Vitamin D Guidance for Primary Care
Ruth Dales Prescribing Advisor October 2013

ADULTS - Management Flowchart

Does the patient have any risk factors or symptoms?*

Yes
Symptoms/Signs; Lifestyle advice* Investigations Therapeutic intervention

No
No investigations required. Give lifestyle advice*
NB ALL pregnant and breast feeding women should take 400IU (10µg) vitamin D daily*

Arrange Investigations
25OHD levels, U+Es, eGFR, calcium, phosphate, alkaline phosphate (LFTs), Ferritin (FBC) to identify multiple vitamin deficiencies

Risk Factors Only
Lifestyle advice* No investigations are required if the patient is asymptomatic
Recommend daily self treatment with purchased supplement 8 of 1000-2000 IU Vitamin D daily (400 IU in pregnancy) unless contraindicated
Recommend prescribing colecalciferol 800IU capsules, 2 capsules daily in those >65years who are housebound or institutionalised unless contraindicated (colecalciferol 400unit / calcium carbonate 1.5g tablets 2 tablets daily if dietary calcium is not adequate)
NB ALL pregnant and breast feeding women should take 400IU (10µg) vitamin D daily. Refer to health visitor for Healthy start vitamins^*

Insufficiency / maintenance
Vitamin D levels (25OHD) 25-50nmol/L (12-20ng/ml)
- Recommend OTC 4 colecalciferol 1000-2000 IU (25-50µg) daily
- OR consider prescribing colecalciferol 800IU capsules, 2 capsules daily (licensed product, contains peanut oil and gelatine, suitable for Halal and Kosher diets)
- OR consider prescribing colecalciferol 400unit / calcium carbonate 1.5g tablets 2 tablets daily if dietary calcium is not adequate

Treatment of Deficiency
Vitamin D levels (25OHD) <25nmol/L (12ng/ml)
Colecalciferol 800IU, 4 capsules (3,200 IU) daily for 12 weeks then oral maintenance as above (licensed product, contains peanut oil and gelatine, suitable for Halal and Kosher diet)

OR
Alternative where peanut allergy/ vegetarian
Colecalciferol 800IU, 5 tables (4000IU) daily for 12 weeks then oral maintenance of 2 tablets daily (licensed product does not contain gelatine, soya or peanut oil)

OR
Alternative ONLY where GI absorption is an issue
IM injection of ergocalciferol 300,000 IU** 2 injections 3 months apart followed by maintenance treatment as either oral doses above or regular injections once per year (licensed product)

Pregnancy and Breast Feeding
The recommended dose for ALL pregnant/ breast feeding women is 400IU (10µg) daily which can be achieved by referring for Healthy Start vitamins^ or prescribing colecalciferol 400unit / calcium carbonate 1.5g tablets, 1 daily
Breast fed babies of women found to be insufficient/ deficient should be supplemented ^ Refer pregnant women found to be deficient to specialist

Refer to Specialist if:
- Significant renal impairment, renal disease/ stones
- Abnormal Calcium
- TB, sarcoidosis
- Liver disease, lymphoma, metastatic cancer
- Parathyroid disorders
- Atypical biochemistry (persistent hypophosphataemia, elevated creatinine)
- Focal bone pain
- Deficiency that fails to respond to treatment

Further assessment required consider referral to Bone Health (or to Obstetrics for pregnant women)

Patients’ family is likely to have similar risk of Vitamin D deficiency – consider investigation and treatment if necessary

Retesting
Deficiency
1 month serum calcium and renal profile 25OHD levels
6 months

Insufficiency
No routine monitoring is required for maintenance doses, unless symptoms re-occur or do not resolve

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*Please see Note 1
* Please see Note 2
^ Please see Note 3
**to convert IU to µg calciferol, divide by 40
CHILDREN – Management Flowchart

Does the child have any risk factors or symptoms?*

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No investigations required. Give Lifestyle advice*

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Risk Factors Only

Lifestyle advice** AND supplementation

- All children 6 months to 5 years of age should take a daily supplement
- Children who are having 500ml of formula milk a day do not need supplementation
- Breast fed infants may need supplementation from one month of age if the mother has not had vitamin D supplementation

Recommended vitamin D supplement

- 0-5 years: 280-340IU (7-8.5 µg) daily
- 5 years plus: 400IU (10µg) daily

Multivitamins containing vitamin D (e.g. Abidec®/Dalavit® drops) are available from pharmacies and other retailers. Care must be taken to follow individual product information to avoid vitamin A toxicity.

Children under the age of 4 years refer to Health Visitor for Healthy Start vitamins

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Symptoms/Signs

Lifestyle advice
Investigations
Therapeutic intervention

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Arrange Investigations

25OHD levels, U+Es, calcium, phosphate, alkaline phosphate (LFTs), magnesium (infants), Hb and Ferritin (FBC) to identify multiple vitamin deficiencies

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Insufficiency/ maintenance

Vitamin D levels (25OHD) 25-50nmol/L (12-20ng/ml)

Lifestyle advice** AND prescribe

Pro-D3® Liquid drops 100 IU/ drop (20ml) (Suitable for vegetarian, halal and kosher diets. Does not contain peanut oil, or gelatine)

- 0-6 months: 400 IU (4 drops) daily adjusted as necessary
- Over 6 months: 400-800 IU (4-8 drops) daily adjusted as necessary

Colecalciferol 800IU capsules

- 12 years and over 800IU (1 capsule) daily

Treatment of Deficiency

Vitamin D levels (25OHD) <25nmol/L (12ng/ml)

Lifestyle advice AND prescribe

NphD3 solution** (colecaciferol 3,000 units/ml) 100ml (Suitable for vegetarian, halal and kosher diets. Does not contain peanut oil, or gelatine)

- 0-6months: 3000 IU (1ml) daily
- 6months - 12years: 6000 IU (2ml) daily
- 12-18years: capsules/tablets as per the adult flow chart

Course length is 8 weeks followed by maintenance as above.

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Retesting

Deficiency

1 month: serum calcium, renal profile
3 months: 25OHD levels, serum calcium, Alkaline phosphate (LFTs)

Insufficiency

No routine monitoring is required for maintenance dose, unless symptoms re-occur or do not resolve

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For children refer to specialist if:

- Family history (parent, siblings) with severe rickets
- Abnormal calcium.
- Atypical biochemistry (persistent hypophosphataemia, elevated creatinine)
- Failure to reduce alkaline phosphatase levels within 3 months
- Intestinal malabsorption or chronic liver disease
- Infants under one month with calcium < 2.1mmol/l at diagnosis as risk of seizure. Check vitamin D level of mothers in this group immediately and treat, particularly if breast feeding.
- Deficiency established with absence of known risk factors

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Patients’ family is likely to have similar risk of Vitamin D deficiency – consider investigation and treatment if necessary

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*Please see Note 1
** Please see Note 2
# Please see Note 3
** For more information see Note 4

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Note 1 – Risk Factors, Signs, Symptoms

Risk Factors for Vitamin D deficiency

<table>
<thead>
<tr>
<th>Inadequate UV light exposure</th>
<th>Poor dietary intake</th>
<th>Metabolic risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Northern latitude (applies to Rotherham)</td>
<td>• Malabsorption including short bowel and cholestatic jaundice, crotches, cystic fibrosis, coeliac disease.</td>
<td>• Reduced synthesis: elderly over 65 years</td>
</tr>
<tr>
<td>• Air pollution</td>
<td>• Cholestryramine use</td>
<td>• Infants and young children under 5 years</td>
</tr>
<tr>
<td>• Occlusive garments</td>
<td>• Exclusively breast fed infants of mothers who have not taken vitamin D supplements during pregnancy/breast feeding</td>
<td>• Pregnant and breastfeeding women particularly multiple short interval pregnancies, teenage and young women</td>
</tr>
<tr>
<td>• Habitual sunscreen use</td>
<td></td>
<td>• Obesity</td>
</tr>
<tr>
<td>• Dark pigmented skin</td>
<td></td>
<td>• Increased breakdown</td>
</tr>
<tr>
<td>• Institutionalised/ housebound</td>
<td></td>
<td>• Drugs (rifampicin, anticonvulsants, HAART, glucocorticoids)</td>
</tr>
<tr>
<td>• Poor mobility i.e. wheelchair dependency</td>
<td></td>
<td>• Reduced stores: liver disease</td>
</tr>
</tbody>
</table>

Clinical features/ symptoms of Vitamin D deficiency

<table>
<thead>
<tr>
<th>Symptom, sign, biochemistry</th>
<th>Children</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seizures</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Tetany</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Hypocalcaemia</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Irritability</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Leg bowing</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Knock knees</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Impaired linear growth</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Delayed walking</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Limb girdle pain</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Muscle pain</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Proximal myopathy</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Impaired innate antimycobacterial immunity</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Delayed fontanelle closure</td>
<td>√</td>
<td></td>
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<tr>
<td>Painful wrist swelling</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>
Note 2  Lifestyle advice

Sunlight
Mankind derives >90% of its vitamin D from ultraviolet B light exposure\(^1\). The amount of sun exposure required to produce a set amount of vitamin D varies with latitude, season, time of day and skin type.

For adults in the UK exposure of the hands, face and arms for 20-30 minutes (this increases to 3-10x this for dark pigmented skin) 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\(^2,3\).

Sunscreens with SPF 15 or greater are essential to prevent skin damage with longer sun exposure but will reduce Vitamin D synthesis by 99%\(^1,3\). Advising to omit sunscreen for short, incidental sun exposures would be reasonable\(^2\). Deliberate exposure to sunlight between 11:00 and 15:00 in the summer months is not advised\(^2\).

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 (see below) or supplementation (see Note 3).

Diet
Less than 10% of Vitamin D is acquired through diet. It is a micronutrient and as such the naturally occurring amounts in food is small. Only a relatively small number of foods such as oily fish (for example mackerel, salmon and sardines) and eggs naturally contain vitamin D, and these amounts are small. The amount in most vegetable sources is negligible.\(^1\) At the present time, sufficient intake via exogenous sources can only be guaranteed by supplementation.\(^4\)

If adequate sunlight exposure to generate sufficient endogenous colecalciferol is not possible, then a vitamin D supplement is recommended \(^2\) (see Note 3)

ALL infants and children from 6 months to 5 years should receive a supplement unless they are drinking 500ml or more of formula milk each day (as formula milk is supplemented).

Breast fed infants may need supplementation from one month of age if the mother has not had vitamin D supplementation

ALL pregnant and breast feeding women should take 400IU (10µg) vitamin D daily

People aged over 65 years, particularly the housebound or with reduced mobility, should take a vitamin D supplement\(^5,6\) 400 – 2000IU (10-50µg) daily

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Note 3  Over-The-Counter Preparations

Vitamin D preparations for adults available over the counter and online without prescription

Ergocalciferol (vitamin D₂) and colecalciferol (vitamin D₃) are not equivalent, colecalciferol (Vitamin D₃) is the preparation of choice as ergocalciferol has less than a third of the potency of colecalciferol.

Vitamin D supplements can be purchased from pharmacies, supermarkets, health food shops and over the internet. If patients would usually pay prescription charges it may work out cheaper to buy. The following list is not exhaustive.

<table>
<thead>
<tr>
<th>Product</th>
<th>Suitable for vegetarians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Start Vitamins for Pregnant women Vitamin D₃ 10µg (400IU) per tablet</td>
<td>Suitable for vegetarians and free from milk, egg, gluten, soya and peanut residues</td>
</tr>
<tr>
<td>Holland and Barrett Sunvite D₃ Fast acting liquid 25µg (1000IU)/ 10drops, 10µg (400IU)/ 4drops</td>
<td>Yes</td>
</tr>
<tr>
<td>BioLife Vitamin D₃ 25µg (1000IU) tablets</td>
<td>Yes</td>
</tr>
<tr>
<td>Holland and Barrett Sunvite Vitamin D₃ 25µg (1000IU) caplets</td>
<td></td>
</tr>
<tr>
<td>Boots Pharmaceuticals Vitamin D₃ 25µg (1000IU) tablets</td>
<td></td>
</tr>
<tr>
<td>Nature’s Remedy Vitamin D₃ 25µg (1000IU) tablets/capsules</td>
<td>Yes</td>
</tr>
<tr>
<td>Vitamind3uk Vitamin D₃ 1000IU microtablets</td>
<td>Yes</td>
</tr>
<tr>
<td>Carlson Vitamin D₃ 50µg (2000IU) per drop</td>
<td></td>
</tr>
<tr>
<td>Pure Essence Labs Vitamin D₃ 50µg (2000IU) capsule</td>
<td></td>
</tr>
<tr>
<td>Vitamind3uk Vitamin D₃ 2000IU microtablets (easy to swallow/disintegrate in the mouth)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Multivitamin preparations for Children available over the counter and online without prescription

<table>
<thead>
<tr>
<th>Product</th>
<th>Source</th>
<th>Suitable for vegetarians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Start Vitamin Drops for Children Vitamin D₃ 300IU/ 5 drops</td>
<td>Application forms: call the Healthy Start helpline on 0845 607 6823 asking them to send one to patients home by post <a href="http://www.healthystart.nhs.uk">www.healthystart.nhs.uk</a></td>
<td>Suitable for vegetarians and free from milk, egg, gluten, soya and peanut residues</td>
</tr>
<tr>
<td>Abidec® Vitamin D₂ 400IU/0.6ml Contains arachis oil; avoid in those with allergy to peanuts</td>
<td>Pharmacies</td>
<td></td>
</tr>
<tr>
<td>Dalavit® Vitamin D₂ 400IU/0.6ml</td>
<td>Pharmacies</td>
<td>Suitable for vegetarians, orthodox Jews, Hindus, Muslims if keen to avoid animal source</td>
</tr>
</tbody>
</table>
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Ruth Dales Prescribing Advisor October 2013

**Note 4**

NphD3 solution (colecalciferol 3,000 units/ml) 100ml (Contains only colecalciferol Ph.Eur and sunflower oil Ph.Eur) This product is a special and is manufactured by the Department of Pharmacy, Northwick Park Hospital. They have been making colecalciferol oral solution for some time and it is in an MHRA licensed facility, is fully QC tested and has full stability data (Certificate of Analysis available if required). The price is less than half that of similar products and they only use pharmacopoeial grade ingredients. Once a customer is on the system, the products are delivered the next working day.

Pack size: 100ml Price: £47.30 Order code: COL 712
Shelf life: 12 months from date of manufacture. Store at room temperature. No in-use shelf life (i.e. no need to discard 28 days after first opening).

For further information, contact nwlp-tr.pharmacyspecials@nhs.net
To place an order, please call 020 8869 2295 or fax 020 8869 2370

There is no minimum order charge. Orders received by 12 noon will be will be delivered by 17.00hr the next working day.

**Northwick Park Hospital Specials**

MHRA Licence number: MS 13045

Department of Pharmacy, Northwick Park Hospital, Watford Road, Harrow, Middlesex HA1 3UJ.

**References**

1. Diagnosis and management of vitamin D deficiency Clinical Review Simon HS Pearce, Tim D Cheetham, BMJ 2010 340:b5664
5. Vitamin D - Advice on supplements for at risk groups. UK CMO Cascade letter February 2012
6. Prevention and Management of Hip Fracture in Older People SIGN guidance no. 56 January 2002
7. Vitamin D2 is much less effective than Vitamin D3 in humans Armas LAG, Hollis BW, Heaney RP (2004). J Clin Endocrinol Metab 89 p5387-5391

**Bibliography**

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- Antenatal Care, Routine care for the healthy pregnant woman. NICE CG62 March 2008
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- Vitamin D and Bone Health: a Practical Clinical Guideline for Patient Management. National Osteoporosis Society April 2013
- What dose of vitamin D should be prescribed for the treatment of vitamin D deficiency? UKMi Medicines Q&As 82.1 Prepared by the UKMi pharmacists 29th October 2010

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