



VITAMIN D SUPPLEMENTS

ADULT AND PEDIATRIC RECOMMENDATIONS

Why is Vitamin D important?

Vitamin D is an essential fat-soluble vitamin present in very few foods. It is also produced endogenously in the skin through exposure to UV sunlight. Vitamin D plays an active role in promoting intestinal absorption of calcium and is needed for normal bone growth. Deficiency can cause thin, brittle bones, resulting in rickets and osteomalacia in children, and osteoporosis in adults. Vitamin D also has roles in modulating cell growth, neuromuscular and immune function, and reduction of inflammation¹.

Risk of Deficiency

Those at risk include reduced skin synthesis (darker skin pigment, sunscreen use, reduced outdoor time, higher geographic latitude or dense cloud cover), reduced intake in the diet (breastfed infants, diet low in vitamin D rich foods) or both (older adults). Those with kidney and liver disease who have reduced synthesis and conversion of vitamin D, increased excretion of vitamin D (nephrotic syndrome), fat malabsorptive conditions reducing absorption (bariatric surgery, cystic fibrosis), and those on certain medications (see below) are also at risk².

Serum levels of 25(OH)D is considered the best indicator of vitamin D status³, and are defined as :

Deficiency: <20ng/mL **Insufficiency:** 21-29 ng/mL **Sufficiency:** >30ng/mL **Potential adverse effects:** >50ng/mL

Age group	Recommended Dietary Allowance (RDA) per day	Tolerable Upper Intake Level (UL) per day
Infants 0-6 months	400 IU (10 mcg) *	1000 IU (25 mcg)
Infants 7-12 months	400 IU (10 mcg) *	1500 IU (38 mcg)
Children 1-3 years	600 IU (15 mcg)	2500 IU (63 mcg)
Children 4-8 years	600 IU (15 mcg)	3000 IU (75 mcg)
Children and Adults 9-70 years	600 IU (15 mcg)	4000 IU (100 mcg)
Adults > 70 years	800 IU (20 mcg)	4000 IU (100 mcg)
Pregnancy & Lactation	600 IU (15 mcg)	4000 IU (100 mcg)

*Adequate Intake rather than Recommended Dietary Allowance.



Dosing and Safety

- The American Academy of Pediatrics (AAP) recommends that exclusively breastfed infants or those consuming <1L/day of fortified formula receive 400 IU/day until they are weaned or consuming >1,000 ml/day of fortified formula or whole milk¹.
- The Endocrine Society Clinical Practice Guidelines recommends 2000 IU/day of D₂/D₃ or 50,000 IU D₂ once weekly for at least 6 weeks in children 1-18y those who are deficient to achieve serum 25(OH)D levels >30ng/mL, followed by at least 600 IU/day for maintenance³.
- The Endocrine Society suggests treating adults with vitamin D deficiency with 50,000 IU ergocalciferol (D₂) once weekly for 8 weeks or 6,000 IU/day of D₂/D₃ until serum 25(OH)D levels are >30ng/mL, followed by maintenance doses of 1500-2000 IU/day³.
- Long-term intakes above the UL increase the risk of adverse health effects, including vascular and tissue calcification, leading to heart and kidney damage. Toxicity has been reported for intakes ~10,000-40,000 IU/day and serum 25(OH)D levels of 200-240ng/mL¹.

Drug Interactions

- Anticonvulsants (phenobarbital/phenytoin), glucocorticoids (like prednisone), HAART (AIDS treatment), and antirejection medications activate destruction of vitamin D to an inactive form (calcitric acid)².
- The weight-loss drug orlistat and cholesterol-lowering drug cholestyramine can reduce vitamin D absorption¹.

References

1 Office of Dietary Supplements. Fact Sheet: Vitamin D. National Institutes of Health. Reviewed June 24, 2011.

<http://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>

2 Holick MF. Vitamin D Deficiency. N Engl J Med 2007;357:266-81

3 Holick MF et al. Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice. J Clin Endocrinol Metab. 2011 Jul;96(7):1911-30