

Good afternoon. I'm Nikki Grimsley, and I'm representing the Clinician Outreach and Communication Activity, COCA, with the Emergency Risk Communication Branch at the Centers for Disease Control and Prevention. I'd like to welcome you to today's COCA Call: Recommendations for the Novavax COVID-19 Vaccine Primary Series in Adults 18 Years and Older.

All participants joining us today are in listen-only mode. Free continuing education is offered for this webinar. Instructions on how to earn continuing education will be provided at the end of the call.

In compliance with continuing education requirements, all planners and presenters must disclose all financial relationships in any amount with ineligible companies over the previous 24 months, as well as any use of unlabeled products or products under investigational use. CDC, our planners and presenters wish to disclose they have no financial relationships with ineligible companies whose primary business is producing, marketing, selling, reselling, or distributing healthcare products used by or on patients. Presenters will not include any discussion of the unlabeled use of a product or a product under investigational use, with the exception of Dr. Hall's and Dr. Twentyman's discussion of vaccine use under emergency use authorization or emergency use instruction. CDC did not accept financial or in-kind support from ineligible companies for this continuing education activity.

At the conclusion of this session, the participant will be able to accomplish the following:
Discuss current recommendations for COVID-19 vaccination with Novavax for adults ages 18 years and older, including those who are moderately or severely immunocompromised; List key points for health care providers to use when discussing COVID-19 vaccination with Novavax; and describe where to find online resources for clinicians about Novavax COVID-19 vaccination.

After the presentation, there will be a Q&A session. You may submit questions at any time during today's presentation. To ask a question using Zoom, click the Q&A button at the bottom of your screen, then type your question in the Q&A box. Please note that we receive many more questions than we can answer during our webinars. If you are a patient, please refer your questions to your healthcare provider. If you are a member of the media, please contact CDC Media Relations at 404-639-3286 or send an email to media@cdc.gov. We have introduced self-knowledge checks throughout the presentation. We hope you enjoy these opportunities to assess your understanding of today's session. Please do not type your answers into the Q&A box, as this may disrupt the Q&A portion at the end of the session.

I would now like to welcome our presenters for today's call. We are pleased to have with us Dr. Evelyn Twentyman, who is the Lead for the Vaccine Policy Unit for CDC's COVID-19 Response. Dr. Elisha Hall, who is the Lead for the Clinical Guidelines Vaccine Policy Unit for CDC's COVID-19 Response. Chris Duggar, who is the Lead for the COVID-19 Vaccine Unit for CDC's COVID-19 Response. And Dr. Tanya Myers, who is the V-safe Team Co-lead for the COVID-19 Immunization Safety Unit, also part of CDC's COVID-19 Response. I'll now turn it over to Dr. Twentyman. Dr. Twentyman, please proceed.

Thank you so much. And good afternoon, everyone. And thanks for joining us. I'm Evelyn Twentyman, and I'm here to discuss recommendations for the Novavax COVID-19 vaccine as a two-dose primary series vaccination against COVID-19 for adults ages 18 years and older. This is the fourth COVID-19 vaccine available in the US following its emergency use authorization by the FDA on July 13th, and its recommendation for use by ACIP and CDC on July 19th, 2022.

Today we'll be starting with why another primary series vaccine is relevant to COVID-19 vaccination in the US, including a review of adults still in need of their first COVID-19 vaccine dose. Then we'll discuss what this vaccine is and how it works, including how it compares to other COVID-19 vaccines already available. We'll then review the evidence discussed in depth by the Advisory Committee on Immunization Practices or ACIP, including the Novavax COVID-19 vaccine's potential benefits and harms, considerations for implementation of this vaccine, and we'll then wrap up with the recommendation made by ACIP accordingly. Next slide, please.

Let's start with why another primary series vaccine is relevant in the US by reviewing together the remaining need for primary series COVID-19 vaccination among us adults. Next slide, please.

Here you see data from CDC's National Immunization Survey and from COVID Data Tracker. This shows the percent of US adults in these two data sources that have not yet received a COVID-19 vaccine. In the National Immunization Survey conducted in May of 2022, 13.9% of surveyed adults reported not yet receiving COVID-19 vaccine versus 10.3% in COVID data traffic. Using these data sources and census data, we can estimate that there are about 26 to 37 million adults who have not yet received a single dose of COVID-19 vaccine. Next slide, please.

Let's now use COVID Data Tracker to dig a bit further into how proportions of people not yet vaccinated differ by age. You'll see here that while over 90% of people aged 65 years and older have been fully vaccinated. This is true of just 82% of those ages 50 to 64 years. Among all US adults, the greatest proportion of people still needing vaccination is within those ages 18 to 49. Less than 70% of this group is fully vaccinated. This graph also depicts the large proportions of people in all age categories who are not yet fully up to date, having not yet received all booster doses recommended for them. CDC continues to strongly recommend that all people stay up to date with their COVID-19 vaccines. Getting up to date starts with completing a primary series. Next slide, please.

Unfortunately, vaccine status continues to vary by race and ethnicity. This figure shows data from the main National Immunization Survey COVID-19 module on US adults, and displays the percentage of adults who report not yet having received a vaccine. 22% of persons of other or multiple races, 20% of persons who are American Indian or Alaskan native, and 14% of persons who are Hispanic, and 14% of persons who are white non-Hispanic have yet to receive a COVID-19 vaccine. Next slide, please.

Vaccination status also continues to vary by place of residence. We can see here from the same survey just described that a higher percentage of US adults living in rural areas remain unvaccinated as compared to those living in suburban and urban areas. Next slide, please.

Vaccination status varies by income as well. A higher percentage of US adults with incomes less than 75,000 or living in poverty have not yet received a COVID-19 vaccine compared to adults with higher incomes. Next slide, please.

Unfortunately, vaccination status varies by markers of healthcare access as well. Despite the fact that COVID-19 vaccines have been made available freely without the need for administration by a primary care provider and without the need for health insurance, a higher percentage of US adults who do not have a regular primary care provider or health insurance have not yet received a COVID-19 vaccine, compared to those with a regular provider and those who are insured. In summary, we know that 26 to 37 million adults are not yet vaccinated against COVID-19. We know that disparities in vaccination persist by race, ethnicity, place of residence, income, and biomarkers of healthcare access, such as having a primary care provider and health insurance. Primary series COVID-19 vaccination is still needed. And now we have a fourth option for providing primary series vaccination for those who need it. Next slide, please.

Let's now move to discussing the mechanism of action of the Novavax COVID-19 vaccine, which is the first protein subunit COVID-19 vaccine authorized in the United States. Next slide.

mRNA COVID-19 vaccines including those of Pfizer BioNTech and Moderna on the left, and the viral vector Janssen or J&J vaccine on the right, both use genetic material to encode a SARS-CoV-2 viral antigen and induce an immune response to that antigen. In contrast, adjuvanted protein subunit vaccines like the Novavax COVID-19 vaccine, use the viral antigen without any genetic material and with an adjuvant added to help induce a strong immune response. Next slide, please.

Novavax COVID-19 vaccine includes purified, full-length, stable, recombinant spike protein as the viral antigen, and uses matrix M adjuvant to enhance the magnitude of the immune response to this spike protein. T helper cells then recognize the spike protein as a viral antigen, and these T helper cells stimulate B cells to produce neutralizing antibodies to this viral antigen and help protect the vaccine recipient against COVID-19. The Novavax COVID-19 vaccine is of course new, but this kind of vaccine platform has been around for decades. Between this more traditional platform and the fact that this vaccine does not use any genetic material, it is hoped that some of the 26 to 37 million yet unvaccinated Americans might be interested in this vaccine. Next slide, please.

We're now going to transition to the data ACIP reviewed toward determining Novavax recommendations for use, starting with those potential benefits and harms. Next slide, please.

As I summarize this data, I'd like to start by saying that we used data from one clinical trial to inform our formal evaluations of vaccine efficacy, safety and reactogenicity through the standard grade approach, but then we also had the opportunity to use a much wider set of data sources as we weighed potential benefits and harms. So specifically discussing that formal grade analysis first, we consider the pre-crossover period of the US and Mexico based study 301, a phase three randomized controlled trial conducted from December 27th, 2020 through September 27th, 2021, which included about 30,000 participants randomized two-to-one to receive vaccine or placebo. After we discuss major findings from this data described on the left, we'll then move on to

discuss the broader data reflected on the right, including what we know about how vaccine efficacy has changed in the context of different variants, a strong evaluation of safety which used an expanded clinical trial data set inclusive of all vaccine recipients across all Novavax clinical trials globally, as well as publicly available global post-authorization data. Next slide, please.

From this trial, Study 301, we know that vaccine efficacy in the era of predominance of the Alpha variant of SARS-CoV-2 we know that VE was 89.6% against symptomatic PCR-confirmed COVID-19 with a confidence interval of 82.4% to 93.8%. Next slide, please.

Now, moving to summarize all findings from this great analysis, Novavax COVID-19 vaccine is effective in preventing symptomatic COVID-19 during a period of alpha variant predominance, with an evidence type of one. That is to say with high certainty. Severe COVID-19 was used as a surrogate for the outcome of hospitalization due to COVID-19. That was due to lack of hospitalizations in the trial. Novavax COVID-19 vaccine demonstrated efficacy in preventing severe COVID-19, but this evidence type was three because of the use of that surrogate. Serious adverse events were balanced between the vaccine placebo arms with an evidence type of one. Finally, severe reactions were more common among the vaccinated with any grade three or higher reaction reported in 16.3% of vaccinated participants versus 4% of placebo participants. So from this data, we know that the Novavax COVID-19 vaccine demonstrated high vaccine efficacy in the area of alpha predominance, and appeared safe, although with reactogenicity similar to what we've observed with the other COVID-19 vaccine primary series. Next slide, please.

Now I'd like to focus broader, zoom out of that particular trial and talk about our broader review of potential benefits and harms. First, let's talk about potential benefits. Our big question here was what vaccine efficacy might be in the era of current variance. We know that Novavax vaccine efficacy as assessed in 301 was assessed during the period of predominance of the Alpha variant of SARS-CoV-2. That's this darker teal inverted triangle on the variance plot on the left. We know this both from the time in which case accrual occurred and from the sequence data obtained over the course of case accrual. Of 96 cases accrued, 75 had sequence data. 53% of these sequences were alpha. We also see that 3% of those sequences were beta, and just 1% were delta. Next slide, please.

Now let's start to explore why this might matter in our assessment of benefit of a COVID-19 vaccine. First, in neutralizing antibody studies assessing the immune response of people who received mRNA vaccines, we can see here that the sera from study participants who completed their second dose of the mRNA vaccines two to six weeks earlier mounted a weaker neutralizing antibody response against many variants, as compared with alpha and ancestral lineages in gold and blue on the left. For omicron sublineages specifically on the right in teal, neutralizing titers were much lower compared with the alpha and ancestral strains. Next slide, please.

Now, let's move out of the lab and into real-world vaccine effectiveness studies. First, look at estimates for vaccine effectiveness from CDC's vision network against hospitalization for two-doses of mRNA vaccines during the period of alpha predominance on the left in blue diamonds at approximately 90% for both Pfizer and Moderna vaccines. You'll see that these estimates were the same in the period of delta predominance, where the red circles indicate combined two-dose

mRNA. However, you'll notice a marked drop in the period of Omicron BA1 predominance, down to just under 70%, shown in light gray triangles. And then another drop in the era of Omicron BA2/BA2.12.1 to less than 60%, shown in light blue circles. Next slide, please.

Let's now return to Novavax COVID-19 vaccine. So we've looked at what we've learned from mRNA vaccines. Let's now return to what we know of Novavax. We do have one study that investigated the efficacy of the Novavax COVID-19 vaccine against the beta variant during its predominance in South Africa. Here we saw VE against symptomatic COVID-19 disease of 49.4%, although with slightly higher efficacy among participants who were HIV negative. We know that most sequenced isolates from cases accrued during the study were beta variants, and then the post-hoc analysis VE against beta was 51% with wide confidence intervals crossing zero. All this is to say that we don't yet know what the vaccine effectiveness of the Novavax COVID-19 vaccine will be in the context of Omicron or in the context of future variants. Next slide, please.

We've now talked about potential benefits. So let's shift now to potential harms. Most importantly, we'd like to discuss several events of myocarditis and pericarditis with possible relationship to vaccine detected over the expanded safety dataset. It's important to contextualize though these events of myocarditis and pericarditis. We know that intensive post-authorization COVID-19 vaccine surveillance has identified a small risk of myocarditis associated with mRNA vaccination, particularly after a second dose in adolescent males and young men. We also know that COVID-19 disease itself is associated with risk of multiple serious cardiac outcomes including myocarditis, pericarditis, stroke, acute coronary syndrome, myocardial infarction, heart failure, arrhythmia, and cardiac death. Next slide, please.

It is clear that benefits of COVID-19 vaccination outweigh risks. The risk of cardiac complications is higher after COVID-19 than after mRNA COVID-19 vaccination among males and females of all ages. This includes those ages at higher risk of myocarditis. For example, teen boys ages 12 to 17 have two to six times the risk of cardiac complications after infection compared to after vaccination. And young men ages 18 to 29 years have seven to eight times the risk of cardiac complications after infection compared to after vaccination. COVID-19 vaccination is the best way to protect against COVID-19 and rare cardiac complications. Next slide, please.

Looking at an expanded safety dataset, including 41,546 vaccine recipients ages 16 years and older over all these trials, there were six potential cases of myocarditis or pericarditis identified. Of the six, five were within 20 days of vaccination, and four had no clear alternative etiology, raising concern for possible causal relationship to vaccine. Three of four events occurred following dose two, and the fourth followed dose three in a booster expansion study. Three of the four were men. Unfortunately, all four were hospitalized, but fortunately, all four experienced complete resolution of symptoms. Next slide, please.

Internationally, in global post-authorization data, including a total of 744,235 doses administered in these countries, additional cases of myocarditis or pericarditis events have been identified. Next slide, please.

Total cases here included 35 unique reports with a total of 36 adverse events like this. 29 cases were of pericarditis, including five reports in individuals with a history of pericarditis after mRNA vaccine. Four of these cases were myocarditis, two were myopericarditis, and there was one case of carditis not otherwise specified. The median known age of these patients was 35 years, with 20 males and 15 females identified. Next slide, please.

This table summarizes what is known about myocarditis and pericarditis following Novavax in clinical trials and post-marketing data so far. The first row reflects clinical trials data with 46 cases identified following vaccine out of 41,546 doses administered, for a reporting rate of 96 to 144 cases per million doses. Row two shows the 36 cases reported in global post-marketing data, resulting in a reporting rate of 48 per million doses. And the last row shows data from Australia post-marketing reports 15 cases out of 160,000 doses for a rate of 94 per million doses as described on their Therapeutic Goods Administration website. Next slide, please.

Overall, reviewing potential benefits and harms, we know that Novavax had high efficacy against symptomatic COVID-19 in the setting of alpha predominance. We know that we did have a few reports of myocarditis or pericarditis after no effects in clinical trials and in early post-authorization data globally. We know that we cannot directly compare either the VE or myocarditis rates for Novavax and mRNA vaccines, but we know vaccination remains the best way to protect against COVID-19 including its rare cardiac outcomes. Next slide, please.

So then we'll discuss other data reviewed toward making recommendations for Novavax use, all in the vein of considerations for implementation of this fourth COVID-19 vaccine. Next slide, please.

First, we're going to consider who might be interested in this vaccine. A survey designed by the CDC and University of Iowa and RAND Corporation to assess vaccination intentions for a protein-based COVID-19 vaccine with or without adjuvant among unvaccinated Americans collected data from January 27th through February 2nd, 2022, with a sample size of 541 respondents. Next slide, please.

16% of this unvaccinated group said that they would probably or definitely get an adjuvanted protein subunit vaccine such as Novavax. Next slide, please.

The same survey showed us intent to get an adjuvanted protein subunit vaccine by several demographic characteristics. Vaccine intentions were higher among men than women, lower among non-Hispanic white adults compared to non-Hispanic black adults or Hispanic adults, and did not vary by US region, Metropolitan status, age, or education. Next slide, please.

A Morning Consult survey of 1,788 adults detected an interesting difference in beliefs about safety of these protein-based vaccines versus mRNA vaccines. You'll see on the top row here that overall, among all adults, these assessments of safety were similar. But interestingly, vaccinated adults seem to more commonly express the belief that mRNA vaccines were safer, while unvaccinated adults seemed to more commonly believe that protein subunit vaccines were safer. Next slide, please.

Now moving away from individual interest in Novavax and toward program interest in Novavax COVID-19 vaccine. In a listening session conducted with our jurisdictional partners in early July, most of these partners stated that they would order Novavax vaccine if it became available and expressed a high interest in support related to Novavax. They also described highly varied intent of use, including everything from private provider offices, to pharmacies, local health departments, and even all of the above. Next slide, please.

We additionally reviewed some pros and cons to logistics of use of this vaccine, with some pros including its storage by refrigerator. It's pretty standard series as a two-dose series given three to eight-weeks apart like many other series. And some cons, including a pretty short six-hour puncher to discard time or BUD time, and the fact that expiration dates aren't printed on the labels. Next slide, please.

So now to summarize. Next slide, please.

The ACIP COVID-19 work group observed that the Novavax COVID-19 vaccine had high efficacy against symptomatic COVID-19 disease in the setting of alpha predominance. Rare reports of myocarditis after Novavax COVID-19 vaccine were identified during clinical trials and in early post-authorization data. Thus far, based on available data, we cannot directly compare either vaccine efficacy or myocarditis or pericarditis rates for Novavax with mRNA COVID-19 vaccines. Post-authorization monitoring for both VE and safety will be important. Vaccination remains the best way to protect against COVID-19. Next slide, please.

Our top priority remains vaccination of unvaccinated individuals, and hopefully an additional COVID-19 vaccine using a well-known vaccine technology will provide an additional option for unvaccinated adults. Overall, ACIP judged that the benefits of this vaccine outweigh the risks. Next slide, please.

ACIP voted unanimously to recommend a two-dose Novavax COVID-19 vaccine series as a primary series vaccination for adults ages 18 years and older for the prevention of COVID-19. I'm also happy to say that ordering for these vaccines opened Monday, and first deliveries began landing at their final destinations yesterday. We hope to see this vaccine used among unvaccinated adults. Let's move now to our next slide for a knowledge check.

Current data reviewed today for the Novavax COVID-19 vaccine for adults ages 18 years and older are for a primary series of how many doses? So the four-dose primary series, a three-dose primary series, two-dose primary series, single-dose, zero dose. Next slide, please.

If you answered a two-dose primary series, you are correct. Next slide, please.

Thanks so much to everyone at CDC who helped put this important evidence together. And thanks to everyone listening for your time and for your efforts to protect our population from COVID-19. That is it for me, and I will transition now to Dr. Hall. Dr. Hall, over to you.

Thank you, Dr. Twentyman. Next slide, please.

All right, so I'll be talking about the clinical considerations. And first we'll take a look at the Novavax COVID-19 vaccine schedule. Novavax is authorized for people who are ages 18 years and older. Starting at the top of this slide in teal, for people who are not moderately or severely immunocompromised, this group should receive two primary doses separated by three to eight-weeks. Then shown in gold at the bottom is the schedule for people who are moderately or severely immunocompromised, and this group should receive two primary doses separated by three-weeks. Next slide.

Two things to draw your attention to. A third primary dose for people who are immunocompromised is not currently authorized. At this time, only a two-dose primary series is authorized for both populations. Additionally, just like when other COVID-19 vaccines were first authorized for a primary series, only primary doses are authorized at this time. Neither a homologous or heterologous booster is authorized. We would expect at some point in the future people who choose this primary series would be able to get a booster when they need it. As a reminder, CDC provides clinical guidance for what FDA authorizes. If and when authorized, these doses can be added to the COVID-19 vaccination schedule. Next slide.

COVID-19 vaccines are not interchangeable, and this applies to Novavax as well. The same vaccine products should be used for all doses in a primary series. There are limited data on the safety and efficacy of a mixed primary series composed of any combination of Moderna, Novavax and Pfizer. If a mixed primary series is inadvertently administered, the series is complete, and doses do not need to be repeated. However, this is considered an error and it should be reported to the Vaccine Adverse Event Reporting System, or VAERS. Next slide.

There are some situations in which a mixed series may be warranted. So the exceptional situations in which a different age appropriate COVID-19 vaccine may be administered to complete a primary series at a minimum interval of 28 days from the last dose include when the same vaccine is not available, if the first dose is unknown, or if a person starts but is unable to complete a primary series with the same vaccine due to a contraindication. Since these exceptions are in our guidance, if one of these occurred, this would not need to be reported to VAERS. Next slide.

So I'll walk through three specific examples that we've received questions about. Next slide.

In the first scenario at the top, let's say a patient receives Novavax but has a severe allergic reaction and is contraindicated for subsequent doses of Novavax. They may receive Moderna or Pfizer or Janssen, depending on the reason -- and we'll get into contraindications and precautions later to go into more detail. And the primary series would be considered complete. Next slide.

Conversely, if they received Moderna or Pfizer, but they were contraindicated for subsequent doses, they could receive Novavax to complete the series. Next slide.

We also received questions about what to do if a person had already received Janssen and is then contraindicated for subsequent doses. Can they get Novavax? Again, we'll go into more detail as to the contraindications and precautions. There's some nuances about the ingredients. But as a reminder, regardless, Janssen is a single-dose series. So this person has already completed their

primary series and does not need any Novavax doses to complete their primary series. They should get a booster dose with an mRNA vaccine two months after the Janssen dose. As a reminder, Novavax is not authorized as a booster dose. So that could only be an mRNA. There are additional recommendations for people who are immunocompromised. So this is just an example of those who are not immunocompromised to give some context to that mixed series. Next slide, please.

Additionally, with all COVID vaccines, Novavax is similar in its scheduling, doses administered up to four days before the minimum interval, known as the four-day grace period, are considered valid. For Novavax, this means that if dose two is administered 17 days or more after dose one, it is considered valid. We recommend that you use the grace period to determine if doses are valid when retrospectively reviewing records, but not use the grace period to schedule appointments earlier than the recommended interval. Next slide.

So this also means that doses administered prior to the grace period are considered invalid. So this would be 16 days or fewer after the first dose. And doses administered prior to this time should be repeated. You would space the repeat dose after the dose given in error by at least the recommended interval or 21 days. Some experts, however, recommend an eight-week interval. And we have more information on that in our appendices in the interim clinical considerations. Next slide, please.

Again, similar to all COVID-19 vaccines, existing coadministration guidance applies to Novavax as well. In general, COVID-19 vaccines may be administered without regard to timing of other vaccines. This includes the same day or any time before after. Routine administration of all age-appropriate doses of vaccines simultaneously is recommended for people for whom no specific contraindications exist at the time of the healthcare visit. The only exception is that there are additional considerations for orthopoxvirus vaccines. And I'll talk more about that in a couple slides. Next slide.

So when deciding whether to co-administer another vaccine with COVID-19 vaccine, providers may consider whether a person is behind or at risk of becoming behind on recommended vaccines, the likelihood of the person returning for another vaccination, the risk of becoming infected with a vaccine preventable disease, the risk of severe disease if infected, and the reactogenicity profile of the vaccines. Next slide.

So as I mentioned, there's one exception to coadministration guidance that is related to orthopoxvirus vaccines. Because of the observed risks for myocarditis after receipt of Acam 2000, Moderna, Novavax and Pfizer BioNTech vaccines and the unknown risk for myocarditis after Jynneos, there are two scenarios to consider. In the first at the top here, if a person receives an orthopoxvirus vaccine first, they might consider waiting four weeks before receiving a Moderna, Novavax or Pfizer BioNTech vaccine. This would particularly apply to adolescent or young adult males. And as a reminder, Novavax would be the young adult males. For adolescents, they can only receive Moderna or Pfizer. In the second scenario, if a person receives a Moderna, Novavax or Pfizer BioNTech vaccine first and they are then recommended for an orthopoxvirus vaccine for prophylaxis in the setting of an outbreak, administration of that orthopoxvirus vaccine should not be delayed because of recent receipt of one of these COVID-19

vaccines. This is because the benefit of administering orthopoxvirus vaccine as soon as possible when indicated for prophylaxis outweighs the possible risk of myocarditis by administering them too close together. Next slide.

Now we'll cover preparation and administration for Novavax. As mentioned previously, Novavax is indicated for ages 18 years and older. One dose contains five micrograms of SARS-CoV-2 recombinant spike protein and 50 micrograms of matrix M adjuvant. The injection volume of one dose is 0.5 milliliters. The vaccine should not be diluted. Vaccine is supplied in multidose vials containing 10 doses per vial, and the dose should be injected intramuscularly into the deltoid muscle. Next slide.

Now looking at storage, Novavax should be stored in the refrigerator between two to eight Celsius. It should be removed from refrigerated storage only when ready to use. An unpunctured vial should not be stored at room temperature. Although some other COVID-19 vaccines can be frozen, this vaccine should not. The vial must be used within six hours after the first puncture. During the six hours, the punctured vial can be stored at room temperature. If the vaccine is not used within six hours after the first puncture, it must be discarded. And of note, the expiration is not printed on either the vial or the carton. You can use the website listed on the slide to reach an expiry date checker. Next slide, please.

And CDC also provides a vaccine expiration date tracking tool on which you can record the expiration date, the lot number and where you got that information, along with the name of the provider that recorded the expiration date. Next slide, please.

So now we'll transition into contraindications and precautions that will dive a little deeper into what I just touched on the surface in that mixed series, because it is a little more nuanced with the contraindications and precautions. So before I dive in, I just want to highlight that we classified the currently authorized or approved COVID-19 vaccines into three types of vaccines. This will come up on the next few slides. So the first type is mRNA. This includes both Moderna and Pfizer BioNTech. The next type is adenovirus vector, which includes only Janssen. The third type is protein subunit, which includes only Novavax. So when I say type of vaccine on the following slides, these are the three distinct types I am referring to. Next slide, please.

The contraindications will look familiar to existing guidance for other COVID-19 vaccines. Contraindications for Novavax include a history of a severe allergic reaction after a previous dose or a component to the vaccine, or a history of a known diagnosed allergy to a component of the vaccine. Next slide.

So far before Novavax, we've said that an allergy-related contraindication to one type of vaccine is a precaution to another. Now with Novavax, it's just slightly modified. People with an allergy-related contraindication to one type of a COVID-19 vaccine have either a contraindication or a precaution to the other type. So I'll break that down into its two pieces. People with a known allergy to polysorbate have a contraindication to both Novavax and Janssen. So in this case, if a person for example had a contraindication to Janssen, because of the polysorbate allergy, now that Novavax is authorized, it is also a contraindication because Novavax also contains polysorbate. And all other allergens, in all other cases, an allergy-related contraindication to one

type of vaccine is a precaution to another. So in those mixed series examples I had given earlier, if someone got Novavax and then had a contraindication because of a severe allergic reaction, and then got Moderna or Pfizer, the Moderna or Pfizer would be a precaution. Next slide, please.

Again, other precautions will look familiar to existing guidance, just applied to Novavax. So this includes a history of an immediate allergic reaction to any vaccine other than COVID-19 vaccine or to any injectable therapy. People with a history of non-severe immediate allergic reaction after a dose of the same vaccine. Moderate or severe acute illness, history of MIS-C or MIS-A, and history of myocarditis or pericarditis after a dose of an mRNA or Novavax vaccine. Next slide.

So taking a look closer at myocarditis and pericarditis after a dose of mRNA or Novavax, as I mentioned previously, is a precaution to a subsequent dose. And this is actually of any COVID-19 vaccine. Considerations for subsequent vaccination include whether myocarditis or pericarditis was considered unrelated to mRNA or Novavax vaccination, the personal risk of severe acute COVID-19. Timing of immunomodulatory therapies. And for people ages 18 years and older who choose to receive a subsequent COVID-19 vaccine, some experts advise using Janssen. People who choose this vaccine should be informed of the risk of thrombosis with thrombocytopenia syndrome. The highest risk is in females ages 30 through 49 years. And as a reminder, much of this guidance has already been in place for mRNA vaccines, and this is simply being extended to Novavax vaccine. Next slide.

And then a history of myocarditis or pericarditis prior to COVID-19 vaccinations is not a precaution. These people may receive any currently authorized or approved vaccine after the episode has resolved. Next slide.

So I'll just wrap this up on and mention the extended interval between dose one and dose two of Novavax. No specific data on the extended interval between dose one and dose two of Novavax exist, and this is that eight-week interval. However, there is evidence of benefits of an extended interval in mRNA recipients. Some studies show a smaller risk of myocarditis or pericarditis can be associated with mRNA vaccines, and peak antibody responses and vaccine effectiveness may be increased. Therefore, an eight-week interval may be used to potentially reduce the risk of myocarditis or pericarditis and increase vaccine effectiveness. Next slide, please.

So I'll just cover the populations that would be most applicable for each of these intervals. For the three-week interval, this would be most appropriate for people who are moderately or severely immunocompromised. This is already on the schedule we had covered. There is no extended eight-week interval on the schedule for people who are immunocompromised. People ages 65 years and older, and when protection needs to be achieved soonest. Next slide.

And the eight-week interval, again, this would be considered for the potential to reduce myocarditis risks, especially important in those young adult males that receive Novavax, and to optimize vaccine effectiveness. Next slide.

And finally, the knowledge check. The question here is, which of the following are authorized for Novavax? Is it a two-dose primary series, a third additional dose for people who are immunocompromised, a booster dose, or all of the above? Next slide, please.

So the answer is A, currently only a two-dose primary series is authorized. This may seem counterintuitive, because we're all used to the mRNA schedules that have that additional dose and additionally with Janssen the booster doses. However, at this time, again, Novavax is not currently authorized for an additional primary dose or a booster dose. Next slide.

And I just want to acknowledge everyone who contributed to the clinical considerations. Next slide. And now I'll hand it off to Chris Duggar.

Thanks, Dr. Hall. Good afternoon. Good morning, everybody. I've just got a couple of slides about our supply line and distribution. Next slide, please.

So our limited Novavax supply that the US government just procured this summer has been allocated across all of our distribution channels. That's all 50 states, our islands, territories, our federal retail pharmacy program and some other federal entities like DOD, Veterans Affairs and others. It is a one-time pro rata threshold based on eligible unvaccinated adults. So not our traditional supply constraint pro rata based on the entire population, but remaining unvaccinated folks. That does mean in areas where they had high coverage, they saw a lower threshold. And our areas with still a fair amount of adults to be vaccinated are going to get a bigger piece of the pie. Ordering began this Monday, July 25th. And our first deliveries began yesterday. We have more in the air and on the ground today, and more expected to be delivered tomorrow. So for those of you asking, "Why don't I see it yet?" Keep looking. And it is active in Vaccine Finder on vaccines.gov as of today. But remember, we don't have a lot of deliveries out there yet, so as that inventory grows, you'll be able to find it when you search actively. Again, just reiterating, the Novavax vaccine is shipped and stored at our standard vaccine refrigeration temperatures, not frozen. Please do not freeze this vaccine. I did see the questions. Once received, it goes into your refrigerator and the maximum shelf life for Novavax is nine months. That's what they got through EUA. Everything that we're shipping to you has a February 2023 expiration. So the lot that we have for distribution expires in February next calendar year. It is a 10-dose vial in a carton of 10 vials, so that's a 100-dose minimum order quantity. And we do still provide the ancillaries for all the other COVID vaccines. This one comes with an adult kit with one-inch, one-and-a-half-inch needle syringes and all the other materials. Next slide, please.

The Novavax distribution model is similar to three of the others. We're using McKesson Specialty, so it's going to move just like Moderna and Janssen. We cut off orders from all of our partners and awardees at 12:00 noon for this system, and deliveries normally arrive within 48 to 72 hours, sometimes faster based on the workload. We are still delivering five days a week, Monday through Friday, unless there's a holiday. I did drop in the Novavax customer service lines. So if anything comes up with your shipments, any other questions, they are live and active waiting to hear from you. And then the Novavax expiry lookup. Novavax also has a webpage where you can type in the lot number and it will tell you that specific lot's expiry date. It'll be green if it's still good, red if it's not. There was no date printed on the label nor on the carton.

And I believe that's it from my side of the street.

Right, thank you. Go ahead, Chris.

You want me to do the self-check? All right, pop quiz. Ordering has begun for Novavax for adults 18 and older. true or false? And our answer -- next slide -- is true.

We began accepting orders Monday, and deliveries have begun already domestically. Thank you.

Wonderful, thank you so much to our presenters for providing our audience with this timely information. We will now go into our Q&A session. And we also have joining us for our Q&A session Dr. Sarah Oliver. She is a medical officer with CDC's National Center for Immunization and Respiratory diseases.

Our first question, if people had a reaction to the first dose of an mRNA vaccine, and they did not complete the series, is Novavax an option for them?

This is Elisha.

Oh, apologies. I'm so sorry. We have another presenter. Please forgive me. Dr. Myers, please go ahead.

Thank you. We are in the early safety monitoring phase now for Novavax vaccine. And I'll just take a few minutes to touch on two of the systems at CDC that are supporting this effort. Next slide, please.

As a reminder, V-safe is a voluntary smartphone-based safety surveillance system that allows anyone to register after any dose of COVID-19 vaccine. Participants self-register on their smartphone and they get started from there. And I think most of our prospective participants who receive Novavax will probably be new to V-safe, but if they happen to have already registered a dependent and were participating on behalf of that dependent, they can now just add Novavax as a vaccine to their own account. Next slide, please.

I wanted to highlight a few points related to the surveys in the context of Novavax. We designed these surveys to be very quick to complete, and we know that on average people are able to complete them in 30 seconds. The survey content for Novavax is the same set of questions, local and systemic reactions and health impacts. And for those who include a response indicating they received medical care for a symptom or health impact, we will continue to follow up as we have been with a phone call encouraging them to complete a report to the Vaccine Adverse Event Reporting System. And we will also be enrolling those who are eligible and interested into a pregnancy registry based on questions in V-safe that seek to identify potential registrants. Next slide, please.

We do rely on vaccine providers to promote registration in V-safe. There are a few ways to do that. You can verbally direct patients to Vsafe.cdc.gov, or provide a V-safe information sheet. Print resources are available at the link displayed at the bottom of this slide. And those also include posters that can be printed and displayed in waiting areas or places where people are receiving vaccine. Next slide, please.

I'm going to briefly touch on the Vaccine Adverse Event Reporting System. It's an early warning system for vaccine safety comanaged by CDC and FDA. And I will just point out that we will be monitoring reports to VAERS for Novavax, just as we have for other authorized COVID-19 vaccines, and we'll be reviewing reports of myocarditis if reported to VAERS. Next slide.

This is a screenshot of the VAERS website. Highlighted is the link for reporting an adverse event. And I just want to point out that there are great resources on this website. To the right of that red box, you'll see the resources link. Next slide, please.

And this is what the reporting form looks like online. I'm going to conclude there and turn things back over to the moderator so that there's a little time left for Q&A. Thank you.

Thank you, Dr. Myers. Okay. We will go ahead and get started then with our Q&A session. And our first question, if people have had a reaction to the first dose and do not complete the mRNA series, is it okay to start the Novavax COVID-19 vaccine? Is that an option?

This is Elisha. I can answer that one. Novavax is an option if a person has had a severe allergic reaction after an mRNA vaccine. Novavax is an option. It is a precaution in most cases, allergy related precaution. The vaccine can be given. Providers might consider a referral to an allergist or immunologist. And at this time, that person would have a 30-minute observation period.

Thank you. Our next question, can you please review the recommendations for co-administering or not co-administering the Novavax vaccines with vaccinations for monkey pox?

This is Elisha. I can do that one as well. I don't know if you can move the slide deck back. If not, it's fine. Because sometimes it's easier to see the visual. So there's two scenarios, essentially. So if orthopoxvirus vaccine is administered first, that's the first situation, you might consider waiting for weeks before Moderna, Novavax or Pfizer BioNTech vaccine. And that's because of the observed risks for myocarditis after some of these vaccines and the unknown risks after JYNNEOS. So then the other situation is if Moderna, Novavax or Pfizer is administered first. Then in that case, there's no minimum interval necessary before the orthopoxvirus vaccination. And that is because the benefit of administering that as soon as possible when indicated for prophylaxis outweighs the possible risk of myocarditis by administering them too close together. So it really matters which one is given first.

Thank you. Our next question. Is there a reason that the expiration date is not included on the vaccine vials?

This is Dr. Twentyman. I can take that. Our colleagues at FDA work closely with manufacturers to design and approve these labels. Our understanding is that that feedback has been received. I don't know any timetable of any revision to that label. Thank you.

Thank you.

I'll add too that all of our COVID vaccines to date are preservative free, and they have been doing stability studies and shelf life extensions. So right now, most of them go with a QR code or just have a lookup tool, because often the expiry dates and shelf life are changed.

Thank you. Can you talk about the best way to message this vaccine to patients?

This is Evelyn. I'll take that one. And I want to start by saying that we really appreciate all the physicians and providers on this call who are encouraging unvaccinated folks to get vaccinated. I think probably the best possible start is to understand from your patient why they have not yet received a vaccine. But some points that I would just underscore about this vaccine are that it is a well-known vaccine technology. This protein subunit technology has been around in use for about 30 years, and has been used very effectively with vaccines like hepatitis B vaccine, for example. So we know this platform really, really well. And that might help some patients who have been concerned that maybe the mRNA platform is new and maybe they want to go with something more traditional. So that would be one approach that one might take. Another approach that someone might take is to just discuss with their patient that this vaccine has been in use around the world. It was approved in about 40 countries prior to its approval here. And so we are in a long line of folks that have been using it now. And so that might be reassuring. And then lastly, I'll start just by saying that there's absolutely nothing wrong with a vaccine that uses genetic material to get our cells to produce viral antigen like a molecule or group of molecules to induce an immune response. But if any patient was for any reason concerned about genetic material, this is a really lovely option to have, because it contains purified recombinant spiked protein. In other words, it contains the viral antigen itself, not any genetic code for making that antigen. So hopefully one of those three comparing strategies might help. And thank you again for your efforts to vaccinate the unvaccinated.

Thank you, and we have time for one last question. Can you speak to why the vaccine is not available in all states, and if it will be?

Sure. Hi, this is Chris again. So vaccine is available to all states, all jurisdictions, all partners. Again, they just began seeing their numbers just before last week, and ordering began Monday, the 25th of this week. So if it's not yet in your jurisdiction, please stay tuned. It will be soon. And the best place to look for it is on vaccines.gov. You can search for all of the authorized and BLA COVID vaccines in the United States.

Great, thank you. And again, thank you to our presenters for this very timely information today. We appreciate you sharing your expertise with us.

All continuing education for COCA Calls are issued online through the CDC training and continuing education online system at <https://tceols.cdc.gov>.

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Again, thank you for joining us for today's call. Have a great day.