Dr. Mariam Hanna
Hello, I'm Dr. Mariam Hanna and this is The Allergist, a show that separates myth from medicine, deciphering allergies and understanding the immune system. It's interesting that in the current era a topic like vaccines causes me a lot of anxiety. It's become a polarizing issue for some of my patients.

Are your vaccines up to date? It's actually just part of the consult. I get everything from a simple yes, an emphatic yes, with the addition of and even this specific one, or no, unvaccinated, or the very last category, segue to a really long rant on a person's philosophy about vaccines and healthcare in general.

Here's the thing, I'm not actually asking about their emotional response to my question. I'm mostly just trying to understand their possible immune response to diseases. Today's topic was actually inspired by one of the most common vaccine questions we now get in clinic.

Patient is on new fancy medication, needs to get a vaccine. How long do they need to wait before getting it? I've polled my colleagues on this very question and the response actually seems to be a standard number, but I've also wondered does it actually matter the type of vaccine they're receiving?

What about the type of drug that you're referring to? Of course it all matters, right? Well, that's the inspiration to this moment, all leading me to finding the perfect guest for today's episode.

It's my absolute pleasure to introduce today's guest, Dr. Anne Pham-Huy. Dr. Pham-Huy completed her subspecialty training in pediatrics infectious diseases at McGill University and then pursued additional training in clinical immunology. She currently works as a clinical immunologist in the Division of Infectious Diseases, Immunology, and Allergy at CHEO in Ottawa, Canada.

She's a member of the Special Immunization Clinic Network and the National Advisory Committee on Immunization, NACI, and is the current chair for Immunize Canada, a national coalition of non-governmental professional health, government, and private sector organizations dedicated to promoting the benefits of immunization. So we're not actually going to talk about the benefits of immunization, we're going to talk about vaccines and vaccine responses. Dr. Anne Pham-Huy, thank you so much for saying yes to such a controversial topic, apparently. Welcome to the podcast.

Dr. Anne Pham-Huy
Thank you so much. I'm very excited for this conversation.

Dr. Mariam Hanna

Okay, to set the groundwork, I want to talk about why it's critical at this point for all physicians, regardless of what specialty, to really understand nuance in vaccines.

Dr. Anne Pham-Huy
Yeah, and I think your description, your question really describes the landscape right now. Just the word vaccine has somehow become polarizing, anxiety-provoking. And so I think it's important because we all know, and I don't have to tell your audience, that vaccines are at the core of preventive medicine, how important it is.

But knowledge about vaccine, understanding how they work, how they protect our patients, helps to build trust in healthcare. And that's one of the key things, I think, that just the trust that has changed over the years. And so being comfortable answering questions about vaccines does build trust with your patients and therefore leads to better outcome.

I think vaccine discussions or vaccine counseling is really a team sport. It's not just the idea. And I think we all have a role to play in this.

Dr. Mariam Hanna
I like that. Team sports. This is the fall.

We're all talking about team sports in my household. Okay, let's walk through major vaccine types, because with the introduction of mRNA vaccines, for example, we rehashed this. There are different vaccine types.

Let's first go through what are the big categories for these different vaccine types, and then we'll talk about how they differ.

Dr. Anne Pham-Huy
Good question. And I think for many it's becoming a bit more complex because there's more different vaccine types. So I'm going to try my best to simplify things.

There are two main categories. I'd say there are live attenuated vaccines and then there are non-live attenuated vaccines or non-live vaccines. In the live attenuated vaccines, this could be against a viral or a bacterial pathogens, right?

And so those are the classic ones that we think of like measles, mumps, rubella, varicella vaccines. So these are pathogens that have been like passed on through cell culture and they're just so weakened that they should not cause disease in an individual. The other category of non-live vaccines is becoming broader.

And if we think of what we're trying to achieve is we're trying to like teach or train our immune system to recognize a potential pathogen in order to mount an early or primary immune response or protection. And so how do we recognize it could be any part of a pathogen? And that's where it gets a little bit more complicated.

So it could be that we've taken a whole bacteria or virus that we've inactivated, we killed it. So those are called inactivated vaccines. And those contain most components of the pathogen, but it cannot replicate.

You cannot have the actual vaccine strain disease from a killed or inactivated. So those are your some influenza vaccine, hepatitis A vaccine, things like that. Then there are a whole slew of what we call subunit or protein vaccines where it contains just parts of it.

So again, those are very classic. Some of our influenza vaccine, for example, have that hepatitis B. And so those again are not live.

So you cannot have the disease from the vaccine. We can skip to like these newer like mRNA vaccine. And essentially, this has really been quite a revolution, like decades in the making.

This has not just come up in 2020. But essentially, we're trying to provide the genetic code or the recipe to a specific protein or antigen that will then stimulate the immune response. But we're asking our own cells to make it.

So again, this is just a recipe provided to our cells to make the antigen that then gets recognized by our immune system. And so these are obviously the mRNA COVID-19 vaccine, but there are new and upcoming vaccines that are using this mRNA technology as well. We have viral vector vaccines, where we use a inactivated or harmless virus that we have removed the capacity to fully replicate, but it's really just a vector.

So it delivers that genetic code or the genes to teach our body to make the vaccine antigen. We had some of the COVID-19 vaccines, which were viral vectors. So the AstraZeneca, for example, one of our Ebola vaccine is also a viral vector vaccine.

Let's see what else there are. Oh, I shouldn't forget the conjugate vaccine. So we know that certain targets of the immune system on a pathogen may not be as immunogenic.

So this we often think of like polysaccharide or capsules of bacteria. So they're not just, they don't induce a very strong immune response. So what we often do or we like to do is we link it to a protein, which is better recognized, obviously elicits a T cell response.

So these are conjugate vaccines that are linked to a polysaccharide. So this will include all the pneumococcal vaccines, the meningococcal vaccines. This just gives you a flavor again of live and not live.

And again, different parts that we're trying to select on a pathogen, either bacteria or virus to elicit this immune response.

Dr. Mariam Hanna

Okay. Is there a particular strategy for vaccination that seems to be safer or gets a better immune response that's longer lasting?

Dr. Anne Pham-Huy
So that's a complex question because there's so many other variables. But again, just to keep it in broad principles, in general, if we're trying to mimic a natural infection, having something as close as possible to that infection is best. So in general, a live attenuated vaccine where we have a very weakened version of the virus, but then or the bacteria, but then contains, you know, all the outer antigens, inner antigens, different glycoproteins, things like that could in general elicit a broader immune response and a more long lasting, durable response.

So this is again, just to give the example of the measles, mumps, rubella vaccine, which typically we give a dose and it has excellent efficacy, effectiveness, and durability. Obviously it's a live attenuated. So from a safety perspective, it might be a little bit more tricky for certain individuals whose immune system is very weakened or not able to handle this type of virus.

And then you can have potential adverse events or vaccine strain disease. So that's kind of in general. Now, obviously we have different tricks in our toolbox to try to increase the immunogenicity or the response to these non-live vaccine.

So sometimes we add a component like an adjuvant to try to elicit a more kind of recruit that innate inflammatory response. There's more recruitment. Sometimes we have higher dosage of antigen in a vaccine compared to others.

We have the, for example, the childhood, the early childhood version of the diphtheria tetanus has that capital D, so a higher diphtheria content or a higher pertussis content. Some influenza vaccine that have been designed for the elderly, for example, have a higher influenza antigen content as well. So there's a few tricks that we can do to try to improve the immunogenicity, but it really depends on your patient, their medical condition, the indication and things like that.

But those are kind of just broad general principles.

Dr. Mariam Hanna
Okay, great. Are there vaccines that we are still under utilizing, but we have in our toolbox?

Dr. Anne Pham-Huy
Oh, that's a really good question. I think that maybe adult immunization is probably underutilized. I think there's still a lot of the population and even providers that might think that immunizations are just for kids, but it's not.

We have a whole adult immunization schedule as well. So I think ensuring that there's a pertussis booster, there's a lot of pneumococcal vaccines that are now available for older adults. There's the HPV vaccine, there are meningococcal vaccines.

So there's a whole slew of vaccine that exists and can be used in adults. And I think we are under utilizing those. And I also think that influenza vaccine is underutilized.

I think it's a vaccine that when I counsel does bring up some emotions in a lot of people. But it's a vaccine that is, again, the intent is to prevent severe disease. It's not to prevent all influenza.

And I think that's a misconception that some patients or families may have is that they feel like, oh, it's a failure of the vaccine because I still got symptoms. But the hope is to prevent severe disease. So I think it's, you know, I mean, I work in a children's hospital, so I see a lot of influenza-related disease and complications and hospitalizations.

And, you know, I think there's still a misunderstanding of what the purpose is or the availability of the vaccine. So, yeah, I'd say that one is underutilized.

Dr. Mariam Hanna
And groups that don't respond well to vaccines or really need to more actively think about vaccines and their boosters, are there particular practice populations that we really need to focus in on? Did they get their vaccines? Did they get boosted?

And will they respond appropriately?

Dr. Anne Pham-Huy
Yeah, so this is really important because there are increasing individuals in our patient population that fall into this category of what we call special. These are special populations.

Dr. Mariam Hanna
I love my special populations.

Dr. Anne Pham-Huy
I think everybody thinks they're special, but in truth, a lot of additional, like more and more people are special. And so when I say special, it means groups that may need some specific consideration when it comes to vaccines. So this is a long list.

It could be individual who have chronic medical conditions, who are immunocompromised, on immunosuppression. They have pre or post-transplant, pre or post-splenectomy, elderly. They may be travelers.

They may be in pregnancy as well. So all of these conditions may make you special. And so they may have special ways to vaccinate.

So it may be the schedule may be a little bit different. The dosing, the type of vaccine, need for boosting, need to measure serology because it's not standard to measure vaccine titers after receiving vaccine. But at certain populations, you may need to really make sure that they are protected.

And so those you may want to do. So the list is quite long, but I think as a provider, when you're characterizing the individual in front of you, try to see if there are these special features.

Dr. Mariam Hanna
So are you vaccinated and are you special, in my mind, is what I need to ask next. OK, how do we approach timing with vaccines in patients on biologics? And the reason I'm asking you is as allergists, we drift away from our immunology knowledge and now we've been sucked back towards immunology with the rising use of biologics for many different allergic conditions.

They've been around for other conditions, obviously. But one of the big questions I get from the pharmacy is to say they're due for this vaccine. How long should I hold X biologic before they get their vaccine?

How am I supposed to answer that? I'm so glad you're here to answer this question for me.

Dr. Anne Pham-Huy
OK, yeah, no, it's a good question. And again, because more and more people are on a variety of different biologics, this question becomes very, very important. And I'm learning because, again, there's I feel like there's a new biologic that comes up on the market and being used every week or every like very frequently.

So I think, again, back to basics, I'd say we generally aim to vaccinate when an individual is at their either before you start a biologic or anything that could be immune suppressive or immune modulating. So before. And if they are on a drug, then we aim to do it at the perceived, I guess, or presumed lowest level of immune suppression or in like kind of stable disease status.

We want to do that to optimize, obviously, safety and immunogenicity of the vaccine. Again, just general principles. If you're going to do a live vaccine, then in general, you want to do it at least four weeks before you start any kind of immune suppression.

For inactivated or non-live vaccine, then we say to wait at least two weeks in general before you start therapy. So those are just guiding principles. Now, when it comes to somebody already on a biologic, it really depends on the biologic because each of these monoclonal antibody biologics target a very specific immune pathway.

So some may be very important in the development of both cell-mediated and humoral immunity, but some maybe are not that profoundly or systemically immune suppressive and you may not need to actually do anything very special for those individuals. So probably extremes would be, you know, if you have a patient, which I don't think you use so much from an allergy perspective, but if they were on a B-cell depleting agent like rituximab, for example, we have fairly clear guidance to not provide any live vaccine or any vaccines at least for six months in general because that's the time we estimate that they would recover their B-cells. Sometimes they can recover a bit earlier.

Some people recover never or later. So that would be kind of one that's a bit more important. In the world of, I guess, asthma, eczema, allergies, like for the anti-IL-5, anti-IgE, anti-IL-4 receptor like dupilumab, those are not considered to be profoundly or systemically immunosuppressive, right?

Like, in fact, they're more of an immune modulator to help with the dysregulated pathway.

Dr. Mariam Hanna
Hold on one second. This is like an aha moment that's really important. Many of my patients need to hear this is not a systemic immunosuppression that they are on.

It's an immune modulator.

Dr. Anne Pham-Huy
Yeah, and that's how I present it to parents as well. For example, let's say you're using dupilumab for severe atopic dermatitis. I say like, you have a dysregulated, imbalanced immune response in the skin, right?

And so what we're trying to do is just regulate and rebalance things. And so we're using this drug to modulate. It's not going to lead to immune deficiency, right?

And I say the rest of his immune system, the rest of the parts to fight off infection should be intact. And again, that's what we see in the studies and all of that. So in terms of inactivated or non-live vaccine, like just proceed as usual, for the live vaccine, in fact, for the majority, unless there are other factors, other medication, you know, some people are on combination immunosuppression.

In general, you can proceed with live vaccine, but I think I would say with caution. So I think I want to dispel the myth that you cannot receive live vaccine on these drugs. You can, in fact, receive them, but I would say with caution.

If you read the monograph for many of these drugs, it does say that live vaccine may be provided risk benefit caution or some kind of wording like that.

Dr. Mariam Hanna
And the inactivated ones, essentially, there is no special precautions that need to occur around dosing. Is that correct?

Dr. Anne Pham-Huy
Yes, there's none. So we would just proceed as usual, as per routine schedule. And in fact, for let's say like just to show like dupilumab per se does not actually, you don't necessarily, you're not at increased risk for like invasive pneumococcal disease and stuff.

So you actually don't qualify for the additional vaccines. So I don't know if it's a good thing or a bad thing, but it may reassure you that it's not thought to lead to that degree of immune suppression and disease.

Dr. Mariam Hanna
Perfect. Okay. Checking titers and functions.

This brings me back to fellowship days. Checking titer and function of antibody responses, vaccine antibody responses. Is there a role in doing that routinely for some of these special patients that we have in clinic?

Dr. Anne Pham-Huy
Yeah, so it really depends on their underlying condition and their potential risk of exposure. So for example, individuals with chronic kidney disease who are on dialysis, so they are at higher risk of, because of the blood borne exposure, blood exposure to hepatitis B. In addition, because of their underlying condition of having advanced kidney disease, they don't respond as to the vaccine as well.

So those are an example of a group of patient where we actually would be very careful to give the hepatitis B vaccine. In fact, we actually give a higher dose of the hepatitis B vaccine. And even after completing the series, we want to monitor their titers to ensure that they're protected and boost accordingly.

But for the, let's say an individual who has chronic asthma, if they receive a tetanus booster, that's not a patient that we would go and chase a tetanus titer, for example. So I think there are very select groups that do warrant serology, but I would say it's still the minority of individuals.

Dr. Mariam Hanna
Perfect. You know, you're modifying my consult question. Now in my mind is, are you vaccinated?

Are you special enough? Is what we've just covered, which is great. Okay.

What is key in counseling patients that are particularly just nervous about adverse events, but may benefit from protection of vaccines? What is that dialogue or that brisk benefit discussion like?

Dr. Anne Pham-Huy
I think the first step is listening, maybe not like not lecturing. So at first, I think building that rapport and sometimes it's easier if you have a patient that you actually are following or one of the primary care providers, but still the first step is should be listening. So seeing what the concerns are.

I think one thing that I've learned is not to assume what people's anxieties or concerns are. It's not always the same. So first, just listen, be patient.

And then I think as you build the trust, it's to go have that dialogue, have that conversation of why you think that it is important. And I think it's important to shift the conversation as well to the risk of the disease. I think there's so much focus and emphasis on the potential theoretical hypothetical risk of the vaccine, but people forget that we don't live in a sterile world and we have potential exposure to these diseases, which may be way more severe and more real in terms of risk than the risk associated with the adverse event.

And so that's the approach is to listen, talk a lot about the protection, both personal and from a community benefit. And then it's also to explain what you're proposing. I think one at a time, like it might be overwhelming to here, I'm going to offer you five different vaccines.

So just go with a list of priorities explaining that vaccine. What I find is a lot of people may not like have, don't understand what the vaccine is. A lot of people actually think that all vaccines are live.

A lot of people think that all vaccines give the same side effect profile and same risk. And so a lot of people are very surprised when I explain that, no, it's actually not live. It's actually 150% impossible to get the flu from the flu injectable vaccine.

And so just having that conversation is how I think most people should approach, but definitely have the conversation. I think the worst thing is to dismiss people's concerns and they say, no, you just need to get it and brush them off because then that concern can build up and then they may reach out to other non-studied, I guess, alternative approaches.

Dr. Mariam Hanna
Yes. Non-validated healthcare approaches. Yes.

Dr. Anne Pham-Huy
Yeah. I think a bit of handholding is good for some individuals. I'm a bit lucky we are able to offer vaccines in our own clinics.

So sometimes it's helpful. They know, okay, you can come back. You know who to reach if there's an issue.

And once I have that, okay, I'll take it. Then I take advantage. Okay, we'll vaccinate today and we'll hold your hand.

You call you back. We'll check in, make sure you're okay. So sometimes that helps.

Dr. Mariam Hanna
Of course it helps. It all helps. Okay.

What are you most excited about for new or upcoming vaccines? What is the ID immunologist in you super excited about in terms of vaccines coming up?

Dr. Anne Pham-Huy
Oh, lots of stuff. I'm actually excited to hear about the combination mRNA vaccines that are being studied and being reviewed. So these would be like COVID-19 and influenza combination mRNA because often individuals at risk for one are also at risk for the other.

And anything that we can do to increase acceptance and make things a little bit easier would be great. But again, I haven't heard all the data. So I'm very excited to hear more about that.

The other vaccine that we already have that I'm excited about, hopeful to have it rolled out a bit more is nirsevimab. So that's actually not active immunization, but passive immunization. So the monoclonal antibody for RSV to prevent RSV disease in infants.

And so it was rolled out in a few provinces and territories last year. And so in Ontario, we did have a program for nirsevimab for all newborns and also some catch up for the higher risk. But we haven't seen all the data yet.

But anecdotally, at least in my institution, it was like, wow. So I remember going to the ICU and they were like, where's the RSV? So anyways, I'd be excited to hear and see if other provinces and territories will also adopt a program.

Dr. Mariam Hanna
Exciting times. All right. Time to wrap up and ask today's immunologist, Dr. Anne Pham-Huy, for her top three key messages to impart to busy physicians, clinicians, and our patients on today's topic, vaccines and vaccine responses. Dr. Anne Pham-Huy, over to you.

Dr. Anne Pham-Huy
All right. So my number one would be to really think that every medical encounter is an opportunity to review and optimize vaccination. I really think it's everyone's job.

Don't be scared of the word vaccine. And again, like again, that whole concept that vaccination is a team sport. And I think the more you do it, the more you practice it, the more you'll be comfortable with it, confident about it.

And then it'll be your patients who will see that. So that would be my number one. So I hope that after, you know, whoever, you know, your audience listens to this and then they're like, okay, my next patient I'm going to talk about and review the vaccine.

So that would be amazing. Number two is again about the immunocompromised or these special patients. And I think to always think of that window of vaccination because timing and immune status does matter.

So I guess that's the message. But the other, I guess, as we talked about certain biologics, maybe you don't need that window. So really you need to know your drugs, I guess.

And number three, always safety first. But again, have that true discussion of the risk-benefit balance, which includes now the unfortunate emergence and resurgence of some of our vaccine preventable disease like measles. So before, maybe 10 years ago, we didn't need to as much.

But I would say right now in Ontario, Alberta, and other parts of Canada, there are cases. So we have to be aware of that risk and build that into our risk-benefit discussion as well. And that, in fact, live vaccine can be given to many patients that are considered immunocompromised.

Just have to do it cautiously. So not all, but again, I guess refer to your friendly special immunization clinic, neighbourhood special immunization clinic for assistance if you have any questions.

Dr. Mariam Hanna
Thank you, Dr. Anne Pham-Huy for joining us on today's episode of The Allergist.

Dr. Anne Pham-Huy
Thank you for having me.

Dr. Mariam Hanna
This podcast is brought to you by the Canadian Society of Allergy and Clinical Immunology and produced in collaboration with Podcraft Productions.

The opinions shared by our guests are their own and do not necessarily reflect the views of the CSACI. Please remember that this podcast is for informational purposes only and does not provide any individualized medical advice. For show notes and relevant links from today's discussion, visit CSACI.ca. While you're there, check out the Find an Allergist tool to connect with a specialist near you. If you enjoyed this podcast, we'd love your support. Subscribe wherever you get your podcasts, leave a review and a five-star rating. It helps others find the show.

And remember, the three questions, are you vaccinated? Are you special? Are you special enough?

Okay, ball's in your court, your game. Thanks for listening. Sincerely, The Allergist.