Editorials

Vitamin D Screening and Supplementation in Primary Care: Time to Curb Our Enthusiasm

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Recent trends in vitamin D testing and supplementation strongly suggest that physicians and patients believe that identifying and correcting vitamin D deficiency improves health outcomes. From 2000 to 2010, the volume of serum 25-hydroxyvitamin D (25-OH-D) tests reimbursed by Medicare Part B increased 83-fold.[1] In 2000, four out of 1,000 U.S. adults 70 years or older reported taking a daily vitamin D supplement of at least 1,000 IU, compared with four out of 10 in 2014—a 100-fold increase.[2]

In contrast, LeFevre and LeFevre's review of the evidence for vitamin D screening and supplementation in adults in this issue of *American Family Physician* determined that these commonplace practices have virtually no established health benefits.[3] The American Society for Clinical Pathology recommends against screening for vitamin D deficiency in the general population.[4] The U.S. Preventive Services Task Force found insufficient evidence that vitamin D supplementation prevents cardiovascular disease, cancer, or fractures in community-dwelling adults.[5-7] An umbrella review of more than 100 systematic reviews and meta-analyses of observational studies and randomized controlled trials found only a handful of "probable" relationships between serum vitamin D concentrations and clinical outcomes, and concluded that vitamin D supplementation does not increase bone mineral density or reduce the risk of fractures or falls in older adults.[8]

What factors explain the disconnect between the research on vitamin D and the great enthusiasm for screening and supplementation in clinical practice? First, vitamin D is a vitamin—by definition, something the body needs. To many adults, a relationship between vitamin D levels and general health seems plausible because they spend most of their time indoors and are counseled by clinicians to minimize sun exposure to reduce skin cancer risk.[9] Second, earlier research had suggested positive effects that were not subsequently borne out. For example, observational studies often make news by publicizing associations between low vitamin D levels and chronic conditions such as cardiovascular disease,[8] but subsequent randomized controlled trials showing negative results may be less widely reported.[10] Clinicians may misapply evidence that vitamin D supplements reduce fall rates in institutionalized older adults[11] to community-dwelling populations. Finally, physicians may misinterpret serum 25-OH-D concentrations of 20 to 30 ng per mL (50 to 75 nmol per L) as representing a deficiency that requires correction, when the National Academy of Medicine (formerly the Institute of Medicine) considers 97.5% of individuals with levels greater than 20 ng per mL to have adequate vitamin D for bone health.[12]

Screening for vitamin D deficiency leads to hundreds of millions of dollars wasted in testing costs annually.[3] Low-level daily supplementation with calcium and vitamin D can increase the risk of kidney stones,[13] and higher monthly doses of vitamin D increased the risk of falls in a randomized controlled trial of older adults with vitamin D deficiency.[14] The National Academy of Medicine has noted that vitamin D intakes above the tolerable upper limit of 4,000 IU per day may cause toxic effects such as renal impairment, hypercalcemia, or vascular calcification.[15] In 2014, 3% of all U.S. adults and 6.6% of adults older than 60 years reported taking a vitamin D supplement of 4,000 or more IU per day.[2]

It is time for clinicians and patients to curb our enthusiasm for vitamin D screening and supplementation. Strategies to decrease unnecessary testing could include distributing the patient handout on vitamin D tests created by Consumer Reports for the Choosing Wisely campaign (http://www.choosingwisely.org/patient-resources/vitamin-d-tests/) and implementing clinical decision support for ordering laboratory tests. In Alberta, Canada, the number of vitamin D tests decreased by more than 90% during the first 12 months after implementation of a paper and electronic requisition form that required physicians who were ordering laboratory tests to select one of several approved indications (e.g., metabolic bone disease, abnormal blood calcium levels, malabsorption syndromes,

chronic renal disease, chronic liver disease).[16] Family physicians should also counsel patients on the recommended dietary allowance for vitamin D (600 IU per day in adults 70 years and younger, and 800 IU per day in adults older than 70 years), and discourage most patients from using supplements, especially in dosages near or above the tolerable upper limit of 4,000 IU per day.

Editor's Note: Dr. Lin is Associate Deputy Editor of *AFP* online.

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