

How to Make Sure Kids Get Enough Vitamin D

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Of all the nutrients to be concerned about, vitamin D is top of my list. It's one of the hardest nutrient requirements to meet for people of all ages, partly because there's a short list of food sources.

The good news? Milk is one of those food sources that packs a punch of vitamin D. Just one cup of milk provides 100 IU of vitamin D towards the daily requirement of 600 IU for children and adults over the age of one year.

As a dietitian, I was surprised to learn in my 40's that I was vitamin D deficient. But like many things involving nutrition, even dietitians like me can get off track. Ever since, I've been supplementing vitamin D in my diet, especially in the winter, and pay attention to vitamin D food sources like milk in mine and my children's diets, too.

What Does Vitamin D Do?

Vitamin D is involved in many different functions throughout the body. Although we generally think about bone health, several other important roles exist, including regulation of calcium levels in the blood, the immune system, and our immune response.

Two forms of vitamin D exist: D₂, which comes from plants, and D₃, from animals. We can make vitamin D₃ in our skin when we are exposed to ultraviolet B (UV-B) rays from sunlight. When we ingest vitamin D from food or create it in our skin, it needs to be activated. The first step is done in the kidney and liver, producing the active form of vitamin D, called 25-hydroxylated compound (or 25-(OH)D). This is stored in the liver and body fat. When vitamin D is needed, the kidneys produce a biologically active form of vitamin D, called 1,25(OH)₂D. This is the form of vitamin D that circulates through the blood.

Vitamin D and Bone Health

Vitamin D helps calcium and phosphorus enter the bones, which hardens and strengthens them. Vitamin D deficiency leaves bones soft, and in young children, encourages malformation of the bone. This condition is called rickets and is caused by inadequate vitamin D and/or calcium consumption. It often presents as bowed legs or knock knees, muscle weakness, irritability, and stunted growth.

Vitamin D and Other Functions in the Body

There are vitamin D receptors on nearly every type of cell in the body. For example, there are vitamin D receptors on immune cells, respiratory cells, and intestinal cells, as well as on organs of the body such as the heart, brain and skin. Thus, vitamin D is believed to play a role in

keeping the immune system strong, improve mood, possibly protect against certain cancers, respiratory illness, heart disease, neurodegenerative diseases, and both type 1 and type 2 diabetes.

How Much Vitamin D Do Kids Need?

Infants need 400 International Units (IU) per day up to 12 months of age. From age 1 to 18, children need 600 IU per day.

Sources of Vitamin D

As mentioned earlier, we get vitamin D from food and sunlight. In fact, creation of vitamin D in the skin contributes 80-90% of an individual's biologically active levels, according to a 2018 review article in the *Journal of Pediatric Endocrinology and Metabolism*.

There are few natural food sources of vitamin D. Oily fish such as sardines, tuna, mackerel and salmon, cod liver oil, egg yolks, shiitake mushrooms, and liver are the main ones. Not exactly the foods children are eating on a daily basis!

Fortified foods such as milk, orange juice and ready-to-eat cereals offer additional sources of vitamin D in the diet.

Vitamin D Deficiency

When children don't get enough vitamin D from a combination of food, supplementation and sunshine, they can become deficient. A vitamin D deficiency may lead to:

Rickets, a bone disease that causes softening of bone and malformation, often seen as bowed legs. The U.S. incidence of rickets is 24 cases per 100,000, according to the American Academy of Pediatrics (AAP). This level is higher than in other developed countries.

Bone fractures, and weakened bones. Studies have shown that children who are vitamin D deficient or who have low intake are at higher risk for bone fractures. Furthermore, bone fractures are more severe in vitamin D deficient children.

The AAP has outlined vitamin D status in children based on blood testing as follows:

Severe deficiency: < 5 ng/mL (nanograms per milliliter)

Deficiency: 5 -15 ng/mL

Insufficiency: 16 - 20 ng/mL

Sufficiency: 21 – 100 ng/mL

Excess: 101 – 150 ng/mL

Toxicity: >150 ng/mL

More recently, eleven international scientific organizations came together and created the “Global Consensus Recommendations on Prevention and Management of Nutritional Rickets” in an effort to eradicate rickets worldwide. They classify vitamin D status in children in the following way:

Deficiency: < 12 ng/mL

Insufficiency: 12 -20 ng/mL

Sufficiency: > 20 ng/mL

Toxicity: >100 ng/mL

Who’s at Risk for Vitamin D Deficiency?

Certain children and older individuals will be at higher risk for vitamin D deficiency than others, such as:

- Babies who are exclusively breastfed and who aren’t supplemented with vitamin D
- Individuals with dark-pigmented skin
- Individuals with obesity
- People who live in the northern part of the U.S.
- Babies born to mothers with vitamin D deficiency
- A diet low in calcium and vitamin D
- Individuals who regularly use sunscreen or who cover their bodies when outside

Screening for deficiency may be a prudent approach for these populations, as it may prevent other conditions associated with a deficiency, and expedite treatment, if needed.

How to Prevent Vitamin D Deficiency

There are three main ways to prevent vitamin D deficiency in children including exposure to sunlight, use of natural and fortified foods with vitamin D, and vitamin D supplementation. Increasing the exposure to sunlight can be challenging, particularly with the known risk of skin cancer. For instance, parents are encouraged to keep babies out of the sunlight for the first 6 months. For children, they’re encouraged to use sunscreen protection and limit sun exposure with protective clothing and shade when outside.

Hence, families need to look to natural and fortified foods and supplementation to match the needs of their children. Vitamin D fortification of food is optional in the United States for foods like milk, cereals, and fruit juices. Typically, the fortification level of milk and orange juice is about 100 IU per cup, or 400 IU per liter. Some experts feel that current fortification levels aren’t sufficient for children who are at higher risk for vitamin D deficiency.

~Lisal Folsom, MD, FAAP from the AAP Recommendations on the prevention and management of rickets.

Vitamin D supplementation is the main tactic for preventing deficiency. Here are the current guidelines for supplementation:

- Newborns who are breastfed (exclusively and/or partially) should receive 400 IU per day beginning shortly after birth and continue until they are drinking at least 32 ounces (1 liter) of vitamin-D fortified infant formula or whole milk.
- Babies drinking infant formula and children who are drinking less than a liter of formula or milk should also receive 400 IU per day.
- In older children, supplementation should be tailored to the child based on usual dietary patterns, sunlight exposure, and the risk factors for deficiency.

Making Sure Kids Get Enough Vitamin D

The good news is there are several avenues to make sure children get enough vitamin D. In my experience, focusing on food sources of vitamin D can really help. Here are a few tips:

1. Serve milk with meals. The currently MyPlate recommendations for children are to include 3 servings of dairy each day. I think the easiest way to stay on track with this recommendation is to offer a cup of vitamin D-fortified milk at each meal.
2. Choose ready-to-eat cereals that pack a punch of vitamin D. I've outlined what I think are [the healthiest cereals for kids](#).
3. Offer fish like salmon and tuna twice a week. Not only will this contribute to vitamin D intake, it will offer omega-3 fats which are important to brain and heart health, as well.
4. Choose vitamin D-enhanced eggs and vitamin D-fortified orange juice when shopping. These fortified foods enhance the overall vitamin D content of the diet.
5. If you're concerned your child isn't getting enough vitamin D in his diet, discuss adding a multivitamin with your dietitian or doctor, and consider screening for deficiency.

Resources:

Vitamin D Health Professionals Fact Sheet: <https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>

AAP statement on prevention of rickets: <https://www.aappublications.org/news/2017/02/10/Rickets021017>

Global Consensus Recommendations on Prevention and Management of Nutritional Rickets:
<https://pubmed.ncbi.nlm.nih.gov/26745253-global-consensus-recommendations-on-prevention-and-management-of-nutritional-rickets/>

Vitamin D Deficiency in Childhood: <https://pubmed.ncbi.nlm.nih.gov/29397388-vitamin-d-deficiency-in-childhood-old-lessons-and-current-challenges/>