Vitamin D is a media darling. In addition to its essential role in bone health, it has been touted to cure or prevent ailments as wide-ranging as depression, infectious diseases, cancer and diabetes.

It is easy for pediatricians to be swept up in the whirlwind of vitamin D enthusiasm, particularly when encouraged by well-read parents bearing the newest articles on their smartphones. It is critical that providers be equally well-read.


Ensuring adequate intake

Vitamin D is both a nutrient and a hormone. Infants up to age 12 months require 400 international units (IU) daily of vitamin D; children and adolescents require 600 IU daily.

In the U.S., many foods are fortified with vitamin D, including milk, orange juice, cereals and yogurt. One cup of vitamin D fortified milk provides 100-125 IU. Oily fish also are a good source; 3 ounces of salmon provide 447 IU, according to the National Institutes of Health, http://bit.ly/2kGWLgq.

Infants who are exclusively breastfed or receive less than 1 liter of formula daily should be supplemented with 400 IU of vitamin D daily, starting in the first few days of life and continuing until they are 12 months of age. Older children often are notoriously unpredictable eaters and also may require supplemental vitamin D. Most multivitamins provide 300-600 IU per serving.

Vitamin D also can be synthesized by the skin through ultraviolet (UV) light exposure. However, multiple factors affect the magnitude of UV rays that actually reach the skin, including latitude, time of day, season, cloudiness and air pollution. Due to the unpredictability of sun exposure, as well as the increased risk of skin cancer with UV exposure, consumption of vitamin D through diet is the most dependable way to ensure adequate intake.

Assessing status

Vitamin D status is best assessed by measuring serum concentrations of 25-hydroxyvitamin D (25OHD). The Global Consensus Recommendations define vitamin D deficiency as a serum 25OHD concentration less than 12 nanograms/milliliter (ng/mL) (30 nanomoles/liter [nmol/L]), and insufficiency as 12-20 ng/mL (30-50 nmol/L).

Although routine 25OHD screening is not recommended for healthy children, those with bone disease or certain other chronic diseases (especially those involving malabsorption or use of medications that interfere with vitamin D synthesis, such as antiseizure medications) can benefit from monitoring. Some of these children also may benefit from chronic supplementation and require higher daily vitamin D doses.

Consequences of deficiency

In growing children, vitamin D deficiency can result in rickets, defined as defective growth plate mineralization, and osteomalacia, defined as abnormal matrix mineralization of established bone. The U.S. incidence of nutritional rickets (NR) is 24 cases per 100,000, greater than in other developed countries (2.9 and 7.5 per
Rickets can result in limb deformity and scoliosis, and can be associated with fracture. Other health complications include seizures, tetany and cardiac arrhythmias secondary to hypocalcemia, bone pain and muscle weakness, dental abnormalities and developmental delays.

Specific groups at higher risk for NR include infants who are exclusively breastfed without vitamin D supplementation, those whose mothers had vitamin D deficiency, those with dark skin pigmentation or reduced sun exposure, and those who consume diets consistently low in vitamin D and calcium.

**Treating, preventing rickets**

The Global Consensus Recommendations state that children with NR due to vitamin D deficiency should receive at least 2000 IU of vitamin D daily for three months, after which a 25OHD concentration should be repeated to determine whether supplementation should be continued. When treating NR with vitamin D, providers also should ensure the child is consuming at least 500 milligrams of calcium daily through diet or supplementation.

As the world becomes increasingly more global and families from Africa, Asia and the Middle East are immigrating to far northern and southern countries, NR is making a comeback. NR is a serious but preventable disease; therefore, public health systems and providers must collaborate to develop prevention strategies. Potential interventions include supplementing all infants with vitamin D, developing and implementing rickets prevention and detection protocols in high-risk populations, and fortifying commonly consumed foods with vitamin D and calcium.

Although a sprinkling of vitamin D might not cure *everything* that ails you, it is absolutely essential for bone health in growing children.

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