# Transcript of webinar: Seasonal Influenza 2022-2023

# September 29th, 2022

**Claudyne Chevrier:** Thank you so much. Hi, and welcome, everyone. My name is Claudyne Chevrier from the National Collaborating Centre for Infectious Diseases or the NCCID. Welcome to the Public Health Agency of Canada's webinar for health care providers on today's topic, Seasonal Influenza 2020-2023, a collaboration with NCCID. NCCID is funded by the Public Health Agency of Canada to provide knowledge, translation, and evidence for use in public health planning and policy, and is supporting the agency with knowledge translation during the COVID-19 pandemic response. I want to acknowledge that NCCID is hosted at the University of Manitoba, situated on the ancestral lands of the Anishinaabeg, Anishininewuk, Dakota, Oyate, Denesuline and Nehethowuk nations. It is also in the heart of the homeland of Métis nation. At NCCID we strive to honor the lands and their original caretakers in our work. We acknowledge that we are on Treaty One land. We recognize that this and other treaties have been implemented as part of the process of colonization, intended to benefit some of us and harm others. We are committed to working with our partners toward reconciliation.

Before we begin, I want to mention some housekeeping items. As I'm sure you've noticed. We are running this webinar through Zoom. If you have any questions or any technical problems with Zoom, please email NCCID at nccid@umanitoba.ca. The question and answer session today will be focusing on seasonal influenza vaccines and antivirals. The session will be taking place using the Q&A tab, which you can activate at the bottom of your screen. You can also like other people's questions to push them up in priority. We will try to answer as many questions as possible. We might not get to all of them. The hosts will use the chat tab for extra communication with participants, so please keep an eye on it. And finally, the recording of this webinar and presentation slides will be available shortly after the webinar at nccid.ca.

And now I'd like to introduce and welcome our speakers for today's webinar, Dr. Robyn Harrison and Dr. Jesse Papenburg. Dr. Harrison is the vice chair of the National Advisory Committee on Immunization or NACI. She is an infectious disease specialist and is a clinical professor at the University of Alberta in the Department of Medicine, Division of Infectious Diseases. She joins us from Edmonton, Alberta. Dr. Papenburg is the chair of the Influenza Working Group at NACI. He is an assistant professor of pediatrics and an associate member of the Department of Epidemiology, Biostatistics, and Occupational Health at McGill University. He practices pediatric infectious diseases and medical microbiology at the Montreal Children's Hospital of the McGill University Health Centre. He is joining us from Montreal, Quebec.

Here are the disclosures for today's presentation.

Text on screen. Dr. Jesse Papenburg: research grants- MedImmune & Merck; participation of scientific steering committee- AbbVie. Dr. Robyn Harrison, no conflicts of interest to declare. Claudyne Chevrier, no conflicts of interest to declare.

And on the next slide are the learning objectives for today's presentation.

At the end of this webinar, the participants will be able to:

* discuss with patients the importance of seasonal influenza vaccination
* identify and address barriers to seasonal influenza Vaccine uptake
* apply the National Advisory Committee on Immunization Recommendations on Seasonal Influenza Vaccine for use in the 2022 - 2023 season and identify where to access NACI and relevant Public Health Agency of Canada resources relevant to vaccination during the 2022 - 23 season.

I would now like to turn the floor over to Dr. Harrison, who will be our first speaker. Over to you, Dr. Harrison.

Text on screen:

Setting the stage: What is the burden of influenza and which popluations are at highest rist?

**Dr. Robyn Harrison:** Thank you very much, Claudyne. Thank you to our hosts. And hello. Good morning from west to east. Good afternoon. So the first thing we're going to do today is just set the stage and speak a little bit about the burden of influenza and which populations are at highest risk of infection.

Next slide, please. It's important here to note that this summary slide focuses on the time before the COVID-19 pandemic. So the burden of influenza does vary year to year, but the variation we've seen in the last two years have been extraordinary. I'm going to focus here and summarize the pattern we were in up to 2019. And so globally, every year, worldwide, seasonal influenza caused an estimated 1 billion infections, 3 to 5 million cases of severe illness, and anywhere between roughly 300,000- 650,000 deaths. And the global annual attack rate was estimated to be 5 to 10% in adults higher, than 20 to 30% in children.

Now, if we look at our own country in Canada, influenza and pneumonia are ranked among the top ten leading causes of death in Canada. There's no doubt that influenza is a serious disease that causes a lot of harm, and it certainly did every single year leading up to the pandemic. So it's estimated about 3500 deaths each year up to 2019. That was every year, 12,200 hospital stays are all linked to influenza. So what has changed in the last two years is we had historical lows throughout the pandemic, and we've now been in a time of uncertainty about; when will it come back, and what's it going to look like. and we've seen a little bit of that already. So in 2022 and as we head towards 2023, there's a possibility of simultaneous outbreaks of influenza and COVID-19 in Canada. And so anything we can do to minimize this influenza-related harm, the morbidity-mortality will reduce the burden on the health care system, and of course, on our patients.

Next slide, please. On this slide, we just want to show you the patterns focusing in on those last two years in comparison to the pattern that we were in up until 2019. So I mentioned historical lows. It was really unprecedented not to see really any influenza in the 2020 - 2021 season. So what you see here in the two graphics on your left is an illustration of the testing. And so if you look at the gray area, this is showing you pooled averages historically prior to the pandemic. The dotted blue lines show you the 2020 - 21 year and then 2021 – 2022 through to present day is the red line.

So what you can see on the red line is that we've been doing more testing for influenza as we're also testing for COVID 19. And the gray would be sort of a baseline in years past. But if you look at the graphic on your right-hand side, you see the percentage of those tests, the percent positivity, the number that are testing positive and so for many years, if you look at the week of the year, surveillance week 39, you see the grey start to ramp up there and lots of positive tests. We didn't see that in 2020 - 21. That's why the blue dotted line is flat. But if you look at the red line this year, in 2022, surveillance week, about 15 there they're talking April, you see the test starting to test positive again, influenza coming back and we've had a peak already.

Next slide, please. So this has been a really unique time in history. So community circulation returned this year, and we experienced an epidemic that began in mid-April, which was typical for us. It lasted nine weeks. This is what we know so far about this year, and it was driven by H3 and 2. Now, that's interesting because that virus does tend to appear after pandemics when you look back historically too, and we know it causes severe disease. So it's catching attention. This was late in the season, relatively low in intensity. You saw the peak didn't mount as high as that gray peak and short in length. But I don't think the virus is done yet, and we're all staying tuned.

So typical influenza season starts in the fall, late fall and winter. It really peaks in those winter months. Overall, our vaccination coverage for adults 18 and older really didn't change much through the pandemic, but it's low at 39%. Our goal is 80%. So especially for those who are at highest risk of severe disease. And so we really need to keep this in focus. There is higher uptake in older adults, which is really good to see. But we're still sitting at 71% aiming for 80 or higher. So we do still have improvements to make.

Next slide, please. I just want to remind all of you about typical influenza symptoms so that the hallmarks, the typical symptoms are sudden onset of fever, cough, muscle aches, pains, myalgia, just aching. And other common symptoms include severe fatigue or prostration, headache, chills or feeling feverish, loss of appetite, sore throat and runny or stuffy nose. And some people and it's more common in children you can also see what we call gastrointestinal side symptoms, rather, which would be nausea, vomiting and diarrhea, much more common in children. So in a typical illness, most people recover in 7 to 10 days, but severe illness and the severe illness can be linked to many different medical complications. Pneumonia is one of them. We know this occurs, and some groups are particularly high risk of those complications and therefore hospitalization.

Next slide, please. Influenza A and B are the main types that cause seasonal outbreaks in humans. So these are the ones we see or expect every year. Influenza A strains can really be classified into two subtypes, and those are based on their surface proteins the hemagglutinin and the neuraminidase. Among them, Influenza A is caused widespread disease over the decades, and there are three subtypes that are associated with that hemagglutinin, or H1, H2 and H3 and two subtypes for the neuraminidase one and two.

Influenza B is a little different, and it has evolved into two distinct lineages. B Yamagata, B Victoria, I'm telling you all of this because these are things we aim to target with our vaccine, and there's been some interesting change with Influenza B through the pandemic and that we haven't seen B Yamagata. So over time, we know these strains can change. There's antigenic variation, which we call antigenic drift, that can occur in any of the subtypes or lineages. There's also antigenic shift, and this antigenic shift is due to a re-assortment of genes and it can cause abrupt or major change in the influenza A virus.

Next slide, please. Every year, seasonal influenza vaccines are developed in response to some of these changes, particularly the drift or when there's a shift of the influenza viruses. So this is something that involves global coordination. There's ongoing surveillance within our country and with the World Health Organization to establish which viral components should be included in the vaccine for both the northern and southern hemispheres each season. And influenza vaccines are based on our best predictions for the upcoming season. And as a result, effectiveness can vary year to year because you need to have a good match to the strain that's circulating and what was chosen for the vaccine. And it's obviously chosen ahead of time with a vaccine. Several influenza strains can be included in one vaccine. So we have trivalent, which means three strains, two A, one B, and we have quadrivalent in most products you'll see are going to be in use are quadrivalent, which is two strains of A and the two B strains. Viruses circulating within a population can sometimes change during the flu season. And so if that happens again, the flu vaccine may not work as well as expected during that season. And then, of course, there are individual factors as well that can affect how well a vaccine works. You can expect it will work well with young and healthy people. That's one of the reasons it's strongly recommended that healthcare workers protect those around them. It will not work as well in someone who is older with a weakened immune system. It's good to keep that in mind. And of course, vaccine immunity to influenza can wane over time. And as you know, we recommend vaccination annually.

Next slide, please. This slide is just sort of illustrating that point, that you can see changes in effectiveness year to year. We have groups of experts in this country who monitor and study this very closely and provide their expertise. And so what you see here are the years leading up to the pandemic. We couldn't do these kinds of studies when there was no influenza being detected or circulating. So you don't have a 2020 - 2021 year here, but you can certainly see in years past that from this graphic that the effectiveness varies 40 much higher than 40, 60 or 70%. There's variation year to year, but we do see benefit year after year.

Next slide, please. Now, this slide is just showing you the chosen strains that the vaccine is going to be targeting for protection this year. As I mentioned, these are chosen by the World Health Organization, and these are for the quadrivalent. So you'll see four strains we have two now with the newer products. We have two platforms: egg-based platforms and cell-culture or recombinant-based vaccines. And so those that are egg-based, essentially what you're seeing in both is that you've got H1N1 that's similar to the pandemic 2009 H1N1 covered. You have an H3 and 2, and then you have the two B lineages. And then for the trivalent vaccine, it is the B Victoria that is covered.

Next slide, please. Now, this slide is just meant to show you a little something about vaccine uptake and where we have room for improvement. So this is from a Canadian seasonal influenza vaccination coverage survey. And so, as I mentioned earlier in the presentation, older Canadians have a much higher uptake than those who are younger, those with chronic conditions, have lower uptake than older Canadians, and you see the numbers there for all adults, pools greater than 18 years old. So with a goal of 80%, we know we have room to improve here, and especially for those with chronic conditions that make them more vulnerable to severe disease.

Next slide, please. That slide also just showed you that there wasn't a lot of change through the pandemic years. So key takeaway on this, the first of four sections in the presentation on the impact of influenza is that influenza absolutely can lead to severe complications, including hospitalization and death and especially in our highest risk populations. Most people recover fully in 7 to 10 days and for the very best protection, it's recommended that you obtain an influenza vaccine annually. Circulating strains do change from year to year, so we all need to be aware of that. And as a result, the vaccination formulations change year to year, and the vaccine can help prevent influenza and its complications. That's why we recommend it and why we receive it and prevent transmission to others. So the effectiveness of the vaccine may not be 100% and may not persist beyond a year, but has an impact. And that's why it's recommended.

Next slide, please. Community circulation returned to Canada this year. And so, as I mentioned, although the pattern wasn't exactly what we would expect with its appearance in April, we know that it's back. And I'm going to hand it over here, I believe, to Claudyne or Margaret.

**Claudyne Chevrier:** Hello. Thank you. So we have arrived to our first interactive poll of the presentation. So it's a true or false question. We invite everyone to answer the pop-up that appears on your screen. All answers are anonymous, so just go right ahead and choose.

The question is, some groups, such as those 65 years of age or older and adults with chronic medical conditions, are at increased risk of influenza-related complications and hospitalizations. True or false?

All right, everyone answered "True" 100%. Am I seeing that correctly? Yes, okay, and that is correct. The correct answer is true. Thank you. So moving on to this new section, we will be back with Dr. Harrison. So over to you, Dr. Harrison.

**Dr. Robyn Harrison:** Thank you so much. So, this short section, the second and fourth, is just trying to address and get us all thinking about what we can do about improving the vaccine uptake that I've just highlighted where we want it to be. Title of this section is "Identifying and Addressing Barriers."

Next slide, please. So conversations about the seasonal vaccine might look different than it did before the COVID-19 pandemic. I think it's really good, especially for those of you who are immunization providers, to be aware of this. And I think that this is one of the good things that has come out of the pandemic actually is we have more engagement from a more diverse audience than we ever did. So for example, people may want to know what type of vaccine you're giving specifically, which brand is it? We didn't often hear that from clients, patients, and people coming to be immunized. But people might be interested because there's certainly been lots of discussion on those lines with the COVID-19 vaccine. So be prepared. Have the product monograph nearby so that you can easily address those and feel confident sharing the information that people seek. Use plain language, and obviously, be sure you're delivering accurate information. If you don't know, seek out someone who does. So you can give people what they need to understand and feel confident in the immunization that they're coming to receive.

Be sure that your language is culturally sensitive and age-appropriate. Not everybody experiences the health care system in the same way, and the other experiences they've had in life, the culture they have come from, their socioeconomic status, and their exposure to racism. These types of things can significantly impact the way they seek, hear, and receive information. So really be sensitive to that. Be careful and focus on the person right in front of you. There are some great tools from the Public Health Agency of Canada to help you do this and to help learn more about this theme, and the web links have been provided by. So I encourage you to really seek those out ahead of time so you can feel good having those exchanges with people.

Do provide information on severe impacts of the disease and show them things such as, for example, the vaccine is not 100% effective, but what we do know is about how severe this disease's and we know who's at risk and we know the vaccine has benefit and this is why it's recommended. Be prepared to discuss the potential risks from the vaccine and be ready to talk to them about: can I receive this with other vaccines, such as my COVID-19 vaccine or the routine immunizations for my child. They need to be up to date. We cannot get behind on those. So can we get these vaccines together? The answer is yes, and be prepared to work through those.

Next slide, please. Key factors that influence vaccine hesitancy. Some people use a model called the "Five C's": confidence, complacency, convenience, calculation, and collective responsibility. I really encourage you to look through these and think about them will make your conversations more interesting when you're speaking with people. But some of these will apply to some of the people that you're speaking with when they come to get immunization or when they say they're not going to get an immunization.

I'll just give you one example here. Convenience. What if someone doesn't have access to the Internet? If they're living without a fixed address, they're homeless. How are they going to use an online booking system? What things are being done in your community to meet people where they are?

Or calculation? Some people are going to be very vulnerable to misinformation. Other people are wanting to get more information than they're being given so that they can feel confident. How can you help them, get them what they need to know more about the vaccine for the disease?

Next slide, please. And discussions on vaccine confidence. Start by identifying the person in front of you, and their knowledge, attitudes, and their belief toward the influence of vaccines. And we do have a vaccination coverage survey that I mentioned earlier in the presentation, and these are some of the data points from the survey that was done this year between January and February 11th. So the most commonly reported reason among all adults for not getting the influenza vaccine is they're healthy. They never get the flu. The majority of the population stated that the COVID-19 pandemic has no impact on their likelihood of getting the flu vaccine, so they didn't see how it could make a difference, for example, protecting the health system. These things weren't in the discussion, and 92% of the respondents believe that the flu shot is safe, but 38% of them believe they might get the flu from the vaccine, which is not true. And 35% agreed the flu vaccine does not protect them from getting flu.

Next slide, please. We can learn from that feedback from the survey respondents. So understanding the factors that are preventing people from getting vaccinated is key to starting the supportive discussions that we want to have. Be transparent. Cultivate a safe space for these discussions and activate the right emotions. And again, this primer from Public Health Canada has some really great tips about how to activate those right emotions. So you don't want to say something like, "Is it traumatic?" You want to be able to acknowledge that. So what you want to do is to say, 'What was it that made you feel good about this?" And how can we move forward? So there are some really good practical examples and tips in there. And being careful to avoid judgments and labels is really important.

**Claudyne Chevrier:** Thank you. That brings us to a new survey. So, again, a pop-up message will appear on your screen, and we encourage everyone to participate. The answers are anonymous. It's another true or false question.

According to the 2021 - 2022 vaccine coverage survey. The most commonly reported reason among all adults for not getting their flu shot was that they are healthy and or they never get the flu?

So just keep voting. All right. Thank you for participating. The answer is true. The most commonly reported reason among all adults for not getting their flu shot was that they are healthy and or that they never get the flu. So now I would like to turn the floor over to Dr.Papenburg, who will cover NACI recommendations. Over to you.

**Dr. Jesse Papenburg:** Hi, everybody, and thanks so much for the opportunity to present. Thank you, Clauson. Thank you, Robin, for such an eloquent way of expressing some complex subjects that we've been going over up until now. So let's talk a little bit about the National Advisory Committee on Immunization (NACI) and the recommendations that this body has made regarding influenza vaccination.

Next slide, please. So what is NACI? It is an expert advisory body that provides independent advice to the Public Health Agency of Canada on the best way of using authorized vaccines in Canada. So NACI can make recommendations for the vaccination of both individuals and for vaccine programs. In other words, what is the benefit and risk balance for the individual and take into consideration other elements for vaccine programs such as population acceptability, ethics, feasibility and cost can enter into that as well. But, at the end of the day, it's the provinces and territories that are responsible for their vaccine policies and immunization programs. So you might notice that there is some variability across Canada, and I think that probably has come to a head. We've noticed that in the COVID-19 vaccine response, right. Not every province has approached it in exactly the same way, despite the fact that there are these overarching national recommendations from NACI.

Also, it's important to realize that NACI recommendations may differ a little bit from the indications that Health Canada has given for the use of a product. And that's just because NACI can either decide to be broader or more narrow in its recommendations, because NACI takes into consideration other factors beyond the efficacy and safety data that are really primordial for Health Canada and all these other issues, such as ethical considerations, acceptability, programmatic factors, what other types of products are available on the market in Canada? All these things. NACI will consider that Health Canada doesn't need to address. Now, every year, NACI issues a statement on the seasonal influenza vaccine. It informs healthcare providers on the optimal use of the vaccines available for influenza in Canada. And based on the most up-to-date information available at the time that the report is written. So you can find the 2022 - 23 statements online through this weblink. And there's also guidance from the Public Health Agency of Canada on the use of the influenza vaccine in the context of the COVID-19 pandemic that was developed in consultation with NACI.

Next slide, please. So who should receive the flu vaccine? And NACI recommends that any person, six months of age or older who does not have contraindications to the vaccine should be immunized for influenza on a seasonal basis. And the reason why children under six months of age are not included in that is because we know that they don't mount a good immune response to influenza vaccines under the age of six months of age. So it's not an effective way to prevent influenza vaccination. But we'll talk a little bit about vaccination during pregnancy and how that can potentially prevent influenza outcomes in the youngest age group, under six months of age.

In addition to the general population, six months of age and older that isn't contraindicated ,we do want to emphasize that people at high risk of influenza-related complications or hospitalizations, should be vaccinated as well, in preference or particularly, in addition, to people capable of transmitting influenza to those at high-risk as well as other types of at-risk exposure populations.

Next slide, please. So who are the individuals at high risk for influenza-related complications or hospitalization? I think you're probably familiar with most of these, but let's go over the list as a refresher.

So adults and children with underlying high-risk chronic medical conditions such as chronic cardiac or pulmonary disorders, diabetes, whether it be type 1 or type 2, and other metabolic diseases, cancer, and immune compromising conditions. And this immune compromise can be either due to the underlying condition itself or due to treatments of a condition. You can think of autoimmune disorders that require immunosuppressants or malignancies that require chemotherapy as high-risk conditions. Chronic renal disease, persons with anemia or hemoglobin myopathy in particular sickle cell anemia, are at high risk of complications of their influenza infection. Persons with morbid obesity. Speaking of a BMI of over 40 and children who are undergoing treatment with aspirin, chronic aspirin therapy puts them at risk for Reye’s syndrome if they do develop an influenza infection and they are considered at higher risk.

Then we know that the extremes of age. So think about the groups at high risk, the extremes of age. All children under the age of five are considered high risk. In particular, those under age two are at high risk of influenza hospitalization, as well as the elderly. So adults 65 years of age and older are at high, very high risk of complications of their influenza infection at higher mortality risk as well. There's a bit of a glitch here. Neurologic or neurodevelopmental conditions really should be in the column on the left as a chronic high-risk condition. There is data from Canada that support that persons with these conditions are at higher risk of having a severe influenza infection.

People who are pregnant as well are at higher risk of being hospitalized for influenza infection. They should be targeted for preventing severe diseases in the person who is pregnant. And then people who are of any age who are residents of nursing homes or other chronic care facilities because they often accompanied with multiple medical conditions, medical complexity, they are frail, regardless of the age. And also we know that these long term care facilities or chronic care facilities tend to be very good places for a rapid outbreaks of influenza that can carry a high morbidity. Certainly the COVID-19 pandemic has brought that to light as well. How long term care facilities sometimes are, just because of the nature of the care that's given and the frailty of the individuals there, outbreaks can be quite problematic for respiratory viruses, including influenza.

And finally, in indigenous peoples, whether they be in remote areas or living in urban areas, are also thought to be at higher risk of complicated influenza infection.

Next slide, please. Next category is people who are capable of transmitting influenza to those who are at high risk. So you can think about health care providers, but also other types of care providers, in facilities, but also in the community. And that could be either paid work or unpaid care providers. So health care workers, emergency response workers, long term care facility workers, home care workers, students in the health care field, as well as volunteers and frequent visitors. So due to their occupation or close contact with people who may be infected with influenza, they are also themselves often at increased risk of infection and thereby increased risk of transmitting it to those who are potentially at high risk of complications from their infection. Even though these workers may be otherwise healthy themselves.

Next slide, please. So again, in terms of people who can transmit to those at-risk household contacts, both adults and children of individuals at high risk, whether the individual at high risk has been vaccinated or not. So those who provide regular child care to young children under the age of five, whether they are inside or outside of the home, and those who provide services within closed or relatively close settings to people at high risk.

Next slide, please. Now, other people who are risks of exposure; you can think about people who provide essential community services, and that's a rather broad category and provinces can define that differently. People in direct contact with poultry, because we know there's a potential for poultry to be infected with avian influenza types, and particularly during culling operations, there can be transmitted from birds to humans. So we want to try and prevent that, especially in the context of limiting the possibility of avian types of influenza spreading in the community.

Next slide, please. Now, what about the seasonal influenza vaccine schedule? It's usually one dose that's given at the beginning of the influenza season for adults and children, nine years of age and older, with the exception of children under nine years of age who have never yet received an influenza vaccine. So if it's their first influenza vaccine, we do recommend receiving two doses at a four-week interval. Now, if they got their first dose in the previous season, that dose counts. So they only need one dose in the following season. It's really just that if they're going to be receiving the first dose in one season, it should be followed by a second dose four weeks later, ideally. Otherwise, everybody else should be getting one dose. And there has been no evidence to support multiple dosing during a season as of yet.

Next slide, please. So in terms of new or updated information for this upcoming season, that's included in our seasonal statement on influenza vaccination. There is inclusion of a recombinant quadrivalent seasonal influenza vaccine. So Supemtek, it’s a recombinant influenza vaccine and the first and only such vaccine that's licensed in Canada and it can be considered for use amongst the other quadrivalent influenza vaccines offered to adults 18 years of age and older.

We've also provided additional guidance on the use of the seasonal influenza vaccine in the presence of COVID-19. So NACI guidance that outlines the administration of COVID-19 may occur at the same time as or at any time before or after influenza immunization, and that includes seasonal influenza. All seasonal influenza vaccines LAIV, Live attenuated vaccine for persons aged five years of age and older. Now, that youngest age group from six months of age to under five, there's a precaution that is put into place to try and really, if there are any side effects we want, we'll be able to tease out between different vaccine types. So we are suggesting that there should not be any vaccine four weeks prior to or more than two weeks after a COVID-19 vaccine for those youngest children. And the types of seasonal influenza vaccines have been updated, and there's a nice table that summarizes that in both the slide deck and in the statement itself.

There's also an updated age indication for Flu Cell Vax Quad, and a Flu Cell Vax is a standard dose mammalian cell culture-based quadrivalent inactivated flu vaccine that's now authorized for use. The age has been extended down to six months of age, in children and adults. The age indication has also been extended for Influvac Tetra which is a quadrivalent egg-based subunit inactivated influenza vaccine. Again, now going down to six months of age, and NACI statements for the expanded indications of both Flucelvax Quad and Influvac Tetra I believe, have not yet been released or they were just recently released, but they'll be forthcoming in the next iteration of the influenza statement.

Next slide, please. So who should not receive the influenza vaccine? People have had an anaphylactic reaction to any of the vaccine components with the exception of egg because we know that persons with severe egg allergies can safely receive influenza vaccine, even though those that can do contain ovalvulen or egg proteins. For people who have developed Guillain-Barré Syndrome within six weeks of previous influenza vaccination, unless another cause was found for the Guillain-Barré Syndrome (GBS), there is a very small increased risk of GBS after influenza vaccination that is considerably smaller than the risk of GBS after influenza infection itself. So it is just due to that theoretical risk, we're talking probably somewhere in the order of one per million doses. It's recommended these people do not receive the influenza vaccine if they've had the syndrome following influenza vaccination. And we mentioned infants under six months of age due to their lack of immune response to the vaccines available currently. So the contraindications that I've just mentioned are really specific to influenza vaccines.

Next slide, please. Now, what about the live attenuated influenza vaccine (LAIV)? So most of the vaccines, that are injectable, are inactivated or derived from cell culture or recombinants. So those injectable vaccines are not able to replicate at all, whereas the live attenuated influenza vaccine has modified strains of influenza that are able to replicate, but they are temperature sensitive. In other words, they only replicate in the upper airway, where it's a little bit cooler, and they're attenuated, and they cannot cause severe disease. But they do replicate in the upper respiratory mucosa. And it's thought to thereby perhaps elicit a broader and better mucosal immune response and overall immune response. But there are some contraindications, and people with immune-compromising conditions should not be receiving LAIV, with the exception of children who have a stable HIV infection on highly active antiviral retroviral therapy and with adequate immune functions. So good CD4 counts and a low viral load. Persons with severe asthma, in other words, are currently on oral or high-dose inhaled glucocorticoid steroids or having active wheezing just because that LAIV can prompt a wheezing episode in these people.

Children under 24 months of age are actually a contraindication. It's not authorized for use in this youngest age group because of an increased risk of wheezing following LAIV or medically attended wheeze and the week after they had medically attended weeks in the seven days prior to the proposed date of vaccination because LAIV can induce a wheezing episode. But it is important that is not contraindicated for people with a history of stable asthma or recurrent wheezing.

Next slide, please. Again, other contraindications are children who are receiving chronic aspirin-containing therapy because of that theoretical risk of Reye’s syndrome. Individuals who are pregnant, because since it is a live attenuated vaccine and there is a lack of safety data for that particular influenza vaccine during pregnancy, but LAIV is not contraindicated in breastfeeding individuals.

Next slide, please. And LAIV should not be administered in the context of ongoing antiviral treatment because, as I mentioned, it is a live vaccine and the antivirals could inhibit that replication, which is important to the development of immunity against the vaccine strains. So you should not administer LAIV until there's been at least 48 hours after stopping antiviral agents and these antiviral agents, unless they are medically indicated, shouldn't be administered until two weeks after the receipt of LAIV. So the idea is that we don't want those antivirals inactivating the replication of the virus. Now, if the antiviral agents are given, we do recommend revaccination, as if they are given within 48 hours pre-vaccination to two weeks post-vaccination, Revaccination should take place at least 48 hours after the antivirals have stopped. Or you could simply get an inactivated intramuscular vaccine at any time.

Next slide, please. This table just summarizes the dose and route of administration by age. And I think I'm just going to say that almost all influenza vaccines are given as a 0.5 milliliters intramuscular injection with the exception of the pediatric adjuvanted trivalent vaccine for children from 6 to 23 months of age. It's a half dose, 0.25 milliliters. And the other dose that's different is the high-dose influenza vaccine that can be authorized for use in persons 65 years and older. It has four times the amount of antigen for each strain, and it is a 0.7-milliliter dose. Of course, the intranasal vaccine is administered intranasally at 0.1 milliliters in each nostril.

We've talked about the number of doses is always one, with the exception of children under nine who should receive two doses in their first season after their first dose four weeks apart.

Next slide, please. So some key takeaways from our NACI recommendations are that NACI has issued recommendations for healthcare providers on the appropriate selection of seasonal flu vaccines for the 2022 - 23 season, including information on seasonal influenza itself, as well as the vaccines that protect against influenza, different vaccine products that are recommended and there are specific products that are recommended, according to age groups. So there are age-appropriate product recommendations made. There are contraindications that can vary according to the different products, and there are dosages and routes of administration that are spelled out. And you can find those complete recommendations as well in the Canadian Immunization Guide chapter on influenza seasonal vaccination that's been updated for 2022 - 2023. Next slide please.

**Claudyne Chevrier:** Thank you. That brings us to our next poll question. So which one of the following is the live attenuated vaccine, intranasal vaccine contraindicated for? A.) Children over 24 months of age; B.) People, who are pregnant? or C.) People with mild asthma.

So, as you did previously, you can simply choose the answer on the pop-up on your screen currently. See the answers going. Thank you. And the correct answer that the majority of people got was B.) People who are pregnant. Thank you for participating. So for the next section, for this final section, we'll continue with Dr. Papenburg as our speaker. Over to you, Dr. Papenburg, Thank you.

**Dr.Jesse Papenburg:** Thanks. Claudyne. I'm just trying to start my video. There we go. And so, in the next section we're going broach, is the antiviral treatment of influenza.

Next slide, please. So, as Dr. Harrison already mentioned, most people with influenza really will have a mild illness and don't require any medical care or any antiviral medication. But in the event that someone does get the flu, we can give antivirals as they have been shown to decrease the duration of symptoms and the risk of severe outcomes with an influenza infection. So we want to consider prescribing antivirals to reduce that morbidity and mortality, but in particular for people who are at higher risk of complicated infant influenza or who are already severely ill with their influenza and are having a progressive severe disease or require hospitalization. So, these decisions are going to depend really on the patient risk category, the history of the illness as it's going on, and the duration and severity of symptoms that are presenting to us.

Next slide, please. So there are currently four antivirals that are approved for use in Canada and are recommended for the treatment of influenza. And the first three on this list are neuraminidase inhibitors, and Oseltamivir is the most commonly prescribed. It's an oral agent. It can be given us a liquid suspension for children, and it's authorized for use by Health Canada in persons one year of age and older, although there are data for dosing in infancy. So under one year of age as well. But that should be probably discussed with a pediatrician or a pediatric infectious disease specialist.

Zanamivir is another neuraminidase inhibitor, and that's given as a dry powder for oral inhalation through a plastic device called a diskhaler. And its authorization is for persons age seven and above. Now, the reason that it's not given to younger children is that it does take a certain amount of coordination to be able to administer the medication and inhale it properly so that the drug gets to the airways and doesn't just wind up on the mucosa of the mouth. It's also not recommended in patients with reactive airway disease, whether it be asthma or COPD, because there is a concern about possibly precipitating an exacerbation of Peramavir is given intravenously, and it's the only IV influenza medication that we have available to us. But it does require special access from Health Canada in order to obtain it. So really, it's for very complicated infections that, in the hospital setting and persons two years of age and above that, it would be considered.

And finally, there's the newest antiviral agent. It's a first-in-class medication of a polymerase inhibitor, and it's called Baloxavir Marboxil, and it's been shown as a single oral dose to reduce the duration of influenza symptoms in a manner that's very comparable to the neuraminidase inhibitors. So it's got that advantage of being a single dose, and it's approved for use in persons 12 years of age and older with non-severe influenza in the outpatient setting. Now, the one caveat is that it's currently not being marketed in Canada, but that might change over time. One last point I'd like to make is that you may have heard about adamantines such as Amantadine, that used to be used for the treatment of influenza. Well, currently all circulating seasonal strains are resistant to adamantanes and they are not recommended for use in the treatment of influenza.

Next slide, please. So the Association for Medical Microbiology and Infectious Diseases (AMMI) has issued guidelines on the use of antiviral agents for influenza. And we actually publish updates of those yearly. And I think the key points are that antivirals should be initiated as rapidly as possible after the onset of the illness, as the benefits of treatment are greatest or have been really proven the best in the first 48 hours and are probably greatest within the first 12 hours. So as soon as possible, you're going to get the most benefit from your treatment. Now, if there have been more than 48 hours after initiation of treatment, you should still consider administering antivirals if the patient has severe enough disease to require hospitalization. There's a lot of observational data to suggest that treating early in the course of a hospitalization, even though it's been more than 48 hours of symptoms, reduces the risk of severe outcomes. Persons who have progressive, severe, or complicated influenza. So you think about influenza pneumonia in the outpatient setting, regardless of their risk status, should also be considered treating them even though it's been more than 48 hours.

And I will ask for the next slide, please. Now, on the other hand, if you have an otherwise healthy patient with a relatively mild influenza infection that doesn't require hospitalization, it's not severely progressive; if it's been more than 48 hours, we do not recommend treatment in that context. And for people who were not initially treated, you should probably mention to them, that there is a possible treatment that maybe are choosing not to give at this point. But what are the signs and symptoms that should cause them to seek care again and possibly initiate treatment. Treatment duration is only five days, but there are certain scenarios where we would tend to treat longer, particularly in immunosuppressed patients, and you can find our guidance on the AMMI Canada website.

**Claudyne Chevrier:** Thank you very much to both of our presenters. Now, as we move to the question and answer period, I'd like to remind everyone that this part will take place using the Q&A tab, which is at the bottom. Many of you have submitted questions already. We will only be answering questions that are directly related to the topic at hand. So seasonal influenza. You should feel free to like the questions of other people in order to bring them up for us to see. We will try to answer as many questions as possible, but we might not be able to get through all of them. While I give everyone time to write and look at the questions, I just want to remind everyone that a video of this presentation, as well as a copy of the slides of the presentation, will be available on nccid.ca on the website right after the presentation or shortly after. We've also included some supplemental slides that, in the interest of time, we have not presented today, but that will be posted online. They include links to free resources for frontline workers, flu awareness posters for printing, social media accessories to share, a list of vaccine products that are not available in Canada during the 2020 - 2023 influenza season, as well as information on the new Vaccine Injury Support Program. So we encourage everyone to consult these additional free resources. So we're now going to move on to our questions with our experts. So the first question I'd like to ask you is a question that came in the chat. I think I will send it to you, Dr. Harrison, to give Dr. Papenburg a break after talking for so long. Does receiving the vaccine help stop your risk of spreading?

**Dr. Robyn Harrison:** [Okay. Thank you. Yes. Good question. So if you obtain a vaccine and it prevents infection, you cannot pass an infection to other people. So this would be the main reason we do get the influenza vaccine. I did show that the vaccine is not 100% effective, but influenza spreads when people have symptoms or just in that day that they're falling ill. And when those symptoms come, and particularly if they're strong fever and cough and so on, then obviously your risk of spreading is very high. So the vaccine stops the risk of spreading by blocking infection. If the vaccine conferred any benefits so that your infection was milder or shorter, that can reduce your risk of spreading as well. So, it is a reason, certainly, the reason that I get the influenza vaccine, it actually links to another question, what about those people who say, "But I never get influenza." One day, I could if I'm in the wrong place at the wrong time. And so I get my vaccine every year so that I don't because I don't want to get ill and I don't want to pass it on. Not my patients, not my family, not my friends and coworkers.

**Claudyne Chevrier:** Thank you for that answer. Thank you. My next question will be for you, Dr. Papenburg. How should we coordinate the importance of the COVID-19 vaccine and the flu at the same visit?

**Dr.Jesse Papenburg:** Well, I think it's important to mention that they can be given at the same time, they could be administered on the same visit. And I think that we know also that a lot of people with risk factors for severe COVID-19 align very well with the risk factors for severe influenza. So these are the people that we want to be getting both of those vaccines as either a fall booster dose for COVID-19 or their seasonal influenza vaccine. Now, the timing of those has been a little bit different across provinces. Some provinces started their booster vaccine, their booster program a little bit earlier. Others are just starting now. So I think it's really a province-to-province kind of issue as to whether it is possible to get it at the same time. Now, if you're at high risk for COVID-19, I would not recommend waiting for the influenza vaccine before receiving it. I would recommend getting it now if you haven't gotten a booster this fall if it's been more than six months since you got your last vaccine, more than two months since you've gotten your last infection, and if you're at high risk, I couldn't wait to coordinate, but when at all possible, I think it is easier to give it concurrently. But different provinces are organizing those programs differently.

**Claudyne Chevrier:** Thank you for that. Perhaps as a follow-up question to the same question for both of our speakers. I'm wondering, I should say a participant is wondering what you can tell us about the recommendation, the recommended interval when receiving the flu vaccine, and the monkeypox vaccine.

**Dr.Robyn Harrison:** That's a great question. So, two things. The monkeypox vaccine is a newer vaccine, and the National Advisory Committee on Immunization has two statements on monkeypox. One is when it's being used for post-exposure prevention after an event, you've been exposed, and you have to give it very quickly. So in that event, your top priority is getting that dose. And then the other statement addresses when you're giving it more electively. In that guidance, you'll see there's a recommendation not to co-administer it with an mRNA COVID vaccine only because Monkeypox is very new that this vaccine and as a sort of an abundance of caution. But it also goes on to say that they can be co-administered when it's going to be the way to get the vaccines that you need. There's no reason to think that there'd be a problem with that approach. And with influenza vaccines, we have decades and decades of experience with the side effects. So the side effects that can occur for some people are very well known to us. Sore arm, sometimes fatigue. They're very well tolerated. So, I would say you can get them together, but you will find that bit of guidance that says face them if you're able to, just to be sure that if you do get a side effect, you don't then wonder, "Was it my flu vaccine?" Should I never get it again? Just to prevent confusion and mostly for you and, of course, the people interpreting that review these side effects all the time.

**Claudyne Chevrier:** Thank you. Thank you for that question. I will sneak in one last question because there's been a lot of interest in it. How would we know if a patient's symptoms are related to flu versus COVID and which antiviral should they need?

**Dr. Robyn Harrison:** This is the challenge of the year.

**Dr.Jesse Papenburg:** Yeah, I mean, we had a little bit of co-circulation of influenza and COVID this past spring, late winter-spring. And really, there is no clinical set of criteria that will accurately distinguish COVID from influenza. So the short answer is these patients need to be tested and ideally tested for both. I mean, it could be sequentially as well, especially if you're more concerned about COVID, maybe test for COVID first and then test for influenza if the COVID is negative. A lot of labs now are offering in certain patient populations test that detects both COVID and influenza at the same time. And you're right, because the treatment is very different for the two of them, especially if they're at high risk. There are early treatments that can be given for COVID-19. We've talked about the antivirals for influenza as well. They're not the same. So the only way is to test, and then you can make the appropriate management decisions as of that.

**Dr. Robyn Harrison:** Yeah. And I just want to just sort of reiterate that it's also the reason to be immunized. You don't want one, you don't want the other, and you don't want them together. And anything you can do to prevent will help the clinicians that are having to sort this out. And we can say, yes, influenza is abrupt onset of fever and cough, which is different than COVID generally, but it's not enough. As my colleague Dr. Papenburg says, you need a test.

**Claudyne Chevrier:** Thank you. And we do have time for a little bit.

**Dr. Robyn Harrison:** I lost you there, Claudyne.

**Dr. Jesse Papenburg:** Unfortunately. Claudyne Froze.

**Dr. Robyn Harrison:** Yes.

**Dr. Jesse Papenburg:** I don't know if it's because we hit 2:00 on the mark and that we're being cut off.

**Alain Abols:** Perhaps, for the last question, we can have a short discussion on the how to talk to patients who are vaccine-hesitant. We can start with Dr. Harrison.

**Dr. Robyn Harrison:** Sure. So the question is just generally what to recommend or I did see one there that said what if they say I just never get influenza that's the question?

**Alain Abols:** Let's go with that one.

**Dr.Robyn Harrison:** Sure. Yeah. I mean, if there's ever a year to get the vaccine for the sake of someone or something else, I would argue that this is the year. So, if it's your first time, I would say go for it. A lot of people have seen what the isolation requirements and the shutdowns that came with COVID have done to us collectively. And we've all been affected in different ways. But if you don't usually get influenza, it doesn't mean that you couldn't get influenza. And any infection, even if it isn't severe. I mean, one of the things that I make is all of the testing for flu. So, you might get influenza and not know if you're not tested, and it may not too severe. So, you don't need the hospital if you're young and healthy. But the chance that you can pass it to someone else is very high, and that's the risk. And so I think that's one angle. Some people that doesn't appeal to them, they don't want to hear about what they can do to help something else. They want it to be more personal. And that's where I recommend you pull the public health agency guide with the five Cs and look at the five Cs. See what applies to the person you're speaking with, and you'll find some tools in there to maybe help them focus on the things that might be personal to their situation, that just might motivate them to say, "You know what?" Yeah, okay, I can see some value in that angle, and maybe I'll do it.

**Dr. Jesse Papenburg:** And I think the other thing that some people have brought up is, well, you know, there wasn't that much influenza last year and the year before there was none. So do I really need to get a flu shot? I got two flu shots, and it was like I got a flu shot during 2020 and 2021 and there was no influenza. It seems like a waste of time. But the one thing we know about influenza is that it will reliably be unpredictable. In other words, we never really know when the season is going to start, or how bad that season is going to be. And what we do know is that there have been fewer people recently who have gotten influenza. So as a population, I would say we're more susceptible to infection than we have been in recent memory. So, there is a good chance that this coming influenza season might be more severe than the average. So based on that, I would say I wouldn't trust the last two seasons to be a predictor of what's going to happen. Quite the opposite. I think it's more likely that we're going to have a more severe season this year.

**Dr.Robyn Harrison:** It's a really excellent point. And some might say maybe that little April wave that I showed you was a herald wave. But if it comes and it comes, bigger, people might be caught by surprise. Never had influenza till now. And even mild illness is not fun if you've actually had influenza. Most people feel it.

**Alain Abols:** Thank you again to Dr.Harrison and Dr. Papenburg, who took the time to present for us today. A copy of this presentation deck and the recording will be posted on the NCCID website, nccid.ca. A link will be sent to all those who attended today's webinar when the video is ready for viewing. Upon exiting, you'll be asked to complete an evaluation survey. We appreciate your feedback, as the surveys are important to future planning. Finally, we'd like to thank all of those who attended today. Thank you.