

Covid-19 and Vitamin D, 2-Page Summary

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This document is for medical professionals only.

June 2020 UPDATE: We have now published our full research in preprint on medRxiv which includes a causal inference analysis verifying a causal link between vitamin D status and COVID-19 outcomes:

[Evidence Supports a Causal Model for Vitamin D in COVID-19 Outcomes](#)

This document is no longer being updated.

Evidence strongly suggests Vitamin D supplements could be effective in preventing Covid-19, and play a key role in treating patients if added to existing treatment plans, especially if this is done early in the disease progression.

Full report: bit.ly/VitDCovid19Info

Call for data: we ask ICUs to test serum levels, add D3 to treatment plans, measure outcomes and report. Please also measure 25(OH)D serum levels in post mortem examinations up to 10 days after death, especially in cases with no apparent comorbidities. Early clinical evidence will support clinical trial applications. **Please Test, Treat, Measure, Report.**

High Level Summary

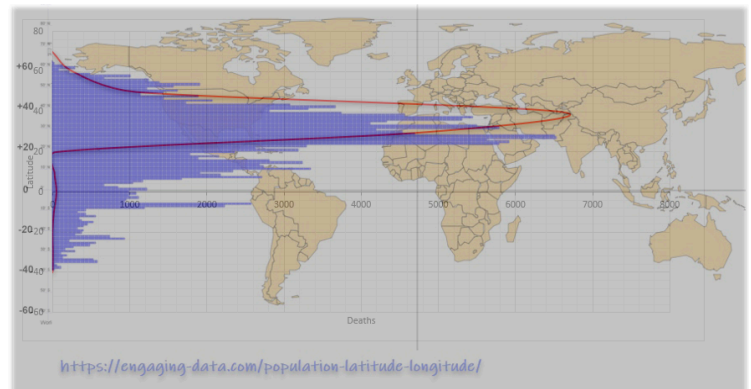
- **Vitamin D deficiency is common during winter (Oct - Mar) in northern latitudes above 20 degrees and (Apr - Sep) in southern latitudes 20 degrees below the equator.** (Mithal et al. 2009)(Isaia et al. 2003)(Garland and Garland 2006)(Giustina et al. 2019)
- **Coronaviruses and influenza viruses in the past have displayed very strong seasonality with winter appearances** (Gaunt et al. 2010). **Severe Covid-19 outbreaks have happened above 20 degree winter latitudes whereas outbreaks in the southern summer hemisphere have been mild and case fatalities relatively low. Case fatalities show a striking relationship to latitude.** (23-Mar-2020. See [Figure 1](#)).
 - The most severe outbreak in the north has been Italy where it is noted vitamin D deficiency is one of the highest in Europe (Watkins 2020).
 - Japan is an outlier in the north, with only a very mild outbreak and has the lowest incidence of Vitamin D deficiency thanks to its high fish-content diet (Mithal et al. 2009). [NB: Other factors no doubt contribute in both countries but culture and behaviour account for speed of spread not case fatality rates].
- **Research suggests SARS-Cov-2 virus enters cells via ACE2**(Hoffmann et al., n.d.). **Coronavirus viral replication downregulates ACE2**(Dijkman et al. 2012) **dysregulating the renin-angiotensin system (RAS) and leads to a cytokine storm**(Ji et al. 2020)(Chen et al. 2010) **in the host, causing Acute Respiratory Distress Syndrome (ARDS).**
- **Research shows that Vitamin D acts to rebalance RAS**(Kong et al. 2013)(Yuan W n.d.) **and attenuates lung injury**(Kong et al. 2013)(Xu et al. 2017).
- **Research shows that Vitamin D supplementation increases immunity and reduces inflammatory responses**(Jiménez-Sousa et al. 2018) **and the risk of acute respiratory tract infection**(Martineau et al. 2017).
- **Vitamin D deficiency is strongly associated with ARDS**(Dancer et al. 2015) **and poor mortality outcomes**(Ednan K. Bajwa , Ishir Bhan , Sadeq Quraishi , Michael Matthay , B. T. Thompson 2016), **as well as being associated with many comorbidities associated with Covid-19 case fatalities.**
- **High dose oral Vitamin D has been shown to improve mortality in patients with severe vitamin D deficiency.**(Christopher 2016)
- **Chronic vitamin D deficiency induces lung fibrosis through activation of the RAS.**(Et al 2017)
- Vitamin D is a steroid hormone naturally produced in the skin in summer exposure to UVB light. It is considered safe to take as cholecalciferol (D3) oral supplements in doses up to a maximum of 4,000iu/d for short periods

("Vitamin D and Health - SACN" 2016). NICE recommends daily supplements for all UK adults all year ("Colecalciferol - NICE, BNF" n.d.) ("Scenario: Prevention of Vitamin D Deficiency in Adults - NICE" 2018)

- "25(OH)D was found to be stable in various experiments for at least 10 days postmortem." (Priemel M 2010)

Deaths + population vs latitude reveals a striking northern hemisphere bias

Figure 1 - Covid-19 case fatalities by latitude vs population. Severe outbreaks to 23rd March 2020 have only happened north of 20° latitude (winter).



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