

# Medicine for Managers

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## Vitamin D

**Vitamin D is one of those agents which has gained considerable prominence over recent years. Everyone knows that Vitamin D is manufactured in the skin in the presence of sunlight but deficiency states are now more commonly seen because of the liberal use of sunscreens, less time spent outside and, in Asian cultures, the wearing of dress which covers up virtually all the skin.**

In humans, Vitamin D is unique in its ability to be ingested as Vitamin D3 (colecalciferol or Vitamin D2, ergocalciferol. It is also found in oily fish, liver, meat, eggs, fortified breakfast cereals and powdered milk although this source may only represent 10% of intake. 90% of Vitamin D is manufactured from cholesterol in the skin by most mammals and can be synthesised in adequate amounts when exposed to sunlight (ultraviolet irradiation). Indeed with a balanced diet and taking advantage of the summer sun all normal Vitamin D requirements should be met.

*Dogs and Cats cannot synthesise Vitamin D and must have it in the diet*

The bone requirement of Vitamin D is to prevent rickets and osteomalacia. Rickets is a childhood disease where deficiency of Vitamin D (and calcium or phosphorus) result in impaired growth of the long bones which become soft and bow outwards. It became common in deprived areas in the industrial revolution but is relatively rarely seen today in the United Kingdom. Osteomalacia is a bone-

thinning disorder that occurs exclusively in adults and is associated with fragile bones and muscle weakness. Both conditions can be treated with supplementation.

Vitamin D itself is essential for the absorption of calcium and phosphorus which are necessary for the maintenance of healthy bones. Some authorities also believe it to be an important factor in fighting off infections such as colds, reducing the risk of multiple sclerosis and maybe even reducing the risk of developing cancer.

It is possible to take too much Vitamin D, a condition known as hypervitaminosis D. Only fat soluble vitamins have diseases of excess (i.e. A&D) whereas excess water soluble vitamins (i.e. B&C) are simply passed out in the urine. Excess vitamin D causes raised blood calcium levels with resulting calcification of soft tissues, the heart and kidneys amongst other organs. In the kidney it may produce kidney stones. Other

symptoms may include anorexia, constipation, fatigue, irritability and muscle weakness. Vitamin D toxicity is reversed by withdrawing supplementation and reducing calcium intake.

Replacement of Vitamin D has recently been the subject of many recommendations by different authoritative advisers, which will culminate in the publication of NICE guidelines in June 2014. As the ideal target for vitamin D levels remains subject to debate, the threshold at which patients should be treated is variable according to local policy. The 'optimal' vitamin D level is 75nmol/L, and anything above 50nmol/L is considered adequate; below this, a patient may develop symptoms.

The severity and impact of these symptoms will depend on the level of deficiency. Expert consensus suggests that a vitamin D of below 25nmol/L represents a clinical deficiency, and replacement with 6-8 weeks of high-strength oral supplements is recommended. In the grey area between 25nmol/L and 50nmol/L, increased dietary intake combined with over-the-counter supplements will increase vitamin D to an acceptable level.

Concomitant administration of calcium is not recommended. Regular consumption of Vitamin D containing foods as part of a balanced diet will help maintain adequate vitamin D levels after deficiency has been treated.

During the UK winter, there is not enough UVB to allow synthesis, meaning that the body relies more heavily on dietary intake and its summer stores. However, experts agree that patients should not be encouraged to deliberately seek

out prolonged sun exposure in order to boost vitamin D levels, as the risks of developing skin cancers and other sun-related skin damage outweigh the potential benefit.

Sunscreens which protect against UVB radiation do reduce the level of vitamin D synthesis, but again, it would be unwise to recommend that such measures be abandoned. Short, frequent periods of sun exposure are considered to be safer and should provide adequate opportunity for vitamin D synthesis.

Vitamin D levels can be rechecked 3 months after treatment has been started. Some patients may require longer-term replacement. In rare cases a patient may not respond to standard treatment, and referral to a hospital specialist may be required.

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