

Rise in Vaccine Distrust as a Result of the Covid-19 Pandemic

Katherine Sandt

Sacred Heart University

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Dr. Brian Stiltner and Dr. Sandra Young

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Everyone remembers where they were in March of 2020. Whether studying at college, starting a new job, or raising children, everything came to a halt when Covid-19 was declared a global pandemic. Ironically, since then, the number of people questioning the effectiveness of all vaccines has skyrocketed.

Our body's immune system is supposed to protect us from diseases. However, some pathogens (disease-causing organisms) are able to fight through our immune barrier and cause illness. As children, our immune systems are not fully developed, making tiny humans even more susceptible to the most harmful diseases. Some individuals have chronic illnesses or compromised immune systems that cause them to be more susceptible to these pathogens as well. Vaccines were created to familiarize the immune system with a specific pathogen; that way, the body knows how to fight off those harmful pathogens when they try to fight through our barrier (World Health Organization, 2020). MMR, varicella, TDap, and HPV are just a few of the vaccines that have been routinely administered to children for years.

These vaccines have protected the human race from serious illness and even death that once resulted from infection with these viruses. So why are we so quick to question their effectiveness now? Myths, rumors, and disinformation have always been prevalent on social media; however the pandemic has exponentially increased these issues. With nothing to do but scroll through our phones, the pandemic has led to increased numbers of circulating misinformation on the internet. For the past two years, the global health crisis has caused major distrust in the healthcare system, specifically vaccines. Increased spread of misinformation and disinformation surrounding the global pandemic has caused a dramatic and unnecessary rise in vaccine and overall healthcare distrust.

Part 1: Background

At the end of 2019, Wuhan, an emerging business hub in China, experienced an outbreak of a coronavirus that killed more than eighteen hundred and infected over seventy thousand individuals within the first fifty days of the epidemic (Shereen et al., 2020). By March 2020, the virus had spread across the globe and been declared a global pandemic. Schools, businesses, and life closed down. For months we spent our time inside our houses binge watching Netflix, cooking, reading, and finding new hobbies to distract us from the fear of what this new normal had become. We knew that this virus was spreading quickly and could have detrimental effects, but we did not know exactly why or how.

Covid-19 is a highly transmissible viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The original coronaviruses emerged in 2003 in China as severe acute respiratory syndrome (SARS). At the end of 2019, an outbreak of the now-called Covid-19 emerged. Covid-19 is spread by close contact with an infected person exposed to coughing, sneezing, respiratory droplets or aerosols. This means that when a person expels the germs by either coughing or sneezing, the droplets get suspended in the air for a short time and can attach to a new host. Symptoms can appear between 2-14 days after exposure. Mild symptoms include fever, chills, cough, shortness of breath, headache, loss of taste and smell, nausea, vomiting, and diarrhea (CDC, 2022).

Some people who contract Covid-19 experience more severe symptoms, specifically those with impaired immune systems. Lung inflammation is the main cause of life-threatening respiratory disorders. Damage caused by the virus in the lungs can lead to acute respiratory distress syndrome (ARDS). This causes short/rapid breathing and cyanosis, which is a bluish

color of the skin resulting from poor circulation. Patients with ARDS are often admitted to ICUs and require mechanical ventilation. Autopsies discovered that the lungs of people who died from covid infection were filled with a clear liquid-jelly like substance indicating wet drowning (Hellman et al., 2020). These liquid substances in the lungs resulted from infection. When the virus entered the lungs of these individuals, it rapidly multiplied and caused inflammation in the respiratory tract leading to the production of life-threatening symptoms. The best way to avoid these serious complications of Covid infection is by vaccination.

There have been three main companies who have developed Covid-19 vaccines in order to prevent the spread of Covid and minimize its symptoms. Pfizer and Moderna are mRNA vaccines which means that they are inactive. Non-live vaccines do not contain any living or infectious particles so they can not cause disease. They contain whole pathogens or parts such as proteins or polysaccharides of inactivated pathogens. The virus is inactivated by heat, radiation, or chemicals (Vetter et al., 2018). These methods destroy the pathogen's ability to replicate but it maintains its immunogenicity (ability to provoke an immune response) so that the immune system can target it. Because it is inactivated, multiple doses are needed in order to be fully immune to the virus. It is also recommended for people to get booster vaccinations in order to enhance their immunity because over time, the antibodies in the body produced from the original vaccine begin to disappear. There are no risks involved in getting multiple doses of the vaccine, because more doses are needed depending on how long the denatured proteins can survive in the body (Vetter et al., 2018).

MRNA vaccines can be developed rapidly because RNA synthesis can be immediately carried out once the sequence is encoded (Vetter et al., 2018). In the past vaccines took years to develop, so there was skepticism surrounding the effectiveness and reliability of the Covid

vaccine. However, production of this vaccine was expedited because researchers had already developed a SARS mRNA vaccine years ago. Since Covid-19 is a form of SARS, researchers were able to use that vaccine to help in the development of the Covid-19 vaccine.

Because the vaccine initiates an immune response, the individual may experience some side effects after either dose. Common side effects include headache, fever, chills, and fatigue. These are usually gone within 48 hours (Rommel, 2021). It is possible for allergic reactions leading to anaphylaxis to occur from the vaccine but this is extremely rare and avoidable in most cases. “The Moderna vaccine elicits about three anaphylactic reactions per million doses administered, and the Pfizer–BioNTech vaccine triggers five reactions per million doses, according to VAERS data” (Rommel, 2021). Anyone who is allergic to any of the ingredients in the vaccine or have had a reaction to similar vaccines in the past should not receive the Covid-19 vaccine. Even though there have been some reports of allergic reactions, there have been no cases of death resulting from any of the Covid-19 vaccines (Rommel, 2021). These vaccines are extremely safe and the risks of possible side effects outway the risks of contracting a virus that could lead to lifelong complications or even death.

Part 2: Misinformation and Disinformation

About the Pandemic

The largest influence on the spread of misinformation is social media. In 2020, “the spread of misleading information about the virus led the World Health Organization (WHO) to warn of an on-going ‘infodemic’ or an overabundance of information—especially misinformation—during an epidemic” (Linden, et al., 2020). In this internet based world, it is

difficult to find reliable information. It takes a millisecond to see an interesting headline and click share.

Right at the start of the pandemic, misinformation spread like wildfire. Misinformation is the spread of false information regardless of intent. Conspiracy theories such as “the virus was engineered in a lab” (Linden, et al., 2020) and hydroxychloroquine being a potential treatment for the virus were just a few. The Hydroxychloroquine rumor was particularly dangerous since hydroxychloroquine is a potential dangerous substance if not used properly. Even President Trump was encouraging the ingestion of this substance when there was no science behind it being a potential treatment for Covid. All the while, the FDA had warned against its use outside of a hospital setting due to the risk of heart rhythm problems (Cathey, 2020). However, a man in Arizona died because of ingestion of non-medication chloroquine in an attempt to self-medicate, thinking “hey isn’t that the stuff they’re talking about on TV?” (Cathey, 2020). People will be quick to believe information when the head of the government is telling them there is nothing to worry about. The president is supposed to be someone we can trust, but President Trump was a major component in spreading misinformation. On February 27th of 2020, President Trump stated, “It’s going to disappear. One day, it’s like a miracle—it will disappear.” Around this same time, Dr. Anthony Fauci, who is the the director of the National Institute of Allergy and Infectious Diseases and the Chief Medical Advisor to the President, was warning the public that numbers of cases were expected to rise in the coming weeks. This conflicting information forced people to choose a side. Those who chose to follow President Trump then came to become the “anti-Fauci” group. Even though he is a respected scientist who researches these viruses, people chose to believe a politician instead. These same people went on to believe as though anything Dr. Fauci recommended or suggested was in bad conscience and untrue.

Disinformation from the media began to influence the perception of the virus.

Disinformation is a subset of misinformation that is deliberately deceptive. Doubts about the severity of the virus emerged as a result of this disinformation. Thus began the conspiracy that the pandemic was a government construct or a hoax. Coincidentally, that conspiracy contradicts the previous beliefs that President Trump was the good guy. The idea that Covid was created by the government was a common fear in the United States. To disprove this theory, Covid was spreading around the world, and started in China. It's not plausible for a virus that started in China to be constructed and planned by the U.S government. These rumors led people to believe that the virus was not as serious as it truly is. They thought that the government was trying to scare the public.

The thought that Covid was not as serious as the media was making it out to be resulted in many people not following protocols such as limiting gatherings and wearing masks. Soon, rumors began that the public was being lied to about the number of deaths caused by Covid as well. According to the conspiracy theorists, if a person died in a car accident and coincidentally had the coronavirus antigen in their body, it was recorded in the statistics as a death resulting from Covid. A large group of people felt that something was going on inside the government. Whether that means the government was lying to us about numbers or that they started the whole thing in the first place, people did not want to believe the reality of the world we were living in. Those who chose to deny the severity of the virus did not find it possible for a virus to spread rapidly and kill millions of people. In reality, viral epidemics and pandemics have occurred many times in the past- the plague, polio, spanish flu, and AIDS were all viruses that had great impacts on the world. It is astonishing that large communities of people failed to consider our history when debating our present.

How the creation of these myths occur and the speed at which they spread is not completely understood. One theory about the spread of disinformation involves bots. Bots are software robots that are automated to spread information and produce content even if it is not true. Bots will repost and spread information all over social media no matter what it is about. Social bots, which pose as real human users on platforms such as Twitter, use behaviors like excessive posting, early and frequent retweeting of emerging news, and tagging or mentioning influential figures in the hope they will spread the content to their thousands of followers (Himelein-Wachowiak et al., 2021). Bots have been contributing to the increased spread of “anti-vaxxer” information. The proliferation of Covid-19 misinformation by bots, coupled with human susceptibility to believing and sharing misinformation, may well impact the course of the pandemic (Himelein-Wachowiak et al., 2021).

Another theory describes how acceptance tends to occur spontaneously when people process information, whereas rejection of information as false is thought to involve a secondary process demanding motivation and cognitive resources (Newman, et al., 2022). It is much easier to accept something as true and move on than it is to question its truthfulness and determine reliability. So, when you are scrolling through Twitter or Instagram and see something that says “Covid-19 is just a hoax,” you are more likely to just accept it and keep scrolling onto the next thing than to question it and look further. This acceptance of wrong information had a major influence on the spread of misinformation around the pandemic because it was a huge conversation starter. People would quickly swipe through quotes and opinions on social media and then share those to their friends without knowing if they were true.

About Vaccines

Once the Covid-19 vaccines began to emerge, disinformation about them was only bound to start as well. Vaccine misinformation is not a new concept. Originally, vaccines were greatly praised after they were developed. They saved many lives and were administered to almost everyone because there was finally a way to protect people from our greatest threats. However, vaccine distrust was inevitable. There will always be people who want to disprove science.

One of the largest anti-vaccine myths was spread from one article suggesting that the MMR (Measles, Mumps, and Rubella) vaccine caused autism. Time website wrote an article about the topic, stating “February 28, 2018 marks the 20th anniversary of an infamous article published in the prestigious medical journal, *The Lancet*, in which Andrew Wakefield, a former British doctor, falsely linked the MMR (measles, mumps and rubella) vaccine to autism” (Quick & Larson, 2018). Wakefield falsified this study of a small group of people. It was constructed and manipulated by him in order to form the outcomes desired to scare the public. After the study was published, the news quickly spread. “It took nearly two decades for the UK immunization rates to recover. By the end, UK families had experienced more than 12,000 cases of measles, hundreds of hospitalizations — many with serious complications — and at least three deaths” (Quick & Larson, 2018). The article and its suggestions have since been disproved, however some people still believe it to be true.

Now, with the Covid-19 vaccine, we are seeing just the same. *Stamford News* reported that “anti-vaccination influencers, like Robert F. Kennedy, Jr and Joseph Mercola, have cherry-picked unverified reports from the Vaccine Adverse Event Reporting System (VAERS), the public health database where people self-report adverse side effects from vaccination, in a way that misrepresents vaccine safety” (De Witte, 2022). By reporting about the worst possible symptoms that may be extremely rare or even not possible at all, it instills fear in people,

especially when important facts such as the incidences of such symptoms are left out. To add, “anyone can report events to VAERS, even if it is not clear whether a vaccine caused the problem. Because of this, VAERS data alone cannot determine if the reported adverse event was caused by a COVID-19 vaccination” (CDC, 2021). Anti-vaccine people believe the things that happen to them in the days following administration of the vaccine is a direct result of the vaccine itself, when in reality there are other things at play. Illness may occur under normal circumstances of viral spread and have no relation to the vaccine and simply be a coincidence.

A common conspiracy theory that has been around for years is that the government is tracking and watching its citizens. Anti-vaxxers took to social media and reported that the Covid vaccines have chips in them so that the government can control us. Video’s were posted of administration of the vaccine that looked like something other than liquid was being inserted into the individual’s arm’s. These videos developed into a rumor that the vaccines had chips in them. What was really happening was that the needles were retractable and they were seeing the needle retract into the syringe.

A more realistic myth is that the vaccine causes variants to form. Many people believe that when the virus attacks a host and the vaccine antibodies are present, the virus is sometimes able to withstand the antibodies, causing mutation of the virus with the ability to infect people more easily. In more simplified terms, it was thought that there were stronger parts of the virus that could avoid the vaccine and then those parts would develop into a stronger form of the virus. According to the CDC, “new variants of a virus happen because the virus that causes COVID-19 constantly changes through a natural ongoing process of mutation (change)” (CDC, 2021). The vaccine reduces the spread of the virus and prevents the formation of new variants by decreasing the spread. The vaccine has no part in creating new variants.

Some young people were afraid to get the vaccine due to rumors that it could cause infertility. This rumor was spread during the later stage of the vaccine administration, and caused people to put off getting it, especially the younger generation. According to the CDC, “there is currently no evidence that vaccine ingredients or antibodies made following COVID-19 vaccination would cause any problems with becoming pregnant now or in the future” (CDC, 2022). In fact, it is suggested that those planning to get pregnant should get the vaccine because Covid-19 can cause serious illness in pregnant women and can lead to serious complications (CDC, 2022).

It is understandable that people would be skeptical about the Covid vaccine because it is new, and long term side effects are not fully known. Even with clinical trials, the vaccine has not been distributed world wide. Healthy, young adults would hesitate to get the vaccine if they feel they are not at risk for Covid-19 complications. However, with so many people not getting vaccination, it is just causing the virus to mutate and spread more. We will not be able to reach herd immunity until enough people get vaccinated or are infected with the virus. In addition, getting the vaccine doesn't only protect yourself but protects others around you. We need to vaccinate the young and healthy in order to protect the elderly and immuno-compromized individuals who are at higher risk for serious complications from Covid.

Part 3: Decrease in Childhood Vaccines

America's trust in science and health care professions has decreased incredibly since the start of the pandemic. The general public has been arguing with information that comes from the professions who are trying to stop illness and death resulting from Covid-19, even though this information is based on research and evidence. This includes distrust in journalists, government

officials, and many other groups who are involved in spreading information surrounding the pandemic. Any conversation regarding Covid-19 has turned negative, meaning that the conversations are argumentative and untrusting of the facts. In addition, people are not afraid to speak their opinions, even if they do not have evidence to back it up. Through social media or word of mouth, misinformation and disinformation is spread, further increasing the distrust.

“In 2020, the number of completely unvaccinated children increased by 3.4 million” (World Health Organization, 2021). This is directly related to people questioning the intentions of not only the people creating the vaccines but also the people administering them. Not only are people refusing to get the Covid vaccines, but some parents are now avoiding getting their children routine vaccinations such as MMR and Varicella (chickenpox). When it comes time for health visits and vaccinations are recommended, some parents are refusing because of the constant debates on social media. This lack of vaccinations will eventually lead to an increase in viruses that were thought to have been virtually eradicated. There have already been multiple outbreaks of measles in the New York area. If the decline of vaccination continues, deadly viruses such as tuberculosis, rubella, and HPV will start to reemerge and this could have detrimental effects on our lives.

If we look back, the polio epidemic was very similar to our current Covid pandemic. “In a severe polio outbreak in 1937, the country closed down. Playgrounds, pools, theaters and schools were ordered to shut down. Nearly 315,000 elementary students participated in remote learning – through the radio rather than over Zoom” (Nebraska Medicine, 2021). Like Covid, polio is a viral infection that can cause serious respiratory issues and death. In 1961 the polio vaccine was released and nobody thought twice about it. “If a vaccine came out, you got it. It's

real personal when your friends' children die," Reported Dr. Chambers, a cardiologist who lived through both polio and Covid-19. "Back then, there were no anti-vaxxers," he explained.

Today, we no longer see cases of polio, along with the other historic viral epidemics we now have vaccines for. The vaccines of the past saved so many lives and there was no question of whether or not to get the vaccine if one wanted to live. However, we did not have social media back then to create false narratives. If we don't continue to vaccinate our children for these viruses, they may come back. More people may become severely ill and even die from viruses that can be avoided.

There is no concrete answer to stop or prevent the problem of disinformation and misinformation creating doubt in vaccines. However, there are ways to attempt to avoid increasing vaccine distrust by minimizing the spread of this misinformation. For example, if you come across a headline, article, or image that seems interesting but unreliable, do some quick research. An easy Google search can disprove a myth before you retweet or share it and cause further spread of something that is untrue. Making sure the information being shared is not false, and avoiding those that are, will make it easier for you to feel confident in your own knowledge as well as improve your ability to explain the facts to others. Using reliable resources such as Google Scholar or websites where you can find peer-reviewed research is one of the best ways to find information. Ensure that when you want to know more about a specific topic, the sources that you read are credible.

Finally, if you have questions or are unsure about what to do involving a medical decision, ask your doctor. As long as you feel your doctor is trustworthy, and is knowledgeable about that topic, they can help you find the answer to your question and guide you toward the best action. Most doctors are extremely well versed in the medical field and keep up to date on

incoming research. By implementing these tactics, we may be able to improve the community's trust in vaccines and prevent outbreaks of old viruses.

Conclusion

In conclusion, increases in misinformation, distrust, and questions stemming from the pandemic will eventually cause reemergence of previously tamed viruses and lead to an ultimate downfall in global health. Social media has had such a negative effect on the spread of misinformation and disinformation that people have started to question the reliability of all health related matters. The rumors surging through social media and gossiped by friends have a much bigger impact on society than they may seem.

As people become more and more distrustful of the health-care system and vaccines, the overall health of the human race is becoming a greater risk. By being aware of the possibility of misinformation on social media and attempting to avoid being swayed by falsified information, it may be possible to prevent reemergence of deadly viruses for the past. However, the continued lack of routine childhood vaccines pose a great threat. In the past, epidemics have led to the progression of new science in order to protect people.

This new deadly virus that has killed millions may just cause us to backtrack. The constant circulating misinformation and disinformation regarding the state of the current pandemic has led to dramatic and unnecessary questioning of the reliability of health care, which may lead to an even scarier reality.

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