September 15, 2021 Patient Education Webinar- COVID-19 Update

Becky: Welcome everyone and thank you for joining us tonight for the COVID-19 update and COVID-19 vaccines education webinar. This call is now being recorded. I would like to thank you for being on the call with us. And a big thank you to our sponsors, Genentech, Principia Biopharma, a Sanofi Company, argenx and Cabaletta Bio for making today's call possible. “Information is a key factor in treating and living with any condition. However, every patient's situation is unique. The IPPF reminds you that any information found on the internet or during any of our presentations should be discussed with your own doctor or health care team to determine if it applies to your specific situation.” Before we begin, I would like to start with a quick poll and I'm just going to launch it now and you should see it appearing on your screen. How many of you on this call this evening have received one of the COVID-19 vaccines?

Becky: While you're answering that, let me take a minute and introduce you to our speakers for this evening. At the University of Pennsylvania, Dr. Payne is a Professor of Dermatology and Director of the NIH-funded Penn Clinical Autoimmunity Center of Excellence. Dr. Payne’s clinical practice specializes in the diagnosis and treatment of patients with autoimmune blistering diseases. Dr. Mary Tamayko is a physician scientist who specializes in the diagnosis and treatment of autoimmune blistering disease and other immune-mediated skin disease. Dr. Tomayko is the director of dermatology education at Yale University School of Medicine. It looks like most people have responded, so I'm just going to close the poll. And, we should be able to see right now. It looks like about 23% are fully vaccinated. About 61% may be fully vaccinated, but haven't received the booster. 0% said that they have received a partial vaccine, but didn't complete the series. 12% say, no, I have not received the vaccine, but may get one. And 5% don't plan on receiving the vaccine. So, I'm just going to pull up our next slide. Before we begin, I would just like to go over a few housekeeping items... (Reviews over Housekeeping Slides). So now it is my pleasure to introduce you to Dr. Payne and Dr. Tomayko and have them present to you about COVID-19 and the COVID-19 vaccines, and then to answer your questions.

Dr. Tomayko: It's our pleasure to be here this evening. It sounds like most people are vaccinated or have gotten their first vaccination. It sounds like many, many of you are considering the booster. So we hope that our information we give you this evening will help you make your plans to get your booster vaccination. And it sounds like there is still a fraction of people out there considering weighing the pros and the cons of the vaccine. So, again, we hope that this evening we'll be able to give you some more information to help you with your decision making process. Dr. Payne, do you want to start with the introduction?

Dr. Tomayko: So what we're going to do today is we're breaking this talk up into two main parts. First I will begin giving an overview of the vaccine's efficacy and safety with discussions

about the booster shot. And then Dr. Payne is going to go into more detail about these topics. And particularly, give you some information about FDA and CDC recommendations for boosters, treatments for pemphigus and pemphigoid and how the treatments may impact your vaccine efficacy and your booster efficacy and talk about some research on COVID vaccines. Then we'll have time for additional questions and answers. Dr. Payne and I have read through your questions, and we've incorporated them into the talk, and some will try to address as we go through. Becky, do you mind advancing, please?

Dr. Tomayko: So as an overview of vaccines, currently here in the United States, we have three authorized COVID-19 vaccinations. We have the Pfizer vaccine, we have the Moderna vaccine, and then we have the Johnson and Johnson, Janssen vaccine. Two of these, the Pfizer and the Moderna vaccines are mRNA vaccines. The Johnson and Johnson Janssen vaccine is a modified adenovirus vaccine. The mRNA vaccines, you typically get two shots. For your first series versus one for Johnson and Johnson. The Pfizer so far is our vaccine that has full complete FDA approval. Dr. Payne's going to explain in more detail later about what full FDA approval means, what emergency use authorization means, and she'll also give you an update about where the Moderna and Johnson and Johnson vaccines stand in the full approval process. Then finally, which boosters are approved for immunosuppressed patients. This was a specific question. The people who have received either the Pfizer or the Moderna vaccines, are people who are currently approved for booster vaccination. There are some questions here so let me address those. Karen asks, is it okay to get a booster of Moderna even though it's still not FDA approved? So the answer is, if you're immunocompromised, yes, it is okay to get the Moderna. Carol asks, when checking on the side effects of the Moderna vaccine, I read that if you had a history of anaphylaxis, don't get the shot. How can I be sure the other vaccines won't have the same effect? I think this is an important question because I suspect what you're referring to is that if a person has had an anaphylaxis response to the Moderna vaccine, that person should not get a Moderna vaccine. The vaccines are all sufficiently different that if a person has an anaphylaxis reaction to one, you're not likely to have an anaphylaxis reaction to another. So, the Johnson and Johnson or the Pfizer should be safe for a person who had an anaphylaxis reaction to the Moderna. These anaphylaxis reactions are extremely uncommon, extremely uncommon. I think another thing that's important to emphasize here is that if you have a history of anaphylaxis, like you're allergic to peanuts, for example, it's safe to get these vaccines. It's recommended that you get these vaccines. You are required and recommended to stay at your vaccine site for an additional 15 minutes or for a full half an hour post vaccination, to be monitored so that if you do have one of these extremely unusual anaphylaxis reactions to a vaccine that you're in a in a setting where you can be cared for. And then finally Anna asks, how much time should pass between flu shots and a booster vaccination, or a Moderna vaccination. This is a great question because we're getting into flu vaccine season and no time needs to pass. You could, in fact, have them done on the same day. Initially, our initial recommendations when these vaccines were brand-new, was to separate them out because as we were gathering information about what reactions individuals have, we wanted to have it be very clear cut that if there is a potential reaction, there was only one vaccine that

went in. But now that hundreds of millions of doses have gone out across the world, we're very comfortable with vaccinating for influenza and COVID-19 simultaneously. Next slide, please.

Dr. Tomayko: So this slide is a cartoon describing what the immune response to COVID-19 vaccines looks like. The purpose of a vaccine is to train your immune system to respond to a harmless form of the virus. It activates a part of your immune response called your adaptive immune response. Your adaptive immune response has three main types of components that we'll be talking about. One is antibodies, one is B cells, B cells make antibodies, and another is T cells. So T cells can help the B cells make antibodies and T cells can kill infected cells. Antibodies will block the virus from establishing itself. These are three components. Just remember because it's helpful as you understand the purpose for boosters, to know that there are these three separate components and Dr. Payne's gonna go through some slides later, showing this in a little bit more detail. Next slide please.

Dr. Tomayko: People asked, how does the booster work? Is it really a booster? Or is it a do over? How quickly does the added protection from a third shot take effect? How much immunity is gained through this extra shot? People also asked, what is an antibody titer? How does an antibody titer change the recommendation to get a booster or not to get a booster? So what I'm showing you here in this graph is how antibodies change after exposure to an antigen. An antigen in this case is the dose of the COVID-19 vaccine. So you see the first dose of antigen on the left and then you see in the middle a second dose of antigen and then I've put a blue arrow for where you can imagine where the booster is going to be. So let's look at the green lines where it says IgG. IgM and IgG are both antibodies. IgG is going to be the most important part of blocking viruses from taking hold in your body. After the first dose, the first injection of your vaccination you're going to get antibodies that are made, both IgM but also IgG. What titer refers to is it's a way of measuring what your antibody level is. So I've written antibody titer here in red. It gives you a sense of how much of that antibody is in your blood. After a second dose of the same vaccine, you see you make a whole bunch more IgG. The titer level goes up very much. Also notice that the rate at which that level goes up is much higher. It's a much steeper curve. The first curve was slight and after the second response, it's much steeper so it goes up quicker so you get more antibodies. The antibody increases more quickly. Then third, not shown on this slide is the antibody is better. Its ability to bind to the virus is better, it's tighter, it binds and holds onto it better. Here we are showing your first immunization and your second immunization. The point of a third immunization is to increase this even further, to get even higher levels of IgG and to make the IgGs even stronger. Next slide, please.

Dr. Tomayko: So how effective are the vaccines? This is a slide that we've shown in previous webinars that shows what the initial clinical trial data showed about effectiveness of the vaccines in preventing infections, serious disease, and death. Now, the thing to remember is that the trial recruited people who are healthy adults, so it's an ideal population. The initial data

showed that, both the Pfizer and the Moderna vaccines we're about 95% effective in preventing any infection that had symptoms and 100% effective at preventing severe disease and 100% effective at preventing death. The J&J was really good as well, maybe not quite as good. It was 72% effective at preventing symptomatic infection and 86% in preventing severe disease. Although we couldn't really compare those numbers head to head because the J&J trial was a little bit different. It enrolled older people who we know don't make as good of immune responses and who are at higher risk for severe COVID-19 disease and it was being trialed at times that we had more COVID variance. So, you can't really compare these data head to head but the take home is that all three are very, very good. Next slide, please.

Dr. Tomayko: So how effective are these vaccines in the real-world? This is a beautiful study that just came out this week in the New England Journal of Medicine, that measured how effective the vaccines were at preventing infection among people who are symptomatic. So these are people who had colds, some who had COVID. In the real world, people who are old people, young people with chronic medical conditions, people who are associated with having poor outcomes possibly because of the communities that they live in. In the real-world, the Pfizer and the Moderna vaccines were somewhere between 80 and 95% effective at preventing urgent care visits, emergency room visits and hospitalizations. In the real-world, the J&J was about 68% to 73% effective at preventing urgent care visits, emergency room visits and hospitalizations. There are lots of questions that you have asked about, about variants. This particular study couldn't address variance because it was a real-world study happening over several months period of time and the dominant variants were changing in the community. Again, these are all outstanding for preventing serious illness. Next slide, please.

Dr. Tomayko: One question that we got was, how effective are the vaccines against Delta and other variants? This is a very important question. There are two different types of ways that I thought you might like to think about it. One is real-world data and the other would be test tube data. For real-world data, I'm showing you the results of a particular study that looked at the effectiveness of the Pfizer vaccine, two full doses against the Alpha, the original variant and the Delta variant. Against the original Alpha variant in this study, there was 93.7% protection against testing positive. The Delta variant was pretty close, not quite as good. Two doses of Pfizer were about 88% effective at preventing people from testing positive from the Delta. So, still, very, very good. We would predict that the Moderna vaccine would be very similar because their vaccine design is so similar. It was a British study so it did not look at the Moderna vaccine. Another way of asking this question is to look at test tube data. So I'm showing you the results of a study that looked at the titer, so the relative amount of neutralizing antibodies, antibodies that bind to the virus and stop it in its tracks in the blood, looking at the Alpha versus the Delta. This study shows that the degree of neutralizing antibodies is less against the Delta variant, 3.3 fold lower for Pfizer, 2.7 fold lower from Moderna and about 5.5% lower for Johnson and Johnson. But, again, the real-world data looks very reassuring that, even if the titer is lower that the effectiveness against protecting people, it's still quite robust. Next slide, please.

Dr. Tomayko: We got some questions about natural immunity, meaning immunity from infections. So one of you asks, do the antibodies fade faster after getting the vaccine, if I actually become infected with COVID-19? Another of you asks, if I'd been diagnosed with COVID-19 and I've had both of the COVID shots already, do I really need a third? And these are interesting questions. I can't answer them fully at this time, but what I can tell you is that individuals who are naturally infected with the virus that causes COVID-19, the SARS-CoV-2 virus, do develop protective immunity. And furthermore, individuals who have natural infection of COVID-19 disease and then are immunized, have exceptionally high and exceptionally strong, broad immunity. So that combination of natural immunity plus a vaccine gives particularly robust immunity. Next slide, please.

Dr. Tomayko: So I'm going to just briefly talk about medications that are used for pemphigus and pemphigoid and talk about their risk for COVID-19 disease. And this is setting up what Dr. Payne is going to talk in more detail about how medicines affect the vaccine response. One of you asks, does just having an autoimmune disease put me at greater risk of getting COVID-19, or is it the treatment or is it both? Excellent question. This has been answered very well partly from our colleagues from Israel. Autoimmunity by itself is not a risk for severe COVID-19 disease, however treatments for autoimmunity are a risk. We can put these different treatments on a scale. Medicines that are low risk for severe disease include topical medicines, tetracycline, antibiotics, doxycycline, minocycline, niacinamide, nicotinamide which is often used for bullous pemphigoid, methotrexate is also very low risk. Intermediate risks are going to be mycophenolate mofetil (Cellcept) or Azathioprine (Imuran). Prednisone is an intermediate to high risk and of all of these, it turns out that Rituximab, particularly Rituximab given more recently, is the highest of these risks. So next slide, please.

Dr. Tomayko: So to emphasize a little bit more about how high risk Rituximab is, there is a COVID-19 Global Rheumatology Alliance Physician Registry that calculated that the odds of death for a patient who's taking Rituximab, who gets infected with COVID-19 is four times higher than that of a patient who's taking methotrexate. So it’s a substantially increased risk. In addition, but beyond the scope of what we really need to worry about today, B cell depletion is a risk for generating brand new viral mutants and that's another reason from a public health point of view, that it's important for us all to be vaccinated to prevent our B cell depletion therapy individuals from getting infected. Next slide, please.

Dr. Tomayko: We have a whole bunch of questions. I'll read the questions and then Dr. Payne's gonna get to them. So, what is the efficacy of the Pfizer vaccine for people who have pemphigoid? Is COVID-19 antibody testing carried out to ensure the usefulness of vaccines for blistering patients? What do we know about the effectiveness of COVID-19 vaccines if given with IVIg treatment? Should I stop my mycophenolate first and then get my booster? Is there an order I should do this in? Another question asks about being on Cellcept and getting a booster and when will they be fully vaccinated? Some treatments for autoimmune disease increase the risk of having severe COVID-19 disease or a poor outcome should you become infected, the

same treatments also impair your immune response to the vaccine and the pattern is going to be very similar. You're going to get your best vaccine response with something like methotrexate, a moderate response to mycophenolate or prednisone and the lowest response with Rituximab. But, booster's really may increase the response. I'm showing you some data collected on patients who had organ transplants, and they don't have a booster. But antibody levels were measured after the first dose and after the second dose. So organ transplant patients take many immunosuppressive medicines. Some of them are similar to the ones that you use, including prednisone, mycophenolate mofetil and azathioprine and others. After the first dose vaccination, only 15% of transplant patients made antibodies. However, after the second dose, 54% did. So, this shows you that an additional vaccine dose can begin to increase the robustness of the immune response and that would then be the logic for saying, a third dose could increase this even higher. Next slide, please.

Dr. Tomayko: So there are ongoing studies that you may want to be aware of on COVID-19 vaccines and boosters for patients who have pemphigus or pemphigoid. One is the NIH Autoimmunity Centers of Excellence trial. This is a trial for pemphigus only. There are sites throughout the country. So that's one to be aware of. The other study is here in New Haven in Connecticut. It's a Yale Immunology, NIH Human Immunology Project Consortium study and this is recruiting both pemphigus and pemphigoid patients. So those are numbers in case you want more information. Next slide, please.

Dr. Tomayko: Here's a hot topic, can vaccination flare auto immunity? And we have lots of questions about this. So one person says, I had the first vaccination in August. I broke into a flare, I'm worried about getting my next vaccine, what do you suggest? Another says I flared after the first and second, will it get worse after the third? Another person asks, is it the treatments interacting that might cause me to flare? Maria wonders if there's any research or data about patients with pemphigus worsening after the COVID vaccine? And another says, my family doctor firmly believes that I got BP because of the COVID vaccine. What is it about the vaccine, why did this happen to me? Certainly flares of both pemphigus and pemphigoid have been reported, we have observed them after vaccination for COVID-19. We cannot say for certain that this is causative versus it's correlated. I think we're all aware that with these chronic illnesses that can wax and wane, that they get better and certainly as clinicians, at any one time we're going to see some of you who are stable, some who are getting better, some who are getting worse. So is it a cause or is it correlated? We don't have the numbers to say that. What we can say is that in our experience so far and in the experience of the reported literature so far, the flares that we do see don't seem to be so serious. They seem to be manageable and controllable. And in our expert opinion, the risks of getting COVID-19 disease are so much higher and so much more serious than the risk of having a flare, which we can manage. As Dr. Janet Fairley says, we have treatments for bullous pemphigoid, but we have few and very poor approaches to be able to treat COVID-19. So she will take a pemphigoid flare anyday over COVID-19. So, that’s where that is. Now, what about onset or cause of pemphigoid or pemphigus, new onset of pemphigoid or pemphigus after COVID-19 vaccination? There are reports and I'm responsible for one of those reports of new diagnoses of mostly pemphigoid but

also pemphigus after COVID-19 vaccination. So far, I know of 19 reports. Completely, totally in both the United States and Europe, that's all. That's the whole number. We can't say again, whether this is causative or if it's correlated. And it would be very dangerous for us to try and state that more firmly. Remember there are going to be new diagnoses of pemphigus and pemphigoid every year. We estimate that in the United States, 1 out of every 25,000 people will get a new diagnosis of pemphigoid in any given year, and one in about 100,000. And now we're immunizing broad swaths of the population. So, there is going to be a coincidence that some people are going to have both happen within a short period of time. For the pemphigoid patients which we've looked at in great detail, the people who have developed pemphigoid around the time of their immunization are very similar in characteristics to people who get typical pemphigoid. They're similar in terms of age and other comorbidities. So to say that this was a coincidence versus a cause we can say. I will say that again, anecdotally, many of these cases have been very mild self resolving. Several of these patients have cleared completely off medication in a relatively short period of time. But it's still an open question. So, your physicians are encouraged to report any suspected cases to the International Dermatology COVID-19 Registry. And I have the address and the web address right there. Then one more slide and then I'll pass it on to Dr. Payne.

Dr. Tomayko: So really, just in summary, please take precautions against infection. So, in addition to your vaccinations and your boosters, please wear your masks. It's critical that your family, your friends, and your co-workers are vaccinated. That's where your biggest protection is going to come from. It's being in a social unit of protection. Limit your contact with individuals who are not immunized and in individuals who are unknowns and maintain social distance. Then finally, if you do contract COVID-19, alert your doctor immediately. You are likely to be a candidate for a protective monoclonal antibody treatment. This is antibodies like the antibodies that we make after vaccination, that combine to neutralize the virus and help prevent it, really taking hold. These monoclonal antibody treatments need to be given as soon as possible. Thank you very much. I'll pass it on to Dr. Payne.

Dr. Payne: Thank you so much, Dr. Tomayko.

Becky: Before you begin, we've got quite a few questions just to clarify for our listeners about what you mean when you say immunosuppressed? What medications? Is it any medications or if I've ever taken medications? We are getting a lot of those questions.

Dr. Tomayko: Sure. Do you want to take that, Dr. Payne?

Dr. Payne: Yes. In general, having pemphigus and pemphigoid in and of itself, does not make you immunosuppressed. They establish cutoffs for what counts as immunosuppressed. Most

severely, prednisone greater than 20 milligrams a day but there are studies that show that prednisone even down to 5 milligrams a day can impair your response. Mycophenolate, they start to see the response more severely above 1,000 milligrams per day but you know less than that could also slightly impair the response. Methotrexate, the cutoff is around 7.5 milligrams per week. Azathioprine hasn't fully been established but it's somewhere around the 100 milligram per day range where they think that it's going to severely impairs your response and then Rituximab most severely within the six months prior to vaccination but up to a year afterwards as well you can have an impaired response. So those are the general cutoffs.

Becky: Great. Thank you so much.

Dr. Payne: In this next section, we're going to address some of your questions about what the FDA and CDC recommendations were for boosters. There were a lot of questions coming in about the treatments that are used for pemphigus and pemphigoid and how they affect the vaccine or the booster, how you should space your treatments with your booster or vaccine, if relevant, and then additional questions on research for vaccines. I thought I might help you interpret the alphabet soup that is some of the institutes and the government, just because we shared a lot on the news and it might help to kind of keep things straight. So the first is the Food and Drug Administration, this is the FDA. The FDA is responsible for protecting the public health by ensuring the safety, efficacy, and security of food, drugs, cosmetics, and medical devices. For those of you who are history buffs, it was founded in the early 1900s to prevent contaminated foods and drugs from entering the system and the FDA approves drugs and vaccines, which is relevant to today's call. They will also take action against medical fraud. So they'll issue warning letters, fines, lawsuits. Some of you may have heard about the FDA issuing some of those letters with companies who are putting out non-authorized or non-approved COVID tests. If we go forward.

Dr. Payne: The CDC is the Centers for Disease Control and Prevention. The CDC, this is from their website, "Protects America from health and security threats, both abroad and in the United States." It was founded in 1946 to help eradicate Malaria in the United States and it seems like they did their job because we don't typically hear about Malaria and the United States right now. They focus on statistics and data analysis, detecting, and responding to health threats, eliminating disease, and then furthermore, promoting safe behaviors, communities, and the environment recognizing that we don't always want to be responding to a crisis but we want to help prevent a crisis. And that's why they've really been at the forefront of the COVID-19 pandemic, because it's literally exactly what they were set up to do. This is led by Rochelle Walensky. If we go forward.

Dr. Payne: The National Institutes of Health, or the NIH, is the nation's biological and medical research agency. They provide research funding, both within and outside of the NIH. They

provide research training, and it includes the National Institute of Allergy and Infectious Diseases, or NIAID led by Anthony Fauci. Generally speaking, the NIH has these individual institutes that focus on different things. For example, infectious diseases, cancer, et cetera. These are some of the names you've likely been hearing about on the news. So if we go forward.

Dr. Payne: There was a question coming in about emergency use authorization as well as full FDA approval as Dr. Tomayko had mentioned in one of her earliest slides. During public health emergencies, the Emergency Use Authorization allows the FDA to allow unapproved drugs to be used to diagnose, treat or prevent serious or life-threatening diseases. The key here is when there are no adequate, approved and available alternatives. So the criteria for the EUA are that they have to be reasonably efficacious, the benefits should likely outweigh the risks, both known risks, as well as potential risks and there's no adequate, approved and available alternative. So the three vaccines that received the EUA were, as Dr. Tomayko mentioned, Pfizer originally, Moderna next and then J&J. There are several other vaccines that came around afterwards, but they didn't get emergency use authorization because at that point the vaccines were actually available, so they didn't actually issue any more EUAs after J&J. Go forward.

Dr. Payne: To gain full FDA approval, six month follow-up data must be presented to the FDA. That's basically the barrier that Pfizer just passed to become fully FDA approved. If we go forward. Again, COVID-9 vaccines that are currently authorized or approved by the FDA. I tried to go through this a few days ago to try to indicate which ones are authorized for use. They're authorized under the EUA and which ones have full FDA approval. So, Pfizer is authorized for individuals' 12 to 15. It's also authorized as a booster for solid organ transplant or similarly immunocompromised persons. What they cite for that is, people on cancer treatments, those who have HIV, or who are on high dose steroids. But again, that list of treatments that we talked about, prednisone greater than 20 milligrams a day, Cellcept over 1,000 milligrams a day, all of those same general cutoffs apply. Pfizer Biotech vaccine received full FDA approval August 23rd for individuals 16 and older, and they currently have an application filed to get full FDA approval as a booster vaccine for all individuals 16 and older. This is undergoing review on September 17. If we go forward.

Dr. Payne: Now Moderna and J&J are a little bit behind so they're authorized for use in individuals 18 and older. Moderna's authorized as a booster for solid organ transplant or similarly immunocompromised person. They have a request pending to be authorized for individuals' 12 to 17. So far, the data on the boosters is expected to be filed for Jensen and J&J, but they just haven't filed you up for that Emergency Use Authorization. Moderna has their request pending for full FDA approval for people 18 and older and J&J states that they have plans to file for full FDA approval of their vaccine later this year when the get to the six month

mark. They've already hit the six month mark, actually but it's just an issue of getting it reviewed. If we go forward.

Dr. Payne: Now, there are a number of COVID-19 vaccines that are in clinical trials. You will hear results of these trials before the company actually will put in the full application to the FDA. So there's a number of clinical trials ongoing in children ages anywhere from 5 to 11, as well as children ages 6 months to 5 years. And you can see all of the different age groups that are being included in these clinical trials. And if we go forward one, these are their expected timeline based on the company's stated public timeline. In children that are ages 5 through 11, the data is expected in September of 2021 and it's possible that an Emergency Use Authorization will be in place for children ages 5 to 11 this year. Pfizer has stated that they expect the data on kids 6 months to 5 years in late 2021 but it may not be enough time to actually get an Emergency Use Authorization by the end of the year. And Madonna and J&J are similarly delayed compared to that. Moderna expects their data in kids 6 through 11 in late 2021 and in kids 6 months to 6 years in early 2022 and then the authorization would come at least 4 to 6 weeks after that. The J&J booster is pending review and the trials and children are just starting late 2021 or early 2022 so it will be several months until we get those data. If we go forward.

Dr. Payne: Now, the Emergency Use Authorization in children requires at least two months safety follow up for at least half the trial participants. So basically the FDA is concerned about safety. That's the number one thing that they look at really when they review these studies. These are the criteria that they've established, where they're trying to balance, obviously, pushing out vaccines to the children who need them. As we all know that the kids are entering back to in person school, and not all school districts are requiring masking but at the same time, they want to make sure that they're meeting the minimum safety criteria that they set out to make sure that it's safe. If we go forward.

Dr. Payne: Now, the recommendations by the CDC. Once a vaccine is FDA authorized or approved, the CDC then sets the adult and childhood immunization schedules based on the recommendations of a group known as the Advisory Committee on Immunization Practices. This is a group of medical and public health experts in vaccines. If we go forward. Here are the existing CDC recommendations and pretty much what they do is they take that really complicated chart I just showed you and they just simplify it down to make it easy to understand. So, for Pfizer, it's recommended for people ages 12 and older and it's also recommended as a booster to people 12 and older who have solid organ transplant or who are similarly immunocompromised. Moderna and J&J are recommended for people 18 and older and Moderna is similarly recommended as a booster for persons 18 and older who are immunocompromised. J&J doesn't have any recommendations yet because we have not filed to receive Emergency Use Authorization as a booster. If we go forward.

Dr. Payne: This is something I have to admit I'm guilty of even within the context of this talk. One person asked the question, what's the difference between a booster shot and an additional or third shot? And many people in the lay press and medical fields use these terms interchangeably. So if we go forward. Technically speaking, the CDC uses the term additional dose or third dose but this gets to be really confusing because in the context of J&J, there's no third dose, so it would be a second dose if you're referring to J&J. They use this term to refer to vaccination in immunocompromised people who did not mount a protective response to begin with. So, this is already authorized. Basically both Moderna and Pfizer are authorized as an additional or a third dose to people who are immunocompromised and who did not mount a protective response to the initial COVID vaccination, although that was a second question that we'll get back to you on in just a moment. If we go forward.

Dr. Payne: CDC technically uses the term booster dose to refer to individuals, including otherwise healthy individuals who made a protective response to initial current vaccination, but they're recommending a third dose because that protection is waning over time. That's actually what's going to be reviewed on September 17th by the FDA. The application by Pfizer, to give a booster dose to healthy individuals. So one person asked the question, whether or not antibody testing should be used to determine whether or not you made a response to the vaccine? The CDC and the FDA have not made recommendations for universal antibody testing to recommend whether or not you made a good response to the vaccine. Number one, probably because it's just a logistical issue. We can't have 350 million people rushing out to figure out what their antibody levels are. The second issue, which I think it's a more critical issue, is that they're very difficult to interpret. So during the Emergency Use Authorization, there were probably well over 2 dozen or more antibody tests that were approved primarily for COVID diagnosis, not necessarily to follow what your antibody response was. Some of these tests, if you get them done, it'll basically just say positive or negative. It can't tell the difference as to whether or not you actually made a response to the vaccine, whether you were previously COVID infected, or what the level of your protection is. So in that example, if you went out and got that tests, we really wouldn't get any more information from it. There are some tests which are semi quantitative, where you start to get an actual response, but they're all different from each other. One might be on a scale on the order of a thousand. One might be on the scale of 0 to 1. Another might be on the scale of 0 to 2. So it's very difficult to compare across all of these tests. Furthermore, there are some tests out there that only measure the nuclear capsid, which is for natural infection and the vaccine induces antibodies against the spike protein. So if you were to go out and your physician were to accidentally order a particular test that was only for nuclear capsid or Quest or LabCorp said, I'm out of that test, I'm just going to run this test for COVID vaccine, it'll be very difficult to know what the response was. And obviously, if you got vaccinated, you might come up negative on a nuclear capsid test. So, basically, this is a long winded way of saying that the testing is not recommended to determine the response to the vaccine because it's just too hard to know why that is. So if some of you are reading, all of the FDA guidance is on this, they actually say, we do not recommend antibody testing to determine your response to the vaccine, unless it's in the context of a clinical trial. That's because they know that the tests that are being run have been qualified. We have a general

idea how to interpret them, the physicians who are ordering them know exactly what tests to order, etcetera. It's really just an issue of training and familiarity with the test. If we go forward.

Dr. Payne: Basically, and I think I actually summarized this, Pfizer Biotech's supplemental application is being reviewed September 17th. The CDC has not yet weighed in on recommendations for booster doses in healthy individuals. It seems like a little bit of a double approval but the FDA will make their decision as to whether or not to approve or authorize the booster dose, rather. Separate from that, the CDC may make recommendations on that. The WHO sort of weighed in that they are not a fan of booster shots just from a health equity perspective considering the world COVID-19 pandemic crisis. If we were to go forward.

Dr. Payne: I might actually also mention that, ultimately, what I recommend here is I plan to follow the CDC guidance. Because basically, the CDC is a group of experts that are really looking at all of the data from the FDA to try to understand what is the data that it actually achieves what it says it wants to achieve, yes or no? Then the FDA will say, yes, we agree that you achieved what you want to achieve, and that it's safe and effective for that purpose. Then, the CDC will make the public health decision whether or not to recommend the booster to healthy individuals over the age of 16, based on their review of the data. Ultimately, I plan to follow the CDC guidance on that. You can stay tuned, there will probably be a lot of press releases on it. So there were a lot of questions, most of the questions were surrounding how to do treatments for pemphigus and pemphigoid affect vaccine efficacy. Dr. Tomayko went through several studies that address this and this is also a summary. Prednisone will reduce your vaccine efficacy relative to the dose. So the thought is that even at doses of 5 milligrams, there can be an impaired response and it's more severely impaired if you're above 20 milligrams at the time of vaccination. What the studies have shown is that a third of people on varying doses of prednisone have absolutely no antibody response to the vaccine and even those who make a response, it's up to six fold lower compared to people who are not on prednisone. With mycophenolate, azathioprine, methotrexate it's reduced efficacy is probably dose related, and it's anywhere from 1.4 to 3 fold lower antibody response. This is why, sometimes it's not that bad. Basically one fold is exactly the same. So 1.4 fold is not that terrible, but 3 fold is probably more significant against the variants. Rituximab shows reduced efficacy. There's a 14 fold lower antibody response and 40% had no antibody response to the vaccine and most of those were within 6 months after infusion because we know that Rituximab lowers your B cells usually to the undetectable range in the blood. Starting about 6 to 12 months, they start to come back so the farther you are out from Rituximab, the more likely it is you'll make an antibody response to the vaccine. If we go forward.

Dr. Payne: Now, there were questions about some of the other therapies that could be used, for example, Humira or an anti-TNF therapy. The data is really mixed on Humira. Some studies actually show that people on Humira make a better antibody response to the vaccine. Some show, essentially, no difference and other show, slightly reduced response. But, in general, I

would say, most people on Humira I wouldn't worry. I don't think it's going to significantly affect your response to the vaccine. For IVIg, in the earliest phases they actually recommended that IVIg not be given within 1 to 2 months from vaccination. But I just noticed on the CDC website that they actually state that there is no recommended minimal interval between IVIg and the vaccine either before or after the vaccine. The way that IVIg works it actually lowers antibody levels. So presumably, if you got the vaccine you, you got whatever antibody response you got then you would get the IVIg and then an antibody response probably would drop a little bit but then as the IVIg wash out of your system it actually could theoretically come back assuming that you're not getting constant IVIg infusions. Now, Dapsone and doxycycline it's unknown, it hasn't really been studied, but it's not predicted to have an effect. One big caveat is at the bottom, which is that almost all of these studies have looked at antibody response only, and that's sort of a caveat that we'll go into in a few slides. Go forward.

Dr. Payne: There were a lot of questions about Rituximab and COVID-19. What should I do if I'm on Rituximab? Should I delay the treatment? What are the risks? There was a study that was published that showed that rheumatoid arthritis patients treated with Rituximab had a 4 fold higher odds of hospitalization or death from COVID. That was a similar study that Dr. Tomayko covered. That's sort of the bad news, if you will. But if we go forward, there was a recent study in cancer patients where they looked at cancer patients who are treated with the Rituximab alone. I think Dr. Tomayko had really nicely highlighted in the beginning of the presentation how you have two types of immune cells that can respond to infection. There's T cells and then there's B cells. T cells are what we call the generals of the Army and B cells are called the soldiers. B cells make the antibodies that fight off COVID. They also actually make the antibodies that cause pemphigus and pemphigoid. Basically, the vaccine will use both B cells and T cells that fight COVID. Cancer patients treated with Rituximab alone, interestingly enough, actually had a totally normal to even higher level of COVID specific CDA or killer T cells. And they had a 3.6 fold lower risk of death compared to people that were treated with Rituximab and also received other therapies which also wiped out their T cells. I'm going to basically state this in hopefully amore simple way and in a couple of slides. The idea is that Rituximab is sort of bad news because it wipes out the B cells that make all the protective antibodies, but it doesn't wipe out the T cells. So basically, it's better than nothing which is what the general consensus is. How do we interpret these studies for patients with pemphigus and pemphigoid? Over the next few slides, I'll describe how the vaccine works and how the therapy affects the vaccine efficacy. So if we go forward.

Dr. Payne: How does the vaccine protect from infection? When you get vaccinated, your body will make antibodies that prevent the virus from entering. They are that initial wall that prevents the virus from coming in. Let's say you inhale or you breathe in the virus through your nose. The idea is that these antibodies are going to be like a protective film that's going to prevent the virus from even entering. Let's say that they didn't fully do their job and some of the virus particles got past that initial wall of defense. Then memory T cells kick in second. What happens is your nose or your mouth cells will become infected with the virus. The virus will multiply within those cells they will burst out and make and that will release potentially

thousands more viral particles. Incidentally, that's often why you have a loss of taste or smell after infection just because your memory T cells are coming in there saying, oh, this is a problem. Normally, I don't want to kill my own cells but, in this case, I'm going to do it because these cells, if they make a thousand more viral particles that are going to be far more dangerous to my system then me killing off a few nose or mouth cells. So basically the memory T cells come in, those are the CDA killer T cells that kill those infected cells to limit the viral spreading. If we go forward.

Dr. Payne: So let's say though the memory T cells didn't quite do their job. In that case, the nose or the mouth cells made thousands more viral particles, these then get released into your body and start spreading throughout and they might go to your lungs, they might go to your heart, they might go to all the different places in your body. So now there are antibodies circulating all throughout your blood after vaccination, and that's the third line of defense. They try to neutralize as many of those particles as they can and prevent them from getting to their target of the lung, the heart, et cetera. Again, this is where antibodies kick in yet again to help protect you and why antibodies ought to be slightly more important than the memory T cells. If we go forward, some of you may have been sharing about memory B cells, in the debate over whether or not boosters should be used. Memory B cells are your long term memory. The hope is that if memory B cells do their job, then you may only have to be immunized once. We think about the different vaccines that are in use today, with tetanus you get a shot once every 10 years because after 10 years the immune cells get tired, they stop doing their job. Pneumococcus, you get immunized when you're 2 and then not again until you're 65. Those last a really long time. Your memory B cells do a fantastic job for 63 years, protecting you against that and you don't actually need a booster every year against those types of infections. So the idea here is that the Memory B cells will live in various different places like your spleen, your bone marrow, your lymph nodes and if you ever get exposed to COVID again, they're going to re-activate, they're gonna make a lot more antibody, and then it starts the whole cycle over again. If we go ahead and think about all the different scenarios that are possible, if we go forward. ‘

Dr. Payne: Fully vaccinated, people may test positive for COVID-19 virus based on a nasal swab. So let's say, you're fully vaccinated and somebody sneezes on you that is COVID infected and you happen to inhale these viral particles. The antibodies are going to do their job they are going to ward off that virus but you can't prevent the virus from being in your nose. So if you were to get a nasal swab as being a close contact, you may test positive. However, as long as you don't become severely sick yourself and prevent a high risk for spreading infection to others, by and large, the vaccine did its job. We can't prevent the fact that the person sneezed on you but as long as we prevent you from getting sick, that's the goal of the vaccine. If we go forward.

Dr. Payne: It's a competition between the level of virus that the person is exposed to and the level of antibodies they have to prevent the virus from entering. This is the rationale for a

booster shot. Basically, the idea is that if you get a huge viral load where you have basically been exposed to a lot of viral particles, you want as many antibodies as possible to try to ward off that particular infection. Then similarly, on the other end, it basically breaks through. Some people argue we want the highest level possible to protect you from infection. You know, this is why healthy people should get boosters so even if they're exposed we can make sure that they don't get sick to begin with and if it does break through that initial barrier that it doesn't spread throughout their body. Go forward.

Dr. Payne: The memory B cell issue. So some people feel that if antibody levels decrease with time, memory B cells will still kick in to protect you from severe disease. The thought is that the goal of vaccines is not to prevent every single positive COVID test, but it's to prevent people from getting severely sick and dying from COVID and having long COVID. That's some of the debate that you might be hearing on the news that memory B cells are going to kick in, they're gonna make more antibodies so even if your antibody levels are waning a little bit over time, if you get exposed to COVID, the memory B cells will likely kick in and bump up higher naturally and you'll be protected from severe disease and death. Go forward.

Dr. Payne: The other side of the argument, which you may be hearing in the news, is that other experts feel that because competition and Delta is an extremely aggressive variant, that that is extremely infectious, we should boost these antibody levels at eight months, because otherwise we would expect that there will be an increase in mild to moderate infections, even in fully vaccinated people. This is basically the debate that's going on, which is going to be weighed in on, over the next week because as soon as the FDA makes its assessment on September 17th and CDC is going to make its recommendation on what should actually happen after the FDA makes its opinion. So stay tuned. Like I said, my plan is to just follow what the public health experts tell me to do.

Dr. Payne: In terms of how therapy affects the vaccine responses. So Rituximab decreases the body's ability to produce antibodies after vaccination and to have memory B cells that provide that long term protection, so it wipes out 1, 3 and 4. The B cells start to come back about 6 to 12 months after infusion but if we go forward one, there have been studies showing that memory T cells in Rituximab treated patients are intact. If you have received Rituximab even if you have no detectable antibody response, you likely have a completely normal to even better memory T cell response against COVID compared to somebody who didn't get Rituximab This is why, it's a little bit of a debate. But, vaccination, even shortly after Rituximab, provides some protection compared to no vaccination. And if we go forward.

Dr. Payne: If we look at other therapies, such as prednisone, mycophenolate, azathioprine, methotrexate, these just sort of globally suppress the immune system in a dose related manner. So if you're on Cellcept 3,000 milligrams a day, that's going to be far more immunosuppressive compared to 1,000 milligrams a day. These generally suppress the

immune system, so they reduced but do not always prevent vaccine responses. The thought is you'll probably have a lower titer.

Dr. Payne: Dr. Tomayko mentioned the studies in solid organ transplant when they did those clinical trials, they found that patients with solid organ transplant, they're typically on a combination of prednisone, mycophenolate and even an additional drug that targets T cells known as tactrolinus, it's shown that if you give them a third shot, if those patients did not originally had an antibody response to initial COVID vaccine, 40% of people who get a third shot will actually then make a response after that additional shot. That's the data that led the CDC and and led the FDA to authorize booster shots for immunosuppressed individuals'. It's based on these data. If we go forward.

Dr. Payne: There were a lot of questions about, should I delay Rituximab to get the vaccine or the booster? So currently, the International guidelines do not recommend maintenance doses of Rituximab, meaning that if your doctors tells you to go in and get Rituximab every 6 months even if you have absolutely no blisters, absolutely no symptoms, no itching from the disease. Currently that's not recommended based on international guidelines because if you're doing fine, it's probably a good idea to just delay that next infusion until you get symptoms. But talk to your doctor as it definitely depends on the severity of your disease and whether or not you made an initial response to COVID vaccine and so on. To increase the likelihood of an antibody response, you might consider waiting 4 to 6 months after Rituximab to receive the vaccine or booster. That would optimize the chance that you would get, not only a memory T cell boost but also a memory B cell and antibody boost. If we go forward one.

Dr. Payne: If you receive the vaccine first, then wait at least 2 to 4 weeks after the final vaccine shot to receive Rituximab. The longer you wait, the more memory B cells you may generate. So, basically what will happen is the memory B cells will go up, up, up, and then Rituximab will wipe them out. But like the longer you wait, the more likely it is that the memory B cells will find a good home in your spleen, bone marrow, and lymph nodes where Rituximab may not be able to fully wipe them out. Memory T cells will likely be induced regardless of the timing. So I think the take home message here with Rituximab is that there's some optionality about when you treat with Rituximab because your disease is actually well controlled, I would actually potentially follow those guidelines about optimal timing of when you get Rituximab to the vaccine or booster. But if you know if you have to get Rituximab because your disease is severe and an example of this is our mucous membrane pemphigoid or cicatricial pemphigoid patients. We cannot risk death from blistering or going blind and some of those patients are receiving Rituximab every six months because of severe disease. In that case, I would just get the vaccine and the timing really doesn't matter. You're going to get a memory T cell response, you'll be slightly protected compared to never having gotten the vaccine. If we go forward.

Dr. Payne: Research on COVID vaccines and pemphigus and pemphigoid. So Dr. Tomayko referred to this NIH study, which is looking at an extra COVID-19 vaccine dose in people with autoimmune diseases. This is enrolling or soon to enroll at 15 to 20 sites nationwide, including Penn and Yale, where Dr. Tomayko and I are. Unfortunately, this is pemphigus patients only. We're very, very sorry to the pemphigoid patients in the community. It was a little bit difficult just because of the disease activity criteria and things like that, it was a little bit hard to manage too many separate diseases being enrolled. If we go forward.

Dr. Payne: I'll mention that the hope is that what we learn from pemphigus patients should likely apply to the pemphigoid patients so we'll be able to learn simultaneously from that. The key inclusion criteria for this particular trial is that you have to have made a suboptimal response to the initial COVID vaccine. The study will actually prescreen you for antibody levels. In general, what we're finding is that if you got a COVID vaccine any time within six months after Rituximab, you likely had a suboptimal response. 80% of people roughly, will have a suboptimal response. If you've got the vaccine first and then you waited at least two months before you got Rituximab, patients are actually in general, not qualifying for this trial. Their antibody levels are too high to actually make it into this trial. With mycophenolate, you have to be on doses of 1,000 milligrams daily or higher and with methotrexate, you have to be on doses of 7.5 milligrams weekly or higher going forward. Going forward. Individuals on mycophenolate and methotrexate will be randomized to holding or not holding their medications for two weeks surrounding immunization. There's some preliminary data suggesting that if you hold your mycophenolate three days prior to the vaccine and then restart it 2 weeks later that that will help improve responses but we have to weigh that against the risk of potentially flaring disease. We think in general, 2 weeks of stopping mycophenolate shouldn't hurt and similarly for methotrexate it will involve holding the dose surrounding the vaccine. There's a parallel smaller study that's enrolling at 5 sites Northwell, Penn, Emory, Michigan and Oklahoma Medical Research Foundation, which is including similar populations of pemphigus but it has broader inclusion criteria to reflect a real-world setting. I think that there's a lot of people who aren't qualifying for the prospective booster vaccine trial maybe because they have an antibody level that's a little bit higher than what is required to enroll in the trial or maybe they got Rituximab 12 months and one day ago and they don't and they don't qualify. So, those patients are being enrolled in the prospective observational trial. I think that's it.

Dr. Tomayko: And just to add on to what Dr. Payne just said, there's also a smaller trial at Yale for both pemphigus and pemphigoid patients that requires a blood donation before booster and then two weeks after booster. So, another site for people who wouldn't qualify.

Becky: Great. We got quite a few questions asking, if a patient is in remission for pemphigus or pemphigoid, do they still fall under the immunocompromised category of patient to qualify for the third vaccine?

Dr. Tomayko: Meaning off medications?

Becky: The question I'm looking at right now says the last dose was in March of 2021.

Dr. Tomayko: I would say that unless it was Rituximab, no, they would not qualify. If it was Rituximab, because the B cell depletion that happens with the Rituximab is prolonged, your B cells don't come back for maybe 6 months or a year or later, that my recommendation would be that would be considered immunosuppressed. But if your last dose of mycophenolate mofetil or methotrexate, Azathioprine, or prednisone was March, that's great news. You're in really great shape. That's what I would say. How about you Dr. Payne?

Dr. Payne: Yes, I would agree with that. We consider Rituximab within the last 12 months to be in the immunosuppressed category.

Becky: Great. And we're getting quite a few questions about the timing of the booster after the second dose. Some patients were told to get it after 5 months, some patients were told to wait. So what is the recommendation from the CDC for that booster dose?

Dr. Tomayko: Isn't it at least 28 days after the last dose?

Dr. Payne: Yeah, there's no maximum time interval yet. The very earliest people in the country were immunized in December of 2020. At the most, people are sort of nine months out from their original vaccine. The only guideline is a minimum of four weeks from your last vaccine shot.

Becky: Great. And then we're getting some questions, as you had mentioned earlier in the webinar about how patients should protect themselves and be careful to make sure they're around people who are vaccinated. There's a few questions that have come in about how vaccinated people can transmit COVID. So, why does being around those with a vaccine matter?

Dr. Tomayko: Well, breakthrough infections that can be transmitted are rare, not unheard of, but they happen with less frequency. When people are vaccinated, they're less likely to acquire an infection. If they do acquire infection, it's less likely to be severe enough that they are

spewing virus out of their nose and so they're less likely to transmit it, but they're not unable. It is true that some caution is still recommended.

Dr. Payne: Becky, are the prior COVID-19 webinars posted on the website?

Becky: They are. They're all listed. You guys have been champs.

Dr. Payne: Good, because there is one, we actually didn't use this graphic, but I don't know if any of you have seen the graphic on the swiss cheese analogy? There's overlapping layers of swiss cheese and every single one of them has a whole and they are slightly imperfect but if you layer them all together it increases your chance to not get infected. So, I think on our last call, we had a list of lower risk scenarios and higher risk scenarios. Things such as the size of the gathering, what percent of people in the gathering are vaccinated, whether it's outdoors or indoors, whether people can be physically distant or are they going to be packed like sardines and whether or not you yourself are on immunosuppressive therapy? So it's your risk, plus the risk of people around you essentially. For example, a lower risk event might be a small gathering of people outdoors, where everybody's vaccinated. That's sort of a lower risk setting, where especially if everybody's wearing masks, and they can be physically distanced, I think that's fine for immunosuppressed patients to do. Then, higher risk would be large gatherings indoors, people very close by, yelling, screaming, singing, because I can spew particles from the mouth and you're not masked and you're very close together and you're immunosuppressed. So what you can do then is you can mix and match the protective behaviors and this was also a question that was asked. So number one, you can vaccinate yourself. We know that that's our foolproof though because some people can't fully respond if you've been treated with mycophenolate or high dose prednisone or Rituximab. So, you can still vaccinate yourself to try to optimize whatever protection you have. I do think that vaccinating your close contacts, that was a question that people had, is another way you can protect yourself because even if they were to get a breakthrough infection, they would likely have a lower viral load that they can then pass onto you. So, it's all about viral load and what level of virus you get exposed to, as to how sick you would be. So, yeah, I definitely recommend that everybody that you live with, your close contacts be vaccinated, and then layer on top of that. Masking, physical distancing, outdoor events to the extent possible. Don't forget hand-washing still helps. Some of the same things about not going out and touching your mouth and your nose and everything right after you go out. And then of course, testing. If somebody in your household does become sick.The thing is if you're vaccinated, sometimes you think, no it’s just cold but nowadays don't ignore cold symptoms. If you're having any sore throat, headache, cold, fever, cough, any of those symptoms, your close contacts should get tested right away and then isolate away from you while they're waiting for their test results.

Becky: Great. Thank you. That's really great advice and really helpful. I really like that swiss cheese analogy. So thank you for that. We're getting a couple of questions about, what if you got the vaccine and then didn't start your prednisone for 2 or 3 months after getting your vaccine. How does that affect your level of protection against COVID?

Dr. Tomayko: The good thing is, in this scenario, you've got your immunization at a time when your immune system is robust and made the best possible antibody response, B cells, memory B cells, memory T cell response. You're geared up and ready to go, but now you're on prednisone, which means if you get an infection, you're going to be less able to fight it off as well. So, you should consider yourself at an intermediate risk. You have that protection of the original vaccine, which is great. However, the prednisone is going to inhibit the memory B cells and the memory T cells that are there from acting as effectively. So you should still consider yourself at risk. Should you get a booster or not, I would say yes you should get a booster because you are on prednisone more than 20 or our mycophenolate mofetil. If you make those criteria for being immunosuppressed, my recommendation would be a booster in that situation.

Becky: Great, thank you. We also got a question that if you are having a flare right now, but you're not taking any medications to treat the flare, should you get your booster now or should you wait until the flare has passed?

Dr. Payne: Yeah, that's an interesting question. I think in that particular case, it might be a good idea to get the booster now. Again, I don't know your personal circumstances, but let's say your doctor's almost certain that you might need Rituximab sometime in the next 3 to 6 months, then the argument would be get the booster now because if you even have 1 or 2 months before you get Rituximab or start prednisone, you will get that response and the antibody response will last for for at least a couple of months.

Becky: Great. Thank you. We also got a question about the Novavax vaccine, is that better against the variants than the vaccine brands that we've mentioned on the webinar tonight?

Dr. Payne: I have to admit, I don't follow the Novavax vaccine because I just bother with the ones that are authorized in the United States. I haven't heard about any plans to file. I'm not 100% certain where they would stand with that. For Emergency Use Authorization, if you remember, there has to be no authorized, approved, or available alternative. And now there are FDA approved vaccines, they're available. So, there's a question about whether or not we need a fourth vaccine in the mix.

Becky: Great. With this being flu season, and I think you covered it earlier in the webinar but I just want to reiterate. With people now, it's that time of year when we're getting flu vaccines and shingle vaccines and the pneumovax vaccines. What is the timeline in relation to getting either your first set of COVID vaccine or the booster in relation to also getting these other vaccines?

Dr. Tomayko: The CDC has given us a clear statement about this. You should get your flu vaccine according to the schedule your doctor recommends, you should get your COVID-19 vaccine yesterday and get the booster when you're ready, and they can be given simultaneously.

Becky: Great. Thank you. We've also got a couple of questions about what are the side effects in the elderly group of patients with pemphigus and pemphigoid over the age of 70? Is there any data or anything out there that talks about the side effects in this population?

Dr. Tomayko: Side effects to the vaccine, right?

Becky: Yes.

Dr. Tomayko: Elderly people can have the same side effects that younger people have. Sore arm, sometimes an injection site reaction, sometimes a red, delayed, itchy plaque on the arm, fever, sometimes even chills, body aches, pains, muscle aches, joint aches or pains can happen to people of all ages.

Becky: Great. One last question for you, we've got a few questions in before the webinar, but also during the webinar tonight. If you have received the Pfizer Vaccine, should you stick with the Pfizer booster? Or is it okay to switch to basically whatever somebody will put in your arm? What's the best advice if you're going for that third shot?

Dr. Payne: I usually tell people to just stick with what they originally had. There are studies that are being done to actually look at crossovers. There's a little bit of rationale sometimes to go from J&J to Moderna or Pfizer because there's a small proportion of people that can have antibodies against the J&J vaccine that might kind of block the vaccine from working and then in that case, if you came in with Moderna or Pfizer after that you might get a better booster than if you came back with the J&J alone. But J&J actually looked at their booster data from the trial, it was in the news recently, it hasn't been officially filed yet, but the data is strong.They showed

that the booster shot, just getting a second dose of J&J on top of the prior J&J there was 9-fold increase in antibody level, which is just as good as pretty much what you see with Moderna or Pfizer. I really think it's just whatever is available is fine and I generally feel like it if you got one just stick with the same one.

Becky: Great. Well, thank you very much for all the great information you've provided us since the beginning of the pandemic and especially tonight. I know these are not the easiest webinars to prepare for and you guys provide such great information and I appreciate you going over the time. I know we've hung out a little bit longer than we normally do. So thank you so much. And thank you to everybody for hanging with us and learning some really great information from some really great experts here. I can't believe how quick the time has gone. Before we go, I do want to just mention that if you'd like to learn more about the COVID-19 booster vaccine and for the non-responders, which was discussed in tonight's webinar, you can visit www.clinicaltrials.gov and search COVID-19 booster and Autoimmune Disease Non-responders. That can provide information and tell you more about the studies as well as the sites. This is a randomized, multi-site adaptive, open label clinical tria, comparing the immune system responses to different COVID-19 vaccines and booster doses in participants with autoimmune disease requiring immunosuppressive medications. As a reminder, they are recruiting for pemphigus vulgaris and like the doctors had mentioned, they do believe that information will transfer over to the pemphigoid community as well, but we're all just waiting to find out what the trial says. Also, the IPPF makes these resources like tonight's webinar available for patients, caregivers, and medical professionals, and others through the generous support of people just like you. If you'd like to support this work, please text the IPPF to 224365, and follow the prompts to make a donation. Again, that's 24365 and we thank you very much for the support. I'm also very excited to announce that the registration is now open for the 2021 Virtual IPPF Patient Education Conference. This conference will be held from October 22nd to Sunday, October 24th. And we hope that you'll join us for this exciting, educational and free online event. Registered today at https://go.pemphigus.org/conference2021. If you haven't registered for the IPPF's Natural History Study, we also encourage you to do so. The IPPF Natural History study is a patient registry sponsored by the National Organization for Rare Disorders (NORD) and the US Food and Drug Administration (FDA). You can register today at www.pemphigus.iamrare.org. This online data system collects, stores, and retrieves patient data for analysis in research studies. The more data we can collect, the better the information we can give to researchers, the sooner they can find better treatments, earlier diagnosis, and hopefully one day a cure. Lastly, we got a lot of questions in and we did our best to answer as many questions as we could on our call but if you have additional questions please contact one of the IPPF's Peer Health Coaches on our website by visiting: www.pemphigus.org/peer-health-coaches/ or you can email me, Becky Strong at becky@pemphigus.org or you can call the foundation at (916) 922-1298, and we would be more than happy to help. This call recording will be sent out after tonight's webinar and it will be posted on our website. Thank you everyone and have a good night.