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Vitamin D and Health

Vitamin D

Vitamin D is a fat-soluble vitamin that helps us have healthy bones. It also helps with nerve, muscle, and immune function. Most vitamin D is made in the body in response to sunlight. It is also found in small amounts in certain foods. Vitamin D deficiency can cause bone disorders. These include rickets, osteomalacia, and osteoporosis. Vitamin D deficiency has also been linked to cancer, diabetes, heart disease, and autoimmune diseases.¹

There are 2 forms of vitamin D. They are D₂ and D₃. Vitamin D₂ is found naturally in some plants. Vitamin D₃ is made in the skin following exposure to the sun. It is also found naturally in fatty fish and eggs and is used to fortify other foods. Multivitamins may include either form.²

How much vitamin D is needed?

How much vitamin D a person needs depends on his/her age and risk factors. People with some risk factors need to get more vitamin D to achieve healthy levels.² For example, obese people may need more than nonobese people. This is because vitamin D is stored in fat and is not as available for the body to use.

It's hard to measure the amount of vitamin D we get from the sun. So recommendations are usually made just for the vitamin D we get from food or supplements. Two recommendations are shown in the table.

Life-stage Group	Institute of Medicine (IU/day) ³	Endocrine Society (IU/day) ²
0-12 months	400	400-1000
1-18 years	600	600-1000
19-70 years	600	1500-2000
> 70 years	800	1500-2000
Pregnant or nursing women		
14-18 years	600	600-1000
19-50 years	600	1500-2000



Interpreting test results

Not everyone agrees on what certain 25(OH)D levels mean. Here's what the Endocrine Society and the American Association of Clinical Endocrinologists recommend^{2,10,11}:

Vitamin D, ng/mL	Health Status
< 20	Deficient
20-30	Insufficient
> 30-60	Sufficient/optimal
≥ 150	Toxic

Take action to prevent vitamin D deficiency

- Know the risk factors for vitamin D deficiency
- Test your high-risk patients using a reliable and accurate LC/MS/MS method

Vitamin D deficiency: who should be tested?

More than 70% of children and adults do not get enough vitamin D.^{4,5} So many people are at risk for deficiency. The Endocrine Society guidelines recommend testing those at risk, including²:

- Obese people
- Elderly people, especially if they have a history of falls or fractures
- People who do not get enough sunlight
- People with dark skin
- Breastfed infants
- Pregnant or nursing women
- People with certain medical conditions
 - Fat malabsorption disorders
 - Bone diseases (rickets, osteomalacia, osteoporosis)
 - Hyperparathyroidism
 - Chronic kidney disease
 - Liver failure
 - Granuloma-forming disorders
 - Some lymphomas
- People taking certain medications, including steroids and medications used to treat HIV, epilepsy, or fungal infections

How is vitamin D measured?

Vitamin D is measured by testing the level of 25-hydroxyvitamin D, also known as 25(OH)D, in the blood. There are 2 main ways of doing this. The first is by using immunoassay. Immunoassays can have a large amount of variability.⁶ Some underestimate the amount of 25(OH)D₂.^{7,8}

The second way is to test blood levels of 25(OH)D using liquid chromatography, tandem mass spectrometry (LC/MS/MS). LC/MS/MS is very accurate and precise. It is the method used by both the Centers for Disease Control and Prevention and the National Institute of Standards and Technology.⁹ LC/MS/MS can measure both types of vitamin D with equal precision.⁹ Knowing the 25(OH)D₂ and 25(OH)D₃ levels can tell you how much of a patient's vitamin D is coming from each form. This can help you better understand what's going on with the patient and make better treatment decisions.

References

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