



Vaccine Myths Training Module Transcript

Slide 1: Hello and welcome to Vaccine Myths & Misinformation, an educational video presented by The Immunization Partnership. This video will be narrated by myself, Ashley Beale, Program Coordinator and my colleague Rachel Walker, Program Coordinator.

Slide 2: The Immunization Partnership is a Texas-based non-profit dedicated to helping individuals, physicians, and others with an interest in immunizations to protect their communities from vaccine-preventable diseases. All across Texas, The Immunization Partnership conducts educational community forums and researches immunization best practices.

Slide 3: This presentation is made possible through partnerships and funding from our listed supporters.

Slide 4: Vaccine Myths & Misinformation is eligible for Nursing Continuing Education credits, through approval with the Cizik School of Nursing at UTHealth.

Slide 5: Viewers planning to receive Continuing Education credits must complete all three listed steps. 1) listen to the entire presentation, 2) submit the online pre-test, and 3) submit the online evaluation. Your certificate of completion will be sent via email. Please contact The Immunization Partnership's Education Manager, Katy Gore at kgore@immunizeUSA.org with any questions.

Slide 6: Before we get started, please note: all speakers and individuals on the planning committee have no disclosed conflicts of interest. Additionally, this presentation is for educational use only and does not constitute legal advice.

Slide 7: Hi, I'm Rachel Walker. Here is the agenda for today's presentation:

I will be covering the following sections: Vaccine Hesitancy, COVID-19 Myths, and How to Dispel Myths and Misinformation.

This is Ashley Beale, and I will be covering the following sections: Common Vaccine Myths and Misinformation, Misinformation: What is it? and Helpful Resources

Slide 8: We're going to touch briefly on vaccine hesitancy before jumping into myths and misinformation. Vaccine hesitancy is when an individual exhibits a delay in acceptance or refusal of vaccines.

Slide 9: In 2019, the WHO named vaccine hesitancy as one of the Top 10 Threats to Global Health.[1] We say "hesitancy is a spectrum" because there are a wide range of complex reasons as to why people are vaccine hesitant. Many have a lot of questions regarding vaccines in general. Some people only want

their children to take certain vaccines. The list goes on. We'll get into possible reasons one may be vaccine hesitant in the next slide.

[1] <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>

Slide 10: Why are people hesitant of vaccines? This Venn diagram shows four main categories of the reasons why an individual may be vaccine hesitant. Notice that an individual may only have one factor of vaccine hesitancy, a combination of two or three, or all four factors. This Venn diagram is a great reminder that vaccine hesitancy is individual, complex, and as stated previously, a spectrum. [2]

Complacency can be described as a belief that vaccines are unnecessary.

Convenience may be a factor related to barriers to access vaccines or other health services.

Confidence may arise when an individual has concerns about vaccine safety and or side effects.

And Calculation is best described as the process of weighing the pros/cons of vaccinating.

[2] Betsch C, Bohm R, Chapman G B. (2015). "Using Behavioral Insights to Increase Vaccination Policy Effectiveness." Accessed: <http://bbs.sagepub.com/content/2/1/61.full>

Slide 11: Here are some specific reasons why people may be vaccine hesitant:

Side effects – Some vaccines may produce mild side effects such as arm soreness or a low-grade fever initially. While these mild side effects are not uncommon or seriously concerning, they may cause some individuals to be concerned that a vaccine is dangerous or harmful. [3]

Mistrust in the health care system – there are many reasons why an individual may lack trust in the health care system. Many of these reasons are rooted in historical injustices as well as present day disparities in our society. An individual's race, ethnicity, preferred language, immigration status, sexual orientation, income, and education level may all impact their own level of comfort and trust of the health care system.

One example of a major injustice that contributed to mistrust in the United States' health care system (especially among those in the African-American community) took place from 1932 – 1972, when the U.S. Public Health Service began a study called the "Tuskegee Study of Untreated Syphilis in the Negro Male" in Tuskegee, Alabama. In this study, 600 black men (399 with syphilis, 201 without) were recruited to treat their "bad blood" – which was a local term that included syphilis, fatigue, and anemia. However, these men did not end up receiving the treatment needed to cure their ailments.

In July 1972, after a public outcry following an Associated Press story that condemned the study, the Assistant Secretary for Health and Scientific Affairs appointed an Advisory Panel to review the study. It was determined that even though penicillin was deemed a highly effective drug used to treat syphilis by 1947, researchers never offered it to participants. Instead, study participants who had syphilis did not receive treatment, and the disease ran its course. At the end of the review, the panel concluded that the participants were misled about their lack of legitimate treatment and not informed about the purpose of the study. They asked that the study be ended immediately. In November 1972, the Assistant Secretary for Health and Scientific Affairs formally announced the end of the study for good. [4] The Tuskegee Syphilis Study has left deep wounds and greatly impacted people's trust in the healthcare system and government, particularly among the African American community. It serves as an important

reminder that the events of the past and present can have significant impacts on an individual or community's trust in the healthcare system.

Additives – trace amounts of aluminum & formaldehyde are a common example of concerns about additives that contribute to vaccine hesitancy for some individuals. [3]

Religious beliefs – some vaccines are produced with animal-derived gelatin, which may be a concern for certain religious or faith communities. [5]

Overwhelming the immune system – some parents believe that babies get too many shots and worry it may adversely affect the baby's immune system. [3]

For this presentation, we will focus on the lack of understanding about the purpose of immunizations and lack of vaccine information. This overall lack of understanding about vaccines often leads to the creation and perpetuation of myths and misinformation. These days many people rely on social media and non-scientific mediums to get their information. As a health professional or community member you should learn how to identify and combat these myths. [5]

[3] <https://www.health.harvard.edu/blog/why-do-parents-worry-about-vaccines-2019080217406>

[4] <https://www.cdc.gov/tuskegee/timeline.htm>

[5] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4869767>

Slide 12: Now we are going to delve into common myths and misinformation about vaccines. As a healthcare professional, you have probably come across at least one of these myths in your lifetime.

Slide 13: Natural immunity means getting sick from catching a disease. Sometimes people experience stronger immunity naturally than by receiving a vaccine. On the other hand, this natural approach can be much more risky than beneficial. For example, if you want to become immune to the measles by contracting the disease, there is a "1 in 500 chance of dying from your symptoms." However, there is less than one-in-one million people who have experienced an allergic reaction side effect from receiving an MMR vaccine. [6]

A single natural infection usually makes an individual immune to a disease, whereas immunity from a vaccine can take several doses over time. Again, natural infection often has dangerous outcomes. The chickenpox, may lead to pneumonia. Haemophilus influenza type b (Hib), may lead to an intellectual disability. One may develop a brain infection from having rubella or liver cancer from Hepatitis B. Contracting measles may even cause death. [6]

Imagine the world from the perspective of your immune system. It does not matter where the virus or bacteria comes from. When your immune system does not recognize something in the body, it "attacks it, disables it and then adds it to the memory bank so it can react more quickly the next time it encounters it." [7]

Dose and the known time of exposure determine the main differences between a vaccine and getting the disease naturally [7]:

A dose is often larger when someone is exposed to viruses naturally. The immune response that develops will usually greater and as a result, so are the symptoms. When vaccines are developed,

researchers make sure the smallest amount of the virus or bacteria needed to generate a protective immunologic response are used.

Let's think about another scenario. Oftentimes, for children we do not exactly know the time of exposure to a virus or bacteria, but we do know when we bring a child to the doctor's office to get a vaccine. Essentially, we control when and where we are exposing them to viruses or bacteria that the vaccines protect against. In contrast, and more often than not, children may be exposed to viruses and bacteria from touching everyday objects such as books in school, door knobs, monkey bars, or even their toys.

Now we'll cover some vaccines that induce a better immune response than natural infection [7]:

First, the Human papillomavirus (HPV) vaccine has a better immune response than natural infection due to the high purity of the specific protein in the vaccine.

Next is the Tetanus Tetanusvaccine — People with tetanus disease are still recommended to get the vaccine because the toxin made by tetanus is so potent that the amount that causes disease is actually lower than the amount that induces a long-lasting immune response.

Then there's the Haemophilus influenza type b (Hib) vaccine — Many children under 2 years old normally do not have a good response to the sugar coating (polysaccharide) on the surface of disease causing Hib. The Hib vaccine is more beneficial than natural infection because it links this sugar coating to a helper protein that creates a long lasting immune response.

The pneumococcal vaccine works in a similar way to the Hib vaccine to create a better immune response than natural infection.

Lastly, the COVID-19 vaccine --- Because little is known about the long-term effects of COVID-19, experts recommend those who have already been infected to still get the vaccine. Re-infection with COVID-19 is possible and there are severe health risks associated with the disease. Some early evidence suggests natural immunity may not be long-lasting. [8]

Overall, vaccines protect us by control of scheduling exposure and with less amounts of virus or bacteria.

[6] <https://www.publichealth.org/public-awareness/understanding-vaccines/vaccine-myths-debunked/>

[7] <https://www.chop.edu/centers-programs/vaccine-education-center/vaccine-safety/immune-system-and-health>

[8] <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html#hadcovid>

Slide 14: A vaccine can infect you with the disease it's supposed to prevent. False. It is impossible to get the disease from any vaccine made with dead (killed) bacteria or viruses.

Vaccines like the chickenpox (varicella) and measles-mumps-rubella (MMR) are made from weakened (or attenuated) live viruses. As a result, children may experience a mild form of the disease. However, there is a very high probability that the child's symptoms will be much less severe than if the child was naturally exposed to the disease.[9] It is important to note, these types of vaccines may cause problems for children with weakened immune systems, such as those being treated for cancer.

In all, there is an extremely small risk of disease from vaccination. For example, the United States no longer uses the live virus, oral polio vaccine (OPV). The live virus was replaced with a killed form of the virus called the inactivated polio vaccine (IPV) and eliminated the possibility of immunization caused by polio, thanks to the successful polio vaccination program.

[9] <https://kidshealth.org/en/parents/fact-myth-immunizations.html>

Slide 15: Infant immune systems can't handle so many vaccines. Well...According to the CDC, getting multiple vaccines at the same time has been shown to be safe. Babies have stronger immune systems than you might think, and they can handle far more germs than what they receive from vaccines. [9]

Based on the number of antibodies present in the blood, a baby would theoretically have the ability to respond to around 10,000 vaccines at one time. Even if all 14 scheduled vaccines were given at once, it would only use up slightly more than 0.1% of a baby's immune capacity. [6]

Scientific data show that getting several vaccines at the same time does not cause any chronic health problems. A number of studies have been done to look at the effects of giving various combinations of vaccines, and when every new vaccine is licensed, it has been tested along with the vaccines already recommended for a particular aged child. The recommended vaccines have been shown to be as effective in combination as they are individually. Sometimes, certain combinations of vaccines given together can cause fever, and occasionally febrile seizures; these are temporary and do not cause any lasting damage. [10]

Based on this information, both the Advisory Committee on Immunization Practices and the American Academy of Pediatrics recommend getting all routine childhood vaccines on time.

[9] <https://kidshealth.org/en/parents/fact-myth-immunizations.html>

[6] <https://www.publichealth.org/public-awareness/understanding-vaccines/vaccine-myths-debunked>

[10] <https://www.cdc.gov/vaccinesafety/concerns/multiple-vaccines-immunity.html>

Slide 16: This image is a portion of a larger image from the CDC entitled, "The Journey of Your Child's Vaccine." This particular section explains how a vaccine is developed, approved, and manufactured.

Before a new vaccine is ever given to people, extensive lab testing is done that can take several years. Once testing in people begins, it can take several more years before clinical studies are complete and the vaccine is licensed.

The Food and Drug Administration sets rules for the three phases of clinical trials to ensure the safety of the volunteers.[11] Researchers test vaccines with adults first. In Phase 1, there are 20-100 healthy volunteers. In this phase, researchers focus on answering the following questions: Is the vaccine safe? Does the vaccine seem to work? Are there any serious side effects? How is the size of the dose related to side effects?

Phase 2 comprises of several hundred volunteers and concentrate on answering two questions: What are the most common short-term side effects? And...How are the volunteers' immune systems responding to the vaccine?

Lastly, in Phase 3 hundreds or thousands of volunteers are studied to answer: How do people who get the vaccine and people who do not get the vaccine compare? Is the vaccine safe? Is the vaccine effective? And what are the most common side effects?

The FDA only licenses the vaccine if its safe and effective and the benefits outweigh the risks. Then, the vaccines are made in batches called lots. Manufacturers test all lots to make sure they are safe, pure and potent. Once the FDA reviews the lots for safety and quality, the lots can be released. Also, the FDA inspects manufacturing facilities regularly to ensure quality and safety.

If you are interested in learning more about adverse vaccine events The Vaccine Adverse Event Reporting System and National Vaccine Injury Compensation Program keep track of those events and offer compensation for those harmed from vaccines.

[11] <https://www.cdc.gov/vaccines/parents/infographics/journey-of-child-vaccine-h.pdf>

Slide 17: Here is the next myth: If everyone around me is immune, then I don't need to be vaccinated. Here is the fact: If too many people don't vaccinate themselves or their children, they contribute to a collective danger, opening up opportunities for viruses and bacteria to establish themselves and spread.

Herd immunity (also called "community immunity") plays an important role in regard to stopping the spread of a virus. It happens when the majority of the population is immune from an infectious disease and as a result, provides indirect protection to those who have weakened or compromised immune systems. [12]

In order to achieve herd immunity, usually 50% to 90% of a population needs immunity (depending on how contagious the virus is). [12] For example, if 90% of a population is immune to a virus, 9 out of every 10 people who encounter someone with the disease won't get sick. Thereby, keeping the spread of infectious disease under control.

[12] <https://www.jhsph.edu/covid-19/articles/achieving-herd-immunity-with-covid19.html>

Slide 18: Ingredients in vaccines are harmful. Not true.

Today's vaccines use only the ingredients they need to be as safe and effective as possible.

Each ingredient in a vaccine serves a specific purpose [13]:

- for the production of the vaccine
- provide immunity (protection)
- And to keep the vaccine safe and long lasting

Initially, some of the ingredients used in vaccines may be concerning or even off-putting. But truthfully, the actual amount of what is contained in vaccines is far less than what we are all exposed to on a daily basis. The quantities of ingredients in vaccines are minimal and any ingredients are tested during vaccine safety trials.

For example, we'll first focus on aluminum. It is the 3rd most abundant element after oxygen and silicon. Aluminum is found in plants, soil, water, and air. In fact, infants ingest about 4.4 milligrams of aluminum in the first six months of life from vaccines, however, they ingest more than that in their diet alone. [14]

- Breast-fed infants ingest about 7 milligrams
- formula-fed infants ingest about 38 milligrams
- and infants who are fed soy formula ingest almost 117 milligrams of aluminum during the first six months of life.

Another controversial ingredient we'll touch on is formaldehyde. Formaldehyde raises concerns because high concentrations of it can cause cancerous changes in cells. However, all humans have detectable quantities of natural formaldehyde in their circulation. It is actually essential to our metabolism and is required for the synthesis of DNA and amino acids. The total amount of formaldehyde found in an average 2-month old infant's circulation system is about 1500x more than the amount an infant would be exposed to in any individual vaccine. [15]

[13] <https://www.cdc.gov/vaccines/vac-gen/additives.htm>

[14] <https://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/aluminum>

[15] <https://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/formaldehyde>

Slide 19: While this is one of the most prominent myths related to vaccines, the results of decades of research is clear - Vaccines do not cause autism.

To debunk this myth we must first understand its origins. The myth that vaccines cause autism gained mainstream attention following publication of a 1998 study, authored by an English researcher, Andrew Wakefield. Wakefield's study was published in the highly reputable medical journal, *The Lancet*, lending his work great credibility. The study hypothesized that the MMR vaccine (measles, mumps, rubella) caused autism through a series of events including intestinal inflammation. The study also hypothesized that this intestinal inflammation could trigger harmful proteins to enter the bloodstream and eventually harm the brain, leading to the development of autism. To support this hypothesis, the study highlighted 12 children with developmental delays, 8 of which had autism. All of these children had also received an MMR vaccine and complained of intestinal issues.[16] It is also important to note, that during this time, the number of vaccines children were receiving had been increasing, and at the same time diagnoses of autism were also increasing.[18] This helped set the stage for serious concern in the medical and research communities.

However, the study was flawed for one major reason - it did not analyze the incidence of autism among children who had received the MMR vaccine, as well as the incidence of autism in children who had not received the MMR vaccine. Without this comparison, drawing a clear connection between vaccines and autism is scientifically unfounded. At the time this study was conducted in England, about 90% of children had received their MMR vaccine, so it would be expected that some children who had recently received their MMR vaccine also developed autism.[16] Additionally, the age at which a child receives their MMR vaccine may overlap with developmental indicators of autism. This does not mean the vaccine lead to a child's development of autism. Results of the study were not able to be replicated, as the data was found to be fraudulent. Ultimately, the study was retracted from *The Lancet* on grounds of scientific misconduct, meaning the data was misrepresented. The author, Andrew Wakefield, also lost his license to practice medicine.[19]

Since this study was published, researchers have dedicated a great amount of time and effort into understanding if there is any connection between vaccines and autism. Numerous epidemiological studies have been conducted in a variety of countries and all found the same result, vaccines do not cause autism. One of the more notable studies was conducted in Denmark from 1991-1998 and included data on 537,303 children, of which 82% had received their MMR vaccine. The results of the study were published in the New England Journal of Medicine and found there was no difference in the risk of autism between the group of vaccinated and unvaccinated children. Additional studies have been conducted to determine if there is a link between autism and an ingredient used in some vaccines, thimerosal. Once again, researchers found no link between thimerosal and autism. [17]

While the science around this myth is clear, it lingers to this day. Part of this is due to the prominence that discredited researchers such as Andrew Wakefield have been given by the anti-vaccine movement. Additionally, while research into the causes of autism have progressed, there is still no known exact cause of autism, which leaves the myth of vaccines as a convenient scapegoat. What we do know is that the cause of autism is highly genetic and is likely linked to early development of the nervous system while in the womb. [16] Support for this genetic link comes from studies of twins. Researchers found that when one identical twin had autism, the chance the other twin would develop autism was greater than 90%. The same result was not found in fraternal twins, with only a 10% chance of the second twin developing autism being observed. Since identical twins have identical genes and fraternal twins do not, this helped prove the genetic component of autism. Further research has identified some of the specific genes associated with autism and the work continues to better understand autism's genetic component.

Finally, supporters of this myth often turn to the rise in autism diagnoses over the last several decades as evidence of a link to vaccines. Currently, the CDC estimates 1 in 59 children have been identified with an Autism Spectrum Disorder. This is an increase from years past, with prevalence in the 1980s being reported as 4 in 10,000 and 1 in 2,500 in the 1990s. However, we cannot compare autism rates over the last three decades, as the criteria for a diagnosis has changed numerous times and now include four variations of the disorder that were not all previously included. [20]

Prominent advocacy and educational groups such as Autism Speaks and the Autism Science Foundation clearly support the established science that there is no link between vaccines and the cause of autism.[20][21]

[16] <https://www.chop.edu/centers-programs/vaccine-education-center/vaccines-and-other-conditions/vaccines-autism>

[17] <https://media.chop.edu/data/files/pdfs/vaccine-education-center-autism.pdf>

[18] <https://autismsciencefoundation.org/what-is-autism/autism-and-vaccines>

[19] [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(97\)11096-0/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(97)11096-0/abstract)

[20] <https://autismsciencefoundation.org/what-is-autism/how-common-is-autism>

[21] <https://www.autismspeaks.org/what-causes-autism>

Slide 20: By now you've probably noticed that many myths and misinformation about the COVID-19 vaccine have been snowballing through social media and other non-scientific mediums. In this subsection, we'll discuss some common myths associated specifically with the COVID-19 vaccines released by Pfizer/BioNTech, Moderna, and Johnson & Johnson.

Slide 21: One of the most common myths regarding the COVID-19 vaccine is that it is not safe because it was developed and tested too quickly.

The emergency situation of the pandemic warranted an emergency response, but that does not mean that vaccine manufacturers bypassed safety protocols or did not perform adequate testing. Many manufacturers and governments around the globe invested significant resources into quickly developing a vaccine for COVID-19. [22] This unprecedented amount of financial prioritization, combined with prior research on other coronavirus vaccines, and the streamlining of government processes helped bring forth effective and safe COVID-19 vaccines in a rapid manner.

All vaccines in the United States go through rigorous testing before being authorized or approved. To receive emergency use authorization, the biopharmaceutical manufacturers must have followed at least half of the study participants for at least two months after completing the vaccination series, and the vaccine must be proven safe and effective in that population. [22]

The Pfizer/BioNTech vaccine was the first authorized vaccine for emergency use by the FDA on December 11, 2020. This vaccine was studied in approximately 43,000 people prior to its authorization.

The Moderna vaccine was authorized for emergency use by the FDA on December 18, 2020. Moderna enrolled more than 30,000 participants in their Phase 3 clinical trial.

Although these vaccines use mRNA technology to be developed in a rapid manner, mRNA technology is nothing new. mRNA technology is safe and has been studied for more than 10 years. mRNA vaccines can be developed in a laboratory using a DNA template (that can be standardized and scaled up), lending to a faster vaccine development process than traditional methods. [23] It is free from animal origin and synthesized without preservatives. [22] Other benefits of using this technology includes use of a non-infectious element and the potential for targeting multiple diseases. [23]

Finally, the Johnson and Johnson vaccine was authorized for emergency use by the FDA on February 11, 2021. Almost 40,000 participants were included in the Phase 3 clinical trial.

Even after a vaccine receives Emergency Use Authorization, the FDA and CDC monitor any safety concerns reported by the general public or among those in the clinical trials. Vaccine safety monitoring is a continual and ongoing process.

[22] <https://www.mayoclinichealthsystem.org/hometown-health/featured-topic/covid-19-vaccine-myths-debunked>

[23] <https://www.cdc.gov/vaccines/covid-19/hcp/mrna-vaccine-basics.html>

Slide 22: The Pfizer and Moderna COVID-19 vaccines are messenger ribonucleic acid (mRNA) vaccines. mRNA isn't the same as DNA. According to the CDC, mRNA vaccines work by instructing cells in the body how to make a protein that triggers an immune response.[23] Injecting mRNA into your body will not interact or do anything to the DNA of your cells because the mRNA never enters the nucleus of the cell where DNA is kept. Human cells break down and get rid of the mRNA soon after they have finished using the instructions to create an immune response to the virus.

[23] <https://www.cdc.gov/vaccines/covid-19/hcp/mrna-vaccine-basics.html>

Slide 23: Per the CDC, neither the Pfizer nor Moderna vaccines were developed with the live virus that causes COVID-19.[24] Both vaccines only deliver a portion of genetic material, the mRNA, from a part of the virus's spike protein. This information only allows the body to recognize and build an immune response to the spike protein and does not allow for replication of the whole COVID-19 virus itself. Similarly, the Johnson & Johnson vaccine also does not use a live portion of the COVID-19 virus. Like Pfizer and Moderna's vaccines, the J&J vaccine takes a small portion of genetic material used to create just a portion of the virus's spike protein. This genetic material is delivered via a portion of the common cold virus that is unable to replicate in the human body.

Therefore, the COVID-19 vaccine cannot make you sick with the SARS-Cov-2 virus. If an individual tests positive for COVID-19 after taking the vaccine, they were most likely infected right before or right after the time of vaccination. The vaccine would not have had a chance to provide enough of an immune response at that particular time.

It is important to note, that some individuals may feel unwell for a short period following administration of the vaccine. Common side effects reported by participants in clinical trials, as well as the general public, include pain at the injection site, mild fevers, headaches, fatigue, and body aches. While these side effects may be uncomfortable, they are all short term and should subside within a day or two of receiving the vaccine. Individuals should be prepared for possible side effects and understand that they are a side effect of the body's immune system working hard to build a response and antibodies to COVID-19, not symptoms of a true COVID-19 illness.

[24] <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/facts.html>

Slide 24: Some individuals who have already contracted COVID-19 may not believe they still need to be vaccinated. This is particularly important in populations where large portions of people have already had COVID-19 (such as long-term care facilities or other health care settings). Currently, the CDC still recommends individuals with a prior COVID-19 illness receive the vaccine. This is important for several reasons.

First, it is unknown how long natural immunity from a COVID-19 illness offers protection. Additionally, every person's own immune response is unique, and huge discrepancies in antibody numbers have been observed in people with a prior COVID-19 illness. What we do know, is that the antibody levels generated by a COVID-19 vaccine are far greater than what has been observed from any natural infection, meaning the vaccines offer the very best form of protection. While it is rare, scientists believe it is still possible for someone who already had COVID-19 to become reinfected. As new variants of COVID-19 continue to appear and spread, the chances for reinfection only increase.

If someone has had COVID-19 they need to be fully recovered before receiving the vaccine, according to current CDC guidelines. Additionally, anyone who has received monoclonal antibodies or convalescent plasma as treatment for COVID-19 should wait 90 days before receiving a vaccine.

[25] <https://www.cdc.gov/coronavirus/2019-ncov/your-health/reinfection.html>

Slide 25: One of the more outlandish myths about the COVID-19 vaccine is also the most straightforward to explain – the COVID-19 vaccine does NOT contain a microchip.

The vaccine does not contain a tracking device planted by the government or manufacturers. In fact, the ingredients of the Moderna COVID-19 vaccine only include the following: mRNA, lipids, tromethamine, tromethamine hydrochloride (both used to treat electrolyte imbalance), acetic acid, sodium acetate (salt), and sucrose (sugar). [26]

The Pfizer vaccine contains very similar ingredients to the Moderna vaccine: mRNA, lipids, four types of salt, and sucrose (sugar). [27]

Finally, the ingredients of the Johnson and Johnson vaccine include the adenovirus used to deliver the spike protein's genetic material, acid and acid stabilizers, and salts.

Based on the official ingredient lists provided by the FDA, none of the COVID-19 vaccines have the capability to implant a microchip and invade one's privacy.

Additionally, while the COVID-19 vaccines have been described as using "nano technology", which may sound highly technical or like something from a science fiction story, it's simply another way of describing the technology used in the vaccines. In this case, "nano" means "small" (either the mRNA or adenovirus) and technology is simply synonymous with "something we've created".

[26] <https://www.fda.gov/media/144638/download>

[27] <https://www.fda.gov/media/144413/download>

Slide 26: Now that we've debunked some of the most popular vaccine-related myths, we will cover Misinformation in a broader sense – what is it and how do you identify it?

Slide 27: Being able to identify false information is a critical first step when dispelling myths related to vaccines. False information can be broken into two categories; Misinformation and Disinformation. Both misinformation and disinformation have the potential to flourish and perpetuate inaccurate information, contributing to vaccine hesitancy.[28]

Misinformation occurs when conclusions are drawn based on wrong or incomplete facts.[28] Misinformation is not inherently deliberate or malicious, and therefore can often simply be corrected with factual information and explanations.

Disinformation, on the other hand, occurs when false information is deliberately spread in order to promote an agenda. Disinformation is deliberate and trickier to combat than misinformation.[28] In recent years, a well-organized anti-vaccine movement has emerged, with strategic attempts of spreading disinformation reaching the general public.

[28] <https://www.hsph.harvard.edu/ecpe/vaccines-social-media-spread-misinformation>

Slide 28: On this slide you will see two examples of Disinformation.

The image on the left is an Instagram post from a prominent anti-vaccine organization. This group has a clear and established agenda of weakening vaccine confidence and does so through the amplification of inaccurate posts like this one. This post is inaccurately correlating increases in childhood conditions such as obesity, autism, and asthma as being directly linked to childhood vaccines. As we know, correlation does not equal causation, and this post is deliberately ignoring established science that vaccines do not cause these conditions. However, a parent or caregiver could easily read this post, and without the

proper context or education, assume that it is true. Additionally, this post includes the link to the CDC's vaccine schedule – while not directly related to the content in the post, an individual could view the CDC link as "proof" that what they are reading is reputable.

The image on the right is also from Instagram, shared by a prominent anti-vaccine viral account. The posts and messaging from this page are clear attempts at spreading Disinformation as the intention of each post is to cast doubt on the safety, effectiveness, and morality of vaccines. This image is once again tying autism to vaccines – though indirectly, which can be confusing for individuals who do not have the proper knowledge to know that multiple longitudinal studies have established no connection between vaccines and autism. Additionally, this post brings up another common messaging tactic related to vaccine disinformation by downplaying the seriousness and risk of many childhood diseases, like measles. As time has gone on since these vaccines were introduced, more and more people lack first-hand experience with vaccine-preventable diseases and may mistakenly underestimate the health risk they pose. Those familiar with infectious diseases will understand that even a small number of measles cases are cause for concern in any population, as measles is a highly contagious disease and there will always be individuals who are either unable to or have not yet received their protective vaccines.

While large tech companies have made a more concerted effort in recent years to stop the spread of disinformation on their platforms, large accounts like these still exist and the shareability of this information on social media cannot be understated. Social media platforms remain one of the most prominent sources for vaccine misinformation and disinformation, and significantly contribute to both accidental and deliberate sharing of inaccurate information.

Slide 29: On this slide you will see a different example of Disinformation. This is the website from an organization called the National Vaccine Information Center. On the surface, both the website and organization seem to be an objective source for vaccine information (notice, the name is strategically neutral). However, further review of the information provided by this organization reveals a careful attempt to instill vaccine hesitancy by strategically highlighting different issues related to vaccines, such as autism, ingredients, and government mandates, without presenting the full set of information. This is problematic as once again, someone without the proper education would not know they are not receiving the full story and could begin to form hesitant or negative opinions about vaccines, believing they are receiving neutral information.

This page once again visits the autism and vaccines myth. While there is no text on this page that explicitly states, “vaccines cause autism”, the use of several tactics highlighted on the right lead the reader in that direction. First, we see that this page highlights the story of one individual mother and child’s experience with autism. This is a useful tool to grab a reader’s attention and humanize what is oftentimes a science-heavy conversation. Additionally, it plays on the emotions of parents and caregivers, who already want to do the very best for their child.

The next highlighted statement does not explicitly mention vaccines, however by calling out unknowns surrounding the causes of autism in this larger paragraph, a reader without the proper knowledge and education would be likely to infer a connection between childhood vaccines and autism.

Finally, this paragraph mentions the “autism-vaccine connection” but does not mention the fact that it has been debunked by numerous studies, scientists, and physicians since originally being introduced.

Introducing this phrase without providing the full context of the issue is an attempt to raise skepticism and could contribute to an individual's vaccine hesitancy.

This website is important to remember, as it is a great example of the many faces of vaccine disinformation – some, like the social media examples are more obvious, while others like this website, can masquerade as valid and objective information by using professional design, less inflammatory language, and carefully cherry-picking sources.

Slide 30: Misinformation and disinformation can be spread in a variety of ways but have really taken off due to technology and the open platform available on the internet. Social media platforms and other blog mediums are generally free and not vetted, allowing anyone to post their thoughts and opinions. This can become a problem when someone begins to post inaccurate information and it is taken as fact. Experts point out that prior to the rise of social media, typical news stories were researched and checked before being reported – this review component is missing on social media.[28] As mentioned previously, several large tech companies have started to try to combat misinformation on their platforms, however, disinformation is still flourishing.

Additionally, many social media posts surrounding vaccines prey on the emotions surrounding parenthood and doing what is best to protect your child. This emotional element of vaccine information can be used to create or contribute to a person's vaccine hesitancy.[28] As shown in the previous examples, many inaccurate posts about vaccines also assume correlation with causation, without providing ample evidence to connect these claims to vaccines. This can be confusing to individuals who may be unfamiliar with how scientific studies are managed and analyzed.

[28] <https://www.hsph.harvard.edu/ecpe/vaccines-social-media-spread-misinformation>

Slide 31: Ultimately, the effect of cumulative exposures to misinformation and disinformation poses a great threat to the health and safety of individual children, as well as the communities they live in. Immunization advocates understand the importance of vaccines, but for all the reasons previously listed, vaccines have been taken for granted, and even worse, villainized. Preventing future outbreaks of horrible diseases like measles, hepatitis, and polio, means that we must actively combat vaccine misinformation.

[29] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7090020/>

Slide 32: Before you can address misinformation and disinformation, you must first know how to spot it. Here we see 4 steps from the organization Stronger, which is focused on fighting misinformation, particularly online, and defending vaccines. [30]

First, Check the Source: One of the most important aspects of online information involves where and who the information is coming from. Are they reputable? Do they have a clear agenda and what is it? Is the rhetoric open and honest, or divisive?

Next, Check the Date: Knowing when the information you are viewing was originally created is critical. Depending on the content, newer studies and information may be available on the topic. Additionally, old news videos and interviews may resurface to illicit reactions in the present – do not be fooled into assuming all content is "new".

Check the Data and Motive – In other words, what claims are being made, and what is the proof? Are these claims objective, or is there a deeper motive? Do they include all the evidence, or only evidence that supports this claim. Remember, cherry-picking data and sources is not the same as objectively presenting all of the accurate information available.

Finally, are you Still Unsure? Try using a reputable fact-checking website, like FactCheck.org or Snopes.com to double check any confusion you may have about the source at hand.

While it can be tempting to share information on the internet in the moment, following these steps can help ensure you don't inadvertently contribute to the spread of vaccine misinformation.

[30] <https://stronger.org/spot-misinformation>

Slide 33: Knowing how to dispel myths and misinformation related to vaccines is important to addressing vaccine hesitancy. Whether you are speaking with a patient in a medical practice, a concerned parent as a school nurse, or a close friend or family member, everyone can help speak truth to vaccine myths. Let's review some general guidelines to keep in mind, as well as learn a specific technique to use when addressing vaccine myths or when speaking with vaccine hesitant individuals.

Slide 34: When dispelling vaccine misinformation or talking to vaccine hesitant individuals, it's important to keep several general things in mind.

First, be knowledgeable about the established science on the issue. Presenting strong evidence in a simple format that is not overly technical is essential to helping individuals understand the truth about vaccines. Again, not focusing so much on restating the myth is important here – the goal is to starve it of oxygen. Instead, double-down on evidence-based science to help refute the claim.[28]

While it's important to come prepared with the proper science and information, it is just as, if not more important to balance those facts with empathy and understanding. As we've seen in previous examples of Disinformation, many anti-vaccine messages are successful because they rely on a person's emotions. While we'd like to believe that individuals make decisions about vaccines based on hard science and data alone, we must acknowledge that there is an emotional element at play in these decisions. A dismissive tone or attitude to a parent's emotional concerns about vaccines is unlikely to put their mind at ease or reduce vaccine hesitancy. A gentle balance must be struck to ensure the delivery of evidence-based science is not done in a way that ignores the warranted emotions of a parent.[31] Remember, vaccine hesitant parents have their child's wellbeing in mind. Additionally, vaccine hesitation and fears may be different based on an individual's own cultural background, and it is important to keep this in mind. An individual's age, race, ethnicity, native language, religion, and immigration status may all influence their beliefs and comfort level with the healthcare system.[31]

Understanding the unique perspective of each person you speak to will help you to tailor your message to be the most effective.

Tailoring your message to best suit the specific audience you are engaging with is also crucial. Detailed science and journal articles are unlikely to convince most people – you will need to explain the science in a way that people can relate to their everyday lives.

[28] <https://www.hsph.harvard.edu/ecpe/vaccines-social-media-spread-misinformation>

[31] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5405806/>

Slide 35: One approach to dispelling misinformation that we will focus on is called motivational interviewing. Motivational interviewing is a counseling method that helps people resolve ambivalent feelings and insecurities to find the internal motivation they need to change their behavior.¹ The tools of motivational interviewing can be used to steer conversations in a conducive manner, so an individual feels motivated to make a behavior change on their own.

Motivational interviewing has been found to be a great approach to use when having conversations with vaccine hesitant individuals. Let's look at some of the specific aspects of motivational interviewing and discuss how they can be used when addressing vaccine hesitancy.

[32] <https://www.psychologytoday.com/us/therapy-types/motivational-interviewing>

Slide 36: The goal of motivational interviewing is not to necessarily resolve an individual's problems – the goal is to allow the individual to become more introspective and help resolve their ambivalence. With this approach they will have a better chance of finding an acceptable resolution on their own. [33]

The interactive OARS framework highlights essential aspects of motivational interviewing that include; asking open-ended questions, giving affirmations, listening in a reflective manner, and summarizing what someone says. Although this model is meant to be patient-centered, one may also use the strategies when speaking to friends, family members, or anyone else who may be hesitant. It is vital to use verbal and non-verbal skills, as well as having a culturally sensitive mindset when addressing concerns. [34]

Next, we'll go over each aspect of OARS in detail, along with examples of each.

[33] <https://clinmedjournals.org/articles/jfmdp/journal-of-family-medicine-and-disease-prevention-jfmdp-3-069.php?jid=jfmdp>

[34] https://rhntc.org/sites/default/files/resources/2017-10/fpntc_oars_model_2016.pdf

Slide 37: It is important to ask open-ended questions, rather than “yes” or “no” questions. It gives the person the opportunity to respond freely without the pressure or fear of being right or wrong. [33] These type of questions allow the patient to tell you their story, and also allows you to gain a better understanding of their personal happenings. These answers often reveal the individual's inner most thoughts, feelings, hopes, and experiences. [34]

Here are some open-ended question examples:

- What brings you in the clinic today?
- Tell me more about why you are hesitant to vaccinate your child...
- Who have you talked to about vaccines?
- What questions do you have for me?
- Where do you feel comfortable getting information about vaccines?

[33] https://www.aafp.org/fpm/2011/0500/p21.html?source=post_page-----

[34] https://rhntc.org/sites/default/files/resources/2017-10/fpntc_oars_model_2016.pdf

Slide 38: Expressing empathy towards the person's concerns is a powerful tool. When you give affirmations you build rapport and encourage the individual's strengths and abilities by building on their level of self-efficacy (or the belief in one's own abilities). Keep in mind, the key to affirming is to share a belief you have about the individual so they are responsible for their own decision making. [33]

Some affirmation examples include [34]:

- You're obviously really good at...
- You handled yourself really well in that situation.
- It sounds like you've been very thoughtful about your decision.
- I appreciate that you are willing to talk to me about vaccines.

[33] https://www.aafp.org/fpm/2011/0500/p21.html?source=post_page-----

[34] https://rhntc.org/sites/default/files/resources/2017-10/fpntc_oars_model_2016.pdf

Slide 39: Oftentimes, concerned individuals have the answers within themselves and your role as the healthcare professional or as a knowledgeable source of accurate information is to simply help them realize those answers. Reflective listening is a technique when you listen, observe, and reflect on what the person shares with you. You should reflect on the words they use and pay close attention to their behavior and tone when they speak. It is also essential to acknowledge the person's mood. When you reflect their words and/or emotions, the individual has a chance to hear your perceptions and experience of what they shared. [33]

Some examples of reflective listening may play out as follows [34]:

- You seem frustrated when you talk about vaccines...
- I noticed you smiled when you said that...
- You mentioned that you won't vaccinate your child because you aren't sure of the ingredients. That seems to make these check-up appointments very stressful for you.

[33] https://www.aafp.org/fpm/2011/0500/p21.html?source=post_page-----

[34] https://rhntc.org/sites/default/files/resources/2017-10/fpntc_oars_model_2016.pdf

Slide 40: Summaries are a great way to bring an interaction to a close. You can keep the conversation moving by summarizing the dialogue exchanged between you and the individual from the beginning, middle, and end. Be sure to check the understanding of their goals and in turn, confirm the individual has understanding for the way ahead. This is the perfect time to correct any misunderstandings or touch on anything that may have been missed. [35]

There are a few different ways to summarize a conversation: a collective summary, a linking summary, and a transitional summary.

Here are some examples [34]

A collective summary – “So what I’m hearing is...” A collective summary is a more generic statement referring to a series of interrelated items that you and the individual talked about during the exchange.

A linking summary – “When you first came in you said you wanted to talk to your wife about allowing your child to get vaccinated...would you like to talk more about how to do that?” A linking summary is when the individual says something that stands out to you during the conversation and is linked back towards the end of the exchange – in which you address the statement that stood out to you and provide suggestions for a resolution upon request.

A transitional summary – “We’ve just gone over the next time you are scheduled to bring in your child for their booster. Remember, we’re always here to help if you have concerns. Do you have any other questions before you leave today?” A transitional summary is when you reflect on the purpose of the exchange and signal a shift for something new.

The four techniques of motivational interviewing that we just discussed are critical in communicating effectively and empathetically with the concerned individual. It allows them to become aware in their hesitations and increase their motivation to change.

[34] https://rhntc.org/sites/default/files/resources/2017-10/fpntc_oars_model_2016.pdf

[35] Safren, S. A., Naar, S. (2017). Motivational Interviewing and CBT: Combining Strategies for Maximum Effectiveness. United States: Guilford Publications.

Slide 41: Now we’ll use the techniques from OARS to go through a scenario between a nurse and a patient, discussing the patient’s hesitation about the COVID-19 vaccine, related to misinformation they saw on social media.

The nurse starts by asking the patient an open-ended question:

Nurse: How can I help you today?

Patient: I’m scheduled to get my COVID-19 vaccine today, but I really don’t know if it’s safe. I saw on Facebook that it could change my DNA.

Next, the nurse affirms the patient.

Nurse: It’s clear that you care about what you put in your body and that is very important. However, I can assure you that the vaccine is safe and does not change your genetic make-up. According to the CDC, *here the nurse gives details explaining why vaccines are safe”

Patient: Okay, thanks for explaining why it’s safe. It’s just really scary. *the patient then begins to discuss their fear of how the vaccine works*

The nurse continues to carefully listen to the patient’s fear about how the vaccine works in the body.

Slide 42:

After listening, the nurse reflects on the patient’s emotional response when expressing their concerns.

Nurse: I noticed that your voice sounded shaky when you talked about your fear of how the vaccine actually works – and that’s okay. Let me explain the process... (nurse gives simplified explanation of the science behind how the vaccine works in the body)

Patient: Thanks for explaining the process. That makes me feel much better.

In this scenario, the nurse uses a transitional summary to ease the patient’s safety concerns about taking the vaccine.

Nurse: We’ve just gone over why vaccines are safe and how the COVID-19 vaccine works in your body. Remember, we’re always here to help if you have additional concerns. Do you have any other questions before we administer the vaccine?

Patient: No, I appreciate you breaking it down for me. I think I’m ready to take it.

Again, this was an extremely simplified scenario highlighting how to use the OARS technique when speaking to a patient. Not all interactions will play out with such ease. Motivational interviewing helps the healthcare provider build a trusting rapport with the patient. It is also a great way to help patients identify their personal beliefs and feelings in order to assist in developing a new outlook on their initial hesitations or concerns. While our example has focused on a clinical-based interaction, motivational interviewing is a technique that can be applied to any conversational setting.

Slide 43: Now we’ll discuss some helpful resources that cover immunization best practices, general knowledge about vaccines, and combatting misinformation.

Slide 44: The first helpful resource listed is the Advisory Committee on Immunization Practices (ACIP) “General Best Practice Guidelines for Immunization.” This report will help vaccination providers to assess vaccine benefits and risks, use recommended administration practices, understand the most effective strategies for ensuring that vaccination coverage in the population remains high, and communicate the importance of vaccination to reduce the effects of vaccine-preventable disease.

Next is the Center for Disease Control and Prevention’s (CDC) “Pink Book.” The Pink Book is the nickname for the Epidemiology and Preventions of Vaccine-Preventable Diseases publication. It provides health care professionals with the most comprehensive information on routinely used vaccines and the diseases they prevent.

Slide 45: The Children's Hospital of Philadelphia has wonderful information on their site including the “Vaccine Education Center.” This resource provides up-to-date and reliable information about vaccines to parents and healthcare professionals. It is vetted by the Global Advisory Committee on Vaccine Safety.

The “Understanding Vaccines” section of PublicHealth.org discusses vaccine understanding, explains how vaccines work, and discusses vaccine myths.

And lastly, Stronger.org is an excellent resource as it is the first vaccine advocacy campaign to focus on the root cause of vaccine hesitancy - misinformation. Their goal is to stop the spread of harmful misinformation about science, medicine, and vaccines.

Slide 46: Be sure to follow us on Twitter, Facebook, Instagram, and LinkedIn.

Also, if you'd like to stay updated on the latest information from The Immunization Partnership sign up for our alerts at www.immunizeusa.org.

Slide 47: People like you are vital in helping promote the importance about how to eliminate vaccine-preventable diseases from spreading in your communities. We hope you will take the tools, strategies, and resources you've learned about to help you navigate situations where you may encounter vaccine myths and misinformation. The work is ongoing as organizations like The Immunization Partnership and healthcare professionals like yourselves work to push the message that vaccines are safe and effective.

Immunize. Prevent what's preventable.

Slide 48: N/A

Slide 49: If you have any questions about this presentation please reach out to myself, Ashley Beale or my colleague, Rachel Walker, at The Immunization Partnership. Thank you for listening.