Importance of vitamin D
Severe vitamin D deficiency can result in rickets (among children) and osteomalacia (among children and adults)\(^1\). Vitamin D deficiency should be treated to prevent skeletal complications\(^2\).

Sources of vitamin D in the UK
Dietary sources of vitamin D are limited. The main natural source is from the action of sunlight on skin. However, from mid-October to the beginning of April in the UK there is no ambient ultraviolet sunlight of the appropriate wavelength for skin synthesis of vitamin D\(^1\). The risks and benefits of sunlight exposure (including exposure to prevent vitamin D deficiency) will be covered in a NICE guidance currently under development (anticipated publication date: July 2015).

Should vitamin D supplementation be recommended to prevent chronic diseases?
Clear evidence of benefit over harm for vitamin D is not available, therefore, vitamin D supplements should not be recommended for prevention of chronic diseases (e.g. cardiovascular disease, cancer, chronic obstructive lung disease, or diabetes)\(^2\).

When to test for vitamin D levels?
Health professionals should not routinely test people's vitamin D status unless\(^1\&3\):

- they have symptoms of deficiency e.g. symptoms of suspected osteomalacia, chronic widespread pain
- there is a clinical reason to do so (e.g. they have osteomalacia or have had a fall)
- before starting patients on any antiresorptive agent (i.e. bisphosphonates or denosumab) if they are not going to be co-prescribed vitamin D containing supplements

Population groups at risk of vitamin D deficiency\(^4\)

- All pregnant and breastfeeding women, particularly teenagers and young women
- Infants and children under 5 years
- 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 who have darker skin, e.g. people of African, African–Caribbean and South Asian origin

Routine testing for vitamin D levels is not required in these groups\(^3\)

Recommend and record vitamin D supplement use (prescribed or purchased) among at-risk groups above whenever possible.
This could take place during registration appointments with new patients or routine appointments with existing patients (e.g. appointments for vaccinations, screening, or health checks)\(^1\).

References


Vitamin D: Patient Management Pathway (based on National Osteoporosis Society Vitamin D guideline)

Patients who need vitamin D supplements but do NOT require vitamin D testing

Is vitamin D testing required?

Only test vitamin D status if:
- Patient has symptoms of deficiency e.g. symptoms of suspected osteomalacia, chronic widespread pain
- There is a clinical reason to do so (e.g. they have osteomalacia or have had a fall).
- Before starting patients on any antiresorptive agent (i.e. bisphosphonates or denosumab) if they are not going to be co-prescribed vitamin D containing supplements

Population groups at-risk of having a low vitamin D status include:
- All pregnant and breastfeeding women
- Infants and children under 5 years
- People over 65
- People who have low or no exposure to the sun e.g. those who cover their skin for cultural reasons, who are housebound or confined indoors for long periods
- People who have darker skin, e.g. people of African, African–Caribbean and South Asian origin.

Deficiency*
- Imperial and C&W: <40 nmol/L
- ASPH & Hillingdon: <25 nmol/L

Insufficient*
- Imperial and C&W: 40-69 nmol/L
- ASPH & Hillingdon: 25-50 nmol/L

Replete*
- Imperial and C&W: 70-150 nmol/L
- ASPH & Hillingdon: 51-75 nmol/L (normal)
- >75 nmol/L (optimal)

If one or more of following applies:
- Fragility fracture/osteoporosis/high fracture risk
- Drug treatment for bone disease
- Symptoms suggestive of vitamin D deficiency
- Increased risk of developing vitamin D deficiency e.g. reduced UV exposure, raised PTH, treatment with anticonvulsants or glucocorticoids, malabsorption

Where correction of vitamin D deficiency is less urgent and when co-prescribing vitamin D supplements with an oral antiresorptive agent (e.g. bisphosphonates), maintenance therapy may be started without the use of loading doses.

Maintenance therapy
See page 3 for vitamin D products & doses.

Women who are at least 10 weeks pregnant and families with children younger than 4 years who are on benefits or tax credits are entitled to free Healthy Start vitamins (www.healthystart.nhs.uk).

People may be more likely to take a vitamin D-only supplement than one that is combined with calcium. Supplements containing vitamin D and calcium may be harder to swallow and cause side effects such as constipation.

Commence maintenance vitamin D 4 weeks after completing loading dose regimen correction

Rapid correction
Loading dose usually for 6-8 weeks:
See page 3 for vitamin D products & doses

- Check serum adjusted calcium 4 weeks after treating with loading doses of vitamin D (rapid correction) as vitamin D repletion may unmask primary hyperparathyroidism
- Routine repeat vitamin D testing is not required

Maintain vitamin D through safe sun exposure & current diet/supplement

*Vitamin D assays can vary between different hospitals and publications. Please use the reference figure for the hospital undertaking the test.
## Licensed vitamin D preparations of choice

### Rapid correction of vitamin D deficiency

<table>
<thead>
<tr>
<th>Product</th>
<th>Age</th>
<th>Dose</th>
<th>Cost per Course</th>
<th>Contains</th>
<th>Suitable for Vegetarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fultium-D3 20,000 unit capsules</td>
<td>12-18</td>
<td>1 capsule once every 2 weeks for 6 weeks</td>
<td>£3.40</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Over 18</td>
<td>2 capsules once every week for 7 weeks</td>
<td>£15.90</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>InVita D3 25,000 units/1ml oral solution</td>
<td>0-18</td>
<td>1 drinkable ampoule once every 2 weeks for 6 weeks</td>
<td>£4.45</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Over 18</td>
<td>2 drinkable ampoules once a week for 6 weeks</td>
<td>£17.80</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Fultium-D3 3,200 unit capsules</td>
<td>Over 18 (licensed for use in pregnancy and breast-feeding)</td>
<td>1 capsule daily for 12 weeks</td>
<td>£37.30</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

### Maintenance therapy of vitamin D deficiency

<table>
<thead>
<tr>
<th>Product</th>
<th>Age</th>
<th>Dose</th>
<th>Cost per Year</th>
<th>Contains</th>
<th>Suitable for Vegetarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fultium-D3 20,000 unit capsules</td>
<td>12-18</td>
<td>1 capsule every 6 weeks</td>
<td>£9.87</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Over 18</td>
<td>1 capsule once a month</td>
<td>£13.63</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>InVita D3 25,000 units/1ml oral solution</td>
<td>0-1</td>
<td>1 drinkable ampoule every 8 weeks</td>
<td>£9.66</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>1-18</td>
<td>1 drinkable ampoule every 6 weeks</td>
<td>£12.89</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Over 18</td>
<td>1 drinkable ampoule once a month</td>
<td>£17.80</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>InVita D3 2,400units/ml oral drops (expected to be available July 2015)</td>
<td>0-1 years</td>
<td>400 units (6 drops) daily</td>
<td>£22</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>1-18 years</td>
<td>600 units (9 drops) daily</td>
<td>£33</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Pregnancy &amp; breast-feeding</td>
<td>400 units (6 drops) daily</td>
<td>£22</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Fultium-D3 800unit capsules</td>
<td>Over 12 (licensed for use in pregnancy and breast-feeding)</td>
<td>1 capsule once a day</td>
<td>£43.80</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

- As an alternative to the prescribed products listed for maintenance therapy above, patients can purchase vitamin D from pharmacies. Patients should discuss appropriate choice of products with their pharmacist.
- InVita D3 does not contain gelatin or porcine sourced materials or any ingredients from slaughtered animals.
- Fultium 800 and 3200 units used to contain nuts and soya but are now reformulated with maize oil. Old batches may be available so patients should consult their pharmacist when receiving them.

### Prevention & treatment of vitamin D + calcium deficiency in the elderly

- Vitamin D + calcium supplement as an adjunct to specific osteoporosis treatments of patients who are at risk of vitamin D & calcium deficiency

<table>
<thead>
<tr>
<th>Product</th>
<th>Dose</th>
<th>Cost per Year</th>
<th>Contains</th>
<th>Suitable for Vegetarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accrete D3 tablets</td>
<td>One tablet twice a day</td>
<td>£35.89</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Calceos 500mg/400unit chewable tablets</td>
<td>One tablet twice a day</td>
<td>£43.56</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Adcal-D3 750mg/200unit caplets</td>
<td>Two tablets twice a day</td>
<td>£47.58</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Calfovit D3 oral powder sachets</td>
<td>1 sachet in with water per day</td>
<td>£52.56</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>

**NICE CKS:** A calcium intake of at least 1000 mg/day (preferably via the diet) is recommended for people at increased risk of a fragility fracture. To calculate the dietary calcium intake, see [Calculate your Calcium](#). Hence, for some patients it may be clinically appropriate to review the use of calcium supplements in light of their dietary calcium intake⁵.