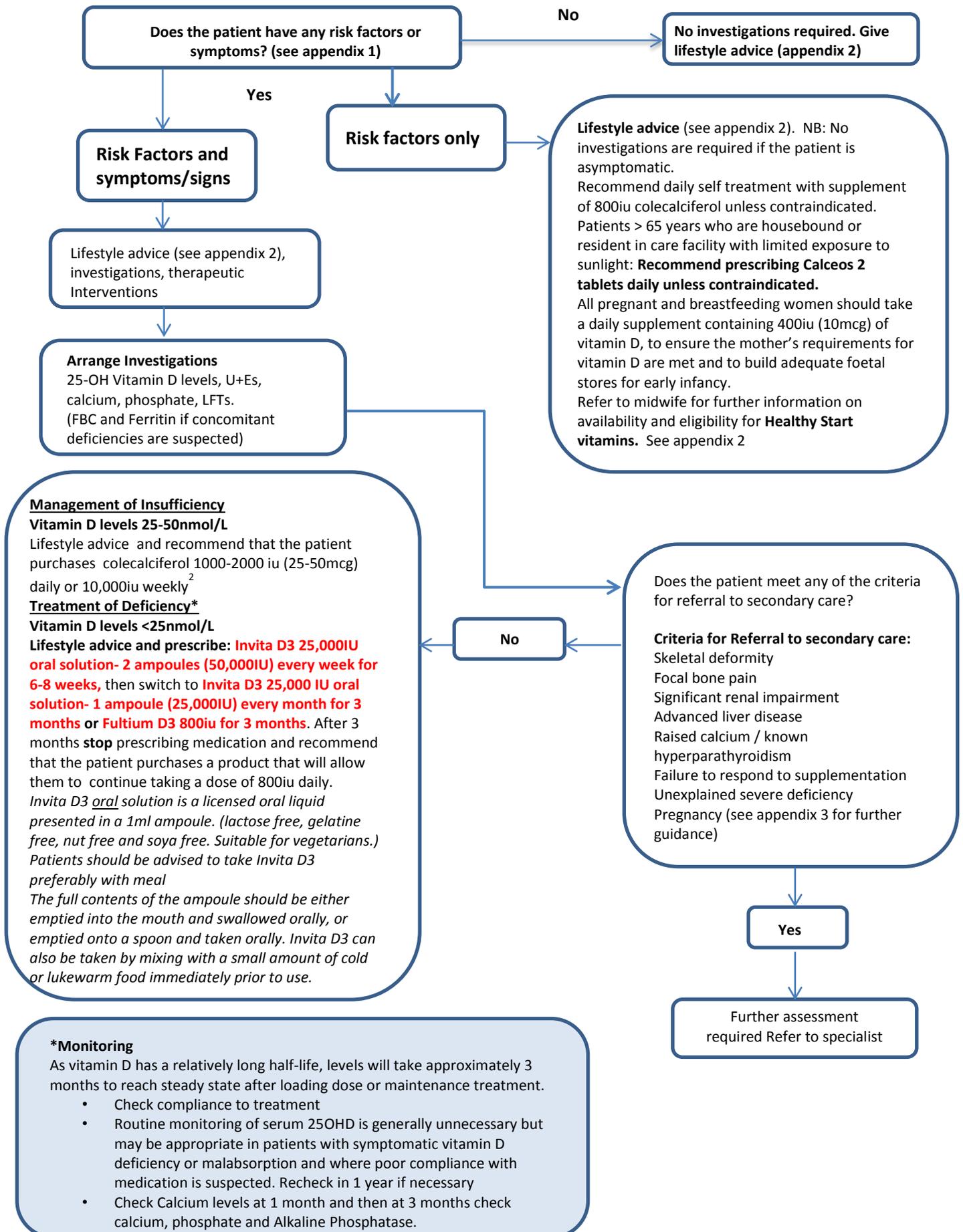


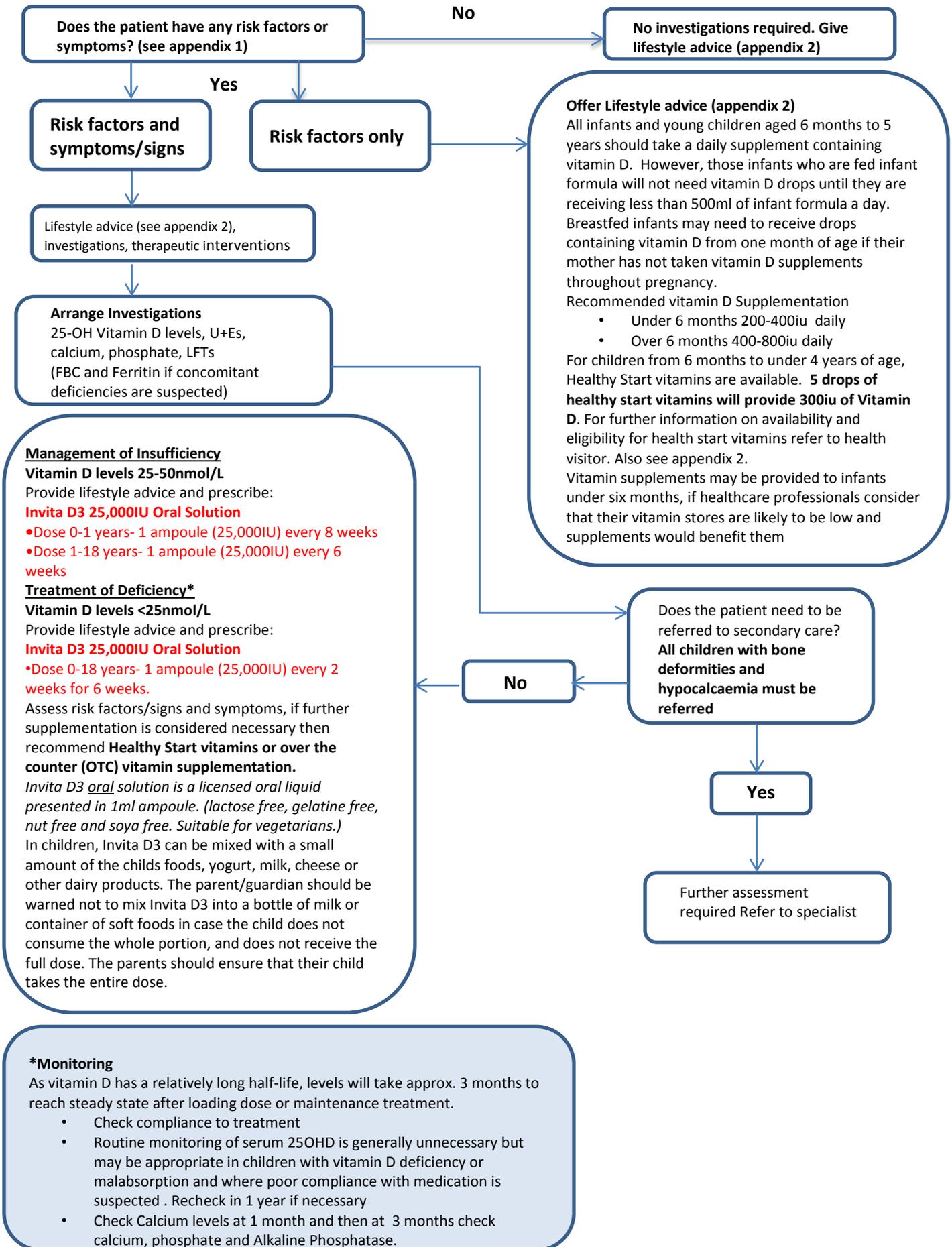
Guidelines for the Treatment of Vitamin D Deficiency and Insufficiency

ADULTS-Management Flowchart



Guidelines for the Treatment of Vitamin D Deficiency and Insufficiency

CHILDREN-Management Flowchart



Appendix 1

Risk factors for Vitamin D deficiency

Inadequate UV exposure	Poor oral intake	Metabolic risk
<ul style="list-style-type: none"> • Air Pollution • Occlusive garments • Pigmented skin • Habitual sunscreen use • Institutionalised/housebound and people with poor mobility e.g. wheelchair bound 	<ul style="list-style-type: none"> • Vegetarian (or fish free diet) • Malabsorption, including short bowel and cholestatic jaundice • Colestyramine use • Breastfed infant. 	<ul style="list-style-type: none"> • Reduced synthesis • Increased breakdown • Drugs including rifampicin, anticonvulsants, HAART therapy, glucocorticoids. • Liver disease • Kidney disease

Clinical features of Vitamin D deficiency

Symptoms, Sign, Biochemistry	Children	Adult
Seizures	✓	✓
Tetany	✓	✓
Hypocalcaemia	✓	✓
Irritability	✓	
Leg bowing	✓	
Knock knees	✓	
Impaired linear growth	✓	
Delayed walking	✓	
Limb girdle pain	✓	✓
Muscle pain	✓	✓
Proximal myopathy	✓	✓
Impaired innate antimycobacterial immunity	✓	✓

Healthy Start Vitamins

'Healthy Start' is a UK wide, means-tested, statutory scheme providing pregnant women, women with a child under 12 months and children aged from six months to four years with free Healthy Start vitamins. The scheme provides coupons which can be exchanged for Healthy Start vitamin supplements.

Children that are having 500ml or more of formula a day, do not need Healthy Start vitamins.

Further information about eligibility for free healthy start vitamins is available from Health Visitors and midwives or at <http://www.healthystart.nhs.uk/> or contact 0845 6076823

Details of the pharmacies stocking Healthy Start Vitamins can be accessed via: <http://www.telfordccg.nhs.uk/healthy-start-vitamins>. **Most community pharmacies will also sell healthy vitamins** (Current Retail price: Drops £2.10, tablets £1.15) **to people who do not qualify for vouchers.**

Lifestyle advice

Sunlight

For adults in the UK, exposure of the hands, face and arms for 20-30 minutes on most days during the summer months (April to September) is estimated will provide sufficient exposure to the ultraviolet B wavelengths (UVB) to achieve healthy Vitamin D levels. Adults with dark pigmented skin may need to increase this exposure by 3-10 fold.

Sunscreens with \geq SPF 15 are essential to prevent skin damage with longer sun exposure but will reduce Vitamin D synthesis by 99%. Advising people to omit sunscreen for short, incidental sun exposures would be reasonable. Deliberate exposure to sunlight between 11:00 and 15:00 in the summer months is not advised

NB. For the six months between October and April, 90% of the UK lies above the latitude that permits exposure to the UVB that is necessary for Vitamin D synthesis. During these months people are reliant on exogenous sources i.e. from diet or supplementation

Diet

Less than 10% of Vitamin D is acquired through diet. Only a relatively small number of foods such as oily fish (for example mackerel, salmon and sardines), eggs and fortified cereals contain vitamin D, and these amounts are small.

Appendix 3

Vitamin D dosing regimens in pregnancy

Women should have adequate vitamin D stores for their own requirement, for their developing foetus and to build stores for early infancy particularly if they plan to breast-feed.

During pregnancy, maternal vitamin D deficiency (defined here as less than 30nmol/L) can lead to deficiency in the infant, resulting in Rickets and other skeletal abnormalities.

For routine supplementation, current DH guidance recommends 10mcg (400 units) daily in all pregnant women; However, this will not correct deficiency in pregnancy where that has been identified. (Healthy Start Vitamin supplementation will provide the daily recommended vitamin D requirement in pregnancy)

Vitamin D use in pregnancy is not associated with an increased risk of congenital malformation, although the data are insufficient to confirm that there is unequivocally no risk.

Testing

There is no consensus on exactly which pregnant women to test for vitamin D deficiency but there is an argument that some groups of women who are pregnant should have screening test: for example, on the basis of skin colour, obesity or risk of pre-eclampsia.

Safety

Vitamin D use in pregnancy is not associated with an increased risk of congenital malformation, although there is insufficient data to confirm that there is unequivocally no risk. In the general population, an upper physiological limit of 10,000units of vitamin D/day has been suggested. Above this daily dose, adverse effects are theoretically more likely so bolus injections or oral doses of more than 10,000units per day should be avoided and very high single bolus doses (i.e. 300,000-500,000units) should not be used in pregnancy. Safety data relate to use in the second or third trimesters and use of high dose vitamin D in the first trimester should be avoided

Dose for correction of vitamin D deficiency (vitamin D <30nmol/L)

It would be rational to use an oral dose of 2000-4000units per day for up to 11 weeks to provide a cumulative dose of around 150,000 or 300,000units in pregnancies that are in the 2nd or 3rd trimester. Correction should begin in the 2nd or 3rd trimester because of the lack of safety or outcome data in first trimester, and because the majority of skeletal growth and development is thought to occur in the 2nd or 3rd trimester.

Dose for rapid correction

If the baseline vitamin D level is very low (less than 15nmol/L) and the woman is in the 3rd trimester of her pregnancy, then rapid correction may be required particularly if there are unmodifiable risk factors. In these cases it would be rational to use doses higher than 4000units/day (but not more than 10,000units/day) in the second or third trimesters (e.g. 7,000units/day for 6-7 weeks or 10,000units/day for 4-5 weeks to provide a cumulative dose of around 300,000 units). However, the higher doses should only be used with the input of an obstetrician and with monitoring of calcium levels.

When choosing a regimen, prescribers should also take into account: the severity of deficiency at baseline; whether unmodifiable risk factors (such as covering of the skin for religious/cultural reasons) remain an issue; the likelihood of compliance; the time of year; planned holidays in the sun; and product availability.

...Continued overleaf

Which Vitamin D preparation should be used?

Vitamin D deficiency in pregnancy should be managed with colecalciferol.

There are currently no licensed high strength formulations available. However, there are licensed products that enable a dosing regimen of 4000units/day which are not contraindicated in pregnancy.

Preparations licensed for use in pregnancy

- ❖ **Thorens 10 000 I.U. /ml oral drops, solution** (NB high strength formulation is not recommended)
- ❖ **InVita D3 2,400 IU/ml oral drops, solution** (NB high strength formulation is not recommended)
- ❖ **Fultium-D₃ Preparations**
 - Fultium-D₃ Drops (3 drops contains 200 IU colecalciferol (vitamin D₃))
 - Fultium-D₃ 800 IU Capsules
 - Fultium-D₃ 3,200 IU Capsules

Fultium-D₃ 20,000 IU capsules are **not** recommended during pregnancy unless the clinical condition of the woman requires treatment.

Use of these preparations at the doses suggested for the management of Vitamin D deficiency will be 'off license'

Products containing vitamin A (such as Cod Liver Oil) should be avoided because this is a known teratogen

Combined calcium and vitamin D products should not routinely be used to correct vitamin D deficiency in pregnancy.

Treatment Monitoring

To avoid maternal (and possibly foetal or neonatal) hypercalcaemia, pregnant women being treated for vitamin D deficiency should have their serum calcium levels checked a month after starting treatment and then three months later, when steady state vitamin D levels have been achieved. Subsequent monitoring of calcium levels depends on duration of treatment and concerns about toxicity. If calcium levels are raised, then the prescriber should review the prescription for vitamin D or reduce the dose. Routine monitoring of vitamin D levels is not necessary but if they are re-checked, this should be 3 months after starting therapy, when steady-state has been reached.

Calcium intake

Pregnant women should try to maintain an adequate calcium intake (700mg/day) through their diet. Combined calcium and vitamin D products should not routinely be used to correct vitamin D deficiency in pregnancy

[Guidance adapted from UKMI Q&A 329.2 – Which oral vitamin D dosing regimens correct deficiency in pregnancy? \(date prepared June 2016\)](#)

References

- [UKMI: What dose of vitamin D should be prescribed for the treatment of vitamin D deficiency Apr 2015 Q&A 82.3](#)
- [NICE PH 56 Vitamin D: increasing supplement use among at-risk groups 9 Nov 2014](#)
- [UK CMO letter Gateway Reference: 17193](#)
- [UKMI: Which oral vitamin D dosing regimens correct deficiency in pregnancy? June 2016 Q&A 329.3](#)