

# VITAMIN D GUIDANCE

## GUIDELINE FOR THE DIAGNOSIS AND MANAGEMENT OF VITAMIN D DEFICIENCY IN ADULT PATIENTS

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### INTRODUCTION

This guideline is intended for use in primary and secondary care (in and out-patient settings). It contains an algorithm for the diagnosis and management of vitamin D deficiency in adults. In addition, it gives recommendations on adequate vitamin D supplementation and management for specific population groups.

The guideline is based on current published evidence and local expert guidance. At present, there is insufficient evidence for clear recommendations in some areas of practice. It is our aim to provide safe advice for clinicians in areas where clinical uncertainty remains. The guideline should be used in conjunction with condition specific guidance where appropriate.

### CLINICAL BACKGROUND, SYMPTOMS AND RISK FACTORS

**Many symptoms have been associated with vitamin D deficiency. However, an alternative cause for the symptoms needs to be excluded clinically before attributing symptoms to vitamin D deficiency.**

**Symptoms and indications** which may lead you to consider vitamin D testing if clinically appropriate:

- Multiple sclerosis (not covered in this guideline. Consult Neurology)
- Myalgia or muscle weakness
- History of fragility fractures >50yrs
- Recurrent falls >65yrs
- Radiological osteopenia
- Latent TB
- Specific drug therapies e.g. anti-epileptics, glucocorticoids, TB agents, highly active anti-retroviral treatment, cholestyramine, potent antiresorptive bone agents (e.g. Bisphosphonates, strontium, Denosumab)
- Other features of osteomalacia
  - Bone pain
  - Kyphosis/Knock knees
  - Radiological looser zones or bowing of long bones
  - Abnormal Biochemistry e.g. Raised ALP / PTH, low Ca/Phosphate

**Risk factors** for vitamin D deficiency which may raise clinical suspicion and should lead you to consider testing if clinically appropriate include:

- Age >65yrs
- Non-Caucasian ethnicity
- Lack of sun exposure, e.g.
  - Housebound individuals
  - Those who cover their skin
  - Those who work night shifts
  - Institutionalised patients
- Malabsorption syndromes (including previous bariatric surgery)
- Vegan
- Chronic renal or liver disease
- Hypoparathyroidism

### NATURAL WAYS OF INCREASING VITAMIN D LEVELS

#### Sunlight

Sunlight is the best natural source of vitamin D. **Sunburn should always be avoided.** The target is to spend 15 minutes per day in the sun at least twice a week between 11.00am to 3.00pm with the face and arms exposed without sunscreen. For those with pigmented skin, exposure time or frequency needs to be increased 2-fold to 10-fold. Note that from November–February in the UK there is no benefit from sun exposure.

Patients with the following conditions or therapies should avoid unprotected sun exposure: skin cancer, porphyrias, Xerodermapigmentosum, albinism, sulphonamides, phenothiazines, tetracyclines, psoralens, granulomatous disease (sarcoid but not TB) and lymphoma.

#### Dietary advice

Diet is a poor source of vitamin D hence sun exposure is a far better way of naturally increasing vitamin D levels. However, foods which are relatively good sources include:

- Oily fish such as salmon, mackerel and sardines
- Eggs
- Fortified spreads and breakfast cereals
- Powdered milk

These should be taken as part of a healthy balanced diet.

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Indication to consider vitamin D testing? (See page 1)  
Give lifestyle advice

Measure vitamin D

Vitamin D Replete

≥50nmol/L

<50nmol/L

Multiple sclerosis

- TREATMENT AIMS**
- Use adequate dose to increase 25OHD >50nmol/L
  - Improve symptoms caused by deficiency
  - Avoid toxicity

Consider:  
Hypercalcaemia  
Sarcoidosis  
Active TB  
Teriparatide therapy  
Kidney stones

YES

Seek specialist advice

NO

GFR <30 (CKD stage 4-5)  
or  
Pregnant

YES

See kidney disease / pregnancy section (Page 3)

NO

Total 25-Hydroxyvitamin D level (nmol/L)

<30 nmol/L

30-50 nmo/L

300,000IU in total over 6-15 days. Then OTC 800-2000IU/d maintenance

Patient symptomatic?  
Starting antiresorptive bone agent?  
Recurrent falls?  
Consider 300,000IU in total over 6-15 days. Then OTC 800-2000IU/d maintenance

No Symptoms  
Consider OTC 800-2000IU/d maintenance

Check for hypercalcaemia 2 weeks after completion of loading dose

YES

Measure PTH and refer to relevant clinic

NO

Symptoms at 6 months

NO

YES

Continue OTC maintenance

Re-test vitamin D / review diagnosis

To convert IU to µg divide by 40  
OTC = over-the-counter

Vitamin D repeat test requests will be rejected if within **6 months** of previous unless specifically agreed with the laboratory

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### VITAMIN D IN PREGNANCY AND BREAST FEEDING WOMEN

Vitamin D deficiency is very common in the North East London population. Pregnant women are a high risk group for Vitamin D deficiency. Severe deficiency in pregnant mothers can result in neonatal hypocalcaemic fits and a consequent prolonged stay on the neonatal intensive care unit. Additionally, rickets is a rare but potentially serious manifestation of vitamin D deficiency in childhood. It is therefore advisable to try to prevent vitamin D deficiency in mothers by advising vitamin D supplementation in pregnancy and during lactation.

At BHRUT, pregnant women are advised to take 400IU (10µg) daily of vitamin D according to 2008 NICE Guideline for Antenatal Care. This advice is reinforced by a sticker on the front of the patient's antenatal notes. It is especially important for women who are at a higher risk of deficiency to take vitamin D supplementation in pregnancy e.g. those who are overweight, dark-skinned or who regularly cover the majority of the skin. Enquiry should be made as to whether the woman is taking vitamin D supplementation and this should be recorded in the patient's notes.

Women that are exclusively breast-feeding their infants are advised to take a 400IU (10µg) daily for the first 6 months of the baby's life. If a mother has been advised to take vitamin D supplementation because of diagnosed vitamin D deficiency, they should be advised to continue this throughout the period of pregnancy and lactation.

Pregnant women identified as vitamin D deficient (<50nmol/L) should be managed in the same way as other adult patients (algorithm page 2) except high dose treatment (300,000IU) should be given over a period of **30 days**.

### VITAMIN D IN HOUSEBOUND INDIVIDUALS AND THOSE IN CARE HOMES

Individuals in care homes and other long stay facilities and the house bound may be at greater risk of Vitamin D deficiency. The department of health recommends intake of 400 IU daily in people over 65 years.

Calcium and vitamin D is cheap and safe. Combined calcium and Vitamin D supplementation is associated with an improvement in mortality which is not associated with Vitamin D supplementation alone. So in housebound patients with previous fall and fragility fracture, calcium 800 mg and Vitamin D 800 IU in combined supplementation will be appropriate.

### VITAMIN D AND KIDNEY DISEASE

In CKD there is decreased activation of vitamin D in the kidney, along with decreased gut calcium absorption and increased phosphate retention. As eGFR declines these processes may trigger secondary hyperparathyroidism with bone reabsorption, pathological fractures and metastatic calcification leading to an increased risk of CVD.

Since the risk of hypercalcaemia and acute on chronic renal failure in patients with chronic kidney disease is higher, vitamin D replacement and maintenance regimens should be used more cautiously.

Calcium should be reviewed regularly (with routine CKD blood tests) and vitamin D should be reviewed annually.

Patients with CKD stages 4 or 5 in whom vitamin D deficiency is demonstrated should be referred to the Advice and Guidance Nephrology clinic. Renal bone disease in patients with CKD stages 3-5 is best managed in liaison with secondary care.

### REFERENCES

- [1] National Osteoporosis Society; Vitamin D and bone health: A practical clinical guideline for patient management. April 2013.
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- [4] Barts Health Vitamin D Guidelines - Adults, 2016.
- [5] Institute of Medicine: Dietary reference intakes for calcium and vitamin D; 2010.
- [6] Pearce SH: Diagnosis and management of vitamin D deficiency. BMJ 2010; 340.
- [7] NICE CG73: Chronic Kidney Disease; 2008.
- [8] Rejnmark L. Vitamin D with calcium reduces mortality: Patient level pooled analysis of 70528 patients from eight major vitamin D trials. J Clin Endo Metab 2012, Aug; 97(8):2670-81
- [9] UKMi: Which oral dosing regimens correct deficiency in pregnancy? Jan 2014.
- [10] NICE PH56: Vitamin D: Increasing supplement use

### VITAMIN D AND CHILDREN

Please refer to:

BHR CCG's and BHRuT NHS Trust Shared Care Guidelines for the treatment of symptomatic vitamin D deficiency in infants, children and adolescents

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### TREATMENT OPTIONS FOR ADULTS

A range of vitamin D products are available over-the-counter or on prescription.

Some products may contain peanut (arachis), sunflower oil or soya oil. Allergy to these may lead to severe allergic reactions, including anaphylaxis. Patients should be advised to raise allergies at the point of purchase, prescribing and dispensing to ensure the content of the product is safe to take. Secondary Care: Contact Pharmacy Medicines Information on 01708 435418 for further advice. Primary Care: Seek advice from your medicines management team on 020 8822 3074/76.

#### Safety Considerations

- High doses of vitamin D can be toxic (resulting in hypercalcaemia and renal failure). This is most likely to occur if high doses (used as initial treatment loading doses) are taken over a longer than recommended period of time, or if **alfacalcidol** or **calcitriol** are given in error.
- Vitamin D treatment doses are contraindicated in patients with hypercalcaemia or metastatic calcification, or where there may be significant interactions with other medications.
- **Alfacalcidol & calcitriol** should only be used in patients who cannot activate vitamin D and should therefore not be used for the routine treatment of primary vitamin D deficiency/insufficiency, as they carry a higher risk of toxicity and require long-term monitoring and specialist supervision.
- There is a risk of hypercalcaemia developing in the presence of undiagnosed sarcoidosis or primary hyperparathyroidism in patients taking vitamin D.

#### Preferred Vitamin D Products for primary care

- **Colecalciferol only products** are recommended in preference to those containing calcium unless this is specifically indicated e.g. patients over 65yrs
- Primary care prescribing of vitamin D should be by brand only. Prescribe treatment/loading courses as a one-off acute prescriptions. Do not put on repeat prescribing systems.
- Please follow this link for the latest recommended brands of vitamin D for primary care. This also includes advice for treatment and maintenance regimes: <http://www.redbridgeccg.nhs.uk/downloads/For-health-professionals/Medicines-management/Guidance/Vitamin%20D%20Formulary.pdf>

#### Hospital Formulary

Products	Need to check individual product for patient suitability	
Colecalciferol tablets ( <b>Desunin®</b> ) 800 IU/tablet	Suitable for vegetarians Licensed for treating deficiency in pregnancy	Peanut oil free Soya oil free Alcohol free
Colecalciferol Capsules (unlicensed) 50000 IU/capsule (D3-50 Bio Tech)	Suitable for vegetarians Kosher Certified Halal Certified	Peanut oil free Egg free Fish & Shellfish free Gluten free Sugar free Soya oil free Dairy free Wheat free Yeast free
Ergocalciferol IM injection 7.5mg (300,000 IU) per 1ml	Suitable for vegetarians	Peanut and soya oil free
Colecalciferol forte liquid ( <b>Pro D3®</b> ) 3000 IU/ml	Suitable for vegetarians Halal Certified	Peanut oil free Sugar free Soya oil free Alcohol free