COVID BY THE NUMBERS

An Ad Hoc Super meta-analysis of all the government and scientific data regarding COVID 19 compiled from 60+ databases and over 800+ scientific case studies around the world

Written and analyzed by

Reluctant Analyst Anon

With help from

Anonymous Reddit User & Covid Analyst Anon

The Purpose

The purpose of this study is to objectively analyze as much government data and as many relevant scientific case studies to conclusively answer the following questions.

1. How deadly is COVID 19?
2. How **effective** is the COVID 19 Vaccine?
3. How **safe** is the COVID 19 Vaccine?
4. Is Natural Immunity effective?
5. How effective is natural immunity compared to the vaccine?
6. Is there any scientific proof of any **effective** COVID 19 treatment existing?
7. If any effective COVID 19 treatments exist, exactly how effective are they?

The need for this clarity is of the utmost importance. With government vaccine mandates, new variant strains of COVID, a growing anecdotal reports of vaccine side effects, all contained inside a HYPER PARTISAN political atmosphere, gaining an objective evidence-based perspective on the reality of the situation has never been more critical. This study aims to inform the public, media and legal entities of the science-based FACTS regarding COVID 19's most pressing questions and thus help public discourse and thus guide public policy.

Challenge This Paper

The COVID 19 argument has become a political battleground whether we like it or not. The next battlefront in the ongoing political information war is now being waged in an area that should not be happening. This information war has resulted in mistrust, hostility, division, and stifled progress. It has undoubtedly hampered combating the COVID 19 pandemic **causing many people to die who otherwise could have lived based on the data I found**. This paper attempts to remove all propaganda from both sides by citing EVIDENCE BASED FACTS. Any non-science information I share (which isn't much) will be denoted as such.

Trusting the science doesn't mean trusting a talking head on your favorite news channel.

Its gotten so bad that for us as a society to 'Trust the science', we must go straight to the scientific sources if we ever want any true clarity. This paper is not to be taken as Gospel and is not an irrefutable, infallible truth that cannot be questioned. This paper should be questioned, challenged, and refuted. That is this papers strength. I believe it can take a barrage of criticisms and only come out stronger for it. I went to pain staking length to gather as much information, data and science as I could and then organize and analyze it as fast as I reasonably could (My apologies in advance for any typos or grammatical errors). The data I share is not my own, however the analysis is. I add that I also got help from two others, without whom I doubt this paper could have been written.

Thank you to Covid Analyst Anon and Anon Reddit User.

As you read this you might disagree with datasets or the analysis I present. If you do I have one simple question to ask of you, the reader.

I challenge you, the reader, to find scientific PROOF aka EVIDENCE the scientific facts I provide are wrong.

You cannot be correct just because you FEEL, THINK, OR WANT to be correct, or just because you disagree. The goal here is to gain an **understanding of reality**, not advocate preconceived notions based on prior beliefs. What is not ok is to read the data, disregard it, and then provide ZERO EVIDENCE to the contrary and **still think you are right**. Unless you can find evidence that proves a specific bit of information, I have is incorrect, you are going to have to come to terms with accepting it. I did my part, the onus to prove me wrong is on you, the reader.

Also if someone in the media says "This report is fake news" the only response you should have is

"Prove it by showing me the evidence to support your claim"

If they cannot show evidence then they are lying

anything and everything else other than evidence is propaganda

Good Luck

Reluctant Analyst Anon

WHY AM I DOING THIS?

Because the science says it's time to end the pandemic and nobody seemed to step up to the plate and figure out what is really going on. I didn't want to have to do this, but I felt it was my duty to do so, nobody else was going to do it. The data I discovered shows that we have enough technology and resources to finally end this nightmare. The problem is not ability. The problem is that liberals, conservatives, and everyone in between have been lied to and made to fight each other instead of working together and find real solutions. It's time for liberals, conservatives, and independents to put down our pitchforks, come together, and seek unity in the truth. Only when the truth is known by all will this pandemic ever really end. Its time someone shared with you the actual scientific evidence of what is really going on. Once you review the facts its up for you to decide how we proceed as a nation, as a people, and as a world.

WHY REMAIN ANONYMOUS?

The decision to remain anonymous was a difficult one to make. I do want to publicly explain and clarify this paper. However, I have seen what happens to those who speak truth to power. The media, corporations, and the government can easily come after myself and the ones I love. It's a sad state of affairs that in the United States a person speaking scientific truth will bring about retaliation both financially, legally and in some extreme cases lethally. Besides, who I really am is not important. What is important is the evidence. The entire COVID debate should be weighed not by the messenger but by the facts and evidence presented.

Truth is only dangerous to those who seek to undermine it.

- Reluctant Analyst Anon

THE SUMMARY

99.9% of you won't read this entire paper and that is ok. What I have done is summarized the findings into a fastest and easiest but most meaningful way possible. Here are the end results at the beginning that you can learn the important facts ASAP and share it with others. Every point that I make in this summary is backed by the data and science collected below. No statement I make from here on out is my opinion. If you question my summary feel free to scroll below and read the evidence for yourself.

Top 7 Major Points

1. If everyone magically got 100% vaccinated today the pandemic would not end
2. Because Big pharma cut corners and made a low-quality vaccine that encourages variants via evolutionary natural selection.
3. The vaccine creates COVID spike proteins inside the body and while they provide immunity against alpha, the vaccine does not work against the Delta variant (see point 2)
4. Unfortunately, the spike proteins created by the vaccine have proven to be toxic to endothelial cells (heart, lung, arteries, brain) and do cause side effects like blood clotting. (see point 2)
5. Young people have incredibly low risk of dying if infected while conversely old people have extremely high risk of dying if infected.
6. Age has the strongest correlation with COVID risk above all other factors.
7. Highly effective treatments do exist and there is massive scientific evidence that prove they work against COVID 19.

We do have a way to end this pandemic.

Keep reading this summary and I explain.

How deadly is COVID 19?

The Relative Odds of Survival by Age (meaning out of people infected)

Age Group	Odds
0-17	1 in 10098.5
18-29	1 in 2097.3
30-39	1 in 542.8
40-49	1 in 189.7
50-64	1 in 55.2
65-74	1 in 15.7
75-84	1 in 6.7
85+	1 in 3.5
Total & Average	1 in 49.1

The Absolute Odds of Survival by Age (meaning out of total population)

Age Group	Absolute Odds of Survival in age group
0-17	1 in 155,106.4
18-29	1 in 12,644.9
30-39	1 in 4,416.8
40-49	1 in 1,561.4
50-64	1 in 533.5
65-74	1 in 219.9
75-84	1 in 93.6
85+	1 in 35.1
Total & Average	1 in 487.4

- The older you are, the more dangerous COVID 19
- People over the age of 50 need to be concerned since the chance of death drops below 1 in 100 if you catch it
- Children 17 and younger are at extremely low risk of dying
- People 85 and over are at extremely high risk of dying. You have better odds playing Russian roulette (1 in 3.5 from COVID vs 1 in 6 from RR)
- Despite the Pandemic, COVID 19 was only the 3rd largest cause of death in 2020, behind heart disease and cancer
- Only 239 children die on average from COVID per year
- For comparison 1,000+ children died from the swine flu in a single year. (4x)
- 643 children died from the regular flu during the 2018-2019 flu season (2.7x)
- COVID 19 isn't even in the top 10 causes for childhood mortality.
- A child is almost 4 times more likely to drown than die of COVID 19
- Obesity was not a major comorbidity as less than 5% of all who died from COVID were overweight.
- COVID 19 can damage the neurological system as well as the cardiovascular system

How effective is the COVID 19 Vaccine?

- The Vaccine is extremely effective against the Alpha variant. It massively reduces infection, hospitalization, and death with minimal breakthrough across all ages.
- The vaccines reduced the total amount of infected by 7 million when you compare 2020 vs 2021.
- The vaccines have saved an estimated 150,000 lives in the USA so far.
- The Vaccine does a terrible job when confronted with Delta. Delta bypasses the immune system of vaccinated people as if they did nothing at all.
- Let me repeat, the data is clear. The vaccines are ineffective against Delta.

- NO statistically significant relationship between vaccination rates and infection rates. The vaccines are not working the way we need because they are flawed.
- Early studies show the booster is very effective against Delta.
- Governments and institutions continue to falsely claim that the 2-dose vaccine is effective against Delta by citing flawed test negative control studies. All real-world data conclusively proves that is wrong.

How effective is natural immunity?

- Evidence shows that natural immunity is just as effective as the vaccine against Alpha
- Evidence shows that natural immunity is very effective against the delta variant

Which is more effective? natural immunity or the COVID 19 Vaccines?

- So far, the evidence shows that natural immunity is more effective against variants and has longer lasting more robust protection than the vaccine.
- **Vaccination is the inferior form of protection.**
- But to get natural immunity requires rolling the dice and getting COVID 19 which can be very risky depending on your age. (Treatments I discuss less this risk dramatically)

Is the COVID 19 Vaccine safe?

- Evidence shows Adverse Effects happen at an estimated rate of 6.59 per 10,000 people (assuming double jabbed) (0.659%)
- Whistle Blower has claimed on the record the vaccine manufacturers lied about adverse effects, lied about the data, and lied about the volume of adverse effects
- The vaccine creates spike proteins which evidence proves
    - damages the arteries, lungs, heart, and brain
    - causes blood clots
    - circulate around the body via blood where they are not supposed to
    - causes brain hemorrhaging
    - causes Neurodegeneration
    - causes inflammation inside the body
    - can pass right through the blood brain barrier
- The vaccine is supposed to create spike proteins in the muscle. Evidence shows they can travel anywhere and use ANY cell to make spike proteins. This is dangerous, imagine your heart or brain being used to do this. Its scientifically possible.
- Flawed boosters will only create new variants like Delta or the new A.30 variant
- The vaccines are creating antibody dependent enhancement i.e. the vaccine backfires when exposed to Delta making Delta more deadly
    - **Evidence from the UK data shows fully vaccinated people dying from COVID almost 4 times more than unvaccinated people**
- The potential for autoimmune disorders exist
- The virus is evolving because the vaccine is inherently flawed

    - There is just enough missing protection to leave enough room for variants to easily survive, reproduce and evolve into stronger variants via evolutionary natural selection
- Big Pharma cut corners and the vaccine is low quality
    - COVID 19 virus has 4 main proteins. 3 on the outside 1 on the inside
    - The S, M, & E proteins are on the outside. N is in the inside
    - They only created the vaccine using 1 protein instead of all 4 (the S protein.)
    - Had they created a vaccine that covered at least two proteins like the M protein it would have worked much better against variants
    - But because they only chose 1 protein, if the S protein changes in a live Virus then the vaccines created immune system defense is totally bypassed. Which totally explains Delta.
    - Choosing at least 2 proteins would have made it exponentially harder for the virus to escape and mutate because creating 2 beneficial mutations via evolution at the exact same time is exponentially much more improbable than just making one
    - MY OPINION: The most obvious explanation for this is that this was to save money and maximize profits.
- Reports are showing vaccines can cause myocarditis (Inflammation and enlarging of the heart)
- Data Analysis shows that all-cause mortality is going up in vaccinated vs unvaccinated
- Doctors argue that vaccinating children is a terrible idea, they don't need it due to the risk of adverse reactions being higher than the risk of COVID 19
- mRNA vaccine given to ferrets caused hepatitis and killed parts of their liver in multiple ferrets
- The vaccine can cause original antigenic sin which mean the immune system cannot adapt to variants as easily
- The vaccine can cause Bell Palsy (Face paralysis)
- The vaccine can cause Guillian Barr Syndrome. Your immune system attacks your nervous system and disables movement.
- Study shows that 86% of VAERS deaths cannot be ruled out a non-vaccine related
- News is reporting such issues as harder hitting colds, Car crashes up 28%, & heart attacks up 25% without a clear cause.
- Data shows that immunodeficiency could be happening in vaccinated (More studies needed)
- Official university lab result that shows Graphene Oxide inside the vaccine. (More studies needed)

Are there any other treatments that exist for COVID 19 that work?

- Treatments exist. Let me repeat. You have been lied too. Treatments exist.
- I have hundreds of studies down below that show these treatments work.
- Remdesivir which is the only FDA approved drug is barely effective
- Budesonide was shown lowering risk of death and hospitalization by up to 80% in some studies
- Brohexmine reduce risk of death by up to 76% in some studies
- Ivermectin works and here's why
    - Evidence shows Ivermectin stops the virus from multiplying. Not only does it work, but we also know exactly how it works.
    - Evidence shows if you use it early it works great.

    - Evidence shows if you use it late after someone is super sick, it doesn't work at all
    - Evidence shows it works for ALL viruses not just COVID (threatens big pharma)
    - Peru is the smoking gun, they started using Ivermectin nationwide and COVID dropped 90%. A new president was elected, he banned Ivermectin and COVID shot back up to previous highs.
    - MY OPINION: "Horse Dewormer" is literally propaganda from big pharma to convince you to be against it
- Hydroxychloroquine works as well. Much like ivermectin by stopping the virus from multiplying (Ivermectin is better)
- If you use HQC when someone is super sick it doesn't do anything.
- Mulpolnovir has only 3 studies and 2 studies were self-funded by Big Pharma and the 3rd had a small sample size not even worth statistically significant (18 people)
- Quercetin works by preventing the virus from entering the cell
    - Quercetin reduced COVID by up to 94%
    - In several studies reduced death from 65 to 95%
- Intravenous Vitamin C works in large quantities.
    - 12 grams every 12 hours Intravenous Vitamin C minimum has been shown **to pull people out of critical condition from COVID 19**
    - Possible to give up to 200 grams per day safely
- Vitamin D3 deficiency strongly associated negative COVID 19 outcomes
    - high Vitamin d3 is linked with better COVID 19 outcomes
- Zinc reduced risk of death by almost 80%
    - Low zinc levels associated with worse covid 19 outcomes

Can we finally end the pandemic?

Yes, we can & here is what the science says on how

- **Update the Emergency Use Act to allow treatments without sacrificing vaccines**
    - The EUA states that a vaccine can only be available so long as treatment doesn't exist.
    - This is a pandemic, right? **It's stupid that we must choose between treatment and a vaccine.** We should have access to both. It's a stupid law.
    - Congress can pass a law that updates the Emergency Use Authorization Act. They can make a new law right now that says that
        - If congress declares an official pandemic the FDA can authorize vaccines under the EUA
        - And that the EUA doesn't have to expire just because a treatment is found so long as congress legally declares a pandemic exists.
    - MY OPINION: Doing this will stop incentivizing Big Pharma from suppressing treatments via the media and paying off politicians
- **Fix the Vaccines major flaws, Update the Vaccine so it works and safely to a six sigma rating of safety.**
    - Admit the current vaccine is too flawed to be the solution

- Instead of throwing it out the vaccine, also acknowledge that we are very close to getting this right. We know what the problems are. So instead of pretending they don't exist we should use our brains and fix the following issues with the COVID 19 vaccine
    - Add the other 3 protein types to the vaccine. We are only vaccinating for the S protein. Now add M protein, E protein and N protein. This will absolutely cover all potential mutations and stop the virus dead in its tracks once and for all. This should fix the following
        - Immune Escape
        - Variants via Natural selection
        - Antibody Dependent Enhancement
    - Update the ligands on the lipid nano particle to stop the vaccine from traveling around the body and making spike proteins in the wrong places. We don't want the vaccines making spike proteins in our hearts or brains, only in our muscles.
    - Figure out a way to make the spike proteins nontoxic and non-damaging as much as possible without sacrificing vaccine efficacy. Spike proteins are causing a lot of problems. We just need to accept the spike proteins are doing damage and figure out a way to make them safe while still making them work. Good luck to the Biochemists, this will not be easy. But I'm confident it is possible.
    - Rebuild Trust. Conduct independent studies that examine the contents of the vaccine. Trust in the vaccines is low. It must be earned again. Mandates, force, coercion, deception can never replace Truth and Transparency. People don't trust the vaccine because they don't think it's safe. And until these concerns are proven without a doubt, that fear, uncertainty and doubt will continue to exist. If you fix the vaccines, **it needs to be proven without a doubt its safe**. Credibility has been destroyed and needs to be rebuilt again. Then people will easily do it.
    - Everything must be on the up and up, honest, and above all independently transparent or else this won't work
- **Prophylactic treatment (Taking medicine before you get sick)**
    - What can we do at home? We can use evidence-based treatments to help us be better prepared for COVID
    - Based on the Science adults should take the following daily
        - 10,000 IU of vitamin D3
        - 2,000 mg of vitamin C
        - 10 mg of zinc
        - 1,000 mg of Quercetin
    - Doing all this has been scientifically proven to help you fight COVID 19 before you get it.
    - If the whole country did this together the COVID 19 numbers would drop overnight
- **Post infection Treatment (Taking medication after you get sick)**
    - Based on the science if you get infected with COVID 19 you should take the following.
        - Ivermectin standard human dose daily
        - 50,000 IU of Vitamin D3 (split up 25,000 in morning, 25,000 at night)

        - 25g to 50g of intravenous vitamin C every 12 hours for the first 3 days. Half until uninfected. People over 50 and people with comorbidities should get the highest amount (50g) immediately.
        - 20 mg of zinc (only while infected)
        - Quercetin (2,000 m)
        - Brohexmine twice per day
        - STOP Taking Remdesivir. It doesn't do anything.
    - These are temporary amounts to help you fight COVID 19. You need to seek immediate medical attention if you test COVID positive so that your doctor can help you.
    - **Early treatment is key factor in COVID recovery. Evidence Shows Speed is your friend. Do not let it linger. Throw everything you have at it ASAP.**
    - Treatments is also acts as a safety net for any vaccine breakthrough which WILL occur. Not everyone has a strong enough immune system for even the perfect vaccine to work 100%. It's the persons immune system that is the issue. Its nice to know there is a backup plan, especially for those who get sick even if vaccinated.

The science is clear, we have solutions, we can start enacting evidence-based solutions now and if we followed this plan, the pandemic would be over in this country once and for all within 90 days. But the biggest problem about COVID isn't necessarily COVID. The biggest problems is we have been lied to and pit against each other. Nobody knows this information. Everyone is still stuck in the old paradigm mentally. There is no solution there. We must help share this information to move people into this new paradigm of evidence-based thinking. And for that ….

I need your help

This paper only works when everyone knows about it. I cannot spread the word alone. So, if you read this, you NEED to send this to everyone you know. So go ahead and start texting the link to your family and friends. We need everyone to learn about these facts or else nothing will ever change for the better. That's all you got to do. If everyone in America did that, we will have succeeded.

Thanks!

-Analyst Anon

So you want to keep reading huh?

Well, if you are curious like me you will be interested in everything that I wrote down, analyzed, and organized. All the data that I collected is here for you to examine yourself. Do not take my word for anything. Look at the data yourself. It's a lot, but worth it. You should be able to find everything you are looking for that I claimed up above.

Enjoy.

Reluctant Analyst Anon

What the experts are saying

To get where we are going, first we need to know where we are. Below are links from leading authority figures and health organizations. This provides the statements in full view of the world so that there is no miscommunication.

World Health Organization

- https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19
    - Claim 80% recover, 15% need intensive care, 5% become critical
    - People age 60 and over with co morbidities are at highest risk, but people of all ages can die
    - Social distancing, masks, and washing hands are recommended
    - There are several vaccines available and need to be approved by national entities
    - *WHO QUOTE: "Results from the WHO's Solidarity Trial indicated that remdesivir, hydroxychloroquine, lopinavir/ritonavir and interferon regimens appear to have little or no effect on 28-day mortality or the in-hospital course of COVID-19 among hospitalized patients."*

FDA

- https://www.fda.gov/consumers/consumer-updates/learn-more-about-covid-19-vaccines-fda
    - The vaccines are available due to Emergency Authorization Use
    - Getting the vaccine will help prevent you from getting COIVD 19 and spread it
    - The FDA looked at the data and approved the vaccines for emergency use
    - The FDA claims that they looked at the data and that the vaccine will help against COVID 19 variants
    - FDA: *"The FDA has authorized three vaccines for emergency use because the data from clinical studies clearly showed that the known and potential benefits of the FDA-authorized COVID-19 vaccines outweighed the known and potential risks."*
    - FDA admits there are the following side effects to the vaccine
        - Myocarditis
            - Claim its temporary
        - Pericarditis
            - Claim its temporary
        - Anaphylaxis
            - Treatable
        - Guillian Barr Syndrome (Janssen Vax)
            - Neurological disorder where the immune system attacks the nervous system and causing muscle weakness and paralysis
            - Started 40+ days after Vax
        - Blood Clots (Janssen Vax)
            - 1 to 2 weeks after Vax

        - Low Platelet counts (Janssen Vax)
            - 1 to 2 weeks after Vax

FDA – EUA Explained

- https://www.fda.gov/vaccines-blood-biologics/vaccines/emergency-use-authorization-vaccines-explained
- Emergency Authorization Use (EUA) Explained
    - *"Emergency Use Authorization (EUA) is a mechanism to facilitate the availability and use of medical countermeasures, including vaccines, during public health emergencies"*
    - *"Under an EUA, FDA may allow the use of unapproved medical products, or unapproved uses of approved medical products in an emergency to diagnose, treat, or prevent serious or life-threatening diseases or conditions when certain statutory criteria have been met,* ***including that there are no adequate, approved, and available alternatives****."* – REMEMBER THIS FOR LATER

CDC

- https://www.cdc.gov/coronavirus/2019-ncov/vaccines/effectiveness/work.html
- Quotes
    - *"Vaccines reduce the risk of COVID 19 and serious complications"*
    - *"Reducing the risk of COVID-19, including severe illness, among people who are fully vaccinated by 90 percent or more."*
    - *"While COVID-19 vaccines are working well, some people who are fully vaccinated against COVID-19 will still get sick, because no vaccines are 100% effective."*
    - *"However, data suggest that vaccination may make symptoms less severe in people who are vaccinated but still get COVID-19."*
    - *"It typically takes about 2 weeks for the body to build protection after vaccination. You are fully vaccinated two weeks after your second dose of Pfizer -BioNTech or Moderna vaccine and two weeks after your single dose of Johnson & Johnson's J&J/Janssen vaccine"*
    - CDC Reaffirms that the FDA-authorized COVID-19 vaccines help protect against Delta variants
    - *"These vaccines are effective at keeping people from getting COVID-19, getting very sick, and dying."*
    - *"We don't know how effective the vaccines will be against new variants that may arise."*

US Dept of Health and Human Services

- https://www.hhs.gov/about/news/2021/07/15/us-surgeon-general-issues-advisory-during-covid-19-vaccination-push-warning-american.html
    - "U.S. Surgeon General Dr. Vivek Murthy is issuing the first Surgeon General's Advisory of this Administration to warn the American public about the urgent threat of health misinformation. Health misinformation, including disinformation, have threatened the U.S. response to COVID-19 and continue to prevent Americans from getting vaccinated,

prolonging the pandemic and putting lives at risk, and the advisory encourages technology and social media companies to take more responsibility to stop online spread of health misinformation."
    - Surgeon General says there are many vaccine myths preventing people from getting it

National Institute of Health

- https://covid19.nih.gov/treatments-and-vaccines/covid-19-vaccines
    - "As of October 2021, one COVID-19 vaccine has been approved….for emergency use. "
    - "Studies show that protection against SARS-CoV-2 begins to decrease over time after initial vaccine doses. Additional vaccine doses (**booster vaccinations**) provide longer-lasting protection against COVID-19"
    - "Vaccines have very high safety standards, and COVID-19 vaccines are no exception. COVID-19 vaccines have undergone and will continue to undergo the most intensive safety monitoring in U.S. history."
    - "Serious side effects that could cause long-term health problems are extremely unlikely following any vaccination, including COVID-19 vaccination."
    - "Studies and current data show that the antibodies our bodies make after vaccination recognize and protect against COVID-19 variants. This is being closely investigated, and more studies are underway."
    - "Studies indicate that vaccination produces a stronger immune response than the one produced by COVID-19 infection. The benefits of vaccination after infection far outweigh any known or potential risks."

Yale Medicine

- https://www.yalemedicine.org/news/2019-novel-coronavirus#:~:text=According%20to%20the%20CDC%2C,can%20lead%20to%20death
    - COVID 19 is spread in 3 ways
        - By breathing in air when close to an infected person who is exhaling small droplets and particles that contain the virus;
        - Having these droplets and particles land on the eyes, nose, or mouth:
        - Or touching the eyes, nose, and mouth with hands that have the virus on them.
    - Strict measures are critical for slowing the spread of the disease
    - Infection prevention is key thus using vaccines
    - In the U.S., widely available testing is important in understanding the true infection and mortality rates of COVID-19. (REMEMBER THIS FOR LATER)
    - *"Two kinds of tests are important to know about: viral tests help diagnose a current infection and antibody tests can tell if you've had a previous one."*
    - *"Doctors are also refining their approaches to treating COVID-19. The antiviral drug remdesivir, is the first and only drug to receive full FDA approval for patients ages 12 and older after some evidence showed it could reduce the number of days spent in the hospital. Studies on dexamethasone, a widely available corticosteroid (or steroid), have shown a link between the drug and a reduction of deaths from COVID-19 by a third for*

patients with "severe and critical" cases of COVID-19. Yale and other medical centers now have special clinics to treat patients with long-COVID symptoms."

- *"Threats like COVID-19 can lead to the circulation of misinformation, so it's important to trust information only from reputable health organizations and sources such as the CDC and the WHO. "The public health infrastructure in the U.S. is a critical resource for leading the federal, state, and local response," says Richard Martinello, MD, a Yale Medicine infectious diseases expert."*

Dr Anthony Fauci

- https://www.cnn.com/videos/tv/2021/10/03/sotu-fauci-on-decreasing-covid-risk.cnn
  - "It is never ok to get infected"
  - "You know the way to decrease the risk by 100%? Don't get infected in the first place"
- https://www.independent.co.uk/news/world/americas/us-politics/vaccine-covid-fauci-deaths-b1808878.html
  - *"The J&J data that just came out – when you have advanced critical disease, there were no hospitalizations and no deaths. That's good news,"* Dr Fauci said in an interview with CBS's Margaret Brennan.
  - *"The varying 'effectiveness' rates miss the most important point: The vaccines were all 100 per cent effective in the vaccine trials in stopping hospitalizations and death. Waiting for a more effective vaccine is actually the worst thing you can do to lower your risk of getting severely ill and dying of Covid-19,"* the doctors on Mr Biden's team wrote.
  - *"If I were not vaccinated now and I had a choice of getting a J&J vaccine now or waiting for another vaccine, I would take whatever vaccine would be available to me as quickly as possible for the simple reason of what I said a moment ago – we want to get as many people vaccinated as quickly and expeditiously as possible,"* Dr Fauci said.
- https://www.cnn.com/2021/10/11/health/us-coronavirus-monday/index.html
  - CNN - The nation's top infectious disease expert (Dr. Fauci) says vaccine mandates work and they'll help get more people vaccinated against Covid-19.
  - "We've obviously been trying very hard," Fauci said. "We try to get trusted messengers out there and try and get this away from being an ideological or political statement, get back into the realm of pure public health, and try to convince people."
  - "But we know that mandates work," (Fauci) said.
  - The best way for the US to assure that a decline in cases, hospitalizations and deaths will continue is to get "a lot more" people vaccinated, he added.
- https://www.npr.org/sections/coronavirus-live-updates/2021/07/08/1014214448/fauci-says-current-vaccines-will-stand-up-to-the-delta-variant
  - "No matter what study you look at, the protection against severe disease leading to hospitalization is always well within the 90%, regardless of the study, regardless of the country," Fauci said.
  - "It's so easy to get vaccinated. Viruses don't mutate if they can't replicate, and you can prevent them from replicating by vaccinating enough people so that the virus has nowhere to go," said Fauci, who is also chief medical adviser to President Biden.
  - INTERVIEW

        - **Bolden – "I saw some of the news out of the White House COVID-19 briefing today that here in the U.S., 99.5% of deaths from COVID-19 are in unvaccinated people. It does suggest strongly that the vaccinations are working at preventing death."**
        - Fauci – "Yes, very much so. The data are so clear. And if you look in our own country, where the level of vaccination is low, the level of infection is increasing. And with that, you'll have hospitalizations and hopefully not but likely you would see increase in deaths — an overwhelming reason why we've got to get as many people vaccinated as we possibly can."
        - **Bolden – "How worried are you that the Delta variant could mutate into something more aggressive, more worrisome, particularly with so many unvaccinated people still out and about?"**
        - Fauci – "Well, that is a concern, and that's the reason why we keep pushing, saying, please, people, if you're not vaccinated, seriously, consider it. It's so easy to get vaccinated. Viruses don't mutate if they can't replicate, and you can prevent them from replicating by vaccinating enough people so that the virus has nowhere to go. If you give the virus free reign to circulate in the community, sooner or later it's going to mutate. And one of those mutations may be a mutation that makes it a more dangerous virus."
- https://www.cbsnews.com/news/anthony-fauci-covid-19-unvaccinated-americans-delta-variant-face-the-nation/
    - "We have 100 million people in this country … who are eligible to be vaccinated, who are not vaccinated," Fauci said in an interview with "Face the Nation." "We've really got to get those people to change their minds, make it easy for them, convince them, do something to get them to be vaccinated because they are the ones that are propagating this outbreak."
    - The "predominant message," Fauci said, is that "if you're vaccinated, you're much, much more protected against getting infected than an unvaccinated who is completely vulnerable."
- https://www.cnbc.com/2021/09/02/covid-vaccine-fauci-says-he-would-not-be-surprised-if-full-regimen-is-three-doses.html
    - "I must say from my own experience as an immunologist, I would not at all be surprised that the adequate full regimen for vaccination will likely be three doses," Fauci told reporters during a White House Covid briefing.
- https://apnews.com/article/fact-checking-afs:Content:9792931264
    - Claim that animal trials were not skipped
    - Then they don't even post the studies that prove it.
- https://www.fda.gov/consumers/consumer-updates/why-you-should-not-use-ivermectin-treat-or-prevent-covid-19
    - The FDA has not authorized or approved ivermectin for use in preventing or treating COVID-19 in humans or animals. Ivermectin is approved for human use to treat infections caused by some parasitic worms and head lice and skin conditions like rosacea.
    - Currently available data do not show ivermectin is effective against COVID-19. Clinical trials assessing ivermectin tablets for the prevention or treatment of COVID-19 in people are ongoing.

- The FDA has not authorized or approved ivermectin for the treatment or prevention of COVID-19 in people or animals. Ivermectin has not been shown to be safe or effective for these indications.

How Dangerous is Covid 19?

During this pandemic there has been a conflicting message regarding the danger of the COVID 19 Virus. These perceptions on the reality of the situation differ dramatically among the population, DESPITE much of the data being available to the public. Some examples include ideas like “COVID-19 is no more dangerous than the flu” and Vice Versa, sometimes vast and different estimates on deaths, hospitalization rates, contagiousness, and policy and approach to COVID 19.

- https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-10103-x
- https://www.brookings.edu/research/how-misinformation-is-distorting-covid-policies-and-behaviors/

This section attempts to provide clarity on what is really going on with the danger that COVID 19 poses. First, we need to gather accurate data regarding the population of the USA so we will use the CIA’s most up to date information on the USA and its population. According to the CIA the population of the USA is approximately 334,998,398 as of JULY 2021. According to the Census the total population is almost the same as the CIA’s estimate at 334,900,248.

- https://www.cia.gov/the-world-factbook/countries/united-states/#people-and-society
- https://www.census.gov/data-tools/demo/idb/#/pop?COUNTRY_YR_ANIM=2021

Total Population

AGE	MALE	FEMALE	Combined
95 to 99	191,264	474,399	665,663
90 to 94	698,877	1,339,676	2,038,553
85 to 89	1,562,368	2,444,106	4,006,474
80 to 84	2,861,632	3,864,358	6,725,990
75 to 79	4,645,571	5,708,961	10,354,532
70 to 74	7,159,776	8,316,268	15,476,044
65 to 69	8,710,869	9,766,137	18,477,006
60 to 64	10,211,692	11,034,482	21,246,174
55 to 59	10,403,313	10,944,170	21,347,483
50 to 54	10,181,165	10,479,593	20,660,758
45 to 49	9,733,969	9,929,295	19,663,264
40 to 44	10,405,774	10,492,616	20,898,390
35 to 39	11,109,903	10,998,144	22,108,047
30 to 34	11,918,444	11,572,134	23,490,578
25 to 29	11,891,467	11,334,345	23,225,812
20 to 24	11,218,217	10,736,233	21,954,450
15 to 19	10,740,438	10,309,989	21,050,427
10 to 14	10,578,739	10,136,172	20,714,911
5 to 9	10,321,985	9,872,684	20,194,669
0 to 4	10,526,683	10,074,340	20,601,023
TOTALS	165,072,146	169,828,102	334,900,248

This data is great however the next problem we have is the odd formatting by age the CDC tends to use. So before we move forward I reformatted the data to fit the CDC's model. For years that split the Census model such as 15 to 19 I divided the number of years the CDC counts into the total number and then added that to the CDC model total age group and put the rest in the next age group. For example, for the age group 0 to 17, I added all census data from 0 to 14, but since the Census measures age from 15 to 19 I took the total for that age group (21,050,427) and divided it by 5 years. Then I multiplied it by the amount of years to hit 17 (3) which gave me a total of 12,630,256 to add to the 0 -17 age group. Here is that same data reformatted to fit the CDC's data set. This reformatted data can allow us to it easily for out analysis.

Age Group	Total Estimated Population
0-17	74,140,859
18-29	45,180,262
30-39	45,598,625
40-49	40,561,654
50-64	63,254,415
65-74	33,953,050
75-84	17,080,522
85+	6,710,690
Total & Average	334,900,248

With total population calculated and reformatted, we can begin to analyze the data. These links below provide demographic data for the USA in relation to COVID infection and death. Of all these data sets the most accurate and complete data sets come from the CDC. There one special note I would like to highlight. There is a conflicting data point regarding the total amount of infected in the USA. The demographic data and the total infected data have a roughly 20% difference in total infected. For this study I used the lesser demographic data because it provided more information regarding those infected and deaths associated with infection. It is reasonable to assume that if the higher number was indeed the correct one than increasing the follow numbers by 20% would provide roughly accurate figures.

- https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#AgeAndSex
- https://www.cdc.gov/nchs/nvss/covid-19.htm
- https://www.cdc.gov/nchs/nvss/covid-19.htm
- https://covid.cdc.gov/covid-data-tracker/#demographics
- https://covid.cdc.gov/covid-data-tracker/#demographicsovertime
- https://www.statista.com/statistics/1254271/us-total-number-of-covid-cases-by-age-group/
- https://covid.cdc.gov/covid-data-tracker/#demographics
- https://www.worldometers.info/coronavirus/country/us/

The first data set we look at is the following "Of all the Americans affected, how many Americans have been infected by COVID 19 by age group relative to the total population"

Age Group	Covid Infection Percentage of total pop
0-4	2.4%
5-11	5%
12-15	4.2%
16-17	2.7%
0 – 17 (Combined)	14.3% (Combined)
18-29	22.2%
30-39	16.6%
40-49	14.6%
50-64	19.4%
65> (Combined)	12.8% (Combined)
65-74	7.2%
75-84	3.6%
85+	2%

The data shows relatively average spread among the total population by age. The most likely people to be infected via age group are those age 18 – 29 while the least likely to catch it are those over 85 years. Nothing particularly striking stands out in this data set. The distribution of infection is relatively 'even' among the population. Keep in mind that the population sizes tend to decrease in older ages, hence less people to infect, hence less overall percentage of total population available to infect.

DEATH STATISTICS

Next we look at death statistics, analyzing both relative and absolute data points.

- Relative = deaths vs infected
- Absolute = deaths vs total population

According to the Demographic data provided by the CDC there have been a total of 33,722,039 Cases of COVID 19 as of OCT 1 2021 beginning from MAR 2020. The summary below taken from the CDC website (Table 1 Sex and Age) shows how many were infected versus how many died. Next to those I then add columns that analyze the survivability of the virus relative to the total amount infected. Then in the table below analyze the same data relative to the total population providing data in absolute terms.

Mar 1 2020 to OCT 1 2021. Total infected: 33,722,039 people

https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#AgeAndSex

RELATIVE DATA SET 2020+2021 Combined

Age Group	Total Infected	Total Death	Relative Survival Rate%	Relative Death Rate%	Relative Odds of Survival	Total Dead out of 100,000 Infected
0-17	4,827,078	478	99.9901	0.0099	1 in 10098.5	9.90
18-29	7,493,787	3,573	99.9523	0.0477	1 in 2097.3	47.67
30-39	5,603,462	10,324	99.8158	0.1842	1 in 542.8	184.24
40-49	4,928,346	25,978	99.4729	0.5271	1 in 189.7	527.11
50-64	6,548,624	118,573	98.1893	1.8107	1 in 55.2	1,810.65
65-74	2,430,417	154,373	93.6483	6.3517	1 in 15.7	6,351.70
75-84	1,215,209	182,511	84.9811	15.0189	1 in 6.7	15,018.90
85+	675,116	191,362	71.6549	28.3451	1 in 3.5	28,345.05
Total & Average	33,722,039	687,172	97.9622	2.0378	1 in 49.1	2,037.75

ABSOLUTE DATA SET 2020 + 2021 combined

Age Group	Total Population 2021	Total Death	Absolute Survival Rate%	Absolute Death Rate%	Absolute Odds of Survival in age group	Total Dead out of 100,000 Pop
0-17	74,140,859	478	99.9994	0.00064	1 in 155,106.4	0.64
18-29	45,180,262	3,573	99.9921	0.00791	1 in 12,644.9	7.91
30-39	45,598,625	10,324	99.9774	0.02264	1 in 4,416.8	22.64
40-49	40,561,654	25,978	99.9360	0.06405	1 in 1,561.4	64.05
50-64	63,254,415	118,573	99.8125	0.18745	1 in 533.5	187.45
65-74	33,953,050	154,373	99.5453	0.45467	1 in 219.9	454.67
75-84	17,080,522	182,511	98.9315	1.06853	1 in 93.6	1068.53
85+	6,710,690	191,362	97.1484	2.85160	1 in 35.1	2851.60
Total & Average	334,900,248	687,172	99.7948	0.20519	1 in 487.4	205.19

There is a clear connection with age, the older someone is, the higher they are at risk of dying. Children ages 0 to 17 face a tiny risk in absolute terms. The chance they will die from COVID 19 is 0.00064%. In Absolute Terms the chance of someone dying from Covid less than 0.1% all the way up to 49 years of age. From 50 to 74 years of age the chance is less than 1%. From 75 to 84 the chance is about 1%, with the worst-case scenario in absolute terms of people over 85 having a 2.85% chance of dying from COVID 19.

However, the most surprising statistic was the relative death statistics from those infected. In Relative Terms (comparing death vs infected) the results are much more deadly. If someone between the ages of 0 to 17 years of age is infected with COVID they have a miniscule 0.0099% chance of dying. However, the

older a person is the chances of dying begin to increase dramatically. If someone over the age of 85 catches COVID 19 they have a 28.3% chance of dying. A little over 1 in 3. Keep in mind in Russian Roulette you have a 1 in 6 chance of dying.

For comparison I pulled death data from different places to see exactly how dangerous COVID 19 is compared to things that have existed. The data below is presented in absolute population wide figures. However, when I loaded the data I realized that the odds relative to the total population were incorrect. So I went back to the Census table and got the total population from 2019 which was 328,239,523. Then I collected the numbers and ran it again in absolute terms. I decided to include COVID 19 data but the problem was the data set included almost 2 years of data. So I decided to halve the data to provide a more reliable and consistent data set to match.

- https://www.census.gov/data-tools/demo/idb/#/pop?COUNTRY_YR_ANIM=2021&menu=popViz&POP_YEARS=2019&FIPS=US&popPages=BYAGE
- https://injuryfacts.nsc.org/all-injuries/preventable-death-overview/odds-of-dying/
- https://www.iii.org/fact-statistic/facts-statistics-lightning
- https://www.dogsbite.org/dog-bite-statistics-fatalities-2019.php
- https://www.cdc.gov/mmwr/volumes/68/wr/mm6829a5.htm
- https://www.ncdc.noaa.gov/billions/events/US/2020
- https://injuryfacts.nsc.org/home-and-community/safety-topics/guns/
- https://www.nimh.nih.gov/health/statistics/suicide
- https://www.cdc.gov/heartdisease/facts.htm
- https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2019.html
- https://www.cdc.gov/nchs/fastats/copd.htm
- https://www.cdc.gov/nchs/fastats/accidental-injury.htm
- https://www.cdc.gov/drowning/facts/index.html
- https://www.usfa.fema.gov/data/statistics/
- https://www.statista.com/statistics/527321/deaths-due-to-choking-in-the-us/
- https://www.cdc.gov/mmwr/volumes/69/wr/mm6924a1.htm
- https://pubmed.ncbi.nlm.nih.gov/33756057/
- https://www.cdc.gov/nchs/fastats/diabetes.htm

334,900,248 - Total population in 2021

Cause of Death	Total Deaths	Absolute Odds
Heart Disease – Annual average from CDC	659,000	1 in 508
Cancer - 2019	606,880	1 in 552
COVID 19 – Total – Annual Avg.	343,586	1 in 975
Chronic Lower Respiratory Disease	156,979	1 in 2,133
Alzheimer's – 2019	121,499	1 in 2,756
COVID 19 - 85+ – Annual Avg.	95,681	1 in 3,500
COVID 19 - 75-84 – Annual Avg.	91,256	1 in 3,670
Diabetes – 2019	87,647	1 in 3,821
COVID 19 - 65-74 – Annual Avg.	77,187	1 in 4,339

Unintentional Poisoning	65,773	1 in 5,092
COVID 19 - 50-64 – Annual Avg.	59,287	1 in 5,649
Suicide - 2019	47,511	1 in 7,049
Falling	39,433	1 in 8,493
Vehicle Crash	37,595	1 in 8,908
Homicide Gun Deaths - 2019	14,414	1 in 23,234
COVID 19 - 40-49 – Annual Avg.	12,989	1 in 25,783
Choking on Food - 2019	5,228	1 in 64,059
COVID 19 - 30-39 – Annual Avg.	5,162	1 in 64,878
Drowning – Annual average	3,960	1 in 84,571
Fire/Smoke	3,704	1 in 90,416
COVID 19 - 18-29 – Annual Avg.	1,787	1 in 187,409
Sun Stroke – annual average	702	1 in 477,066
Accidental Gun Discharge - 2019	481	1 in 696,258
Cataclysmic Storms & Fires - 2020	262	1 in 1,278,245
COVID 19 - 0-17 – Annual Avg.	239	1 in 1,401,256
Hornet, Wasp, Bee Stings - 2017	89	1 in 3,762,924
Dog Attack - 2019	52	1 in 6,440,389
Lightning – 2019	17	1 in 19,700,015

When add the absolute age-related data is provides a clearer picture we can see in relative and absolute terms how deadly COVID 19 is. COVID is the 3rd most Dangerous cause of death nationwide. However, people are still dying more from heart disease and cancer. When we divide COVID 19 by age groups we see a much more drastic and realistic difference in the risk factors. A child 17 and under odds almost a 1 in 1.4 million of dying from COVID in absolute terms. Whereas a person 85 and older has a much lower 1 in 3,500 chance of dying. Some statistics also show that if you are under 50 you are more likely to die from a car crash than COVID 19. These death rates that we have lived with for all our lives can help us put the danger of COVID 19 in perspective.

In an entirely separate study not associated with the data I just provided there was an examination of the Leading Causes of Death 2020

https://jamanetwork.com/journals/jama/fullarticle/2778234

In this study, the top 3 killers are heart disease, cancer and covid 19 in that order. Here we have data convergence where two separate examinations yield similar results.

COVID 19 VS THE FLU

Next I wanted to directly compare the Influenza virus to COVID 19. Since both are dangerous respiratory diseases with the most similarities. This will also attempt to answer, “How dangerous is the Flu compared to COVID 19”. Here is the Flu Data from the 2017 to 2018 Flu season. This is the most recent flu season data that is not contaminated with any COVID 19 infections. The flu does not operate in a

clean data set that fits our annual calendar (Jan to Dec). So we count the 'season' of the flu starting at the end of summer and ending at the beginning of spring. I also used the population size from 2018 of 326,687,501

- https://www.cdc.gov/flu/about/burden/2017-2018.htm
- https://www.cdc.gov/flu/symptoms/flu-vs-covid19.htm
- https://www.census.gov/data-tools/demo/idb/#/pop?COUNTRY_YR_ANIM=2018&COUNTRY_YEAR=2018&FIPS_SINGLE=US&menu=popViz&popPages=BYAGE&FIPS=US&POP_YEARS=2018,2021

Flu Relative Death Data Set - 2018

Age Group	Symptomatic Illness	Deaths	Relative Survival Rate	Relative Death Rate	Relative Odds of Survival	Death Rate per capita 100,000 infected
0-17 yrs Combined	11,190,943	643	99.994%	0.005%	1 in 17,404	5.74
18-49 yrs	14,428,065	2,803	99.980%	0.019%	1 in 5,147	19.4
50-64 yrs	13,237,932	6,751	99.949%	0.050%	1 in 1,961	50.99
65+ yrs	5,945,690	50,903	99.143%	0.856%	1 in 116	856.13
All ages	44,802,629	61,099	99.863%	0.136%	1 in 733	136.3

Flu Absolute Data Set - 2018

Age Group	Total Pop	Deaths	Absolute Survival Rate	Absolute Death Rate	Absolute Odds of Survival	Death Rate per capita 100,000 pop
0-17 yrs Combined	73,458,673	643	99.99912	0.00087	1 in 114,244	0.88
18-49 yrs	137,776,059	2,803	99.99797	0.00203	1 in 49,153	2.03
50-64 yrs	63,083,430	6,751	99.9893	0.01070	1 in 9,344	10.70
65+ yrs	52,369,339	50,903	99.9028	0.09720	1 in 1,029	97.20
All ages	326,687,501	61,099	99.9813	0.01870	1 in 5,347	18.70

For the covid Comparison I needed to halve the COVID data. Simply put there is two years' worth of data in the COVID data set tables whereas the FLU data set tables only have 1 year. It would not be a good or fair comparison otherwise.

Age Group	Total Avg Infected COVID 19 (20' to 21')	Total Death Average COVID 19 (20' to 21')
0-17	2,413,539	239
18-29	3,746,894	1,786
30-39	2,801,731	5,162
40-49	2,464,173	12,989

50-64	3,274,312	59,286
65-74	1,215,209	77,186
75-84	607,605	91,255
85+	337,558	95,681

COVID vs the FLU Relative

	Relative Survival Rate 2020-2021 average	Relative Death Rate per capita 100k infected 2020-2021 average	Relative Survival Rate 2017-2018	Relative Death Rate per capita 100k infected 2017-2018	Covid is X times deadlier than the Flu for age group when infected
Age group	**Covid 19**	**Covid 19**	**Flu**	**Flu**	
0-17 yrs Combined	99.9901%	9.90	99.994%	5.74	1.7
18-49 yrs	99.7787%	221.21	99.980%	19.4	11.4
50-64 yrs	98.1893%	1,810.65	99.949%	50.99	35.5
65+ yrs	87.7741%	12,225.82	99.143%	856.13	14.2

COVID vs the FLU Absolute

	Absolute Survival Rate 2020-2021 average annual death rate	Absolute Death Rate per capita 100k infected 2020-2021 average	Absolute Survival Rate 2017-2018	Absolute Death Rate per capita 100k infected 2017-2018	Covid is X times deadlier than the Flu for age group
Age group	**Covid 19**	**Covid 19**	**Flu**	**Flu**	
0-17 yrs Combined	99.9996%	0.32	99.9991%	0.88	0.36
18-49 yrs	99.9848%	15.18	99.9979%	2.03	7.47
50-64 yrs	99.9062 %	93.81	99.9893%	10.70	8.76
65+ yrs	99.5426%	480.77	99.9028%	97.18	4.94

In relative terms for children 17 and under COVID 19 is 1.7 times more dangerous than the flu. But then again, the Flu is not that dangerous for kids to begin with. COVID is 35 times more dangerous than the flu for people between 50 to 64 years of age and 14 times more deadly than the flu for people 65+. Despite the flu becoming more dangerous for older people, it pales in comparison to the lethality of COVID for older people in relative terms.

In absolute terms the FLU was almost 3 times more deadly than COVID 19 for young people. For older people COVID was still more dangerous but in absolute terms only 5 to 8 times more deadly.

The flu can be dangerous but when you compare someone infected with the flu vs someone infected with COVID 19 the data is clear. COVID 19 is more dangerous. However, the data also shows that the

FLU spread twice as much. Is that because of quarantine and safety measures because of masks and hand washing and social distancing and quarantining reduced the spread of COVID 19? Very likely.

COVID 19 FOR CHILDREN DEATH STATISTICS

For the year 2020 here are the stats for children ages 0 -17

https://www.childstats.gov/americaschildren/tables/pop1.asp

Using data from above pulled from the Census Bureau there were

- 72.8 million children from 0-17 in the year 2020
- 74.1 million children from 0-17 in the year 2021
- To average it out we get 73.45 million children average from both years. This provides a more fair representation of the data

Then below we separate the data from each year for COVID infected and deaths and place them accordingly.

Relative Table

	Age Group	Total Infected	Total Deaths	Relative Survival Rate%	Relative Death Rate%	Relative Odds of Survival	Total Dead out of 100,000 Infected
2020	0-17	2,950,621	198	99.9932	0.006	1 in 14,902	6.7
2021	0-17	1,876,457	280	99.9850%	0.015	1 in 6,701	14.9
Comb	0-17	4,320,742	478	99.9850%	0.009	1 in 10,098	9.9

Absolute Table

Year	Age Group	Total Pop 0-17	Total Infected	% Infected to total Pop 0-17	Total Deaths	Absolute Survival Rate%	Absolute Death Rate%	Absolute Odds of Survival	Total Dead per 100,000 Pop
2020	0-17	72.8M	2,950,621	4.05%	198	99.9997%	0.00027%	1 in 367,676	0.27 per 100k
2021	0-17	74.1M	1,876,457	2.53%	280	99.9996%	0.00037%	1 in 264,642	0.37 per 100k
20' + 21'	0-17	74.1M	4,320,742	5.83%	478	99.9993%	0.00065%	1 in 155,020	0.64 per 100k

How Dangerous is Covid 19 for Children? Not very dangerous at all.

COVID 19 vs SWINE FLU for children

Let now compare the deaths of COVID 19 to the deaths of swine flu for children back during 2009 to 2011 epidemic.

- https://academic.oup.com/cid/article/52/suppl_1/S75/499147
- An estimated 1,282 children died of swine flu from April 2009 to Apr 2010
- When you average out 10 months from 2020 and 2021 you get an average of 239 for COVID 19
- To be consistent I will divide the total death from 12 months from the swine flu by 12 months then multiply by 10 to give us an accurate comparative number
    - 1,282/12 = 106.834
    - 106.824 * 10 = estimated 1,068 deaths in a death month period for swine flu
- With that we can accurately compare mortality.
- In a average 10 month period
    - COVID 19 caused an average 239 deaths in a 10-month period
    - Swine flu caused 1,068 deaths in a 10-month period

Swine Flu killed 4.46 times more children than COVID 19 in absolute terms

All-cause mortality

However instead of comparing all deaths in the USA to COVID 19 children's deaths. Let's compare all child mortality to Covid 19 child mortality. Here are the numbers from the New England Journal of Medicine.

https://www.nejm.org/doi/full/10.1056/nejmsr1804754

The numbers below compare absolute totals. We compare total Absolute COVID deaths, Total Absolute Deaths from all causes, Absolute Flu deaths from the 2017-2018 Flu Season. To provide more balanced information I provided the average death count from the year 2020 and 2021 to provide a more accurate data set. I then added a 10% increase in population size to account for the missing 18- and 19-year old's.

Child Mortality All Causes vs COVID 19

Cause Ages 0 -19	No of Deaths	Study Rate per 100,000	Est. Absolute Comparison
All Causes	20,360	26.06	78.02
All injury related causes	12,336	15.79	**47.28**
Motor Vehicle Crash	4,074	5.21	**15.60**
Firearm related Injury	3,143	4.02	**12.04**
Malignant Neoplasm	1,853	2.37	**7.10**
Suffocation	1,430	1.83	**5.48**
Drowning	995	1.27	**3.80**
Drug Overdose or Poisoning	982	1.26	**3.77**
Congenital Anomalies	979	1.25	**3.74**
Fall 2017- Winter 2018 Flu Season	643	0.82	**2.45**
Heart Disease	599	0.77	**2.31**

Fire or Burns	340	0.44	**1.32**
Chronic Lower Respiratory Disease	274	0.35	**1.05**
Average COVID 19 Death for the year 2020 and 2021 - Ages 0 -17 + 10% to estimate for 18 and 19 Y.O	**262**	**0.334**	**1**

In Estimated absolute terms of all the things that children ages 0 -19 died of Covid 19 was one of the least deadly things that can affect a child. Not even in the top 10 of things that can kill a person 19 years of age or younger.

COMORBIDITIES

Next, we examine the comorbidities next associated with COVID 19. While we can see what other conditions people have, its practically assured that many people had more than one comorbidity. Which causes the data to not be as clean and clear.

https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#Comorbidities

Age	0-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total	Percentage of Covid Mortality Pop
Influenza and pneumonia	769	3498	9144	23684	52883	83294	90481	78424	342,184	47.96%
Chronic lower respiratory diseases	94	269	618	1846	6909	15536	20175	16274	61,722	8.65%
Adult respiratory distress syndrome	291	1144	3012	7773	15735	21467	17059	9816	76,298	10.69%
Respiratory failure	568	2403	6667	17773	41413	68439	75594	63161	275,980	38.68%
Respiratory arrest	35	142	324	835	1920	3106	3947	4604	14,913	2.09%

Other diseases of the respiratory system	131	401	927	2236	5061	7718	8355	6986	31,815	4.46%
Hypertensive diseases	58	519	2174	6695	17659	30851	37202	40740	135,900	19.06%
Ischemic heart disease	21	130	523	2237	7677	16559	23351	24772	75,271	10.55%
Cardiac arrest	236	981	2543	6579	14010	20554	21343	19680	85,927	12.04%
Cardiac arrhythmia	44	152	415	1419	4396	10094	15998	19695	52,213	7.32%
Heart failure	34	169	474	1476	4388	9685	15294	21338	52,859	7.41%
Cerebrovascular diseases	44	147	463	1413	4015	7669	9787	10747	34,286	4.81%
Other diseases of the circulatory system	208	545	1285	3185	6940	10856	12209	12293	47,522	6.66%
Sepsis	204	718	2148	5802	13033	19629	17285	10709	69,529	9.74%
Malignant neoplasms	87	144	416	1350	4649	9279	10395	7678	33,998	4.76%
Diabetes	175	802	2763	8173	19329	30770	29810	19697	111,521	15.36%
Obesity	429	1685	3604	6094	8562	7979	3950	961	33,267	4.66%
Alzheimer disease	0	1	3	21	195	1503	6637	14586	22,946	3.22%
Vascular and unspecified dementia	0	2	9	63	810	5289	18444	37169	61,787	8.66%
Renal failure	131	635	1872	5279	11887	19048	19268	15458	73,580	10.31%
Intentional and unintentional injury,	141	339	566	1036	2058	3081	3515	4099	14,836	2.08%

poisoning, and other adverse events										
All other conditions and causes (residual)	1000	2822	6717	16999	39649	65410	73624	71538	227,776	31.92%
COVID-19	1940	6889	17582	44145	99312	160784	187758	195124	713,545	-NA

The greatest comorbidity with COVID 19 are respiratory diseases. **Its my opinion** that these respiratory diseases are likely caused by COVID 19 itself. The non-respiratory diseases are a smaller percentage of people infected. Respiratory comorbidities such as Influenza and Respiratory failure can be as high as 40 to 50%. Meanwhile cardiovascular disease, diabetes and other non-respiratory diseases average between range between 2 to 19% (not including the vague 'all other conditions'). Obesity is NOT an indicator of COVID risk since 33k people were obese when dying from COVID. Out of the sample size of 713k. Roughly 4.6% of the total percentage of people who died from COVID were Obese.

While the chart does show comorbidities it separates each disease individually. Which is useful to track comorbidities but makes it difficult to get absolute numbers. Since the totals add up more than it is obvious that most people had more than one comorbidity. To get an average I added all the total comorbidities and divided it by the total. The result shows that people died on average with 2.7 comorbidities. However, when I removed the first four rows (respiratory comorbidities) the number of co morbidities drop to 1.65 average NON-Respiratory comorbidities. It is highly likely that the vast majority of COVID 19 deaths are associated with a non-respiratory comorbidity.

NOTE: There is a disparity between the Total COVID 19 death in the comorbidity chart vs the Total COVID 19 deaths in the demographic chart 687k to 713k. This is because this comorbidity chart includes some of OCT 21 data that did not exist at the time when I pulled the Demographic chart. The percentages make up with a sample size of 713K with only a 4% difference in size should roughly be about the same.

OTHER COVID 19 DANGERS

NEUROLOGICAL

COVID 19 attacks the cells in the brain

- https://www.nature.com/articles/s41593-021-00926-1

COVID 19 causes brain inflammation. Lew's bodies were also observed which is a precursor to Parkinson's disease

- https://www.biorxiv.org/content/10.1101/2021.02.23.432474v2

This study shows that most people lose (olfactory) smell and (gustatory) taste

- https://els-jbs-prod-cdn.jbs.elsevierhealth.com/pb/assets/raw/Health%20Advance/journals/jmcp/jmcp_ft95_5_18.pdf

This study shows how neurological problems occurred in 153 COVID 19 patients

- https://www.thelancet.com/action/showPdf?pii=S2215-0366%2820%2930287-X

This study showed how COVID 19 victims suffered neuro inflammation during COVID 19 infection

- https://academic.oup.com/brain/article/143/10/3104/5868408

These studies showed ischemic strokes in COVID 19 patients

- https://pubmed.ncbi.nlm.nih.gov/34656887/
- https://jnnp.bmj.com/content/jnnp/early/2020/05/28/jnnp-2020-323586.full.pdf

There is sufficient evidence that COVID 19 can penetrate the blood brain barrier and affect the brain and associated neurological systems.

ANALYSIS

- Covid 19 affects does not infect any age group population any more than the other
- Covid 19 is deadlier the older you get
- In Relative terms COVID 19 can be almost as safe as the Flu if you are a child
- In Relative terms COVID 19 can be extremely deadly if you are over 85 (28%+ mortality)
- In Absolute terms COVID 19 is insignificant compared to all cause mortality in children
- In Absolute terms COVID 19 has a 2.85% death rate so far for all persons over 85.
- In Relative Terms COVID 19 is 1.7 times more deadly than the flu for ages 0-17
- In Relative Terms COVID 19 is 14 times more dealty than the flu for ages 65+
- In Absolute terms COVID 19 is almost 3 times safer than the flu for ages 0 – 17
- In Absolute terms COVID 19 is almost 5 times deadlier than the flu for ages 65+
- A child is literally 100 times more likely to die from anything else BUT COVID 19
- When compared with other mortalities COVID 19 Total is the 3rd deadliest cause of death behind heart disease and cancer
- For all persons 49 years of age and younger COVID 19 is not even in the top 10 cause of mortality.
- In relative terms COVID 19 is 2,863 times more deadly for a 85+ person than someone 0-17
- In relative terms COVID 19 is 53 times deadlier for a person between the age 40 – 49 than a person 0 to 17
- Relative total death rate is 2.03% (this is important for later)
- Absolute total death rate is 0.2% (This is important for later)
- COVID can affect the brain, not just the lungs.

ARE THESE NUMBERS ACCURATE?

Well the math from these numbers is as close as they can be. The data is only as good as the people reporting it. It is my opinion that the data and numbers paint an relatively accurate picture of what is happening in terms of COVID 19 mortality. However there have been vocal critics of the reporting itself, stating that both the total infected and the total deaths have been inflated.

Inflated COVID 19 infection numbers

When someone tests for COVID 19 they are likely using a PCR test. These tests go through a 'cycle' to find a specific pathogen. Critics claim that the standard cycle amount for these tests is around 20 - 25. The current cycle total is 40. Critics claim at 40 cycles you will see a dramatic increase in false positive as the test will turn positive from overuse. Essentially you will 'find what you are looking for'

- https://www.reuters.com/article/uk-factcheck-who-instructions-pcr-guidan/fact-check-who-released-guidance-on-proper-use-of-tests-it-did-not-admit-pcr-tests-showed-inflated-infection-numbers-idUSKBN2A429W
- https://www.medpagetoday.com/infectiousdisease/covid19/90508
- https://www.fda.gov/medical-devices/safety-communications/potential-false-positive-results-certain-lots-ellume-covid-19-home-tests-due-manufacturing-issue-fda

This could explain 'asymptomatic' cases where people test positive for COVID 19 but have no illness. (Only in cases where no COVID 19 antibodies are found) When looking at the data of how strong this virus is, even accepting false positives, COVID 19 has a profound effect in inducing illness. It is my opinion that the high PCR cycle is the explanation for some of these asymptomatic COVID 19 cases. Everyone else is getting sick, but there are people, with no prior exposure with no symptoms at all. They could have powerful immune systems or could have been infected with a weakened virus or received a false positive.

Even in the worst-case scenario where PCR testing was deliberately fraudulent, it is my opinion that there is nothing we can do. How can we retest if someone falsely tested positive? The moment is gone forever. It is possible that you could measure antibodies, but almost 60% of the population has gotten the COVID 19 vaccine. It's practically certain that the antibodies created by the Vaccine would corrupt any future testing. Even if there could be a definitive way to measure this there are two problems. How are you going to convince 340 million people to take this test? And what happens if they caught and beat COVID after the false positive. There are too many variables, too unfeasible, and quite frankly too late. Short of getting a time machine, I do not believe that any 'audit' of the COVID 19 infection numbers can ever be done. We are stuck with what we have. It is also my opinion that the number reported do not seem that unfeasible either. While there are false positives, there are likely many true positives too.

Inflated COVID 19 Death numbers

There have been complaints that people have inflating the COVID 19 death figures. Anecdotal reports are coming in saying that Doctors and hospitals are deceptively putting 'COVID 19' as the cause of death for some cases. Fact Check claims that the story is fake news and that the idea that a doctor would deliberately treat a person for covid while putting them on a respirator is insane and unfeasible.

https://www.factcheck.org/2020/04/hospital-payments-and-the-covid-19-death-count/

Then further down the article they admit the following

- Q: Are hospitals inflating the number of COVID-19 cases and deaths so they can be paid more?
- A: Recent legislation pays hospitals higher Medicare rates for COVID-19 patients and treatment, but there is no evidence of fraudulent reporting.

- *"An analysis by the Kaiser Family Foundation looked at average Medicare payments for hospital admissions for the existing diagnosis-related groups and noted that the "average Medicare payment for respiratory infections and inflammations with major comorbidities or complications in 2017 … was $13,297. For more severe hospitalizations, we use the average Medicare payment for a respiratory system diagnosis with ventilator support for greater than 96 hours, which was $40,218.""*
- *"It is true, however, that the government will pay more to hospitals for COVID-19 cases in two senses: By paying an additional 20% on top of traditional Medicare rates for COVID-19 patients during the public health emergency, and by reimbursing hospitals for treating the uninsured patients with the disease (at that enhanced Medicare rate). Both of those provisions stem from the Coronavirus Aid, Relief, and Economic Security Act, or CARES Act. The CARES Act created the 20% add-on to be paid for Medicare patients with COVID-19. The act further created a $100 billion fund that is being used to financially assist hospitals — a "portion" of which will be "used to reimburse healthcare providers, at Medicare rates, for COVID-related treatment of the uninsured," according to the U.S. Department of Health and Human Services."*

- Gerald Kominski, senior fellow at the UCLA Center for Health Policy Research said:
    - "There's an implication here that hospitals are over-reporting their COVID patients because they have an economic advantage of doing so, [which] is really an outrageous claim, (any suggestion that patients may be put on ventilators out of financial gain, not medical need) is basically saying physicians are violating their Hippocratic Oath … it would be like providing heart surgery on someone who doesn't need it."

The article confirms that a financial incentive to lie exists.

Also, I agree with Doctor Kominski that giving people COVID 19 treatment who don't need it is a terrible idea. However, filling out some paperwork and sending the government a bill is easy to do. Do we have any irrefutable proof that no fraud exists? No, we do not. How? Simple.

“Is Medicare conducting an audit of all the Medicare claims for COVID 19 and ventilators?”

The answer is no. There has been NO forensic audit of all COVID 19 deaths let alone Medicare related one. There are no reports of Medicare conducting an audit or verifying the claims of hospitals and doctors. The bottom line is this.

There exists and loophole in the system with a financial incentive to submit false Covid 19 claims for government money. Which in turn would increase the ‘deadliness’ of COVID 19 and cause more panic. Medicare is likely overworked because of the pandemic; the likelihood of any forensic audit is practically zero. **There is no study or audit that can either prove or disprove this theory**.

The honest answer is we don’t know if this is happening. We have no definitive proof either way.

All we have are reports we get from surviving family members saying loved ones dying from NON COVID reasons are being listed as COVID 19 deaths. If someone says this isn’t happening than ask them to show you the forensic audit of all the hospitals. They won’t be able to because it doesn’t exist. Right now, nobody knows for sure. The only way to restore full confidence in the medical system regarding the counting of COVID 19 deaths is a full fledge Forensic Audit. This would readjust the numbers and provide us with more meaningful data to guide public policy.

WHAT IS THE MRNA VACCINE AND HOW DOES IT WORK?

- Who invented it?
    - Robert Malone in 1987
        - https://www.nature.com/articles/d41586-021-02483-w
        - Robert was testing mixing mRNA with human fats and discovered that proteins were being produced
        - He wrote in 1988 it might be possible to treat RNA like a drug
- How does regular vaccine work vs MRNA Vaccine
    - How the mRNA vaccine works
        - https://www.cdc.gov/coronavirus/2019-ncov/downloads/vaccines/COVID-19-mRNA-infographic_G_508.pdf
        - RNA is the genetic material that tells your body how to make proteins
        - The RNA would be destroyed if it entered your body, so it is wrapped in a special material called LIPID Nano Particles
        - The vaccine contains RNA with instructions to make a COVID 19 Alpha Variant spike protein
        - Imagine the virus like a ball and imagine spikes that come out of that ball. The spikes have different shapes and sizes. Each 'Spike' is unique, so the vaccine causes your body to produce these spike proteins and release them into your body.
        - The body then recognizes these spikes and creates antibodies
        - When your body is confronted by the real COVID 19 virus, your body will theoretically recognize and 'remember' the spike proteins on the surface of the Virus and attack.
        - Without this antibody defense, the immune system would bypass, and the virus would have time to replicate causing infection.
        - The vaccine uses your own protein creation factories to make bits and pieces of the COVID 19 virus to create immunity
    - Lipid Nanoparticles
        - https://www.cas.org/resource/blog/understanding-nanotechnology-covid-19-vaccines

        - Liposomes were the 1st generation of nano delivery system and are still used to great effect in medicine today
        - Liposomes surround the material in a fatty protein that the body does not attack.
        - The liposome can then pass through the cell wall and deliver the materials inside without the immune system attacking it
        - There are a few downsides to liposomes
            - Short circulation time in the blood stream
            - Unstable in the human body
            - Lack of selective targeting
        - Lipid nano particles aim to fix the problems
            - Enhance tissue targeting by updating the liposomes surface with ligands or antibodies that bind to specific receptors or cells
            - Improve longevity in the blood stream
            - Provide controlled release
    - How mRNA vaccines are different than old school vaccines
        - https://www.breakthroughs.com/advancing-medical-research/what-makes-rna-vaccine-different-conventional-vaccine
        - Traditional vaccines
            - grow viruses in chicken or mammalian eggs
            - Can take months to create, extracts and ship batches
            - Growing large quantities of viruses present a biohazard
            - The antigen (piece of the virus) is injected to create the immune response
            - Each new vaccines requires an entirely new production process
        - mRNA vaccines
            - Can be synthesized by mapped DNA sequence in a computer
            - Take a single week to make a batch
            - No biohazard since mRNA is not a virus nor is it dangerous
            - mRNA uses the Ribosome (Protein factory in a cell) to create the antigen which induces immune response
            - mRNA vaccine production can be scaled and updated much faster and easier than older systems
    - The vaccines create COVID 19 Spike proteins without creating the whole virus. This creates immunity.
        - https://www.jimmunol.org/content/early/2021/10/11/jimmunol.2100637
    - This scientific case study goes into extreme detail to explain how the mRNA vaccines works
        - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5906799/
    - Liposomes help substance be absorbed by cells
        - https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC7356785/#!po=1.06383
- What can mRNA do?
    - mRNA can be used to activate protein production

        - https://www.modernatx.com/mrna-technology/science-and-fundamentals-mrna-technology
    - mRNA can be used to STOP protein production
        - https://www.sciencedaily.com/releases/2016/09/160929133723.htm
    - mRNA can be engineered to make whatever protein you want
        - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6302713/
    - You can use mRNA to increase protein degradation
        - https://jbioleng.biomedcentral.com/articles/10.1186/1754-1611-4-9
    - You might be able to inactivate chromosomes
        - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5627158/
    - You might be able to alter DNA through chromosome reproduction
        - https://www.nature.com/scitable/topicpage/genetic-imprinting-and-x-inactivation-1066/
    - mRNA can block protein production
        - https://elifesciences.org/articles/27417
    - More information
        - https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjGkrmr07nzAhUPHzQIHWfDC-wQFnoECBIQAQ&url=https%3A%2F%2Fwww.mdpi.com%2F1999-4923%2F12%2F2%2F102%2Fpdf&usg=AOvVaw37XzUhiVM51NK-lUA0CNer

IS THE COVID 19 VACCINE EFFECTIVE?

A major contention people have is the effectiveness of the vaccine. Half the population feels it works great. The other half feel it does not work. In this section we examine the efficacy of the COVID 19 vaccines. First, we start off by looking at some of the most widely cited studies.

Popular Studies

Effectiveness of First Dose of COVID-19 Vaccines Against Hospital Admissions in Scotland: National Prospective Cohort Study of 5.4 million People

- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3789264
- 2 months study from FEB 2021 on real world effect vaccines are having
- Vaccines statistically show massive reduction in hospitalizations in UK
- The Vaccines still prove very effective for those over 80 years of age

BNT162b2 mRNA COVID-19 Vaccine Effectiveness in the Prevention of SARS-CoV-2 Infection: A Preliminary Report

- https://academic.oup.com/jid/article/224/3/431/6278131
- Vaccine effectiveness increased over time up to 96% for vaccinated health care workers compared to unvaccinated healthcare workers

Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine

- https://www.nejm.org/doi/10.1056/NEJMoa2034577
- 43,448 participant received injections. Half with the vaccine and the other half with a placebo
- The vaccine was 95% effective compared to the control group

Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine

- https://www.nejm.org/doi/10.1056/NEJMoa2035389
- Randomized, blind, placebo-controlled study with 30,420 volunteers
- Half got the vaccine, half the placebo
- Vaccine efficacy was 94.1% compared to the control group at preventing infection

BNT162b2 mRNA Covid-19 Vaccine in a Nationwide Mass Vaccination Setting

- https://www.nejm.org/doi/10.1056/NEJMoa2101765

- 596,000 people participated in the study
- Estimated effectiveness in preventing death from COVID 19 was 72%
- Vaccinated participants showed improvements in all measurements of infection, disease severity, and death

Impact and effectiveness of mRNA BNT162b2 vaccine against SARS-CoV-2 infections and COVID-19 cases, hospitalizations, and deaths following a nationwide vaccination campaign in Israel: an observational study using national surveillance data

- https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC8099315/
- Study in Israel that tracked infections, hospitalizations and deaths from COVID 19 post vaccine roll out.
- Tracked 232,000 infections
- Two dose vaccine was found to be incredibly effective against COVID 19

Results: The Vaccine works incredibly well against the Alpha variant

Data Analysis of infected and death rates comparing 2020 vs 2021

Next, I shall do is look at both 2020 and 2021 and compare infection and death annual rates? Why 2020 vs 2021? Because On DEC 11th, 2020, Vaccines were approved under EUA. By JAN 1, 2021, approximately 3.75 million people received their 1st dose and in January people began to receive their second dose. It is admitted that full protection is only available until after two doses. I decided to include the data from Dec in the unvaccinated group for two reasons. Nobody was fully vaccinated in the month of Dec 2020. The total amount of 1 dose vaccinations was less than 1% of the total population for the entire month of dec. Conversely this means more than 99% of the population was theoretically still at risk. With almost 100% of the population not receiving both vaccines.

- https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations-process.html#:~:text=%E2%80%A2%20On%20Dec.%2011,of%20COVID%2D19.
- https://ourworldindata.org/covid-vaccinations?country=USA
- https://www.cnbc.com/2020/12/23/covid-vaccine-us-has-vaccinated-1-million-people-out-of-goal-of-20-million-for-december.html

Splitting up the data gives us two 10-month sample sizes. One from Mar 2020 to Dec 2020 and the next 10-month Sample size from Jan 2021 to Oct 2021.

2020 Infected and Death Statistics

Total infected: 20,633,715 people

Age Group	Total Infected	Total Death	Survival Rate%	Death Rate%	Odds of Survival	Total Dead out of 100,000
0-17	2,950,621	198	99.9932	0.0068	1 in 14,902	6.7
18-29	4,580,685	1481	99.9676	0.0324	1 in 3,093	32.3
30-39	3,425,197	4287	99.8748	0.1252	1 in 799	125.1
40-49	3,012,522	11318	99.6243	0.3757	1 in 266	375.7
50-64	4,002,941	56739	98.5825	1.4175	1 in 71	1,417.4
65-74	1,485,627	82251	94.4635	5.5365	1 in 18	5,536.5
75-84	742,814	106204	85.7024	14.2976	1 in 7	14,297.5
85+	412,674	122779	70.2479	29.7521	1 in 3.3	29,752.1
Total	20,613,081	385,257	98.1310	1.869	1 in 53.5	1,868.9

- What we see is that 20.6 million contracted COVID with an average death rate of 1 out of 53.5 people
- 385,257 died in 2020 from COVID 19
- With an average infected death rate of 1.8671% across all ages

2021 Infected and Death Statistics.

Total Infected: 13,108,859 infected so far

Age Group	Total Infected	Total Death	Survival Rate	Death Rate	Odds of Survival	Out of 100,000
0-17	1,876,457	280	99.9850%	0.015	1 in 6,701	14.9
18-29	2,913,102	2,092	99.9281%	0.0719	1 in 1,392	71.8
30-39	2,178,265	6,037	99.7228%	0.2772	1 in 360	277.1
40-49	1,915,824	14,660	99.2347%	0.7653	1 in 130	765.2
50-64	2,545,683	61,834	97.5710%	2.429	1 in 41	2,428.9
65-74	944,790	72,122	92.3663%	7.6337	1 in 13	7,633.6
75-84	472,395	76,307	83.8467%	16.1533	1 in 6	16,153.2
85+	262,442	68,583	73.8673%	26.1327	1 in 3.8	26,132.6
Total	13,108,859	301,915	97.6969	2.303	1 in 43.4	2,303.137

- What we see is that 13.1 million contracted COVID with an average death rate of 1 out of 43.5 people
- 301,915 died in 2021 from COVID 19
- With an average infected death rate of 2.3008% across all ages

When we look and analyze the two data sets against each other we can draw the following conclusion

- All age groups suffered increased mortality rates except 85+ which saw a 13.2% decrease in mortality
- 23.2285% increase in mortality POST Vaccine
- We have a 36.4% drop-in total infection rate.
- 7,524,856 less people contracted COVID in 2021 in the USA vs 2020

So on one hand less people died, but on the other hand COVID 19 became 18.9% more deadly. What was the major cause of the drops in death? It has to be undoubtedly the Vaccine. It's the only major variable change on a massive scale.

How many lives did the vaccine save? Well its difficult to estimate but we can use 3 numbers to get an approximation. 2020 average infected death rate, 2021 and the average of the two death rates. The graph below shows the math

	Total Difference in pop	Average Death Rate	Estimated lives saved
2020	7,524,856	1.869	140,639
2021	7,524,856	2.303	173,297
2020/2021 average	7,524,856	2.086	156,968

The vaccines have reduced the total infection rate by 7.2 million and saved an estimated 140,000 to 173,000 peoples lives. So why are the infection numbers and deaths still high. It is highly likely that the people still suffering were unvaccinated.

What about Breakthroughs?

To bring those who are unaware up to speed there are many different types of COVID 19 viruses that exist. The primary was the ALPHA or first strain that hit the world scene in China in late 2019 and spread across the world. There are many others that exist, but it is the DELTA variant which is the most significant. In this section we examine how the vaccine works against the alpha and delta variants. The other variants I have found are statistically insignificant to really be considered in this meta-analysis.

I began searching online for how many fully vaccinated people died from covid 19 in USA. I found many news reports and zero citations. Unfortunately, my search was unable to find comprehensive data complete sets I was looking for. The only data I was able to find was individual state data and one CDC page that referenced total breakthroughs. Many states did not have breakthrough information I was looking for. John Hopkins University encountered the same problem when they confirmed what I saw, which was that the state data regarding breakthrough cases are a mass.

- https://coronavirus.jhu.edu/pandemic-data-initiative/news/the-state-of-state-level-breakthrough-case-reporting

CDC is actively not tracking post vax infections, only hospitalizations and death

- https://covid.cdc.gov/covid-data-tracker/#vaccine-effectiveness
- https://www.govexec.com/management/2021/08/cdc-only-tracks-fraction-breakthrough-covid-19-infections-even-cases-surge/184711/

Nothing the CDC cited had aggregate Post Vax Data. Just an old study just that ended APR 30th 2021

- https://www.cdc.gov/mmwr/volumes/70/wr/mm7021e3.htm

For the USA we are stuck with the limited data set. I did the best I could with the limited data available

How many people have the vaccine in the USA as of OCT1

https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total

First Dose

Demographic	Total	Percentage of Population
POP >= 12YO	214,638,536	75.7%
POP >= 18YO	200,201,379	77.5%
POP >= 65YO	51,437,496	94.0%
Total	214,870,696	64.7%

Fully Vaxxed (2 Doses)

Demographic	Total	Percentage of Population
POP >= 12YO	185,011,183	65.2%
POP >= 18YO	173,230,020	67.1%
POP >= 65YO	45,660,393	83.5%
Total	185,143,698	55.8%

Fully Vaxxed + Booster

Demographic	Total	Percentage of Population
POP >= 18YO	4,724,297	2.7%
POP >= 50YO	3,955,103	4.3%
POP >= 65YO	2,988,820	6.5%
Total	4,742,750	2.6%

How bad is post vaccine breakthrough. (Getting sick with Covid after you got the vaccine)

What is the CDC saying?

https://www.cdc.gov/vaccines/covid-19/health-departments/breakthrough-cases.html

According to the CDC as of SEP 27th, 2021, the breakthrough in the USA is

- Infection Rate unknown
- 16,889 hospitalizations
- 5,226 deaths

As I searched, I tried to get more definitive data for all time periods in 2021 after the distribution of the vaccines. I searched the databases at the CDC and was unable to find anything more than the quick summation described in the link above. I went to every single state website and found where they keep COVID tracking and breakthrough information. Not every state is tracking breakthrough reporting which inhibits the ability to effectively track what is going on. Also, most states do not conduct genomic sequencing on the viral infection to determine if it was delta or alpha. The truth is that often in the following data set we don't know. I was able to find that delta did not appear in the USA until early summer and when it did appear the numbers were very low. It is safe to assume that most of these breakthroughs were of the alpha strain. Keep in mind that in the USA that Infected Reporting is limited due to the fact people don't always report.

State	Time Period	Fully Vaxxed	PostVX-Infected	Hospitalization	Deaths	Odds of death (1 in…)
CA	Jan 01- Sep 27	23,700,000	171,300	4,859	729	32,510
DE	Jan 01 – July 22	465,378	518	22	8	58,172
DC	Jan 01 – Sep 27	422,443	4303	41	9	46,938
FL	Jan 01 – Sep 27	19,119,043	?	?	?	x
ID	May 15 – Sep 27	878,212	6232	227	72	12,179
IL	Jan 01 – Sep 27	6,766,091	?	2016	566	11,954
IN	Jan 01- Oct1	3,270,143	39,176	845	334	9,791
MN	Jan 01 – Oct1	876,059	4,167	164	51	17,178
MI	Jan 01 – Sep 28	5,210,000	30,867	1,211	417	12,494
MT	Jan 01 – Sep 17	447,171	3,610	248	54	8,281
NJ	Jan 01 – Jun 09	2,200,000	1,319	30	7	314,286
NM	Jan 01 – Jun 02	937,297	696	67	8	117,162
NY	Jan 01 – Oct 01	12,428,470	86,860	6,083	?	x
OK	Jan 01 – Jul 19	1,333,317	1,416	130	19	70,175
OR	Jan 01 – Jul 01	2,100,000	1,790	191	31	67,742
RI	Jan 01 – Sep 30	722,295	6,898	335	60	12,038
TN	Jan 01 – Sep 29	3,113,030	52,946	1044	427	7,290
VT	Jan 01 – Sep 22	446,306	2,819	76	33	13,524
VA	Jan 01 – Sep 25	5,007,185	27,318	1,061	273	18,341
WA	Jan 01 – Sep 29	4,549,228	41,721	3,754	386	11,786
TOTAL			483,956	22,404	3484	

- 483,956 total breakthroughs from limited data sets.
- 22,404 hospitalizations
- 3,484 deaths

Quite frankly the data sets for a national review are incomplete and fragmented. However, the limited data is showing that the Vaccine is working to reduce overall deaths and hospitalizations.

Just from this limited data set breakthroughs account for 1 out of 27 people infected in 2021 or 3.69% of the total infected population. This number is likely higher since I was not able to find data from every state, which confirms the CDC estimate of 5,226 deaths.

If 5,226 break through is accurate than that means that out of 301,915 total deaths in 2021 so far

- Breakthroughs only counted for 1.73% of all COVID deaths in the USA.
- Unvaccinated deaths counted for 98.27% of all COVID deaths in the USA.

Here is the references for all the table data from the states I found.

1. https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19/Post-Vaccine-COVID19-Cases.aspx
2. https://news.delaware.gov/2021/07/23/weekly-covid-19-update-july-23-2021-delaware-sees-uptick-in-new-covid-19-cases/
3. https://coronavirus.dc.gov/data/vaccination
4. https://public.tableau.com/app/profile/idaho.division.of.public.health/viz/DPHIdahoCOVID-19Dashboard/Home
5. http://ww11.doh.state.fl.us/comm/_partners/covid19_report_archive/covid19-data/covid19_data_latest.pdf
6. https://coronavirus.idaho.gov/
7. https://www.dph.illinois.gov/covid19/data-portal
8. https://www.coronavirus.in.gov/vaccine/2680.htm
9. https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/airborne/coronavirus/data.shtml
10. https://www.michigan.gov/coronavirus/0,9753,7-406-98163_98173_105123---,00.html
11. https://dphhs.mt.gov/assets/publichealth/CDEpi/DiseasesAtoZ/2019-nCoV/Reports/MontanaBreakthroughreport_FINAL_9.24.21.pdf
12. https://www.nj.gov/health/news/2021/approved/20210609a.shtml
13. https://cv.nmhealth.org/wp-content/uploads/2021/06/FINAL-NM-COVID19-Day-449-Press-Update2021_06_02.pdf
14. https://www1.nyc.gov/site/doh/about/press/pr2021/vaccination-campaign-prevented-covid-cases-deaths-hospitalizations-in-2021.page
15. https://covid19vaccine.health.ny.gov/covid-19-vaccine-tracker
16. https://covid19vaccine.health.ny.gov/covid-19-breakthrough-data-report
17. https://oklahoma.gov/content/dam/ok/en/covid19/documents/weekly-epi-report/2021.07.21%20Weekly%20Epi%20Report.pdf
18. https://www.oregon.gov/oha/covid19/Documents/DataReports/Breakthrough-Report-07-2021.pdf
19. https://ri-department-of-health-covid-19-vaccine-data-rihealth.hub.arcgis.com/
20. https://ri-department-of-health-covid-19-breakthrough-cases-rihealth.hub.arcgis.com/
21. https://www.tn.gov/content/dam/tn/health/documents/cedep/novel-coronavirus/CriticalIndicatorReport.pdf
22. https://data.news-leader.com/covid-19-vaccine-tracker/tennessee/47/
23. https://www.healthvermont.gov/covid-19/current-activity/data-summary
24. https://www.healthvermont.gov/sites/default/files/documents/pdf/COVID19-Weekly-Data-Summary-9-24-2021.pdf

25. https://www.vdh.virginia.gov/coronavirus/covid-19-in-virginia/covid-19-cases-by-vaccination-status/
26. https://www.doh.wa.gov/Portals/1/Documents/1600/coronavirus/data-tables/420-339-VaccineBreakthroughReport.pdf
27. https://www.doh.wa.gov/Emergencies/COVID19/DataDashboard

Vaccinated people comprise a small percentage of those total infected and even smaller death rate. This data disproves previous claims that the vaccine is 100% effective. They are not. They do show very good efficacy against what know for certain is mostly the Alpha variant. The Delta is another matter which leads us to the next section.

ARE THE VACCINES EFFECTIVE AGAINST DELTA?

For this investigation I decided to leave the USA and examine the data from the UK. The reason is twofold.

- The UK does mandatory genomic sequencing on all covid patients. We know which people have Delta and which have Alpha.
- The UK was exposed to Delta much earlier than the USA and has already been hit by at least one full wave of delta. Thus, Delta has had more time to spread giving us accurate and real data to use.
- India is ground zero for Delta. UK has massive population traveling from India thus the surge.

The following document from the UK contains all the data regarding COVID 19.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1018547/Technical_Briefing_23_21_09_16.pdf

Page 19 contains the chart I used to pull the data from to analyze

	Total Delta Cases	Unknown(unlinked)	<21 days after 1st dose 1	>=21 days post dose 1	>= 21 days Post dose 2	Unvaccinated
Delta in UK	593,572	58,003	30,674	90,138	157,400	257,357
Overnight in patient admission	12,407	187	325	958	4,634	6,303
Percentage Hospitalized from sub group	N/A	0.332%	1.059%	1.062%	2.944%	2.449%
Deaths 50<	204		6	11	48	132
Deaths 50>	2,336		11	138	1,565	590

Total Deaths	2,542	41	17	149	1,613	722
Percentage Dead from Sub Group	N/a	0.07%	0.055%	0.165%	1.02%	0.28%
Odds of survival from Delta	1in 234	1 in 1,414	1 in 1,804	1 in 604	1 in 98	1 in 356

In this data set I compare Unvaccinated vs those who have had both vaccines and were infected at least 21 days post vaccination. There are intermediary people that include 1st dosage before and after 21 days infection. But to keep things simpler I'm focusing on 'Fully Vaccinated' vs 'Completely Unvaccinated' when confronted with Delta.

The data separates age groups into people over 50 years of age and under. Those people under 50 years of age had a significantly less risk of dying from Delta than those over 50 years.

Vaccinated people

- 2.97% of vaccinated people who died were under the age of 50
- 97.03% of vaccinated people who died were over the age of 50
- Relative death rate of all vaccinated people who caught delta was 1.02%

Unvaccinated people

- 18.2% of unvaccinated people who died were under the age of 50
- 81.8% of unvaccinated people who died were over the age of 50
- Relative death rate of all unvaccinated people who caught delta was 0.28%

Who had better survival rates?

- Vaccinated people were 38.9% less likely to be infected
- Fully vaccinated person is 3.63 Times more likely to die from Delta than an unvaccinated person.

Page 34 claims that the vaccines provide

- 60% to 85% infection reduction
- 90% reduction in hospitalization
- 90% reduction in mortality in delta.
- They do this by citing an entirely different document that isn't even peer-reviewed and ignore their own data inside their own report!
    - https://khub.net/documents/135939561/338928724/Vaccine+effectiveness+and+duration+of+protection+of+covid+vaccines+against+mild+and+severe+COVID-19+in+the+UK.pdf/10dcd99c-0441-0403-dfd8-11ba2c6f5801
    - Table S3 claims
- 895,000 had delta in this study, yet in data of the original only 593,000 had delta. What is up with the 300,000 difference?
- The study is critically flawed as it uses no control of unvaccinated at all.

- This data absolutely conflicts with the data presented. The data gathered earlier in the report absolutely trumps the non-peer reviewed study which uses a negative test control. The data uses real world definitive data. The non peer reviewed study makes assumptions based on data.

However, their own data on page 19 conflicts with that with the following for 2 dose vaccinated with 21 days to get full immunity. When infected with Delta these fully vaccinated people experienced the following when compared to unvaccinated people infected with Delta

- 38.9% reduction in aggregate infection
- 20.2% increase in per capita hospitalization
- 246% increase in per capita mortality

Delta Study from the USA in San Diego CA

Here is a study from the New England Journal of Medicine that details how faculty from the University of San Diego were almost 90% vaccinated. When Delta hit the school, the vaccines had no effect on stopping infection.

- https://www.nejm.org/doi/full/10.1056/NEJMc2112981?query=featured_home
- They cite several studies also from the NEJM that say the vaccines work, then go on to hypothesize as to why the vaccines don't work against delta.
- What is not in question is the fact the vaccines do not protect against Delta in any meaningful way

Another study from the NEJM claims that the vaccine was effective against Delta. But when I examined the data I was able to point out some serious flaws.

- https://www.nejm.org/doi/10.1056/NEJMoa2108891
- Delta Variant was first discovered in India in Dec 2020, but this test was sequencing back to OCT 2020? Why not start the month Delta was first discovered in the USA?
- Sample size of 247,297
- 4.2% of sampled unvaxxed group had delta
- 0.8% of sampled 2 dose vaccine 1 group had delta
- 2.6% of sampled 2 dose vaccine 2 group had delta
- Based on their findings the vaccine reduced infection anywhere from 80.9% to 38% when compared to the sample size of the unvaxxed.
- Used a test negative control as a methodology. Hard data from UK data on page 19 beats it.

They claimed

> *"With the BNT162b2 vaccine, the effectiveness of two doses was 93.7% (95% CI, 91.6 to 95.3) among persons with the alpha variant and 88.0% (95% CI, 85.3 to 90.1) among those with the delta variant. With the ChAdOx1 nCoV-19 vaccine, the effectiveness of two doses was 74.5% (95% CI, 68.4 to 79.4) among persons with the alpha variant and 67.0% (95% CI, 61.3 to 71.8) among those with the delta variant."*

They claimed effectiveness of 88% and 67% for the two alpha vaccines for delta.

However, in their own study in table two the unvaccinated had an infection rate of delta of 4.2% of the sample size. Then the infection rate for 2 dose vaccinated people was 0.8% and 2.6% of the sample group. When you compare the group infection rate percentage it doesn't communicate 90% effectiveness they claim. A simple arithmetic shows 80.9% reduction for vaccine 1 and a 38% reduction for vaccine 2.

Interestingly, when compared to the numbers in the UK study above the 90% effectiveness rate doesn't match. **But surprisingly MATCHES the lower infection rate of 38.8%** from the table on page 19 of the original report I cited. Test Negative control guess cannot compete with real world data that measures real world results on a per capita basis as a form of comparison.

CDC website analysis

On the CDC website the list 15 studies in which they use to create public policy. I examine each one.

1. https://www.cdc.gov/mmwr/volumes/70/wr/mm7031e2.htm
   - Outbreak in Barnstable County Massachusetts in July 2021
   - 479 cases positive
   - 364 fully vaccinated (74%)
   - 133 were checked and sequences and 119 people or 89% of the sample were Delta.
   - The study has zero information on hospitalizations or deaths
2. https://www.medrxiv.org/content/10.1101/2021.07.28.21261295v1
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Cohort Study in Singapore
   - 218 people had delta
   - 71 of those were fully vaccinated, 130 unvaccinated
   - Claim vaccinated required less oxygen, viral loads decreased faster, faster antibodies
3. https://www.medrxiv.org/content/10.1101/2021.07.05.21260050v3
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Cohort Study in Ontario Canada
   - 212,332 sample size
   - Compared to non-VOC SARS-CoV-2 strains (Alpha, Beta, Gamma), the adjusted elevation in risk associated with N501Y-positive variants was 52% (43-62%) for hospitalization; 89% (67-116%) for ICU admission; and 51% (30-74%) for death. Increases with Delta variant were more pronounced: 108% (80-138%) for hospitalization; 234% (164-331%) for ICU admission; and 132% (47-230%) for death.
   - Delta is more dangerous
4. https://www.medrxiv.org/content/10.1101/2021.07.07.21260122v2
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Cohort Study in Mainland China

- Claim Viral Loads in Delta patients are 1,000 times greater than normal.

5. https://www.researchsquare.com/article/rs-637724/v1
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Study in India
   - Delta dominates breakthroughs and with higher viral loads
   - 8 times less sensitivity to antibodies compared to wild type Wuhan-1 bearing D614G
6. https://www.medrxiv.org/content/10.1101/2021.06.28.21259420v3
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Ontario study
   - Effectiveness against symptomatic infection ≥7 days after two doses was 89–92% against Alpha, 87% against Beta, 88% against Gamma, 82–89% against Beta/Gamma, and 87–95% against Delta across vaccine products.
7. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3861566
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Singapore study
   - Delta Infection was associated with higher odds of oxygen requirement, ICU admission, or death
8. https://www.medrxiv.org/content/10.1101/2021.07.31.21261387v4
   - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
   - Wisconsin study
   - Delta Variant showed up more over time during PCR testing
9. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005517/Technical_Briefing_19.pdf
   - Earlier UK study. Same one as above. Just an earlier date from July not Sep.
   - Data is in line with previous analysis, just less data points obviously
10. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01358-1/fulltext
    - Study in Scotland
    - Delta became the dominate strain in Scotland
    - Delta caused twice the hospitalizations per capita
    - Compared to those unvaccinated, at least 14 days after the second dose, BNT162b2 (Pfizer–BioNTech vaccine) offered very good protection: 92% (95% CI 90–93) *S* gene-negative, 79% (75–82) *S* gene-positive.
    - Protection associated with ChAdOx1 nCoV-19 (Oxford–AstraZeneca vaccine) was, however, substantial but reduced: 73% (95% CI 66–78) for *S* gene-negative cases versus 60% (53–66) for those *S* gene-positive (appendix p 6).
    - Vaccine had 79% and 60% effectiveness against delta according to the test negative study
11. https://khub.net/web/phe-national/public-library/-/document_library/v2WsRK3ZlEig/view_file/479607329
    - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
    - UK study
    - Claim 88% VE with Pfizer for Delta
    - Claim 67% VE with AstraZeneca for Delta
    - Claim Delta VE with vaccines exist

- No unvaccinated control group

12. https://www.nejm.org/doi/10.1056/NEJMoa2107058
    - Cohort with 3,975 healthcare, frontline, first responders from Dec 2020 to Apr 2021
    - Delta didn't exist until Dec 2020. Small chance of it becoming an issue here.
    - Weekly Covid PCR testing using nasal swabs
    - 204 got covid
    - 5 fully vaccinated, 11 partially vaxxed, 156 unvaccinated, 32 people indeterminate vaccine status
    - VE was 91%
    - Nothing to do with Delta
13. https://www.nejm.org/doi/10.1056/NEJMoa2107058
    - Not Peer reviewed but on the CDC website dictating policy in clear violation of the rules.
    - UK study
    - Estimate that Delta is more transmissible
14. https://www.publichealthmdc.com/blog/breakthrough-infections-and-impact-of-the-delta-variant
    - Madison, Wisconsin Data
    - Feb 2021 to Aug 17 2021
    - 1,472 fully vaccinated people testing positive for Covid 19
    - 4 hospitalized, 2 dead from Alpha
    - 21 hospitalized, 2 dead after arrival of Delta
    - 8,020 unvaxxed tested positive in same time period
    - 174 hospitalized, 24 died unvaxxed
15. https://www.cdc.gov/mmwr/volumes/70/wr/mm7037e1.htm?s_cid=mm7037e1_w__;!!PIZeeW5wscynRQ!8Lzu1SYZHUp4yGFkJxjhPQOOhR05joQBHP0u5sNdeGf62ezpgrdta_xaMHeXAyE$
    - Study in 13 places in the USA
    - From Apr 4th to July 17th 2021
    - Rounded up 90%+ reduction in cases, hospitalizations, and deaths
    - Figure 2 shows positive results and decline in all markers. Then Delta arrives the numbers begin to increase
    - Criticism is the numbers are too early to tell. Delta barely hits and before its had a chance to really take effect the study ends. 1 month of minimal delta information from the study at the beginning of the outbreak is not enough data to make any meaningful observation or analysis.
    - Confirms previous numbers that the Alpha vaccine is effective against the Alpha Variant.

	Cases		Hospitalizations		Deaths	
	Unvaxxed	Fully Vaxxed	Unvaxxed	Fully Vaxxed	Unvaxxed	Fully Vaxxed
Totals	569,142	46,312	34,972	2,976	6,132	616

Everything the CDC cites goes against what they are saying.

- Vaccines made for alpha works for alpha, but not delta

- Delta is more dangerous in general
- Its still dangerous to fully vaccinated people than in terms of infectiousness
- In most of the studies the vaccines to not seem to have an effect.
- Only in the test negative control studies to vaccines seem to magically work.

More studies about Delta

Delta can become resistant

- https://www.biorxiv.org/content/10.1101/2021.08.22.457114v1.full
- Delta breakthrough variants are evolving and bypassing the antibodies created by the vaccines

Qatar study shows less effectiveness that diminishes over time

- https://www.medrxiv.org/content/10.1101/2021.08.25.21262584v1
- Immunity efficacy diminishes drops from week 3 peak to a week 5 low and stays there for at least up to 6 months
- Protect against infection wanes rapidly against delta
- Then claims protection against hospitalization and death still work though
- Another test negative case control claims vaccines protect against delta

Alpha vax doesn't work against delta

- https://www.journalofinfection.com/article/S0163-4453(21)00392-3/fulltext
- Antibody Dependent Enhancement is a concern
- Enhancing antibodies have higher affinity for Delta than Alpha
- Neutralizing antibodies have decreased affinity for Delta than Alpha
- *PAPER: "Thus, ADE may be a concern for people receiving vaccines based on the original Wuhan strain spike sequence (either mRNA or viral vectors)"*

This study says reinfection likely to occur with an average 16 months (3 months to 5 years range). Educated Estimate

- https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(21)00219-6/fulltext
- Compares the immunity profile of evolutionary similar coronaviruses and compares the antibody density over time to see how immunity holds up. This study says reinfection likely to occur with an average 16 months (3 months to 5 years range). However, this is an educated guess, extrapolated on non COVID 19 data.
- Not a data set observation.

Vaccine works against COVID for pregnant women

- https://www.nature.com/articles/s41591-021-01490-8
- Vaccine is effective in stopping COVID 19 in pregnant women.

- 10,800 women in test group.
- 10,800 women in control group.
- This shows after 14 days the covid infection rate dropped to almost nothing.
- Not details on variant type.

Breakthrough cases are increasing in Oklahoma

- https://oklahoma.gov/content/dam/ok/en/covid19/documents/weekly-epi-report/2021.10.13%20Weekly%20Epi%20Report.pdf
- Pg 8 shows that Delta is starting to infect Oklahoma
- Pg 9 shows that infections, hospitalizations and deaths are starting to go up

Brand New Variant A.30 completely bypasses the vaccinated immune system

- https://www.nature.com/articles/s41423-021-00779-5

Pfizer-BioNTech vaccine recipients have lower antibody levels targeting the Delta variant

- https://www.ucl.ac.uk/infection-immunity/news/2021/jun/pfizer-biontech-vaccine-recipients-have-lower-antibody-levels-targeting-delta-variant
- QUOTE: *"people are less likely to develop antibody levels against the B.1.617.2 (Delta) variant as high as those seen against the previously dominant B.1.1.7 (Alpha) variant, first found in Kent."*

Yale still claims the vaccines work against delta.

- https://www.yalemedicine.org/news/5-things-to-know-delta-variant-covid
- They make 5 claims
    1. Delta is more contagious than the other virus strains.
        - This is true. The data confirms this
    2. Unvaccinated people are at Risk
        - Sure. This is also true.
    3. Delta could lead to hyperlocal outbreaks
        - They claim that the virus skips over small patches of vaccinated people and infects those unvaccinated. They data and science show that vaccinated people are getting hit by Delta just as hard, if not harder than unvaccinated
        - FALSE
    4. There is still more to learn about Delta
        - While this is true, we now know enough about delta to start making educated, evidence-based decisions to help fight against it.
        - They say they don't have enough info to really understand how bad Delta is. That is FALSE. I was able to find plenty of information easily.
        - Either they are incompetent or are lying.
    5. Vaccination is the best protection against delta
        - Unequivocally FALSE
        - Evidence shows the alpha vaccine can cause ADE in the vaccinated making it more deadly to the vaccinated and is confirmed by evidence from the UK where vaccinated people are dying almost 4 times the rate of unvaccinated

- This is embarrassing for such a respected institution as Yale. I'm not a doctor yet was able to find, compile and analyze the scientific evidence to disprove three claims they are using to dictate public policy.

NO statistically significant relationship between vaccination rates and infection rates

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8481107/
- Examines data across 68 countries around the world
- QUOTE: *"there appears to be no discernable relationship between percentage of population fully vaccinated and new COVID-19 cases in the last 7 days"*
- QUOTE: *"There also appears to be no significant signaling of COVID-19 cases decreasing with higher percentages of population fully vaccinated"*
- QUOTE: "Of the top 5 counties that have the highest percentage of population fully vaccinated (99.9–84.3%)… (CDC) identifies 4 of them as "High" Transmission counties WHERE CONVERSLY 57 counties that have been classified as "low" transmission counties by the CDC, 26.3% (15) have percentage of population fully vaccinated below 20%."
- I.E. lower vaccinated locations are showing less transmission vs higher vaccinated locations.

What about the booster?

The booster is a 3rd vaccine made to be taken AFTER the first two which can theoretically provide protection against the Delta variant. The booster is still new, and data is still sparse. We will do the best I can. Here are some news and science case studies about the booster.

Reuters news article shows that early Israeli testing showing that Delta case are going down

- https://www.reuters.com/world/middle-east/israels-covid-19-vaccine-boosters-show-signs-taming-delta-2021-08-24/
- Delta cases are on the decline and for those over 60+ data shows that the Delta wave is no longer in the spreading phase but declining.

Study shows booster is working to helping with COVID rates

- https://www.medrxiv.org/content/10.1101/2021.08.29.21262792v1
- This paper is compromised since people presenting this study are being funded by the pharmaceutical companies which stand to make financial gain

This is another study in Israel about the booster

- https://www.nejm.org/doi/full/10.1056/NEJMoa2114255
- Table 2 of the study shows a 90% reduction in Delta breakthrough
- QUOTE: *"In this study involving participants who were 60 years of age or older and had received two doses of the BNT162b2 vaccine at least 5 months earlier, we found that the rates of*

confirmed Covid-19 and severe illness were substantially lower among those who received a booster (third) dose of the BNT162b2 vaccine."

The analysis

- Being vaccinated works incredibly well against the Alpha vaccine.
- But Being Vaccinated with the Alpha vaccine could reduce the risk of infection of Delta by roughly 40% but increase mortality by almost 4 times
- UK study holds more weight because it is an aggregate real-world total. Not an educated estimate aka test negative case control
- Two major studies have flaws in their analysis.
    - UK study says vaccines are effective and then cites an NON peer reviewed journal that uses test negative control methodology to assert the claim
    - They ignore the data they provide on page 19 which says the opposite that the vaccines cause almost 4 times the mortality rate than those who are unvaccinated when infected with the Delta variant
    - NEJM cite those vaccines are effective but use a faulty assumption based on total infected with no proof either way that the total delta infections were because of the vaccine and not the early emergence of the variant itself.
- Multiple studies show that Delta is
    - More contagious
    - Replicates faster
    - Causes more hospitalizations and deaths
- The only study we have with clear data on vaccinated vs unvaxxed Delta points to Vaccination being more deadly for the delta variant.
- The only times vaccination proves to effective against Delta are in the test negative case control methodologies which are essentially educated guesses. Every time there is real world data, it conflicts with the results of the methodology.
- The Booster holds much promise and early studies show a 90% reduction in breakthroughs

IS NATURAL IMMUNITY FROM COVID 19 EFFECTIVE?

People infected with COVID 19 produced antibodies that have lasted up to 12 months so far

- https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab884/6381561#.YWGhCytQ_Hc.twitter

The severity of infection is determines the strength of the immune response to COVID 19

- https://onlinelibrary.wiley.com/doi/epdf/10.1002/eji.202149535
- The more severe the COVID 19 infection the more robust the immune response.
- The more robust the immune response the higher the NAB titer levels over time
- Mild infections produced less NAB titers while severe infections produced more NAB titers
- Titers are persisting up to 13 months so far
- COVID 19 antibodies are created post infection and can exist up to 12 months and possibly beyond

Do people previously infected with COVID 19 need a vaccine?

- https://www.medrxiv.org/content/10.1101/2021.06.01.21258176v2
- Examined 52,000+ healthcare employees
- QUOTE: *"The cumulative incidence of SARS-CoV-2 infection remained almost zero among previously infected unvaccinated subjects, previously infected subjects who were vaccinated, and previously uninfected subjects who were vaccinated, compared with a steady increase in cumulative incidence among previously uninfected subjects who remained unvaccinated"*
- QUOTE: *"Not one of the 1359 previously infected subjects who remained unvaccinated had a SARS-CoV-2 infection over the duration of the study."*
- QUOTE: *"Individuals who have had SARS-CoV-2 infection are unlikely to benefit from COVID-19 vaccination, and vaccines can be safely prioritized to those who have not been infected before."*
- No they do not need the vaccine. They are protected

COVID 19 infection induces long lived bone marrow plasma cells in humans

- https://www.nature.com/articles/s41586-021-03647-4

- Long lived bone marrow plasma cells are a large source of protective antibodies.
- Concerns that rapid drops in serum antibodies may mean protection is short lived.
- Study shows 4 months post infection does create a drop, but 7months after the decline is much slower and more gradual.
- Protection was detectable 11 months after infection.
- Mild infection with COVID 19 produces robust antigen specific, long lived humoral immune memory in humans.

Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and memory B and T cells

- https://www.medrxiv.org/content/10.1101/2021.04.19.21255739v2
- Analyzed the immune system of 254 patients who were infected with COVID 19 for eight months
- Findings indicate that broad and effective immunity may persist long term in COVID 19 patients
- Infection created antibodies to two common human beta corona viruses
- Neutralizing antibodies, B cells and T cells were detected up to 8 months post infection

Immunological memory to SARS-CoV-2 assessed for up to 8 months after infection

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7919858/
- Detailed study of immune response post COVID 19 infection
- B cells were more abundant at 6 months post infection than 1 month
- CDT4 and CDT8 cells declined with a half life of 3-5 months but were detectable
- Immune response post infection confirmed

Persistence of neutralizing antibodies a year after SARS-CoV-2 infection

- https://www.medrxiv.org/content/10.1101/2021.07.13.21260426v1
- Shows that COVID 19 neutralizing antibodies persisted from 89% to 97% of subject post infection
- The more severe the infection the higher level of antibodies
- Antibodies to variants were created from wild COVID, but were significantly lower than wild type antibody

Quantifying the risk of SARS-CoV-2 reinfection over time

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8209951/pdf/RMV-9999-e2260.pdf
- Trying to quantify the COVID reinfection risk
- From March 2020 to Feb 2021
- Reinfection was uncommon (0 -1.1% absolute rate)
- Data shows that natural immunity does not wane for up to 10 months and likely longer

Natural immunity against COVID-19 significantly reduces the risk of reinfection: findings from a cohort of sero-survey participants

- https://www.medrxiv.org/content/10.1101/2021.07.19.21260302v1

- Study in India with control shows that natural immunity not only protects against death but also significantly reduces severity compared to unvaxxed with no natural immunity population

Immune Memory in Mild COVID-19 Patients and Unexposed Donors Reveals Persistent T Cell Responses After SARS-CoV-2 Infection

- https://pubmed.ncbi.nlm.nih.gov/33777028/
- Indian study confirms immune response post COVID 19 infections

Highly functional virus-specific cellular immune response in asymptomatic SARS-CoV-2 infection

- https://rupress.org/jem/article/218/5/e20202617/211835/Highly-functional-virus-specific-cellular-immune
- Asymptomatic and symptomatic COVID cases produce effective immune responses

SARS-CoV-2-specific T cell memory is sustained in COVID-19 convalescent patients for 10 months with successful development of stem cell-like memory T cells

- https://www.nature.com/articles/s41467-021-24377-1?utm_source=other&utm_medium=other&utm_content=null&utm_campaign=JRCN_1_LW01_CN_natureOA_article_paid_XMOL
- COVID specific T cells were measured up to 10 months post infection confirming effective immune response

COVID-19 natural immunity – WHO Brief

- https://apps.who.int/iris/bitstream/handle/10665/341241/WHO-2019-nCoV-Sci-Brief-Natural-immunity-2021.1-eng.pdf?sequence=3&isAllowed=y
- World Health Organization study from 10 May 2021
- Within 4 weeks people infected with COVID have detectable antibodies
- Not entirely sure about absolute strength and duration of natural immunity but at the time of the study 8 months of protection was confirmed
- Still studying how variants effect the natural immunity (Disputed)
- Claim protection is not well understood (Disputed)

SARS-CoV-2 re-infection risk in Austria

- https://pubmed.ncbi.nlm.nih.gov/33583018/
- Natural immunity reduced reinfection vs infection in Austria by 10 times (0.27% reinfection rate vs 2.85% infection rate)

Anti-spike antibody response to natural SARS-CoV-2 infection in the general population

- https://www.medrxiv.org/content/10.1101/2021.07.02.21259897v1
- Tested COVID 19 positive people for immune protection in the UK to determine how long protection could potentially last
- Protection with natural immunity confirmed and measured
- The antibody half life protection against reinfection is **estimated** to be 1.5 to 2 years

SARS-CoV-2 infection rates of antibody-positive compared with antibody-negative health-care workers in England: a large, multicenter, prospective cohort study (SIREN)

- https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00675-9/fulltext
- Cohort study from England
- Reinfection from natural immunity was 7.6 per 100,000 where infection with no protection was 57.3 per 100,000
- Natural immunity provided 7.5 times reduction in infection than naive population

SARS-CoV-2 Natural Antibody Response Persists for at Least 12 Months in a Nationwide Study From the Faroe Islands

- https://academic.oup.com/ofid/article/8/8/ofab378/6322055
- All infected people developed natural immunity and detectible antibodies
- Antibody levels dropped from high post infection to 7 months. Then remained stable from 7 to 12 months
- U shaped curve, youngest and oldest population have highest antibodies where middle aged population had less

Longitudinal observation of antibody responses for 14 months after SARS-CoV-2 infection

- https://www.sciencedirect.com/science/article/pii/S1521661621001510
- COVID antibodies persisted in 96% of the people tested after 14 months post infection
- The more severe the infection correlates with higher level of antibodies

SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected controls

- https://www.nature.com/articles/s41586-020-2550-z_reference.pdf
- Measured the T cells of those who recovered from SARS in 2003.
- SARS is also a coronavirus closely related to COVID 19.
- T cells were still measured in people who recovered from SARS in 2003.
- 17 years old SARS T Cells show surprising and robust cross reactivity to COVID
- Its is possible and plausible, that COVID immunity could last up to 17 years

Assessment of protection against reinfection with SARS-CoV-2 among 4 million PCR-tested individuals in Denmark in 2020: a population-level observational study

- https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00575-4/fulltext
- Study from Denmark March 2021
- Of those infected during the first wave (11,068) only 72 were reinfected (0.65%) in wave 2
- Compared to 16,819 who became infected in wave 2 who were not infected wave 1 (525,339) a 3.27% infection rate
- Natural Immunity provided a 5 times reduction in infection opposed to those never infected or vaccinated
- In population 65yo+ the protection rate for natural immunity was 47%

NEWS: Had COVID? You'll probably make antibodies for a lifetime

- https://www.nature.com/articles/d41586-021-01442-9
- QUOTE: "People who recover from mild COVID-19 have bone-marrow cells that can churn out antibodies for decades"
- QUOTE: The study provides evidence that immunity triggered by SARS-CoV-2 infection will be extraordinarily long-lasting. Adding to the good news, "the implications are that vaccines will have the same durable effect", says Menno van Zelm, an immunologist at Monash University in Melbourne, Australia."

NEWS: Project Veritas: Your [COVID] Antibodies Are Better Than The [Pfizer] Vaccination.

- https://rumble.com/vnbq1p-pfizer-scientists-your-covid-antibodies-are-better-than-the-pfizer-vaccinat.html
- Nick Karl. Biochemist at Pfizer admits on camera: *"When someone is like naturally immune, like they got COVID, they probably have, better, like, not better, but more antibodies against the virus. Because what the vaccine is – is, like I said, that protein, - that's just on the outside. So it's just one antibody against one specific part of the virus. When you actually get the virus, you're going to start, producing antibodies against, like, multiple pieces of virus, and not only like the outside portion, like the inside portion, the actual virus. Your antibodies are probably better than at that point than the vaccination"*

OPINION FROM REDDIT USER:

"We've known for decades that once you are infected with a virus or disease, your body creates a robust immune response, including memory T cells and B cells. These cells stick around so that you can quickly respond to a new infection. However, this fact is being completely ignored by vaccine pushers, they want a needle in every arm, even in the arms of those who do not need it, like the covid recovered. We might say, well covid is new and different, and perhaps immunity wanes after a time. This assumption was prudent in the beginning of the pandemic but now we have lots of evidence that the covid recovered have a near zero chance of getting sick again. Your body takes a few weeks and months to build up its antibodies after an infection. Most of the time the second infection takes place during this time frame. There is no reason to force every covid recovered patient to take an experimental drug, especially after that initial 3 month period after they have build up a sufficient immune response. If you still think that the miniscule chance that their immune system has failed makes them a danger, then why are these people not asked for proof of antibodies. It's because they don't actually care if you have antibodies. The vaccinated, without knowing whether they have antibodies or not, can walk around free, but a covid recovered patient, with proof of antibodies is still considered a danger. It's ass backwards and it is evidence that vax pushers don't actually care about immunity. It is just about getting a needle into every arm. The reason why they are doing this, I do not know I leave it up to you, but it doesn't make sense and I make a point of not going along with things that don't make sense."

ANALYSIS

- Surviving Covid 19 creates all around protection even among variants.
- Natural Immunity needs to be taken seriously.
- Testing for antibodies needs to be part of the nation's plan to recover.
- A vaccine passport is wrong, counter productive and unscientific.
- Study show natural immunity is effective against both alpha and delta variants
- We can confirm antibody protection up to a year
- We can confidently and reasonably speculate that antibodies will continue to be produced in the bone marrow for life.

WHICH IS MORE EFFECTIVE THE VACCINE OR NATURAL IMMUNITY?

Israeli study shows that vaccinated people where 13 times MORE likely to have a breakthrough infection from delta than those with natural immunity

- https://www.medrxiv.org/content/10.1101/2021.08.24.21262415v1
- Protected against alpha and 13 times more protect against delta than fully vaccinated w/o Booster

Shedding of Infectious SARS-CoV-2 Despite Vaccination

- https://www.medrxiv.org/content/10.1101/2021.07.31.21261387v6
- Vaccinated and unvaccinated can transmit delta

Large-scale study of antibody titer decay following BNT162b2 mRNA vaccine or SARS-CoV-2 infection

- https://www.medrxiv.org/content/10.1101/2021.08.19.21262111v1.full
- Compared Antibodies of vaccinated vs natural immunity
- Vaccinated had 40% more antibodies than natural immunity BUT
- Vaccinated antibodies decreased by 40% per month where natural immunity antibodies decreased by 5% per month
- After 6 months, 16.1% of vaccinated people had antibodies levels below the seropositivity threshold of < 50 AU/ML vs 10.8% of natural immunity people
- Natural immunity people had longer lasting immunity than vaccinated people

Discrete Immune Response Signature to SARS-CoV-2 mRNA Vaccination Versus Infection

- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3838993
- Sequenced the blood of both vaccinated and unvaccinated post infection for immune response
- Confirmation that both had robust and innate immune responses
- Confirmed differences in the types of IR.
- Natural patients had higher levels of interferon which helped killer T cells protect the body, this process was absent in vaccinated

Incidence of Severe Acute Respiratory Syndrome Coronavirus-2 infection among previously infected or vaccinated employees

- https://www.medrxiv.org/content/10.1101/2021.07.03.21259976v2
- Comparing reinfection between vaccinated and natural immunity and those who had neither

- Vaccination and natural immunity are effective while having neither was ineffective.

Single cell profiling of T and B cell repertoires following SARS-CoV-2 mRNA vaccine

- https://www.biorxiv.org/content/10.1101/2021.07.14.452381v1
- Examined B cells, T cells, and antigen responses in both vaccinated people vs natural immunity
- Both had robust spike specific B cells, CDT 4 cells, and polyfunctional CDT 4 responses.
- BUT vaccine induces CDT 8 cells response was 'weak and variable' vs Natural infections larger CDT 8 cell response.

mRNA vaccine-induced T cells respond identically to SARS-CoV-2 variants of concern but differ in longevity and homing properties depending on prior infection status

- https://www.biorxiv.org/content/10.1101/2021.05.12.443888v2
- Examines T cell response from post vaccine and natural immunity and naive (people who had neither)
- Vaccine created T cells for the alpha strain
- People who already got natural immunity had no effect on COVID 19 T cells post second vaccination
- People who had natural immunity and get the vaccine may have more protection when combined
- Study asserts this proves protection against variants (disputed)

Protection of previous SARS-CoV-2 infection is similar to that of BNT162b2 vaccine protection: A three-month nationwide experience from Israel

- https://www.medrxiv.org/content/10.1101/2021.04.20.21255670v1
- Israeli study comparing vaccinated vs natural immunity vs neither
- Vaccination was highly effective
- Natural immunity effectiveness was identical to vaccinated individuals
- The scientist questions the need for vaccination for people with natural immunity

Live virus neutralization testing in convalescent patients and subjects vaccinated against 19A, 20B, 20I/501Y.V1 and 20H/501Y.V2 isolates of SARS-CoV-2

- https://www.medrxiv.org/content/10.1101/2021.05.11.21256578v1
- Testing the COVID mutations in vaccinated, mild COVID infections, and severe COVID infections
- Natural immunity provided neutralization capacity for the two tested variant whereas vaccination produced significantly lower capacity
- The vaccine does not provide significant neutralization capacity for variants whereas natural immunity does

Anti- SARS-CoV-2 Receptor Binding Domain Antibody Evolution after mRNA Vaccination

- https://www.biorxiv.org/content/10.1101/2021.07.29.454333v2
- COVID infection produces B cell responses that continue to evolve for at least one year
- Vaccinating a person with natural immunity produces high levels of plasma neutralizing activity against all variants

- Examines B cell evolution 5 months after vaccination with Pfizer and Moderna Vaccines vs COVID Naive individuals
- Only during Prime and Boost does the vaccines induce B cells that evolve increased neutralizing activity. There is no increase in potency or breadth thereafter
- Vaccination has greater antibody potency and breadth than vaccination, meanwhile vaccination does has greater potency of neutralizing plasma.

Differential effects of the second SARS-CoV-2 mRNA vaccine dose on T cell immunity in naïve and COVID-19 recovered individuals

- https://www.biorxiv.org/content/10.1101/2021.03.22.436441v1
- What happens T cells when you give vaccines to people who have natural immunity and naive?
- With naive population both humoral and cellular immunity increases
- Vaccines induce a REDUCTION in cellular immunity to COVID 19
- Scientist declare that vaccines may not be necessary for people with natural immunity

Associations of Vaccination and of Prior Infection with Positive PCR Test Results for SARS-CoV-2 in Airline Passengers Arriving in Qatar

- https://jamanetwork.com/journals/jama/article-abstract/2781112
- Study from Qatar June 2021
- Compared whether vaccination from Pzifer or Moderna or Natural Immunity were associated with lower risk for testing PCR positive.
- People with no vaccination or prior infection had 1% infection rate
- Vaccinated people have a 0.22% infection rate
- Natural Immunity had a 0.26% infection rate
- Vaccinated and Natural immunity show significantly reduced rates of infection when measured with PCR positive testing

IS THE VACCINE SAFE?

Half of the country believes that the COVID vaccines are safe while the other half believe they are incredibly dangerous. Is there any evidence that we can look at to determine how safe these vaccines are? In this section we explore the available data and science to gain understanding of the reality of the vaccine.

HOW OFTEN DO ADVERSE EFFECTS HAPPEN?

- https://www.publichealthontario.ca/-/media/documents/ncov/epi/covid-19-aefi-report.pdf?la=en
- 65.9 per 100,000 doses have an adverse effect
    - 32.95 per 50,000 people (assuming double dosed)
    - 6.59 per 10,000 people (assuming double jabbed)
- 798 serious effects
    - Results in death, is life-threatening, requires in-patient hospitalization or prolongs an existing hospitalization, results in persistent or significant disability/incapacity, or in a congenital anomaly/birth defect.
- 1 adverse reaction in 1,517 doses (Not people)
- https://covid19tracker.ca/provincevac.html?p=ON
    - 74.55% of people fully vaccinated
    - 3.126% of people got one shot
    - 11,516,403 people have gotten at least 1 dose
    - If we divided the total people into serious side effects, we get
    - 1 in 14,431 chances of serious life-threatening side effect

WHISTLE BLOWER

Whistle blower has come out that vaccine manufactures lied about their adverse effects, lied about the data to cover it up, and quality control staff were overwhelmed by volume of problems.

- https://www.bmj.com/content/375/bmj.n2635
- (Pfizer) falsified data, unblinded patients, employed inadequately trained vaccinators, and was slow to follow up on adverse events reported in Pfizer's pivotal phase III trial. Staff who conducted quality control checks were overwhelmed by the volume of problems they were finding. After repeatedly notifying Ventavia of these problems, the regional director, Brook Jackson, emailed a complaint to the US Food and Drug Administration (FDA). Ventavia fired her later the same day. Jackson has provided *The BMJ* with dozens of internal company documents, photos, audio recordings, and emails

SPIKE PROTIEN DAMAGE

ANON REDDIT USER: *"The spike protein of the virus, that is also being utilized in the vaccines, is damaging to our cells through 3 mechanisms. The first is that when the spike protein binds to the ACE2 receptor it causes the ACE2 to send signals to the mitochondria within the cell which destroys the mitochondria, eventually killing the cell. The second is that when the spike protein binds to our ACE2 receptors it causes the ACE2 to send signals to other cells which increases the amount of pro-inflammatory agents in the blood. This inflammation damages the tissues. The third way is that when the spike protein binds to the ACE2 of the platelets in our blood, it causes them to clot. Now, the vaccine manufacturers did take steps to make the spike protein more safe. The spike protein has two parts an S1 subunit and an S2 subunit. The S1 is the part that connects to the ACE2, and the S2 is the part that opens up like a knife stabbing the membrane and facilitates fusion between the membrane of the cell and the envelope of the virus. With the vaccines, they modified the S2 subnit so that it could not open up and jab into the cell membranes if it connects with any ACE2 receptors. They thought this would make the spike protein safe, but this assumption is false and if they had taken the time to do more research before rushing to production they would have found that out. It may seem like the jabby bit is what damages the cells, but actually the major damage is caused by the S1 connecting to the ACE2 receptor. Just the S1, by itself without the S2, causes the ACE2 receptor to start the cell signaling processes that cause the mitochondrial damage, the pro-inflammatory response, and the blood clots."*

Studies on the spike protein that confirm claim:

- Study on how the virus uses the spike protein to enter human cells:
  - https://www.nature.com/articles/d41586-021-02039-y
- Study on how the Covid19 spike protein crosses the blood-brain barrier:
  - https://www.sciencedirect.com/science/article/pii/S096999612030406X?via%3Dihub
- Japanese study on how the Pfizer vax is associated with brain hemorrhaging (lending credence to the hypothesis that the spike proteins are crossing the blood brain barrier in some people):
  - https://joppp.biomedcentral.com/articles/10.1186/s40545-021-00326-7
- Study on how AstraZeneca is associated with blood clots in the brain (lending more credence to the hypothesis that the spike proteins are crossing the blood brain barrier in some people):
  - https://www.nejm.org/doi/full/10.1056/NEJMoa2104840
- Study on how the Covid19 spike protein binds to the ACE2 receptor of our platelets to cause bloodclots:
  - https://jhoonline.biomedcentral.com/articles/10.1186/s13045-020-00954-7
- Study explaining that blood clots from the spike protein interacting with our platelets are associated with both COVID-19 infection and vaccination:
  - https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1003648
- Study explains that just the S1 subunit of the spike protein can cause platelets to clot:
  - https://www.medrxiv.org/content/10.1101/2021.03.05.21252960v1
- Study with evidence that spike proteins do end up circulating in the blood, when they're not supposed to, they're supposed to be anchored on the cell membranes:
  - https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab465/6279075
- More evidence that spike proteins do not stay on the cell membranes but end up circulating in the blood. This study aims to explain the blood clots caused by the J&J and AstraZeneca adenovector vaccines, they claim that the DNA isn't properly spliced and the spike proteins end up in the blood causing thrombosis when the spikes attach to the ACE2 receptors of the endothelial cells:
  - https://www.researchsquare.com/article/rs-558954/v1

- Study on how the spike protein can cause neurodegeneration:
    - https://www.sciencedirect.com/science/article/pii/S0006291X2100499X?via%3Dihub
- Study with evidence that the spike protein by itself can damage cells by binding to ACE2, causing the cells mitochondria to lose their shape and break apart:
    - https://www.ahajournals.org/doi/10.1161/CIRCRESAHA.121.318902
- Study on how the spike protein in vaccines can cause cell damage via cell signaling:
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7827936/
- Study that when the spike protein binds to the ACE2 receptor it causes the release of soluble IL-6R which acts as a extracellular signal which causes inflammation (see the first paper for evidence that the spike causes the release of IL-6R and see the second paper for an explanation of how soluble IL-6R causes pro-inflammatory extracellular signaling:
    - https://pubmed.ncbi.nlm.nih.gov/33284859/ And
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3491447/
- Study that spike protein from covid or the vaccine causes inflammation through cell signaling, this time there is evidence that the spike protein causes senescence (premature aging) signals in the cell which attracts leukocytes that cause inflammation of the cell:
    - https://journals.asm.org/doi/10.1128/JVI.00794-21
- Spike protein by itself causes cell damage by eliciting a pro-inflammatory response:
    - https://www.nature.com/articles/s41375-021-01332-z
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7758180/
    - COVID 19 spike protein damages endothelial cells
    - Endothelial cells line your cardiovascular system, heart, brain, lungs, skin and muscle
    - https://www.ncbi.nlm.nih.gov/books/NBK57148/
- https://www.ahajournals.org/doi/10.1161/CIRCRESAHA.121.318902
    - Another study expands on how spike proteins damage endothelial cells
    - Its caused because the spike protein binds to the ACE2 in the host cells
    - Study shows the S protein alone can damage lung endothelial cells with evidence
- Spike proteins pass through the blood brain barrier
    - https://www.sciencedirect.com/science/article/pii/S096999612030406X
    - Brain blood barrier function negatively affected by COVID spike protein
    - They pass right through, and brain endothelial cells becomes inflamed when exposed to spike protein
- Analysis of spike protein. Confirmation the spike protein damages the cardiovascular system
    - https://www.salk.edu/news-release/the-novel-coronavirus-spike-protein-plays-additional-key-role-in-illness/
    - They reproduced the spike protein damaging the endothelial cells and confirmed it's the ACE2 receptor that binds.

BIODISTRIBUTION DATA: HOW THE VACCINE TRANSPORTS AROUND THE BODY

ANON REDDIT USER:

- *Pfizer animal testing document that was obtained by Dr. Byram Bridle through a FOI request to the Japanese government which shows the biodistribution of the lipid-nano particles throughout the bodies and organs of the test subjects. This is evidence that the lipid nanoparticles do not*

stay in the injection site, but instead travel all throughout the body (go to pg 16/23 for the charts showing biodistribution over the course of 48hrs): https://files.catbox.moe/0vwcmj.pdf

- *Addendum to the above link. This blog post provides easy to understand information (with pictures) on the make-up of the lipid nanoparticles used in the Covid19 vaccines. It shows that the pharmaceutical companies could have designed them to have targeting ligands on the outside, so that the nanoparticles would only transfect the muscle cells. But instead the vax was designed with PEG polymers on the outside, so that the immune system will not be able to pick them up and put them in the trash. The PEG is what Byram Bridle says is the reason the vaccine travels throughout the body and since it does not have targeting ligands, it can transfect any type of cell: https://www.cas.org/resource/blog/understanding-nanotechnology-covid-19-vaccines*
- Bottom Line: The vaccine is supposed to create the spike proteins inside the muscle or the liver, but instead had been designed to travel anywhere around the body to create the spike protein which can be disastrous, dangerous and potentially lethal

VACCINE IMMUNE ESCAPE: THE VIRUS EVOLVES AND MUTATES TO AVOID THE VACCINE ANTIBODIES

ANON REDDIT USER:

- *Vaccine enhanced immune escape occurs when a poorly designed or weak vaccine helps create new variants. This happens in the exact same way as antibiotic resistance and regular old evolution. In the case of evolution, if you want to make an organism stronger, you put it under evolutionarily unfavorable conditions. This way you kill all the weak examples of the organism and just leave the strong ones. If you want to create heat resistant bacteria, put a petri dish full of the bacteria under moderately high heat that kills 99% of the bacteria. Save the 1% that were able to survive the heat, allow them to grow, and repeat the process over and over again while turning up the heat just a little each time. Do this until you have a population of bacteria that are all extremely heat resistant. The same process occurs with antibiotic resistance. When you only take half your meds, you kill 99% of the bacteria and you leave only the 1% that were slightly more resistant to the drugs and now they flourish. Before they were a small part of the population but you changed the conditions of their environment so that they have the advantage. You've killed all the normal bacteria that the mutant variants had to compete with so that now the antibiotic resistant bacteria are the alpha strain that have unlimited resources and so surge in population to take over your body. Well, the same thing happens with viruses and vaccines.*
- *If you produce a vaccine that elicits a weak immune response, you are creating an unfavorable environment for the virus. This will kill the weak 99%, and leave those 1% of mutant virus particles that are not as hindered by the antibodies produced by the vaccine. Whereas before these mutants were only a tiny part of the population and would have been unlikely to transmit on to the next person. Now these mutant virus particles surge in number because they no longer have to compete with the other virus particles and your bodies defenses do not work. They are now highly likely to transmit on to the next person, whereas*

before they would not have been able to leave the host in which the mutation occurred. In terms of creating variants, the current covid vaccines are very bad for three reasons.

- *First, some vaccine manufacturers require two shots and now also boosters because the first shot produces a very weak immune response.*
- *Second, the vaccines are very leaky. Even after you have gotten a full immune response from both shots, you can still get and transmit the virus onto others. Well, which virus particles are likely to get passed on by a fully vaccinated person? Clearly they will be those virus particles that have the ability to multiply quickly while avoiding the antibodies produced by the vaccines.*
- *This will create very virulent and antibody resistant variants. Watch for these variants in the news as time goes on, we're already seeing things like Delta, Lambda, Eplsion, etc.*

- *As we implement boosters, they will start to come at faster and faster rates, and over time data scientists will start to see timed correlations between the implementation of mass boosters and the emergence of new strains. Third, the vaccines do seem to help reduce the severity of the disease when people are infected (although this may change as new variants emerge). Why would this be a concern? Well, because of the leakiness of the vaccines we just spoke about. If you have very low symptoms but you can still get and transmit the virus, then you won't even realize that you're sick and you'll be spreading the virus to even more people as an asymptomatic carrier. So, these vaccines will only increase transmission by creating more and more asymptomatic carriers (although this may not be a bad thing, if everyone in the world gets the virus and everyone is asymptomatic, then there's really no need to care about covid anymore. But this is an unrealistic idealization that is unlikely to occur, some people will still get sick and die or suffer long haul covid). One additional point to address here is the claim that the unvaccinated are causing the emergence of new vaccine resistant variants. Let me be clear, the unvaccinated absolutely have the ability to facilitate the creation of new variants. However, it would require a statistically enormous number of people to get the virus before they could produce a new variant by chance. This is because a mutant virus particle will only make up a small portion of the virus population inside a person's body.*
- *Therefore, it is highly unlikely that this particular particle will be able to spread to a new person. Whereas, in the vaccinated, their weak immune response specifically selects for the mutant variants. It is highly likely that if a vaccinated person passes on the virus to another person, the particles they pass on will be those that have the ability to escape from the immune response elicited by the vaccines. An analogy would be if you did an experiment with 500 room temperature petri dishes filled with bacteria and 500 heated petri dishes with bacteria, then found a heat resistant variant but didn't know which dish it came from. It would be absurd to think that the heat resistant strain of bacteria came from the room temperature petri dishes. It would possible, sure, but completely improbable that the heat resistant strain had suddenly appeared in a room temp petri dish. There would be no reason for it to become a dominant strain in that environment. Logically, statistically, and evolutionarily, it must have come from the heated petri dishes. This is a very basic and obvious conclusion, but the media and government bureaucrats in lab coats are trying to tell you that the absurd thing is true. They're trying to say that the unvaccinated (the room temperature petri dishes) are where the vaccine resistant strains are coming from.*

Vaccine Enhanced Immune Escape Sources

- Evidence of cov2 immune escape:
    - https://science.sciencemag.org/content/early/2021/06/30/science.abi7994
- Article from 2015 that explains how imperfect vaccination (like the Pfizer and Moderna that require at least two shots to be effective) can create immune escape variants:
    - https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1002198
    - Study cites evolution and natural selection as a serious risk for imperfect vaccines. Viruses that survive vaccinated immune systems can mutate into more dangerous strains (Delta perfect example)
    - Imperfect Vaccination can make things worse
    - Citing natural selection, claims that vaccines that are not 100% effective can create more deadly pathogens through natural selection
    - Cites studies with animals that show this process working
    - Vaccines essentially 'backfire' and create perfect evolutionary conditions for natural selection to take place and create more deadly and vaccine resistant pathogens
- Article from 2021 explains that unless vaccination is done quickly, there will be a high probability of escape mutants:
    - https://www.nature.com/articles/s41598-021-95025-3

ANTIBODIES DEPENDENT ENHANCEMENT – WHEN THE VACCINE BACKFIRES

ANON REDDIT USER:

- *"There is a potential for ADE, antibody dependent enhancement. This is when the virus mutates so that the antibodies no longer neutralize the virus but the antibodies still try to attach to it. This can actually help the virus get into your immune cells because when the virus is covered with antibodies it will draw macrophages to the virus that will try to eat it. However, when your macrophages come to eat the virus particle that they think has been neutralized, the virus gets inside them and starts replicating because the antibodies actually didn't neutralize the virus. Your own antibodies act like a kind of Trojan Horse. Another way that ADE can happen is your own antibodies connect to the receptors of your cells and actually help the virus get in directly. This was a huge problem with the Dengue vaccine and we need to do a lot of testing to make sure this isn't a possibility. Clearly with these rushed vaccines we haven't eliminated this possibility and with the virus mutating, ADE may pop up with a later variant. We must stay vigilant and keep an eye out for this signal. It will manifest as people with high antibody levels being more likely to get sick and die."*

Antibody Dependent Enhancement:-

- Study from 2005 shows evidence that sars-cov1 vaccine, that also focused on the spike protein, caused ADE when subjects were challenged with different strain:

    - https://www.nature.com/articles/news050110-3#ref-CR1
- Study explaining how ADE works in Sar-cov1:
    - https://www.nature.com/articles/s41586-020-2538-8
- Study explaining the potential for ADE in Covid19:
    - https://www.nature.com/articles/s41586-020-2538-8
- Study that speculates on the potential for ADE in Covid19:
    - https://pubmed.ncbi.nlm.nih.gov/32920233/
- A Study from 2021 explains that there is evidence that covid19 is able to kill macrophages by using antibody dependent mechanisms: https://www.biorxiv.org/content/10.1101/2021.02.22.432407v1
- Government AI study shows ADE is happening in vaccinated patients when infected with Delta.
    - https://www.naturalnews.com/files/Salus_Humetrix_VE_study_2021_09_28.pdf
    - This study was taken down by Humetrix from this address
        - https://www.humetrix.com/powerpoint-vaccine.html
    - Examined Medicare data and concluded the following
    - Vaccine effectiveness in people 65 and older is dropping
    - Vaccinated elderly are dying more from Delta
    - Delta is infectious and ADE is happening
    - **Which aligns with previous finding from UK data in previous section that Delta is more dangerous to the vaccinated than to the unvaccinated**

AUTOIMMUNE RESPONSE – THE BODY ATTACKS ITSELF

ANON REDDIT USER:

- *"There is a potential for an autoimmune response from the vaccines. The vaccines that were developed for Sars-Cov-1 used the spike protein, just like the vaccines for Sars-Cov-2. Unfortunately, those vaccines caused the animals to develop serious autoimmune disorders and they ended up causing severe organ damage. There is a question about whether these new vaccines, which also focus on the spike protein, will also cause autoimmune disorders. The problem is that autoimmune disorders take time to develop and to show up. It may also take a long time before doctors and scientists can link the sudden rise in autoimmune disorders with these vaccines. Usually, in a vaccine trial you closely monitor your trial group for years and years. This allows you to identify the signals. With the current program of injecting millions of people, there will be no clear way to link causation to the vaccines and an increase in autoimmune disorders may just fly under the radar. We may not know for a very long time or never. Another concern is that because of the way the mRNA vaccines work, they cause your own cells to present as foreign entities. Your immune system comes over and starts killing your own cells. This has never been done before in human history. We have no idea if there will be long term consequences for this and whether this will lead to autoimmune disorders."*
- Research results of past vaccines for sars-cov1 that used the spike protein:-
    - Journal article from 2004 on autoimmune disorders from Sars-cov1 vaccine that also focused on the spike protein:
        - https://www.cidrap.umn.edu/news-perspective/2004/12/sars-vaccine-linked-liver-damage-ferret-study

- Journal article from 2005 on autoimmune disorders from Sars-cov1 vaccine that also focused on the spike protein:
  - https://pubmed.ncbi.nlm.nih.gov/15755610/
- Journal article from 2012 on autoimmune disorders from Sars-cov1 vaccine that also focused on the spike protein:
  - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0035421
- Journal article from 2020 on autoimmune disorders from Sars-cov vaccine (can't figure out if they're talking about cov1 or 2):
  - https://jvi.asm.org/content/78/22/12672.abstract
- Journal article from 2020 explains why immune disorders happen with covid vax, because human and Covid19 proteins are similar:
  - https://www.sciencedirect.com/science/article/pii/S2589909020300186

VACCINE EFFECACY – DO THEY WORK?

ANON REDDIT USER:

- *The mRNA vaccines are narrowly focused on just the spike protein when they could have been designed to target more proteins. The Covid19 coronavirus has 4 main proteins. There are 3 on its outside and 1 on the inside. The S-protein, the M-protein, and the E-protein, are on the outside, while the N-protein is on the inside. When you get a natural infection your body will likely produce antibodies for all or most of these proteins (depending on the function of your own unique immune system). We knew from studying Sars-Cov-1 that antibodies to the S-protein and the M-protein are both neutralizing. In fact, they used exactly that knowledge when they designed the current vaccines. So, they could have tried to make vaccines that utilize the M-protein to avoid the potential for autoimmune disorders discussed above. But they didn't, they instead focused only on the S-protein. They could have designed the vaccines so that they present both the S-protein and the M-protein. This would have made the vaccines much more effective and less leaky since any mutated virus particles would have to have mutated both the S-protein and the M-protein to avoid the antibodies. Whereas, the current vaccines are narrowly focused on just the S-protein, meaning that the virus only has to mutate the one protein. It is exponentially harder for an organism to mutate two beneficial traits vs just mutating one beneficial trait. So, these vaccines are worse than they could have been.*

- **Vaccine efficacy:-**
  - This study shares current knowledge on the 4 known proteins of coronaviruses. S, M, N & E proteins
    - https://virologyj.biomedcentral.com/articles/10.1186/s12985-019-1182-0
  - Article explains how vaccine manufacturers have used relative risk reduction to determine that vaccine efficacy is ~90+%, however they should have used absolute risk reduction which would tell us that the vaccines will only reduce total covid cases by ~1%:
    - https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(21)00069-0/fulltext
  - Addendum to the above information. This video from 2013 explains the difference between relative and absolute risk reduction in a very simple way:

        - https://www.youtube.com/watch?v=7K30MGvOs5s&ab_channel=TerryShaneyfelt
    - Article from 2005 explains that antibodies to the S-protein and the M-protein are effective in neutralizing the sars-cov1 virus. However, the sars-cov2 vaccines only target the S-protein. This is evidence that the vaccine manufacturers could have chosen to make a superior mrna vax that produced two types of antibodies, but chose to focus narrowly on just the S-protein:
        - https://pubmed.ncbi.nlm.nih.gov/16544518/
    - Antibodies from vaccines start to drop within 6 months, get ready for endless boosters:
        - https://www.nature.com/articles/s41586-021-03777-9

VARIOUS HEALTH RELATED ISSUES

Swedish public health agency stopped all COVID 19 vaccinations for people under 30 citing high risk of myocarditis

- https://www.folkhalsomyndigheten.se/nyheter-och-press/nyhetsarkiv/2021/oktober/anvandningen-av-modernas-vaccin-mot-covid-19-pausas-for-alla-som-ar-fodda-1991-och-senare/

CDC examining VAERS report on myopericarditis and Pericarditis following COVID 19 shot

- https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-08-30/03-COVID-Su-508.pdf
- CDC examining VAERS report on myopericarditis and Pericarditis following COVID 19 shot
- 2,500+ reports of myocarditis as of AUG 21 in the USA

Confirmation of Vaccine associated mortality

- https://roundingtheearth.substack.com/p/confirmation-of-vaccine-associated
- Shows increase in all cause mortality post vaccine roll out

Data analysis with citation Shows that ALL CAUSE mortality is higher in vaccinated patients than unvaccinated patients

- https://probabilityandlaw.blogspot.com/2021/09/all-cause-mortality-rates-in-england.html
- ONS data that was used for this calculation was pulled down

Doctors argue against vaccinating children

- https://www.sciencedirect.com/science/article/pii/S221475002100161X#bib0110
- Why are we vaccinated children?
- The science doesn't support it

    - Bulk of COVID-19 per capita deaths occur in elderly with high comorbidities.
    - Per capita COVID-19 deaths are negligible in children.
    - Clinical trials for these inoculations were very short-term.
    - Clinical trials did not address long-term effects most relevant to children.
    - High post-inoculation deaths reported in VAERS (very short-term).
- Children have extremely minimal risk from COVID 19

Study with pregnant women getting the vaccine reported 1.1% spontaneous abortion following vaccines

- https://perma.cc/J33H-R6ZK
    - Study tracked for 3 months between 3,958 pregnant women vaccinated with COVID 19 from Dec 14th 2020 to Feb 28, 2021
    - Of the 3,958 total
        - 827 women completed pregnancy
            - 712 live birth
            - 115 results in pregnancy loss 2.9% of total women tracked
            - 0 Neonatal deaths immediately following birth
    - https://www.medicalnewstoday.com/articles/322634
        - Average rate of 10 to 15% of pregnancies result in a loss
    - 46 women reported spontaneous abortion following COVID 19 vaccine (1.1%)
    - The spontaneous abortion is downplayed over vaccine efficacy
    - The study claims findings DO NOT show obvious safety signals among pregnant women who received the COVID 19 vaccine.

mRNA vaccine for rabies given in study had 78% of participants report adverse side effects with 10% serious side effects. 0 fatalities

- https://pubmed.ncbi.nlm.nih.gov/28754494/
    - Rabies mRNA vaccine in 2017 study
    - Both men and women ages 18 to 40 in Germany with no previous history of Rabies vaccine
    - 3 vaccines in total treatment between OCT 2013 and Jan 2016
    - 95% reported injection site reactions
    - 78% reported adverse effects
    - 10 people out of total 101 reported serious adverse effects (9.8%)
    - Zero fatalities
    - Vaccine proved to create some immunity

mRNA vaccine for SARS tested in ferrets, many contracted hepatitis and some had livers begin to die

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC525089/
    - mRNA vaccine for SARS in ferrets study
    - Caused Hepatitis
    - Ferrets who got the vaccine shows immune response while non vaccinated ferrets had no effect

    - Vaccinated ferrets had increased levels of alanine aminotransferase
    - All vaccinated ferrets developed
        - severe hepatitis
        - necrotic liver cells

Original antigenic sin is a concern for COVID 19 (Difficulties adapting to new strains of similar viruses)

- https://pubmed.ncbi.nlm.nih.gov/33938416/
    - Original antigenic sin is a cause of concern for COVID 19
    - https://pubmed.ncbi.nlm.nih.gov/28479213/
        - Explains what OAS is
        - If true then body can only make specific antibodies for specific epitopes
        - It cannot 'adapt' and must rely on memory reducing effectiveness
    - https://pubmed.ncbi.nlm.nih.gov/34499051/
        - Evidence OAS is happening
    - https://pubmed.ncbi.nlm.nih.gov/34185632/
        - Is the theory driving India's failed response rate to vaccination in covid
    - https://pubmed.ncbi.nlm.nih.gov/33915711/
        - Possible ADE from previous infection

Myocarditis is from vaccine analysis for ages 12 to 17

- https://www.medrxiv.org/content/10.1101/2021.08.30.21262866v1
    - Identifying myocarditis from covid vaccination ages 12 to 17
    - Better chance of getting myocarditis than being sick and dying from COVID
    - This can be extrapolated to all children 17 and under

Bell Palsy from shot

- https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(21)00451-5/fulltext
- Study finds increased risk of Bells palsy (muscle weakness that causes face to droop)

(Bells Palsy) Face Paralysis from shot

- https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2779389
- Found cases of Bells Palsy reported as vaccine side effect

Analysis on the VAERS death data shows that in 86% of reports the vaccine cannot be ruled out as a causal factor in the death of the patient:

- https://www.researchgate.net/publication/352837543_Analysis_of_COVID-19_vaccine_death_reports_from_the_Vaccine_Adverse_Events_Reporting_System_VAERS_Database_Interim_Results_and_Analysis
- Addendum to the above link. OpenVAERS is a site that allows you to easily read VAERS reports and breaks down the numbers. The reports seem to be a lot of people who have comorbidities or are old, but there are also some really eye opening cases where young people experience horrible side effects. Read for yourself and make up your own mind about what the vax is doing to your fellow Americans: https://www.openvaers.com/openvaers

POTENTIALLY RELATED NEWS: Further Studies Needed

News: 3 Nordic Countries halt vaccination under 30 citing high myocarditis risk relative to COVID risk

- https://www.marketwatch.com/story/three-nordic-countries-halt-use-of-modernas-covid-19-vaccine-in-younger-individuals-2021-10-07
    - Denmark, Finland and Sweden stopped the shot in people under 30 citing that the evidence doesn't show the risk of the shot vs the risk of covid 19 is worth the side effects for young people.

News: the worst 'cold' ever is being felt by many in UK for no particular reason

- https://www.mirror.co.uk/news/uk-news/double-jabbed-brits-suffering-worst-25179317
    - Fully vaccinated people are experiencing the worst cold ever

News: Car Crashed up 10 to 28% in a single year for no particular reason

- https://www.thedrive.com/news/42252/road-deaths-keep-spiking-in-2021-despite-people-driving-less-nhtsa
    - People are driving 2.1% less yet car crash fatalities have risen from state to state anywhere from 10% all the way up to 28%
    - Driving fatalities was trending down from 2016 to 2019 then stopped in 2020 and began to rise in 2021

NEWS: unexplained 25% increase in heart attacks from blocked arteries for no particular reason

- https://www.thetimes.co.uk/article/mystery-rise-in-heart-attacks-from-blocked-arteries-m253drrnf
    - 25% increase in heart attacks from blocked arteries

NEWS: Has there been previous testing and what did we learn?

- https://medium.com/microbial-instincts/hypothetical-lasting-health-problems-of-mrna-vaccine-vs-coronavirus-ee11bddb9637
    - Hypothetical risks with COVID 19 vaccine
        - Long term safety of mRNA vaccines does not exist
        - How long do the spike proteins really last inside the body?
        - Faulty Vaccines

NEWS: Rushing the vaccine could backfire (ADE)

- https://www.scientificamerican.com/article/the-risks-of-rushing-a-covid-19-vaccine/
    - ADE is real and observed in previous vaccines
    - The older you get, the weaker your immune system becomes, thus it follows that the less effective the vaccines becomes because your immune system wont be able to produce quite a robust response as a younger person

    - Trust in vaccines is already questionable, if something goes wrong, vaccine trust would plummet
    - Even Scientific American is advocating for anti viral treatment in conjunction with vaccines

NEWS: EU finds J&J vaccine linked to blood clotting

- https://archive.ph/BUnAs
    - Possible blood clotting link with vaccine

BIG CLAIMS THAT WARRANT MORE RESEARCH

IMMUNODEFICIENCY

A comparison of official Government reports suggest the Fully Vaccinated are developing Acquired Immunodeficiency Syndrome

- https://theexpose.uk/2021/10/10/comparison-reports-proves-vaccinated-developing-ade/
- https://theexpose.uk/2021/10/15/its-worse-than-we-thought-fully-covid-vaccinated-ade/
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016465/Vaccine_surveillance_report_-_week_36.pdf
- Here are the Claims
    - Data is collected from the UK
    - People aged 40-69 have already lost 40% of their immune system capability and are losing it progressively at 3.3% to 6.4% per week.
    - Everybody over 30 will have lost 100% of their entire immune capability (for viruses and certain cancers) within 6 months.
    - 30-50 year olds will have lost it by Christmas. These people will then effectively have full blown acquired immunodeficiency syndrome and destroy the NHS.

Doctor claims to have spotted potential immunodeficiency in one of his patients which correlates to this claim.

- https://rumble.com/vnarin-my-jaw-dropped-when-i-tested-someones-immune-system-after-the-2nd-jab..html
    - Doctor conducts expanded immune system panel
        - Blood Count
            - White Blood Cell
            - Red Blood Cell
            - HemoGlobin
            - Hematocrit
            - MCV
            - MCH

        - MCHC
        - RDW
        - Platelet Count
        - MPV
    - Automated Differential
        - Granulocyte % and #
        - Lymphocyte % and #
        - Monocyte % and #
        - Eosinophils % and #
        - Basophil % and #
    - CD4 and CD8T cells “killer t cells”
        - Kills sniper specific, and cancer too
        - Kills cells expressing spike protien
    - How they measure HIV progression
    - Results
        - Granulocytes went up
            - Emergency cells
            - Tissue damage
            - Bacteria
        - Lymphocytes went up
            - CD4 and CD8 and B lympcytes
            - Massive drop
        - Natural killer cells dropped
            - All the immune cells has dropped
        - Adaptive immune system is worse post vaccine
        - This person has Auto Immunity Disease aka AIDS
        - If this Adapative immune response persists then people are now more susceptible to viral infection

Graphene Oxide, Parasites, inside the Vaccine

Claim: American Doctor Dr. Robert Young claims his team along with the La Quinta found Graphene Oxide and parasites inside the Vaccine when they examined the contents

- https://rightsfreedoms.wordpress.com/2021/09/02/american-scientists-confirm-toxic-graphene-oxide-and-more-in-covid-injections/
- https://www.drrobertyoung.com/meet-dr-young
- https://www.laquintacolumna.net/
- Founded by Ricardo Delgado Martin
    - Graduated in Statistics from the University of Seville. Master of specialization in Biostatistics. Postgraduate in Health Biology: Clinical Microbiology, Epidemiology and Applied Clinical Immunology from the Miguel de Cervantes European University. University Expert in Clinical Genetics from the Antonio de Nebrija University. Certificate

of Scientific Contribution from the University of Seville and the SIPIE Master's Degree in Child Psychology. Master in Banking and Finance from the Higher Institute of Banking Techniques and Practices. Master in Personal Training

- Here is the actual lab results that details all the information from LA QUINTA on how they found the Graphene Oxide
    - https://www.dropbox.com/s/b3kbszxvjg1hebl/1-INFORME_T%C3%89CNICO_FINAL_DETECCI%C3%93N_DE_GRAFENO_EN_VACUNAS_COVID.pdf?dl=0
    - Prof. Dr. Pablo Campra Madrid
      University PROFESSOR
      Doctor of Chemical Sciences
      Bachelor of Science in Biology

Rebuttal: Forbes and Politifact claim this is debunked

- FORBES
    - https://www.forbes.com/sites/brucelee/2021/07/10/graphene-oxide-in-pfizer-covid-19-vaccines-here-are-the-latest-unsupported-claims/?sh=8a600d874d71
    - Cite the corporate vaccine ingredient list as proof
    - They debunk Dr. Jane Ruby who also makes the claim as a psychologist and not a medical doctor
    - "The post mentioned Spanish scientists without specifying their qualifications or presenting their data for the scientific community to review."
    - "These so-called Spanish lab findings have not been published in any respectable peer-reviewed scientific journal"
    - There are claims that this Spanish lab is located at the University of Almería in Almería, Spain, yet this university has "unequivocally distanced itself from the analysis"
- POLITIFACT
    - https://www.politifact.com/factchecks/2021/jul/08/facebook-posts/no-evidence-graphene-oxide-s-toxic-pfizer-covid-19/
    - Admit some vaccines use it, but not this one
    - Cites the corporate vaccine ingredient list as proof.
    - Claims Dr. Jane Ruby claims are unverifiable.
    - State the claim is false

Rebuttal:

- Corporate vaccine ingredient list is not proof of what's really in the vaccines. Any asshole can point to a website, but that doesn't prove a damn thing. Show me proof where an INDEPENDENT group CONFIRMED that the ingredients in the vaccine match the ingredients claimed in the list.
- The truth is that neither POLITIFACT NOR FORBES contributor 'Bruce Y Lee' cite any study because it does NOT exist. They don't have proof of what is really in the vaccines.
- Then they use appeal to accomplishment logical fallacy to degrade Dr. Ruby because she is a psychologist and not a regular doctor. This doesn't prove anything their case

- Bruce then says that the post mentions no doctors or any qualifications. Shitty work Bruce. It took me 2 minutes and I was able to find the lab results and the Doctor, his name and his qualifications. What a joke.
- There is no study that does a independent randomized sampling of vaccine ingredients from all over the USA
- Graphene Oxide has been tested as a adjuvant for vaccines before. So its entirely within the realm of possibility.
    - https://pubs.rsc.org/en/content/articlelanding/2016/nr/c5nr09208f

FINAL POINT: We have a documented lab analysis of the COVID 19 with EVIDENCE of graphene oxide inside. The debunkers PolitiFact and Bruce from Forbes used appeal to authority and appeal to accomplishment logical fallacies to hide the fact they have ZERO independent evidence that proves the contrary.

SPARTICUS THE ANONYMOUS POSTER

Another online anonymous poster called 'Sparticus' shares his concerns with COVID 19. Here is the summary of his claims. My quick response will be written after his claim.

- https://www.fastrope.com/wp-content/uploads/2021/09/COVID-19-The-Spartacus-Letter-1.pdf
    - COVID-19 is a blood and blood vessel disease. SARS-CoV-2 infects the lining of human blood vessels, causing them to leak into the lungs.
        - CONFIRMED
    - Current treatment protocols (e.g. invasive ventilation) are actively harmful to patients, accelerating oxidative stress and causing severe VILI (ventilator-induced lung injuries). The continued use of ventilators in the absence of any proven medical benefit constitutes mass murder.
        - IN QUESTION
    - Existing countermeasures are inadequate to slow the spread of what is an aerosolized and potentially wastewater-borne virus and constitute a form of medical theater.
        - IN QUESTION
    - Various non-vaccine interventions have been suppressed by both the media and the medical establishment in favor of vaccines and expensive patented drugs.
        - TRUE AS I WILL DEMONSTRATE LATER
    - The authorities have denied the usefulness of natural immunity against COVID-19, despite the fact that natural immunity confers protection against all of the virus's proteins, and not just one.
        - TRUE
    - Vaccines will do more harm than good. The antigen that these vaccines are based on, SARS-CoV-2 Spike, is a toxic protein. SARS-CoV-2 may have ADE, or antibody-dependent enhancement; current antibodies may not neutralize future strains, but instead help

them infect immune cells. Also, vaccinating during a pandemic with a leaky vaccine removes the evolutionary pressure for a virus to become less lethal.
    - TRUE
- There is a vast and appalling criminal conspiracy that directly links both Anthony Fauci and Moderna to the Wuhan Institute of Virology.
    - IN QUESTION. Gain of function research has been linked to Dr. Fauci. Pending.
- COVID-19 vaccine researchers are directly linked to scientists involved in brain-computer interface ("neural lace") tech, one of whom was indicted for taking grant money from China.
    - IN QUESTION
- Independent researchers have discovered mysterious nanoparticles inside the vaccines that are not supposed to be present.
    - THERE IS EVIDENCE
- The entire pandemic is being used as an excuse for a vast political and economic transformation of Western society that will enrich the already rich and turn the rest of us into serfs and untouchables
    - IN QUESTION

We have another person who is discovering the same set of information independent of my own research.

IS THERE ANY EVIDENCE THAT ANY TREATMENTS ARE EFFECTIVE AGAINST COVID 19?

Are there claims that alternative treatments exist and work?

There are alternative treatments that are effective against Covid19 but they are being suppressed. Why? Because the vaccines are not approved by the FDA but instead they are emergency use authorized only. The emergency use authorization can only be granted if "there are no adequate, approved, and available alternatives". Well, a growing body of scientific research is showing that both Ivermectin and Fluvoxamine (among other drugs) are adequate alternatives for early treatment of Covid19, and both of these drugs have been FDA approved for years. Unfortunately, that means they are now off patent and no one can make any money off of them. So, for the vaccines to continue to receive their EUA, the existence of these treatments must be suppressed. We have seen a huge amount of censorship of doctors who have been speaking out about these drugs.

Emergency use authorization for the vaccines cannot be granted if there are effective alternative approved treatments for Covid19. So, if the pharmaceutical industry is going to make any money off covid, they must suppress the existence of any existing off patent drugs that may be effective in treating or preventing covid: https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization

Remdesivir

- https://www.nejm.org/doi/10.1056/NEJMoa2007016
  - 5 or 10 day trial of 200mg of remdesivir daily Patients infected with COVID 19 with oxygen saturation less than 94% unassisted (53 patients qualify)
  - Clinical improvement was observed in 68% of patients
  - More studies needed
- https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31022-9/fulltext
  - 237 patients given Remdesivir. 158 remdesivir vs 79 placebo
  - No statistically significant difference in clinical improvement
  - There was noted reduction in time required for clinical improvement
  - More studies needed
- https://www.nejm.org/doi/10.1056/NEJMoa2015301
  - 397 patients. 200 for 5 days and 197 for 10 days of treatment with 200mg on the 1st day with 100mg daily afterwards
  - 10 day group did significantly worse than the 5 day group
  - Clinical improvement of 2 points or more occurred in 64% of the 5 day group vs 54% in the 10 day group
  - No Placebo. Effectiveness unknown. Further study needed
- https://www.medrxiv.org/content/10.1101/2020.06.22.20136531v1
  - Cohort study of Pubmed data from examining 1075 subjects
  - Significantly Decreased mortality (8.18% vs 12.7%)
  - A 35.5% reduction in mortality
- https://www.ijidonline.com/article/S1201-9712(20)30528-2/fulltext
  - 5 patients total in Paris France
  - 3 survived, 2 died
  - Possible damage to kidneys causing kidney failure. Author says Unknown if treatment or COVID caused it
- https://jamanetwork.com/journals/jama/fullarticle/2769871
  - 584 patients with COVID 19
  - Patients with 5 day course of Remdesivir had a statistically better improvement than non-Remdesivir patients. A 1.65 times better result exactly
  - Day 28 all cause mortality for 5 day Remdesivir group was 1%. 2% for 10 day Remdesivir Group. 2% for Non Remdesivir group
- https://academic.oup.com/jac/article/75/11/3359/5896161
  - Effectiveness of COVID 19 patients on ventilator in Italy
  - 51 patients total, median age 67
  - Kaplan Meier curve shows significantly lower mortality with Remdesivir use
- https://academic.oup.com/cid/article/72/10/e558/5898276
  - 11,721 patients included
  - Remdesivir only used in 48
  - Reduced risk of mortality

- https://www.nejm.org/doi/full/10.1056/NEJMoa2007764
  - 1,062 patients
  - 541 given Remdesivir and 521 placebo
  - Day 29 mortality was 11.4% with Remdesivir vs 15.2% with placebo
- https://www.nejm.org/doi/full/10.1056/NEJMoa2023184
  - 2,750 late stage COVID 19 patients (76% on ventilator)
  - Non ventilated show greater benefit
  - Total risk of death reduced by 0.2% compared to control group
- https://www.medrxiv.org/content/10.1101/2020.10.16.20214130v1
  - 7,816 VA patients with COVID 19
  - Remdesivir produced an almost 50% increase in survival probability than no treatment at all by day 30
- https://www.medrxiv.org/content/10.1101/2020.10.30.20215301v1
  - 122 received Remdesivir vs 211 control
  - Resdemivir showed better clincal improvement and lower mortality (Not statistically significant)
- https://www.medrxiv.org/content/10.1101/2020.11.19.20234153v1
  - 303 with Remdesivir vs 303 control
  - 23 deaths using Remdesivir vs 45 deaths with control (NSS)
- https://www.ijsciences.com/pub/article/2417
  - 60 patients. 30 given Remdesivir vs 30 given nothing
  - No difference in outcomes
- https://www.biorxiv.org/content/10.1101/2020.12.23.424232v2
  - In Vitro study shows that ivermectin and resdemivir work synergistically against COVID 19
  - In Vivo studies needed
- https://onlinelibrary.wiley.com/doi/10.1111/fcp.12643
  - Remdesivir inhibits CES2
  - Exercise must be cautioned when mixing drugs with Remdesivir
- https://www.sciencedirect.com/science/article/pii/S1198743X2100094X
  - Remdesivir has a chance of inducing Bradycardia (slow heart beat)
- https://www.medrxiv.org/content/10.1101/2021.03.05.21251351v1
  - 324 patients in Iran received various drugs including Remdesivir.
  - No control group, although no difference was noted in Remdesivir group
- https://www.sciencedirect.com/science/article/pii/S1198743X21001130
  - 142 COVID 19 patients were part of the study. 29 given Remdesivir vs 113 control group
  - Remdesivir did not affect nasopharyngeal viral load
  - RDV shortened hospital stay by less than a day compared to non treated control
  - RDV reduced stay from non intubated groups from both the primary and control groups
  - NSS
- https://www.medrxiv.org/content/10.1101/2021.03.09.21253183v1
  - Japanese study with 269 patients. 195 control with 74 receiving Remdesivir

        - Fatality risk is only 12.2% with vs 13.3%
        - Length of hospital stay was 14 days with Remdesivir vs 11 days with control
        - Study shows Remdesivir had no effect on COVID 19 patients in Japan
    - https://bmjopen.bmj.com/content/11/4/e042042.info
        - 3,219 patients in the USA
        - Only 8 patients received Remdesivir
        - This study has such a small test group size its inconclusive
    - https://www.sciencedirect.com/science/article/pii/S0929664621001832
        - Remdesvir reduced the risk of death by 31%
        - Increased the odds of recovery by 10%
        - The higher risk the patient, the better Remdesivir worked
        - Reduced period of hospitalization (9.9 days vs 12.9 days)
    - https://www.medrxiv.org/content/10.1101/2021.06.18.21259072v1
        - 1,549 people given Remdesivir vs 4,964 in the control group
        - 9.3% mortality rate with Remdesivir vs 11.9% control group
        - Reduction in mortality not statistically significant
    - https://www.acpjournals.org/doi/10.7326/M21-0653
        - 42 patients given remdesivir and no significant differences in treatment
    - https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2781959
        - 5,898 people in the test group with 2,374 receiving Remdesivir
        - With control matching the results are
            - All Differences were less than 10%
            - Risk of death was higher with Remdesivir vs control (12.2% vs 10.6%)
            - Hospital discharge times were higher with Remdesivir vs control (6 days vs 3 days)
    - https://www.medrxiv.org/content/10.1101/2021.07.15.21260600v1
        - 1,262 patients, 398 treated with Remdesivir
        - Risk of death is lower with Remdesivir with less than 10 days onset of symptoms (3.6-5.8% vs 10.4%)
        - Then the Risk of death becomes higher when treated after 10 days onset of symptoms (16.7% vs 10.4%)
    - https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD014962/full
        - Cohort study of multiple studies and datasets
        - Remdesivir makes little to no difference statistically in risk of mortality up to day 28
    - https://academic.oup.com/jac/article/76/10/2690/6345860
        - Study shows no significant difference in mortality with or without Remdesivir
    - https://www.medrxiv.org/content/10.1101/2021.08.13.21261992v1
        - 145 hospitalized patients show no difference in mortality when delayed dosage of Remdesivir
    - https://mid.journals.ekb.eg/article_189643.html
        - Compared 25 Remdesivir patients vs 25 HCQ patients
        - Claims Remdesivir has faster viral clearance but does not have data on HCQ group

- https://www.sciencedirect.com/science/article/pii/S1473309921004850
  - 857 hospitalized patients. 414 treated with Remdesivir vs 418 in control group
  - No significant differences in outcomes
- https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciab875/6378778
  - 57,710 total patients in study with 28,855 receiving Remdesivir vs 28,855 control
  - Remdesivir lost 10.6% of patients by 14 day mark vs 15.4% in control
  - Remdesivir lost 15.4% of patients by 28 day mark vs 19.1 in control
  - Improvement in survival is noted and statistically significant
- https://c19rmd.com/smeta.htmlBudesinide
  - Meta study shows
    - 19% improvement in death risk
    - -36% worsening in hospitalization
    - 19% improvement in serious outcomes
    - 8% improvement in randomized controlled trials
  - My opinion
    - Remdesivir is only slightly effective in battling COVID 19. Certain usecases have shown to actually create worse outcomes for patients. If I was a doctor I would only use this if there was nothing else better.

Budesonide

- https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(21)00160-0/fulltext
  - 73 Budesonide vs 73 control patients
  - Risk of hospitalization 2.7% vs 15.1% (81% lower)
  - Risk of no recovery was 10% vs 30.4% (67% lower)
  - Recovery time was 12.5% faster
- https://www.sciencedirect.com/science/article/pii/S014067362101744X
  - 1,073 patients
  - Risk of death was 39.1% lower (0.8% vs 1.3%)
  - Risk of ventilation was 6% lower (1.7% vs 1.8%)
  - Risk of ICU admission was 52% lower (1.3% vs 2.7%)
  - Risk of combined hospitalization/death 25% lower
  - Recovery Time 17.4% Faster
- https://www.biorxiv.org/content/10.1101/2021.05.05.442779v1
  - In Vitro study in animal lung model
  - Bedesonide inhibits COVID 19 viral replication
  - Reduces lung inflammation
- https://www.mdpi.com/1999-4915/13/7/1411
  - In Vitro Study
  - Produced anti viral effect and reduced viral titers
- https://www.sciencedirect.com/science/article/pii/S2213219821009065
  - Budesonide is a intranasal cortisteroid
  - Intranasal cortisteroids (undefined which)
    - reduced death by 23.5%
    - reduced risk of ICU admission by 22.3%
    - reduced risk of hospitalization by 18.9%
- https://www.researchsquare.com/article/rs-72221/v1
  - 44,968 patients in South Korea
  - Budesonide reduced risk of COVID 19 case by 32.6%
- https://www.sciencedirect.com/science/article/pii/S0016508521034909
  - Measures risk of death with patients with Inflammatory bowel disease with COVID 19
  - Budesonide risk of death 78% higher
  - Don’t use Budesonide with patients with IBD
- https://c19budesonide.com/

Brohexmine

- https://www.frontiersin.org/articles/10.3389/fmolb.2021.666626/full
  - *In SIlico* study of TMPRSS2 inhibition by camostat, nafamostat, and bromhexine, suggesting allosteric binding for bromhexine, compared to camostat and nafamostat which bind to the active site of TMPRSS2 forming covalent adducts.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7970656/
  - 100 patients, 48 received Brohexmine vs 52 control
  - Risk of death reduced 76%
  - Risk of no improvement reduced 75.9%
  - Risk of COVID 19 case 74.5% higher
- https://www.medrxiv.org/content/10.1101/2021.03.03.21252855v1
  - 25 patients treated vs 25 control
  - Risk of hospitalization dropped 80%
  - Risk of symptomatic case dropped 90.9%
  - Risk of no viralogical cure dropped by 71.4%
- https://www.jbc.org/article/S0021-9258(21)00490-7/fulltext
  - *In Vitro* study showing that ambroxol (a metabolite of bromhexine) inhibits SARS-CoV-2 infection.
- https://www.researchgate.net/publication/347446399_The_potential_role_of_Bromhexine_in_the_management_of_COVID-19_Decipher_and_a_real_game-changer
  - Noted that it has great effect in lung tissue
  - Reduces the entry and proliferation of COVID 19
- https://lib.ossn.ru/jour/article/view/1440
  - Russian study
  - 33 treated with brohexmine and spironolactone
  - Risk of PCR+ test by day 10 dropped 38.8%
  - Risk of no virological cure dropped by 87.4%
- https://ascpt.onlinelibrary.wiley.com/doi/10.1111/cts.12881
  - 12 brohexmine patients vs 6 control
  - Risk of no hospital discharge dropped 75%
  - Risk of oxygen therapy dropped 50%
  - Recovery time was 3.2% higher
- https://bi.tbzmed.ac.ir/Article/bi-23240
  - 39 patients received bromhexine and 39 are control
  - Risk of death dropped 90% (0.0% vs 12.8%)
  - Risk of Ventilation dropped 88.9% (2.6% vs 23.1%)
  - Risk of ICU Admission dropped 81.8% (5.1% vs 28.2%)
- https://link.springer.com/article/10.1007/s11739-020-02383-3
  - Study says Brohexmine should be considered in COVID 19 treatment based on its ability to inhibit TMPRSS2
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7192109/

        - Study says Brohexmine should be considered in COVID 19 treatment based on its ability to inhibit TMPRSS2
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7175911/
        - Study says Brohexmine should be considered in COVID 19 treatment based on its ability to inhibit TMPRSS2
    - https://www.cell.com/cell/fulltext/S0092-8674(20)30229-4
        - Study shows that COVID 19 uses ACE2 for entry and that the TMPRSS2 inhibitor blocked entry in Vitro
    - https://c19bromhexine.com/
        - 87% reduction in mortality
        - 82% reduction in ICU admission
        - 80% reduction in hospitalization
        - 76% reduction in viral clearance
        - Brohexmine is incredibly promising BUT the studies are too small. We need a massive study with a large double blind control group.

Ivermectin

- https://journals.lww.com/americantherapeutics/Abstract/9000/Ivermectin_for_Prevention_and_Treatment_of.98040.aspx
  - Meta-analysis on the efficacy of Ivermectin in treating Covid19:
- https://www.medrxiv.org/content/10.1101/2021.05.31.21258081v1
  - A double-blind, randomized placebo-controlled trial shows that Ivermectin is able to cure covid within 6 days for most people:
- https://onlinelibrary.wiley.com/doi/10.1002/jmv.26880
  - More evidence that Ivermectin treatment leads to much faster recovery from Covid19:
- https://pubmed.ncbi.nlm.nih.gov/33278625/
  - An NIH study reveals that a five-day course of ivermectin for the treatment of COVID-19 may reduce the duration of illness:
- https://www.sciencedirect.com/science/article/pii/S0166354220302011
  - Ivermectin stops replication of covid:
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3888155/
  - Ivermectin has anti-viral properties:
- https://www.nature.com/articles/s41429-020-0336-
  - Ivermectin has anti-viral properties against covid:
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7996102/
  - Ivermectin binds to Covid19 proteins to block the virus:
- https://www.buongiornosuedtirol.it/wp-content/uploads/2021/04/Nota-Journal-of-Biomedical-Research-Safety-and-Efficacy-Iota-Carrageenan-and-Ivermectin.pdf\
  - Evidence that Ivermectin can be effective as a prophylaxis, Argentinian frontline healthcare workers were given Ivermectin as a preventative and zero got sick with covid, whereas 58.2% of the control group who did not take Ivermectin got covid:
- https://www.ijidonline.com/article/S1201-9712%2820%2932506-6/fulltext
  - Ivermectin safe to give 12mg per day for 5 days:
- https://www.tandfonline.com/doi/full/10.1080/10428194.2020.1786559
  - Ivermectin safely administered 60mg per day for 6 months:
- https://ivmmeta.com/
  - Meta analysis of 64 scientific case studies of Ivermectin and COVID 19
  - Mortality reduced 56%
  - Cases reduced 78%
- https://zenodo.org/record/5525362
  - Retrospective 21,232 patients in Argentina, 3,266 assigned to ivermectin treatment, showing lower mortality with treatment. Greater benefits were seen for patients >40, and a dose dependent response was found.
  - risk of death, 55.1% lower
  - risk of ICU admission, 65.9% lower
  -
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3918289

        - High Dose and Very High Dose Ivermectin for the Early Treatment of COVID-19 (COVIER Study): A Randomised, Double-Blind, Multicentre, Phase II, Dose-Finding, Proof of Concept Clinical Trial
        - Early terminated 89 patient RCT with 29 high dose and 32 very high dose ivermectin patients
        - risk of hospitalization, 600.0% higher
    - https://www.npmj.org/article.asp?issn=1117-1936;year=2021;volume=28;issue=2;spage=81;epage=87;aulast=Okogbenin
        - Retrospective 300 COVID-19 patients in Nigeria treated with ivermectin, zinc, vitamin C, and azithromycin, reporting no deaths. Authors conclude that early treatment is critical.
    - https://www.sciencedirect.com/science/article/pii/S2052297521000883
        - Review concluding that the evidence supports worldwide use of ivermectin for COVID-19, complementary to immunization. Authors note that it is likely non-epitope specific, possibly retaining efficacy with new viral strains. They note that ivermectin has been safely used with 3.7 billion doses since 1987, is well tolerated even at much greater than standard doses, and has been used without serious AEs in high-dose COVID-19 treatment studies.
    - https://www.researchgate.net/publication/353195913_Bayesian_Meta_Analysis_of_Ivermectin_Effectiveness_in_Treating_Covid-19_Disease
        - Bayesian analysis of a subset of ivermectin trial data concluding that there is overwhelming evidence to support a causal link between ivermectin, COVID-19 severity, and mortality.
        - Study finds the link is over 99%
    - https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-021-06348-5
        - RCT with 501 relatively low-risk outpatients in Argentina
        - risk of death, 33.5% higher
        - risk of mechanical ventilation, 33.5% higher
        - risk of hospitalization, 33.0% lower
        - risk of no virological cure, 26.8% higher by day 12
        - There are concerns with the methodology of this study
    - https://link.springer.com/article/10.1007/s11606-021-06948-6
        - CDC analysis of ivermectin prescriptions in the US suggesting that, while national health authority recognition is delayed in that country, many physicians are aware of the efficacy demonstrated in clinical trials.
    - https://www.dovepress.com/clinical-biochemical-and-molecular-evaluations-of-ivermectin-mucoadhes-peer-reviewed-fulltext-article-IJN
        - 114 patients in Egypt, 57 treated with ivermectin mucoadhesive nanosuspension intranasal spray, showing faster recovery and viral clearance with treatment.
        - relative duration of fever, 63.2% lower
        - relative duration of cough, 64.3% lower
        - risk of no virological cure, 78.6% lower
    - https://www.medrxiv.org/content/10.1101/2021.06.01.21258147v2

        - Analysis of the manufacturing cost of several COVID-19 medications, showing a cost of $0.55 per course of ivermectin, including excipients, formulation, tax, and profit.
    - https://onlinelibrary.wiley.com/doi/10.1002/jmv.27122
        - 164 hospitalized patients in Egypt showing lower mortality and shorter hospitalization, but without statistical significance.
        - risk of death, 25.0% lower,
        - risk of mechanical ventilation, no change,
        - hospitalization time, 19.6% lower,
    - https://onlinejima.com/read_journals.php?article=683
        - Retrospective 1,470 healthcare workers in India, showing significantly lower risk of symptomatic COVID-19 with ivermectin prophylaxis.
        - risk of symptomatic case, 87.9% lower,
    - theprofesional.com/index.php/tpmj/article/view/5867
        - 100 outpatients in Pakistan, 50 treated with ivermectin vs 50 control
        - risk of no recovery was 75.0% lower
    - https://www.tandfonline.com/doi/full/10.1080/07391102.2021.1906750?journalCode=tbsd20
        - *In Silico* study showing inhibition of importin-α1 by ivermectin, which disrupts SARS-CoV-2 replication.
    - https://www.medrxiv.org/content/10.1101/2021.04.30.21256415v1
        - A Meta-analysis of Mortality, Need for ICU admission, Use of Mechanical Ventilation and Adverse Effects with Ivermectin Use in COVID-19 Patients
        - Systematic review and meta analysis with 30 studies included in quantitative analysis, showing mortality
        - Our meta-analysis suggests that Ivermectin could be an effective adjuvant therapy in reducing mortality, particularly in patients with mild-moderate clinical presentation of COVID-19. Trends of decreased need for ICU admissions and mechanical ventilation were observed but were not significant. The analysis for adverse effects was inconclusive.
    - https://www.cureus.com/articles/56545-clinical-variants-characteristics-and-outcomes-among-covid-19-patients-a-case-series-analysis-at-a-tertiary-care-hospital-in-karachi-pakistan
        - 165 hospitalized patients in Pakistan
        - risk of death, 50.0% lower,
    - https://openheart.bmj.com/content/8/1/e001655
        - Review suggesting that the effectiveness of ivermectin in the cytokine storm phase of COVID-19 may be, at least in part, an anti-inflammatory effect mediated by increased activation of glycine receptors on leukocytes and possibly vascular endothelium.
    - https://www.clinmedjournals.org/articles/jide/journal-of-infectious-diseases-and-epidemiology-jide-7-202.php?jid=jide
        - 25 patients with an average age of 83.5. All in the very high risk group
        - risk of death was 70.0% lower

- https://www.cureus.com/articles/63131-ivermectin-as-a-sars-cov-2-pre-exposure-prophylaxis-method-in-healthcare-workers-a-propensity-score-matched-retrospective-cohort-study
  - Propensity matched retrospective prophylaxis study of healthcare workers in the Dominican Republic showing significantly lower cases with treatment, and no hospitalization with treatment (versus 2 in the PSM matched control group).
  - risk of hospitalization was 80.0% lower
  - risk of COVID-19 case was 74.0% lower
- https://www.ijidonline.com/article/S1201-9712(21)00345-3/fulltext
  - Prophylaxis RCT in Singapore with 3,037 low risk patients
  - risk of symptomatic case, 49.8% lower,
- https://ijhcr.com/index.php/ijhcr/article/view/1263
  - Retrospective 100 patients in India with 50 treated with ivermectin, and SOC for all patients including HCQ+AZ, showing much higher viral clearance with ivermectin.
  - 50 treated vs 50 control
  - risk of no virological cure was 89.4% lower
- https://www.frontiersin.org/articles/10.3389/fimmu.2021.663586/full
  - Repurposing Ivermectin for COVID-19: Molecular Aspects and Therapeutic Possibilities
  - Review of how ivermectin was identified for use in COVID-19, mechanisms of action, and selected clinical trials.
- https://www.researchsquare.com/article/rs-495945/v1
  - Cluster RCT outpatients in Argentina showing significantly faster recovery with ivermectin. There were no deaths. Cluster RCT where outpatients in Tucumán were assigned to the ivermectin group and outpatients from San Miguel de Tucumán and Gran San Miguel de Tucumán were assigned to the control group. All comorbidities, percentage of male patients, and age were higher in the ivermectin group, favoring the control group.
  - 110 treated vs 144 control
  - Risk of no discharge was 86.9% lower,
- https://www.medrxiv.org/content/10.1101/2021.03.26.21254377v1
  - Retrospective study of the 31 onchocerciasis-endemic countries using the community-directed treatment with ivermectin (CDTI) and the 22 non-endemic countries in Africa, showing significantly lower mortality per capita in the countries using ivermectin.
  - risk of death was 88.2% lower
- https://www.futuremedicine.com/doi/10.2217/fvl-2020-0342
  - *In Silico* analysis finding that ivermectin has high binding affinity for the SARS-CoV-2 viral spike protein, main protease, replicase, and human TMPRSS2 receptors.
- https://huvemec.bg/covid-19-huvemec-klinichno-izpitanie/za-isledvaneto/
  - Late treatment study of 100 people 50 vs 50
  - risk of no improvement was 31.6% lower at day 7

- https://www.researchgate.net/publication/350365014_Comparisons_between_the_Neighboring_States_of_Amazonas_and_Para_in_Brazil_in_the_Second_Wave_of_COVID-19_Outbreak_and_a_Possible_Role_of_Early_Ambulatory_Treatment
  - Comparison between the two largest neighboring states in Brazil, Amazonas and Pará, showing more than 5 times lower mortality in Pará during the second wave when the Pará government supported early treatment and Amazonas did not, compared to similar results in the first wave when treatment protocols were similar.
- https://medicalpressopenaccess.com/upload/1616111435_1008.pdf
  - Retrospective 856 patients previously admitted to hospital for COVID-19 in Argentina, finding that ivermectin improved recovery from "long covid" symptoms.
- https://www.signavitae.com/articles/10.22514/sv.2021.043
  - 703 treated vs 620 control
  - risk of death, 79.5% lower
- https://osf.io/9egh4/
  - Ivermectin for COVID-19 in Peru: 14-fold reduction in nationwide excess deaths, p=.002 for effect by state, then 13-fold increase after ivermectin use restricted
- https://www.medrxiv.org/content/10.1101/2021.03.04.21252084v1
  - 196 critically ill patients in Mexico
  - risk of death was 19.0% lower
- https://www.tandfonline.com/doi/full/10.1080/20477724.2021.1890887
  - 168 very late stage severe condition hospitalized patients comparing CQ, HCQ, and ivermectin not showing significant differences. Authors were unable to add a control arm due to ethical issues.
- https://www.medincell.com/wp-content/uploads/2021/03/PR_MDCL_safety_ivermectine-50321.pdf
  - Safety analysis of >350 articles showing that ivermectin has an excellent safety profile. The author notes that "no severe adverse event has been reported in dozens of completed or ongoing studies involving thousands of participants worldwide to evaluate the efficacy of ivermectin against COVID-19".
- https://www.researchsquare.com/article/rs-160254/v1
  - *In SIlico* analysis predicting that ivermectin has a large binding affinity for the SARS-CoV-2 spike protein. Three different computer modeling techniques show that ivermectin can inhibit SARS-CoV-2 entrance via hACE2.
- https://onlinelibrary.wiley.com/doi/10.1002/jmv.26880
  - 62 mild and early moderate patients with home treatment with ivermectin + nitazoxanide + ribavirin + zinc, showing significantly faster viral clearance.
  - risk of no virological cure 86.9% lower by day 15
- https://www.cureus.com/articles/64807-prophylactic-role-of-ivermectin-in-severe-acute-respiratory-syndrome-coronavirus-2-infection-among-healthcare-workers
  - 3,532 healthcare workers, 2,199 receiving two-dose ivermectin prophylaxis
  - risk of COVID-19 case, 83.0% lower with two doses
- https://www.medrxiv.org/content/10.1101/2021.05.31.21258081v1

        - Double blind RCT for mild-moderate COVID-19 outpatients in Israel showing significantly faster reduction in viral load with treatment, and lower hospitalization with treatment.
        - risk of hospitalization 70.2% lower
        - risk of no virological cure 70.2% lower by day 10
    - https://www.sciencedirect.com/science/article/pii/S1201971221001004
        - Prospective trial of 768 COVID-19 outpatients in Mexico, 481 treated with ivermectin, AZ, montelukast, and aspirin, and 287 control patients with various treatments, showing significantly lower mortality and hospitalization, and significantly higher recovery at 14 days with treatment.
        - risk of death, 77.7% lower,
        - risk of mechanical ventilation, 51.9% lower,
        - risk of hospitalization, 67.4% lower,
        - risk of no recovery, 58.6% lower
    - https://www.frontiersin.org/articles/10.3389/fmicb.2020.592908/full
        - Molecular docking analysis showing that ivermectin efficiently binds to the viral S protein as well as the human cell surface receptors ACE-2 and TMPRSS2; therefore, it might be involved in inhibiting the entry of the virus into the host cell. It also binds to M^{pro} and PLpro of SARS-CoV-2; therefore, it might play a role in preventing the post-translational processing of viral polyproteins. The highly efficient binding of ivermectin to the viral N phosphoprotein and nsp14 is suggestive of its role in inhibiting viral replication and assembly.
    - https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3765018
        - Analysis of ivermectin usage within states in Peru showing sharp reductions in COVID-19 deaths corresponding to the usage of ivermectin treatment.
    - https://www.nature.com/articles/s42003-020-01577-x
        - Computational molecular modeling screening and *in vitro* analysis for inhibitory effects on SARS-CoV-2 specific 3CLpro enzyme, showing that ivermectin blocked more than 85% of 3CLpro activity of SARS-CoV-2. Antiviral activity of ivermectin mediated through the blocking of α/β1 importin has been previously established, this analysis suggests an additional antiviral mechanism of ivermectin for SARS-CoV-2 via inhibitory effects on 3CLpro.
    - https://www.sciencedirect.com/science/article/pii/S0149291821002010
        - 69 patients total
        - risk of death, 197.1% higher
            - treatment 1 of 35 (2.9%), control 0 of 34 (0.0%)
            - There was one death in the treatment group, the patient was in critical condition at baseline and died within 24 hours of admission
        - risk of mechanical ventilation, 94.3% higher
        - recovery time, 31.6% lower
        - hospitalization time, 15.5% lower,
    - https://www.researchsquare.com/article/rs-148845/v1

        - Meta analysis of 18 ivermectin RCTs with 2,282 patients showing faster viral clearance (dose and duration dependent), improved clinical recovery, and lower hospitalization and mortality.
        - risk of death was 75.0% lower
    - https://www.medrxiv.org/content/10.1101/2021.02.02.21250840v1
        - 50 ivermectin and 50 control patients
        - risk of no virological cure, 38.7% lower by day 3
        - risk of no virological cure, 82.4% lower by day 7
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8415509/
        - 117 healthcare workers treated with ivermectin and iota-carrageenan, and 117 controls,
        - risk of moderate/severe case 95.2% lower
        - risk of COVID-19 case 84.0% lower,
    - https://b3d2650e-e929-4448-a527-4eeb59304c7f.filesusr.com/ugd/593c4f_8cb655bd21b1448ba6cf1f4c59f0d73d.pdf
        - Meta analysis confirming the effectiveness of ivermectin for COVID-19
        - risk of death was 83.0% lower
    - https://www.sciencedirect.com/science/article/pii/S2405844020326633
        - *In vivo* analysis of the safety of high dose ivermectin with a Corydoras fish animal model.
    - https://rcm.imrpress.com/EN/10.31083/j.rcm.2020.04.264
        - Review urging early treatment of COVID-19 with sequential multidrug treatment that has been shown to be safe and effective. Proposed treatment includes zinc, vitamin D & C, quercetin, and depending on age, comorbidities, and symptoms may include >=2 of HCQ, ivermectin, favipiravir; AZM/DOXY; corticosteroids; colchicine; bamlanivimab; aspirin; LMWH; and supplemental oxygen.
    - https://www.biorxiv.org/content/10.1101/2020.12.23.424232v1
        - *In Vitro* study showing enhanced antiviral activity of ivermectin and remdesivir in combination.
    - https://covid19criticalcare.com/wp-content/uploads/2020/11/FLCCC-Ivermectin-in-the-prophylaxis-and-treatment-of-COVID-19.pdf
        - Meta analysis of ivermectin clinical studies and natural experiments where ivermectin has been widely used, showing efficacy of ivermectin in prophylaxis and treatment of COVID-19.
        - Risk of death was 69% lower
    - https://ejmed.org/index.php/ejmed/article/view/599
        - 91% reduction in COVID-19 cases with ivermectin prophylaxis. 118 healthcare workers in Bangladesh, 58 receiving ivermectin 12mg monthly
    - https://ijclinmedcasereports.com/pdf/IJCMCR-RA-00320.pdf
        - 95 outpatients in Pakistan with 40 patients treated with ivermectin
        - duration of fever was 98.0% lower,
    - https://www.researchgate.net/publication/346639384_Outcome_of_ivermectin_and_doxycycline_in_cancer_patients_with_COVID-19_A_positive_experience_in_Bangladesh

        - Small case study of ivermectin + doxycycline with 8 cancer patients, with all patients becoming PCR- by day 6 when tested again.
    - https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30464-8/fulltext
        - 12 400mcg/kg single dose ivermectin patients and 12 control patients
        - risk of symptoms was 96.0% lower
        - viral load was 94.6% lower
        - risk of no virological cure was 8.0% lower
    - https://www.medrxiv.org/content/10.1101/2020.11.30.20236570v1
        - Review of ivermectin mechanisms and 8 trials, showing positive mortality benefit, reduced time to clinical recovery, reduced incidence of disease progression, and decreased duration of hospital admission in patients across all stages of clinical severity.
    - https://pubs.acs.org/doi/abs/10.1021/acsptsci.0c00179
        - *In Vitro* analysis of ivermectin with orally administrable nanoparticles showing efficacy for decreasing expression of the viral spike protein and ACE2.
    - https://www.sciencedirect.com/science/article/pii/S1201971220325066
        - Small 72 patient RCT of ivermectin and ivermectin + doxycycline showing faster recovery with ivermectin. The ivermectin + doxycycline group uses only a single dose of ivermectin vs. 5 daily doses for the ivermectin group.
        - risk of unresolved symptoms was 85.0% lower
        - risk of no virological cure, 75.6% lower
    - https://www.facebook.com/correaradiovision/videos/674257910121741/
        - Observational study in Argentina showing significantly lower mortality in the 60 days after adopting ivermectin compared to the 60 days before, relative risk RR 0.082, *p*=0.003.
        - risk of death was 91.8% lower
    - https://www.sciencedirect.com/science/article/pii/S0924857920304684
        - Analysis of COVID-19 cases vs. widespread prophylactic use of ivermectin for parasitic infections showing significantly lower incidence of COVID-19 cases.
        - risk of COVID-19 case was 80.0% lower worldwide,
    - https://www.embopress.org/doi/full/10.15252/emmm.202114122
        - Animal study showing that standard doses of ivermectin prevented clinical deterioration, reduced olfactory deficit, and limited the inflammation of the upper and lower respiratory tracts in SARS-CoV-2-infected hamsters.
    - https://www.medrxiv.org/content/10.1101/2020.11.16.20232223v1
        - Retrospective 976 hospitalized patients with 34 treated with ivermectin
        - risk of death was 99.1% lower
    - https://medicalpressopenaccess.com/upload/1605709669_1007.pdf
        - Prophylaxis study using ivermectin and iota-carrageenan showing 0 of 788 cases from treated healthcare workers, compared to 237 of 407 control.
        - Risk of COVID-19 case 99.9% lower
    - https://iaimjournal.com/wp-content/uploads/2020/10/iaim_2020_0710_23.pdf
        - 100 patient prospective trial of ivermectin + doxycycline showing reduced time to symptom resolution and shorter hospital stay with treatment.

        - recovery time was 21.1% lower
        - hospitalization time was 15.5% lower
    - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0242184
        - 26 patient retrospective study of very late treatment with ivermectin 200 µg/kg, median 12 days after symptoms
        - risk of mechanical ventilation, 40.0% lower,
        - risk of ICU admission, 33.3% lower,
        - risk of no improvement at day 8, 33.3% higher,
        - risk of no virological cure, 25.0% higher,
    - https://www.researchgate.net/publication/345694745_FLCCC_Alliance_MATH_ascorbic_acid_and_I-MASK_ivermectin_protocols_for_COVID-19_-_A_Brief_Review
        - Review suggesting that ivermectin should be used based on existing data suggesting significant benefits, and that waiting for additional data may result in significant harm.
    - https://www.sciencedirect.com/science/article/pii/S2052297521000792
        - Comparison of HCQ, nitazoxanide, and ivermectin showing similar effectiveness for overall clinical outcomes in COVID-19 when used before seven days of symptoms, and overwhelmingly superior compared to the untreated COVID-19 population, even for those outcomes not influenced by placebo effect, at least when combined with azithromycin, and vitamin C, D and zinc in the majority of the cases. 585 patients with mean treatment delay 2.9 days. There was no hospitalization, mechanical ventilation, or mortality with treatment. Control group 1 was a retrospectively obtained group of untreated patients of the same population.
        - risk of death, 78.3% lower,
        - risk of mechanical ventilation, 94.2% lower,
        - risk of hospitalization, 98.0% lower,
    - https://www.longdom.org/open-access/the-use-of-compassionate-ivermectin-in-the-management-of-symptomatic-outpatients-and-hospitalized-patients-with-clinical.pdf
        - Retrospective study of 3,099 outpatients treated with ivermectin in an ER. Of 2,706 treated on an outpatient basis, 18 were subsequently hospitalized, 2 in the ICU, and there was one death (0.04%).
        - For the 300 late treatment hospitalized patients there was 3 deaths.
        - For the 111 very late treatment ICU patients there was 34 deaths.
    - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0247163
        - Retrospective matched case-control prophylaxis study for HCQ, ivermectin, and vitamin C with 372 healthcare workers, showing lower COVID-19 incidence for all treatments, with statistical significance reached for ivermectin.
        - risk of COVID-19 case, 53.8% lower for model 2 2+ doses
        - risk of COVID-19 case, 44.5% lower for matched pair analysis
    - https://www.nature.com/articles/s41598-021-86679-0
        - Mouse study showing ivermectin reducing MHV viral load and disease. MHV is a type 2 family RNA coronavirus similar to SARS-CoV2.

- https://www.researchgate.net/publication/347890660_COVID-19_EFFICACY_OF_PRE-EXPOSURE_PROPHYLAXIS_WITH_IVERMECTIN_IN_EXPOSED_PERSONS
  - Pre-exposure prophylaxis study with 129 people split into high/low exposure groups, with each group split into different dosing regimens, showing higher effectivess preventing infection with more frequent doses of ivermectin.
- https://www.sciencedirect.com/science/article/pii/S1477893920304026
  - Risk of hospitalization was 13.9% higher
- http://www.iraqijms.net/upload/pdf/iraqijms60db8b76d3b1e.pdf
  - 70 ivermectin+doxycycline patients and 70 control patients
  - risk of death was 91.7% lower
  - risk of death was 67.1% lower
  - risk of disease progression was 83.1% lower
  - risk of disease progression was 57.4% lower
  - recovery time was 40.7% lower
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7968425/
  - Study of African Programme for Onchocerciasis Control (APOC) countries, which used ivermectin, with non-APOC countries in Africa, showing 28% lower mortality for APOC countries, relative risk RR = 0.72 [0.67-0.78]. See also [1] and the author's response [2].
- https://clinicaltrials.gov/ct2/show/results/NCT04425850?view=results
  - risk of COVID-19 case was 96.3% lower
- https://www.nature.com/articles/s41598-020-74084-y
  - Study showing that nebulized ivermectin can reach pharmacodynamic concentrations in the lung tissue of rats. Authors note that additional experiments are required to assess the safety of this formulation in larger animals.
- https://www.sciencedirect.com/science/article/pii/S0012369220348984
  - risk of death was 46.0% lower
  - risk of death was 66.9% lower
  - risk of mechanical ventilation was 63.6% lower
- https://journals.sagepub.com/doi/10.1177/03000605211013550
  - Ivermectin + doxycycline: 183 treatment and 183 control patients
  - risk of death was 85.7% lower
  - risk of disease progression was 57.0% lower
  - risk of no recovery was 94.0% lower
  - risk of no recovery was 38.5% lower
  - risk of no recovery was 96.0% lower
  - time to recovery was 27.0% lower
  - risk of no virological cure was 39.0% lower
- https://chemrxiv.org/engage/chemrxiv/article-details/60c74eab0f50db229e397295
  - *In silico* study showing that ivermectin is capable of interfering in different key steps of the SARS-CoV-2 replication cycle.
- https://www.medrxiv.org/content/10.1101/2020.10.06.20208066v1

        - Retrospective database study of 5683 patients, 692 received HCQ/CQ+AZ, 200 received HCQ/CQ, 203 received ivermectin, 1600 received AZ, 358 received ivermectin+AZ, and 2630 received standard of care.
        - risk of death was 17.1% lower, RR 0.83, *p* = 0.01, treatment 92 of 203 (45.3%), control 1,438 of 2,630 (54.7%)
        - risk of death was 39.0% higher, RR 1.39, *p* = 0.16, treatment 47 of 203 (23.2%), control 401 of 2,630 (15.2%), adjusted, day 30, Table 2, IVM wHR.
        - Mixed results
    - https://www.ijsciences.com/pub/article/2378
        - 25 ivermectin and 25 control patients
        - Risk of no recovery at day 7 was 10.0% lower. Not Statistically significant
    - https://www.archbronconeumol.org/en-ivermectin-treatment-may-improve-prognosis-articulo-S030028962030288X
        - 115 ivermectin patients and 133 control patients
        - risk of death was 87.1% lower
        - risk of ICU admission was 89.5% lower
        - risk of disease progression was 83.5% lower
        - risk of no recovery was 87.1% lower
        - hospitalization time was 40.0% lower
        - Time to viral- was 73.3% lower
    - https://onlinelibrary.wiley.com/doi/10.1002/jcp.30055
        - *In Vitro* study showing Ivermectin is a safe wide-spectrum antiviral against SARS-CoV-2, human papillomavirus (HPV), Epstein–Barr virus (EBV), and HIV.
    - https://www.longdom.org/open-access/safety-and-efficacy-of-the-combined-use-of-ivermectin-dexamethasone-enoxaparin-and-aspirina-against-covid19-the-idea-protocol-70290.html
        - 32 patients treated with Invermectin vs 14 control
        - Moderate/severe patients were 85.4% lower
    - https://www.mdpi.com/2073-4409/9/9/2100
        - Cell culture experiments show robust antiviral action towards HIV-1, dengue virus (DENV), Zika virus, West Nile virus, Venezuelan equine encephalitis virus, Chikungunya virus, Pseudorabies virus, adenovirus, and SARS-CoV-2 (COVID-19).
    - https://www.researchsquare.com/article/rs-73308/v1
        - *In Silico* study showing high binding affinity of ivermectin with SARS-CoV-2 RNA-dependent RNA polymerase, suggesting ivermectin as an inhibitor of RdRp
    - https://openheart.bmj.com/content/7/2/e001350
        - Review suggesting that ivermectin may be useful for late stage COVID-19
    - http://imcjms.com/registration/journal_abstract/353
        - 32 ivermectin patients and 30 control patients
        - Recovery time from enrollment was 16.1% lower
    - https://www.worldwidejournals.com/paripex/recent_issues_pdf/2020/August/ivermectin-as-adjuvant-to-hydroxycholoroquine-in-patients-resistant-to-standard-treatment-for-sarscov2-results-of-an-openlabel-randomized-clinical-study_August_2020_1597492974_4801859.pdf

        - 19 ivermectin patients and 13 control patients
        - Risk of no virological cure was 7.5% higher
        - risk of no virological cure was220.0% higher
    - https://www.jcdr.net/articles/PDF/14529/46795_CE[Ra]_F(Sh)_PF1(SY_OM)_PFA_(OM)_PN(KM).pdf
        - 304 total - 203 ivermectin patients and 101 control patients.
        - Risk of symptomatic case was 91.3% lower
        - Risk of COVID-19 severe case, 92.9% lower
    - https://www.biomedres.info/biomedical-research/effects-of-ivermectinazithromycincholecalciferol-combined-therapy-on-covid19-infected-patients-a-proof-of-concept-study-14435.html
        - Small study with 28 patients treated with ivermectin + AZ + cholecalciferol and 7 control patients.
        - recovery time 70.0% lower
        - risk of viral+ at day 10, 97.2% lower
    - https://www.worldwidejournals.com/international-journal-of-scientific-research-(IJSR)/recent_issues_pdf/2020/October/observational-study-on-clinical-features-treatment-and-outcome-of-covid-19-in-a-tertiary-care-centre-in-india--a-retrospective-case-series_October_2020_1614017661_0932284.pdf
        - Retrospective 148 hospitalized patients showing triple therapy with ivermectin + atorvastatin + N-acetylcysteine resulted in a 1.35% case fatality rate which was well below the national average.
    - https://www.sciencedirect.com/science/article/pii/S0019570720301025
        - Panel review of ivermectin reporting that "ivermectin in the dose of 12mg BD alone or in combination with other therapy for 5–7 days may be considered as safe therapeutic option for mild moderate or severe cases of Covid-19 infection. It is cost effective especially when the other drugs are very costly & not easily available".
    - https://www.researchgate.net/publication/344781515_COVID-19_POST-EXPOSURE_PROPHYLAXIS_WITH_IVERMECTIN_IN_CONTACTS
        - Proposed PEP protocol
        - *“Based on local experience and existing publications, a general PEP Scheme consisting of a dose of 0.2 mg per kilo of weight for 2 days is proposed. A third dose (3 days) is indicated in male Contacts between the ages of 45 and 70. And 4 doses is given for men older than 70, and in the person(s) who assume(n) the role of “Caregiver”. The inclusion of Acetylsalicylic Acid (ASA) or Aspirin in the PEP Scheme is recommended in for men over 45 years of age and in “Persons with Increased Risk” of developing severe illness. Recommended dose is 1 tablet of 100 mg after lunch for 6 to 10 days. Contacts should remain under observation in case they begin to show characteristic symptoms of COVID-19, in which case they should move to therapeutic doses of Ivermectin.”*
    - https://www.researchgate.net/publication/343305357_A_Case_Series_of_100_COVID-19_Positive_Patients_Treated_with_Combination_of_Ivermectin_and_Doxycycline

        - Case study of 100 patients treated with ivermectin and doxycycline, with no ICU admission, deaths, or serious side effects reported.
    - https://web.archive.org/web/20210129105721/http://bcpsjournal.org/mhcms-admin/media/pdf/article761.pdf
        - Comparison of 200 patients treated with ivermectin + doxycycline and 200 treated with HCQ + AZ. The HCQ + AZ group had more severe cases at baseline. Viral clearance was faster with ivermectin + doxycycline, however ivermectin clearance results are only shown for days 5 and 6 and HCQ+AZ results are only shown for days 11 and 12. Results are unadjusted for differences between the groups.
    - https://ejmo.org/10.14744/ejmo.2021.16263/
        - 116 patient study with ivermectin+doxycycline
        - Risk of hospitalization 80.6% lower
        - Risk of no recovery 46.4% lower
        - Recovery time 15.2%
        - Risk of no virological cure 80.6%
    - https://www.medrxiv.org/content/10.1101/2020.07.07.20145979v1
        - Small study of 87 patients, 16 treated with Ivermectin
        - Risk of death 71% lower
        - Hospitalization time 42% lower
        - Risk of No recovery 71%
    - https://iv.iiarjournals.org/content/34/5/3023
        - *In silico* analysis showing ivermectin docking which may interfere with the attachment of the spike to the human cell membrane.
    - https://caretas.pe/wp-content/uploads/2020/05/ESTUDIO-PERU-DEFINITIVO-corregido-en-Word-y-pasado-a-PDF.pdf
        - Prospective study of 63 outpatients in Peru treated with ivermectin, reporting significant improvement within 24 hours.
    - https://www.nature.com/articles/s41429-020-0336-z
        - Antiviral effects from Ivermectin have been reported for Zika, dengue, yellow fever, West Nile, Hendra, Newcastle, Venezuelan equine encephalitis, chikungunya, Semliki Forest, Sindbis, Avian influenza A, Porcine Reproductive and Respiratory Syndrome, Human immunodeficiency virus type 1, and severe acute respiratory syndrome coronavirus 2 aka COVID 19.
    - https://ascpt.onlinelibrary.wiley.com/doi/10.1002/cpt.1909
        - Pharmacokinetic analysis predicting that ivermectin will achieve lung concentration over 10 times higher than the reported EC
    - https://www.researchgate.net/publication/342466502_INCLUSION_DE_LA_IVERMECTINA_EN_LA_PRIMERA_LINEA_DE_ACCION_TERAPEUTICA_PARA_COVID-19_Se_reporta_una_muy_significativa_disminucion_de_la_Tasa_de_Letalidad_con_su_uso
        - Peru observational case study of 7 patients treated with ivermectin, showing improvement and resolution of fever within 48 hours, and 100% recovery.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7172803/

        - Responses to Caly et al., and the author's reply. The original authors note that "ivermectin's key direct target in mammalian cells is a not a viral component, but a host protein important in intracellular transport; the fact that it is a host-directed agent (HDA) is almost certainly the basis of its broad-spectrum activity against a number of different RNA viruses *in vitro*. The way a HDA can reduce viral load is by inhibiting a key cellular process that the virus hijacks to enhance infection by suppressing the host antiviral response. Reducing viral load by even a modest amount by using a HDA at low dose early in infection can be the key to enabling the body's immune system to begin to mount the full antiviral response before the infection takes control."
    - https://www.sciencedirect.com/science/article/pii/S0166354220302011
        - *In Vitro* study showing that ivermectin is an inhibitor of SARS-CoV-2, with a single addition to Vero-hSLAM cells 2h post infection with SARS-CoV-2 able to effect ~5000-fold reduction in viral RNA at 48h.
        - Shows Ivermectin inhibits the replication of SARS-CoV-2 in vitro
    - https://accp1.onlinelibrary.wiley.com/doi/abs/10.1177/009127002237994?sid=nlm%3Apubmed
        - Safety study concluding that ivermectin was generally well tolerated, with no indication of associated CNS toxicity for doses up to 10 times the highest FDA-approved dose. Adverse effects were similar between ivermectin and placebo and did not increase with dose. Authors also show that the plasma concentration is much higher when taken with food (geometric mean AUC 2.6 times higher).
    - https://pubs.acs.org/doi/abs/10.1021/jf00101a015
        - Animal study showing that lung tissue concentration of ivermectin may be ~20 times higher than plasma concentration.
    - https://c19ivermectin.com/
    - https://ivmmeta.com/
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7539925/

Hydroxychloriquine

- https://www.medrxiv.org/content/10.1101/2021.09.28.21264186v1
  - Retrospective database analysis of 374,229 patients in the USA, showing no significant difference with HCQ use, however authors do not adjust for the very different baseline risk for systemic autoimmune disease patients.
  - risk of death, 15.0% lower, RR 0.85, *p* = 0.10, vs. past use (better match for systemic autoimmune diseases).
  - risk of death, 6.0% higher, RR 1.06, *p* = 0.39, vs. never used.
  - risk of hospitalization, 5.0% lower, RR 0.95, *p* = 0.41, vs. past use (better match for systemic autoimmune diseases).
  - risk of hospitalization, 4.0% higher, RR 1.04, *p* = 0.32, vs. never used.
  - risk of COVID-19 case, 10.0% lower, RR 0.90, *p* = 0.004, vs. past use (better match for systemic autoimmune diseases).
  - risk of COVID-19 case, 5.0% lower, RR 0.95, *p* = 0.06, vs. never used.
- https://journal.seameotropmednetwork.org/index.php/jtropmed/article/view/490
  - Retrospective 744 hospitalized patients in Thailand, showing lower risk of a poor outcome for favipiravir treatment within 4 days of symptom onset. Early treatment with CQ/HCQ and lopinavir/ritonavir or darunavir/ritonavir also showed lower risk, but without statistical significance. Sample sizes for the number of patients treated within 4 days of symptom onset are not provided.
  - risk of death, ICU, intubation, or high-flow oxygen, 42.0% lower, RR 0.58, *p* = 0.37, within 4 days of symptom onset, RR approximated with OR.
- https://www.medrxiv.org/content/10.1101/2021.08.19.21262275v1
  - RCT 1,360 healthcare workers in the USA showing OR 0.75 [0.49-1.15] for confirmed or suspected COVID-19 clinical infection by day 30. There were no significant safety issues. Authors note that pooling the results with the COVID PREP study gives OR 0.74 [0.55-1.0] *p* = 0.046.
  - risk of symptomatic case, 23.5% lower, RR 0.76, *p* = 0.18, treatment 41 of 683 (6.0%), control 53 of 676 (7.8%), OR converted to RR, logistic regression.
- https://www.researchsquare.com/article/rs-805748/v1
  - Prospective study of 9,212 autoimmune rheumatic disease patients showing lower mortality with HCQ, without reaching statistical significance
  - risk of death, 65.9% lower, RR 0.34, *p* = 0.10, treatment 5,266, control 3,946.
  - risk of COVID-19 case, 9.1% lower, RR 0.91, *p* = 0.43, treatment 167 of 5,266 (3.2%), control 147 of 3,946 (3.7%), adjusted.
- https://www.medrxiv.org/content/10.1101/2021.08.02.21260750v1
  - Observational study of 927 low-risk healthcare workers in India, 731 volunteering for weekly HCQ prophylaxis, showing higher cases with treatment in unadjusted results. Clinical outcome was in the protocol, however no information on which patients were symptomatic is provided. There were no adverse events and no hospitalizations or deaths. Adherence was very low,

decreasing weekly, with almost all participants discontinuing by week 11. The majority of infections occurred in later weeks when adherence was very low, and there was no per protocol analysis. #ECR/206/Inst/GJ/2013/RR-20.

- https://www.medrxiv.org/content/10.1101/2021.07.30.21261220v1
  - Retrospective 668 hospitalized patients in Argentina, 18 treated with HCQ, not showing a significant difference in unadjusted results.
  - risk of death, 10.8% lower, RR 0.89, *p* = 1.00, treatment 2 of 18 (11.1%), control 81 of 650 (12.5%), unadjusted.
- https://www.mdpi.com/2077-0383/10/13/2954
  - Retrospective 926 patients in Senegal, 674 treated with HCQ+AZ, showing significantly higher hospital discharge at day 15 with treatment.
  - risk of no hospital discharge, 38.7% lower, RR 0.61, *p* = 0.02, treatment 674, control 252, multivariate, RR approximated with OR.
- https://academic.oup.com/aje/advance-article/doi/10.1093/aje/kwab183/6308675
  - Retrospective 1,769 hospitalized patients in the USA showing no significant differences for HCQ, and higher intubation for HCQ+AZ.
  - risk of death, 21.0% higher, RR 1.21, *p* = 0.33, treatment 49 of 228 (21.5%), control 141 of 770 (18.3%), adjusted, HCQ.
  - risk of mechanical ventilation, 33.0% higher, RR 1.33, *p* = 0.25, treatment 32 of 228 (14.0%), control 69 of 770 (9.0%), adjusted, HCQ.
- https://www.authorea.com/doi/full/10.22541/au.162257516.68665404
  - risk of death, 82.1% lower, RR 0.18, *p* = 0.19, treatment 0 of 385 (0.0%), control 2 of 299 (0.7%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of COVID-19 case, 93.7% lower, RR 0.06, *p* < 0.001, treatment 2 of 395 (0.5%), control 24 of 299 (8.0%).
- https://rcm.imrpress.com/EN/10.31083/j.rcm2203116
  - Retrospective 10,429 outpatients in France, 8,315 treated with HCQ+AZ a median of 4 days from symptom onset, showing significantly lower mortality with treatment.
  - risk of death, 83.0% lower, RR 0.17, *p* < 0.001, treatment 5 of 8,315 (0.1%), control 11 of 2,114 (0.5%), adjusted.
  - risk of ICU admission, 44.0% lower, RR 0.56, *p* = 0.18, treatment 17 of 8,315 (0.2%), control 7 of 2,114 (0.3%), adjusted.
  - risk of hospitalization, 4.0% lower, RR 0.96, *p* = 0.77, treatment 214 of 8,315 (2.6%), control 64 of 2,114 (3.0%), adjusted.
- https://europepmc.org/article/med/33913549
  - Retrospective 991 hospitalized patients in Iran focusing on aspirin use but also showing results for HCQ, remdesivir, and favipiravir.
  - risk of death, 19.5% lower, RR 0.81, *p* = 0.09, treatment 553, control 438, multivariate Cox proportional regression.
- https://www.sciencedirect.com/science/article/pii/S0954611121001396
  - risk of death, 3.8% higher, RR 1.04, *p* = 0.97, treatment 62 of 1,382 (4.5%), control 5 of 118 (4.2%), adjusted, OR converted to RR.

- https://www.ijidonline.com/article/S1201-9712(21)00345-3/fulltext
  - Prophylaxis RCT in Singapore with 3,037 low risk patients, showing lower serious cases, lower symptomatic cases, and lower confirmed cases of COVID-19 with all treatments (ivermectin, HCQ, PVP-I, and Zinc + vitamin C) compared to vitamin C.
  - risk of COVID-19 severe case, 35.1% lower, RR 0.65, *p* = 0.14, treatment 29 of 432 (6.7%), control 64 of 619 (10.3%).
  - risk of COVID-19 case, 32.0% lower, RR 0.68, *p* = 0.009, treatment 212 of 432 (49.1%), control 433 of 619 (70.0%), adjusted, OR converted to RR, model 6.
- https://www.sciencedirect.com/science/article/pii/S1567576921002721
  - Retrospective 28,759 adult outpatients with mild COVID-19 in Iran, 7,295 treated with HCQ, showing significantly lower hospitalization and mortality with treatment.
  - risk of death, 69.7% lower, RR 0.30, *p* < 0.001, treatment 27 of 7,295 (0.4%), control 287 of 21,464 (1.3%), adjusted, OR converted to RR.
  - risk of hospitalization, 35.3% lower, RR 0.65, *p* < 0.001, treatment 523 of 7,295 (7.2%), control 2,382 of 21,464 (11.1%), adjusted, OR converted to RR.
- https://www.sciencedirect.com/science/article/pii/S1201971221002769
  - 605 hospitalized patients in Saudi Arabia showing no mortality with HCQ (only 6 patients received HCQ).
  - risk of death, 98.9% lower, RR 0.01, *p* = 0.60, treatment 0 of 6 (0.0%), control 91 of 599 (15.2%), relative risk is not 0 because of continuity correction due to zero events.
  - Study in question due to low amount of treated
- https://www.mdpi.com/1999-4915/13/2/329
  - Retrospective database analysis of prior HCQ usage in South Korea, showing non-statistically significantly lower mortality and cases with treatment.
  - risk of COVID-19 case, 30.3% lower, RR 0.70, *p* = 0.18, treatment 16 of 743 (2.2%), control 91 of 2,698 (3.4%), OR converted to RR, PSM.
- https://www.hindawi.com/journals/bri/2021/6685921/
  - RCT 754 patients comparing HCQ+AZ along with other treatment groups using lopinavir/ritonavir and doxycycline to a control group taking AZ, finding significantly faster viral clearance with all treatment groups. (The labels in Figure 2 appear to be reversed).
  - risk of no virological cure, 66.3% lower, RR 0.34, *p* < 0.001, treatment 38 of 121 (31.4%), control 111 of 119 (93.3%).
- https://www.medrxiv.org/content/10.1101/2021.02.03.21251069v1
  - Retrospective 4666 people with autoimmune or inflammatory conditions, showing HCQ adjusted risk of COVID-19 OR 0.91 [0.68-1.23]. Results are not adjusted for the significantly different risk of COVID-19 depending on the type and severity of autoimmune or inflammatory condition.
  - risk of COVID-19 case, 8.5% lower, RR 0.91, *p* = 0.54, treatment 65 of 1,072 (6.1%), control 200 of 3,594 (5.6%), adjusted, OR converted to RR.
- https://www.sciencedirect.com/science/article/pii/S0761842521000383

        - Retrospective 456 patients in Burkina Faso showing lower risk of ARDS (p=0.001) and mortality (p=0.38) with HCQ.
        - risk of death, 33.0% lower, RR 0.67, p = 0.38, treatment 397, control 59, multivariate.
        - risk of ARDS, 68.0% lower, RR 0.32, p = 0.001, treatment 397, control 59, multivariate, RR approximated with OR.
    - https://www.hindawi.com/journals/jhe/2021/5556207/
        - Retrospective 4,396 hospitalized patients in Italy showing significantly lower mortality with HCQ treatment, and identifying greater efficacy for a subgroup of patients in clustering analysis.
        - Risk of death, 40.0% lower, RR 0.60, p < 0.001, treatment 3,270, control 1,000, OR converted to RR, multivariate Cox proportional hazards model 4, control prevalence approximated with overall prevalence.
    - https://www.medrxiv.org/content/10.1101/2021.01.06.20249091v1
        - Retrospective 1,072 hospitalized patients in Kazakhstan showing no mortality for HCQ treated patients, however only 23 patients received treatment - this result is not statistically significant.
        - risk of death, 95.3% lower, RR 0.05, p = 1.00, treatment 0 of 23 (0.0%), control 20 of 1,049 (1.9%), relative risk is not 0 because of continuity correction due to zero events.
    - https://turkthoracj.org/en/use-of-hydroxychloroquine-in-patients-with-covid-19-a-retrospective-observational-study-131729
        - Retrospective 202 patients in Saudi Arabia not showing significant differences with treatment. No information is provided on how patients were selected for treatment, there may be significant confounding by indication. Time varying confounding is also likely as HCQ became controversial during the period studied, therefore HCQ use was likely more frequent toward the beginning of the period, a time when overall treatment protocols were significantly worse.
        - risk of death, 24.8% higher, RR 1.25, p = 0.76, treatment 6 of 99 (6.1%), control 5 of 103 (4.9%).
        - risk of mechanical ventilation, 41.2% higher, RR 1.41, p = 0.34, treatment 19 of 99 (19.2%), control 14 of 103 (13.6%).
    - https://www.sciencedirect.com/science/article/pii/S2213398421000555
        - Retrospective 3,345 hospitalized patients in India, 11.5% treated with HCQ, showing unadjusted higher mortality with treatment. Confounding by indication and time based confounding (due to declining use over the period when overall treatment protocols improved dramatically) are likely.
        - risk of death, 81.0% higher, RR 1.81, p = 0.007, treatment 27 of 384 (7.0%), control 115 of 2,961 (3.9%).
    - https://www.sciencedirect.com/science/article/pii/S1201971220325832
        - Retrospective database analysis of 1,669 patients in the US showing OR 1.81, p = 0.01. Confounding by indication is likely.
        - isk of death, 69.9% higher, RR 1.70, p = 0.01, treatment 101 of 973 (10.4%), control 56 of 696 (8.0%), OR converted to RR.

- https://academic.oup.com/ofid/article/7/Supplement_1/S330/6057008
  - Retrospective 67 hospitalized patients in the USA showing non-statistically significant unadjusted increased mortality with HCQ. Confounding by indication is likely.
  - risk of death, 63.5% higher, RR 1.63, *p* = 0.52, treatment 17 of 52 (32.7%), control 3 of 15 (20.0%).
- https://academic.oup.com/ofid/article/7/Supplement_1/S251/6058327
  - Retrospective 161 hospitalized patients in the USA showing non-statistically significant unadjusted increased mortality with HCQ. Confounding by indication is likely.
  - risk of death, 79.3% higher, RR 1.79, *p* = 0.10, treatment 17 of 65 (26.2%), control 14 of 96 (14.6%).
- https://smw.ch/article/doi/smw.2020.20446
  - Retrospective 840 hospitalized patients in Switzerland showing non-statistically significant lower mortality with HCQ but significantly longer hospitalization times. Confounding by indication is likely. PSM fails to adjust for severity with a 16% higher mNEWS score for HCQ vs. SOC in the matched cohort.
  - Risk of death, 15.3% lower, RR 0.85, *p* = 0.71, treatment 12 of 93 (12.9%), control 16 of 105 (15.2%), HCQ vs. SOC, PSM.
  - hospitalization time, 49.0% higher, relative time 1.49, *p* = 0.002, treatment 93, control 105, HCQ vs. SOC, PSM.
- https://www.sciencedirect.com/science/article/pii/S1876034120307735
  - Retrospective 824 hospitalized patients in Turkey showing lower ICU admission for HCQ vs. favipiravir.
  - risk of ICU admission, 77.3% lower, RR 0.23, *p* = 0.16, treatment 604, control 100, IPTW multivariate analysis.
- https://www.sciencedirect.com/science/article/pii/S2666776220300193
  - Retrospective 1,747 ICU patients in Belgium showing lower mortality with HCQ, multivariate mixed effects analysis HCQ aOR 0.64 [0.45-0.92].
  - risk of death, 24.7% lower, RR 0.75, *p* = 0.02, treatment 449 of 1,308 (34.3%), control 183 of 439 (41.7%), OR converted to RR.
- https://www.sciencedirect.com/science/article/pii/S0300289620305354
  - 47% lower mortality with HCQ/CQ. Retrospective 1,271 patients with lung disease in Canada, China, Cuba, Ecuador, Germany, Italy and Spain, 83% treated with HCQ/CQ.
  - risk of death, 47.0% lower, RR 0.53, *p* < 0.001, treatment 4,854, control 993, adjusted.
- https://www.medrxiv.org/content/10.1101/2020.12.13.20247254v1
  - Retrospective 1,214 hospitalized patients in Pakistan, 77 HCQ patients, showing 33% lower mortality with HCQ, multivariate Cox HR 0.67, *p* = 0.34.
- https://www.sciencedirect.com/science/article/pii/S0924857920304696
  - Retrospective 1255 patients in Spain showing lower mortality with HCQ. Subject to confounding by indication.

        - risk of death, 22.8% lower, RR 0.77, $p = 0.26$, treatment 251 of 1,148 (21.9%), control 17 of 60 (28.3%).
    - https://www.mdpi.com/2077-0383/9/12/3834
        - 290 patient observational trial in the USA, not showing a significant difference with HCQ treatment overall, but showing significantly lower mortality in a subgroup of patients where HCQ is expected to be beneficial based on a machine learning algorithm.
        - risk of death, 59.0% higher, RR 1.59, $p = 0.12$, treatment 142, control 148, adjusted, all patients.
        - risk of death, 71.0% lower, RR 0.29, $p = 0.01$, treatment 26, control 17, adjusted, subgroup of patients where treatment is predicted to be beneficial.
    - https://www.sciencedirect.com/science/article/pii/S2589537020303898
        - risk of hospitalization, 12.5% lower, RR 0.88, $p = 1.00$, treatment 7 of 304 (2.3%), control 4 of 152 (2.6%), HCQ+AZ or HCQ vs. control.
        - risk of symptomatic at day 21, 25.8% lower, RR 0.74, $p = 0.58$, treatment 9 of 293 (3.1%), control 6 of 145 (4.1%), HCQ+AZ or HCQ vs. control.
    - https://academic.oup.com/ofid/advance-article/doi/10.1093/ofid/ofaa563/5992463
        - Prospective observational study of 315 hospitalized patients in Italy showing 65% lower mortality with HCQ. The median treatment delay was 6 days for survivors and 6.5 days for non-survivors. Mortality relative risk:
        - risk of death, 65.0% lower, RR 0.35, $p = 0.20$, treatment 40 of 238 (16.8%), control 30 of 77 (39.0%), adjusted, PSM.
    - https://www.medrxiv.org/content/10.1101/2020.11.16.20232223v1
        - Retrospective 976 hospitalized patients with 834 treated with HCQ+AZ showing HCQ mortality relative risk RR 0.35, $p < 0.0001$
        - risk of death, 65.4% lower, RR 0.35, $p < 0.001$, treatment 69 of 834 (8.3%), control 34 of 142 (23.9%).
    - https://portlandpress.com/bioscirep/article/40/12/BSR20203455/226985/Prognostic-factors-and-predictors-of-outcome-in
        - Retrospective 258 hospitalized patients in Italy showing lower mortality with HCQ treatment, unadjusted relative risk RR 0.455, $p<0.001$. Data is in the supplementary appendix.
        - risk of death, 54.5% lower, RR 0.45, $p < 0.001$, treatment 41 of 202 (20.3%), control 25 of 56 (44.6%).
    - https://www.sciencedirect.com/science/article/pii/S0168822720307956
        - Retrospective 300 hospitalized patients in Saudi Arabia showing HCQ adjusted odds ratio aOR 0.12, $p < 0.001$.
        - risk of death, 80.0% lower, RR 0.20, $p < 0.001$, treatment 267, control 33, OR converted to RR.
    - https://www.sciencedirect.com/science/article/pii/S2052297520301657
        - 156 treatment patients and 48 control patients.
        - 100% reduction in cases with HCQ+zinc post-exposure prophylaxis. Brief report for healthcare workers in Bulgaria.

        - risk of COVID-19 case, 92.7% lower, RR 0.07, *p* = 0.01, treatment 0 of 156 (0.0%), control 3 of 48 (6.2%), relative risk is not 0 because of continuity correction due to zero events.
    - https://www.sciencedirect.com/science/article/pii/S0211139X20301748
        - 67% lower mortality with HCQ. Retrospective 416 elderly patients in Spain showing adjusted HCQ mortality hazard ratio HR 0.33, *p* = 0.1.
    - https://jamanetwork.com/journals/jama/fullarticle/2772922
        - Early terminated very late stage (65% on supplemental oxygen) RCT with 242 HCQ and 237 control patients not showing a significant difference, 28 day mortality adjusted odds ratio aOR 0.93 [0.48-1.85].
        - risk of death, 6.2% higher, RR 1.06, *p* = 0.85, treatment 25 of 241 (10.4%), control 25 of 236 (10.6%), adjusted, OR converted to RR.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7649104/
        - Retrospective database study of 1,021 patients in Ecuador, Germany, Italy, and Spain, showing HCQ propensity score adjusted mortality odds ratio aOR 0.88, *p*=0.005.
        - risk of death, 7.9% lower, RR 0.92, *p* = 0.005, treatment 200 of 686 (29.2%), control 100 of 268 (37.3%), adjusted, OR converted to RR.
    - https://www.marinemedicalsociety.in/article.asp?issn=0975-3605;year=2020;volume=22;issue=3;spage=98;epage=104;aulast=Mathai
        - risk of COVID-19 case, 89.5% lower, RR 0.10, *p* < 0.001, treatment 10 of 491 (2.0%), control 22 of 113 (19.5%).
    - https://www.sciencedirect.com/science/article/pii/S0924857920304350
        - risk of COVID-19 case, 50.0% lower, RR 0.50, *p* = 0.04, treatment 10 of 132 (7.6%), control 28 of 185 (15.1%), adjusted, PCR+.
    - https://www.sciencedirect.com/science/article/pii/S0002944020304892
        - Convalescent plasma study also showing mortality based on HCQ treatment, unadjusted hazard ratio uHR 1.37, *p* = 0.28. Confounding by indication is likely.
        - risk of death, 37.0% higher,
    - https://www.sciencedirect.com/science/article/pii/S2052297521000792
        - 585 people in study
        - risk of death, 81.2% lower, RR 0.19, *p* = 0.21, treatment 0 of 159 (0.0%), control 2 of 137 (1.5%), relative risk is not 0 because of continuity correction due to zero events, control group 1.
        - risk of hospitalization, 98.3% lower, RR 0.02, *p* < 0.001, treatment 0 of 159 (0.0%), control 27 of 137 (19.7%), relative risk is not 0 because of continuity correction due to zero events, control group 1.
    - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0247163
        - Retrospective matched case-control prophylaxis study for HCQ, ivermectin, and vitamin C with 372 healthcare workers, showing lower COVID-19 incidence for all treatments, with statistical significance reached for ivermectin.
        - risk of COVID-19 case, 27.9% lower, RR 0.72, *p* = 0.29, treatment 7 of 19 (36.8%), control 179 of 353 (50.7%), adjusted, OR converted to RR, model 2 conditional logistic regression.

- https://www.sciencedirect.com/science/article/pii/S1477893920304026
  - 64% lower hospitalization with HCQ. Retrospective 717 patients in Brazil with early treatment, adjusted OR 0.32, *p*=0.00081, for HCQ versus no medication, and OR 0.45, *p*=0.0065, for HCQ vs. anything else.
  - risk of hospitalization, 64.0% lower, RR 0.36, *p* < 0.001, treatment 25 of 175 (14.3%), control 89 of 542 (16.4%), adjusted, OR converted to RR, HCQ vs. nothing.
- https://www.researchsquare.com/article/rs-94509/v1
  - Retrospective 3,473 hospitalized patients showing lower mortality with HCQ+zinc.
  - risk of death, 37.0% lower, RR 0.63, *p* = 0.01, treatment 121 of 1,006 (12.0%), control 424 of 2,467 (17.2%), adjusted, PSM.
- https://www.sciencedirect.com/science/article/pii/S0924857920304258
  - 79% lower mortality and 82% lower hospitalization with early HCQ+AZ+Z. No cardiac side effects. Retrospective 518 patients (141 treated, 377 control).
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3689618
  - Study of SARS-CoV-2-IgG antibodies in 1122 health care workers in India finding 87% lower positives for adequate HCQ prophylaxis, 1.3% HCQ versus 12.3% for no HCQ prophylaxis.
  - risk of IgG positive, 87.2% lower, RR 0.13, *p* = 0.03, treatment 1 of 77 (1.3%), control 115 of 885 (13.0%), adjusted, OR converted to RR.
- https://onlinelibrary.wiley.com/doi/full/10.1111/ajt.16369
  - Retrospective 652 transplant recipient patients in Spain showing 46% lower mortality for patients treated with HCQ, unadjusted relative risk RR 0.54, *p*<0.0001.
  - risk of death, 45.6% lower, RR 0.54, *p* < 0.001, treatment 55 of 307 (17.9%), control 108 of 328 (32.9%).
- https://academic.oup.com/ckj/article/13/5/878/5934808
  - risk of death, 33.1% lower, RR 0.67, *p* = 0.28, treatment 56, control 66, adjusted, OR converted to RR.
  - risk of combined death/ICU, 68.7% lower, RR 0.31, *p* = 0.11, treatment 4 of 36 (11.1%), control 11 of 31 (35.5%), not requiring O2 on diagnosis (relatively early treatment).
- https://www.sciencedirect.com/science/article/pii/S1198743X21001403
  - Small early terminated late stage (60% on oxygen) RCT in France showing 46% lower mortality.
  - If not stopped early and the same trend continued, statistical significance would be reached on 28 day mortality after ~550 patients (1,300 patients were planned).
  - No safety concerns were identified. This study has been presented as negative, however the results do not support that conclusion.
  - risk of death at day 28, 46.0% lower, RR 0.54, *p* = 0.21, treatment 6 of 124 (4.8%), control 11 of 123 (8.9%).
- https://www.sciencedirect.com/science/article/pii/S014795632030412X

        - Retrospective 164 ICU patients in Mexico showing 32% lower mortality with HCQ+AZ and 37% lower with CQ.
    - https://www.sciencedirect.com/science/article/pii/S2589537020303357
        - Retrospective 607 patients reporting results for early outpatient HCQ use with mortality odds ratio OR 0.092 [0.022-0.381], p = 0.001 (65 patients), and for hospital use, mortality odds ratio OR 0.737 [0.38-1.41], p = 0.36 (558 patients). Median age 69.
        - risk of death, 20.3% lower, RR 0.80, p = 0.36, treatment 127 of 558 (22.8%), control 14 of 49 (28.6%), adjusted, OR converted to RR.
        - outpatient use, 88.0% lower, RR 0.12, p = 0.001, treatment 2 of 65 (3.1%), control 139 of 542 (25.6%), adjusted, OR converted to RR.
    - https://www.nejm.org/doi/full/10.1056/NEJMoa2023184
        - WHO SOLIDARITY open-label trial with 954 very late stage (64% on oxygen/ventilation) HCQ patients, mortality relative risk RR 1.19
        - risk of death, 19.0% higher, RR 1.19, p = 0.23, treatment 104 of 947 (11.0%), control 84 of 906 (9.3%).
    - https://www.medrxiv.org/content/10.1101/2020.10.09.20209775v1
        - Analysis of hospitalized patients in Turkey showing HCQ was given to 99.2% of patients and the incidence of critical illness was lower than most studies. Authors note "whether HCQ administration lowered the rates of critical illness development is beyond the scope of this study." There is no comparison with a control group.
    - https://www.medrxiv.org/content/10.1101/2020.10.06.20207092v1
        - Retrospective 654 hospitalized patients focused on low-density lipoprotein cholesterol levels, also showing results for HCQ with 605 HCQ patients, unadjusted 30 day mortality relative risk RR 0.37, p = 0.008.
        - risk of death, 63.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.10.06.20208066v1
        - Retrospective database study of 5683 patients, 692 received HCQ/CQ+AZ, 200 received HCQ/CQ, 203 received ivermectin, 1600 received AZ, 358 received ivermectin+AZ, and 2630 received standard of care.
        - risk of death, 18.1% lower, RR 0.82, p < 0.001, treatment 346 of 692 (50.0%), control 1,606 of 2,630 (61.1%), day 54 (last day available) weighted KM.
        - risk of death, 84.0% higher, RR 1.84, p = 0.02, treatment 165 of 692 (23.8%), control 401 of 2,630 (15.2%), adjusted, day 30.
    - https://www.sciencedirect.com/science/article/pii/S2052297520301281
        - Meta analysis of 43 studies: "HCQ was found consistently effective against COVID-19 when used early, in the outpatient setting. It was found overall effective also including inpatient studies. No unbiased study found worse outcomes with HCQ use. No mortality or serious safety adverse event was found.
    - https://www.ajtmh.org/view/journals/tpmd/103/6/article-p2419.xml
        - Retrospective 766 hospitalized patients in DRC showing mortality reduced from 29% to 11%, and improvement at 30 days increased from 65% to 84%.

- https://www.sciencedirect.com/science/article/pii/S1319016420302334
  - Retrospective 161 hospitalized patients in Saudi Arabia showing lower ventilation and ICU admission with HCQ, but not statistically significant with the small sample sizes.
  - risk of mechanical ventilation, 65.0% lower, RR 0.35, *p* = 0.16, treatment 3 of 95 (3.2%), control 6 of 66 (9.1%).
- https://www.researchgate.net/publication/344221734_Sero-survey_for_health-care_workers_provides_corroborative_evidence_for_the_effectiveness_of_Hydroxychloroquine_prophylaxis_against_COVID-19_infection
  - risk of hospitalization, 82.4% lower, RR 0.18, *p* = 0.01, treatment 2 of 279 (0.7%), control 9 of 221 (4.1%), PCR+.
- https://www.bakirkoytip.org/jvi.aspx?pdir=bakirkoytip&plng=eng&un=BMJ-50469&look4=
  - Small prophylaxis study of 208 healthcare workers in Turkey, 138 with high risk exposure received HCQ, while 70 with low and medium risk exposure did not. COVID-19 cases were lower in the treatment group, relative risk RR 0.43, *p* = 0.026. Since the control group had lower risk, the actual benefit may be larger.
  - risk of COVID-19 case, 57.0% lower, RR 0.43, *p* = 0.03, treatment 12 of 138 (8.7%), control 14 of 70 (20.0%).
- https://link.springer.com/article/10.1007/s11739-020-02505-x
  - 2075 hospital patients in Spain showing HCQ reduces mortality 52%,
- https://www.medrxiv.org/content/10.1101/2020.09.30.20204693v1
  - Meta analysis of prophylactic and early treatment RCTs, 24% reduction in cases, hospitalization or death with HCQ, RR 0.76, *p*=0.025. No serious adverse cardiac events were reported. 5,577 patients.
- https://www.sciencedirect.com/science/article/pii/S1201971220321755
  - Observational study 1,064 hospitalized patients in the Netherlands, 53% reduced risk of transfer to the ICU for mechanical ventilation with HCQ treatment starting on the first day of admission.
  - risk of combined death/ICU, 32.0% lower, RR 0.68, *p* = 0.02, treatment 30 of 189 (15.9%), control 101 of 498 (20.3%), adjusted.
- https://academic.oup.com/europace/advance-article/doi/10.1093/europace/euaa216/5910968
  - Safety study of 649 patients finding that HCQ administration is safe for short-term treatment for patients with COVID-19 infection regardless of the clinical setting of delivery, causing only modest QTc prolongation and no directly attributable arrhythmic deaths.
  - Arrhythmic safety data from a large cohort of patients treated with HCQ alone or in combination with other QT-prolonging drugs.
- https://www.annalsofoncology.org/article/S0923-7534(20)41826-5/fulltext
  - Small retrospective study of 22 lung cancer patients, 14 treated with HCQ+AZ, showing HCQ+AZ mortality relative risk RR 0.57, *p* = 0.145.
  - risk of death, 43.0% lower,
- https://www.thelancet.com/journals/lanrhe/article/PIIS2665-9913(20)30305-2/fulltext

        - Retrospective patients with rheumatologic conditions showing zero of 10,703 COVID-19 deaths for HCQ patients versus 7 of 21,406 propensity matched control patients (not statistically significant). The average age of HCQ patients is slightly lower 64.8 versus 65.4 control.
        - risk of death, 91.3% lower, RR 0.09, p = 0.10, treatment 0 of 10,703 (0.0%), control 7 of 21,406 (0.0%), relative risk is not 0 because of continuity correction due to zero events, COVID-19 mortality within all patients.
        - risk of death, 90.7% lower, RR 0.09, p = 0.19, treatment 0 of 31 (0.0%), control 7 of 78 (9.0%), relative risk is not 0 because of continuity correction due to zero events, mortality for infected patients.
        - risk of COVID-19 case, 20.9% lower, RR 0.79, p = 0.27, treatment 31 of 10,703 (0.3%), control 78 of 21,406 (0.4%), OR converted to RR.
    - https://academic.oup.com/cid/article/72/11/e835/5929230
        - risk of hospitalization, 50.1% lower,
        - Authors note: - the trial was underpowered & investigation into more frequent dosing may be warranted & - insufficient dosing with no participants achieving more than the *in vitro* EC_{50}
    - https://www.researchsquare.com/article/rs-350749/v1
        - risk of COVID-19 case, 67.9% lower, RR 0.32, p = 0.47, treatment 0 of 142 (0.0%), control 1 of 127 (0.8%), relative risk is not 0 because of continuity correction due to zero events.
    - https://academic.oup.com/ofid/article/7/11/ofaa500/5930834
        - Analysis of 2,795 outpatients not showing significant safety concerns with HCQ. No deaths were related to HCQ. There was one serious event requiring hospitalization, identical to the frequency with placebo.
    - https://www.panafrican-med-journal.com/content/series/37/1/9/full/
        - Retrospective 307 hospital patients in Ghana showing 33% reduction in hospitalization time with HCQ, 29% reduction with HCQ+AZ, and 37% reduction with CQ+AZ.
    - https://ascpt.onlinelibrary.wiley.com/doi/full/10.1111/cts.12860
        - Retrospective 377 patients, 73% reduction in mortality with HCQ+AZ, adjusted hazard ratio HR 0.27 [0.17-0.41]. Mean age 71.8. No serious adverse events. Subject to incomplete adjustment for confounders.
        - risk of death, 73.5% lower,
    - https://www.medrxiv.org/content/10.1101/2020.09.09.20184143v1
        - Observational prospective 5,541 patients, adjusted HCQ mortality odds ratio OR 0.36, p = 0.012. Adjusted hospitalization OR 0.57, p < 0.001. Zinc supplementation was used in all cases. Early treatment in ambulatory fever clinics in Saudi Arabia.
        - risk of death, 63.7% lower,
        - risk of hospitalization, 38.6% lower,
    - https://bmjopenrespres.bmj.com/content/7/1/e000646
        - Prospective 56 patients in Uganda, 29 HCQ and 27 control, showing 25.6% faster recovery with HCQ, 6.4 vs. 8.6 days (p = 0.20)

- https://www.sciencedirect.com/science/article/pii/S2665991320303787
  - Observational database study of RA/SLE patients in the UK, 194,637 RA/SLE patients with 30,569 having >= 2 HCQ prescriptions in the prior 6 months, HCQ HR 1.03 [0.80-1.33] (HR 0.78 before adjustments).
  - risk of death, 3.0% higher,
- https://www.medrxiv.org/content/10.1101/2020.09.05.20184655v2
  - Retrospective 117 patients, 58 HCQ showing lower mortality for HCQ patients.
  - risk of death, 23.6% lower, RR 0.76, *p* = 0.27, treatment 21 of 98 (21.4%), control 60 of 214 (28.0%).
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7467095/
  - *In Vitro* study providing novel insights into the molecular mechanism of CQ/HCQ treatment, showing that CQ and HCQ both inhibit the entrance of 2019-nCoV into cells by blocking the binding of the virus with ACE2.
- https://link.springer.com/article/10.1007/s41999-020-00432-w
  - Retrospective 100 elderly nursing home patients, HCQ+AZ mortality 11.4% vs. control 61.9%,
  - risk of death, 95.6% lower, RR 0.04, *p* = 0.004, treatment 8 of 70 (11.4%), control 16 of 30 (53.3%), adjusted.
- https://www.medrxiv.org/content/10.1101/2020.08.31.20185314v1
  - Analysis of autoimmune disease patients on HCQ, compared to a control group from the general population
  - risk of hospitalization, 50.0% higher, RR 1.50, *p* = 1.00, treatment 3 of 687 (0.4%), control 2 of 688 (0.3%).
  - risk of COVID-19 case, 42.6% higher, RR 1.43, *p* = 0.15, treatment 42 of 648 (6.5%), control 30 of 660 (4.5%), suspected COVID-19.
  - risk of COVID-19 case, 7.8% lower, RR 0.92, *p* = 0.84, treatment 12 of 678 (1.8%), control 13 of 677 (1.9%), confirmed COVID-19.
- https://www.mdpi.com/1424-8247/13/9/228/htm
  - Review of zinc as an inhibitor of SARS-CoV-2's RNA-dependent RNA polymerase, and zinc ionophores including CQ/HCQ, showing the latest evidence for zinc and CQ/HCQ having antiviral, and in particular anticoronaviral action.
- https://www.sciencedirect.com/science/article/pii/S2052297520301013
  - Analysis of US states and countries. Country analysis shows a significant correlation between the dates of decisions to adopt/decline HCQ, and corresponding trend changes in CFR. US state analysis shows a significant correlation between CFR and the level of acceptance of HCQ.
- https://www.mdpi.com/2077-0383/9/9/2800
  - Retrospective 1376 hospitalized patients in Italy, 211 treated with HCQ and 166 with HCQ+AZ.
  - risk of death, 18.4% lower, RR 0.82, *p* = 0.15, treatment 60 of 211 (28.4%), control 172 of 605 (28.4%), adjusted, OR converted to RR, HCQ vs. neither.
  - risk of death, 9.0% higher, RR 1.09, *p* = 0.54, treatment 60 of 211 (28.4%), control 172 of 605 (28.4%), adjusted, OR converted to RR, HCQ+AZ vs. neither.

        - risk of ICU admission, 9.2% higher, RR 1.09, $p = 0.70$, treatment 73 of 211 (34.6%), control 46 of 605 (7.6%), adjusted, OR converted to RR, HCQ vs. neither.
        - risk of ICU admission, 71.3% higher, RR 1.71, $p < 0.001$, treatment 73 of 211 (34.6%), control 46 of 605 (7.6%), adjusted, OR converted to RR, HCQ+AZ vs. neither.
    - https://academic.oup.com/cid/article/72/10/e558/5898276
        - Database analysis of 11,721 hospitalized patients, 4,232 on HCQ. Strong evidence for confounding by indication and compassionate use of HCQ. 24.9% of HCQ patients were on mechanical ventilation versus 12.2% control. Ventilation mortality was 70.5% versus 11.6%.
        - risk of death, 27.0% higher, RR 1.27, $p < 0.001$, treatment 1,048 of 4,232 (24.8%), control 1,466 of 7,489 (19.6%).
    - https://link.springer.com/article/10.1007/s10067-020-05334-7
        - Analysis of 1641 systemic autoimmune disease patients showing csDMARD (HCQ etc.) RR 0.37, p=0.015.
        - risk of COVID-19 case, 63.0% lower,
    - https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-021-05773-w
        - Retrospective 1,274 outpatients, 47% reduction in hospitalization with HCQ with propensity matching, HCQ OR 0.53 [0.29-0.95]. Sensitivity analyses revealed similar associations.
        - risk of death, 54.5% lower,
        - risk of ICU admission, 28.6% lower,
        - risk of hospitalization, 37.3% lower,
    - https://www.sciencedirect.com/science/article/pii/S0953620520303356
        - Retrospective 3,451 hospitalized patients, 30% reduction in mortality with HCQ after propensity adjustment, HR 0.70 [0.59 - 0.84].
        - risk of death, 30.0% lower,
    - https://www.sciencedirect.com/science/article/pii/S0924857920303423
        - Retrospective 8,075 hospitalized patients, 4,542 low-dose HCQ, 3,533 control. 35% lower mortality for HCQ (17.7% vs. 27.1%), adjusted HR 0.68 [0.62–0.76]. Low-dose HCQ monotherapy was independently associated with lower mortality in hospitalized patients.
        - risk of death, 32.0% lower,
    - https://academic.oup.com/jac/article/75/11/3359/5896161
        - Retrospective 51 ICU patients under mechanical ventilation, 33 treated with HCQ, showing unadjusted lower mortality with treatment.
    - https://www.sciencedirect.com/science/article/pii/S0924857920304301
        - Retrospective analysis of retirement homes, HCQ+AZ >= 3 days mortality OR 0.37, p=0.02. 1690 elderly residents (mean age 83), 226 infected residents, 116 treated with HCQ+AZ >= 3 days.
        - risk of death, 55.6% lower,
    - https://www.medrxiv.org/content/10.1101/2020.08.18.20172874v1

        - Retrospective study focused on eosinophil recovery with 9,644 hospitalized patients in Spain, showing lower mortality for HCQ (14.7% vs 29.2%, *p*<0.001), and AZ (15.3% vs. 18.4%, *p*<0.001)
        - risk of death, 26.6% lower,
    - https://www.sciencedirect.com/science/article/pii/S221371652030206X
        - Retrospective analysis of 36 hospitalized patients showing HCQ/AZ associated with lower ICU admission
        - risk of ICU admission, 87.6% lower,
    - https://www.sciencedirect.com/science/article/pii/S2052297520300998
        - Review concluding that HCQ/AZ does not cause Torsade de Pointes or related deaths, HCQ decreases cardiac events, and HCQ should not be restricted in use for COVID-19 patients because of fear of cardiac mortality.
    - https://cancerdiscovery.aacrjournals.org/content/10/10/1465
        - Restrospective 890 cancer patients with COVID-19, adjusted mortality HR for HCQ/CQ 0.41, *p*<0.0001.
        - risk of death, 59.0% lower,
    - https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(20)30615-7/fulltext
        - Retrospective study of HCQ use in 9 hospitals in the Netherlands, showing no significant difference in mortality with HCQ/CQ or dexamethasone. Late stage (admitted to hospital with positive test or CT scan abnormalities).
        - risk of death, 9.0% higher, R
    - https://www.ajtmh.org/view/journals/tpmd/103/4/article-p1635.xml
        - Small RCT in Egypt with 97/97 HCQ/control patients, showing 58% more recovery @28days for HCQ (53.6% HCQ, 34% control),
        - risk of death, 20.0% higher,
        - risk of no recovery at day 28, 30.0% lower,
    - https://www.jmir.org/2020/9/e21758/
        - Retrospective 176 hospitalized patients (144 HCQ, 32 control) showing no significant differences with HCQ or TCZ. Confounding by indication.
        - risk of death, 37.7% higher,
    - https://link.springer.com/article/10.1007/s13318-020-00640-6
        - *In Silico* analysis of HCQ treatment showing concluding that HCQ may affect viral clearance if administered early enough when the virus is still confined to the pharyngeal cavity;
    - https://www.sciencedirect.com/science/article/pii/S0022073620305288
        - Safety study of 109 patients showing 5 days of HCQ+AZ did not lead to clinically significant QT prolongation or other conduction delays compared to baseline ECG in non-ICU patients.
    - https://www.medrxiv.org/content/10.1101/2020.08.05.20151027v1
        - Retrospective 65 HCQ+AZ, 20 control patients, showing median time to negative PCR of 23 days for HCQ+AZ vs. 19 days for control.
        - median time to PCR-, 21.0% higher,
    - https://drive.google.com/file/d/1NZOJ57fM0RTaHD1t_9w2iua7lUJhOgWT/view

        - Open letter signed by 38 professors and doctors regarding misinterpretation of statistics in HCQ RCTs.
    - https://ard.bmj.com/content/early/2020/08/19/annrheumdis-2020-218500
        - No mortality of severity information is provided to determine if HCQ treated patients fared better. No adjustment for concomitant medications or severity.
        - risk of COVID-19 case, 9.0% higher,
    - https://www.sciencedirect.com/science/article/pii/S2213716520301934
        - Small retrospective database analysis of 36 patients receiving HCQ not showing significant differences. Confounding by indication is likely.
        - risk of death, 67.0% higher,
    - https://www.medrxiv.org/content/10.1101/2020.07.30.20165365v1
        - Study of 349 low-risk hospitalized patients with 151 non-consenting or ineligible patients used as controls
        - risk of disease progression, 5.0% lower
        - risk of disease progression, 54.8% lower with comorbidities.
        - risk of viral+ at day 7, 25.5% lower,
        - risk of viral+ at day 14, 10.0% higher,
    - https://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(20)30431-6/fulltext
        - risk of death, 18.2% lower,
    - https://link.springer.com/article/10.1007/s11427-020-1782-1
        - Retrospective 2,882 patients in China, median age 62, 278 receiving HCQ, median 10 days post hospitalization, showing that HCQ treatment can reduce systemic inflammation and inhibit the cytokine storm, thus protecting multiple organs from inflammatory injuries, such as detoxification in the liver and attenuation of cardiac injury.
        - risk of progression to critical, 82.5% lower,
        - risk of death, 85.0% lower,
    - https://www.sciencedirect.com/science/article/pii/S0924857920303125
        - Retrospective of 132 hospitalized patients. HCQ+AZ(52)/AZ(28) significantly reduced death/ICU, HR=0.45, p=0.04. Adjusted for Charlson Comorbidity Index (including age), obesity, O2, lymphocyte count, and treatments. Mean delay from admission to treatment 0.7 days.
        - risk of combined intubation/hospitalization, 55.0% lower,
    - https://academic.oup.com/biomedgerontology/article/76/3/e19/5879759
        - Retrospective 272 nursing home residents showing significantly improved survival after establishing a treatment program including HCQ with or without lopinavir/ritonavir and with the addition of adjuvant and antimicrobial treatments depending on circumstances. Dosage details are in the supplementary appendix. Mortality relative risk is from [1]
        - risk of death, 59.0% lower,
    - https://www.sciencedirect.com/science/article/pii/S1477893920303227

        - Report on HCQ+AZ use in 41 elderly high-risk patients. 29 of 30 patients with treatment >= 5 days survived. Only 10% were PCR negative after one week, however the Ct value is not specified.
    - https://www.ijidonline.com/article/S1201-9712(20)30600-7/fulltext
        - HCQ 197 patients, HCQ+AZ 94, control 92.
        - risk of death, 34.0% lower, RR 0.66, *p* = 0.12, treatment 53 of 197 (26.9%), control 47 of 92 (51.1%), adjusted.
        - HCQ+AZ, 56.0% lower, RR 0.44, *p* = 0.009, treatment 22 of 94 (23.4%), control 47 of 92 (51.1%), adjusted.
    - https://pubmed.ncbi.nlm.nih.gov/32718127/
        - Observational study of 174 hospitalized patients in Turkey, median age 45.4, 23 treated with HCQ, 113 with HCQ+AZ, and 32 with regimens including favipiravir. 75% reduction in the median time to clinical improvement for HCQ+AZ vs. FAV, RR 0.25, *p*<0.001. 83% reduction for HCQ. However, there was significant confounding by indication.
    - https://www.nejm.org/doi/full/10.1056/NEJMoa2021801
        - Death rate reduced from 0.6% to 0.4%, RR 0.68, not statistically significant due to low incidence (8 control cases, 5 treatment cases).
    - https://www.medrxiv.org/content/10.1101/2020.07.21.20159301v1
        - Study of hospital health care workers showing HCQ prophylaxis reduces COVID-19 significantly,
        - risk of COVID-19 case, 51.0% lower,
    - https://www.nejm.org/doi/full/10.1056/NEJMoa2019014
        - Late stage RCT of 667 hospitalized patients with up to 14 days of symptoms at enrollment and receiving up to 4 liters per minute supplemental oxygen, not finding a significant effect after 15 days.
        - risk of death, 16.0% lower,
        - risk of hospitalization, 28.0% higher,
    - https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3622350
        - Prophylaxis study with 334 low-risk healthcare workers in India, showing significantly lower risk of cases with treatment.
        - risk of COVID-19 case, 86.3% lower,
    - https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1009212
        - *In Vitro* analysis showing that HCQ efficiently blocks viral entry mediated by cathepsin L, but not by TMPRSS2, and that a combination of HCQ and a TMPRSS2 inhibitor prevents SARS-CoV-2 infection more potently than either drug alone.
    - https://bpspubs.onlinelibrary.wiley.com/doi/full/10.1111/bcp.14482
        - Retrospective 82 hospitalized patients HCQ/AZ, 52 SOC, not finding statistically significant differences
        - risk of death, 143.0% higher,
    - https://www.medrxiv.org/content/10.1101/2020.07.17.20155960v1
        - HCQ HR 0.83 [0.77-0.89] based on propensity score matched retrospective analysis of 1,645 hospitalized patients.

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7369577/
  - Retrospective 152 mechanically ventilated patients in the USA showing unadjusted lower mortality with vitamin C, vitamin D, HCQ, and zinc treatment, statistically significant only for vitamin C.
  - risk of death, 20.4% lower,
- https://www.researchsquare.com/article/rs-41653/v1
  - Retrospective 199 sarcoidosis patients showing non-statistically significant HCQ
  - risk of COVID-19 case, 16.9% lower,
- https://academic.oup.com/aje/article/doi/10.1093/aje/kwaa152/5873640
  - Updated meta analysis including 7 new studies of high-risk outpatients, for a total of 12 studies, all showing significant benefit.
- https://arxiv.org/abs/2007.09477
  - Secondary analysis of Boulware et al.'s PEP trial and treatment delay-response data, confirming that HCQ is effective when used early, $p<0.01$.
- https://www.medrxiv.org/content/10.1101/2020.07.17.20156521v1
  - HCQ+AZ early in the epidemic had a fairly good success rate with few complications, 86% of HCQ patients survived and 92% of HCQ+AZ patients.
  - risk of death, 70.0% higher,
- https://www.nature.com/articles/s41467-020-19056-6
  - Small RCT of nasopharyngeal viral load not showing significant differences.
  - risk of death, 3.7% lower,
  - improvement in viral load reduction rate, 71.0% lower,
- https://icjournal.org/DOIx.php?id=10.3947/ic.2020.52.3.396
  - HCQ 1-4 days from diagnosis was the only protective factor against prolonged viral shedding found,
  - 57.1% viral clearance with 1-4 days delay vs. 22.9% for 5+ days delayed treatment.
  - risk of prolonged viral shedding, 64.9% lower, RR 0.35, $p = 0.001$, treatment 42, control 48,
- https://www.acpjournals.org/doi/10.7326/M20-4207
  - ~70 to 140 hour (inc. shipping) delayed outpatient treatment with HCQ showing lower hospitalization/death and faster recovery, but not reaching statistical significance.
  - risk of combined hospitalization/death, 49.4% lower,
- https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2768602
  - Analysis of 2215 intensive care unit patients showing no significant differences with this very late stage use of HCQ. HCQ+AZ mortality relative risk RR 0.96,
  - risk of death, 6.0% higher,
- https://www.researchsquare.com/article/rs-39421/v1
  - Retrospective 100 hospitalized patients in Spain showing lower mortality with HCQ+AZ.
  - risk of death, 35.6% lower,
- https://ejmo.org/10.14744/ejmo.2021.16263/

        - Small 116 patient RCT comparing ivermectin+doxycycline and HCQ+AZ, not showing a significant difference in time to PCR negative or symptom resolution
    - https://ccforum.biomedcentral.com/articles/10.1186/s13054-020-03117-9
        - Retrospective 80 ICU patients, 22 SOC, 20 lopinavir/ritonavir, 38 HCQ. 28 day mortality 24% (HCQ) versus 41% (SOC), a 41% decrease,
        - risk of death, 42.0% lower,
        - risk of treatment escalation, 6.0% lower,
        - risk of viral+ at day 7, 15.0% lower,
    - https://onlinelibrary.wiley.com/doi/full/10.1111/ajt.16185
        - Analysis of 144 hospitalized kidney transplant patients showing HCQ mortality HR 1.53
        - risk of death, 53.0% higher,
    - https://www.sciencedirect.com/science/article/pii/S0025775320304486
        - risk of death, 19.0% lower
    - https://www.medrxiv.org/content/10.1101/2020.07.04.20146548v1
        - Treatment Response to Hydroxychloroquine and Antibiotics for mild to moderate COVID-19: a retrospective cohort study from South Korea
        - time to viral clearance, 3.0% lower,
    - https://www.thelancet.com/journals/lanrhe/article/PIIS2665-9913(20)30227-7/fulltext
        - Rheumatic disease patients on HCQ had a lower risk of COVID-19 than those on other disease-modifying anti-rheumatic drugs,
        - risk of COVID-19 case, 91.0% lower,
    - https://www.ijidonline.com/article/S1201-9712(20)30534-8/fulltext
        - HCQ decreases mortality from 26.4% to 13.5%
        - risk of death, 51.3% lower,
    - https://www.nature.com/articles/s41408-020-00372-5
        - Retrospective 167 multiple myeloma patients in Spain.
        - risk of death, 33.0% lower,
    - https://link.springer.com/article/10.1007/s11606-020-05983-z
        - HCQ decreases mortality, HR 0.53 (CI 0.41–0.67). IPTW adjustment does not significantly change HR 0.53 (0.41-0.68). Retrospective 6,000 patients in New York City.
        - risk of death, 47.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.06.30.20143289v1
        - Small late stage (7-10 days post symptoms) study of nasal swab RNA with 12 control and 33 patients, showing no significant differences
        - risk of viral load, 25.0% higher,
    - https://www.cirugiaycirujanos.com/frame_esp.php?id=358
        - Small retrospective study of 56 ICU patients in Mexico showing HCQ RR 1.1, p = 1.0.
        - risk of death, 10.5% higher,
    - https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.26286
        - Chronic treatment with HCQ provides protection against COVID, odds ratio 0.51 (0.37-0.70).

        - risk of COVID-19 case, 47.1% lower,
    - https://www.sciencedirect.com/science/article/pii/S1477893920302817
        - Outcomes of 3,737 COVID-19 patients treated with hydroxychloroquine/azithromycin and other regimens in Marseille, France: A retrospective analysis
        - risk of death, 59.0% lower,
    - https://www.aging-us.com/article/103583/text
        - Observational prospective 108 hospitalized patients 65 and older, showing HCQ mortality OR 0.49, *p* = 0.15.
        - risk of death, 42.8% lower,
    - https://www.medrxiv.org/content/10.1101/2020.06.19.20136093v1
        - Significantly faster clinical recovery and shorter time to RNA negative (from 7.0 days to 2.0 days (HCQ), *p*=0.01. 67 patients with mild/moderate cases.
        - median time to PCR-, 72.0% lower
    - https://link.springer.com/article/10.1007/s42770-020-00395-x
        - Viral load comparison for 34 HCQ and 32 control patients hospitalized with moderate COVID-19
        - While not achieving statistical significance, results show faster recovery with HCQ. The greatest benefit is seen mid-recovery as expected for an effective treatment:
        - Δt7-12 ΔCt improvement, 80.8% lower, relative rate 0.19, *p* = 0.40, treatment 34, control 32.
        - Δt<7 ΔCt improvement, 24.0% lower, relative rate 0.76, *p* = 0.36, treatment 34, control 32.
        - Δt>12 ΔCt improvement, 15.0% higher, relative rate 1.15, *p* = 0.52, treatment 34, control 32.
    - https://www.nih.gov/news-events/news-releases/nih-halts-clinical-trial-hydroxychloroquine#.Xu4uzn5Nh_4.twitter
        - NIH halts late stage trial reporting no harm and no benefit. 470 patients.
    - https://www.medrxiv.org/content/10.1101/2020.06.16.20132597v1
        - Retrospective of 4,642 hospitalized patients in France showing significantly faster discharge with HCQ and HCQ+AZ.
        - No significant effect is seen on 28-day mortality, however many more control patients are still in hospital at 28 days.
        - risk of death, 5.0% higher,
        - risk of no hospital discharge, 20.0% lower,
    - https://journals.lww.com/jcardiovascularmedicine/Fulltext/2020/11000/Low_hospitalization_rate_without_severe.15.aspx
        - Prospective analysis of early treatment of 350 patients in Italy (without waiting for PCR results), showing low hospitalization rates and no serious adverse events.
        - From 274 patients treated with HCQ, 16 required hospitalization (5.8%). Minor complications (mainly gastrointestinal, diarrhoea) were found in eight patients

(2.9%), none of whom had to interrupt treatment. No major cardiac complications were found.
        - Risk of Hospitalization reduced by 50%
    - https://onlinelibrary.wiley.com/doi/10.1002/jmv.26193
        - 30 hospitalized patients. Early use of HCQ is more effective, 43% reduction in progression from moderate to severe. "Early" is relative here, within 7 days of hospitalization.
    - https://www.annalsofoncology.org/article/S0923-7534(20)39894-X/fulltext
        - Analysis of hospitalized lung cancer patients with 35 of 48 taking HCQ,
        - risk of death, 2.2% higher,
    - https://www.kjim.org/journal/view.php?doi=10.3904/kjim.2020.224
        - Small retrospective study of hospitalized patients with 31 lopinavir-ritonavir and 34 HCQ patients, HCQ 400mg once per day, finding no significant difference in clinical response, but more rapid viral clearance with lopinavir-ritonavir.
    - https://ard.bmj.com/content/79/9/1163
        - Analysis of 1255 COVID-19 patients in Wuhan Tongji Hospital finding 0.61% with systemic autoimmune diseases, much lower than authors expected (3%–10%). Authors hypothesise that protective factors, such as CQ/HCQ use, reduce hospitalization.
        - risk of hospitalization, 80.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.06.11.20128926v1
        - Database analysis of 7,592 patients in NYC, showing adjusted HCQ mortality odds ratio OR 0.96, p = 0.82, and HCQ+AZ OR 0.94, p = 0.63
        - risk of death, 5.8% lower,
    - https://www.medrxiv.org/content/10.1101/2020.06.10.20101105v1
        - 80 moderate cases, HCQ+AZ appears to reduce serious complications and death. Moderate treated cases resulted in hospitalization at the same rate as mild untreated cases suggesting efficacy.
    - https://www.medrxiv.org/content/10.1101/2020.06.09.20116806v1
        - HCQ reduced cases from 38% to 7%. 106 people. No serious adverse effects.
    - https://www.sciencedirect.com/science/article/pii/S2052297520300615?via%3Dihub
        - [H]CQ effective and reduces mortality by a factor 3. Meta analysis of 20 studies.
    - https://www.nejm.org/doi/full/10.1056/NEJMoa2022926
        - RECOVERY trial finds no significant benefit for very late stage very sick patients.
    - https://www.nejm.org/doi/full/10.1056/NEJMoa2016638
        - COVID-19 cases are reduced by [49%, 29%, 16%] respectively when taken within ~[70, 94, 118] hours of exposure (including shipping delay). The treatment delay-response relationship is significant at p=0.002. PEP delayed treatment RCT.
        - The longer you wait, the worse hydroxychloroquine does
    - https://www.journalajmah.com/index.php/AJMAH/article/view/30224
        - Mean clinical recovery time reduced from 26 days (SOC) to 9 days, p<0.0001 (HCQ+AZ) or 13 days, p<0.0001 (AZ). No cardiac toxicity. Small retrospective study of 88 patients with case control analysis with matched patients.

        - risk of death, 61.4% lower,
        - recovery time, 65.0% lower,
    - https://www.lungcancerjournal.info/article/S0169-5002(20)30468-2/fulltext
        - Retrospective 17 hospitalized lung cancer patients showing lower mortality with HCQ+AZ treatment.
        - risk of death, 91.6% lower,
    - https://www.medrxiv.org/content/10.1101/2020.05.28.20114835v1
        - Viral Dynamics Matter in COVID-19 Pneumonia: the success of early treatment with hydroxychloroquine and azithromycin in Lebanon
        - HCQ+AZ potentially explains 94.7% success in treating a fairly complex cohort.
    - https://journals.lww.com/ijmr/pages/default.aspx
        - 4+ doses of HCQ associated with a significant decline in the odds of getting infected, dose-response relationship exists.
        - risk of COVID-19 case, 66.8% lower,
    - https://academic.oup.com/nsr/article/7/9/1428/5848167
        - 197 CQ patients, 176 control. Mean time to undetectable viral RNA and duration of fever significantly reduced. No serious adverse events.
        - time to viral-, 67.0% lower, relative time 0.33, $p < 0.001$, treatment 197, control 176.
    - https://www.nejm.org/doi/10.1056/NEJMoa2015301
        - Remdesivir for 5 or 10 Days in Patients with Severe Covid-19
        - Study focused on remdesivir but with results for HCQ in the supplementary appendix, showing 9% death with HCQ versus 12% control,
        - risk of death, 22.3% lower,
    - https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31187-9/fulltext
        - Retrospective 928 cancer patients,
        - risk of death, 134.2% higher, RR 2.34, $p < 0.001$, treatment 45 of 181 (24.9%), control 121 of 928 (13.0%), OR converted to RR, HCQ+AZ.
    - https://europepmc.org/article/med/32471903
        - Analysis of rheumatic disease patients showing no significant association between antimalarial therapy and hospitalisation,
        - risk of hospitalization, 3.3% lower,
    - https://academic.oup.com/aje/article/189/11/1218/5847586
        - Five Early Treatment studies, including two controlled clinical trials, have demonstrated significant outpatient treatment efficacy.
    - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0237693
        - Retrospective study of late stage use on 2,512 hospitalized patients showing no significant differences in associated mortality for patients receiving any HCQ during the hospitalization (HR, 0.99 [95% CI, 0.80-1.22]), HCQ alone (HR, 1.02 [95% CI, 0.83-1.27]), or HCQ+AZ (HR, 0.98 [95% CI, 0.75-1.28]).
        - risk of death, 1.0% lower,
    - https://annalsofintensivecare.springeropen.com/articles/10.1186/s13613-020-00678-4

        - Retrospective 45 very late stage ICU patients, 17 treated with HCQ+AZ, showing no significant difference in viral clearance after 6 days, or mortality 6 days from ARDS.
        - risk of death, 64.7% lower, RR 0.35, *p* = 0.21, treatment 2 of 17 (11.8%), control 5 of 15 (33.3%), day 38 +- 7.
        - risk of death, 376.5% higher, RR 4.76, *p* = 0.49, treatment 2 of 17 (11.8%), control 0 of 15 (0.0%), continuity correction due to zero event, day 6 from ARDS.
        - risk of no virological cure, 2.9% higher, RR 1.03, *p* = 1.00, treatment 14 of 17 (82.4%), control 8 of 10 (80.0%), day 6 from treatment.
    - https://www.ajtmh.org/configurable/content/journals$002ftpmd$002f103$002f1$002farticle-p69.xml?t:ac=journals%24002ftpmd%24002f103%24002f1%24002farticle-p69.xml
        - Retrospective 283 COVID-19+ diabetes patients in China, showing non-statistically significant lower mortality with HCQ/CQ treatment.
        - risk of death, 32.4% lower,
    - https://www.medrxiv.org/content/10.1101/2020.05.12.20099028v1
        - EHR analysis of 3,372 hospitalized COVID-19 patients not showing a significant difference for mortality or the risk of mechanical ventilation. Subject to the limitations of EHR analysis. Misclassification is possible. Confounding by indication is likely.
        - risk of death, 5.0% lower,
        - risk of mechanical ventilation, 19.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.05.13.20094193v1?versioned=true
        - Retrospective of 97 moderate cases.
        - hospitalization time, 51.0% lower,
        - time to viral-, 56.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.05.18.20066902v1
        - 54 patients in long term care facilities. 6% death with HCQ+AZ compared to 22% using a naive indirect comparison.
    - https://link.springer.com/article/10.1007%2Fs11427-020-1732-2
        - Retrospective, 550 critically ill patients. 19% fatality for HCQ versus 47% for non-HCQ,
        - The levels of inflammatory cytokine IL-6 were significantly reduced from 22.2 pg/mL to 5.2 pg/mL ($p<0.05$) at the end of the treatment in the HCQ group but there was no change in the control group.
        - risk of death, 60.5% lower,
    - https://www.bmj.com/content/369/bmj.m1844
        - Observational study of 181 patients with advanced disease requiring oxygen showing no benefit for HCQ
        - None of the 15 patients receiving HCQ+AZ were transferred to intensive care or died compared to 23% overall.
        - risk of death, 20.0% higher, RR 1.20, *p* = 0.75, treatment 9 of 84 (10.7%), control 8 of 89 (9.0%), adjusted.

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7220612/pdf/10928_2020_Article_9689.pdf
  - Odds of PCR-positive decrease by 53% for each unit increase in HCQ log-concentration
  - Similarly, the odds decrease by 61%, and by 12% for each day increase, and for azithromycin co-treatment, respectively.
- https://www.medrxiv.org/content/10.1101/2020.05.08.20095679v1
  - 3 hospitalized patients in Saudi Arabia showing a non-statistically significant 15% reduction in PCR positive results at day 5
  - risk of no virological cure at day 5, 14.7% lower,
- https://jamanetwork.com/journals/jama/fullarticle/2766117
  - Restrospective observational late stage study showing no significant differences but calling for clinical trials.
  - risk of death, 35.0% higher,
- https://www.kidney-international.org/article/S0085-2538(20)30508-1/fulltext
  - Analysis of 94 hemodialysis COVID-19 positive patients.
  - risk of death, 42.9% lower,
- https://academic.oup.com/cid/article/71/16/2265/5831983?login=true
  - On human lung parenchymal explants, CQ concentration clinically achievable in the lung (100 μM) inhibited the lipopolysaccharide-induced release of TNF-α (by 76%), IL-6 (by 68%), CCL2 (by 72%), and CCL3 (by 67%). In addition to antiviral activity, CQ may also mitigate the cytokine storm associated with severe pneumonia caused by coronaviruses.
- https://www.microbiologyresearch.org/content/journal/jmm/10.1099/jmm.0.001250
  - Retrospective 932 patients showing that the addition of zinc to HCQ+AZ reduced mortality / transfer to hospice, ICU admission, and the need for ventilation.
- https://www.nature.com/articles/s41586-020-2558-4_reference.pdf
  - Monkey study which reports no effect of HCQ or HCQ+AZ.
  - However, there are several signs of effectiveness despite the very small sample sizes
  - 58% reduction in lung lesions:
  - 97% increase in viral load recovery after one week:
- https://www.preprints.org/manuscript/202005.0057/v2
  - 166 patients hospitalised with COVID-19, HCQ increased survival 1.4 - 1.8 times when patients admitted in early stages.
  - risk of death, 55.1% lower,
- https://www.sciencedirect.com/science/article/pii/S1477893920302179
  - Retrospective 1061 patients. HCQ+AZ safe and results in a low fatality rate.
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3586954
  - Analysis of COVID-19 amongst 2.4B people shows a wide counterintuitive disparity between well-developed and less-developed countries, with more affluent countries about one hundred times more likely to be infected and die due to COVID-19

        - They find the effect is most apparent when comparing to countries with the highest rates of endemic malaria. Since travelers to malaria-endemic countries are likely to be taking antimalarial prophylaxis and there is evidence of efficacy with COVID-19, authors find the data highly probative for the hypothesis that prophylactic antimalarial use by incoming visitors markedly attenuates a country's COVID-19 fatality rate.
        - risk of death, 99.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.05.04.20089904v2
        - Database analysis of many drugs and COVID-19 cases, with 23 cases taking HCQ, and 251 control patients not taking HCQ
        - risk of COVID-19 case, 47.7% higher
    - https://journals.lww.com/md-journal/Fulltext/2020/12240/Hydroxychloroquine_is_associated_with_slower_viral.34.aspx
        - 34 patients finding slower binary PCR viral clearance with HCQ
        - time to viral-, 203.0% higher,
    - https://jamanetwork.com/journals/jamacardiology/fullarticle/2765631
        - Study of 90 hospitalized patients given HCQ, 53 also receiving AZ,
        - Median change for HCQ+AZ ΔQTc of 23ms vs. 5.5ms for HCQ
        - Without a control arm, they could not conclude that HCQ and AZ conferred increased cardiotoxic risk; however, compared with HCQ alone, ΔQTc differences were likely associated with the addition of AZ.
    - https://www.europeanreview.org/article/21038
        - Analysis of COVID-19 and malaria, finding that COVID-19 is highly pandemic in countries where malaria is least pandemic, and vice versa, suggesting that CQ/HCQ (widely used for malaria) are protective for COVID-19. This paper also includes a review of 9 articles supporting the efficacy of HCQ and CQ.
    - https://www.sciencedirect.com/science/article/pii/S201325142030050X
        - Status of SARS-CoV-2 infection in patients on renal replacement therapy.
        - Analysis of 868 patients on renal replacement therapy. Statistically significant reduction in mortality with HCQ for patients on dialysis
        - risk of death, 45.9% lower, RR 0.54, p = 0.005, treatment 322, control 53, OR
    - https://www.ahajournals.org/doi/10.1161/CIRCEP.120.008662
        - 201 hospitalized patients. No serious side effects of HCQ. No instances of Torsade de pointes, or arrhythmogenic death were reported. They report that although use of these medications resulted in QT prolongation, clinicians seldom need to discontinue therapy.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7185016/
        - Proposal to use HCQ as an aerosol in order to reach sufficient therapeutic levels at the alveolar epithelial cells.
    - https://journals.lww.com/ccmjournal/Fulltext/2020/09000/ICU_and_Ventilator_Mortality_Among_Critically_Ill.35.aspx
        - Retrospective 217 critically ill patients, 114 receiving HCQ, showing no significant difference in mortality.

- https://www.sciencedirect.com/science/article/pii/S0882401020305155
  - HCQ and AZ has a synergistic effect *in vitro* on SARS-CoV-2 at concentrations compatible with that obtained in human lung.
- https://www.researchgate.net/publication/341197843_COVID-19_in_Iran_a_comprehensive_investigation_from_exposure_to_treatment_outcomes
  - 100 patients concluding that HCQ improved clinical outcome
  - risk of death, 67.5% lower,
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3575899
  - Compares the dynamics of daily deaths in the 10 days following the 3rd death in countries using and not using [H]CQ, showing dramatically lower death in [H]CQ countries.
  - risk of death, 85.0% lower
- https://www.sciencedirect.com/science/article/pii/S2666634020300064
  - Retrospective 807 hospitalized patients, no statistically significant reduction in mortality or the need for mechanical ventilation with HCQ or HCQ+AZ, or for death with HCQ+AZ, HR 1.83, *p*=0.009 for HCQ mortality.
- https://pubmed.ncbi.nlm.nih.gov/32305587/
  - Post exposure prophylaxis of 211 high-risk people after major exposure event in a long term care hospital, showing no positive cases after 14 days.
- https://www.dropbox.com/s/5qm58cd4fneeci2/2020.04.15%20journal%20manuscript%20final.pdf
  - 636 patients. HCQ+AZ reduced hospitalization 79% when used within 7 days (65% overall). Non-randomized.
  - risk of hospitalization, 64.0% lower,
- https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.25887
  - Theory on the effectiveness of HCQ. HCQ has been shown to block the polarization of macrophages to an M1 inflammatory subtype and is predicted to interfere with glycosylation of a number of proteins involved in the humoral immune response, possibly including the macrophage FcR gamma IgG receptor and other immunomodulatory proteins, potentially through inhibition of UDP-N-acetylglucosamine 2-epimerase. In combination with potential other immunomodulatory effects, this could possibly blunt the progression of COVID-19 pneumonia all to way up to ARDS.
- https://www.bmj.com/content/369/bmj.m1849
  - 150 patients very late stage RCT showing no significant difference. Treatment very late, average 16.6 days after symptom onset.
  - risk of no virological cure at day 21, 21.4% lower,
- https://www.jstage.jst.go.jp/article/bst/14/2/14_2020.03072/_article
  - Increasing evidence from completed clinical studies shows CQ and HCQ effective (HCQ more effective).
- https://www.sefq.es/_pdfs/NEJM_Hydroxychlorquine.pdf
  - study with 63 patients (32 treated with HCQ), showing no effectiveness,
  - risk of death, 147.0% higher,
- https://www.medrxiv.org/content/10.1101/2020.03.22.20040949v2

        - this analysis does suggest further studies of HCQ-AZ combination therapy should be prioritized with great haste.
    - https://pubmed.ncbi.nlm.nih.gov/32251731/
        - *In silico* analysis confirming the antiviral properties of CQ, showing a new mechanism of action of CQ, and showing that HCQ is more potent than CQ.
    - https://academic.oup.com/jmcb/article/12/4/322/5814655
        - 22 patients. All CQ patients discharged by day 14 versus 50% of Lopinavir/Rotinavir patients. Symptom onset to treatment 2.5 days for CQ vs. 6.5 days for Lopinavir/Rotinavir.
        - risk of no recovery at day 14, 91.7% lower,
        - risk of no improvement in pneumonia at day 14, 83.0% lower,
    - https://www.medrxiv.org/content/10.1101/2020.03.22.20040758v3
        - 62 patients.
        - 13% progressed to severe cases in the control group, versus 0% for the treatment group.
        - Significant improvement seen in pneumonia on chest CT for 61% of treated patients and 16% of control patients.
        - risk of no improvement in pneumonia at day 6, 57.0% lower
    - https://academic.oup.com/cid/article/71/15/887/5811417
        - CQ and HCQ inhibit replication at early stages of infection
    - https://www.nature.com/articles/s41421-020-0156-0
        - *In Vitro* study showing that HCQ is effective *in vitro* and less toxic than CQ. In addition to direct antiviral activity, HCQ is a safe and successful anti-inflammatory agent that has been used extensively in autoimmune diseases and can significantly decrease the production of cytokines and, in particular, pro-inflammatory factors.
    - https://www.sciencedirect.com/science/article/abs/pii/S0924857920300996
        - Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial
        - HCQ was significantly associated with reduction / elimination of viral load, which was enhanced with AZ
        - risk of no virological cure at day 6, 66.0% lower
    - https://europepmc.org/article/med/32194152
        - Discussion of mechanisms of action, CQ vs. HCQ, early studies, safety.
        - Effective against COVID-19
    - https://www.sciencedirect.com/science/article/pii/S0924857920300881
        - Discusses mechanisms of CQ interference with the SARS-CoV-2 replication cycle.
    - https://www.sciencedirect.com/science/article/pii/S0883944120303907
        - Review of six articles and 23 ongoing clinical trials in China recommending research and clinical use of HCQ adhering to MEURI.
    - https://academic.oup.com/cid/article/71/15/732/5801998
        - *In Vitro* study showing that HCQ is more potent than CQ *in vitro* for inhibiting SARS-CoV-2
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7135139/

        - Recommending CQ and HCQ for COVID-19 based on 20 clinical studies in China and a strong rationale for use.
    - https://www.jstage.jst.go.jp/article/bst/14/1/14_2020.01047/_article/-char/en
        - Results from 15 clinical trials in China showing CQ is effective.
    - http://www.chictr.org.cn/showproj.aspx?proj=49263
        - Efficacy of Chloroquine and Lopinavir/ Ritonavir in mild/general novel coronavirus (CoVID-19) infections:
        - risk of no virological cure, 37.5% lower
    - https://www.nature.com/articles/s41422-020-0282-0?fbclid=IwAR0sG1G81fFcpaEubHB_oCyNsiVs8_7R1KkwOuqjRhx7psfHV6iSDRD1cM0
        - *In Vitro* study showing that Remdesivir and CQ potently blocked SARS-CoV-2 infection.
    - https://www.sciencedirect.com/science/article/pii/S0006291X0401839X
        - *In Vitro* study from 2004, SARS-CoV-1 (COVID 19 cousin), not included in the study count or percentages. IC_{50} of CQ for antiviral activity (8.8) is significantly lower than cytostatic activity CC_{50} (261.3), selectivity index of 30. IC_{50} for inhibition of SARS-CoV *in vitro* approximates the plasma concentrations of CQ reached during treatment of acute malaria. CQ may be considered for immediate use in the prevention and treatment of SARS-CoV infections.
    - https://c19hcq.com/
    - https://hcqmeta.com/

Mulpolnovir

- https://www.merck.com/news/merck-and-ridgebacks-investigational-oral-antiviral-molnupiravir-reduced-the-risk-of-hospitalization-or-death-by-approximately-50-percent-compared-to-placebo-for-patients-with-mild-or-moderat/
  - risk of death, 94.2% lower, RR 0.06, *p* = 0.003, treatment 0 of 385 (0.0%), control 8 of 377 (2.1%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of combined hospitalization/death, 48.3% lower, RR 0.52, *p* = 0.001, treatment 28 of 385 (7.3%), control 53 of 377 (14.1%).
  - This is their own study so this is not taken too seriously. Useful when compared against other data. They have financial incentive for the success of this drug
- https://academic.oup.com/jac/advance-article/doi/10.1093/jac/dkab318/6358705
  - Dose and safety study of molnupiravir with 18 participants, finding no serious adverse events in short-term followup. There was no significant difference in clinical outcomes.
  - risk of no recovery, 100% higher, RR 2.00, *p* = 0.61, treatment 4 of 12 (33.3%), control 1 of 6 (16.7%), all dosages, symptomatic at day 29.
  - risk of no recovery, 50.0% higher, RR 1.50, *p* = 1.00, treatment 1 of 4 (25.0%), control 1 of 6 (16.7%), 800mg, symptomatic at day 29.
- https://www.medrxiv.org/content/10.1101/2021.06.17.21258639v1
  - RCT 202 outpatients in the USA showing significantly faster viral clearance, but no significant differences in symptom duration or severity.
  - risk of death, 76.5% lower, RR 0.23, *p* = 0.31, treatment 0 of 140 (0.0%), control 1 of 62 (1.6%), relative risk is not 0 because of continuity correction due to zero events, all.
  - risk of death, 65.4% lower, RR 0.35, *p* = 1.00, treatment 0 of 55 (0.0%), control 1 of 62 (1.6%), relative risk is not 0 because of continuity correction due to zero events, 800mg.
  - risk of death, 66.7% lower, RR 0.33, *p* = 1.00, treatment 0 of 62 (0.0%), control 1 of 62 (1.6%), relative risk is not 0 because of continuity correction due to zero events, 400mg.
  - risk of death, 57.8% lower, RR 0.42, *p* = 1.00, treatment 0 of 23 (0.0%), control 1 of 62 (1.6%), relative risk is not 0 because of continuity correction due to zero events, 200mg.
  - risk of hospitalization, 32.9% higher, RR 1.33, *p* = 1.00, treatment 3 of 140 (2.1%), control 1 of 62 (1.6%), all.
  - risk of no virological cure, 49.2% lower, RR 0.51, *p* = 0.12, treatment 10 of 118 (8.5%), control 9 of 54 (16.7%), infectious, day 3, all.
  - risk of no virological cure, 92.3% lower, RR 0.08, *p* = 0.004, treatment 1 of 117 (0.9%), control 6 of 54 (11.1%), infectious, day 5, all.

        - This study was funded by Ridgeback Biotherapeutics which has financial incentive for the success of this drug
    - https://c19mp.com/

Quercitcin

- https://www.sciencedirect.com/science/article/abs/pii/S1093326321002096
  - *In SIlico* study identifying quercetin derivatives as SARS-CoV-2 spike protein, ACE2, and neuropilin inhibitors.
  - Inhibition of the SARS2 Cov-2 Spike protein, ACE2, nuerophilin which helps prevent cell entry
  -
- https://journals.sagepub.com/doi/full/10.1177/2515690X211026193
  - Retrospective 113 outpatients, 53 (patient choice) treated with zinc, quercetin, vitamin C/D/E, l-lysine, and Quina, showing lower cases with treatment.
  - risk of COVID-19 case, 94.4% lower, RR 0.06, p = 0.003, treatment 0 of 53 (0.0%), control 9 of 60 (15.0%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of COVID-19 or flu-like illness, 81.1% lower, RR 0.19, p = 0.01, treatment 2 of 53 (3.8%), control 12 of 60 (20.0%).
- https://www.dovepress.com/potential-clinical-benefits-of-quercetin-in-the-early-stage-of-covid-1-peer-reviewed-fulltext-article-IJGM
  - RCT 42 outpatients in Pakistan, 21 treated with quercetin phytosome, showing faster viral clearance and lower symptom severity with treatment.
  - risk of death, 66.7% lower, RR 0.33, p = 1.00, treatment 0 of 21 (0.0%), control 1 of 21 (4.8%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of ICU admission, 66.7% lower, RR 0.33, p = 1.00, treatment 0 of 21 (0.0%), control 1 of 21 (4.8%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of hospitalization, 66.7% lower, RR 0.33, p = 1.00, treatment 0 of 21 (0.0%), control 1 of 21 (4.8%), relative risk is not 0 because of continuity correction due to zero events.
- https://www.dovepress.com/possible-therapeutic-effects-of-adjuvant-quercetin-supplementation-aga-peer-reviewed-fulltext-article-IJGM#
  - RCT 152 outpatients in Pakistan, 76 treated with quercetin phytosome, showing lower mortality, ICU admission, and hospitalization with treatment.
  - risk of death, 85.7% lower, RR 0.14, p = 0.25, treatment 0 of 76 (0.0%), control 3 of 76 (3.9%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of ICU admission, 94.1% lower, RR 0.06, p = 0.006, treatment 0 of 76 (0.0%), control 8 of 76 (10.5%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of hospitalization, 68.2% lower, RR 0.32, p = 0.003, treatment 7 of 76 (9.2%), control 22 of 76 (28.9%).
- https://journals.tubitak.gov.tr/biology/abstract.htm?id=29756

        - RCT 447 moderate-to-severe hospitalized patients in Turkey, 52 treated with quercetin, bromelain, and vitamin C, showing no statistically significant difference in clinical outcomes.
    - https://europepmc.org/article/ppr/ppr239932
        - Small prophylaxis RCT with 113 patients showing fewer cases with quercetin + vitamin C + bromelain prophylaxis
        - risk of COVID-19 case, 91.7% lower, RR 0.08, *p* = 0.03, treatment 1 of 71 (1.4%), control 9 of 42 (21.4%), adjusted.
    - https://www.frontiersin.org/articles/10.3389/fimmu.2020.01451/full
        - Review of the evidence for the use of vitamin C and quercetin both for prophylaxis in high-risk populations and for the treatment of COVID-19 patients.
        - Quercetin show evidence of anti viral properties including
            - Virus entry
            - Virus replication
            - Virus Protein Assembly
    - https://chemrxiv.org/engage/chemrxiv/article-details/60c74a53469df45440f43d21
        - *In silico* study of natural compounds identifying quercetin, curcumin, hispidulin, cirsimaritin, sulfasalazine, and artemisin as potential compounds that inhibit SARS-CoV-2.
    - https://c19quercetin.com/

Vitamin c

- https://www.annalsmedres.org/index.php/aomr/article/view/3910
  - Retrospective 139 hospitalized patients in Turkey, 58 treated with high dose vitamin C, showing improved kidney functioning with treatment. Mortality was lower with treatment, but not reaching statistical significance with the small sample size.
  - Intravenous VC therapy was administered to the patients in Group 1 at a dose of 25 g/day for seven days in addition to these drugs.
  - risk of death, 44.1% lower, RR 0.56, *p* = 0.18, treatment 6 of 58 (10.3%), control 15 of 81 (18.5%).
  - risk of ICU admission, 10.2% lower, RR 0.90, *p* = 0.66, treatment 18 of 58 (31.0%), control 28 of 81 (34.6%).
- https://www.aging-us.com/article/203503/text
  - Retrospective 113 severe and critical patients in China with cardiac injury, 51 treated with high dose vitamin C, showing treatment associated with improvement of myocardial injury.
  - Briefly, vitamin C was administered intravenously at the excess dosage of 100 mg/kg every 6 hours for 1 day followed by 100 mg/kg every 12 hours for additional 5 days during hospitalization.
  - Example 40g per day per 100kg person day 1 down to 20g per day per 100kg person for the next 5 days
  - Example 26g per day per 65kg person day 1 down to 13g per day per 65kg person for the next 5 days
  - Average age 68
- https://www.cureus.com/articles/38460-characterization-of-critically-ill-covid-19-patients-at-a-brooklyn-safety-net-hospital
  - Retrospective 102 ICU patients in the USA, 73 receiving vitamin C and zinc, showing a negative correlation of treatment with mortality, but not reaching statistical significance (*p* = 0.31).
- https://academic.oup.com/qjmed/advance-article/doi/10.1093/qjmed/hcab184/6329274
  - PSM retrospective 207 hospitalized patients in China, 46 treated with diammonium glycyrrhizinate and vitamin C, showing lower risk of ARDS with treatment.
  - risk of combined intubation/death, 24.5% lower, RR 0.75, *p* = 0.74, treatment 1 of 46 (2.2%), control 14 of 115 (12.2%), OR converted to RR.
  - risk of ARDS, 73.3% lower, RR 0.27, *p* = 0.002, treatment 7 of 46 (15.2%), control 41 of 115 (35.7%), OR converted to RR.
- https://onlinelibrary.wiley.com/doi/10.1002/fsn3.2458
  - Survey of 80 recovered COVID-19 patients in Pakistan, showing faster recovery with vitamin C, vitamin D, and zinc supplementation.

- https://journals.sagepub.com/doi/full/10.1177/2515690X211026193
  - Retrospective 113 outpatients, 53 (patient choice) treated with zinc, quercetin, vitamin C/D/E, l-lysine, and Quina, showing lower cases with treatment.
  - risk of COVID-19 case, 94.4% lower, RR 0.06, *p* = 0.003, treatment 0 of 53 (0.0%), control 9 of 60 (15.0%), relative risk is not 0 because of continuity correction due to zero events.
  - risk of COVID-19 or flu-like illness, 81.1% lower, RR 0.19, *p* = 0.01, treatment 2 of 53 (3.8%), control 12 of 60 (20.0%).
- https://dergipark.org.tr/en/download/article-file/1774154
  - Retrospective 160 ICU patients, 32 with raised neutrophil/lymphocyte ratio treated with vitamin C, showing no significant differences.
  - risk of death, 9.3% lower, RR 0.91, *p* = 0.69, treatment 17 of 32 (53.1%), control 75 of 128 (58.6%).
  - In this study, patients started with 6g/day vitamin C dose at admission to ICU and had very highCRP and D dimer levels (113.4 mg/L and 10.9 mg/L,respectively).
- https://www.ijbamr.com/assets/images/issues/pdf/FuXsaN_e2u6D7_ZY1348_LzacYt_766641.pdf
  - Retrospective 8,634 hospitalized patients in India, showing lower mortality with high-dose vitamin C in unadjusted results. No group details are provided, the text and table appear to show different results, and some numbers do not match.
  - risk of death, 54.2% lower, RR 0.46, *p* = 0.03, treatment 164 of 8,634 (1.9%), control 10 of 241 (4.1%).
  - *AUTHOR – "The study, headed by Professor Zhiyong Peng at Wuhan's Zhongnan University Hospital, started in February and gave every other critically ill COVID-19 patient on ventilators either 12,000 milligrams (mg) of vitamin C twice daily or sterile water in their drip. Neither the patient nor the doctors knew who was getting vitamin C or placebo so the trial was "double blind." This is the 'gold standard' of research design.Overall, 5 out 26 people (19%) died in the vitamin C group while 10 out of 28 (36%) receiving the placebo died. That means that vitamin C almost halved the number of deaths. Those on vitamin C were 60% more likely to survive."*
  - AUTHOR –*"The key measure of the severity of symptoms is called the SOFA oxygenation index. Those with a SOFA score greater than 3 are most critically ill. Of those most critically ill, 4 people (18%) in the vitamin C group died, compared to 10 (50%) in the placebo group. That's two-thirds less deaths. Statistically this meant that of those most critically ill who were given vitamin C, they were 80% less likely to die. This result, backed up with a clear reduction in inflammatory markers in the blood, was statistically significant – beyond doubt."*
- https://journals.sagepub.com/doi/10.1177/08971900211015052
  - PSM retrospective 8 ICU patients treated with vitamin C and 24 matched controls, showing no significant difference. Authors note that "it is possible for the delayed timing of IV vitamin C to have blunted the beneficial effects as these

patients may have already progressed to the late fibroproliferative phase or ARDS". IV vitamin C 1.5 grams every 6 hours.
        - risk of death, 10.5% higher, RR 1.11, *p* = 1.00, treatment 7 of 8 (87.5%), control 19 of 24 (79.2%), PSM.
    - https://bpspubs.onlinelibrary.wiley.com/doi/full/10.1111/bph.15579
        - Review of data supporting the use of megadose vitamin C as a treatment for sepsis and COVID-19.
        - *AUTHOR – "Our findings demonstrate that intravenous megadose intravenous vitamin C reversed organ dysfunction and improved the clinical state in a clinically relevant ovine model of sepsis. We also demonstrated the safety and benefit of this treatment in one critically ill COVID-19 patient."*
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8112281/
        - Retrospective 323 hospitalized patients, 153 treated with vitamin C, showing no significant differences. Patients in each group were in different time periods, with the vitamin C group first. Time based confounding is possible due to improvements in SOC.
        - Dosages
        - risk of death, 21.3% lower, RR 0.79, *p* = 0.52, treatment 17 of 153 (11.1%), control 24 of 170 (14.1%).
        - risk of ICU admission, 1.9% higher, RR 1.02, *p* = 1.00, treatment 11 of 153 (7.2%), control 12 of 170 (7.1%).
        - Excluded in after exclusion results of meta analysis: substantial time varying confounding likely due to declining usage over the early period when overall treatment protocols improved dramatically.
    - https://www.frontiersin.org/articles/10.3389/fphar.2021.638556/full
        - PSM retrospective 110 patients, 55 treated with high-dose IV vitamin C, showing lower progression to severe disease with treatment. Patients in each group were in different time periods, time based confounding is likely due to SOC improving over time
        - risk of disease progression, 72.0% lower, RR 0.28, *p* = 0.03, treatment 4 of 55 (7.3%), control 12 of 55 (21.8%), adjusted, PSM.
    - http://immunopathol.com/Files/Inpress/ipp-22230.pdf
        - RCT with 38 patients treated with vitamin C and vitamin E, and 34 control patients, showing lower ICU admission with treatment, but not statistically significant.
        - 1000mg of Vitamin C daily
        - risk of ICU admission, 46.3% lower, RR 0.54, *p* = 0.46, treatment 3 of 38 (7.9%), control 5 of 34 (14.7%).
        - hospitalization time, 1.0% lower, relative time 0.99, *p* = 0.82, treatment 38, control 34.
    - https://bmjopen.bmj.com/content/11/4/e042549.info
        - Retrospective 283 patients in the USA showing higher mortality with all treatments (not statistically significant). Confounding by indication is likely. In the supplementary appendix, authors note that the treatments were usually

given for patients that required oxygen therapy. Oxygen therapy and ICU admission (possibly, the paper includes ICU admission for model 2 in some places but not others) were the only variables indicating severity used in adjustments.
        - risk of death, 0.7% higher, RR 1.01, *p* = 0.98, treatment 19 of 55 (34.5%), control 36 of 226 (15.9%), adjusted, OR converted to RR, multivariate logistic regression.
    - https://bmjopen.bmj.com/content/11/4/e042042.info
        - Retrospective database analysis of 3,219 hospitalized patients in the USA. Very different results in the time period analysis (Table S2), and results significantly different to other studies for the same medications (e.g., heparin OR 3.06 [2.44-3.83]) suggest significant confounding by indication and confounding by time.
        - risk of death, 32.2% higher, RR 1.32, *p* = 0.01, treatment 157 of 794 (19.8%), control 359 of 2,425 (14.8%), adjusted, OR converted to RR, logistic regression.
        - Excluded in after exclusion results of meta analysis: substantial unadjusted confounding by indication likely, substantial time varying confounding likely due to declining usage over the early period when overall treatment protocols improved dramatically.
    - https://www.researchsquare.com/article/rs-354711/v1
        - Retrospective 158 critically ill patients receiving vitamin C and propensity matched controls, showing mortality OR 0.77 [0.48-1.23], and statistically significantly lower thrombosis, OR 0.42 [0.18-0.94]. 1000mg of vitamin C was given daily.
        - risk of death, 14.9% lower, RR 0.85, *p* = 0.27, treatment 46 of 142 (32.4%), control 59 of 142 (41.5%), OR converted to RR, PSM.
        - Amount of Vit C dosage unknown
    - https://www.clinicalandtranslationalinvestigation.com/frame_esp.php?id=375
        - RCT 80 hospitalized patients with severe COVID-19, 40 treated with methylene blue + vitamin C + N-acetyl cysteine, showing lower mortality, shorter hospitalization, and significantly improved SpO_2 and respiratory distress with treatment.
        - risk of death, 44.4% lower, RR 0.56, *p* = 0.38, treatment 5 of 40 (12.5%), control 9 of 40 (22.5%).
        - hospitalization time, 37.6% lower, relative time 0.62, *p* = 0.004, treatment 40, control 40.
    - https://www.researchsquare.com/article/rs-289381/v1
        - Reanalysis of Thomas et al. showing that vitamin C increased the recovery rate by 70%, *p* = 0.025.
        - *AUTHOR – "The COVID A to Z trial…examined a high dose of vitamin C which was previously predicted to reduce the duration of respiratory virus infections by about 20%. In this reanalysis we calculated the rate ratio of recovery between the vitamin C and usual care arms and found that vitamin C increased the rate of recovery by 70% (95% CI 6.8% to 170%, P = 0.025). Furthermore, we calculated quantile treatment effect of vitamin C. At the 60th percentile level of symptom*

distribution, duration was 9 days in the usual care arm, and 6 days in the vitamin C arm, which corresponds to reduction in symptom duration by 3 days (95% CI 3 to 4.6 days; P < 0.001). The analysis of the quantile treatment effect indicates that there may be around 30% reduction in symptom duration in patients with the longest symptoms. Our reanalysis indicates a need for methodologically sound trials with larger numbers of patients to investigate the treatment effects of vitamin C against SARS-CoV-2."

- https://www.aging-us.com/article/202557/text
  - Retrospective 76 COVID-19 patients, 46 treated with intravenous high-dose vitamin C, showing lower mortality and improved oxygen requirements with treatment. Dosage was 6g intravenous infusion per 12hr on the first day, and 6g once for the following 4 days.
  - risk of death, 86.0% lower, RR 0.14, *p* = 0.04, treatment 1 of 46 (2.2%), control 5 of 30 (16.7%), adjusted, KM.
- https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2776305
  - Small 214 low-risk outpatient RCT showing non-statistically significant faster recovery with zinc and with vitamin C
  - recovery time, 17.9% lower, relative time 0.82, *p* = 0.38, treatment 48, control 50, mean time to a 50% reduction in symptoms, p value approximated with combined p value in study.
  - Patients were randomized in a 1:1:1:1 allocation ratio to receive either 10 days of zinc gluconate (50 mg), ascorbic acid (8000 mg), both agents, or standard of care.
  - Patients who received usual care without supplementation achieved a 50% reduction in symptoms at a mean (SD) of 6.7 (4.4) days compared with 5.5 (3.7) days for the ascorbic acid group, 5.9 (4.9) days for the zinc gluconate group, and 5.5 (3.4) days for the group receiving both (overall *P* = .45).
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3779211
  - Case series of 24 COVID-19 patients (12 confirmed PCR+) treated with vitamin D, vitamin C, and melatonin, showing positive outcomes with no patient having worse than a mild case, including 7 high risk patients.
  - We report a case series of 12 confirmed positive patients and 12 presumptive positive patients all of whom had either an entirely asymptomatic or relatively mild clinical course
  - 2 patients had active cancer, 3 patients were cancer survivors, 1 patient without cancer was 74 years old.
  - All patients were treated early in their disease course with vitamin D loading (50,000iu daily for 3 days), 60 to 240mg melatonin, and 2000mg oral vitamin C.
  - The 6 high risk patients and one 59 year old patient were treated with at least 2 intravenous doses of vitamin C. The 2 patients with active cancer received 75 grams of vitamin C (one daily, the other every other day).
  - All of the high risk patients had a nearly asymptomatic clinical course and were tested after 10 days and all had a RT PCR for COVID-19 that was negative.

        - We report these unexpectedly positive clinical outcomes of COVID-19 patients including patients with different risk factors, under supplemental vitamin C and D and melatonin. These supplements have a favorable safety profile and are already being suggested as potentially disease altering therapies in the ongoing COVID-19 pandemic.
    - https://apm.amegroups.com/article/view/56244/html
        - Retrospective case study of 12 severe/critical COVID-19 patients finding that high dose IV vitamin C improved inflammatory response, immune and organ function. There was no control group.
        - Twelve patients were enrolled including six severe [age of mean, 56; interquartile range (IQR), 32–65 years, 3 men] and six critical (age of mean, 63; IQR, 60–82 years, 4 men) patients.
        - The dosage of vitamin C [median (IQR), mg/kg (body weight)/day] were 162.7 (71.1–328.6) for severe and 178.6 (133.3–350.6) for critical patients.
        - By Generalized estimating equation (GEE) model, C-reactive protein (CRP) was found to decrease significantly from day 0 to 3 and 7 (severe: 59.01±37.9, 12.36±22.12, 8.95±20.4 mg/L; critical: 92.5±41.21, 33.9±30.2, 59.56±41.4 mg/L)
        - Lymphocyte and CD4+ T cell counts in severe patients reached to normal level since day 3.
        - HDIVC might be beneficial in aspects of inflammatory response, immune and organ function for aggravation of COVID-19 patients. Further clinical trials are in warrant.
    - https://www.sciencedirect.com/science/article/pii/S073170852100039X
        - Vitamin C supplementation is necessary for patients with coronavirus disease: An ultra-high-performance liquid chromatography-tandem mass spectrometry finding
        - Prospective study with 31 COVID-19 patients and 60 controls reporting on a new method to assess plasma vitamin C concentrations. Vitamin C was deficient (11.4µmol/l vs. 52µmol/l for healthy controls), and returned to a normal range (76µmol/l) with intravenous vitamin C. Authors recommend high dose intravenous vitamin C for COVID-19 patients at a dose of 100mg/kg/day.
    - https://www.researchsquare.com/article/rs-139942/v1
        - Small late stage RCT for the addition of vitamin C to HCQ and lopinavir/ritonavir, with 30 treatment and 30 control patients, finding a significant reduction in temperature and a significant improvement in oxygenation after 3 days in the vitamin C group. However, hospitalization time was longer and there was no significant difference in mortality.
        - 6 grams of vitamin C daily
        - risk of death, no change, RR 1.00, p = 1.00, treatment 3 of 30 (10.0%), control 3 of 30 (10.0%).
        - risk of mechanical ventilation, 25.0% higher, RR 1.25, p = 1.00, treatment 5 of 30 (16.7%), control 4 of 30 (13.3%).
        - hospitalization time, 30.8% higher, relative time 1.31, p = 0.03, treatment 30, control 30.

- https://journals.sbmu.ac.ir/jcma/article/view/32182
  - Small RCT in Iran with 20 ICU patients, 10 treated with high-dose vitamin C, melatonin, and zinc, not showing significant differences
  - 8 grams IV vitamin C every 24hrs. 2g every 6 hour dose
  - risk of disease progression, 33.3% lower, RR 0.67, p = 1.00, treatment 2 of 10 (20.0%), control 3 of 10 (30.0%).
  - CU time, 6.0% lower, relative time 0.94, p = 0.30, treatment 10, control 10.
- https://www.mdpi.com/2072-6643/12/12/3760
  - Review of vitamin C use for respiratory infections including COVID-19 and the mechanisms of action.
  - Authors note that evidence to date indicates oral vitamin C (2–8 g/day) may reduce the incidence and duration of respiratory infections, and intravenous vitamin C (6–24 g/day) has been shown to reduce mortality, intensive care unit (ICU) and hospital stays, and time on mechanical ventilation for severe respiratory infections.
  - Authors conclude that given the favourable safety profile and low cost of vitamin C, and the frequency of vitamin C deficiency in respiratory infections, it may be worthwhile testing patients' vitamin C status and treating them accordingly with intravenous administration within ICUs and oral administration in hospitalised COVID-19 patients.
- https://www.cureus.com/articles/45284-the-role-of-vitamin-c-as-adjuvant-therapy-in-covid-19
  - The Role of Vitamin C as Adjuvant Therapy in COVID-19
  - RCT 150 hospitalized patients in Pakistan showing 26% faster recovery, p < 0.0001. 36% lower mortality, not statistically significant due to the small number of events. Dosage was 50 mg/kg/day of intravenous vitamin C.
  - Example a 100kg person would receive 5,000mg of intravenous Vitamin C
  - Example a 65kg person would receive 3,250 mg of intravenous Vitamin C
  - one group received the intervention [50 mg/kg/day of intravenous (IV) VC] along with the standard therapy, and the other group received standard therapy only.
  - COVID-19 patients who received IV VC became symptom-free earlier (7.1 ± 1.8 vs. 9.6 ± 2.1 days, p-value: <0.0001) and spent fewer days in the hospital (8.1 ± 1.8 vs. 10.7 ± 2.2 days, p-value: <0.0001) compared to those who received standard therapy only.
  - However, there was no significant difference in the need for mechanical ventilation (p-value: 0.406) and mortality (p-value: 0.31) between the two groups.
  - risk of death, 36.4% lower, RR 0.64, p = 0.45, treatment 7 of 75 (9.3%), control 11 of 75 (14.7%).
  - risk of mechanical ventilation, 20.0% lower, RR 0.80, p = 0.67, treatment 12 of 75 (16.0%), control 15 of 75 (20.0%).
  - recovery time, 26.0% lower, relative time 0.74, p < 0.001, treatment 75, control 75, days to symptom-free.

        - Hospitalization time, 24.3% lower, relative time 0.76, $p < 0.001$, treatment 75, control 75, days spent in hospital.
    - https://nutrition.bmj.com/content/4/1/149
        - Survey analysis of dietary supplements showing no significant difference in PCR+ cases with vitamin C usage in the UK, however significant reductions were found in the US and Sweden. These results are for PCR+ cases only, they do not reflect potential benefits for reducing the severity of cases. A number of biases could affect the results, for example users of the app may not be representative of the general population, and people experiencing symptoms may be more likely to install and use the app.
        - Vitamin C levels have no affect on infection rates
    - https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0247163
        - risk of COVID-19 case, 9.6% lower, RR 0.90, $p = 0.58$, treatment 29 of 67 (43.3%), control 157 of 305 (51.5%), adjusted, OR converted to RR, model 2 conditional logistic regression.
        - risk of COVID-19 case, 16.5% lower, RR 0.83, $p = 0.28$, treatment 29 of 67 (43.3%), control 157 of 305 (51.5%), adjusted, OR converted to RR, matched pair analysis.
    - https://journal.chestnet.org/article/S0012-3692(20)32508-3/fulltext
        - Retrospective 176 hospitalized patients, 96 treated with oral vitamin C (from 500mg to 1500mg daily), showing lower mortality with treatment.
        - risk of death, 29.5% lower, RR 0.71, $p = 0.18$, treatment 22 of 96 (22.9%), control 26 of 80 (32.5%).
        - risk of death, 15.6% lower, RR 0.84, $p = 0.60$, treatment 15 of 30 (50.0%), control 16 of 27 (59.3%), ICU patients.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7499070/
        - Pilot study with 21 ICU patients finding low serum levels of vitamin C and vitamin D in most patients. Older age and low vitamin C level appeared to be co-dependent risk factors for mortality.
        - Serum levels of vitamin C and vitamin D were low in most of critically ill COVID-19 ICU patients.
        - AUTHOR – *"Older age and low vitamin C level appeared co-dependent risk factors for mortality. Many were also insulin-resistant or diabetic, overweight or obese, known as independent risk factors for low vitamin C and vitamin D levels, and for COVID-19. These findings suggest the need to further explore whether caring for COVID-19 patients ought to routinely include measuring and correcting serum vitamin C and vitamin D levels, and whether treating critically ill COVID-19 warrants acute parenteral vitamin C and vitamin D replacement."*
    - https://ccforum.biomedcentral.com/articles/10.1186/s13054-020-03249-y
        - Small study of 18 COVID-19 ARDS patients showing that vitamin C levels were very low - 17 patients had undetectable levels and one had a low level (2.4 mg/L).
    - https://annalsofintensivecare.springeropen.com/articles/10.1186/s13613-020-00792-3

        - Small RCT for high dose vitamin C for ICU patients showing reduced (but not statistically significant) mortality. Dosage was 12g of vitamin C/50ml every 12 hours for 7 days at a rate of 12ml/hour.
        - risk of death, 50.0% lower, RR 0.50, *p* = 0.20, treatment 6 of 27 (22.2%), control 11 of 29 (37.9%), adjusted, ICU mortality.
        - risk of death, 80.0% lower, RR 0.20, *p* = 0.04, treatment 5 of 27 (18.5%), control 11 of 29 (37.9%), adjusted, ICU mortality for SOFA>=3.
        - risk of death, 50.0% lower, RR 0.50, *p* = 0.31, treatment 6 of 27 (22.2%), control 10 of 29 (34.5%), adjusted, 28 day mortality.
        - risk of death, 70.0% lower, RR 0.30, *p* = 0.07, treatment 5 of 27 (18.5%), control 10 of 29 (34.5%), adjusted, 28 day mortality for SOFA>=3.
    - https://www.tandfonline.com/doi/full/10.1080/14787210.2020.1794819
        - Case study of 17 patients receiving IV vitamin C for COVID-19, finding a significant decrease in inflammatory markers, including ferritin and D-dimer, and a trend to decreasing FiO_2 requirements, after vitamin C administration. There was no control group.
    - https://www.sciencedirect.com/science/article/pii/S0899900720302318
        - Review concluding that there is clear evidence that vitamin C in high doses can reduce interleukin-6 and endothelin-1 mediators. Authors suggest a relatively low dose as prophylaxis, and in cases of severe COVID-19, an (intravenous) high-dose regimen may be beneficial.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7369577/
        - Retrospective 152 mechanically ventilated patients in the USA showing unadjusted lower mortality with vitamin C, vitamin D, HCQ, and zinc treatment, statistically significant only for vitamin C.
        - risk of death, 30.7% lower, RR 0.69, *p* = 0.04, treatment 40 of 79 (50.6%), control 52 of 73 (71.2%), adjusted, OR converted to RR.
    - https://www.frontiersin.org/articles/10.3389/fimmu.2020.01451/full
        - Review of the evidence for the use of vitamin C and quercetin both for prophylaxis in high-risk populations and for the treatment of COVID-19 patients.
        - Can enhance Quercetin and helps fight cytokine storm damage
        - *AUTHORS - "Quercetin displays a broad range of antiviral properties which can interfere at multiple steps of pathogen virulence -virus entry, virus replication, protein assembly- and that these therapeutic effects can be augmented by the co-administration of vitamin C. Furthermore, due to their lack of severe side effects and low-costs, we strongly suggest the combined administration of these two compounds for both the prophylaxis and the early treatment of respiratory tract infections, especially including COVID-19 patients."*
    - https://link.springer.com/article/10.1007%2Fs13337-020-00643-6
        - *In Silico* analysis finding that magnesium ascorbate, a form of Vitamin C, was found to be the top compound among 106 nutraceuticals for binding to M^{pro} of SARS-CoV-2.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7172861/

        - Intravenous Vitamin C reduces Cytokine Storm in Acute Respiratory Distress Syndrome
        - the reduction of the cytokines storm in the late stages of the Covid19 infection is the most significant application of IV Vit-CCovid19 pneumonia is a complex medical disorder with high morbidity and mortality rate. This causes severe lung injury that results in Acute Respiratory Distress Syndrome (ARDS), a life-threatening lung disorder. This process prevents the necessary oxygen to enter into the lungs and ultimately causes death. Coronaviruses increase oxidative stress that promotes cellular malfunction and ultimately results in organ failure. It is believed that pulmonary failure (ARDS) is the principal cause of Covid19's action on humans
    - https://journals.lww.com/ccmjournal/Abstract/2020/07000/Harm_of_IV_High_Dose_Vitamin_C_Therapy_in_Adult.38.aspx
        - This meta study examined multiple reports on high dosage of vitamin c to find evidence of side effects or harm
        - *AUTHOR – "CONCLUSION: There is no consistent evidence that IV high-dose vitamin C therapy is more harmful than placebo in double-blind randomized controlled trials. However, reports of oxalate nephropathy, hypernatremia, glucometer error, and hemolysis in glucose-6-phosphate dehydrogenase deficiency patients warrant specific monitoring."*
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4864764/
        - 77 patients were given high dose intravenous vitamin c between 42g to 20g
        - Study suggests an acute BP-reducing effect of high-dose IVC, particularly with dosages above 30 g, and in patients with prehypertension and normal BMI. Furthermore, our study indicated a marked and clinically relevant hypertensive effect of IVB12, suggesting routine BP monitoring during i.v. therapy in clinical practice.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3215871/
        - This article about using Intravenous vitamin C for cancer
        - The main purpose I cited this was to show a mega dosage level of 500mg/kg to be safe with no reported side effects
    - https://pubmed.ncbi.nlm.nih.gov/24867961/
        - This meta study on Vitamin C and cancer also showed some levels of intravenous vitamin C up to 200g per single infusion with no adverse side effects
    - https://c19vitaminc.com/
    - https://c19vitaminc.com/cmeta.html

Vitamin D3

- https://bmjopen.bmj.com/content/11/10/e055435.long
  - Analysis of 259 hospitalized COVID-19 patients in the UK, showing a majority of patients had vitamin D deficiency/insufficiency, which was associated with poor outcomes. Both free and total 25(OH)D were analyzed with consistent results
  - risk of death, 68.4% lower, RR 0.32, *p* = 0.005, high D levels 68, low D levels 191, OR converted to RR, >50nmol/l, multivariable, Supplementary Table 2, control prevalance approximated with overall prevalence.
  - risk of mechanical ventilation, 66.0% lower, RR 0.34, *p* = 0.004, high D levels 6 of 68 (8.8%), low D levels 61 of 191 (31.9%), OR converted to RR, >50nmol/l, multivariable, Supplementary Table 2.
- https://www.mdpi.com/2072-6643/13/11/3680
  - Retrospective 646 COVID-19 patients in the UAE, showing significant associations between genetic determinants of vitamin D metabolism and COVID-19 severity, and an association with vitamin D deficiency and COVID-19 severity.
- https://www.sciencedirect.com/science/article/pii/S0188440921001983
  - Retrospective 2,908 hospitalized patients in Mexico with vitamin D levels measured on admission, showing significantly lower mortality for patients without vitamin D deficiency.
- https://www.sciencedirect.com/science/article/pii/S1530891X21012593
  - RCT 106 hospitalized patients with vitamin D levels <30ng/ml in Iran, 53 treated with calcifediol, showing that treatment was able to correct vitamin D deficiency/insufficiency, resulting in improved immune system function. Hospitalization, ICU duration, ventilation, and mortality was lower with treatment, without reaching statistical significance with the small sample size. The dosage used in this trial was much lower than other trials.
- https://www.jstage.jst.go.jp/article/tjem/255/2/255_127/_article/-char/en
  - Retrospective 646 COVID-19+ hospitalized patients in Iran, showing higher mortality with vitamin D deficiency.
- https://apm.amegroups.com/article/view/80821/html
  - Report on the relatively low mortality and relatively mild COVID-19 symptoms at a French nursing facility that has adopted several treatments including vitamin D, zinc, anticoagulants, corticosteroids, and a multivitamin.
- https://febs.onlinelibrary.wiley.com/doi/10.1002/2211-5463.13309
  - Analysis of UV and temperature levels in 26 European countries, showing that low temperature, UV index, and cloud-free vitamin D UV dose levels are negatively correlated with COVID-19 prevalence. Authors suggest that low UV exposure can affect the required production of vitamin D in the body, which substantially influences the dynamics of COVID-19 transmission and severity.
- https://www.sciencedirect.com/science/article/abs/pii/S1567134821003981

        - Analysis of 500 hospitalized patients in Iran, showing associations between specific vitamin D receceptor gene polymorphisms and COVID-19 outcomes.
    - http://www.elis.sk/index.php?page=shop.product_details&flypage=flypage.tpl&product_id=7390&category_id=171&option=com_virtuemart&vmcchk=1&Itemid=1
        - Retrospective 207 hospitalized patients in Turkey, 37 with vitamin D levels <30ng/ml treated with a 300,000IU vitamin D, showing lower mortality with treatment.
        - risk of death, 80.9% lower, RR 0.19, *p* = 0.04, treatment 1 of 37 (2.7%), control 24 of 170 (14.1%).
        - risk of ICU admission, 94.5% lower, RR 0.06, *p* = 0.13, treatment 0 of 37 (0.0%), control 14 of 170 (8.2%), relative risk is not 0 because of continuity correction due to zero events.
    - https://www.mdpi.com/2072-6643/13/10/3596
        - Meta analysis of 8 studies with vitamin D levels measured pre-infection or on the day of hospital admission, showing a correlation between the levels and mortality. Authors recommend combining vaccination with vitamin D supplementation to maintain levels above 50 ng/ml. Authors extrapolate to predict a point of zero mortality, however there is no reason to predict a linear relationship where zero mortality would be reached.
    - https://www.frontiersin.org/articles/10.3389/fpubh.2021.758347/full
        - Retrospective 1,267 hospitalized patients in Spain, 189 on vitamin D supplementation before admission, showing lower ICU admission with supplementation, and no statistically significant difference for mortality or ventilation.
        - risk of death, 12.4% higher, RR 1.12, *p* = 0.59, treatment 50 of 189 (26.5%), control 167 of 1,078 (15.5%), adjusted, OR converted to RR.
        - risk of mechanical ventilation, 43.3% lower, RR 0.57, *p* = 0.22, treatment 11 of 189 (5.8%), control 113 of 1,078 (10.5%), adjusted, OR converted to RR.
    - https://www.dovepress.com/implications-for-systemic-approaches-to-covid-19-effect-sizes-of-remde-peer-reviewed-fulltext-article-JIR
        - Review of the effects of COVID-19 on inflammatory markers, and the effects on those markers of standard treatments vs. vitamin D, melatonin, and meditation, showing comparable or superior effects with the non-standard treatments. The standard treatments in this study were remdesivir and tocilizumab. We note that standard treatments vary widely around the world, for example vitamin D is a standard treatment in many locations.
    - https://www.medrxiv.org/content/10.1101/2021.09.20.21263865v1
        - UK Biobank retrospective showing that vitamin supplements, including vitamin D, mediate the Asian disparity in COVID-19 susceptibility, and vitamin D levels mediate Asian and Black COVID-19 severity disparities. Authors conclude that the results support the use of vitamin D as both a prophylactic and a supplemental therapeutic for COVID-19 in those individuals.
    - https://onlinelibrary.wiley.com/doi/full/10.1002/fsn3.2591

        - Retrospective 290 hospitalized patients in Iran, showing higher mortality with vitamin D deficiency.
    - https://www.sciencedirect.com/science/article/pii/S1567576920330186
        - Analysis of vitamin D levels and COVID-19 in Indian states and union territories, showing an inverse correlation of vitamin D levels with SARS-CoV-2 cases and mortality.
    - https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1009840
        - *In Vitro* studying identifying 35 compounds that inhibit SARS-CoV-2 in Vero cells and hepatocytes when treated prior to infection, and several compounds that slow replication when treated after infection: vitamin D, amodiaquine, atovaquone, bedaquiline, ebastine, LY2835219, manidipine, and panobinosta. Authors use a nano-luciferase tagged version of the virus to quantify viral load.
    - https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC8425676/
        - RCT 50 hospitalized patients in the USA, 25 treated with calcitriol, showing significantly improved oxygenation with treatment. Mortality, intubation, ICU admission, and hospitalization time also favored treatment, while not reaching statistical significance with the very small sample size.
        - risk of death, 85.7% lower, RR 0.14, p = 0.23, treatment 0 of 25 (0.0%), control 3 of 25 (12.0%), relative risk is not 0 because of continuity correction due to zero events.
    - https://www.endocrine-abstracts.org/ea/0070/ea0070ep552
        - Analysis of 239 consecutive diabetic patients, 97 taking vitamin D supplements, showing significantly higher vitamin D levels in supplemented patients. There was no statistically significant difference in cases based on supplementation, with only 3 cases total.
        - risk of COVID-19 case, 26.8% lower, RR 0.73, p = 1.00, treatment 1 of 97 (1.0%), control 2 of 142 (1.4%).
    - https://europepmc.org/article/PMC/PMC7868648
        - Retrospective 510 patients in Iran, showing lower risk of severity with vitamin D (statistically significant) and zinc (not statistically significant) supplementation. IR.TUMS.VCR.REC.1398.1063.
    - https://journals.sagepub.com/doi/full/10.1177/20101058211041405
        - Small RCT with 56 eldery diabetes patients hospitalized in Egypt, 40 treated with cholecalciferol, not showing significant differences.
    - https://www.tandfonline.com/doi/full/10.1080/07315724.2021.1951891
        - Meta analysis of 24 observational studies with 3,637 participants, showing low vitamin D status associated with a higher risk of death and a higher risk of developing severe COVID-19 pneumonia.
    - https://www.mdpi.com/2072-6643/13/9/3021
        - Retrospective 161 hospitalized patients in Russia, showing COVID-19 severity and mortality associated with vitamin D deficiency. Patients in this study may overlap with those in an earlier smaller study from some of the same authors.

        - risk of death, 77.8% lower, RR 0.22, *p* = 0.006, high D levels 8 of 96 (8.3%), low D levels 10 of 37 (27.0%), adjusted, OR converted to RR, >10ng/mL, logistic regression model 2.
        - risk of death, 84.8% lower, RR 0.15, *p* = 0.06, high D levels 1 of 43 (2.3%), low D levels 17 of 90 (18.9%), adjusted, OR converted to RR, >20ng/mL, logistic regression model 2.
    - https://journals.sagepub.com/doi/full/10.1177/21501327211041206
        - Retrospective 92 hospitalized patients not showing significant differences in outcomes based on vitamin D status or supplementation.
        - risk of death, 35.9% lower, RR 0.64, *p* = 0.74, high D levels 6 of 77 (7.8%), low D levels 1 of 15 (6.7%), OR converted to RR, >20ng/mL, multivariable logistic regression.
        - risk of mechanical ventilation, 56.9% lower, RR 0.43, *p* = 0.22, high D levels 8 of 15 (53.3%), low D levels 4 of 15 (26.7%), OR converted to RR, >20ng/mL, multivariable logistic regression.
    - https://zenodo.org/record/5266352
        - Analysis of vitamin D and zinc levels in 53 PCR+ outpatients and 53 controls, showing lower zinc levels in COVID-19 patients, and increased risk of symptomatic cases with vitamin D deficiency. Currently only the abstract is available.
    - https://www.medrxiv.org/content/10.1101/2021.08.22.21262216v1
        - Meta analysis of 6 vitamin D treatment RCTs, showing statistically significant improvements for pooled outcomes and PCR positivity, and positive but not statistically significant improvements for mortality, mechanical ventilation, ICU admission, and severity.
        -
    - https://onlinelibrary.wiley.com/doi/10.1002/jmv.27277
        - Retrospective 293 hospitalized patients in Iran showing lower levels of zinc, vitamin B12, and vitamin D in patients that died, with statistical significance reached only for zinc.
    - https://academic.oup.com/jcem/advance-article/doi/10.1210/clinem/dgab599/6349205
        - Retrospective 88 patients in Italy, showing vitamin D deficiency associated with severe cases, blood glucose, and BMI.
        - risk of death, 10.7% lower, RR 0.89, *p* = 1.00, high D levels 5 of 28 (17.9%), low D levels 12 of 60 (20.0%), >20ng/mL.
        - risk of ICU admission, 41.6% lower, RR 0.58, *p* = 0.22, high D levels 6 of 28 (21.4%), low D levels 22 of 60 (36.7%), >20ng/mL.
    - https://www.sciencedirect.com/science/article/pii/S0960076021001576
        - Retrospective 159 COVID-19+ pregnant women in Turkey and 332 healthy pregnant controls, showing significantly lower vitamin D levels in COVID-19+ patients. 23% of COVID-19 patients where on vitamin D supplementation, while none of the 7 severe cases were on supplementation.
        - risk of moderate/severe case, 79.5% lower, RR 0.21, *p* < 0.001, high D levels 8 of 100 (8.0%), low D levels 23 of 59 (39.0%), >10ng/mL.

- https://www.cambridge.org/core/journals/epidemiology-and-infection/article/vitamin-d-levels-in-children-with-covid19-a-report-from-turkey/627E5F7B744279CDBF0BD0CC12938C2C
  - Retrospective 75 COVID-19 hospitalized pediatric patients in Turkey and 80 healthy controls, showing significantly lower vitamin D levels in COVID-19 patients.
- https://www.sciencedirect.com/science/article/pii/S0009898121002709?via%3Dihub
  - Retrospective 1,634 patients tested for SARS-CoV-2 in Brazil, showing vitamin D levels <30ng/mL associated with greater odds of a positive SARS-CoV-2 test in patients older than 49 years.
  - risk of COVID-19 case, 50.5% lower, RR 0.50, p = 0.01, >30ng/mL, multivariate, RR approximated with OR.
- https://www.sciencedirect.com/science/article/pii/S2049080121006117
  - Case control study with 156 PCR+ cases in India and 204 controls, showing more frequent vitamin D deficiency in COVID-19 patients, and an association between lower vitamin D levels and COVID-19 severity.
  - risk of death, 50.4% lower, RR 0.50, p = 0.17, high D levels 13 of 131 (9.9%), low D levels 5 of 25 (20.0%), >10ng/mL, within cases.
- https://www.emerald.com/insight/content/doi/10.1108/NFS-11-2020-0421/full/html
  - Retrospective 603 patients in Iran, 192 taking vitamin D supplements, showing no significant difference in COVID-19 cases in unadjusted results.
  - risk of COVID-19 case, 12.4% lower, RR 0.88, p = 0.09, treatment 99 of 192 (51.6%), control 242 of 411 (58.9%).
- https://link.springer.com/article/10.1007/s00203-021-02482-5
  - Case control study with 191 COVID-19 patients and 203 healthy controls in Iran, showing an association between vitamin D deficiency and COVID-19 infection and severity. 84.4% of COVID-19 patients had vitamin D deficiency.
  - risk of COVID-19 case, 66.1% lower, RR 0.34, p < 0.001, >20ng/mL, RR approximated with OR.
- https://onlinelibrary.wiley.com/doi/10.1111/ijcp.14675
  - Systematic review and meta analysis of 23 studies, finding significantly higher risk of COVID-19 cases and severity with vitamin D deficiency. Mortality risk was higher with deficiency, but not reaching statistical significance, OR 1.6 [0.5-4.4].
- https://www.sciencedirect.com/science/article/pii/S0960076021001515
  - Report on extended results from the GERIA-COVID study, showing significantly lower mortality at 3 months with vitamin D treatment. Results combine prophylaxis and early treatment.
- https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0255132
  - Prospective study of vitamin D levels and COVID-19 infection in the Black Women's Health Study, showing higher risk of infection for lower vitamin D levels. Vitamin D levels were from 3-7 years before infection. Levels at the time of infection may differ, which may reduce the size of the effect observed.

        - risk of COVID-19 case, 38.6% lower, RR 0.61, *p* = 0.04, high D levels 94 of 1,601 (5.9%), low D levels 33 of 373 (8.8%), adjusted, OR converted to RR, >20ng/mL, multivariable.
    - https://elifesciences.org/articles/68165
        - Case control study examining medication usage with a healthcare database in Israel, showing lower risk of hospitalization with vitamin D (defined as being picked up within 35 days prior to PCR+). Other patients may have acquired vitamin D supplements outside of the healthcare system.
        - risk of hospitalization, 9.1% lower, RR 0.91, *p* = 0.003, treatment 737 of 2,406 (30.6%), control 6,216 of 18,453 (33.7%), OR converted to RR, PCR+, cohort 2.
    - https://www.mdpi.com/2072-6643/13/8/2559
        - Retrospective 288 hemodialysis patients in Spain, 137 with existing vitamin D treatments (94 with paricalcitol), showing lower mortality with treatment. There was no significant difference in outcomes based on serum levels, however authors do not separate patients that received vitamin D treatment.
        - risk of death, 50.1% lower, RR 0.50, *p* = 0.02, treatment 16 of 94 (17.0%), control 65 of 191 (34.0%), adjusted, paricalcitol, multivariate Cox regression.
    - https://www.nature.com/articles/s41430-021-00984-5
        - Retrospective 175 ICU patients, 113 treated with a single dose of 300,000IU intramuscular cholecalciferol, showing lower mortality with treatment, but not reaching statistical significance. Calcifediol or calcitriol, which avoids several days delay in conversion, may be more successful, especially with this very late stage usage.
    - https://link.springer.com/article/10.1007/s40618-021-01639-9
        - Retrospective study of cholecalciferol and calcitriol supplementation in Catalonia showing a small but significant lower risk of cases with cholecalciferol, but no significant difference for mortality, or for calcitriol supplementation. Significant benefit was found for cases, severity, and mortality in patients achieving serum vitamin D levels ≥30ng/ml.
    - https://onlinelibrary.wiley.com/doi/10.1002/fsn3.2458
        - Survey of 80 recovered COVID-19 patients in Pakistan, showing faster recovery with vitamin C, vitamin D, and zinc supplementation.
    - https://journals.sagepub.com/doi/full/10.1177/2515690X211026193
        - Retrospective 113 outpatients, 53 (patient choice) treated with zinc, quercetin, vitamin C/D/E, l-lysine, and Quina, showing lower cases with treatment.
        - risk of COVID-19 case, 94.4% lower, RR 0.06, *p* = 0.003, treatment 0 of 53 (0.0%), control 9 of 60 (15.0%), relative risk is not 0 because of continuity correction due to zero events.
        - risk of COVID-19 or flu-like illness, 81.1% lower, RR 0.19, *p* = 0.01, treatment 2 of 53 (3.8%), control 12 of 60 (20.0%).
    - https://www.mdpi.com/2072-6643/13/7/2170
        - Small RCT of 69 hospitalized patients comparing 1000IU and 5000IU daily cholecalciferol, showing faster recovery with the higher dose.
    - https://link.springer.com/article/10.1007/s40618-021-01614-4

        - Meta analysis of 13 vitamin D treatment studies, showing significantly lower ICU admission/mortality with treatment.
    - https://www.sciencedirect.com/science/article/pii/S0899900721002628
        - Retrospective 60 ICU patients in Iran, showing that lower levels of vitamin D, magnesium, and zinc were significantly associated with higher APACHE scores (*P* = 0.001, 0.028, and <0.001, respectively) and higher lung involvement (*P* = 0.002, 0.045, and <0.001, respectively).
    - https://www.mdpi.com/2072-6643/13/7/2129
        - Retrospective 148 patients in Austria, showing no statistically significant differences in vitamin D levels and metabolites for mortality or respiratory support.
        - risk of death, 46.4% lower, RR 0.54, *p* = 0.08, high D levels 24 of 121 (19.8%), low D levels 10 of 27 (37.0%), >30nmol/L.
    - https://academic.oup.com/jcem/advance-article/doi/10.1210/clinem/dgab439/6303537
        - Retrospective 80,670 people in the UK with vitamin D levels measured within the last 12 months, showing higher risk of hospitalization with low vitamin D levels.
        - risk of hospitalization, 71.6% lower, RR 0.28, *p* < 0.001, adjusted, OR converted to RR, >25 nmol/L, control prevalence approximated with overall prevalence.
    - https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-021-06281-7
        - Prospective study of 103 hospitalized patients in Italy, showing very high prevalence of vitamin D deficiency, and increased severity for lower vitamin D levels.
        - risk of death for severe patients, 24.3% lower, RR 0.76, *p* = 0.53, high D levels 6 of 39 (15.4%), low D levels 13 of 64 (20.3%), >20ng/mL.
        - risk of ICU for severe patients, 53.1% lower, RR 0.47, *p* < 0.001, high D levels 12 of 39 (30.8%), low D levels 42 of 64 (65.6%), >20ng/mL.
    - https://www.medrxiv.org/content/10.1101/2021.06.04.21258358v1
        - Retrospective 253 hospitalized patients in Israel showing higher mortality and higher risk of severe cases with vitamin D deficiency. Vitamin D levels were measured 14 to 730 days before the COVID-19 test. Adjusted results are only provided for severity.
        - risk of severe or critical case, 85.1% lower, RR 0.15, *p* = 0.001, high D levels 109 of 120 (90.8%), low D levels 76 of 133 (57.1%), OR converted to RR, >40ng/mL vs. <20ng/mL, multivariate logistic regression.
    - https://www.sciencedirect.com/science/article/pii/S0960076021001217
        - Retrospective 1,549 patients in Spain showing that the frequency of vitamin D deficiency was higher in admitted patients compared to the overall Spanish population, and that vitamin D deficiency was associated with increased risk of ICU admission amongst admitted patients. Adjusted vitamin D levels were lower in deceased patients, but statistical significance was not reached (authors provide only average levels, they do not provide mortality analysis based on deficiency).

        - risk of ICU admission, 73.2% lower, RR 0.27, *p* = 0.02, high D levels 3 of 214 (1.4%), low D levels 91 of 1,017 (8.9%), OR converted to RR, >30ng/mL vs. <20ng/mL.
    - https://clinicalnutritionespen.com/article/S2405-4577(21)00201-1/fulltext
        - Retrospective 25 ICU patients in Brazil, showing vitamin D deficiency associated with higher neutrophil-lymphocyte ratio. There appears to be a typo in the mortality percentage for vitamin D deficiency (20% is not valid for the group size of 8).
        - risk of death, 29.4% lower, RR 0.71, *p* = 1.00, high D levels 3 of 17 (17.6%), low D levels 2 of 8 (25.0%), >20ng/mL.
    - https://www.sciencedirect.com/science/article/pii/S2405457721001911
        - Analysis of vitamin D deficiency and COVID-19 cases and deaths in 47 countries, showing vitamin D deficiency significantly associated with mortality.
    - https://www.mdpi.com/2077-0383/10/11/2378
        - Very small 42 PCR+ outpatient RCT in Mexico, 22 treated with vitamin D. Most patients had insufficient vitamin D levels, there were more symptoms in those with insufficient levels, and there were less cases with fever or with >3 symptoms at day 14 for treatment with vitamin D.
    - https://journaljpri.com/index.php/JPRI/article/view/31603
        - *In Silico* study showing vitamin D binding with M^{pro} of SARS-CoV-2. Among the compounds tested, vitamin D had the highest potential interaction in terms of total H-bond, van der Waal, torsional, and desolvation energy. Authors recommend adding vitamin D to COVID-19 treatment protocols.
    - https://www.wjgnet.com/2220-3249/full/v10/i3/111.htm
        - Country analysis showing negative correlations between population vitamin D level and severe cases and death (but not with cases overall). Authors conclude that higher vitamin D levels may protect from severe cases and death, even more so in the elderly.
    - https://www.endocrine-abstracts.org/ea/0073/ea0073pep14.2
        - Retrospective 356 Hashimoto's thyroiditis outpatients, 270 taking vitamin D, zinc, and selenium, showing significantly lower hospitalization with treatment. Authors adjust for age, gender, BMI, and smoking status, reporting statistically significant associations with $p<0.001$ for hospitalization and mechanical ventilation, however they do not report the adjusted risks.
        - risk of mechanical ventilation, 97.4% lower, RR 0.03, $p < 0.001$, treatment 0 of 270 (0.0%), control 9 of 86 (10.5%), relative risk is not 0 because of continuity correction due to zero events, unadjusted.
    - https://www.mdpi.com/2072-6643/13/6/1760
        - Retrospective 537 patients in Spain, 79 treated with calcifediol, showing significantly lower mortality with treatment. The treated group had a higher risk of comorbidity, whereas the control group had lower O2 saturation, higher CURB-65, and higher ARDS (serverity measures were included in the multivariate analysis).

        - risk of death, 80.8% lower, RR 0.19, *p* = 0.04, treatment 4 of 79 (5.1%), control 90 of 458 (19.7%), adjusted, OR converted to RR, day 30, multivariate logistic regression.
    - https://www.mdpi.com/2072-6643/13/5/1714/htm
        - Retrospective 464 patients in United Arab Emirates showing low D levels at first hospital visit associated with higher COVID-19 severity and mortality.
        - risk of death, 59.3% lower, RR 0.41, *p* = 0.05, high D levels 16 of 337 (4.7%), low D levels 10 of 127 (7.9%), adjusted, OR converted to RR, >=12ng/mL.
    - https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2779952
        - Cohort study of 18,148 patients in the USA showing low vitamin D associated with COVID-19 PCR+ status before adjustments but not after.
    - https://www.cambridge.org/core/journals/bjpsych-bulletin/article/revisiting-vitamin-d-status-and-supplementation-for-inpatients-with-intellectual-and-developmental-disability-in-the-north-of-england-uk/9ABB85B839DD2343107CCD98B10A81EA
        - Retrospective 64 patients with intellectual and developmental disability in the UK, showing no sigificant difference in COVID-19 status with vitamin D supplementation. Only 6 patients were not on vitamin D supplementation.
    - https://www.annalsofrscb.ro/index.php/journal/article/view/9130
        - Retrospective 42 PCR+ patients in Indonesia, showing significantly higher risk of symptomatic cases with vitamin D deficiency.
        - risk of symptomatic case, 88.0% lower, RR 0.12, *p* < 0.001, high D levels 3 of 25 (12.0%), low D levels 17 of 17 (100.0%), >20ng/ml.
    - https://academic.oup.com/jes/article/5/Supplement_1/A279/6240740
        - Retrospective 129 hospitalized patients with vitamin D levels measured within 90 days prior to admission, showing lower, but not statistically significant, risk of severe cases with vitamin D supplementation among patients with levels <20ng/mL or <12ng/mL. For <30ng/mL, lower (but not statistically significant) risk was seen overall but not for ≥50,000IU (the sample size is not given, it may be extremely small for this case). Only minimal details for <30ng/mL are provided, and no details for <20ng/mL or <12ng/mL are provided. The potential effect of supplementation on the risk of a case severe enough for hospitalization is not included.
    - https://www.medrxiv.org/content/10.1101/2021.04.27.21255937v1
        - Retrospective 16,401 hospitalized patients in Spain showing a significant reduction in mortality associated with the prescription of vitamin D, especially calcifediol, within 15-30 days prior to hospitalization.
        - risk of death, 71.9% lower, RR 0.28, *p* < 0.001, treatment 193, control 193, calcifediol, <15 days before hospitalization, Cox model with inverse propensity weighting.
    - https://translational-medicine.biomedcentral.com/articles/10.1186/s12967-021-02838-x
        - Case control study with 220 adults showing significantly lower vitamin D levels in PCR+ patients.
    - https://www.sciencedirect.com/science/article/pii/S1567576921003222

        - Review of vitamin D for COVID-19 noting that infections are likely to be more prevalent in the winter season; clinical trials show vitamin D as a potential therapeutic agent; vitamin D is beneficial against COVID-19 by reducing inflammatory response; vitamin D boosts immune response against SARS-CoV-2 infection; and vitamin D deficiency increases the risk of COVID-19 severity and mortality.
    - https://www.mdpi.com/2227-9059/9/5/509
        - risk of death, 43.0% lower, RR 0.57, *p* = 0.001, treatment 2,296, control 3,407, multivariate, patients with CKD stages 4-5.
    - https://link.springer.com/article/10.1007/s40618-021-01566-9
        - Retrospective 56 patients in Turkey showing greater need for oxygen therapy and higher mortality with vitamin D deficiency, and significantly lower risk of pneumonia with vitamin D supplementation.
        - risk of death, 80.6% lower, RR 0.19, *p* = 0.23, high D levels 0 of 29 (0.0%), low D levels 2 of 27 (7.4%), relative risk is not 0 because of continuity correction due to zero events, >=20ng/mL.
        - risk of oxygen therapy, 73.4% lower, RR 0.27, *p* = 0.07, high D levels 2 of 29 (6.9%), low D levels 7 of 27 (25.9%), >=20ng/mL.
    - https://onlinelibrary.wiley.com/doi/10.1111/ijcp.14166
        - Retrospective 104 consecutive patients tested for COVID-19 in a hospital in the UK, showing lower vitamin D and higher social deprivation associated with COVID-19 positive results.
        - risk of COVID-19 case, 50.9% lower, RR 0.49, *p* = 0.02, high D levels 16 of 52 (30.8%), low D levels 31 of 52 (59.6%), OR converted to RR, >34.4nmol/L.
    - https://link.springer.com/article/10.1007/s00431-021-04030-1
        - The association between vitamin D levels and the clinical severity and inflammation markers in pediatric COVID-19 patients: single-center experience from a pandemic hospital
        - Retrospective 103 pediatric hospitalized COVID-19 patients, showing an association between vitamin D deficiency and clinical severity.
        - risk of moderate/severe case, 69.5% lower, RR 0.30, *p* = 0.03, high D levels 10 of 60 (16.7%), low D levels 24 of 43 (55.8%), adjusted, OR converted to RR, >12 ng/mL, multivariate logistic regression.
    - https://www.frontiersin.org/articles/10.3389/fnut.2021.660420/full
        - Systematic review and meta analysis showing that low vitamin D levels was associated with COVID-19 cases, severity, and mortality.
    - https://www.medrxiv.org/content/10.1101/2021.03.22.21254032v1
        - Analysis of 491 hospitalized patients in Portugal showing that polymorphisms in the vitamin D binding protein encoded by the GC gene are related to COVID-19 severity (*p* = 0.005). There was an association between vitamin D polygenic risk score and vitamin D levels (*p* = 0.042), and between vitamin D levels and mortality (*p* = 1.5e-4). Authors conclude that a genetic susceptibility for vitamin D deficiency may explain higher severity in COVID-19.

        - risk of death, 41.2% lower, RR 0.59, *p* = 0.02, high D levels 23 of 179 (12.8%), low D levels 68 of 311 (21.9%), >20ng/mL.
    - https://www.sciencedirect.com/science/article/pii/S0960076021000765
        - Meta analysis showing vitamin D deficiency associated with higher risk of COVID-19, worse severity, and higher mortality.
    - https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2777682
        - Retrospective 4,638 individuals with vitamin D levels within 1 year before COVID-19 testing, showing higher risk of COVID-19 PCR+ for vitamin D deficient individuals, and lower (but not statistically significant) cases for individuals using vitamin D supplementation.
        - risk of COVID-19 case, 34.6% lower, RR 0.65, *p* = 0.11, high D levels 61 of 1,097 (5.6%), low D levels 118 of 1,251 (9.4%), adjusted, >40ng/mL vs. <20ng/mL, Table 2, Model 2.
    - https://www.medrxiv.org/content/10.1101/2021.03.12.21253490v2
        - Retrospective 551 moderate to severe COVID-19 patients in Mexico showing vitamin D ≤12ng/mL independently associated with COVID-19 mortality. No association was found between vitamin D levels and the need for intubation. Vitamin D deficiency was more prevalent in women and patients with type 2 diabetes.
        - risk of death, 52.6% lower, RR 0.47, *p* = 0.006, high D levels 95 of 494 (19.2%), low D levels 21 of 57 (36.8%), adjusted, >12ng/mL.
    - https://www.sciencedirect.com/science/article/pii/S1871402121000746
        - Analysis of Asian countries finding that prevalence of vitamin D deficiency and lower vitamin D levels were associated with COVID-19 infection and mortality.
    - https://www.medrxiv.org/content/10.1101/2021.03.11.21253361v1
        - Retrospective 19 European countries showing countries with mean vitamin D levels > 50nmol/L have a 2.2 times lower risk of mortality (*p* = 0.032) compared to those with mean levels < 50 nmol/L.
        - risk of death, 53.6% lower, RR 0.46, *p* = 0.03, >50nmol/L.
    - https://www.endocrinepractice.org/article/S1530-891X(21)00057-4/fulltext
        - Retrospective 287 hospitalized patients in the USA showing significantly lower mortality with vitamin D sufficiency in elderly patients and patients without obesity; and lower mortality for all patients but not reaching statistical signifance.
        - risk of death, 34.1% lower, RR 0.66, *p* = 0.26, high D levels 12 of 100 (12.0%), low D levels 29 of 187 (15.5%), adjusted, OR converted to RR, >=30ng/mL.
    - https://www.clinicalnutritionjournal.com/article/S0261-5614(21)00135-7/fulltext
        - Retrospective 26 ICU patients showing that the majority of patients had vitamin D deficiency. There was no statistically significant association of 25-hydroxyvitamin D status and clinical course, however low levels of 1,25-dihydroxyvitamin D were associated with prolonged mechanical ventilation and a worse APACHE II score. Clinical outcomes based on baseline vitamin D status are not provided.
        -

- https://onlinelibrary.wiley.com/doi/10.1002/ccr3.4010
  - Case report of a high-risk immunocompromised patient with multiple comorbidities that had a mild case of COVID-19. The patient had UVB phototherapy three months earlier and had normal vitamin D levels (92.2 nmol/L, normal range 50-125).
- https://link.springer.com/article/10.1007/s40618-021-01535-2
  - Retrospective 348 hospitalized patients in Italy showing vitamin D deficiency associated with acute hypoxemic respiratory failure. Vitamin D supplementation during hospitalization was not significantly associated with mortality or ventilation.
- https://journals.physiology.org/doi/full/10.1152/ajpendo.00517.2020
  - Retrospective 270 patients with vitamin D levels measured in the last year, showing no significant difference in outcomes based on vitamin D levels or vitamin D supplementation.
  - risk of death, 14.7% lower, RR 0.85, $p = 0.56$, high D levels 88, low D levels 95, OR converted to RR, control prevalence approximated with overall prevalence, >30 ng/mL vs. <20 ng/mL, >30 ng/mL group size approximated.
  - risk of mechanical ventilation, 18.9% lower, RR 0.81, $p = 0.48$, high D levels 88, low D levels 95, OR converted to RR, control prevalence approximated with overall prevalence, >30 ng/mL vs. <20 ng/mL, >30 ng/mL group size approximated.
  - risk of ICU admission, 28.5% lower, RR 0.72, $p = 0.17$, high D levels 88, low D levels 95, OR converted to RR, control prevalence approximated with overall prevalence, >30 ng/mL vs. <20 ng/mL, >30 ng/mL group size approximated.
- https://respiratory-research.biomedcentral.com/articles/10.1186/s12931-021-01666-3
  - Retrospective 52 hospitalized COVID-19 patients showing that vitamin D deficiency is associated with compromised inflammatory responses and higher pulmonary involvement. Vitamin D deficient patients also showed higher mortality, although not quite reaching statistical significance with the small sample size.
  - risk of death, 87.6% lower, RR 0.12, $p = 0.07$, high D levels 0 of 30 (0.0%), low D levels 3 of 22 (13.6%), relative risk is not 0 because of continuity correction due to zero events, >10 ng/mL.
- http://ijpsat.es/index.php/ijpsat/article/view/3269
  - Prospective study of 30 female COVID-19 patients, all treated with calcifediol on admission, showing significantly increased vitamin D levels with treatment. There was no mortality.
- https://www.mdpi.com/2072-6643/13/3/717
  - Retrospective 65 elderly COVID-19 patients and 65 matched controls, showing lower vitamin D levels associated with more severe lung involvement, longer disease duration, and higher mortality. Vitamin D supplementation was less common in the COVID-19 group compared to the control group.
  - risk of COVID-19 case, 50.4% lower, RR 0.50, $p < 0.001$, treatment 22 of 66 (33.3%), control 43 of 64 (67.2%), vitamin D supplementation.

- https://www.nature.com/articles/s41598-021-90189-4
  - RCT 44 treatment and 43 control patients with vitamin D levels <30ng/ml, showing significant reduction in inflammatory markers with treatment of 60,000IU vitamin D per day for 8 days (10 days for BMI >25). Death and ICU admission was lower in the treatment group but not statistically significant.
  - risk of death, 60.9% lower, RR 0.39, *p* = 0.27, treatment 2 of 44 (4.5%), control 5 of 43 (11.6%).
  - risk of ICU admission, 21.8% lower, RR 0.78, *p* = 0.74, treatment 4 of 44 (9.1%), control 5 of 43 (11.6%).
- https://www.tandfonline.com/doi/full/10.1080/07315724.2020.1869626
  - Retrospective 437 mostly serious condition (85% hospitalized) patients in New York, showing vitamin D deficiency associated with increased likelihood of oxygen support, but no association with mortality and hospitalization. Multivariate analysis excluded variables with p > 0.2 in univariate analysis. Adjustment for factors correlated with vitamin D may obscure the effect of vitamin D levels.
  - risk of death, 4.7% higher, RR 1.05, *p* = 0.83, high D levels 80 of 260 (30.8%), low D levels 52 of 177 (29.4%), >20ng/ml.
  - risk of death, 44.8% lower, RR 0.55, *p* < 0.001, high D levels 102 of 376 (27.1%), low D levels 30 of 61 (49.2%), >10ng/ml.
  - risk of oxygen therapy, 55.2% lower, RR 0.45, *p* < 0.001, high D levels 127 of 260 (48.8%), low D levels 116 of 177 (65.5%), adjusted, >20ng/ml, multivariate.
- https://www.tandfonline.com/doi/full/10.1080/07315724.2021.1877580
  - Retrospective 137 hospitalized patients in Italy. All patients had low vitamin D levels, and lower levels were associated with higher mortality.
  - risk of death, 54.8% lower, RR 0.45, *p* = 0.05, high D levels 4 of 19 (21.1%), low D levels 55 of 118 (46.6%), >20ng/mL.
- https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC7888253/#!po=1.28205
  - Small retrospective study of 29 hip fracture patients in the UK, 14 with COVID-19. All COVID-19 patients were treated with vitamin D except for 2 where testing and supplementation was missed due to a clerical error. The two COVID-19 patients that died were the two that did not receive vitamin D supplementation.
  - risk of death, 93.3% lower, RR 0.07, *p* = 0.01, treatment 0 of 12 (0.0%), control 2 of 2 (100.0%), relative risk is not 0 because of continuity correction due to zero events.
- http://www.elis.sk/index.php?page=shop.product_details&flypage=flypage.tpl&product_id=7119&category_id=171&option=com_virtuemart&vmcchk=1&Itemid=1
  - Prospective study of 204 patients with COVID-19-like pneumonia in Turkey, 42 outpatients (mild cases), and 162 inpatients (serious cases), showing significantly higher risk of severe cases with vitamin D deficiency.
  - risk of COVID-19 severe case, 68.6% lower, RR 0.31, *p* = 0.005, high D levels 82 of 119 (68.9%), low D levels 80 of 85 (94.1%), OR converted to RR, >10µg/L, per standard deviation increase in levels.
- https://aseestant.ceon.rs/index.php/jomb/article/view/30228

        - Retrospective 50 hospitalized PCR+ patients in Indonesia showing ICU admission, mortality, and ISTH DIC (Disseminated Intravascular Coagulation) score>=5, and increased D-dimer significantly associated with lower vitamin D levels.
        - risk of death, 91.5% lower, RR 0.09, *p* = 0.32, high D levels 0 of 8 (0.0%), low D levels 9 of 42 (21.4%), relative risk is not 0 because of continuity correction due to zero events, >49.92 nmol/L.
        - risk of ICU admission, 90.5% lower, RR 0.10, *p* = 0.32, high D levels 0 of 8 (0.0%), low D levels 8 of 42 (19.0%), relative risk is not 0 because of continuity correction due to zero events, >49.92 nmol/L.
    - https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3779211
        - Case series of 24 COVID-19 patients (12 confirmed PCR+) treated with vitamin D, vitamin C, and melatonin, showing positive outcomes with no patient having worse than a mild case, including 7 high risk patients.
    - https://link.springer.com/article/10.1007/s12291-020-00950-1
        - Analysis of vitamin D levels and COVID-19 in 37 Asia Pacific countries, finding a significant association with the number of cases/million (r = −0.394, *p* = 0.016) and a weak association with the number of deaths/ million (r = −0.280, *p* = 0.093).
    - https://dergipark.org.tr/tr/download/article-file/1693503
        - Retrospective 30 hospitalized pediatric COVID-19 patients and 82 healthy controls, showing significantly lower vitamin D levels in COVID-19 patients.
    - https://nutrition.bmj.com/content/early/2021/05/04/bmjnph-2021-000255
        - UK Biobank Mendelian randomization study not finding significant differences in COVID-19 risk. The number of people predicted to have vitamin D deficiency does not appear to be provided.
        - risk of hospitalization, no change, RR 1.00, *p* = 1.00, OR converted to RR, >50nmol/L, baseline risk approximated with overall risk.
    - https://journals.lww.com/ccmjournal/Fulltext/2021/01001/138__Vitamin_D_Levels_in_Children_With_COVID_19.106.aspx
        - Retrospective 14 pediatric COVID-19 ICU patients showing that the majority were vitamin D deficient.
    - https://onlinelibrary.wiley.com/doi/10.1002/jmv.26832
        - Retrospective cohort study of 487 patients finding that lower vitamin D levels is associated with more severe cases as measured by affected lung segments and increased hospitalization time for COVID-19 positive patients, and that lower vitamin D levels increases COVID-19 PCR+ cases.
        - risk of COVID-19 severe case, 89.3% lower, RR 0.11, *p* < 0.001, high D levels 13, low D levels 99, ratio of the mean number of affected lung segments, >30ng/ml vs. <=10ng/mL.
        - hospitalization time, 87.1% lower, relative time 0.13, *p* < 0.001, high D levels 13, low D levels 99, >30ng/ml vs. <=10ng/mL.
        - risk of COVID-19 case, 24.2% lower, RR 0.76, *p* = 0.18, high D levels 13 of 31 (41.9%), low D levels 99 of 179 (55.3%), >30ng/ml vs. <=10ng/mL.

- https://www.medrxiv.org/content/10.1101/2021.01.28.21250673v1
  - Analysis of vitamin D deficiency and COVID-19 cases and mortality in European countries showing significant correlations with infections (r=0.82, *p*<0.001) and mortality (r=0.53, *p*=0.05).
  - risk of COVID-19 case, 30.0% lower, RR 0.70, *p* = 0.03, treatment 49 of 363 (13.5%), control 1,329 of 7,934 (16.8%), adjusted, OR converted to RR.
- https://www.mdpi.com/2072-6643/13/2/411
  - Summary of epidemiological and intervention studies for vitamin D supplementation. Author concludes that despite limitations, evidence strongly supports widespread supplementation, in particular for high-risk populations, as well as high-dose supplementation for those infected.
- https://clinicalnutritionespen.com/article/S2405-4577(21)00028-0/fulltext
  - Retrospective 205 patients in Iran, showing higher mortality with vitamin D deficiency, not quite reaching statistical significance.
  - risk of death, 47.5% lower, RR 0.52, *p* = 0.07, high D levels 34 of 180 (18.9%), low D levels 9 of 25 (36.0%), >10ng/ml.
- https://www.minervamedica.it/en/journals/panminerva-medica/article.php?cod=R41Y9999N00A21012508
  - Retrospective 118 consecutive hospitalized PCR+ patients in Italy showing higher ventilation and mortality with vitamin D deficiency.
  - risk of death, 64.9% lower, RR 0.35, *p* = 0.44, high D levels 1 of 31 (3.2%), low D levels 8 of 87 (9.2%), >20ng/mL.
  - risk of mechanical ventilation, 64.9% lower, RR 0.35, *p* = 0.15, high D levels 2 of 31 (6.5%), low D levels 16 of 87 (18.4%), >20ng/mL.
- https://academic.oup.com/jcem/article/106/10/e4017/6294179
  - Quasi-randomized trial with 930 hospitalized patients, 447 treated with calcifediol, showing significantly lower ICU admission and death with treatment. Note that the randomization in this trial is by ward. Authors report that patients were allocated to empty beds available at admission time regardless of patient conditions, and that staff in all wards followed the same protocol.
  - risk of death, 79.0% lower, RR 0.21, *p* = 0.001, treatment 21 of 447 (4.7%), control 62 of 391 (15.9%), adjusted, ITT.
  - risk of death, 48.0% lower, RR 0.52, *p* = 0.001, treatment 500, control 338, adjusted, including patients treated later.
  - risk of ICU admission, 87.0% lower, RR 0.13, *p* < 0.001, treatment 20 of 447 (4.5%), control 82 of 391 (21.0%), adjusted, ITT.
- https://www.nature.com/articles/s41598-021-81419-w
  - Analysis of the increase in COVID-19 cases in European countries, showing no correlation with temperature, but a significant correlation with country latitude. Since UV radiation decreases earlier for higher latitudes, this supports the theory that low vitamin D levels increases COVID-19 risk.
  - Author recommends that vitamin D supplementation be considered to reduce pandemic severity during the winter, noting that UV levels in Europe and Northern USA will not return to a level above that of October until the end of March.

- https://www.degruyter.com/document/doi/10.1515/cclm-2020-1567/html
  - Retrospective 165 hospitalized patients with known vitamin D levels, showing an associated between vitamin D deficiency and ICU admission. There was no statistically significant difference in clinical outcomes for ICU patients. It's unclear why authors do not provide clinical outcomes for all patients rather than ICU only.
  - risk of ICU admission, 58.8% lower, RR 0.41, *p* = 0.001, high D levels 9 of 40 (22.5%), low D levels 41 of 75 (54.7%), all hospitalized patients, >50 nmol/L.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8413335/
  - Retrospective 508 hospitalized COVID-19 patients in Iran showing lower mortality with vitamin D supplementation (not reaching statistical significance), and an association between lower vitamin D levels and disease severity, ICU admission, and increased mortality. Details of supplementation are not provided. The multivariate result for vitamin D deficiency is in the preprint, the journal version only contains the multivariate result for serum level.
  - risk of death, 30.4% lower, RR 0.70, *p* = 0.45, treatment 7 of 88 (8.0%), control 48 of 420 (11.4%), vitamin D supplementation.
  - risk of ICU admission, 63.8% lower, RR 0.36, *p* = 0.009, treatment 13 of 185 (7.0%), control 53 of 323 (16.4%), adjusted, vitamin D levels >30ng/mL.
- https://www.mdpi.com/2072-6643/13/1/219/htm
  - Retrospective 91 hospitalized patients, 36 treated with high-dose cholecalciferol, showing lower combined death/ICU admission with treatment.
  - risk of combined death/ICU, 36.6% lower, RR 0.63, *p* = 0.13, treatment 14 of 36 (38.9%), control 29 of 55 (52.7%), OR converted to RR.
- https://www.tandfonline.com/doi/full/10.1080/07315724.2020.1856013
  - Prospective study of 120 severe cases of COVID-19 in Algeria finding low vitamin D and low calcium both associated with increased mortality.
  - risk of death, 85.5% lower, RR 0.14, *p* = 0.002, high D levels 4 of 30 (13.3%), low D levels 15 of 32 (46.9%), adjusted, >30µg/l vs. <10µg/l, proportional Cox regression.
  - risk of death, 63.0% lower, RR 0.37, *p* = 0.10, high D levels 4 of 30 (13.3%), low D levels 14 of 35 (40.0%), adjusted, >30µg/l vs. 10-19µg/l, proportional Cox regression.
- http://www.aginganddisease.org/EN/10.14336/AD.2020.1108
  - UK Biobank retrospective 353,299 patients showing that vitamin D insufficiency and deficiency are associated with increased COVID-19 risk. This study also analyzes metabolic/obesity phenotypes and the combination with vitamin D status.
  - risk of COVID-19 severe case, 36.2% lower, RR 0.64, *p* < 0.001, OR converted to RR, >25nmol/L.
- https://www.sciencedirect.com/science/article/pii/S002561962100001X
  - Retrospective 144 patients in the USA showing significantly lower mortality for vitamin D levels >=30ng/mL.

        - risk of death, 88.0% lower, RR 0.12, *p* = 0.01, high D levels 6 of 65 (9.2%), low D levels 20 of 79 (25.3%), adjusted, >30ng/mL, supplementary table 2, multivariable logistic regression model 5.
    - https://www.frontiersin.org/articles/10.3389/fmed.2020.590805/full
        - Retrospective 72 non-severe COVID-19 patients in India, showing very high levels of vitamin D deficiency (70 of 72 patients).
        - 82 patients admitted and discharged with the diagnosis of non-severe COVID-19 in the stipulated time were retrieved. Of these 82 patients, 10 patients were excluded (3 due to age <18 years, 7 due to incomplete medical records). Finally, 72 patients with non-severe COVID-19 with complete medical records were included in the final analysis. A similar number of healthy adult men and women were recruited from CUBES for comparison. Only nine patients (12.5%) had moderate disease, while the rest (87.5%) had mild disease. The presenting symptoms of patients with mild and moderate disease have been represented in Table 1. In short, patients with moderate disease were more likely to have fever, cough, and shortness of breath at presentation than patients with mild disease.
    - https://nutrition.bmj.com/content/early/2021/01/07/bmjnph-2020-000151
        - Analysis of vitamin D levels and COVID-19 cases and severity based on genetic predisposition to higher vitamin D levels or lower vitamin D deficiency, finding no significant association.
        - COVID-19 severity, 32.3% higher, RR 1.32, *p* = 0.20, OR converted to RR, >=50nmol/L vs. <25nmol/L, MR Egger, baseline risk approximated with overall risk.
        - risk of COVID-19 case, 7.6% higher, RR 1.08, *p* = 0.14, OR converted to RR, >=50nmol/L vs. <25nmol/L, MR Egger, baseline risk approximated with overall risk.
    - https://www.medrxiv.org/content/10.1101/2021.01.04.21249219v1
        - Meta analysis of 4 supplementation studies, finding that vitamin D supplementation "seems to decrease the mortality rate, the severity of the disease, and serum levels of the inflammatory markers". Mortality odds ratio OR 0.264, *p* = 0.008.
        - risk of death, 67.5% lower, RR 0.32, *p* = 0.008, treatment 13 of 123 (10.6%), control 17 of 67 (25.4%), OR converted to RR.
    - https://journal.niidi.ru/jofin/article/view/1073?locale=en_US
        - Retrospective 80 COVID-19 patients showing low vitamin D levels associated with severity and mortality.
        - risk of death, 79.4% lower, RR 0.21, *p* = 0.11, high D levels 1 of 23 (4.3%), low D levels 12 of 57 (21.1%), OR converted to RR, >20ng/ml.
        - risk of COVID-19 severe case, 71.1% lower, RR 0.29, *p* = 0.07, high D levels 3 of 23 (13.0%), low D levels 22 of 57 (38.6%), OR converted to RR, >20ng/ml.
    - https://www.tandfonline.com/doi/full/10.1080/07435800.2020.1867162
        - Retrospective 93 hospitalized patients with vitamin D levels 1-365 days before admission, not showing significant differences with vitamin D deficiency or

vitamin D levels. Vitamin D levels may vary significantly throughout the year creating a major cofounder that authors do not adjust for.
    - risk of death, 5.6% higher, RR 1.06, *p* = 1.00, high D levels 14 of 58 (24.1%), low D levels 8 of 35 (22.9%).
    - risk of mechanical ventilation, 39.7% lower, RR 0.60, *p* = 0.21, high D levels 10 of 58 (17.2%), low D levels 10 of 35 (28.6%).
    - risk of no hospital discharge, 26.7% higher, RR 1.27, *p* = 0.50, high D levels 21 of 58 (36.2%), low D levels 10 of 35 (28.6%).
- https://rcm.imrpress.com/EN/10.31083/j.rcm.2020.04.264
    - Review urging early treatment of COVID-19 with sequential multidrug treatment that has been shown to be safe and effective. Proposed treatment includes zinc, vitamin D & C, quercetin, and depending on age, comorbidities, and symptoms may include >=2 of HCQ, ivermectin, favipiravir; AZM/DOXY; corticosteroids; colchicine; bamlanivimab; aspirin; LMWH; and supplemental oxygen.
- https://www.nature.com/articles/s41598-021-85809-y
    - Prospective study of 410 hospitalized patients in India showing lower mortality and ICU admission with cholecalciferol treatment, although not statistically significant with the small number of cases. The median total dose was 60000IU.
    - risk of death, 82.0% lower, RR 0.18, *p* = 0.12, treatment 1 of 128 (0.8%), control 3 of 69 (4.3%).
    - risk of ICU admission, 33.7% lower, RR 0.66, *p* = 0.29, treatment 16 of 128 (12.5%), control 13 of 69 (18.8%).
- https://www.sciencedirect.com/science/article/abs/pii/S1876382020314529
    - RCT of 30 ventilated ICU patients showing lower mortality with vitamin D treatment, RR 0.36, *p* = 0.004. Authors do not indicate why the patients were hospitalized or if any of the patients were COVID-19 patients. 300,000 IU intramuscular vitamin D was used.
    - risk of death, 63.5% lower, RR 0.36, *p* = 0.004, treatment 5 of 16 (31.2%), control 12 of 14 (85.7%).
- https://www.aging-us.com/article/202307/text
    - 70% lower mortality with vitamin D supplementation. Analysis of 98 PCR+ nursing home residents in Italy, mean age 90, vitamin D supplementation RR 0.30, *p* = 0.04. The paper provides the p value for regression but not the effect size. Treatment was 2x per month 25000IU.
- https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.26726
    - Case control study with 201 patients and 201 matched controls in Iran showing vitamin D deficiency associated with COVID-19.
    - risk of COVID-19 case, 53.9% lower, RR 0.46, *p* = 0.001, high D levels 108, low D levels 294, >30ng/ml.
- https://www.mdpi.com/2072-6643/12/12/3799
    - 80% lower mortality with cholecalciferol booster therapy. Retrospective 986 hospitalized patients in the UK finding that cholecalciferol booster therapy, regardless of baseline serum levels, was associated with a reduced risk of mortality in acute COVID-19 inpatients.

        - risk of death, 79.8% lower, RR 0.20, $p < 0.001$, treatment 73, control 253, OR converted to RR, primary cohort.
    - https://vitamind4all.org/letter.html
        - Over 100 scientists and doctors call for efforts to increase vitamin D levels. Recommendations include reaching 75 nmol/L serum levels, 2000-4000IU daily supplementation (in the absence of testing), and measurement and treatment in hospitalized patients.
    - https://www.sciencedirect.com/science/article/pii/S1109966620302840
        - Vitamin D deficiency correlates with a reduced number of natural killer cells in intensive care unit (ICU) and non-ICU patients with COVID-19 pneumonia
        - Observational study of 29 ICU patients and 10 non-ICU patients showing vitamin D levels positively correlated with cytotoxic T cells, natural killer (NK) cells, NK-T cells, and regulatory T cells.
    - https://www.mdpi.com/2072-6643/12/12/3773/htm
        - Small prospective study of 30 ICU patients, showing higher mortality risk for low vitamin D levels. When divided into two groups at the median level, there was 5 of 15 deaths for the low vitamin D group compared to 0 of 15 in the high vitamin D group.
    - https://link.springer.com/article/10.1186/s12933-020-01184-4
        - Retrospective 439 diabetic hospitalized patients in Saudi Arabia showing lower mortality with vitamin D >12.5 nmol/L, adjusted hazard ratio aHR 0.14, $p = 0.007$.
        - risk of death, 85.7% lower, RR 0.14, $p = 0.007$, high D levels 111, low D levels 328, >12.5 nmol/L.
    - https://www.sciencedirect.com/science/article/pii/S0899900720303890
        - Retrospective database analysis showing patients with vitamin D deficiency were 4.6 times more likely to be COVID-19 positive, $p<0.001$.
        - risk of COVID-19 case, 78.4% lower, RR 0.22, $p < 0.001$, adjusted.
    - https://nutrition.bmj.com/content/4/1/149
        - Survey analysis of dietary supplements showing vitamin D usage associated with lower incidence of COVID-19. These results are for PCR+ cases only, they do not reflect potential benefits for reducing the severity of cases. A number of biases could affect the results, for example users of the app may not be representative of the general population, and people experiencing symptoms may be more likely to install and use the app.
        - risk of COVID-19 case, 7.5% lower, RR 0.92, $p < 0.001$, OR converted to RR, United Kingdom, all adjustment model.
    - https://academic.oup.com/ajcp/advance-article/doi/10.1093/ajcp/aqaa252/6000689
        - Retrospective 186 hospitalized patients in Belgium showing that 59% of patients were vitamin D deficient, and that non-vitamin D deficient patients had significantly lower mortality risk, RR 0.26, $p = 0.015$.
        - risk of death, 70.1% lower, RR 0.30, $p = 0.02$, high D levels 7 of 77 (9.1%), low D levels 20 of 109 (18.3%), adjusted, OR converted to RR, >20ng/mL.
    - https://www.nature.com/articles/s41598-020-77093-z

        - Prospective study of 91 asymptomatic and 63 ICU patients showing significantly higher vitamin D deficiency in the ICU patients (97% vs. 33%).
        - risk of death, 85.2% lower, RR 0.15, *p* = 0.001, high D levels 2 of 64 (3.1%), low D levels 19 of 90 (21.1%), >20ng/mL.
        - risk of ICU admission, 95.4% lower, RR 0.05, *p* < 0.001, high D levels 2 of 64 (3.1%), low D levels 61 of 90 (67.8%), >20ng/mL.
    - https://jamanetwork.com/journals/jama/fullarticle/2776738
        - Very late stage (mean 10 days from symptom onset, 90% on oxygen at baseline) vitamin D supplementation RCT not showing significant differences.
        - Ethnicity was poorly matched between arms, and diabetes was 41% in the treatment arm vs. 29% in the control arm. Baseline ventilation was 15% in the treatment arm vs. 12% control, this alone may account for the higher mortality. Calcifediol or calcitriol, which avoids several days delay in conversion, may be more successful, especially with this very late stage usage.
        - risk of death, 48.7% higher, RR 1.49, *p* = 0.43, treatment 9 of 119 (7.6%), control 6 of 118 (5.1%).
        - Risk of mechanical ventilation, 47.5% lower, RR 0.52, *p* = 0.09, treatment 9 of 119 (7.6%), control 17 of 118 (14.4%).
        - risk of ICU admission, 24.6% lower, RR 0.75, *p* = 0.30, treatment 19 of 119 (16.0%), control 25 of 118 (21.2%).
    - https://academic.oup.com/jn/article/151/1/98/5981721
        - Retrospective 335 patients in China compared to 560 matched controls showing significanlty lower risk of severe COVID-19 with vitamin D sufficiency (>=30 nmol/L) OR 0.37, *p* = 0.014.
        - risk of disease progression, 63.0% lower, RR 0.37, *p* = 0.01, high D levels 335, low D levels 560, >30nmol/L.
    - https://pmj.bmj.com/content/early/2020/11/12/postgradmedj-2020-139065.full
        - 53% reduction in PCR+ with high-dose cholecalciferol supplementation. RCT with 16 treatment patients and 24 control patients.
        - 25(OH)D levels at day 14 were 52 ng/ml vs. 15 ng/ml in the intervention and control group.
    - https://www.sciencedirect.com/science/article/pii/S0899900720303385
        - Retrospective 105 Parkinson's disease patients, 92 caregivers, and 127 hospital inpatients, showing higher, but not statistically significant mortality and hospitalization with treatment. Supplementation was defined as >=25,000IU/month for at least 3 months.
        - risk of death, 73.0% higher, RR 1.73, *p* = 0.14, treatment 7 of 18 (38.9%), control 40 of 152 (26.3%), OR converted to RR, >=25.
        - risk of hospitalization, 17.3% higher, RR 1.17, *p* = 0.68, treatment 7 of 27 (25.9%), control 36 of 170 (21.2%), OR converted to RR.
    - https://www.medrxiv.org/content/10.1101/2020.11.07.20227512v1
        - Small retrospective study of 135 patients not finding a significant difference in vitamin D status. Patients with good outcomes had a median of 45.0 nmol/L versus 37.7 nmol/L for bad outcomes, *p* = 0.85.

        - Authors found that vitamin D sufficient persons had accelerated elastic fiber degradation, they hypothesize pro-calcification effects during COVID-19 and that vitamin K might compensate for this.
        - Risk of combined intubation/death, 0.4% higher, RR 1.00, *p* = 1.00, high D levels 48 of 110 (43.6%), low D levels 10 of 23 (43.5%), >25nmol/L.
    - https://www.mdpi.com/2072-6643/12/11/3377
        - Retrospective study finding that regular bolus vitamin D supplementation was associated with less severe COVID-19 and better survival in frail elderly.
        - risk of death, 93.0% lower, RR 0.07, *p* = 0.02, treatment 2 of 29 (6.9%), control 10 of 32 (31.2%), adjusted, regular bolus supplementation.
    - https://europepmc.org/article/med/33187772
        - Prospective cohort study of 129 adult hospitalized COVID-19 patients finding patients with vitamin D levels >20ng/mL had increased mortality after adjustment. This study does not account for the risk of having a serious enough case to be hospitalized, and adjustments for factors correlated with vitamin D levels could obscure a potential association with vitamin D levels.
        - risk of death, 120.0% higher, RR 2.20, *p* = 0.04, high D levels 10 of 30 (33.3%), low D levels 24 of 99 (24.2%), OR converted to RR, >20ng/mL.
        - risk of ICU admission, 86.7% lower, RR 0.13, *p* = 0.59, high D levels 0 of 30 (0.0%), low D levels 5 of 99 (5.1%), relative risk is not 0 because of continuity correction due to zero events.
    - https://journals.lww.com/americantherapeutics/Abstract/2020/10000/Vitamin_D_Supplementation_in_COVID_19_Patients__A.8.aspx
        - Small case study of 4 vitamin D deficient patients with 2 patients treated with cholecalciferol 1000 IU daily and two patients treated with ergocalciferol 50,000 IU daily for 5 days (high dose), showing that patients receiving high dose therapy had improved clinical recovery, with shorter lengths of stay, lower oxygen requirements, and a reduction in inflammatory marker status.
    - https://www.mdpi.com/2072-6643/12/11/3361
        - Review of vitamin D and COVID-19 concluding that the evidence seems strong enough that people and physicians can use or recommend vitamin D supplements to prevent or treat COVID-19 in light of their safety and wide therapeutic window.
    - https://link.springer.com/article/10.1007%2Fs00394-020-02411-0
        - Retrospective 73 hospitalized patients showing the probability of death in patients with vitamin D deficiency (< 25ng/mL) was 34.6% compared with 6.4% in patients with sufficient vitamin D levels.
    - https://academic.oup.com/jcem/advance-article/doi/10.1210/clinem/dgaa733/5934827
        - Retrospective 216 COVID-19 patients and 197 population controls, showing vitamin D deficiency in 82.2% of COVID-19 cases and 47.2% of population-based controls (*P* < .0001).

        - risk of combined death/ICU/ventilation, 83.0% lower, RR 0.17, $p < 0.001$, high D levels 35, low D levels 162, >= 20ng/mL risk of hospitalization * risk of death/ICU/ventilation | hospitalization.
    - https://www.mdpi.com/2218-1989/11/9/565
        - Retrospective 120 hospitalized patients in Spain showing no significant differences for vitamin D deficiency.
        - risk of mechanical ventilation, 35.0% lower, RR 0.65, $p = 0.21$, high D levels 15 of 27 (55.6%), low D levels 18 of 78 (23.1%), adjusted, OR converted to RR, ≥20 ng/mL, bivariate logistic regression.
    - https://www.sciencedirect.com/science/article/pii/S2213398420302256
        - Review of vitamin D for COVID-19, concluding that the available evidence is very suggestive of protective and preventive effect of vitamin D.
        - Authors note that strict lockdown (longer time indoors and home quarantine) may increase the risk of developing vitamin D deficiency. They suggest it is the duty of governments to strengthen recommendations regarding nutritional supplementation (especially vitamin D and C), particularly under quarantine and lockdown times.
    - https://www.nutricionhospitalaria.org/articles/03193/show
        - Retrospective 80 hospitalized patients in Spain showing higher risk of severe COVID-19 with vitamin D deficiency.
    - https://www.aging-us.com/article/104117/text
        - Retrospective 2,102 rheumatology patients in Spain showing lower, but not statistically significant, cases with vitamin D supplementation. Details of vitamin D supplementation are not providied - other patients may have also independently taken vitamin D.
    - https://www.sciencedirect.com/science/article/pii/S096007602030296X
        - Vitamin D3 supplementation during or just before COVID-19 was associated with 68% lower mortality and less severe COVID-19 in frail elderly.
        - Risk of death, 89.0% lower, RR 0.11, $p = 0.002$, treatment 10 of 57 (17.5%), control 5 of 9 (55.6%), adjusted.
    - https://www.tandfonline.com/doi/full/10.1080/07315724.2020.1826005
        - Case control study in China comparing 62 patients with 80 healthy controls showing vitamin D deficiency is a risk factor for COVID-19, especially for severe/critical cases.
    - https://www.medrxiv.org/content/10.1101/2020.10.05.20206706v1
        - Analysis of vitamin D status and anti-SARS-Cov-2 antibodies in UK healthcare workers finding that Vitamin D deficiency is a risk factor for COVID-19 seroconversion.
        - risk of seropositive, 28.8% lower, RR 0.71, $p = 0.003$, high D levels 170 of 331 (51.4%), low D levels 44 of 61 (72.1%), >30nmol/L.
    - https://onlinelibrary.wiley.com/doi/10.1002/ppul.25106
        - Retrospective 40 hospitalized pediatric COVID-19 patients and 45 healthy controls showing significantly lower vitamin D levels for COVID-19 patients (13.1 vs. 34.8µg/L), and that, within the hospitalized patients, there was more

moderate and severe cases for patients with low vitamin D levels (non-statistically significant due to the small numbers).

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7533663/
  - Retrospective 149 COVID-19 patients, 69.1% with vitamin D deficiency, showing lower vitamin D levels associated with higher mortality.
- https://pubmed.ncbi.nlm.nih.gov/33295720/
  - Prospective study of 88 hospitalized PCR+ COVID-19 patients and 20 asymptomatic PCR- medical personnel, showing lower vitamin D levels correlated with COVID-19 and with the development of ARDS and MAS.
- https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239252
  - Analysis of 191,779 patients in the US finding COVID-19 positivity strongly and inversely associated with circulating 25(OH)D levels. The relationship persists across latitudes, races/ethnicities, gender, and age ranges.
  - Patients with high D levels (>55 ng/mL) compared to patients with very low D levels (<20 ng/mL) have a much lower risk of COVID-19 cases, with unadjusted RR 0.47, $p<0.001$.
- https://www.mdpi.com/2072-6643/12/9/2757/htm
  - Observational study 185 patients in Germany shows an association between vitamin D status and severity and mortality. Adjusted hazard ratio of vitamin D sufficiency for combined mechanical ventilation and death was HR 0.16, $p < 0.001$, and for death HR 0.068, $p < 0.001$.
  - risk of death, 93.2% lower, RR 0.07, $p = 0.001$, high D levels 144, low D levels 12, >30nmol/L.
- https://www.medrxiv.org/content/10.1101/2020.09.04.20188268v1
  - The link between vitamin D deficiency and Covid-19 in a large population
  - risk of COVID-19 case, 21.3% lower, RR 0.79, $p < 0.001$, high D levels 2,601 of 32,712 (8.0%), low D levels 5,011 of 39,485 (12.7%), adjusted, OR converted to RR, multivariable >75 nmol/L vs. <30 nmol/L.
- https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2770157
  - Retrospective 489 patients showing 44% lower risk for COVID-19 with vitamin D sufficiency, relative risk RR = 0.56, $p = 0.02$.
  - risk of COVID-19 case, 43.5% lower, RR 0.56, $p = 0.02$, high D levels 39 of 317 (12.3%), low D levels 32 of 172 (18.6%), adjusted, >20ng/mL.
- https://www.sciencedirect.com/science/article/pii/S0960076020302764
  - RCT on calcifediol (25-hydroxyvitamin D) treatment for hospitalized COVID-19 patients showing significantly reduced intensive care unit admissions.
  - risk of death, 85.4% lower, RR 0.15, $p = 0.11$, treatment 0 of 50 (0.0%), control 2 of 26 (7.7%), relative risk is not 0 because of continuity correction due to zero events.
  - Risk of ICU admission, 94.2% lower, RR 0.06, $p = 0.008$, treatment 50, control 26, OR converted to RR.
- https://www.sciencedirect.com/science/article/pii/S0168170220310558
  - Prospective study of 123 outpatients in Iran, showing mortality associated with significantly lower vitamin D levels

- https://pmj.bmj.com/content/early/2020/10/06/postgradmedj-2020-138712?rss=1
  - Prospective study of 105 hospitalized patients, showing lower vitamin D levels in the COVID-19 positive group (27.0 nmol/L vs 52.0 nmol/L, *p*=0.0008), and non-statistically significant higher mortality with vitamin D deficiency.
  - risk of death, 28.6% lower, RR 0.71, *p* = 0.50, high D levels 4 of 31 (12.9%), low D levels 6 of 39 (15.4%), adjusted, >30nmol/L.
- https://translational-medicine.biomedcentral.com/articles/10.1186/s12967-020-02488-5
  - Review of vitamin D for the prevention and treatment of COVID-19, focusing on preventing SARS-CoV-2 infection, acting as an immunosuppressant inhibiting cytokine release syndrome, and preventing loss of neural sensation by stimulating expression of neurotrophins like Nerve Growth Factor (NGF).
- http://www.jocms.org/index.php/jcms/article/view/822
  - Brief report noting that there was a dramatic and complete resolution of ICU admissions after adding routine vitamin D supplementation to standard of care.
- https://www.biomedres.info/biomedical-research/effects-of-ivermectinazithromycincholecalciferol-combined-therapy-on-covid19-infected-patients-a-proof-of-concept-study-14435.html
  - Small study with 28 patients treated with ivermectin + AZ + cholecalciferol and 7 control patients.
  - Recovery time, 70.0% lower, relative time 0.30, *p* < 0.001, treatment 28, control 7.
  - risk of viral+ at day 10, 97.2% lower, RR 0.03, *p* < 0.001, treatment 0 of 28 (0.0%), control 7 of 7 (100.0%), relative risk is not 0 because of continuity correction due to zero events.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7418699/
  - Nutrient study of 50 hospitalized COVID-19 patients in South Korea showing that 76% of patients were vitamin D deficient. Comparison with 150 matched controls showed a higher probability of cases with vitamin D deficiency.
- https://link.springer.com/article/10.1007/s40618-020-01370-x
  - Retrospective study 42 patients with acute respiratory failure, 81% with low vitamin D levels.
  - After 10 days, patients with severe vitamin D deficiency had a 50% probability of dying, while those with vitamin D ≥ 10 ng/mL had a 5% mortality risk, RR 0.1, *p* = 0.019.
- https://febs.onlinelibrary.wiley.com/doi/full/10.1111/febs.15495
  - Analysis of 7,807 patients finding that low vitamin D levels are correlated with increased risk of cases and hospitalization. Adjusted odds ratio OR for sufficient vitamin D level for cases 0.69, *p* < 0.001, and for hospitalization 0.51, *p* = 0.061.
  - risk of hospitalization, 46.4% lower, RR 0.54, *p* = 0.06, high D levels 79, low D levels 703, OR converted to RR, >30ng/mL.
  - risk of COVID-19 case, 28.4% lower, RR 0.72, *p* < 0.001, high D levels 1,139, low D levels 6,668, OR converted to RR, >30ng/mL.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7376335/

        - Analysis of COVID-19 mortality rate and sunlight exposure finding a correlation that suggests a protective effect of sunlight exposure.
        - In continental metropolitan France, average annual sunlight hours were found to be significantly correlated to the COVID-19 mortality rate, with a Pearson coefficient of -0.636.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7369577/
        - Retrospective 152 mechanically ventilated patients in the USA showing unadjusted lower mortality with vitamin C, vitamin D, HCQ, and zinc treatment, statistically significant only for vitamin C.
        - risk of death, 19.0% lower, RR 0.81, *p* = 0.42, treatment 8 of 16 (50.0%), control 84 of 136 (61.8%).
    - https://www.medrxiv.org/content/10.1101/2020.07.14.20152728v1
        - Vitamin D supplementation to prevent acute respiratory infections: systematic review and meta-analysis of aggregate data from randomised controlled trials
    - https://pjmhsonline.com/2020/apr-june/462.pdf
        - Prospective study of 168 patients in Pakistan reporting an association between vitamin D deficiency and symptomatic cases. Details of the association are not provided.
    - http://imj.ie/vitamin-d-deficiency-and-ards-after-sars-cov-2-infection
        - Analysis of 33 hospitalized COVID-19 patients with respiratory failure requiring FiO_2 greater than 0.4.
        - risk of mechanical ventilation, 69.0% lower, RR 0.31, *p* = 0.03, high D levels 4 of 21 (19.0%), low D levels 8 of 12 (66.7%), adjusted, >30nmol/L.
    - https://www.medrxiv.org/content/10.1101/2020.06.21.20136903v2
        - Retrospective analysis 134 hospitalized patients. 19% of ICU patients had 25(OH)D levels > 50 nmol/L vs. 39.1% of non-ICU patients, *p*=0.02
        - risk of ICU admission, 52.0% lower, RR 0.48, *p* = 0.02, high D levels 8 of 44 (18.2%), low D levels 34 of 90 (37.8%), >50nmol/L.
    - https://www.medrxiv.org/content/10.1101/2020.06.25.20137323v2
        - Retrospective 689 patients showing vitamin D deficiency associated with hospitalization and disease severity.
        - risk of death, 7.0% lower, RR 0.93, *p* = 0.89, high D levels 21 of 600 (3.5%), low D levels 5 of 89 (5.6%), OR converted to RR.
        - risk of ICU admission, 55.3% lower, RR 0.45, *p* = 0.008, high D levels 47 of 600 (7.8%), low D levels 18 of 89 (20.2%), OR converted to RR.
    - https://www.ajicjournal.org/article/S0196-6553(20)30574-5/fulltext
        - Analysis of 88 countries, showing a significant correlation between death rates and latitude, suggesting that sunlight exposure and vitamin D levels influence mortality.
    - https://preprints.scielo.org/index.php/scielo/preprint/view/839
        - Systematic review showing deficiencies of vitamins A and D negatively affecting the prognosis of respiratory tract infections.
    - https://www.biorxiv.org/content/10.1101/2020.06.21.162396v1

        - *In Vitro* study showing that the active form of Vitamin D, calcitriol, exhibits significant potent activity against SARS-CoV-2.
    - https://academic.oup.com/jpubhealth/article/42/3/451/5859581
        - UK Biobank retrospective not finding a significant association between vitamin D levels and the risk of PCR+ after adjustment. Since adjustment factors may be correlated with vitamin D deficiency, the extent of any causal contribution of both vitamin D and the adjustment factors is unclear.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7664496/
        - Analysis of COVID-19 mortality and latitude as of May 18, 2020, showing that latitude was significantly associated with mortality (p=0.031), with an estimated 4.4% [0.4%-8.5%] increase in mortality for each 1° further north.
    - https://www.medrxiv.org/content/10.1101/2020.05.01.20087965v3
        - Causal inference analysis of COVID-19 severity and latitude concluding that vitamin D status plays a key role in COVID-19 outcome.
        - Our analysis confirmed a striking correlation between COVID-19 severity and latitude, and ruled out the temporal spread of infection as an explanation. We compared observed severity for 239 locations with our contrasting model. In the causal model, 16 predictions matched observed data and 3 predictions were untestable; in the acausal model, 14 predictions strongly contradicted observed data, 2 appeared to contradict data, and 3 were untestable.
    - https://www.sciencedirect.com/science/article/pii/S0899900720303002
        - Observational study of 43 patients >= 50 years old, with 17 patients receiving vitamin D, magnesium, and vitamin B12 (DMB); and 26 control patients, showing a significantly lower need for oxygen therapy and ICU admission with treatment.
        - risk of oxygen therapy, 80.5% lower, RR 0.20, p = 0.04, treatment 3 of 17 (17.6%), control 16 of 26 (61.5%), adjusted.
    - https://academic.oup.com/jtm/article/27/5/taaa069/5836963?login=true
        - Retrospective 14,520 patients in Israel, 1,317 testing positive, showing no significant difference in vitamin D levels (23.6ng/mL and 24.1ng/mL for positive and negative cases respectively).
    - https://www.mdpi.com/2072-6643/12/5/1359
        - 25-hydroxyvitamin D concentrations are lower in patients with positive PCR for SARS-CoV-2
        - Retrospective 107 patients in Switzerland showing lower vitamin D levels (11.1 ng/mL) in PCR positive patients compared with negative patients (24.6 ng/mL), p = 0.004.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7189189/
        - Does vitamin D status impact mortality from SARS-CoV-2 infection?
        - Analysis of case fatality rates showing that the CFR was significantly greater for Northern states (>40° latitude) compared to Southern States (6.0% vs. 3.5%, p < 0 .001), although there were some exceptions with individual states.
    - https://www.medrxiv.org/content/10.1101/2020.04.24.20075838v1

        - Analysis of 20 hospitalized COVID-19 patients, 13 requiring ICU admission. 84.6% of the ICU patients had low vitamin D levels versus 57.1% of the non-ICU patients.
        - risk of ICU admission, 45.0% lower, RR 0.55, *p* = 0.29, high D levels 2 of 5 (40.0%), low D levels 11 of 15 (73.3%), >30ng/mL.
    - https://www.mdpi.com/2072-6643/12/4/988/htm
        - Review of the evidence that vitamin D supplementation could reduce COVID-19 risk.
    - https://www.sciencedirect.com/science/article/abs/pii/S0960076018306228
        - Daily oral dosing of vitamin D3 using 5000 TO 50,000 international units a day in long-term hospitalized patients: Insights from a seven year experience
        - Report on the long-term use of vitamin D in hospitalized patients with daily dosing from 5,000 to 50,000IU over 7 years. There were no cases of hypercalcemia or any adverse events related to vitamin D supplementation. Authors conclude that long-term supplementation with vitamin D3 in doses ranging from 5,000 to 50,000 IUs/day appears to be safe.
    - https://www.bmj.com/content/356/bmj.i6583
        - Meta analysis of 25 RCTs showing 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.
    - https://jamanetwork.com/journals/jamasurgery/fullarticle/1782085
        - Retrospective 770 gastric bypass surgery patients showing a strong relationship between pre-operative vitamin D levels and the risk of hospital acquired infections.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3686844/
        - Meta analysis of 11 placebo-controlled studies of 5660 patients. Vitamin D showed a protective effect against RTI (Respiratory Tract Infections) (OR 0.64 [0.49-0.84])
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4018438/pdf/nihms541186.pdf
        - Review showing vitamin D deficiency is common worldwide in all age groups.
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3755751/
        - Study of 634 healthy volunteers showing 64% had 25(OH)D ≤ 30 ng/mL. Gender, ethnicity, and multivitamin use were significantly associated with 25(OH)D levels.
    - https://academic.oup.com/ajcn/article/91/5/1255/4597253
        - RCT for vitamin D supplementation and seasonal influenza A in schoolchildren, showing 10.8% incidence in children in the vitamin D3 group compared with 18.6% in the placebo group, relative risk RR 0.58 [0.34-0.99], *p* = 0.04
        - A 42% reduction
    - https://www.sciencedirect.com/science/article/abs/pii/S0960076018300037
        - Epigenome-wide chromatin accessibility study before and after vitamin D supplementation (calcitriol), showing significant changes at hundreds of sites within the epigenome of human leukocytes (part of the immune system).

- https://pubmed.ncbi.nlm.nih.gov/16959053/
    - Review article on the mechanisms of action and seasonality of vitamin D levels, concluding that varying vitamin D levels may be the reason for the seasonality of epidemic influenza.
- https://c19vitamind.com/
- https://vdmeta.com/

Zinc

- https://www.mdpi.com/2072-6643/13/10/3304
  - risk of death, 79.0% lower, RR 0.21, $p = 0.01$, high zinc levels 3 of 49 (6.1%), low zinc levels 7 of 24 (29.2%).
- https://www.sciencedirect.com/science/article/pii/S120197122100686X
  - Prospective analysis of 114 ICU patients and 112 matched non-ICU patients in Iran, showing mortality associated with lower zinc levels. There was no significant difference in zinc levels between ICU and non-ICU patients.
- https://www.medrxiv.org/content/10.1101/2021.08.10.21261855v1
  - Retrospective 2017 hospitalized patients in India, showing lower mortality with zinc treatment.
  - risk of death, 65.1% lower, RR 0.35, $p < 0.001$, treatment 486, control 1,201, adjusted, OR converted to RR, model 4, multivariate logistic regression, control prevalence approximated with overall prevalence.
- https://elifesciences.org/articles/68165
  - Case control study examining medication usage with a healthcare database in Israel, showing lower risk of hospitalization with calcium + zinc supplements (defined as being picked up within 35 days prior to PCR+), however only 10 patients took the supplements. Other patients may have acquired supplements outside of the healthcare system.
  - risk of hospitalization, >99.9% lower, RR <0.001, $p = 0.04$, treatment 0 of 10 (0.0%), control 6,953 of 20,849 (33.3%), OR converted to RR, relative risk is not 0 because of continuity correction due to zero events, PCR+, cohort 2.
- https://pubs.rsc.org/en/content/articlelanding/2021/cc/d1cc03563k/unauth
  - *In Silico* and *In Vitro* study showing that ionic zinc inhibits SARS-CoV-2 main protease (M^{pro}) and inhibits viral replication.
  - Zinc acetate inhibited viral replication in Vero E6 cells, while zinc glycinate and zinc gluconate did not at non-toxic concentrations. The combination of zinc acetate with zinc ionophore quercetin significantly improved inhibition at low concentrations.
- https://www.medrxiv.org/content/10.1101/2021.06.09.21258271v2
  - Prospective study of 139 hospitalized COVID-19 patients, showing 96% had zinc deficiency. Higher zinc levels were associated with a shorter length of hospitalization. Mortality and ventilation was lower with higher zinc levels, but not reaching statistical significance.
- https://ccforum.biomedcentral.com/articles/10.1186/s13054-021-03785-1
  - Retrospective 266 ICU patients showing lower mortality with zinc treatment (very close to statistical significance), and higher odds of acute kidney injury. NRC21R/287/07.

        - risk of death, 36.0% lower, RR 0.64, *p* = 0.11, treatment 23 of 82 (28.0%), control 32 of 82 (39.0%), adjusted, in-hospital, PSM, multivariable Cox proportional hazards.
        - risk of death, 48.0% lower, RR 0.52, *p* = 0.03, treatment 19 of 82 (23.2%), control 31 of 82 (37.8%), adjusted, 30 day, PSM, multivariable Cox proportional hazards.
    - https://www.clinicalnutritionjournal.com/article/S0261-5614(21)00234-X/fulltext
        - Analysis of 240 consecutive patients in France, showing significantly higher zinc deficiency in COVID-19 patients, and significantly greater risk of hospitalization for COVID-19 patients with zinc deficiency. 2020PI087.
        - risk of hospitalization, 89.2% lower, RR 0.11, *p* = 0.002, high zinc levels 6 of 110 (5.5%), low zinc levels 7 of 42 (16.7%), OR converted to RR, within COVID-19 patients.
        - risk of COVID-19 case, 27.6% lower, RR 0.72, *p* = 0.003, high zinc levels 110 of 188 (58.5%), low zinc levels 42 of 52 (80.8%).
    - https://www.mdpi.com/2218-1989/11/4/244
        - Analysis of serum metal levels in 150 COVID-19 patients and 44 controls, finding that COVID-19 severity was associated with lower serum Ca, Fe, Se, Zn levels when compared to controls.
    - https://bmjopen.bmj.com/content/11/4/e042042.info
        - Retrospective database analysis of 3,219 hospitalized patients in the USA. Very different results in the time period analysis (Table S2), and results significantly different to other studies for the same medications (e.g., heparin OR 3.06 [2.44-3.83]) suggest significant confounding by indication and confounding by time.
        - risk of death, 45.6% lower, RR 0.54, *p* < 0.001, treatment 256 of 1,596 (16.0%), control 260 of 1,623 (16.0%), adjusted, OR converted to RR, logistic regression.
    - https://www.sciencedirect.com/science/article/pii/S1684118221000268
        - Retrospective 275 patients showing zinc levels significantly lower in patients with poor outcomes, 840 vs. 970 µg/L, *p*< 0.0001.
    - https://link.springer.com/article/10.1007/s12011-020-02546-5
        - 134 COVID-19 patients, 49 treated with zinc, showing faster recovery of olfactory function in patients treated with zinc (median 7 vs. 18 days). There was no difference in overall recovery time. There were 4 deaths but authors do not indicate zinc treatment status. There was no significant difference in zinc levels based on severity. SVU-MED-MBC004-2020-04.
    - https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0008895
        - Literature review concluding that zinc should be included as part of preventative supplementation for COVID-19, in general for support of immune health, and should also be considered in the context of zinc deficiency acquired during a viral infection and host immune response.
        - Zinc is the second most abundant essential trace element in the human body with critical roles in immune health and response to infectious diseases.
        - Zinc deficiency is common even in the developed world and risks for deficiency can compound.

        - Overlap between symptoms in different conditions, for example, a nutritional deficiency versus Coronavirus Disease 2019 (COVID-19), can be used to suggest clinical tests, diagnosis, and triage interventions.
        - Zinc provides a safe and cheap alternative to enhance immunity worldwide, both to correct chronic nutritional deficiencies and to address acute deficiencies resulting from a viral infection and host immune response.
    - https://aspenjournals.onlinelibrary.wiley.com/doi/full/10.1002/ncp.10612
        - Retrospective 169 ICU patients in Brazil, 214 with low zinc levels, showing an association between low zinc levels and severe ARDS.
        - risk of COVID-19 severe case, 82.3% lower, RR 0.18, $p < 0.001$, high zinc levels 7 of 55 (12.7%), low zinc levels 145 of 214 (67.8%), adjusted, OR converted to RR, ≥70 µg/dL, logistic regression.
    - https://www.mdpi.com/2218-1989/11/9/565
        - Retrospective 120 hospitalized patients in Spain showing zinc deficiency associated with higher ICU admission.
        - risk of mechanical ventilation, 49.3% lower, RR 0.51, $p = 0.06$, high zinc levels 7 of 31 (22.6%), low zinc levels 49 of 89 (55.1%), adjusted, OR converted to RR, ≥84 mcg/dL, multivariate logistic regression.
        - risk of ICU admission, 52.0% lower, RR 0.48, $p = 0.02$, high zinc levels 9 of 31 (29.0%), low zinc levels 55 of 89 (61.8%), adjusted, OR converted to RR, ≥84 mcg/dL, multivariate logistic regression, final model.
    - https://www.sciencedirect.com/science/article/pii/S2213231720309691
        - Analysis of 35 COVID-19 patients showing a significant correlation for serum zinc levels between COVID-19 patients and controls, and between COVID-19 survivors and non-survivors.
    - https://www.mdpi.com/2072-6643/13/2/562/htm
        - Retrospective 249 PCR+ hospitalized patients in Spain, 58 with zinc levels on admission <50 µg/dL, showing higher mortality and ICU admission, and slower recovery with low zinc levels.
    - https://www.ijidonline.com/article/S1201-9712(20)30730-X/fulltext
        - Prospective study of zinc levels in 47 hospitalized COVID-19 patients and 45 healthy controls. COVID-19 patients had significantly lower zinc levels (74.5 vs. 105.8 median µg/dl, $p < 0.001$). 57.4% of COVID-19 patients were zinc deficient, and they had higher rates of complications, ARDS, prolonged hospital stay, and increased mortality.
        - risk of death, 89.7% lower, RR 0.10, $p = 0.06$, high zinc levels 0 of 20 (0.0%), low zinc levels 5 of 27 (18.5%), relative risk is not 0 because of continuity correction due to zero events.
        - risk of ICU admission, 92.4% lower, RR 0.08, $p = 0.02$, high zinc levels 0 of 20 (0.0%), low zinc levels 7 of 27 (25.9%), relative risk is not 0 because of continuity correction due to zero events.
    - https://www.ijidonline.com/article/S1201-9712(20)30723-2/fulltext
        - Retrospective 62 hospitalized patients, 29 with serum zinc data, showing significantly lower serum zinc levels for severe COVID-19 cases (intubation)

compared with mild and moderate cases, $p = 0.005$. Authors recommend zinc supplementation.

- https://journal.chestnet.org/article/S0012-3692(20)31961-9/fulltext
  - Retrospective 242 hospitalized patients in the USA showing adjusted hazard ratio for zinc treatment, aHR 0.66 [0.41-1.07]. [1] notes that the study would be more informative if baseline serum zinc levels were known.
  - risk of death, 34.0% lower, RR 0.66, $p = 0.09$, treatment 73 of 196 (37.2%), control 21 of 46 (45.7%), adjusted, multivariate Cox regression.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7369577/
  - Retrospective 152 mechanically ventilated patients in the USA showing unadjusted lower mortality with vitamin C, vitamin D, HCQ, and zinc treatment, statistically significant only for vitamin C.
  - risk of death, 17.6% lower, RR 0.82, $p = 0.18$, treatment 31 of 58 (53.4%), control 61 of 94 (64.9%).
- https://www.sciencedirect.com/science/article/pii/S1201971220304410
  - Case report on 4 patients treated with high dose zinc. All patients experienced significant improvement after one day.
- https://c19zinc.com/

Fluvoxamine:

- Fluvoxamine helps in covid treatment: https://pubmed.ncbi.nlm.nih.gov/33180097/
- Covid leads to long term inflammation, useful for long haul Covid19 treatment: https://pubmed.ncbi.nlm.nih.gov/33391730/
- Fluvoxamine has anti-inflammatory properties that can help treat covid: https://www.frontiersin.org/articles/10.3389/fphar.2021.652688/full
- Fluvoxamine targets sigma-1 to stop covid replication: https://pubmed.ncbi.nlm.nih.gov/33403480/

OPINION

ANON REDDIT USER:

- Criminals are innocent until proven guilty, but medical drugs are not like criminals, medical drugs are guilty until proven innocent. Pharmaceutical companies must prove the innocence of their medications through long term testing. Doctors, bureaucrats, and the public seem to have forgotten this fact when they mandate a new technology to be injected into us without long term testing to prove the innocence of the drug. The vaccine may have completely unknown and serious side effects that manifest in a majority of the people only in the long term. So, the vax may appear to be safe in the short term, but in the long run it causes severe harm or even death. It is extremely risky to inoculate the entire population if we don't know what the long term effects may be. It is especially risky to vax our critical workers with an experimental drug about which we know nothing in the long term. If it turns out that within 2 years of taking it, the vaccine causes the debilitation of a large portion of the people who took it and we had forced all our healthcare professionals to take it, then our countries will lose a large portion of their healthcare professionals. This would devastate our society's ability to treat the sick and cause massive death and suffering. Same goes for the military. If we vax all our fighters, and the vax turns out to weaken greatly physically or mentally most of the people who took it, there goes our ability to defend ourselves. We won't be able to fight off any aggressors and will lose years of military experience as we will have to re-train a whole new set of recruits without the previous military leaders. If most of the laborers are vaxxed and the vax causes bodily weakness, then they won't be able to go to work and our production falls to zero. Without domestic production, we would have to rely on foreign imports but the economy would also grind to a halt so the nation would have no money to pay for these imports. This would probably be a death stroke for whatever nation was victim to it. So, force vaccinating critical workers, or even a large portion of the menial labor force, is a massive national security risk. We also have no way of calculating how large the percentage of risk is since we know nothing at all about the long term effects of inoculation with this type of technology. This could destroy any highly vaxxed nations. This outcome would be so bad (total collapse of a society's infrastructure) that only a massive amount of safety data could justify inoculating the entire population with any treatment. But we just don't have that safety data for these experimental drugs right now and will probably not have it for decades to come. By then, it will be too late to do anything about it. You can fry an egg, but you can't unfry it. Just the same, you won't be able to unvax the population, there's no way to get the vax out of the body once it's in. The solution is to only vax the old and vulnerable at-risk populations and not vax everyone. This issue worries me deeply since there must be risk responsive people at high levels of government who must understand and be sensitive to this type of national security risk. Yet, these people are either being completely ignored, or they are allowing the government to proceed with the risky mass vaccination programs anyway.
- Separately, these issues would be a concern. But put together, they are incredibly alarming. To me, something feels very wrong here. You too may have already felt it in your gut or in the back of your mind or when reading this. That feeling that something is wrong is instinct, it is the product of millions of years of evolution. A gift from our ancestors who also saw something that was wrong in their environment and had this weird bad feeling. They acted on it and it saved

them. So they were able to pass on that instinct to their off-spring from generation to generation. Now, after millions of years, it finds its way to you. If you feel what I feel, that something is very wrong here, I implore you:

- *Do not ignore it.*

Reluctant Analyst Anon

- We can end the pandemic now. I did my part and compiled the data. Now its time for you to do yours and spread the info.
- Good luck.