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VITAMIN

**BRIEFING**

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Frequently asked questions  
about Vitamin D in childhood

## Where do we get Vitamin D?

Sunshine is the main natural source of our Vitamin D. Less than 10% of Vitamin D is from our diet. In the UK, Vitamin D can only be made in our skin by the action of sunlight during the summer-time, and only during the middle of the day when the sun is high in the sky. Vitamin D is found in a few natural foods such as oily fish (sardines, salmon, mackerel, pilchards and tuna). A few foods are fortified with small amounts of Vitamin D (infant formula milk, margarine and some breakfast cereals). The main source of Vitamin D for much of our population these days is supplements, either prescribed or over-the-counter from pharmacies, health food shops and the internet.

## What is Vitamin D?

Vitamin D is an essential nutrient that we need for healthy bones, and to control the amount of calcium in the blood. There is recent evidence that it has a role in preventing many other important diseases.

## What is Vitamin D deficiency?

There is scientific debate about what is the optimal Vitamin D blood level. Vitamin D deficiency historically is defined as a blood level of 25hydroxyVitaminD below 25nmol/L. Current practice is to define deficiency as less than 50nmol/L based on robust evidence of benefits to bone health when levels are more than 50nmol/L. However, recent scientific evidence is emerging that the optimal level for general health may be above 75nmol/L.

## Why is Vitamin D important?

Vitamin D deficiency is an increasing problem, especially for dark-skinned people. Vitamin D deficiency causes rickets and poor growth in children, seizures in infants and adolescents, cardiomyopathy in infants, and osteomalacia in adults. It can also cause muscle weakness at any age.

**There is recent evidence that Vitamin D may prevent some cancers, diabetes, TB, rheumatoid arthritis, obesity and multiple sclerosis in adults.**



## What makes us more likely to get Vitamin D deficiency?

### 1. Increased need:

- a) Pregnant and breastfeeding women
- b) Infants
- c) Twin and multiple pregnancies
- d) Adolescents

### 2. Reduced sun exposure:

- a) Northern latitude – especially above 50 degrees latitude
- b) Season – low levels are common in winter and spring
- c) Asian and Afro-Caribbean people – dark-skinned people need more sunshine to make Vitamin D
- d) Wearing concealing clothing
- e) Immobility – especially those with chronic diseases
- f) Excessive use of sun block – most block out UVB more than UVA (although it is UVA which is the main cause of skin cancer)

### 3. Diet (but remember sunshine is more important – less than 10% of Vitamin D is from diet):

- a) Vegan, ingestion of phytates (present in chapatis)
- b) Prolonged breastfeeding – breast milk does not contain enough Vitamin D to maintain levels in a baby even if the mother has sufficient Vitamin D
- c) Exclusion diets – e.g. cows milk allergy
- d) Malabsorption – e.g. Coeliac disease, Crohn's disease.
- e) Liver disease – (impaired 25-hydroxylation)
- f) Renal disease – (impaired 1-hydroxylation)
- g) Some drugs – e.g. Anticonvulsants, Anti-TB drugs



## Assessing the patient

### Characteristics

Healthy

### Management

No investigations, lifestyle advice and consider prevention

Risk factors, no symptoms

Lifestyle advice and consider prevention

Risk factors AND symptoms or signs

Lifestyle advice, blood tests, treatment and long-term prevention

## Symptoms and signs in children

Infants

Seizures, tetany and cardiomyopathy

Children

Aches and pains, bowed legs, knock knees, poor growth, muscle weakness and myopathy causing delayed walking

Adolescents

Aches and pains, muscle weakness, seizures and tetany

## Blood tests

25hydroxyVitaminD is the standard blood test, and is an excellent marker of body stores. People with risk factors and symptoms of hypocalcaemia and D deficiency should have a check of their blood level. The blood test requires about 5ml of serum and does not need to be transported to the laboratory urgently. The cost of this blood test is approximately £20 - £50. Basic bone biochemistry (calcium, phosphate and alkaline phosphatase) is often normal despite significant Vitamin D deficiency. High alkaline phosphatase implies rickets. Blood levels of 25hydroxyVitaminD are measured in nmol/L in this country, but in ng/ml in the USA. 50nmol/L = 20ng/ml.

## Parathyroid hormone (PTH)

PTH is produced in glands in our neck when the parathyroid calcium-sensing receptors detect a low level of blood calcium. PTH can be measured on the same specimen as Vitamin D, but is more expensive and not usually necessary. In children a high level of PTH is usually due to Vitamin D deficiency. Other causes (parathyroid tumours or renal failure) are very rare.



## Treatment of relatives

If a patient is diagnosed with D deficiency the family should be screened or treated. At least screening by history taking with prevention advice should take place. Investigation of other family members by blood testing may be indicated. Alternatively, prescribe a treatment dose of Vitamin D to those sharing the same sun exposure and diet.

## Prevention

NICE recommends supplements for pregnant or breastfeeding women and their children from six months to four years: [www.nice.org.uk/nicemedia/pdf/PH011guidance.pdf](http://www.nice.org.uk/nicemedia/pdf/PH011guidance.pdf).

The Chief Medical Officer recommends prevention for children up to five years of age: [www.dh.gov.uk/assetRoot/04/11/56/64/04115664.pdf](http://www.dh.gov.uk/assetRoot/04/11/56/64/04115664.pdf). The government's "Healthy Start" programme aims to prevent deficiency by providing vitamins free to people on income support, and at low cost to all others: [www.healthystart.nhs.uk](http://www.healthystart.nhs.uk). Currently "Healthy Start" vitamins appear to be in short supply.

Liquid Vitamin D for deficient children was previously in short supply, but is now manufactured at Northwick Park Hospital - Colecalciferol 3,000 units per ml. Capsules of 20,000 and 100,000 units are now available as "specials". Combined Calcium and Vitamin D tablets usually contain only 200 or 400 units of Vitamin D which is a relatively low dose. Unless the patient needs calcium supplements it is often better, and cheaper, to supply a pure Vitamin D product.





## Our usual dosage recommendation

Category	Vitamin D dose and frequency	Duration	Examples of preparations
0-6 months	200 IU daily		Abidec, Dalivit, Baby Ddrops and 'Healthy Start' Vitamins
6 months-4 years	400 IU daily		
Adolescents	400 IU-1,000 IU daily		Over-the-counter preparations e.g.: Boots high strength Vitamin D, Ddrops, Holland & Barrett Vitamin D, SunVit-D3 and Vitabiotics

Note: A dose of 10 micrograms of Vitamin D is 400 units.

Patients with risk factors for D deficiency may need to take life-long supplements of 400 units daily. The same effect can be obtained by taking 3,000 units once a week because Vitamin D has a half-life of several weeks.

Some patients require a higher maintenance dose of 1,000 units daily. In every case, thought needs to be given to compliance - vitamin supplements are usually not taken as prescribed.



## Treatment of deficiency with symptoms

Category	Vitamin D dose and frequency	Duration
0-6 months	3,000 IU daily	1 month
6 months-4 years	6,000 IU daily	1 month
Adolescents	20,000 IU daily	2 weeks

## Monthly treatment, if compliance not assured

Category	Vitamin D dose and frequency	Duration
0-6 months	30,000 IU monthly	2 months
6 months-4 years	60,000 IU monthly	2 months
Adolescents	100,000 IU monthly	2 months

Colecalciferol liquid as well as the capsules of 20,000 units and 100,000 Units are approved by the MHRA as 'specials'.

Whichever regimen is prescribed, review the patient after one month. Ask to see all vitamin and drug bottles at the review. Consider repeating a blood test at the review if it is not clear that sufficient vitamin has been taken. All patients treated for deficiency should continue prevention.

Activated Vitamin D preparations such as Calcitriol or Alfacalcidol are not recommended for the treatment of simple Vitamin D deficiency. They should only be used for the treatment of complex cases advised by specialists. They are ineffective in treating simple Vitamin D deficiency and can cause severe adverse effects, particularly hypercalcaemia.

## Prevention for babies and children

Preparation	Contents	Dosage	Comments	Cost
<b>Healthy Start Vitamin Drops</b>	5 drops contain: Vit A: 700iu Vit D: 300iu Ascorbic acid 20mg	Child: 1 month-1 year 5 drops daily	Visit <a href="http://www.healthystart.nhs.uk">www.healthystart.nhs.uk</a> Suitable for vegetarians Free from milk, egg, gluten, soya and peanut residues	Available through Healthy Start Scheme for pregnant women and their babies up to one year

Supplies shortage  
Available through Healthy Start Scheme free to children under four years

Preparation	Contents	Dosage	Comments	Cost
<b>Abidec Multivitamin Drops</b>	0.6ml contains: Vit A: 1333iu Vit B group Vit C: 40mg Vit D: 400iu ergocalciferol	Birth to 6 months: 200iu (0.3ml) daily	Contains sucrose and peanut oil Avoid in soya allergy	

Preparation	Contents	Dosage	Comments	Cost
<b>Dalivit Multivitamin Oral Drops</b>	0.6ml contains: Vit A: 5000iu Vit B group Vit C: 50mg Vit D: 400iu ergocalciferol	6 weeks to 1 year: 7 drops (0.3ml) daily	Not licensed for children under 6 weeks Suitable for vegans and vegetarians No additives or colourants No peanut oil	

Preparation	Contents	Dosage	Comments	Cost
<b>Baby Ddrops</b>	1 drop contains 400IU Vit D	0-6 months, specifically designed for breastfed babies	No taste, no odour, sugar-free, wheat-free, soya-free, gluten-free	£13.60 for three months supply

## Prevention for adolescents

Preparation	Contents	Dosage	Comments	Cost
<b>Holland and Barrett SunVite D3</b>	100 caplets: 1 caplet is 25 ug (1,000 units)	1-2 caplets daily	Not intended for use by persons under the age of 18 No milk, lactose, gluten, wheat, yeast, fish, porcine Contains bovine gelatine and sucrose	Approximately £7.69

Preparation	Contents	Dosage	Comments	Cost
<b>Sunvit D3</b>	180 tablets 1 tablet is 25 ug (1,000 units)		Internet only Tasteless tablet, yeast-free, soya-free, gluten-free and dairy-free	Approximately £8.16 (+packaging and posting)

Preparation	Contents	Dosage	Comments	Cost
<b>Ddrops</b>	180 drops 1 drop contains 1,000 units Vit D	1 drop daily	No taste, no odour, sugar-free, wheat-free, soya-free, gluten-free Vegan product is available	£10.10 for 6 months supply



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