

Guidelines for the Management of Vitamin D Deficiency in Primary Care

Children and Young People – January 2019

Table of Contents

Purpose and Scope 2

Sources of vitamin D 2

 Sunlight (this section should be read in conjunction with NICE guidelines 34: Sunlight exposure risks and benefits)..... 2

 Diet..... 3

 Supplements..... 3

General Lifestyle Advice 3

Groups at risk of Vitamin D deficiency 4

Other risk factors for Vitamin D deficiency 4

Symptoms of Vitamin D deficiency 5

Testing for Vitamin D deficiency 5

Recommended Investigations 6

 Radiological assessment 6

 Initial blood tests 6

 Additional blood tests 6

Classification of vitamin D status 6

Indications for specialist referral 6

Treatment of vitamin D deficiency 7

 Prescribing considerations..... 7

 Calcium supplementation 8

 Product selection and dosing..... 9

Monitoring requirements during vitamin D treatment 10

Vitamin D toxicity 10

Contraindications to vitamin D supplementation 10

Cautions and drug interactions 10

Appendix 1: Flowchart: Investigation and Treatment of Vitamin D deficiency and insufficiency for Children and Young people 11

Appendix 2: Licensed Vitamin D preparations of colecalciferol products available (January 2019) and their suitability in certain diets (Children) 12

Appendix 3: Examples of OTC (Over the Counter) Vitamin D preparations available for children 14

Appendix 4 Healthy Start Vitamins and Drops Collection Points within Croydon 15

References 17

Purpose and Scope

This guideline is intended to support primary care and secondary care (Croydon Health Services, CUH) clinicians with the prevention, identification and management of vitamin D deficiency within children (0-18 years). It incorporates recommendations from the Royal College of Paediatrics & Child Health Guide for Vitamin D in Childhood and National Osteoporosis Society Vitamin D and Bone Health: A Practical Clinical Guideline for Management in Children and Young People: June 2015.

This guideline relates only to the management of vitamin D deficiency to promote optimal bone health and **does not** address the use of vitamin D for other potential indications such as auto-immune disease, cancer, mental health problems and cardiovascular disease.

This guideline does not address the management of vitamin D deficiency in children who are under the care of a paediatrician, children who have severe or end-stage chronic kidney disease, severe liver disease, malabsorption syndromes, unexplained bone pain, unusual fractures and other evidence of metabolic bone disorders. Specialist advice should be sought for the management of such children.

Sources of vitamin D

The sources of vitamin D are diet and sunlight exposure, with sunlight being a major source in most people. Approximately 80-90% of human vitamin D supply is manufactured in skin under the stimulus of solar ultraviolet B (UVB) light, the other 10-20% comes from the diet.

Sunlight (this section should be read in conjunction with [NICE guidelines 34: Sunlight exposure risks and benefits](#))

Environmental and personal factors greatly affect vitamin D production in the skin, making it difficult to recommend a one-size-fits-all level of exposure for the general population.

In the UK, sunlight is strongest between 11am and 3pm between March/early April and the end of September. Between 11am and 3pm most people can make sufficient vitamin D by going out for short periods and leaving areas of skin uncovered, such as forearms, hands or lower legs. Longer periods may be needed for those with darker skin.

It should be advised that skin that is not usually exposed to sunlight (for example the back, abdomen and shoulders) is particularly likely to burn, so extra care is needed.

Many young people will have experienced sunburn. They can use this experience to know what their skin looks like normally, how it reacts to sunlight, how long they can be exposed without risking sunburn, and how to protect their skin accordingly.

Before 11am and after 3pm it takes longer to synthesise sufficient vitamin D, however the risk of sunburn is less.

Exposure to sunlight through windows is insufficient because glass blocks UVB light which is required for vitamin D synthesis.

In the UK, from October to March, there is no ambient UVB sunlight of appropriate wavelength to generate skin synthesis of vitamin D. During this time the population relies on both body stores from sun exposure in the summer and dietary sources to maintain vitamin D status.

Diet

Vitamin D2 is found in foods of non-animal origin (particularly mushrooms) and vitamin D3 in foods such as fatty fish, fish liver oil and egg yolk.

Food sources which contain greater than 200 units (5micrograms) of vitamin D per portion include:

- 2 teaspoons of cod liver oil (also contains vitamin A which can be harmful in high doses)
- 70g sardines
- 100g tinned salmon, pilchards or tuna
- 110g of cooked mackerel or herring
- 130g cooked kipper

Small amounts of vitamin D are provided by egg yolk, red meat and fortified foods, such as formula milks for infants and toddlers (plain cow's milk is not fortified in the UK), some breakfast cereals, fat spreads (margarine) and some yogurts.

Consumption of food sources alone, in the absence of skin synthesis, will not provide optimal vitamin D status.

Supplements

Following the review by the Scientific Advisory Committee on Nutrition (SACN) on the evidence of vitamin D and health, Public Health England (PHE) have advised that to protect bone and muscle health, everyone (children from the age of 1 years) needs vitamin D equivalent to an average daily intake of 400 units (10 micrograms).

In the UK, during spring and summer, the majority of the population will get enough vitamin D through sunlight on the skin and a healthy balanced diet, however during autumn and winter; everyone will need to rely on dietary sources of vitamin D. Since it is difficult for people to meet the 400 units (10 micrograms) recommendation from consuming foods naturally containing or fortified with vitamin D, **PHE advise that everyone (children from the age of 1 years) should consider taking a daily supplement containing 400 units (10 micrograms) of vitamin D during the autumn and winter months (i.e. between October to March).**

Those groups at high risk of vitamin D deficiency (see Table 1 below) should consider taking a daily supplement containing 400 units (10 micrograms) of vitamin D throughout the entire year.

In line with NHS England's guidance on conditions for which over the counter items should not be routinely prescribed, South West London CCGs do not support the routine prescribing of vitamin D (colecalciferol, ergocalciferol) for maintenance or prophylaxis of vitamin D insufficiency. This includes babies and children. For more information, see the South West London Position statement on prescribing of vitamin D: <https://www.swlmcg.nhs.uk/Policies/Position%20Statements/SWL%20Position%20statement%20vitamin%20D%20FINAL%20V2%20August%202018.pdf>

General Lifestyle Advice

Appropriate lifestyle advice which encourages, 'enjoying the sun safely whilst taking care not to burn' (**please note: exposure to sunlight through windows is insufficient because glass blocks UVB light**), adequate dietary intake (including adequate calcium intake (see page 7)) and daily vitamin D supplementation where necessary, should be provided to all patients.

Groups at risk of Vitamin D deficiency

Public Health England recommends vitamin D supplementation in all children from birth to 4 years of age in order to prevent Vitamin D deficiency, as per Table 1.

Table 1: Public Health England Recommendations on Vitamin D supplementation in the UK (Children)

Groups at risk of vitamin D deficiency
Breastfed infants from birth to 1 year of age*
Recommendation: Advise purchase of over the counter (OTC)** supplements containing 340-400 units (8.5 - 10 micrograms /per day)*
Children aged 1 to 4 years of age
Recommendation: Advise purchase of over the counter (OTC)** supplements containing 400 units (10 micrograms /per day)*

*Infants who are fed infant formula will not need to be given vitamin D supplementation until they are receiving less than 500ml of infant formula a day, as these products are fortified with vitamin D.

**Children aged from four weeks old until their fourth birthday may be eligible to obtain vitamins free of charge as part of the Healthy Start Scheme. Further information on the eligibility criteria can be found on the Healthy Start website at www.healthystart.nhs.uk.

At the time this guideline was finalised, existing UK supplies of Healthy Start vitamin drops contain 7.5 micrograms (300 units) of vitamin D and are licensed for infants over 4 weeks old. Clinicians should note that this formulation is not fully compliant with the dose set out within the current Public Health England recommendations. However, NHS BSA have confirmed that a revised formulation of Healthy Start vitamin drops that is fully compliant with the recommended 400 units (10 micrograms of vitamin D) per dose is anticipated to be in the supply chain by July 2019.

Parents/carers of children who are not eligible for Healthy Start, can purchase Healthy Start vitamin drops from some community pharmacies or be advised to buy an over the counter multivitamin preparation with similar vitamin and mineral composition to the Healthy Start vitamins, which are available at most pharmacies and larger supermarkets.

Care should be taken with multivitamin preparations as Vitamin A toxicity is a concern.

Other risk factors for Vitamin D deficiency

- Malabsorption conditions (Crohn's disease, coeliac disease, short bowel syndrome, cystic fibrosis)
- Vegan or vegetarian diets or generally poor diets
- Pigmented skin (includes people of African, African-Caribbean and South Asian family origin). Limited sun-exposure (those who cover their skin for cultural reasons or health reasons e.g. those with skin photosensitivity or immobile/disabled patients)
- Obesity (BMI >98th BMI for age centile)
- Chronic liver or renal disease
- Medications that can increase metabolism or reduce absorption of vitamin D (e.g. carbamazepine, phenytoin, primidone, barbiturates, oral glucocorticoids (i.e. for 3 months or longer), rifampicin, colestyramine, colestipol, orlistat and some antiretrovirals)
- Family members with proven vitamin D deficiency.

Symptoms of Vitamin D deficiency

Symptoms of vitamin D deficiency are vague and it can be difficult to ascertain whether a low vitamin D is causal or a surrogate marker. **Symptoms that could be attributed to vitamin D deficiency (especially if patients are in high risk groups) include:**

Infants	<ul style="list-style-type: none">• Seizures• Tetany• Cardiomyopathy
Children	<ul style="list-style-type: none">• Aches and pains (long standing of more than 3 months)• Myopathy causing delayed walking• Rickets with bowed legs – wide range of related skeletal defects, swelling of costochondral junctions,• Knock knees• Poor growth and muscle weakness• Fractures following minor trauma
Adolescents	<ul style="list-style-type: none">• Aches and pains (long standing of more than 3 months)• Muscle weakness• Bone changes of rickets or osteomalacia• Fractures following minor trauma
Abnormal Investigations	<ul style="list-style-type: none">• Low serum calcium or phosphate, high alkaline phosphatase (greater than the local age appropriate reference range)• Radiographs – showing osteopenia, rickets or pathological fractures revealed by radiographs

Testing for Vitamin D deficiency

Routine vitamin D testing is not recommended to screen the normal population for deficiency. Vitamin D testing should be prioritised to those where the outcome will alter clinical management

It is not recommended to test vitamin D levels in patients at high risk of vitamin D deficiency, unless they show symptoms of deficiency. Efforts should be focused on giving appropriate lifestyle advice and encouraging daily supplementation of vitamin D (see page 3).

Vitamin D testing should be considered in the following:

- **Patients with disease where outcomes may be improved with vitamin D treatment**
 - Confirmed rickets
- **Patients with signs or symptoms that could be attributed to vitamin D deficiency (especially if patients are in high risk groups)**
 - See “Symptoms of Vitamin D deficiency”
 - Other causes for symptoms should be excluded
- **Disorders impacting on vitamin D metabolism**
 - Malabsorption conditions (coeliac disease, cystic fibrosis).
 - Chronic renal or liver disease
- **Bone diseases in children where correction of vitamin D deficiency prior to treatment would be indicated (under specialist recommendation):**
 - Osteogenesis imperfecta
 - Idiopathic juvenile osteoporosis
 - Osteoporosis secondary to glucocorticoids, inflammatory disorders, immobility and other metabolic bone conditions.

Recommended Investigations

Radiological assessment (if rickets suspected): To provide a definitive diagnosis of rickets - a radiological assessment. The long bone may show cupping, splaying and fraying of the metaphysis.

Initial blood tests: Serum 25 vitamin D, calcium, phosphate, alkaline phosphatase (ALP) and parathyroid hormone (PTH) (if the patient has rickets or hypocalcaemia).

Additional blood tests: Renal function (to exclude renal failure), liver function tests (to exclude hepatic failure), full blood count (to identify possible vitamin deficiencies), thyroid function tests, inflammatory markers (ESR & C-reactive protein), malabsorption screen, rheumatoid and other autoimmune screening.

Classification of vitamin D status

Table 2 outlines the classification of vitamin D status and recommended management strategies. These are broadly in line with Royal College of Paediatrics & Child Health Guide for Vitamin D in Childhood and National Osteoporosis Society Vitamin D and Bone Health: A Practical Clinical Guideline for Management in Children and Young People: June 2015.

Table 2: Classification of vitamin D status, associated effects on bone health and management strategies

Serum vitamin D concentration	Vitamin D status	Management
<30 nmol/L	Deficient	Prescribed high-dose vitamin D followed by purchased over the counter (OTC) long term maintenance vitamin D supplementation PLUS lifestyle advice
30-50 nmol/L	Insufficient	Purchased over the counter (OTC) long term maintenance vitamin D supplementation PLUS lifestyle advice
>50 nmol/L* (Optimal vitamin D levels > 75 nmol/L)	Sufficient	Reassurance and lifestyle advice

*NB: Vitamin D toxicity is known to occur at serum 250HD values above 375nmol/L

Indications for specialist referral

- All patients under 2 years with symptoms of vitamin D deficiency
- Patients with skeletal deformities/short stature or orthopaedic abnormalities related to rickets
- Patients with symptomatic/asymptomatic hypocalcaemia
- Patients with contraindications to vitamin D supplementation: severe renal impairment (CKD stage 4 or eGFR < 30mL/minute/1.73 m²), hypercalcaemia or metastatic calcification, primary hyperparathyroidism, renal stones, severe hypercalciuria and nephrocalcinosis
- Patients developing hypercalcaemia following supplementation
- Failure to respond to treatment after 3 months
- Patients with suspicion of, or with, malabsorption conditions
- Patients with suspicion of, or with, liver disease or tuberculosis
- Patients taking medications that can increase the risk of vitamin D deficiency (e.g. certain antiepileptics or oral corticosteroids) or risk of vitamin D toxicity (e.g. thiazide diuretics, digoxin)

Treatment of vitamin D deficiency

Prescribing considerations

Key aims for treating vitamin D deficiency are to ensure correction of vitamin D deficiency (serum vitamin D ideally $>50\text{nmol/L}$), reverse the clinical consequences of vitamin D deficiency in a timely manner and to avoid toxicity.

The BNF for Children (BNFC) and National Osteoporosis Society Vitamin D and Bone Health: A Practical Clinical Guideline for Management in Children and Young People (NOS) recommends the following daily doses (see Table 3) for treatment of vitamin D deficiency over a period of **8-12 weeks**. Whereas the Royal College of Paediatric & Child Health (RCPCH) Guide for Vitamin D in Childhood recommends the same daily doses over a period of **4-8 weeks**.

RCPCH Vitamin D in Childhood guidelines have been used to establish a cumulative treatment dose of Vitamin D required for each age range. This is a more conservative cumulative treatment dose than the BNFC and NOS but will better enable use of licensed colecalciferol products at licensed doses, where possible, especially given that the cumulative treatment dose of currently licensed preparations is significantly lower than that recommended in the BNFC and NOS.

Table 3: Recommended doses for the treatment of vitamin D deficiency

Age	Daily treatment dose (Based on BNFC, NOS, and RCPCH)	Cumulative Vitamin D treatment dose (Based on RCPCH)
Up to 6 months	1,000 – 3,000 units daily	28,000 – 168,000 units
6 months up to 12 years	6,000 units daily	168,000 – 336,000 units
12-18 years	10,000 units daily	280,000 – 560,000 units

Oral vitamin D is the preparation of choice. Whilst intramuscular administration results in 100% adherence, it has an unpredictable bioavailability, slower onset of action and is associated with the additional administration burden in comparison to oral preparation.

Prescribing of intramuscular vitamin D preparations should remain with the specialist, as this is usually reserved for those patients with compliance issues or malabsorption conditions.

Colecalciferol (vitamin D3) is considered the preferred form of vitamin D for treatment, as it has been reported to raise vitamin D levels more effectively than ergocalciferol (vitamin D2) and has a longer duration of action. A colecalciferol preparation should be prescribed unless this is unacceptable to the patient.

Colecalciferol (vitamin D3) is commercially synthesised from an animal source such as lanolin/wool fat from sheep's wool. If the animal is not harmed in the manufacture of the raw vitamin D3, the product could be considered suitable for vegetarians. It is advised that the source of vitamin D3 be discussed with vegans, to enable them to make an informed choice as to whether this is acceptable to them or not.

Ergocalciferol (vitamin D2) is derived from a common plant steroid, and could be used at equivalent doses (in a gelatine free product) for vegans who do not find it acceptable to take colecalciferol containing products.

The choice of preparation should be discussed for patients who have various dietary requirements (e.g. halal, kosher, vegan or vegetarian, soya allergies), so that an informed decision can be made.

There are many licensed preparations of colecalciferol available for high dose (and maintenance vitamin D supplementation, if appropriate) which can be prescribed to meet the needs of various dietary requirements (e.g. vegetarian, allergies), see Appendix 2. Therefore, it is expected that prescribing of unlicensed preparations, will only be undertaken in exceptional circumstances to meet the specific needs of an individual. If in doubt of the suitability of a preparation, contact the Medicines Optimisation Team for further advice.

Licensed preparations should be prescribed by BRAND, where possible to avoid potential for dispensing unlicensed preparations or preparations that do not meet the dietary requirements of specific patients.

It is recommended that where **high dose** vitamin D is prescribed, this is prescribed as **an acute prescription**, to avoid inadvertent repeated prescribing.

Alfacalcidol and calcitriol should not be used for the routine treatment of primary vitamin D deficiency, as unlike vitamin D, they carry a higher risk of toxicity and require long term monitoring.

Calcium supplementation

Many children with Vitamin D deficiency rickets have a poor dietary calcium intake. As their bones are growing, there is a greater risk of negative calcium balance. Therefore in children, consideration should always be given to the need for calcium supplementation.

Consideration should be given to the patient's dietary intake of calcium, possibly by using "calcium calculators" e.g. <http://www.cgem.ed.ac.uk/research/rheumatological/calcium-calculator/>

The recommended daily intake of calcium is:

Age	Recommended calcium intake
Younger than 12 months	525mg (13.1 mmol)
1-3 years	350mg (8.8 mmol).
4-6 years	450mg (11.3 mmol)
7-10 years	550mg (13.8 mmol)
11-18 years (boys)	1000mg (25.0 mmol)
11-18 years (girls)	800mg (20.0 mmol)

Many children with vitamin D deficiency will have a depleted calcium status and/or a poor calcium intake and may therefore benefit from advice about dietary calcium intake (see the British Dietetic Association (BDA) factsheet on [calcium](#) (available at www.bda.uk.com) for information on how the recommended daily calcium intake can be achieved).

In some cases calcium supplementation may be required over the period of Vitamin D treatment. The BNF for Children provides details of recommended calcium supplementation doses. Dosing also needs to consider dietary intake and the size of the child.

Product selection and dosing

Table 4: Preferred products and doses of licensed colecalciferol preparations for management of vitamin D deficiency and insufficiency in Children and Young people

Vitamin D status and level (nmol/L)	Age	Product	Dose and Frequency		
Deficient <30 nmol/L	Up to 6 months	Thorens 10,000 units/ml oral drops	2,000 units (10 drops) daily for 6 weeks followed by maintenance vitamin D supplementation		
	6 months up to 12 years		2,000 units (10 drops) daily for 12 weeks (NB: off license dosing frequency) followed by maintenance vitamin D supplementation		
	12 years up to 18 years	Tablets and capsules			
		Plenachol 20,000 unit capsules	20,000 units capsules once a week for 15 weeks (NB: off license dosing frequency) followed by maintenance vitamin D supplementation		
		Stexerol 25,000 unit tablets (can be swallowed whole or crushed)	25,000 units tablets once a week for 12 weeks (NB: off license dosing frequency) followed by maintenance vitamin D supplementation		
	1 month up to 18 years	Liquids: Prescribe for patients unable to swallow tablets and capsules			
		Thorens 25,000 units/2.5ml oral solution	25,000 units once a week for 12 weeks (NB: off license dosing frequency) followed by maintenance vitamin D supplementation		
Insufficient 30-50 nmol/L*	1 month up to 18 years	Advise purchase of OTC vitamin D supplements to provide 400 – 600 units daily (maintenance therapy) (see Appendix 3)*			
Maintenance Therapy	<p>After a treatment course with vitamin D, the following is recommended:</p> <ol style="list-style-type: none"> Lifestyle and dietary advice: <ul style="list-style-type: none"> Between March/early April to end of September short daily periods of sun exposure of skin (forearms, hands or lower legs), taking care not to burn. Dietary vitamin D can be acquired from oily fish, eggs and fortified cereals yogurts and margarine. Maintenance Therapy: (See SWL CCG position statement on the prescribing of vitamin D) <div style="border: 1px solid black; padding: 5px; display: inline-block;"> SWL CCG recommends maintenance therapy is purchased over the counter (OTC) in the first instance.* </div> 				
<p>*Prescriptions should only be considered for patients who have undergone two or more previous treatment courses and other special groups (patients who have medical conditions that may pre-dispose them to inadequate vitamin D levels and where clinical assessment of the patient indicates that continuous treatment is justified e.g. conditions resulting in intestinal malabsorption e.g. short bowel syndrome)</p> <p>Should it be necessary to prescribe maintenance therapy, the following options are recommended:</p>					
	1 - 6 months	Thorens 10,000 unit/ml oral drops	400 units (2 drops) – 600 units (3 drops) daily		
	6 months up to 12 years		400 units (2 drops) – 600 units (3 drops) daily		
	12-18 years	Tablets and capsules:			
		Plenachol 20,000 unit capsules	20,000 unit capsule once every 6 weeks		
		Stexerol 25,000 unit tablets	25,000 unit tablet once every 6 weeks		
	12-18 years	Liquids:			
		Thorens 10,000 units/ml oral drops	400 units (2 drops) – 600 units (3 drops) daily		
<p>3. Ensure calcium intake assessed, dietary advice provided and calcium supplementation prescribed where considered appropriate (see pages 7-8)</p>					

Monitoring requirements during vitamin D treatment

Adjusted serum calcium should be checked 1 month after completing high dose vitamin D treatment or after starting maintenance vitamin D supplementation (or more regularly e.g. every 1-2 weeks in the first month of treatment in patients receiving calcium supplements in addition to high dose vitamin D treatment), in case hyperparathyroidism has been unmasked or to detect hypercalcaemia/ determine how long calcium supplementation is needed.

Serum vitamin D levels should be repeated at the end of high dose vitamin D therapy.

Serum vitamin D levels will take 3-6 months to reach steady state after high dose vitamin D therapy. **Vitamin D levels should therefore be checked at least 3 months after treatment with high dose vitamin D.**

Patients who do not respond to treatment with high dose vitamin D may be considered for referral to secondary care.

Vitamin D toxicity

Vitamin D toxicity, defined as hypercalcaemia, is known to occur at serum vitamin D levels of above 375nmol/L. However, toxicity is rare and is unlikely to occur with recommended supplemental or therapeutic doses. Research has suggested vitamin D below 10,000 units/day is not usually associated with toxicity, whereas doses equal to or above 50,000 units/day for several weeks or months are frequently associated with toxicity. The Scientific Advisory Committee on Nutrition (SANC) has accepted the European Food Safety Authority recommendations of a safe upper limit of 1,000 units/day for infants up to 1 year old, 2,000units/day for children aged 1-10 years old and 4,000units/day for those older than 10 years old.

Early symptoms of toxicity will include symptoms of hypercalcaemia, such as thirst, polyuria, constipation, nausea and vomiting and weight loss. Toxicity can lead to renal failure if left untreated, therefore, if toxicity is suspected, vitamin D must be withdrawn and serum calcium and renal function checked urgently. In severe cases, patients may require emergency inpatient care with rehydration therapy.

Contraindications to vitamin D supplementation

Vitamin D is contraindicated in patients with severe renal impairment (CKD stage 4 or eGFR <30mL/minute/1.73 m²), hypercalcaemia or metastatic calcification. Relative contraindications include primary hyperparathyroidism, renal stones, severe hypercalciuria and nephrocalcinosis.

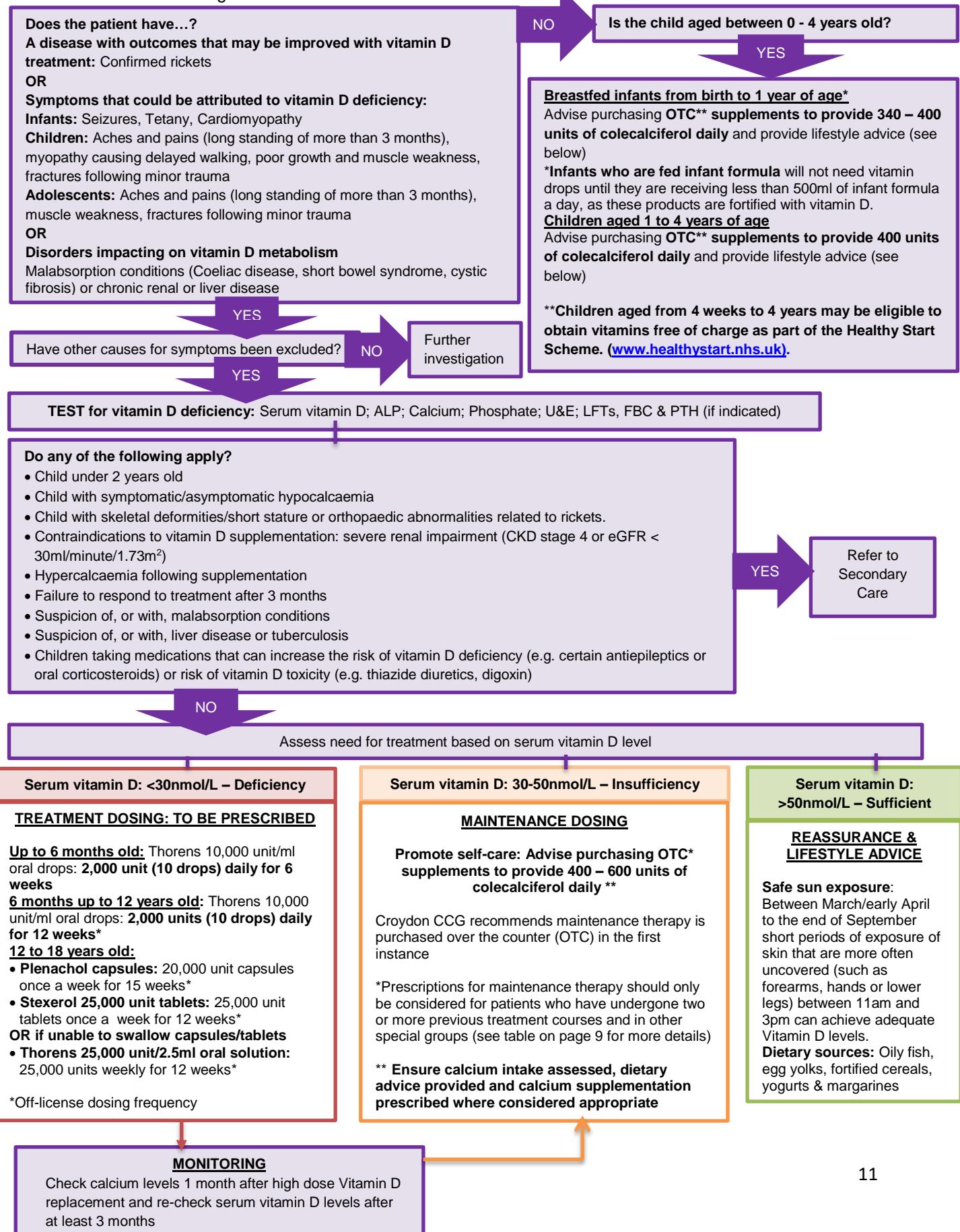
Cautions and drug interactions

This list is not exhaustive. Please refer to individual product Summary of Characteristics accessible via: <http://www.medicines.org.uk/emc/search> for further details.

- Effects of digoxin and other cardiac glycosides may be accentuated by vitamin D
- Risk of hypercalcaemia is increased in patients taking thiazide diuretics
- Concomitant treatment with carbamazepine, phenytoin, barbiturates, primidone, corticosteroids and some antiretroviral activation can decrease effect of vitamin D

Appendix 1: Flowchart: Investigation and Treatment of Vitamin D deficiency and insufficiency for Children and Young people

Please refer to full guidelines for further details.



Appendix 2: Licensed Vitamin D preparations of colecalciferol products available (January 2019) and their suitability in certain diets (Children)

Name and Form	Price Unit	Price for 12-18 year treatment course (300,000 units)	Suitability				Preparations contains			
			Halal	Kosher	Vegetarian	Vegan	Soya	Nut	Gelatine	Lactose
Colecalciferol 200 units										
Fultium-D3 2740 units/ml oral drops Dose: Please check SPC for the dose recommendations	£10.70 / 25ml	£42.80	Not halal certified	Not kosher certified	✓	See notes	✗	✓	✗	✗
Thorens 10,000 units/ml oral drops Dose: Please check SPC for the dose recommendations	£5.85 / 10ml	£17.55	✓	✓	✓	See notes	✗	✗	✗	✗
Colecalciferol 800 units										
Desunin 800 unit tablets* Dose: Please check SPC for the dose recommendations	£3.60 / 30 tablets	£45.00	✗	✗	✓	See notes	✗	✗	✗	See notes
Fultium-D3 800 unit capsules* Dose: Please check SPC for the dose recommendations	£3.60 / 30 capsules	£45.00	See notes	✓	✗	✗	✓	See notes	✓	✗
Colecalciferol 1,000 units										
Stexerol-D3 1,000 unit tablets* Dose: Please check SPC for the dose recommendations	£2.95 / 28 tablets	£31.60	✓	✓	See notes	See notes	See notes	See notes	✗	See notes
Colecalciferol 20,000 units										
Aviticol 20,000 unit capsules* Dose: Please check SPC for the dose recommendations	£29.00 / 30 capsules	£14.50	✗	✗	✗	✗	✗	See notes	✓	✗
Fultium-D3 20,000 unit capsules* Dose: Please check SPC for the dose recommendations	£17.04 / 15 capsules or £29.00 / 30 capsules	£14.50 - £17.04	See notes	✓	✗	✗	✓	✗	✓	✗
Plenachol 20,000 unit capsules* Dose: Please check SPC for the dose recommendations	£9.00 / 10 capsules	£13.50	✓	✓	See notes	See notes	See notes	See notes	See notes	See notes
Colecalciferol 25,000 units										
InVita D3 25,000 unit dose vials (SF oral solution) Dose: Please check SPC for the dose recommendations	£4.45 / 3 x 1ml	£17.80	Not halal certified	Not kosher certified	✓	See notes	✗	✗	✗	✗
Thorens 25,000 units/2.5ml oral solution Dose: Please check SPC for the dose recommendations	£1.55 / 2.5ml	£18.60	✓	✓	✓	See notes	✗	✗	✗	✗
Stexerol 25,000 unit tablets* Dose: Please check SPC for the dose recommendations	£17.00 / 12 tablets	£17.00	✓	✓	See notes	See notes	See notes	See notes	✗	See notes

*Only licensed in 12-18 year olds



preferred products

Additional notes on products to discuss with patients who have specific dietary requirements

Fultium-D3® (Oral drops, 800 unit & 20 000 unit capsules)
Drops: The active ingredient is derived from the wool of sheep, the sheep are alive when the wool is taken for the lanolin. The drops contains no peanuts or tree nuts.
Capsules: The gelatine used in the capsules is derived from beef bone and hide. Only the gelatine in the capsule is halal certified. The remaining constituents of the product have not been halal certified. The capsules are Kosher certified. Fultium-D3 capsules contains soybean oil. Note: Fultium-D3 800 unit capsules previously contained nuts (arachis oil) but are now reformulated with maize oil. Previous batches may still be in circulation so patients should consult their pharmacist when receiving them.
Thorens® (25 000 unit oral solution & 10,000 unit oral drops)
Thorens oral solution contains colecalciferol and refined olive oil. The colecalciferol is derived from cholesterol from wool grease (lanolin). Thorens is considered to be suitable for vegetarian patients but is not considered suitable for vegan patients. The colecalciferol in Thorens is halal and kosher-certified.
Thorens can be mixed with a small amount of children's food, yogurt, milk, cheese or other dairy products. The parents should be warned not to mix Thorens into a bottle of milk or container of soft foods in case the child does not consume the whole portion, and does not receive the full dose. The parents should ensure that their child takes the entire dose. In children who are not breast-feeding, the prescribed dose should be administered with a meal.
Thorens 10,000 unit oral drops comes with a dropper and has a shelf life of 6 months from first opening of bottle.
Desunin® (800 unit tablets)
The manufacturers have confirmed that the product is suitable for vegetarians. The source of colecalciferol (vitamin D3) is synthetically produced in a process that includes wool grease/lanolin from healthy live sheep. The manufacturer is not able to confirm whether the product is suitable for a Halal or Kosher diet. They cannot guarantee that the product is lactose free.
Stexerol-D3® (25,000 unit & 1,000 unit) tablets
The manufacturer states that it is suitable for vegetarians, however they have not sought any accreditation for vegetarian use. They have confirmed that the finished products do not contain excipients of animal origin; however, the active ingredient colecalciferol is derived from the lanolin contained in sheep's wool, and therefore may not be suitable for all vegans. They state that the products do not contain ingredients sourced from nuts or soya derivatives; however, they cannot guarantee that the products are manufactured in a nut or soya free environment. The product does not contain lactose, however, they are unable to guarantee that the product has not come into contact with lactose during the manufacturing process.
Aviticol® (20 000 unit capsules)
The capsules are free from peanuts and peanut derivatives. However, it cannot be guaranteed that they are free from other nuts. The product may have come into contact with nut ingredients during manufacture or packaging.
Plenachol® (20,000 unit capsules)
The manufacturers confirm that the product is suitable for vegetarians, is Halal and Kosher certified, does not contain lactose, soya or gelatine and is free from peanuts or peanut oil; although they cannot guarantee that the product does not come into contact with any of these during manufacture. They cannot guarantee that the product is free from all nuts during each stage of manufacture. The Vitamin D3 used in the production of Plenachol is synthetically derived from the wool grease from live sheep.
InVita D3® (25 000 unit oral solution)
It does not use any ingredients from slaughtered animals, it does not contain gelatine or porcine sourced materials and it is alcohol-free. The vitamin D3 is sourced from lanolin from live sheep's wool.
Other
The choice of product should be discussed with patients who have halal, kosher, vegan or vegetarian requirements, so that they may make an informed decision.

Appendix 3: Examples of OTC (Over the Counter) Vitamin D preparations available for children

Product	Dose	Age	Suitability
Healthy Start drops (10ml)	5 drops (300 unit colecalciferol) once daily.	Children aged up to the age of 4 years who are registered with a Croydon GP.	<ul style="list-style-type: none"> • Suitable for vegetarians • Free from milk, egg, gluten, soya and peanut residues • Shelf life of 10 months from manufacture • Available to purchase OTC or free to eligible patients: http://www.healthystart.nhs.uk
DaliVit (25ml)	0.6ml or 14 drops once daily (400 unit colecalciferol). (This dose is unlicensed in children less than 1 year of age.)	DaliVit multivitamin drops can be taken by children from 6 weeks.	<ul style="list-style-type: none"> • Does not contain peanut oil • Suitable for vegetarians and vegans • No added colours
Abidec (25ml)	0.6ml or 14 drops once daily (400 units colecalciferol) (This dose is unlicensed in children less than 1 year of age.)	From birth.	<ul style="list-style-type: none"> • Contains peanut oil • Once opened use within 4 weeks

Appendix 4: Healthy Start Vitamins and Drops Collection Points within Croydon

Note each collection point operates individual times where members of the public can exchange their Healthy Start vouchers, please ensure you use link below for full details of collection times.

Children Centres

- **Aerodrome Children's Centre**

Violet Lane (large red and cream building) Croydon, CR0 4HN
Tel: 020 8688 4975

- **Byron Children's Centre**

St. David's (Off Stoneyfield Road), Coulsdon, Surrey, CR5 2XE
Tel: 020 8763 6285

- **Woodside Children's Centre**

Morland Road, Croydon, CR0 6NF
Tel: 020 8655 5655

- **Kensington Avenue Children's Centre**

Buckingham Avenue, Thornton Heath, Surrey CR7 8AS -or- Hawthorn Avenue, Thornton Heath, Surrey, CR7 8BW
Tel: 020 8765 8128

- **Winterbourne Children's Centre**

Winterbourne Road, Thornton Heath, Surrey CR7 7QT
Tel: 020 8689 0978

- **Fairchildes Children's Centre**

Fairchildes Avenue, New Addington, Croydon, CR0 0JD
Tel: 01689 847136

- **Castle Hill Children's Centre**

Castle Hill Academy, Dunley Drive, New Addington, Croydon, CR0 0RJ

- **Purley Oaks Children's Centre**

Bynes Road, Purley, South Croydon, CR2 0PR
Tel: 020 8325 4517

- **Selhurst Children's Centre**

23 Dagnall Park Road, SE25 5PL
Tel: 020 8684 3777

- **Shirley Children's Centre**

34 Lilac Gardens, Shirley, CR0 8NR
Tel: 020 8777 2119

- **Woodlands Children's Centre**

Woodlands Children's Centre, Gilbert Scott Primary School, Farnborough Avenue, South Croydon, CR2 8HD
Tel: 020 8916 0543

Health Centres

- **Thornton Heath Health Centre**
61A Gillett Road, Thornton Heath CR7 8RL
Tel: 0208 664 1590
- **Purley War Memorial Hospital**
856 Brighton Road, Purley CR8 2YL
Tel: 020 8401 3000
- **Parkway Health Centre**
Parkway, Croydon, CR0 0JA
Tel: 01689 808810
- **Woodside Clinic**
3 Enmore Road
South Norwood, Croydon, London SE25 5NT
Tel: 020 8274 6900
- **Shirley Clinic**
135 Shirley Road, Croydon, CR0 7LR
Tel: 020 8714 2800

For more information on the full addresses, access points and opening times, see:

<https://www.croydon.gov.uk/sites/default/files/articles/downloads/Healthy%20Start%20Vitamins%20and%20Drops%20-%20collection%20sites.pdf>

References

1. The National Osteoporosis Society. Vitamin D and Bone Health: A practical clinical guideline for patient management. Available at <https://nos.org.uk/media/2073/vitamin-d-and-bone-health-adults.pdf> <Accessed 03.07.2018>
2. The National Osteoporosis Society. Vitamin D and Bone Health: A practical clinical guideline for management in Children and Young People. Available at <https://nos.org.uk/media/2074/vitamin-d-and-bone-health-children.pdf> <Accessed 03.07.2018>
3. National Institute for Health & Care Excellence. Vitamin D: supplement use in specific Vitamin D: supplement use in specific population groups PH Guidance 56; November 2014, last updated August 2017.
4. British Association of Dermatologists. Skin Cancer; Vitamin D. Available at <http://www.bad.org.uk/for-the-public/skin-cancer/vitamin-d> <Accessed 11.05.2015>
5. Pearce S, Cheetham D et al, Diagnosis and management of vitamin D deficiency. BMJ 2010; 340: b5664
6. Royal College of Paediatric and Child Health. Guide for Vitamin D in Childhood. October 2013.
7. Evelina London Paediatric Formulary. Monographs: Colecaciferol (Vitamin D3) <http://cms.ubgo.com/public/d2595446-ce3c-47ff-9dcc-63167d9f4b80/content/cb199664-cc54-4e93-a5b1-5f6bce8120a7> <Accessed 02.07.2018>
8. Public Health England. PHE publishes new advice on Vitamin D – Press Release. Available via: <https://www.gov.uk/government/news/phe-publishes-new-advice-on-vitamin-d> <Accessed 02.07.2018>
9. UKMI Q&A, Which vitamin D preparations are suitable for a vegetarian or vegan diet? Prepared by UK Medicines Information (UKMi) pharmacists for NHS healthcare professionals, Date prepared 2nd May 2017, Available via www.evidence.nhs.uk <Accessed 26.10.2018>
10. Committee on Toxicity. COT Statement on Vitamin D – lay summary. December 2014. Available via <http://cot.food.gov.uk/cotstatements/cotstatementsyrs/cotstatements2014/cot-statement-on-vitamin-d> <Accessed 29.05.2015>
11. UKMI Q&A What dose of vitamin D should be prescribed for the treatment of vitamin D deficiency? Prepared by UK Medicines Information (UKMi) pharmacists for NHS healthcare professionals, Date prepared 18th December 2017, Available via www.evidence.nhs.uk <Accessed 02.07.2018>
12. NHS South West London Croydon Borough Team. Guideline for the Management of Vitamin D Deficiency in Primary Care. June 2011.
13. Medicines and Healthcare products Regulatory Agency. Drug Safety Update: Antiepileptics Adverse Effects on bone. 1st April 2009. Available via <https://www.gov.uk/drug-safety-update/antiepileptics-adverse-effects-on-bone> <Accessed 08.08.2015>
14. Scientific Advisory Committee on Nutrition. Vitamin D and Health report. July 2016. Available via <https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report> <Accessed 02.07.2018>
15. National Institute for Health & Care Excellence. Sunlight exposure risks and benefits. NG 34; February 2016.
16. Lambeth CCG. A comparison of licensed Vitamin D preparations for Adults available in the UK. November 2015. Available via <http://www.lambethccg.nhs.uk/news-and-publications/meeting-papers/lambeth-borough-prescribing-committee/Lambeth%20Borough%20Prescribing%20Committee/Clinical%20Guidelines/Comparison%20table%20of%20licensed%20Vitamin%20D%20preparations%20for%20adults%20Nov%202015.pdf> <Accessed 21.04.2016>
17. Summary of Product Characteristics for Fultium-D3 Drops. <https://www.medicines.org.uk/emc/medicine/30438>
18. Drug Tariff Online. July 2018.
19. Summary of Product Characteristics for Desunin 800 IU tablets. Available via: <https://www.medicines.org.uk/emc/medicine/27007>
20. Summary of Product Characteristics for Fultium-D3 800IU capsules. Available via: <https://www.medicines.org.uk/emc/medicine/25664>
21. Summary of Product Characteristics for Plenachol 20 000IU capsules. Available via: <https://www.medicines.org.uk/emc/product/5048/smpc>
22. Summary of Product Characteristics for Aviticol 20 000IU capsules. Available via: <https://www.medicines.org.uk/emc/medicine/29660>

23. Summary of Product Characteristics for Fultium-D3 20 000IU capsules. Available via: <https://www.medicines.org.uk/emc/medicine/29815>
24. Summary of Product Characteristics for Thorens 10 000IU/ml oral solution. Available via: <https://www.medicines.org.uk/emc/product/7044>
25. Summary of Product Characteristics for Thorens 25 000IU/2.5ml oral solution. Available via: <https://www.medicines.org.uk/emc/product/7041>
26. Summary of Product Characteristics for InVita D3 25 000IU oral solution. Available via: <https://www.medicines.org.uk/emc/medicine/28998>
27. Summary of Product Characteristics for Stexerol 1,000 IU and 25 000IU tablets. Available via: <https://www.medicines.org.uk/emc/product/5062>
28. National Institute for Health & Care Excellence. Clinical Knowledge Summary; Vitamin D deficiency in Children. November 2016. Available via: <https://cks.nice.org.uk/vitamin-d-deficiency-in-children#!topicsummary> <Accessed 21.02.2017>
29. UNICEF UK. The Baby Friendly Initiative Position Statement on Vitamin D on Vitamin D supplementation for breastfed babies. Updated January 2017. Accessed via: <http://353ld710iigr2n4po7k4kgvv-wpengine.netdna-ssl.com/babyfriendly/wp-content/uploads/sites/2/2017/01/Vitamin-D-supplementation-for-breastfed-babies-Unicef-UK-Statement.pdf>. <Accessed 21.02.2017>
30. British National Formulary for Children. Available via: https://www.medicinescomplete.com/#/content/bnfc/_311399043 <Accessed 02.07.2018>
31. Healthy Start website. Available from: <https://www.healthystart.nhs.uk/for-health-professionals/vitamins/> <Accessed 03.07.2018>
32. Abidec Multivitamin Drops Patient Information Leaflet. Available from: <https://www.drugs.com/uk/abidec-multivitamin-drops-leaflet.html> <Accessed 03.07.2018>
33. Dalivit Drops. Available from: <http://www.dalivit.co.uk/> <Accessed 03.07.2018>
34. SWL CCG. Position statement on the prescribing of vitamin D (colecalciferol, ergocalciferol) for the treatment, maintenance and prophylaxis of vitamin D insufficiency or deficiency, August 2018. Available from: <https://www.swlmcg.nhs.uk/Policies/Position%20Statements/SWL%20Position%20statement%20vitamin%20D%20FINAL%20V2%20August%202018.pdf> <Accessed 29.10.2018>