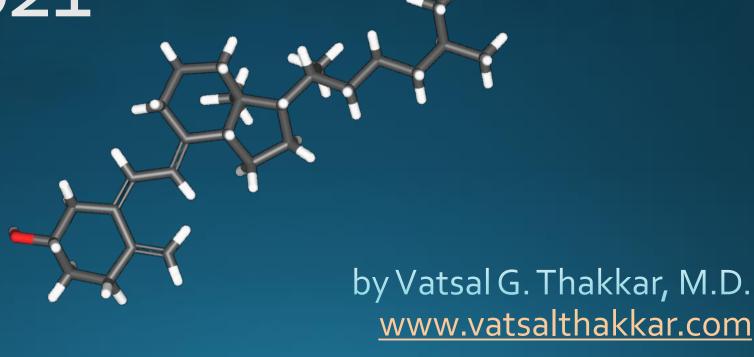
# Vitamin D & Covid-19 Winter 2021





#### About me...

- Board-Certified Psychiatrist
- Previous:
  - Sub-investigator for 9 years in clinical trials at Vanderbilt, NYU Langone
  - Course director for 2<sup>nd</sup> 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, MedPageToday, 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. <u>It must come from the</u> <u>sun or supplements.</u>

#### Vitamin D as Immunomodulator

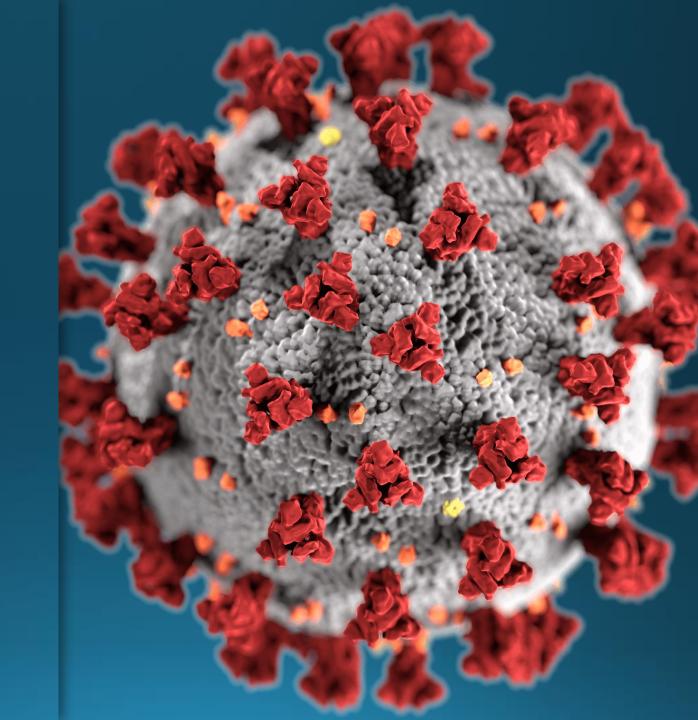
- Deficiency has been linked to various auto-immune dz:
  - Multiple Sclerosis
  - Rheumatoid Arthritis
  - Lupus
  - Type 1 DM



- 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)

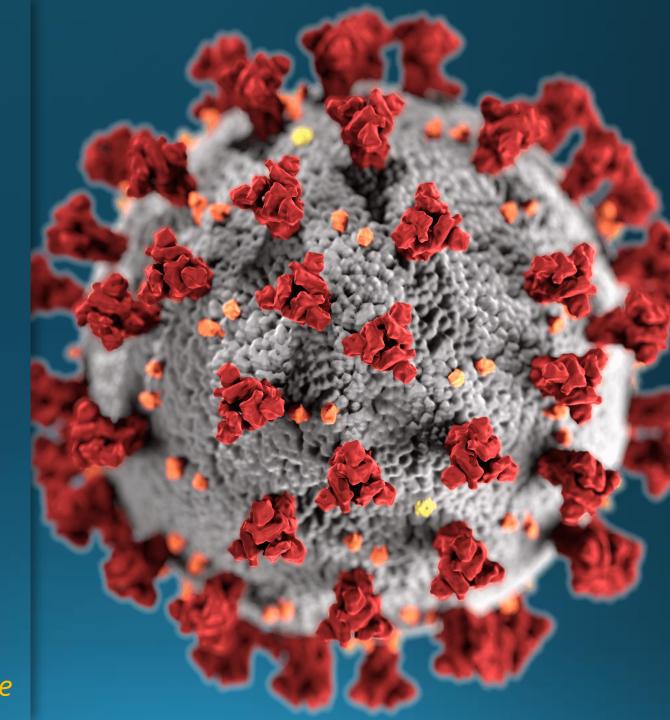
#### How does SARS-CoV-2 kill?

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

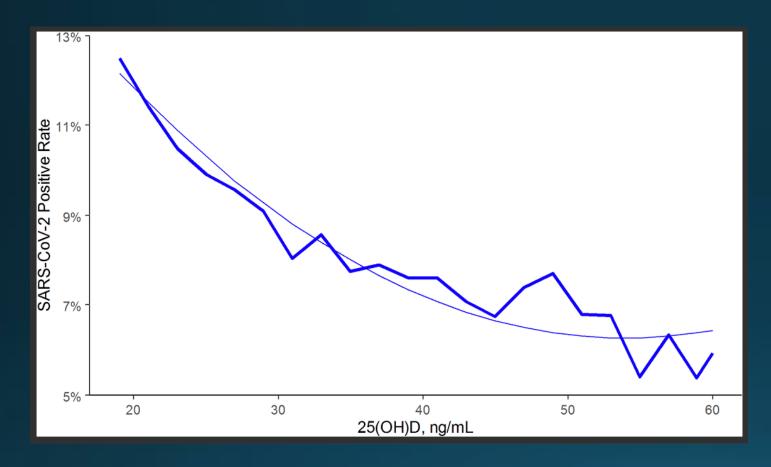


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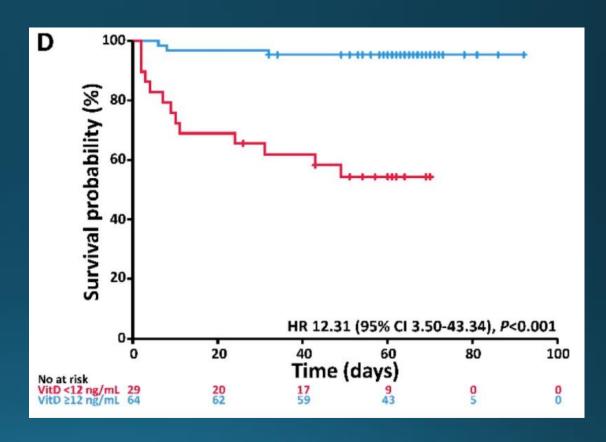
# Vitamin D levels inversely related to Covid-19 Positivity Rates



- 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</li>
  - Risk of ventilation: 6x
  - Risk of death: 15x



Survival Probability in the Inpatient Subgroup

#### Vit D & Severe Covid-19

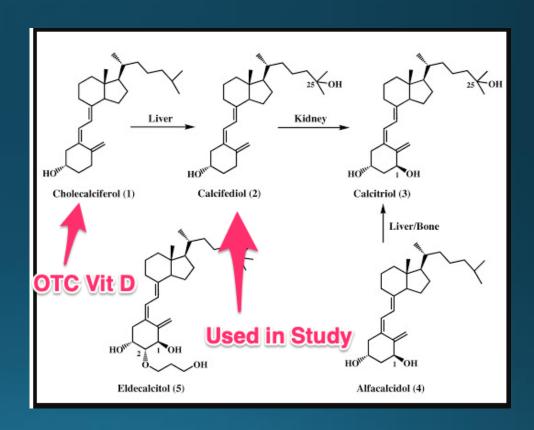
- Lau et al: LSU hospital patients with Covid-19
- Prevalence of Vit D Insufficiency (VDI <30 ng/mL) was found in:
  - 84.6% of ICU patients vs 57.1% of floor patients
  - 100% of ICU patients < 75 yrs old had VDI

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

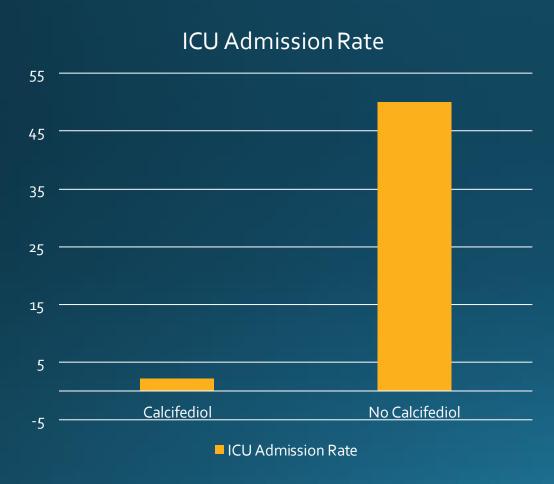
- Tort et al: Mexico
- 172 patients with Covid-19 with known vit D levels
- Studied mortality as sole outcome
- Avg level 16.5 ng/mL
- 95% of admitted patients insufficient/deficient
- Level < 8 ng/mL = 3.68 higher risk of death

#### 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 D<sub>3</sub>)
- 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:

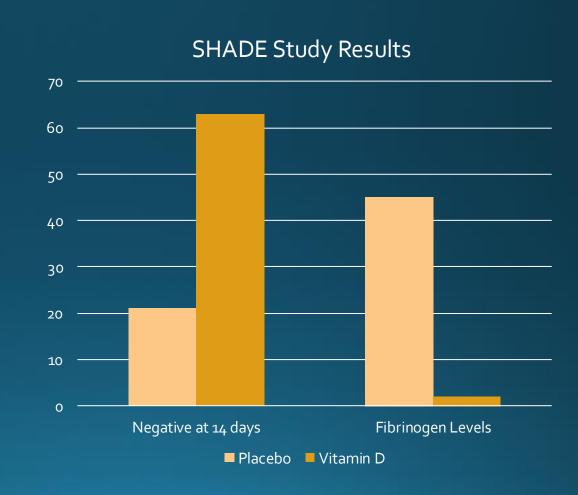


- Of the calcifediol group, only 2% required treatment in ICU & no deaths
- Of the no calcifediol group,
   50% required ICE and 2 died
- Calcifediol was chosen for its potency (3.2x) and faster normalization of vitamin D status (the typical D3 can take weeks to change serum levels)

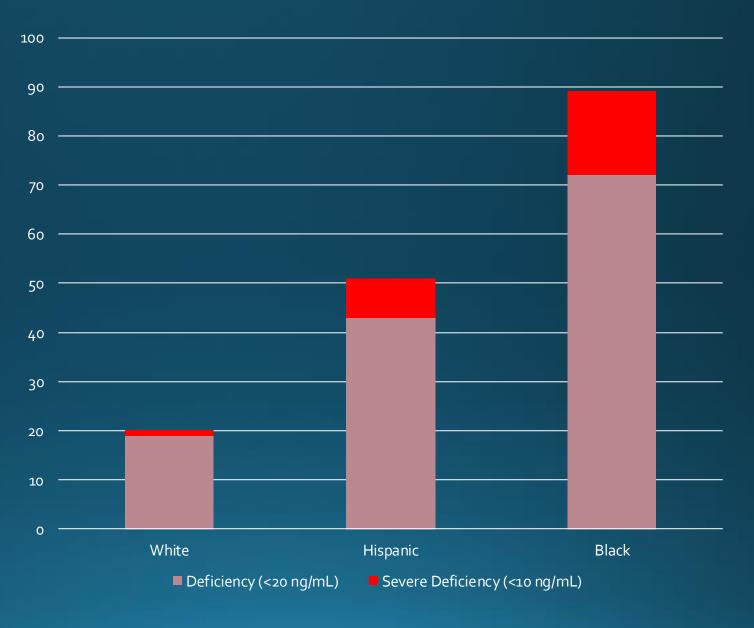
https://www.sciencedirect.com/science/article/pii/Sog6oo76o2o3o2764#biboo55

### 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)

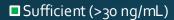


Rates of Vitamin D Deficiency in the United States - 2004



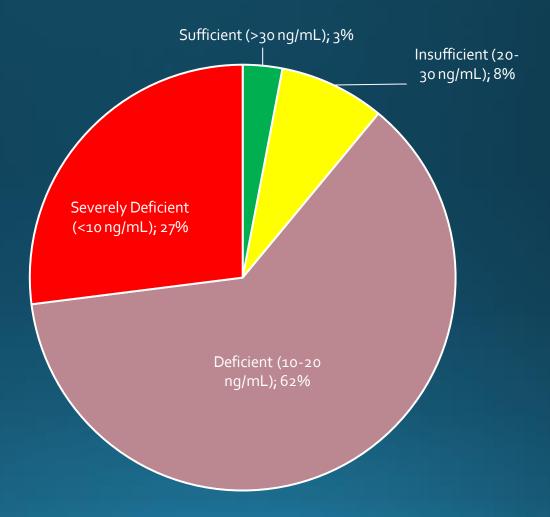
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3447083/

#### Deficiency among Black Americans, 2004



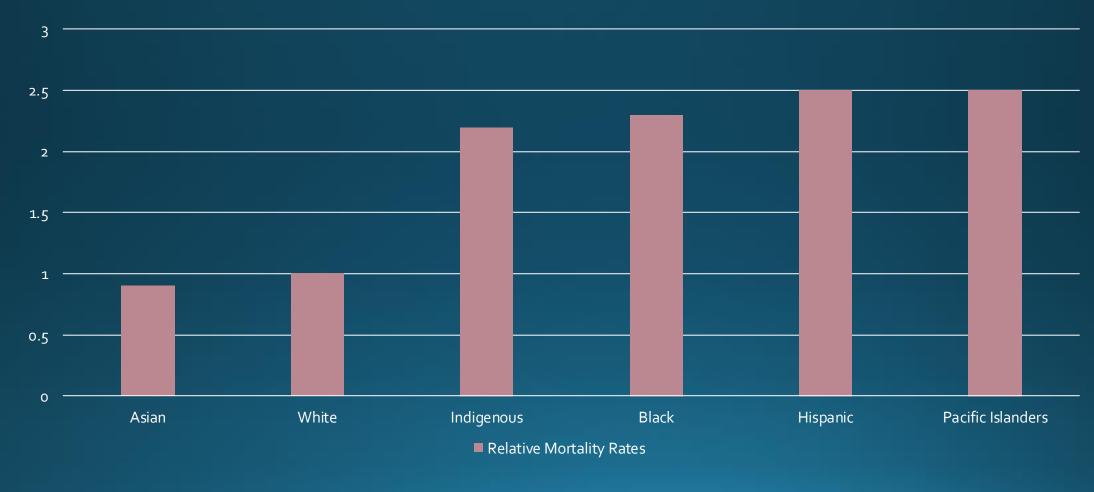
- Insufficient (20-30 ng/mL)
- Deficient (10-20 ng/mL)
- Severely Deficient (<10 ng/mL)

Avg: 15 ng/mL



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

### Age-Adjusted Mortality thru 1/5/2021



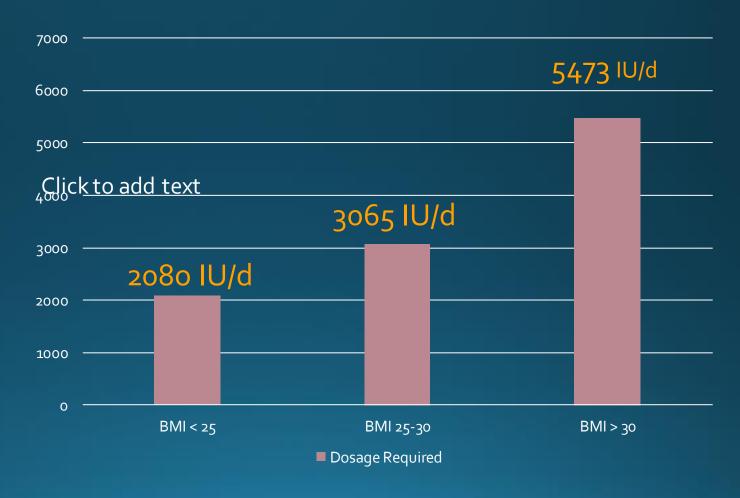
https://www.apmresearchlab.org/covid/deaths-by-race

## Fitzpatrick Scale

	6	6 6			36	
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	3-4×

### 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/

# Success with Vitamin D – England

Newcastle Hospitals ranked 4<sup>th</sup> lowest Covid death rate (out of 124)



This analysis needs fine toothcombing but if correct points towards an overwhelming impact of Dr Richard Quinton and his team in **Newcastle** megadosing Covid patients with **vitamin D** 

#### Statistical Report @AnalyticsFast · 1/11/21

The NHS Acute trust mentioned in @matthabusby's Guardian article is:

- The Newcastle Upon Tyne Hospitals

The rate of #COVID19 deaths, 25 Mar 2020 to 5 Jan 2021, ranks @NewcastleHosps significantly lower than England average #NHS nonspecialist acute trusts (4th lowest of 124).

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





#### What dose of vitamin D should you take?



Find you personalized dose recommendation at <a href="https://www.VatsalThakkar.com">www.VatsalThakkar.com</a>