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URL of this page: <https://medlineplus.gov/vitamindeficiency.html>

Vitamin D Deficiency

Also called: Hypovitaminosis D, Low Vitamin D

What is vitamin D deficiency?

Vitamin D deficiency means that you are not getting enough vitamin D to stay healthy.

Why do I need vitamin D and how do I get it?

Vitamin D [<https://medlineplus.gov/vitaminD.html>] helps your body absorb calcium [<https://medlineplus.gov/calcium.html>]. Calcium is one of the main building blocks of bone. Vitamin D also has a role in your nervous, muscle, and immune systems.

You can get vitamin D in three ways: through your skin, from your diet, and from supplements. Your body forms vitamin D naturally after exposure to sunlight. But too much sun exposure [<https://medlineplus.gov/sunexposure.html>] can lead to skin aging and skin cancer, so many people try to get their vitamin D from other sources.

How much vitamin D do I need?

The amount of vitamin D you need each day depends on your age. The recommended amounts, in international units (IU), are

- Birth to 12 months: 400 IU
- Children 1-13 years: 600 IU
- Teens 14-18 years: 600 IU
- Adults 19-70 years: 600 IU
- Adults 71 years and older: 800 IU
- Pregnant and breastfeeding women: 600 IU

People at high risk of vitamin D deficiency may need more. Check with your health care provider about how much you need.

What causes vitamin D deficiency?

You can become deficient in vitamin D for different reasons:

- You don't get enough vitamin D in your diet
- You don't absorb enough vitamin D from food (a malabsorption problem [<https://medlineplus.gov/malabsorptionsyndromes.html>])

- You don't get enough exposure to sunlight.
- Your liver or kidneys cannot convert vitamin D to its active form in the body.
- You take medicines that interfere with your body's ability to convert or absorb vitamin D

Who is at risk of vitamin D deficiency?

Some people are at higher risk of vitamin D deficiency:

- Breastfed infants, because human milk is a poor source of vitamin D. If you are **breastfeeding** [<https://medlineplus.gov/breastfeeding.html>] , give your infant a supplement of 400 IU of vitamin D every day.
- Older adults, because your skin doesn't make vitamin D when exposed to sunlight as efficiently as when you were young, and your kidneys are less able to convert vitamin D to its active form.
- People with dark skin, which has less ability to produce vitamin D from the sun.
- People with disorders such as Crohn's disease [<https://medlineplus.gov/crohnsdisease.html>] or celiac disease [<https://medlineplus.gov/celiacdisease.html>] who don't handle fat properly, because vitamin D needs fat to be absorbed.
- People who are obese [<https://medlineplus.gov/obesity.html>] , because their body fat binds to some vitamin D and prevents it from getting into the blood.
- People who have had gastric bypass surgery [<https://medlineplus.gov/weightlossurgery.html>]
- People with osteoporosis
- People with chronic kidney [<https://medlineplus.gov/chronickidneydisease.html>] or liver disease [<https://medlineplus.gov/liverdiseases.html>] .
- People with hyperparathyroidism [<https://medlineplus.gov/parathyroiddisorders.html>] (too much of a hormone that controls the body's calcium level)
- People with sarcoidosis [<https://medlineplus.gov/sarcoidosis.html>] , tuberculosis [<https://medlineplus.gov/tuberculosis.html>] , histoplasmosis [<https://medlineplus.gov/histoplasmosis.html>] , or other granulomatous disease (disease with granulomas, collections of cells caused by chronic inflammation)
- People with some lymphomas [<https://medlineplus.gov/lymphoma.html>] , a type of cancer.
- People who take medicines that affect vitamin D metabolism, such as cholestyramine (a cholesterol drug), ant seizure drugs, glucocorticoids [<https://medlineplus.gov/steroids.html>] , antifungal drugs, and HIV/AIDS medicines [<https://medlineplus.gov/hivaidsmedicines.html>] .

Talk with your health care provider if you are at risk for vitamin D deficiency. There is a blood test which can measure how much vitamin D is in your body.

What problems does vitamin D deficiency cause?

Vitamin D deficiency can lead to a loss of bone density [<https://medlineplus.gov/bonedensity.html>] , which can contribute to osteoporosis and fractures [<https://medlineplus.gov/fractures.html>] .

Severe vitamin D deficiency can also lead to other diseases. In children, it can cause rickets [<https://medlineplus.gov/rickets.html>] . Rickets is a rare disease that causes the bones to become soft and bend. African American infants and children are at higher risk of getting rickets. In adults, severe vitamin D deficiency leads to osteomalacia. Osteomalacia causes weak bones, bone pain, and muscle weakness.

Researchers are studying vitamin D for its possible connections to several medical conditions, including diabetes, high blood pressure, cancer, and autoimmune conditions such as multiple sclerosis. They need to do more research before they can understand the effects of vitamin D on these conditions.

How can I get more vitamin D?

There are a few foods that naturally have some vitamin D:

- Fatty fish such as salmon, tuna, and mackerel
- Beef liver
- Cheese
- Mushrooms
- Egg yolks

You can also get vitamin D from fortified foods. You can check the food labels to find out whether a food has vitamin D. Foods that often have added vitamin D include

- Milk
- Breakfast cereals
- Orange juice
- Other dairy products, such as yogurt
- Soy drinks

Vitamin D is in many multivitamins. There are also vitamin D supplements, both in pills and a liquid for babies.


If you have vitamin D deficiency, the treatment is with supplements. Check with your health care provider about how much you need to take, how often you need to take it, and how long you need to take it.


Can too much vitamin D be harmful?

Getting too much vitamin D (known as vitamin D toxicity) can be harmful. Signs of toxicity include nausea, vomiting, poor appetite, constipation, weakness, and weight loss. Excess vitamin D can also damage the kidneys. Too much vitamin D also raises the level of calcium in your blood. High levels of blood calcium (hyperkalemia) can cause confusion, disorientation, and problems with heart rhythm.


Most cases of vitamin D toxicity happen when someone overuses vitamin D supplements. Excessive sun exposure doesn't cause vitamin D poisoning because the body limits the amount of this vitamin it produces.

Resources

- **25-hydroxy vitamin D test** [<https://medlineplus.gov/ency/article/003569.htm>] (Medical Encyclopedia)
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003569.htm>]
- **Low Vitamin D: What Increases the Risk?** [<https://www.hsph.harvard.edu/nutritionsource/vitamin-d-deficiency-risk/>] (Harvard School of Public Health)
- **On the Possible Link between Vitamin D Deficiency and Cardiovascular Disease** [<http://circ.ahajournals.org/content/129/13/e413.full>] (American Heart Association)
- **Osteomalacia** [<http://www.mayoclinic.org/diseases-conditions/osteomalacia/basics/definition/CON-20029393?p=1>] (Mayo Foundation for Medical Education and Research)
- **Osteomalacia** [<https://medlineplus.gov/ency/article/000376.htm>] (Medical Encyclopedia)
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000376.htm>]
- **Rickets: MedlinePlus Health Topic** [<https://medlineplus.gov/rickets.html>]  (National Library of Medicine)

- Vitamin D [<https://ods.od.nih.gov/factsheets/VitaminD-Consumer/>]
 (National Institutes of Health, Office of Dietary Supplements)
 Also in Spanish [<https://ods.od.nih.gov/factsheets/VitaminD-DatosEnEspanol/>]
- Vitamin D Deficiency
<http://www.hormone.org/sitecore%20modules/web/~media/Hormone/Files/Patient%20Guides/Bone%20and%20Mineral/PGVitamin%20D%20523.pdf> (Hormone Health Network) - PDF
- Vitamin D Deficiency (Beyond the Basics) [<https://www.uptodate.com/contents/vitamin-d-deficiency-beyond-the-basics?view=print>] (UpToDate)
- Vitamin D Test [<https://labtestsonline.org/understanding/analytes/vitamin-d/tab/test>]
 (American Association for Clinical Chemistry)

Statistics and Research

- Exposure to Cigarette Smoke Reduces Vitamin D3 in the Blood Stream and Respiratory Tract
<http://www.aaaai.org/global/latest-research-summaries/Current-JACI-Research/cigarette-smoke-vitamin-D3>
 (American Academy of Allergy, Asthma, and Immunology)
- NIH Researchers Find Vitamin D Binding Protein May Help to Assess Vitamin D Deficiency in African and White Americans [<https://www.nia.nih.gov/research/announcements/2013/11/nih-researchers-find-vitamin-d-binding-protein-may-help-assess>]  (National Institute on Aging)

Journal Articles

References and abstracts from MEDLINE/PubMed (National Library of Medicine)

- Article: Hypovitaminosis D and "small burden" uterine fibroids: Opportunity for a...
<https://www.ncbi.nlm.nih.gov/pubmed/28033263?tool=MedlinePlus>
- Article: Effect of vitamin D3 on self-perceived fatigue: A double-blind randomized...
<https://www.ncbi.nlm.nih.gov/pubmed/28033244?tool=MedlinePlus>
- Article: Vitamin D Deficiency - Is There Really a Pandemic? [<https://www.ncbi.nlm.nih.gov/pubmed/27959647?tool=MedlinePlus>]
- Vitamin D Deficiency -- see more articles [[https://www.ncbi.nlm.nih.gov/pubmed?term=\(Vitamin+D+Deficiency\[majr\]\)+AND+humans\[mh\]+AND+english\[la\]+AND+\(review\[pt\]+OR+guideline\[pt\]+OR+clinical+trial\[pt\]+OR+jsubsetk\[text\]+OR+patient+education+handout\[pt\]+OR+jsubsetaim\[text\]+OR+jsubsetn\[text\]+NOT+\(letter\[pt\]+OR+editorial\[pt\]+OR+case+reports\[pt\]+OR+comment\[pt\]\)+AND+%22last+1+Year%22\[edat\]&tool=MedlinePlus](https://www.ncbi.nlm.nih.gov/pubmed?term=(Vitamin+D+Deficiency[majr])+AND+humans[mh]+AND+english[la]+AND+(review[pt]+OR+guideline[pt]+OR+clinical+trial[pt]+OR+jsubsetk[text]+OR+patient+education+handout[pt]+OR+jsubsetaim[text]+OR+jsubsetn[text]+NOT+(letter[pt]+OR+editorial[pt]+OR+case+reports[pt]+OR+comment[pt])+AND+%22last+1+Year%22[edat]&tool=MedlinePlus)]



National Institutes of Health

The primary NIH organization for research on *Vitamin D Deficiency* is the NIH Office of Dietary Supplements [<https://ods.od.nih.gov/>]

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