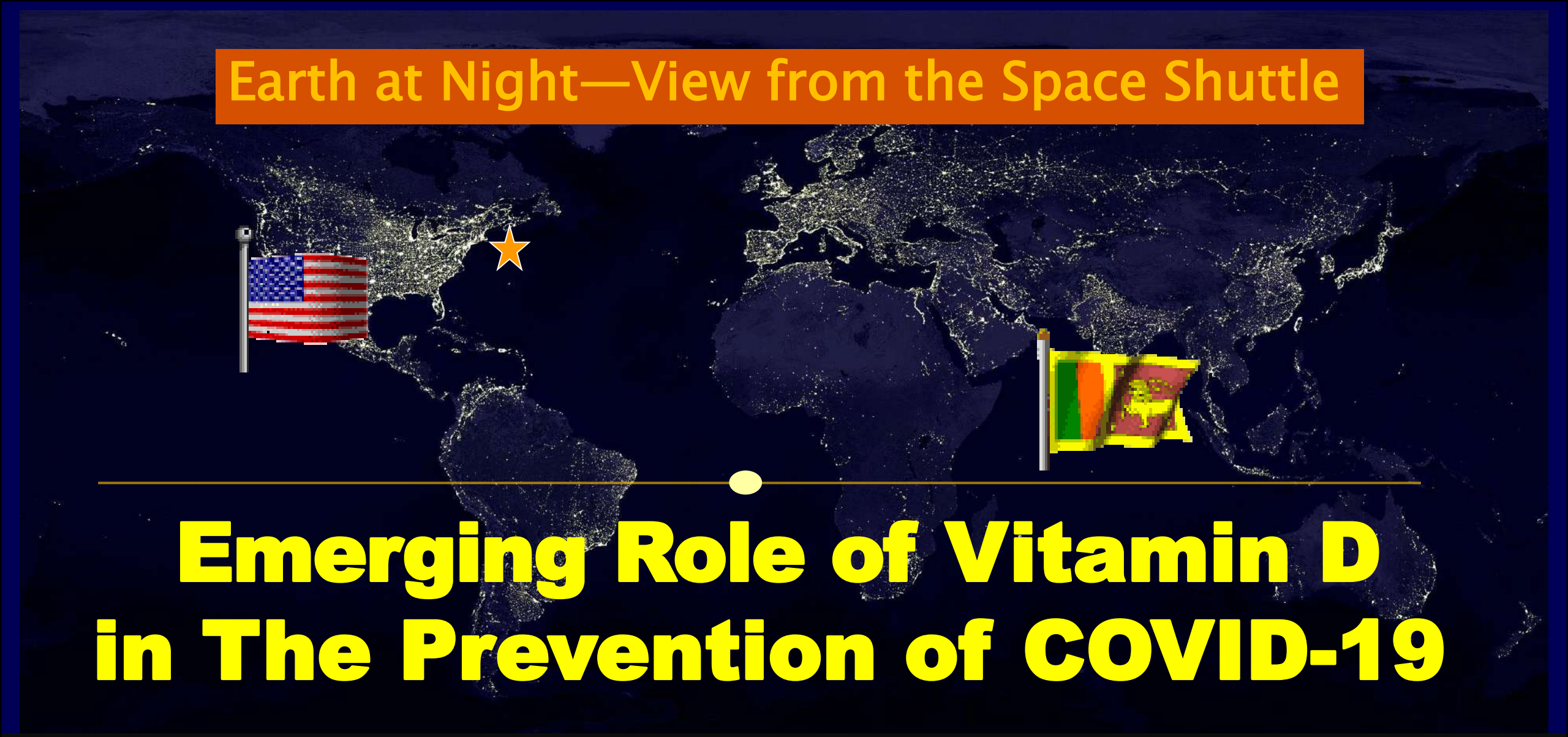
Earth at Night—View from the Space Shuttle



Emerging Role of Vitamin D in The Prevention of COVID-19

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Vitamin D:
Skeletal and Non-Skeletal Effects

by

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Vitamin D (Calcitriol): An Essential Hormone

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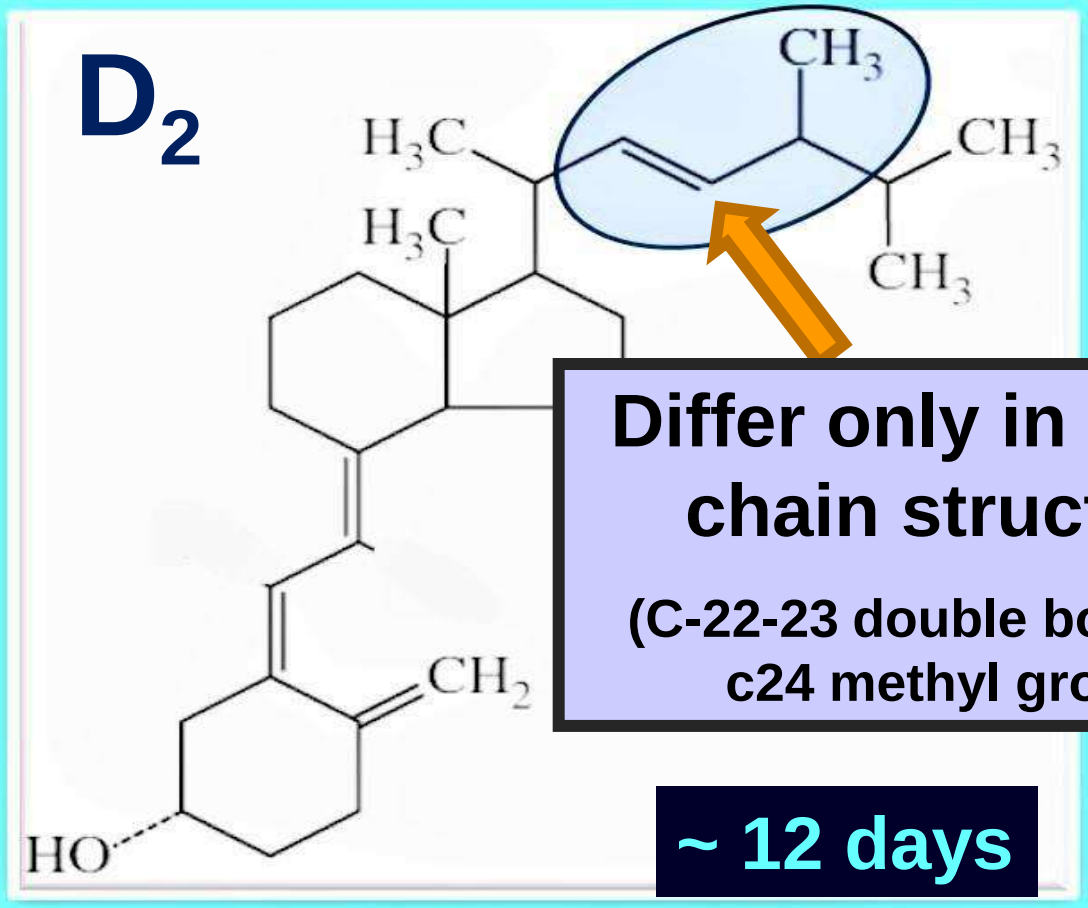
Vitamin D_2 vs. D_3

Plant Sources

Animal Sources

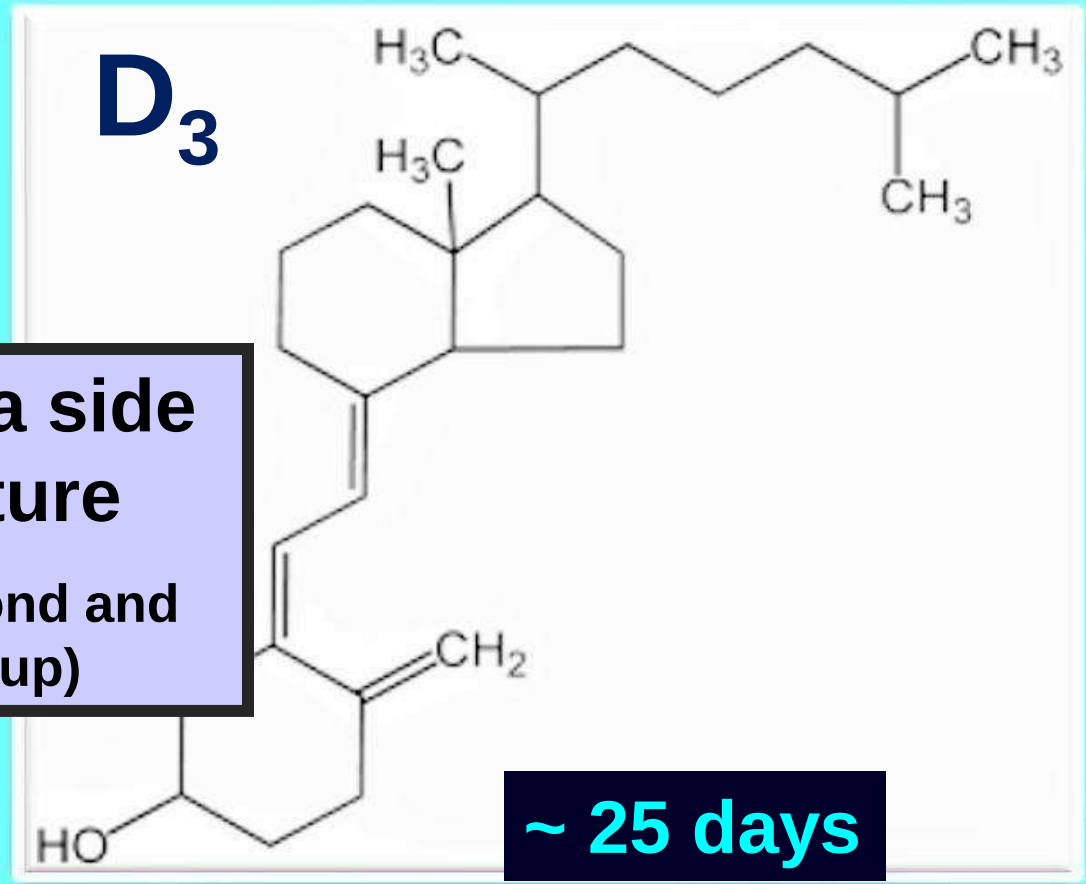


Differ only in a side chain structure

(C-22-23 double bond and c24 methyl group)

~ 12 days

A. Ergocalciferol
Vitamin D_2



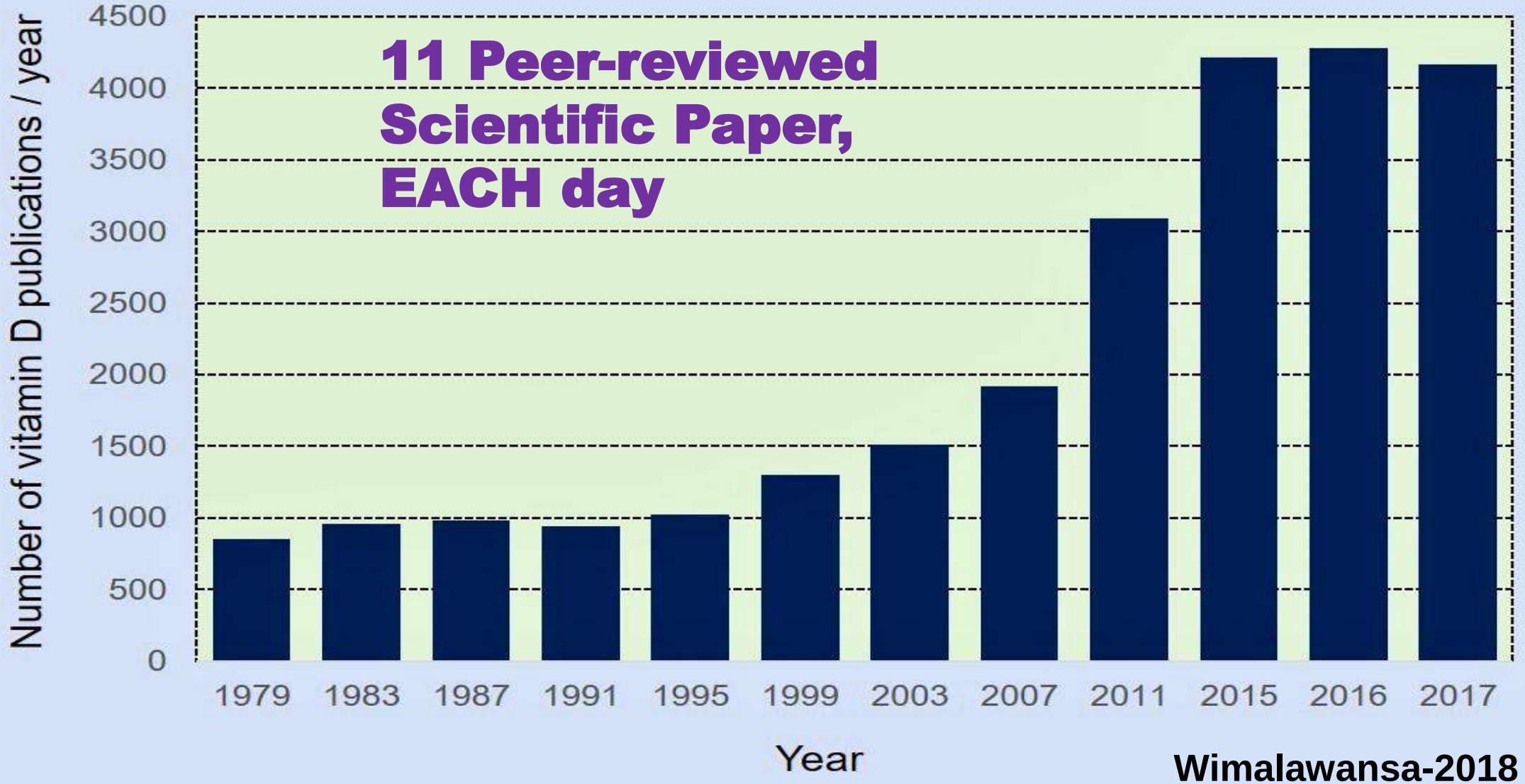
~ 25 days

B. Cholecalciferol
Vitamin D_3

Vitamin D Facts and Figures

- Vitamin D is essential for survival
- Major portion of our vitamin D requirement is made in the skin
- Most common cause of vitamin D deficiency is lack of sun exposure
- Assessing the vitamin D status: measurement of serum 25(OH)D levels is the only way.

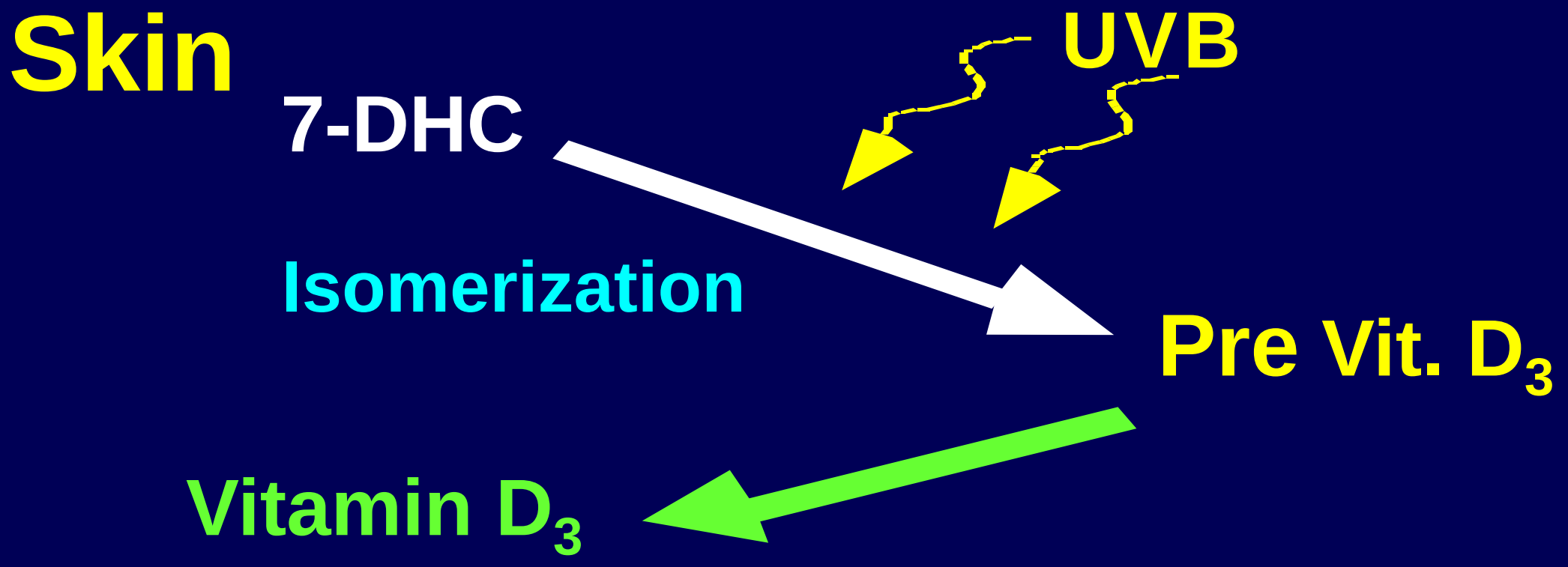
Vitamin D, Scientific Publications /Year



BIOCHEMISTRY, PHYSIOLOGY AND PHARMACOLOGY OF VITAMIN D

Historically, Humans Obtained Vitamin D From the Sun

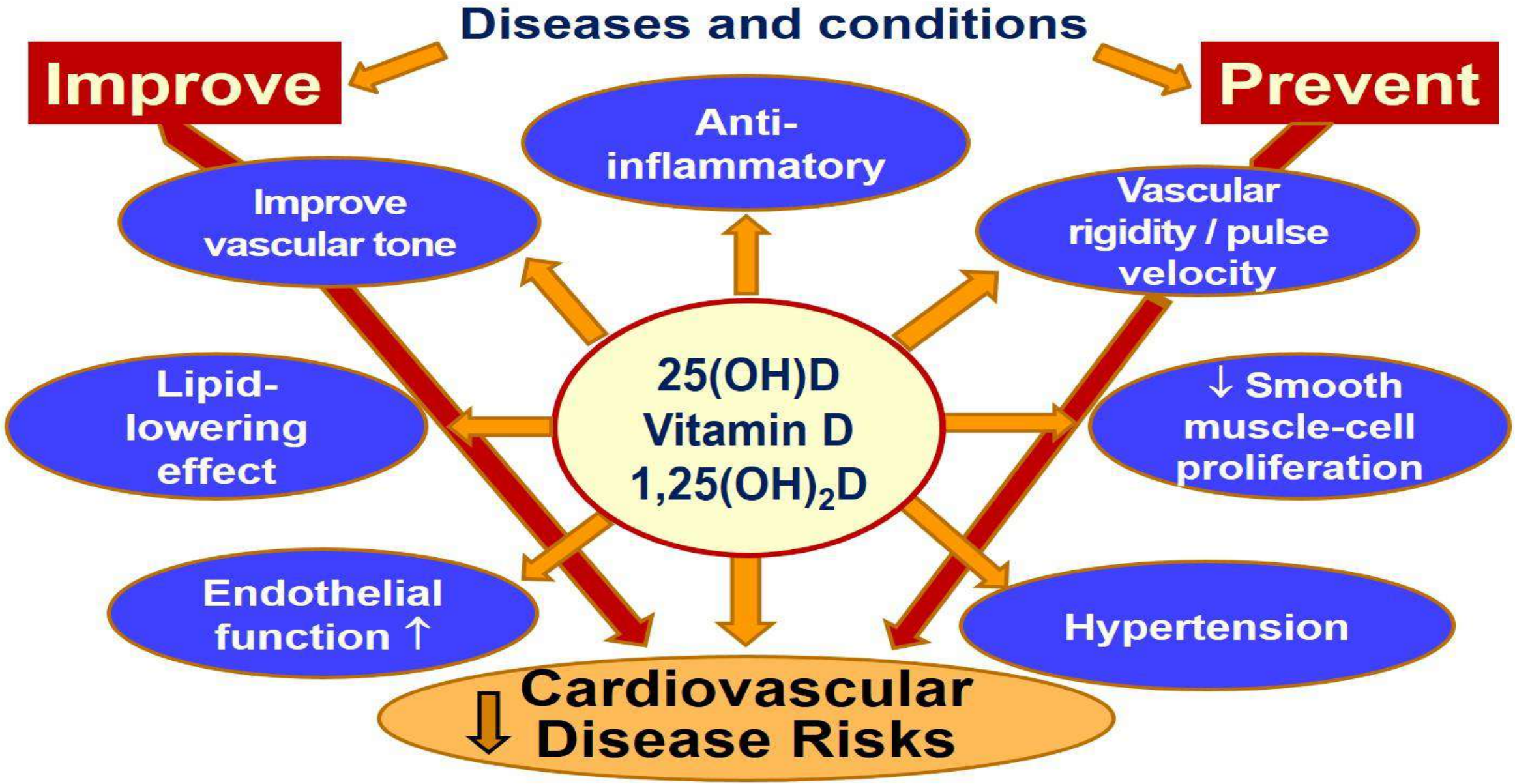
UVB (~280–315 nm) Produces Vitamin D



Wimalawansa, SBMB, -2006

Vitamin D Deficiency

- Most common nutritional disorder in the world
- It is easy to correct vitamin D deficiency
- Deficiency:
  - in children leads to rickets
  - in adults leads to osteomalacia
- Is associated with increased falls, osteoporosis and fractures
- Also associated with many other diseases



Beneficial Effects of Vitamin D in Cardiovascular Diseases

Cost-Benefits of Vitamin D Therapy

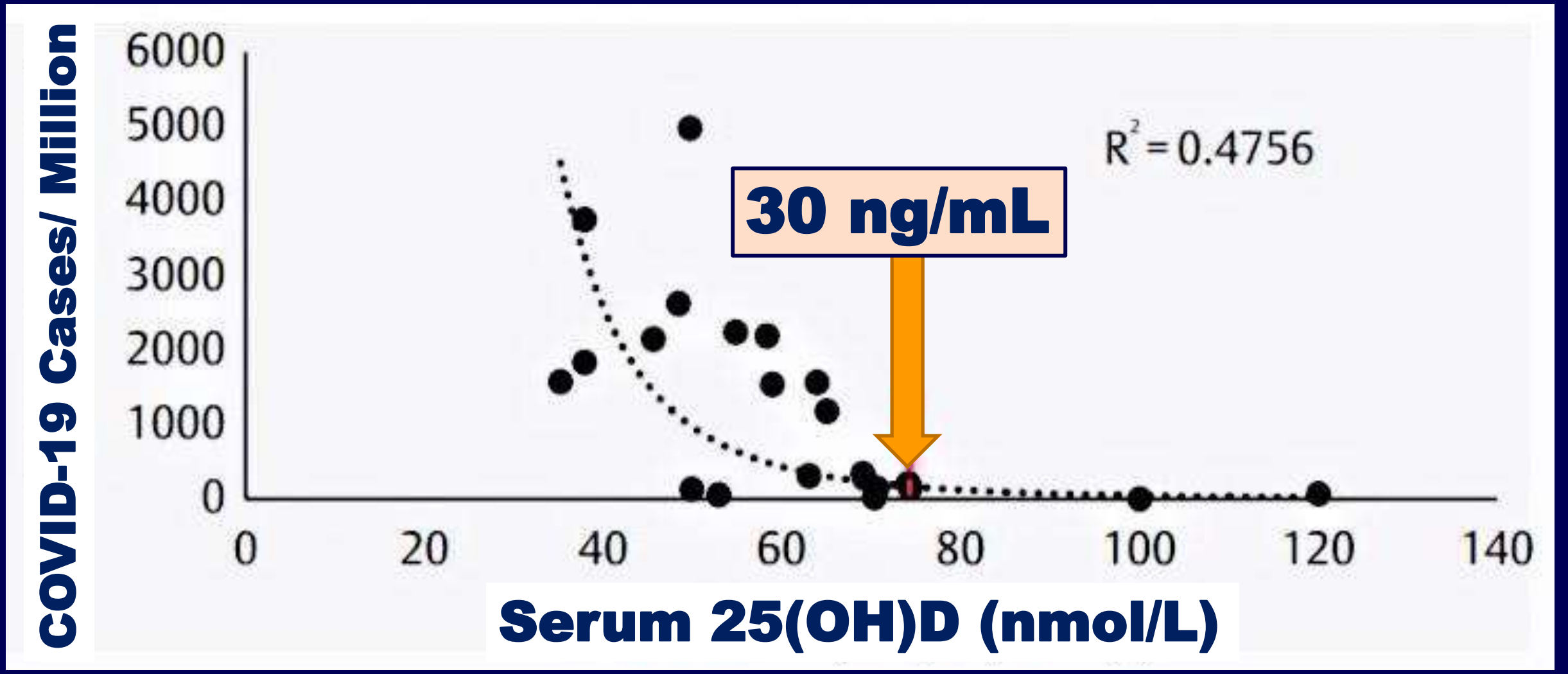
- ✓ **Cost of correction of vitamin D deficiency is less than 0.001% of the cost of dealing with complications associated with D deficiency**
- ✓ **Yet vast majority of the populations are kept D deficient**

Wimalawansa, SJ, SBMB, 2019

Achieving AND maintaining optimal serum 25(OH)D concentration of more than 30 ng/mL (range, 30 to 60 ng/mL) will prevent many diseases

The goal for those with comorbid conditions and during the COVID-19 wea, to maintain serum 25(OH)D between 40 and 60 ng/mL.

Near Zero COVID-Related Deaths in Those With Serum 25(OH)D Concentration >30 ng/mL



Proper use of effective face masks such as N95 is the single most effective mean of reducing the viral entry (aerosolized particles and microdroplets).

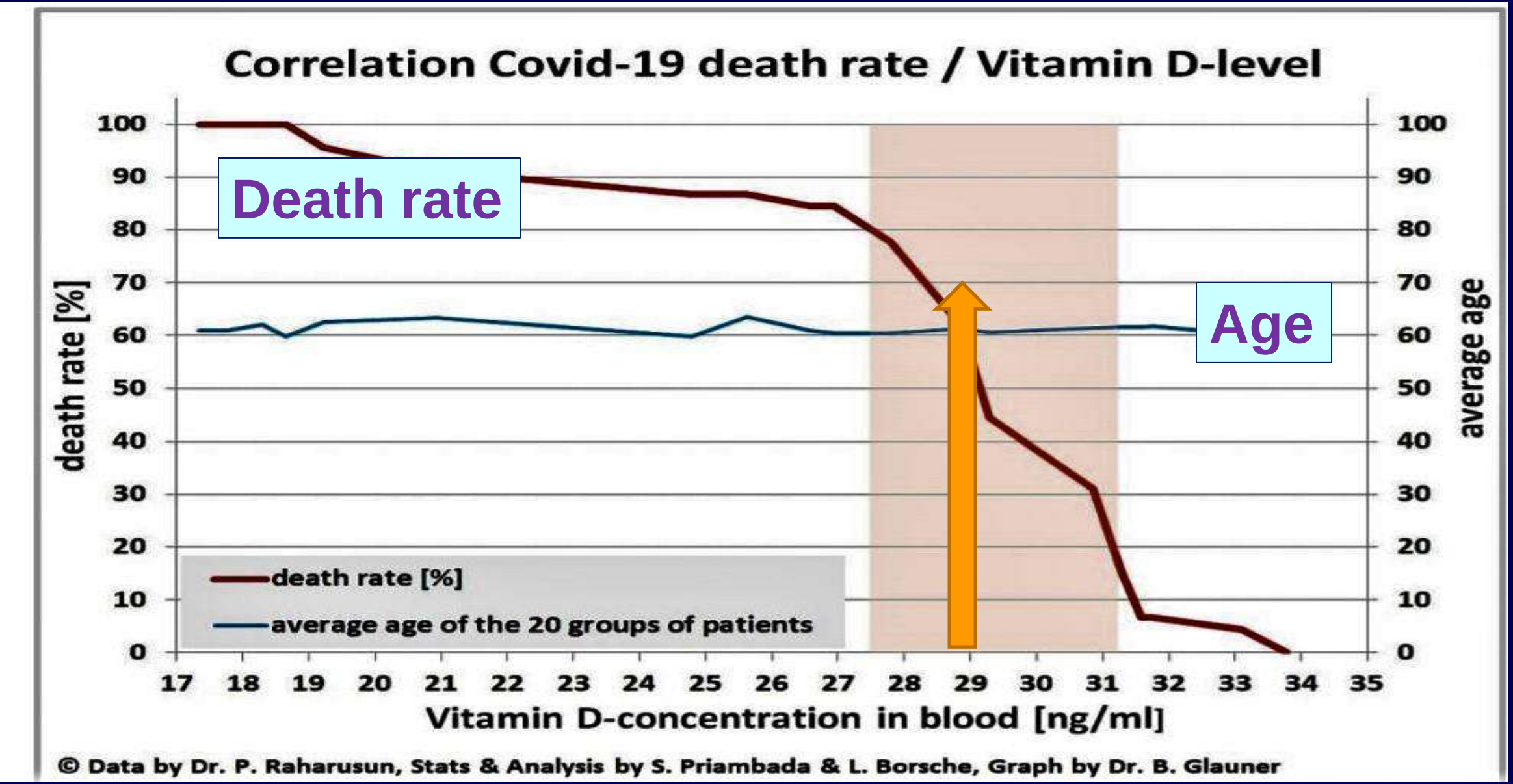
Frequent hand washing with soap and water reduces the entry of COVID-19 through mucous membrane via contaminated fingers.

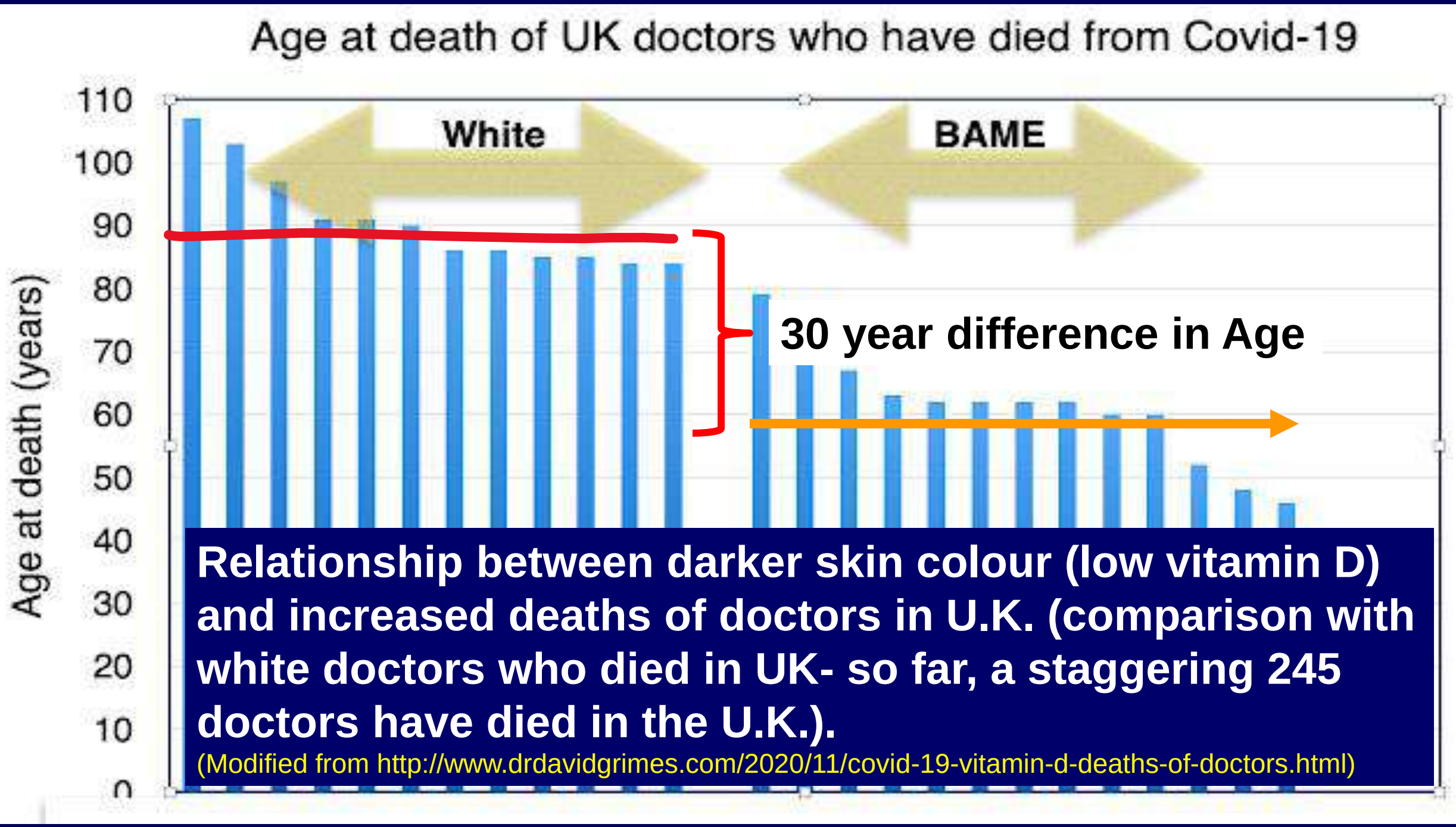
Wimalawnasa, SJ, J Biomed Res Environ Sci.
DOI: 10.37871/jbres1174, Article ID: JBRES1174

Avoid or minimize participating in crowd gatherings, enclosed rooms, travel, and prolonged exposure, minimize strangers, will reduce viral loads.

Relationship Between Serum 25(OH)D Concentration and Death Rate From COVID

COVID Death Rates & Serum 25(OH)D

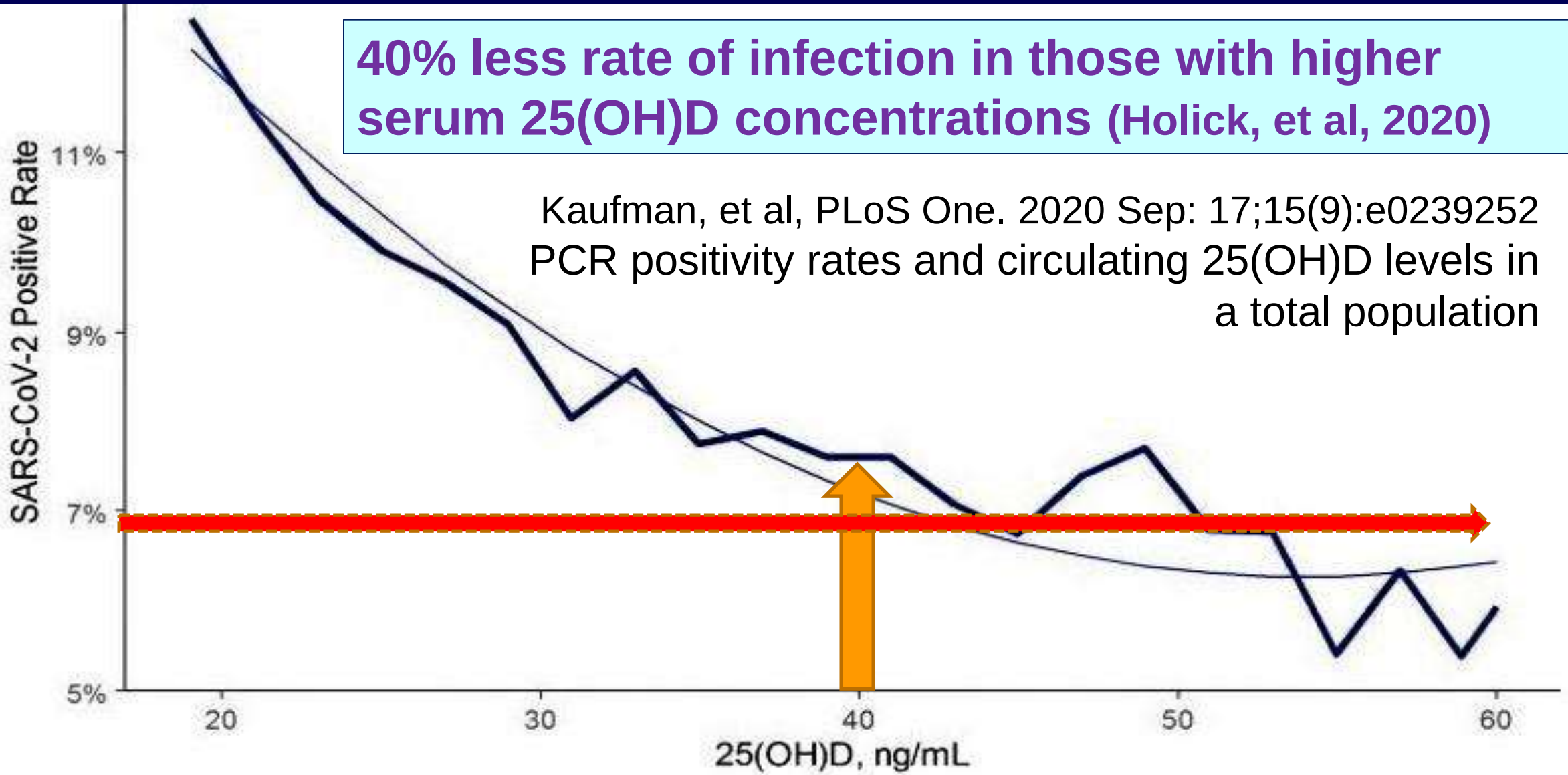



Age at death of UK doctors who have died from Covid-19
Age at death (years)
110
100
90
80
70
60
50
40
30
20
10
0
White
BAME
30 year difference in Age
Relationship between darker skin colour (low vitamin D) and increased deaths of doctors in U.K. (comparison with white doctors who died in UK- so far, a staggering 245 doctors have died in the U.K.).
(Modified from http://www.drdavidgrimes.com/2020/11/covid-19-vitamin-d-deaths-of-doctors.html)

Rate of COVID-19 Test Passivity (n=192,000)

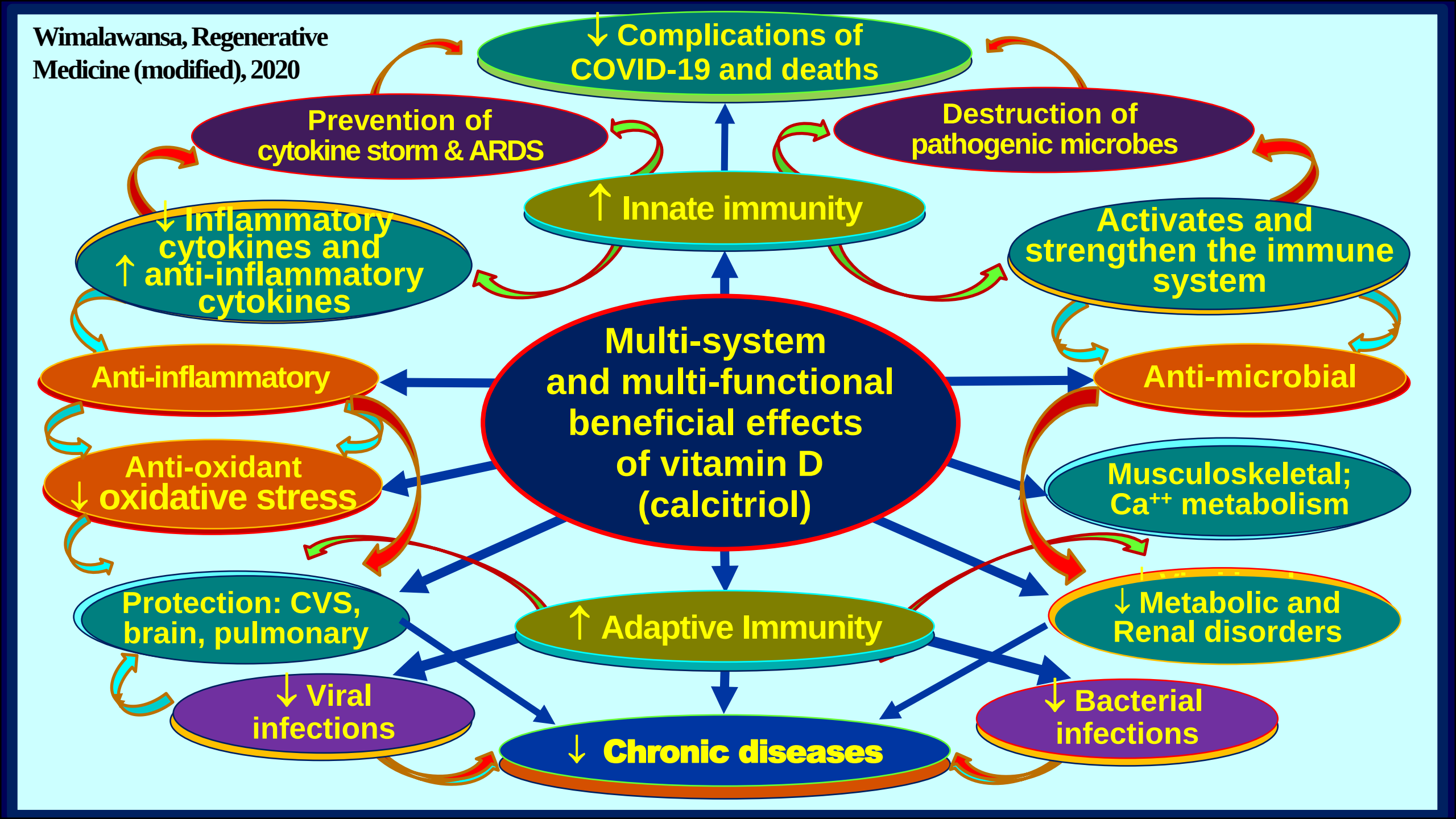
40% less rate of infection in those with higher serum 25(OH)D concentrations (Holick, et al, 2020)

Kaufman, et al, PLoS One. 2020 Sep: 17;15(9):e0239252
PCR positivity rates and circulating 25(OH)D levels in a total population



Other Benefits of Vitamin D in Controlling COVID-19

- **Stimulating immune cells [Innate & Adaptive]**
- **Potent, anti-inflammatory and anti-oxidant effects**
- **Anti-microbial properties [both viruses & bacteria]**
- **Prevention of complications (e.g., cytokine storm)**
- **Formation of neutralizing antibodies**
- **Increase synthesis of soluble ACE-2**
- **Protection of all body systems**


Wimalawansa, Regenerative Medicine (modified), 2020
↓ Complications of COVID-19 and deaths
Prevention of cytokine storm & ARDS
Destruction of pathogenic microbes
↑ Innate immunity
↓ Inflammatory cytokines and ↑ anti-inflammatory cytokines
Activates and strengthen the immune system
Multi-system and multi-functional beneficial effects of vitamin D (calcitriol)
Anti-inflammatory
Anti-microbial
Anti-oxidant ↓ oxidative stress
Musculoskeletal; Ca++ metabolism
Protection: CVS, brain, pulmonary
↑ Adaptive Immunity
↓ Metabolic and Renal disorders
↓ Viral infections
↓ Bacterial infections
↓ Chronic diseases

Summary: Reasons For Very Low Prevalence and Death Rates in Tropical Countries

- The low prevalence of COVID-19 and low death rates reported in tropical countries are simply due to logistical and natural reasons.
- Low number of “PCR testing” AND reasonable “population vitamin D levels.”
- Nothing to do with curfews or lockdowns, or any form of healthcare intervention.

The Right Way To Present Basic Statistics

- **PCR POSITIVITY Rate:**

  The number of PCR positive cases / total number of PCR tests carried out (in a given period) x 100

- **COVID-19 DEATH Rate:**

  COVID-19 related deaths / total number of COVID infected people in the country x 100

Mistakenly Enforced Curfew in October 2020

- **The curfew was based on the increasing number of positive PCR tests, rather than the "rate" of spread—the true incidence of COVID-19 in the country.**

- **Rate change was from 2% to 3%, which is fully accountable by the increased numbers of PCR testing in "high-risk" populations. There was no exponential dissemination as claimed.**

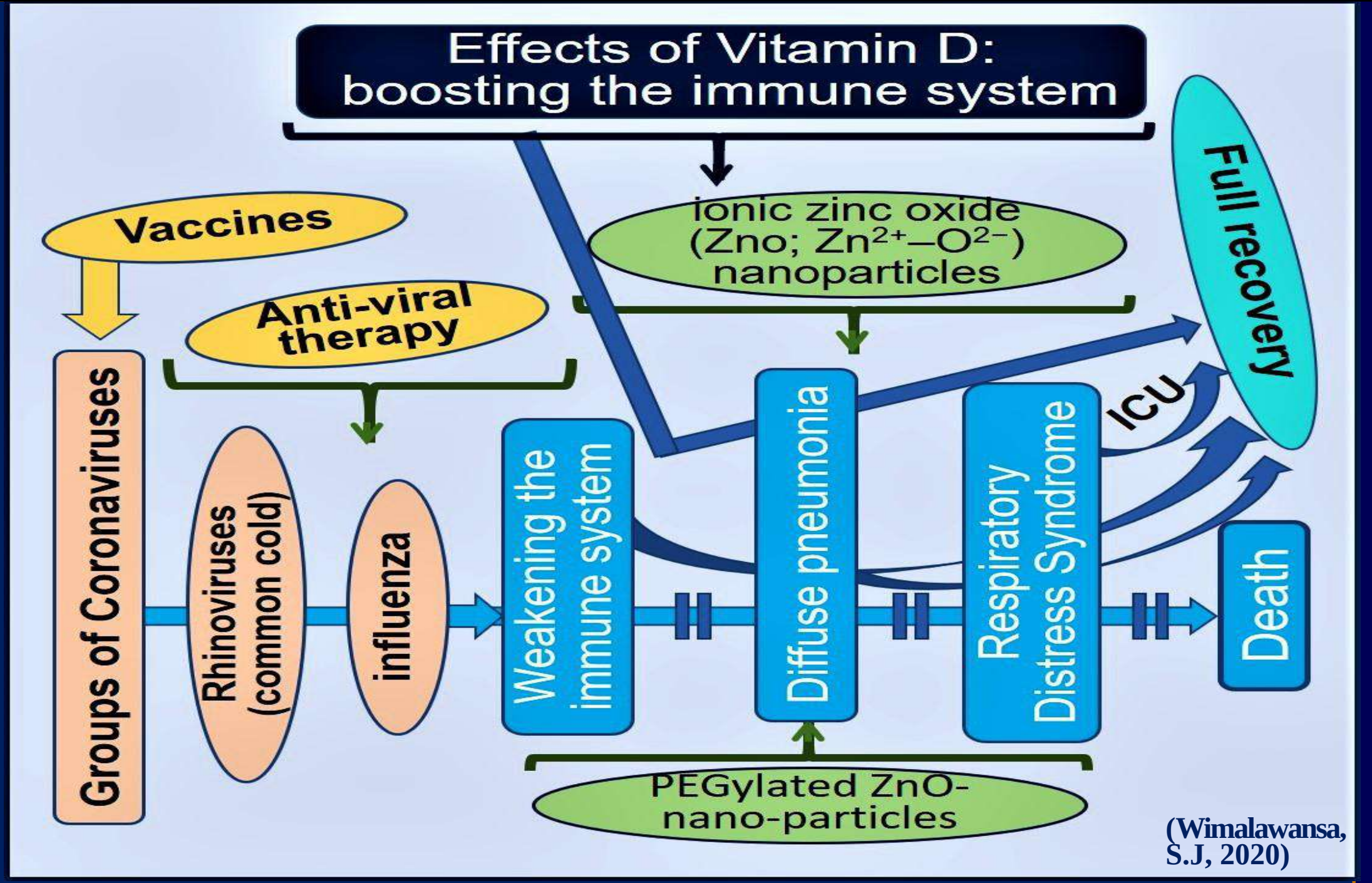
Errors of Judgements — Statistical Error

- Whether it is incidence, prevalence, severity (i.e., ICU bed occupancy) or deaths, the numbers must be presented as a "Rate" OR "Percentage" OR PCR positive persons per million population
- Raw data must be standardized (RATE) as above: Present as incidence, complications, or death rates
- e.g., COVID-19 related deaths divided by total number of COVID infected people in the country

Medications and Management of COVID

- Except for hydroxychloroquine, there are no cost-effective pharmacological agents or vaccine to prevent or treat COVID-19. Contrary to propaganda to sell their products, these will be less effective.
- This is true irrespective of the medical system: Western, Eastern, Unani, or in Ayurvedic.
- The use of high-doses of vitamin D is likely to be more effective than potential COVID-19 vaccine.

Postulated Defenses Against COVID-19

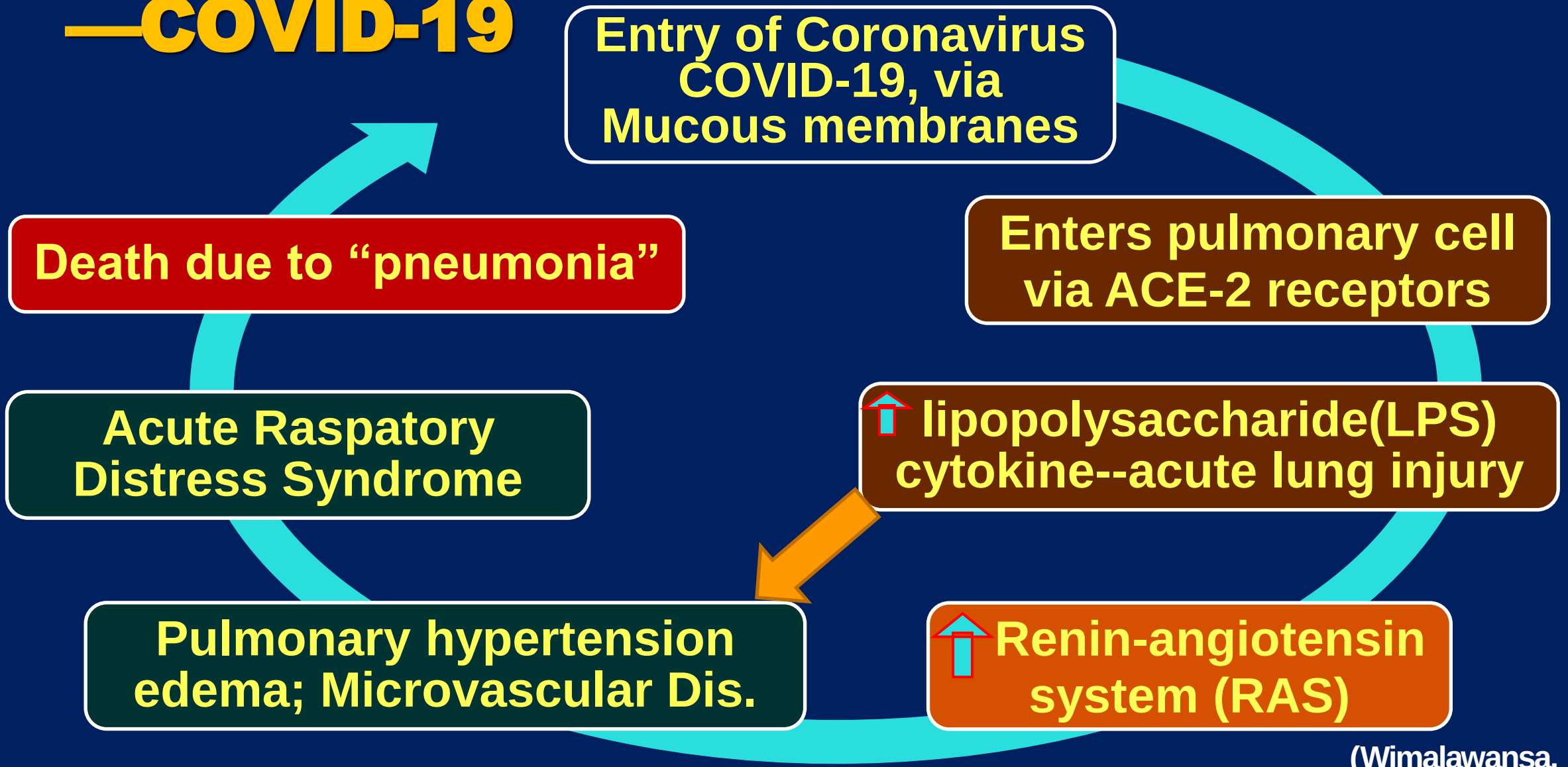


(Wimalawansa, S.J, 2020)

Problems Associated With COVID Vaccines

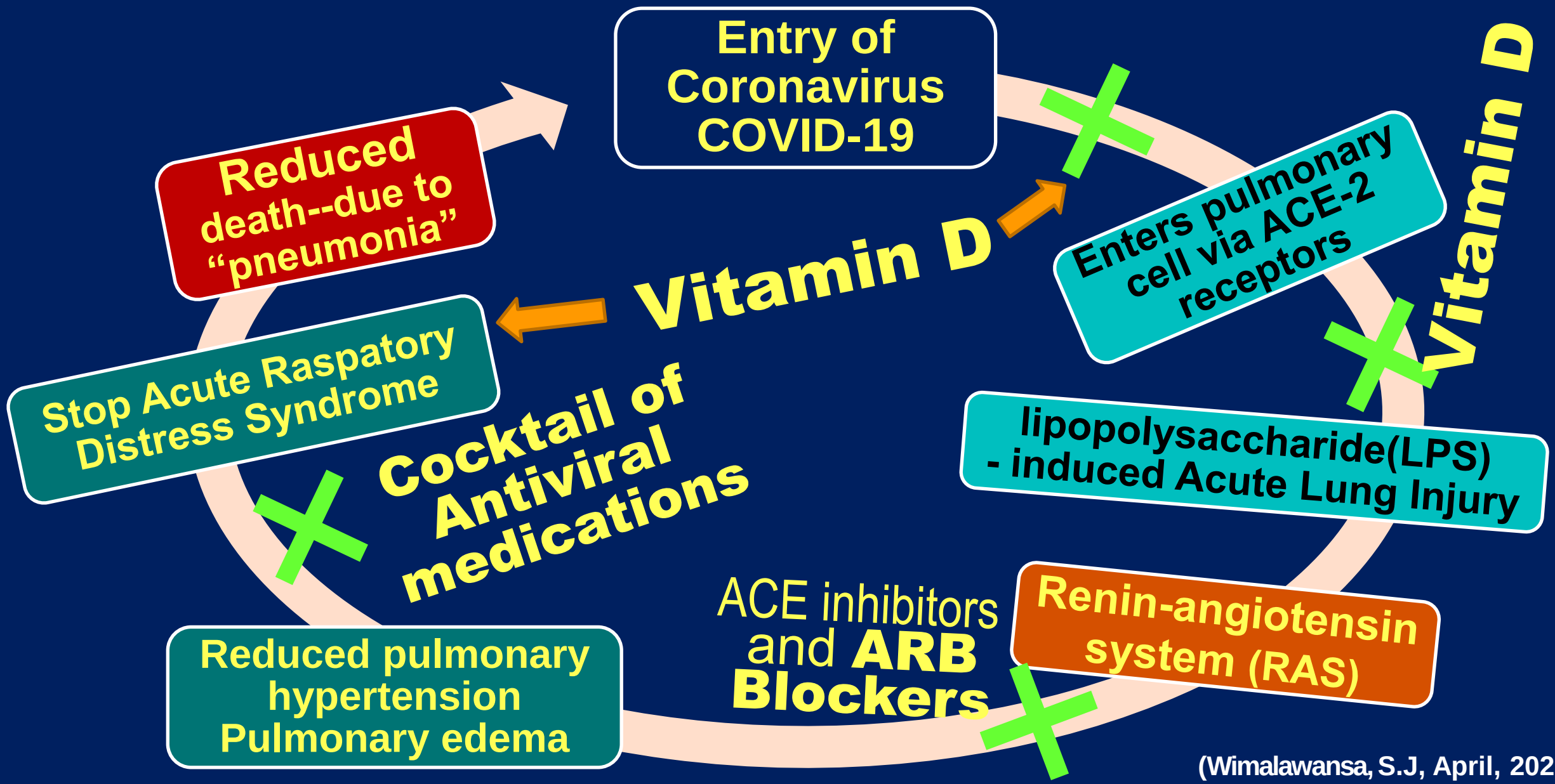
- ✓ Expensive — unaffordable for the majority of world's population
- ✓ Safety issues—likely have serious adverse effects
- ✓ Needs at least two doses, with weeks apart
- ✓ Effectiveness (adaptive immunity) may not last beyond few months. If so, need repeated doses
- ✓ Transportation & storage difficulties (need freezing)

Cause of Death From Coronavirus —COVID-19



(Wimalawansa, S.J, April, 2020)

Summary:—Role of Vitamin D in COVID-19



(Wimalawansa, S.J, April, 2020)

Summary (COVID-19—Vitamin D)

- **Those with serum 25(OH)D concentrations above 40 ng/mL, rarely contract COVID-19: If get infected unlikely to develop complications.**
- **Most industries will continue to get affected including, airlines, oil corporations, automobiles companies, banking, tourism and hotels, and supply chains, thus most production.**

In addition to Public Health Guidelines, Recommendations For High-Risk Groups

- **Frontline workers (healthcare, contact tracers, law-enforcement, etc.) ANYONE dealing with COVID-19 patients:**
- **Public who are at greatest risk of COVID-19 (elderly, Diabetes, obese, chronic diseases, lung diseases, high social contact);**
- **For those with recently identified as PCR positive, or COVID-19 sero-positive.**

Summary

- Taking 4,000 IU/day will maintain a healthy levels of serum 25(OH)D to maintain the immune system
- In emergencies, it is necessary to administer loading doses of between, 100,000 and 600,000 IU, to rapidly boost the immune system.
- This to be followed by daily maintenance doses of 2,000 to 5,000 IU of oral vitamin D.
- These strategies will save lives and the economy

Vitamin D deficiency – induced disorders are common but preventable

- ✓ **Adequate vitamin D levels prevent COVID-19, related complications, and deaths**

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Some of our recent philanthropic contributions:
https://wimalawansa.org/community_projects

Our recent charitable work:
https://www.facebook.com/pg/WimalawansaFoundation.PreventingCKDmfo/posts/

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