VITAMIN D DEFICIENCY TREATMENT GUIDELINE

1. INTRODUCTION

- Guideline for treating vitamin D deficiency in adults with eGFR >30 and low or normal serum calcium.
- This guideline represents the views of the Gloucestershire Hospitals NHS Foundation Trust, which were arrived at after consideration of the available evidence and the development of consensus. It has been updated following the publication of the National Osteoporosis Society’s Guidelines: Vitamin D and Bone Health, a Practical Clinical Guideline for Patient Management, in April 2013.
- The guideline aims to ensure equity and best practice within the context of resources currently available to the NHS locally.
- This guideline does not override the responsibility of healthcare professionals to make appropriate decisions in the circumstances of the individual patient in consultation with the patient and/or carer.
- This guideline provides recommendations on the treatment of established vitamin D deficiency/insufficiency in adults with eGFR >30 and low or normal serum calcium; for recommendations on vitamin D supplementation please see Department of Health guidance. For recommendations on treating vitamin D deficiency in patients with stage 4 or 5 CKD (eGFR <30) please see NICE guidance.

2. DEFINITIONS

<table>
<thead>
<tr>
<th>Word/Term</th>
<th>Descriptor</th>
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<tbody>
<tr>
<td>Colecalciferol</td>
<td>Vitamin D3</td>
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<tr>
<td>Ergocalciferol</td>
<td>Vitamin D2</td>
</tr>
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3. ROLES AND RESPONSIBILITIES

<table>
<thead>
<tr>
<th>Post/Group</th>
<th>Details</th>
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<tbody>
<tr>
<td>Osteoporosis Guidelines Group</td>
<td>Responsible for ensuring guidelines remain up to date with clinical evidence/ national consensus</td>
</tr>
<tr>
<td>Prescribers</td>
<td>Responsible for following this guideline</td>
</tr>
</tbody>
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4. POPULATION TO BE TREATED

This guideline is only for use in adults with eGFR >30 and low or normal serum calcium.

Vitamin D deficiency is very common and associated with many diseases.

Vitamin D ‘insufficiency’ occurs in > 50% of the adult UK population. The incidence is much higher in the elderly and occurs in >90% of care home residents.

Supplementation should be considered for the following high risk groups:

- History of fragility fracture, or known osteoporosis (>50yrs)
- Fallers over 65 yrs
- Starting potent bone specific parenteral therapies such as Zolendronic Acid, Teriparatide, Denosumab etc.
- Pts on enzyme inducing anti-epileptic drugs (NICE CG20)
- Intestinal malabsorption
- Pts treated with oral glucocorticoids
- Over 80’s – especially if housebound
- Care home residents

Patients with the above risk factors from ethnic minorities are at additional risk.
5. **ASSESSING VITAMIN D STATUS**

Vitamin D status is most reliably determined by assay of serum 25-hydroxyvitamin D (25-OHD).

**Interpretation of serum 25-OHD concentration:**

- <30nmol/l - Deficiency
- 30-50nmol/l - Insufficient
- >50nmol/l - Adequate

6. **DIETARY ADVICE**

Diet is a poor source of vitamin D.

7. **SUN ADVICE**

Sun exposure is the main source of vitamin D, but excessive sun exposure is the main cause of skin cancer, including melanoma, the fastest rising type of cancer in the UK. Enjoying the sun safely, while taking care not to burn, can help to provide the benefits of vitamin D without unduly raising the risk of skin cancer.

It is impractical to offer a one-size-fits-all recommendation for the amount of sun exposure that people need to make sufficient vitamin D, because this varies according to a number of environmental, physical and personal factors.

The time required to make sufficient vitamin D is typically short and less than the amount of time needed for skin to redden and burn. Regularly going outside for a matter of minutes around the middle of the day without sunscreen should be enough. When it comes to sun exposure, little and often is best, and the more skin that is exposed, the greater the chance of making sufficient vitamin D before burning. However, people should get to know their own skin to understand how long they can spend outside before risking sunburn under different conditions.

For more information see the National Osteoporosis Society's [Sunlight Campaign](http://www.nos.org.uk/sunlight-campaign).

8. **WHO SHOULD BE TESTED FOR VITAMIN D DEFICIENCY?**

- Pts with bone diseases that may be improved with Vitamin D replacement e.g. osteomalacia, Paget's
- Before commencing potent anti-resorptive therapy (e.g. Zolendronate or Denosumab)
- Pts with musculoskeletal symptoms that might be attributable to Vitamin D deficiency e.g. myopathy, chronic widespread pain

There is no need to routinely test for vitamin D deficiency in the following groups:

- Asymptomatic individuals at higher risk of Vitamin D deficiency – these patients should be commenced on maintenance Vitamin D therapy.
- Osteoporosis or fragility fracture where a decision has been made to prescribe an oral bisphosphonate. In this situation a Vitamin D preparation (with or without Calcium) should be routinely co-prescribed.
- Asymptomatic healthy individuals

9. **VITAMIN D REPLACEMENT**

Oral dosing with colecalciferol (D3) has been shown to be the preferred method, aiming to replace approximately 600,000 IU per annum.

NB: Standard calcium/vitamin D supplementation may not be sufficient for those with Vitamin D deficiency.
Serum calcium levels should be checked one month after starting Vitamin D loading dose / maintenance in case subclinical primary hyperparathyroidism has been unmasked.

9.1 Ergocalciferol (D2 [plant])
Inconsistent data regarding persistence and bioactivity and so not recommended unless animal source of vitamin D is unacceptable (see vegan section below).

9.2 Intramuscular Vitamin D:
Unpredictable and slow systemic uptake. Only recommended for patients with small bowel resections, unable to take or non-compliant with oral therapy.

10. VITAMIN D PREPARATIONS OF CHOICE

<table>
<thead>
<tr>
<th>Injection/Oral</th>
<th>Suitable for vegetarians</th>
<th>Suitable in peanut / soya allergy</th>
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</thead>
<tbody>
<tr>
<td>Injection</td>
<td>Colecalciferol (300,000iu in 1ml) injection</td>
<td>Yes</td>
</tr>
<tr>
<td>Oral</td>
<td>HuxD3® (colecalciferol 20,000iu) capsules</td>
<td>Yes</td>
</tr>
<tr>
<td>Low dose</td>
<td>Desunin® (colecalciferol 800iu) tablets</td>
<td>Yes</td>
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10.1 Miscellaneous (if above preparations not suitable):

Vegan preparations:
Colecalciferol is derived from sheep wool and therefore not suitable for vegans. Ergocalciferol is derived from yeast and therefore suitable for vegans provided it is not encapsulated in animal gelatine.

<table>
<thead>
<tr>
<th>Oral</th>
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<th>Suitable in peanut / soya allergy</th>
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<tbody>
<tr>
<td>Calcium &amp; ergocalciferol (calcium 97mg / ergocalciferol 400iu) tablets</td>
<td>Yes</td>
<td>check product info</td>
</tr>
<tr>
<td>Uvestrol D® (ergocalciferol 30,000iu/20ml) liquid: available from IDIS</td>
<td>Yes</td>
<td>Yes</td>
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Oral liquid preparations:
For patients with swallowing difficulties.

<table>
<thead>
<tr>
<th>Oral</th>
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<th>Suitable in peanut / soy allergy</th>
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<tbody>
<tr>
<td>HuxD3® (colecalciferol 20,000iu) capsules</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>The capsule contents may be squeezed out or the capsule may be chewed by patients with swallowing difficulty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>InVita D3® (colecalciferol 25,000iu/1ml) oral solution</td>
<td>Yes</td>
<td>Yes</td>
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</table>
11. PRESCRIBING ADVICE

There are 3 potential regimens to correct vitamin D deficiency:

1/ Maintenance therapy – where correction of Vitamin D deficiency is less urgent and when co-prescribing supplements with an oral anti-resorptive agent, maintenance therapy can be started without the use of loading doses. This is suitable for the majority of people in the community.

2/ Slower Loading over 7-8 weeks (followed by maintenance therapy) - where more rapid correction is needed e.g. in symptomatic disease or prior to commencing treatment with a potent anti-resorptive agent as an out-patient.

3/ Faster Loading over 4-5 days (followed by maintenance therapy) – generally for hospital patients where quick loading prior to IV bisphosphonate or Denosumab administration is deemed appropriate. Can also be considered in those where compliance with the slower loading regimen might be felt to be an issue. This regimen is generally recommended only on the advice of a hospital bone health specialist.

**SLOWER Loading Dose**

25-OHD = 0-30 nmol/l (deficiency):

- HuxD3 40,000iu po ONCE WEEKLY for 7 weeks – followed by maintenance therapy

25-OHD = 30-50 nmol/l (insufficiency):

- HuxD3 20,000iu po ONCE WEEKLY for 8 weeks – followed by maintenance therapy

**FASTER Loading Dose**

25-OHD = 0-30 nmol/l (deficiency):

- HuxD3 60,000iu po ONCE DAILY for 5 days – followed by maintenance therapy

25-OHD = 30-50 nmol/l (insufficiency):

- HuxD3 40,000iu po ONCE DAILY for 4 days – followed by maintenance therapy

**MAINTENANCE Therapy**

- Desunin 1600iu po ONCE DAILY

Or

- HuxD3 40,000iu to 60,000iu ONCE MONTHLY – only for use in patients who are likely to remember to take medication on a monthly basis

OR A SUITABLE ALTERNATIVE (see preparations listed above – section 10)