Please note that this is in-progress. I will be adding additional questions and information on an on-going basis.

This post addresses issues specifically concerning the omicron variant. For information about Covid-19 which pertains to the delta variant, click here. You can access general Covid information here.

https://redemptivehistorytheology.com/covid-19-the-delta-variant/

https://redemptivehistorytheology.com/blog/covid-19-information/

1. How Was the US Managing Covid-19 Until Recently?

2. Does the omicron variant have different symptoms from previous SARS-CoV-2 variants? Are vaccinated people who get infected contagious?

3. How does a virus variant arise?

4. When and where did the omicron variant originate?

5. How fast has the omicron variant spread in the US? What percentage of cases occurring now are caused by that variant?

6. What is an R\textsubscript{0} number in disease transmission? How has it changed from other SARS-CoV-2 variants? Why are vaccinated people getting breakthrough infections? Does that mean natural immunity is better?

7. Is the omicron variant less dangerous than the others we have seen?

8. With other variants, older people and those in poor health were most likely to have a severe case or die. Is that still true with the omicron variant?

9. What pre-exposure options are available for people who don’t develop an immune response to vaccines, like transplant patients or individuals with some blood cancers?

10. I have been exposed to SARS-CoV-2 or tested positive in the last 5–10 days. Is there a safe and effective treatment available? How can I access it?

11. Can people who were previously infected get Covid again? How does natural immunity compare to the immunity from vaccines?

...13. Why do the vaccines decrease the risk of hospitalization or death? How effective are they?

14. How risky is post-vaccination myocarditis for younger people? How does the risk of other vaccine side effects compare to the symptoms of Covid?
15. Are mRNA vaccines safe for pregnant women and their babies?
16. What about the risk of infertility?

17. How can I discuss this with people I love who are vaccine-hesitant?
18. What sources can I trust?

Coming soon:

12. How long does the protection from an mRNA vaccine last? Why are booster shots being recommended, and who should get one? If I got the Johnson & Johnson vaccine, should I get an mRNA booster?

About me: I have a masters’ degree in Infectious Disease Epidemiology from UCLA, a bachelors’ degree from Wheaton College in biology with a certificate in International Community Development, and a masters’ in Greek and Hebrew Exegesis from Gordon-Conwell Theological Seminary. Usually, I am writing and posting bible studies on the Redemptive History Facebook page, but these are not normal times. I have been writing about Covid since March 2020.

I began my career by editing a medical monograph and writing an accompanying peer-reviewed journal article during my graduate studies at UCLA (MPH, Tropical and Infectious Disease Epidemiology). My first publication concerned the excess risk of severe illness or death from a bacterium in raw milk in California. It was featured on the front page of the Los Angeles Times and was debated in the state legislature. After graduation, I conducted records-based research concerning the efficacy of a poly-pharmacy reduction program for nursing home residents. We focused upon the frequency and severity of adverse drug reactions, and whether our patients could stop taking their medications without needing to resume using them. Textbooks still cite it today.

Paul Terrill MD, FAAFP has been an invaluable collaborator in assessing and compiling many of these resources.

Due to the sudden onset and severity of the pandemic, many journals are pre-empting their normal four-week to six-month process of peer reviewing articles before releasing them for publication. When you look at any research involving Covid-19, it is important to note the status of the article: pre-print or accepted for publication after peer review. Check the comments under pre-print articles. Several major studies were retracted after the peer-review process detected significant issues.

Does Peer Review Still Matter in the Era of COVID-19? — Milton Packer describes the impossible task of vetting medical research

Lancet, NEJM retract studies on hydroxychloroquine for COVID-19
1. How Was the US Managing Covid-19 Until Recently?

During August and September 2021, the Southeast US and Texas experienced a large wave of infections, hospitalizations, and deaths due to the delta variant. That has now shifted to the West and North, from Arizona to Montana and over to New England.

In general, we are not in a good position to be encountering a highly transmissible new variant. A darker shade in this graphic represents the amount of change in the past seven days, not how many new cases there are.

Please note that Florida updates their data on Saturdays, and the algorithm Johns Hopkins University uses does not account for that. As the week progresses, the state looks better. For December 17–23, Covid cases among the state’s permanent residents increased by 323%:

The number of excess deaths in the US from all causes lags behind the spread of the delta variant by several weeks:
Covid-19: The Omicron Variant

DT Plichta, MPH

JHU: Track Covid-19 Trends Across the US, See Where Cases and Rising and Falling

Florida Covid Statistics: What is Really Happening?

CDC: Excess Deaths Associated with COVID-19

2. Does the omicron variant have different symptoms from previous SARS-CoV-2 variants? Are vaccinated people who get infected contagious?

People infected with the omicron variant are less likely to experience cough or the loss of smell. So far, the symptoms are primarily extreme fatigue, achiness, headache, and a scratchy throat instead of a sore throat. Many children infected with omicron are experiencing skin rashes. Some people remained asymptomatic.

However, this variant initially was identified in young adults, a population less likely to experience severe illness. With other variants, hospitalizations and deaths occurred approximately three weeks after diagnosis.

To see a full listing of Covid-19 symptoms, click here:

https://redemptivehistorytheology.com/blog/covid-19-information/#firstquestion

*Symptoms which require immediate emergency medical care* include difficulty breathing, continuous pressure or pain in the chest, an inability to awaken or to stay awake, a new onset of confusion, or a blue tinge in the face or lips.

Investing in a pulse oximeter to track your blood oxygen level is a great idea. They cost about $20. A normal oxygen saturation level runs between 95–100%. People with Covid-19 can experience a drop in that percentage without realizing it has happened. If it does occur, seek medical attention immediately.
Two of the first announced cases world-wide occurred in fully vaccinated people staying in a quarantine hotel in Hong Kong, with one person getting sick a week before the other. Both had large numbers of viral particles in their nasal swabs. They were in rooms across from each other. Over one-fourth of environmental samples taken in their rooms and the corridor tested positive for the omicron variant. While both patients were sent to the hospital, it is unclear whether that was standard protocol, or they had severe illness. While we do not yet have a definitive answer about vaccinated people transmitting the disease, the high viral load does point in that direction.

CDC: Science Brief: Omicron (B.1.1.529) Variant

The Hill: Doctor Who Discovered Omicron Explains the Symptoms to Watch Out For

The Hill: Experts Say You Should Watch for an Unusual Omicron Symptom in Kids

MN Dept Health: Oxygen Levels, Pulse Oximeters, and COVID-19 How does COVID-19 affect a person’s oxygen levels?

Hong Kong Government: Analysis of Imported Cases

3. How does a virus variant arise?

Random mutations occur due to errors in the viral replication process. While coronaviruses have an enzyme which corrects most of those mistakes, some do still slip through to create a new variant. Only those mutations which confer an advantage to viral replication, transmission, or survival of immune systems expand in a host population. Since mutations are random, vaccine developers cannot predict in advance what a virus will look like in the future.

JAMA: Genetic Variants of SARS-CoV-2—What Do They Mean?

4. When and where did the omicron variant originate?

Originally called B.1.529, the omicron variant was initially identified in South Africa on November 24, 2021, from a sample taken almost two weeks earlier. It appears to have arrived in the US that month. Mayo Clinic maintains a list of the variants of greatest concern world-wide.

CDC: About Variants of the Virus that Causes COVID-19

Mayo: COVID-19 Variants: What’s the Concern?

5. How fast has the omicron variant spread in South Africa and in the US?

During the week of November 15–22, South Africa experienced an astounding 740% increase in Covid-19 cases (3,500 to over 29,000). During November 29–December 6, there were 109,000 new cases diagnosed, an increase of 75% over the prior week.
The first omicron case in the US was identified on December 1st. By December 3rd, it was identified in ten states. At least one of the patients had not traveled to South Africa, indicating it was already spreading in that community.

The CDC’s interactive dashboard shows the proportion of each variant over time for the entire US and for each region. It is currently updated every week, with the last update on January 8th showing 98% of samples consisted of the omicron variant.

That is only five weeks since omicron was first detected in the US. The delta variant had spread for sixteen weeks before it accounted for 98% of Covid cases (April 24th–August 14th):

Regional differences range from 90% in Region 7 to 99% in Regions, 2, 4, and 6. Data for individual states is lagging significantly:
You can see what was happening in any county in the US yesterday compared to eight days ago. One caveat: Florida officially reports cases and deaths only on Saturdays.

Miami-Dade County was one of the first places in the state to detect the omicron variant. On December 16th, 80% of samples sequenced there were the omicron variant. Only two weeks before that, 99% had been the delta variant. Look at what has happened there in the seven days before January 4th:

- 100,000 cases despite 85% of the eligible population being fully vaccinated. Two weeks before, there were about 11,500 cases. This is an increase of 870%.
- Almost 3.7% of the population tested positive during that week
- A 35% positivity rate, meaning the actual number of cases is likely 7 times higher. This is 10% greater than the positivity rate from last week
- 124% more hospitalizations than a week ago, when the rate had risen by 134%.
- Eighteen people died, 31% fewer than a week ago.
Covid-19: The Omicron Variant

Miami-Dade County, Florida

State Health Department [ ]

7-day Metrics | 7-day Percent Change

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Transmission</td>
<td>High</td>
</tr>
<tr>
<td>Everyone in Miami-Dade County, Florida should wear a mask in public, indoor settings. Mask requirements might vary from place to place. Make sure you follow local laws, rules, regulations or guidance. How is community transmission calculated?</td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>99,926</td>
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<tr>
<td>Case Rate per 100k</td>
<td>3,677.89</td>
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<tr>
<td>% Positivity</td>
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<tr>
<td>Deaths</td>
<td>18</td>
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<tr>
<td>% of population ≥ 5 years of age fully vaccinated</td>
<td>85.6%</td>
</tr>
<tr>
<td>New Hospital Admissions</td>
<td>2,159</td>
</tr>
</tbody>
</table>

January 4, 2022

Miami-Dade County, Florida

State Health Department [ ]

7-day Metrics | 7-day Percent Change

<table>
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<td></td>
</tr>
<tr>
<td>Cases</td>
<td>90.57%</td>
</tr>
<tr>
<td>% Positivity</td>
<td>9.83%</td>
</tr>
<tr>
<td>Deaths</td>
<td>-30.77%</td>
</tr>
<tr>
<td>% of population ≥ 5 years of age fully vaccinated</td>
<td>N/A</td>
</tr>
<tr>
<td>New Hospital Admissions</td>
<td>124.2%</td>
</tr>
</tbody>
</table>

January 4, 2022
During December 4th–24th weekly case numbers in Miami-Dade County rose by 3,552%:

WHO: Country Data South Africa
CDC: Science Brief Omicron (B.1.1.529) Variant
CDC: Variant Proportions
Covid-19: The Delta Variant
CDC: Integrated County View, Miami-Dade FL
ABC News: Omicron Makes Up 80% of Cases in Miami-Dade
Salemi USF: COVID-19 in Florida

6. What is an R₀ number in disease transmission? How has it changed from other SARS-CoV-2 variants? Why are vaccinated people getting breakthrough infections? Does that mean natural immunity is better?

An R₀ (“R naught”) represents the basic reproduction rate of a pathogen: how many people become infected when exposed to a single case. When an R₀ is larger than 1.0, an outbreak is increasing; when it is less than 1.0, an epidemic is waning. Human behavior and the properties of an infectious agent both impact disease transmission, so some variability does exist.
Researchers use the $R_0$ to estimate the proportion of a population that must no longer be susceptible to infection to reach herd immunity. That can typically be achieved by a combination of surviving natural infection and immunization. Diseases with a higher $R_0$ require more people with immunity for transmission to stop.

Omicron spreads four times as easily as the original SARS-CoV-2 virus. The first strain of the virus which came from China had an $R_0$ of 2.5; in the UK, the delta variant is almost three times more transmissible with an $R_0$ of approximately 7, and the $R_0$ of omicron is 10.

Initial research of human bronchial tissue indicates the omicron variant replicates 70 times faster than the delta variant, making it likely that the $R_0$ will be significantly higher for the omicron variant. On a positive note, virus inside lung tissue replicates much more slowly, which should result in less severe disease.

A technical briefing from the UK indicates that household contacts of a person infected with the omicron variant become infected 20% of the time. That is double the rate from the delta variant. Researchers estimate that omicron has an $R_0$ of 10.

Chickenpox has an $R_0$ of 9–10, which means that the average person with that virus infects 9 or 10 people. As a result, 89–90% of the population surrounding an infected individual must be immune to prevent spreading that disease.

For those of us too old to have received the vaccine to prevent chickenpox, how many of us escaped infection? That is why many experts are warning that anyone unvaccinated against Covid-19 in the US will almost certainly contract the infection. Please do not make the mistake of equating transmissibility with severity. Covid-19 is far more dangerous than chickenpox.

For other variants, two weeks after vaccination, the antibody level of saliva from people vaccinated with either mRNA vaccine is comparable to that of people who have recovered from Covid.

That does not include the one-third of people who tested positive for SARS-CoV-2 and were sick who showed no antibody response three weeks after they felt better. Some of them were severely ill. This happened most often in younger adults.

After several months, a comparison of antibody levels in Moderna and Pfizer recipients revealed over twice the number of antibodies produced by the Moderna vaccine. This is likely due to the increased amount of mRNA in Moderna and the longer interval between doses.

The omicron variant has about 30 mutations in its spike protein. That enables escape from vaccines and from antibodies derived from natural infection.

Compare an antibody to a master key for a large building: it can fit into many locks with similar—but not necessarily identical—ridge patterns. If someone installs a new lock too different from the existing ones, the master key will not fit well enough to work.
In England, a population-based study revealed that those with a prior Covid infection were five times more likely to become infected with omicron compared to reinfection with other variants. The researchers estimate that only one-fifth of unvaccinated people who previously tested positive can fend off the omicron variant.

Following vaccination or natural infection, when we are exposed to the virus, our circulating antibodies attach to the spike protein of SARS-CoV-2, preventing the virus from entering a cell. When there are more viral particles than available antibodies, the virus breaks through our defenses. How we behave has an enormous impact on the amount of virus we encounter.

Once inside, the omicron variant reproduces so rapidly that it can spread before our immune system has time to react, enabling the virus to spread to others. However, the vaccines also produce T cell immunity. Our T cells go on a search and destroy mission, killing any infected cells and neutralizing the virus within them. This significantly shortens how long vaccinated people can spread the virus.

People who are fully vaccinated produce more antibodies and a much stronger T cell response than those infected with SARS-CoV-2 one year ago. In a study of omicron-specific T cells, individuals who were infected with the virus over a year ago and received two doses of the Pfizer vaccine showed a greater T cell response than those who had Covid six weeks earlier. However, compared to the original strain, T cell responses declined by 25–30% when presented with the omicron variant.

This analogy by Dr. Leana Wen is helpful: “Think of the vaccine as a very good raincoat. It keeps you dry in a drizzle. If there are constant thunderstorms, you may get wet. The problem isn’t the raincoat—it’s the weather. To best protect all of us, we need to reduce the storm of Covid-19 by increasing vaccination rates.”
**Covid-19: The Omicron Variant**

DT Plichta, MPH

7. *Is the omicron variant less dangerous than the others we have seen?*

The omicron variant does appear to produce less severe illness in adults and more serious cases in children when compared to the delta variant. That was based upon South Africa’s experience, which showed a 50% decrease in hospitalizations per 100,00 infected people.
So far, people in England have been 40–45% less likely to require hospitalization for omicron than for the delta variant; they are 20% less likely to seek emergency services at the hospital.

After accounting for prior infection and vaccination status in a region of California with a mixture of delta and omicron cases, researchers compared the severity of infection of the two variants. In comparison to people infected with the delta variant, those with omicron:

- Were 53% less likely to need hospital care
- If hospitalized, had a 70% shorter stay
- Had a 74% lower ICU admission rate if hospitalized
- Experienced a 91% decrease in deaths

Per 1,000 cases of Covid due to the omicron variant by January 15, 2022, in the US:

- 27 were admitted to the hospital for an average stay of 5.5 days
- 3.5% needed a ventilator
- 9 died (there is a three-week lag after diagnosis)

However, omicron ($R_0 = 10$) spreads much more easily than the delta variant ($R_0 = 7$). That means the average person with the omicron variant will infect ten people, versus seven for delta. Even if the likelihood of hospital admission is half that of delta, much like compound interest in banking, that increased transmissibility means a much higher rise in Covid hospitalizations. The Inside Medicine: Omicron Paradox link has a fantastic visualization of this phenomenon. It is happening at a time when many health care workers are in quarantine after testing positive.
Approximately one-third of official admissions are due to a primary Covid diagnosis; one-third are due to Covid making an underlying condition worse; and one-third are admitted for another reason. In-patients tend to have shorter stays and are less likely to require an ICU bed than with the delta variant, dropping from roughly 25% to 10%.

Here is what has been happening in Florida. A 31% positivity rate means there are likely five undiagnosed infections for each new positive test:
Eighty percent of Covid admissions at Tampa General Hospital are for people who have not received a primary vaccination series. Someone I know died during the first week of January after five days in the hospital on a ventilator, so it’s not something to take lightly. Less severe than delta can still be deadly.

South Africa Dept of Health: Speaking Notes by Minister of Health, Dr. Joe Phaahla, During Virtual Media Briefing Programme on the Update of SA—17 December 2021

MedPage: What to Expect When We’re Expecting More Omicron Cases—COVID Cases Surge as New Variant Threatens the Integrity of Current Vaccines

MRC Centre: Report 50 – Hospitalisation Risk for Omicron Cases in England

MedRxiv: Clinical Outcomes among Patients Infected with Omicron (B.1.1.529) SARS-CoV-2 Variant in Southern California

MMWR: Trends in Disease Severity and Health Care Utilization During the Early Omicron Variant Period Compared with Previous SARS-CoV-2 High Transmission Periods—United States, December 2020–January 2022

Inside Medicine: The Omicron Paradox: If It’s Milder, Why Are Hospitals on the Brink of Disaster?

Tampa Bay Times: Florida COVID Hospital Admissions Highest Since Summer as Omicron Spreads
**Becker's Hospital Review: Omicron Patients Less Likely to Be Hospitalized, Have Shorter Stays: 6 Study Findings**


**Salemi USF: COVID-19 in Florida Hospital Admissions by Age**

8. With other variants, older people and those in poor health were most likely to have a severe case or die. Is that still true with the omicron variant?

In a part of California with a mixture of Covid cases due to the delta variant and the omicron variant, the highest hospitalization rates for those with omicron occurred in people aged 20–39. They were less likely to have comorbidities than individuals who needed hospital care for the delta variant.

Among adults under 60, the demographic groups with the largest rates of increase in severe Covid cases in Florida correspond to the percentage of people vaccinated within that age group. Vaccination makes an enormous difference:

<table>
<thead>
<tr>
<th>Age</th>
<th>% Change Admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–17</td>
<td>218</td>
</tr>
<tr>
<td>18–29</td>
<td>367</td>
</tr>
<tr>
<td>30–39</td>
<td>184</td>
</tr>
</tbody>
</table>
Here is what one doctor who treats Covid patients in NYC has testified:

- People who have received a booster shot are likely to experience symptoms like those of a mild common cold
- Those with two doses of an mRNA vaccine tend to feel sicker than those with booster shots but can still breathe
- Individuals with one dose of Johnson & Johnson often feel miserable, with some shortness of breath but do not require oxygen or hospitalization
- Unvaccinated people are 15 times more likely to need hospital care for extreme shortness of breath requiring oxygen

MedRxiv: Clinical Outcomes among Patients Infected with Omicron (B.1.1.529) SARS-CoV-2 Variant in Southern California

COVID Data Tracker: New Admissions of Patients with Confirmed COVID-19 per 100,000 Population by Age Group

Salemi USF: COVID-19 in Florida

CDC: Omicron Variant: What You Need to Know
9. What pre-exposure options are available for people who don’t develop an immune response to vaccines, like transplant patients or individuals with some blood cancers?

On December 8, 2021, the FDA issued an Emergency use Authorization for Evusheld, a monoclonal antibody developed for people over the age of 12 with severe immunosuppression. The National Infusion Center maintains a web site listing facilities which can deliver this preventative treatment.

FDA: FDA Authorizes New Long-Acting Monoclonal Antibodies for Pre-Exposure Prevention of COVID-19 in Certain Individuals

National Infusion Center Locator

10. I have been exposed to SARS-CoV-2 or tested positive in the last 5–10 days. Is there a safe and effective treatment available? How can I access it?

Monoclonal antibodies are made in a lab to mimic those which occur naturally after infection with SARS-CoV-2. Unfortunately, there are going to be severe supply issues.

For the delta variant, an infusion given after exposure or when symptoms are still mild is 70% effective at preventing hospitalization or death. People over the age of twelve who are at high risk of severe illness are eligible to receive that treatment at no cost.

Mutations which have resulted in the omicron variant render ineffective almost all the monoclonal antibodies currently in use. The antibody combination used in Regeneron against the delta variant (imdevimab and casirivimab) fails to inhibit omicron.

There is only one monoclonal antibody produced in the US and UK which can attach to circulating omicron particles. Sotrovimab, known commercially as Xevudy, works against the omicron variant at a dosage three times that required to neutralize the delta variant.

With the sudden shift in predominating strains, it is likely to be very difficult even for people at the highest risk to access the limited supply of monoclonal antibody treatment for an omicron infection. If you have been relying on that option, this is a great time to get vaccinated instead.

Due to the overwhelming demand for this medication, the NIH has released updated guidelines prioritizing monoclonal antibody treatment for those at the highest risk of progressing to severe Covid-19: people who test positive and are unvaccinated or are unlikely to develop a sufficient antibody response after vaccination and fall into at least one of these categories:

- an age of at least 65 years;
- has cancer, cardiovascular disease, diabetes, chronic kidney, or lung issues;
- has a compromised immune system or is taking immunosuppressive medication;
- has a
body mass index over 30; is pregnant; or has sickle cell disease. Those with multiple comorbidities receive the highest priority.

You can [click here](#) for additional information if you suspect you are infected with either variant.

Receiving monoclonal antibodies is likely to increase your susceptibility to reinfection. The current recommendation for monoclonal antibody recipients regarding any Covid vaccination is to wait for 90 days after the infusion or injection to prevent the treatment from interfering with your immune system’s ability to produce antibodies.

On December 22, 2021, the FDA approved an oral antiviral treatment for adults and children with mild-to moderate illness who fall into the categories eligible for monoclonal antibodies. Clinical trials showed Paxlovid is 90% effective at preventing hospitalization and death. Ingestion of this prescription medication must begin within five days of the first symptoms.

Paxlovid is not authorized as a substitute for vaccines, nor can it be prescribed to prevent Covid. By the end of 2021, the US expects to have enough to treat 180,000 people. Production takes 6–8 months, so this medication will also be extremely hard to access despite the US government’s order of doses for ten million Covid patients.

Another oral medication (Molnupiravir) approved for treating the omicron variant is far less effective. It decreased the risk of hospitalization or death by about one-third.

Use of the older intravenous treatment Remdesivir has been expanded to outpatients over a three-day course. Against omicron, it remains 87% effective at preventing hospitalization or death. Early in the pandemic, this medication fell out of favor due to the high adverse reaction rate (55%).

[NEJM: REGEN-COV Antibody Combination and Outcomes in Outpatients with Covid-19](#)

[MedRxiv: An Infectious SARS-CoV-2 B.1.1.529 Omicron Virus Escapes Neutralization by Several Therapeutic Monoclonal Antibodies](#)

[NEJM: Efficacy of Antibodies and Antiviral Drugs Against Covid-19 Omicron Variant](#)

[MedRxiv: The Dual Function Monoclonal Antibodies VIR-7831 and VIR-7832 Demonstrate Potent In Vitro and In Vivo Activity Against SARS-CoV-2](#)

[Nature: Omicron Overpowers Key COVID Antibody Treatments in Early Tests: Nearly All Monoclonal Antibodies Used to Prevent Severe Disease Fail to Stand Up to the New Variant, Laboratory Assays Show](#)

[Pharm Tech: GSK’s Sotrovimab Retains Activity Against Omicron Variant](#)
11. Can people who were previously infected get Covid again? How does natural immunity compare to the immunity from vaccines? Do monoclonal antibodies increase the risk of reinfection?

Here is what we know so far about the percentage of people whose blood samples showed sufficient antibody protection. Note that booster efficacy will decline another 15–20% after 10 weeks:

- Had the delta variant, not vaccinated = 15%
- Had the alpha variant, not vaccinated = 10%
- Recovered from Covid + AstraZeneca vaccine = 100%
- Recovered from Covid + Pfizer vaccine = 100%
- Two doses of the AstraZeneca vaccine = 0%
- One dose of the Johnson & Johnson vaccine = 8%
- Two doses of the Pfizer vaccine = 30–45%
- Two doses of the Moderna vaccine = 50%
- Three doses AstraZeneca = 67%
- Two doses AstraZeneca + one dose Pfizer = 71%
- Three doses Pfizer = 76%
- Three doses Moderna = 88%
In England, a population-based study revealed that those with a prior Covid infection were five times more likely to become infected with omicron compared to reinfection with other variants. The researchers estimate that only one-fifth of unvaccinated people who previously tested positive can fend off the omicron variant.

People who have received monoclonal antibodies for a previous Covid infection are more likely to become reinfected.

Lancet: Omicron Variant and Booster Covid-19 Vaccines

MedRxiv: SARS-CoV-2 B.1.1.529 Variant (Omicron) Evades Neutralization by Sera from Vaccinated and Convalescent Individuals

MedRxiv: Broadly Neutralizing Antibodies Overcome SARS-CoV-2 Omicron Antigenic Shift

MedRxiv: Increased Risk of SARS-CoV-2 Reinfection Associated with Emergence of the Omicron Variant in South Africa

Imperial College: Omicron Largely Evades Immunity from Past Infection or Two Vaccine Doses

MedPage: Early UK Data: Two Vax Doses Don’t Cut It Against Omicron—But Booster Bumps Effectiveness to More than 70%, Technical Briefing Finds

MedRxiv: Booster of mRNA-1273 Vaccine Reduces SARS-CoV-2 Omicron Escape from Neutralizing Antibodies
MedRxiv: Omicron-B.1.1.529 Leads to Widespread Escape from Neutralizing Antibodies

NEJM: Effectiveness of Covid-19 Vaccines against the B.1.617.2 (Delta) Variant

MedRxiv: Effectiveness of COVID-19 Vaccines Against the Omicron (B.1.1.529) Variant of Concern


Question 12 is still in-progress

13. Why do the vaccines decrease the risk of hospitalization or death? How effective are they?

In serious cases, people have the fever and cough for several days before breathing problems develop. The virus shuts down the part of their immune systems which produce neutralizing antibodies. Instead, their immune systems create a non-neutralizing form of IgG antibody which causes severe inflammation. A “cytokine storm” then damages the lungs, heart, liver, kidneys, and brain.

In contrast, vaccination-induced immunity is characterized by the production of IgG antibodies which neutralize the virus while reducing inflammation.

An early study regarding Vaccine Effectiveness in the UK compared adults over the age of 65 who received an mRNA booster shot to people in that demographic group who did not. For the first 2–9 weeks, boosted individuals were 50% less likely to have a symptomatic infection from the omicron variant. That percentage dropped to 25% after 10 weeks.

Six months after receiving two doses of any Covid vaccine in the UK, adults over 49 years old were 60% less likely to die due to the omicron variant.

Any combination of a primary two dose vaccine series followed by a Pfizer booster prevented 90% of hospitalizations during the first 2–9 weeks. During the 10 through 14th week, that Vaccine Effectiveness fell to 75%. A Moderna booster is 90–95% protective against hospitalization for the first 9 weeks. Follow-up data for that vaccine is not yet available.

Among immunocompromised people in the US during the delta wave, those who had a third dose of an MRNA vaccine experienced 88% fewer hospitalizations than unvaccinated people with compromised immune systems. Two doses provided protection to 69% of them. The study team expects a similar degree of improvement with a third dose vs. two shots against the omicron variant.

UK residents who received any mRNA booster shot saw their risk of death drop by 90% compared to their unvaccinated peers. As of late January 2022, 80% of adults in the UK had received booster shots.
Last summer in the UK, 90% of adults had received at least one dose of a vaccine. That decreased the risk of hospitalization by 96%. However, slightly more than half of deaths occurred in fully vaccinated people.

Compare an 80-year-old fully vaccinated man with a 45-year-old unvaccinated man. The risk of death from Covid doubles with every seven years of age. Dropping the likelihood of death 20 times by being vaccinated cannot offset increasing the risk of being 80 years old by 32 times.

The Lancet: COVID-19: Consider Cytokine Storm Syndromes and Immunosuppression

Science Translational Medicine: Early Non-neutralizing, Afucosylated Antibody Responses Are Associated with COVID-19 Severity


UK Health Security: Boosters Provide High Level of Protection Against Death with Omicron

MMWR: Effectiveness of a Third Dose of Pfizer-BioNTech and Moderna Vaccines in Preventing COVID-19 Hospitalization Among Immunocompetent and Immunocompromised Adults—United States, August–December 2021

BMJ: Significant Proportions of People Admitted to Hospital, or Dying from Covid-19 in England are Vaccinated—This Doesn’t Mean the Vaccines Don’t Work

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14. How risky is post-vaccination myocarditis for younger people? How does the risk of other vaccine side effects compare to the symptoms of Covid?

Concerns about myocarditis and pericarditis after vaccination have prevented many young men and women from getting vaccinated. For the mRNA vaccines, they have occurred at a rate of 12.6/million. People who experience this side effect have chest pain within 2–3 days after receiving their second dose of an mRNA vaccine. Almost all cases remained mild, and the patients fully recovered.

However, young men who become infected with SARS-CoV-2 develop those conditions at a rate of 450/million. Infected young women experience them at a rate of 235/million. In contrast to the myocarditis arising from vaccination, the inflammation resulting from SARS-CoV-2 can cause life-threatening heart conditions in children, adolescents, and adults.
With the omicron variant transmitting more easily than chickenpox, it is far safer to get vaccinated.

A nationwide study in Israel revealed that no adolescents who received two doses of the Pfizer vaccine needed hospitalization for the Covid-19 delta variant, in contrast to one in every 300 of their unvaccinated peers.

In the US during June through September 2021, the Pfizer vaccine was 93% effective at preventing hospitalization in adolescents with the more virulent delta variant. None of the 77 teens who required ICU admission or life support or who died were fully vaccinated.

Research into 2.4 million vaccine recipients, who were equally divided between the Moderna and Pfizer vaccine, identified fifteen men between the ages of 18 and 40 who required hospitalization for myocarditis. All responded well to standard treatment. There was no statistical difference between Moderna and Pfizer recipients (seven vs. eight).

On October 29, 2021, the FDA approved Pfizer vaccine’s Emergency Use Authorization in children 5–11 years old. It prevented 90% of SARS-CoV2 infections. Among the 3,100 children who received the vaccine during clinical trials, there were no cases of myocarditis, pericarditis, anaphylaxis, or death. Children who experienced fatigue, muscle pain, or headache after vaccination recovered within two days.

MedRxiv: Risk of Myocarditis from COVID-19 Infection in People Under Age 20: A Population-Based Analysis

Circulation: Myocarditis with COVID-19 mRNA Vaccines
Circulation: Striking Similarities of Multisystem Inflammatory Syndrome in Children and a Myocarditis-Like Syndrome in Adults

MedPage Today: Post-Vax Myocarditis Playbook Has Mostly Worked So Far, Uncertainties Aside—Chest Pain is the Classic Warning Sign of Rare Phenomenon

Emerg Inf Dis: Effectiveness of BNT162b2 Vaccine in Adolescents during Outbreak of SARS-CoV-2 Delta Variant Infection, Israel, 2021

MMWR: Effectiveness of Pfizer-BioNTech mRNA Vaccination Against COVID-19 Hospitalization Among Persons Aged 12–18 Years—United States, June–September 2021

JAMA: Acute Myocarditis Following COVID-19 mRNA Vaccination in Adults Aged 18 Years or Older

FDA to Hold Advisory Committee Meetings to Discuss Emergency Use Authorization for Booster Doses and COVID-19 Vaccines for Younger Children

MedPage: FDA Authorizes First COVID Vaccine for Younger Kids—Agency Emphasizes Immune Response, Safety Data in Children Ages 5 to 11 Years

A study of two million people in Israel compared the likelihood of experiencing a significant Pfizer vaccine-induced side effect to the risk of those same symptoms of Covid-19. Here are the results:
Compared to those infected with SARS-CoV-2, people vaccinated with two doses of the Pfizer vaccine were substantially protected against acute kidney injury, cardiac arrhythmia, deep vein thrombosis, hemorrhagic stroke, heart attack, myocarditis, inflammation surrounding the heart, blood clots in the lung, erectile dysfunction, and reduced male fertility.

While cases of shingles remained rare among individuals in that study, there was an increase in risk among those who received the vaccine.

The Radiological Society of North America recommends waiting 4–6 weeks after the final dose of an mRNA vaccine to undergo a routine mammogram, noting that swelling of lymph nodes in the armpit (lymphadenopathy) is a normal immune response that resolves with time.

This is a side effect which I experienced. While I was aware of a lump for a few weeks, it didn’t cause any problems. Nevertheless, I did mention it to the woman who did my mammogram. She then asked which arms had received the injections in case any swelling appeared in the scans.

**NEJM: Safety of the BNT162b2 mRNA Covid-19 Vaccine in a Nationwide Setting**

**JAMA: Sperm Parameters Before and After COVID-19 mRNA Vaccination**

**The Conversation: COVID-19 Could Cause Male Infertility and Sexual Dysfunction—but Vaccines Do Not**

**RSNA: Covid-19 Vaccine-Related Lymphadenopathy: What to Be Aware Of**

**15. Are mRNA vaccines safe for pregnant women and their babies?**

Research comparing miscarriages, preterm births, and low birth weights as pregnancy outcomes for vaccinated women and women who were pregnant before the pandemic found no differences between them. No neonatal deaths occurred among vaccinated women.

Newborns whose mothers were vaccinated early in the third trimester produced a greater antibody response compared to those whose mothers received a vaccine closer to the time of delivery.

Vaccinated women who breastfed their infants secreted Covid-specific antibodies in their milk for at least six weeks. That provided protection to their newborns.

Milk from breastfeeding women who received either mRNA vaccine did not yield any detectable vaccine in the days after vaccination.

On the other hand, pregnant women who become infected with SARS-CoV-2 are more likely to experience severe illness requiring hospitalization, breathing assistance, or ventilation. They also have increased risk of preterm delivery or death.
From March 2020–October 2021, fifteen pregnant women died from Covid in Mississippi alone. Almost all had underlying conditions and most died a few days after giving birth. None were fully vaccinated. The delta variant increased the likelihood of death five times compared to the original SARS-CoV-2 virus, from five deaths/1,000 pregnant women with Covid-19 to 25/1,000. During the time when the delta variant predominated, pregnant women infected with SARS-CoV-2 in Mississippi were eight times more likely to die than infected women of similar ages who were not expecting a child. Black and Hispanic women were at greatest risk.

A study of 1,250,000 births in the US from March 2020 through September 2021 found that pregnant women infected with the delta variant are four times as likely to experience stillbirth as uninfected women. Investigators in this study were not able to assess their vaccination status. As of July 2021, only 30% of pregnant women were fully vaccinated.

That is why the American College of Obstetrics and Gynecology enthusiastically recommends that all pregnant women receive vaccination and Pfizer booster shots, and the CDC has issued an urgent advisory.

Similar results occur with the AstraZeneca vaccine, and a second dose is recommended for women who become pregnant after starting the series. However, due to more research on pregnancy with the mRNA vaccines, Pfizer or Moderna are preferable for unvaccinated women.


**NEJM: Receipt of mRNA Vaccines and Risk of Spontaneous Abortion**

**JAMA: Spontaneous Abortion Following COVID-19 Vaccination During Pr**

**MedRxiv: Early Versus Late Third Trimester Maternal SARS-CoV-2 BNT162b2 mRNA Immunization Maximizes Transplacental Antibody Transfer and Neonatal Neutralizing Antibody Levels**

**JAMA: SARS-CoV-2–Specific Antibodies in Breast Milk After COVID-19 Vaccination of Breastfeeding Women**

**JAMA: Evaluation of Messenger RNA from COVID-19 BTN162b2 and mRNA-1273 Vaccines in Human Milk**

**CDC: COVID-19 Vaccines While Pregnant or Breastfeeding**

**MedPage: “Alarming” Number of Pregnant Women Admitted to Alabama ICUs—The Trend Points to Just How Important It is for Pregnant Women to Get Vaccinated, Physicians Say**

**JAMA: Characteristics and Outcomes of Women with COVID-19 Giving Birth at US Academic Centers During the COVID-19 Pandemic**
16. What about the risk of infertility?

Women may experience irregular menstrual cycles or changes in flow after vaccination or after having Covid-19. This is common for infections and immune system reactions and lasts for only a few months. The North American Society for Pediatric and Adolescent Gynecology recommends vaccination for adolescents and young adults.

In a large fertility study, women who were vaccinated were slightly more likely to become pregnant. Getting Covid had no effect upon the fertility of women in the study. However, when their male partners became infected, they experienced an 80% reduction in the likelihood of conception during the first month. After 60 days, their fertility was restored.

A recent study confirmed that antibodies to the SARS-CoV-2 spike protein have no effect upon the implantation of an embryo or pregnancy development. In women, neither natural infection nor vaccination cause sterility.

Receiving an mRNA Covid vaccine did not affect ovarian stimulation or early pregnancy outcomes among women using In Vitro Fertilization.

Another study involving sperm counts in men found that sperm concentration and motility increased after the second vaccination. In contrast, research on men who contracted Covid-19 found reduced fertility and erectile dysfunction.

NASPAG Position Statement on COVID-19 Vaccines and Gynecologic Concerns in Adolescents and Young Adults

Am J Epidemiol: A Prospective Cohort Study of COVID-19 Vaccination, SARS-CoV-2 Infection, and Fertility

ASRM: New Study Reveals Covid Vaccine Does Not Cause Female Sterility
17. How can I discuss this with people I love who are vaccine-hesitant?

Here is an explanation I gave to a friend who had been terrified about getting vaccinated until a mutual friend got Covid:

The day of our friend's diagnosis, she got vaccinated but called me the next day because she wasn't feeling great. I explained the vaccine to my friend using coral snakes and milk snakes to illustrate:

"Your immune system is encountering what it thinks is a coral snake and is rising up to kill it. If you’re not feeling good, it’s because your immune system is working to destroy a coral snake. Since there’s no genetic material there, it can’t reproduce, and it does not affect your DNA. Within a few days your liver clears out what’s left.

"Right now, you’re 30% protected from the delta variant. When another milk snake comes along, your immune system produces more protection to destroy what looks like the same threat.

"Two weeks after the second dose, when your immune system sees a coral snake, it’s prepared to overwhelm it before it can make you very sick. Based on what I’m seeing, most of the antibodies are in lymph nodes in your chest. That explains why fully vaccinated people who do get infected usually have mild cold symptoms. The virus gets neutralized before reaching your lungs."

[Images of coral snake and milk snake]

MedLine Plus: What are mRNA Vaccines and How Do They Work?
Ad Drug Deliv Rev: Controlling Timing and Location in Vaccines


UAB: Three Things to Know about the Long-Term Side Effects of COVID Vaccines

18. What sources can I trust?

1) Health Data.Gov – COVID-19 Community Profile Report – Updated every weekday

2) World Health Organization Situation Reports – These tend to be one day behind. Some nations are not keeping their information up to date: WHO: Situation Reports

3) Johns Hopkins University – Johns Hopkins Univ: Coronavirus Resource Center – Not recommended for Florida statistics as that state updates only once per week, is hiding deaths, and does not include any non-resident data.


5) Investigation of SARS-CoV-2 Variants of Concern: Technical Briefings – for the UK

6) Redemptive History and Theology – Covid-19 Information covers broader Covid-19 issues, including medical and theological perspectives

7) HHS Protect Public Data Hub – Hospital Utilization by facility or by state

8) CDC: Covid-19 Integrated County View – transmission, cases, test positivity, deaths, hospital usage, % of vaccinated people, and a Social Vulnerability Index by county

9) Florida Statistics: What is Really Happening? – A review of Florida statistics showing what that state is trying to hide and how you can find the missing information.

10) Dr. Jason Salemi – Covid-19 Dashboard: A Focus on FL with National Comparisons