The Effects of Vitamin D and COVID-Related Outcomes

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STORY AT-A-GLANCE

- Researchers investigated the effects of Pulse D therapy — daily high-dose supplementation (60,000 IUs) of vitamin D — for eight to 10 days, in addition to standard therapy, for COVID-19 patients deficient in vitamin D
- Vitamin D levels increased significantly in the vitamin D group — from 16 ng/ml to 89 ng/ml — while inflammatory markers significantly decreased, without any side effects
- Vitamin D has multiple actions on the immune system, including enhancing the production of antimicrobial peptides by immune cells, reducing damaging proinflammatory cytokines and promoting the expression of anti-inflammatory cytokines
- A growing number of studies shows that vitamin D administration significantly reduces ICU admission and death in cases of COVID-19
- Vitamin D is inexpensive, widely available and safe; getting your blood tested — and optimizing your levels — is one of the simplest and most straightforward steps you can take to improve your health, including in relation to COVID-19

Do you know your vitamin D level? If not, getting your blood tested — and optimizing your levels — is one of the simplest and most straightforward steps you can take to improve your health, including in relation to COVID-19. Vitamin D, as an immunomodulator, is a perfect candidate for countering the immune dysregulation that's common with COVID-19.[1]

As early as November 2020, it was known that there were striking differences in vitamin D status among people who had asymptomatic COVID-19 and those who became severely ill and required ICU admission. In one study, 32.96% of those with asymptomatic cases were vitamin D deficient, compared to 96.82% of those who were admitted to the ICU for a severe case.[2]

COVID-19 patients who were deficient in this inexpensive and widely available vitamin had a higher inflammatory response and a greater fatality rate. The Indian study authors recommended "mass administration of vitamin D supplements to populations at risk for COVID-19,"[3] but this hasn't happened, at least not in the U.S.

As of April 21, 2021, the date the U.S. National Institutes of Health (NIH) last updated their COVID-19 treatment guidelines/vitamin D page, they stated, "There are insufficient data to recommend either for or against the use of vitamin D for the prevention or treatment of COVID-19."[4] As you'll see in the paragraphs that follow, however, the evidence for its use is beyond overwhelming.

Vitamin D Therapy Reduces COVID's Inflammatory Storm

Vitamin D has multiple actions on the immune system, including enhancing the production of antimicrobial peptides by immune cells, reducing damaging proinflammatory cytokines and promoting the expression of anti-inflammatory cytokines.[5] Cytokines are a group of proteins that your body uses to control inflammation.

If you have an infection, your body will release cytokines to help combat inflammation, but sometimes it releases more than it should. If the cytokine release spirals out of control, the resulting "cytokine storm" becomes dangerous and is closely tied to sepsis, which may be an important contributor to the death of COVID-19 patients.[6]

Many COVID-19 therapeutics are focused on viral elimination instead of modulating the hyperinflammation often seen in the disease. In fact, uncontrolled immune response has been suggested as a factor in disease severity, making immunomodulation "an attractive potential treatment strategy."[7]

In one example, researchers investigated the effects of Pulse D therapy — daily high-dose supplementation (60,000 IUs) of vitamin D — for eight to 10 days, in addition to standard therapy, for COVID-19 patients deficient in vitamin D.[8] Vitamin D levels increased significantly in the vitamin D group — from 16 ng/ml to 89 ng/ml — while inflammatory markers significantly decreased, without any side effects.

> *"Vit.D acts as a smart switch to decrease the Th1 response and pro inflammatory cytokines while enhancing the production of anti-inflammatory cytokines in cases of immune dysregulation. It is pertinent to note that SARS-CoV-2 virus activates Th1 response and suppresses Th2 response,"* researchers wrote in the journal Scientific Reports.[9]

They concluded that Pulse D therapy could be safely added to COVID-19 treatment protocols for improved outcomes.

Vitamin D3 Reduces COVID-19 Deaths and ICU Admissions

Another group of researchers in Spain gave vitamin D3 (calcifediol) to patients admitted to the COVID-19 wards of Barcelona's Hospital del Mar.[10] About half the patients received vitamin D3 in the amount of 21,280 IU on day one plus 10,640 IU on Days 3, 7, 15 and 30. Those that received vitamin D fared significantly better, with only 4.5% requiring ICU admission compared to 21% in the no-vitamin D group.

Vitamin D treatment also significantly reduced mortality, with 4.7% of the vitamin D group dying at admission compared to 15.9% in the no-vitamin D group. "In patients hospitalized with COVID-19, calcifediol treatment significantly reduced ICU admission and mortality," according to the researchers.[11] In response to the findings, British MP David Davis tweeted:[12]

> *"This is a very important study on vitamin D and Covid-19. Its findings are incredibly clear. An 80% reduction in need for ICU and a 60% reduction in deaths, simply by giving a very cheap and very safe therapy - calcifediol, or activated vitamin D … The findings of this large and well conducted study should result in this therapy being administered to every COVID patient in every hospital in the temperate latitudes."*

At one point, the U.K.'s National Health Service was offering free vitamin D supplements to people at high risk from COVID-19,[13] but they also state, like the U.S., "there is currently not enough evidence to support taking vitamin D to prevent or treat COVID-19."[14]

While their guidance does urge Britons to take a vitamin D supplement between October and March "to keep your bones and muscles healthy," it only recommends a dose of 400 IUs a day, which is easily 20 times lower than what most people require for general health and optimal immune function.

Dose matters when it comes to COVID-19 recovery. Researchers compared daily supplementation with either 5,000 IUs or 1,000 IUs oral vitamin D3 among patients with suboptimal vitamin D levels hospitalized for mild to moderate COVID-19.[15] Those in the 5,000 IUs group had a significantly shorter time to recovery for cough and loss of the sense of taste compared to the 1,000 IUs group.

According to the researchers, "The use of 5000 IU vitamin D3 as an adjuvant therapy for COVID-19 patients with suboptimal vitamin D status, even for a short duration, is recommended."[16]

If You're Hospitalized With COVID-19, Ask for Vitamin D

The evidence continues to grow that treatment with vitamin D leads to significantly better outcomes for people hospitalized with COVID-19. In another example, hospitalized COVID-19 patients who received vitamin D3 had a mortality rate of 5%, compared to 20% for those who did not. The researchers explained:[17]

> *"… [T]he protective effect of calcifediol remained significant after adjustment for multiple confounder factors related to severity disease even after selecting those subjects who were older (≥65 years) and had worse oxygen saturation levels at admission (<96%)."*

Similarly, 76 consecutive patients hospitalized with COVID-19 at Reina Sofia University Hospital in Córdoba,[18] Spain, were randomized to receive either standard care or standard care plus vitamin D3 to rapidly increase vitamin D levels.

Of 50 treated with vitamin D, only one person was admitted to the ICU. Of 26 who were not treated with vitamin D, 13 (50%) required admission to the hospital. Researchers noted, "Calcifediol seems to be able to reduce severity of the disease."[19] Further:

> *"Of the patients treated with calcifediol, none died, and all were discharged, without complications. The 13 patients not treated with calcifediol, who were not admitted to the ICU, were discharged. Of the 13 patients admitted to the ICU, two died and the remaining 11 were discharged."*

In a previous review,[20] the researchers explained that vitamin D has favorable effects during both the early viraemic phase of COVID-19 as well as the later hyperinflammatory phase,[21] including for acute respiratory distress syndrome (ARDS), a lung condition that's common in severe COVID-19 cases, which causes low blood oxygen and fluid buildup in the lungs.

"Based on many preclinical studies and observational data in humans, ARDS may be aggravated by vitamin D deficiency and tapered down by activation of the vitamin D receptor," they said[22] … "Based on a pilot study, oral calcifediol may be the most promising approach."

Even regular "booster" doses of vitamin D, regardless of baseline vitamin D levels, appear to be effective in reducing the risk of mortality in people admitted to the hospital with COVID-19, particularly for the elderly.[23,24] Those researchers noted, "This inexpensive and widely available treatment could have positive implications for the management of COVID-19 worldwide, particularly in developing nations."[25]

Lower Vitamin D Levels May Increase Death Risk

Researchers in Indonesia, who looked at data from 780 COVID-19 patients, found those with a vitamin D level between 21 ng/mL (52.5 nmol/L) and 29 ng/mL (72.5 nmol/L) had a 12.55 times higher risk of death than those with a level above 30 ng/mL.[26]

Having a level below 20 ng/mL was associated with a 19.12 times higher risk of death. A "majority of the COVID-19 cases with insufficient and deficient Vitamin D status died," they added,[27] suggesting that research is needed to look into the role of vitamin D supplementation on COVID-19 outcomes.

One such study, a systematic review and meta-analysis published in the Journal of Endocrinological Investigation,[28] included 13 studies involving 2,933 COVID-19 patients. Again, vitamin D was a clear winner, with use in COVID-19 patients significantly associated with reduced ICU admission and mortality, along with a reduced risk of adverse outcomes, particularly when given after COVID-19 diagnosis.

When it comes to data to support the use of vitamin D for COVID-19, 87 studies have been performed by 784 scientists. The results show:[29]

- 53% improvement in 28 treatment trials
- 56% improvement in 59 sufficiency studies
- 63% improvement in 16 treatment mortality results

A number of clinical trials are also underway looking further into the use of vitamin D for COVID-19,[30] including one by Harvard Medical School researchers looking into whether taking daily vitamin D reduces COVID-19 disease severity in those newly diagnosed as well as reduces risk of infection in household contacts.[31]

'A Simple and Inexpensive Measure'

Some positive advances have already occurred that could make this potentially lifesaving strategy more widely used. The French National Academy of Medicine released a press release in May 2020, referring to the use of vitamin D as a "simple and inexpensive measure that is reimbursed by the French National Health Insurance" and detailing the importance of vitamin D for COVID-19.[32]

For COVID-19 patients over 60, they recommend vitamin D testing and if deficiency is found, a bolus dose of 50,000 to 100,000 IU. For anyone under the age of 60 who receives a positive COVID-19 test, they advise taking 800 IUs to 1,000 IUs of vitamin D per day. A vitamin D review paper published in the journal[33] Nutrients in April 2020 recommends higher amounts, however, stating:

> *"To reduce the risk of infection, it is recommended that people at risk of influenza and/or COVID-19 consider taking 10,000 IU/d of vitamin D_3 for a few weeks to rapidly raise 25(OH)D concentrations, followed by 5000 IU/d.*
>
> *The goal should be to raise 25(OH)D concentrations above 40-60 ng/mL (100-150 nmol/L). For treatment of people who become infected with COVID-19, higher vitamin D_3 doses might be useful."*

The best way to know how much vitamin D you need is to have your levels tested. Data from GrassrootsHealth's D*Action studies suggest the optimal level for health and disease prevention is between 60 ng/mL and 80 ng/mL, while the cutoff for sufficiency appears to be around 40 ng/mL. In Europe, the measurements you're looking for are 150 to 200 nmol/L and 100 nmol/L respectively.

How to Optimize Your Vitamin D

While most people would probably benefit from a vitamin D3 supplement, it's important to get your vitamin D level tested before you start supplementing. The reason for this is because you cannot rely on blanket dosing recommendations. The crucial factor here is your blood level, not the dose, as the dose you need is dependent on several individual factors, including your baseline blood level.

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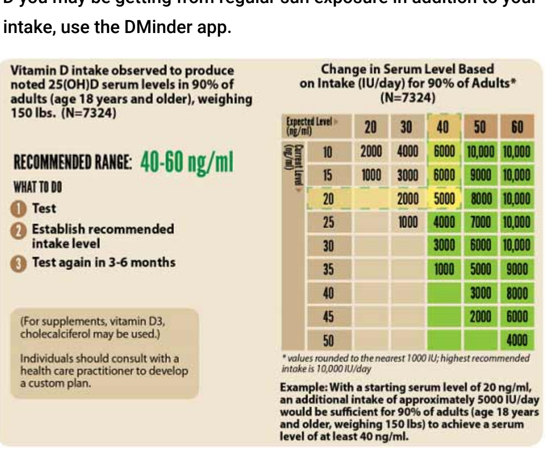
I've published a comprehensive vitamin D report in which I detail vitamin D's mechanisms of action and how to ensure optimal levels. I recommend downloading and sharing that report with everyone you know. A quick summary of the key steps is as follows:

1. **First, measure your vitamin D level —** One of the easiest and most cost-effective ways of measuring your vitamin D level is to participate in the GrassrootsHealth's personalized nutrition project, which includes a vitamin D testing kit.

   Once you know what your blood level is, you can assess the dose needed to maintain or improve your level. If you cannot get enough vitamin D from the sun (you can use the DMinder app to see how much vitamin D your body can make depending on your location and other individual factors), then you'll need an oral supplement.

2. **Assess your individualized vitamin D dosage —** To do that, you can either use the chart below, or use GrassrootsHealth's Vitamin D*calculator. To convert ng/mL into the European measurement (nmol/L), simply multiply the ng/mL measurement by 2.5. To calculate how much vitamin D you may be getting from regular sun exposure in addition to your supplemental intake, use the DMinder app.

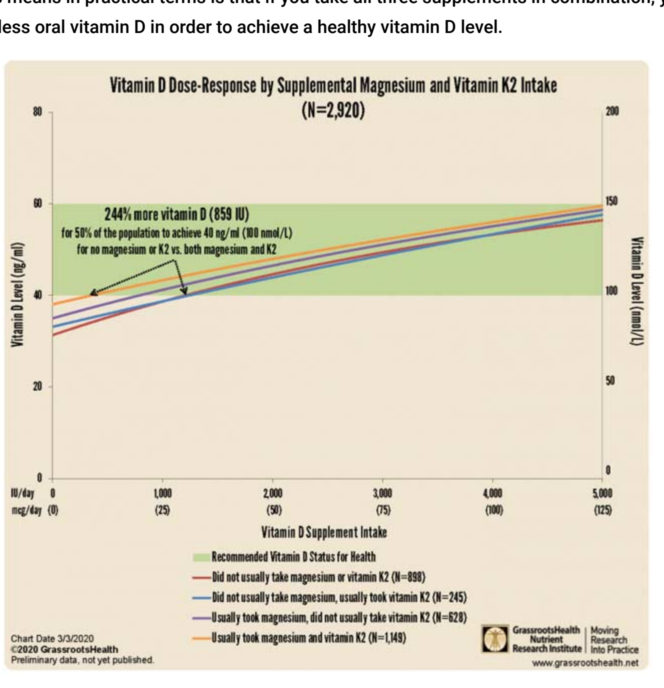


3. **Retest in three to six months —** Lastly, you'll need to remeasure your vitamin D level in three to six months, to evaluate how your sun exposure and/or supplement dose is working for you.

Take Your Vitamin D With Magnesium and K2

As detailed in "Magnesium and K2 Optimize Your Vitamin D Supplementation," it's strongly recommended to take magnesium and K2 concomitant with oral vitamin D. Data from nearly 3,000 individuals reveal you need 244% more oral vitamin D if you're not also taking magnesium and vitamin K2.

What this means in practical terms is that if you take all three supplements in combination, you need far less oral vitamin D in order to achieve a healthy vitamin D level.



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