



VITAMIN D

Essential for Good Health

VITAMIN D: THE POPULAR VITAMIN

Vitamin D is popular these days. That is because research has demonstrated that this essential fat-soluble vitamin is important for overall health.¹ Our skin has the unique ability to make vitamin D through UVB rays, but since it is advisable to limit sun exposure, our bodies may not be making adequate amounts for optimal health. Additionally, few foods naturally contain vitamin D, and fortified foods contain minimal amounts of this nutrient.² Furthermore, the increased prevalence of overweight and obesity has exacerbated our nation's poor vitamin D status.³ Consequently, nationally representative research demonstrates that 93% of Americans are receiving inadequate vitamin D from their diet alone,⁴ and approximately 1/3 of the US population, including children, adolescents, adults, and the elderly, are suffering from either insufficient or deficient levels of vitamin D.⁵ A vitamin D supplement is an inexpensive, safe and effective way to ensure you are receiving adequate amounts of this important micronutrient.

WHY IS VITAMIN D IMPORTANT?

- ✓ **Bone health support:** Vitamin D helps build and maintain strong bones by enhancing calcium absorption, regulating concentrations of calcium and phosphorus in the body, and regulating osteoclast (bone-resorbing cell) and osteoblast (bone-building cell) actions involved in bone remodeling.^{6-7†} Vitamin D is mandatory for prevention of rickets and osteomalacia, and along with calcium, is associated with higher bone mineral density, lower osteoporosis risk, and reduction in fracture and fall risk.^{8†}
- ✓ **Muscle health support:** Vitamin D is important for muscle health because it supports muscle function, muscle strength, and balance.^{9†}
- ✓ **Immune health support:** Vitamin D supports immune health by playing a crucial role in both acquired and innate immune responses.^{10†}

Other extraskeletal roles currently under investigation suggest vitamin D's role in the body to be virtually ubiquitous.¹

FOOD SOURCES OF VITAMIN D

Few foods naturally contain vitamin D; these include certain fatty fish (e.g. salmon, mackerel, sardines), fish liver oils, eggs, and UV-irradiated mushrooms. To prevent rickets, the US began fortifying our dairy and cereal with vitamin D in the early 20th century. Unfortunately, you have to consume large amounts of these natural or fortified sources to meet your vitamin D needs. For example, you would need to consume approximately 20 glasses of milk per day¹¹ to achieve 500 mcg (2,000 IU) of vitamin D, a daily recommended level associated with healthy vitamin D blood levels.¹²

Source	Amount Per Serving ^{11,13}
Fortified milk	2.5 mcg (100 IU) per cup
Fortified orange juice	2.5 mcg (100 IU) per cup
Fortified cereal	3.3 mcg (133 IU) per cup
Cooked wild salmon	21.2 mcg (847 IU) per 3 oz
Cooked farmed salmon	5.2 mcg (206 IU) per 3 oz
Egg	1.0 mcg (41 IU) per 1 whole egg

Useful Vitamin D Conversion:

1 mcg = 40 IU
1 ng/ml = 2.5 nmol/L

DID YOU KNOW THAT THERE ARE TWO TYPES OF VITAMIN D?

Vitamin D is available in two forms: vitamin D₂ (plant-derived) and vitamin D₃ (animal-derived). Vitamin D₃ is the preferred form because it has been shown to be more effective at raising and maintaining serum vitamin D levels in your body.¹⁴ Vitamin D₃ is the form most commonly found in nutritional supplements; the D₂ form is found as a prescription mostly.



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HOW MUCH IS RIGHT FOR ME?

Pharmacokinetics research demonstrates that 2.5 mcg (100 IU) of vitamin D increases serum 25-hydroxyvitamin D [25(OH)D] levels by approximately 1 ng/ml.¹⁵ Although individual differences and one's baseline status affect the response to supplementation, this "rule of thumb" is useful to estimate dosing for vitamin D supplementation regimens. The National Academy of Medicine (NAM) Dietary Reference Intakes (DRIs) for vitamin D¹⁶ and the US Endocrine Society's Clinical Practice Guidelines for vitamin D¹² are useful to understand population and individual vitamin D needs, respectively. These recommendations are summarized in the tables below:

VITAMIN D INTAKE AND SUPPLEMENTATION RECOMMENDATIONS^{12,16}

Age Group	Minimum Requirement For Bone Health ¹⁶	To Raise 25(OH)D Levels Consistently > 30 ng/ml ¹²	To Correct Deficiency ¹²
Infants (0-1 year)	10 mcg (400 IU)/day	At least 25mcg (1,000 IU)/day	50mcg (2,000 IU)/day or 1,250 mcg (50,000 IU)/week (for 6 weeks)
Children & Adolescents (1-18 years)	15 mcg (600 IU)/day	At least 25 mcg (1,000 IU)/day	50 mcg (2,000 IU)/day or 1,250 mcg (50,000 IU)/week (for 6 weeks)
Adults (19+ years)	15 mcg (600 IU)-20 mcg (800 IU)/day	At least 37.5 mcg (1,500 IU)-50 mcg (2,000 IU)/day	150 mcg (6,000 IU)/day or 1,250 mcg (50,000 IU)/week (for 8 weeks)

Note: obese children and adults may need 2-3 times more vitamin D daily than their normal-weight counterparts.¹²

Guidance for interpreting serum 25(OH)D levels:¹²

- Deficiency: < 20 ng/ml
- Insufficiency: 21-29 ng/ml
- Sufficiency: ≥ 30 ng/ml

ARE YOU AT RISK FOR VITAMIN D INSUFFICIENCY?

You may be at risk if you:

- ✓ Do not take a daily multivitamin with vitamin D and/or a vitamin D supplement
- ✓ Do not make vitamin D in your skin from UVB rays as efficiently: older adults; darker-skinned individuals
- ✓ Have an increased need for vitamin D: overweight or obese individuals; older adults
- ✓ Limit sun exposure: wear sunscreen; restricted to indoor activity; live at higher latitude or in region with long winter season or air pollution
- ✓ Have a malabsorption syndrome, liver disease, or renal disease
- ✓ Take medications that interact with vitamin D absorption or metabolism

Your doctor can arrange for a simple serum 25-hydroxyvitamin D blood test to determine your vitamin D status. Be proactive with your health and consider taking a daily vitamin D supplement as part of a healthy supplement regimen.

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