Transcript of Answering COVID-19 Questions with Erick Arellano, MSN, RN, Np-C, PCCN

Intro

Well, guys, my name is Erick Arellano. I did a presentation on COVID the other day. I'll let you know a little bit about who I am. I've been at this church for a while. But I'm a nurse. I'm a nurse practitioner right now. I've been a bedside nurse over at HEB Hospital for about 13 years on the progressive care unit. That is to say that I take care of very sick people, and through the pandemic, we've been the COVID unit, so I'm pretty well versed in COVID. I know a lot about the disease, but, certainly, there are things that I don't know. So what I want to do is I want to share what my experience is with it and some of the information that I know and answer some of the questions that have come back since we talked last time. Once again, I won't tell you anything that I don't know, and if there are questions that come that I don't have the answers to, I'll get them for you, and we can figure out a way to get them to you.

How was the vaccine developed and tested so quickly? How does it work?

The short answer is the technology was available and we threw a whole bunch of money at it. So a lot of people get kind of hung up on this because they think that the technology just kind of popped up. The technology that we are using for the messenger RNA (mRNA) vaccines from Pfizer and Moderna has really been around for a number of years. I first read about Moderna and the way in which they were approaching this whole thing back in 2017 where they came out with this new way of putting a medicine in someone and their body making its own medication. At first I thought this would be great for Alzheimers or other things -- these different applications. Moderna was really thinking about vaccines for cancers and different types of viruses. I found a really neat article from January of 2018 that spoke specifically about messenger RNA vaccination and that even highlighted the work of Moderna and BioNTech and the way in which they were doing that. It talked about how they had already had clinical trials on animals for different types of viruses like influenza, zika virus, cytomegalovirus, hepatitis C, rabies, even HIV, and it was all in the works and it was all giving pretty good results.

To go further with this, and to tell you about how the stuff works, it helps to have a good idea of how a virus works. So I want to go ahead and show you just with an example. I have a syringe, and it has a needle on it. Some viruses are actually shaped like this. The way a virus works is you have a body of a virus, and it has genetic material in there, and then you have a little spike like a needle. We call it a "spike protein". The virus floats around until it gets to the place where it can attach to a cell, and it uses the spike protein to go inside and once that's done, it will inject the genetic material into the cell. That genetic material finds some of the protein factories called ribosomes in our cells and they pump out a whole bunch of different viruses and then once the cell is depleted, those viruses are pushed out to find other cells to replicate over and over and over again. I want you to keep that image in mind of the virus body and the protein that actually goes into the cell. I'll set this aside and we'll actually talk about that a little bit later.

To actually have an understanding of how this whole thing worked. When they first got the genetic sequencing of COVID-19, it took them about 40 hours to completely decode the entire genetic sequence of the virus. Once that decoding was done, it was through a lot of drama, it was actually published publicly. On Saturday, January 11, 2020, it hit the internet. On Monday, January 13, Moderna, even though they only had a couple days, had already developed a working vaccine. On February 7, their first clinical batch of virus was completed. About 25 days from the day they decoded the whole genome to the time they manufactured a whole bunch of it. We threw a whole bunch of money at it. About May 15, they had Operation Warp Speed and they had a boost for their development and were finishing up the Phase 1 trials. They were already in clinical trials.

So going back on how the virus works. I want you to understand. When I say they decoded the genome and they had the whole genetic makeup of the virus. They looked at it and they looked for patterns and what they found was the genetic material for tjust the spike on the needle. It wasn't the whole virus, but just the spike. When we put the blueprint of just the spike in the protein factories of your cells, you make a whole bunch of these [holds up cover]. And when these enter into the bloodstream, your body makes antibodies just to this. So it makes a whole bunch of "caps." That way, when it sees a "needle," you have a "cap" on it. That's how messenger RNA works. When you see a virus after having the vaccine, your body is going to recognize just the spike part of it. Since it's already seen the spike part, it has a bunch of antibodies for that particular protein. And that fits on there like that and then all of a sudden the virus can't enter into the cell. All that is to say that the technology was already at hand. We had already developed it, and it was ready to go for just an application just like this. That's how we were able to get it done so quickly.

As of right now there is not enough evidence to say that we need a third vaccine to add on top of what we already have, but as we get that data, you might see that change and they might say that we need a third shot of what we already had. Or they make a booster to address those variants of concern to help us get immunity for those variants. The whole goal is to make sure that we are all as protected as possible against the virus.

What is the likelihood I might get COVID-19 if I have been vaccinated? What's the big deal about the Delta variant?

Anecdotally, just what I've seen at the hospital so far since the vaccine has been going since the beginning of January when we talk about breakthrough infections, I've only seen two. A breakthrough infection is someone who comes down with COVID pneumonia or a COVID infection after having had two weeks pass since the completion of vaccination, whether that's the one shot for the Johnson and Johnson vaccine or the two shots for the Pfizer or Moderna vaccine. THe first one that I saw was back in May. Knowing how the virus was at that time, that was probably just a breakthrough infection from the original strain. The second one I got just the other day. Knowing how prevalent the Delta strain is, odds are he's probably got it. As of right now, it's about 83% of all the COVID infections throughout the nation are the Delta strain. I don't know the genetic sequencing of that particular person because we don't necessarily order that

at the hospital. Again, I've seen two breakthrough infections. Both of them have been vaccinated. All of my other COVID infections that I've seen at the hospital have been among unvaccinated patients.

I've looked around to see what exactly the hospitalization rate is for people that are vaccinated versus unvaccinated. Of course, there's a whole bunch of different places. I like to look at sources that I know have credibility -- sources like the CDC -- or sources really from teaching institutions -- Mayo Clinic, UT Southwestern, Johns Hopkins, UC Davis typically has a lot of good stuff. Actually, I looked at UC Davis earlier and it said that what they saw was about 97% of COVID hospitalizations are unvaccinated people. I looked at the numbers a little while ago from our hospital over at HEB, and it kind of matches that. I had about 30 patients today and just the one guy who was vaccinated out of all of them, and that's right at about 97% unvaccinated patients. Now that's not to say that infections aren't higher in vaccinated people because breakthrough infections still happen.

When the vaccines first came out, the efficacy on both of them -- meaning the percentage of people who actually get the virus even though they are completely vaccinated -- was still about 5-5.9%. From the beginning we knew that just having the vaccine wasn't going to completely prevent everyone from getting the virus. The purpose of having the vaccine to begin with was yeah to hopefully prevent you from getting infected, but also to prevent symptoms from happening that were so bad that they would land you in the hospital. So people typically when they have an infection, a breakthrough infection after being vaccinated, they would just have a lesser event of symptoms. Their symptoms wouldn't be as severe. So when we talk about the vaccinations themselves, it kind of goes into another conversation of how effective they are against the Delta variant.

I'm sure a lot of you all may have seen in the news that Israel had published some studies that the Pfizer and Moderna vaccines efficacy numbers were a lot lower. They said about 39% effective. There are some questions on that study. THere was another study that was published by the *New England Journal of Medicine* that really talked about what the UK was saying or was seeing. The UK saw that it was still about 88% effective, so there's a little bit of discrepancy there. What the Israeli study did show was even though there was more people that had the vaccine that would get a subsequent infection it was still very effective at preventing those people from going to the hospital. So about 88% effective against hospitalization. Again, this is the Israeli study. And it was 91% effective against severe illness -- the illness that is going to land you in ICU on a ventilator or worse even. The *New England Journal of Medicine* article that was citing the UK data, we didn't have the outcomes yet, so we don't know about the hospitalization rate or severe illness with that. We just know that it seems to be a lot more effective from what the UK is seeing.

All this talk about breakthrough infections leads to the next point. This is one of the reasons why masking is still being talked about as being really quite needed right now. Because even though you get the vaccine, you can still be infected, and if you're infected, you can still spread it. The big difference between the Delta variant and the original variant isn't necessarily that the

symptoms are worse because the symptoms are the same. The big difference is that the Delta variant is a lot more contagious than the initial strain -- up to four times more contagious. That's a huge things we're talking about right now and one of the big reasons why masking is so important. We want to prevent the spread of the virus.

How do we best protect our children, especially those who are not yet able to be vaccinated?

Are kids more vulnerable to the new strain? I have two kids. Y'all see them at church, I'm sure. If you haven't you're missing out. One's nine, and one's just starting kindergarten. So, I've got a lot in that game right now. I'll tell you, as of really the other day, the American Academy of Pediatrics recommends that all kids over two years old should wear masks at school. When it comes to the symptoms of the virus to kids, they typically seem to fare better than adults. This has been true since the beginning, last March, up until now. Kids typically do better. They're sick for a couple of days if they're sick at all and then they're ok.

Again, the problem isn't necessarily the symptoms as much as it is the spread. When we talk about illnesses like the flu, and we've all seen those years in the past, and our teachers have seen those years in the past, where their classes are wiped out because of the flu, well, the spread of this think can be . . . will be . . . is a lot stronger, a lot more virulent than those other strains. When I consider some households and I consider a student that could be exposed to it or a student that actually contracts it coming into a multi-generational household, all of a sudden, there's people that are going to react differently than a typical kid would. And that's really what the fear is. If a kid gets the virus and brings it home to Grandma and Grandpa, it's a whole different ball game that we're looking at. The odds are in everyone's favor that hopefully they'll have mild to moderate symptoms. About 81% of everyone that gets the virus are going to have zero symptoms to moderate to mild symptoms. About 14% are going to have severe symptoms, and that will land them in the hospital where they will need supplemental oxygen or otherwise. That remaining 5% are going to end up in ICU. The whole goal is to make sure that we're taking care of the 19% of the people in the hospital. We don't want you to get there. If we can prevent all of this incidence by keeping our kids from exposure, that's in our better interest. That's why the American Academy of Pediatrics wants them to wear a mask right now.

Just like it's concerning for a kid to bring the virus to the family, it's also concerning for us that may have been exposed to spread it to other kids. So, my kids, being as young as they are, nine and six, going to be ten and six, they're not vaccinated. So we have this whole swath of kids that are under 12 years old that can't receive the vaccine, so we have a little bit of an added motivation to keep them safe, which is why it's important for us to wear a mask and it's also important for them. Because, again, with the symptoms being lesser, we don't want them to spread it. Now there are a lot of kids out there that have a lot of different things wrong with them. My neighbor's grandkid has a really bad case of asthma and a lot of pulmonary issues. So when we have these kids that have underlying comorbidities, a virtual infection, really any kind of viral infection, but especially something like this, can really do a number on them, and they can end up in the hospital. They don't necessarily have the same type of fight that we can.

Their reserves tend to be a lot lower, so we kind of owe it to them to keep them as safe as we possibly can.

What are the most important statistics to watch? What is happening in our local hospital?

There's a lot of statistics out there associated with COVID-19, really from the beginning of the pandemic to now that we've all been accustomed to hearing about, but maybe not necessarily been accustomed to knowing which ones are important to watch. We hear things like positivity rates and overall hospitalizations and ICU bed capacity, deaths, overall percentages, all of these things. The question was which ones of these stats are the ones that are most important or which ones of these stats are the ones we need to look at. It kind of helps to kind of know what they are talking about.

So when we are talking about positivity rates, it's exactly that. Out of all the people that get tested for COVID-19, what's the percentage of them that are actually positive. To think about that number, if that number gets really high, it can mean one of two things. Either there's not a whole lot of testing going on at all. If I have 10 people that I test and four out of the 10 are positive, that's a 40% positivity case. That's really, really high, but that's not a very big sample number to choose from. If it's high, what it probably means is that you need more testing done. That's for a couple reasons. One, because you're not actually getting a good representation of your sample size. But also because there's a whole bunch of people out there who might have mild symptoms who don't get tested. People that end up having a cough because they think it's allergy season, but in all actuality, they actually have the virus. If we were to test those people and see that positivity, well, if we tested more of them rather, what we would see is a bigger sample size, and that number would go lower. Positivity rates can be kind of tricky. If it's very, very low, either we're testing way too much or, the more likely outcome, is the numbers are actually decreasing, which would be a blessing. So positivity rates is kind of tricky, and you have to take it in context.

Deaths is something that we're always focused on, and really because it's a reminder. It's a reminder of the cost to society that we've had to go through. The mortality rate for COVID-19 up to this point is about 1.8%, and a lot of that 1.8% is owned by our older populations, the people who can't fight against the virus as well as younger people. As incidence goes up, as our numbers go up, our deaths will go up. The hard part about that particular metric isn't necessarily in the number as much as it is in all of what happens before we get to that number. When I treat people at the hospital, I treat them for weeks at a time. If they're the type of person that has a low likelihood of making it, I can guarantee that they are going to be at the hospital for several weeks, and it's the drama and the defeatedness and the pain of the family and the pain of the patient and all those things that goes wrong with their body for those weeks up until that time. So a lot of times when you see a spike in the numbers, you'll see a small spike in the deaths later, and that's the part that you have to consider. It's not just the fact that people are dying, but all that they go through before they get there, and it's gut-wrenching. So it's a reminder of exactly what we go through.

The other stat that I think is rather important, and I'm kind of biased because I work in a hospital, is the hospitalization rate. It's important. When we were at our peak in early January/late December, we were overwhelmed, and we had about 60% of our hospital beds there at HEB that were dedicated to COVID. The hard part about that isn't that I'm treating these people, because we're going to do that. The hard part about that is that I'm going to be treating these people for a very long time. Not all of them, but a good deal of them. And if your mom were to come in with a stroke, I couldn't do anything about it. Hospitalization rates are important. If our hospital system is inundated with COVID patients, and you have a GI bleed or you have a chest pain, and I don't have anywhere to put you, that's a real problem. The wonderful thing about the vaccine -- again-- hopefully it prevents you from getting the virus to begin with. Two, if you do get the virus, your odds are very good that you're not going to become sick enough to become hospitalized. The more people that are covered and protected from that severe case of the virus opens up our hospital beds to do exactly what we need to do. We can do surgeries. We can treat for strokes and heart attacks and GI bleeds and renal failure and pneumonia and all of the things we need hospitals to do. But when we're plugged up with COVID pneumonia, it limits our ability to be able to take care of our people, of our family. And if you're the type of person or you know the type of person that's sickly and that has been in the hospital over the years, that's the person that's going to get affected even if they never come down with the virus. Hospitalizations are by far, in my opinion, the important metric.

Why is it important to wear a mask? What are the best mask to wear?

Masks have a pretty interesting function. I want to reach over here and grab my mask real quick. So, I'll tell you, I have a lighter here and I'll show you something. This is the mask I use at the hospital. It's a surgical mask, and this is a really good mask. This is what's kept me clean throughout the entirety of the pandemic. This is the type of mask that I use when I'm taking care of COVID patients that aren't on a lot of supplemental oxygen. I wear an N95 type mask for those. Actually, OSHA changed their regulation on it a few weeks ago, and we wear N95 masks for all COVID patients, so we changed a little bit. Rest assured that through the bulk of the pandemic that this is what I was using if someone was just on a little bit of oxygen -- like six liters or less. Six liters is actually kind of high, but this is what I was using. I'll tell you that when I used this mask, I was very, very close to people. When I say very, very close to people, if you've ever been in a hospital, sometimes you need nurses to be in your intimate bubble. We'll say it like that. So with this mask, having been as close to someone's face as I can possibly be, this has kept me safe.

A mask is designed more to prevent the spread of something than it is for me to prevent catching something. What I mean by that is that masks have to have a very good seal around your face for them to work. A lot of cloth masks don't have a very good seal. Cloth masks, some of the masks that I have, they do a very good job of preventing me from spreading something. One of the arguments, or one of the debates really, throughout the pandemic is who wears a mask and when and why is it that everyone needs to wear a mask together. If you can imagine me putting this mask on and then if you would imagine me trying to blow out a candle or a

lighter, I'd have a hard time doing it. The reason for that is because this mask muffles what comes out of my mouth. A cloth mask or a sub-optimal mask is going to do the same muffling. If I'm actually infected and I don't know it. If, in other words, I have the vaccine, and I actually become infected but don't have enough symptoms to really get tested, I can still spread the virus. So as a vaccinated person, wearing a mask is important because it's going to muffle whatever comes out of my mouth. If I were to blow through it to try to blow out a candle, I couldn't do it. I tried this morning, and it was an impossibility. If the person next to me is also wearing a mask, it ensures that whatever is coming out of their face doesn't project forward and it falls. If you've ever gotten a water bottle and just kind of sprayed it out in the air and you've seen the water droplets go out and then fall. That's what happens. That's why masks are important.

Now, masks with the good seal around the face have the added benefit in that they do prevent you from breathing in these water droplets. Surgical masks have been shown to be the best at that. N95 masks are clearly the gold standard, but sometimes they're kind of hard to find and they are even harder to wear. It becomes harder to do. Certainly, masks are important. The more of us that wear masks when we're all together indoors regardless of whether you're vaccinated or not lessens the chance of anyone that's infected, whether they know it or not to spread that germ to somebody else. Even though I'm vaccinated, if I'm not wearing a mask, if someone, vaccinated or no, has the virus and they cough in the air or they sneeze, I can still get that virus. And if I don't have symptoms, I will then spread it to other people, like my unvaccinated kids. So it becomes super important for everyone to wear masks. The CDC went back on that, of course, as everyone knows, and said that vaccinated people don't have to wear a mask so we can go on as we had in the past. But certainly they've come back and they've said, you know what, it's actually a really good idea with all this happening that we all wear masks. Again, with the Delta strain being as contagious as it is, it becomes all the more important for us to protect everyone else because that spread is that more virulent.

How do we sort through constantly changing information?

I think certainly one of the biggest challenges since last March has been the constant stream of information and its change. Whereas one week we're told to do one thing, and it seems like overnight we're told to do another. So, certainly the case at the hospital, where policies change by the day. It's very hard to figure out what's right and what's not, and it's super easy to just ignore it all. I think we still have to pay attention and be grounded in who we are as a community of faith, as friends to the different people that we've known over the years, and we have to remember that the core of everything is that we have to love our neighbor. At the core of everything that we do, we have to look over at the people beside us and think about what I can do to help that person and to love that person. Information is constantly changing as we get data, as we get new evidence. It evolves. The treatments have evolved over time, and we've had better outcomes as we've gone on. The one thing that has kept us afloat is our resiliency and our flexibility, our adaptability to whatever is coming our way. When we lose sight of the importance to move with the times, or if we get so mired down that we just ignore the whole thing, that's when we let our guard down, and that's when it becomes real easy to lose sight that

I’m in it not just to keep myself healthy but also to protect the people beside me. I don’t want to lose sight of that goal. Information changes, and it’s hard to stomach and it’s confusing, but as you see new information, please, whatever you do, look to make sure it’s proper. Check it against proper sources. Verify it with somewhere else. As much as you can, make sure that you’re getting the truest of information. And whatever you do, don’t forget about the person next to you and always do everything you can to help them and to love them through it.