PAN-DORSET GUIDELINE FOR THE MANAGEMENT OF VITAMIN D DEFICIENCY & INSUFFICIENCY IN ADULTS

Introduction
Vitamin D deficiency is common. Up to 40% of the local population could be deemed deficient or insufficient. (See table below)

- The average UK adult daily diet provides only approximately 3 microgram of vitamin D.
- Over 90% of the body’s vitamin D is produced from sunlight exposure, with approximately 3 sunlight exposures per week considered sufficient to achieve adequate vitamin D levels in the summer.
- Vitamin D levels can vary by ~40% from mid-winter to mid-summer, with a three-month lag between depletion and replenishment due to its fat solubility.
- Food sources which contain Vitamin D are described here.

Conversion factors:
10micrograms vitamin D = 400units vitamin D.
To convert 25(OH)D from ng/ml to nmol/L multiply by 2.5 i.e. 2.5nmol/L serum 25OH = 1ng/ml serum 25(OH)D

Vitamin D supplementation

SACN Vitamin D guidelines 2016 recommended vitamin D supplementation to the following groups at risk of vitamin D deficiency:

DOSE : 800 IU per day vitamin D is recommended for the UK population, including pregnant and lactating women and population groups at increased risk of deficiency.

- All pregnant and breast-feeding women, especially teenagers and young women
- Those aged 65 and over
- People with reduced sun exposure
- People with darker skin, for example of African, African-Caribbean & South Asian origin.

In these groups, supplementation is suggested without measurement of vitamin D levels.

Advise patients to buy an appropriate over the counter (OTC) preparation. Low cost Vitamin D options are readily available to purchase OTC and healthcare professionals should refrain from prescribing vitamin D maintenance preparations. Please also refer to the NHSE Consultation recommendations: Conditions for which Over The Counter items should not be routinely prescribed in primary care to ensure patients purchase their own supplies, where appropriate. This includes patients with Long Term Conditions. PHE guidance does not distinguish between the general public and ‘at risk’ patients and therefore vitamin D products are not exempted from the OTC guidance.

Multivitamin preparations are NOT suitable for the treatment of vitamin D deficiency as this may lead to vitamin A toxicity. See NHS Choices for information about vitamin D dietary sources and buying supplements. http://www.nhs.uk/Conditions/vitamins-minerals/Pages/Vitamin-D.aspx

When to test for Vitamin D deficiency?

Vitamin D levels do NOT need to be measured routinely. Consider measuring vitamin D in patients presenting with:

- Persistent musculoskeletal weakness, myalgia & arthralgia.
- Hypocalcaemia.
- Management of primary hyperparathyroidism
- Unexplained osteoporosis or osteoporosis refractory to treatment
- Mal-absorption syndromes
- Patients taking enzyme-inducing anti-convulsants – including off-label use for non-seizure indications e.g. carbamazepine for trigeminal neuralgia?
- Melanoma patients
- Before treatment with IV bisphosphonates and denosumab

Where in doubt, refer to specialist for advice and guidance
**Interpretation of vitamin D levels**

<table>
<thead>
<tr>
<th>Blood level</th>
<th>Status</th>
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<tbody>
<tr>
<td>&lt;30 nmol/L</td>
<td>Deficient</td>
</tr>
<tr>
<td>30-50 nmol/L</td>
<td>Insufficient</td>
</tr>
<tr>
<td>&gt;50 nmol/L</td>
<td>Adequate / replete</td>
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</tbody>
</table>

**Loading Doses in deficiency & treatment of other exceptional circumstances**

<table>
<thead>
<tr>
<th>Circumstance</th>
<th>Dosing</th>
<th>Alternatively</th>
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<tbody>
<tr>
<td>25-hydroxyvitamin D &lt; 30nmol/L</td>
<td>20,000 IU weekly for 6 weeks</td>
<td>3,200 IU daily for 6 weeks</td>
</tr>
<tr>
<td>Rapid replacement before IV bisphosphonate administration and treatment with Denosumab</td>
<td>20,000 IU weekly for 6 weeks</td>
<td>3,200 IU daily for 6 weeks</td>
</tr>
<tr>
<td>Very symptomatic e.g. myalgia</td>
<td>20,000 IU weekly for 6 weeks</td>
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</tr>
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</table>

Maintenance should be continued at 800 IU per day unless there is a predisposing condition to vitamin D deficiency in which case higher doses may need to be considered.

**After loading/treatment, patients should receive maintenance dose Vitamin D, (with or without calcium)**

If the person’s calcium intake is adequate, (>700 mg/day) [calcium calculator here], recommend 800 IU per day of vitamin D (without calcium).

If calcium intake is inadequate: A dose of up to 800 IU of vitamin D with approx. 1000mg of elemental calcium daily is recommended. (e.g. AdCal D3 1 tablet BD)

**Monitoring**

- For patients with osteoporosis NICE recommends re-checking vitamin D levels within 3–6 months of a loading dose (no sooner as it takes at least 3 months for the vitamin D level to stabilize). Repeat testing is on a case-by-case basis based on the recommendations of the secondary care team managing the patient.
- For patients with osteoporosis The National Osteoporosis Society recommends routine monitoring is unnecessary unless the patient has a malabsorption syndrome, is on treatment with s/c denosumab, remains symptomatic, there is a likelihood of poor adherence or hypercalcemia occurs, and to check for unmasked primary hyperparathyroidism
- There is not clear guidance on how often to test vitamin D levels in patients on maintenance therapy with malabsorption syndromes but it seems reasonable to test vitamin D levels periodically, 3-6 monthly, and adjust the time frame depending on the patient’s last level.

**Treatment of At-risk groups:**

Consider the need for referral or seeking specialist advice.

- **Refer to an appropriate specialist (using clinical judgement to decide on the urgency)** if a serious underlying condition, such as cancer or a malabsorption disorder (for example Crohn’s disease), is suspected. See the sections on Causes and Differential diagnosis.
- **Refer or seek specialist advice (depending on clinical judgement)** if the person:
  - Has a fragility fracture, documented osteoporosis, or high fracture risk, or is being treated with an antiresorptive drug for bone disease.
  - Has raised parathyroid hormone levels.
  - Is taking an antiepileptic drug or an oral corticosteroid, or is on long-term treatment with other drugs known to cause vitamin D deficiency, such as colestyramine.
  - Has a malabsorption disorder (for example Crohn’s disease) or other condition known to cause vitamin D deficiency, such as chronic kidney disease.
  - Has a co-existing condition associated with increased sensitivity to vitamin D (such as sarcoidosis, tuberculosis, lymphoma, or primary hyperparathyroidism).
  - Is a pregnant woman.
  - Has an unexplained deficiency.

**NOTE:** As guidelines are developed and approved across Dorset to support Vitamin D supplementation in these At-Risk Groups, links within this document will be provided.