Advice on the Management of Adults over 18 years with Vitamin D Deficiency or Insufficiency in Primary and Secondary Care

This pathway is intended for use by healthcare professionals who see patients at risk of vitamin D deficiency. It is not a screening pathway and Vitamin D testing is not a screening tool. The aim of this guidance is to give recommendations on when measuring of vitamin D levels may be appropriate and how to proceed when abnormal vitamin D levels are seen.

Summary
Vitamin D is essential for good bone health but there is still uncertainty around its role in other diseases such as cancer, heart disease and diabetes. Vitamin status is monitored by measuring serum 25-hydroxyvitamin D (25(OH)D) concentration. Leeds Hospitals endocrinologists use a level of < 30nmol/l to define deficiency in adults.

<table>
<thead>
<tr>
<th>Serum 25(OH)D conc</th>
<th>Vitamin D status</th>
<th>Manifestation</th>
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<tbody>
<tr>
<td>&lt;30 nmol/l</td>
<td>Deficient</td>
<td>Osteomalacia, usually presenting as musculoskeletal pain + weakness in adults.</td>
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<tr>
<td>30 – 75 nmol/l</td>
<td>Insufficient</td>
<td>Possibly associated with increased risk of disease</td>
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<tr>
<td>75 – 125 nmol/l</td>
<td>Sufficient</td>
<td>Healthy</td>
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Please note: Vitamin D levels used to define deficient, insufficient and sufficient in the adult guidelines differ from those in the Leeds children’s guidelines.

Recent information from the UK has indicated that around 50% of the adult population may have vitamin D insufficiency in winter and spring, with the prevalence of vitamin D deficiency at around 16%. People who achieve an adequate level of vitamin D during the summer should have sufficient levels in the winter without supplementation but in some people supplementation may be necessary.

There is currently a lack of evidence to support routine screening of vitamin D levels in general practice.

Lifestyle Advice
90% of the body’s vitamin D requirement is obtained from ultraviolet B sunlight exposure, with only a minimal amount obtainable from food. It follows that adequate exposure to sunlight is essential for good health.

During the summer two or three exposures of 20 minutes (of at least the face and arms without sunscreen and not behind glass) each week should provide adequate amounts of vitamin D for most fair skinned individuals. In the UK, from October to April sun exposure is not adequate for synthesis of vitamin D and levels must be maintained by using tissue stores and dietary sources.
Department of Health recommendations
The DOH advice is that the following people are at risk of deficiency: pregnant and breastfeeding women, people aged over 65, people with low or no sun exposure and those with darker skin.

They recommend supplementation in the following:

<table>
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<tr>
<th>Supplements are recommended for following people:</th>
<th>Daily vitamin D supplement</th>
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<tbody>
<tr>
<td>• All pregnant + breastfeeding women</td>
<td>10mcg (400 units) /day</td>
</tr>
<tr>
<td>• All infants and children from 6 months to 5 years, unless they are drinking 500ml or more of infant formula a day at any time during this age range. (Infants aged 0-6 months may not need supplements as they should get adequate amounts from breast milk or infant formula milk. If there is any doubt about the mother’s use of vitamin supplements during pregnancy and/or breast feeding, breastfed infants will benefit from vitamin D supplements from 1 month)</td>
<td>6 months to 5 years: 7 to 8.5mcg (280-340units) per day</td>
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<tr>
<td>• People with little sun exposure, e.g. people confined indoors for long periods and those who cover their skin for cultural reasons.</td>
<td>10mcg (400units)/day</td>
</tr>
<tr>
<td>• People aged 65 years and over</td>
<td>10mcg (400units) /day</td>
</tr>
</tbody>
</table>

Lifestyle advice should be reinforced with people at risk of deficiency.

Suitable supplements are available to buy from pharmacies, health food shops and supermarkets. Patients should consult their community pharmacist if they are unsure which product to buy.

Supplements are available free of charge to qualifying women and children via the Healthy Start scheme – see website for eligibility criteria [http://www.healthystart.nhs.uk/](http://www.healthystart.nhs.uk/)

No licensed medicines are currently available to prescribe for these groups. Healthy Start Vitamins are not available on prescription.

**Prescribing of nutritional supplements on the NHS to these groups is not recommended.**
Who should we test?

Vitamin D levels should be checked in all people with confirmed or suspected bone disease/low bone mineral density i.e. osteomalacia, osteoporosis, Paget's disease of bone, hyperparathyroidism and osteopenia; regardless of symptoms or risk factors.

In all other people vitamin D deficiency should be considered and checked for only if:

Patient has one or more of the following symptoms:

- Unexplained widespread or localised bone pain and tenderness
- Unexplained muscle weakness and pain.

Exclude other causes e.g. rheumatoid arthritis, polymyalgia rheumatica or hypothyroidism.

AND

One or more of the following risk factors:

- Reduced exposure to sunlight e.g. due to being housebound, having skin covered when outside or routine use of high factor sunscreen.
- Dark skin.
- Over 65s, (particularly with a history of falls or in care home not already prescribed Ca + Vit D)
- Pregnant + breastfeeding women
- Obese people i.e. BMI>30.
- Those who may have fat malabsorption e.g. CF, Crohns or bariatric patients.
- Those taking medication that may increase vitamin D catabolism e.g. anti-epilepsy drugs, glucocorticoids, systemic anti-fungal drugs such as ketoconazole, cholestryramine, rifampicin, HIV drugs.

Patients with the following conditions would normally be managed by secondary care or should be referred to secondary care for treatment if abnormal vitamin D level discovered:

Refer to secondary care if:

- Chronic liver or kidney disease (CKD 4 or above)
- Primary hyperparathyroidism
- History of renal stones
- Hypercalcaemia
- Metastatic calcification
- Patient with chronic granuloma forming disorders (sarcoidosis or TB), chronic fungal infections or lymphoma.
It is worthwhile encouraging all patients with risk factors – even those not exhibiting symptoms – to make lifestyle changes in order to achieve adequate amounts of vitamin D, but it is not necessary to measure their levels, e.g. patients over 65 years in care homes should be encouraged to go or be taken outdoors regularly.

What baseline tests are required?

- 25(OH)vitamin D
- Bone profile (to exclude hypercalcaemia and provide a baseline for monitoring)
- U+Es,

Safety Issues.

The Food Standards Agency advises that doses of up to 1000 units daily of vitamin D are not known to cause adverse effects in the general adult population. Research suggests up to 10,000 units can be taken daily by healthy people for up to 16 weeks without toxicity. Excessive intake can rarely lead to hypercalcaemia; symptoms include muscle weakness, apathy, headache, anorexia, nausea and vomiting.

Notes

Nomenclature: The term vitamin D is used for a range of compounds. Vitamin D2 is known as ergocalciferol. Vitamin D3 is known as colecalciferol. 1mcg colecalciferol / ergocalciferol are equivalent to 40 units.

Colecalciferol (vitamin D3) is considered the preferred form of vitamin D for treatment. It has been reported that colecalciferol raises vitamin D levels more effectively than ergocalciferol (vitamin D2), and has a longer duration of action.


References:

4. UKMI Q+A What dose of Vitamin D should be prescribed for the treatment of vitamin D deficiency? http://www.evidence.nhs.uk/search?q=%22What+dose+of+vitamin+D+should+be+prescribed+for+the+treatment+of+vitamin+D+deficiency%22
5. Aviticol SPC https://www.medicines.org.uk/emc/

Grateful thanks to Dr S Orme, Dr A Abbas and Nicola Butler at Leeds Teaching Hospitals for their invaluable help writing this guideline.
Vitamin D levels should be checked in the following people regardless of symptoms or risk factors: All people with confirmed or suspected bone disease or low bone mineral density i.e. osteomalacia, osteoporosis, Paget’s disease of bone, hyperparathyroidism and osteopenia.

Other patients should be treated as follows:

Patient has one or more of the following symptoms:
- Unexplained widespread or localised bone pain and tenderness
- Unexplained muscle weakness and pain.
(Exclude other causes e.g. rheumatoid arthritis, polymyalgia rheumatica or hypothyroidism)

Patient has one or more of the following risk factors
- Reduced exposure to sunlight e.g. due to being housebound, having skin covered when outside or routine use of high factor sunscreen.
- Dark skin.
- Over 65s, particularly with a history of falls or in care home not already prescribed Ca + Vit D
- Pregnant or breastfeeding women
- Obese people i.e. BMI>30.
- Those who may have fat malabsorption e.g. CF, Crohns or bariatric patients.
- Those taking medication that may increase vitamin D catabolism e.g. anti-epilepsy drugs, glucocorticoids, systemic anti-fungal drugs such as ketoconazole, cholestryramine, rifampicin, HIV drugs.

Test
25(OH) vitamin D, bone profile (to exclude hypercalcaemia and provide a baseline for monitoring), U+Es,

SERUM 25(OH)D conc < 30nmol/L: DEFICIENT
Look at treatment box 1 for treatment options

SERUM 25(OH)D conc 30 - 75nmol/L: INSUFFICIENT
Look at treatment box 2 for treatment options

SERUM 25(OH)D conc >75nmol/L: SUFFICIENT
Give lifestyle and dietary advice.
For people at risk see DOH advice.

Monitor Calcium + Vit D levels at 6 weeks after loading doses
For everyone repeat full bloods after 12 weeks (U+Es, Ca, ALP, 25(OH)VitD)
If levels still <30nmol/L with symptoms and compliance confirmed consider referral to secondary care.

Repeat full bloods after 12 weeks (U+Es, Ca, ALP, 25(OH)VitD)
If levels still <75 nmol/L with symptoms and compliance confirmed consider referral to secondary care.

MAINTENANCE - see below
### DEFICIENCY - Treatment options

<table>
<thead>
<tr>
<th>Regime</th>
<th>Treatment Options</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DAILY REGIME</strong></td>
<td>Colecalciferol 3200 units daily for 12 weeks</td>
<td>Licenced products available.</td>
</tr>
<tr>
<td><strong>WEEKLY REGIMES</strong></td>
<td>Colecalciferol 2 x 20 000 units capsules each week for 7 weeks (licenced products available)</td>
<td>Or</td>
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<tr>
<td></td>
<td>Colecalciferol 50 000 units weekly for 6 weeks (prescribed as Invita D3 25000 unit / 1ml oral solution in snap top ampoule, 2 every week, licenced product)</td>
<td></td>
</tr>
<tr>
<td><strong>SINGLE DOSE REGIME</strong></td>
<td>Colecalciferol 300,000 units as a single oral loading dose (LTH unlicensed dosing regimen).</td>
<td>Recheck calcium and vitamin D after 6 weeks. Regime may be repeated after 3 months</td>
</tr>
<tr>
<td></td>
<td>If vitamin D is &lt; 30nmol/L after 2 attempts at oral loading refer to secondary care for IM injection</td>
<td></td>
</tr>
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**SAFETY NOTE:** Errors have occurred due to confusion between monthly, weekly and daily regimes and also high dose supplements being left on repeat prescription. We advise dose over 1000 units should not be added to repeat and stop dates added to prescriptions where appropriate.

For information on the use of the drugs in pregnancy and lactation see the manufacturers information (can be accessed via [www.medicines.org.uk](http://www.medicines.org.uk)) Seek specialist advice if required.

### INSUFFICIENCY Treatment options

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<tr>
<td>Over The Counter (OTC) Colecalciferol treatment to give 800 - 1000 units once or twice daily for 12 weeks².</td>
<td>Unlicensed OTC product eg : SunVit D3 tablets: see under treatment above</td>
</tr>
<tr>
<td>Or Prescribe colecalciferol 40 000 to 50 000 units once monthly for 3 months</td>
<td>Use 20 000 unit licenced capsules or InVita D3 liquid.</td>
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</tbody>
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Primary + Secondary Care Vitamin D guidelines June15
# Maintenance regimes following correction of deficiency (<30nmol / L) that need to be prescribed

- At LTH the Endocrinologists advise patients that once they are replete (ie they have a vitamin D level > 75nmol/L) to take colecalciferol 40 – 50,000 units once per month (October to March inclusive) and 20 – 25,000 units once per month (April to September inclusive), using any of the licensed products available. This regime is an empirical regimen used by the Endocrinologists. It seems to enable patients to have a vitamin D level within the target range aimed for by the Endocrinologists of between 75-125nmol/L. This regimen would need to be prescribed.

- Daily regime of colecalciferol 800unit tablets or capsules (Desunin of Fultium D3) 1 or 2 daily Calcium + vitamin D 800units per day eg Calceos 2 daily, for elderly, institutionalised people to prevent falls and for those with osteoporosis/osteopenia.

- Monitoring of vitamin D levels is not required at this dosage unless on going low BMD, bone problems, poor absorption or symptomatic of vitamin D deficiency.

- **Maintenance treatments that may be purchased Over The Counter**
  - People with continued high risk should be maintained on a supplement containing 800 - 1000units vitamin D daily combined with food and lifestyle advice.
  - Examples available to buy OTC: SunVit D3 tablets 1000 units