Policy Statement: Prescribing of Vitamin and Minerals

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Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH
Nutrition and Dietetic department.
### Summary

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Indication</th>
<th>Dose</th>
<th>Review</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adult</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamin and mineral</td>
<td>Medically diagnosed deficiency</td>
<td>1 forceval capsule daily, one hour after a meal</td>
<td>3- 6 months (1) Continued need should be reviewed regularly</td>
</tr>
<tr>
<td></td>
<td>Malnutrition including alcoholism</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>See also bariatric surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adult</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paediatric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamin and mineral</td>
<td>6 months to 5 years are given every day.</td>
<td>Daily vitamin supplements containing vitamins A, C and D</td>
<td>Until 5 years Purchased OTC</td>
</tr>
<tr>
<td></td>
<td>A-Z Vitamin and Minerals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>General deficiency</td>
<td>Vitamin A should not be prescribed to patients for concerns regarding general deficiency.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patients should be advised to purchase this OTC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cystic Fibrosis</td>
<td>See section on Cystic Fibrosis</td>
<td></td>
</tr>
<tr>
<td>B Vitamins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiamine</td>
<td>Wernicke-Korsakoff syndrome</td>
<td>200 – 300mg per day (in divided doses) whilst the patient is undergoing assisted withdrawal, or are drinking excessively</td>
<td>Annually based on drinking habits</td>
</tr>
<tr>
<td></td>
<td>Beriberi</td>
<td>50mg as a single daily dose during the maintenance stage following withdrawal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deficiency related to chronic alcoholism</td>
<td>Chronic alcohol dependence, oral thiamine may need to be continued indefinitely.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chronic alcohol dependence, oral thiamine may need to be continued indefinitely.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitamin B Compound Strong</td>
<td>Vitamin B Compound Strong NOT Vitamin B Compound or Complex (unless for use in tube fed patients)</td>
<td>De-prescribe when clinical manifestations resolve.</td>
</tr>
<tr>
<td></td>
<td>Proven clinical and sub-clinical deficiency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Indication</th>
<th>Dose</th>
<th>Review</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vitamin C</strong></td>
<td>Claims that vitamin C ameliorates colds or promotes wound healing have not been proven</td>
<td><strong>Ascorbic acid should not be prescribed to patients.</strong></td>
<td>Patients should be advised to purchase this OTC</td>
</tr>
<tr>
<td><strong>Vitamin D</strong></td>
<td>Proven clinical deficiency</td>
<td>See GWH 3T’s ‘Treatment of Vitamin D deficiency in Adults’</td>
<td>For maintenance dose, this should be purchased OTC as per NHSE OTC Consultation.</td>
</tr>
<tr>
<td></td>
<td>Osteoporosis</td>
<td>Calcium and vitamin D can be prescribed for osteoporosis management.</td>
<td>Vitamin D as a standalone treatment, can be prescribed when there is sufficient calcium in the diet.</td>
</tr>
<tr>
<td></td>
<td>Bariatric Surgery</td>
<td>See section on Bariatric Surgery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cystic Fibrosis</td>
<td>See section on Cystic Fibrosis</td>
<td></td>
</tr>
<tr>
<td><strong>Vitamin E</strong></td>
<td>General deficiency</td>
<td><strong>Vitamin E should not be prescribed to patients for concerns regarding general deficiency.</strong></td>
<td>Patients should be advised to purchase this OTC</td>
</tr>
<tr>
<td></td>
<td>Cystic Fibrosis</td>
<td>See section on Cystic Fibrosis</td>
<td></td>
</tr>
<tr>
<td><strong>Anaemias</strong></td>
<td><strong>Disease Specific Vitamin and Mineral Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutrient</td>
<td>Indication</td>
<td>Dose</td>
<td>Review</td>
</tr>
<tr>
<td><strong>B12</strong></td>
<td>See section on B12 algorithm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Folate</strong></td>
<td>Hb (µmol/L)</td>
<td>Child 1–11 months</td>
<td>Annual blood test</td>
</tr>
<tr>
<td></td>
<td>Male &lt; 14</td>
<td>Initially 500 micrograms / kg once daily (max. per dose 5 mg) for up to 4 months, doses up to 10 mg daily may be required in malabsorption states.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female &lt; 11 AND MCV &gt; 100</td>
<td>Child 1–17 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 mg daily for 4 months (until term in pregnant women), doses</td>
<td></td>
</tr>
</tbody>
</table>

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department. August 2018. Review date August 2019.
Iron deficiency anaemia

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Gastric Band and Balloon</th>
<th>Gastric Bypass and Sleeve Gastrectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb (µmol/L)</td>
<td>Ferrous sulphate Tablets (200 mg): Treatment: 1 tablet TDS; Prevention: 1 tablet OD</td>
<td></td>
</tr>
<tr>
<td>Male &lt; 14 Female &lt; 11 AND MCV &lt; 80</td>
<td>Capsules (310 mg): Treatment: 1 capsule BD; Prevention: 1 capsule OD</td>
<td></td>
</tr>
<tr>
<td>Adults 5 mg daily for 4 months (until term in pregnant women)</td>
<td>Doses up to 15 mg daily may be required in malabsorption states.</td>
<td></td>
</tr>
</tbody>
</table>

Doses up to 15 mg daily may be required in malabsorption states.

Annual blood test
Deprescribe when levels are within range.
Provide dietary advice to minimise risk of reoccurrence of deficiency.

Bariatric Surgery (2) (3)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Gastric Band and Balloon</th>
<th>Gastric Bypass and Sleeve Gastrectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 2 weeks post op:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamin, minerals &amp; trace elements (Forceval soluble is preference)</td>
<td>1 daily chewable / liquid / dissolvable</td>
<td>1, twice daily chewable / liquid / dissolvable</td>
</tr>
<tr>
<td>Calcium &amp; Vitamin D: Accrete D3 One a Day is preference</td>
<td>One tablet ONECE daily</td>
<td></td>
</tr>
<tr>
<td>After 2 weeks, lifelong (unless stated otherwise):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamins, minerals &amp; trace elements (A-Z complete) – Forceval capsule is preference</td>
<td>One tablet ONECE daily</td>
<td>One tablet ONECE daily</td>
</tr>
<tr>
<td>Thiamine (Vitamin B1) (over the counter)</td>
<td>50-100mg daily</td>
<td></td>
</tr>
<tr>
<td>Calcium &amp; Vitamin D: Accrete D3 One a Day is preference</td>
<td>One tablet ONECE daily</td>
<td></td>
</tr>
<tr>
<td>Vitamin D (over the counter)</td>
<td>25mcg twice daily</td>
<td></td>
</tr>
<tr>
<td>Ferrous fumarate</td>
<td>Not routine</td>
<td>300mg daily</td>
</tr>
<tr>
<td>Vitamin B12 (hydroxycobalamin)</td>
<td>Not routine</td>
<td>1mg IM 3 monthly Start 6 months postop</td>
</tr>
<tr>
<td>Planning for and during pregnancy (advise to plan pregnancy after 12-18months)</td>
<td>As above but ensure vitamin A in A-Z is in beta carotene form (Forceval capsules fine).</td>
<td>As above but reduce A-Z to once a day and ensure vitamin A is in beta carotene form (Forceval capsules fine).</td>
</tr>
</tbody>
</table>

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department. August 2018. Review date August 2019.
of operation – ideally wait until weight stable) | Plus 5mg folic acid for at least 3 months pre-conception & up until 13th week of pregnancy. | Plus 5mg folic acid for at least 3 months pre-conception & up until 13th week of pregnancy.

Cystic Fibrosis

**Vitamin A and Vitamin D**

| Dose recommended by secondary care specialist | Vitamins A and D capsules BPC 1973 |

**Vitamin E**

| Dose recommended by secondary care specialist | Valupak Vitamin E 100unit capsules £0.77 / 30 caps |
| Valupak Vitamin E 400unit capsules £1.78 / 30 caps |

If a liquid preparation is required, the licensed **Alpha tocopheryl acetate 500mg/5ml oral suspension** is the preferred option.

**Vitamin K**

Secondary care initiation only

<table>
<thead>
<tr>
<th>Type of feed</th>
<th>EBM</th>
<th>Fortified EBM</th>
<th>Preterm formula</th>
<th>Post discharge formula</th>
<th>Term formula</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vitamins</strong></td>
<td>0.6ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
</tr>
<tr>
<td><strong>Folic acid</strong></td>
<td>50 microgram OD when on full feeds until 6 weeks post EDD</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td><strong>Sytron</strong></td>
<td>0.5ml/kg up to a max of 1ml OD when on full feeds. Start only on Day 28. Continue until 6 months post EDD</td>
<td>0.5ml/kg up to a max of 1ml OD when on full feeds. Start only on Day 28. Continue until 6 months post EDD</td>
<td>NIL</td>
<td>NIL</td>
<td>0.5ml/kg up to a max of 1ml OD when on full feeds. Start only on Day 28. Continue until 6 months post EDD</td>
</tr>
<tr>
<td><strong>Phosphate</strong></td>
<td>Usually stopped prior to discharge</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
</tbody>
</table>

**Refeeding Syndrome (1)**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Dose</th>
<th>Review</th>
</tr>
</thead>
</table>

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| **B vitamins**       | Thiamine: 200-300 mg per day (in divided doses)  
Vitamin B vitamin compound strong 1-2 tablets three times daily,  
*or* Vitamin B Complex crushed if swallowing difficulties. | Prescribed for the first ten days from when feeding recommences.  
Supply is provided on discharge; GP not to continue the prescription |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multivitamin and mineral</strong></td>
<td>Forceval 1 capsule OD, or Forceval Soluble one tablet OD dissolved in water if swallowing difficulties</td>
<td>Until adequate oral diet re-established</td>
</tr>
</tbody>
</table>

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.  
Introduction
Vitamins and minerals are essential nutrients which most people should get from eating a healthy, varied and balanced diet. Patients should be advised that this can be achieved by eating a balance of starchy foods (wholegrain where possible) with plenty of fruit and vegetables (at least five to ten portions a day, with more emphasis on vegetables); two to three portions of protein-rich foods; two to three portions of milk and dairy foods; and not too much fat, salt or sugar (4). This will give them all the nutrients they need. The Eatwell Guide is a very useful tool which can be used to demonstrate to people how a healthy, varied and balanced diet can be achieved and what proportion of each food type should be consumed (4).

Multivitamins and Minerals
Patients should only be prescribed vitamin and mineral preparations if there is an ACBS approved indication, i.e. only in the management of actual vitamin or mineral deficiency (5); they are not to be prescribed as dietary supplements or as a general "pick-me-up" (6).

Vitamins and minerals prescribed on FP10 for patients who are not being treated in-line with an ACBS approved indication should be discontinued (6).

If patients still want to take vitamins and minerals for dietary supplementation or as a "pick-me-up" they should be advised that they should be purchased as self-care over-the-counter with the support of the community pharmacist (4) (6).
New prescriptions for vitamin and mineral preparations should not be initiated unless they are for the management of actual or potential vitamin or mineral deficiency in-line with an ACBS approved indication (4) (6). Multivitamin and mineral preparations are included in NHS England consultations on medications of low clinical value that should not routinely be prescribed.

Some patients may be eligible for NHS Healthy Start vitamins which are specifically designed for pregnancy, breastfeeding and growing children. They are available free of charge from local distribution points. More information is available from the Healthy Start website: https://www.healthystart.nhs.uk/healthy-start-vouchers/healthy-start-vitamins/ (6) (7)

Certain patients with malnutrition may require a vitamin and mineral supplementation (1).

Forceval is the only complete multivitamin and mineral available on prescription (6) (8). In addition, it also has the correct balance of micronutrients, in particular zinc and copper to aid nutrient absorption (8). Other preparations, e.g. vitamin capsules have a limited nutrient content and the patient would be better advised to purchase as OTC A-Z multivitamin and mineral supplement.

Paediatric Vitamins
Department of Health recommends that all children aged 6 months to 5 years are given vitamin supplements containing vitamins A, C and D every day (9) (10). These should be purchased OTC unless directed by a healthcare professional (see section on premature infant supplementation).

It's also recommended that babies who are being breastfed are given a daily vitamin D supplement from birth, independently of whether the mother is taking a multivitamin and mineral supplement (9) (10).

Babies who are having more than 500ml (about a pint) of infant formula a day shouldn't be given vitamin supplements. This is because formula is fortified with vitamin D and other nutrients (9) (10).

Pregnant women, women with a child under 12 months and children aged from six months to four years who are receiving Healthy Start vouchers are entitled to free Healthy Start vitamins.

Healthy Start vitamins contain vitamins A, C and D for children aged from six months to four years, and folic acid and vitamins C and D for pregnant and breastfeeding women. The Healthy Start website has more information on the scheme: https://www.healthystart.nhs.uk/for-health-professionals/vitamins/

B Vitamins including Vitamin B Co Strong / Vitamin B Compound
Dental Patients
It is unjustifiable to treat stomatitis or glossitis with mixtures of vitamin preparations; this delays diagnosis and correct treatment (8).

Most patients who develop a nutritional deficiency despite an adequate intake of vitamins have malabsorption and if this is suspected the patient should be referred to a medical practitioner (8).

Thiamine
For the treatment of thiamine deficiencies due to increased dietary requirements, reduced intakes, reduced absorption or increased excretion. Also for treatment of Wernicke-Korsakoff syndrome, beriberi and thiamine deficiency related to chronic alcoholism.

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
Unless clinically indicated due to severe deficiency, patients should be encouraged to have a balanced diet or purchase an over-the-counter A-Z multivitamin and mineral supplement.

For those with an identified severe deficiency, the appropriate dose is 200-300mg per day in divided doses.

**Vitamin B Co Strong / Vitamin B Compound**

If using Vitamin B for other indications, it is recommended to use vitamin B co strong tablets as there are potentially significant cost saving but no difference in nutritional content. Each tablet contains 20mg Nicotinamide, 2mg Pyridoxine Hydrochloride, 2mg Riboflavin, 4.85mg Thiamine Mononitrate.

- Vitamin B compound: 28 tablets = £26.63
- Vitamin B compound strong: 28 tablets = £1.55

Clinical indications include, treatment of clinical and sub-clinical vitamin B deficiency states (manifestations of which include glossitis, stomatitis, cheilosis, the heart manifestations of beriberi, the skin manifestations of pellagra, corneal vascularisation and polynicoritis).

**Alcohol misuse and Wernicke’s encephalopathy**

Wernicke’s encephalopathy is a state of mental confusion, ataxia and ophthalmoplegia that may develop in problem drinkers. People who are alcohol-dependent are often malnourished and deficient in vitamins, particularly in thiamine, due to poor diet, poor absorption, and a high demand for the vitamin – thiamine has a role as a co-enzyme in alcohol metabolism (11).

If vitamin supplementation is being initiated in primary care, GPs may follow CKS guidance:

**Oral thiamine should be offered to dependent drinkers when:**

- They have decompensated liver disease
- They are in acute alcohol withdrawal
- Medically-assisted alcohol withdrawal is planned and
  - They are malnourished or have a poor diet
  - There is weight loss/reduced BMI
  - There is a loss of appetite or nausea and vomiting are present

Unless there is severe malnutrition, oral thiamine should be prescribed as:

- thiamine 200 – 300mg per day (in divided doses) whilst the patient is undergoing assisted withdrawal, or are drinking excessively
- thiamine 50mg as a single daily dose during the maintenance stage following withdrawal, and for as long as malnutrition may be present.
- in chronic alcohol dependence, oral thiamine may need to be continued indefinitely.

Vitamin B compound & vitamin B compound strong tablets are combinations of various B vitamins, including thiamine. They have been used historically in patients with alcohol-use disorder. However, NICE (CG 100) makes no reference to the use of these preparations due to a lack of evidence – neither of these products contains enough thiamine for treatment/prophylaxis of Wernickes encephalopathy (1mg thiamine per Vit B co tab, 5mg thiamine per Vit B co strong tablet)
Vitamin C

Background
Ascorbic acid (vitamin C), a water-soluble vitamin, is a cofactor with iron during the hydroxylation of proline and lysine in the production of collagen. Thus, ascorbic acid is important for tissue repair and regeneration.

Deficiency can be associated with impaired fibroblastic function and decreased collagen synthesis, which can result in delayed healing and capillary fragility. Ascorbic acid deficiency is also associated with impaired immune function which can decrease the ability to fight infection.

However, mega doses of vitamin C have not been shown to accelerate wound healing. One blinded, multi-center trial included 88 patients with pressure ulcers who were randomized to receive 10 mg or 500 mg of vitamin C twice daily. The study did not result in improved healing in either of the two groups. The inclusion of fruits and vegetables such as citrus fruits in the diet can achieve the desired recommended daily amount.

Vitamin C (ascorbic acid) therapy is essential in scurvy and severe scurvy causes gingival swelling and bleeding margins as well as petechiae on the skin. This is, however, exceedingly rare and a patient with these signs is more likely to have leukaemia. Investigation should not be delayed by a trial period of vitamin treatment (12).

Recommendation
Claims that vitamin C ameliorates colds or promotes wound healing have not been proven.

Patients wishing to have vitamin C should be advised to purchase this OTC

- For example: Boots Vitamin C 200 mg - 30 Tablets £0.99

Ascorbic acid should not be prescribed to patients.

Review
No review required as no toxicity reported

Vitamin D

Background
The term Vitamin D is used for a range of compounds which possess the property of preventing or curing rickets. They include ergocalciferol (calciferol, vitamin D2), colecalciferol (vitamin D3), dihydrotachysterol, alfalcacidol (1α-hydroxycholecacidol), and calcitriol (1,25-dihydroxycholecacidol).

Preparations containing colecalciferol with calcium carbonate are available for the management of combined calcium and vitamin D deficiency, or for those at high risk of deficiency.

Vitamin D deficiency caused by intestinal malabsorption or chronic liver disease usually requires vitamin D in pharmacological doses.

Vitamin D requires hydroxylation by the kidney to its active form, therefore the hydroxylated derivatives alfalcacidol or calcitriol should be prescribed if patients with severe renal impairment

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require vitamin D therapy. Calcitriol is also licensed for the management of postmenopausal osteoporosis.

The majority of people’s vitamin D supply comes from the sun and limited amounts of the vitamin are found in foods such as oily fish, eggs and fortified cereals and some dairy products. Note organic milk substitutes (soya, almond, oat) are not routinely fortified with additional vitamin D.

High risks for deficiency include the following groups, however, there is no need to routinely test for vitamin D deficiency in those who are asymptomatic (13):

- All pregnant and breastfeeding women, especially teenagers and young women are particularly at risk
- Patients under 5 or aged 65 years and over
- Patients not exposed to much sun, for example those who cover their skin for cultural reasons, who are housebound or confined indoors for long periods
- Ethnic minorities who have darker skin, because their bodies are less able to produce vitamin D
- Obese people (BMI>30)
- Medical risk factors such as renal and hepatic disease, malabsorption
- Other risk factors such as alcoholics, vegetarians or vegans
- Medication - patients taking rifampicin, anticonvulsants or Highly Active Antiretroviral Treatment (HAART)

**Recommendations**

Simple vitamin D deficiency can be prevented by taking an over-the-counter oral supplement of ergocalciferol (calciferol, vitamin D2) or colecalciferol (vitamin D3) daily (14).

https://www.bda.uk.com/foodfacts/VitaminD.pdf

The Scientific Advisory Committee on Nutrition (SACN) guidance document ‘Vitamin D and Health’ (15) applies to England and Wales advises:

- Everyone over the age of four should take 10 micrograms of vitamin D every day, particularly from October to March
- Pregnant and breastfeeding women and at-risk groups (such as people from ethnic minority groups with dark skin, elderly people in care homes and those who wear clothing that cover most the skin) should take 10 micrograms of vitamin D per day all year round
- Children between the age of one and four should take 10 micrograms of vitamin D supplements all year round
- All babies from birth up to one year of age should take 8.5 to 10 micrograms of vitamin D per day (particularly those being breastfed)

In Swindon:

Pregnant women, women with a child under 12 months and children aged from six months to four years who are receiving Healthy Start vouchers are entitled to free Healthy Start vitamins or vitamin drops (7)  [https://www.healthystart.nhs.uk/](https://www.healthystart.nhs.uk/).

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These are available from health visitors or the following locations:

- Ladybirds Family Centre, Westrop Primary School, Rivers Road, Highworth, Swindon, SN6 7DN
- Butterflies Family Centre, Abbey Meads School, Hugo Drive, Abbey Meads, Swindon, SN25 4GY
- Saltway Centre, Pearl Road, Swindon, SN5 5TD
- One Stop Shop, Swindon Borough Council, Beckhampton Street, Swindon, SN1 2JG

Over-the-counter pregnancy vitamins e.g. Pregnacare, Centrum or own-brand are also suitable.

For all others, over-the-counter vitamin D supplements are available from most supermarkets and pharmacies including Boots and Superdrug

Swindon CCG will not be funding vitamin D supplements on prescription for the general population

Review

When to test for vitamin D deficiency (note cost of this is ~£20 per test, only to be requested by secondary care):

- Patients with bone diseases that may be improved with vitamin D treatment or where correcting vitamin D deficiency prior to specific treatment would be appropriate
- Where abnormalities on laboratory investigations are suggestive of vitamin D deficiency e.g. low calcium, low phosphate, isolated or raised ALP or raised PTH
- Musculoskeletal symptoms that could be attributed to vitamin D deficiency or who have symptoms of osteomalacia (proximal myopathy or chronic pain)
- Routine vitamin D testing may be unnecessary in patients with osteoporosis or fragility fracture, who may be co-prescribed vitamin D supplementation with an oral antiresorptive treatment
- Routine monitoring of serum vitamin D is generally unnecessary but may be appropriate in patients with symptomatic vitamin D deficiency, malabsorption and other conditions associated with vitamin D deficiency, and where poor compliance with medication is suspected

Anaemias

Interpreting blood results for Anaemias

<table>
<thead>
<tr>
<th>Hb (µmol/L)</th>
<th>MCV</th>
<th>Anaemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male &lt; 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female &lt; 11</td>
<td>&gt; 100</td>
<td>Folate / B₁₂</td>
</tr>
<tr>
<td>Male &lt; 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female &lt; 11</td>
<td>80 - 100</td>
<td>Anaemia due to chronic disease</td>
</tr>
<tr>
<td>Male &lt; 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female &lt; 11</td>
<td>&lt; 80</td>
<td>Iron deficiency anaemia</td>
</tr>
</tbody>
</table>

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
Iron

Background
Iron deficiency anaemia (IDA) should be treated with oral iron tablets first-line and advice about diet. Iron rich foods include liver (but avoid this during pregnancy), meat, beans, nuts, dried fruit – such as dried apricots, wholegrains – such as brown rice, fortified breakfast cereals and most dark-green leafy vegetables – such as watercress and curly kale.

Iron tablets can cause anorexia and GI effects such as constipation; consideration should be given to the risk: benefit of prescribing in at risk groups, for example the elderly, malnourished in care homes and whether the risk of side effects are outweighed by the benefits.

Recommendations
Ferrous fumarate is the first line choice for prescribing in Swindon:

Tablets: 210mg Contains 68mg iron.
- Recommended doses: Treatment: 1 tablet TDS; Prevention: 1 tablet OD

Capsules: 305mg Contains 100mg iron.
- Recommended doses: Treatment: 1 capsule BD; Prevention: 1 capsule OD

Review
Haemoglobin levels (full blood count) should be checked after 2–4 weeks to assess the person’s response to iron treatment (16).

People should undergo specialist assessment if there is a lack of response (increase of less than 2 g/100 mL in the haemoglobin level) after 2–4 weeks (16).

Once haemoglobin concentration and red cell indices are normal, iron treatment should be continued for 3 months to aid replenishment of iron stores, and then stopped. The person’s full blood count should be monitored every 3 months for 1 year (16).

Megaloblastic Anaemia (vitamin B_{12} or folate)

Background
Most megaloblastic anaemias result from a lack of either vitamin B12 or folate, and it is essential to establish in every case which deficiency is present and the underlying cause.

In emergencies, when delay might be dangerous, it is sometimes necessary to administer both substances after the bone marrow test while plasma assay results are awaited. Normally, however, appropriate treatment should not be instituted until the results of tests are available.

One cause of megaloblastic anaemia in the UK is pernicious anaemia in which lack of gastric intrinsic factor resulting from an autoimmune gastritis causes malabsorption of vitamin B_{12}. Apart from dietary deficiency, all other causes of vitamin B_{12} deficiency are attributable to malabsorption

For prophylaxis in chronic haemolytic states, malabsorption, or in renal dialysis, folic acid is given daily or sometimes weekly, depending on the diet and the rate of haemolysis. Folic acid is also used for the prevention of methotrexate-induced side-effects in severe Crohn’s disease, rheumatic disease, and
severe psoriasis. Folinic acid is also effective in the treatment of folate deficient megaloblastic anaemia but it is generally used in association with cytotoxic drugs; it is given as calcium folinate.

There is no justification for prescribing multiple ingredient vitamin preparations containing vitamin B₁₂ or folic acid.

**Recommendations**

There is little place for the use of low-dose vitamin B₁₂ orally and none for vitamin B₁₂ intrinsic factor complexes given by mouth. Vitamin B₁₂ in larger oral doses [unlicensed] may be effective.

Hydroxocobalamin has completely replaced cyanocobalamin as the form of vitamin B₁₂ of choice for therapy; it is retained in the body longer than cyanocobalamin and thus for maintenance therapy can be given at intervals of up to 3 months. Treatment is generally initiated with frequent administration of intramuscular injections to replenish the depleted body stores. Thereafter, maintenance treatment, which is usually for life, can be instituted. There is no evidence that doses larger than those recommended provide any additional benefit in vitamin B₁₂ neuropathy.

Folic acid has few indications for long-term therapy since most causes of folate deficiency are self-limiting or will yield to a short course of treatment. It should not be used in undiagnosed megaloblastic anaemia unless vitamin B₁₂ is administered concurrently otherwise neuropathy may be precipitated.

In folate-deficient megaloblastic anaemia (e.g. because of poor nutrition, pregnancy, or antiepileptic drugs), daily folic acid supplementation for 4 months brings about haematological remission and replenishes body stores.
For management of vitamin B12, please use the following link:


The rationale for treating patients with apparently asymptomatic but significantly reduced levels (<150ng/l) of serum vitamin B12 is that some of these patients show biochemical evidence of subclinical vitamin B12 deficiency e.g. increased levels of plasma homocysteine and methylmalonic acid and some will develop symptomatic problems if left untreated.

Patients treated with oral repletion therapy need to have their initial response to treatment monitored with vitamin B12 levels after 2-3 months followed by 6-12 monthly tests to ensure an ongoing response.

Review
Repeat blood test annually.

Bariatric
The incidence of obesity and associated comorbidities continues to increase, with around 8,500 bariatric surgeries performed each year. This procedure is now an increasingly routine option for the treatment of obesity in patients with a Body Mass Index of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² with co-morbidity.

Many patients presenting for surgery may have pre-existing low blood vitamin concentrations. All bariatric surgical procedures compromise nutrition to varying extents, with the potential to cause clinically significant micronutrient deficiencies.

The British Obesity & Metabolic Surgery Society (BOMSS) published its guidelines in 2014, which make recommendations for the peri-operative biochemical monitoring and micronutrient replacement for bariatric surgery patients (3).

‘Ten Top Tips for the management of patients’ post-bariatric surgery in primary care (3), as listed below

1. Keep a register of bariatric surgery patients
2. Encourage patients to check their own weight regularly and to attend an annual BMI and diet review with a healthcare professional
3. Symptoms of continuous vomiting, dysphagia, intestinal obstruction (gastric bypass) or severe abdominal pain require emergency admission under the local surgical team
4. Continue to review comorbidities post-surgery, including diabetes, hypertension, hypercholesterolaemia and obstructive sleep apnoea, as well as mental health
5. Review the patient’s regular medications
6. Bariatric surgery patients require lifelong annual blood tests, including micronutrient monitoring
7. Be aware of potential nutritional deficiencies that may occur and their signs and symptoms
8. Ensure the patient is taking the appropriate lifelong nutritional supplements
9. Discuss contraception – ideally pregnancy should be avoided for at least 12-18 months’ post-surgery

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
10. If a patient should plan or wish to become pregnant after bariatric surgery the patient should alter their nutritional supplements to one suitable during pregnancy (Adapted from: The Royal College of General Practitioners’ Nutrition Group, article in the British Journal of Obesity)

Vitamin and mineral supplementation (3) (2) (17)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Gastric Band and Balloon</th>
<th>Gastric Bypass and Sleeve Gastrectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 2 weeks post op:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamin, minerals &amp; trace elements (Forceval soluble is preference)</td>
<td>1 daily chewable / liquid / dissolvable</td>
<td>1, twice daily chewable / liquid / dissolvable</td>
</tr>
<tr>
<td>Calcium &amp; Vitamin D: Accrete D3 One a Day is preference</td>
<td>One tablet ONCE daily</td>
<td></td>
</tr>
<tr>
<td>After 2 weeks, lifelong (unless stated otherwise):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivitamins, minerals &amp; trace elements (A-Z complete) – Forceval capsule is preference</td>
<td>One tablet ONCE daily</td>
<td>One tablet TWICE daily</td>
</tr>
<tr>
<td>Thiamine (Vitamin B1) (over the counter)</td>
<td>50-100mg daily (over the counter)</td>
<td></td>
</tr>
<tr>
<td>Calcium &amp; Vitamin D: Accrete D3 One a Day is preference</td>
<td>One tablet ONCE daily (over the counter)</td>
<td></td>
</tr>
<tr>
<td>Vitamin D (over the counter)</td>
<td>25mcg twice daily (over the counter)</td>
<td></td>
</tr>
<tr>
<td>Ferrous fumerate</td>
<td>Not routine</td>
<td>300mg daily</td>
</tr>
<tr>
<td>Vitamin B12 (hydroxycobalamin)</td>
<td>Not routine</td>
<td>1mg IM 3 monthly Start 6 months postop</td>
</tr>
<tr>
<td>Planning for and during pregnancy (advise to plan pregnancy after 12-18 months of operation – ideally wait until weight stable)</td>
<td>As above but ensure vitamin A in A-Z is in beta carotene form (Forceval capsules fine). Plus 5mg folic acid for at least 3 months pre-conception &amp; up until 13th week of pregnancy.</td>
<td>As above but reduce A-Z to once a day and ensure vitamin A is in beta carotene form (Forceval capsules fine). Plus 5mg folic acid for at least 3 months pre-conception &amp; up until 13th week of pregnancy.</td>
</tr>
</tbody>
</table>

Pregnancy post gastric surgery:

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
Healthy women, planning for pregnancy, should take an additional 400 mcg/day folic acid prior to conception (purchased OTC) until the 12th week of pregnancy (18) however in women with obesity or diabetes, the recommendation is 5 mg folic acid until the 12th week of pregnancy as there may be an increased risk of neural tube defect affected pregnancy (3).

Women, as part of preconception care, are advised to avoid vitamin and mineral preparations which contain vitamin A in the retinol form in the first 12 weeks of pregnancy (3). Supplements containing retinol may increase the teratogenic risk especially in the first trimester. Beta-carotene sources of vitamin A have no known teratogenic effects and are safe to take in pregnancy. The vitamin A in Forceval is beta-carotene and this supplement can be prescribed during pregnancy and lactation. Alternately a pregnancy specific multivitamin and mineral can be prescribed if preferred.

There are vitamin and mineral supplements containing no vitamin A which are specifically aimed at preconception and pregnancy e.g. Pregnacare, Seven Seas Pregnancy and Centrum Pregnancy Care (2).

Avoidance of supplements containing vitamin A may place women more at risk of low vitamin A levels especially if they have had a distal bypass or duodenal switch. The health care professional should check that any supplements contain vitamin A in the beta carotene and not retinol form.

UGI surgery or partial/total gastrectomy for cancer
Patients who have had Upper Gastrointestinal (UGI) surgery or partial/total gastrectomy for cancer. will need similar supplementation post-surgery as the bariatric patients. The following is advised:

- 3-monthly IM injections of vitamin B12 (19)
- deficiencies in Vitamin D, calcium and iron can also be common post-gastrectomy and patients should receive long-term monitoring (purchased OTC) (20)
- Post-gastrectomy patients need to be followed up for 20-30 years (20)

CF patients
Factors that may contribute to fat soluble vitamin deficiencies in CF include:

- Fat mal-digestion and malabsorption as a consequence of pancreatic insufficiency and bile salt deficiency.
- Fat mal-digestion and malabsorption due to suboptimal PERT or poor adherence to PERT especially with vitamin replacement therapy.
- Poor dietary intake due to anorexia or poor dietary sources of vitamins.
- Poor adherence to prescribed fat soluble vitamin supplementation.
- Inappropriate vitamin supplementation regimens.
- Increased utilisation and reduced bioavailability.
- Short gut syndrome due to previous bowel resection.
- CF-related liver disease.
- Chronic antibiotic use.

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
**Vitamin A**

*Background*

Good food sources of vitamin A include: cheese, eggs, oily fish, fortified low-fat spreads, milk and yoghurt. The main food sources of beta-carotene are: yellow, red and green (leafy) vegetables, such as spinach, carrots, sweet potatoes and red peppers and yellow fruit, such as mango, papaya and apricots.

People with CF who are pancreatic insufficient (PI) and show evidence of low plasma levels should take daily vitamin A supplements with food and pancreatic enzymes. Doses should be adjusted depending on plasma levels.

People with CF who are pancreatic sufficient should only be commenced on vitamin A supplementation if plasma vitamin A levels are low at a time of clinical stability.

*Recommendation*

**Dose recommendations to be made by secondary care / specialist centre**

In pregnancy, serum retinol levels should be measured ideally preconceptionally or early in the pregnancy and dose adjusted according to levels.

Following transplantation, vitamin A levels should be monitored annually; reduction or discontinuation of vitamin A supplementation should occur if levels exceed the reference range.

**Vitamin D**

*Background*

In CF, suboptimal vitamin D status may be one of the many factors that contribute to the aetiology of low bone mineral density and increase the risk of low trauma fracture.

Low levels of 1,25 dihydroxy vitamin D (1,25(OH)2D) increase the production of PTH, resulting in increased bone turnover and bone loss, particularly in cortical bone.

People with CF have a high prevalence of vitamin D deficiency and numerous studies have reported low levels of 25-hydroxy vitamin D (25OHD) in their clinic populations despite supplementation.

Vitamin D deficiency in CF may be due to a number of factors:

- Reduced absorption of dietary and supplemental vitamin D due to pancreatic insufficiency.
- Low BMI leading to reduced capacity for vitamin D storage in adipose tissue.
- Reduced levels of vitamin D binding protein.
- Impaired hepatic hydroxylation of vitamin D.
- Reduced sunlight exposure due to poor health or photosensitivity with quinolone antibiotics.

*Recommendation*

**Dose recommendations to be made by secondary care / specialist centre**

There is currently no consensus on optimal vitamin D levels for bone health in the CF population. Guidelines vary from 50nmol/l (20ng/ml) to 75nmol/l (30ng/ml).

People with CF who are PI should take daily vitamin D supplements with food and pancreatic enzymes.
People with CF who are PS should be commenced on vitamin D supplementation depending on plasma levels or in line with guidelines for the UK population.

The assessment of vitamin D status should include serum 25-hydroxyvitamin D, serum calcium and parathyroid hormone concentrations

Review
Assessment of response to changes in supplemental dose should be undertaken by measuring vitamin D levels three months to six months after the change.

Vitamin E
Background
Vitamin E is found in a wide variety of foods with good sources including; plant oils – such as soya, corn and olive oil, nuts and seeds and wheatgerm – found in cereals and cereal products

Vitamin E acts as an antioxidant reducing the effects of free radicals produced by infection and chronic inflammation, thus helping to protect cell membranes from oxidative damage. Studies have shown that many newly diagnosed people with CF have low vitamin E levels, irrespective of pancreatic function.

Vitamin E deficiency has been associated with haemolytic anaemia in infants and may cause ataxia, neuromuscular degeneration and compromised cognitive function.

Oxidative stress is enhanced in CF due to chronic respiratory inflammation. Studies suggest that people with CF have inadequate antioxidant defences to cope with elevated oxidative stress. Therefore, vitamin E may be important in controlling the progression of lung disease.

The daily requirement of vitamin E (tocopherol) has not been well defined but is probably 3 to 15 mg daily. There is little evidence that oral supplements of vitamin E are essential in adults, even where there is fat malabsorption secondary to cholestasis. In young children with congenital cholestasis, abnormally low vitamin E concentrations may be found in association with neuromuscular abnormalities, which usually respond only to the parenteral administration of vitamin E.

Vitamin E has been tried for various other conditions but there is little scientific evidence of its value.

Recommendation
Dose recommendations to be made by secondary care / specialist centre.

People with CF who are PI should take daily vitamin E supplements with pancreatic enzymes and food.

In people with CF who have abnormal lipid levels it may be beneficial to consider vitamin E in relation to lipid levels.

Treatment for conditions such as Cystic Fibrosis or Crohn’s disease should be initiated by secondary care, who should also advise on dose alteration

Vitamin E Different pharmaceutical forms of vitamin E are available, with different licenses and costs:

- Alpha tocopheryl acetate 500mg/5ml oral suspension Licenced £67.97 / 100ml (May 2018 Drug Tariff)

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.
- Vedrop® 50mg/ml oral solution (tocophersolan) Licenced £54.55 / 20ml
- Vita-E® 75IU capsules Not licenced - food supplement £3.69 / 100 caps
- Vita-E® 400IU capsules £4.27 / 30 caps
- Alpha tocopheryl acetate 100mg chewable tablets Not licensed - Imported Price volatile ≈£90 per 30 tabs
- Valupak Vitamin E 100unit capsules £0.77 / 30 caps
- Valupak Vitamin E 400unit capsules £1.78 / 30 caps

**NHS Swindon CCG advise prescribers to use the brand Valupak Vitamin E capsules** for adults and older children who are able to swallow capsules as it is the most cost-effective option.

If a liquid preparation is required, the licensed **Alpha tocopheryl acetate 500mg/5ml oral suspension** is the preferred option.

Prescribers are advised to NOT prescribe chewable tablets as they are extremely expensive on FP10 prescription. Children who are unable to swallow solid pharmaceutical forms should be prescribed an oral liquid form.

Conversion for IU to mg:

1 International Unit (IU)= 0.67 Milligram (mg) for d-alpha-tocopherol (natural)

= 0.45 Milligram (mg) for dl-alpha-tocopherol (synthetic)

**Review**

Levels should be measured annually and status assessed.

**Premature infant supplementation**

Supplementation for infants <37 weeks gestation

<table>
<thead>
<tr>
<th>Type of feed</th>
<th>EBM</th>
<th>Fortified EBM</th>
<th>Preterm formula</th>
<th>Post discharge formula</th>
<th>Term formula</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vitamins</strong></td>
<td>0.6ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
<td>0.3ml Abidec OD</td>
</tr>
<tr>
<td><strong>Folic acid</strong></td>
<td>50 microgram OD when on full feeds until 6 weeks post EDD</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
</tr>
<tr>
<td><strong>Sytron</strong></td>
<td>0.5ml/kg up to a max of 1ml OD when on full feeds. Start only on Day 28. Continue until 6 months post EDD</td>
<td>0.5ml/kg up to a max of 1ml OD when on full feeds. Start only on Day 28. Continue until 6 months post EDD</td>
<td>NIL</td>
<td>NIL</td>
<td>0.5ml/kg up to a max of 1ml OD when on full feeds. Start only on Day 28. Continue until 6 months post EDD</td>
</tr>
</tbody>
</table>

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.

### Phosphate

<table>
<thead>
<tr>
<th>Type</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5mmol/kg Three times a day (TDS) to four times a day (QDS) if serum level &lt;1.5mmol/L when on full feeds (Need to monitor Phosphate (PO$_4$) and Alkaline phosphatase (ALP))</td>
<td></td>
</tr>
<tr>
<td><strong>Usually stop prior to discharge</strong></td>
<td></td>
</tr>
</tbody>
</table>

Iron supplements (Sytron) should not be given with Calcium or Phosphate at the same time as it can cause the formation of soaps within the intestine.

### Refeeding Syndrome

<table>
<thead>
<tr>
<th>Type</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B vitamins</strong></td>
<td>Thiamine: 200-300 mg per day B vitamin co –strong 1-2 tablets three times daily, or Vigranon B syrup 5ml three times daily if swallowing difficulties.</td>
</tr>
<tr>
<td><strong>Multivitamin and mineral</strong></td>
<td>Forceval 1 capsule OD, or Forceval Soluble one tablet OD dissolved in water if swallowing difficulties, until adequate oral diet re-established</td>
</tr>
</tbody>
</table>

Patients at risk of refeeding syndrome or those with prolonged poor nutritional intake may require additional vitamin supplementation as sub-clinical deficiency is likely (1) (21). Additional care is needed with renal or pregnant patients – the doctors should discuss these with the Dietitian or pharmacist and document the outcome of the discussion (21). Avoid single micronutrient supplementation unless proven deficiency is established (21).

Oral thiamine and Vitamin B Co Strong should be prescribed for the first ten days from when feeding recommences (1). Typically, 14 days’ supply is provided on discharge and so the GP does not need to continue the prescription (21).

Multivitamin capsules (Forceval or Forceval Soluble) should be started alongside Thiamine and Vitamin B Co Strong (1). Unless recommended by a Dietitian, Forceval should be not continued by the patients GP (21). If the patient is being discharged to a care or nursing home, multivitamin supplements are not required as the nutritional needs should be met by the care home menu.
References


15. **SACN.** *Vitamin D and Health*. s.l.: Scientific Advisory Committee on Nutrition, 2016.


21. **GWH.** Management of Adult Patients at Risk of Refeeding Syndrome in the Great Western Hospital Clinical Guideline. s.l.: Great Western Hospital, 2017.

Adapted and compiled with Swindon CCG Medicines Optimisation Team with input from GWH Nutrition and Dietetic department.


