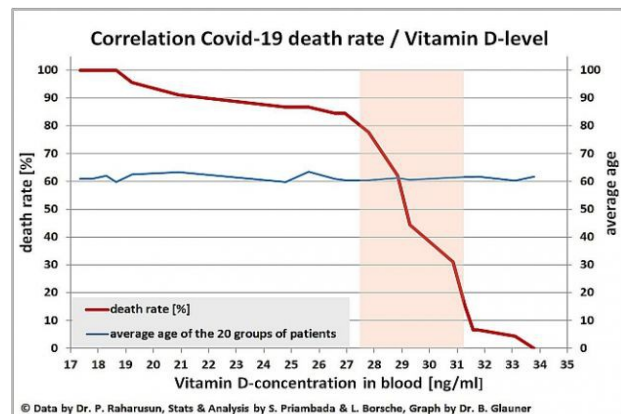


Covid-19: More deaths? More lockdown? More suffering?

Vitamin D deficiency causes a 10 times higher death rate in Covid-19 patients according to recent studies. What we can do to get the Covid-19 pandemic under control and avoid another lockdown.

Table 3. Association between Vitamin D status and mortality
(adjusted for age, sex, and comorbidity)

| Variable | OR | p-value |
|-------------------------|-------|---------|
| Vitamin D Status | | |
| Normal | - | |
| Insufficient | 7.63 | <0.001 |
| Deficient | 10.12 | <0.001 |



Results of the age-corrected clinical study by the working group of Dr. [Prabowo Raharusun](#)

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Introduction

The authors see sufficient scientific plausibility that with a good vitamin D level many corona deaths could still be alive today.

The studies listed wrt the course of the disease and the death rate in Covid-19 infections dependant on vitamin D level are evident, among others a study with 780 participants. That may be a factor of 12 smaller than a placebo-controlled double-blind study with 10,000 participants. The study is still significant because it shows that infections in groups with deficient vitamin D levels are 10 times more likely to end in death.

With a vitamin D supplementation to levels known from nature (East Africa: Massai/Hadza, Central Africa: wild chimpanzees) of 45 ng/ml, there is a good chance that Covid-19 would not have any worse effects than a severe wave of influenza. A lockdown would then be just as unnecessary as the justified fear of our elderly fellow citizens and the risk groups, which imposes an abnormal life on all of us.

Quite independently of corona, it has been known and published for many years that vitamin D deficiency promotes the development of pneumonia - technically correct from ARDS (Acute Respiratory Distress Symptom) - as a result of viral infections. In addition, vitamin D stimulates the body's own synthesis of antiviral substances which specifically block the spike protein necessary for the docking mechanism of covid-19 to the receptor protein ACE2. All this is well-researched, published information that clearly shows us that vitamin D deficiency patients are at high risk of getting pneumonia.

In today's society, a large part of the population suffers from a massive vitamin D deficiency - especially in winter (see chapter: What else you should know [WHO vs. D-A-CH limits]).

Statistics often assume that blood values of 20ng/ml are sufficient for vitamin D function. But these limits date back to the time when vitamin D was only studied for its effect on bone metabolism. The fact is - and studies in many European countries show this - that depending on the country, 20-40% of people do not even reach this value (20 ng/ml) even in summer. One reason for this is the recommendations for vitamin D substitution. It has been published for years that the official recommendations of 400-800 units of vitamin D per day are based on a calculation error by a factor of 10. Unfortunately, this has still not been included in the official recommendations, as they should be in the range of 5,000 international units per day. Necessary for a stable immune system are blood values of 40-50ng/ml. But only a few people to reach this level.

The data presented in this article show that up to 90% of deaths could be avoided. This means that the current situation could also be symbolically described as a "vitamin D deficiency pandemic". Unfortunately, in Germany neither the family doctor nor hospitalised patients routinely measure the blood level of vitamin D, even though all relevant organisations, such as the DGE, BfR, RKI and WHO, repeatedly report that our population suffers from a vitamin D deficiency that also causes other health problems.

The present study from Indonesia shows exactly the result that must be expected based on the scientific background described above. At vitamin D concentrations below 20 ng/ml, a very large number of patients succumb to the pneumonia triggered by Covid-19, whereas at vitamin D concentrations >30 ng/ml, the majority of patients survive and this with a statistically very good correlation.

Large medical studies are very expensive. Someone has to raise the necessary funds in the hope that if the results are positive that there will be a revenue. Given the low market price of vitamin D, this simple economic constraint explains why there are relatively few studies on vitamin D. Lorenz Borsche has been trying for a few weeks now to find partners in the medical field in Germany who, with his financial support, carry out purely observational ex-post studies (vitamin D testing of infected persons / course of disease), unfortunately without any success so far. The three studies presented here were initiated by ordinary doctors (MD/GP) and financed from their own resources and with considerable personal commitment^(*). One must therefore not apply the same standard as in large-scale double-blind studies. Nevertheless, the results are so overwhelmingly clear that they should be examined.

The rapid increase of vitamin D levels in covid-19 infected patients with vitamin D deficiency (< 30ng/ml), as well as vitamin D supplementation in doctors, nursing staff and risk patients to a healthy blood level of 40-50ng/ml, is - in the authors' view - the only conceivable solution to effectively contain the corona pandemic. One then could most likely allow the SARS-CoV-2 virus to spread and people could survive the infection like a wave of influenza. Apart from the social and economic benefits, this would also be much more economic than any other measure and might cost a fraction of what the lockdown has cost and will cost us - in money and in human lives.

*) MD/GP Dr. Prawodo Raharusun, lead author of the largest study with 780 participants, tragically died on 13.5.2020, only 57 years old. Not because of Corona, but rather because of his grueling commitment against Corona. A short "in memoriam" and an appreciation of his work, as well as an impression of the situation of the researchers of all three studies can be found [here as a PDF](#).

The latest studies on Covid-19 and vitamin D

On 2 May the authors received a [publication from Indonesia](#). Prabowo Raharusuna and his team had examined 780 covid-19 patients for their vitamin D levels. This study is neutral and independent, it was neither sponsored nor are there any other conflicts of interest.

The result: depressingly clear!

After correction for age, sex and previous illnesses, the risk of death is 10 times higher for people with vitamin D deficiency. For insufficient vitamin D status still 7 times higher than for sufficient, good vitamin D level.

Table 3. Association between Vitamin D status and mortality (adjusted for age, sex, and comorbidity)

| Variable | OR | p-value |
|-------------------------|-------|---------|
| Vitamin D Status | | |
| Normal | - | |
| Insufficient | 7.63 | <0.001 |
| Deficient | 10.12 | <0.001 |

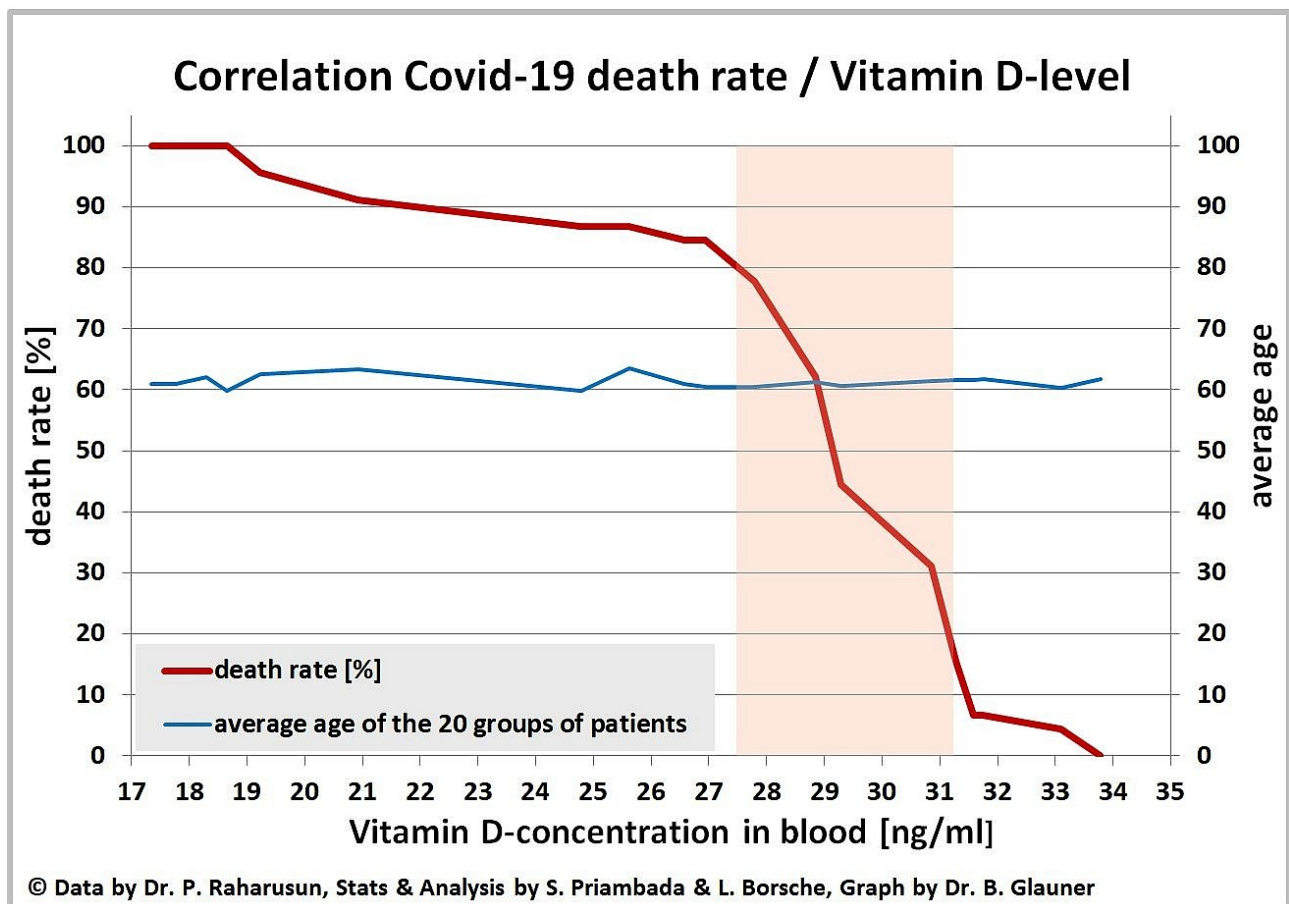
In order to make the evaluation transparent and easy to interpret even for non-scientists, Sadiyah Priambada, a statistician in the team, prepared the data in such a way that the three comparison groups with vitamin D levels of <20, 20-30 and >30 ng/ml can be assessed on the basis of an equal age average and an equal number of cases. This more easily readable evaluation leads to practically the same results as the original data, which proves not only the stability of the data, but also the correctness of the previously chosen statistical approach to the calculation of the influencing factors age, sex and previous fluctuations.

| | Vitamin D < 20 ng/ml (18.2 ± 0.6) | Vitamin D 20-30 ng/ml (26.6 ± 1.4) | Vitamin D > 30 ng/ml (32.1 ± 1.3) |
|----------------|--------------------------------------|---------------------------------------|--------------------------------------|
| Overall, N | 60 | 60 | 60 |
| Mean age | 61.5 ± 4.9 | 61.2 ± 3.5 | 61.3 ± 1.6 |
| Comorbidity, % | 85.0 | 76.7 | 10.0 |
| Death, % | 100.0 | 88.3 | 3.3 |
| Active, % | 0.0 | 11.7 | 96.7 |

The authors could not standardise the comorbidity (pre-existing conditions), too few cases would have remained. One should therefore not compare the percentage of deaths and attribute everything to vitamin D, as this would result in too high a ratio, here about 30:1, instead of 10:1. Every simplification has its limits.

The data show that pre-existing conditions have an influence on the course of the infections. It is not possible to say with certainty to what extent the Covid-19 infection or the previous illness is responsible for the occurrence of death. However, the available data suggest that the mortality rate is significantly lower even in the presence of pre-existing conditions when vitamin D levels are sufficient. Whether pre-existing conditions may also be the result of decades of vitamin D deficiency will have to be proven in future studies.

The **original data** (table, 780 cases) is available [here as PDF](#) with detailed explanations of the **data reduction** and **comments** by **Sadiyah Priambada**. There also the contact of the zero line below at approx. 34 ng/ml is explained, what it is based on and what means.



The above graph shows very clearly the dependence of the death rate in hospitalized Covid-19 infected patients on the measured vitamin D concentration in the blood. The data are based on the same data reduction as the above table, but with finer granulation - in 20 groups. The procedure is the same as explained in the PDF above, the same data set was used.

There is a very sharp drop in the death rate in the range of blood levels between 27 and 32 ng/ml vitamin D (marked area). At vitamin D levels above 32 ng/ml, the death rate determined in this study is a factor of 10 lower than at vitamin D levels below 27 ng/ml.

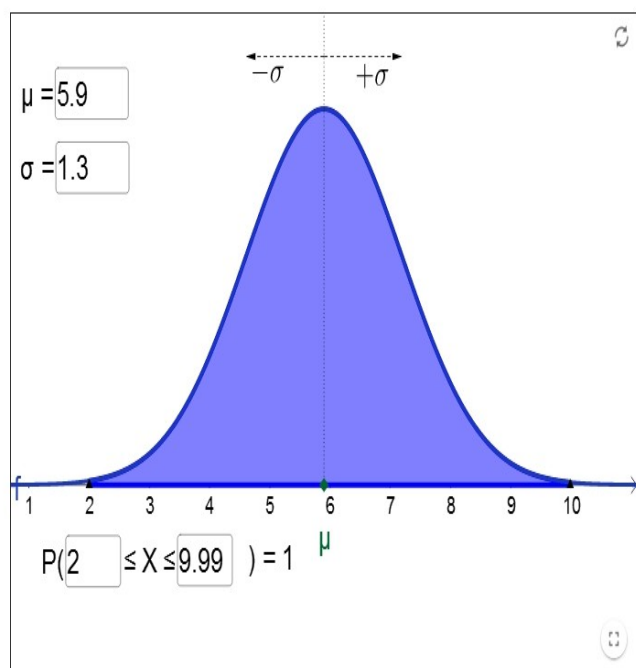
What else you should know (WHO vs. D-A-CH limits):

The Indonesians use the international guidelines of the WHO for the vitamin D level: 20 ng/ml is already considered "deficient", i.e. a deficiency, 20-30 is "insufficient", i.e. insufficient, and only more than 30 ng/ml is considered "normal". In Germany, outdated and significantly lower values apply: Above 20 ng/ml is already "normal", 10-20 ng/ml is borderline, and only below 10 ng/ml is a deficiency worthy of treatment established. In most cases, however, this is not treated because far too little tests are carried out. The test has to be paid by the patient himself and is in the order of 30 Euros.

German healthy seniors have over 80% "German" normal values, i.e. more than 20 ng/ml. 80% of sick seniors (geriatric patients) on the other hand have insufficient, and half of them values, which even in Germany are classified as **deficiency** (<10 ng/ml, among others [here](#)). From the data of the RKI ([Vitamin D status in Germany](#), p.36, 2016) it can be calculated that **30% of** all Germans between 18 and 79 must have far less than 10 ng/ml in the winter quarter (Dec/Feb):

| B | C | D | E |
|-----------------|---------------|--------------|-----------------|
| RKI_2016 | | | |
| Alter | Mangel | | |
| 18 – 29 Jahre | 28,4% | | |
| 30 – 44 Jahre | 32,8% | | |
| 45 – 64 Jahre | 29,6% | | |
| 65 – 79 Jahre | 30,0% | | |
| Schnitt/Jahr | 30,2% | | |
| Quartal | Mangel | „1-%“ | 10 ng/ml |
| Jun/Aug | 8,3% | 0,92 | 13,01 |
| Sep/Nov | 19,3% | 0,81 | 11,45 |
| Mär/Mai | 38,4% | 0,62 | 8,74 |
| Dez/Feb | 52,0% | 0,48 | 6,81 |
| Schnitt/Jahr | 29,5% | 0,71 | 10,00 |
| | | | 0,705 |

Abbildung 1 zeigt, dass der Vitamin-D-Status starken saisonalen Schwankungen unterliegt. Während im Sommer und Herbst 8,3 % bzw. 19,3 % der Erwachsenen einen mangelhaften Vitamin-D-Status aufweisen, sind es im Frühling und Winter 38,4 % bzw. 52,0 %.



The arithmetical calculation of the dec-Feb values gives an **average of 6.81 ng/ml**

In fact, however, significantly smaller values are also measured. If a Gauss distribution with values between 2 and 10 ng/ml is taken as a basis, the peak of the curve is only weak **5.9 ng/ml**, which would apply to 30% of the population between 18 and 79 in the winter quarter.

Since the facts leading to this statement have been known for years, it is hardly understandable that the risks of such a serious deficiency, which are associated with severe health hazards, are not widely discussed.

About Prabowo Raharusuna, we received [another study](#) on the subject with over 200 subjects, by Mark Alipio, a very young medical doctor from Davao (also, self-financed, neutral and independent).

Here too, the results are very clear:

| Variables | Overall N (%) | Clinical Outcomes | | | | p-value |
|----------------------|---------------|-------------------|-------------|-------------|-------------|---------|
| | | Mild | Ordinary | Severe | Critical | |
| Overall N (%) | 212 (100.0) | 49 (23.1) | 59 (27.8) | 56 (26.4) | 48 (22.6) | |
| Serum 25(OH)D, ng/ml | 23.8 | 31.2 ± 1.08 | 27.4 ± 2.14 | 21.2 ± 1.12 | 17.1 ± 2.39 | <0.001 |
| Vitamin D status | | | | | | |
| Normal | 55 (25.9) | 47 (85.5) | 4 (7.3) | 2 (3.6) | 2 (3.6) | <0.001 |
| Insufficient | 80 (37.7) | 1 (1.3) | 35 (43.8) | 23 (28.8) | 21 (26.3) | |
| Deficient | 77 (36.3) | 1 (1.4) | 20 (26.0) | 31 (40.3) | 25 (32.5) | |

The data can be summarised as follows (abstract translated)

For each increase by one standard deviation of serum 25(OH)D, the probability of a mild clinical outcome instead of a severe one was approximately 7.94 times (OR = 0.126, p <0.001), while interestingly, the chances of a critical outcome instead of a mild one were 19.61 times higher (OR = 0.051, p <0.001).

The following vitamin D levels were used:

The mean serum vitamin D level was 23.8 ng/ml. Serum vitamin D levels in mild cases were 31.2 ng/ml, 27.4 ng/ml for normal, 21.2 ng/ml for severe and 17.1 ng/ml for critical.

From the available data it follows that only 4.3% of the patients who had a mild course had vitamin D levels below 30 ng/ml. In contrast, 95.8% of the patients with vitamin D levels below 30 ng/ml had a severe or even fatal course. Unfortunately, no further data such as age and BMI were collected.

In Germany the average vitamin D level over the year is only 18.8 ng/ml. Seniors with comorbidities are almost half that level and often even below 10 ng/ml, especially in winter. According to the available studies it follows that especially our elderly fellow citizens do not have sufficient protection against Covid-19 infections. Conversely, the data suggest that the vast majority of Covid-19 patients with vitamin D levels above 30 ng/ml would survive the infection unscathed.

At this point it should be noted that nature has provided for a vitamin D level in the range of 45 ng/ml for humans. This results from the values measured in primitive peoples (Massai/Hadza). The fact that many people nowadays do not reach this value is due to our modern lifestyle, especially the fact that we hardly ever move unprotected in the sun at the relevant times of day.

In case anyone wonders why even the Filipino patients examined do not have more than 24 ng/ml vitamin D on average, when there is much more sunshine? That's exactly why, it is so hot there that they usually avoid the sun. This is a bit like the situation in nursing homes, except that in this country there is too little sunshine instead of too much, and the senior citizens stay indoors because it is cold.

A study from England also fits the picture:

The role of Vitamin D in the prevention of Coronavirus Disease 2019 infection and mortality

The researchers around Petre Cristian Ilie have tested the number of Covid-19 deaths per 1 million inhabitants against the vitamin D level in 20 European countries and come to the following conclusion:

The mean vitamin D level in the countries studied (mean 22.4 ng/ml, StDev ± 4.24) correlates strictly with the number of Covid-19 infected per million population (mean 295.95, StDev ± 298.73 , $p=0.004$) and with mortality (mean 5.96, StDev 15.13, $p<0.00001$)

The death rates in Spain and Italy are much higher than in Scandinavia. The researchers explain this with the statistically significant higher vitamin D level among the inhabitants of the Nordic countries:

The study shows that in older people, the average blood vitamin D level in Spain is 10.4 ng/ml, in Italy, 11.2 ng/ml, while in the Scandinavian countries it is 18 ng/ml.

The northerners obviously have the better vitamin D level, although the sun is not as intense there as in the south. This could either be because they are more active outdoors or because they get more vitamin D from food, e.g. fish, or both. Fat sea fish contains a lot of vitamin D. And southerners tend to spend their midday hours in the shade or indoors. Shadow, window glass and a longer way through the atmosphere (morning/evening, autumn/spring) reduce UVB radiation much more than UVA.

Another study from the USA (2016) shows that high supplementation with vitamin D can still help even after the emergency has already occurred, i.e. in patients who need to be ventilated.

High dose vitamin D administration in ventilated intensive care unit patients: A pilot double blind randomized controlled trial

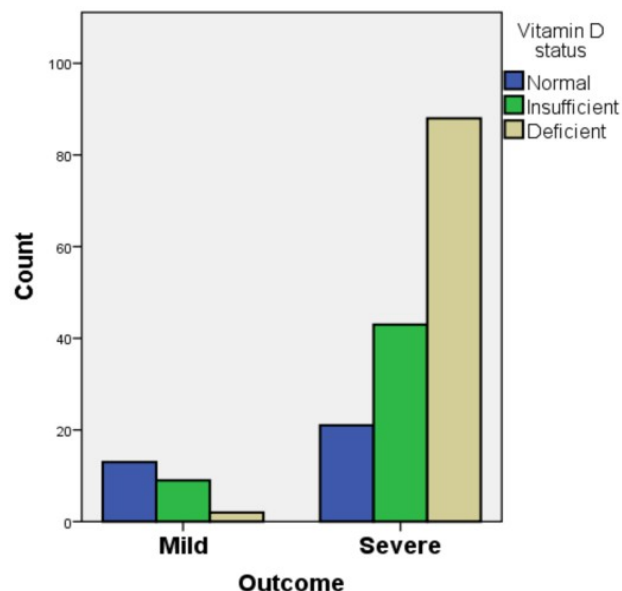
In the study, patients with vitamin D deficiency (<20ng/ml) were divided into three groups: A placebo group, and two groups that were given different doses of vitamin D. The single administration of 250,000 IU of vitamin D was compared with the single administration of 500,000 IU of vitamin D by injection. In addition, the vitamin D levels were increased to 45 and 55 ng/ml, respectively. While the length of stay of the placebo group at the ICU was 36 days, the 250,000 IU group averaged 25 days and the 500,000 IU group averaged 18 days. This is a smooth halving and means that vitamin D is useful not only in prevention but also in acute cases.

Another very recent study is by El James Glicio, a retired general practitioner and author from New Delhi:

[„Vitamin D Level of Mild and Severe Elderly Cases of COVID-19“](#)

Although the study is relatively small, it provides comparable results. The majority (84.6%) of COVID-19 patients with critical course had vitamin D deficiency. Among those under 75 years of age, this was even 100% of critical cases.

In the following figure the data are divided according to the international vitamin D level groupings (<20: deficiency, 20-30: insufficient, >30 sufficient/good).



One can see very clearly that the severe cases are mostly due to vitamin D deficiency. In the mild cases, patients with good vitamin D levels predominate.

Finally a small study in ventilated patients from Iran 2018:

Effect of High-Dose Vitamin D on Duration of Mechanical Ventilation in ICU Patients ([MirMohammad Miri et al.](#))

Table 2. Comparison of the mean duration of hospitalization, duration of mechanical ventilation and mortality of the patients in two groups.

| | Group | | p-value |
|-------------------------------|------------------|-----------------------|---------|
| | Control (n = 18) | Intervention (n = 22) | |
| Mechanical ventilation (days) | 27.72 ± 22.48 | 17.63 ± 14 | 0.06 |
| Length of ICU stay (days) | 28.72 ± 23.58 | 19.5 ± 12.2 | 0.06 |
| Mortality (%) | 11 (61.1) | 8 (36.3) | 0.00 |

Intervention was carried out intramuscularly with 300,000 IU of vitamin D. Instead of 28 days only 18 days mechanical ventilation, instead of 29 only 19 on ICU, instead of 61% deaths only 36%.

What we could do

To sum it all up: If all people, especially the seniors, had a vitamin D level significantly above 30 ng/ml, rather above 40 ng/ml, there would be a high probability that we would not have to fear Covid-19. At 45 ng/ml, as found in native, traditional living peoples near the equator, we should hope to lose practically no one because of Covid-19, unless the comorbidities are so severe that it would have been a matter of days or weeks anyway.

From the Indonesian study with 780 participants it follows that the risk of death would only be 1/10 if all of them had vitamin D levels of just over 30 ng/ml. Whether there would have been any deaths at all at 45 ng/ml is difficult to answer; the highest measured value was below 34 ng/ml. Above 33 ng/ml (only women, all without comorbidities) there were no deaths despite hospitalisation.

From the Philippine study it follows that people with poor vitamin D levels have an 8 times higher risk of having a "critical" course. So that is the same again. The Iranian "ventilator study" shows a reduction of mortality under artificial respiration by half when vitamin D is administered intramuscularly with 300,000 IU. The American study sees a reduction in the time spent in intensive care units from 36 to 18 days at 500,000 IU.

Only every tenth person is still on intensive care, half of which can be saved with high-dose Vitamin D. A lethality rate of 2-4% currently assumed would result in 0.1-0.2% or less, a figure that even a severe flu would reach (2018: 25,000 deaths among perhaps 15-20 million infected persons).

Apart from this, it is highly plausible that people with comorbidities would also benefit significantly from a better D-level, indeed the entire population as a whole.

Moreover, the above studies suggest that a corresponding high-dose intervention would be indicated at the time of hospitalization, not at the time of transfer to the ICU. Which could save even more lives and turn severe courses into mild ones.

And how much does it cost?

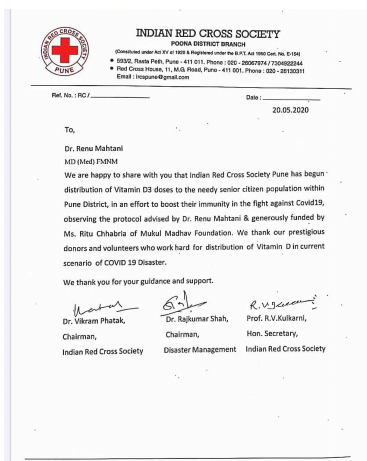
For a healthy level of more than 45 ng/ml at 70 kg body weight, 5,000 IU vitamin D3 + 200 mcg vitamin-K2, which cost about 7 cents per day, are sufficient. The authors explicitly point out that each vitamin D supplementation must be accompanied by sufficient vitamin K2. This certainly prevents the rise of the calcium level in the blood, which is often seen as a risk for the supply of vitamin D

For people who are not infected with Covid-19, e.g. hospital staff and high-risk patients, corresponding studies show that the vitamin D level can be raised relatively quickly to the "healthy" range if two to three times the amount is administered for two to three weeks (10,000 - 20,000 IU depending on weight). In Covid-19 patients who are hospitalized, the level can be raised immediately to sufficient values with the 500,000 IU syringe mentioned above.

From the authors' point of view, this should mean that we no longer need another partial lockdown or special protective measures. The Covid 19 pandemic would continue, but we could safely wait until herd immunity is established if vaccination is not available first. In addition, we would save many billions in costs and avoid social disruption.

These assumptions are not only supported by the clinical studies listed, but also by published basic studies: It was investigated how and where vitamin D intervenes in the relevant metabolic pathways. Without going into too much detail, the so-called renin/angiotensin system (RAS) is of particular importance. The misregulation of this system in vitamin D deficiency contributes decisively to the development of ARDS and the triggering of a cytokine storm.

A very good summary with quotations from important publications has been compiled by Dr. Renu Mahtani, an American physician of Indian descent (see especially the second half of the lecture). She impressively proves that a sufficient supply of vitamin D is sufficient to keep Covid-19 largely in check. It should be noted that Mrs. Mahtani does not mention the parallel supply of vitamin K2, which is absolutely necessary in the authors' view, when supplementing with vitamin D.



Since 20.5.2020, the Red Cross of Poona has been distributing vitamin D3 to senior citizens "in an effort to boost their immunity" according to Dr. Mahtani's protocol.

[Here is the link](#) to Renu Mahtani's very convincing presentation (in English)

Afterword

It is undisputed that Germany and many other countries have prevented many Covid-19 infections and thus many deaths through their measures.

How many more people could have been saved if the information on vitamin D presented here had been known and implemented? Could we perhaps even have avoided the lockdown with all its consequences for our economy and social interaction? The authors have great hopes that this article will help to ensure that vitamin D will in future have the place it deserves in the treatment of Covid-19 infections and that we can at least prevent the "second wave" that is already on everyone's lips about it.

Heidelberg/Tübingen, Lorenz Borsche, Dr. Bernd Glauner, May 2020

Author's info:

Dr. Bernd Glauner studied biochemistry in Tübingen and, after a phase as an independent software developer, was responsible for the development and worldwide distribution of the cell counting device "CASY" for many years - first at 'Schärfe System', then at 'Innovatis' and 'Roche' and finally at 'OMNI Life Science'. In his private life, he has - in addition to his penchant for marathon running - been studying the influence of vitamins on our health for many years.

Lorenz Borsche studied mathematics and physics, later sociology and political science. He is a software developer (POS/PPS), but statistics is his real vocation. "Spiegel" once ironically called him a "[statistics guru](#)" because of his criticism of PISA. He is the founder of the largest booksellers' cooperative (ebuch eG) with his own nationwide webshop "[genialokal.de](#)". His most recent book has been published: [Sugar: Deadly Temptation](#). For the vitamin D thesis see also his website: Does [vitamin D \(& C\) help with Covid-19?](#) as well as the latest article of both **Dr. B. Glauner / L. Borsche**: [7 Cent or lockdown?](#)

Ausgewählte Veröffentlichungen zur Rolle von Vitamin D bei der Sterblichkeit von Covid-19 Patienten.

Selected publications on the role of Vitamin D regarding the mortality of Covid-19 patients.

Veröffentlichung 1 - 5 : Klinische Studien und Erkenntnisse
Veröffentlichung 6 - 10 Wissenschaftliche Beweise

Publication 1 - 5 : Clinical studies and findings
Publication 5 - 10 Scientific evidence

.Raharusun P, et al. **Pattern of Covid-19 Mortality and Vitamin D: An Indonesian study.** 30. April 2020, SSRN. Preprint

Auszug aus dem Abstract / Excerpt from the abstract:

The aim was to determine patterns of mortality and associated factors, with a special focus on Vitamin D status.

When controlling for age, sex, and comorbidity, Vitamin D status is strongly associated with COVID-19 mortality outcome of cases.

Link zur Veröffentlichung / Link to the publication:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3585561

Statistische Datenauswertung / Statistical data evaluation Borsche L.:

https://borsche.de/res/Indo_1.pdf

.Alipio M. **Vitamin D supplementation could possibly improve clinical outcomes of patients infected with coronavirus-2019 (COVID-19).** Apr 9, 2020, SSRN. Preprint

Auszug aus dem Abstract / Excerpt from the abstract:

Vitamin D status is significantly associated with clinical outcomes. A multinomial logistic regression analysis reported that for each standard deviation increase in serum 25(OH)D, the odds of having a mild clinical outcome rather than a severe outcome were approximately 7.94 times (OR=0.126, p<0.001) while interestingly, the odds of having a mild clinical outcome rather than a critical outcome were approximately 19.61 times (OR=0.051, p<0.001).

In conclusion, this study provides substantial information to clinicians and health policy-makers. Vitamin D supplementation could possibly improve clinical outcomes of patients infected with COVID-19.

Link zur Veröffentlichung / Link to the publication:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3571484

.llie PC, et al. **The role of Vitamin D in the prevention of coronavirus disease 2019- infection and mortality.** Research Square. doi: 10.21203/rs.3.rs-21211/v1

Auszug aus dem Abstract / Excerpt from the abstract:

We have identified the mean levels of vitamin D for 20 Europeans Countries for which we have also got the data regarding the morbidity and mortality caused by COVID-19.

The mean level of vitamin D (average 56mmol/L, STDEV 10.61) in each country was strongly associated with the number of cases/1M (mean 295.95, STDEV 298.73 p=0.004, respectively with the mortality/1M (mean 5.96, STDEV 15.13, p < 0.00001).

Vitamin D levels are severely low in the aging population especially in Spain, Italy and Switzerland. This is also the most vulnerable group of population for COVID-19.

We believe, that we can advise Vitamin D supplementation to protect against SARS-CoV2 infection.

Link zur Veröffentlichung / Link to the publication:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7202265/pdf/40520_2020_Article_1570.pdf

.Han J E, et al. **High dose Vitamin D administration in ventilated intensive care unit patients: A pilot double blind randomized controlled trial.** J Clin Transl Endocrinol. 2016 Jun; 4:59-65. doi: 10.1016/j.jcte.2016.04.004. Epub 2016 May 5.

Auszug aus dem Abstract / Excerpt from the abstract:

There is a high prevalence of vitamin D deficiency in the critically ill patient population. Several intensive care unit studies have demonstrated an association between vitamin D deficiency [25-hydroxyvitamin D (25(OH)D) < 20 ng/mL] and increased hospital length of stay (LOS), readmission rate, sepsis and mortality.

In this pilot study, high-dose vitamin D3 safely increased plasma 25(OH)D concentrations into the sufficient range and was associated with decreased hospital length of stay without altering other clinical outcomes.

Link zur Veröffentlichung / Link to the publication:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4939707/pdf/main.pdf>

.Schwalfenberg G. **Vitamin D for influenza.** Can Fam Physician 2015 Jun; 10 (11); 61 (6): 507.

Comment on antiviral medication for influenza. Korownyk C, et al.

Can Fam Physician 2015 Apr; 61 (4): 351. PMID: 26071153 PMCID: PMC4463890

Auszug aus dem Abstract / Excerpt from the abstract:

In those patients who do have influenza, we have treated them with the *vitamin D hammer*, as coined by my colleague. This is a 1-time 50 000 IU dose of vitamin D3 or 10 000 IU 3 times daily for 2 to 3 days. The results are dramatic, with complete resolution of symptoms in 48 to 72 hours. One-time doses of vitamin D at this level have been used safely and have never been shown to be toxic.

Link zur Veröffentlichung / Link to the publication:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4463890/pdf/0610507.pdf>

.Dancer RCA., et al. **Vitamin D deficiency contributes directly to the acute respiratory distress syndrome (ARDS)**. Thorax 2015; 70 (7): 617-624. doi: 10.1136/thoraxjnl-2014-206680. Epub 2015 Apr 22.

Auszug aus dem Abstract / Excerpt from the abstract:

Vitamin D deficiency is common in people who develop ARDS. This deficiency of vitamin D appears to contribute to the development of the condition, and approaches to correct vitamin D deficiency in patients at risk of ARDS should be developed.

Link zur Veröffentlichung / Link to the publication:

<https://thorax.bmj.com/content/thoraxjnl/70/7/617.full.pdf>

.Xu J, et al. **Vitamin D alleviates lipopolysaccharide-induced acute lung injury via regulation of the renin-angiotensin system**. Mol Med Rep 2017 Nov., 16(5): 7432-7438

Auszug aus dem Abstract / Excerpt from the abstract:

Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) are the clinical manifestations of severe lung damage and respiratory failure. ALI and ARDS result are associated with high mortality in patients. At present, no effective treatments for ALI and ARDS exist. It is established that vitamin D exhibits anti-inflammatory effects, however, the specific effect of vitamin D on ALI remains largely unknown. The aim of the present study was to investigate whether, and by which mechanism, vitamin D alleviates lipopolysaccharide (LPS)-induced ALI.

Link zur Veröffentlichung / Link to the publication:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5865875/pdf/mmr-16-05-7432.pdf>

.Bergman P, et al. **Vitamin D supplementation to patients with frequent respiratory tract infections: a post hoc analysis of a randomized and placebo-controlled trial**.

BMC Research Notes 2015; 8: 391. Published online 2015 Aug 30. doi: 10.1186/s13104-015-1378-3

Auszug aus dem Abstract / Excerpt from the abstract:

Vitamin D supplementation was found to significantly increase the probability of staying infection free during the study period. This finding further supports the notion that vitamin D-status should be monitored in adult patients with frequent respiratory tract infections (RTIs) and suggests that selected patients with vitamin D deficiency are supplemented. This could be a safe and cheap way to reduce RTIs and improve health in this vulnerable patient population.

Link zur Veröffentlichung / Link to the publication:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4553208/pdf/13104_2015_Article_1378.pdf

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Auszug aus dem Abstract / Excerpt from the abstract:

Cationic host defence peptides, such as defensins and cathelicidins, are important components of innate immunity with antimicrobial and immunomodulatory capabilities. In recent years they have also been shown to be natural, broad-spectrum antivirals against both enveloped and non-enveloped viruses.

Link zur Veröffentlichung / Link to the publication:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775153/pdf/40259_2013_Article_39.pdf

.Quraishi SA., et al. **Effect of cholecalciferol supplementation on vitamin D status and cathelicidin levels in sepsis: A randomized, placebo-controlled trial.** *Crit Care Med.* 2015; 43(9): 1928-1937. doi: 10.1097/CCM.0000000000001148

Auszug aus dem Abstract / Excerpt from the abstract:

In this randomized controlled trial of critically ill patients, we compared the effects of placebo versus 200,000 IU cholecalciferol versus 400,000 IU cholecalciferol on vitamin D status and expression of an endogenous, vitamin D-dependent, antimicrobial peptide. We demonstrated that a single bolus dose of 400,000 IU cholecalciferol is safe and effective for rapidly improving circulating 25OHD levels, bioavailable 25OHD, and expression of LL-37 in patients with severe sepsis or septic shock.

Link zur Veröffentlichung / Link to the publication:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4537665/pdf/nihms688734.pdf>