NHS
Shropshire, Telford and Wrekin
Clinical Commissioning Group

Guidance for the Treatment of Vitamin D Deficiency and Insufficiency

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2	15/12/21	Updated from Telford and Wrekin CCG guidelines Oct 2016, adapted PrescQIPP vitamin D pathways.

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Adult Pathway[1] (Adapted from PrescQIPP Vitamin D Pathway for Adults Bulletin 275)

Patient presents with symptoms, consider test for:

- Patients with diseases with outcomes that may be improved with vitamin D treatment, e.g. confirmed osteomalacia, osteoporosis.
- Patients with symptoms that could be attributed to vitamin D deficiency, e.g. suspected osteomalacia, chronic widespread pain.
- Test before starting patients on a potent antiresorptive agent (zoledronic acid, denosumab or teriparatide).

Test serum 25-hydroxyvitamin D (25(OH)D)

Do not routinely test asymptomatic individuals at risk of vitamin D deficiency:

- Pregnant or breastfeeding women, especially teenagers and young women.
- Older people, age 65 years and over.
- People who have low or no exposure to the sun, e.g. those who cover their skin for cultural reasons, who are housebound or who are confined indoors for long periods.
- People, who have darker skin, for example people of African, African-Caribbean or South Asian origin, because their bodies are not able to make as much vitamin D.
- Obese patients (body mass index >30kg/m^2) vitamin D may be sequestered into adipose tissue reducing bioavailability

Serum 25(OH)D < 25 nmol/L **Deficiency**

Serum 25(OH)D 25nmol/L-50nmol/L **Insufficiency**

Serum 25(OH)D >50 nmol/L **Normal range**

Does the patient have one or more of the following?

- Fragility fracture, documented osteoporosis or high fracture risk.
- Treatment with antiresorptive medication for bone disease.
- Symptoms suggestive of vitamin D deficiency.
- Raised parathyroid hormone (PTH).
- Medication with antiepileptic drugs or oral glucocorticoids.
- Conditions associated with malabsorption, or other condition known to cause vitamin D deficiency.

Yes

No

Treat - Use licensed vitamin D preparation 1st line. To aid compliance consider supplements for people with particular dietary/religious needs if the licensed products do not fulfil requirements.

Specialist advice or referral should be sought before treatment of certain patients: e.g. predisposition to hypercalcaemia, end-stage CKD, severe liver failure, pregnancy, malabsorption and renal stones.

Rapid correction needed if:

- Symptoms of vitamin D deficiency.
- About to start treatment with potent antiresorptive agent (zoledronic acid, denosumab or teriparatide).

Rapid correction dose:

- Give a loading regimen of approximately 300,000 IU (750micrograms) vitamin D3 (or D2) orally in divided doses over 6-10 weeks.
- Commence maintenance vitamin D therapy 4 weeks after loading as per elective correction.
- See below for example loading regimens.

Elective correction is given if rapid correction is not needed/ is less urgent e.g.

- When co-prescribing vitamin D supplements with an oral antiresorptive agent, maintenance therapy may be started without the use of loading doses.

Elective correction dose:

- 800-2,000 IU (20-50 micrograms) vitamin D3 daily or intermittently at higher equivalent dose.
  A cost-effective brand should be prescribed. Switch to CCG preferred brand – InVita D3.

Note: vitamin D maintenance may be prescribed for people with osteoporosis or a chronic condition or surgery that results in deficiency or malabsorption. Advise other people to purchase over the counter.

Maintain vitamin D through safe sun exposure and diet.

- Give lifestyle advice.
- Provide reassurance and give advice on maintaining adequate vitamin D levels through safe sun exposure and diet.
- Recommend self-care prophylaxis with an OTC supplement when appropriate. *Note: 1000unit (25microgram) tablets are currently cheaper to buy than other strengths*
- Give self-care patient information leaflet.
- Normal adult dosage 400IU (10micrograms) vitamin D daily.
- Offer free Healthy Start vitamins to all pregnant and breastfeeding women (eligibility criteria apply).

Vitamin D testing in Adults

Testing for deficiency

Guidance states that health professionals should not routinely test people's vitamin D status unless:

- They have symptoms of deficiency such as musculoskeletal symptoms with features of osteomalacia.
- There is a clinical reason to do so (for example, they have suspected bone disease e.g. osteomalacia, osteoporosis).
- Known bone disease where vitamin D deficiency correction is required prior to treatment e.g. osteoporosis treatment with antiresorptive agent.[2]
- NICE recommends testing patients that are considered to be at particularly high risk of deficiency (for example, they have a very low exposure to sunlight).[3] The ROS publication does not support testing of asymptomatic patients at high risk of deficiency as it is noted this will not change the management advise for these patients to take regular maintenance dose of vitamin D[2]. Therefore routine testing of these patients is not recommended.

Ongoing monitoring of vitamin D levels

Routine monitoring of serum 25-hydroxyvitamin D (25[OH]D) levels is not needed. Checking the serum 25(OH)D level 3–6 months after starting vitamin D treatment may be considered in some patients e.g. patients with symptomatic vitamin D deficiency, malabsorption or where poor compliance with medication is suspected.[2] It may also be considered in patients receiving antiresorptive therapy, with very low 25(OH)D levels at baseline assessment or those or those requiring sequential doses of antiresorptive agent.[2]

Other monitoring

For patients that have completed treatment with a fixed loading regimen for Vitamin D deficiency, based on pharmacokinetics of 25(OH)D, check adjusted serum calcium levels within one month after the administration of the last loading dose. This is to detect those with primary hypoparathyroidism. The presence of hypercalcaemia should lead to cessation of further vitamin D supplementation (and calcium if taking) prior to investigation of the hypercalcaemia.[1] Where hypocalcaemia is detected, asses the patients dietary calcium intake and advise to increase dietary calcium and/or on the need for calcium supplementation if this is inadequate.

Management and Treatment in Adults

Oral administration of vitamin D is recommended

Intramuscular administration has an unpredictable bioavailability, slower onset of repletion and an additional administration burden in comparison to oral preparations.[3]

Example Adult regimens:

Loading regimens

Loading regimens for the treatment of deficiency are up to a total of approximately 300,000 IU (7,500 micrograms) given either as weekly or daily split doses, usually over 6 to 10 weeks. The exact regimen will depend on the local availability of vitamin D preparations but will include one of the following options:

- 50,000 IU (1,250 micrograms) tablets, capsules or liquid once weekly for six weeks (Total: 300,000 IU/7,500 micrograms)
- 40,000 IU (1,000micrograms) given weekly for seven weeks (Total: 280,000 IU/7,000 micrograms)
- 1,000 IU (25micrograms) tablets, four a day for 10 weeks (Total: 280,000 IU/7,000 micrograms)
- 800 IU (20 micrograms) capsules, five a day given for 10 weeks (280,000 IU/7,000 micrograms).

This list is not exhaustive.[2]

Maintenance regimens

Maintenance regimens should generally be started one month after fixed loading regimen, with doses equivalent to 800 to 2,000 IU (20-50 micrograms) daily (up to a maximum of 4,000 IU daily for certain conditions on specialist advice), given either daily or intermittently at a higher equivalent dose.[3]

If the patient has risk factors and has previously been diagnosed as vitamin D deficient or insufficient, a cost-effective brand should be prescribed for maintenance. The CCG preferred brand for 800 IU (20 micrograms) is InVita D3.

If the patient does not have risk factors they should purchase maintenance dose vitamin D OTC.[8] 1000unit (25microgram) tablets are currently cheaper to buy than other strengths and would be suitable for use as a maintenance dose OTC.

Assessing a patients calcium intake[2]

Assess the patients calcium intake, consider using a calcium calculator https://www.cgem.ed.ac.uk/research/rheumatological/calcium-calculator/

- Where a patient has inadequate calcium intake <700mg/day or <1000mg/day in patients with osteoporosis, advise to increase dietary calcium intake.
- Where patients are unable or unwilling to increase dietary calcium intake, consider the need for calcium supplements.

Lifestyle advice[2]

- Provide advice on safe sun exposure to help skin synthesis of vitamin D
- Provide advice on dietary sources of vitamin D.
- Provide advice on dietary intake of calcium.
- Provide advice on sources of information and support, such as:
  The NHS patient information Vitamins and minerals - Vitamin D.
  The patient.info leaflet Vitamin D deficiency.

The Royal Osteoporosis Society (ROS) leaflet Vitamin D for bones, which includes a factsheet on vitamin D supplements and tests.
The self-care vitamin D patient information leaflet (Appendix 1)

Healthy Start Vitamins

Women more than 10 weeks pregnant or who have a child under 4, may be entitled to get help to buy healthy food and milk. If eligible, they'll be sent a Healthy Start card with money on it which can be used in some UK shops. Benefit is added onto this card every 4 weeks. The card can be used to collect Healthy Start vitamins.[6]

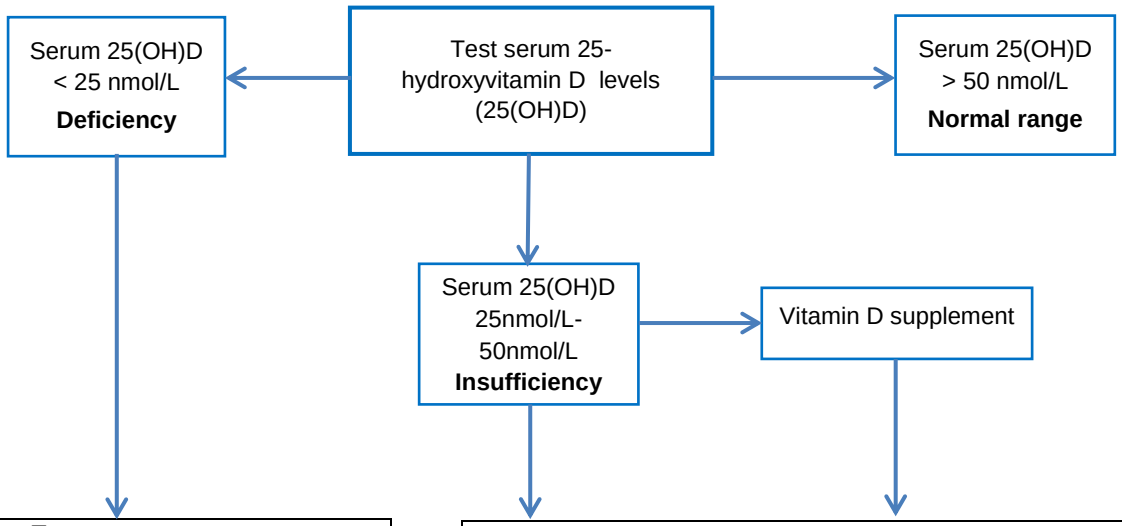
Women can have Healthy Start vitamin tablets while they're pregnant and up to their baby's 1st birthday.[6]

For further information: www.healthystart.nhs.uk/getting-vitamins

Self-care in care homes or domiciliary care settings

Advice on self-care in care homes/domiciliary care can be found here: Self-Care Medicines and Homely Remedies A Guide for Care Homes

Childhood Pathway[1] (adapted from PrescQIPP Bulletin 275 Children pathway)



Treatment

Vitamin D3 as the preferred treatment, although treatment with vitamin D2 is effective.

Category	Vitamin D dose and frequency[7]	Duration
1 - 5 months	3,000 IU (75 micrograms) orally daily	8-12 weeks
6 months – 11 years	6,000 IU (150 micrograms) orally daily	8-12 weeks
12 – 18 years	10,000 IU (250 micrograms) orally daily. (A single or divided oral dose totalling 300,000 IU (7,500 micrograms) can be considered as an alternative, if there is concern about compliance).	8-12 weeks

Prevention

Consider prevention dose and lifestyle advice - give self-care patient information leaflet (see below).

Category	Dose and frequency	Examples of OTC preparations
Newborn up to 1 year*	340 – 400 IU daily (8.5-10 micrograms daily)	**Contain D2:** Abidec® Multivitamin drops, Dalivit® oral drops **Contain D3:** 'Healthy Start®' Vitamins
1 – 4 years	400 IU daily (10 micrograms daily)	

*Including exclusively breast fed and partially breast fed infants, form birth. Babies receiving more than 500ml per day of infant formula do not require additional vitamin D supplements.

Vitamin D testing in Children

Testing for deficiency

Routine testing for vitamin D deficiency in children and young people who are asymptomatic is not recommended. Testing should be restricted to children and young people with a clear indication for testing vitamin D status:

- Symptoms and signs of rickets, e.g. progressive bowing of legs and knock knees, wrist swelling, rachitic rosary, craniotabes, delayed tooth eruption and enamel hypoplasia.
- Other symptoms or conditions associated with vitamin D deficiency, e.g. unexplained bone pain>3 months, muscular weakness, tetany, seizures and cardiomyopathy.
- Abnormal investigations, e.g. low plasma calcium or phosphate, high alkaline phosphatase, radiographs showing osteopenia, rickets or pathological fractures.
- Chronic disease that may increase risk of deficiency, e.g. chronic renal and/or liver disease, malabsorption syndromes (e.g. coeliac disease, Crohn's disease, cystic fibrosis).

- Treatment with bone-targeted drugs that require vitamin D sufficiency, e.g. bisphosphonates.[5]

Other monitoring

For patients that have completed treatment with a fixed loading regimen for Vitamin D deficiency, check serum 25(OH)D level and bone profile within one month after the administration of the last loading dose.

Management and Treatment in Children

Treatment of deficiency

Where rapid correction of Vitamin D levels is required, fixed loading dose regimen to be prescribed depending on age for 8-12 weeks (see Childhood Pathway above) followed by regular maintenance Vitamin D one month after loading unless there are significant lifestyle changes to influence Vitamin D status.

Specialist advice or referral should be sought before treatment of certain patients: e.g. predisposition to hypercalcaemia, hypocalcaemia, clinical features of rickets, end-stage CKD, severe liver failure, malabsorption and renal stones.

Correction of Vitamin D insufficiency/ Prevention and maintenance

Advise on the need for long-term maintenance Vitamin D supplements following treatment for deficiency unless there is a significant change in lifestyle to improve Vitamin D status.

Public Health England advises 400 IU (10 micrograms) daily of vitamin D throughout the year, for everyone in the general UK population aged 4 years and above.[4]

Insufficient data is available to set reference nutrient intakes (RNI) of vitamin D for children under 4 years old. A 'Safe Intake' of 340-400 IU (8.5-10 micrograms) daily of vitamin D for ages 0 up to 1 year (including exclusively breast fed and partially breast fed infants, from birth) therefore has been set by the Scientific Advisory Committee on Nutrition (SACN).[4]

Babies receiving more than 500ml per day of infant formula do **not** require supplements.[5]

For ages 1-4 years, 400 IU (10 micrograms) daily of vitamin D is recommended.[4]

Vitamin D preparations for prevention and maintenance should be purchased OTC in the absence of a chronic condition or surgery that results in deficiency or malabsorption. [8]

Assessing the childs calcium intake[7]

Assess the childs calcium intake, consider using a calcium calculator
https://www.cgem.ed.ac.uk/research/rheumatological/calcium-calculator/

- Advise that the recommended daily calcium intake for children to prevent rickets is
    - Birth to 6 months: 200mg/day
    - 6-12months: 260mg/day
    - Over 12 months: more than 500mg/day

- In children with inadequate calcium intake, advise parents/carers to increase dietary calcium intake.
- If the child is unable or unwilling to increase dietary calcium intake, consider the need for calcium supplements.

Healthy Start Vitamins

Children can have free Healthy Start vitamin drops from the age of 4 weeks until their 4th birthday.[6]

Children who are having 500ml or more of formula a day do not need Healthy Start vitamins.

For further information: www.healthystart.nhs.uk/getting-vitamins

References

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2. NICE Clinical Knowledge Summary, Vitamin D deficiency in adults, Revised September 2021, Available at: https://cks.nice.org.uk/topics/vitamin-d-deficiency-in-adults/ (Accessed December 2021)
3. Royal Osteoporosis Society. Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management. February 2020. https://strwebprdmedia.blob.core.windows.net/media/ef2ideu2/ros-vitamin-d-and-bone-health-in-adults-february-2020.pdf (Accessed December 2021)
4. The Scientific Advisory Committee on Nutrition (SACN). Vitamin D and Health report. July 2016. Available at: https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report (Accessed December 2021)
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6. NHS website, Healthy Start Scheme: Collecting your Healthy Start vitamins, Available at: https://www.healthystart.nhs.uk/getting-vitamins/ (Accessed December 2021)
7. NICE Clinical Knowledge Summary, Vitamin D deficiency in children, Revised April 2021, Available at: https://cks.nice.org.uk/topics/vitamin-d-deficiency-in-children/ (Accessed December 2021)
8. NHSE Guidance, Conditions for which OTC items should not routinely be prescribed in primary care, March 2018, Available at: https://www.england.nhs.uk/wp-content/uploads/2018/03/otc-guidance-for-ccgs.pdf (Accessed December 2021)

Self-Care Vitamin D Patient Information Leaflet

Why is Vitamin D important?

Vitamin D helps regulate the amount of calcium and phosphate in the body. These nutrients are needed to keep bones, teeth and muscles healthy. Low vitamin D levels are linked to conditions such as rickets in children, osteoporosis and bone pain caused by a condition called osteomalacia (soft bones) in adults.

Many people with low vitamin D may have no symptoms or may complain of only vague ones such as tiredness or general aches.

Sources of vitamin D

We get 90% of our vitamin D from sunlight and a small amount from the food we eat.

The body creates vitamin D from direct sunlight on the skin when outdoors. Your body can't make vitamin D if you're sitting indoors by a sunny window because ultraviolet B (UVB) rays (the ones your body needs to make vitamin D) can't get through the glass.

From late March/early April to the end of September, most people can make enough vitamin D from being out in the sun. Researchers at the University of Manchester have been looking into the relationships between sunlight exposure and vitamin D. They have found that – for people with lighter skin – daily sunlight exposure for 10-15 minutes between April and September provides enough year-round vitamin D while also minimising the risks of sunburn and skin cancer. People with dark skin, such as those of African, African-Caribbean or south Asian origin, will need to spend longer in the sun to produce the same amount of vitamin D as someone with lighter skin. For people with darker skin, 25-40 minutes is recommended. Daily exposure for short periods of time with your forearms, hands or lower legs uncovered, and without sunscreen, should be enough sunlight especially between 11am to 3pm. Take care not to burn by covering up or protecting your skin with sunscreen before your skin starts to turn red and burn.

Vitamin D is found in a small number of foods. Sources include:

- Oily fish – such as salmon, sardines, herring and mackerel.
- Red meat.
- Liver.
- Egg yolks.
- Fortified foods.

Foods that are fortified with vitamin D include all infant formula milk, some breakfast cereals, fat spreads and non-dairy milk alternatives. The amounts added to these products can vary and may only be added in small amounts. Manufacturers must add vitamin D to infant formula milk by law. In the UK, cows' milk is generally not a good source of vitamin D because it is not fortified, as it is in some other countries.

It is very difficult to get enough vitamin D from just our food, so between October and early March your body does not make enough vitamin D from sunlight. Everyone should consider vitamin D supplementation during this time.

Do I need to take a vitamin D supplement?

Public Health England recommends that everyone needs an average daily intake of 10 micrograms vitamin D.
During the autumn and winter, when the sun is not strong enough and it is difficult to get enough vitamin D from food alone; everyone should consider taking a daily supplement containing 10 micrograms of vitamin D. A microgram is 1,000 times smaller than a milligram (mg). The word microgram is sometimes written with the Greek symbol μ followed by the letter g (μg).
Certain groups of people are more likely not to be able to make enough vitamin D and should take a vitamin D supplement all year round. These people include:

- Pregnant and breastfeeding women
- Children under five years of age
- People over 65 years of age
- People who are not exposed to much sun, e.g. those who cover their skin for cultural reasons, those that are housebound or in a care home.
- African, African-Caribbean and South Asian people

How much vitamin D should I take?

- Fully and partially breastfed babies from birth up to the age of 1 year should be given a daily supplement containing 8.5 to 10 micrograms of vitamin D.
- Bottle-fed babies should **not** be given a vitamin D supplement unless they have less than 500mL (about a pint) of infant formula a day, as infant formula is fortified with vitamin D.
- Children aged 1 to 4 years old should be given a daily supplement containing 10 micrograms of vitamin D.
- At-risk adults take 400 IU daily (10 micrograms daily) of vitamin D all year round. This includes pregnant and breastfeeding women.
- All adults need 400 IU daily (10 micrograms daily) of vitamin D during autumn and winter.

You can buy vitamin D supplements or vitamin drops containing vitamin D (for under 5s) in many shops, including pharmacies and supermarkets. If you are unsure of the amount of vitamin you should take or if you have any questions about vitamin D, ask a pharmacist.

Healthy Start vitamins

If you are pregnant or have a child under four years old you could get a Healthy Start card with money on to spend on milk, plain fresh and frozen fruit and vegetables, and infant formula milk. You can also get free vitamins. Healthy Start vitamins are only needed for children from birth who are having less than 500mL (one pint) of infant formula a day.

Healthy Start women's vitamin tablets contain:

- **Folic acid:** reduces the chance of your baby having spina bifida, a birth defect where the spine doesn't form properly
- **Vitamin C:** helps maintain healthy tissue in the body
- **Vitamin D:** helps your body to absorb calcium and so supports your baby's bones to develop properly.

Healthy Start children's vitamin drops contain:

- **Vitamin A:** for growth, vision in dim light and healthy skin
- **Vitamin C:** helps maintain healthy tissue in the body
- **Vitamin D:** for strong bones and teeth.

Healthy Start vitamins are suitable for vegetarians and halal diets, and are free from milk, egg, gluten, soya and peanut residues.

To find out if you are eligible and to apply for the Healthy Start scheme ask your pharmacist, GP or midwife or see the website for more information: https://www.healthystart.nhs.uk/.

Further Information:

- NHS. Vitamin D. Last reviewed August 2020 . https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/
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With acknowledgement and thanks to Rotherham Clinical Commissioning Group for the use of their leaflets, 'Vitamin D. All you need to know' and 'Vitamin D and Lifestyle Advice'.