

we think you need to satisfy your requirement if you're not getting enough of it from sun exposure."

He says he takes a supplement in that amount daily, year round, even though he plays tennis and cycles in the summertime. And when he is outside in the summer, he spends part of the time — 15 minutes or so — without sunscreen.

Sunscreen blocks DNA-damaging UVB radiation, but those are the same wavelengths of light that help synthesize vitamin D. "You don't want to get a sunburn, ever," Holick says. "But I typically will go out, get some sun exposure, and *then* put sunscreen on, so I take advantage of the beneficial effect and prevent the damaging effects due to excessive exposure."

Recommendations for adequate vitamin D supplements depend somewhat on a person's lifestyle, skin color, age and overall health. A light-skinned lifeguard in a bathing suit on a sunny summer day probably synthesizes as much as 20,000 or 30,000 units of vitamin D, says Giovannucci. People with very dark skin probably need about 10 times as much sun exposure to synthesize the same amount of vitamin D as people with very light skin — or may need more from supplements if they aren't getting that much sun exposure.

Obese people may need more vitamin D (because the vitamin is sequestered in fat), and so do people who can't readily absorb nutrients from their gut into their bloodstream. Also, people need more supplementary vitamin D as they age, because their skin and kidneys gradually become less efficient at synthesizing vitamin D and converting it into its active form.

Gauging Vitamin D Levels

Holick recommends getting blood levels of vitamin D measured once a year, in late fall. (The amount of vitamin D you make from sunlight from spring into fall determines your stores for the year.) "If you are deficient then, you will remain so throughout the winter," he says.

But there is still controversy about what makes for an adequate blood level. Blood tests measure not vitamin D itself, but a compound that is made from vitamin D by the liver, called 25-hydroxyvitamin D, or calcidiol. Doctors had thought that levels of 16 to 20 nanograms of 25-hydroxyvitamin D per milliliter of blood were adequate. But researchers are finding that even for bone health — and probably also for

cancer prevention — levels of around 30 to 40 are optimal.

"So someone with 25, which would not be considered deficient by current standards, would do better to get his or her levels up to 30 at least," says Giovannucci. However, "unless your physician is very up on vitamin D literature, if your values are even like 15 or 20, the lab is likely to say 'normal' and your physician is not going to worry about it and say your vitamin D level is fine."

Deficiencies in Diet

Relying on dietary sources alone probably won't work to get your vitamin D levels high enough. "There's essentially no vitamin D naturally occurring in our diet, and very few foods are fortified with vitamin D," says Holick, "and it's so little that it's inadequate to satisfy your requirement."

Milk or orange juice fortified with vitamin D have only about 100 International Units in a glass. And Holick has found that milk very often doesn't have as much as it says it does on the label. Salmon contains high levels of vitamin D,

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—MICHAEL HOLICK, PH.D., M.D., Boston University Medical Center

perhaps as much as 1,000 units a serving, but that's only in wild salmon, he says, and "you'd have to eat it every day."

Taking 1,000 units a day in the form of a supplement will never be too much, Holick says. Even if you get outside a lot in the summertime, the body knows how much you're making in your skin, and it destroys any excess.

Giovannucci says the guidelines for dietary intake — 200 to 600 units a day, depending on age — need to be revised, and that some people may need as much as 2,000 units a day of vitamin D to get their blood levels up to adequate amounts. Sun exposure is the most efficient way to make vitamin D, he says, although he finds it impractical to make specific recommendations. "But at the same time, I think that sometimes the messages of avoiding sun and always putting on sunscreen are too extreme." **H**

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