

# Take Your Vitamins: New research shows Vitamin D deficiency can lead to worse COVID outcomes



A recent article in the *American Journal of Infection Control* titled “COVID-19 fatalities, latitude, sunlight, and vitamin D” found that a country’s latitude had a significant effect on its COVID-19 death rate. Using data from 88 countries, the author, Paul B Whittemore, PhD, of Pepperdine University, found that 16% of the variation in COVID-19 fatality rates could be attributed to a country’s latitude with lower death rates correlating with proximity to the equator.

The explanation for this is hypothesized to be centered around Vitamin D. Vitamin D is an important immune system modulator. It has both an enhancing role, stimulating innate antimicrobial and antiviral effects, and a suppressive role, decreasing the excessive expression of inflammatory agents and preventing it from causing self-harm. A Vitamin D deficiency can throw the immune system out of balance and has been shown to increase the severity of respiratory viral infections. Now there is emerging clinical and epidemiological data suggesting a vitamin D deficiency is associated with increased likelihood of COVID-19 infection, severity and mortality.

Humans obtain vitamin D from their diet or from sunlight. Direct sunlight on skin produces vitamin D and is humans’ most significant source because dietary intake is usually insufficient. UV radiation intensity is higher closer to the equator and it is hypothesized that populations living closer to the equator have lower rates of vitamin D deficiency, which leads to lower COVID-19 fatality rates.

Data from Ireland and Singapore illustrate this. These countries have similar populations (Ireland 4.9 million, Singapore 5.3 million) but Singapore is only 94 miles from the equator and has around 600 more hours of sunlight a year than Ireland. Last May these two countries had similar COVID-19 case numbers, yet the COVID-19 death rate in Ireland was 74 times that in Singapore.

Proximity to the equator isn’t the only factor in Vitamin D distribution around the world, however.

Clouds, weather patterns, pollution and other factors can affect its amount and intensity. Data from Italy suggest this can have devastating effects. In Italy, the COVID-19 pandemic rapidly accelerated last winter and spring, yet its effect was not equally distributed across the country. Milan's death rate reached 15,729 per million in May, while in Naples, only 318 miles south, the COVID-19 death rate was only 403 per million. Naples receives, on average, 58 more sunny days a year than Milan. Nearly two more months of sun a year may decrease the rate of Vitamin D deficiency and help explain the drastic difference in COVID-19 fatality rate among the cities.

The effectiveness of UV radiation on skin to produce vitamin D decreases with age and with darker skin pigmentation. High levels of vitamin D deficiency have been found in both African American and elderly populations. Institutional settings with limited sunlight exposure, such as nursing homes and prisons, have also reported high rates of vitamin D deficiency. These populations are also experiencing higher levels of COVID-19 mortality. This harsh reality, along with positive preliminary evidence that vitamin D supplementation may reduce the risk and severity of COVID-19, is leading researchers to call for more investigation into these possible connections.

It is important to remember that COVID-19 is an emerging crisis and research is constantly ongoing. There is, however, growing evidence vitamin D and sunlight is playing a role in the pandemic. As winter approaches in New England and the amount of sunlight decreases every day, vitamin D deficiency may be a growing public health concern.

#### *Sources*

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