

## The vitamin D debate

**V**itamin D has been a nutrient of interest for its role in bone health and its potential roles in cancer and diabetes prevention, immune system and neuropsychological functioning, inflammatory and cardiovascular disease, and a number of other conditions.<sup>1</sup> The “sunshine vitamin” is touted as a cure-all, and high-dose supplementation is frequently mentioned in the media. During the Canadian autumn, winter, and spring the adult population is unlikely to achieve adequate levels of vitamin D through diet and sunlight alone, and supplementation may be considered during those seasons.<sup>2</sup> Taking mega doses, however, is not only unwarranted, it may be unsafe.

### Current recommendations

Health Canada’s recommendations for dietary reference intakes for vitamin D are available at [www.hc-sc.gc.ca/fn-an/nutrition/vitamin/vita-d-eng.php](http://www.hc-sc.gc.ca/fn-an/nutrition/vitamin/vita-d-eng.php).

The Institute of Medicine published a comprehensive review of vitamin D and calcium in 2011. The recommended dietary allowance for vitamin D in children and adults younger than 70 years of age was set at 600 IU per day, with a tolerable upper intake set at 4000 IU per day.<sup>3</sup> Despite the conclusions reached in this review, doses above and beyond the tolerable upper limit are still promoted by some groups for better health outcomes.

Recent controversy was sparked by Paul Veugelers and John Paul Ekwaru, biostatisticians at the University of Alberta. Published in October 2014 in the online journal *Nutrients*, their work concluded that the Institute of Medicine—the organization

that develops recommended dietary allowances for Canadians and Americans—made a serious calculation error in determining the allowances for vitamin D and that higher doses of supplementation were required.

More recently PureNorth S’Energy Foundation, a Canadian organization offering a nutrition and supplement-based health prevention program, has been recommending at least 5000 IU per day and, for obese Canadians, as much as 15 000 IU—nearly quadruple Health Canada’s recommended safe upper limit. After formal reviews both Health Canada and the Institute of Medicine concluded that no statistical error in determining recommended dietary allowances for vitamin D was made.

According to Health Canada, intake at these higher-than-suggested levels may increase the risk for adverse health effects for some people.<sup>4</sup> Because vitamin D is stored in fat cells, excess doses can build up to harmful levels. Vitamin D toxicity and resultant hypercalcemia can cause nonspecific symptoms such as weight loss or anorexia, as well as heart arrhythmias, polyuria, calcification of soft tissues, and kidney stones.

Vitamin D supplements are available as D2 (ergocalciferol) or D3 (cholecalciferol). Vitamin D3 has been shown to be 3 times more effective than vitamin D2 at increasing serum 25(OH)D levels and is usually advised.<sup>2</sup> Weekly dosing or monthly dosing has been shown to be safe. At this time high doses of vitamin D3 once per year are not recommended; recent evidence has shown possible increased fracture risk.<sup>2</sup>

Measuring serum vitamin D levels is seldom indicated and is not covered under MSP unless ordered by a specialist for selected patients. For

suspected vitamin D toxicity, measurement of serum calcium is recommended rather than measurement of vitamin D levels.

Further studies are pending regarding vitamin D and recommended doses, as well as potential uses for vitamin D supplementation in various conditions. At this time Health Canada’s recommendations for dietary reference intakes for vitamin D should be followed.

For further information on vitamin D, patients can call HealthLinkBC at 8-1-1.

—Kathleen Cadenhead, MD

### Acknowledgments

Special thanks to the team of dietitians at HealthLinkBC for providing background information for this article.

### References

1. Newberry SJ, Chung M, Shekelle PG, et al. Vitamin D and calcium: A systematic review of health outcomes (update). Evidence Report/Technology Assessment No. 217. Agency for Healthcare Research and Quality. Accessed 24 February 2015. [www.effectivehealthcare.ahrq.gov/reports/final.cfm](http://www.effectivehealthcare.ahrq.gov/reports/final.cfm).
2. Guidelines and Protocols Advisory Committee. Vitamin D testing protocol. Accessed 14 September 2015. [www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/vitamin-d-testing#utilization](http://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/vitamin-d-testing#utilization).
3. Institute of Medicine. Dietary reference intakes for calcium and vitamin D. Chapter 6: Tolerable upper intake levels: Calcium and vitamin D. Accessed 24 February 2015. [www.nal.usda.gov/fnic/DRI/DRI\\_Calcium\\_Vitamin\\_D/TolerableUpperIntakeLevels.pdf](http://www.nal.usda.gov/fnic/DRI/DRI_Calcium_Vitamin_D/TolerableUpperIntakeLevels.pdf).
4. Health Canada. Vitamin D and calcium: Updated dietary reference intakes. Accessed 24 February 2015. [www.hc-sc.gc.ca/fn-an/nutrition/vitamin/vita-d-eng.php#a13](http://www.hc-sc.gc.ca/fn-an/nutrition/vitamin/vita-d-eng.php#a13).

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