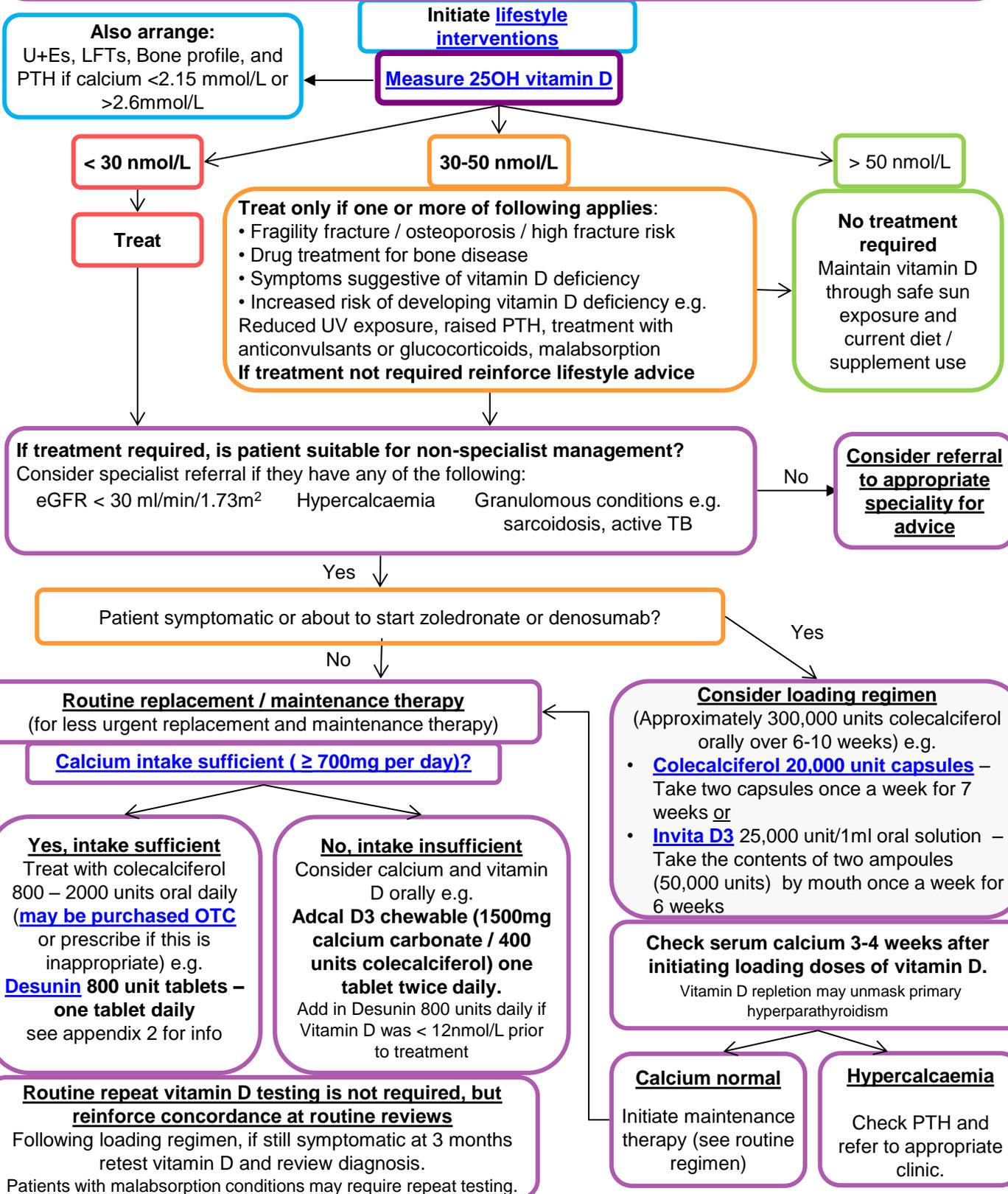


# Vitamin D Guideline: Deficiency and Insufficiency in Adults

## Who to Test?

1. Patients with diseases with outcomes that may be improved with vitamin D treatment e.g. **confirmed osteomalacia, osteoporosis**
  2. Patients with **symptoms** that could be attributed to vitamin D deficiency e.g. suspected osteomalacia, chronic widespread pain
  3. Before starting patients on a **potent antiresorptive agent** e.g. IV zoledronic acid or denosumab
  4. Before oral osteoporosis therapy if not going to be co-prescribed vitamin D containing supplements
  5. Specialists may test other specific patient groups as deemed clinically necessary
- N.B. Pregnant and breastfeeding women, children < 5 years, those > 65 years and people who are not exposed to much sun are at greater risk of deficiency and are recommended to take supplements see [here](#)



## Appendix 1: Risk factors, signs and symptoms, practicalities of levels and classification of deficiency

**Table 1: Risk factors for vitamin D deficiency**

Inadequate UVB light exposure	Inadequate dietary intake or absorption	Metabolic factors
Pigmented skin (non-white ethnicity)	Vegetarian (or other fish-free diet)	Older people aged 65 years and over (reduced synthesis in the skin)
Lack of sunlight exposure or atmospheric pollution	Malabsorption (e.g. coeliac disease, Crohn's disease etc)	Drug interactions e.g. rifampicin, anticonvulsants (carbamazepine, oxcarbazepine, phenobarbital, phenytoin, primidone and valproate), isoniazid, cholestyramine, sucralfate, glucocorticoids, highly active antiretroviral treatment (HAART)
Skin concealing garments or routine use of sun protection factor 15 or above	Short bowel	
Northern latitude	Cholestatic liver disease, jaundice	
Housebound or indoor living (e.g. care homes)		Chronic liver disease
Seasonal		Chronic renal disease

### Signs and symptoms of Vitamin D deficiency and Osteomalacia

- General lethargy, muscle ache and pain
- Muscle weakness, skeletal pain and tenderness
- Pathological fractures (Looser zones)
- Osteopenia on plain radiograph
- Low bone density on dual energy x ray absorptiometry scan (does not equate to osteoporosis)

### Practicalities of taking a Vitamin D level:

- Vitamin D (Serum 25(OH)D) levels should be taken in a yellow or red top tube
- Vitamin D (Serum 25(OH)D) assay costs approximately £15 per test

**Table 2: Classification of vitamin D status**

The following treatment recommendations apply only to those patients who fulfil the criteria for testing (see flowchart "Who to treat").

National Osteoporosis Society Guidelines: "The use of serum 25OHD measurements in asymptomatic healthy individuals and the correction of deficiency to reduce the incidence of the diseases putatively associated with vitamin D deficiency have never been studied. This form of population screening has not been carried out and would not fulfil recognised criteria for screening. Although vitamin D deficiency is highly prevalent, universal screening of asymptomatic populations is not recommended"

Serum 25(OH)D concentration	Vitamin D status	Manifestation	Management
<30 nmol/l	Vitamin D deficiency	Risk of Rickets / Osteomalacia	See flow chart. Requires treatment
30-50 nmol/l	Vitamin D insufficiency	Associated with disease risk	Requires intervention only in some groups (see below)
>50 nmol/l	Unlikely to require intervention	Healthy	No supplementation required Lifestyle advice only
>75 nmol/l	Optimal	Healthy	None

Treatment of **insufficiency** is advised in patients with the following:

- fragility fracture, documented osteoporosis or high fracture risk
- treatment with antiresorptive medication for bone disease
- symptoms suggestive of vitamin D deficiency
- increased risk of developing vitamin D deficiency in the future because of reduced exposure to sunlight, religious/cultural dress code, dark skin, etc.
- raised PTH
- medication with antiepileptic drugs or oral glucocorticoids
- conditions associated with malabsorption.

## Appendix 2: Recommended Vitamin D preparations for prescribing (when treating in accordance with Nottinghamshire vitamin D guideline)

**Table 1: Recommended vitamin D preparations (To be taken with food) .**

Further information on available products is available [here](#)

Oral Vitamin D preparation	Licensing status	Availability	Cost	Allergy / dietary info
Colecalciferol 20,000 unit capsules	Licensed UK products (e.g. Fultium D3, Aviticol, Plenachol)	POM - normal wholesalers	£17.04 for 15 £29.00 for 30 capsules	<i>Check individual products</i> Gelatin in Aviticol and Fultium D3 suitable for kosher and halal. No Gelatin in Plenachol. Aviticol, Plenachol and Fultium D3 are arachis oil free.
InVita D3 25,000 units/ 1ml oral solution. Formulation is a 1ml single dose "snap and squeeze" ampoule	Licensed UK product (replaces Pro D3 and Dekristol capsules)	POM - normal wholesalers	£4.45 for 3 ampoules	<i>Does not contain peanut oil or soya.</i> Olive oil based liquid. Suitable for vegetarians
<p>Comes as a "Snap and squeeze" ampoule (see below). Patients should be advised to take InVita D3 at mealtimes – If preferred, the contents can be emptied onto a spoon and taken orally or mixed with a little cold or lukewarm food immediately before use. See <a href="#">SPC</a> for further information</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">  <p>1</p> </div> <div style="margin-right: 10px;">  <p>2</p> </div> <div style="margin-right: 10px;">  <p>3</p> </div> <div style="margin-right: 10px;">  <p>4</p> </div> <div style="border: 1px solid orange; border-radius: 10px; padding: 5px; margin-left: 10px;"> <p><b>i</b> Patients simply 'snap' the top off the ampoule... and 'squeeze' the full contents into their mouth before swallowing</p> </div> </div>				
Desunin® 800 unit colecalciferol tablets (30 tabs) N.B. doses over 5 tablets a day are off-label	Licensed UK product	POM - normal wholesalers	£3.60 for 30 tablets	<i>Does not contain gelatin, peanut oil or soya.</i> Colecalciferol is derived from healthy <b>live</b> sheep's wool fat – may be acceptable to vegetarians
Fultium D3® 800 unit colecalciferol capsules (30 caps) N.B. doses over 4 capsules a day are off-label	Licensed UK product	POM - normal wholesalers	£3.60 for 30 capsules	<i>Contains glycerol and gelatin.</i> The gelatin used in the capsule shell is certified to Halal and kosher standards (see website)

**NOT RECOMMENDED: Named patient 'specials' of vitamin D (unlicensed) for adults in primary care should NOT be routinely prescribed.**

### **Intramuscular Injection:**

Please note that injection of Ergocalciferol is not routinely encouraged due to variable absorption and slower onset of repletion. Therefore it should only be used if a patient cannot take an oral preparation.

Dose for osteomalacia treatment: 300,000 units of ergocalciferol given by intramuscular injection once only or give a second dose 3 months later

There is a licensed UK injection of ergocalciferol but its not always available. This is gelatin free. Ergocalciferol, 7.5 mg (300 000 Units)/mL in oil, Injection for intramuscular use only. 1-mL amp = £9.35, 2-mL amp = £10.84.

### **Alfacalcidol/Calcitriol (Specialist initiation only)**

Alfacalcidol and Calcitriol have no routine place in the management of primary vitamin D deficiency and should be reserved for use in renal disease, liver disease and primary hypoparathyroidism.

### **Additional reference sources**

[Is there a calcium and vitamin D preparation which is suitable for a vegetarian or vegan?](#)

[Is there a suitable vitamin d product for a patient with a peanut or soya allergy?](#)

**Appendix 3: Patient groups at risk of vitamin D deficiency**

People at risk of vitamin D deficiency	Daily oral supplement advised
All pregnant* and breastfeeding women	400 units daily <sup>†</sup>
All babies and young children aged 6 months to 5 years <ul style="list-style-type: none"> <li>Babies who are fed infant formula should not need a vitamin D supplement until they are having less than 500ml (about a pint) of infant formula a day. These products are fortified with vitamins and minerals and there is a risk of high intakes if they are consumed together.</li> <li>Breastfed infants should be given a vitamin D supplement from one month of age if the mother did not take a vitamin D supplement throughout her pregnancy.</li> </ul>	280 to 340 units daily
People aged 65 and over	400 units daily
People who are not exposed to much sun; for example, those who cover their skin for cultural reasons, are housebound or who stay indoors for long periods (e.g. care home residents) **	400 units daily
<p>* REMEMBER – pregnant women should avoid taking multivitamins containing vitamin A (retinol) due to the teratogenic risk of vitamin A</p> <p>† High risk women (women with increased skin pigmentation, reduced exposure to sunlight, or those who are socially excluded or obese) may be advised to take at least 1000 units (25 micrograms) daily (in line with <a href="#">RCOG guidelines 2014</a>)</p> <p>** Evidence from a recent Cochrane Review suggests that calcium and vitamin D supplements, particularly in high risk patients (postmenopausal women and older men in care homes), result in a small reduction in hip fracture risk. There is evidence that vitamin D alone is unlikely to prevent hip fractures in these patients. N.B. Vitamin D (colecalfiferol, cholecalciferol, ergocalciferol) content may be expressed in units. 10 micrograms is equivalent to 400 units..</p>	

**Appendix 4: Patient information about vitamin D and lifestyle advice**

A variety of patient information leaflets are available including:

[Public Health England: Vitamin D – All you need to know](#)

[NHS Choices Vitamin D PIL](#)

[National Osteoporosis Society: Healthy bones:](#)

[Royal National Orthopaedic Hospital: FAQs about Vitamin D in childhood](#)

[National Osteoporosis Society: Children's bone health](#)

[Royal College Obstetrics and Gynaecologists: Healthy eating and vitamin supplements in pregnancy](#)

## Appendix 5: Vitamin D products available without prescription

### Healthy Start vitamins

Healthy Start vitamins ([www.healthystart.nhs.uk](http://www.healthystart.nhs.uk)) for women and children are free of charge for low income families and are available from Sure Start centres and [some other health centres](#). You can also ask your midwife or health visitor for where they are available locally.

Women qualify for free Healthy Start vitamins from the 10<sup>th</sup> week of pregnancy or if they have a child under four years old, and if she or her family receives:

- Income Support, or
- Income-based Jobseeker's Allowance, or
- Income-related Employment and Support Allowance, or
- Child Tax Credit (but not Working Tax Credit unless the family is receiving Working Tax Credit run-on only) and has an annual family income of £16,190 or less.

Women who are under 18 and pregnant also qualify, even if they do not get any of the above benefits or tax credits.

Some Sure Start centres will also sell them to other customers (at minimal charge), but not all have the facility to take money.

There are two different Health Start products:

- Healthy Start **women's** vitamin **tablets**. The daily dose of one tablet contains: 400 units of vitamin D3 per tablet (as well as 70 micrograms of vitamin C and 400 micrograms of folic acid)
- Healthy Start **children's** vitamin **drops**. The daily dose of five drops contains: 300 units of vitamin D3 (as well as 233 micrograms of vitamin A and 20 milligrams of vitamin C)

For those people in whom healthy start vitamins are not suitable, a range of vitamin D3 supplements are available for purchase from various manufacturers, some examples of which are included in Table 1 below.

**Table 1: Example colecalciferol (Vitamin D3) health food supplements available for purchase,** adapted from [UKMI Q&A](#) (last updated 21/06/2013).

None of the listed products have a UK marketing authorisation. They are marketed as nutritional supplements. This list is for information only and is not exhaustive. Look for GMP stamped supplements

Preparation (listed alphabetically)	Manufacturers, & distributors	Manufacturers/ distributors additional information	Relative Price
BioLife Vitamin D3 25µg (1000 IU) tablets (90 tablets)	Available for purchase only from <a href="http://www.lifestylenaturalhealth.co.uk">www.lifestylenaturalhealth.co.uk</a>	Suitable for vegetarians	££
Boots Pharmaceuticals Vitamin D3 25µg (1000 IU) tablets (90 tablets)	Available for purchase from Boots stores or <a href="http://www.boots.com">www.boots.com</a>	Free from soya and peanuts Suitable for vegetarians	£
Nature's Remedy Vitamin D3 25µg (1000 IU) Veg tablets and capsules (packs of 100)	Available for purchase only from <a href="http://www.naturesremedy.co.uk/">www.naturesremedy.co.uk/</a>	Do not contain nuts or soya. Colecalciferol is derived from sheep's wool fat – however the company has confirmed the product is suitable for vegetarians	£-££
Pro D3 1000 (1000 IU) capsules (30 capsules)	Available for purchase only from <a href="http://www.prod3.co.uk">www.prod3.co.uk</a>	Do not contain any peanut or soya related ingredients. Colecalciferol is derived from sheep's wool fat – however the company has confirmed the product is suitable for vegetarians	££££££
Solgar Vitamin D3 25µg (1000 IU) softgels (100 capsules)	Available at various retailers, see <a href="http://www.solgar.co.uk">www.solgar.co.uk</a>	No information available. Capsules contain gelatine, not suitable for vegetarians	££
SunVit D3 1000 IU tablets (28 tablets)	Available from <a href="http://www.sunvitd3.co.uk">www.sunvitd3.co.uk</a>	Do not contain peanut or soya related ingredients. Suitable for vegetarians according to the <a href="#">vegetarian society</a>	££££££

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**References:**

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- Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management April 2013 <https://www.nos.org.uk/document.doc?id=1352>
- UKMI Medicines Q&As:
  - Is there a suitable vitamin D product for a patient with a peanut or soya allergy? [here](#)
  - Which vitamin D preparations are suitable for a vegetarian or vegan diet? [here](#)
  - What dose of vitamin D should be prescribed for the treatment of vitamin D deficiency? [here](#)
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