

How Much Sunlight Is Equivalent to Vitamin D Supplementation?

Now is the winter of our vitamin D discontent.

Vitamin D is essential for bone mineralization and may have other health benefits. Experts disagree on the serum vitamin D level necessary to maintain health. Some recommend concentrations above 30 ng/mL and consider the range between 20 and 30 ng/mL insufficient and concentrations lower than 20 ng/mL deficient. By this reckoning, many Americans are vitamin D insufficient or deficient. Because it is difficult to obtain enough vitamin D from food intake, oral supplements and sunlight have been recommended for individuals with low serum D levels. The suggested dose for supplements is 400 to 1000 IU/day. It has been suggested that a few minutes of sunlight each day to the face, neck, hands, and arms are all that is necessary to restore vitamin D sufficiency, but the amount of sunlight required for photoconversion of 7-dehydrocholesterol to pre-vitamin D varies considerably depending on a person's age, Fitzpatrick sun-reactive skin type, geographic location, and season. (The six Fitzpatrick skin types classify sensitivity to ultraviolet light; skin type I is fair skin that always burns, never tans; type III is darker white skin that burns and tans; type V is brown skin that rarely burns, tans easily.) Investigators employed the **FastRT computational tool** to predict the length of daily exposure required to obtain the sunlight equivalent of 400 and 1000 IU oral vitamin D supplementation.

At noon in Miami, someone with Fitzpatrick skin type III would require 6 minutes to synthesize 1000 IU of vitamin D in the summer and 15 minutes in the winter. Someone with skin type V would need 15 and 29 minutes, respectively. At noon in the summer in Boston, necessary exposure times approximate those in Miami, but in winter, it would take about 1 hour for type III skin and 2 hours for type V skin to synthesize 1000 IU of D. After 2 PM in the winter in Boston, it is impossible for even someone with Fitzpatrick type I skin to receive enough sun to equal even 400 IU of vitamin D.

Comment: These findings raise serious questions about the recommendation that a "little bit" of outdoor sun exposure is sufficient to maintain adequate vitamin D levels. Moreover, predictions of the time required to achieve adequate vitamin D photosynthesis are probably underestimates, because it is unlikely that people would walk around Boston for an hour or two in the winter with face, neck, and arms exposed. These findings corroborate other observations (e.g., *J Clin Endocrinol Metab* 2007; 92:2130) that cast doubt on sun exposure as a way to prevent vitamin D deficiency.

— **Craig A. Elmets, MD**

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Citations:

Terushkin V et al. Estimated equivalency of vitamin D production from natural sun exposure versus oral vitamin D supplementation across seasons at two US latitudes. *J Am Acad Dermatol* 2010 Jun; 62:929.e1 [[PubMed Abstract](#)]

Tsiaras WG and Weinstock MA. Ultraviolet irradiation and oral ingestion as sources of optimal vitamin D. *J Am Acad Dermatol* 2010 Jun; 62:935. [[PubMed Abstract](#)]

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