

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

## Introduction

Vitamin D deficiency is common. The average adult daily diet in the UK 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](#).

## Definition of Vitamin D Deficiency

Vitamin D deficiency has been defined as a **25-hydroxyvitamin D < 30nmol/L**. As many as 40% of the local population could be deemed deficient or insufficient. (see table below)

## 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

## Interpretation of vitamin D levels

Blood level	Status
<30 nmol/L	Deficient
30-50 nmol/L	Insufficient
>50 nmol/L	Adequate / replete

## When should I 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
- Epilepsy patients
- Melanoma patients
- Before treatment with IV bisphosphonates and Denosumab

## Vitamin D supplementation

[SACN Vitamin D guidelines 2016](#) recommended vitamin D supplementation to the following groups of the population at risk of vitamin D deficiency especially:

- 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.

As a precaution, a 'safe intake' of vitamin D is recommended for ages:

0-1 year: 340-400 IU/d including exclusively breast fed and partially breast fed infants, from birth

1-4 years: 400 IU/d

800 IU/d vitamin D is recommended for the UK population aged 4 years and above, including pregnant and lactating women and population groups at increased risk of deficiency.

In these groups, supplementation is suggested **without measurement of vitamin D levels**. For those with two or more risk factors, advise an appropriate over the counter (OTC) preparation, Vitamin D is very cheap to buy OTC Healthcare professionals should refrain from prescribing vitamin D maintenance preparations, and encourage patients to buy their dose instead. 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. See NHS Choices for information about vitamin D dietary sources and buying supplements. <http://www.nhs.uk/Conditions/vitamins-minerals/Pages/Vitamin-D.aspx>

Multi-vitamin preparations are NOT suitable for the treatment of vitamin D deficiency as this may lead to vitamin A toxicity. Some calcium salts may interfere with absorption of other medications e.g. levothyroxine, iron so they should be taken at least 4 hours apart.

## Monitoring

For patients with Osteoporosis NICE recommends that 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.

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For patients with Osteoporosis NOS recommends routine monitoring is unnecessary unless the patient has a malabsorption syndrome, is on treatment with s/c Denosumab, remains symptomatic, or there is a likelihood of poor adherence or hypercalcemia occurs, and to check for unmasked primary hyperparathyroidism

### Dosing in exceptional circumstances

There are some circumstances where high dose vitamin D is required

Circumstance	Dosing	Alternatively
25-hydroxyvitamin D < 30nmol/L	20,000 IU weekly for 6 weeks	3,200 IU daily for 6 weeks
Rapid replacement before IV bisphosphonate administration and treatment with Denosumab	20,000 IU weekly for 6 weeks	3,200 IU daily for 6 weeks
Very symptomatic e.g. myalgia	20,000 IU weekly for 6 weeks	3,200 IU daily for 6 weeks

### Vitamin D alone or Vitamin D with calcium?

If the person's calcium intake is adequate ([Calcium Calculator](#)) (>700 mg/day), recommend 10 micrograms (400 IU) of vitamin D (without calcium).

If calcium intake is inadequate: A dose of **up to** 20 mcg (800 IU) of vitamin D with 1000 mg of calcium daily is recommended.

### At-risk groups:

**Hypercalcemia** – Be careful with Vitamin D replacement and interpretation in this cohort. Hypercalcemia should raise suspicion of primary hyperparathyroidism, and appropriate investigations should be instigated.

### Mal-absorption syndromes

Options include:

- High dose oral therapy e.g. 20,000 IU oral cholecalciferol weekly
- IM injection of ergocalciferol. Initially 300,000 IU IM injections 3 months apart followed by maintenance treatment of 300,000 IU IM 6 monthly. (licensed product). This is the last resort and used for treatment and not as a loading dose, as although good for adherence loading doses are shown to be either ineffective or associated with higher rates of falls and fractures.

### Chronic kidney disease (CKD)

If found to be insufficient /deficient (<50nmol/L) patients with all stages of CKD may be prescribed inactivated vitamin D (Colecalciferol).

Check Calcium, Phosphate and PTH 3 months after initiating vitamin D. If any of these test results are significantly and consistently raised, seek advice from advice and guidance (EE Referral)

Prescribing of alfacalcidol requires special monitoring so will only be initiated by the renal team.

### Drugs

Adults on anticonvulsant medications (phenytoin / carbamazepine/ sodium valproate), glucocorticoids, antifungals such as ketoconazole, and anti-retroviral medications for [HIV/AIDS](#) – recommend calcium and vitamin D product or single vitamin D product if calcium is contraindicated.

### Other groups

#### Co-existent Primary Hyperparathyroidism & post parathyroid surgery

Primary hyperparathyroidism can be masked by co-existent vitamin D deficiency and patients with primary hyperparathyroidism are often vitamin D deficient. It is important to correct vitamin D deficiency and maintain sufficiency (recommend supervision via the Calcium Clinic). A persistently raised PTH, despite successful parathyroid surgery, is often due to vitamin D deficiency.

#### Osteoporosis

In patients over the age of 60 years on bisphosphonate therapy, the elderly, and those on corticosteroids, calcium & vitamin D 800iu/day is appropriate, for example. Please refer to the Medical management of men and women who have or are at risk of osteoporosis or the Medical [management](#) of adults with previous fragility fractures.

#### Prison population

A trial of vitamin D may be suggested if the patient is symptomatic for vitamin D deficiency.

#### Pregnancy and Breast Feeding

The Department of Health recommends that all pregnant and breastfeeding women should take 10µg (400IU) of vitamin D daily to prevent vitamin D deficiency.

Available as Healthy Start (91p for 56 tablets) or free to eligible women under the Healthy Start scheme - [www.healthystart.nhs.uk](http://www.healthystart.nhs.uk). A suitable alternative to buy over the counter is Pregnacare (£13.23 for 90 tabs)

Refer pregnant women in whom vitamin D deficiency is suspected to specialist for investigation & management

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Breast milk of women taking pharmacological doses of vitamin D can cause hypercalcaemia if given to an infant and additional monitoring is required

Breast fed infants may need to receive drops containing vitamin D from one month of age if their mother has not taken vitamin D supplements throughout pregnancy

### **Vitamin D excess and toxicity**

This can occur from errors in formulation or fortification (the most common), inappropriate prescribing or dispensing, and errors in administration