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The Crucial Role of Vitamin D in Physical and Mental Health

Analysis by Dr. Joseph Mercola | October 30, 2023

STORY AT-A-GLANCE

- Vitamin D is a potent immunomodulator, influencing both your innate and adaptive immune responses. As such, vitamin D deficiency has been linked to health conditions such as osteoporosis, autoimmune diseases, cardiovascular diseases and cancer
- Vitamin D is also crucial for the maintenance of healthy bones and nervous system function
- Sun exposure is the primary source of vitamin D, and while sunburn needs to be avoided, this risk needs to be balanced with the need for vitamin D production
- In the critically ill, vitamin D deficiency has been shown to increase infection and mortality rates, and is associated with longer hospital stays
- Chinese researchers concluded that vitamin D status can predict your risk of death from COVID-19, as well as the severity of your symptoms in the acute phase. Having a vitamin D level lower than 36.04 ng/mL was predictive for death

For decades, the conventional medical establishment and media have downplayed if not entirely ignored evidence showing that sun exposure is a crucial part of a healthy lifestyle that prevents, as opposed to creates, diseases — including cancer.

Is that about to change? It's too early to tell, but surprisingly supportive scientific papers and mainstream media articles have recently highlighted the benefits of sun exposure and vitamin D optimization.

Scientific Review Highlights Importance of Vitamin D

Among them is a scientific review published in the peer-reviewed journal Cureus, in which the authors highlight "the intricate relationship between Vitamin D and patient outcomes." An excerpt from the paper, "The Sunlight-Vitamin D Connection: Implications for Patient Outcomes in the Surgical Intensive Care Unit," reads:[1]

> *"Vitamin D, known for its multifaceted roles in immune modulation, inflammation regulation, and maintenance of calcium homeostasis, emerges as a pivotal factor in the care of critically ill patients.*
>
> *Our exploration reveals a high prevalence of Vitamin D deficiency in the SICU, primarily attributable to limited sunlight exposure, comorbidities, and medication use.*
>
> *Importantly, Vitamin D status impacts infection rates, mortality, and length of stay in the SICU, making it a clinically relevant consideration ... The prospect of personalized Vitamin D supplementation strategies offers promise for optimizing patient care."*

The paper goes on to stress that vitamin D's "crucial role in maintaining human health" goes well beyond its classical role in bone health (by regulating calcium and phosphorus homeostasis).

"Emerging evidence suggests that vitamin D exerts a much broader influence on various physiological processes," the authors note. For example, they point out that vitamin D is "a potent immunomodulator, influencing the innate and adaptive immune responses":

> *"In the innate immune response, Vitamin D enhances the production of antimicrobial peptides like cathelicidins and defensins, which are essential for defense against infections.*
>
> *The adaptive immune response regulates the proliferation and differentiation of T and B cells, two critical immune system components. By modulating the immune response, Vitamin D can help the body defend against pathogens and*

may be involved in autoimmune diseases where the immune system mistakenly attacks the body's tissues."

As such, vitamin D deficiency has been linked to health conditions such as osteoporosis, autoimmune diseases, cardiovascular diseases, and cancer. According to this paper, vitamin D is also "crucial for the functioning of the nervous system and has been associated with mental health disorders."

Vitamin D is also a key regulator of cell growth and differentiation, and "Proper cell growth and differentiation regulation is crucial for maintaining tissue health and preventing abnormal cell proliferation, often associated with cancer," the authors state.

Sensible Sunlight Exposure Is the Primary Source of Vitamin D

Importantly, the authors accurately stress that sunlight is the primary source of vitamin D, and while sunburn needs to be avoided, this risk needs to be balanced with the need for vitamin D production:[2]

"When ultraviolet B (UVB) radiation from the sun penetrates the skin, it triggers a series of enzymatic reactions that lead to the synthesis of Vitamin D in the body. This process highlights the crucial role of sunlight exposure in maintaining adequate Vitamin D levels ...

Using clothing that covers most of the skin and applying sunscreen can block UVB radiation, inhibiting Vitamin D synthesis. While protecting the skin from harmful UV radiation is essential to prevent sunburn and skin cancer, individuals may need to balance sun protection practices with the need for Vitamin D production.

Strategies such as exposing uncovered skin for short periods or considering Vitamin D supplements may be necessary when sun protection is paramount."

Vitamin D in Critical Illness

The authors also review the clinical implications of vitamin D in critically ill ICU patients, where the scientific evidence shows vitamin D deficiency:[3]

- Increases infection rates, including hospital-acquired nosocomial infections
- May increase mortality rates in SICU patients
- Is associated with longer hospital stays

Conversely, higher vitamin D levels in SICU patients have been shown to:

Reduce infection rates	Improve immune function by directly regulating immune cells' behavior and regulating adaptive immunity, thereby preventing excessive immune activation
Mitigate excessive inflammation	Improve muscle function and mobility, thereby aiding in patient recovery and rehabilitation
Support lung function	Mitigate cardiovascular risks and complications
Improve mental health	Improve patient outcomes and reduce mortality

To improve outcomes in SICU patients, the authors recommend taking an individualized approach, where patients with documented vitamin D deficiencies are given vitamin D supplements, with vitamin D3 (the active form) being preferred over D2 (the synthetic version), as it raises levels more effectively.

The authors also accurately recommend assessing the patient's baseline vitamin D level through blood testing before supplementing, to determine the extent of the deficiency, and to monitor the level during and after supplementation. This is the only way to ensure

vitamin D sufficiency, because it's the blood level that matters, not the individual dose. In conclusion, the authors made the following comments:[4]

> *"Through our exploration of Vitamin D's immunomodulatory effects, anti-inflammatory properties, and role in maintaining calcium homeostasis, it becomes evident that Vitamin D is a critical factor influencing the recovery and overall health of SICU patients.*
>
> *Despite the challenges and complexities surrounding accurate assessment and supplementation, the implications for clinical practice are substantial. Routine screening, individualized dosing strategies, and patient education can help optimize care in the SICU."*

Vitamin D Status Can Predict COVID-19 Mortality Rate

In November 2020, I coauthored a scientific review on vitamin D's impact on COVID-19. That paper, "Evidence Regarding Vitamin D and Risk of COVID-19 and Its Severity" was published in the journal Nutrients.[5]

Media vilified me for my stance on vitamin D, and one journalist went so far as to claim she "couldn't verify" that I was the author of this peer-reviewed paper, all in an effort to discredit me.

Since then, the evidence for vitamin D against COVID has only grown stronger. Most recently, an observational study[6,7] from China concluded that vitamin D status can predict your risk of death from COVID-19, as well as the severity of your symptoms in the acute phase.

> **"In the critically ill, vitamin D deficiency has been shown to increase infection and mortality rates, and is associated with longer hospital stays."**

The study, published in the Virology Journal, analyzed data from 399 COVID patients hospitalized between December 2022 and February 2023. The patients were categorized into three groups based on their vitamin D blood levels at admission (normal: 30 ng/mL or higher, insufficient: 20-29 ng/mL, or deficient: less than 20 ng/mL).

Analysis revealed that vitamin D deficiency was associated with more severe symptoms and having a vitamin D level lower than 36.04 ng/mL was predictive for death.

The predictability of COVID-19 mortality was even greater when vitamin D levels were considered together with levels of interleukin-5 (IL-5) and eosinophil. Patients with vitamin D below 36.04 ng/mL, IL-5 higher than 1.7 pg/mL, and an eosinophil count of less than 0.015 had the highest risk of death.

What's particularly notable here is that 36.04 ng/mL is within the "normal" range for vitamin D, clearly illustrating that "normal" is far from optimal, and not enough when your life hangs in the balance. Most vitamin D experts consider 30 ng/mL half of what an optimum vitamin D level should be, which is 60 to 80 ng/mL.

'Unexpected' Life Extension Benefits

October 1, 2023, The Guardian also ran an article[8] highlighting some of the "unexpected" benefits of sun exposure, including longer life expectancy and a reduced risk of death from skin cancer. Of course, anyone who has spent any amount of time investigating the matter will not be surprised. That said, here's an excerpt from that article, written by science correspondent Linda Geddes:

> *"For decades, it has been drilled into us that if the sun is out, we'd better slip on protective clothing, slop on suncream and slap on a hat to stay safe. There's little doubt that too much sun exposure — and particularly sunburn — increases our risk of developing skin cancer.*
>
> *It also prematurely ages the skin. But scientists are increasingly questioning the mantra that sunlight is an evil to be avoided at all costs, and investigating the brighter side of sun exposure.*

It's not just about vitamin D. Though important for strong bones and teeth this sun-induced vitamin is just the tip of the iceberg in terms of the physiological processes that are influenced by sunlight falling on the skin. Sunseekers may even have a longer lifespan.

This counterintuitive connection first came to light in 2014, when a Swedish researcher ... published the results of a large study[9] that followed the health of around 30,000 women over 20 years.

It found that, on average, women who spent more time in the sun lived for one to two years longer than those who avoided the sun, even after taking into account factors such as wealth, education and exercise.

This increased life expectancy appeared to stem from lower rates of cardiovascular disease and other non-cancer-related illnesses, including type 2 diabetes, autoimmune disease and chronic lung disease.

Other studies[10] have since identified a similar pattern, including among pale-skinned Britons ... [T]hose with more active sun-seeking behavior were 14% less likely to die from any cause during the [13-year] study period compared to sun avoiders, and their risk of death from cardiovascular disease was 19% lower ...

Curiously, active sunseekers' risk of dying from cancer, including skin cancers, was also 14% lower. [A] similar pattern has been seen in other studies too."

Your Skin Has Built-In Protective Mechanisms

Geddes accurately describes how melanin, the pigment that gives your skin its dark color, protects your skin cells from DNA damage by absorbing ultraviolet sun rays. This is what causes you to develop a tan. She also explains how melanin production is activated by the release of beta-endorphins in response to sunlight, which have stress- and pain relieving effects all of their own.

And, while skin cancer can be triggered by repeated sunburn that damages your skin, people who get lots of sun exposure still have longer life expectancy than those who avoid the sun. So, clearly, routine sun exposure is not a prescription for death by skin cancer. Quite the opposite.

The key, really, is to avoid the skin damage caused by sunburns,[11] and the easiest way to do that is by gradually building up a tan. Start by exposing large portions of skin for only five to 15 minutes if you're fair-skinned, and longer if you have naturally darker skin, around solar noon.

You want your skin to develop just the slightest hint of pink, then cover back up. Each day after that, add a few more minutes. This will allow your melanin to do its job and protect your skin cells from UV damage. If you start in the spring, by mid-summer, you'll be able to spend hours outside without burning, and your risk of skin cancer will then be minimal.

Vitamin D Supplements Do Not Confer the Same Benefits

Thankfully, Geddes also accurately notes that vitamin D supplements do not confer the same benefits as sun exposure, and that your vitamin D level is a biomarker of sun exposure, which is something I've been stressing for quite some time. Never in the history of mankind have we relied on pills for vitamin D production, and there's no evidence to suggest that it would be wise to do so. Geddes writes:[12]

> *"Surprisingly though, large long-term trials assessing the impact of taking daily vitamin D supplements to prevent these conditions have produced mixed results, prompting some researchers to question whether they may have been looking at this from the wrong perspective.*
>
> *'Your vitamin D level is a biomarker that you have been in the sun, but it is not necessarily the active agent involved in human disease pathogenesis,' says Prof Prue Hart at the Telethon Kids Institute in Perth, Australia ...*

As evidence mounts for these potentially beneficial effects of sunlight, so do calls for a rethink of public health advice on how best to stay safe in the sun.

In 2020, Weller, Hart, Lindqvist and 12 other researchers published a review[13] in the International Journal of Environmental Research and Public Health, alerting doctors and policymakers to the 'significant public health problem of insufficient sun exposure.'

While they don't dispute that UV exposure is a major cause of skin cancer, they believe the 'Slip, Slap, Slop' approach to sun avoidance — originally advocated by Cancer Council Australia, but now broadly adopted in other countries — may be damaging the health of people living in high-latitude countries such as the UK."

The one drawback with using sun exposure to maintain a protective vitamin D level is that there's simply not enough sunlight hitting the earth year-round in some areas. If you live north of 37 degrees North latitude, you may still need a vitamin D supplement to get you through the winter.

VITAMIN D SYNTHESIS

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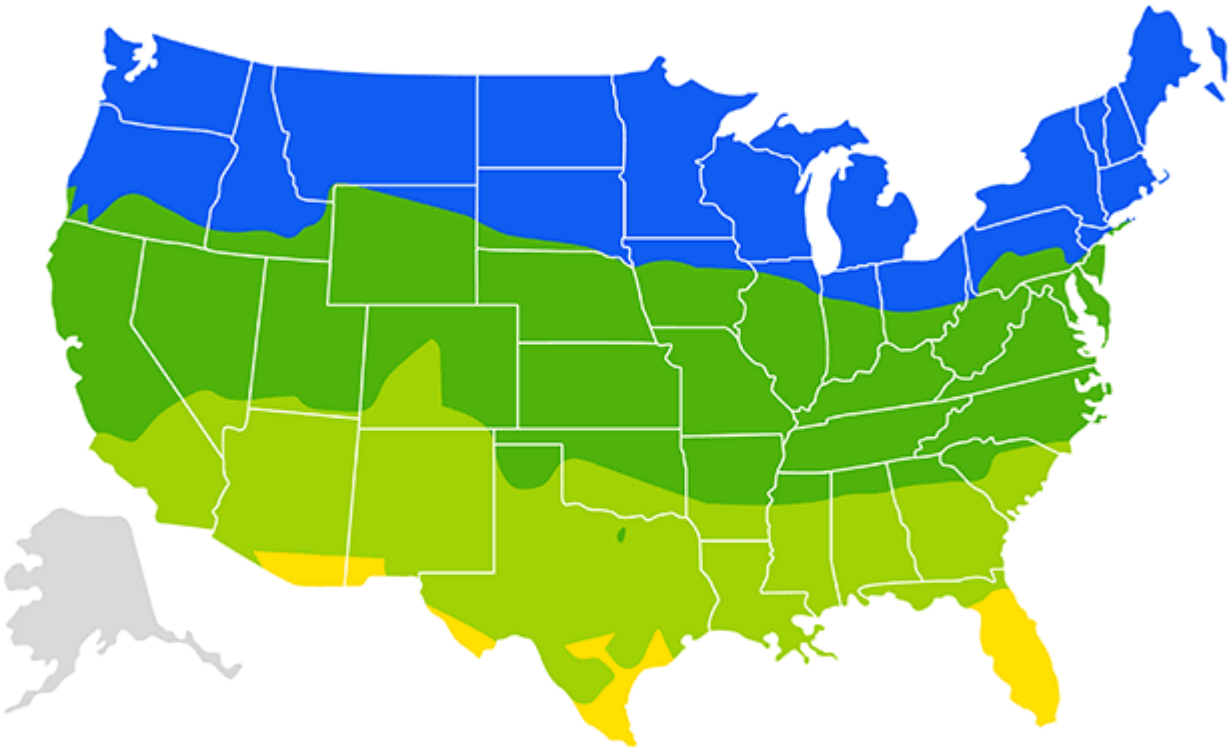

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Source for UV index: https://www.epa.gov/sunsafety/sun-safety-monthly-average-uv-index

*The figures provided are estimates and can vary depending on the person and/or climate changes.

VITAMIN D SYNTHESIS

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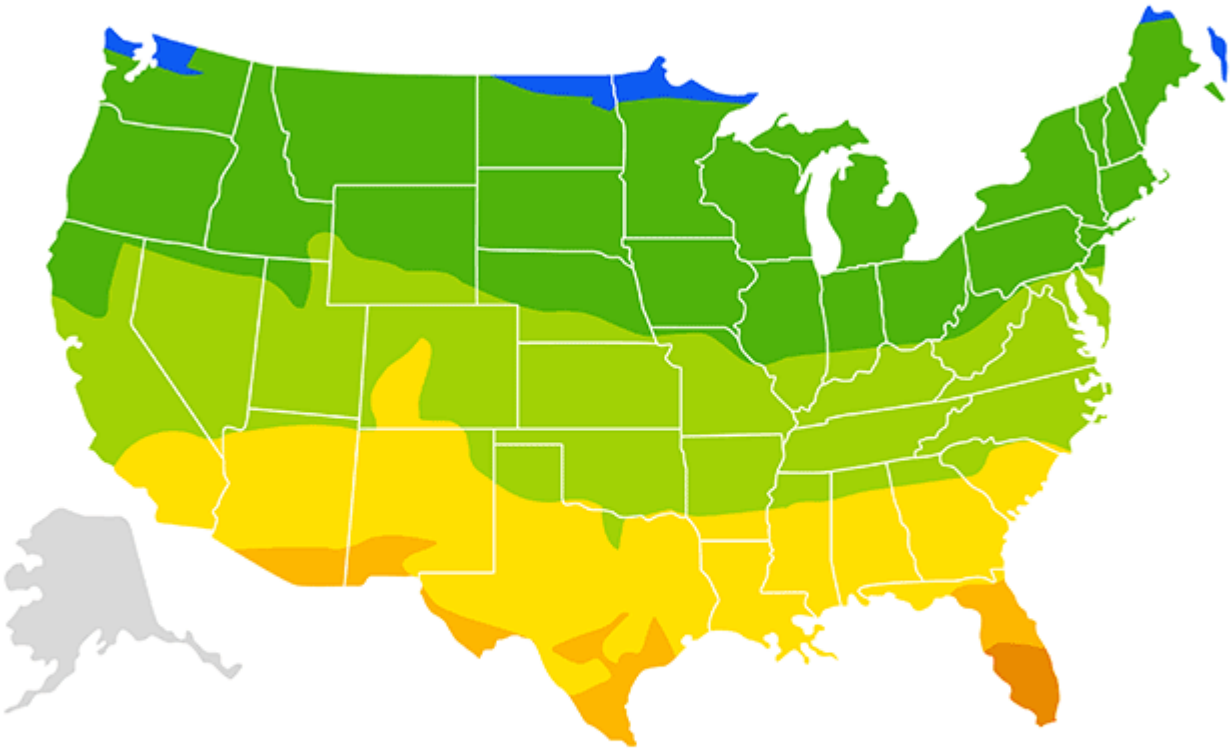

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VITAMIN D SYNTHESIS

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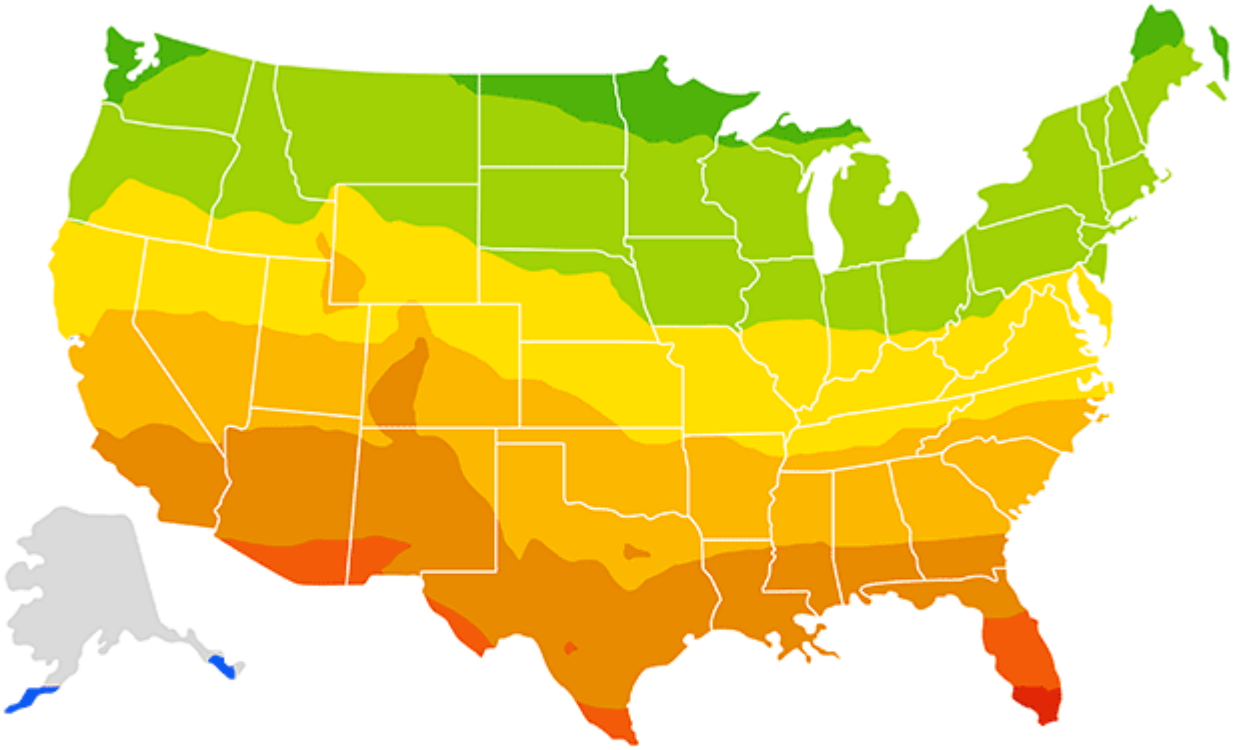

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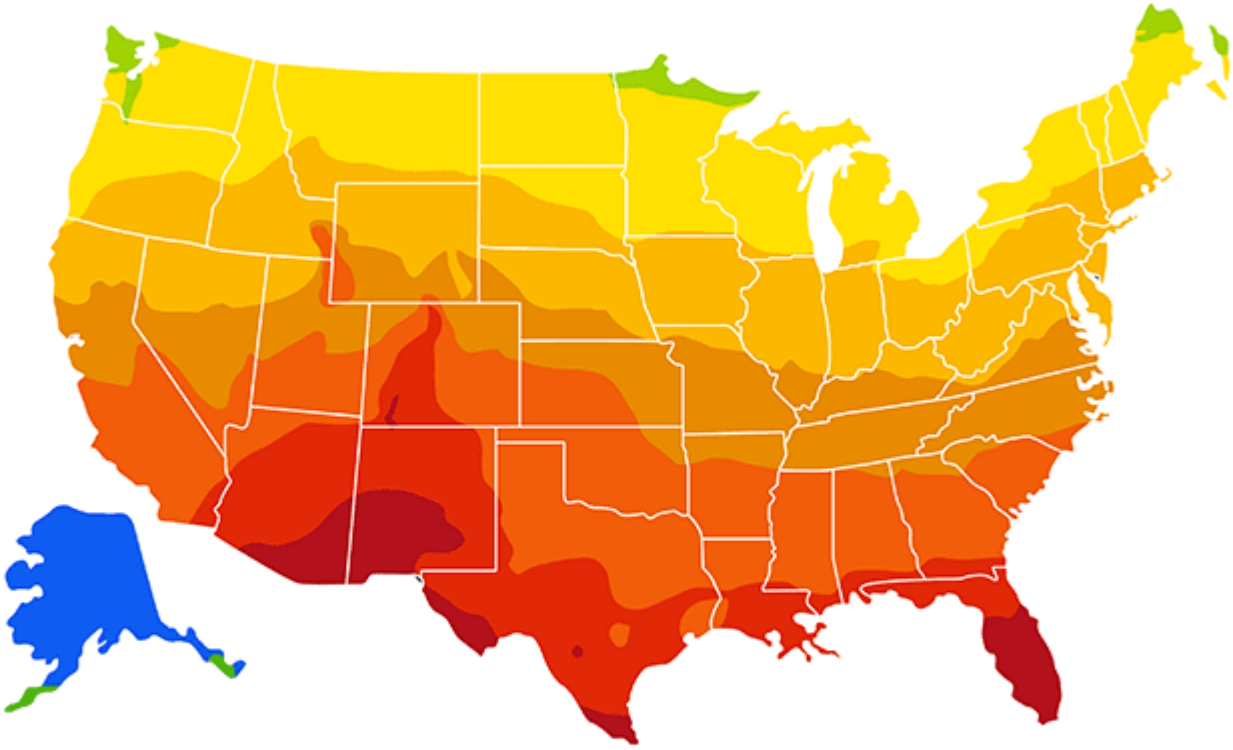

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VITAMIN D SYNTHESIS

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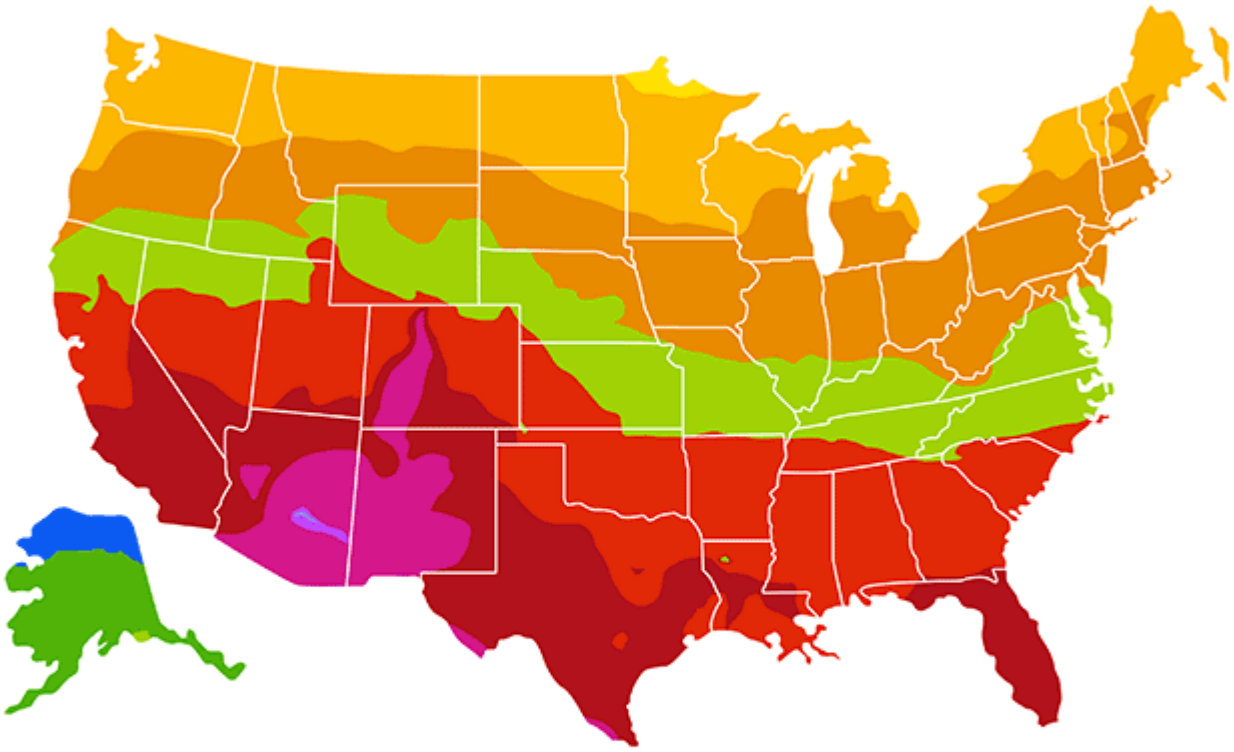

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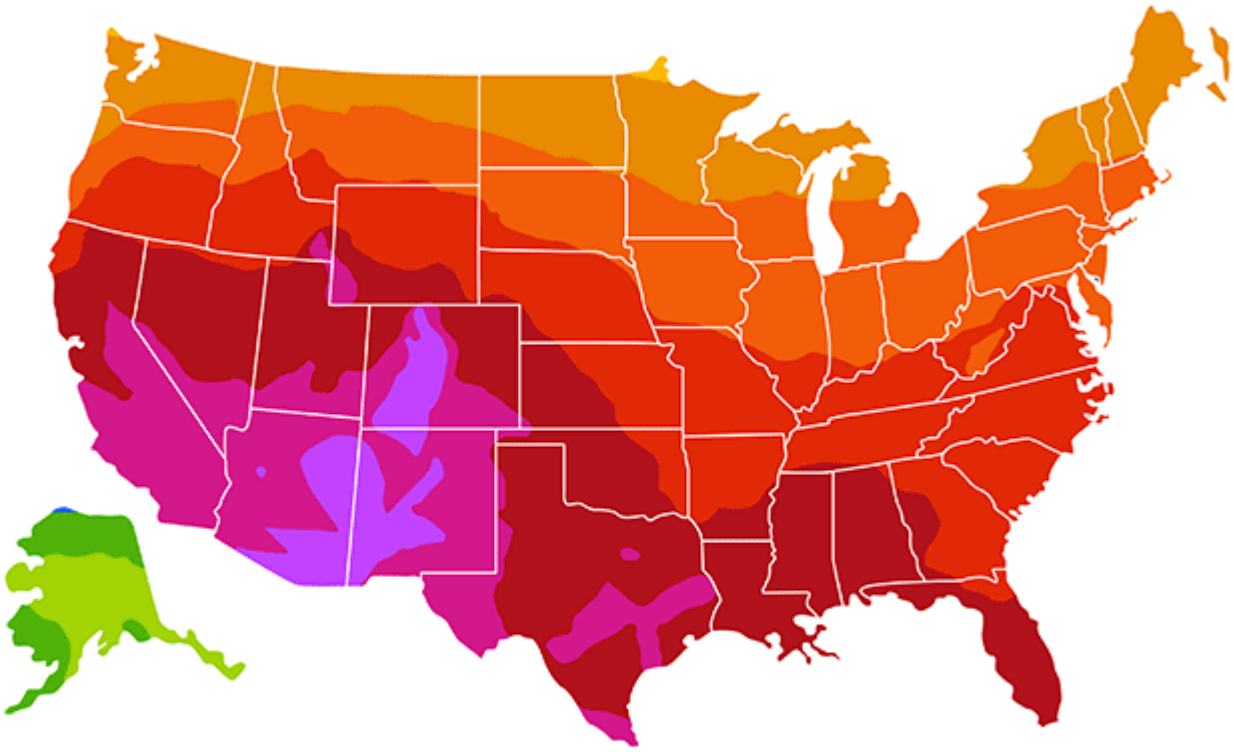

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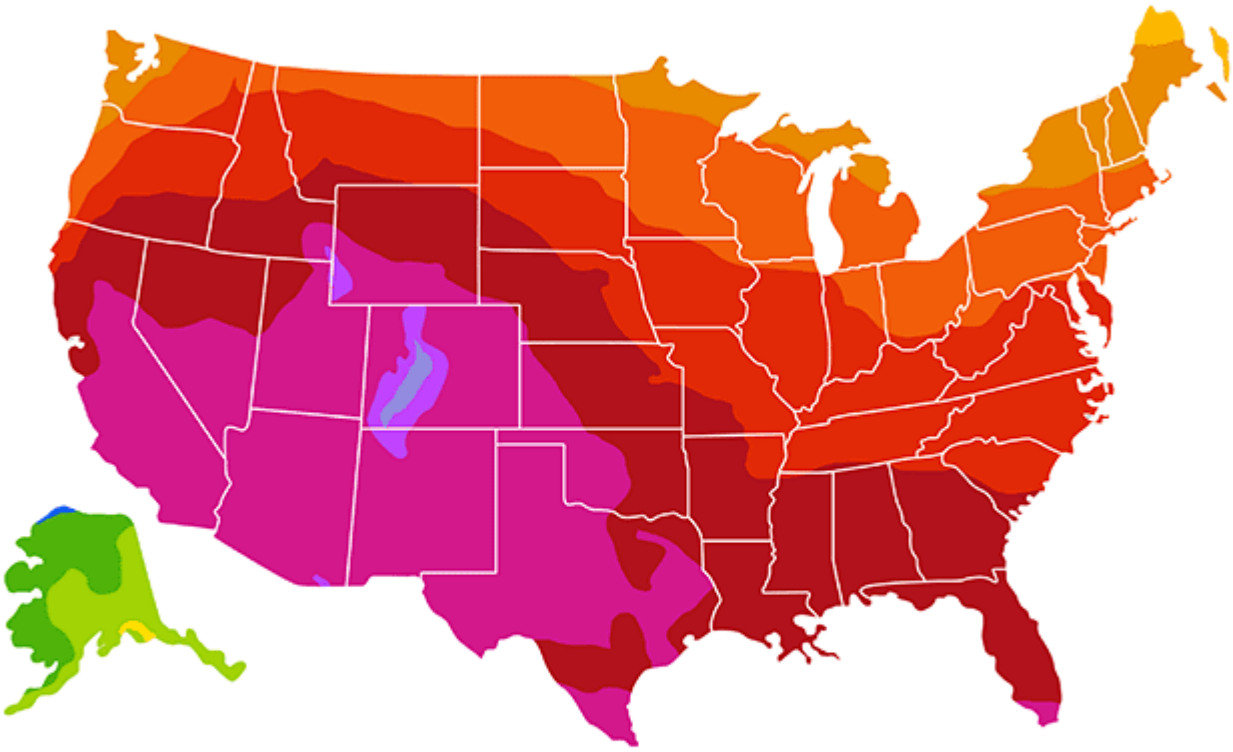

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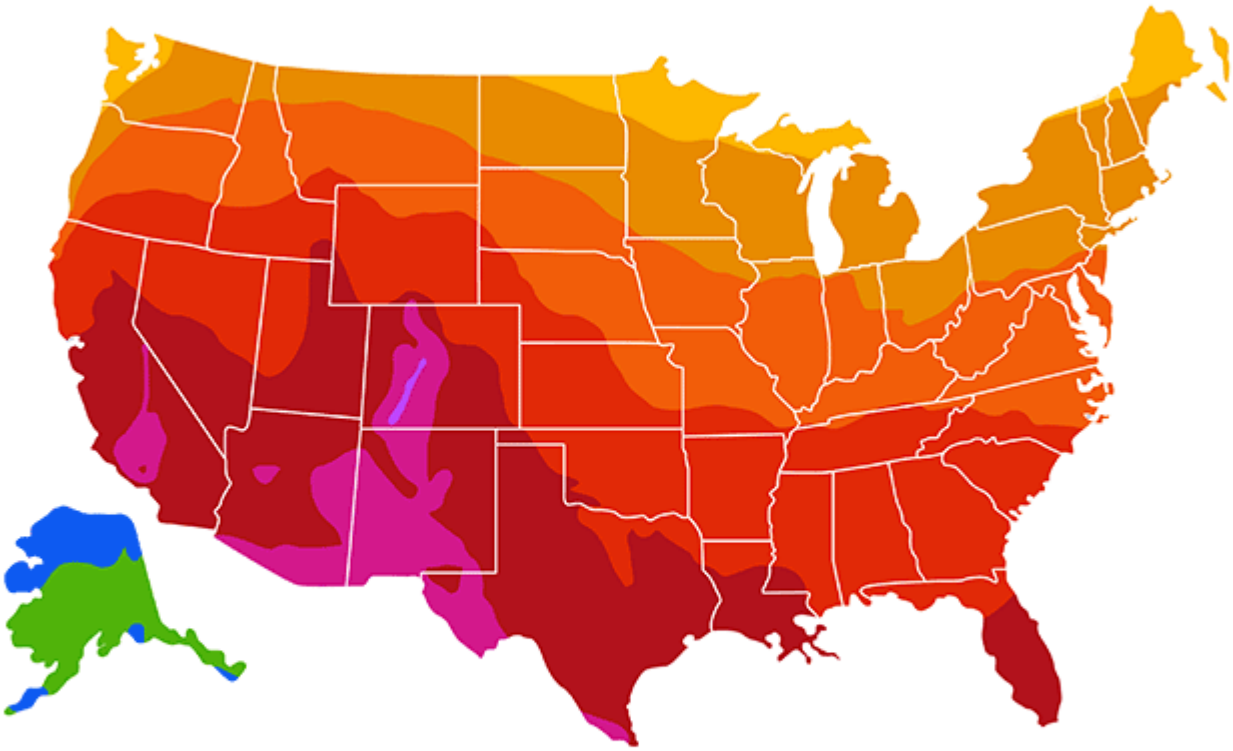

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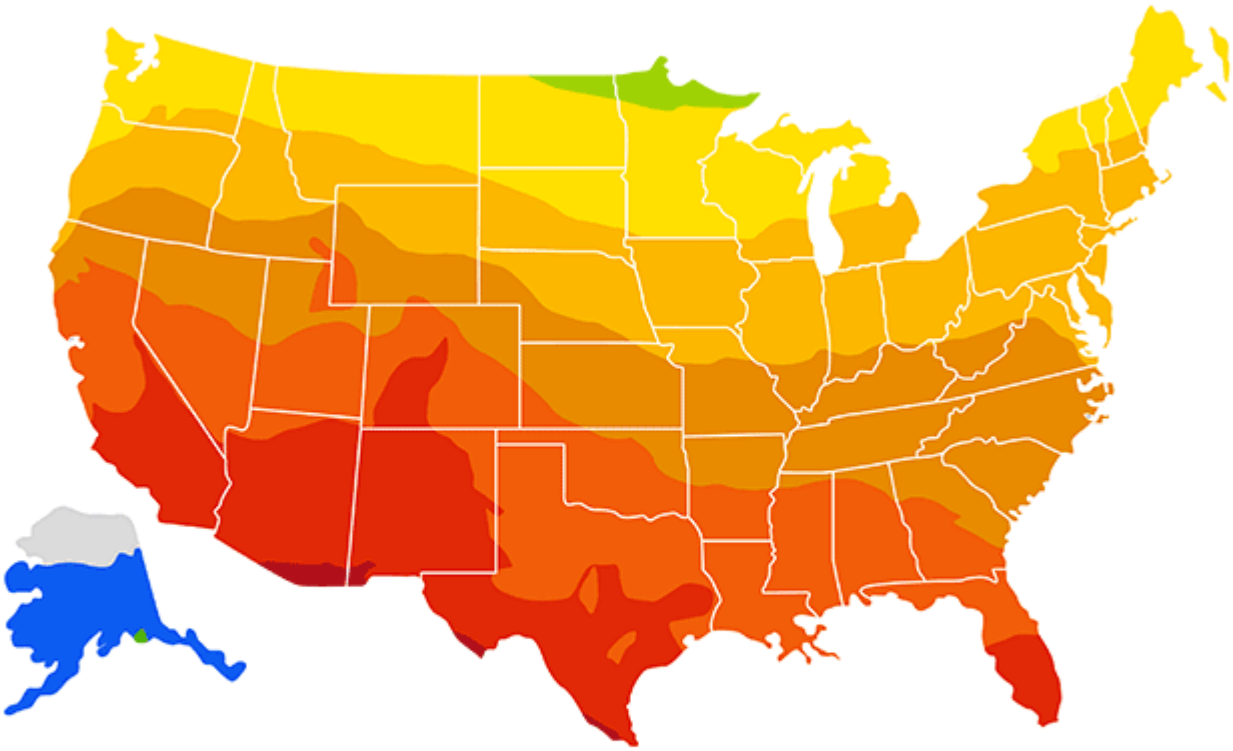

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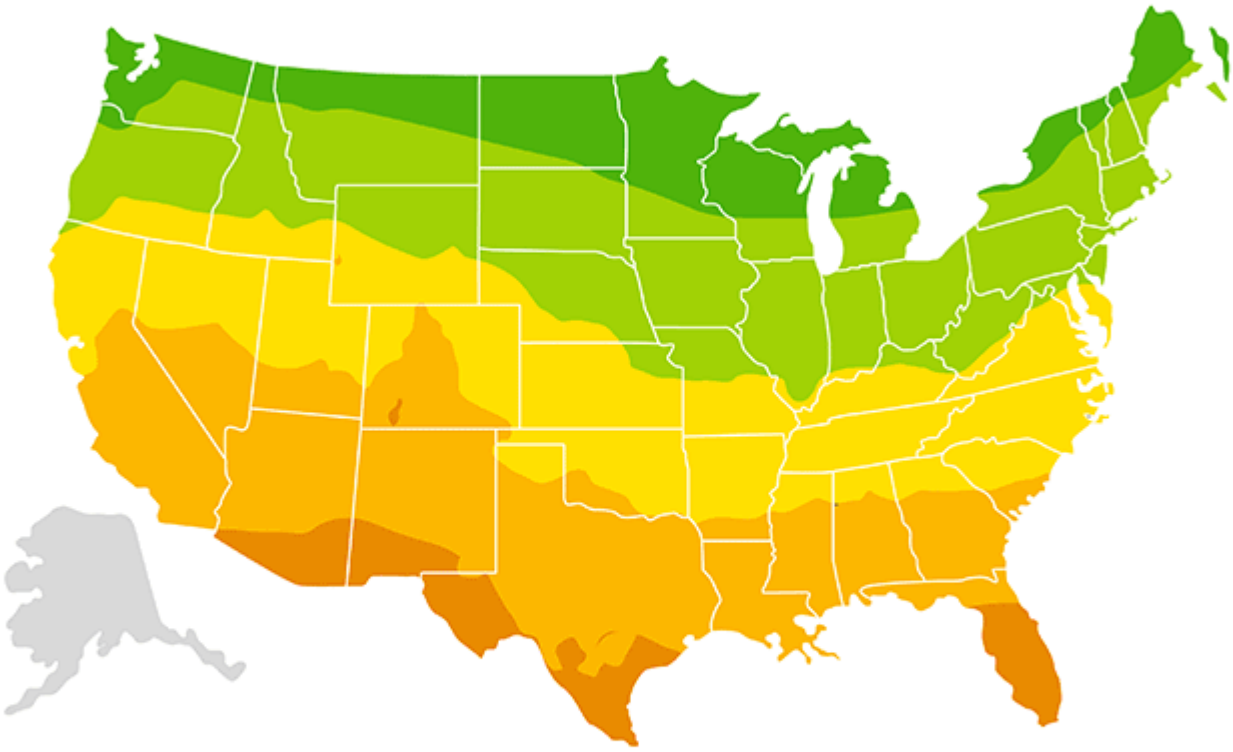

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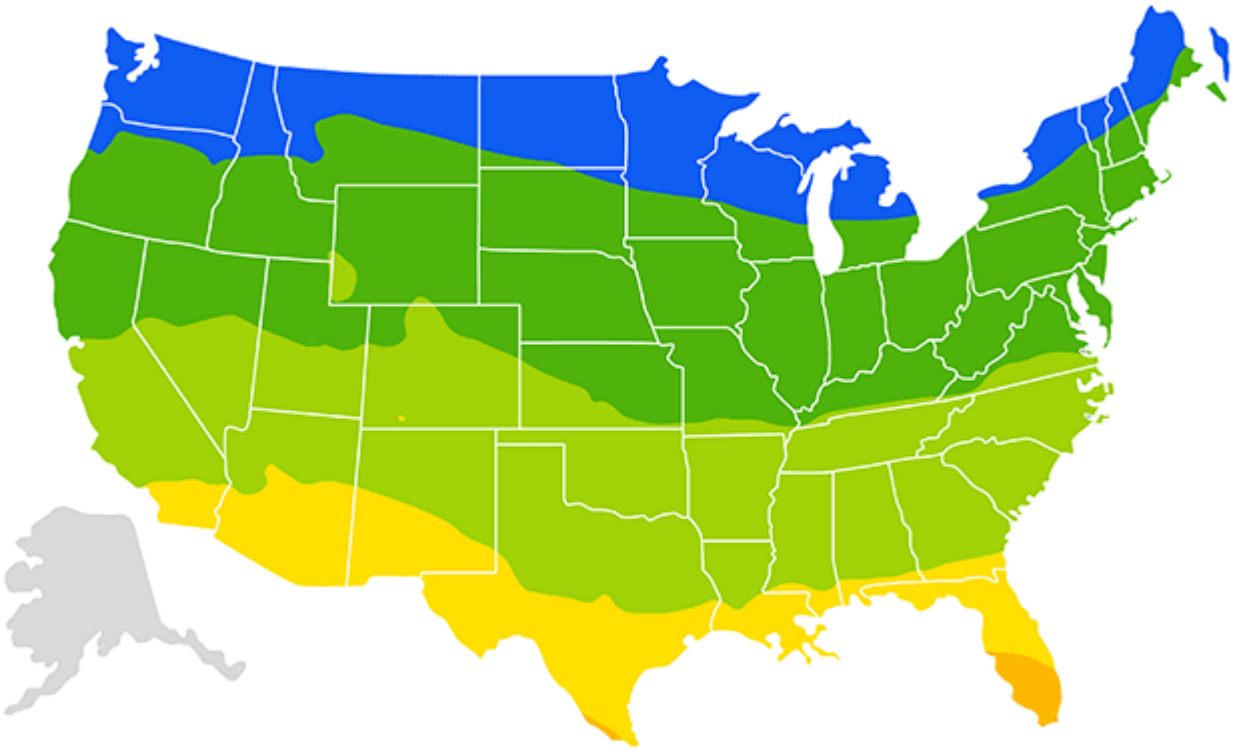

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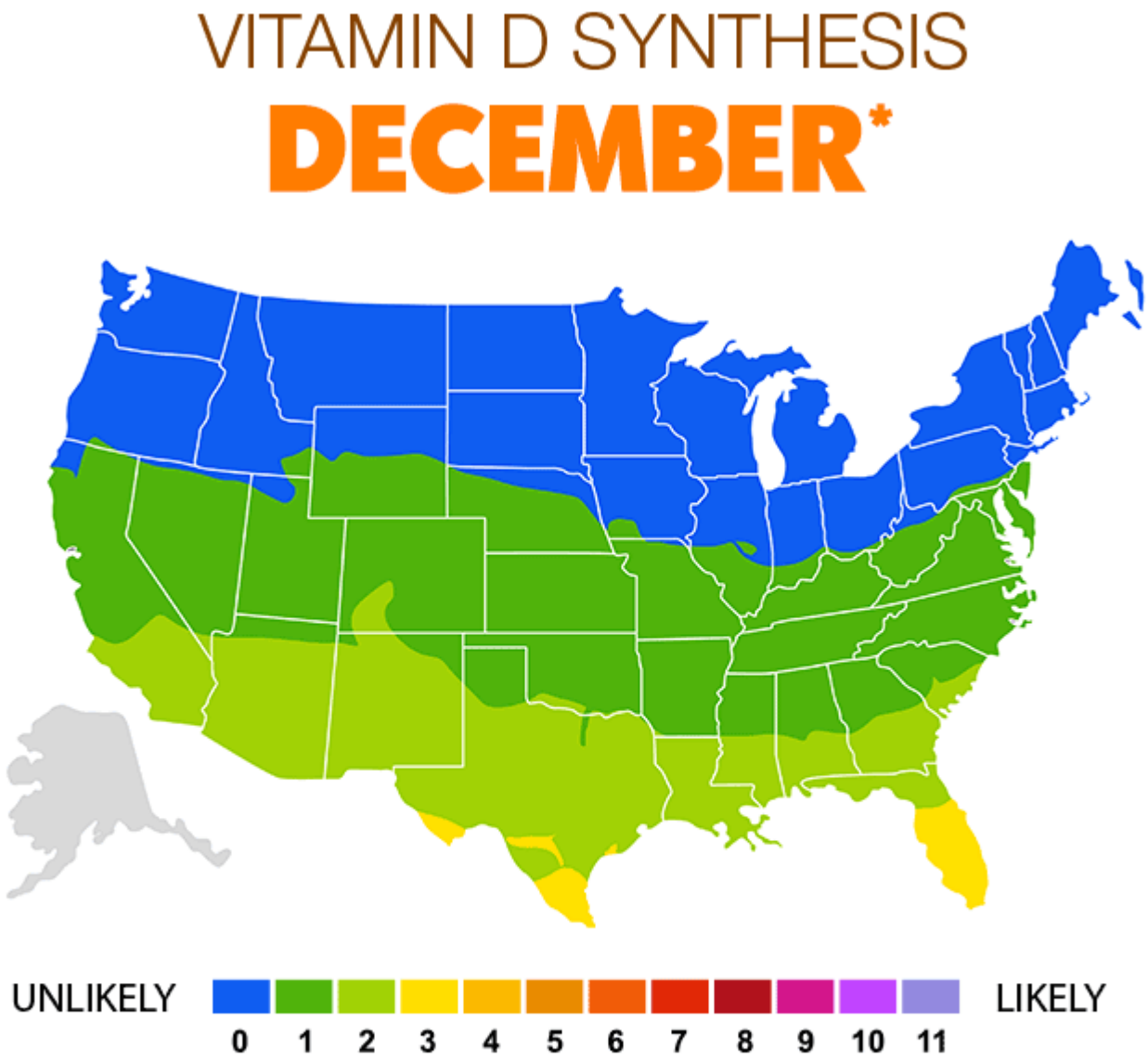

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Cancer Organizations Trade Skin Cancer for Internal Cancers

Indeed, the U.S. Surgeon General,[14,15] the American Academy of Dermatology (AAD) and many other cancer organizations recommend complete and total sun avoidance in order to prevent skin cancer. The AAD will not even acknowledge different recommendations based on skin type.

This is a disastrous recommendation, as having a vitamin D blood level of 40 ng/mL or higher is a key prevention tool for all types of cancer, including internal cancers that are far deadlier than melanoma (malignant skin cancer). Studies have repeatedly demonstrated that it can significantly reduce your cancer risk, and increase your chances of surviving cancer if you do get it.[16,17]

For example, researchers at the University of California found that women with a vitamin D serum level of 40 ng/mL or greater had a 67% lower risk of cancer compared to women with levels of 20 ng/mL or less.[18,19]

The study included ALL invasive cancers, except for skin cancer, and had a follow-up period of nearly four years. Higher vitamin D is also associated with lower all-cause mortality.[20,21] So, essentially, the recommendation to avoid all sun exposure trades the low risk of skin cancer for a far greater risk of deadly internal cancers.

By adhering to sensible sun exposure guidelines and making sure you do not get burned, you can maximize your benefits and minimize the risks of skin damage that could lead to skin cancer.

On the whole, overexposure to the sun, not all sun exposure, is the real problem when it comes to raising your risk for skin cancer.[22] Meanwhile, optimizing your vitamin D via regular UV exposure can help decrease your risk of well over a dozen different cancers that are far more common and far more deadly than melanoma.

Brittle Bones Is a Serious Problem

Optimizing your vitamin D with sensible sun exposure will also protect you against osteopenia (brittle bones) and osteoporosis (bone loss), the prevalence of which is on the rise among younger people.

As of 2020, an estimated 12.3 million Americans over 50 were affected by osteoporosis, and an additional 47 million younger Americans were in the early stages.[23] If your bones are getting compromised in your 40s or even 30s, what life expectancy, not to mention quality of life, can you really expect?

Fosamax and other bisphosphonate drugs are not the answer to this, as they are incredibly toxic and can raise your risk of bone fractures, particularly in the thigh bone.[24]

The reason for this is because these drugs strengthen your bones, but they do that by inhibiting your body's ability to absorb old bone. As a result, the bone becomes harder, but also more brittle. Truly healthy bone is hard yet flexible.

Other side effects of bisphosphonate drugs include gastrointestinal problems, gastric ulcers, flu-like symptoms, severe bone, joint and muscle pain, and osteonecrosis of the jawbone.

Optimizing your vitamin D and getting sufficient exercise is a far better route for most people. **KAATSU**, or blood flow restriction (BFR) training is a great option if you're frail and/or out of shape, as you don't need heavy weights.

Recent research[25] has confirmed that BFR increases not only muscle mass but also bone mass, "primarily through several hormonal pathways at the same time it enhances cardiovascular function."

As noted by the authors, "The improvements in mobility and gait are indicators of greater health-related quality of life minimizing disability in older adults." For more details on how BFR works its magic, see my previous article "**How to Stay Fit for Life**."

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