JYNNEOS™ (Live – Non Replicating)

Vaccination Schedule and Dosing Regimens for JYNNEOS Vaccine[5, 7]

Specific Population	Route of administration§	Injection volume	Recommended number of doses	Recommended interval between 1st and 2nd dose	Interval between last primary (including additional) to booster dose
• People age older than 18 years • People with prior history of smallpox vaccination[2] • People who are pregnant[3] or breastfeeding[4] • People with three or more major cardiac risk factors[5] • People with atopic dermatitis, eczema, or other exfoliative skin conditions[6]	Intradermal (ID)	0.1 mL	2	28 days	2 or 10 years if a person remains at continued risk for exposure***
• People age **younger** than 18 years • People of **any age** who have a history of developing keloid scars	Subcutaneous [1] (SQ)	0.5 mL	2	28 days	
• A person who is diagnosed with MPOX after their first dose of JYNNEOS[7] • A person who would be eligible for vaccination but has been diagnosed with MPOX during this outbreak, which started in the United States on May 17, 2022[7]	NOT recommended to receive the vaccination at this time, because MPOX infection likely confers additional immune protection.				
• An immunocompromised person who is diagnosed with MPOX after their first dose of JYNNEOS[7]	May be eligible to receive the second dose of JYNNEOS on a case-by-case shared decision-making basis based on the clinical judgment of the healthcare provider				

***Continued risk refers to persistent risk due to occupational work performed. Designated public health and healthcare worker response teams approved by public health authorities are not at "continued risk" because they are vaccinated for the purposes of preparedness.

[1] If a patient has any medical condition or age indication requiring subcutaneous administration, JYNNEOS can be administered subcutaneously using the standard regimen (rather than intradermally using the alternative regimen).

[2] Previous smallpox vaccination probably does provide some protection, but it may not necessarily be lifelong. During the 2003 Monkeypox outbreak and during the current outbreak, several people who were infected with Monkeypox had previously been vaccinated against smallpox

decades prior. In response to the current outbreak, vaccines and other medical measures should be given to eligible people who were previously vaccinated against smallpox.

[3] While there are no data for people who are pregnant, animal data do not show evidence of reproductive harm; pregnancy is not a contraindication to receiving JYNNEOS.

[4] While there are no data for people who are breastfeeding, animal data do not show evidence of reproductive harm; breastfeeding is not a contraindication to receiving JYNNEOS. It is not known whether JYNNEOS is excreted in human milk. Data are not available to assess the impact of JYNNEOS on milk production or the safety of JYNNEOS in breastfed infants. However, because JYNNEOS vaccine is replication-deficient, it likely does not present a risk of transmission to breastfed infants and can be administered to women who are breastfeeding if vaccination is critical.

[5] Presence of three or more of these major cardiac risk factors is a contraindication to vaccination with ACAM2000: hypertension, diabetes, hypercholesterolemia, heart disease at age ≤50 years in a first-degree relative, or smoking. Clinical studies have not detected an increased risk for myopericarditis in recipients of JYNNEOS. However, people with underlying heart disease (e.g., previous myocardial infarction, angina, congestive heart failure, cardiomyopathy, stroke or transient ischemic attack, or other heart conditions) 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.

[6] Studies evaluating JYNNEOS in people with atopic dermatitis have demonstrated immunogenicity in eliciting a neutralizing antibody response. No concerning safety signals were revealed.

[7] In the context of the current MPOX outbreak, and while the supply of JYNNEOS vaccine is limited, these populations are exceptions to the recommended two-dose series:

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[§] Providers should have both SQ and ID vaccines options available. Although the CDC states that the ID route is preferred for persons 18 and older without a history of keloids, JYNNEOS vaccine may be SQ using the standard regimen. Persons unable or unwilling to receive the vaccine ID should receive the vaccine SQ. Additionally, dosing regimens are interchangeable when necessary. For example, persons who may have received a first dose ID, had a robust local reaction, and now refuse the second dose unless given SQ, may receive a second dose SQ.

Vaccine Recommendations[13]

JYNNEOS™ vaccine is indicated for the prevention of smallpox and MPOX disease in ***children and adults*** determined to be high risk for smallpox or MPOX infection[2].

JYNNEOS™ is an attenuated, live, non-replicating smallpox and MPOX vaccine that elicits humoral and cellular immune responses to orthopoxviruses. Vaccinia neutralizing antibody responses in humans were evaluated to establish the effectiveness of JYNNEOS™ for prevention of smallpox and MPOX[2].

Pre – Exposure Prophylaxis (PREP)[9]

Centers for Disease Control and Prevention (CDC) recommends vaccination for select persons at risk for occupational exposure to orthopoxviruses with 2 doses of JYNNEOS administered at least 4 weeks (28 days) apart, OR 1 dose for persons who previously received a smallpox vaccination. People with minor illnesses, such as a cold, may be vaccinated.

Recommendations for JYNNEOS™ Primary Series[2]

- Laboratory personnel*, clinical laboratory personnel performing diagnostic testing for orthopoxviruses, and for designated response team members at risk for occupational exposure to orthopoxviruses.
- Healthcare personnel** who administer ACAM2000 or care for patients infected with replication competent orthopoxviruses (based on shared clinical decision-making).
- Public health authorities, at their own discretion, may approve a cohort of healthcare and/or public health personnel to receive primary vaccination against orthopoxviruses for preparedness purposes (e.g., first responders who might participate in a smallpox or MPOX outbreak or those caring for patients enrolled in clinical trials for replication- competent orthopoxvirus vaccines and those caring for persons with suspected or confirmed orthopoxvirus infections (e.g., clinicians and environmental services personnel).

Recommendations for JYNNEOS™ Booster Doses[14]

- Persons who are at continued risk*** for occupational exposure to more virulent orthopoxviruses like variola virus or MPOX virus should receive a booster dose of JYNNEOS every 2 years after the primary JYNNEOS series.
- Persons who are at continued risk*** for occupational exposure to replication competent orthopoxviruses like vaccinia virus or cowpox virus should receive booster doses of JYNNEOS at least every 10 years after the primary JYNNEOS series.
- Persons who are at continued risk*** for occupational exposure to orthopoxviruses, and who received an ACAM2000 primary vaccination, should receive a booster dose of JYNNEOS when their next booster dose is due as an alternative to a booster dose of ACAM2000. JYNNEOS™ is usually administered as a series of 2 injections, 4 weeks apart. People who have received smallpox vaccine in the past might only need 1 dose. Administer subsequent JYNNEOS booster doses every 2 or 10 years depending on the orthopoxvirus.

JYNNEOS™ Vaccination Not Recommended[14]

- Clinical laboratory personnel who perform routine chemistry, hematology, and urinalysis testing, including for suspected or confirmed patients with orthopoxvirus infections, are not included in this recommendation as their risk for exposure is very low.

*Research laboratory personnel are those who directly handle cultures or animals contaminated or infected with replication-competent vaccinia Virus, recombinant vaccinia viruses derived from replication-competent vaccinia strains (i.e., those that are capable of causing clinical infection and produce infectious virus in humans), or other orthopoxviruses that infect humans (e.g., MPOX, cowpox, and variola).

**Healthcare personnel (HCP) refers to all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials, including body substances (e.g., blood, tissue, and specific body fluids); contaminated medical supplies devices, and equipment; contaminated environmental surfaces; or contaminated air. These HCP include, but are not limited to, emergency medical service personnel, nurses, nursing assistants, physicians, technicians, clinical laboratory personnel, autopsy personnel, therapists, phlebotomists, pharmacists, students and trainees, contractual staff not employed by the healthcare facility, and persons not directly involved in patient care, but who could be exposed to infectious agents that can be transmitted in the healthcare setting (e.g., clerical, dietary, environmental services, laundry, security, engineering and facilities management, administrative, billing, and volunteer personnel). *Adapted from https://www.cdc.gov/infectioncontrol/guidelines/healthcare-personnel/index.html*

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Post – Exposure Prophylaxis (PEP)[9]

CDC recommends administering JYNNEOS vaccine ***within 4 days from the date of exposure*** to prevent onset of the disease. Administer 2 doses at least 4 weeks (28 days) apart. Persons who previously received a smallpox vaccination should receive 2 doses. If given between 4–14 days after the date of exposure, vaccination may reduce the symptoms of disease, but may not prevent the disease. **Vaccinate persons recommended to receive JYNNEOS™ due to an exposure to MPOX virus regardless of concurrent illnesses, pregnancy, breastfeeding, or weakened immune system.**

Degree of Exposure[3]	Recommendations		Exposure Characteristics
	Monitoring	PEP	
High	Monitoring§	Recommended	• Unprotected contact between a person's skin or mucous membranes and the skin, lesions, or bodily fluids from a patient (e.g., any sexual contact, inadvertent splashes of patient saliva to the eyes or oral cavity of a person, ungloved contact with patient), or contaminated materials (e.g., linens, clothing) -OR • Being inside the patient's room or within 6 feet of a patient during any procedures that may create aerosols from oral secretions, skin lesions, or resuspension of dried exudates (e.g., shaking of soiled linens), without wearing an N95 or equivalent respirator (or higher) and eye protection -OR • Exposure that, at the discretion of public health authorities, was recategorized to this risk level (i.e., exposure that ordinarily would be considered a lower risk exposure, raised to this risk level because of unique circumstances)
Intermediate	Monitoring§	Informed clinical decision making recommended on an individual basis to determine whether benefits of PEP outweigh risks	• Being within 6 feet for 3 hours or more of an unmasked patient without wearing, at a minimum, a surgical mask -OR • Activities resulting in contact between sleeves and other parts of an individual's clothing and the patient's skin lesions or bodily fluids, or their soiled linens or dressings (e.g., turning, bathing, or assisting with transfer) while wearing gloves but not wearing a gown -OR • Exposure that, at the discretion of public health authorities, was recategorized to this risk level because of unique circumstances (e.g., if the potential for an aerosol exposure is uncertain, public health authorities may choose to decrease risk level from high to intermediate)
Low / Uncertain	Monitoring§	None	• Entered the patient room without wearing eye protection on one or more occasions, regardless of duration of exposure -OR • During all entries in the patient care area or room (except for during any procedures listed above in the high-risk category), wore gown, gloves, eye protection, and at minimum, a surgical mask -OR • Being within 6 feet of an unmasked patient for less than 3 hours without wearing at minimum, a surgical mask -OR • Exposure that, at the discretion of public health authorities, was recategorized to this risk level based on unique circumstances (e.g., uncertainty about whether MPOX virus was present on a surface and/or whether a person touched that surface) • Exposure that public health authorities deemed did not meet criteria for other risk categories

§ Monitoring includes ascertainment of selected signs and symptoms of MPOX: fever (≥100.4°F [≥38°C]), chills, new lymphadenopathy (periauricular, axillary, cervical, inguinal), and new skin rash through 21 days after the exposure to the patient or the patient's materials. Monitoring could involve in-person visits, regular communications (e.g., phone call or another system) between public health representatives and the person under monitoring, self-monitoring by persons and reporting of symptoms to health departments only if symptoms appear, or another reliable system determined by the health department. Persons should be advised to self-isolate if any symptoms develop. Persons who report only chills or lymphadenopathy should remain at their residence, self-isolate for 24 hours, and monitor their temperature for fever; if fever or rash do not develop and chills or lymphadenopathy persist, the person should be evaluated by a clinician for the potential cause. Clinicians can consult with the state health department if MPOX is suspected. If a fever or rash develops, CDC should immediately be consulted.

LAC+DPH Expanded PEP Recommendations[9, 11]

Eligibility Criteria

Anyone who requests vaccination can receive it without having to disclose information on personal risk. (Effective 12/22/22)

A. The following groups remain at risk for MPOX and are encouraged to get vaccinated to protect against MPOX infection and severe disease:

- Any man or transgender person who has sex with men or other transgender persons
- Persons of any gender or sexual orientation who engage in commercial and/or transactional sex (e.g., sex in exchange for money, shelter, food, or other goods or needs) or have sex in association with a large public event
- Persons living with HIV, especially persons with uncontrolled or advanced HIV disease
- Persons who had skin-to-skin or intimate contact with someone with suspected or confirmed MPOX, including those who have not yet been confirmed by Public Health
- Sexual partners of people in any of the above groups
- People who anticipate being in any of the above groups

B. Through direct outreach by DPH for select high-risk groups:

- People who have had high- or intermediate-risk contact with someone with MPOX (as defined by CDC and confirmed by Public Health).

C. Persons in select occupational groups who self-attest that their jobs may expose them to orthopoxviruses including:

- Research laboratory personnel working with orthopoxviruses.
- Clinical laboratory personnel performing diagnostic testing for orthopoxviruses.
- Designated public health response team members.
- Health care personnel who administer ACAM2000 (Smallpox [Vaccinia] Vaccine).
- Designated health care workers who care for persons with suspected or confirmed orthopoxvirus infections, including clinicians and environmental services personnel.

Note: The risk of MPOX transmission remains very low for health care workers if appropriate personal protective equipment is worn and other infection control practices are followed.

For Patients Under 18 years old

The Food and Drug Administration has issued an Emergency Use Authorization and the Centers for Disease Control has released interim clinical guidance including continued use of subcutaneous dosing (0.5ml given 28 days apart) for eligible pediatric populations. Please see the interim clinical guidance for pediatric use of JYNNEOS or contact Department of Public Health (MPOXvaccine@ph.lacounty.gov).

Consent for Minors:

- Minors between the ages of 12-17 may **consent** to receiving the vaccine at DPH vaccination sites (e.g., DPH Centers and DPH Points of Dispensing). Please refer to the **DPH justification** for more information. Minors younger than 18 y/o that plan to receive the vaccine at a non-DPH site, should contact the vaccine provider to learn about their requirements for parental consent.
- A parent, legal guardian, or a responsible adult **must** accompany children under the age of 12. If the child is accompanied by a responsible adult, the CDPH MPX Vaccination Registration/Consent Form must name the responsible person and be signed by the parent or legal guardian.

Contraindications and Precautions[5]

Medical History/ Condition	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 MPOX vaccine safety questions for their patients. (Clinical Immunization Safety Assessment (CISA) Project).

Co-administration with other vaccines and mRNA COVID-19 Vaccine[4,5]

If a JYNNEOS vaccine is recommended for prophylaxis in the setting of an outbreak, do NOT delay administration because of recent receipt of an mRNA COVID-19 vaccine, concurrent illnesses, pregnancy, breastfeeding, or weakened immune system.

- There is no minimum interval between mRNA COVID-19 and JYNNEOS vaccines.

Males 40 years and older and 11 years and younger, and females of any age

- Offer COVID-19 vaccination with JYNNEOS vaccine. Rationale: Females of all ages and males who are 40 years of age and older, as well as those under 12, have a very low risk of myocarditis associated with COVID-19 vaccines. The benefit of COVID-19 vaccination outweighs the theoretical risk of myocarditis with co-administration of COVID-19 and JYNNEOS vaccine.

Males 12-39 years of age

- Counsel regarding theoretical risk of increased myocarditis with co-administration of these 2 vaccine products. If they agree, both JYNNEOS and COVID-19 vaccinations should be offered.
- http://publichealth.lacounty.gov/acd/monkeypox/Vacc ine/

Storage and Handling[1,6,12]

Temperature When Received	Storage Temperature	Use by	Comments
Frozen (-20°C)	-25°C to -15°C (-13°F to 5°F)	Expiration date on carton	1. Expiration date is not on the vial 2. **Once thawed, DO NOT refreeze** * Please note that this Beyond Use Date (BUD) guidance differs from the package insert guidance, which states that the vaccine may be kept at 2°C to 8°C (36°F to 46°F) for 12 hours (Section 2.2 Preparation and Administration and 16.2 Storage Conditions).
Refrigerated	2°C to 8° C (36°F to 46°F)	**8 weeks*** Label carton w/Beyond Use Date (BUD)	
	After first puncture 2°C to 8°C (36°F to 46°F)	**8 hours**	

Preparation and Administration[1,5, 8, 12, 13]

The JYNNEOS vaccine contains a frozen suspension that does NOT contain a preservative and requires thawing prior to administration if vaccine is received frozen.

1. If frozen, remove the required number of vial(s) from storage and thaw before use.

Thaw at Room Temperature between 17° to 23°C (65° to 71°F)	
-50°C to room temperature: 10 minutes to thaw	-20°C to room temperature: 10 minutes to thaw

2. Check the expiration date on the carton.
3. When thawed, JYNNEOS is a milky, light yellow to pale white colored suspension.
4. Confirm there are no other particulates and that no discoloration is observed.
5. Do NOT administer if vaccine is discolored or contains other particulate matter.
6. Swirl the vial gently for at least **30 seconds** before use.
7. Do NOT dilute the vaccine.
8. DO NOT combine residual vaccine from multiple vials to obtain a dose.
9. **For SQ Injections:** Use a 23–25 gauge, 5/8-inch needle to withdraw **0.5 mL** of vaccine into a sterile syringe.
   - Administer in the fatty tissue overlying the anterolateral thigh muscle (<1 year of age) or fatty tissue over triceps (>1 year of age).
10. **For ID Injections:** Use a 26-27 gauge, ¼ to ½ inch tuberculin syringe or low dead volume syringe and/or needles to withdraw **0.1 mL** of vaccine into a sterile syringe. *If standard syringes and needles are used, there may not be sufficient volume to extract 5 doses from a single vial.*
    - Administer vaccine ID in the inner or volar surface of the forearm, upper back below the scapula or at the deltoid.
11. Please review MPOX: Vaccine Administration Errors and Deviations

References:

1. Bavarian Nordic, AG (2022). Written communication dated 8/1/22, from Bernard Hoet, VP, Medical Affairs. Direct inquiries to Bavarian Nordic Medical Information via telephone at 1-844-4BAVARIAN from 8:00AM-4:30PM CST Monday to Friday or via email at medical.information_us@bavarian-nordic.com.

2. CDC (2019). MPOX and Smallpox Vaccine Guidance. Accessed 5/26/22. https://www.cdc.gov/poxvirus/MPOX/clinicians/smallpox-vaccine.html

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6. CDC (2022). JYNNEOS Smallpox and MPOX Vaccine. Accessed 8/15/22 https://www.cdc.gov/poxvirus/MPOX/pdf/Storage-and-Handling-Summary.pdf

7. CDC (2022). MPOX: Vaccination Administration Considerations for Specific Populations Vaccination Administration Considerations for Specific Populations. Accessed 8/12/22 https://www.cdc.gov/poxvirus/MPOX/interim-considerations/special-populations.html

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9. CDC (2022). MPOX Vaccination Strategies. Accessed 8/12/22. https://www.cdc.gov/poxvirus/MPOX/interim-considerations/overview.html

10. CDC (2022). What Clinicians Need to Know About MPOX in the United States and Other Countries. Retrieved on 5/26/22 from https://emergency.cdc.gov/coca/calls/2022/callinfo_052422.asp

11. DPH MPOX Home (2022). Accessed 8/24/22 http://publichealth.lacounty.gov/acd/MPOX/Vaccine/#current-groups-eligible-for-vaccination

12. Food and Drug Administration (FDA) (2022). FACT SHEET FOR HEALTHCARE PROVIDERS ADMINISTERING VACCINE: EMERGENCY USE AUTHORIZATION OF JYNNEOS (SMALLPOX AND MPOX VACCINE, LIVE, NON-REPLICATING) FOR PREVENTION OF MPOX DISEASE IN INDIVIDUALS DETERMINED TO BE AT HIGH RISK FOR MPOX INFECTION. Accessed 8/17/22 https://www.fda.gov/media/160774/download

13. Food and Drug Administration (2022). JYNNEOS Package Insert. Retrieved on 5/26/2022 from https://www.fda.gov/media/131078/download

14. Rao AK, Petersen BW, Whitehill F, et al. Use of JYNNEOS (Smallpox and MPOX Vaccine, Live, Nonreplicating) for Preexposure Vaccination of Persons at Risk for Occupational Exposure to Orthopoxviruses: Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. MMWR Morb Mortal Wkly Rep 2022;71:734–742. Accessed 5/27/22 DOI: http://dx.doi.org/10.15585/mmwr.mm7122e1external icon https://www.cdc.gov/mmwr/volumes/71/wr/mm7122e1.htm#T3_down