Centers for Disease Control and Prevention

ACAM2000 Vaccine

Updated August 9, 2022

Interim guidance

ACAM2000 is licensed by the U.S. Food and Drug Administration for immunization against smallpox disease for people determined to be at high risk for smallpox infection. It has been made available for the prevention of monkeypox disease under an Expanded Access Investigational New Drug application (EA-IND).

CDC recommends that vaccination with ACAM2000 can be considered for people aged 1 year and older who have been determined to be at high risk for infection to prevent monkeypox disease.

Vaccination Schedule

ACAM2000 vaccine is licensed as a single dose.

Adverse events following ACAM2000, including myopericarditis/pericarditis or vaccinia virus transmission to household contacts, can be serious. ACAM2000 will be made available for individuals who decide in consultation with their healthcare provider that the potential benefits of vaccination outweigh potential risks from ACAM2000 adverse events.

Table 4. Vaccination Schedule for ACAM2000 Vaccine

ACAM2000 regimen	Route of administration	Injection Volume	Recommended number of doses
People age ≥1 years	Percutaneous, delivered using a bifurcated needle	0.0025 mL droplet of reconstituted vaccine	1 (single dose)

Duration of Immunity

Peak immunity is expected to be reached 4 weeks after the dose of ACAM2000 is administered. The duration of immunity is unknown; however, longstanding ACIP guidance includes a recommendation for revaccination of laboratory and health care workers designated to be at risk for ongoing occupational exposure to monkeypox viruses and replication-competent vaccinia viruses with a booster dose every 3 years or at least every 10 years, respectively. (Petersen et al, MMWR 2016; 65(10):257-62).

Evidence Quality

Effectiveness of ACAM2000 against monkeypox is unknown, but it is suggested by at least one study reporting that its precursor, the first-generation smallpox vaccine Dryvax, was 85% effective against zoonotic monkeypox among 338 patients in the Democratic Republic of the Congo (then known as Zaire) (Jezek Z et al, Bulletin of the World Health Organization, 1988; 66(4):465-70 [913 KB, 6 pages]). Evidence for immunogenicity is moderate (Petersen et al, MMWR 2016; 65(10):257-62). No immune correlate of protection (i.e., minimum threshold level of antibodies needed to prevent symptoms) has been established, and clinical efficacy of ACAM2000 against monkeypox is unknown. Safety and effectiveness of ACAM2000 in preventing smallpox or monkeypox disease have not been established in people under age 16 years. No data are available on acceptability, cost-effectiveness, feasibility, values or health equity. Regarding prevention of monkeypox disease, the level of certainty for the evidence for public health benefits is low, and desirable consequences may or may not outweigh undesirable consequences. The balance of consequences is closely balanced or uncertain, but favors the intervention in the context of the current public health emergency. These interim clinical considerations may change as additional evidence is considered.

Administration

Percutaneous

ACAM2000 is administered via a two-pronged (bifurcated) needle to prick the skin several times with a droplet of vaccine. ACAM2000 should not be injected by the intradermal, subcutaneous, intramuscular, or intravenous route (ACAM2000 package insert [873 KB, 11 pages]). Following a successful inoculation, virus will grow at the injection site, causing a localized infection (known as a “take”) to develop at the site of the vaccination. The lesion at the vaccination site normally develops from a red, itchy sore spot into a blister, which then dries to a scab that dries up and falls off, leaving a scar. This process can last several weeks. Providers should be properly trained on administration of ACAM2000 using a bifurcated needle and should follow up with the patient to assess the vaccination site for a vaccination “take.” Any licensed provider can administer ACAM2000; training is available online through a CDC training video.

Coadministration of ACAM2000 vaccine with other vaccines

If possible, consider delaying other vaccines when administering ACAM2000, due to the reactogenicity profile of ACAM2000. When deciding whether to co-administer other vaccine(s) with ACAM2000, the reactogenicity of ACAM2000 must be considered in balancing the benefits and risks of multiple vaccine doses administered at the same time. To prevent potential confusion around vaccine-associated rash, ACAM2000 and live injectable vaccines should not be administered on the same day. Live vaccines and ACAM2000 should be separated by at least 28 days. Health-care workers scheduled to receive an annual purified protein derivative (PPD) skin test for tuberculosis screening should not receive the skin test until >1 month after ACAM2000 vaccination.

However, there are additional considerations if administering a COVID-19 vaccine. More information available at 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 (with 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

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 ACAM2000 vaccine and vaccines that may be more likely to cause a local reaction in different limbs, if possible.

More information available at ACIP's general best practices and Epidemiology and Prevention of Vaccine-Preventable Diseases (CDC Pink Book).

Patient counseling

Pre-vaccination counseling

Potential recipients should be informed of the risks and benefits of ACAM2000 prior to vaccination and given a copy of the FDA ACAM2000 Vaccine Medication Guide. Healthcare providers should ascertain the medical history of potential recipients to appropriately identify any contraindications to ACAM2000 vaccination. People who are eligible for and offered ACAM2000 also should be offered testing for pregnancy and HIV prior to vaccination. Recipients should also be counseled on potential side effects and sign an informed consent. Recipients should be counseled about possible side effects from vaccination including inoculation site signs and symptoms, lymphadenitis, and constitutional symptoms, such as malaise, fatigue, fever, myalgia, and headache. Self-limited skin rashes that are not associated with vaccinia virus replication in skin, including urticaria and folliculitis, may occur following vaccination.

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.

ACAM2000 recipients should take precautions to prevent the spread of vaccinia virus to others until the injection site lesion has completely healed (i.e., scab has fallen off to form a scar). This process can last several weeks. To avoid inadvertent inoculation with live vaccinia virus to the eyes or other anatomic sites (autoinoculation) or to other people, recipients should be advised to keep the vaccination site covered. Recipients should avoid contact (including direct skin-to-skin contact, sharing of blankets and towels, and swimming) with others who might be at risk for serious adverse events from vaccinia virus, such as people with weakened immune systems, with a history of eczema, children younger than age 12 months, or people who are pregnant.

Safety

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.

Contraindications and precautions

CDC considers the following situations to be either contraindications (not recommended) or precautions to vaccination with ACAM2000.

Table 5. Contraindications[1] for Use of ACAM2000 Vaccine

Medical condition or history	Interim Guidance	Suggested action(s)
History of a severe allergic reaction (e.g., anaphylaxis) after a previous dose of ACAM2000	Contraindication	Do not administer. Referral to an allergist-immunologist should be considered to assess the risks versus benefits of administering a dose.
History of a severe allergic reaction (e.g., anaphylaxis) to a component of ACAM2000	Contraindication	Do not administer. Referral to an allergist-immunologist should be considered to assess the risks versus benefits of administering a dose.

Three or more major cardiac risk factors (hypertension, diabetes, hypercholesterolemia, heart disease at age ≤50 years in a first-degree relative, or smoking)	Contraindication	Do not administer.
Eye disease treated with topical steroids	Contraindication	Do not administer.
Congenital or acquired immune deficiency disorders, including those taking immunosuppressive medications and people living with HIV (regardless of immune status)	Contraindication	Do not administer.
Atopic dermatitis/eczema and people with a history of atopic dermatitis/eczema or other acute or exfoliative skin conditions	Contraindication	Do not administer.
Infants age <12 months	Contraindication	Do not administer.
Pregnancy	Contraindication	Do not administer.
Children and adolescents ages 1 through 16 years	Precaution	Assess risks versus benefits of administering a dose; safety and effectiveness of ACAM2000 have not been established in people under age 16 years.
Moderate or severe acute illness, with or without fever	Precaution	Consider deferring vaccination until the acute illness has improved.

[1]There would be no absolute contraindication to vaccination with ACAM2000 in a smallpox post-event scenario.

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 experts 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

Vaccine providers should report adverse events following ACAM2000 administration as required under the provider agreement for the HHS Monkeypox Vaccination Program using the procedure outlined in the EA-IND. In addition, vaccination errors with or without adverse events, and clinically significant or unexpected adverse events (including Serious Adverse Events) should be reported to VAERS, even if it is uncertain whether the vaccine caused the event.
Information on how to submit a report to VAERS is available at https://vaers.hhs.gov or by calling 1-800-822-7967.

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JYNNEOS Vaccine Information Statement (VIS) [151 KB, 2 pages]

FDA EUA Fact Sheet for Providers [900 KB, 16 pages]

JYNNEOS Storage and Handling Summary [1.1 MB, 2 pages]

FDA EUA Fact Sheet for Patients and Caregivers [465 KB, 5 pages]

ACAM 2000 Medication Guide

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