NHS Greater Glasgow and Clyde

CLINICAL GUIDELINE

Vitamin D Prevention and Treatment of Deficiency in Adults

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

Version Number:	7
Does this version include changes to clinical advice:	Yes
Date Approved:	20th November 2025
Date of Next Review:	31st May 2027
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Approval Group:	Medicines Utilisation Subcommittee of ADTC
Guideline ID number:	024

Important Note:

The online version of this document is the only version that is maintained.
Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

SCOPE:

This guidance gives advice on how to treat adults who are at risk of or who are known to have deficient /insufficient levels of vitamin D.

This guidance is written for primary and secondary care prescribers. It refers to adults only.

Note – The use of vitamin D in patients with Primary Hyperparathyroidism should be determined through specialist referral to Endocrinology.
Potent vitamin D analogues such as calcitriol or alfacalcidol are typically reserved for patients with renal osteodystrophy or for patients with Primary
Hypoparathyroidism and should be used in the context of guidance from appropriate specialists as they carry risk of hypercalcaemia / hypercalciuria.

BACKGROUND:

The Scottish Government released updated guidance (available here) in July 2020 including revised guidance to reflect the coronavirus (COVID-19) situation. NICE guidance can be accessed here.

In brief, the current recommendations **for adults** (living in Scotland) are:

- All pregnant and breastfeeding women should take a daily supplement containing 10 micrograms (400 units) of vitamin D, to ensure the mother's requirements for vitamin D are met and to build adequate fetal stores for early infancy.
- The Scientific Advisory Committee on Nutrition (SACN) also recommends people who are not exposed to much sunlight, such as frail or housebound individuals, or those that cover their skin for cultural reasons; and people from minority ethnic groups with dark skin such as those of African, African-Caribbean and South Asian origin, (because they require more sun exposure to make as much vitamin D) should also consider a daily supplement all year round.
- The Scottish Government recommends that everyone aged 5 and above should consider taking a daily supplement of 10 micrograms (400 units) of vitamin D particularly during the winter months (October to March).

Most of the population of the West of Scotland has low levels of vitamin D because of low levels of UV/sun exposure. The important clinical syndrome that can result from deficiency of vitamin D is osteomalacia – a syndrome characterised by malaise, multifocal bone pain with tenderness and proximal myopathy. Osteomalacia is associated with abnormal biochemistry – high serum alkaline phosphatase, serum calcium low/low normal, serum PTH high & low vitamin D, usually <25nmol/L. The prime aim in giving vitamin D to our patients is to prevent this vitamin D deficiency syndrome. Diverse health problems ranging from MS to heart disease, from TB to cancers at various sites have been ASSOCIATED with low levels of vitamin D (and with higher latitude) BUT there is NO or INSUFFICIENT evidence to support a causal link between low vitamin D and any of these problems; furthermore there is no evidence that giving vitamin D alters the incidence of any of these conditions. A NICE Rapid guideline COVID-19: vitamin D concluded that there was insufficient evidence to recommend using vitamin D to prevent or treat Covid-19.

Vitamin D levels of <25nmol/L are generally considered to be 'deficient' (however even at this level most patients do not have osteomalacia). Vitamin D levels of above 50nmol/L are generally viewed as 'sufficient'. In terms of description; vitamin D levels in the range of 25-50nmol/l are described as insufficient however use of vitamin D supplements are often not required in this context - see Royal Osteoporosis Society (ROS) - Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management here. The vitamin D status is assessed by measuring 25-hydroxyvitamin D (25(OH)D).

This compound is inactive, but is stable, and serum levels correlate reasonably well with vitamin D activity. This is the vitamin that is measured when "vitamin D" measurement is requested through biochemistry.

1,25-dihydroxyvitamin D (1,25(OH)2D3) is the biologically active form of vitamin D. This can be measured biochemically but it is unstable and levels do not correlate well with vitamin D activity. Measurement of 1,25(OH)2D3 should be reserved for patients with hypercalcaemia complicating granulomatous disease such as sarcoidosis or in patients with vitamin D resistant rickets. There may rarely be course to measure1,25(OH)2D3 in patients taking calcitriol or alfacalcidol.

WHEN TO MEASURE VITAMIN D:

1. Patients with low adjusted serum calcium (<2.1mmol/L) and/or where other blood results suggest possible osteomalacia (e.g. low serum phosphate or raised alkaline phosphatase). Osteomalacia is clinically characterised by joint and bone pain.
2. Patients with malabsorption syndromes
3. CKD (eGFR <30) - measurement in this context should usually be carried out by specialist clinics only.

WHEN NOT TO MEASURE VITAMIN D:

1. Patients prescribed Vitamin D at daily doses of less than 5000 units/day. Toxicity is unlikely at these doses and where required should be undertaken by secondary care specialists.
2. Patients on alfacalcidol or calcitriol (not measured by assay – see 1,25(OH)2D3 above)
3. Vitamin D is not helpful in investigation of tiredness, chronic fatigue / fibromyalgia or non-specific aches and pains (with normal bone biochemistry).

HOW FREQUENTLY TO MEASURE VITAMIN D:

Follow-up measurements are generally not required but there are occasional exceptions, for example in patients with malabsorption with suboptimal vitamin D. But repeat testing is only appropriate after at least 6 months' supplementation and is only available at specialists' request. Performance management will not permit repeat measurements from primary care within 12 months.

PRESCRIBING VITAMIN D:

See the following flowcharts for advice on when supplementation of vitamin D is indicated and what to prescribe;

Note: If prescribing vitamin D in a patient with a calcium level at the upper end of the normal range it is best practice to re-check calcium levels after 6-8 weeks.

Flowchart 1 – Vitamin D: Prevention & Treatment of Deficiency in Adults
Flowchart 2 - Vitamin D: Deficiency in Adults in the context of (or at increased risk of) osteomalacia, osteoporosis or increased risk of fracture.

NHS Greater Glasgow and Clyde

Guideline authors: NHSGGC Osteoporosis Strategy Group
Approved by: Medicines Utilisation Subcommittee of ADTC
Date approved: November 2025
Date for review: May 2027

Flowchart 1 –Vitamin D: Prevention & Treatment of Deficiency in Adults

Which patient population are you managing?

Patients with;
- Proven or possible osteomalacia
- Osteoporosis
- Increased risk of fracture

→ Refer to Flowchart 2 below

Pregnant or breastfeeding women particularly teenagers and young women. **Vitamin D blood measurement not required**

→ The Scottish Government[1] recommends a daily supplement containing 10 micrograms (400 units) of vitamin D.

Healthy Start vitamins are available from maternity services for pregnant women. Breastfeeding women can receive free vitamin D through the Vitamin D Supplements scheme, with initial supply from maternity services and ongoing supplies from community pharmacies.

General Population
Vitamin D blood measurement not required

- The Scottish Government[1] recommends that everyone aged 5 and above should consider taking a daily supplement of 10 micrograms (400 units) of vitamin D particularly during the winter months (October to March).

- People at particular risk of vitamin D deficiency, who may also benefit from a daily supplement all year round, include
  - People from ethnic groups with dark skin
  - Institutionalised, frail or housebound people
  - Chronic alcohol misusers
  - People who observe vegetarian, vegan, halal, kosher or nut free diets
  - Obese people
  - People who wear concealing clothing (e.g. Muslim men and women)
  - Medical risk factors: renal/hepatic disease unless attending specialist clinics
  - Specific medicines (e.g. anticonvulsants and anti- retrovirals)

→ Give advice on regular sun exposure (Panel 2), dietary sources of vitamin D (Panel 1) and buying over the counter vitamin D supplements particularly in the winter

Panel 1: Dietary Sources of Vitamin D[2]
- Oily fish
- Cod liver oil or other fish oils
- Eggs
- Fortified breakfast cereals (see individual product packaging)
- Margarine
- Infant milk formula

Panel 2: Sun exposure advice [3]

When possible, only a limited amount of time should be spent in strong sunlight. People who choose to expose their skin to strong sunlight to increase their vitamin D status should be aware that prolonged exposure (for example, leading to burning or tanning) is unlikely to provide additional benefit. Exposing commonly uncovered areas of skin such as forearms and hands, for short periods when in strong sunlight provides vitamin D. (Longer periods of exposure may be needed for those with darker skin.)

References
1. Scottish Government, Scientific Advisory Committee on Nutrition (SACN) advice available here
2. BMJ 2010; 340 doi: http://dx.doi.org/10.1136/bmj.b5664 (Published 11 January 2010) Cite this as: BMJ 2010;340:b5664 Diagnosis and management of vitamin D deficiency
3. NICE 34 Sunlight exposure: risks and benefits available here.

Flowchart 2-Vitamin D: Deficiency in Adults in the context of (or at increased risk of) osteomalacia, osteoporosis or increased risk of fracture

Are vitamin D levels known?
See box A for when to measure vitamin D levels

YES

Osteomalacia present? (comprising non-arthritic bone pain; low vitamin D and raised PTH; raised ALP and calcium low/normal)

YES

Prescribe a loading regimen to provide a total of 300,000 units oral colecalciferol e.g.
50,000 units weekly for six weeks,
40,000 units weekly for 7 weeks or
4000 units daily for 10 weeks
(or a suitable alternative loading regimen based on the strength and availability of colecalciferol preparations)

After completing the loading dose continue with colecalciferol 800-1000 IU daily.

NO

Vitamin D <25 nmol/L

Prescribe colecalciferol 1600 – 2000 units once daily for 3 months then continue maintenance 800-1000 units vitamin D thereafter.
See points 1-3 in Box B: special considerations.

Vitamin D 25-50 nmol/L

25-50 nmol/l may be inadequate in some people. Consider maintenance 800-1000 units vitamin D supplementation.
See point 1 in Box B: special considerations.

NO
Assess whether to measure vitamin D

Vit D measuring required

No Vit D measuring required

Is patient on treatment with bisphosphoate/denosumab or on bisphosphonate drug holiday?

YES

Does the patient have documented hypercalcaemia

NO

Prescribe colecalciferol at a dose of 800-1000 units daily in an appropriate calcium and vitamin D preparation from GGC Adult Formulary. As alternative consider once monthly Calcifediol 266 µg or Colecalcfiferol 25,000 IU capsule ensuring adequate dietary calcium intake

YES

Prescribe colecalciferol 800-1000 units once daily

NO
Refer to Flowchart 1 Vitamin D: Prevention & Treatment of Deficiency in Adults (above)

Box A: Measuring Vitamin D levels

When to Measure Vitamin D:

1. Patients with low adjusted serum calcium (<2.1mmol/L) and/or possible osteomalacia.
2. Patients with malabsorption syndromes
3. CKD (eGFR <30), measurements will be carried out by specialist clinics only.

Box B: Special Considerations

1. If fracture / osteoporosis and for IV zoledronic acid or SC denosumab, give 100,000 units colecalciferol orally once only and then treat with appropriate ongoing calcium and vitamin D preparation or if calcium contraindicated with separate colecalciferol supplement.
2. A once monthly vitamin D supplement can be considered, i.e. Calcifediol 266 µg capsules once monthly or Colecalciferol 25,000 IU once monthly.
3. Patients with malabsorption such as coeliac disease / pancreatic insufficiency (e.g. cystic fibrosis) or with chronic liver disease low Vitamin D should be treated as for patient with a vitamin D level of <25 nmol/L unless osteomalacia in which case follow guidance above.
4. Patients with chronic kidney disease (& eGFR <30) merit discussion with specialists.
5. Contact pharmacy if there are any concerns regarding choice of product in swallowing issues/dietary or religious restrictions

Notes – The use of vitamin D in patients with Primary Hyperparathyroidism should be determined through specialist referral to Endocrinology. Potent vitamin D analogues such as calcitriol or alfacalcidol are typically reserved for patients with renal osteodystrophy or for patients with Primary Hypoparathyroidism and should be used in the context of guidance from appropriate specialists – as they carry risk of hypercalcaemia / hypercalciuria.