

Vitamin D guidelines - Adults

This guideline was developed in collaboration with Newham, Tower Hamlets and Waltham Forest CCG medicines management teams, and lead pharmacists from Barts Health.

Main Document Information		
Version:	1	
Approved By:	Tower Hamlets Newham Waltham Forest (TNW) MOB	23 rd March 2022
Review Date:	March 2024	

Current Document Replaces:	
Previous Document Name:	Vitamin D guidelines-Adults
Previous Version Number:	Finalised Draft
Previous Publication Date:	2016

Acknowledgements

Dr Claire Dow, Care of the Elderly Consultant, Royal London Hospital
 Dr Judith Agwada-Akeru, Consultant Orthogeriatrician, Whipps Cross Hospital
 Wajid Qureshi, Lead Prescribing Adviser, Newham CCG
 Bijal Patel, Highly Specialist Pharmacist – Stroke and Care of the Elderly
 Hannah Hathaway, Highly Specialist Pharmacist – Rheumatology, Whipps Cross Hospital

This guideline does not include:

- use of vitamin D in nephrology – please refer to separate guidelines (<30ml eGFR seek specialist advice)
- Healthy Start Programme – please refer to the national programme
- Deficiency in children – please refer to separate guidelines.

VITAMIN D TESTING

This guideline covers the assessment and treatment of adults with vitamin D deficiency. It does not include pregnant women, children or patients with renal failure (<30ml eGFR. Seek specialist advice where appropriate).

Vitamin D testing indicated	Vitamin D testing not necessary
✓ with bone disease regardless of symptoms and risk factors that may be improved with vitamin D treatment e.g. osteomalacia, osteoporosis, Paget's disease, osteopenia, hyperparathyroidism ✓ with bone disease who are starting treatment that requires correction of vitamin D levels (e.g. zoledronate or denosumab).	X with oral bisphosphonates (should be on calcium/vitamin D supplementation) X asymptomatic high risk patients

✓ with symptoms that could be attributed to vitamin D deficiency (e.g. bone pain or tenderness or myalgia, proximal muscle weakness, tenderness over bones)

AND

ONE OR MORE OF RISK FACTORS:

- ✓ Reduced exposure to sunlight e.g. due to being housebound, having skin covered when outside or routine use of high factor sunscreen.
- ✓ Dark skin.
- ✓ Over 65s, particularly with a history of falls or in care home not already prescribed Ca + Vit D
- ✓ Pregnant or breastfeeding women
- ✓ Obese people i.e. BMI>30.
- ✓ Those who may have fat malabsorption e.g. CF, Crohns or bariatric patients.
- ✓ Those taking medication that may increase vitamin D catabolism e.g. enzyme inducing anti-epilepsy drugs, glucocorticoids, systemic anti-fungal drugs such as ketoconazole, cholestyramine, rifampicin, HIV drugs.

X asymptomatic high risk patients requesting tests should be encouraged to buy vitamin D supplementation.

CONSIDER REFERRAL WHERE APPROPRIATE TO SECONDARY CARE FOR TREATMENT OR ADVICE IF ABNORMAL VITAMIN D LEVEL DISCOVERED FOR PATIENTS:

- Chronic liver or kidney disease (CKD 4 or above)
- Primary hyperparathyroidism
- History of renal stones
- Hypercalcaemia
- Metastatic calcification
- Patients with chronic granuloma forming disorders (sarcoidosis or TB), chronic fungal infections or lymphoma

May require lower vitamin D dosing and monitoring including repeat testing of levels

INTERPRETATION OF RESULTS AND MANAGEMENT

Routine monitoring of 25OH Vitamin D level is not required or recommended.

Vitamin D is required for bone and muscle health. Deficiency can lead to rickets or osteomalacia, but treating non-symptomatic deficiency/insufficiency currently has no proven health benefit. Some trial data has suggested a link with low Vitamin D levels and cancer, metabolic syndrome, infection and autoimmune disorders but this is unproven¹.

Seek specialist advice

Vitamin D tested (25-OHD)

Vitamin D deficiency (<25nmol/L)

Vitamin D insufficiency (25-50nmol/L)

Vitamin D adequate (≥50nmol/L)

Consider:
Hypercalcaemia
Sarcoidosis
GFR < 30mL/min/1.73m²
Active TB
Teriparatide therapy
Kidney stones

Assess risk factors:
-Fragility fractures, documented osteoporosis or high fracture risk
-Treatment with anti-resorptive medication for bone disease
-Symptoms of vitamin D deficiency
-Lifestyle factors which increase risk of full -deficiency in the future e.g. poor sunlight exposure
-Raised PTH
-Enzyme inducing Anti-epileptics or oral glucocorticoids
-Conditions associated with malabsorption, e.g. coeliac, chronic pancreatitis, inflammatory bowel

Lifestyle advice:
Maintenance if indicated (self-purchased)
-Increase exposure to sun
-Diet (e.g. oily fish, eggs, meat, fortified cereals)
-Asymptomatic 'at risk' individuals: advise Vitamin D supplement 10 mcg (400iu) daily
-people aged 65 years and over and people who are not exposed to much sun: advise a Vitamin D supplement 10 mcg (400 IU) daily

TREATMENT LOADING DOSE:
GRADUAL LOADING: PRIMARY CARE
40,000iu (2x20,000iu) weekly for 7 weeks OR
RAPID LOADING: PRIMARY AND SECONDARY CARE
40,000iu (2x 20,000iu) daily for 7 days e.g. in-patient, post-fracture, where compliance may be a concern
HIGH INTENSITY LOADING: SECONDARY CARE ONLY
80,000 – 100,000iu per week for 6 weeks.

1 or more risk factors above

No risk factors

PLEASE NOTE: Calcitriol and alfacalcidol should not be used for loading doses due to lack of evidence and risk of toxicity. Compliance with weekly loading regimen should be checked if patient remains symptomatic before requesting blood test. Adcal d3 should only be given when required for use with bisphosphonates, teriparatide or denosumab

MAINTENANCE: 800-2,000iu daily, Patient should buy.

PRESCRIBING VITAMIN D IN PRIMARY CARE:

-Do NOT prescribe generic (i.e. colecalciferol). Prescribe by **BRAND** (Note – to be prescribed as generic in secondary care)
-Do NOT prescribe intramuscular injection unless patient cannot take oral formulation.

Preparation	Strength	Cost	Dietary requirements ⁹
Plenachol capsules	40,000iu	£15/10 caps	Suitable for vegetarians, Halal and Kosher, does not contain nuts or milk
InVitaD3 capsules	50,000iu	£4.95/3caps	Not suitable for vegetarians. Halal and Kosher, does not contain nuts or milk
Stexerol-D3 tablets	25,000iu	£17/12 tabs	Suitable for vegetarians
Fultium-D3 capsules	20,000iu	£17.04/15caps	Not suitable for vegetarians. Halal and Kosher, does not contain nuts or milk
InVita D3 oral solution	50,000iu/mL	£6.25/3mL	Suitable for vegetarians. Halal and Kosher, does not contain nuts or milk

PLEASE NOTE: These products are recommended at the time of publication, appropriate for review in due course.

Check corrected calcium levels 1 month after loading dose completed to check for unmasked primary hyperparathyroidism¹. If calcium level is raised, stop any further vitamin D until this has been investigated.

Key amendments

The previous guidelines for Newham and Tower Hamlets CCGs were based on the Clinical Effectiveness Group (CEG) Vitamin D guidelines (Jan 2011) and Waltham Forest CCG guidelines were based on ONEL. The new guidelines reflect the current recommendations by National Osteoporosis Society (NOS) guidelines¹ and latest evidence.

The following are key changes:

Reference range

Key change

Reference ranges has been changed to reflect National Osteoporosis Society (NOS) thresholds

Rationale

The reference ranges have been changed in line with recommendations by NOS, based on study of evidence conducted by Institute of Medicine, which suggests that serum 25OHD (25-hydroxy vitamin D) of 25nmol/L is sufficient to meet the vitamin D requirements for bone health in half the population, while 50nmol/L is sufficient for 97.5% of the population. Therefore, <25nmol/L is considered as high risk of deficiency and the new guidelines reflects threshold².

The threshold for insufficiency is based on evidence of risk of inadequacy from 25–50 nmol/L, and population above >50nmol/L Vitamin D is considered sufficient.

The table below summarises how the new thresholds differ from that which were reflected in previous guidelines:

Table 1: Thresholds for Vitamin D level testing

Indication	Threshold	
	New guidelines – NOS	Previous guidelines, CEG
Deficiency	serum 25OHD < 25 nmol/L	serum 25OHD < 30 nmol/L
Insufficiency	serum 25OHD of 25–50 nmol/L	serum 25OHD of 30–50 nmol/L
Sufficiency/replete	serum 25OHD > 50 nmol/L	serum 25OHD > 50 nmol/L

Loading doses

Key change

GRADUAL LOADING DOSE REGIMEN

Loading dose 40,000iu weekly for 7 weeks (Total: 280,000iu)
Loading doses based on National Osteoporosis Society (NOS) guidelines.
This replaces 20,000iu five times daily for 2 days loading dose regimen.

PRIMARY CARE ONLY

OR

RAPID LOADING DOSE REGIMEN

Loading dose 40,000iu daily for 7 days (Total: 280,000iu) for certain situations e.g. in—patient hospital, post-fracture or where compliance concerns with weekly loading dosing

PRIMARY CARE OR SECONDARY CARE

OR

HIGH INTENSITY LOADING DOSE REGIMEN

Loading dose: 80,000 or 100,000iu per week for 6 weeks (Total: 480,000-600,000iu) for situations where concerns about total of 280,000 may be sub-threshold.

SECONDARY CARE ONLY

GRADUAL LOADING DOSE REGIMEN

Previous CEG guidelines recommendation on loading dose was 20,000iu five times daily for 2 days, and ONEL guidelines for Waltham Forest CCG 300,000iu over 6-15 days.

Evidence cited by the NOS suggests large immediate loading dose may be ineffective and may not lead to prompt correction of vitamin D as intended³. Total of 300,000iu given on a weekly interval is more likely to lead to sustained correction of vitamin D level.

NOS recommended three loading dose options¹:

- a) 50,000iu once a week for 6 weeks (total: 300,000iu)
- b) 40,000iu (2x20,000iu) weekly for 7 weeks (280,000iu)
- c) 800iu, five a day given for 10 weeks (280,000iu)

Option (b) is cost effective and therefore reflected in guidelines.

Option c) was not selected due to long duration and high frequency of daily dosing.

ONE OFF DOSING

In the past it was advocated that a single large dose (300,000 IU or higher) of vitamin D (stoss therapy) might lead to sustained correction of vitamin D deficiency and potentially avoid adherence problems with regular lower dose supplementation. This was initially proposed for the treatment of rickets and osteomalacia but has also been suggested as a possible therapeutic option for vitamin D insufficiency in the elderly. However, more recently it has been suggested that large doses of vitamin D given intermittently are ineffective and might actually increase fracture risk.

RAPID LOADING DOSE REGIMEN

It is recognised that there are certain situations where rapid loading dose is required e.g. post fracture. Also, it is not practical to offer a patient a weekly loading dose whilst patient is in-patient. There can be confusion if patient is started on weekly loading dose in hospital and discharged before course is completed. The rapid loading dose was based on consensus of opinion from Barts Health consultants, and can also be used in primary care, where a rapid dosing is required or where compliance on weekly dosing may be questionable.

HIGH INTENSITY LOADING DOSE REGIMEN

It has been the experience of some Barts Health consultants that some patients who receive total of loading dose 280,000iu does not always result in corrected levels of vitamin D levels, and subsequently require a repeated loading dose. Based on consensus of opinion from Barts Health consultants, total of 480,000-600,000iu is considered adequate to correct vitamin D levels. Decision to use high intensity loading dose will be based on clinical judgement of consultant, and information stated clearly on transfer of care to primary care.

Formulary products

Key change

There are now licensed solid dosage form and liquid preparations of Colecalciferol available in Primary care. Licensed preparations should be prescribed in preference to unlicensed where appropriate. Licensed high dose brands available are Plenachol, InVita-D3, Stexerol-D3 and Fultium-D3.

Rationale

SunVit D3 tablet and Hux D3 capsules are not licensed preparations. These are considered to be food products and can still be purchased by patients if they wish.

Plenachol is first line as it is suitable for Vegetarians and is Halal and Kosher certified. The capsules contain no soya, lactose and technically this product can be classified as nut-free, however contains coconut oil. Plenachol is gelatin-free but not Vegan as Colecalciferol is obtained from the wool grease of live sheep⁸. There are no licensed Vegan products.

InVita D3 oral solution and capsules, Stexerol-D3 and Fultium-D3 are not as cost effective as Plenachol, however they are alternative licensed options.

Table 2: Cost analysis of loading dose options:

Loading dose regimen	Total Cost of loading dose ⁴				
	InVita D3 50,000iu oral solution (£6.25 per 3ml)	InVita D3 50,000iu (£4.95 for 3 capsules)	Fultium-D3 20,000iu	Stexerol D3 Tablets 25,000iu	Plenachol D3 Capsules 40,000iu
40,000iu (2x20,000iu) weekly for 7 weeks (gradual loading) 40,000iu (2x20,000iu) daily for 7 days (rapid loading)	£12.50 (0.8ml x 7 = 5.6mL, 2 bottles are required)	/	£15.90 (14)	/	£10.50 (7)
80,000iu per week for 6 weeks (High intensity loading)	£25 (1.6mL x 6= 9.6mL, 4 bottles required)	/	£27.26 (24)	/	£18 (12)
100,000iu per week for 6 weeks (High intensity loading)	£25 (2mL x 6= 12mL, 4 bottles required)	£19.80 (2 x 6= 12 capsules)	£34.08 (30)	£34 (24)	/

Table 3: Prices of Vitamin D products

Product	Strength	Pack size	Price
Plenachol	40,000iu	10	£15
Stexerol-D3 tablets	25,000iu	12	£17
InVitaD3 capsules	50,000iu	3	£4.95
Fultium-D3 capsules	20,000iu	15	£17.04
InVita D3 oral solution	50,000iu/mL	3mL	£6.25

The guidelines recommend that patients purchase products for maintenance doses Over-The-Counter (OTC). They can choose which product they wish to buy, whether licensed or unlicensed.

Maintenance dose

Key change

Maintenance dose recommended after completion of loading dose is 800-2,000iu daily in line with National Osteoporosis Society guidelines. This replaces 400-1,000iu daily dose recommended in previous guidelines. Patients should be encouraged to buy.

Rationale

A patient information leaflet has been developed to provide to patients initiated on loading dose, to promote education and compliance. Patients are requested to purchase maintenance doses over the counter.

In exceptional situations where maintenance dose is necessary, the licensed Stexerol-D3 tablets are £2.95 for 28 tablets.

Monitoring

Key change

**No routine monitoring recommended for Vitamin D (25OHD).
Corrected Calcium should be monitored 1 month after completion of loading dose.**

Rationale

It can take 3-6 months for steady state of 25OHD to be achieved after treatment. Therefore, routine monitoring of 25OHD levels is not necessary after completing loading dose. If patient remains symptomatic, adherence with loading dose regimen should be established.

Where patients remain symptomatic after completion of loading dose, repeating 25OHD may be necessary, particularly where there are co-morbidities that may result in malabsorption.

Vitamin D treatment can unmask previously undiagnosed primary hyperparathyroidism. Although the dosing regimen is unlikely to result in toxicity, it should be recognised that certain groups may be predisposed to increased risk. Therefore, calcium levels should be measured one month after completing the loading dose regimen¹.

The CEG guidelines³ previously recommended monitoring of calcium at 4 and 8 weeks if:

- Risks of hypercalcaemia are higher than average such as in CKD, active TB, and patients on thiazide diuretics in combination with calcium supplements.
- Patients on digoxin and other cardiac glycosides – where drug effect may be accentuated by vitamin D
- Any symptoms or signs of hypercalcaemia (anorexia, nausea, thirst, polyuria, vomiting, diarrhoea, confusion).

Removal of the PIL

Patient information leaflets are not routinely included in Trust guidelines.

References

1. National Osteoporosis Society: Vitamin D and Bone Health. A Practical Clinical Guideline for Patient Management. 2013. <https://www.nos.org.uk/document.doc?id=1352>
2. IOM (Institute of Medicine). Dietary reference intakes for calcium and vitamin D. Washington: DTNAP; 2011.
3. Clinical Effectiveness Group – Vitamin D guidance, Jan 2011. <http://www.blizard.qmul.ac.uk/ceg-resource-library/clinical-guidance/clinical-guidelines/10-vitamin-d-january-2011/file.html>
4. Drug Tariff February 2022. <https://www.drugtariff.nhsbsa.nhs.uk/#/00813478-DC/DC00813189/Part%20VIII%20products%20C>. Accessed 02.02.2022
5. Fultium-D3 20,000IU capsules Summary of product characteristics <https://www.medicines.org.uk/emc/product/3659/smpc> Accessed 02.02.2022
6. InvitaD3 Summary of product characteristics <https://www.vitamin-d3.co.uk/summary-of-product-characteristics/> Accessed 02.02.2022
7. Stexerol-D3 Tablets Summary of product characteristics <https://www.medicines.org.uk/emc/product/5062> Accessed 02.02.2022
8. Plenachol D3 40 000 IU Capsules Summary of product characteristics <https://www.medicines.org.uk/emc/product/5049/smpc> Accessed 02.02.2022
9. [Choosing an oral vitamin D preparation for vegetarians or vegans](#) by Amisha Gopal, Regional Medicines Information Pharmacist, London Medicines Information Service · Published 13 December 2021 <https://www.sps.nhs.uk/articles/choosing-an-oral-vitamin-d-preparation-for-vegetarians-or-vegans/> Accessed 02.02.2022
10. Vitamin D deficiency in adults:Vitamin D supplements Last revised in September 2021 <https://cks.nice.org.uk/topics/vitamin-d-deficiency-in-adults/prescribing-information/vitamin-d-supplements/> Accessed 02.02.2022

Version	Process
Draft 1	Dec 2015 - Consultation within Newham, Tower hamlets and Waltham Forest CCG Medicines Management Teams
Draft 2	Jan 2016 – Meeting with Nicola Russell, Highly Specialist Pharmacist – Stroke and Care of the Elderly. Wajid Qureshi, Bola Sotubo
Draft 3	Jan 2016 – CCG Medicines Management Committee
Draft 4	Feb 2016 – WEL Group
Draft 5	Further comments from Dr Tahir Hassan, Consultant, Barts Health – Whipps Cross Hospital
Draft 6	May 2016 – Comments from Dr Ruth Ayling, Pathology, Barts Health
Finalised draft	Finalised draft following comments from all sites, Barts Health
Revised Draft 1	October 2021 – Guidelines reviewed and revised as per updated National Guidelines by Bijal Patel - Highly Specialist Pharmacist – Stroke and Care of the Elderly
Revised Draft 2	November 2021 – Comments made by Dr Sivapathasuntharam and Dr Dow– Consultant Geriatricians
Revised Draft 3	November 2021 – Draft discussed with Rheumatology
Revised Draft 3	December 2021 – Discussion with Dr Agwada-Akeru – Consultant Orthogeriatrician
Revised Draft 4	Decemeber 2021- Comments from Pharmacy Clinical Leadership Committee, Barts Health
Revised Draft 5	February 2022 – Primary care medicine choice updated, Tower Hamlets, Newham and Waltham Forest ICP Medicine Optimisation Team (TNW MOT)