

OPTIONS FOR IMPROVING FOLATE INTAKES OF WOMEN OF REPRODUCTIVE AGE AND PREVENTING NEURAL TUBE DEFECTS**VITAMIN B12 FACTS**

1. Vitamin B12, is required for normal cell division and to help maintain healthy nerve cells and red blood cells. The metabolism of vitamin B12 is closely related with the metabolism of folate as vitamin B12 is needed for the production of active folate inside cells.
2. Vitamin B12 is only found in foods of animal origin such as milk, meat and eggs. It is also found in some fortified foods, such as breakfast cereals.
3. The recommended nutrient intake for vitamin B12 is 1.5 micrograms/day for adults.
4. Vitamin B12 deficiency is not usually caused by lack of vitamin B12 in the diet, although dietary deficiency is more common in vegetarians, particularly vegans. A much more common cause of vitamin B12 deficiency is inadequate absorption of vitamin B12 by the gut.
5. In order for vitamin B12 to be digested by the body, it needs to be released from food by acid which is secreted in the stomach. The free vitamin B12 must then bind with a substance called *intrinsic factor*, which is also secreted in the stomach, before it can be absorbed into the body.
6. People at increased risk of vitamin B12 deficiency are those with:
 - *pernicious anaemia* – this is an autoimmune disease which damages stomach cells and prevents the secretion of intrinsic factor so vitamin B12 cannot be absorbed;
 - *gastrointestinal disorders* –includes individuals with Crohn's disease and coeliac disease which both affect the small intestine where most nutrient absorption occurs; also includes individuals who have had gastrointestinal surgery which can result in loss of cells that secrete acid and intrinsic factor; (individuals with gastrointestinal disorders will also have multiple nutrient deficiencies);
 - *older adults* – impaired digestion becomes more common with increasing age due to age-related deterioration of the gut which means that secretion of acid and intrinsic factor is reduced so vitamin B12 cannot be released or absorbed from food.

7. Vitamin B12 deficiency caused by impaired absorption of vitamin B12 from food is usually treated with intramuscular injections of vitamin B12 (1mg/month).
8. Clinical symptoms of vitamin B12 deficiency are megaloblastic anaemia and peripheral neuropathy, which are reversible. Prolonged deficiency can lead to the serious and irreversible condition of *subacute combined degeneration of the spinal cord*.
9. Treatment with folic acid can improve the anaemia and therefore delay the diagnosis of vitamin B12 deficiency, which could lead to irreversible neurological damage if the deficiency is not treated. Patients with vitamin B12 related peripheral neuropathy do not always have anaemia.
10. Case reports of patients with vitamin B12 deficiency indicate that folic acid intakes up to 1mg/day are not associated with a delay in the diagnosis of vitamin B12 deficiency in older people. The lowest level of folic acid associated with delaying diagnosis was 5mg/day.
11. In the UK, the prevalence of low vitamin B12 status is relatively common in adults aged 65 years and over (5-10%). However not all adults with low vitamin B12 status will develop vitamin B12 deficiency.
12. The attached flow diagram, explaining vitamin B12 deficiency in older people, has been adapted from a diagram that was used in the FSA consumer research.

Vitamin B12 status and deficiency in people aged 65 years and over

