East Lancashire Health Economy
Medicines Management Board
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Vitamin D Deficiency in Adults Guidance

VERSION CONTROL.
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Version number	Amendments made	Author	Date
1.1	Supersedes guidelines on diagnosis& management of Vit D deficiency in adults for non-specialists	EL MMT	October 2022

Vitamin D Deficiency in Adults Guidance

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Introduction:

- Vitamin D (calciferol) is the collective name for a group of related steroid-like molecules, which includes vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol). It is a fat-soluble vitamin and is stored in liver and adipose tissue.

- Vitamin D regulates the absorption of calcium and phosphate and is essential for skeletal growth and bone health. It also has several non-skeletal roles in the body, such as regulating cell proliferation and differentiation and maintaining a healthy immune system.

- Around 20% adults may have low vitamin D status. Severe deficiency of vitamin D can result in rickets in children and osteomalacia in adults.

- The principle source of vitamin D for humans is from synthesis in the skin following exposure to UV light. In the northern hemisphere, the intensity of sunlight required to generate vitamin D in this way is only present during the summer months.

- Dietary vitamin D is available in foods such as oily fish, cod liver oil, red meat, fortified cereals, fortified margarine/spreads and egg yolks. In the UK, milk is not fortified with vitamin D, so dairy products contain only small amounts of vitamin D.

- The biologically active form of vitamin D is synthesised in the body by hydroxylation in the liver, and then the kidneys, to make 1,25-dihydroxyvitamin D (calcitriol).

- Routine laboratory testing measures 25-hydroxyvitamin D, which is the most stable form of the vitamin circulating in the plasma and reflects both cutaneous synthesis and dietary intake.

Risk factors for Vitamin D deficiency are shown Table 1 below.

Inadequate UVB light exposure	**Inadequate dietary intake or**	**Metabolic factors**
Pigmented skin (non-white ethnicity) Skin concealing garments or routine use of sun protection factor 15 or above Housebound or indoor living (e.g. care homes)	Vegetarian/vegan (or other fish-free diet) Malabsorption (e.g. coeliac disease, cystic fibrosis, Crohn's disease etc.) Short bowel syndrome Cholestatic liver disease, jaundice	People aged ≥65 years (reduced synthesis in the skin) Pregnant/breastfeeding women Drug interactions, e.g., rifampicin, anticonvulsants (carbamazepine, oxcarbazepine, phenobarbital, phenytoin, primidone, valproate), isoniazid, cholestyramine, sucralfate, glucocorticoids, highly active antiretroviral treatment (HAART) Chronic liver disease Chronic kidney disease Nephrotic syndrome

Prevention of Vitamin D deficiency/insufficiency

The Scientific Advisory Committee on Nutrition (SACN) report on Vitamin D and Health[1] and NICE Clinical Knowledge Summary (2018)[2] recommend the following for the UK population to prevent vitamin D deficiency/insufficiency:

- **People with risk factors (see Table 1) are advised to take a daily supplement of 400 IU (10 µg) vitamin D throughout the year.**
- In winter months (October to early March), ALL adults (and children >4 years old) should consider taking a daily supplement of 400 IU (10 µg) vitamin D
- In summer months, the majority of the population will get enough vitamin D through exposure to sunlight and a healthy, balanced diet.

NOTE: Supplements are widely available as over the counter preparations and SHOULD NOT be prescribed.

Vitamin D and COVID-19

In December 2020, in response to the global pandemic, NICE published a rapid guideline[4] on the use of vitamin D supplements to either prevent or treat COVID-19. While acknowledging there is insufficient evidence at present to advocate use of supplements for this purpose, the panel strongly reiterated current UK government advice regarding year-round supplementation in high-risk groups and in the whole population over the age of 4 years old during the winter months.

Vitamin D supplements should not be offered solely to prevent or treat COVID-19, except as part of a clinical trial.

When should vitamin D be measured?

Routine testing for vitamin D deficiency is NOT necessary.

Vitamin D (25-hydroxyvitamin D) measurement is only indicated:

- for patients with diseases with outcomes that may be improved with vitamin D treatment, e.g., confirmed osteomalacia, osteoporosis. (NB: measurement is **not necessary** if patient is co-prescribed vitamin D with their anti-resorptive treatment)
- for patients with symptoms that could be attributed to vitamin D deficiency, e.g., suspected osteomalacia, chronic widespread pain with other features of osteomalacia
- before starting patients on a potent antiresorptive agent (zoledronate, denosumab, teripardatide).

See Appendix 1 for a summary of the guidance from the Royal Osteoporosis Society (Vitamin D and Bone Health: a practical clinical guideline for patient management, 2018).[5]

Interpretation of vitamin D results

The Royal Osteoporosis Society guideline[5], Vitamin D and Bone Health: a practical clinical guideline for patient management, recommends the following interpretation of vitamin D results with respect to bone health (see Table 2).

Table 2: Interpretation of vitamin D results

Vitamin D concentration	Vitamin D status	Management
<25 nmol/L	Deficient	High dose cholecalciferol, then maintenance treatment Further investigations generally not required, but may be helpful to identify treatable causes of vitamin D deficiency
25-50 nmol/L	May be inadequate for some people	Review modifiable risk factors Lifestyle advice. Maintenance vitamin D supplements
>50 nmol/L	Adequate: sufficient for bone health in most people	Lifestyle advice, including supplements as advised for general population

Further investigations :-

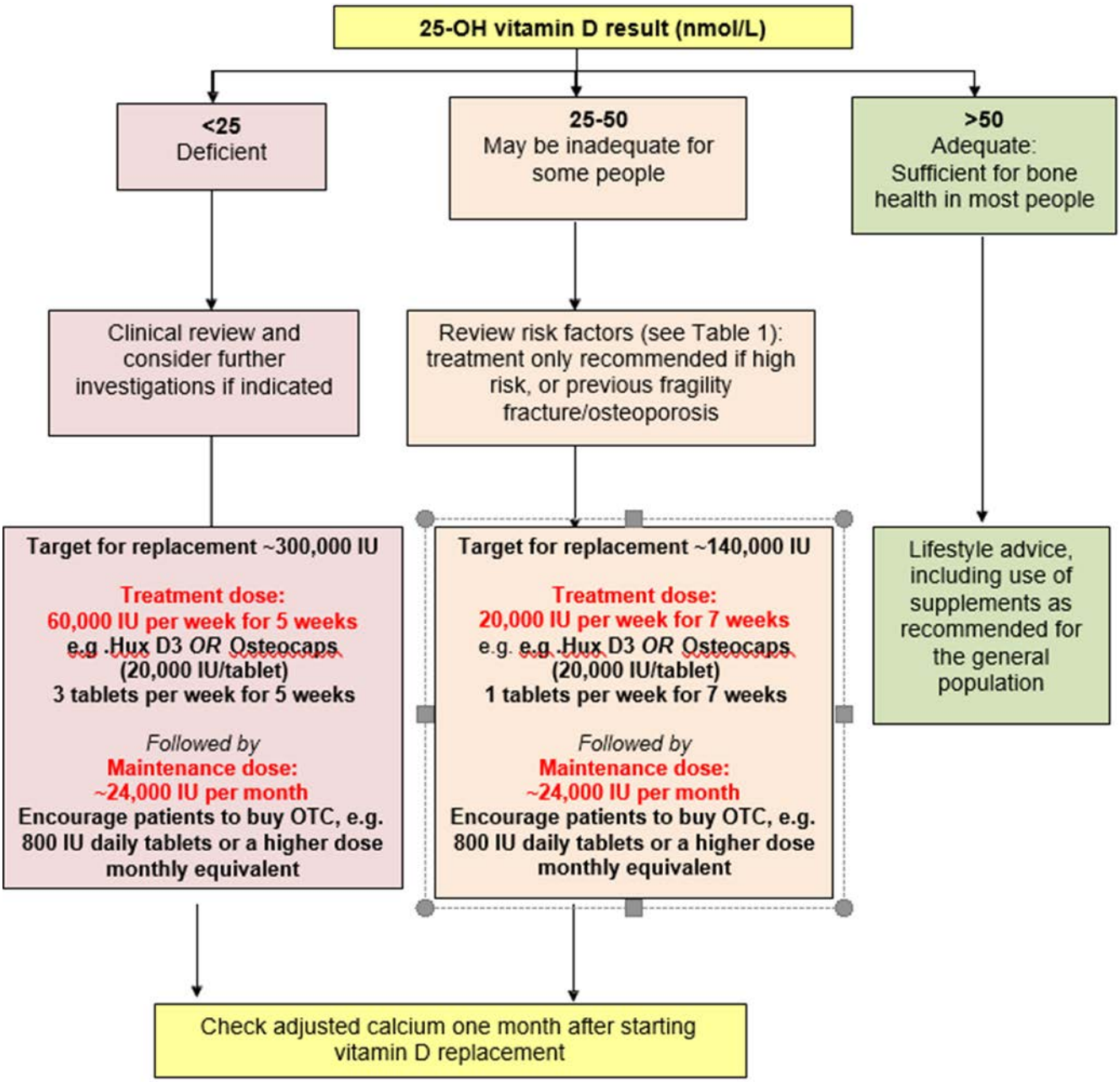
The major causes of vitamin D deficiency are lack of sun exposure and/or poor dietary intake. Further investigations are therefore generally NOT required.

Other common causes are malabsorption and underlying disease such as kidney or liver dysfunction, for which specific investigations may be appropriate. These could include FBC, U&E/eGFR, LFTs, calcium/phosphate, PTH (if hypercalcaemic). **However, these tests are not routinely indicated in vitamin D deficiency.**

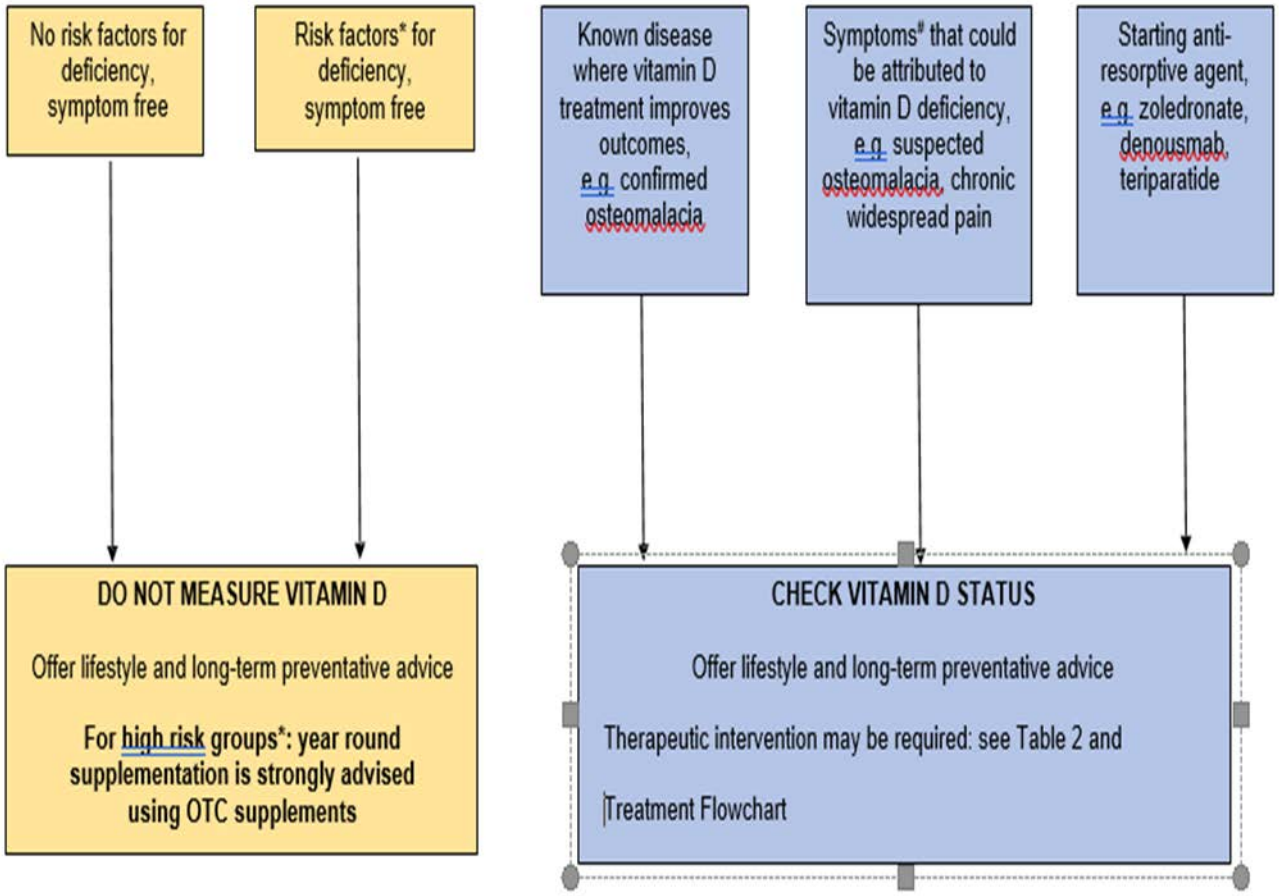
Management

- If there is severe vitamin D deficiency (<25 nmol/L), a **treatment** (loading) dose followed by long-term **maintenance** vitamin D is recommended (maintenance vitamin D should be over the counter medication and not prescribed)
- If serum vitamin D is between 25-50 nmol/L, treatment **may** be indicated if high risk.
- If serum vitamin D is >50 nmol/L, vitamin D replacement is NOT necessary, unless there are specific clinical indications.
- Routine monitoring of serum vitamin D is usually unnecessary; it may be appropriate in patients with symptomatic vitamin D deficiency, malabsorption, or if poor compliance is suspected.
- Whilst on maintenance dose, re-check bone profile and vitamin D if there are symptoms suggestive of vitamin D toxicosis or hypercalcaemia (confusion, polyuria, polydipsia, anorexia, vomiting, constipation or muscle weakness).

Treatment of Vitamin D deficiency



Appendix 1: When should vitamin D be measured?



*Risk factors, e.g. lack of sunlight exposure, darker skin, housebound, malabsorption, pregnant/breastfeeding (see Table 1 for full details)

#Symptoms can include muscle aches and weakness, especially in quadriceps and glutei, waddling gait, chronic widespread pain or bone pain in lower back, pelvis and foot.

References

1. Scientific Advisory Committee on Nutrition: Vitamin D and Health (2016) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/537616/SACN_Vitamin_D_and_Health_report.pdf

2. NICE Clinical Knowledge Summary (last revised December 2020): Vitamin D deficiency in adults – Vitamin D deficiency in adults | Health topics A to Z | CKS | NICE

3. NICE guideline 187: COVID-19 rapid guideline: vitamin D (2020) https://www.nice.org.uk/guidance/ng187/resources/covid19-rapid-guideline-vitamin-d-pdf-66142026720709

4. Vitamin D supplementation during winter (November 2020): PHE and NICE statement Statement from PHE and NICE on vitamin D supplementation during winter - GOV.UK (www.gov.uk)

5. Royal Osteoporosis Society 2018: Vitamin D and Bone Health: a practical clinical guideline for patient management https://strwebprdmedia.blob.core.windows.net/media/ef2ideu2/ros-vitamin-d-and-bone-health-in-adults-february-2020.pdf