

PROACTIVE HEALTH: IMMUNITY AND VITAMIN D

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Vitamin D is a nutrient that plays many important roles in your overall health. One major role of vitamin D is related to bone health. Vitamin D and calcium work together to keep your bones strong.

Vitamin D is also critical for the function of several parts of your body, including muscles, nerves, the brain and the immune system.

WHAT ARE THE SOURCES OF VITAMIN D?

You can get vitamin D from sunlight, food and dietary supplements.

Sunlight.

Sunlight is an important source of vitamin D. When your skin is exposed to ultraviolet (UV) rays from the sun, your body makes vitamin D.

In general, most people's bodies can make a sufficient amount of vitamin D with only a few minutes of direct exposure of skin (face, arms and hands) to sunlight every day. However, there are several factors that affect the amount of vitamin D that people make.

- **Sun Exposure (where, when and how):** The intensity of sunlight varies by latitude, time of the day and season. The body makes more vitamin D when the sun's intensity is greater. Your body can make more vitamin D if exposed to the sun between 10 am to 4 pm and during the spring and summer months. Your body cannot make vitamin D from sun exposure through windows, for example when you are exposed to the sun through closed windows in the car.
- **Age:** Older people make less vitamin D from sun exposure.
- **Skin Color:** People with darker skin make less vitamin D from sun exposure.



Is too much sun exposure harmful?

Yes. It is important to know that UV radiation from the sun and other sources such as tanning beds increases the risk of skin cancer. To protect your skin, experts recommend avoiding too much exposure to sunlight and avoid tanning bed use. In addition, you should use sunscreen with a sun protection factor (SPF) of 15 or higher when you are outdoors.

Food

Natural: Vitamin D is naturally present in very few foods.

- Foods with the highest amount of vitamin D are fatty fish (trout, salmon, tuna and mackerel) and fish liver oils.
- Foods with a medium amount of vitamin D are beef liver, cheese and egg yolks.
- Food with a small amount of vitamin D are certain kinds of mushrooms. Some mushrooms are exposed to UV lights and so have higher amounts of vitamin D.



Fortified: Several foods are fortified with vitamin D in the United States.

- Milk and plant milk alternatives (such as soy milk)
- Infant formula
- Breakfast cereals
- Some brands of orange juice and yogurt

A list of different foods based on their vitamin D content per serving is presented in Table 1 below.

TABLE 1: VITAMIN D CONTENT OF SELECTED FOODS

Food	Amount	mcg (IU) per serving	% DV
Trout (rainbow), farmed, cooked	3 ounces	16.2 (645)	81
Salmon (sockeye), cooked	3 ounces	14.2 (570)	71
Mushrooms, white, raw, sliced, exposed to UV light	1/2 cup	9.2 (366)	46
Milk, 2% milkfat, vitamin D fortified	1 cup	2.9 (120)	15
Soy, almond, and oat milks, vitamin D fortified, various brands	1 cup	2.5-3.6 (100-144)	13-18
Ready-to-eat cereal, fortified with 10% of the DV for vitamin D	1 serving	2.0 (80)	10
Sardines (Atlantic), canned in oil, drained	2 sardines	1.2 (46)	6
Egg, large, scrambled	1 egg	1.1 (44)	6
Liver, beef, braised	3 ounces	1.0 (42)	5
Tuna fish (light), canned in water, drained	3 ounces	1.0 (40)	5
Cheese, cheddar	1.5 ounce	0.4 (17)	2
Mushrooms, portabella, raw, diced	1/2 cup	0.1 (4)	1
Chicken breast, roasted	3 ounces	0.1 (4)	1

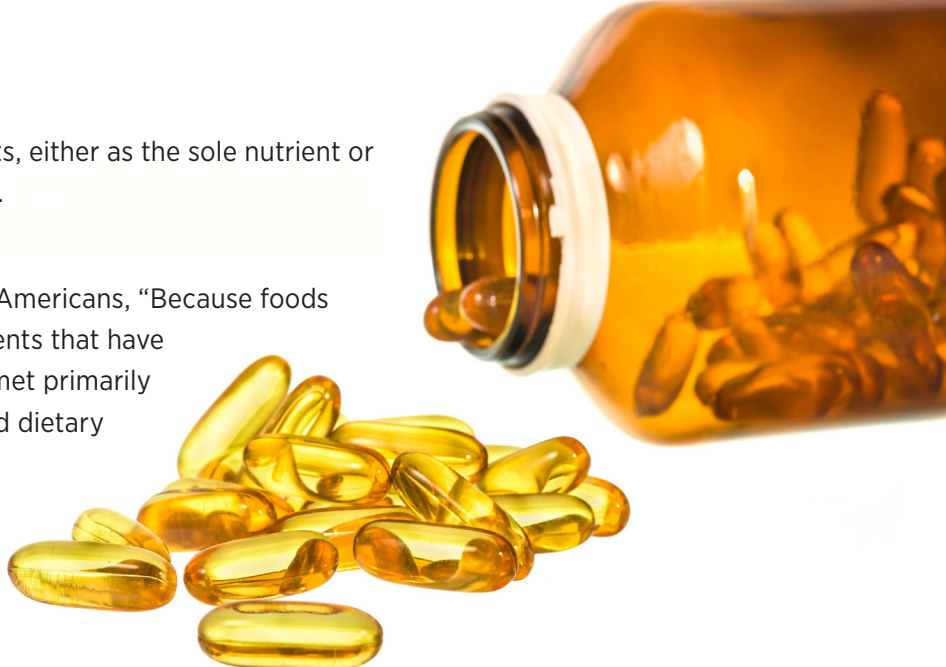
Abbreviations: mcg: microgram; IU: International Units; DV: Daily Values.

Dietary Supplements

Vitamin D is also available in dietary supplements, either as the sole nutrient or in combination with other vitamins and minerals.

Should I take a vitamin D supplement?

Based on the 2020-2025 Dietary Guidelines for Americans, “Because foods provide an array of nutrients and other components that have benefits for health, nutritional needs should be met primarily through foods. In some cases, fortified foods and dietary supplements are useful when it is not possible otherwise to meet needs for one or more nutrients (e.g., during specific life stages such as pregnancy).”



Talk to your healthcare provider to see if you might need to take a vitamin D supplement. Your healthcare provider can check the levels of vitamin D in your blood. Based on factors such as your age, diet, skin color and sun exposure, your healthcare provider might recommend a vitamin D supplement.

For more information about dietary supplements, visit the [Frequently Asked Questions \(FAQ\) area of the National Institute of Health Office of Dietary Supplement website](#).

HOW MUCH VITAMIN D DO I NEED?

The recommended average daily intake of vitamin D for healthy people varies by age, as listed below.

- Birth to 12 months 10 mcg (400 IU)
- Children, 1-13 years..... 15 mcg (600 IU)
- Teens, 14-18 years..... 15 mcg (600 IU)
- Adults, 19-70 years..... 15 mcg (600 IU)
- Adults, 71 years and older..... 20 mcg (800 IU)

WHICH GROUPS ARE AT RISK OF LOW VITAMIN D LEVELS?

- Breastfed infants. Experts recommend vitamin D supplements for breastfed infants, as 10 mcg (400 IU) of vitamin D per day.
- Older adults
- People with limited sun exposure
- People with dark skin
- People with medical conditions that decrease fat absorption, such as celiac disease and Inflammatory Bowel Disease (IBD)
- Obese people

IS TOO MUCH VITAMIN D HARMFUL?

Yes, too much vitamin D can be toxic. The side effects of getting too much vitamin D can range from nausea, vomiting and kidney injury if very high levels are taken, to heart problems and even death if extremely high levels are taken. The main reason for excessively high vitamin D levels is generally due to excessive intake of dietary supplements. People don't normally get too much vitamin D from sunlight. Vitamin D is fat soluble, meaning that the extra amounts are stored in the body and can reach toxic levels if taken excessively.

Daily upper limits of vitamin D are identified for each age group. The daily upper limit is the maximum daily intake of a vitamin considered to be safe for most individuals. For example, for adults 19 years and older, the daily upper limit of vitamin D from both diet and supplements is 100 micrograms (mcg) or 4,000 IU. For more information about daily upper limits of vitamin D for each age group, see the [National Institutes of Health Office of Dietary Supplements Vitamin D Fact Sheet for Consumers](#).

Additional Questions

What is the difference between vitamin D2 and vitamin D3?

D2 (ergocalciferol) and D3 (cholecalciferol) are two forms of vitamin D found in supplements and fortified foods. While D2 comes from plant sources, D3 comes from animal sources. Although both forms are effective, D2 is less effective in increasing your vitamin D levels.

Are vitamin D supplements effective against COVID-19?

Based on the current health guidance (2021), "There is insufficient evidence to recommend either for or against the use of vitamin D for the prevention or treatment of COVID-19."

Disclaimer

This fact sheet provides basic information for educational purposes and should not replace medical advice. Talk to your healthcare providers (registered dietitian, physician, pharmacist, etc.) about the questions that you may have and what may work for your health.

References and Additional Resources

National Institutes of Health Office of Dietary Supplements. Vitamin D Fact Sheet for Consumers. <https://ods.od.nih.gov/pdf/factsheets/VitaminD-Consumer.pdf>.

National Institutes of Health Office of Dietary Supplements. Health Professional Fact Sheet on Vitamin D. <https://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/#en1>.

U.S. Department of Agriculture, Agricultural Research Service. [FoodData Central \(https://fdc.nal.usda.gov/index.html\)](https://fdc.nal.usda.gov/index.html)

U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).



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