

## Treatment of Vitamin D Deficiency in Adults

### Aims

- Advice on the diagnosis and management of vitamin D deficiency in adults and choice of supplements
- Clinical and cost effective investigation of suspected vitamin D deficiency
- An appropriate balance between patient lifestyle, self-management and medical treatment

### Background

- Vitamin D deficiency and insufficiency is a common problem worldwide, >50% of the adult population have levels classed as insufficient and 16% have severe deficiency
- The awareness that vitamin D deficiency may contribute to the development of osteoporosis and to falls and fractures has resulted in a dramatic increase in requests for serum 25 hydroxy vitamin D (25OHD) tests
- In line with NOS Guidance, high dose vit D supplements should be prescribed for treatment of high risk adults with proven deficiency or those about to be initiated on potent anti-resorptives (e.g. zoledronic acid, denosumab)

### Lifestyle Measures – ALL PATIENTS SHOULD BE GIVEN THIS ADVICE

People at high risk of vitamin D deficiency should be advised to supplement their vitamin D levels by:

- Increasing UV sunlight exposure (forearms, hands or lower legs) between April to October. Sun safety advice should be given. Further advice is available at: [How to get vitamin D from sunlight - NHS \(www.nhs.uk\)](http://www.nhs.uk)
- Increasing dietary vitamin D with foods containing or fortified with vitamin D: oily fish, egg yolks, cod liver oil, fresh meat, cereals and some dairy products. Or supplementation with **over the counter** (OTC) low strength vitamin D products.
- Increasing the dietary intake of vitamin D alone will not avoid the need for supplementation in patients with deficiency
- If a patient is prescribed a vitamin D supplement consideration should be given as to whether the patient has enough calcium in their diet. Calcium calculators can help clinicians to do this. See link in further information box below.
- If patients with osteoporosis or bone disease are found to not consume at least 700mg of calcium/day then a calcium supplement or combined vitamin D plus calcium product should be prescribed.
- A Reference Nutrient Intake (RNI) of 400 IU/daily (10 micrograms daily) vitamin D, throughout the year, for everyone in the general UK population aged four years and above is recommended (OTC).

### High Risk Groups for deficiency – follow lifestyle advice: NO NEED TO ROUTINELY TEST IF ASYMPTOMATIC

- All pregnant and breastfeeding women, especially teenagers and young women are particularly at risk
- Patients under 4 (as per [NICE PH56](#)) or aged 65 years and over
- Patients not exposed to much sun, for example those who cover their skin for cultural reasons, who are housebound or confined indoors for long periods
- Ethnic minorities who have darker skin, because their bodies are less able to produce vitamin D
- Obese people (BMI>30)
- Medical risk factors such as renal and hepatic disease, malabsorption
- Other risk factors such as alcoholics, vegetarians or vegans
- Medication - patients taking rifampicin, anticonvulsants or Highly Active Antiretroviral Treatment (HAART)

### When should I test for vitamin D deficiency? (Cost approximately £20 per test)

- Patients with bone diseases that may be improved with vitamin D treatment or where correcting vitamin D deficiency prior to specific treatment would be appropriate
- Where abnormalities on laboratory investigations are suggestive of vitamin D deficiency e.g. low calcium, low phosphate, isolated or raised ALP or raised PTH
- Musculoskeletal symptoms that could be attributed to vitamin D deficiency or who have symptoms of osteomalacia (proximal myopathy or chronic pain)
- Routine vitamin D testing may be unnecessary in patients with osteoporosis or fragility fracture, who may be co-prescribed vitamin D supplementation with an oral antiresorptive treatment
- Routine monitoring of serum vitamin D is generally unnecessary but may be appropriate in patients with symptomatic vitamin D deficiency, malabsorption and other conditions associated with vitamin D deficiency, and where poor compliance is suspected

### When and to whom should I refer?

- eGFR<30ml/min; renal stones; hyper or severe hypocalcaemia; hyperparathyroidism; sarcoidosis, lymphoma, metastatic cancer; active tuberculosis; skeletal deformity, malabsorption e.g. coeliac disease; chronic liver disease, patients who fail to respond to treatment or where symptoms worsen on treatment. Refer to the appropriate specialist.
- These conditions are those where calcium level may be (i) adversely affected by treatment or (ii) absorption or (iii) conversion of vitamin D to 25 (OH)D vitamin D is affected therefore referral is required

## Treatment Options (Traffic Light Status GREEN) – PRESCRIBE BY BRAND NAME

SERUM 25(OH)D			
<25nmol/L	25-50nmol/L	>50nmol/L	>250nmol/L
<b>DEFICIENCY</b> <b>TREATMENT</b> <b>RECOMMENDED</b> (target for replacement ~300,000iu)	<b>INSUFFICIENCY</b> May be inadequate in some people	<b>IS</b> <b>SUFFICIENT</b>	<b>POTENTIALLY</b> <b>TOXIC</b>
For DEFICIENT patients treat as below with loading dosage.	For INSUFFICIENT patients treatment is recommended in <b>high risk</b> patients & those with previous fragility fracture /osteoporosis. <b>In certain situations (see SPC) higher doses of up to 50,000 IU/month or up to 4,000 IU/day may be required short-term if pts cannot be maintained at the lower doses.</b>	Provide reassurance and give lifestyle advice (see overleaf) on increasing vitamin D intake	Daily doses in excess of 250micrograms or 10 000 units are generally required to achieve this. Provided basic investigations are undertaken before treatment & renal disease, liver disease, primary hyperparathyroidism and inflammatory conditions have been excluded, then vitamin D toxicity is very rare. Early symptoms of toxicity include symptoms of hypercalcaemia such as thirst, polyuria and constipation
<b>LOADING DOSES:</b> Prescribe colecalciferol as one of the following: <b>InVita D3 oral solution 25,000 IU / ml</b> (1ml amps): Dose 50,000 IU/week (2 ampoules) for 6 weeks (adults with swallowing difficulties) <b>OR Stexerol D3 25,000IU tablets</b> , TWO tablets (50,000IU) per week for 6 weeks <b>NOTE:</b> Both products suitable for vegetarians/halal/kosher but not for vegans.			
<b>CAUTION:</b> If corrected calcium $\geq 2.5$ when vit D low, Primary Hyperparathyroidism (PHPT) should be considered. Discuss with endocrinology (For RUH: Consultant Connect or bleep 7059) <b>before starting vit D replacement</b>			
<b>Maintenance Therapy:</b> Encourage patients to buy themselves OTC			
For those with documented vitamin D deficiency and where the underlying cause for this cannot be rectified, on-going maintenance therapy is advisable. FP10 options are: <b>Invita D3 oral solution 25,000 units / ml</b> (1ml amps): <b>25,000IU once a month.</b> Certain populations are at high risk of vitamin D deficiency, and may require higher doses and monitoring of serum 25(OH)D. See Summary of Product Characteristics for full details. <b>OR Stexerol D3 tablets 25,000 units ONE tablet each month OR if patient unlikely to adhere to a monthly preparation: Stexerol D3 tablets 1,000IU ONE tablet each day.</b> Note that a daily tablet is more expensive than a monthly one (roughly double the cost). For patients that are at high risk of vitamin D deficiency, lifestyle advice should be given. If this cannot be adhered to, an on-going maintenance dose should be considered.			
<b>Self Care / Purchase</b> 800-2000iu colecalciferol daily can be purchased e.g. from Boots, Holland and Barrett, healthspan.co.uk and lifestylenaturalhealth.co.uk. Monthly cost range £1.50 to £5 <b>OR Prescribe</b> oral vitamin D supplementation as above (+/- calcium).			
<b>PRODUCT INFORMATION</b>			
Stexerol film-coated tablets are suitable for vegetarians, certified halal & kosher, peanut oil free, soya oil free, gelatine free, & gluten free. The tablets can be crushed or swallowed whole and can be taken with food. The vitamin D is derived from sheep's wool so they may not be suitable for vegans but they are suitable for vegetarians. <b>FREE TEXT Compliance Service</b> - Patients can opt into this, see the PIL for further information. To help remind them to take their Stexerol D3. A monthly dose also helps to reduce pill burden as the patient will only require 12 tablets for a year. Summary of product characteristics for Stexerol: <a href="http://www.medicines.org.uk/emc/medicine/31223">http://www.medicines.org.uk/emc/medicine/31223</a> Summary of product characteristics for Invita D3: <a href="http://www.medicines.org.uk/emc/medicine/28998">http://www.medicines.org.uk/emc/medicine/28998</a> See also <a href="https://www.sps.nhs.uk/articles/is-there-a-calcium-and-vitamin-d-preparation-which-is-suitable-for-a-vegetarian-or-vegan/">https://www.sps.nhs.uk/articles/is-there-a-calcium-and-vitamin-d-preparation-which-is-suitable-for-a-vegetarian-or-vegan/</a>			

### Monitoring

- Check serum calcium 2 weeks after initiating treatment in patients with a corrected calcium >2.5 pre-treatment or known PHPT and monitor 2 weekly if rising significantly (discuss with endocrinology if necessary)
- Check after 1 month in all other pts
- If the patient is still symptomatic after treatment, wait at least three months, preferably six months, before re-testing serum 25(OH)D.

### General Points

- All patients taking bisphosphonates or antiresorptive drugs should be taking regular calcium supplements (1-1.3g calcium plus colecalciferol 800 -2000iu daily) unless the clinician is confident dietary calcium is adequate & vitamin D is replete.
- **Conversion factors:** 10micrograms = 400units vitamin D

### 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 OTC is Pregnacare (£13.23 for 90 tabs)
- Refer pregnant women in whom vitamin D deficiency is suspected to specialist for investigation & management
- 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 if their mother has not taken vitamin D supplements throughout pregnancy

**Further information** Healthy Start Scheme [www.healthystart.nhs.uk](http://www.healthystart.nhs.uk) National Osteoporosis Society vitamin D and bone health (Updated Feb 2020)  
Dietary Calcium Calculator <http://www.cgem.ed.ac.uk/research/rheumatological/calcium-calculator> NHSE OTC guidance: <https://www.england.nhs.uk/wp-content/uploads/2018/03/otc-guidance-for-ccgs.pdf> NICE: Vitamin D: increasing supplement use among at-risk groups Nov 2014 PH Guidance 56 <http://www.nice.org.uk/guidance/PH56> PresQIPP Vitamin D Bulletin 275 December 2020