

PAN-DORSET GUIDELINE FOR THE MANAGEMENT OF VITAMIN D DEFICIENCY & INSUFFICIENCY IN ADULTS

Introduction

Over 90% of the body's vitamin D is produced from skin photosynthesis following ultraviolet B sunlight exposure. In a fair skinned person, 20-30 minutes of sunlight exposure to the face and forearms at midday generates about 2000 units of vitamin D. Two or 3 sunlight exposures per week are sufficient to achieve adequate vitamin D levels in the summer if individuals have adequate levels to begin with. However, those with low vitamin D levels, pigmented skin and the elderly need increased exposure time or frequency to get the same level of vitamin D synthesis. Sun exposure should be avoided if someone has a history of skin cancer, or conditions such as xeroderma pigmentosum or actinic keratosis.

The recommended oral daily intake of vitamin D for an adult in the UK is around 400IU (10mcg). The average adult daily diet in the UK provides only 3.7mcg of vitamin D for men and 2.8mcg for women. Food sources which contain greater than 5mcg per portion of vitamin D include 2 teaspoons cod liver oil, 70g sardines, 100g tinned salmon, pilchards or tuna, 110g of cooked mackerel or herring and 130g cooked kipper. Consumption of food sources alone, in the absence of skin synthesis, will not provide optimal vitamin D status.

Vitamin D deficiency develops when there is inadequate exposure to sunlight or a lack of vitamin D in the diet and usually takes a long time to develop as there is slow release of the vitamin from body stores to cover times of deficiency. Between October and April, most of the UK lies above the latitude which allows adequate vitamin D synthesis.

Factors predisposing to Vitamin D deficiency:

Inadequate UV light exposure	<ul style="list-style-type: none"> Northern latitude Air pollution Habitual sunscreen use Dark or pigmented skin Institutionalised/ housebound/ reduced mobility i.e. wheelchair dependency Clothing which limits sunlight exposure or avoidance of sunlight
Poor dietary intake/ malabsorption	<ul style="list-style-type: none"> Poor diet Malabsorption including short bowel, cholestatic jaundice, Crohn's Disease, cystic fibrosis, coeliac disease. Cholestyramine use
Metabolic risk	<ul style="list-style-type: none"> Reduced synthesis :over 65years old Pregnant and breastfeeding women particularly teenagers and young women, multiple short interval pregnancies, infants who are exclusively breast fed Obesity Increased breakdown eg drugs (rifampicin, anticonvulsants particularly phenytoin or carbamazepine treatment , highly active antiretroviral treatment, glucocorticoids) Reduced stores: liver disease

Definition of Vitamin D Deficiency

Vitamin D deficiency has been defined as a **25-hydroxyvitamin D <50nmol/l**. As many as 40% of the local population could be deemed deficient/ insufficient and several risk groups have been identified (see below).

Chief Medical Officer Vitamin D advice on supplementation for at risk groups

CMO guidance (2012) recommended vitamin D supplementation of 400iu (10mcg) daily to the following groups of the population at risk of vitamin D deficiency:

- All pregnant and breast-feeding women, especially teenagers and young women
- Aged 65 and over.
- People with reduced sun exposure
- People with darker skin, for example of African, African-Caribbean and South Asian origin.

In these groups, supplementation is suggested without measurement of 25-OHD. For those with two or more risk factors, advise to take an appropriate over the counter (OTC) preparation.

NB: multi-vitamin preparations are not suitable for the treatment of vitamin D deficiency as this may lead to vitamin A toxicity. Some calcium salts may interfere with absorption of other medications e.g. levothyroxine and they should be taken at least 4 hours apart.

The CMO has also made recommendations for infants and children under 5 years. More guidance on the use of vitamin D supplements in pregnancy, breastfeeding and infants and children under the age of 5 can be found in appendix 1.

When to measure vitamin D levels

- Consider measuring vitamin D in patients presenting with *persistent* musculoskeletal weakness, myalgia & arthralgia.
- Hypocalcaemia.
- Management of Primary Hyperparathyroidism
- Unexplained osteoporosis/ osteoporosis refractory to treatment
- Malabsorption syndromes

Please note: not all Dorset GPs can currently request vitamin D testing. Re-testing after treatment is not currently considered necessary. When measuring vitamin D levels concurrent illness and seasonal factors should be considered. Recent illness or operations may cause a falsely low reading.

Interpretation of vitamin D levels

Blood level	Status
<50 nmol/L	Deficiency
50-75 nmol/L	Insufficiency
>75 nmol/L	Adequate

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Vitamin D Insufficiency (25OHD 50-75nmol/l)

Those patients with 25-OHD levels within the above measurements should be offered lifestyle advice and advised to purchase supplements OTC if required. No investigations are required and lifestyle advice should be provided.

Vitamin D deficiency (25OHD <50nmol/L)

For patients with symptoms of deficiency prescribe colecalciferol 20,000 units orally weekly for 6 weeks followed by **colecalciferol 800-1,600iu daily** thereafter. Most patients require only 1 course of high dose oral therapy and can then be managed on long term maintenance colecalciferol. Please refer to the guide for locally agreed products or the East & South East England Specialist Pharmacy Service guidance on products for Vitamin D deficiency and insufficiency, available at: www.nelm.nhs.uk/en/NeLM-Area/Other-Lib-Updates/Drug-Discontinuation-And-Shortage/Vitamin-D-product-availability/

Maintenance therapy can begin immediately after the completion of the high dose phase. It is recommended to recheck calcium 6 weeks following the initiation of the high dose phase.

Routine repeat of vitamin D levels is not needed if symptoms of vitamin D deficiency resolve. If symptoms do not resolve despite adequate vitamin D repletion then the symptoms are *not* due to vitamin D deficiency.

For **asymptomatic** patients (with 25OHD<50nmol/l), there is no need for the high dose regime and 800-1,600 IU of colecalciferol daily is adequate. It may take up to 3 months to replenish stores. Routine monitoring not required for vitamin D doses ≤2000 IU daily

Patients with high or high-normal calcium levels and vitamin D deficiency may have coexistent primary hyperparathyroidism. Consider referral to a specialist clinic with an interest in calcium.

In patients with significant hypomagnesaemia (Mg²⁺ <0.5mmol/l) from any cause, may develop significant hypocalcaemia due to ineffective release of PTH. PTH measurement is not recommended in patients with severe hypomagnesaemia as it may be uninterpretable). Replacement with combination Magnesium and activated Vitamin D may be necessary- seek specialist help.

Alfacalcidol or calcitriol should NOT be used for routine treatment of vitamin D deficiency as they carry a higher risk of toxicity and require close monitoring.

More information about at-risk groups from local clinicians

Malabsorption syndromes

Oral therapy is more effective than IM injections except where in cases of significant malabsorption. Options include:

- High dose oral therapy e.g. 20,000iu oral colecalciferol weekly
- IM injection of ergocalciferol. Initially 300,000iu IM injections 3 months apart followed by maintenance treatment of 300,000iu IM 6 monthly. (licensed product)

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Chronic kidney disease (CKD)

Local clinicians may assess vitamin D/ PTH/ calcium and phosphate in patients with CKD and treat if deficient.

N.B. Where there is significant renal failure measurement/ monitoring of 25OHD is not clinically relevant and often uninterpretable.

Drugs

Adults on anticonvulsant medications (phenytoin / carbamazepine/ sodium valproate), glucocorticoids, antifungals such as ketoconazole, and anti-retroviral medications for HIV/AIDS – recommend calcium and vitamin D product or single vitamin D product if calcium is contraindicated.

Other groups

Co-existent Primary Hyperparathyroidism & post parathyroid surgery

1° Hyperparathyroidism can be masked by co-existent vitamin D deficiency and patients' with primary hyperparathyroidism are often vitamin D deficient. It is important to correct vitamin D deficiency and maintain sufficiency. (recommend supervision via the Calcium Clinic).

A persistently raised PTH despite successful parathyroid surgery is often due to Vitamin D deficiency.

Osteoporosis

In patients over the age of 60 years on bisphosphonate therapy, the elderly, and those on corticosteroids, calcium & vitamin D 800iu/day is appropriate, for example, Adcal D3® one tablet twice daily.

Multiple Sclerosis

A trial of vitamin D or calcium and vitamin D may be suggested for patients with MS. Due to their possible limited mobility they may also fit into the CMO criteria for treatment.

Type 1 diabetes

A trial of vitamin D may be suggested if the patient is symptomatic for vitamin D deficiency

Tuberculosis

A trial of vitamin D may be suggested if the patient is symptomatic for vitamin D deficiency

Patients with HIV/AIDS

http://www.europeanaidsclicalsociety.org/Guidelines/G2_p52.htm

Prison population

A trial of vitamin D may be suggested if the patient is symptomatic for vitamin D deficiency

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Appendix 1

ADVICE ON VITAMIN D SUPPLEMENTS IN PREGNANCY, BREASTFEEDING AND FOR CHILDREN UNDER 5

Recommendations

The Chief Medical Officers recently issued an alert regarding patient groups that are at risk of vitamin D deficiency. The alert recommended that:

- All pregnant and breastfeeding women should take a daily supplement containing 10 micrograms of vitamin D, to ensure the mother's requirements for vitamin D are met and to build adequate fetal stores for early infancy.
- All infants and young children aged 6 months to 5 years should take a daily supplement containing vitamin D in the form of vitamin drops, to help them meet the requirement set for this age group of 7 – 8.5 micrograms of vitamin D per day. (Please note that those infants who are formula fed will not need vitamin drops until they are receiving less than 500 mls infant formula per day).

The flow chart on in appendix 1 summarises the different situations when supplements may or may not be necessary for infants and children:

Healthy start vitamins

Women qualify for free vitamins from the Government's "Healthy Start" scheme the vitamins from the 10th week of pregnancy **or** if they have a child under four years old, **and** if she or her family receive:

- Income Support, **or**
- Income-based Jobseeker's Allowance, **or**
- Income-related Employment and Support Allowance, **or**
- Child Tax Credit (but not Working Tax Credit unless the family is receiving Working Tax Credit run-on only) and has an annual family income of £16,190 or less.

Women who are under 18 and pregnant also qualify, even if they do not get any of the above benefits or tax credits. Further information can be found on the Healthy Start website at www.healthystart.nhs.uk.

Those mothers who are not entitled to healthy start vitamins should be advised to buy an over the counter multivitamin preparation with similar vitamin and mineral composition to the Healthy Start vitamins. Most multi vitamin and mineral preparation recommended for pregnancy and breast feeding will contain 10 micrograms of Vitamin D (the amount recommended in the CMO alert).

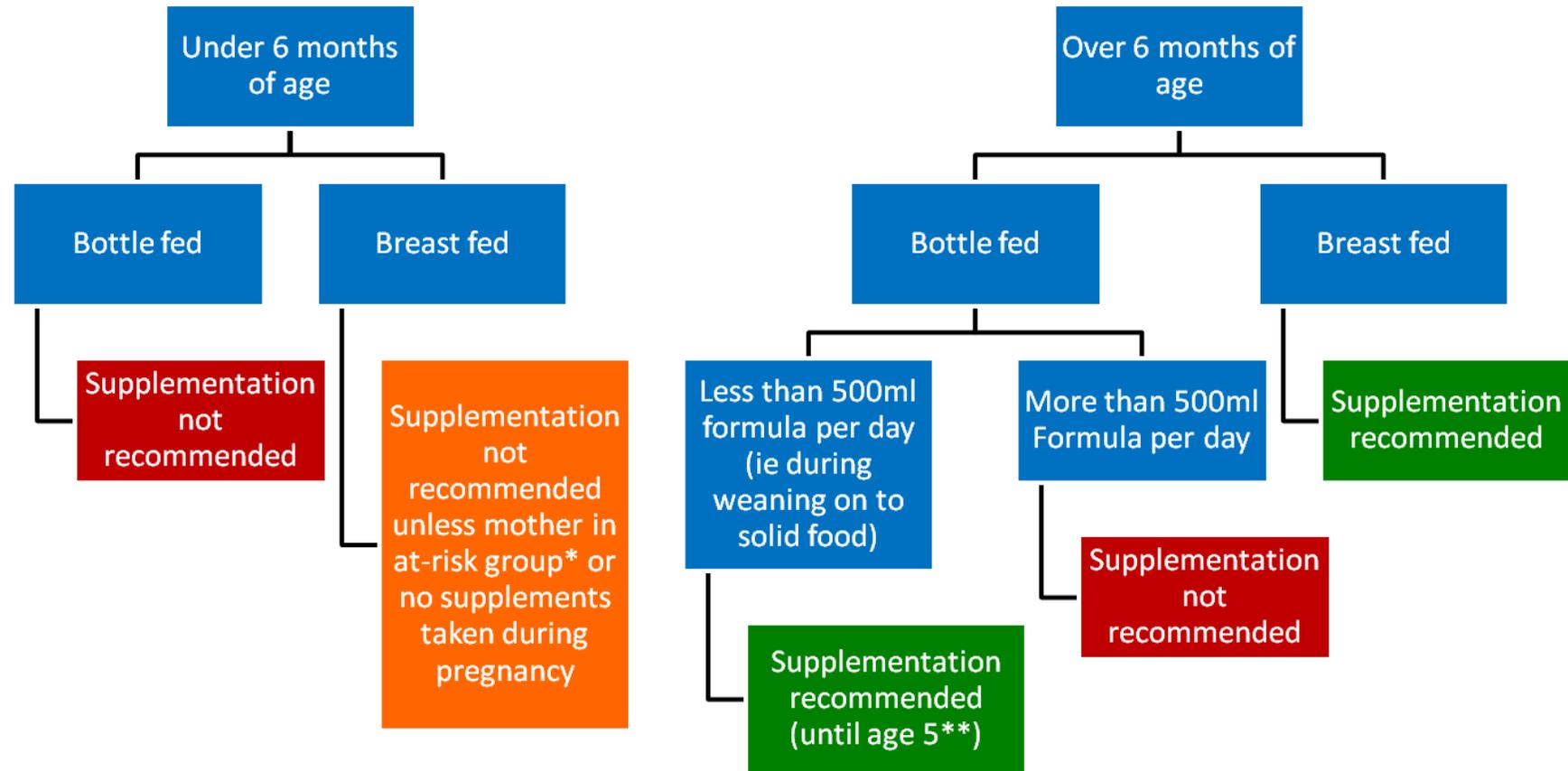
Abidec ® drops for infants aged 0-12 months or Abidec ® Liquid for children aged 1-5 years are suitable alternatives to the Healthy Start vitamins* for children (however other suitable preparations are also available). **NB**** Healthy start vitamins are only available from 6 months to 4years. From 4 to 5 years an alternative vitamin and mineral supplement will have to be bought as above.

Safe intake levels of Vitamin A & vitamin D

Both vitamin A and D are fat soluble so there is risk of accumulation if the intake of either vitamin is too large. Appendix 2 shows a the amounts of vitamin D and vitamin A found in 500ml of range of different infant milk formulas. The information shows that as recommended in appendix 1, it is safe for infants to take Healthy Start supplements if the intake of the listed formulas is less than 500ml.

Intake of more than 500ml formula will mean that sufficient vitamin A & D will be provided from the formula alone, and supplementation is not required.

VITAMIN D SUPPLEMENTATION IN CHILDREN



At risk groups*

- Babies of mothers with darker skin types, particularly when living in high latitude areas such as the UK where winter sun produces little or no access to vitamin D
- Babies of mothers who wear concealing clothes, are housebound, or use sun creams critically reducing exposure to sunlight.
- Babies of obese mothers (BMI >30)

Breast fed babies whose mothers are considered to be in high risk groups (as above) or whose mothers have not taken vitamin supplementation during pregnancy are particularly at risk of vitamin D deficiency. In this instance the breast fed baby should be given vitamin D supplements after 1 month of age, in addition to the mother taking the recommended supplementation