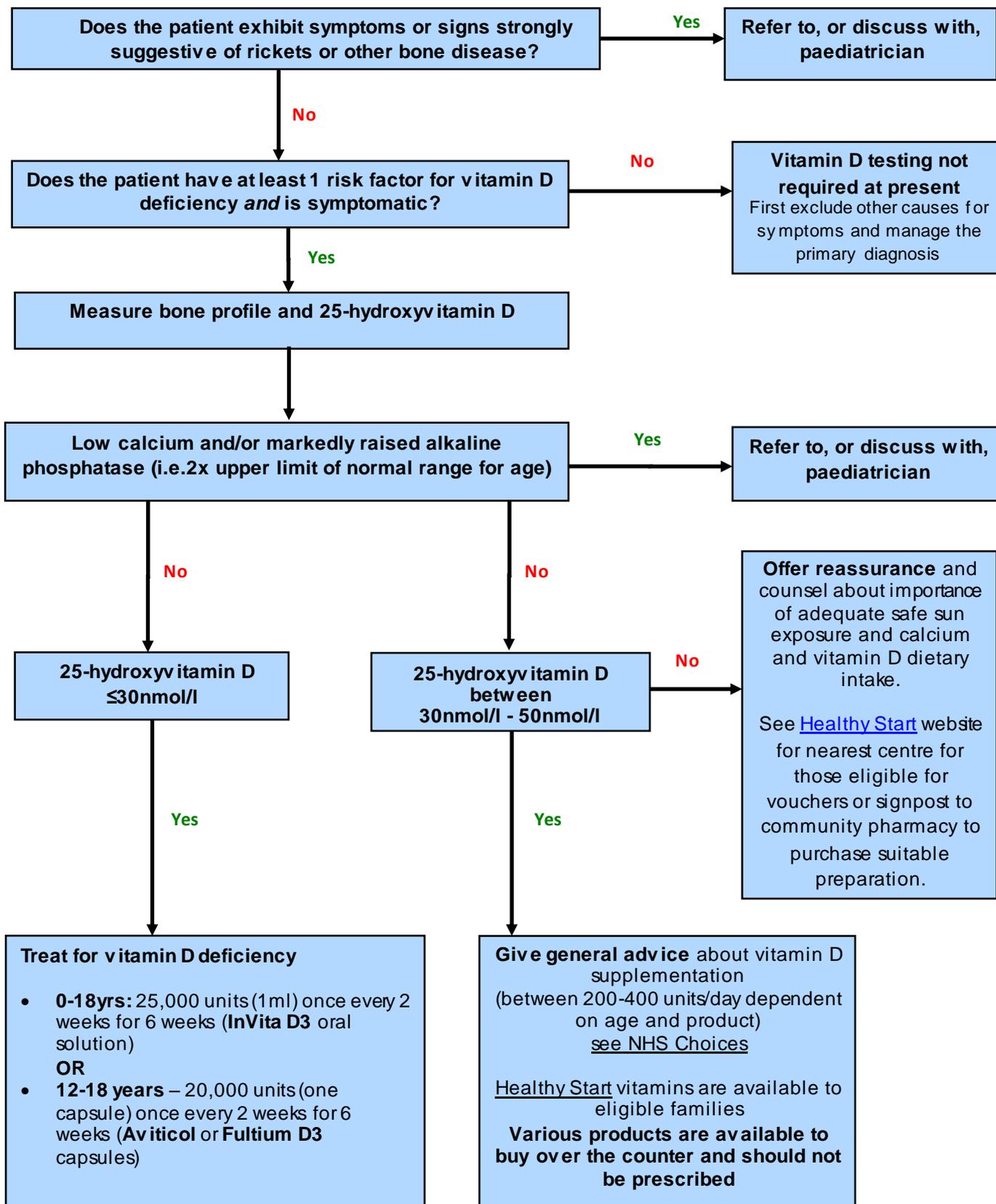


### Children's pathway for vitamin D deficiency in primary care



This pathway is intended for use by General Practitioners for the treatment of symptomatic children up to the age of 16 years.

**It is not a screening pathway and Vitamin D testing should not be used as a screening tool .**

It has been designed in partnership between primary care (Calderdale, North Kirklees, Greater Huddersfield and Wakefield CCGs) and secondary care (Calderdale and Huddersfield NHS Foundation Trust and The Mid Yorkshire Hospitals NHS Trust). It will be reviewed in 2018 or earlier if needed.

Vitamin D2 is known as ergocalciferol and Vitamin D3 is known as colecalciferol. Colecalciferol, is the treatment of choice.

### **Vitamin D deficiency in children**

- Healthcare professionals should provide advice regarding obtaining vitamin D from [safe sun exposure](#) and diet.
- The [Department of Health](#) recommends daily vitamin D supplements in all children between the ages of 6 months to 5 years (unless they are receiving over 500mls of formula milk daily).
  - The vitamin D requirement set for this age group is 280-340 units/day (7 - 8.5 micrograms a day).
  - Breastfed infants may need to receive drops containing vitamin D from one month of age if the mother has not taken vitamin D supplements throughout pregnancy or if the mother is known to be either vitamin D deficient or insufficient.
- Children from families who are eligible for the Government's [Healthy Start](#) scheme should be signposted to their local '[Children's Centre](#)' to receive their supplements.
- Consider investigating possible underlying cause if no risk factors are present or patient fails to respond to treatment.
- Consider monitoring maternal vitamin D status if infant is treated for deficiency.
- During treatment of deficiency consider referral to secondary care at any stage if new symptoms cause concern.

### **Identification of children at risk of vitamin D deficiency**

Any child whom you suspect to be hypocalcaemic secondary to vitamin D deficiency should be urgently referred to secondary care.

Risk factors for vitamin D deficiency include:

- Reduced exposure to sunlight due to routine covering of face and body, housebound or prolonged institutional care and excessive use of high factor sun block.
- Pigmented skin.
- Prolonged breastfeeding without vitamin D supplementation and / or delayed weaning .
- Maternal vitamin D deficiency.
- Chronic disease (renal, hepatic or malabsorption syndromes e.g. coeliac disease, cystic fibrosis).
- Rare genetic causes including vitamin D resistant rickets, and renal tubular acidosis.
- Medication that induces hepatic enzymes e.g. anticonvulsants.
- Obesity (vitamin D is fat soluble and as such obese patients may have increased requirements due to deposition in the adipose tissue).

Symptoms and signs of rickets include:

- bowing of legs or knock knees (genu valgum)
- anterior bowing of the femur
- painful wrist swelling (distal radius)
- prominent costochondral joints ("rickety rosary")
- softening of the skull with frontal bossing, and delayed fontanelle closure
- spinal curvature
- bone pain or leg pain
- dental deformities (delayed tooth formation, enamel hypoplasia)

### When to test

If a patient presents with any of the symptoms combined with one or more of the risk factors above, or there are other strong reasons to suspect vitamin D deficiency, then a blood sample can be taken in primary care and sent for bone profile and vitamin D (25-hydroxyvitamin D-25-(OH)D).

- Note that patients with a low calcium and/or markedly raised alkaline phosphatase (i.e. 2x upper limit of what is normal for the age) should be referred to or a discussion had with secondary care.

### Management of vitamin D deficiency (serum 25(OH)D $\leq$ 30nmol/l)

- **0-18yrs:** 25,000 units (1 ml) as an oral dose once every 2 weeks for 6 weeks (**InVita D3** oral solution)  
**OR**
- **12-18 years** – 20,000 units (one capsule) as an oral dose once every 2 weeks for 6 weeks (**Aviticol** or **Fultium D3** capsules)

Consider the need for calcium supplementation. Many children with vitamin D deficiency will have a depleted calcium status and/or a poor calcium intake and may therefore benefit from advice about dietary calcium intake.

### Management of vitamin D insufficiency (serum 25(OH)D between 30nmol/l and 50nmol/l)

- Advise supplementation with vitamin D at a dose of 200-400 units/day (dose dependent on age).
- Various products are available to buy over the counter and should not be prescribed.
- This should be continued until the child is 5 years old.

If asymptomatic and compliant with supplements then a re-test of vitamin D levels is **not** normally required.

### Follow-up after treatment for vitamin D deficiency

Unless already referred to an outpatient clinic then follow-up should be in primary care.

Repeat bone profile and 25-hydroxyvitamin D concentration shortly after completion of treatment (i.e. 2-3 months after commencement of treatment) **only if patient is still symptomatic**

- If serum 25-hydroxyvitamin D concentration is  $\geq$ 50nmol/L advise to continue with vitamin D supplementation with vitamin D at a dose of 200-400 units/day (dose dependent on age) until fully grown if risk factors for deficiency continue.
- If any abnormality has not resolved despite compliance with adequate vitamin D treatment consider referral.
- If non-compliance is suspected discuss with a paediatrician.

Patients who are diagnosed and subsequently treated for vitamin D deficiency may be reviewed annually for symptoms and compliance with supplements. If asymptomatic at annual review and patient is compliant with vitamin D  $\pm$  calcium supplements then further re-tests of vitamin D levels are **not** normally required.

#### Further Information & Reading:

BNF for children.

NHS Choices: <http://www.nhs.uk/Planners/birthofive/Pages/Vitamins.aspx>

Patient. Co. UK:

<http://www.patient.co.uk/doctor/vitamin-d-deficiency-including-osteomalacia-and-rickets>

Chief Medical Officer; Central Alerting System:

<https://www.cas.dh.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=101726>

NICE; The scientific basis of nutrition education:

[http://www.nice.org.uk/nicemedia/documents/scientificbas\\_nutredue.pdf](http://www.nice.org.uk/nicemedia/documents/scientificbas_nutredue.pdf)

FSA Nutrient and Food Based Guidelines for UK Institutions:

<http://www.food.gov.uk/multimedia/pdfs/nutguideuk.pdf>

NICE PH56:

[Vitamin D: increasing supplement use among at-risk groups](#)

### Available products

Licensed products should be used where available and clinically appropriate.

### High dose Vitamin D preparations for children

Product	Dosing	Other considerations
<b>InVita D3 oral solution:</b> (colecalfic erol 25,000units/ml)  Licensed product: POM (Prescription Only Medicine)	<b>0-18years</b> 25,000 units (1ml) once ev ery 2 weeks f or 6 weeks	Oral solution in snap top single dose ampoules  Suitable f or v egetarians, gelatin-free, nut-free, lactose-free and soya free.  Prescribe as InVita D3 oral solution 25,000units/ml to av oid unlicensed specials
<b>Aviticol capsules:</b> (colecalfic erol 20,000units / capsule)  Licensed product: POM (Prescription Only Medicine)	<b>12-18years</b> 20,000 units (1 capsule) once ev ery 2 weeks f or 6 weeks	Contains gelatin  Free f rom arachis (peanut) oil  Prescribe as Av iticol 20,000 unit capsules
<b>Fultium D3 capsules:</b> (colecalfic erol 20,000units / capsule)  Licensed product: POM (Prescription Only Medicine)	<b>12-18years</b> 20,000 units (1 capsule) once ev ery 2 weeks f or 6 weeks	Contains gelatin Free f rom arachis (peanut) oil  Prescribe as Fultium D3 20,000 unit capsules

*Various formulations of unlicensed 'specials' are available from specials manufacturers*

### Preparations for Vitamin D supplementation for children

*Various products are available to buy over the counter*

Product	Vitamin D content	Dose	Other considerations
<b>Healthy Start</b> Drops (10ml). Multiv itamin preparation	Colecalcif erol 300 units per 5 drops	300 units / dose (5 drops) daily	See the Healthy Start website  Does not contain peanut oil or soya
<b>Dalivit</b> (25ml or 50ml bottles). Multiv itamin preparation  Licensed product.	Ergocalcif erol 400 units per 0.6 mL	<b>6 weeks- 1year</b> 200 units/ 0.3ml dose (7drops) daily  <b>≥ 1 year</b> 400 units/ 0.6ml dose (14 drops) daily	Can be added to squash, juice, milk or jam for ease of administration.  Contains 5000 units/14 drops (0.6ml) of vitamin A - consider v itamin A obtained f rom the diet, in order to prev ent excessive intake.  Does not contain peanut oil or soya
<b>Abidec</b> (25ml) Multiv itamin preparation  Licensed product.	Ergocalcif erol 400 units per 0.6 mL,	<b>Birth -1year</b> 200 units/ 0.3ml dose (7drops)  <b>≥ 1 year</b> 400 units/ 0.6ml dose (14 drops) daily	Contains peanut oil.  Contraindicated in patients with a peanut allergy.  Also av oid in patients with a soya allergy .
<b>Adcal D3</b> chewable tablets / caplets  Contains calcium and vitamin D  Licensed product.	Chewable tablets - Colecalcif erol 400 units /tablet (+ 600mg Calcium)  Caplets – colecalfic erol 200units/caplet (+ 300mg Calcium)	Children ≥ 12 years  Chewable tablets – One daily  Caplets – Two daily	Contains soya oil in the chewable tablets.  Refer to SPC f or full list of excipients.  Note the dif ference strengths between the chewable tablets and the caplets