

Title: Vitamin D Deficiency: Are you getting the "D" you need?

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Abstract: Vitamin D is important for muscle and bone health. Vitamin D deficiency is associated with cortical bone loss, increased bone turnover, and increased parathyroid hormone levels, predisposing to osteoporosis. Vitamin D supplementation increases bone density in established deficiency. Historically, the main source of vitamin D was exposure to sunlight. However, changes in lifestyle and awareness of the hazards associated with sun exposure have changed this. Also, Sunscreen sun protection factor 15 (adequately applied) reduces pre-vitamin D synthesis by >99%. At latitudes greater than 35 degrees (MN is at 40 and greater degrees), UVB energy is insufficient to produce vitamin D during the winter months, producing a 'vitamin D winter' of variable duration, centered on the winter solstice. During these times of no cutaneous vitamin D production, dietary intake of vitamin D and previous vitamin stores become important. Treating deficiency involves correcting the vitamin D deficit and ensuring continuing maintenance of vitamin D status.

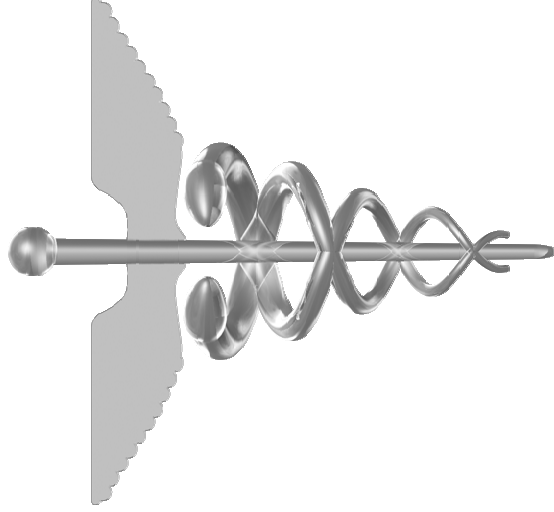
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** ATTENTION **

1. Always consult your doctor before starting any supplements or medications.
2. If you think you may have Vitamin D deficiency, consult your doctor to work out a specific dosing plan personalized to your lifestyle and current state of health.
3. Certain medications or medical conditions can cause vitamin D toxicity to occur.

Food	Selected Food Sources of Vitamin D	International Units	Daily Value, %*
Cod liver oil, 1 tablespoon		1360	340
Salmon, cooked, 3 1/2 ounces		360	90
Mackerel, cooked, 3 1/2 ounces		345	90
Sardines, canned in oil, drained, 3 1/2 ounces		270	70
Eel, cooked, 3 1/2 ounces		200	50
Milk, nonfat, reduced fat, and whole, vitamin D fortified, 1 cup		98	25
Margarine, fortified, 1 tablespoon		60	15
Cereal grain bars, fortified with 10% of the DV, 1 each		50	10
Pudding, 1/2 cup prepared from mix and made with vitamin D fortified milk		50	10
Dry cereal, vitamin D fortified with 10% of DV, 1/2 cup (other cereals may be fortified with more or less vitamin D)		40-50	10
Liver, beef, cooked, 3 1/2 ounces		30	8
Egg, 1 whole (vitamin D is present in the yolk)		25	6

*DV indicates daily value. DVs are reference numbers based on the recommended dietary allowance. They were developed to help a person figure out if a food is a good source of a nutrient. The DV for vitamin D is 400 IU. The percent DV listed on the nutrition facts panel of food labels tells adults what percentage of the DV is provided by one serving. Percent DVs are based on a 2000-calorie diet. Your DVs may be higher or lower depending on your calorie needs. Foods that provide lower percentages of the DV will contribute to a healthful diet. Source: Clinical Nutrition Service. Facts About Dietary Supplements: Vitamin D. Bethesda, Md: National Institutes of Health; 2002.



Univ of MN Medical School: Primary Care Clerkship

VITAMIN D DEFICIENCY: ARE YOU GETTING THE “D” YOU NEED?



VITAMIN D FACTS:

Vitamin D is important for muscle and bone health. Vitamin D deficiency is associated with cortical bone loss, increased bone turnover, and increased parathyroid hormone levels, predisposing to osteoporosis. Vitamin D supplementation increases bone density in established deficiency

Vitamin D deficiency has associations with:

- Cardiovascular disease
- Insulin resistance and β -cell dysfunction
- The development of autoimmune disease (including type 1 diabetes, rheumatoid arthritis and multiple sclerosis),
- Colon, breast and prostate cancers.

Additionally, a prospective interventional study noted increased mood with vitamin D supplementation.

SOURCES OF VITAMIN D

Vitamin D is found in two forms: vitamin D3 – cholecalciferol, occurring in humans and animals; and vitamin D2 – ergocalciferol, occurring in plants. Both forms have been commercially synthesized.

SUNLIGHT EXPOSURE

Historically, the main source of vitamin D was exposure to sunlight. However, changes in lifestyles and awareness of the hazards associated with sun exposure has changed this. Also, Sunscreen sun protection factor 15 (adequately applied) reduces previtamin D synthesis by >99%.

At latitudes greater than 35 degrees (MN is at 40 and greater degrees), UVB energy is insufficient to produce vitamin D during the winter months, producing a 'vitamin D winter' of variable duration, centered on the winter solstice. During these times of no cutaneous vitamin D production, dietary intake of vitamin D and previous vitamin stores become important.

SCREENING

People at risk of significant deficiency include:

- the institutionalized or housebound,
- those with sun avoidant behavior
- refugees
- those with celiac disease (or other malabsorptive conditions)

• those from areas of high vitamin D deficiency prevalence

• those in whom osteoporosis therapy is considered

• those with chronic idiopathic musculoskeletal pain, and

- pregnant women (particularly if dark skinned or veiled).

TREATMENT

The current recommended daily intake of vitamin D is adequate for bone health. Our total requirement for vitamin D (sun exposure and dietary intake) is about 4000 IU/day to keep 25(OH)D levels above 100 nmol/L.

Treating deficiency involves correcting the vitamin D deficit and ensuring continuing maintenance of vitamin D status. To normalize stores:

- adults require 3000–5000 IU/per day for 6–12 weeks
- children aged <1 month require 1000 IU/day
- children aged 1–12 months require 3000 IU/day, and
- children aged >12 months require 5000 IU/day.

Treatment is for 3 months, with adequate daily calcium.