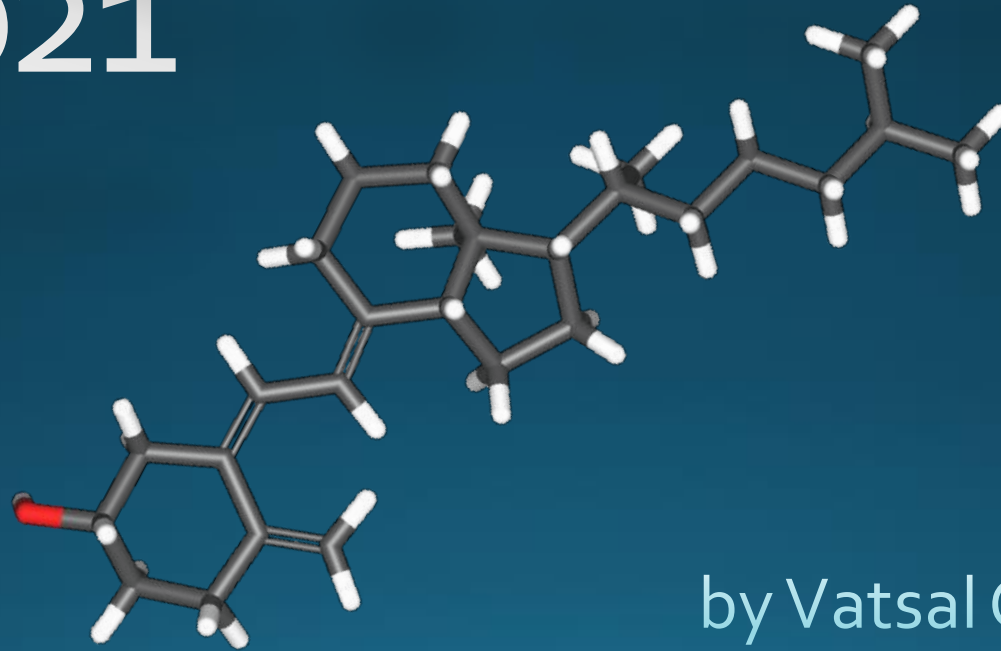


Vitamin D & Covid-19

Winter 2021



by Vatsal G. Thakkar, M.D.
www.vatsalthakkar.com



About me...

- Board-Certified Psychiatrist
- Previous:
 - Sub-investigator for 9 years in clinical trials at Vanderbilt, NYU Langone
 - Course director for 2nd year med students
 - 10+ years private practice: Tested & treated >1000 patients for vitamin D deficiency
- Current:
 - 3 years as a startup founder at [Reimbursify](#)
 - Op-ed writer for NYT, WSJ, MedPage Today, The Hill

*** I have no conflicts of interest to declare*

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Vitamin D Basics

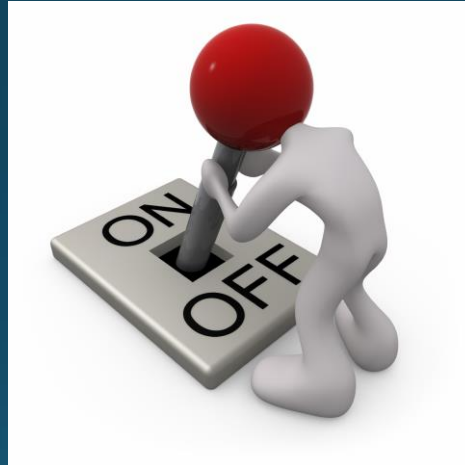


- Vitamin D was discovered during the investigation of rickets, a bone disease
- UV-B rays strike the molecule 7-dehydrocholesterol in skin → forms Vitamin D
- Food is NOT an adequate source of vitamin D. It must come from the sun or supplements.

Vitamin D as Immunomodulator

- Deficiency has been linked to various auto-immune dz:

- Multiple Sclerosis
- Rheumatoid Arthritis
- Lupus
- Type 1 DM



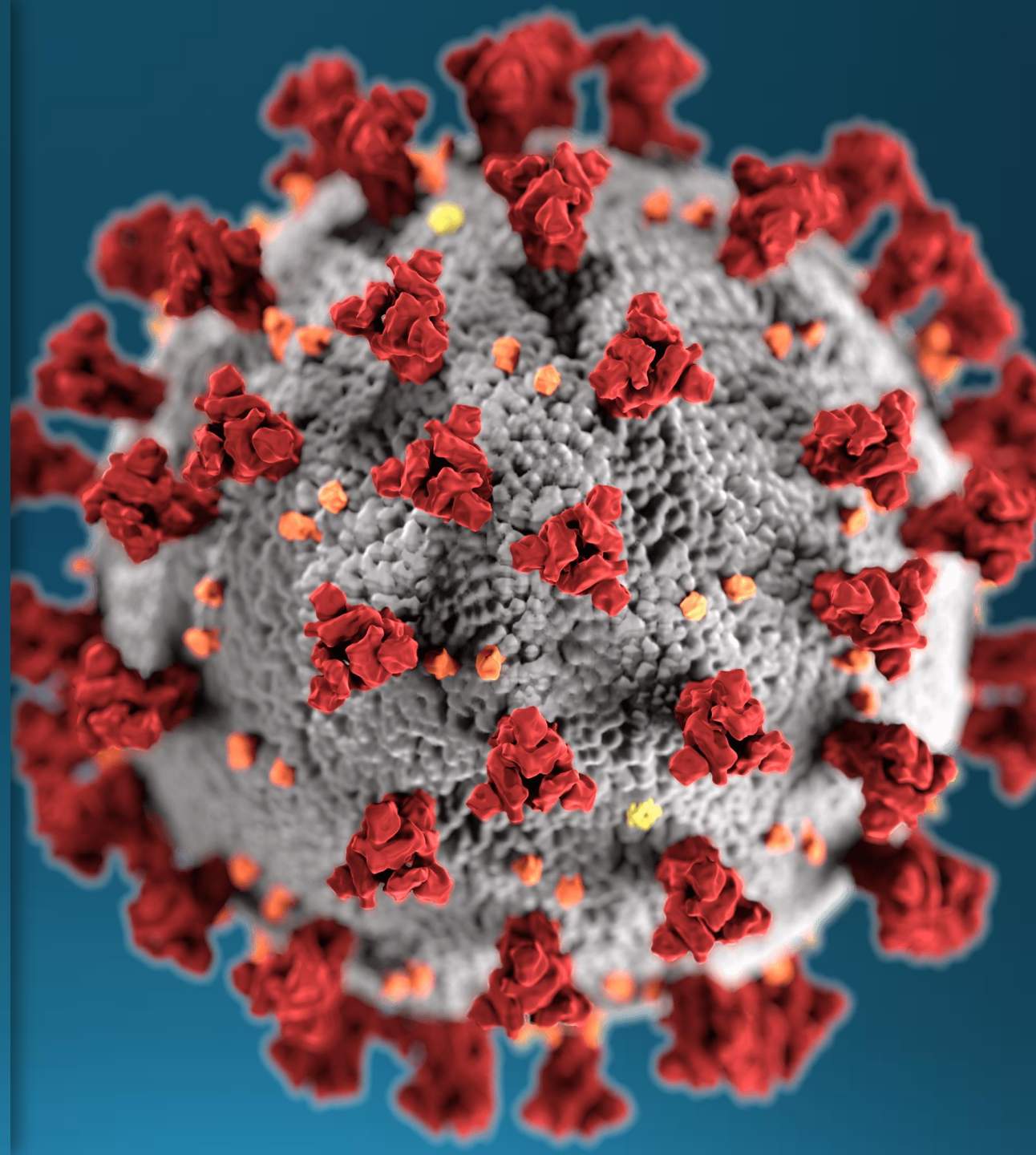
- Vitamin D & Immune System
 - Inhibits CD₄⁺ Th₁ cells
 - Inhibits IL-2, IL-6, IL-8, IL-12, IL-17 (which cause cytokine storm)
 - Inhibits T-cell proliferation
 - Promotes Th₂ response by T cells
 - Enhances production of cathelicidin & defensins
 - Enhances IL-4, IL-5, IL-10 (which fine-tune immune response)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6047889>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7246956/>
<https://pubmed.ncbi.nlm.nih.gov/18981129/>

How does SARS-CoV-2 kill?

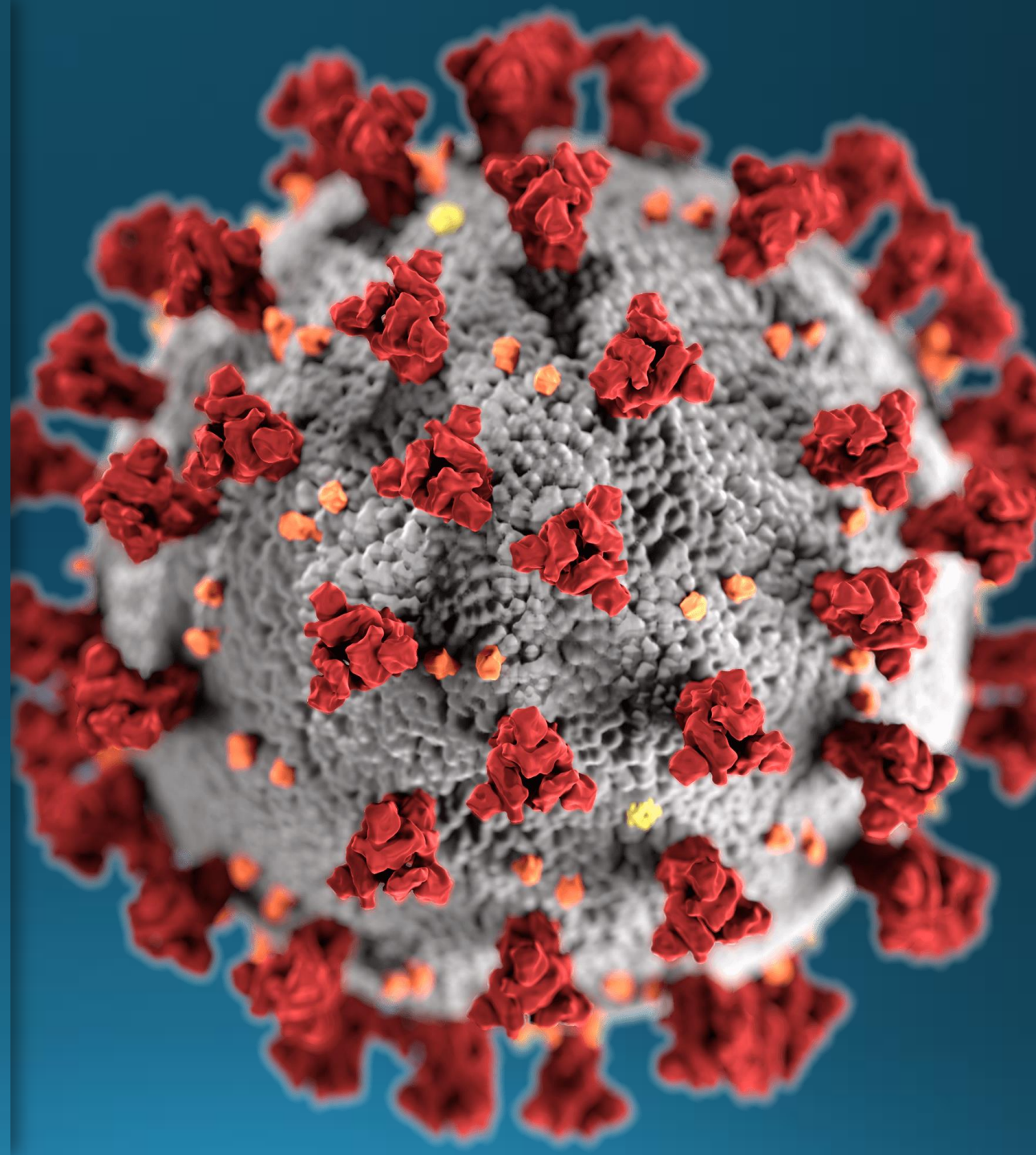
- Infection through respiratory droplets by attachment to ACE₂ receptor
- Unhindered viral replication
- Pneumonia/ARDS
- Hypercoagulation
- Cytokine storm
- Death



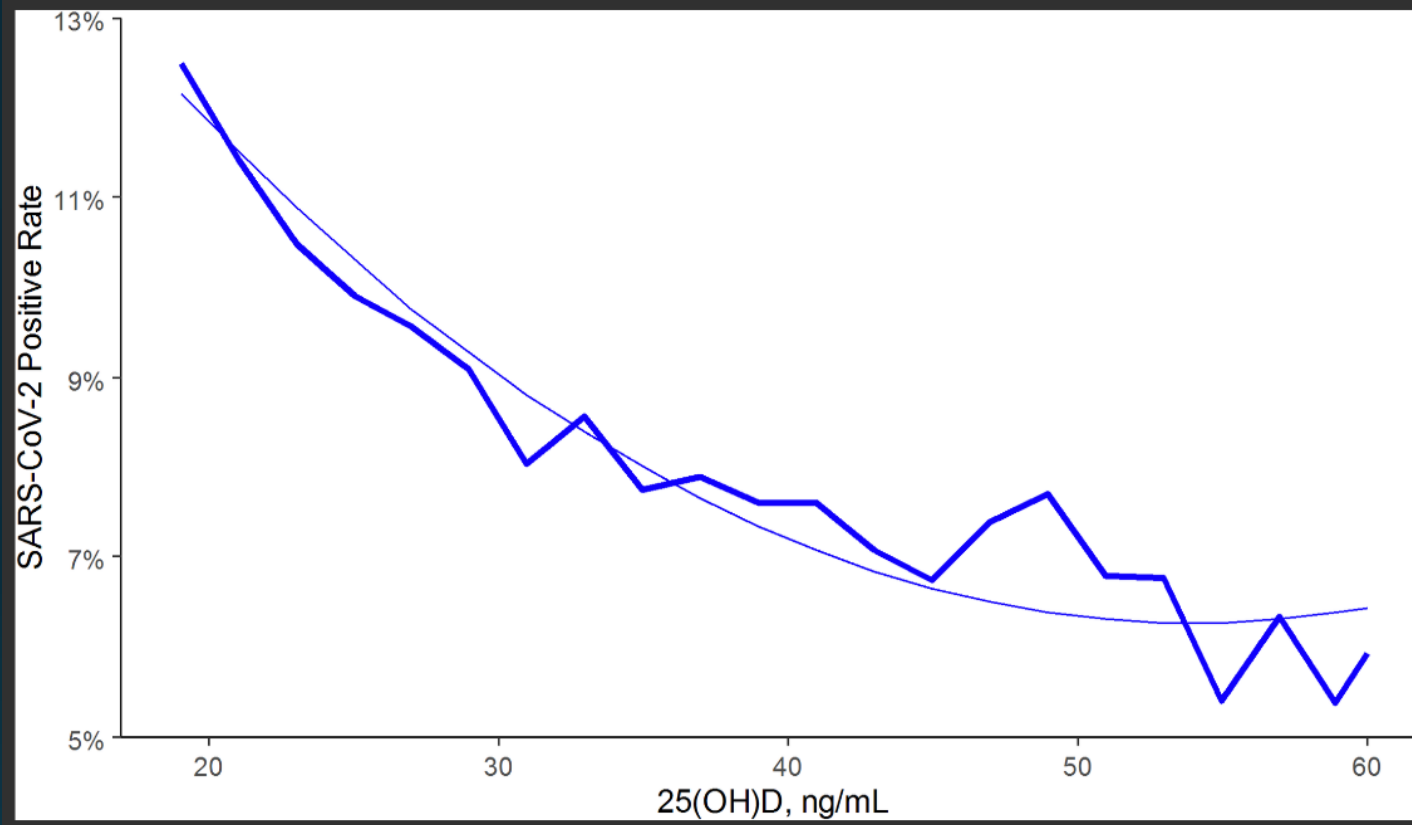
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** Vitamin D shows protective mechanisms here*



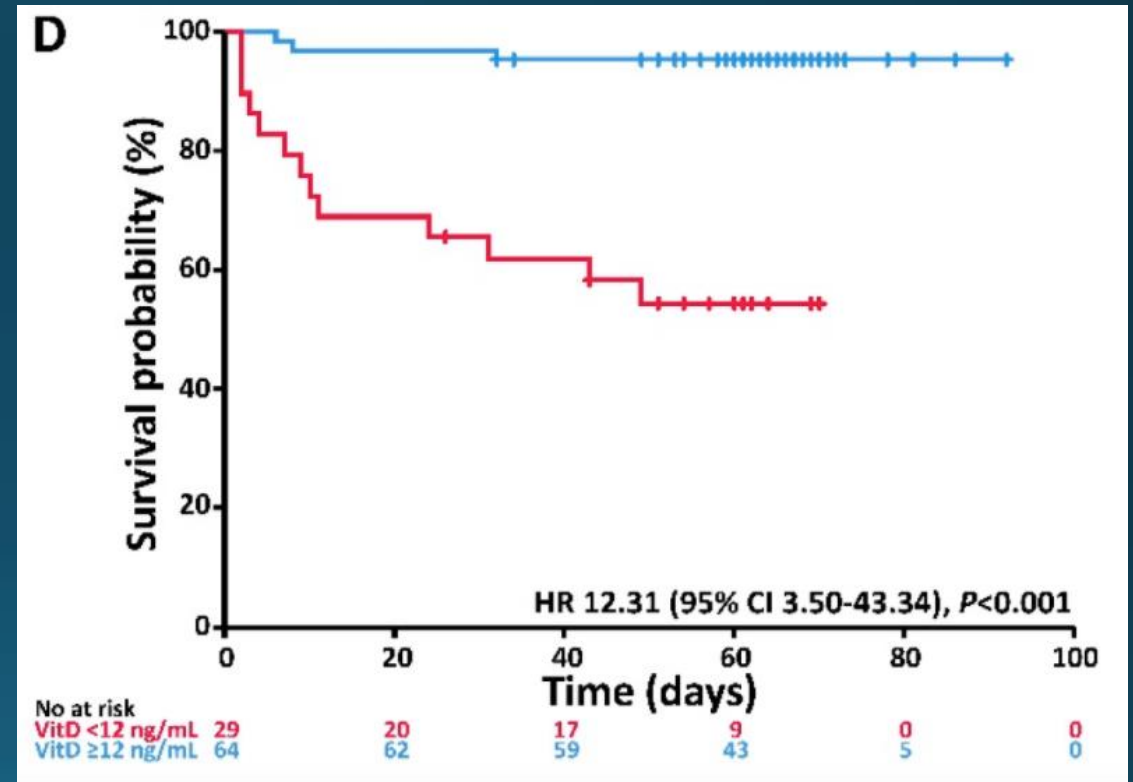
Vitamin D levels inversely related to Covid-19 Positivity Rates



- Boston University study of 190,000 lab records from Quest Diagnostics database
- Published 9/17/20
- Covid-19 positivity risk decreases by 54% with higher D levels
- The decrease in positivity was true across sex, age, and ethnicity

Vitamin D Deficiency: German Study

- 185 patients with Covid-19 presenting for treatment
- Half required admission
- Retrospective Vit D testing on blood samples
- **Vit D Deficiency: < 12 ng/mL**
 - Risk of ventilation: 6x
 - Risk of death: 15x



Survival Probability in the Inpatient Subgroup

Vit D & Severe Covid-19

- Lau et al: LSU hospital patients with Covid-19
- Prevalence of Vit D Insufficiency (VDI <30 ng/mL) was found in:
 - 84.6% of ICU patients vs 57.1% of floor patients
 - 100% of ICU patients < 75 yrs old had VDI

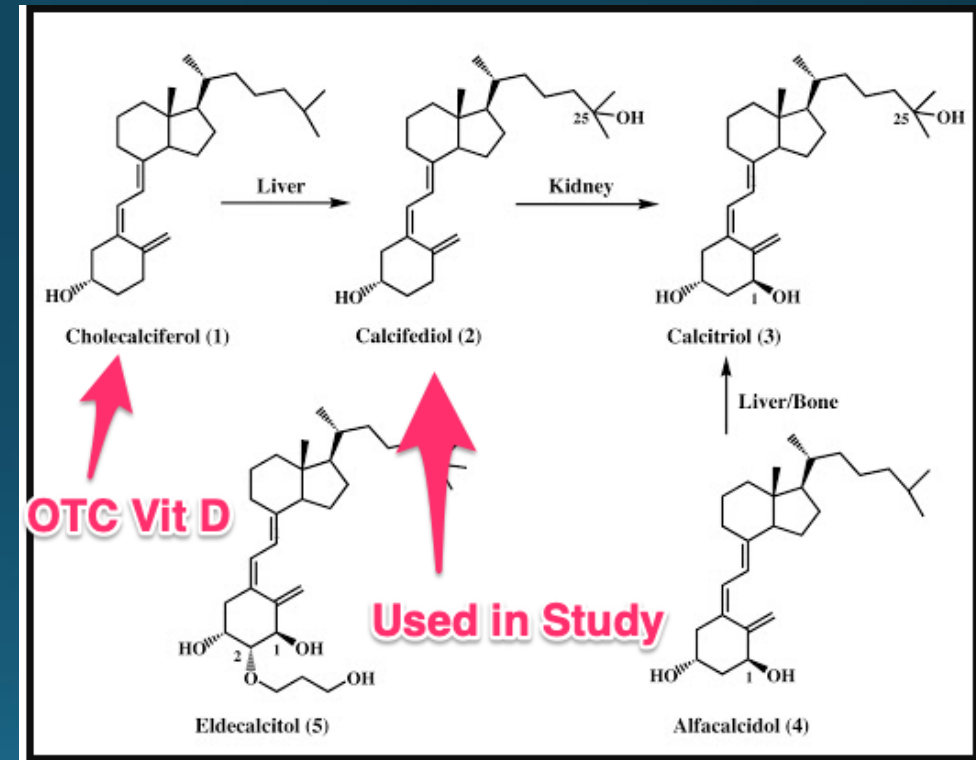
<https://www.medrxiv.org/content/10.1101/2020.04.24.20075838v1>

- Tort et al: Mexico
- 172 patients with Covid-19 with known vit D levels
- Studied mortality as sole outcome
- Avg level 16.5 ng/mL
- 95% of admitted patients insufficient/deficient
- Level < 8 ng/mL = 3.68 higher risk of death

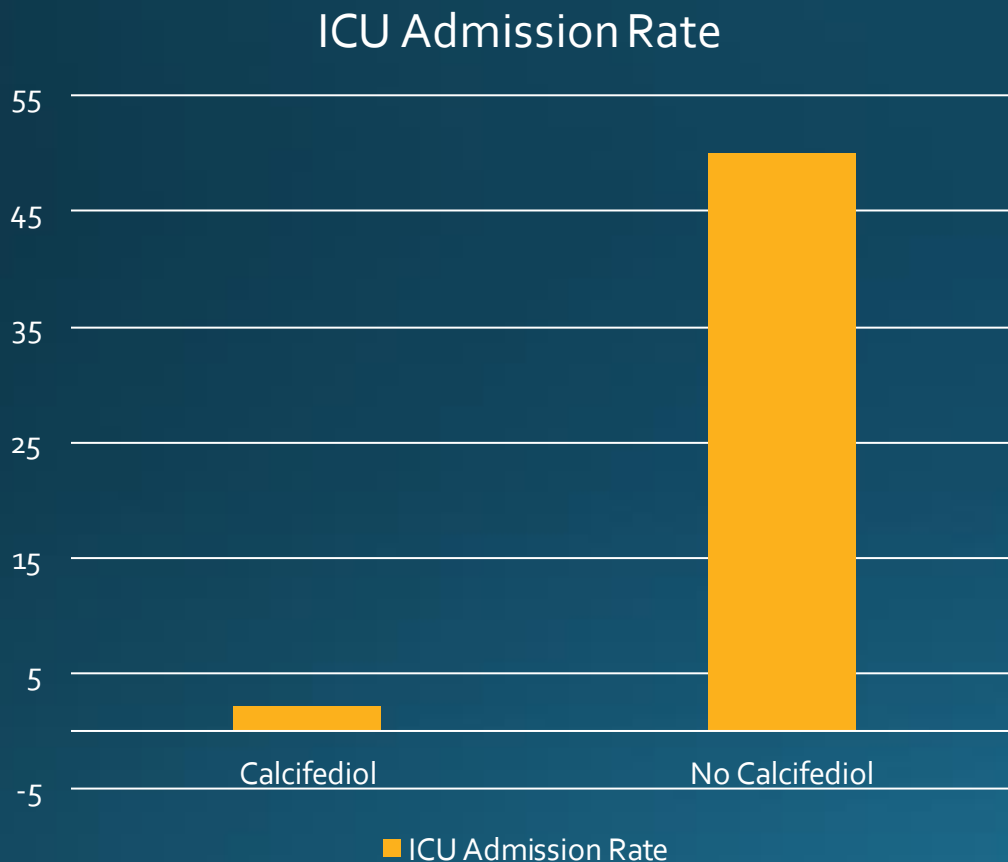
https://www.medigraphic.com/pdfs/sanmil/sm-2020/sm201_22a.pdf

Vitamin D Intervention Trial: Spain

- Covid-19 patients admitted to hospital in Spain
- Randomized 2:1 to receive **calcifediol** (faster-acting and more potent than vit D₃)
- Dose equivalence of **136,000 IU of vitamin D₃** was given in the first week (divided into 3 doses), followed by the equivalent of **34,000 IU weekly** thereafter.



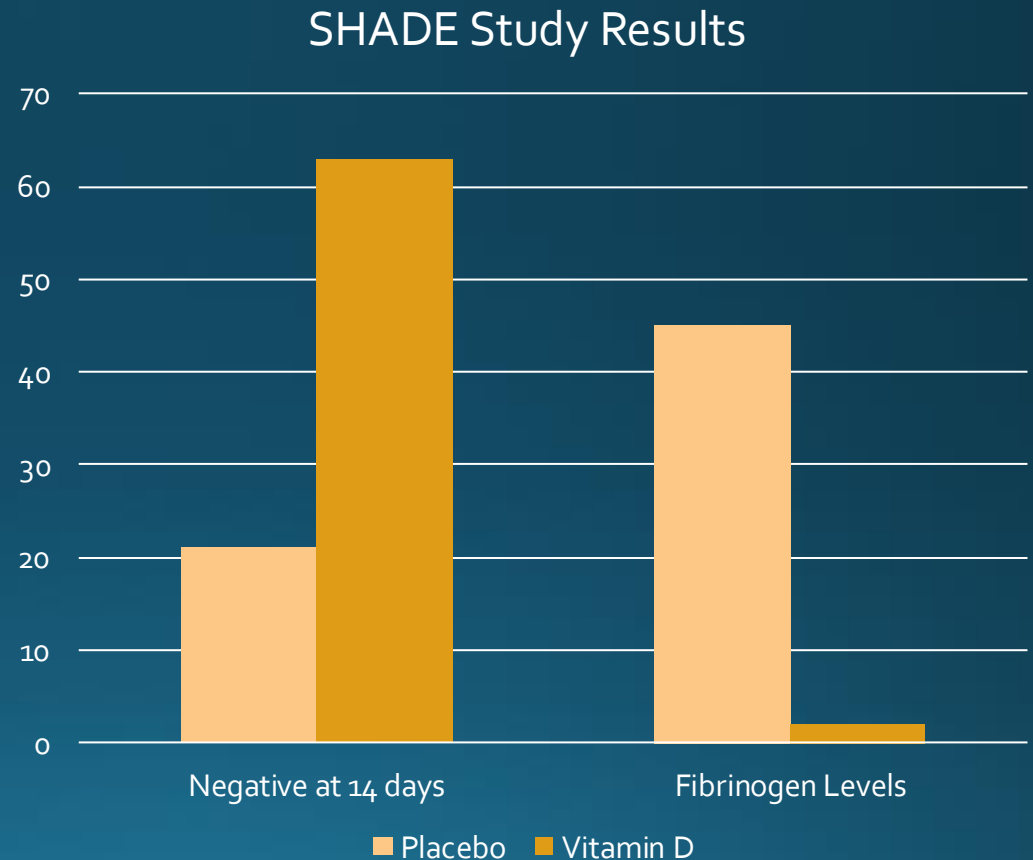
Spanish Vitamin D Trial continued:



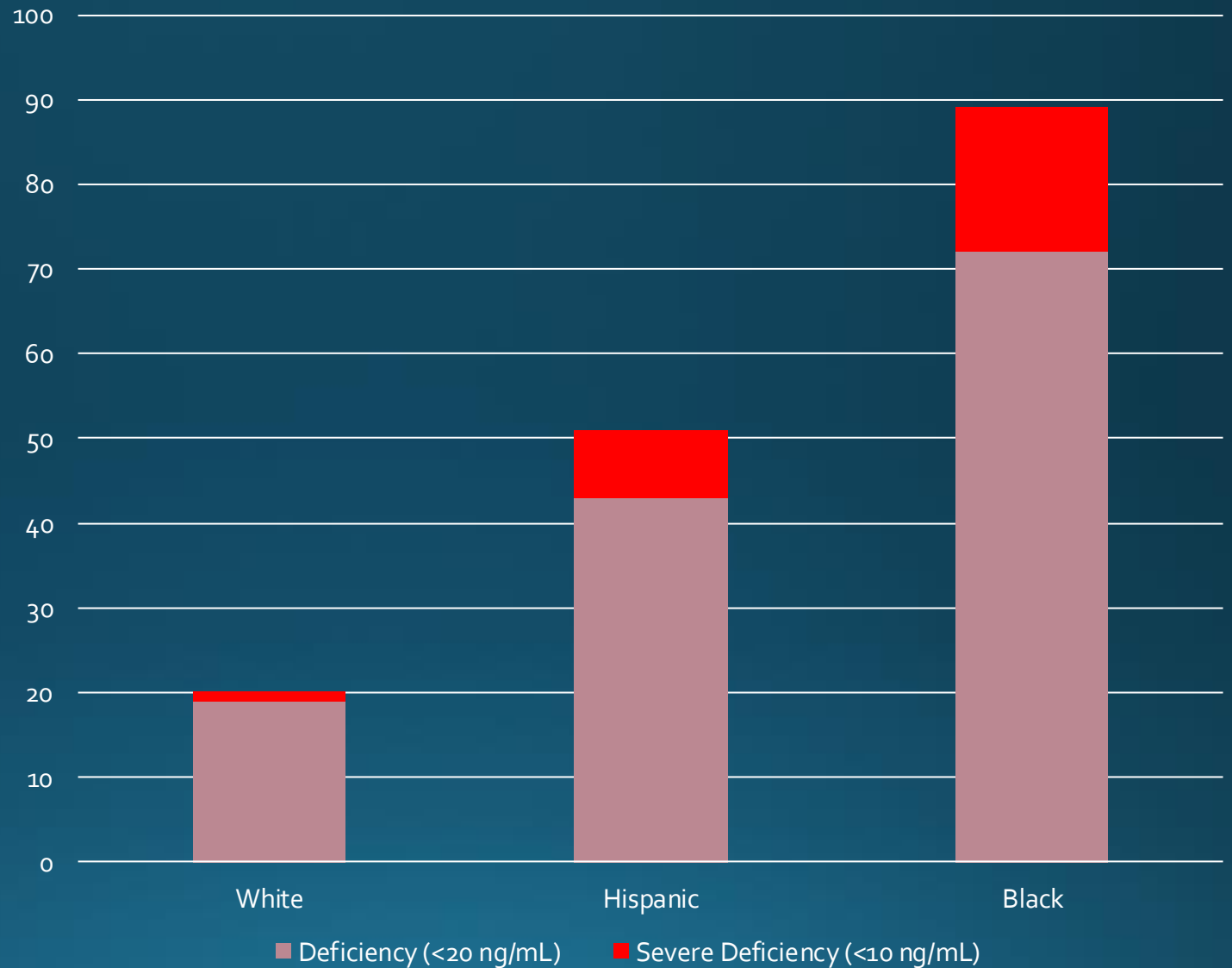
- Of the calcifediol group, **only 2% required treatment in ICU & no deaths**
- Of the no calcifediol group, **50% required ICE and 2 died**
- Calcifediol was chosen for its potency (3.2x) and faster normalization of vitamin D status (the typical D₃ can take weeks to change serum levels)

The SHADE Study – India

- 40 individuals with VDD & mild Covid-19
- Were given either **60,000IU/day for 7 days** or placebo
- Endpoints: clearance of the virus & serum markers
- Viral Clearance: 3x over placebo
- Fibrinogen levels 1/20 compared to placebo (higher fibrinogen = higher risk of blood clots)

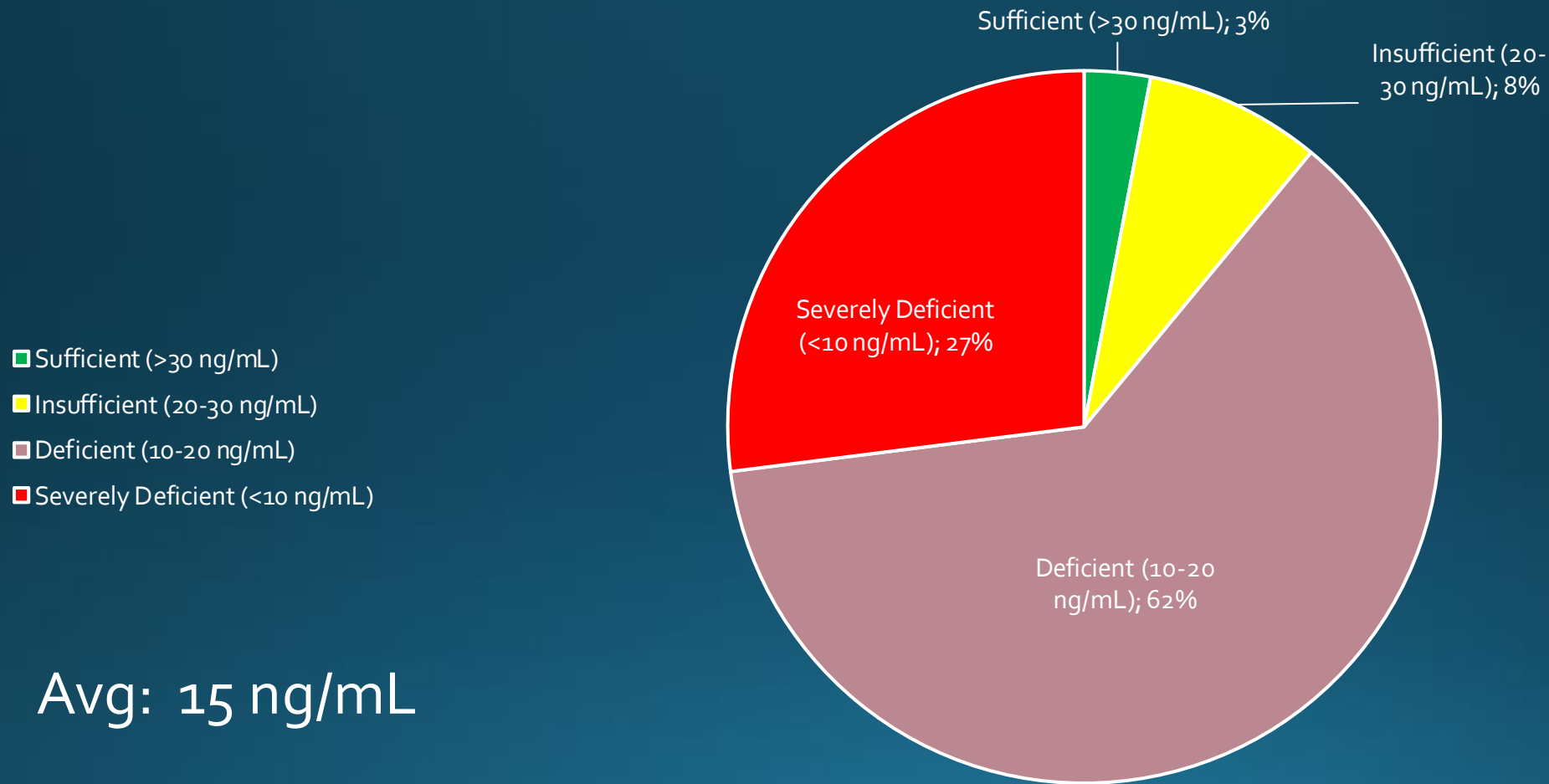


Rates of Vitamin D Deficiency in the United States - 2004



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3447083/>

Deficiency among Black Americans, 2004






Age-Adjusted Mortality thru 1/5/2021



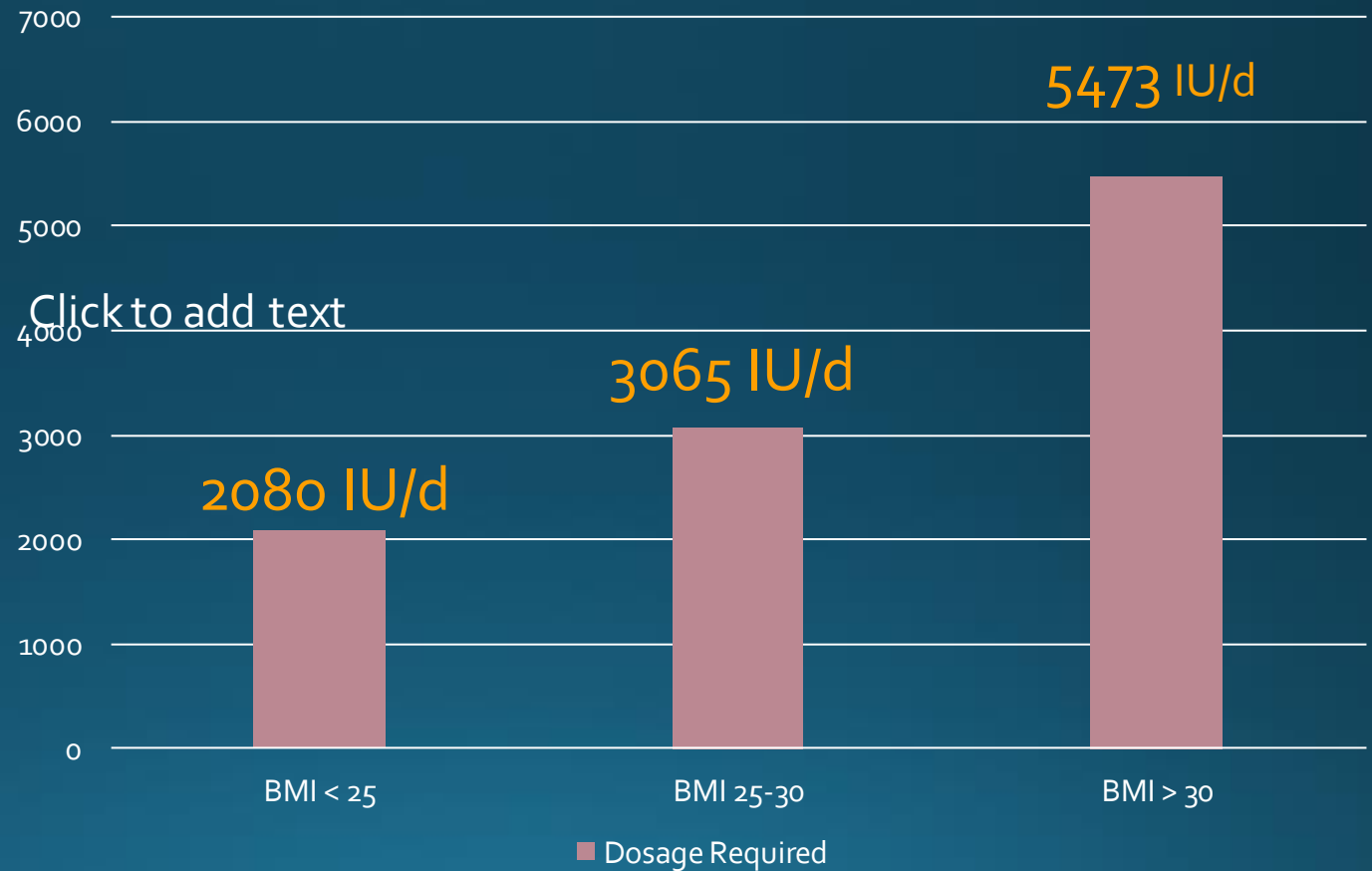
<https://www.apmresearchlab.org/covid/deaths-by-race>

Fitzpatrick Scale

						
Fitzpatrick Type	I	II	III	IV	V	VI
Skin Color	Very White/ Freckled	White	White – Olive	Moderate Brown	Dark Brown	Black
UV-B required for vitamin D	1X	1.2X	1.5X	2X	2.5-3X	3-4X

Vitamin D Dosage by Body Weight

- Study of > 20,000 Canadians who supplement
- In order to reach a blood level of 40 ng/ml, these were the daily doses required by body weight



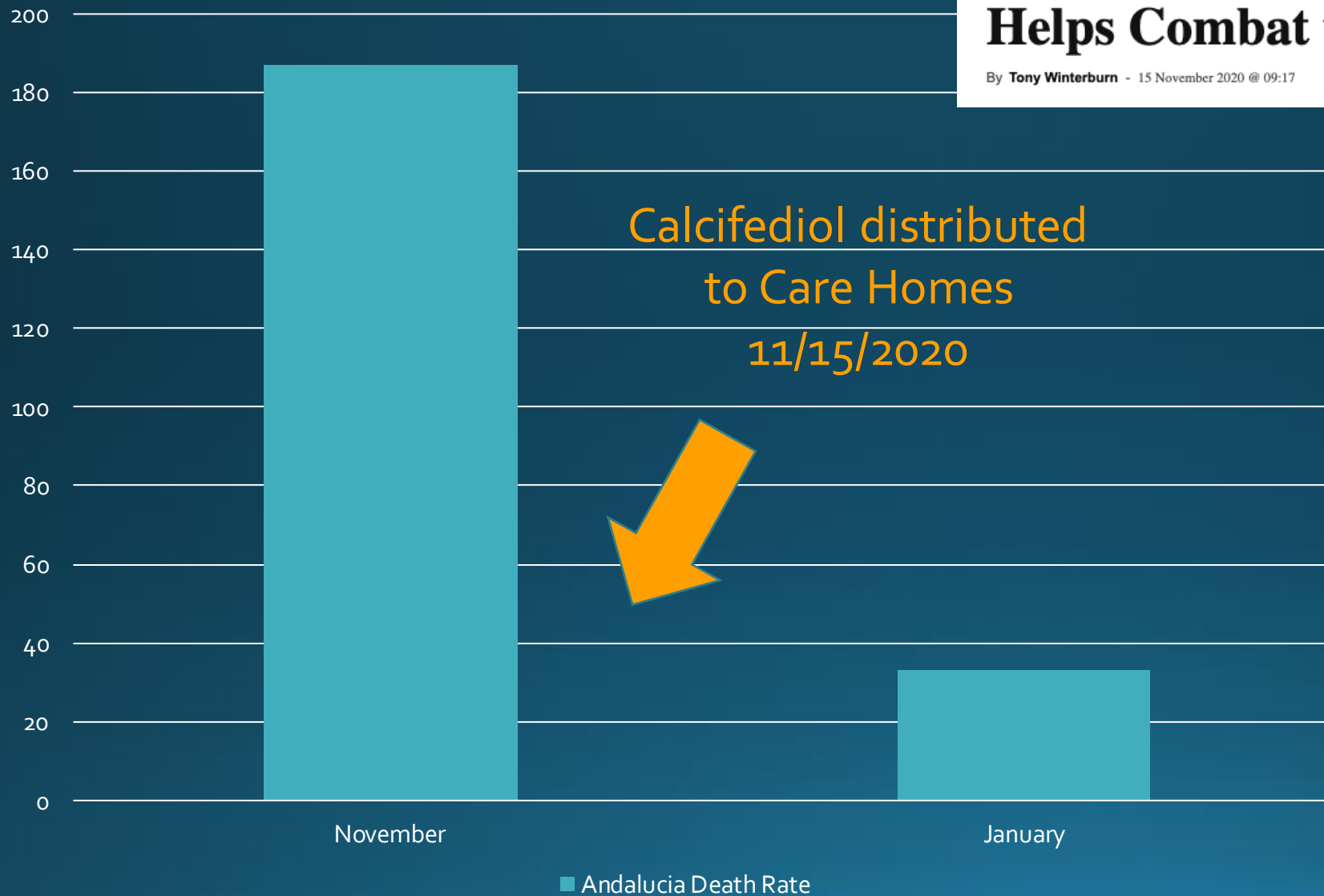
<https://pubmed.ncbi.nlm.nih.gov/25372709/>

Spain's Andalucía to Provide Vitamin D in Residences After Studies Show it Helps Combat the Coronavirus

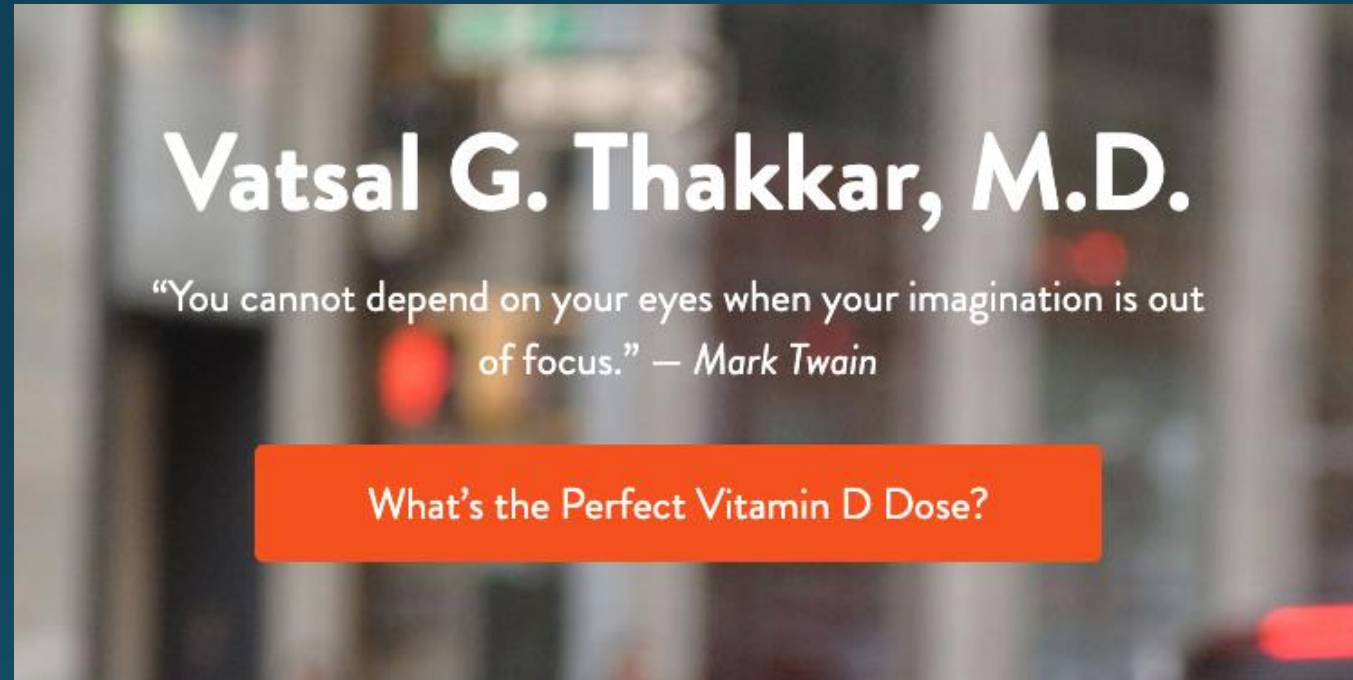
By Tony Winterburn - 15 November 2020 @ 09:17

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Andalucia, Spain Death Count



What dose of vitamin D should you take?



Find you personalized dose recommendation at

www.VatsalThakkar.com