

## Vitamin D deficiency prescribing guidance

**The routine prescribing of vitamin D supplements is not supported in Mid and South Essex. Please refer to the prescribing policy statement on Vitamin D supplementation for further information.**

**The prescribing of vitamin D in deficiency is supported as outlined in the guidance below.**

**Caution:** This guidance is not applicable to patients with bowel malabsorption or renal failure (eGFR <30mL). Seek specialist advice regarding management.

Routine screening of vitamin D levels and prescribing of Vitamin D is not advisable. Both clinical symptoms and risk factors must be present before measuring Vitamin D levels (25OHD). Vitamin D supplementation is not a 'quick fix' and all likely underlying conditions must be investigated first. Once common causes have been eliminated in symptomatic patients, an assay of serum 25OHD is advised. As yet there is no clear evidence to prove the risks from non-symptomatic Vitamin D deficiency.

For treatment of deficiency refer to:

- Flow Chart 1 - Management of Low Vitamin D Levels in Adults over 18 years old
- Flow chart 2 - Management of Low Vitamin D Levels in Children
- Flow chart 3 - Management of Low Vitamin D Levels in Pregnancy or Breastfeeding

**Specialist advice must be sought in patients with; TB, active sarcoidosis, active nephrolithiasis, eGFR <30 mL/min, hypercalcaemia and hypercalciuria or diseases or conditions which can cause these conditions.**

First line lifestyle and dietary advice must always be given. If treatment is necessary, colecalciferol (D3) is the preferred treatment as there is some evidence that it raises vitamin D levels to a greater extent than ergocalciferol (D2). Doses of D3 and D2 are equivalent.

Colecalciferol products derived from sheep's wool or lanolin are not acceptable to vegans. Lichen derived colecalciferol is available. Ergocalciferol is derived from yeast or other fungi and is therefore appropriate for vegans.

Public Health England has issued advice on vitamin D based on the recommendations of the Scientific Advisory Committee on Nutrition.

The advice notes that vitamin D is made in the skin on exposure to UVB in sunlight, but since this is difficult to quantify, a daily dietary intake of 10 micrograms equivalent to 400 international units (IU) is being recommended.

It is noted that in spring and summer the majority of the population get enough vitamin D through sunlight on the skin and a healthy, balanced diet. In autumn and winter months it is difficult for people to meet the 10 microgram recommendation from consuming foods naturally containing or fortified with vitamin D, so people should consider taking a daily supplement containing 10 micrograms (400 IU). This is a personal health responsibility and people should purchase these supplements.

The advice also considers people whose skin has little or no exposure to the sun, like those in institutions such as care homes, or who always cover their skin when outside, and recommends that they need to take a supplement throughout the year.

Where individuals are long term inpatients in an acute or specialist provider organisation, the provider must assess the risk benefit to the individual and may prescribe supplementation within their own budget if it is felt that the patient would be otherwise at risk.

Ethnic minority groups with dark skin, from African, Afro-Caribbean and South Asian backgrounds, may not get enough vitamin D from sunlight in the summer and therefore should consider taking a supplement all year round.

Recommendations are also made for children under 5.

**Birth up to one year of age:**

- Exclusively or partially breastfed babies should be given a daily supplement containing 8.5-10 micrograms (340-400 IU) vitamin D
- Formula fed babies should not be given a vitamin D supplement until they're receiving less than 500ml of formula milk a day

**Children aged 1 – 4 years:**

- Should be given a daily supplement containing 10 micrograms (400 IU) vitamin D

**Aged 5 years and above:**

- Between late March/early April and September - the majority of people aged 5 years and above will probably obtain sufficient vitamin D from sunlight when they are outdoors, alongside foods that naturally contain or are fortified with vitamin D. As such, they might choose not to take a vitamin D supplement during these months.
- From October to March – EVERYONE, including pregnant and breastfeeding women, should consider taking a daily supplement containing 10 micrograms (400 IU) of vitamin D.

Clinicians should be aware of this advice, however, prescribing of vitamin D purely for supplementation following this advice is not recommended.

**Lifestyle advice**

In the UK there is insufficient UVB of the necessary wavelength between October and March to generate vitamin D. Sun exposure for vitamin D production has to be balanced against the risk of skin cancer. It is advised that getting small amounts of incidental sunlight, as you might get through daily activities, without getting a heavy tan or burning, may help to boost vitamin D levels. Long exposure can break down Vitamin D, reducing the benefit and increasing the risk of skin cancer. Where casual sunlight exposure is not practical is it essential for vitamin D supplements to be taken.

**People should buy vitamin D supplements. Pharmacies and health food stores sell a variety of vitamin D products,** they can also be obtained through the [Healthy Start Scheme](#) for those who are eligible.

Dietary sources: Vitamin D can also be obtained through diet. Some foods are fortified with vitamin D (for example some yoghurts, margarine and cereals) and others, such as oily fish, are naturally rich in vitamin D.

Prescribing of unlicensed liquid specials of Vitamin D is not recommended. Licensed liquid preparations are available for prescribing (see individual flow charts).



## Flow Chart 1: Management of Low Vitamin D Levels in Adults over 18 years old

Routine testing of 25-hydroxyvitamin D (25-OHD) level is not recommended  
Vitamin D3 conversions 1mcg = 40 international unit (units), 2.5nmol/L = 1ng/mL

Test vitamin D levels if a person presents with:  
Symptoms indicative of rickets, osteomalacia or symptomatic hypocalcaemia

There should be a high clinical suspicion in patients presenting with these symptoms who also have risk factors that may increase the risk of vitamin D deficiency (Table A) or those at higher risk of having a low vitamin D status or "at-risk group" (Table B).

Also test for vitamin D deficiency if there is a clinical reason to do so, for example:

- Prior to specific treatment where correcting vitamin D deficiency is appropriate
- Patients with osteomalacia, osteoporosis, Paget's disease where disease may be improved with vitamin D treatment or people who have had a fall

Symptoms of rickets include: tetany, leg bowing or knock knees, anterior bowing of femur, painful wrist swelling, softening of the skull, spinal curvature, bone pain. Symptoms of osteomalacia include: bone pain or tenderness, proximal muscle weakness.

### Box 1: Purchase Colecalciferol 400 units daily

Patients given lifestyle advice and advised to buy Vitamin D supplements over the counter (OTC)

**No routine monitoring required.**

For patients with osteoporosis/prevention of fragility fractures [NICE](#) & [NOS](#) recommends additional daily supplementation of 1000mg calcium if their calcium intake is inadequate (700mg/day) which can be prescribed as combination calcium + vitamin D product.

Patients who have undergone bariatric surgery procedures other than gastric balloon or gastric band are likely to require a supplement giving 800mg calcium and 20mcg vitamin D.

NO

YES

TEST for vitamin D levels, renal and bone profile (Ca, Phosphate, Alk Phos) LFTs, FBC +/- Ferritin

25-OHD <30nmol/L

25-OHD = 30-50nmol/L

25-OHD >50nmol/L

### Treatment dose

Prescribe as acute items. DO NOT put on repeat

Oral capsules: 40,000 units colecalciferol **weekly** for 7 weeks (*Plenachol® 40,000 unit capsules*) **single prescription for the entire course (7 capsules)**

#### Patients with swallowing difficulties

50,000 units colecalciferol **weekly** for 6 weeks (*Invita D3® 50,000units/ml oral solution*) **single prescription for the entire course: 6 x 1mL single oral doses**

If patient cannot tolerate oral preparation/severe gastro malabsorption

IM injection: 300,000 units ergocalciferol once only (**Not to be used routinely**)

### No treatment required

Patients given lifestyle advice including dietary advice and safe sun exposure and/or advised to buy Vitamin D supplements over the counter if clinically appropriate, **400units daily**.

Consider an alternative diagnosis.

### Box 2: Calcium levels:

Normal: stop calcium if pt is taking calcium (unless taking for prevention of fragility fractures or post-bariatric surgery)

Low↓: advise OTC calcium (1-2g). Refer to secondary care if pt already taking calcium

High↑: stop calcium if pt is taking calcium, assess hydration, consider specialist advice as probable rare alternative diagnosis (e.g. parathyroid). Re-check level in 3/12 in patients taking calcium for prevention of fragility fracture or post-bariatric surgery

Following treatment dose, provide lifestyle advice and advise to buy vitamin D supplements over the counter (refer to box 1).

### Monitoring:

After 1 month: Serum calcium (see box 2)  
After 3 months: Vitamin D level

Vit D Level > 50nmol

YES

NO

Refer to box 1

Check adherence. Seek specialist advice for possible underlying disease, such as renal disease, liver disease, or malabsorption – the need for maintenance therapy in patients with underlying disease may be an exception to this guidance.

| <b>Table A: Patient with high risk factors that may increase risk of vitamin D deficiency</b>   |
|---|
| Clinicians should have high suspicion of vitamin D deficiency in patients who present with any symptoms that may indicate of rickets, osteomalacia or hypocalcaemia; and should test for vitamin D deficiency.  |
| <p>Patients with a significant risk of osteoporosis e.g.</p> <ul style="list-style-type: none"> <li>• High corticosteroid use</li> <li>• Inflammatory disease, e.g. rheumatoid arthritis, inflammatory bowel disease</li> <li>• Hyperparathyroidism</li> <li>• Active cancer</li> <li>• Sickle cell disease</li> <li>• Prolonged immobilisation</li> <li>• Liver disease</li> <li>• Chronic kidney disease</li> <li>• Anorexia nervosa</li> <li>• Vegan diet</li> </ul> |
| <p>Patients with malabsorption states e.g.</p> <ul style="list-style-type: none"> <li>• Small bowel resection</li> <li>• Coeliac disease</li> <li>• Bariatric surgery</li> </ul>  |
| Fragility fracture despite osteoporosis drug treatment  |
| Fragility fracture at young age (<60 years)   |
| Patients on parenteral potent anti-resorptive agent (IV Bisphosphonate/Teriparatide/Denosumab)  |
| Pregnancy or breast feeding where severe deficiency is suspected  |
| Musculoskeletal symptoms that may be attributed to vitamin D deficiency e.g. Symptoms of osteomalacia   |

| <b>Table B: Patient at higher risk of having a low vitamin D status or “at-risk group” (NICE PH56 Nov 2014)</b>  |
|--|
| Clinicians should take opportunities to ensure people in these groups are aware of Public Health advice regarding vitamin D supplements and that those in at risk groups are advised to take a supplement all year round |
| Black or South Asian patients or those with darker skin  |
| Patients taking antiepileptics, antiretrovirals or aromatase inhibitors (these can impair vitamin D metabolism)  |
| Patients with mental health issues including patients with epilepsy, schizophrenia and bipolar disorder being treated with anti-epileptic drugs.   |
| Patients who have a sun sensitive condition, low or no exposure to the sun, for example, those who cover their skin for cultural reasons   |
| Housebound patients and patients in institutionalised settings e.g. care homes, learning disability homes (calcium intake should also be considered)   |
| Patients who have a high risk of falling/have fallen frequently  |
| Elderly >75 years  |
| Obesity (BMI > 30kg/m <sup>2</sup> )   |
| Menopause  |
| <i>If Alkaline Phosphatase (ALP) is noted as being raised in any patient in the above groups this may indicate more severe osteomalacia, in which case check 25OHD level.</i>  |
| Infants and children aged under 5-please refer to flow chart 2 for management in children  |
| Pregnant and breastfeeding women-please refer to flow chart 3 for management in pregnancy and breastfeeding women  |

## Flow Chart 2: Management of Low Vitamin D Levels in Children (from birth to 18 years old)

Vitamin D3 Conversions 1mcg = 40 international units (units) 2.5nmol/L = 1ng/mL

Babies and young children (0-5years)

Supplementation throughout the year is recommended at the following doses

|   |                                      |
|---|--------------------------------------|
| Babies under 1 (unless on over 500ml formula/day) | 8.5 to 10 micrograms (340- 400units) |
| Children 1-5 years                                | 10micrograms (400units)              |

**Do not prescribe maintenance supplementation.** Refer to prescribing policy (LINK)

### Are there signs and SYMPTOMS of vitamins D deficiency?

**Infants:** seizures, tetany and cardiomyopathy

**Children:** aches and pains; myopathy causing delayed walking; rickets with bowed legs, knock knees, poor growth and muscle weakness.

**Adolescents:** aches and pains, muscle weakness, bone changes of rickets or osteomalacia

YES

NO

TEST for vitamin D levels, renal and bone profile (Calcium, Phosphate, Alk Phos) LFTs, FBC +/- Ferritin

**No treatment or monitoring required**

Give lifestyle advice including dietary advice.  
Advise to buy a vitamin D 400units/10mcg supplement OTC.

Consider an alternative diagnosis.

<25nmol/L

25-50nmol/L

>50nmol/L

| Age                    | Dosage and frequency (locally agreed)                              | CCG recommendation <i>Thorens</i> ® 10,000 units/ml oral drops                      |
|------------------------|--|---|
| Newborn up to 6 months | 400 units daily for 8 weeks on prescription & then OTC maintenance | 2 drops daily   |
| 6 months - 18 years    | 800 units daily for 8 weeks on prescription & then OTC maintenance | 4 drops daily<br>In children able to swallow solid dosage forms: InVita D3 800units |

Maintenance

Royal College of Paediatrics and Child Health (RCPCH) Treatment Dose (\*off-label dosing for age) – locally agreed duration of treatment

| Age                 | RCPCH Dosage and frequency | Duration | Local recommended formulation: <i>Thorens</i> ® 10,000 units/ml oral drops |
|---------------------|----------------------------|----------|--|
| Up to 6 months      | 1,000 – 3,000 units daily  | 3 months | *15 drops (3,000 units) daily  |
| 6 months - 12 years | 6,000 units daily          | 3 months | *30 drops (6,000 units) daily  |
| 12 - 18 years       | 10,000 units daily         | 3 months | *1ml (10,000units) daily   |

**Monitoring:** After 3 months: repeat Vitamin D, calcium and ALP levels. While awaiting result Vit D OTC 400units

Vit D Level > 50nmol

YES

**Lifestyle advice including dietary advice.**

Advise to buy a vitamin D supplement OTC 400 units

NO

**Check adherence. Seek paediatric specialist advice**

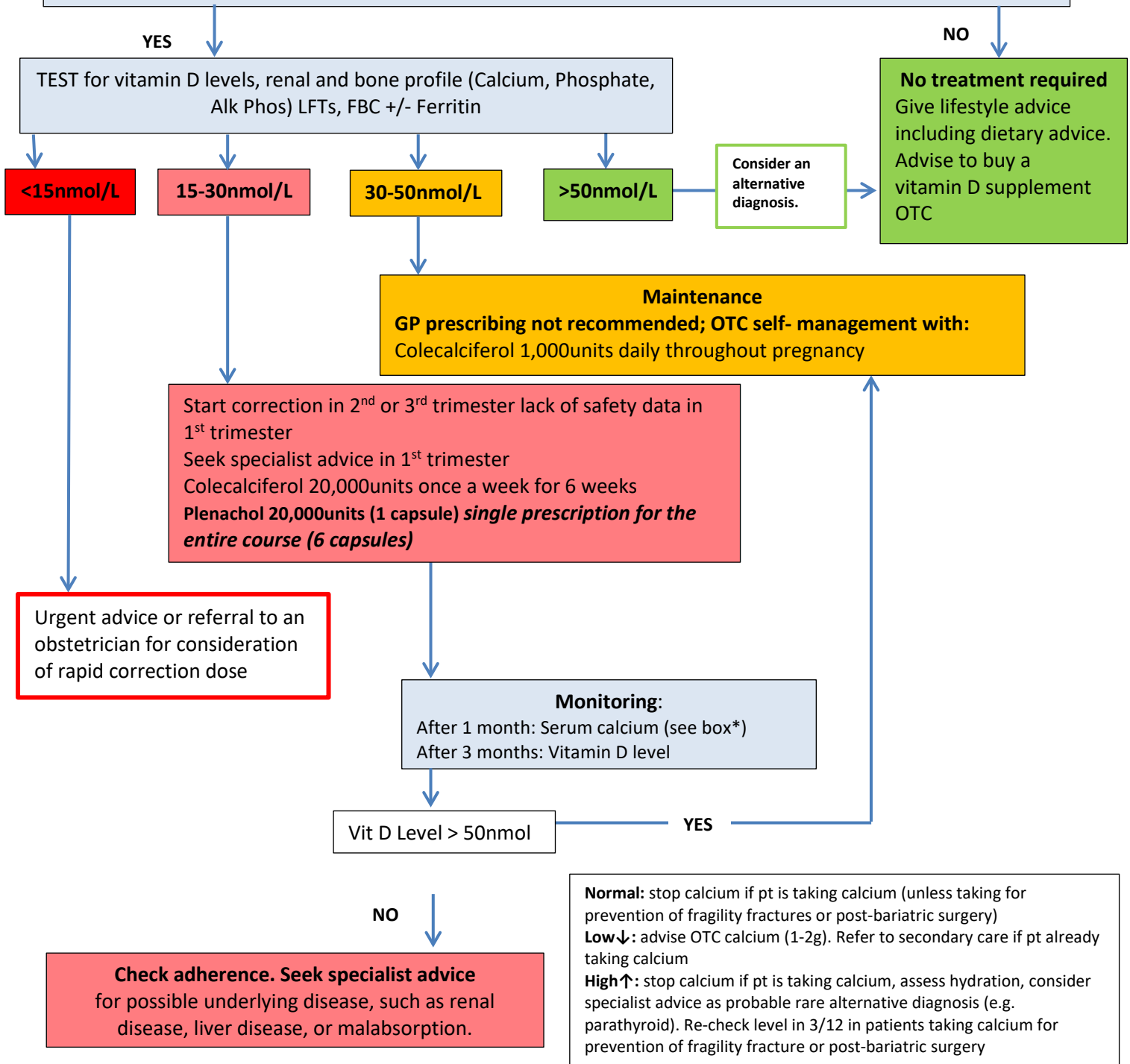
Children should be encouraged to maintain an adequate calcium intake through good sources of calcium in their diet i.e. milk products or calcium fortified milk alternatives.

**Stoss Regime:** For use by secondary care in children with malabsorption symptoms, high risk of rickets and vitamin D < 15nmol/L. Ergocalciferol by IM injection up to 300,000 units as a single dose (dose dependent on age), as directed by the paediatrician.

**Flow Chart 3: Management of Low Vitamin D Levels in Pregnancy / Breastfeeding**  
**Vitamin D3 Conversions 1mcg = 40 international units (units) 2.5nmol/L = 1ng/mL**

All Pregnant and Breastfeeding Women  
 Supplementation throughout the year is recommended at 400 units (10 mcg) colecalciferol daily from OTC products or Healthy Start Women's Vitamins tablets.  
 Women suspected to be at higher risk (increased skin pigmentation, reduced exposure to sunlight, social exclusion, obesity) should supplement with a higher dose (1000 units colecalciferol), purchased OTC.

**Does the patient have SYMPTOMS indicative of rickets, osteomalacia or symptomatic hypocalcaemia?**  
 Symptoms of rickets include: tetany, leg bowing or knock knees, anterior bowing of femur, painful wrist swelling, softening of the skull, spinal curvature, bone pain.  
 Symptoms of osteomalacia include: bone pain or tenderness, proximal muscle weakness.





**Normal:** stop calcium if pt is taking calcium (unless taking for prevention of fragility fractures or post-bariatric surgery)  
**Low ↓:** advise OTC calcium (1-2g). Refer to secondary care if pt already taking calcium  
**High ↑:** stop calcium if pt is taking calcium, assess hydration, consider specialist advice as probable rare alternative diagnosis (e.g. parathyroid). Re-check level in 3/12 in patients taking calcium for prevention of fragility fracture or post-bariatric surgery



| Place in pathway                        | Product  | Suitable in soy or peanut allergy? | Suitable for vegetarians? | Kosher and Halal considerations                            | Additional information                                       | Pack size        |
|---|--|------------------------------------|---------------------------|--|--|------------------|
| <b>Adult treatment deficiency</b>       | 1 <sup>st</sup> line<br>Plenachol® capsules 40,000 units         | Yes                                | Yes                       | Contains no gelatin or porcine sourced excipients          | Lactose free   | 10               |
|   | Plenachol® capules 20,000units                                   |                                    |                           |  |  | 10               |
|   | 2 <sup>nd</sup> line<br>Fultium D3® capsules 20,000units         | Yes                                | No                        | Gelatin is of bovine origin, no porcine sourced excipients | Lactose free<br>Contains Maize oil                           | 30               |
| <b>Adult Swallowing difficulties</b>    | 1 <sup>st</sup> line<br>Invita D3® oral solution 50,000 units/ml | Yes                                | Yes                       | Contains no gelatin or porcine sourced excipients          | Plastic 1 ml ampoule with twist top                          | 3 amps           |
|   | Invita D3® oral solution 25,000 units/ml                         |                                    |                           |  |  | 3 amps           |
|   | 2 <sup>nd</sup> line<br>Thorens 25,000 units/2.5ml               | Yes                                | Yes                       | Halal and kosher certified                                 | Lactose free   | 2.5ml            |
| <b>Children Vit D level 25-50nmol/L</b> | 1 <sup>st</sup> line<br>Invita D3® capsules 800units             |                                    |                           | Gelatin is of bovine origin, no porcine sourced excipients | Lactose free   | 28               |
|   | 2 <sup>nd</sup> line<br>Desunin® 800 units tablets               | Yes                                | Yes                       | Contains no gelatin or porcine sourced excipients          | Tablets can be swallowed whole or crushed or taken with food | 30               |
| <b>Children high dose treatment</b>     | Thorens® oral drops 10,000 units/ml                              | Yes                                | Yes                       | Halal and kosher certified                                 | Lactose free<br>1 drop equivalent to 200 units               | 10ml (500 drops) |
| <b>Pregnancy</b>                        | 1 <sup>st</sup> line<br>Plenachol® cap 20,000 units              | Yes                                | Yes                       | Contains no gelatin or porcine sourced excipients          | Lactose free   | 10               |
|   | 2 <sup>nd</sup> line<br>Fultium D3 cap 20,000units               |                                    |                           |  |  |                  |
| <b>Vegan children doses</b>             | Steriferol oral solution 3,000units/ml                           | Yes                                | Yes and vegans            | Excipients:<br>Refined olive oil                           | Manufactured as a special by Sterling Pharmaceuticals Ltd    | 30ml             |

| Place in pathway                 | Product  | Suitable in soy or peanut allergy? | Suitable for vegetarians? | Kosher and Halal considerations  | Additional information   | Pack size |
|----------------------------------|--|------------------------------------|---------------------------|----------------------------------|--|-----------|
| <b>Vegan adult and pregnancy</b> | Steriferol oral solution<br>20,000units/ml   | Yes                                | Yes and vegans            | Excipients:<br>Refined olive oil | Does not have UK marketing authorisation.<br>Manufactured as a special by Sterling Pharmaceuticals Ltd | 30ml      |
|                                  | Healthy Start Vitamin Drops for Children<br><a href="http://www.healthystart.nhs.uk">www.healthystart.nhs.uk</a> | Yes                                | Yes                       | Halal and kosher certified       | 5 drops equivalent to 300 units  | 10ml      |

**OTC examples for children**

| Picture  | Preparation  | Allergy info  | Vegetarian or vegan           | Dose and other info  | Cost (Sept 2018)                                      |
|--|--|---|-------------------------------|--|---|
|   | Nature's aid vitamin D drops for children<br>1ml contains 400units | Gluten, soya, wheat, corn, dairy, lactose, starch, sugar and nut free | Vegetarians only              | Dose: 1ml daily Not suitable for infants consuming more than 500ml of milk formula Once opened use within 4 months | Holland and Barrett<br>50ml £6.95<br><br>Amazon £6.95 |
|  | Baby D vitamin D drops<br>1 drop contains 400units                 | Gluten, soya, wheat, corn, dairy, sugar and peanut free               | Suitable for vegetarians only | Dose: 1 drop daily Specifically designed for breastfed babies and infants  | Boots 1.7ml (60drops) £9.99                           |



|                         |  |
|-------------------------|--|
| <b>References</b>       | <ol style="list-style-type: none"> <li>1. NICE Clinical Knowledge summaries. Vitamin D Deficiency <a href="https://cks.nice.org.uk/">https://cks.nice.org.uk/</a> (accessed November 2020)</li> <li>2. NICE Vitamin D: supplement use in specific population groups Published: November 2014 Last updated: 30 August 2017 (accessed Nov 2020) <a href="https://www.nice.org.uk/guidance/ph56">https://www.nice.org.uk/guidance/ph56</a></li> <li>3. National Osteoporosis Society (NOS) – Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management. Feb 2020 <a href="https://theros.org.uk/media/ef2ideu2/ros-vitamin-d-and-bone-health-in-adults-february-2020.pdf">https://theros.org.uk/media/ef2ideu2/ros-vitamin-d-and-bone-health-in-adults-february-2020.pdf</a></li> <li>4. Royal College of Paediatrics and Child Health (RCPCH) Guide to Vitamin D in Childhood. December 2018 (accessed Nov 2020) <a href="https://www.rcpch.ac.uk/resources/vitamin-d-infants-children-young-people-guidance">https://www.rcpch.ac.uk/resources/vitamin-d-infants-children-young-people-guidance</a></li> <li>5. UKMi Which oral vitamin D dosing regimens correct deficiency in pregnancy Jan 2019 (accessed Nov 2020) <a href="https://www.sps.nhs.uk/articles/which-oral-vitamin-d-dosing-regimens-correct-deficiency-in-pregnancy/">https://www.sps.nhs.uk/articles/which-oral-vitamin-d-dosing-regimens-correct-deficiency-in-pregnancy/</a></li> <li>6. Fultium-D3® 3,200 unit SPC(accessed Nov 2020) <a href="https://www.medicines.org.uk/emc/medicine/28806">https://www.medicines.org.uk/emc/medicine/28806</a></li> <li>7. Royal College of Obstetricians and Gynaecologist (RCOG) Vitamin D in Pregnancy . June 2014 (accessed Nov 2020) <a href="https://www.rcog.org.uk/globalassets/documents/guidelines/scientific-impact-papers/vitamin_d_sip43_june14.pdf">https://www.rcog.org.uk/globalassets/documents/guidelines/scientific-impact-papers/vitamin_d_sip43_june14.pdf</a></li> <li>8. SACN vitamin D and health report_July 2016 (accessed Nov 2020) <a href="https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report">https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report</a></li> <li>9. British Association of Dermatologists: Vitamin D and the Sun British Phototherapy Group/ British Association of Dermatologists, 2013 <a href="http://www.bad.org.uk/for-the-public/skin-cancer/vitamin-d">http://www.bad.org.uk/for-the-public/skin-cancer/vitamin-d</a> (accessed Nov 2020)</li> </ol> |
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