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Guidelines for management of children with suspected vitamin D deficiency in primary care setting

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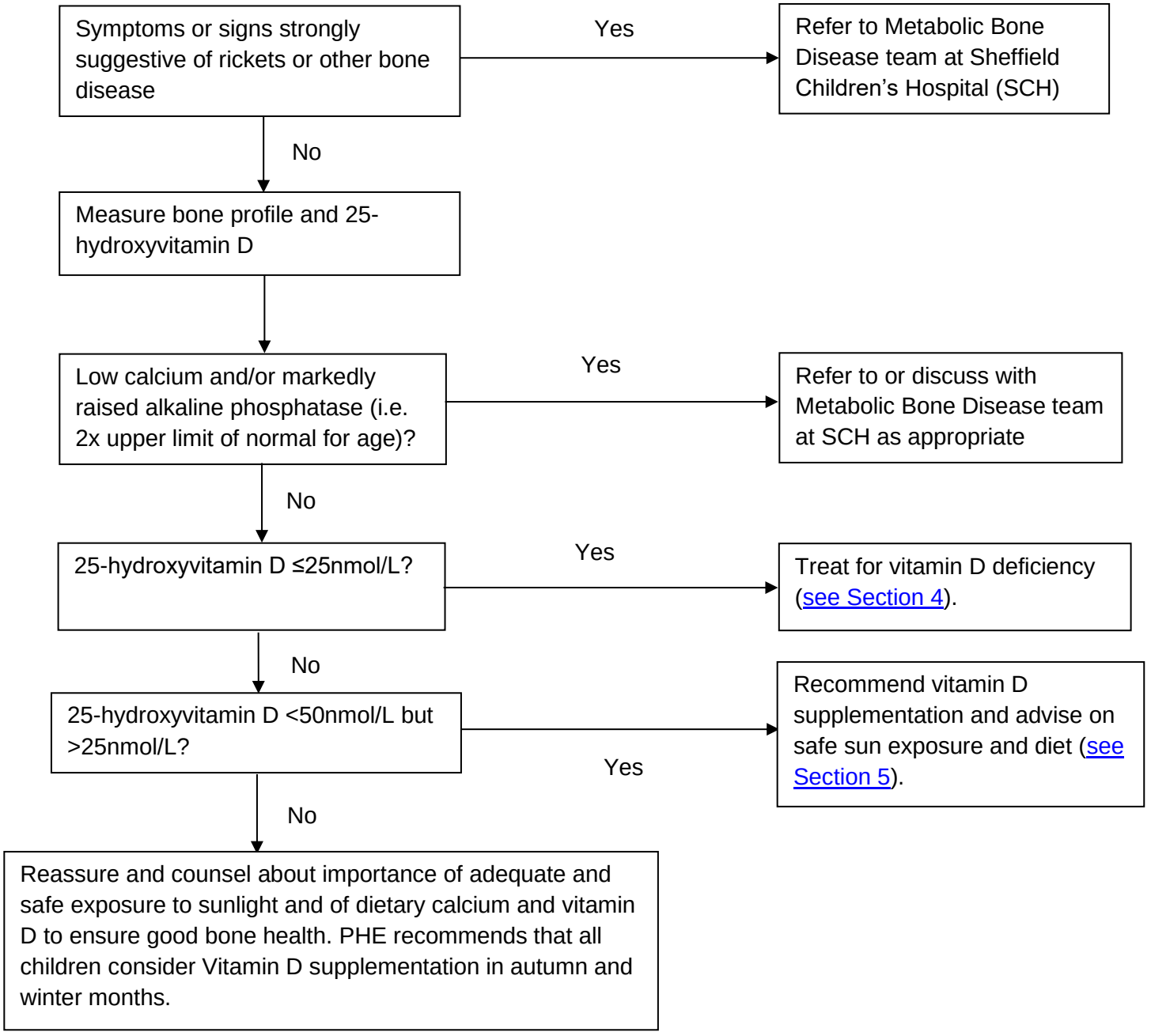
Summary flowchart for management of suspected vitamin D deficiency



Guidelines for management of children with suspected vitamin D deficiency in primary care setting

This guidance has been designed for use by Clinical Prescribers working in General Practice in Sheffield. The content is suitable for children up to the age of 16 years.
The Sheffield guidance on optimising Vitamin D for bone health (for adults) should be used for those over the age of 18 (NB – see below for advice for 16-18 year olds).

1. Vitamin D deficiency in children

Introduction

- Lack of vitamin D in children results in reduced absorption of calcium leading to skeletal deformities (rickets), disturbance in growth and hypocalcaemia in children.
- 85-90% of our daily vitamin D requirement is obtained by the action of UVB sunlight on the skin (only possible during April to September in the UK).
- 10-15% is obtained through diet (oily fish such as sardines, mackerel, or salmon, liver, egg yolks, fortified margarine and fortified breakfast cereals).

Public Health Recommendations

- Healthcare professionals should recommend and record supplement use in all children under 4 years and offer advice regarding obtaining vitamin D from safe sun exposure and diet.
- Public Health England (PHE) recommends daily vitamin D supplements in **all children** from birth (unless they are receiving over 500mls of infant formula milk daily) up to 4 years. The vitamin D requirement set for babies and infants up to the age of 1 is 8.5 - 10micrograms a day (340 - 400 units a day) and the recommendation for children over 1 is 10micrograms a day (400 units). In July 2016, Public Health England advised that all individuals should consider vitamin D supplementation, particularly during the autumn and winter months and throughout the year if they are at risk of vitamin D deficiency.

Obtaining Vitamin D Supplements in Sheffield

- Children from families who are eligible for the Government's Healthy Start scheme should be signposted to their local 'Family Centre' to receive their supplements.
- Patients not eligible for the scheme can buy Healthy Start children's drops from all Family Centres in Sheffield or suitable supplements from their local pharmacy. Healthy Start Vitamins can also be obtained from the Rowlands Pharmacy at Sheffield Children's Hospital.
- Sheffield CCG have secured funding to help encourage the right start in life for children living in Sheffield. This includes the issuing of free 'Healthy Start Vitamins for Women' for preconception women and pregnant women throughout the duration of pregnancy. It also includes a free two month supply for breastfeeding mums. Children will also receive

a free two month supply of 'Healthy Start Vitamins for Children' if they are breastfed or a free two month supply for bottle fed babies (once they are on less than 500mL of infant formula). Children who are deemed to be at risk of vitamin D deficiency by a healthcare professional will also receive free supplementation up until their fourth birthday. Further information about local provision can be obtained by families from a local health visitor or midwife.

- Improving the availability and uptake of vitamin D supplements for children in multi-ethnic populations is essential to the strategy of rickets prevention.

2. Identification of children at risk of vitamin D deficiency

Any child whom you suspect to be hypocalcaemic secondary to vitamin D deficiency should be urgently referred to secondary care (see below).

Risk factors for vitamin D deficiency include;

- Reduced exposure to sunlight due to routine covering of face and body, housebound, prolonged institutional care or excessive use of high factor sun block.
- Skin types with greater pigmentation i.e. darker skin types.
- Prolonged breastfeeding without vitamin D supplementation and / or delayed weaning.
- Maternal vitamin D deficiency.
- Diet insufficient in calcium or vitamin D.
- Chronic disease (renal, hepatic or malabsorption syndromes e.g. coeliac disease, cystic fibrosis).
- Rare genetic causes including vitamin D resistant rickets, and renal tubular acidosis.
- Medication that induces hepatic enzymes e.g. anticonvulsants.
- Obesity (vitamin D is fat soluble and as such obese patients may have increased requirements due to deposition in the adipose tissue).

Symptoms and signs that are associated with vitamin D deficiency include:

- Longstanding (>3 months) unexplained bony pains
- Muscular weakness e.g. difficulty climbing stairs, rising from chair, waddling gait, or delayed walking
- Dental deformities (delayed tooth formation, enamel hypoplasia)
- Symptoms and signs of rickets and hypocalcaemia (see below)

Rickets

The commonest cause of rickets is simple so called 'nutritional' deficiency from low sun exposure combined with inadequate dietary intake of vitamin D and/or calcium. Malabsorption syndromes such as coeliac disease and cystic fibrosis should be considered, especially where there is a poor response to vitamin D treatment. Certain metabolic, renal and liver diseases can also lead to rickets. Peak incidence of rickets is between 3 and 18 months of age. A deficient state may exist for months before there are any signs on physical examination. Children with rickets are often miserable and in pain.

Symptoms and signs of rickets:

- progressive or abnormal bowing of legs (genu varum) or knock knees (genu valgum)*
- anterior bowing of the femur
- wrist swelling (distal radius)
- prominent costochondral joints (“rickety rosary”)
- softening of the skull with frontal bossing, and delayed fontanelle closure
- spinal curvature
- bone pain

*Note that some varus or valgus “deformity” is normal in certain age groups.

Hypocalcaemia

Vitamin D deficiency can result in a low serum calcium concentration, particularly during periods of rapid growth e.g. infancy and adolescence. Symptoms of hypocalcaemia include irritability, tetany, and seizures. If you believe that such symptoms are present, the child needs to attend Sheffield Children’s Hospital straight away; either sent to the paediatric Emergency Department or referred to the Paediatric team to be seen on the Children Assessment Unit. If investigations find the symptoms are cause by low calcium, they will be referred to the Metabolic Bone team at SCH

3. When to test

If a patient presents with any of the above symptoms and /or there are other strong reasons to suspect vitamin D deficiency check vitamin D concentration along with a bone profile.

A blood sample can be taken and a request made for measurement of a bone profile (calcium, phosphate and alkaline phosphatase) and vitamin D (25-hydroxyvitamin D – (25-(OH)D)). The minimum sample required for these is 1.5ml blood to be sent in either a lithium heparin or plasma sample bottle. Patients with a low calcium and/or markedly raised alkaline phosphatase (i.e. 2x upper limit of what is normal for the age) should be referred to the Metabolic Bone Team, SCH.

Most commonly, there is an absence of clearly manifest metabolic or bone-related complications. This situation can be characterised as biochemical vitamin D deficiency.

Patients who are diagnosed and subsequently treated for vitamin D deficiency should have a repeat bone profile and 25-hydroxyvitamin D concentration performed shortly after completion of treatment (i.e. 2-3 months after commencement of treatment). They then may be reviewed annually for symptoms and compliance with supplements (see below). If asymptomatic and there is no reason to suspect deficiency further re-tests of vitamin D levels are **not** normally required.

4. Management of biochemical vitamin D deficiency (serum 25(OH)D ≤25nmol/l)

4.1 Initial treatment of vitamin D deficiency

During treatment for deficiency, discuss with Metabolic Bone Team, SCH at any stage if new symptoms cause parental or professional concern.

All patients that have a serum 25(OH)D level ≤25nmol/l should be treated with vitamin D

The Metabolic Bone Disease Team at SCH commonly use one of two options for the treatment of vitamin D deficiency; **standard dose treatment or high dose treatment** (see below). They do not routinely recommend administration of vitamin D as an intramuscular dose.

The dosing options used are based on those recommended in the BNFc, Royal Osteoporosis Society clinical guideline (Vitamin D and bone health: A practical clinical guideline for the management in children and young people) and the Royal College of Paediatrics and Child Health guide for vitamin D in childhood. Please note these differ from doses recommended for currently licensed preparations.

The preparation of vitamin D to be used, either colecalciferol or ergocalciferol, depends on both dose and availability. Due to ongoing supply problems with ergocalciferol, colecalciferol is the current recommended preparation.

There is no place for the use of 1α-hydroxylated preparations e.g. alfacalcidol or calcitriol in the routine management of vitamin D deficiency.

4.1.1 Option 1 – Standard dose treatment

Suggested dosing in local guidance is based on RCPCH (Guide for vitamin in childhood) and ROS guidelines; (Vitamin D and bone health – a practical clinical guideline for management in children and young people).	Sheffield formulary preparation
1 month up to 6 months - 3000 units daily as an oral dose for 4 weeks	*THORENS 10,000 units /ml 3000 units /0.3ml /day – 8.4ml needed, prescribe 10ml
6 months up to 2 years – 3000 units daily as an oral dose for 8 weeks	*THORENS 10,000 units /ml 3000 units / 0.3ml /day – 16.8ml needed, prescribe 20ml
2 up to 8 years – 6000 units daily as an oral dose for 6 weeks	*THORENS 10,000 units /ml 6000 units /0.6ml /day – 25.2mls needed, prescribe 30ml
8 up to 11 years – 6000 units for 8 weeks	*THORENS 10,000 units /ml 6000 units /0.6ml / day – 33.6mls needed, prescribe 40mls
12 up to 16 years – 10 000 units daily as an oral dose for 8 weeks (or following dosing instruction in the Sheffield Adult Guidelines). Base decision on whether child has completed growth.	*THORENS 10,000 units /ml 10,000 units / 1ml / day – 56mls needed, prescribe 60mls
16 up to 18 years - 10 000 units daily as an oral dose for 8 weeks Or follow dosing instruction in the Sheffield Adult Guidelines. Base decision on whether child has completed growth.	*THORENS 10,000 units /ml 10,000 units / 1ml / day – 56mls needed, prescribe 60mls

*Off label dose

4.1.2 Option 2 – High dose treatment (only in those aged 12 years and over with poor compliance – **discuss with Metabolic Bone Team first**)

300,000 units either as a single oral dose or two divided doses.

4.1.3 Calcium Supplementation

Always consider the need for improving calcium intake. 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 appendix 2). In some cases, calcium supplementation may be worthwhile over the period of vitamin D supplementation.

4.1.4 Considerations when Prescribing Vitamin D

This table summarises considerations that need to be borne in mind when prescribing Vitamin D

Side effects	Hypercalcaemia, polyuria, polydipsia, nausea & vomiting, diarrhoea, sweating, headache & vertigo (side effects unlikely unless hypervitaminosis D occurs e.g. following overdose)
Drug interactions	Increased risk of hypercalcaemia when vitamin D given with thiazide and related diuretics. Drugs containing digitalis and other cardiac glycosides - the use of digitalis glycosides in the presence of hypercalcaemia due to vitamin D administration might result in arrhythmias. Strict medical supervision is needed, together with serum calcium concentration and electrocardiographic monitoring if necessary Vitamin D requirements possibly increased when given with medication that increases vitamin D metabolism e.g. barbiturates, carbamazepine, phenytoin or primidone
Contraindications	Hypercalcaemia, metastatic calcification and sarcoidosis and other granulomatous disease

4.2 Follow-up after treatment for vitamin D deficiency

Unless already referred to an outpatient clinic then follow-up should be in primary care.

If an individual has been treated for deficiency, then a repeat bone profile and 25-hydroxyvitamin D concentration should be performed shortly after completion of treatment (i.e. 2-3 months after commencement of treatment) to ensure that any biochemical abnormality has resolved and that the serum 25-hydroxyvitamin D concentration is ≥50nmol/L. If any abnormality has not resolved despite compliance with adequate vitamin D treatment and you

are confident about compliance, then consider referral to the Metabolic Bone Disease clinic. Discuss with Metabolic Bone Team at SCH if you have any concerns about vitamin D toxicity,

If non-compliance is suspected, then treatment can be repeated. In young people aged 12 years and older, observed high dose treatment (see Section 4.1) can be used as a safe and effective way to ensure compliance and adequacy of treatment. If this is needed in a primary care setting, then please discuss this with a Metabolic Bone Disease team at SCH.

Patients who have successfully completed deficiency treatment should receive supplementation with vitamin D at a dose of 8.5 – 10micrograms (340 - 400 units) /day (dose dependent on age – see (Vitamin D Supplementation), at least until completion of growth, unless there is a significant lifestyle change to improve vitamin D status. Supplementation should start after completion of treatment.

Following successful treatment, if there are ongoing reasons for concern, then children may be reviewed annually for symptoms and compliance with supplements. This can usually take place in a primary care setting or as part of their ongoing hospital care. If asymptomatic and there is no reason to suspect persistent deficiency, then further re-tests of vitamin D levels are **not** normally required.

5. Management of suboptimal Vitamin D (serum 25(OH)D between 26 and 50nmol/l)

Those with an initial serum 25(OH)D level between 26 and 50nmol/l should receive vitamin D supplementation with vitamin D at a dose of 8.5 – 10micrograms (340 - 400 units) day (dose dependent on age – see Vitamin D Supplementation - at least until completion of growth, unless there is a significant lifestyle change to improve vitamin D status.

Healthy Start children's vitamin drops are available at low cost from all family centres in Sheffield and free to families eligible for Healthy Start entitlements. Alternative vitamin supplements can also be obtained from local pharmacies or from Rowlands Pharmacy at Sheffield Children's Hospital. General advice regarding maintenance of vitamin D levels from safe sun exposure and diet should also be given. As with children with vitamin D deficiency, consideration should always be given to calcium intake.

If a child is receiving Vitamin D supplementation for a 'suboptimal' Vitamin D level and they are asymptomatic then a re-test of Vitamin D levels is **not** normally required

6. PHE advice for all children

PHE recommends vitamin D supplementation in all children up to 4 years of age and intake for all those over 4 years at a dose of 10micrograms (400 units) especially during the autumn and winter months. See section 1 for further information. Healthy Start children's vitamin drops are available at low cost from all family centres in Sheffield and free to families eligible for Healthy Start entitlements, also see details of Extended Healthy Start Scheme above and encourage OTC / self-care from 4 years. General advice regarding maintenance of vitamin D levels from safe sun exposure, diet and over the counter supplements should be given.

Note from SACN report - *There is insufficient data to set RNIs for infants and children aged under 4 years. As a precaution, a 'Safe Intake' of vitamin D is recommended for these ages: in*

the range 8.5-10 micrograms / day (340-400 units) for ages 0 up to 1 year (including exclusively breast fed and partially breast-fed infants, from birth); and 10 micrograms / day (400 units) for ages 1 up to 4 years. Healthy Start vitamin drops contains 10 micrograms (400units) per dose; self-care with OTC preparations is advised for older children.

7. Communication

Healthcare professionals should aim to foster a culturally sensitive care approach in accordance with the religious and cultural beliefs of the parents/carers. All parents/carers with learning disabilities, visual or hearing impairments or those whose first language is not English should be offered assistance with interpretation where applicable, and where appropriate a telephone interpreter should be used. Once any decisions have been agreed, clear details must be given to the parents/carers.

To help aid communication regarding Vitamin D supplementation, please refer to the CCG intranet 'Prescribing & Guidelines' under Vitamin D where there are leaflets available in a number of languages.

Appendix 1.

Preparations for treatment of deficiency

Wherever possible licensed products should be used.

In general, UK licensed products and imported products licensed in a country of origin with a strong regulatory framework (e.g. an EU country) should be considered of high quality. In the same vein, UK manufactured special products made in MHRA-licensed facilities would be considered to offer an improved risk position compared with imported products not licensed in the country of origin. Nutritional supplements are generally subject to food safety labelling legislation and whilst this excludes them from a formal licensing process, they may be considered a potentially useful option in some circumstances following a consideration of the risks.

Licensed products

Thorens 10,000 units/mL oral drops solution (colecalciferol) is the option preferred by Sheffield CCG; however other options are also available if this is unsuitable for the patient.

Product	Recommended dose for Deficiency	Other considerations
Thorens 10,000 units/ml oral drops solution (Colecalciferol)	**1 month – up to 6 months** - 3000 units daily as an oral dose for 4 weeks - 0.3ml / day – 8.4ml needed, prescribe 10ml* **6 months – up to 2 years** – 3000 units daily as an oral dose for 8 weeks - 0.3ml / day – 16.8ml needed, prescribe 20ml* **2 – up to 8 years** – 6000 units daily as an oral dose for 6 weeks -0.6ml / day – 25.2mls needed, prescribe 30ml* **8 – up to 11 years** – 6000 units for 8 weeks - 0.6ml / day – 33.6mls needed, prescribe 40mls*	An olive oil-based solution 1 drop = 200 units Suitable for vegetarians Halal and Kosher acceptable

	12 years - 16 years – 10 000 units daily as an oral dose for 8 weeks - 1ml / day – 56mls needed, prescribe 60mls* This is followed by maintenance therapy: **0 - 11 years** – 400 units (2 drops) daily **12 – 18 years** – 600 – 800 units (3 – 4 drops) daily Or alternatively: **Birth – 18 years** – 25,000 units once every 2 weeks for 6 weeks (followed by maintenance therapy of 400 – 1000 units / day)*	
InVita D_3 25,000 units / ml oral solution (Colecalciferol)	**Birth – 18 years** – 25,000 units once every 2 weeks for 6 weeks (followed by maintenance therapy of 400 – 1000 units / day)	An olive oil-based solution presented in 1ml (25,000 units) single dose 'snap and squeeze' plastic ampoule D_3 is sourced from lanolin from sheep's wool-company confirmed product suitable for vegetarians Gelatine-free, PEG-free, peanut oil free Halal and Kosher acceptable
Thorens 25,000 units/2.5ml oral drops solution (Colecalciferol)	**Birth – 18 years** – 25,000 units once every 2 weeks for 6 weeks (followed by maintenance therapy of 400 – 1000 units / day)*	An olive oil-based solution presented as a single-dose bottle of 2.5 ml oral solution Suitable for vegetarians Halal and Kosher acceptable

		Off license in children under 18 years
Fultium-D3 800 unit capsules (Colecalciferol)	**12 – 18 years** – 1 – 4 capsules daily for up to 12 weeks, followed by a long term maintenance dose of 1 capsule daily*	A soft gelatine capsule Peanut oil free Not recommended in children under the age of 12 years Halal and Kosher acceptable

*Off label use – counsel patient accordingly

Unlicensed Products

Product	**Recommended Dose of Deficiency**	**Other considerations**
Pro D3 10,000 units / capsule (Colecalciferol)	**12 – 18 years** – 10,000 units (1 capsule) daily for 8 weeks	Gelatine free Halal and vegetarian approved Free from peanut and soya related ingredients Prescribe as Pro D3 10,000 unit capsules (not generically) Does not have a UK marketing authorisation. Marketed as a nutritional supplement. Pro D3 is manufactured to Good Manufacturing Practice (GMP) standards and each batch and strength is individually tested to the specification for a licensed medicinal product (90% - 125% of labelled claim)

Vitamin D supplementation

PHE recommends all infants and young children from birth to 1 year (including breastfed babies) 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 8.5 - 10 micrograms (340 - 400 units) of vitamin D per day. Please note, infants who are fed infant formula do not need vitamin drops until they are receiving less than 500ml of infant formula a day, as these products are fortified with vitamin D. All infants and young children (up to the age of 4) are advised to take a daily supplement of vitamin D and all children from 4 years upwards are advised to take a supplement containing 10micrograms (400units) of vitamin D particularly during the autumn and winter months.

Vitamin D supplementation should continue in children with a history of vitamin D deficiency or a suboptimal Vitamin D level, unless there has been significant lifestyle change to improve vitamin D status. Children with low exposure to sunlight, for example those who cover their skin for cultural reasons, who are housebound or confined indoors for long periods and children who have darker skin, for example people of African, African-Caribbean and South Asian origin, should also continue on supplements because their bodies are not able to make as much vitamin D.

Available multivitamin / vitamin D preparations

Product	Vitamin D content	Dose	Other considerations
Healthy Start Vitamins (Multivitamin preparation)	Colecalciferol 400 units / 5 drops	**Birth – 5 years** – 400 units / 10mcg (5 drops daily)	Free from soya and peanut residues All family centres in Sheffield now sell Healthy Start vitamins. They are also available from some pharmacies. For further information on Extended Healthy Start Scheme see section 1 and additional guidance Note: this is a food supplement
Dalivit oral drops	Ergocalciferol 400 units per 0.6 ml	**6 weeks – 1 year** – 200 units / 5mcg (7 drops / 0.3ml daily)	Can be added to squash, juice, milk or jam for ease of administration

(Multivitamin preparation)		Note: It is acknowledged that this given dose of Dalivit drops does not contain the PHE recommended intake of Vitamin D. However, the use of these alongside safe sun exposure and diet could be considered **1 years and over** – 400 units / 10mcg (14 drops / 0.6ml daily)	Does not contain peanut oil or soya Suitable for vegetarians and vegans Contains 5000 units / 14 drops (0.6ml) of vitamin A – advise patients not to exceed the stated dose. When using this multivitamin preparation, it should also take into consideration the amount vitamin A that is obtained from the diet in order to prevent excessive intake. Not licensed in babies under 6 weeks old
Abidec oral drops (Multivitamin preparation)	Ergocalciferol 400 units per 0.6 ml	**Birth – 1 years** – 200 units / 5mcg (7 drops / 0.3ml daily) Note: It is acknowledged that this given dose of Abidec drops does not contain the PHE recommended intake of Vitamin D. However, the use of these alongside safe sun exposure and diet could be considered **1 years and over** – 400 units / 10mcg (14 drops / 0.6ml daily)	Contains peanut oil – contraindicated in patients with a peanut allergy. Avoid in patients with a soya allergy
Invita D_3 2,400 units/ml oral drops, solution	Colecalciferol 400 units / 6 drops	**Birth – 1 year** – 400 units (6 drops daily) **1 – 18 years** – 600 units (9 drops daily)	Can be mixed with a small amount of food, yoghurt, milk, cheese or other dairy product. An olive oil-based solution. D_3 is sourced from lanolin from sheep's wool-company confirmed product suitable for vegetarians

			Gelatine-free, PEG-free, peanut oil free Halal and Kosher acceptable
Adcal-D3 Dissolve effervescent tablets (Contains Calcium and Vitamin D)	Colecalciferol 400 units / tablet Calcium carbonate 1.5 grams / tablet	**12 – 18 years** – 2 tablets daily, preferably 1 tablet each morning and evening	Not licensed for children less than 12 years The effervescent tablets should be dissolved in 200ml of water and drunk immediately Contains a small amount of soya oil – contraindicated in patients allergic to peanuts or soya Contains approximately 0.77mg of sucrose per tablet – may be harmful to teeth in prolonged use
Calcichew-D3 chewable tablets (Contains Calcium and Vitamin D)	Colecalciferol 200 units / tablet Calcium carbonate 1.25 grams / tablet	**12 – 18 years** – 2 tablets daily, preferably 1 tablet each morning and evening	Not recommended for children less than 12 years Does not contain peanut oil or soya
Calcichew-D3 Forte chewable tablets (Contains calcium and vitamin D)	Colecalciferol 400 units / tablet Calcium carbonate 1.25 grams / tablets	**12 – 18 years** – 2 tablets daily, preferably 1 tablet each morning and evening	Not recommended for children less than 12 years Does not contain peanut oil or soya

Appendix 2.

Dietary reference values for calcium.

Age	Reference nutrient intake for calcium Mg/day (mmol/day)
0 - 12 months	525 (13.1)
1 - 3 years	350 (8.8)
4 - 6 years	450 (11.3)
7 - 10 years	550 (13.8)
11 - 14 years, male	1000 (25.0)
11 - 14 years, female	800 (20.0)
15 - 18 years, male	1000 (25.0)
15 - 18 years, female	800 (20.0)

Note: 1 mmol calcium = 40 mg calcium.

Calcium-rich foods

Find calcium-rich foods from this list for a bone-healthy diet. Serving sizes are based on average adult portions

Food	Serving Size (average)	Calcium (mg)
Milk		
Milk, semi-skimmed	glass, 200 ml	240
Soy drink, calcium enriched	glass, 200 ml	178
Yoghurt and Cream		
Yoghurt, low-fat, fruit	pot, 150 g	210
Cream, double, whipped	portion, 45 g	26
Cream single	tablespoon, 15 g	13
Cheeses		
Cheddar	medium chunk, 40 g	296
Cheese spread	portion, 30 g	149
Cottage	small pot, 112 g	142

Food	Serving Size (average)	Calcium (mg)
Vegetables		
Broccoli, boiled	serving, 85 g	34
Green/French beans	serving, 90 g	50
Baked beans	serving, 135 g	72
Nuts		
Almonds	12 whole, 26 g	62
Brazil Nuts	6 whole, 20 g	34
Desserts		
Ice cream, dairy, vanilla	average serving, 75 g	75
Fromage frais, fruit	small pot, 60 g	52
Fish		
Sardines in oil, tinned	portion, 100 g	500
Salmon, tinned	average portion, 100 g	91

Food	Serving Size (average)	Calcium (mg)
Breads and grains		
Pasta, plain, cooked	portion, 230 g	85
Rice, white, boiled	portion, 180 g	32
White bread	slice, 30 g	53
Wholemeal bread	slice, 30 g	32
Muesli, Swiss style	portion, 50 g	55
Fruits		
Apricots, raw, no stone	4 fruit, 160 g	117
Figs, ready to eat	4 fruit, 220 g	506
Currants	2 tablespoons, 50 g	47
Orange	peeled, 160 g	75
Other foods		
Tofu, soy bean, steamed	100 g	510
Omelette, cheese	2 eggs, 120 g	344

Food	Serving Size (average)	Calcium (mg)
Quiche, cheese & egg	average slice, 140 g	367
Macaroni cheese	portion, 220 g	374
Pizza, cheese & tomato	9" - 10" pizza, 410 g	873
Lasagne	portion, 420 g	420

References:

1. Food Standards Agency (2002) McCance and Widdowson's The Composition of Foods, Sixth Summary Edition. Cambridge: Royal Society of Chemistry.
2. Food Standards Agency (2002), Food Portion Sizes.

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3. Vitamin D: Is there a licensed product suitable for a patient with peanut or soya allergy? Prepared by UK Medicines Information pharmacist. Date prepared 23rd September 2020
4. Dietary reference values for food, energy and nutrients for United Kingdom, DH Report 41, 1991
5. CMO letter to Healthcare professionals
6. ROS - Vitamin D and Bone Health: A Practical Clinical Guideline for Management in Children and Young People
7. Scientific Advisory Committee on Nutrition (SACN): Vitamin D and Health
8. PHE publishes new advice on Vitamin D, July 2016

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