Centers for Disease Control and Prevention

JYNNEOS Vaccine

Updated August 9, 2022

Interim guidance

CDC recommends that vaccination with JYNNEOS can be considered for people determined to be at high risk for infection to prevent monkeypox disease.

Vaccination Schedule

JYNNEOS vaccine is licensed as a series of two doses administered 28 days (4 weeks) apart.

The **standard regimen** involves a subcutaneous (Subcut) route of administration with an injection volume of 0.5mL. The standard regimen is the FDA-approved dosing regimen. Since August 9, 2022, the standard regimen has been authorized for people aged <18 years under an Emergency Use Authorization.

In the context of the current national Public Health Emergency (PHE), an **alternative regimen** may be used for people age ≥18 years under an Emergency Use Authorization beginning August 9, 2022. The authorized alternative regimen involves an intradermal (ID) route of administration with an injection volume of 0.1mL. This approach could increase the number of available JYNNEOS vaccine doses by up to five-fold. Results from a clinical study showed that the lower intradermal dose was immunologically non-inferior to the standard subcutaneous dose (Frey SE et al, Vaccine, 2015; 33(39):5225-5234).

Table 2. Vaccination Schedule and Dosing Regimens for JYNNEOS Vaccine

JYNNEOS vaccine regimen	Route of administration	Injection volume	Recommended number of doses	Recommended interval between 1st and 2nd dose
Alternative regimen				
People age ≥18 years	ID	0.1 mL	2	28 days
Standard regimen				
People age <18 years	Subcut	0.5 mL	2	28 days
People of any age who have a history of developing keloid scars	Subcut	0.5 mL	2	28 days

Every year, unsafe injection practices by U.S. healthcare providers—like syringe reuse and misuse of medications vials—can cause outbreaks. It is the responsibility of every provider who prepares and administers injections, or supervises those that prepare and administer injections, to make sure that patients receive the correct medication and are not exposed to life

prepare and administer injections, to make sure that patients receive the correct medication and are not exposed to life-threatening infections. Providers should adhere to Standard Precautions and the principles of Safe Injection Practices, including the use of a sterile, single-use, disposable needle and syringe for each injection given, and prevention of contamination of injection equipment and medication.

See the following resources for further information, including on how to safely store, prepare, and administer vaccines:

- ACIP's general best practicesand Epidemiology and Prevention of Vaccine-Preventable Diseases (CDC Pink Book) and
- CDC's Vaccine Administration Tools and
- CDC's One and Only Campaign and FAQs regarding safe injection practices like preparation, administration, and handling of single-dose vials.

For further instructions on use of JYNNEOS monkeypox vaccine, refer the provider agreement for the HHS Monkeypox Vaccination Program.

Duration of Immunity

Peak immunity is expected to be reached 14 days after the second dose of JYNNEOS vaccine. The duration of immunity after two doses of JYNNEOS is unknown.

Dosing Intervals

Recommended interval: The second dose of JYNNEOS vaccine should be given 28 days after the first dose. Based on available clinical study data , the second dose may be given up to 7 days later than the minimum interval of 28 days (i.e., up to 35 days after the first dose).

Minimum interval: The vaccine manufacturer advises against giving the second dose before the minimum interval of 28 days. However, based on ACIP's general best practices, a dose may be administered up to 4 days before the minimum interval of 28 days (known as the "grace period," which would be a minimum of 24 days after the first dose). Vaccine doses should not be administered before the minimum interval. Nevertheless, if the second dose is inadvertently administered before the minimum interval, the dose may not need to be repeated. Please refer to "Table 7. Vaccine Administration Errors and Deviations."

Maximum interval: If the second dose is not administered during the recommended interval, it should be administered as soon as possible based on ACIP's general best practices. There is no need to restart or add doses to the series if there is an extended interval between doses.

Evidence Quality

JYNNEOS is approved for the prevention of monkeypox disease in individuals 18 years of age and older at high risk for monkeypox infection. Licensure was supported by animal studies as well as clinical studies demonstrating a comparable immune response to ACAM2000 (Rao AK et al, MMWR, 2022; 71(22):734-742). No immune correlate of protection (i.e., minimum threshold level of antibodies needed to prevent symptoms) has been established. One peer-reviewed study of 524 randomized subjects found that immunogenicity was non-inferior following the alternative regimen versus the standard regimen (Frey SE et al, Vaccine, 2015; 33(39):5225-5234). This study supported the authorization of the alternative dosing regimen for people 18 years of age and older. The evidence to support the authorized use of JYNNEOS by the subcutaneous route to individuals younger than 18 years of age is based on the data which supported the approved use of JYNNEOS and historical data on the use of smallpox vaccine in the pediatric population. Immunogenicity of JYNNEOS has been studied among people with HIV infection (Overton ET et al, Open Forum Infect Dis, 2015 Apr; 2(2):ofv040). Studies of intradermal administration of influenza vaccines among people with HIV infection suggest similar immunogenicity compared with other routes of administration (Garg S et al, Clin Infect Dis. 2016; 62(3):383-391). No data are currently available on intradermal administration of JYNNEOS for people with severe immunosuppression (Altered Immunocompetence Guidelines for Immunizations from ACIP). The risk for serious adverse events after either the standard regimen or the alternative regimen is expected to be low. Review of previous Vaccine Adverse Event Reporting System (VAERS) reports from influenza vaccine products that were administered intradermally identified no new or unexpected safety concerns, and injection-site reactions were the most commonly reported adverse events. The alternative regimen is likely to be acceptable and feasible. No data are available on cost-effectiveness, values, or health equity. Level of certainty for the evidence for public health benefits is

considered low, but desirable consequences probably outweigh undesirable consequences in most settings. The balance of consequences favors the intervention in the context of a current public health emergency. These interim clinical considerations may change as additional evidence is considered.

Administration

Intradermal (ID)

Intradermal administration involves injecting the vaccine superficially between the epidermis and the hypodermis layers of the skin, typically of the volar aspect (inner side) of the forearm. This should produce a noticeable pale elevation of the skin (wheal). Please refer to related resources, including intradermal administration teaching tools and the Preparation & Administration Summary for the General Population for further details on intradermal vaccine administration.

A person who presents for their second JYNNEOS vaccine dose who is still experiencing erythema or induration at the site of intradermal administration of the first vaccine dose (e.g., the forearm) may have the second dose administered intradermally in the contralateral forearm.

Subcutaneous (Subcut)

Subcutaneous administration involves injecting the vaccine into the fatty tissue, typically over the triceps in people aged 12 months and older, or in the anterolateral thigh for people younger than age 12 months. The manufacturer of JYNNEOS has agreed that it is acceptable to administer this vaccine in the subcutaneous tissue over the triceps area, even though the package insert for JYNNEOS states the site of administration is “deltoid.” CDC offers a short training video about subcutaneous vaccine administration. Please refer to the Preparation & Administration Summary for Special Populations for further details on subcutaneous vaccine administration.

Interchangeability of dosing regimens

When necessary, a person aged 18 years or older who received one JYNNEOS vaccine dose with the standard subcutaneous regimen may receive a second dose with the alternative intradermal regimen at the recommended interval (i.e., 28 days) to complete the vaccination series. For example, a person who received only one dose of the standard regimen before the date of initial Emergency Use Authorization for the alternative regimen (August 9, 2022), may receive one dose with the alternative regimen to complete the series. Also, a person whose 18th birthday occurs between their first and second dose may complete the series with the alternative regimen.

Coadministration of JYNNEOS vaccine with other vaccines

Currently, there are no data on administering JYNNEOS vaccine at the same time as other vaccines. Because JYNNEOS is based on a live, attenuated non-replicating orthopoxvirus, JYNNEOS typically may be administered without regard to timing of other vaccines. This includes simultaneous administration of JYNNEOS and other vaccines on the same day, but at different anatomic sites if possible.

However, there are additional considerations if administering a COVID-19 vaccine. (Interim Clinical Considerations for Use of COVID-19 Vaccines)

- If an orthopoxvirus vaccine is offered for prophylaxis in the setting of an orthopoxvirus (e.g., monkeypox) outbreak, orthopoxvirus vaccination should not be delayed because of recent receipt of a Moderna, Novavax, or Pfizer-BioNTech COVID-19 vaccine; no minimum interval between COVID-19 vaccination with these vaccines and orthopoxvirus vaccination is necessary.
- People, particularly adolescent or young adult males, might consider waiting 4 weeks after orthopoxvirus vaccination (either JYNNEOS or ACAM2000) before receiving a Moderna, Novavax, or Pfizer-BioNTech COVID-19 vaccine, because of the observed risk for myocarditis and/or pericarditis after receipt of ACAM2000 orthopoxvirus vaccine and mRNA (i.e., Moderna and Pfizer-BioNTech) and Novavax COVID-19 vaccines and the unknown risk for myocarditis and/or pericarditis after JYNNEOS.

Best practices for multiple injections include:

Best practices for multiple injections include:

- Label each syringe with the name and the dosage (amount) of the vaccine, lot number, initials of the preparer, and exact beyond-use time, if applicable.
- Administer each injection in a different injection site; separate injection sites by 1 inch or more, if possible.
- Administer the JYNNEOS vaccine and vaccines that may be more likely to cause a local reaction in different limbs, if possible.

Review ACIP's general best practices and Epidemiology and Prevention of Vaccine-Preventable Diseases (CDC Pink Book) for further information.

Patient counseling

Pre-vaccination counseling

Recipients should be informed of the risks and benefits of JYNNEOS prior to vaccination. Healthcare providers should ascertain the medical history of recipients to appropriately determine the route of vaccine administration. Recipients should be counseled about possible side effects from vaccination including injection site pain, redness, swelling, induration, itching, fatigue, headache, nausea, chills, and muscle aches, and be provided with a JYNNEOS vaccine information statement (VIS) or FDA JYNNEOS EUA Fact Sheet, as applicable. There have been reports of prolonged duration of induration or erythema following intradermal administration. Side effects are usually self-limiting.

Post-vaccination counseling

Given the unknown effectiveness of vaccination in this outbreak, people who are vaccinated should continue to take steps to protect themselves from infection by avoiding close, skin-to-skin contact, including intimate contact, with someone who has monkeypox.

Clinical studies have not detected an increased risk for myopericarditis in recipients of JYNNEOS. However, people with underlying heart disease or three or more major cardiac risk factors should be counseled about the theoretical risk for myopericarditis following vaccination with JYNNEOS given the uncertain etiology of myopericarditis associated with replication-competent smallpox vaccines such as ACAM2000.

Safety

Contraindications and precautions

People presenting with minor illnesses, such as a cold, may be vaccinated. People who are moderately or severely ill should usually wait until they have recovered to their baseline state of health before vaccination. A person offered JYNNEOS vaccine due to an exposure to monkeypox virus or disease should be vaccinated regardless of concurrent illnesses, pregnancy, breastfeeding, or weakened immune system.

Vaccine providers, particularly when vaccinating adolescents, should consider observing patients (with patients seated or lying down) for 15 minutes after vaccination to decrease the risk for injury should they faint. If syncope develops, patients should be observed until the symptoms resolve.

CDC considers vaccination with JYNNEOS to be either contraindicated (not recommended) or a precaution in the following situations.

Medical condition or history	Interim guidance	Suggested action(s)
History of a severe allergic reaction (e.g., anaphylaxis) after a previous dose of JYNNEOS	Contraindication	Do not vaccinate. Referral to an allergist-immunologist should be considered to assess the risks versus benefits of administering a dose.

History of severe allergic reaction (e.g., anaphylaxis) following gentamicin or ciprofloxacin[1]	Precaution	Discuss risks and benefits with potential recipients. They may be vaccinated with a 30-minute observation period. Alternatively, vaccination can be delayed until an allergist-immunologist is consulted, but the impact of delaying vaccination should be considered.
History of severe allergic reaction (e.g., anaphylaxis) to chicken or egg protein **AND** are currently avoiding exposure to all chicken or egg products[1]	Precaution	Discuss risks and benefits with potential recipients. They may be vaccinated with a 30-minute observation period. Alternatively, vaccination can be delayed until an allergist-immunologist is consulted, but the impact of delaying vaccination should be considered.
Moderate or severe acute illness, with or without fever	Precaution	Consider deferring vaccination until the acute illness has improved.

[1] JYNNEOS vaccine contains small amounts of gentamicin and ciprofloxacin and is produced using chicken embryo fibroblast cells.

Vaccine providers should be familiar with identifying immediate-type allergic reactions, including anaphylaxis, and be competent in treating these events at the time of vaccine administration. Providers should also have a plan in place to contact emergency medical services immediately in the event of a severe acute vaccine reaction. (ACIP Adverse Reactions Guidelines for Immunization)

CDC's Clinical Immunization Safety Assessment (CISA) Project are available to provide consultation to U.S. healthcare providers and health departments about complex monkeypox vaccine safety questions for their patients. (Clinical Immunization Safety Assessment (CISA) Project).

Reporting of adverse events

Vaccination providers who are administering JYNNEOS under the EUA are **required** to report the following adverse events that occur after JYNNEOS vaccination:

- Vaccine administration errors whether or not associated with an adverse event
- Serious adverse events (irrespective of attribution to vaccination)
- Cases of cardiac events including myocarditis and pericarditis
- Cases of thromboembolic events and neurovascular events

Information on how to submit a report to VAERS is available at https://vaers.hhs.gov or by calling 1-800-822-7967.

Table of Contents

- Interim Guidance
- ACAM2000
- Special Populations
- Errors and Deviations

Related Resources

- JYNNEOS Package Insert
- JYNNEOS Vaccine Information Statement (VIS) [151 KB, 2 pages]
- JYNNEOS Storage and Handling Summary [1.1 MB, 2 pages]
- ACAM 2000 Medication Guide
- Vaccination Operational Planning Guide
- FDA EUA Fact Sheet for Providers [900 KB, 16 pages]
- FDA EUA Fact Sheet for Patients and Caregivers [465 KB, 5 pages]

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