

COVID-19 Vaccines Frequently Asked Questions

General Vaccine Questions	
<p>What are the COVID-19 vaccines that are currently available in the U.S.? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Pfizer-BioNTech BNT162b2 (Comirnaty®): mRNA encoding prefusion stabilized, membrane-anchored SARS-CoV-2 full-length spike protein • Moderna mRNA-1273: mRNA encoding prefusion stabilized SARS-CoV-2 spike protein with a transmembrane anchor and an intact S1-S2 cleavage site • Johnson & Johnson/Janssen Ad23.COVS.S/JNJ-78436735: replication-incompetent human adenovirus 23 encoding full-length prefusion stabilized SARS-CoV-2 spike protein
<p>What are the FDA indications for the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Pfizer-BioNTech (Comirnaty®) is <ul style="list-style-type: none"> ○ Fully approved by the FDA for use in all individuals who are aged 16 years and older ○ Authorized for emergency use by the FDA individuals who are aged 12-15 years ○ Authorized for emergency use by the FDA for a single booster dose in individuals who are aged 65 years and older ○ Authorized for emergency use by the FDA for a single booster dose in individuals who are aged 12 years and older AND are moderately-to-severely immunocompromised ○ Authorized for emergency use by the FDA for a single booster dose in individuals who are aged 18 through 64 years who are at high risk of severe COVID-19 ○ Authorized for emergency use by the FDA for a single booster dose in individuals who are aged 18-64 years whose frequent institutional or occupational exposure to SARS-CoV-2 puts them at high risk of serious complications of COVID-19 including severe COVID-19 • Moderna mRNA-1273 is <ul style="list-style-type: none"> ○ Authorized for emergency use by the FDA in all individuals who are aged 18 years and older ○ Authorized for emergency use by the FDA for a third dose to be administered at least 28 days following completing a two-dose regimen in individuals who are aged 18 years or older who have undergone solid organ transplantation or diagnosed with conditions that are considered to have an equivalent level of immunocompromise • J&J/Janssen (Ad26.COVS.S) is authorized emergency by FDA use in all individuals who are aged 18 years or older

What are the CDC and/or ACIP recommendations for the COVID-19 vaccines?
(Reviewed/updated on 2021.09.27)

- CDC recommends COVID-19 vaccines in all individuals aged 12 years and older within the scope of the EUA or approved indication for the particular vaccine.
- CDC recommends that individuals who are moderately to severely immunocompromised receive an additional dose of mRNA COVID-19 vaccine given at least 28 days after a second dose of Pfizer-BioNTech COVID-19 vaccine (Comirnaty®) or Moderna COVID-19 vaccine. This group include
 - Active treatment for solid tumor and hematologic malignancies
 - Receipt of solid-organ transplant and taking immunosuppressive therapy
 - Receipt of CAR-T-cell or hematopoietic stem cell transplant (within 2 year so of transplantation or taking immunosuppression therapy)
 - Moderate or severe primary immunodeficiency (e.g., DiGeorge syndrome, Wiskott-Aldrich syndrome)
 - Advanced or untreated HIV infection
 - Active treatment with high-dose corticosteroids (i.e., ≥ 20 mg prednisone or equivalent per day), alkylating agents, antimetabolites, transplant-related immunosuppressive drugs, cancer chemotherapeutic agents classified as severely immunosuppressive, tumor-necrosis (TNF) blockers, and other biologic agents that are immunosuppressive or immunomodulatory.
- The following groups **should** receive a third dose of Pfizer-BioNTech COVID-19 vaccine (Comirnaty®) at least 6 months after completing the primary series with Pfizer-BioNTech (Comirnaty®) COVID-19 vaccine
 - Individuals aged 65 years and older
 - Residents of long-term care settings who are aged 18 years and older
 - Individuals aged 50-64 years with underlying medical conditions. They include
 - Cancer/malignancy
 - Chronic kidney disease
 - Chronic lung diseases
 - Dementia
 - Diabetes mellitus (type 1 or type 2)
 - Down syndrome
 - Cardiac/cardiovascular conditions
 - HIV infection
 - Immunocompromised state
 - Liver disease
 - Overweight & obesity
 - Pregnancy
 - Sickle cell disease or thalassemia
 - Smoking, current or former
 - Solid organ or blood stem cell transplant

	<ul style="list-style-type: none"> ▪ Stroke or cerebrovascular disease ▪ Substance use disorders • The following groups may receive a third dose of Pfizer-BioNTech COVID-19 vaccine (Comirnaty®) at least 6 months after completing the primary series with Pfizer-BioNTech (Comirnaty®) COVID-19 vaccine <ul style="list-style-type: none"> ○ Individuals aged 18-49 with underlying medical conditions ○ Individuals aged 18-64 years at increased risk for SARS-CoV-2 exposure and transmission because of occupational or institutional setting. They include <ul style="list-style-type: none"> ▪ First responders, e.g., HCW, firefighters, police, congregate care staff ▪ Education staff, e.g., teachers, support staff, daycare workers ▪ Food and agriculture workers ▪ Manufacturing workers ▪ Corrections workers ▪ U.S. Postal Service workers ▪ Public transit workers ▪ Grocery store workers • Recipients of Moderna COVID-19 vaccine are authorized to receive an additional/supplemental vaccine dose only if they are moderately-to-severely immunocompromised (see above). • No recipient of J&J/Janssen COVID-19 vaccine is authorized to receive a supplemental vaccine dose.
<p>What are the contraindications for the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Individuals with a history of the following should not receive any of the COVID-19 vaccines unless already evaluated and approved by an allergist: <ul style="list-style-type: none"> ○ Severe allergic reaction, e.g., anaphylaxis, after a previous dose or to a component of the COVID-19 vaccine ○ Immediate allergic reaction of any severity to a previous dose or known allergy to a component of the vaccine • Individuals with a contraindication to one of the mRNA COVID-19 vaccines may be able to receive Janssen COVID-19 vaccine and vice versa after been evaluated and approved by an allergist. • Allergic reactions not related to vaccines, injectable therapy, components of any of the COVID-19 vaccines, such as allergic reactions to food, pet, venom, environmental allergens, or oral medications, are not contraindications to vaccination.
<p>Are there any testing requirements, e.g., testing for COVID-19 or pregnancy, prior to vaccination? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • No prerequisite testing is recommended to determine vaccine eligibility. This includes SARS-CoV-2 RT-PCR or antigen-based testing and serologic antibody assays.
<p>How are the vaccines administered? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Pfizer-BioNTech (Comirnaty®): 30 µg (0.3 mL) intramuscularly (deltoid muscle preferably, or alternatively, anterolateral thigh); 21 days apart.

	<ul style="list-style-type: none"> • Moderna mRNA-1273: 100 µg (0.5 mL) intramuscularly (deltoid muscle preferably, or alternatively, anterolateral thigh); 28 days apart. • J&J/Janssen (Ad26.COV2.S): 5×10¹⁰ viral particles (0.5 mL) intramuscularly, one time dose (deltoid muscle, or alternatively, anterolateral thigh).
<p>What are the acceptable dosing intervals of the two dose COVID-19 vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • The doses of the mRNA COVID-19 vaccines should be given as close to the recommended intervals as outlined by the manufacturers (see previous question). • The second dose, however, may be administered up to 4 days prior to the recommended interval and any time after the recommended dose interval.
<p>Is there a preferred COVID-19 vaccine? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Neither CDC nor UHC has a preferred COVID-19 vaccine or recommended one vaccine over another. • Eligible individuals should be encouraged to get whichever COVID-19 vaccine that is readily available to them.
<p>Are there any considerations or precautions that vaccine recipients should be made aware regarding the COVID-19 vaccines? (Reviewed/updated on 2021.09.08)</p>	<ul style="list-style-type: none"> • For the mRNA COVID-19 vaccines (Pfizer-BioNTech (Comirnaty®) and Moderna), <ul style="list-style-type: none"> ○ All individuals should be counseled about expected local and systemic (non-allergic) symptoms, especially if receiving the second dose and/or history of SARS-CoV-2 infection. It is important to be aware that development of these symptoms following the first dose is not a contraindication to receiving the second dose. These individuals should be encouraged to complete the vaccination series to be optimally protected. ○ All individuals, especially males aged 12-29 years, should be aware of the rare possibility of myocarditis or pericarditis following the vaccination. ACIP reviewed the reported cases and determined that the benefits of vaccination clearly outweigh the risks. Individuals who develop symptoms, such as chest pain, dyspnea, or palpitations, usually within a few days after the second dose, should be advised to seek medical care immediately. • For J&J/Janssen COVID-19 vaccine, <ul style="list-style-type: none"> ○ Women who are less than 50 years-old should be advised of the increased incidences of thrombosis with thrombocytopenia syndrome (TTS) and offering the choice of another COVID-19 vaccine, i.e., mRNA COVID-19 vaccine, if readily available. ○ Individuals with history of immune-mediated condition associated with thrombosis and thrombocytopenia should be offered one of the mRNA COVID-19 vaccines if they are within at least 90 days after resolution of their illness. • Individuals with contraindications to the mRNA COVID-19 vaccines have a precaution to the Janssen COVID-19 vaccine and vice versa. Consultation with an allergist is strongly advised to determine if the alternative vaccine is safe for administration. • Individuals with history of immediate allergic reactions to other vaccines or injectable therapy should be monitored for 30 minutes after receiving any of the COVID-19 vaccine.

Special Populations Questions	
<p>Are age groups less than 18 years able to receive the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • The FDA has authorized the emergency use of the Pfizer-BioNTech COVID-19 vaccine (Comirnaty®) for ages 12 years through 15 years and approved for use for ages 16 years and older. • Moderna and J&J/Janssen COVID-19 are not authorized or approved for use in individuals who are aged 17 and younger.
<p>Should women who are pregnant, planning to be pregnant or breastfeeding receive the COVID-19 vaccine? What is the safety profile of the COVID-19 vaccines in this group? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • CDC and American College of Obstetrics and Gynecology recommend the vaccination of all eligible women who are pregnant, planning to be pregnant, or breastfeeding because of the high risk in developing severe illness from COVID-19. • Routine pregnancy testing before vaccination is not recommended.
<p>Should individuals who are immunocompromised, including those with HIV, or receiving immunosuppressive therapy receive the COVID-19 vaccine? What is the safety profile of the vaccines in individuals in this population? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • All eligible immunocompromised individuals should be vaccinated against COVID-19. • Individuals in this population are considered to have higher risk for developing severe illness due to COVID-19. • Individuals who meet the criteria of moderately-to-severely immunocompromised status and completed the vaccination series with one of the two mRNA COVID-19 vaccine should receive an additional vaccine dose, at least 28 days after the last dose. • Serologic antibody testing to confirm immunity is not recommended.
<p>Should individuals with autoimmune diseases receive the COVID-19 vaccine? What is the safety profile of the vaccines for individuals in this population? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Individuals with autoimmune diseases are recommended to receive the COVID-19 vaccine. • The safety and efficacy of the COVID-19 vaccines are similar to the general population.
<p>Should the COVID-19 vaccine be administered to individuals with history of severe allergies or anaphylaxis? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • The COVID-19 vaccines should not be given to individuals with documented history of allergic reaction of any severity or anaphylaxis to a previous dose of the COVID-19 vaccines or to any components of the COVID-19 vaccines unless approved by an allergist. See Figure 1 for the components of the mRNA COVID-19 vaccines. • The Janssen COVID-19 vaccine should not be given to individuals with documented history of allergy to polysorbate unless they have been evaluated and approved by an allergist. See Figure 2 for a list of medications and vaccines containing PEG. • Known polysorbate allergy is not a contraindication, but a precaution, to receiving the mRNA COVID-19 vaccines. • Individuals who are allergic to the mRNA COVID-19 vaccines may be considered to receive the Janssen COVID-19 vaccine, and vice versa, after evaluation and approval by an allergist. Administration of the vaccine should be conducted under the supervision of HCP experienced in the management of severe allergic reactions. • The vaccines may be given to individuals regardless of history of allergic reactions of any severity to foods, medications, insects, latex, vaccine, or other injectable therapy except as noted above. However, individuals with allergic reactions to other vaccines or

	injectable therapies should be monitored for 30 minutes after receiving the COVID-19 vaccine.
Can individuals with history of Guillain-Barré syndrome (GBS) receive the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Individuals with GBS may receive any of the FDA-authorized or FDA-approved COVID-19. • Because of a possible association of the J&J/Janssen COVID-19 with GBS, clinicians with such a patient are advised to seek vaccination with a mRNA COVID-19 instead.
Should individuals with history of multisystem inflammatory syndrome in children (MIS-C) or multisystem inflammatory syndrome in adults (MIS-A) due to COVID-19 receive the COVID-19 vaccine? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • These individuals may choose to be vaccinated. • Considerations for vaccination include: <ul style="list-style-type: none"> ○ Recovery from MIS-C or MIS-A ○ Personal risk of severe acute COVID-19 ○ Level of community COVID-19 transmission and risk of reinfection ○ Lack of safety data of COVID-19 vaccines following those illnesses ○ Timing of any immunomodulatory therapies • Individuals who choose to do so should delay vaccination until they have recovered from their illness and waited 90 days after the diagnosis of MIS-C or MIS-A.
Should individuals with history of myocarditis or pericarditis after the first mRNA COVID-19 vaccine dose receive the second dose? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Individuals with history of myocarditis or pericarditis <i>prior</i> to receiving a mRNA COVID-19 vaccine may receive the vaccine. • Most experts recommend that individuals who developed myocarditis or pericarditis <i>after</i> the first dose of the mRNA COVID-19 vaccine should defer the second dose. • The administration of the second dose may be considered after reviewing the following: <ul style="list-style-type: none"> ○ Personal risk of severe acute COVID-19 ○ Level of community transmission and risk of infection ○ Additional data on the risk of myocarditis or pericarditis following vaccination ○ Additional data on the long-term outcomes of myocarditis or pericarditis following vaccination • Those individuals who choose to receive the second dose of an mRNA COVID-19 vaccine should wait at least until their episode of myocarditis or pericarditis has completely resolved. • ***Alternatively, the J&J/Janssen COVID-19 vaccine may be considered for use to complete the vaccination series.***
Should individuals with a history of dermal fillers receive the mRNA COVID-19 vaccine? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Yes, if they have no contraindications to receiving the vaccine. No additional precautions are needed.
Other Vaccine-Related Questions	
Should individuals who had COVID-19 (asymptomatic or symptomatic) still receive the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Individuals who recovered from COVID-19 are encouraged to receive the vaccine once they have recovered from their illness and met the criteria for discontinuation of isolation.

	<ul style="list-style-type: none"> • There is no established recommended minimal interval between infection and vaccination.
<p>Can individuals who received antibody therapy for the treatment of COVID-19, i.e., monoclonal antibody or convalescent plasma, receive any of the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Individuals who received antibody therapy may be vaccinated but should wait at least 90 days after the treatment.
<p>When should the second dose of a mRNA COVID-19 vaccine be given if an individual develops COVID-19 after the first dose? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • The second dose should be given once the individual has recovered from COVID-19 but still has met the minimum dose interval period recommended by the manufacturer.
<p>If a vaccine recipient developed COVID-19 after the first dose of a mRNA COVID-19 vaccine and received antibody therapy, e.g., convalescent plasma or monoclonal antibody, when should the second dose of the vaccine be given? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • The second dose of either mRNA COVID-19 vaccine should be given at least 90 days after receiving antibody therapy for COVID-19. • If the second dose of a mRNA COVID-19 vaccine is given within 90 days of receiving antibody therapy for COVID-19, the dose does not need to be repeated and the individual should be considered fully vaccinated.
<p>If a vaccine recipient experienced a severe adverse or allergic reaction to the first dose of a mRNA COVID-19 vaccine, should they receive the second vaccine dose? (Reviewed on 2021.09.27)</p>	<ul style="list-style-type: none"> • If the vaccine recipient develops an adverse reaction to a mRNA vaccine that determines to be a contraindication to future doses of the same or different mRNA vaccine, the J&J/Janssen COVID-19 can be used instead to complete the vaccination series. The “second” dose should be administered at least 28 days after the first mRNA vaccine dose.
<p>Will antiviral therapy, whether for COVID-19 or other infections, affect COVID-19 vaccination? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Individuals who have received antiviral therapy for any reason may receive the COVID-19 vaccine, including the Janssen COVID-19 vaccine, without restrictions.
<p>Should individuals who are acutely ill, including fever alone, receive the COVID-19 vaccine? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Individuals who are acutely ill should defer vaccination until they have recovered. • Individuals with fever but without other symptoms should defer vaccination until the fever has resolved. • Individuals with active tuberculosis or being evaluated for tuberculosis may receive the vaccine.
<p>If a vaccine recipient misses the second mRNA COVID-19 vaccine dose, does the vaccination series needs to be restarted? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • No. The vaccination series does not need to be restarted. • The second dose should be given as soon as possible after missing the recommended time interval.
<p>Are the mRNA COVID-19 vaccines interchangeable? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • In general, vaccine recipients should receive the same COVID-19 vaccine for both doses. • If the same COVID-19 vaccine product is not readily available for use for the second dose, it is acceptable to delay the second dose until the same vaccine product is available.

	<ul style="list-style-type: none"> • If another COVID-19 vaccine product was used as the second dose, the vaccination series does not need to be restarted and the vaccine recipient should be considered fully vaccinated 2 weeks after the second dose.
Do the vaccines interact with other medications or therapy? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • There are no known medication or vaccine interactions with any of the COVID-19 vaccines.
Can the COVID-19 vaccines be co-administered or administered around the same time as other vaccines? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • The COVID-19 vaccines may be given around the same time or co-administered with other vaccines. • The vaccines should be administered at different sites.
What concomitant medications or conditions may inhibit or prevent the COVID-19 vaccines from inducing immune response? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • The following populations may have reduced or lack of immune response to the COVID-19 vaccines as listed by CDC: <ul style="list-style-type: none"> ○ Immunodeficiencies involving adaptive immunity ○ Asplenia ○ B-cell directed therapy ○ T-cell directed therapy ○ Many chemotherapy regimens ○ Hematopoietic cell transplantation ○ Underlying aberrant immunity, e.g., graft-vs.-host disease, graft rejection, absent or incomplete immune reconstitution, neutropenia, lymphopenia ○ High-dose corticosteroids, ≥ 20 mg per dose or > 2 mg/kg/d daily of prednisone or equivalent • Regardless, all eligible immunocompromised and immunosuppressed individuals should be vaccinated against COVID-19. • If possible, it is suggested that immunosuppressive therapies are deferred until at least 2 weeks after completing the vaccination series.
Will vaccinated individuals be able to travel by air internationally without the need to be tested for SARS-CoV-2 prior to departure? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Before travel, make sure your patient reviews and understands all airline and destination requirements as they may differ from U.S. requirements. • Vaccination is currently not accepted as an alternative to a negative SARS-CoV-2 test result to meet the requirement to allow entry into the U.S. • Individuals who are traveling internationally will be required to have proof of a negative SARS-COV-2 test that is performed up to 3 days prior to their departure to the U.S. • Recovered individuals with previous diagnosis of COVID-19 within 90 days of departure and met the criteria to end isolation do not need to be tested but will require “documentation of recovery” from public health or a healthcare provider stating that that they have recovered with a copy of the test result attached.
Will the COVID-19 vaccines affect SARS-CoV-2 test results? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Vaccination will not affect the results of molecular diagnostic tests, i.e., PCR- or antigen-based tests. • Serologic anti-SARS-CoV-2 antibody tests against the spike (S) protein, however, will be positive in vaccinated individuals.

Should serologic antibody tests be performed after completing the vaccination series to ensure immunity? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Routine serologic testing for anti-SARS-CoV-2 antibodies to confirm vaccine-induced immunity is not recommended at this time.
How should fully vaccinated individual be evaluated for possible past infection with SARS-CoV-2? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Fully vaccinated individuals may be assessed for past infection with SARS-CoV-2 by serologic tests that specifically detect anti-SARS-CoV-2 nucleocapsid (N) protein antibody. The use of tests that detect anti-SARS-CoV-2 spike (S) protein antibody will not differentiate between immunity from natural infection and vaccine.
When should individuals who are receiving the COVID-19 vaccine undergo screening for tuberculosis? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> The use of either tuberculin skin test (TST) or interferon gamma releasing assay (IGRA) may be performed before, during, or after the same encounter as the COVID-19 vaccination.
Vaccine Administration Error/Deviation Questions	
If the vaccine was administered in the incorrect site, i.e., site other than the deltoid or anterolateral thigh, what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Do not repeat dose. Inform the vaccine recipient for the potential of local and systemic adverse events.
If the vaccine was administered via the incorrect route, e.g., subcutaneous, what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Do not repeat dose. Inform the vaccine recipient for the potential of local and systemic adverse events.
If the vaccine was administered to someone who did not meet the age requirement, i.e., age younger than what was approved for use, what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> If the recipient is less than 12 years old, do not administer additional doses. If the recipient is between 12 to 17 years old and received a COVID-19 vaccine other than the one developed by Pfizer-BioNTech: <ul style="list-style-type: none"> If the first dose administered was the Moderna vaccine, you may administer the Moderna vaccine as the second dose (as off-label use). If the first dose administered was the Janssen vaccine, do not repeat dose with the Pfizer-BioNTech vaccine (Comirnaty®).
If a vaccine recipient was administered the second mRNA COVID-19 vaccine dose earlier than the 4-day grace period from the recommended interval time, what should be done? (Reviewed/updated on 2021-03-07)	<ul style="list-style-type: none"> Do not repeat dose or restart vaccination series. The vaccine recipient should be considered vaccinated at this point.
If the vaccine recipient has not yet received the second dose of mRNA COVID-19 vaccine 42 days after the first dose, what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Administer the second dose of the vaccine as soon as possible, preferably with the same vaccine as the first dose. The vaccination series does not need to be restarted. This also applies to individuals who received the first dose and developed COVID-19 and was treated with antibody therapy before receiving the second dose.
If the vaccine recipient was inadvertently administered two different mRNA COVID-19 vaccines during the vaccination series, what should be done?	<ul style="list-style-type: none"> Do not repeat dose. The vaccination series does not need to be restarted. This individual is to be considered vaccinated.

(Reviewed/updated on 2021.09.27)	
If the vaccine recipient was administered higher-than-authorized vaccine dose or volume, what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Do not repeat dose. Inform the vaccine recipient of potential for local and systemic adverse reactions.
If a vaccine recipient was administered lower-than-authorized vaccine dose or volume, e.g., leaked out, syringe failure, etc., what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> If at least half of the dose was administered, do not repeat dose. If less than half of the dose was administered, or unable to assess the volume administered, then repeat the full dose in the opposite arm. There is no change in dosing interval, if the action performed is the first dose.
If a vaccine recipient was administered the vaccine dose without diluent, what should be done (Pfizer-BioNTech only)? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Do not repeat dose. Inform the vaccine recipient of potential for local systemic adverse reactions.
When should I contact the vaccine manufacturer for more information and instructions? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> When the vaccine administered was improperly stored and handled. When the vaccine administered was past the expiration/beyond use date. When the incorrect diluent type was used. <p>If the manufacturer recommends repeating the vaccine dose, the repeat dose should be administered immediately in the opposite arm.</p>
If a vaccine recipient was administered a COVID-19 vaccine within 90-days of receiving antibody therapy for the treatment of COVID-19, what should be done? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Do not repeat dose. If it was the dose of vaccine was the first in the vaccination series, please wait 90 days after receiving the antibody therapy before administering the second dose.
Vaccination Benefits Questions	
When are vaccine recipients considered fully vaccinated? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Vaccine recipients are considered fully vaccinated 2 weeks after completing the vaccination series of either mRNA COVID-19 vaccines or one dose of the Janssen COVID-19 vaccine. Those did not complete the vaccination series for any reason are not considered fully vaccinated.
What are the medical benefits of vaccination? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> All three COVID-19 vaccines significantly reduce the risk of developing symptomatic COVID-19. All three COVID-19 vaccines significantly reduce the risk of developing severe illness, hospitalization, and death due to COVID-19.
Can vaccinated individuals still develop COVID-19? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> It is still possible for fully vaccinated individuals to get infected by SARS-CoV-2 and develop COVID-19. The risk, however, of developing symptomatic COVID-19 is significantly lower, even after the first dose. Fully vaccinated individuals who test positive for SARS-CoV-2, either PCR or antigen, should have a specimen submitted to Montana Public Health Laboratory for whole

	genome sequencing to detect the presence of a SARS-CoV-2 variant of concern. Additionally, these cases should also be reported to VAERS.
Are the current COVID-19 vaccines effective against the reported variants of concern, i.e., Alpha (B.1.1.7), Beta (B.1.135), Delta (B.1.617.2), and Gamma (P.1)? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> The effectiveness of all FDA-authorized COVID-19 vaccines is preserved against all variants that are circulating in the U.S. It is expected that cases of COVID-19 will occur in those who are fully vaccinated (breakthrough infections) as immunologic responses may be variable depending on underlying factors, e.g., immunocompromised status. The overall number of these cases, however, is small.
Will vaccination prevent asymptomatic COVID-19? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Some studies suggest that vaccination reduces the incidence of asymptomatic infections. It is still important, however, to emphasize that infection with SARS-CoV-2 can still occur after vaccination, especially with the Delta variant. Therefore, it is important to encourage the continued use of facemasks and physical distancing while in public of all fully vaccinated individuals.
Will vaccination prevent transmission of SARS-CoV-2? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> There are limited data to suggest that vaccination may reduce the transmission of SARS-CoV-2. At present, it is still important that vaccinated persons continue to follow transmission-based mitigation and prevention practices.
What is the expected duration of immunity of fully vaccinated individuals? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> There are several factors that influence the durability of the immunity derived from vaccination, such as age, underlying medical conditions, and impaired immune response. Studies suggest that antibody titers do appear to wane over time but remain effective against severe illness, hospitalizations, and death due to COVID-19. Certain populations are recently recommended to receive a supplemental vaccine dose, i.e., third or booster dose, after completing the primary mRNA vaccine series. Details are outlined under the “General Vaccine Questions” section.
Infection Prevention & Control	
Should the COVID-19 vaccine be given after an exposure to known SARS-CoV-2 infection or during an outbreak to prevent infection? (Reviewed/updated 2021.09.27)	<ul style="list-style-type: none"> It is not recommended to administer the COVID-19 vaccine as post-exposure prophylaxis or management of an outbreak because the incubation period of SARS-CoV-2 infection is shorter than the immune response to the vaccine.
What can fully vaccinated individuals safely do? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> Because of the rapid spread of the Delta variant, all individuals regardless of their vaccination status should continue to wear facemasks while in indoor public settings in areas of substantial or high level of transmission of SARS-CoV-2. In most outdoor settings, most fully vaccinated individuals do not need to wear facemasks. Facemasks should be worn, however, in large group settings. Immunocompromised or immunosuppressed are also strongly encouraged to use facemasks and practice physical distancing while in public.

	<ul style="list-style-type: none"> • Facemask use is still required for who those individuals traveling via public transportation, regardless of vaccination status. • They are not required to be tested before or after travel, or self-quarantine after domestic travel. • They can refrain from testing before leaving the US. for international travel (unless required by the destination) and refrain from self-quarantine after arriving back in the US. They are, however, still required to have a negative SARS-CoV-2 test performed no more than 3 days prior to boarding a departure flight to the US.
What should fully vaccinated individuals continue to do? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • They should get tested if experiencing COVID-19 symptoms. • They should follow CDC and state/local health department travel requirements and recommendations.
Are fully vaccinated individuals still required to be quarantined if they are exposed to suspected or known COVID-19 cases? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • CDC does not require any fully vaccinated individuals who are exposed to suspected or confirmed cases of COVID-19 to be quarantined if they remain asymptomatic. They should, however, be advised to monitor for symptoms for 14 days after the last exposure event. Additionally, they should be tested 3-5 days after exposure.
Are vaccinated individuals still required to be isolated if diagnosed with COVID-19? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Yes. All individuals diagnosed with COVID-19 are required to be isolated for the recommended duration, regardless of their vaccination status.
If individuals who have positive results with either PCR- or antigen-based tests after vaccination, should the results be considered as false-positive? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Vaccination does not affect the results of any PCR- or antigen-based tests. • Individuals who have received the any of the vaccines and have positive results from either test should be considered infected.
Vaccine-Related Adverse Reactions	
Should vaccine recipients who developed allergic reactions to a prior mRNA COVID-19 vaccine be given the second dose? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Individuals who had immediate allergic reaction of any severity, including anaphylaxis, to a previous dose of a COVID-19 vaccine should not receive the second dose until they have been evaluated and approved to receive the vaccine by an allergist.
Should individuals who developed significant systemic (non-allergic) symptoms following the first of an mRNA COVID-19 vaccine receive the second dose? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Unless the symptoms are related to anaphylaxis or an immediate allergic reaction, the development of these symptoms are not considered to be contraindication to receiving the second dose of mRNA COVID-19 vaccine. • Individuals who developed significant symptoms should be encouraged to receive the second dose of the mRNA COVID-19 vaccine to be fully protected.
If a vaccine recipient is unable to complete the vaccination series due to a contraindication, e.g., severe allergic reaction to a prior dose of either mRNA vaccines, is there another option to fully vaccinate against COVID-19? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • The J&J/Janssen COVID-19 vaccine may be used to complete the mRNA vaccination series. It should be administered 28 days after the first mRNA COVID-19 vaccine dose. • In these individuals, a single dose of the Janssen COVID-19 vaccine may be considered at a minimal interval of 28 days from the mRNA COVID-19 vaccine dose. • If this option is employed, these individuals will be considered to vaccinated based on receiving the Janssen COVID-19 vaccine instead of a mixed vaccination series.

<p>What is the safety profile of the COVID-19 vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Over 200 million doses of the COVID-19 vaccines have been given since the vaccinated efforts have been started. The incidence of severe adverse reactions, e.g., anaphylaxis, TTS, myocarditis/pericarditis, is rare. • Most adverse reactions are related to vaccine reactogenicity.
<p>What are the commonly reported adverse reactions to the COVID-19 mRNA vaccines? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Reactogenicity commonly reported to v-safe include pain at the injection site, fatigue, headache, muscle ache, chills, fever, joint pain, and nausea. • Adverse events commonly reported to VAERS for the Pfizer-BioNTech COVID-19 vaccine include headache, fatigue, dizziness, nausea, chills, fever, pain, injection site pain, pain in extremity, and dyspnea. • Adverse events commonly reported to VAERS for the Moderna COVID-19 vaccine include headache, fever, chills, pain, dizziness, fatigue, nausea, injection site pain, pain in extremity, and dyspnea. • Vaccine recipients should also be advised that self-limiting lymphadenopathy following vaccination has been reported. • Most adverse reactions last about 1-2 days but usually not more than 3 days.
<p>What are the commonly reported adverse reactions to the Janssen COVID-19 vaccine? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Most adverse reactions with this vaccine are mild to moderate in severity. • Injection site pain is the most common injection site reaction, followed by erythema and swelling. All reactions resolve in 2-3 days • Common systemic adverse events include (in decreasing frequency) fatigue, headache, myalgia, nausea, and fever. Most vaccine recipients will experience at least one adverse event. All reactions resolve in 1-2 days.
<p>How should most of the commonly reported adverse reactions be managed? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • The commonly reported adverse reactions can be managed as needed with either NSAIDs or acetaminophen. • Because of some concerns that vaccine efficacy may be affected by these medications, prophylactic use of NSAIDs or acetaminophen to prevent post-vaccination symptoms is not recommended at this time. • Additionally, prophylactic use of antihistamine to prevent allergic reactions is not recommended as they may mask symptoms of hypersensitivity reactions.
<p>What should be done if a vaccine recipient has persistent reaction symptoms? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Since infection with SARS-CoV-2 may still occur, vaccine recipients with persistent fever, fatigue, headache, muscle ache, joint pain, or diarrhea should be evaluated and ruled out for COVID-19.
<p>What should be done if vaccine recipients develop symptoms that are not listed on the commonly reported vaccine-related adverse reactions? (Reviewed/updated on 2021.09.27)</p>	<ul style="list-style-type: none"> • Vaccine recipients who developed symptoms should be evaluated for other causes of their symptoms. If no obvious cause has been identified, the symptoms should be reported as a possible vaccine-related adverse reaction. • Individuals who report respiratory symptoms, anosmia and/or dysgeusia should be ruled out for infection with SARS-CoV-2.

Should vaccine recipients who developed delayed-onset local reaction after the first mRNA COVID-19 vaccine dose avoid receiving the second vaccine dose? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Delayed-onset local reaction may include erythema, induration, pruritis, and pain that occur on the same arm where the vaccine was administered. It may present as early as few days and through the second week after the injection. This reaction seems to occur more commonly with Moderna mRNA COVID-19 vaccine. • Development of this reaction after the first dose of mRNA COVID-19 vaccine is not considered a precaution or contraindication to receiving the second vaccine dose, preferably given in the opposite arm. • The symptoms are usually self-limited and may be managed with analgesics.
Are the COVID-19 vaccines associated with increased incidence in Bell's palsy? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Although cases of Bell's palsy have been reported during the clinical trials of the COVID-19 vaccines, CDC considers the incidence of Bell's palsy of vaccine recipients like that of the expected incidence in the general public. Thus, they do not feel that the reported cases are vaccine-related.
How should reactions to dermal fillers be managed? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Vaccine-related reactions involving dermal fillers are temporary and may be managed oral corticosteroids and diphenhydramine (Benadryl).
Are there any reported cases of hypersensitivity or anaphylaxis to the vaccines? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Yes, but analyses of VAERS data indicate that they are rare.
How should vaccine-related adverse reactions be reported? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • For individuals who received their vaccine at Billings Clinic, providers are asked to enter all adverse reactions into Safety Net. • For all others, all adverse reactions should be entered into the Vaccine Adverse Events Reporting System (VAERS) at https://vaers.hhs.gov/.
Can vaccine recipients self-report adverse reactions? (Reviewed/updated on 2021.09.27)	<ul style="list-style-type: none"> • Yes. All vaccine recipients are encouraged to register with v-safe at https://vsafe.cdc.gov/ to report adverse reactions.
Common COVID-19 Vaccine Myths	
The COVID-19 vaccines cannot be trusted because their development was rushed.	<ul style="list-style-type: none"> • The pharmaceutical companies were able to develop the COVID-19 vaccines because of the worldwide effort. • All three COVID-19 vaccines were developed based on existing technology. Their effectiveness and safety profile have been established prior to the development of the COVID-19 vaccines.
The COVID-19 vaccines can make me sick with COVID-19.	<ul style="list-style-type: none"> • None of the available vaccines contain SARS-CoV-2. Therefore, the vaccine cannot cause COVID-19.
The COVID-19 vaccines can alter my DNA.	<ul style="list-style-type: none"> • The mRNA in the Pfizer-BioNTech and Moderna vaccines do not enter the cell nucleus. It is quickly degraded after entering the cells. • The DNA in the Janssen vaccine is not able to integrate into the host cell DNA.
The COVID-19 vaccines can affect fertility.	<ul style="list-style-type: none"> • There is no evidence during animal trials that the vaccines affect fertility. • Observational studies have not demonstrated that the vaccines affect fertility.

Since some observational studies have shown substantial immunity after the first dose of mRNA vaccines, a second dose is not necessary.	<ul style="list-style-type: none"> • We do not know the long-term efficacy of either mRNA vaccines as the clinical trials only evaluated two-dose regimens. • The efficacy of the Pfizer-BioNTech mRNA COVID-19 vaccine against the Delta variant is about 44% after one dose but increases to >90% after the second dose. • Therefore, everyone who are receiving a mRNA vaccine should get both doses. • To be deemed fully vaccinated, recipients of the mRNA vaccine must receive two doses.
Because the survival rate is so high, vaccination is not needed.	<ul style="list-style-type: none"> • Although the death rates from COVID-19 is still around 1.5%, the number of individuals hospitalized for moderate to severe COVID-19 can be high and overwhelm the capacity of many hospitals. • Vaccination can help to reduce the likelihood of hospitalization. • Vaccination can help the development of severe disease. • Vaccination can potentially help the spread of the disease to others who are likely to develop severe disease.
After vaccination, face coverings and physical distancing are not needed.	<ul style="list-style-type: none"> • Preventative measures are needed because the vaccine is not 100% effective against developing COVID-19. • Until the effectiveness of the vaccines against the variants of concern have been established, it is wise to continue all preventative measures.
If someone had COVID-19, the vaccine is not needed because they will already have immunity.	<ul style="list-style-type: none"> • If eligible and there are no contraindications, everyone should receive the COVID-19 regardless of prior history of COVID-19. • Re-infection, particularly with variants of concern, has been reported.
Immunity through natural infection is always better than through vaccination.	<ul style="list-style-type: none"> • Although for infections, this may be the case. For other infections, such as measles, a vaccine provides better protection. • Immunity through vaccination is much safer than through natural infection. • Vaccination also do not have the post-infection complications like some natural infections may have, e.g., chickenpox and shingles.
Since there is monoclonal antibody therapy available, there really isn't any need to vaccinate.	<ul style="list-style-type: none"> • Although monoclonal antibody therapy may help those
The side effects of the COVID-19 vaccines are severe and serious.	<ul style="list-style-type: none"> • Most reported vaccine-related symptoms are mild to moderate and well tolerated. • Although hypersensitivity reactions have been reported, they are rare. • Clinical trials demonstrated very few serious adverse events.
The COVID-19 vaccines contain controversial substances.	<ul style="list-style-type: none"> • The vaccines do not contain implants, microchips, tracking devices, or fetal tissue.
If a vaccine recipient had a "bad reaction" to the first mRNA vaccine, the second dose should not be given.	<ul style="list-style-type: none"> • Unless the recipient experienced a reaction that was deemed to be a contraindication for the second dose by an allergist, the second dose should be given.
Those with egg allergy should not receive the vaccine.	<ul style="list-style-type: none"> • None of the COVID-19 vaccines do contain egg or are developed from eggs.

Summary of recent changes:

- Addition of an item under the section “General Vaccine Questions” which outlined the three available COVID-19 vaccines and their differences.
- The item under the section “General Vaccine Questions” which discussed indications for the three available COVID-19 vaccines are updated.
- Addition of an item under the section “General Vaccine Questions” which outlined CDC and/or ACIP recommendations for the use of the COVID-19 vaccines, including additional/supplemental doses.
- The item under the section “General Vaccine Questions” which discussed testing prerequisites for COVID-19 vaccination has been further clarified.
- The item on additional vaccine doses has been removed as this is covered in the indications and CDC and/or ACIP recommendations item.
- The item under the section “General Vaccine Questions” which discussed mRNA vaccine dose administration interval recommendation is updated.
- The item which discussed differences in the mRNA and J&J/Janssen COVID-19 section has been removed as this is included in a previous section.
- The item under the section “Special Population Questions” which discussed the use of vaccine in age groups less than 18 years has been further clarified.
- The item under the section “Special Population Questions” which discussed autoimmune diseases have been simplified.
- The item under the section “Special Population Questions” which discussed vaccinating individuals with history of severe allergic reactions and anaphylaxis has been clarified.
- The item under the section “Special Population Questions” which discussed vaccinating individuals with history of GBS has been updated.
- The item under the section “Special Population Questions” which discussed vaccinating individuals with previous SARS-CoV-2 infection has been revised.
- The item under the section “Other Vaccine-Related Questions” which discussed vaccine interchangeability has been clarified.
- The item under the section “Other Vaccine-Related Questions” which discussed was clarified to offer an option to complete the vaccination series of vaccine recipients who developed severe adverse reaction to the first dose of mRNA vaccine.
- The item under the section “Other Vaccine-Related Questions” which discussed vaccinating individuals who received antibody therapy has been revised.
- The item under the section “Other Vaccine-Related Questions” which discussed tuberculosis testing around the time of COVID-19 vaccination has been updated.
- The item under the section “Other Vaccine-Related Questions” which discussed international travel of vaccinated individuals have been clarified.
- The item under the section “Vaccine Administration Error” which discussed administration of a non-COVID-19 vaccine and the COVID-19 vaccine within 14 days has been removed.

Figure 1. Components of mRNA COVID-19 vaccines.

Appendix C: Ingredients included in COVID-19 vaccines

The following is a list of ingredients for the [Pfizer-BioNTech](#), [Moderna](#), and [Janssen](#) COVID-19 vaccines reported in the prescribing information for each vaccine.*

Description	Pfizer-BioNTech (mRNA)	Moderna (mRNA)	Janssen (viral vector)
Active ingredient	Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2	Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2	Recombinant, replication-incompetent Ad26 vector, encoding a stabilized variant of the SARS-CoV-2 Spike (S) protein
Inactive ingredients	2[(polyethylene glycol (PEG))-2000]-N,N-ditetradecylacetamide	PEG2000-DMG: 1,2-dimyristoyl-rac-glycerol, methoxypolyethylene glycol	Polysorbate-80
	1,2-distearoyl-sn-glycero-3-phosphocholine	1,2-distearoyl-sn-glycero-3-phosphocholine	2-hydroxypropyl- β -cyclodextrin
	Cholesterol	Cholesterol	Citric acid monohydrate
	(4-hydroxybutyl)azanediylbis(hexane-6,1-diyl)bis(2-hexyldecanoate)	SM-102: heptadecan-9-yl 8-((2-hydroxyethyl) (6-oxo-6-(undecyloxy) hexyl) amino) octanoate	Trisodium citrate dihydrate
	Sodium chloride	Tromethamine	Sodium chloride
	Monobasic potassium phosphate	Tromethamine hydrochloride	Ethanol
	Potassium chloride	Acetic acid	
	Dibasic sodium phosphate dihydrate	Sodium acetate	
	Sucrose	Sucrose	

* None of the vaccines contain eggs, gelatin, latex, or preservatives. All COVID-19 vaccines are **free from metals** such as iron, nickel, cobalt, lithium, rare earth alloys or any manufactured products such as microelectronics, electrodes, carbon nanotubes, or nanowire semiconductors.

Note: Both the Pfizer-BioNTech and Moderna COVID-19 vaccines contain polyethylene glycol (PEG). PEG is a primary ingredient in osmotic laxatives and oral bowel preparations for colonoscopy procedures, an inactive ingredient or excipient in many medications, and is used in a process called “pegylation” to improve the therapeutic activity of some medications (including certain chemotherapeutics). Additionally, cross-reactive hypersensitivity between PEG and polysorbates (included as an excipient in some vaccines and other therapeutic agents) can occur. Information on active or inactive ingredients for vaccines and medications can be found in the package insert. [CDC's vaccine excipient summary](#) and the National Institutes of Health [DailyMed database](#) can also be used as a resource.

Adapted from <https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.html>

Figure 2. List of medications and vaccines reported to contain polysorbate or PEG.

TABLE II. Polysorbate and PEG excipients in select vaccines¹²

Excipient	Vaccine type	Vaccine	Amount per dose
Polysorbate 20	Influenza	Flublok&Flublock quad	≤27.5 µg (Tween20)
Polysorbate 20	Hepatitis A	Havrix	0.05 mg/mL
Polysorbate 20	Hepatitis A&B	Twinrix	Unknown
Polysorbate 20*	SARS-CoV-2 (Sanofi)		
Polysorbate 80	Tdap	Boostrix	≤100 µg (Tween 80)
Polysorbate 80	Influenza	Fluad	1.175 mg
Polysorbate 80	Influenza	Fluarix quad	≤0.055 mg (Tween 80)
Polysorbate 80	Influenza	Flucelvax quad	≤1500 µg (Tween 80)
Polysorbate 80	Influenza	Flulaval Quad	≤887 µg
Polysorbate 80	HPV	Gardasil and Gardasil -9	50 µg
Polysorbate 80	Hepatitis B	Heplisav-B	0.1 mg/mL
Polysorbate 80	DTaP	Infanrix	≤100 µg (Tween 80)
Polysorbate 80	Japanese encephalitis	JE-Vax	<0.0007%
Polysorbate 80	DTaP + IPV	Kinrix	≤100 µg (Tween 80)
Polysorbate 80	DTaP + HepB + IPV	Pediarix	≤100 µg (Tween 80)
Polysorbate 80	Pneumococcal 13-valent	Prevnar 13	100 µg
Polysorbate 80	DTaP + IPV	Quadracel	10 ppm
Polysorbate 80	Rotavirus	RotaTeq	?
Polysorbate 80	Zoster	Shingrix	0.08 mg
Polysorbate 80	Meningococcal group B	Trumenba	0.018 mg
Polysorbate 80	DTaP + IPV + HepB + Hib	Vaxelis	<0.0056%
Polysorbate 80*	SARS-CoV-2 (AstraZeneca)		
	SARS-CoV-2 (Johnson & Johnson)		
PEG2000	SARS-CoV-2 (Moderna)		
	SARS-CoV-2 (Pfizer)		

TABLE III. Common injectable medications containing PEG¹⁴

Generic name (brand name)	Molecular weight	General description
Methylprednisolone acetate (Depo-Medrol)	PEG 3350	An anti-inflammatory glucocorticoid for intramuscular, intra-articular, soft tissue or intralesional injection
Methoxy polyethylene glycol-epoetin beta (Micera)	30-kD methoxy PEG butanoic acid	Used to treat anemia in adults with chronic kidney disease
Pegfilgrastim (Neulasta)	20-kD monomethoxy PEG	Used to help reduce the chance of infection due to a low white blood cell count, in people with certain types of cancer (nonmyeloid), who receive anticancer medicines (chemotherapy) that can cause fever and low white blood cell count
Medroxyprogesterone acetate (Depo-Provera)	PEG 3350	Contraceptive and adjunctive therapy and palliative treatment of inoperable, recurrent, and metastatic endometrial or renal carcinoma
Brilliant Blue G Ophthalmic Solution (TissueBlue)	PEG 3350	Disclosing agent indicated to selectively stain the internal limiting membrane
Sulfur hexafluoride (Lumason)	PEG 4000	Ultrasound contrast agent
Biomatoprost implant (Durysta)	PEG, unspecified	Reduction of intraocular pressure in patients with open-angle glaucoma or ocular hypertension
Trastuzumab (Herceptin, Herzuma, Kanjinti, Ogivri, Ontruzant)	PEG 3350	Adjuvant treatment of HER2 overexpressing node-positive or node-negative breast cancer
Rilonacept (Aralyst)	PEG 3350	IL-1 blocker for treatment of cryopyrin-associated periodic syndromes
Perflutren lipid microsphere (Definity)	PEG 5000	Contrast agent used to brighten and clarify images of the heart during echocardiograms

TABLE IV. Common injectable medications containing polysorbate

Drug class	Generic name (brand name)	Polysorbate
Antiarrhythmic	Amiodarone hydrochloride (generics only)	Polysorbate 80
Antidiabetic	Exenatide (Bydureon Beise)	Polysorbate 20
	Insuline glargine (Lantus, Semglee)	Polysorbate 20
	Insuline glulisine (Apidra)	Polysorbate 20
	Dulaglutide (Trulicity)	Polysorbate 80
Antidote	Hyaluronidase (Hylenex Recombinant)	Polysorbate 80
Antifungal	Anidulafungin (Eraxis)	Polysorbate 80
Anti-inflammatory	Interferon beta 1a (Avonex, Plegridy)	Polysorbate 20
	Omalizumab (Xolair)	Polysorbate 20
Antineoplastic	Ofatumumab (Kesimpta)	Polysorbate 80
	Siltuximab (Sylvant)	Polysorbate 80
Antipsychotic	Paliperidone palmitate (Invega Trinza, Invega Sustenna)	Polysorbate 20
	Aripiprazole lauroxil (Aristada)	Polysorbate 20
Antiretroviral	Ibalizumab (Trogarzo)	Polysorbate 80
Antipsoriatic	Adalimumab (Humira, Imraldi)	Polysorbate 20 (Imraldi)/ Polysorbate 80 (Humira)
	Golimumab (Simponi)	Polysorbate 80
	Guselkumab (Tremfya)	Polysorbate 80
	Infliximab - dyyb (Inflectra, Remicade, Renflexis)	Polysorbate 80
	Ustekinumab (Stelara)	Polysorbate 80
Antiviral	Interferon alfa-2b (Intron A)	Polysorbate 80
Biological response modifier	Interferon gamma-1b (Actimmune)	Polysorbate 20
Cancer treatment	Ado-trastuzumab emtansine (Kadcyla)	Polysorbate 20
	Atezolizumab (Tecentriq)	Polysorbate 20
	Avelumab (Bavencio)	Polysorbate 20
	Bevacizumab (Avastin, Zirabev)	Polysorbate 20
	Daratumumab/hyaluronidase (Darzalex Faspro)	Polysorbate 20
	Denosumab (Prolia, Xgeva)	Polysorbate 20
	Dinutuximab (Unituxin)	Polysorbate 20
	Enfortumab (Padcev)	Polysorbate 20
	Olaratumab (Lartruvo)	Polysorbate 20
	Palifermin (Kepivance)	Polysorbate 20
	Pertuzumab/trastuzumab/hyaluronidase (Phesgo)	Polysorbate 20
	Polatuzumab vedotin (Polivy)	Polysorbate 20
	Tafasitamab (Monjuvi)	Polysorbate 20
	Trastuzumab (Herceptin, Herceptin Hylecta, Herzuma, Kanjinti, Ontruzant, Trazimera)	Polysorbate 20
	Belantamab (Blenrep)	Polysorbate 80
	Brentuximab vedotin (Adcetris)	Polysorbate 80
	Cemiplimab (Libtayo)	Polysorbate 80
	Docetaxel (Taxotere)	Polysorbate 80
	Durvalumab (Imfinzi)	Polysorbate 80
	Elotuzumab (Empliciti)	Polysorbate 80
	Etoposide (Toposar, VePesid)	Polysorbate 80
	Fam-trastuzumab deruxtecan (Enhertu)	Polysorbate 80
	Fosaprepitant dimeglumine (EMEND, Fosaprepitant)	Polysorbate 80
	Inotuzumab ozogamicin (Besponsa)	Polysorbate 80
	Ipilimumab (Yervoy)	Polysorbate 80
	Isatuximab (Sarclisa)	Polysorbate 80
	Mogamulizumab (Poteligeo)	Polysorbate 80
	Moxetumomab pasudotox (Lumoxiti)	Polysorbate 80
	Nivolumab (Opdivo)	Polysorbate 80
	Ofatumumab (Arzerra)	Polysorbate 80
	Pembrolizumab (Keytruda)	Polysorbate 80

TABLE IV. (Continued)

Drug class	Generic name (brand name)	Polysorbate
	Ramucirumab (Cyramza)	Polysorbate 80
	Rituximab (Truxima, Rituxan, Ruxience)	Polysorbate 80
	Rituximab and hyaluronidase (Rituxan Hycela)	Polysorbate 80
	Temsirolimus (Torisel)	Polysorbate 80
	Temozolomide (Temodar)	Polysorbate 80
Contraceptive	Medroxyprogesterone acetate (Depo-Provera, Depo-Provera CI, Depo-subQ provera 104)	Polysorbate 80
Corticosteroid	Methylprednisolone acetate (Depo-Medrol)	Polysorbate 80
	Triamcinolone acetonide (Aristocort Forte, Aristospan, Kenalog-40, Kenalog-10, Protherix, Triescence, Triloan Suik, Triloan II Suik, Zilretta)	Polysorbate 80
Diagnostic	Sinacalide (Kinevac)	Polysorbate 20
	Tuberculin purified protein derivative (Aplisol, Tubersol)	Polysorbate 80
Disease-modifying antirheumatic drug	Anakinra (Kineret)	Polysorbate 80
	Tocilizumab (Actemra)	Polysorbate 80
Enzyme	Velaglucerase alfa (Vpriv)	Polysorbate 20
	Imiglucerase (Cerezyme)	Polysorbate 80
	Taliglucerase alfa (Elelyso)	Polysorbate 80
Erythroid maturation agent	Luspatercept (Reblozyl)	Polysorbate 80
Factor Xa inhibitor antidote	Coagulation factor Xa (recombinant), inactivated-zhzo (Andexxa)	Polysorbate 80
Gonadotropin	Follitropin (Menopur, Follistim)	Polysorbate 20
Growth hormone analog	Somatropin (Nutropin AQ Nuspin 5)	Polysorbate 20
Hematopoietic growth factor	Erythropoietin (Retacrit)	Polysorbate 20
	Pegfilgrastim (Fulphila, Neulasta, Nyvepria, Udenyca)	Polysorbate 20
	Romiplostim (Nplate)	Polysorbate 20
	Darbepoetin alfa (Aranesp)	Polysorbate 80
	Filgrastim (Neupogen, Nivestym, Granix, Zarxio)	Polysorbate 80
Hepatitis B/Hepatitis C agent	Peginterferon (Pegasys Pegintron)	Polysorbate 80
Hemostatic	Vitamin K (Phytonadione)	Polysorbate 80
Immune globulin	Hepatitis B immune globulin (HepaGam B, Nabi-HB)	Polysorbate 80
	Rho (d) immune globulin (WinRho)	Polysorbate 80
Immunomodulator	Interferon beta-1a (Avonex, Avonex Pen)	Polysorbate 20
	Emapalumab (Gamifant)	Polysorbate 80
Immunosuppressant	Mycophenolate mofetil (Cellcept IV)	Polysorbate 80
Inflammatory bowel disease agent	Vedolizumab (Entyvio)	Polysorbate 80
Interleukin inhibitor	Sarilumab (Kevzara)	Polysorbate 20
	Dupilumab (Dupixent)	Polysorbate 80
	Mepolizumab (Nucala)	Polysorbate 80
	Secukinumab (Cosentyx)	Polysorbate 80
	Tildrakizumab -asmn (Ilumya)	Polysorbate 80
Kallikrein inhibitor	Lanadelumab (Takhzyro)	Polysorbate 80
Leptin analog	Metreleptin (Myalept)	Polysorbate 20
Macular degeneration agent	Aflibercept (Eylea)	Polysorbate 20
	Ranibizumab (Lucentis)	Polysorbate 20
	Brolucizumab (Beovu)	Polysorbate 80
mAb treatment	Ocrelizumab (Ocrevus)	Polysorbate 20
	Remdesivir (Veklury)	Polysorbate 20
	Romosozumab (Evenity)	Polysorbate 20
	Teprotumumab (Tepezza)	Polysorbate 20
	Atoltivimab/maftivimab/odesivimab-ebgn (Inmazeb)	Polysorbate 80
	Bamlanivimab	Polysorbate 80
	Burosumab (Crysvita)	Polysorbate 80
	Canakinumab (Ilaris)	Polysorbate 80

TABLE IV. (Continued)

Drug class	Generic name (brand name)	Polysorbate
	Casirivimab/Imdevimab	Polysorbate 80
	Eptinezumab (Vyepsti)	Polysorbate 80
	Fremanezumab (Ajoovy)	Polysorbate 80
	Inebilizumab (Uplizna)	Polysorbate 80
	Raxibacumab	Polysorbate 80
Multiple sclerosis treatment	Natalizumab (Tysabri)	Polysorbate 80
Muscle relaxant	Dantrolene sodium (Dantrium, Ryanodex)	Polysorbate 80
P-selectin inhibitor	Crizanlizumab (Adakveo)	Polysorbate 80
Proprotein convertase subtilisin kexin type 9 inhibitor	Alirocumab (Praluent)	Polysorbate 20
	Evolocumab (Repatha)	Polysorbate 80
Rheumatologic	Belimumab (Benlysta)	Polysorbate 80
Thrombolytic	Tenecteplase (Tnkase)	Polysorbate 20
	Alteplase (Cathflo Activase)	Polysorbate 80
	Retepase (Retavase)	Polysorbate 80
Vitamin infusion	Calcitriol (Calcijex, Rocaltrol)	Polysorbate 20
	Doxercalciferol (Hectorol)	Polysorbate 20
	Vitamins A, B1, B2, B6, C, D3, E, K (InfuVite)	Polysorbate 80

Adapted from Banerji A et al. mRNA Vaccine to Prevent COVID-19 Disease and Reported Allergic Reactions: Current Evidence and Suggested Approach. *J Allergy Clin Immunol Pract* 2020; Dec 31:S2213-2198(20)31411-2

Figure 3. Recommendations for Special Conditions and Populations.
Appendix B: Triage of people with a history of allergies or allergic reactions

CONTRAINDICATION TO COVID-19 VACCINATION	PRECAUTION TO COVID-19 VACCINATION	MAY PROCEED WITH COVID-19 VACCINATION
<p>History of the following:</p> <ul style="list-style-type: none"> Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a component of the COVID-19 vaccine† Immediate allergic reaction* of any severity after a previous dose or known (diagnosed) allergy to a component of a COVID-19 vaccine† 	<p>Among people without a contraindication, a history of:</p> <ul style="list-style-type: none"> Any immediate allergic reaction* to other vaccines or injectable therapies‡ <p>Note: people with a contraindication to mRNA COVID-19 vaccines have a precaution to Janssen COVID-19 vaccine, and vice versa. See footnote for additional information on additional measures to take in these people.#</p>	<p>Among people without a contraindication or precaution, a history of:</p> <ul style="list-style-type: none"> Allergy to oral medications (including the oral equivalent of an injectable medication) History of food, pet, insect, venom, environmental, latex, etc., allergies Family history of allergies
<p>Actions:</p> <ul style="list-style-type: none"> Do not vaccinate. Consider referral to allergist-immunologist. Consider other vaccine alternative.†# 	<p>Actions:</p> <ul style="list-style-type: none"> Risk assessment Consider referral to allergist-immunologist 30-minute observation period if vaccinated 	<p>Actions:</p> <ul style="list-style-type: none"> 30-minute observation period: people with history of anaphylaxis (due to any cause) 15-minute observation period: all other people

† See [Appendix C](#) for a list of ingredients. People with a contraindication to one of the mRNA COVID-19 vaccines should not receive doses of either of the mRNA vaccines (Pfizer-BioNTech or Moderna).

* Immediate allergic reaction to a vaccine or medication is defined as any hypersensitivity-related signs or symptoms consistent with urticaria, angioedema, respiratory distress (e.g., wheezing, stridor), or anaphylaxis that occur within four hours following administration.

‡ People with a history of an immediate allergic reaction to a vaccine or injectable therapy that contains multiple components, one or more of which is a component of a COVID-19 vaccine, have a precaution to vaccination with that COVID-19 vaccine, even if it is unknown which component elicited the allergic reaction.

Polyethylene glycol (PEG) is an ingredient in both mRNA COVID-19 vaccines, and polysorbate 80 is an ingredient in Janssen COVID-19 vaccine. PEG and polysorbate are structurally related, and cross-reactive hypersensitivity between these compounds may occur. People with a contraindication to mRNA COVID-19 vaccines (including due to a known allergy to PEG) have a precaution to Janssen COVID-19 vaccine. Among people who received one mRNA COVID-19 dose but for whom the second dose is contraindicated, consideration may be given to vaccination with Janssen COVID-19 vaccine (administered at least 28 days after the mRNA COVID-19 dose). People with a contraindication to Janssen COVID-19 vaccine (including due to a known allergy to polysorbate) have a precaution to mRNA COVID-19 vaccines. For people with these precautions, referral to an allergist-immunologist should be considered. Healthcare professionals and health departments may also request a consultation from the [Clinical Immunization Safety Assessment COVIDvax](#) project. In patients with these precautions, vaccination should only be undertaken in an appropriate setting under the supervision of a healthcare professional experienced in the management of severe allergic reactions.

Adapted from <https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.html>