

Editorials: *Controversies in Family Medicine*

Should Family Physicians Screen for Vitamin D Deficiency?

Yes: Targeted Screening in At-Risk Populations Is Prudent

LEIGH M. ECK, MD, *University of Kansas Medical Center, Kansas City, Kansas*

Vitamin D is critical for bone mineralization.¹ Over the previous decade, vitamin D deficiency has received significant media attention for its association with many adverse health outcomes beyond bone health, including cancer, autoimmune diseases, infections, diabetes mellitus, and cardiovascular health.² Because of this attention, there has been a notable increase in screening for vitamin D deficiency.³

Serum levels of vitamin D, a prohormone synthesized in the skin, are influenced by a multitude of factors, including sun exposure, skin pigmentation, age, adiposity, and dietary intake. The dominant function of vitamin D in its active hormonal form (1,25-dihydroxyvitamin D) is to maintain calcium and phosphate homeostasis.⁴ Measurement of serum 25-hydroxyvitamin D levels is the best current measure of vitamin D status.⁵

With the release of the Institute of Medicine's (IOM) report on dietary intake for calcium and vitamin D in November 2010, enthusiasm for assessing patients' vitamin D status for nonskeletal outcomes was dampened.⁶ In this report, the IOM examined outcomes other than bone health, including cancer, cardiovascular disease, diabetes, immune response, and reproductive outcomes, and determined that the existing science does not sufficiently support vitamin D screening for the prevention of these conditions.⁶ However, the IOM report also clearly substantiated the importance of vitamin D in a composite end point of bone health, specifically for calcium absorption, calcium retention, and increased bone mineral density, in addition to the prevention of rickets, osteomalacia, and fractures.

Soon after the IOM report was released, the Endocrine Society released a clinical practice guideline for the evaluation, prevention, and treatment of vitamin D deficiency, with an emphasis on caring for patients at risk of deficiency.⁷ Some risk factors for vitamin D deficiency include⁷:

- Black race and Hispanic ethnicity
- Body mass index greater than 30 kg per m²



This is one in a series of pro/con editorials discussing controversial issues in family medicine.

▶ See related editorial at <http://www.aafp.org/afp/2013/0415/od2.html>.

- Chronic kidney disease
- Granuloma-forming disorders
- Hepatic failure
- Hyperparathyroid syndrome
- Malabsorption syndromes
- Medication use (e.g., antiseizure medications, glucocorticoids, AIDS medications, antifungals, cholestyramine [Questran])
- Older age with history of falls or nontraumatic fractures
- Osteomalacia
- Osteoporosis
- Pregnancy and lactation
- Rickets
- Some lymphomas

Most of these factors put patients at risk of osteoporosis. Given the role of vitamin D in bone mineralization,¹ patients who are at risk of or who have osteoporosis should be considered as candidates for vitamin D screening. Although emerging data on the role of vitamin D in extraskeletal outcomes, such as autoimmunity, cancer, and cardiovascular disease, make it tempting to screen for deficiency in a broader population, large randomized controlled trials and dose response data are still underway.

In addition to the screening dilemma, there has been disagreement in recent reports on the target vitamin D level for optimal bone health.^{6,7} The IOM suggests that a 25-hydroxyvitamin D level of 20 ng per mL (50 nmol per L) is sufficient for bone health, based on integrated measures of calcium absorption, bone mineral density, osteomalacia, and rickets.⁶ However, based on iliac crest biopsy data,⁸ as well as two meta-analyses studying anti-fracture efficacy,^{9,10} the Endocrine Society guidelines recommend a 25-hydroxyvitamin D level of at least 30 ng per mL (75 nmol per L).⁷ Data from the National Health and Nutrition Examination Survey found that increased hip bone mineral density was associated with

higher serum 25-hydroxyvitamin D levels.¹¹ This was observed in younger and older adults, as well as in persons of different ethnic and racial backgrounds.

Although it is not time for general population-based screening for vitamin D deficiency, this issue will continue to develop. The extraskeletal benefits of vitamin D may prove scientifically sound in larger randomized controlled trials, resulting in future population-based screening. Until then, we should focus on screening populations at risk of or who have osteoporosis.

Address correspondence to Leigh M. Eck, MD, at leck2@kumc.edu. Reprints are not available from the author.

Author disclosure: No relevant financial affiliations.

REFERENCES

1. Smith R, Dent CE. Vitamin D requirements in adults. Clinical and metabolic studies on seven patients with nutritional osteomalacia. *Bibl Nutr Dieta*. 1969;13:44-45.
2. Holick MF. Vitamin D deficiency. *N Engl J Med*. 2007;357(3):266-281.
3. Marcus MB. Vitamin D tests soar as deficiency, diseases linked. *USA Today*. July 13, 2008. http://www.usatoday.com/news/health/2008-07-13-vitamin-d-tests_N.htm. Accessed August 9, 2012.
4. Holick MF. *Vitamin D: Physiology, Molecular Biology, and Clinical Applications*. Totowa, N.J.: Humana Press; 1999.
5. Brannon PM, Yetley EA, Bailey RL, Picciano MF. Overview of the conference "Vitamin D and Health in the 21st Century: an Update." *Am J Clin Nutr*. 2008;88(2):483S-490S.
6. Institute of Medicine. *Dietary Reference Intakes for Calcium and Vitamin D*. Ross AC, Taylor CL, Yaktine AL, Del Valle HB, eds. Washington, DC: National Academies Press; 2011.
7. Holick MF, Binkley NC, Bischoff-Ferrari HA, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline [published correction appears in *J Clin Endocrinol Metab*. 2011;96(12):3908]. *J Clin Endocrinol Metab*. 2011;96(7):1911-1930.
8. Priemel M, von Demarus C, Klatte TO, et al. Bone mineralization defects and vitamin D deficiency: histomorphometric analysis of iliac crest bone biopsies and circulating 25-hydroxyvitamin D in 675 patients. *J Bone Miner Res*. 2010;25(2):305-312.
9. Bischoff-Ferrari HA, Willett WC, Wong JB, Giovannucci E, Dietrich T, Dawson-Hughes B. Fracture prevention with vitamin D supplementation: a meta-analysis of randomized controlled trials. *JAMA*. 2005;293(18):2257-2264.
10. Bischoff-Ferrari HA, Willett WC, Wong JB, et al. Prevention of nonvertebral fractures with oral vitamin D and dose dependency: a meta-analysis of randomized controlled trials. *Arch Intern Med*. 2009;169(6):551-561.
11. Bischoff-Ferrari HA, Dietrich T, Oray EJ, Dawson-Hughes B. Positive association between 25-hydroxy vitamin D levels and bone mineral density: a population-based study of younger and older adults. *Am J Med*. 2004;116(9):634-639. ■