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**UC DAVIS HEALTH** | **SCHOOL OF MEDICINE**  
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**Cardiovascular Wellness Program**

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# Road Map to Health: How to stay healthy in a current pandemic?

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**VA** | **U.S. Department of Veterans Affairs**

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*scientia potentia est*

-Sir Francis Bacon

*Knowledge is power*

-Sir Francis Bacon

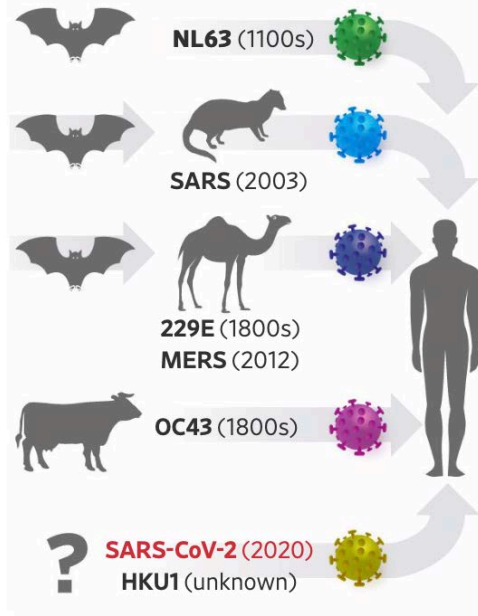
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SARS-CoV-2 (current pandemic)

Other Corona Viruses

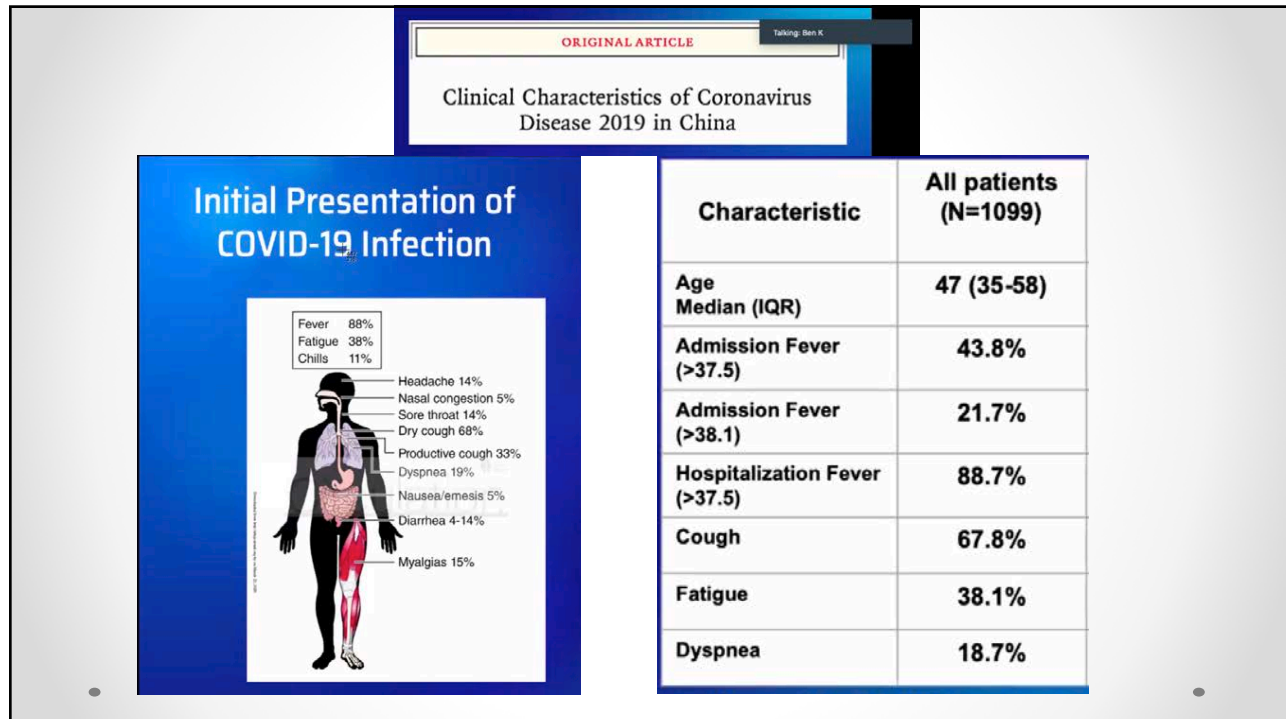
Other Influenza-like viruses/illnesses

- Rhinoviruses
- RSV
- adenoviruses
- parainfluenza
- corona



Source: Timothy Sheahan, University of North Carolina

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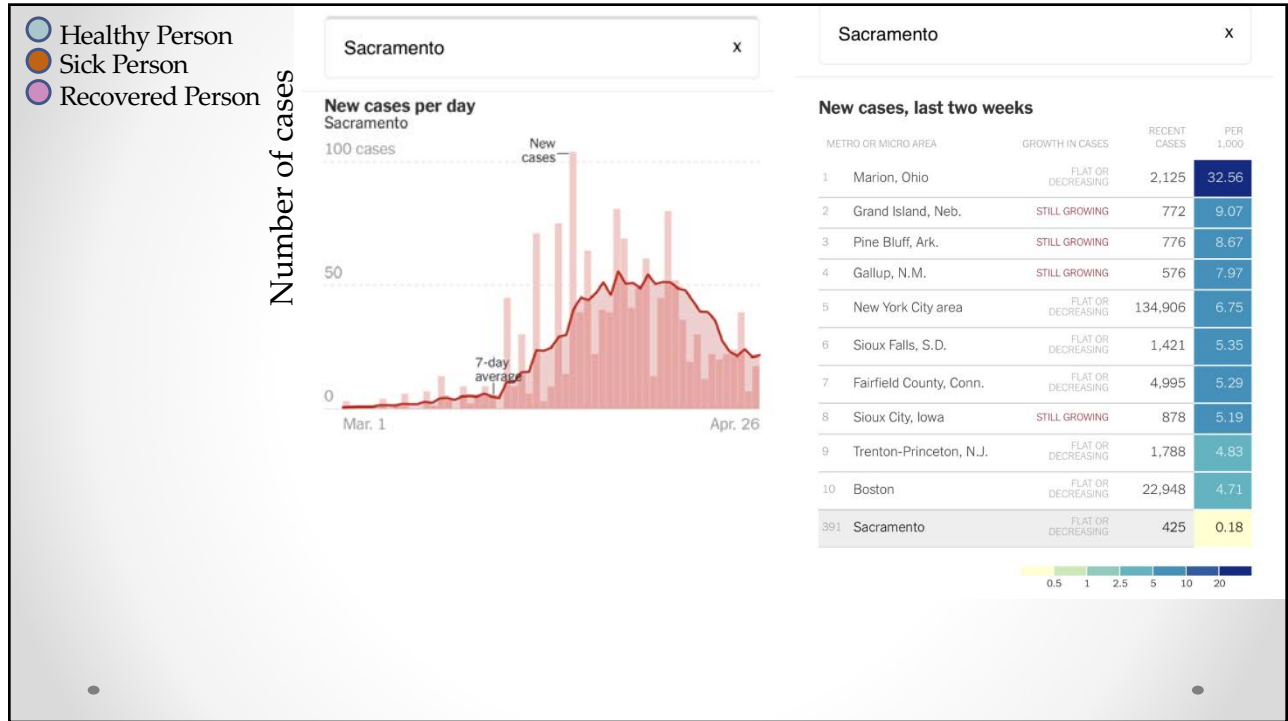


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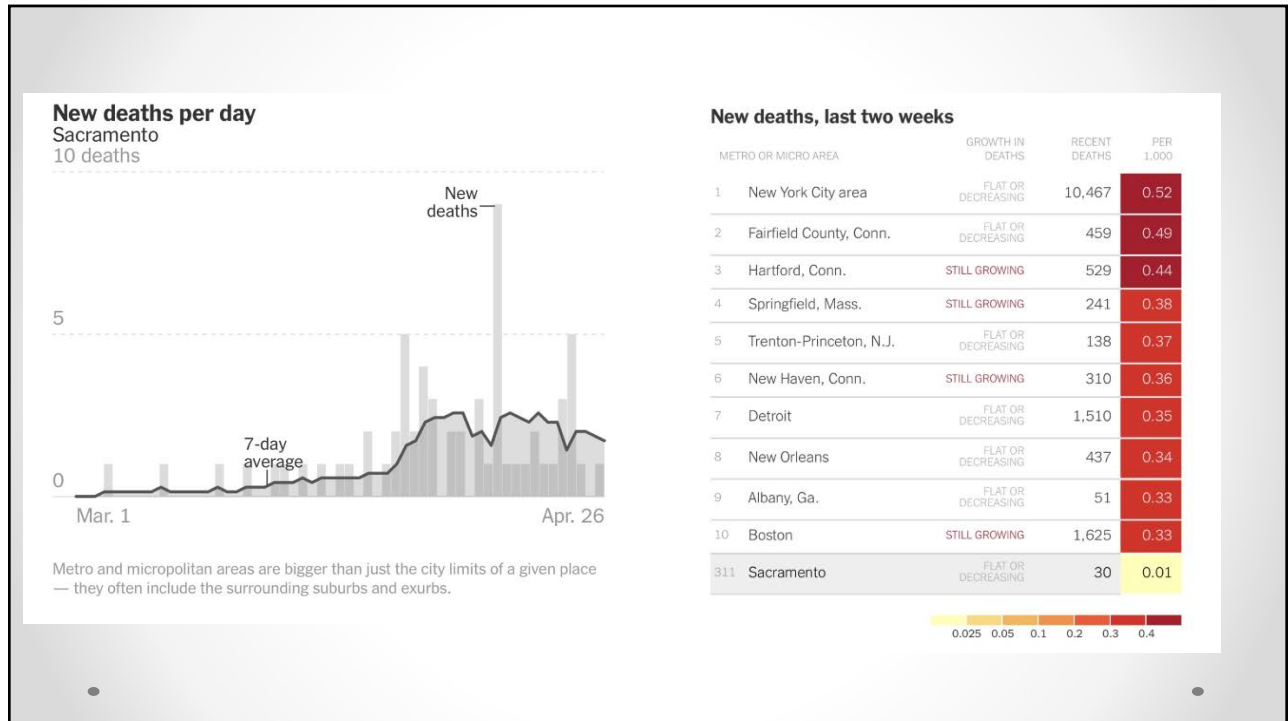
## April 25<sup>th</sup>, 2020 CDC added six new symptoms of COVID-19

- chills,
- rigors,
- muscle pain,
- headache,
- sore throat,
- lack of taste, and lack of smell
- in addition to fever, cough, and shortness of breath

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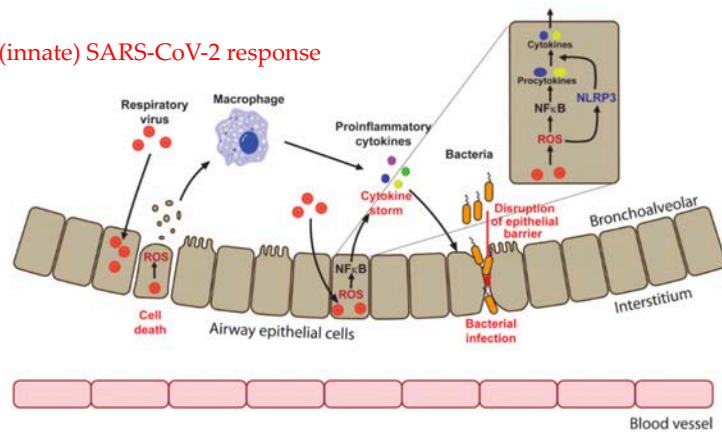
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## Best Treatment is Prevention

- Shelter-in-place order
- **No symptoms- Keep physical distance (6 feet away from each other), or Mask**
- Wash hands, wash hands, wash hands
- Do not touch face
- Stay home if not feeling “well”
- Define new “normal”

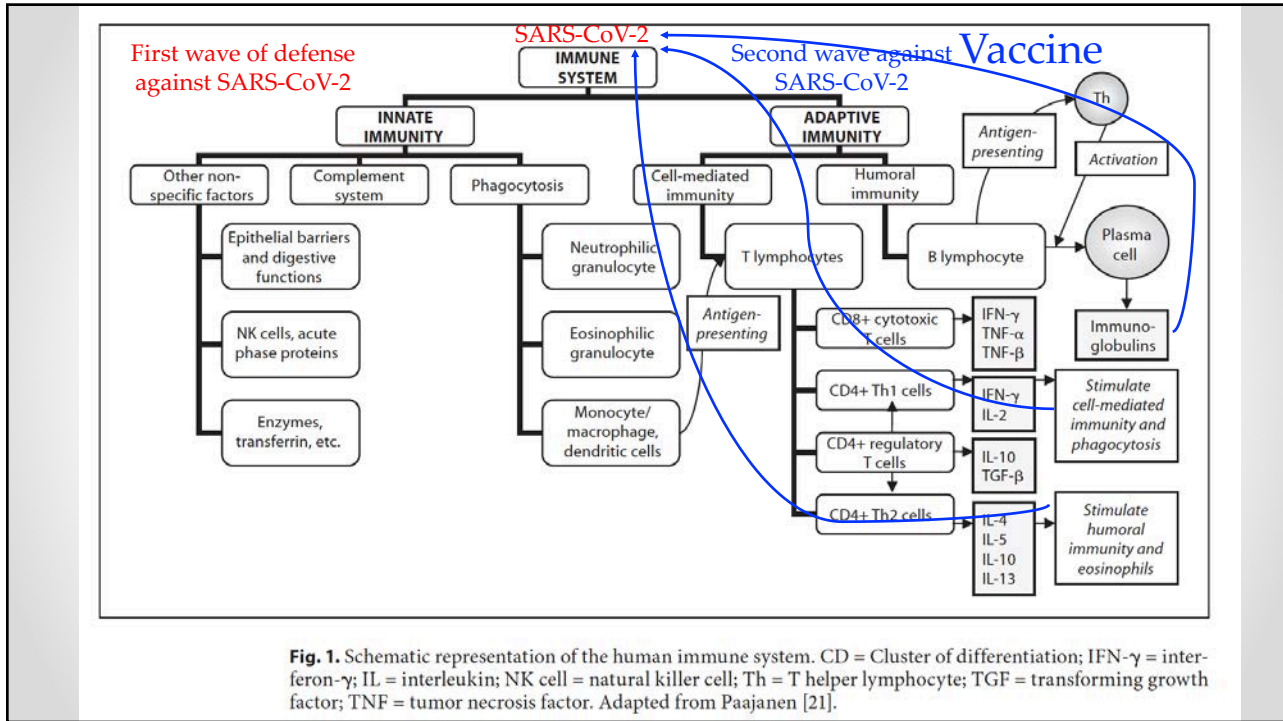
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### Initial (innate) SARS-CoV-2 response



**Figure 2.** Mechanisms of cytokine production (cytokine storm) and epithelial barrier disruption by respiratory viruses. Infection leads to the enhanced ROS production that may trigger cell death and subsequent macrophage activation. This activation is accompanied by cytokine production leading to the inflammation and destruction of epithelial cell contacts. Proinflammatory cytokines could also be produced by infected cells via activation of redox-sensitive nuclear factor kappa B (NFκB) pathway that drives transcription of their genes and via activation of NLRP3 inflammasome in ROS-dependent manner that mediates maturation and secretion of cytokines. Disruption of epithelial barrier results in the increased susceptibility to bacterial infection.

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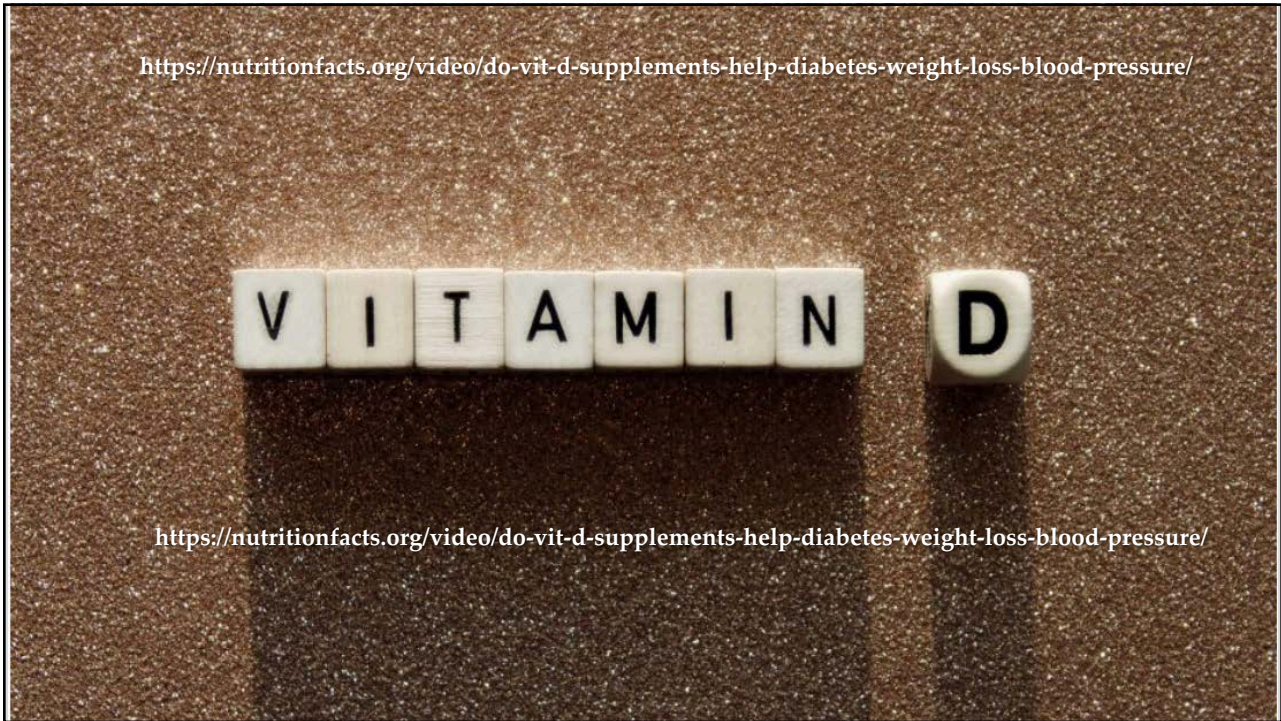


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# How can we help in the meantime?

<https://nutritionfacts.org/video/boosting-immunity-through-diet/>

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**VITAL: The VITamin D and Omega-3 Trial (VITAL): Principal Results for Vitamin D and Omega-3 Fatty Acid Supplementation in the Primary Prevention of Cardiovascular Disease and Cancer**

**Purpose:** To study the primary prevention role daily supplements of vitamin D3 or omega-3 fatty acids in reducing the risk of developing cancer, heart disease, and stroke in people with no history of cancer, heart disease or stroke.

**Trial Design:** 25,871 U.S. adults (men ≥50; women ≥55); median treatment 5.3 years. Double-blinded, placebo-controlled, randomized, 2x2 factorial: (1) vitamin D3 (cholecalciferol; 2000 IU daily) and marine omega-3 fatty acids (Omacor® fish oil, [eicosapentaenoic acid [EPA] and docosahexaenoic acid [DHA]], 1 g daily); (2) vitamin D and omega-3 placebo; (3) vitamin D placebo and omega-3 fatty acids; (4) both placebo.

**Primary Endpoints:** (a) MACE (composite MI, stroke, CVD mortality); (b) total invasive cancer.

**Results:** Major CVD events and total invasive cancer were not significantly reduced by Omega-3 or vitamin D3. Omega-3 significantly reduced total MI, especially in African Americans and those with lower fish intake.

	Vit. D3	placebo	O3FA	placebo
<b>MACE composite</b>	396 events	409 events	386 events	419 events
	HR=0.97		8% reduction (HR=0.92); p=0.24	
<b>Total Invasive Cancer</b>	793 events	824 events	820 events	797 events
	HR=0.96		No reduction (HR=1.03)	
<b>Total MI</b>	169 events	176 events	145 events	200 events
	HR=0.96		28% reduction (HR=0.72, p=0.003)	
<b>MI in African Americans</b>			9 events	39 events
			77% reduction, (HR=.23, interaction p=0.001)	



Presented by: JoAnn E Manson, AHA Scientific Sessions 2018 Chicago, Illinois © 2018, American Heart Association. All rights reserved

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**RESEARCH**

**Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data**

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**ABSTRACT**  
**OBJECTIVES**  
 To assess the overall effect of vitamin D supplementation on risk of acute respiratory tract infection, and to identify factors modifying this effect.  
**DESIGN**  
 Systematic review and meta-analysis of individual participant data (IPD) from randomised controlled trials.  
**DATA SOURCES**  
 Medline, Embase, the Cochrane Central Register of Controlled Trials, Web of Science, ClinicalTrials.gov, and the International Standard Randomised Controlled Trials Number registry from inception to December 2015.  
**ELIGIBILITY CRITERIA FOR STUDY SELECTION**  
 Randomised, double blind, placebo controlled trials of supplementation with vitamin D<sub>3</sub> or vitamin D<sub>2</sub> of any duration were eligible for inclusion if they had been approved by a research ethics committee and if data on incidence of acute respiratory tract infection were collected prospectively and prespecified as an efficacy outcome.  
**RESULTS**  
 25 eligible randomised controlled trials (total 11321 participants, aged 0 to 95 years) were identified. IPD were obtained for 10933 (96.6%) participants. Vitamin D supplementation reduced the risk of acute respiratory tract infection among all participants (adjusted odds ratio 0.88, 95% confidence interval 0.81 to 0.96; P for heterogeneity <0.001). In subgroup analysis, protective effects were seen in those receiving daily or weekly vitamin D without additional bolus doses (adjusted odds ratio 0.81, 0.72 to 0.91) but not in those receiving one or more bolus doses (adjusted odds ratio 0.97, 0.86 to 1.10; P for interaction=0.05). Among those receiving daily or weekly vitamin D, protective effects were stronger in those with baseline 25-hydroxyvitamin D levels <25 nmol/L (adjusted odds ratio 0.30, 0.17 to 0.53) than in those with baseline 25-hydroxyvitamin D levels ≥25 nmol/L (adjusted odds ratio 0.75, 0.60 to 0.95; P for interaction=0.006). Vitamin D did not influence the proportion of participants experiencing at least one serious adverse event (adjusted odds ratio 0.98, 0.80 to 1.20, P=0.83). The body of evidence contributing to these analyses was assessed as being of high quality.  
**CONCLUSIONS**  
 Vitamin D supplementation was safe and it protected against acute respiratory tract infection overall. Patients who were very vitamin D deficient and those not receiving bolus doses experienced the most benefit.  
**SYSTEMATIC REVIEW REGISTRATION**  
 PROSPERO CRD42014013953.

BMJ: first published as 10.1136/bmj.2017.075583 on 15 February 2017. Downloaded from <http://www.bmj.com/> on 3 April 2020 at

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 Accepted: 01 December 2016

Fortified soy milk...  
 Mushrooms. ...  
 Fortified cereals. ...  
 Fortified orange juice. ...  
 Fortified almond milk. ...  
 Fortified rice milk. ...  
**Sunshine!**

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## The Possible Role of Vitamin D in Suppressing Cytokine Storm and Associated Mortality in COVID-19 Patients

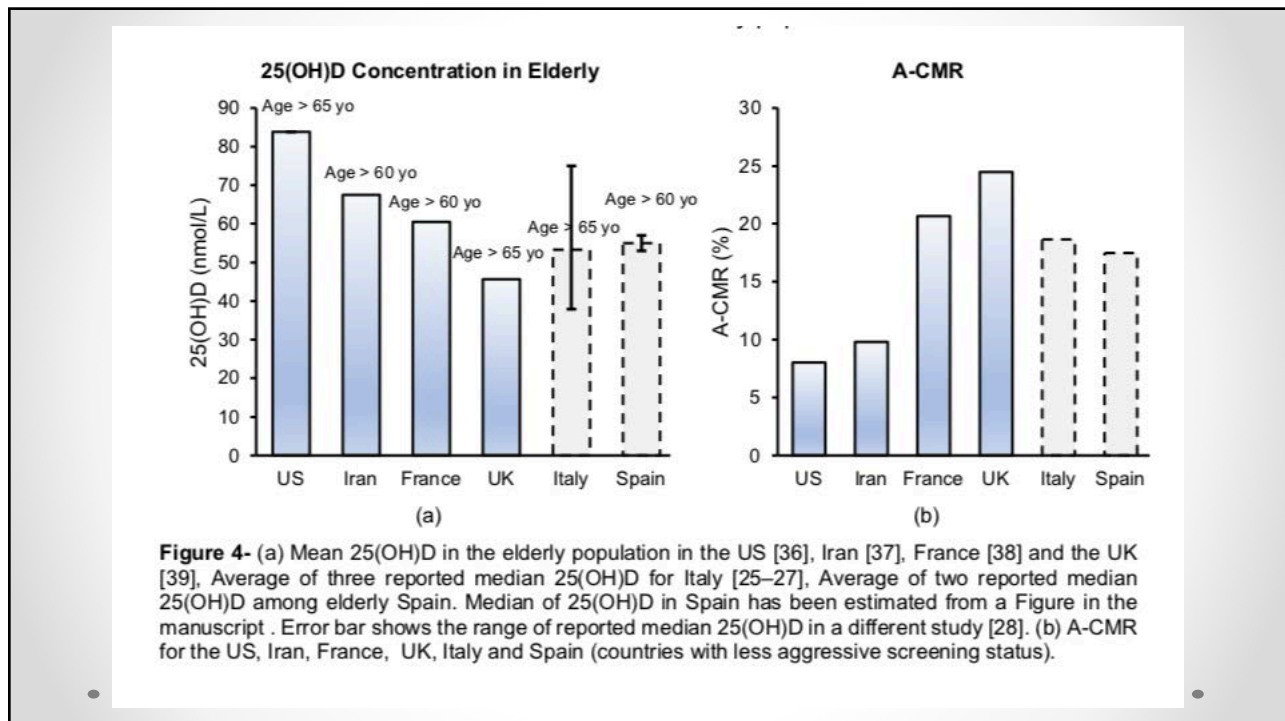
**Ali Daneshkhah<sup>1</sup>, Vasundhara Agrawal<sup>1</sup>, Adam Eshein<sup>1</sup>, Hariharan Subramanian<sup>1</sup>, Hemant K. Roy<sup>2</sup>, and Vadim Backman<sup>1</sup>**

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**Abstract**  
**Background**  
 Large-scale data show that the mortality of COVID-19 varies dramatically across populations, although the cause of these disparities is not well understood. In this study we investigated whether severe COVID-19 is linked to Vitamin D (Vit D) deficiency.

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## In summary

- We are in a better place we had potentially anticipated
- The challenge remain; how to stay healthy in this new environment?
- Physical distancing, masking, hygiene, and sheltering in place are working
- Eating healthy, sunlight, and exercise are powerful lifestyles to help us stay healthy
- We will be following the Vitamin D story- no new recommendations as of today

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