

Lay Summary of the Statement on the Effects of Vitamin D on Maternal Health

1. In 2019, The Scientific Advisory Committee on Nutrition (SACN) agreed to conduct a risk assessment on nutrition and maternal health focusing on maternal outcomes during pregnancy, childbirth and up to 24 months after delivery; this would include the effects of chemical contaminants and excess nutrients in the diet. The Committee on the Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) was consulted, and decided that vitamin D should be considered for a detailed risk assessment.
2. There are two forms of vitamin D; these are vitamin D2 (also known as ergocalciferol) and D3 (also known as cholecalciferol). Vitamin D2 can be found in plants and fungi and therefore is only available to humans via the diet. Vitamin D3 is made in human skin via ultraviolet radiation from the sun, and can also be found in oil rich foods or supplements of animal origin such as cod liver oil. Vitamin D3 is reported to be about three times more potent than vitamin D2.
3. Both forms of vitamin D are converted in the body by the liver to analogous substances called 25-hydroxyvitamin D (25(OH)D) and the 25(OH)D is further converted in the kidney to analogous substances called 1,25-dihydroxyvitamin D (1,25(OH)₂D); this is the active form of vitamin D.
4. Vitamin D (in reality two forms as described in paras 3-4) plays an important role in maintaining healthy bones by ensuring adequate uptake of calcium. It also helps maintain healthy muscles by aiding muscle contraction and helps nerves and the immune system to function. However, consuming too much vitamin D from food sources and supplements can cause adverse health effects.
5. During autumn and winter all adults (including pregnant and breastfeeding women) and children over four years old are advised to consider taking a daily vitamin D supplement of 10 micrograms to protect bone and muscle health. Some groups are at risk of not obtaining enough vitamin D from sunlight exposure. They are advised to take a vitamin D supplement all year

round. These groups include people with dark skin (such as those with African, African-Caribbean, or South Asian backgrounds), those who spend most of their time indoors and those who cover most of their skin when outdoors.

6. Unproven associations between vitamin D deficiency and Covid-19 have been reported which may result in some individuals increasing their consumption of vitamin D supplements. It has been reported that vitamin D usage increased by 8% between October 2019 to October 2020. The current recommendation from the National Institute for Health and Care Excellence (NICE) and the NHS is to “not offer a vitamin D supplement to people solely to prevent COVID-19, except as part of a clinical trial” and that “people should be encouraged to follow the existing UK government advice on vitamin D supplementation”.

7. Too much vitamin D in the body can lead to hypercalcaemia (higher than normal calcium levels in the blood), which can lead to hypercalciuria (higher than normal levels of calcium in urine), demineralisation of bones, kidney and cardiovascular issues. Other side effects of excess vitamin D may include vomiting, nausea, constipation and diarrhoea.

8. It is important to note that whilst too much vitamin D can be consumed from foods and supplements it is not possible to make too much vitamin D via ultraviolet radiation from the sun. This is because there are inbuilt biochemical mechanisms in our skin that prevent vitamin D₃ reaching toxic levels from this route of exposure.

Effects of vitamin D during pregnancy and lactation

9. There is currently no information available on the adverse health effects to reproduction that excess vitamin D might cause during the period preceding conception.

10. Information on the adverse health effects caused by excess vitamin D during pregnancy and lactation is limited, but hypercalcemia (higher than normal calcium levels in the blood) can occur during pregnancy, especially in those rare individuals that have mutations in genes involved in vitamin D metabolism. Individuals with these mutations have experienced hypercalcemia after consuming as little as 1,250 micrograms per month (approx. 40 micrograms per day) of vitamin D. Hypercalcemia during pregnancy may increase risk of poor

health in the fetus and newborn baby. Excess vitamin D during pregnancy may also result in fetal and neonatal hypercalcemia, which can lead to adverse effects on the digestive system, behaviour and growth.

11. There is limited evidence for adverse health effects that could arise due to excess vitamin D exposure during lactation. However, hypercalciuria could possibly occur, with one clinical study carried out on participants with low initial levels of vitamin D reporting a slight increase in possible hypercalciuria after consuming supplements of 700 micrograms per week (i.e., 100 micrograms per day) of vitamin D.

12. In 2003, the Expert Group on Vitamin and Minerals (EVM) set an intake level of 25 micrograms per day as the level of vitamin D that would not be expected to result in adverse health effects – i.e., a safe level of intake. More recently The European Food Safety Authority (EFSA) developed a tolerable upper limit (TUL) of 100 micrograms per day for the general adult population, including pregnant women. This TUL was endorsed by the COT.

13. This risk assessment showed that women attempting conception, pregnant and lactating women who consume vitamin D only from food (and not supplements) are very unlikely to be at risk of adverse health effects from excess vitamin D as their exposure levels are below the TUL of 100 micrograms per day.

14. It is only when higher strength Vitamin D supplements (well above the NHS recommended intake) are taken that problems may arise. Only a minority of women attempting conception, pregnant or lactating who consume vitamin D from both food and supplements are likely to be above the TUL of 100 micrograms per day. It is important to note that this would only be of health concern if high intakes were sustained long-term. Pregnant women with mutations in the genes involved in vitamin D metabolism are more likely to experience adverse health effects such as high blood calcium levels and high calcium levels in the urine. Fortunately, such mutations are often diagnosed early and suitable medical advice provided.

15. The COT concluded that consumption of higher strength vitamin D supplements alone or in combination with food can result in exceedance of the TUL and pose a potential health concern. However, consumption of lower strength supplements (containing 10 micrograms of vitamin D), as recommended by the NHS that aimed at pregnant and breast-feeding women, either alone or in combination with the vitamin D present in food is very unlikely to result in excess vitamin D intake or adverse health effects related to excess vitamin D intake.