



Vitamin D Deficiency

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Vitamin D is a fat-soluble vitamin, which is essential to many body functions. The skin makes this vitamin when it is exposed to sunlight or it can be taken in through our diet.

A deficiency in vitamin D has been well known to cause bone weakness and rickets in children as of the early 20th century. Children were supplemented with cod liver oil to prevent and treat this problem. The condition of rickets led to a movement to fortify milk and cereal with vitamin D and rickets has become a rare disease. However, it turns out that rickets is not the only health concern caused by vitamin D deficiency.

Complications of vitamin D deficiency include osteoporosis, depression, heart disease, strokes, cancers (such as breast, prostate, and colo-rectal cancer), parathyroid problems, immune issues, obesity, diabetes, mood disorders, fatigue, and premenstrual syndrome.

Causes of vitamin D deficiency include inadequate intake, inadequate sun exposure, intestinal disorders (such as crohn's disease, celiac disease, and cystic fibrosis), gastric bypass surgery, and rare genetic diseases, which effect the ability to form the vitamin. We also lose some of our ability to synthesize and absorb vitamin D as we age.

How much vitamin D is enough? It depends on the person, how much they are already getting in the diet, and how much sunlight they are exposed to. Vitamin D testing is necessary to see if you truly are vitamin D deficient or not. The rate of deficiency is about 40% across the country but is much higher in occurrence in the northern states (as high as 85%). The measurements of recommended vitamin D concentrations in the blood to maintain adequate health are slightly different depending on the source on information. According to *Up to Date* the physician's online resource, the blood 25-hydroxyvitamin D concentration in the blood should be at least 30 ng/mL. However, a level above 88ng/mL is potentially toxic and can lead to high blood calcium, high blood phosphate levels, and kidney stones.

To increase our vitamin D level we must take vitamin D3 supplements, increase our exposure to sunlight (while at the same time being careful to not be over exposed to prevent burns and skin issues including skin cancer), and/or increase our dietary vitamin D intake. It may be impossible for some to take in enough vitamin D safely by sun exposure, and it would not be possible to reach an optimal goal by increasing dietary intake (with milk and juice alone, you would have to drink gallons a day to reach optimal levels. That's just too much milk or juice for most adults). In addition, cod liver oil is a great supplement but many people just can't get past the taste. Because it is possible to take in too much vitamin D through supplementation, one really must manage vitamin D supplementation in conjunction with blood monitoring and close follow-up with a healthcare provider. As always, consult your physician if you are concerned about your personal healthcare needs or wish to add supplements to your diet.

Healthiest Foods ranked as quality sources of: vitamin D

Food	Serving Size	Calories	Amount (IU)	Healthiest Foods Rating
Salmon, baked/broiled	4 oz	261.9	411.00	excellent
Shrimp, steamed/boiled	4 oz	112.3	162.39	very good
Cow's milk, 2%	1 cup	121.2	97.60	very good
Cod, baked/broiled	4 oz	119.1	63.50	good
Egg, whole, boiled	1	68.2	22.88	good