

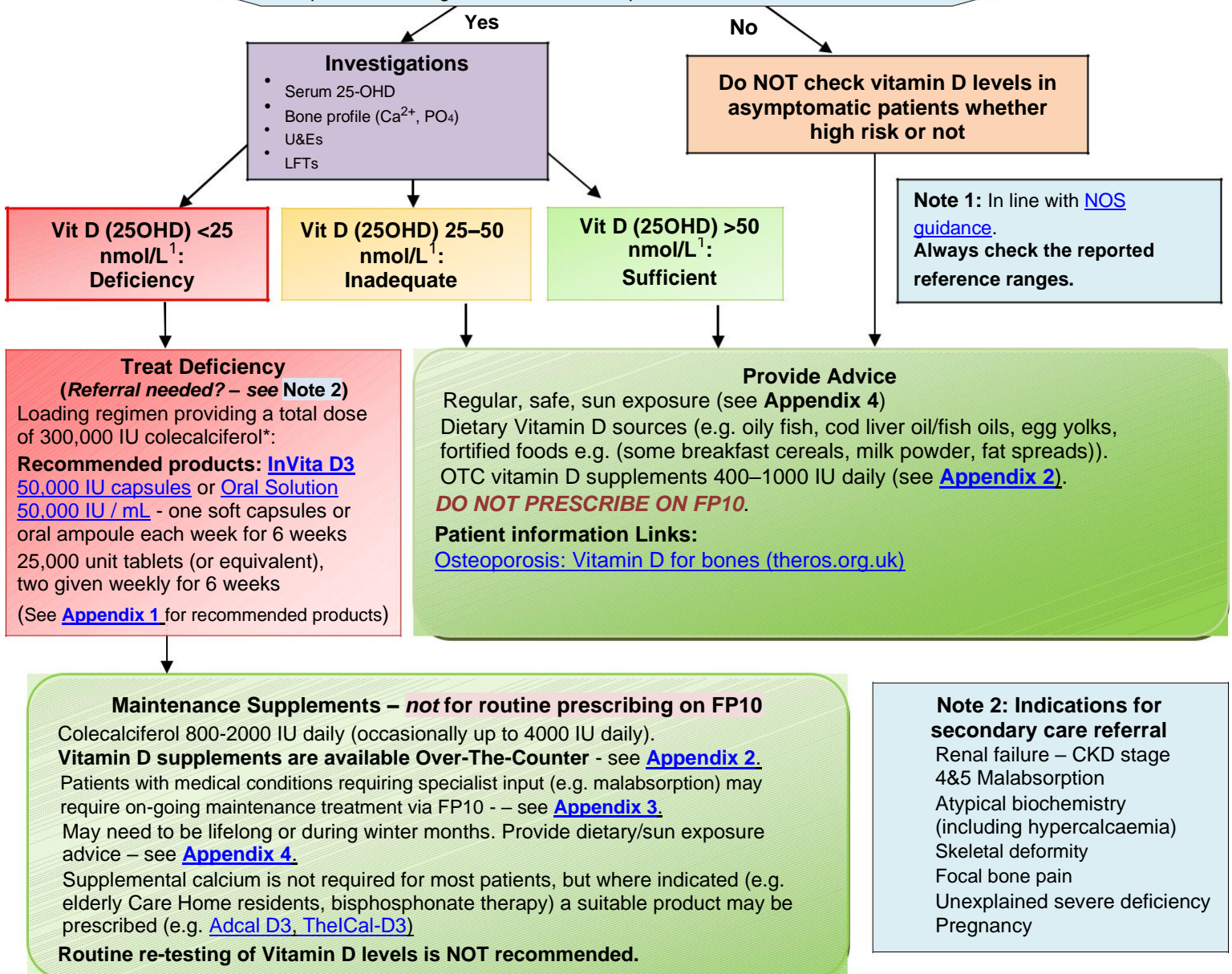
Diagnosis and Management of Vitamin D Deficiency in Adults in Primary Care

Who is considered as high risk of Vitamin D deficiency?

Age/Groups	Poor exposure to UVB light	Reduced dietary intake/absorption	Metabolic risk
≥75 years Pregnancy Breastfeeding	Pigmented skin Occlusive garments Housebound/Care Care Home residents Use of sun blocking creams	Vegetarian/fish-free diet Malabsorption (including bariatric surgery) Cholestatic liver disease	Elderly (reduced synthesis) Liver disease (reduced stores) Renal disease (reduced activation) Obesity (excess storage in fat) Drugs: rifampicin, antiretrovirals, antiepileptics, cholestyramine, glucocorticoids

Who to test?

Rickets, osteomalacia or symptomatic hypocalcaemia
High risk patients (as defined above) with **suggestive symptoms**, such as proximal muscle weakness or musculoskeletal aches and pains that are gradual in onset and persistent.



* **Colecalciferol is drug of choice.** It has been reported to raise serum vitamin D concentrations more effectively than ergocalciferol. Ergocalciferol is an alternative only if colecalciferol is unavailable.

Appendix 1: Licensed Vitamin D Products recommended for the *Treatment* of Vitamin D deficiency in Adults

Preparation (Drug, Strength, Form, Quantity)	Manufacturer / Distributor	Costs of preparations / pack sizes – based on information available at the time of writing	Dosing and Cost of a 300,000 IU treatment course for Vitamin D deficiency	Licensing and risk considerations
Recommended products:				
InVita D3 soft capsules 50,000 IU (colecalfiferol)	Available from Consilient Health Ltd via normal wholesalers	50,000 IU - £4.95 for 3 capsules	One 50,000 IU soft capsule taken each week for 6 weeks – cost £9.90	Licensed UK medicine / Patient Info Leaflet Capsule dimensions are 12.5mm x 8.5mm. Contains gelatin.
InVita D3 Oral Solution 50,000 IU / mL (colecalfiferol)	Available from Consilient Health Ltd via normal wholesalers	Oral solution (S/F) £6.25 for 3 x 1 mL ampoule	50,000 IU (one oral ampoule) taken each week for 6 weeks – cost £12.50	Licensed UK medicine / Patient Info Leaflet Sugar-free liquid Contains Olive oil (refined), and Sweet orange peel oil.
InVita D3 25,000 IU soft capsules (colecalfiferol)	Available from Consilient Health Ltd via normal wholesalers	25,000 IU - £3.95 for 3 capsules	Two 25,000 IU capsules taken weekly for 6 weeks - cost £15.80	Licensed UK medicine Capsule dimensions are 12.5 x 8.5mm. Contains gelatin.
Stexerol D₃ tablets 25,000 IU (colecalfiferol)	Available from ProStrakan via normal wholesalers	25,000 IU - £17.00 for 12 tablets	Two 25,000 IU tablets taken weekly for 6 weeks – cost £17.00	Licensed UK medicine / Patient Info Leaflet Film-coated capsule-shaped tablets (14 mm size) which can be swallowed whole or crushed, and taken with food.
THORENS oral solution : 25,000 I.U. /2.5 ml (2.5ml single dose bottle)	Available from Galen Limited via normal wholesalers	25,000 IU/2.5 ml (2.5ml single dose bottle) oral solution £1.55 per single-dose bottle £5.85 per 4-bottle pack.	Two 25,000 IU/2.5 ml single dose bottles (50,000 IU) taken weekly for 6 weeks – cost £17.55	Licensed UK medicine / Patient Info Leaflet Licensed for the treatment and prevention of vitamin D deficiency in all ages from newborn infants to adults (NB <i>High dose cholecalciferol products such as THORENS 25,000 I.U./2.5ml oral solution are not recommended for use in pregnant and breastfeeding women</i>) Olive oil based solution Halal- and Kosher-certified Suitable for vegetarians Gluten, lactose and nut-free

Appendix 2: Vitamin D (colecalciferol) products available for Purchase by Patients (OTC) (Maintenance Supplements)

Daily dose	Preparation (Drug, Strength, Form, Quantity)	Price (based on information available at the time of writing)	Available from
1000 IU	Boots Pharmaceuticals Vitamin D tablets 25µg (1000 IU)	£4.99 – 90 tablets £8.99 – 180 tablets £16.18 – 360 tablets	Boots www.boots.com
400 IU	Boots Pharmaceuticals Vitamin D tablets 10µg (400 IU)	£2.29 – 90 tablets	Boots www.boots.com
1000 IU	Healthspan Super Strength Vitamin D3 25µg (1000 IU)	£4.50 – 60 tablets £10.95 – 240 tablets	Healthspan www.healthspan.co.uk
400 IU	Holland & Barrett Vitamin D tablets 10µg (400 IU)	£3.55 – 100 tablets £7.99 – 250 tablets	Holland & Barrett www.hollandandbarrett.com
400 IU	Holland & Barrett Vitamin D vegetarian capsules 10µg (400 IU)	£4.99 – 100 capsules	Holland & Barrett www.hollandandbarrett.com
1000 IU	Holland & Barrett Vitamin D tablets 25µg (1000 IU)	£7.99 – 100 £9.24 – 250	Holland & Barrett www.hollandandbarrett.com
400 IU	Nature's Best Vitamin D3 tablets 400 IU	£5.50 – 180 tablets (plus delivery)	Online at www.naturesbest.co.uk
1000 IU	Nature's Best Vitamin D3 capsules 1000 IU	£7.15 – 180 capsules £14.90 – 360 capsules (plus delivery)	Online at www.naturesbest.co.uk
400 IU	SunVit D3 tablets 10µg (400 IU)	£4.26 – 28 tablets (plus P&P)	Online at www.sunvitd3.co.uk
800 IU	SunVit D3 tablets 20µg (800 IU)	£4.74 – 28 tablets (plus P&P)	Online at www.sunvitd3.co.uk
1000 IU	SunVit D3 tablets (1000 IU)	£4.79 – 28 tablets (plus P&P)	Online at www.sunvitd3.co.uk
100 IU / drop	SunVit D3 Oral Drops (100 IU/drop)	£6.99 – 20ml	Online at www.sunvitd3.co.uk
500 IU	Tesco Vitamin D tablets 12.5µg (500 IU)	£3.00 for 90 tablets	Tesco www.tesco.com
1000 IU	Tesco Vitamin D tablets 25µg (1000 IU)	£3.50 for 90 tablets	Tesco www.tesco.com
400 - 800 IU	DLux 400 oral spray 400 IU per spray	£6.25 for 15mL (100 sprays)	Online at www.betteryou.uk.com (Larger Boots and Holland & Barrett stores may also stock)
1000 IU	DLux 1000 oral spray (1000 IU per spray)	£6.95 for 15mL (100 sprays)	Online at www.betteryou.uk.com (Boots and Holland & Barrett stores may also stock)
400 IU	Pregnacare (multivitamins & minerals) Suitable for pregnant women	Prices vary (Approx. £4 to £5 for 30 tablets)	Various outlets including pharmacies and supermarkets

NB: All products are marketed as nutritional supplements (i.e. are not licensed medicines). Please note that other community pharmacies may also stock suitable vitamin D preparations. Patients should be advised to ask for available products.

Appendix 3: Vitamin D products available for Maintenance Supplements on Prescription for patients at risk of deficiency due to on-going medical conditions

Preparation (Drug, Form, Strength)	Manufacturer / Distributor	Cost (Drug Tariff price or from manufacturer) – based on information available at the time of writing	Licensing and risk considerations
Combination products – Colecalciferol and Calcium Carbonate			
Adcal D3 Chewable Tablets (Calcium Carbonate 1500mg , Colecalciferol 400 IU per tablet)	Available via normal wholesaler routes	£3.65 – 56 tablets (Drug Tariff)	Licensed UK medicine Contains soya oil. Contraindicated in those with peanut or soya allergy.
Adcal-D3 Caplets (Calcium Carbonate 750mg , Colecalciferol 200 IU per caplet)	Available via normal wholesaler routes	£2.95 – 112 tablets (Drug Tariff)	Licensed UK medicine. Does not contain soya or peanut based excipients
Calcichew D3 Forte (Calcium Carbonate 1.25g , Colecalciferol 400 IU per chewable tablet)	Available via normal wholesaler routes	£4.24 – 60 chewable tablets (Drug Tariff)	Licensed UK product
Calcichew D3 (Calcium Carbonate 1.25g , Colecalciferol 200 IU per chewable tablet)	Available via normal wholesaler routes	£7.68 – 100 chewable tablets (Drug Tariff)	Licensed UK product
Colecalciferol products			
Stexerol D3 tablets 1000 IU (Colecalciferol)	Available from ProStrakan via normal wholesalers	£2.95 – 28 tablet pack (Drug Tariff)	Licensed UK medicine Film-coated orange, oval tablets (8.5 mm in size) which can be swallowed whole or crushed, and taken with food.
Fultium-D3 Capsules & Drops 800 IU capsules Fultium®₂ Drops 1ml (41 drops) contains 2740 IU colecalciferol 3 drops = 200 IU. (colecalciferol)	Available from Internis Pharmaceuticals Ltd via normal wholesalers	Capsules: £3.60 – 30 capsules (Drug Tariff) £8.85 – 90 capsules Oral Solution (Drops): 25ml £10.70 - equivalent to 85 doses (~12 weeks) of 800 IU daily (Drug Tariff)	Licensed UK medicine - capsules licensed for adults and children aged 12 years and older Soft-gel capsules - contain gelatin
Desunin Tablets 800 IU (Colecalciferol)	Available from Meda Pharmaceuticals via normal wholesalers routes	£ 3.60 – 30 tablets (Drug Tariff) £10.17 – 90 tablets	Licensed UK medicine / Patient Info Leaflet Suitable for vegetarians / Gelatin free Soya and peanut oil free.
Colecalciferol 10,000 units capsules	Alissa Healthcare via normal wholesalers	£9.99 for 20 (Drug Tariff)	Licensed UK product
THORENS Oral Drops 10 000 IU /ml (10ml bottle) 1ml = 50 drops 800 – 1000 IU = 4 to 5 drops	Available from Galen Limited via normal wholesalers	£5.85 for 10,000 IU/ml oral drops, solution (per 10ml bottle) One 10ml bottle provides 100 to 125 doses of 800-1000 IU (14 to 17weeks) (Drug Tariff)	Licensed UK medicine / Patient Info Leaflet Olive oil based solution Halal- and Kosher-certified Suitable for vegetarians Gluten, lactose and nut-free

NB. When prescribing a calcium and vitamin D combination product avoid prescribing Calcium and Ergocalciferol tablets as these contain insufficient calcium and are not cost effective.

Appendix 4: Advice on Sun exposure

The amount of UVB in sunlight changes substantially with season, latitude and time of day. These factors greatly affect vitamin D production, which is greatest around two hours either side of solar noon, and during summer months.

Physical characteristics can also affect vitamin D production; with darker skin requiring longer UV exposures to produce the same amount of vitamin D. Older people have a reduced ability to make vitamin D through their skin.

Exposure to ultraviolet B (UVB) radiation in sunlight is the most efficient way to boost vitamin D supply but it is still unclear how much sunlight is required to produce a given level of 25 (OH) D. However, best estimates suggest that for most people, everyday casual exposure to sunlight is enough to produce vitamin D in the summer months.

In a recent study, Caucasian British people were given a simulated dose of summer exposure to sunlight. These controlled conditions (equivalent to 13 minutes of midday exposure to the summer sun, three times a week for six weeks) raised 25 (OH) D levels to greater than, 50 nmol/l in 90% of people and greater than 70nmol/l in 26 % of these.

It has been consistently shown that vitamin D can be efficiently and sufficiently produced at doses of UV below those which cause sunburn (i.e. reddening of the skin). Additional UV exposure provides no additional vitamin D but increases the levels of DNA damage and increases the risk of skin cancer.

Some unprotected exposure in the hours closest to solar noon may be necessary but people should *not* be advised to deliberately sunbathe or expose themselves to the sun for long periods of time without protecting themselves with a sunscreen or covering up.

For vitamin D synthesis little and often is best i.e. two or three short sunlight exposures per week are sufficient to achieve vitamin D levels between April and September in the UK. During winter months there is not enough UVB for vitamin D synthesis and the body relies on tissue stores. For those who achieve a sufficient supply of vitamin D in summer they will normally keep levels greater than 25nmol/l in winter even without supplements.¹

The [National Osteoporosis Society](#) suggests **trying to get ten minutes of sun exposure to bare skin (face and arms), once or twice a day, without sunscreen and taking care not to burn**^{2,3}

Appendix 4 Reference Sources:

Statement abridged from consensus Vitamin D position statement December 2010 – based on the unified views of the British Association of Dermatologists, Cancer Research UK, Diabetes UK, the Multiple Sclerosis Society, the National Heart Forum, the National Osteoporosis Society and the Primary Care Dermatology Society - <http://www.bad.org.uk/desktopDefault.aspx?TabId=1221>

National Osteoporosis Society. Healthy Living for Strong Bones. December 2011. <http://www.nos.org.uk/~document.doc?id=981>

National Osteoporosis Society. Healthy bones – facts about food. June 2011. <http://www.nos.org.uk/~document.doc?id=395>

Diagnosis & Management Guideline Reference Sources:

Pearce SH, Cheetham TD. Diagnosis and management of vitamin D deficiency. BMJ 2010;340:b5664.

UKMi Q&A 82.3. What dose of vitamin D should be prescribed for the treatment of vitamin D deficiency? 7th April 2015. Accessed at <https://www.evidence.nhs.uk/Search?q=UKMi+what+dose+of+vitamin+D> .

National Osteoporosis Society. Vitamin D and Bone Health: A Practical Clinical Guideline for Patient Management. April 2013. Available at <https://www.nos.org.uk/> - <https://nos.org.uk/media/2073/vitamin-d-and-bone-health-adults.pdf>

East and South East England Specialist Pharmacy Services. Vitamin D deficiency and insufficiency - using appropriate available products. August 2014. Accessed via <http://www.medicinesresources.nhs.uk/en/Communities/NHS/SPS-E-and-SE-England/Medicines-Information/North-London-Regional-MI-Network/Vitamin-D-deficiency-and-insufficiency-using-appropriate-available-products/> on 17/02/2015

UKMi Q&A 387.4 Which vitamin D preparations are suitable for a vegetarian or vegan diet? May 2015 Accessed at <http://www.evidence.nhs.uk/search?q=%22Which%20Vitamin%20D%20preparations%20are%20suitable%22&syn=False&om=%5B%7B%22srn%22%3A%5B%22%20ukmi%20%22%5D%7D%5D>

Document Control Sheet

Document Title	Diagnosis and Management of Vitamin D Deficiency in Adults in Primary Care
Version and Date	Version 10 April 2023
Status	Supported by the NHS Norfolk and Waveney Prescribing Reference Group – January 2016
Owner	Ian Small, Prescribing & Medicines Management Team, NEL CSU (Anglia POD)
File Location	U:\Fiona on Buffalo\Prescribing Reference Group\2016\February 2016
Produced by	Original Author: Susan George, Medicines Management Pharmacist. Updated by Fiona Marshall, TAG Lead Pharmacist, Prescribing and Medicines Management Team, NEL CSU Anglia, for the Norfolk & Waveney Prescribing Reference Group
Consultation (Roles and Groups)	Prescribing Reference Group, Therapeutics Advisory Group, local consultant specialists
Synopsis / outcomes of Equality Impact Analysis	Guideline only – no impact
Training implications	None – part of GPs' usual practice
Dissemination	Is there any reason why any part of this document should not be available on the public web site? No
Approved by (Committee)	Norfolk and Waveney Therapeutics Advisory Group (TAG) (3 rd May 2012) and the NHS N&W Drug & Therapeutics Commissioning Group (17 th May 2012). Updated by the Prescribing Reference Group (PRG) – April 2013, April 2014 & February 2016.
Date approved/ratified	4 th April 2013 / 2 nd May 2013; April & August 2014; February 2016 and February 2018 (PRG) and NEL CSU Anglia PMMT
Next review due	April 2025



Version Control

Version	Date	Author/Editor	Status	Comment
1.	Oct 2011	Susan George	Draft	Used within NHS Great Yarmouth & Waveney as a draft only
2.	May 2012	Prescribing Reference Group working group	Superseded	Full review
3.	June 2012	Edited by Fiona Marshall	Superseded	Sunvite Vitamin D3 tablets 25µg corrected to 1000 IU
4.	Feb– March 2013	Updated by Fiona Marshall following review by the Prescribing Reference Group	Draft v1	Duration of once-weekly treatment of deficiency changed from 12 to 10 weeks in line with NNUH practice, based on PrescQIPP Bulletin 20 July 2012.

				<p>Advice added regarding patients who have specialist input who may require maintenance treatment on FP10.</p> <p>Products and prices updated in line with East & South East England Specialist Pharmacy Services document "Vitamin D deficiency and insufficiency – Using appropriate available products (January 2013)".</p>
4.	April 2013	Updated by Fiona Marshall following further review by the Prescribing Reference Group.	Superseded	<p>Order of treatment regimens for Vitamin D deficiency swapped and also aligned to 10 weeks instead of 12 weeks for both options as per NNUH clinical practice, and based on PrescQIPP Bulletin 20 July 2012 – added to references listed.</p> <p>Order of recommended products changed to prioritise Bio-Vitamin D3 and Adcal.</p>
5.	April 2014	Updated by Fiona Marshall following further review by the Prescribing Reference Group.	Superseded	<p>Reference ranges for vitamin D deficiency, insufficiency and adequacy amended in line with NOS guidelines 2013 http://www.nos.org.uk/document.doc?id=1352 , and to report vitamin D levels as 25OHD. Reference to NNUH reported levels updated to state that NNUH labs are now reporting in line with NOS guidance.</p> <p>Appendices also updated to include Aciferol liquid and tablets, Osteocaps, and Desunin 800iu tablets, with current prices.</p>
6.	August 2014	Updated by Fiona Marshall on behalf of NEL CSU PMMT.	Superseded	<p>Appendices 1 and 3 amended to include SunVit D3 tablets, and to update prices of Pro D3 capsules.</p>
7.1	October – November 2015	Updated by Fiona Marshall on behalf of NEL CSU PMMT for consideration by the Prescribing Reference Group – December 2015 (however meeting was cancelled).	Draft	<p>NOS-recommended loading dose regimen added to treatment of deficiency section as per UKMi Q&A 82.3</p> <p>Key references updated.</p> <p>Licensed products added and highlighted, with links to SPCs and PILs</p>
7.2	January - February 2016	Updated by Fiona Marshall on behalf of NEL CSU PMMT for consideration by the Prescribing Reference Group – January 2016.	Superseded	<p>Updated with further licensed options, prices and costs of dosage regimens.</p> <p>PRG Feb2016 agreed to recommend use of licensed options only for provision via NHS Rx.</p>
8.1	January to March 2018	Updated by Fiona Marshall on behalf of NEL CSU PMMT - supported by the Prescribing Reference Group – February 2018.	Superseded	<p>Recommended treatment regimen for vit D deficiency amended to Invita D3 50,000 IU capsules or 50,000 IU/mL oral solution taken once weekly for 6 weeks.</p> <p>Recommended products for treating deficiency on FP10 amended to licensed options providing 300,000 IU over a 6 week period.</p>
9.0	April 2019	Updated by Fiona Marshall, AGEM CSU MOT - supported by the PRG – April 2019.	Superseded	<p>Thresholds for vitamin D deficiency, insufficiency & adequate revised in line with NOS Guidance Dec 2018</p>
10.0	April 2023	Updated by Natalie Cunningham, NHS Norfolk & Waveney ICB MOT	Current	<p>Addition of ICS logo. Updated patient information link. InVita D3 capsules added to Appendix 1. Appendix 3 separated into two sections – combination products and Colecalciferol only containing products. Products also rearranged with the most-cost effective products being first. Addition of Allissa</p>

