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### Treatment of low Vitamin D levels in children

Vitamin D is involved in the regulation of blood calcium and phosphate levels and is essential for healthy bone growth. Deficiency of vitamin D in infants can cause seizures and cardiomyopathy, in children it can lead to rickets and poor growth, and in adults it can lead to osteomalacia. In older adults it can lead to osteoporosis. It can cause muscle weakness at any age. (Royal College of Paediatrics and Child Health (RCPCH), 2013)

There are several risk factors for low vitamin D levels (RCPCH, 2013):

Increased need	Pregnancy
	Twins or multiple births
	Adolescents
	infants
	obesity
Reduced sun exposure	Northern latitude eg UK
	Asian people – dark skin needs more sunshine to make vitamin D
	Wearing concealing clothing
	Immobility eg inpatients
	Excessive use of sun block
Limited diet	vegetarian or vegan
	Prolonged breastfeeding
	Exclusion diets eg milk allergy
	Liver or renal impairment
	Malabsorption
	Some medicines eg anti-TB drugs, some anticonvulsants

The main source of vitamin D is sunshine. The skin manufactures vitamin D when the sun is high in the sky – from March to October for most of the UK; April to September in Scotland. Dietary sources are minimal – eggs and oily fish are where the most abundant supplies can be found. Some foods such as margarine and breakfast cereals are fortified, plus formulae milk. Cow's milk and breast milk contain very low levels of vitamin D. (RCPCH, 2013)

Vitamin D, regardless of whether it is sourced from sunshine or diet, is converted in the liver to 25hydroxyvitaminD and this is subsequently converted to the active compound 1,25-dihydroxyvitaminD in the kidneys. Treatment of vitamin D levels is by the administration of simple Vitamin D. The activated form of vitamin D should not be used in vitamin D deficiency – this is reserved for use by specialists in the management of complex cases or renal disease. (RCPCH, 2013)

Vitamin D levels are classified by 25hydroxyvitaminD levels as follows:

below 25nmol/L – deficiency

25-50nmol/L – insufficiency

above 50nmol/L – normal

Some laboratories use higher levels so you should use your local reference ranges when treating patients.

(RCPCH, 2013)

The RCPCH (2013) guidelines do not recommend any specific commercial product. The onus is on the prescriber to check their local guidelines for product choice. Access your own local guidelines to answer the following questions, or use the guidelines produced by East Lancashire Health Economy (2014) for the purpose of answering the questions.

#### QUESTION 1

You are working in General Practice, and consulting with Mrs Kahn's three children Safia, Farheen and Kazam. They have been called in to the practice to discuss their vitamin D levels which were checked following general symptoms of sore muscles, aches and pains and. Further assessment of the children found nothing serious and low vitamin D levels were deemed to be the cause of the symptoms.

The childrens' vitamin D levels are listed in the table below. State whether these levels are normal, insufficient or deficient.

child	age	25hydroxyvitaminD level	ANSWER
Safia	13	19	DEFICIENT
Farheen	10	22	DEFICIENT
Kazam	8	33	INSUFFICIENT

#### QUESTION 2

For each child, state whether you would offer lifestyle advice, a prevention dose of vitamin D or a treatment dose of vitamin D.

child	ANSWER
Safia	LIFESTYLE ADVICE PLUS A TREATMENT DOSE
Farheen	LIFESTYLE ADVICE PLUS A TREATMENT DOSE
Kazam	LIFESTYLE ADVICE PLUS A PREVENTION DOSE

### QUESTION 3

Suggest a dose of vitamin D for each child

child	DOSE
Safia	80,000 units once weekly for 7 weeks
Farheen	6000 units daily for 7 weeks
Kazam	400-1000 units daily

### QUESTION 4

Produce a prescription for vitamin D for each child. You will need to state the name of the product, formulation (include strength if necessary), dose and quantity

child	PRESCRIPTION
Safia	HUXD3 20,000 unit capsules, take four each week for 7 weeks, 28 capsules
Farheen	PRO-D3 FORTE 3000units/ml liquid, take 2ml daily for 7 weeks, 2 x 50ml bottles
Kazam	ABIDEC DROPS NB some health economies encourage self care instead of prescription for vitamins unless treating deficiency

### References

Royal College of Paediatrics and Child Health (RCPCH), (2013) Guide for Vitamin D in Childhood, available online at [https://www.rcpch.ac.uk/sites/default/files/2018-03/guide\\_to\\_vitamin\\_d\\_in\\_childhood.pdf](https://www.rcpch.ac.uk/sites/default/files/2018-03/guide_to_vitamin_d_in_childhood.pdf)

East Lancashire Hospitals NHS Trust (2014) Paediatric Vitamin D Guideline, available online at [www.elmmb.nhs.uk](http://www.elmmb.nhs.uk)