What Clinicians Need to Know About Monkeypox in the United States and Other Countries

Clinician Outreach and Communication Activity (COCA) Call

Thursday, May 24, 2022

Continuing Education

- Continuing education is not offered for this webinar.

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  - Submit your question

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- If you are a member of the media, please direct your questions to CDC Media Relations at 404-639-3286 or email media@cdc.gov

Today's Presenters

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Situational update

- **>200 confirmed cases of monkeypox worldwide**
  - Non-Endemic countries with cases: Europe, North America, and Australia
  - Most (but not all) cases among men who identify as: gay, bisexual, or men who have sex with men

- **CDC working with partners in U.S. states and several countries**
- **As of this morning**
  - 8* confirmed orthopoxvirus (OPX) cases
  - Of these, 1 is confirmed monkeypox (Massachusetts)

*This is the number as of this morning. This number is changing rapidly

Confirmed orthopox (OPX) vs. confirmed monkeypox

- **2-step process for testing specimens**
  - 1st: State labs that are part of the Laboratory Response Network* can perform OPX generic test; this confirms presence of OPX DNA from rash lesions → Positive = confirmed orthopox case
  - 2nd: Confirmatory testing by real time PCR (only available at CDC) → Confirmed monkeypox case

- **For this event, we are treating all confirmed orthopox cases as if they are monkeypox until proven otherwise**

Signs and symptoms

- **Historically: characteristic rash preceded by prodromal symptoms (e.g., fever, lymphadenopathy, flu-like symptoms)**
- **Current cases: atypical features**
  - Rash still characteristic; but often starting in genital and perianal areas
  - Rash sometimes not disseminating to other parts of body
  - Being recognized at outpatient clinics because easily confused with sexually transmitted infections
  - Prodromal symptoms mild or not occurring

- **Reasons for unusual presentation unknown at this time**
- **Patient infectious once symptoms begin (whether prodromal or rash symptoms) until lesions scab and scabs fall off**

Incidence

- **Monkeypox is endemic in several African countries**
- **From 2018 to May 2022, 9 imported cases of monkeypox to non-endemic countries**
  - United States (2)
  - United Kingdom (5)
  - Israel (1)
  - Singapore (1)

- **No flight contacts developed infection**
- **One healthcare worker developed monkeypox (UK) and 2 family members acquired monkeypox (UK)**

Transmission

- **Direct or indirect contact with body fluids or lesion materials**
- **Contact with fomites**
- **Exposure to respiratory secretions**
- **Examples of high and intermediate risk exposures**
  - Shared towels and bedding (infectious body fluids and scabs may be present)
  - Skin-to-skin contact with a patient who has monkeypox
  - 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, without wearing an N95 or equivalent respirator (or higher) and eye protection
- **Good news: Not easily transmitted**

What clinicians need to know: Diagnosis

- **CDC issued health advisory on 5/20**
- **Advice for clinicians**
  - Be vigilant to possibility of monkeypox if characteristic rash present*
  - Know that illness is presenting atypically
  - Clinicians working in outpatient clinics may be first to suspect monkeypox
    - Many patients have mild symptoms
    - Easy to confuse with sexually transmitted infection OR varicella zoster virus
  - Obtain sexual and travel history; determine if any contacts have/had a similar rash
- **Obtain specimens** †
- **Notify health department**
  - Consider initiating contact tracing and monitoring §
  - Facilitate laboratory testing

*https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html
† https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html
§ https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html

What clinicians need to know: Treatment and prevention

- **Patients**
  - All specimens reported outside of endemic countries, to date, West African clade of monkeypox (associated with milder illness)
  - Supportive care typically enough
  - Antivirals are available through consultation with CDC
- **Contacts**
  - Monitoring of healthcare personnel should be reported to health department; monitoring is for 21 days
  - Post-exposure prophylaxis with 2 U.S. licensed vaccines a possibility depending on risk level*
  - Pre-exposure prophylaxis for certain healthcare personnel available †

* https://www.cdc.gov/poxvirus/monkeypox/clinicians/prep-collection-specimens.html
† https://www.cdc.gov/poxvirus/monkeypox/outbreak/current.html

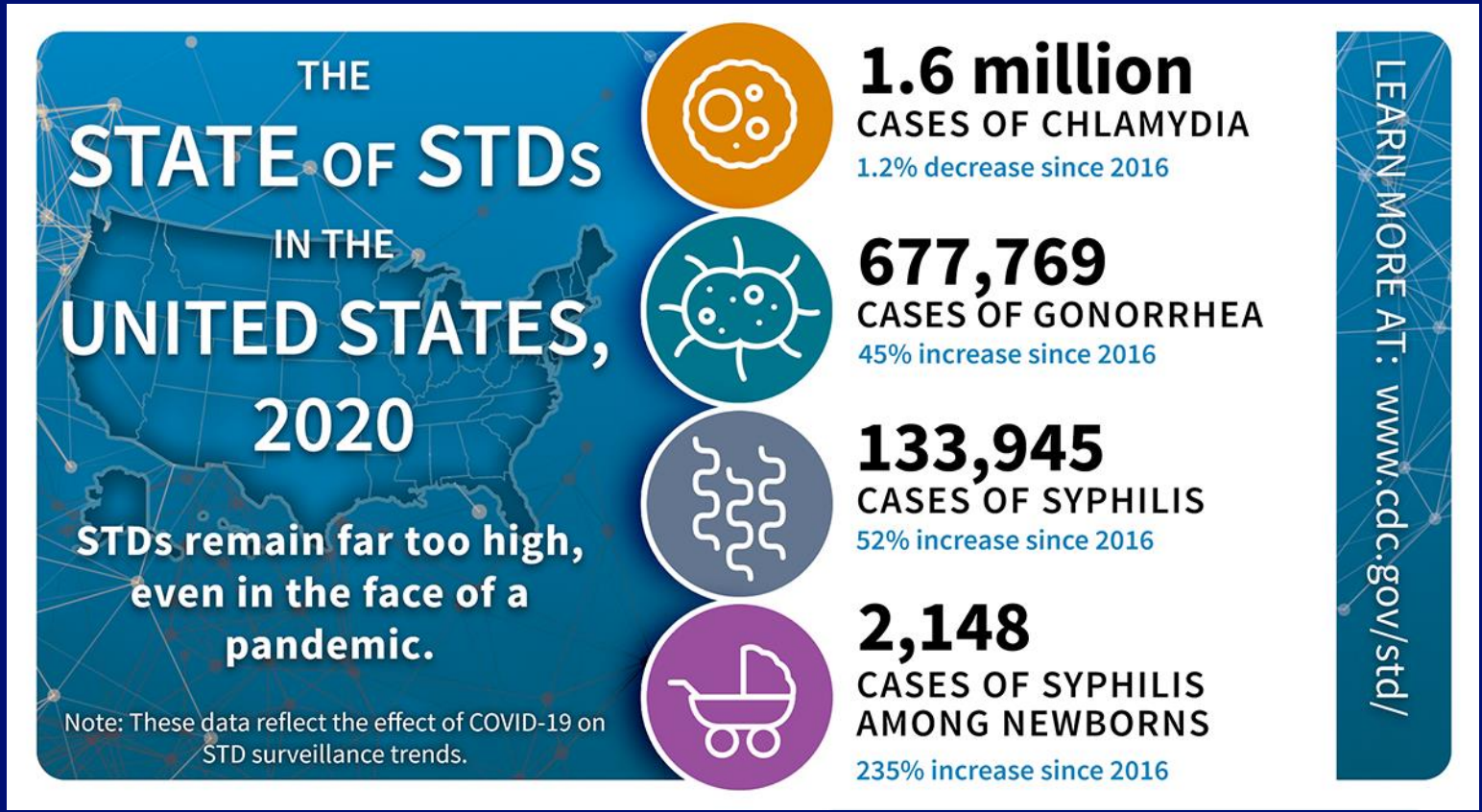
What clinicians need to know: Miscellaneous*

- Infection control: hospital and home
- Duration of isolation
- Autopsy and handling of human remains
- Decontamination of contaminated surfaces

- Monkeypox virus does not have the potential to be a pandemic; number of cases worldwide still low
- Cases may be occurring in communities other than those where the initial cases have been identified

* https://www.cdc.gov/poxvirus/monkeypox/clinicians/index.html

2.4 million cases of chlamydia, gonorrhea, and syphilis were reported in the first year of the COVID-19 pandemic



Monkeypox cases – 2022

- **Some reported cases in men who report sexual contact with other men**

- **Atypical presentation?**
  - Genital and/or perianal lesions
  - Proctitis
  - Much to be learned…

- **Individuals may present to sexual health clinics for care**

- **Monkeypox is not a sexually transmitted infection in the typical sense, but it can be transmitted during sexual and intimate contact, as well as with personal contact and shared bedding/clothing.**

Genital Ulcer Disease: Differential Diagnosis

Infectious

- Herpes simplex virus
- Syphilis
- Chancroid
- Lymphogranuloma venereum (LGV)
- Granuloma Inguinale

Non-infectious

- Recurrent aphthous stomatitis
- Behcet's Disease
- Trauma
- Squamous cell carcinoma
- Drug-induced
- Other

Other infections to consider

Diffuse Rash

- Syphilis
- Varicella/VZV
- Disseminated herpes
- Molluscum contagiosum
- Other pox viruses
- Disseminated fungal infections
- Disseminated gonococcal infection

Proctitis

- Gonorrhea
- Chlamydia (including LGV)
- HSV

Distinguishing monkeypox from other rash illnesses

- **Comprehensive history**
  - **History of present illness** – typical sequence of clinical manifestations
    - Usually fever, malaise, headache, sore throat, cough, lymphadenopathy
    - Macules→papules→vesicles→pustules→scabs
    - Tongue/mouth→face→arms/legs→hands/feet (including palms/soles)
    - Pain and pruritis may be prominent
    - Clinical presentation in current outbreak may not be typical!

Distinguishing monkeypox from other rash illnesses

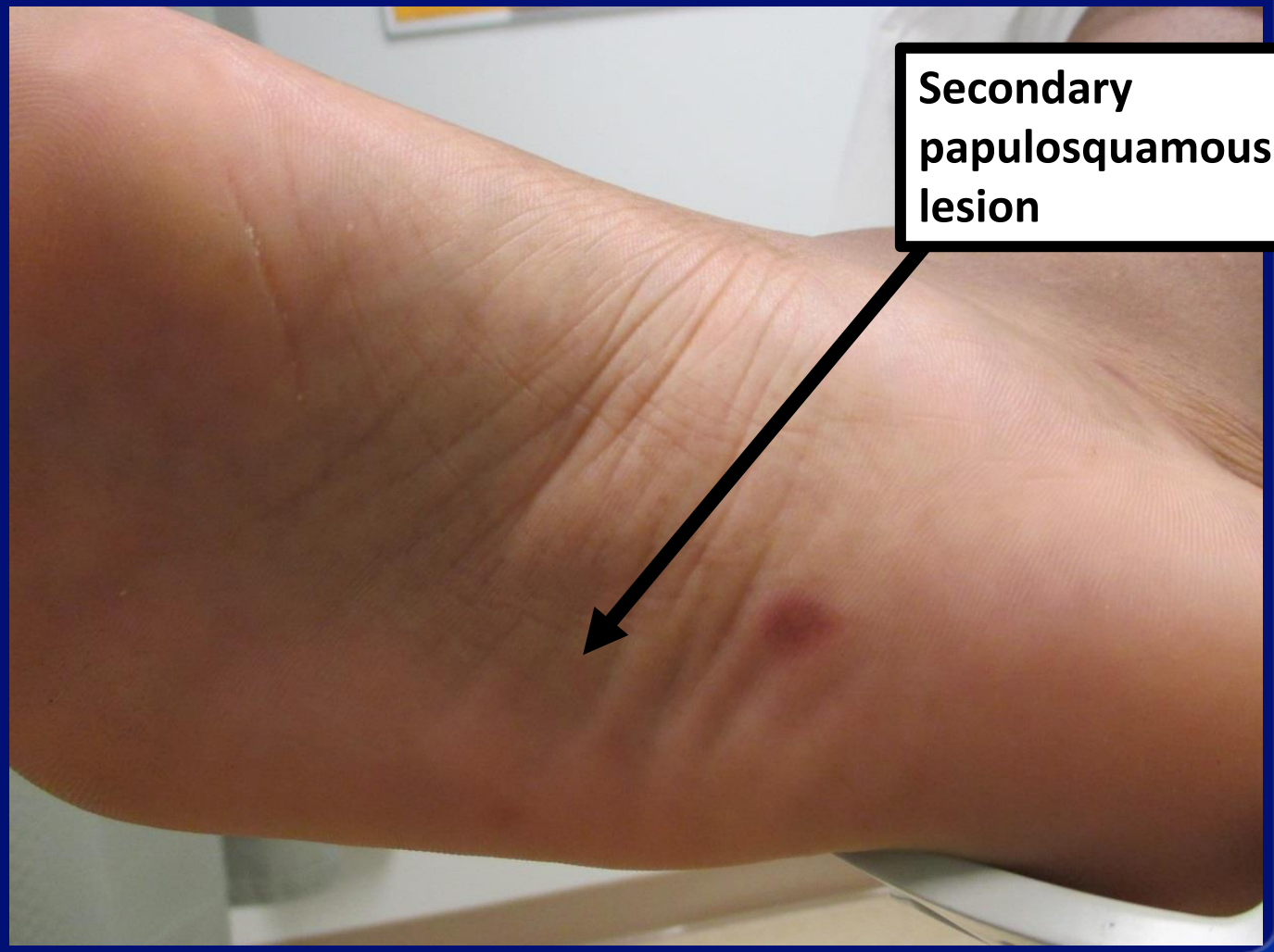
- **Social history**
  - Travel history – particularly to central and west African countries and other countries where non-endemic monkeypox has been reported
  - Contact with a person or people with confirmed or suspected monkeypox
  - Man who regularly has close or intimate in-person contact with other men, including those met through online website, digital application (“app”), or at a bar or party

Physical examination

- **Perform thorough exam of all skin in room with good lighting**
  - Clues may be present in other areas of the body for persons presenting with genital/perianal complaints
- **Rash concentrates on face, arms, legs (centrifugal distribution)**
- **Lesions typically similar size and at same stage**
- **Lesions become umbilicated**

Primary syphilis

Primary and secondary syphilis – overlap



Secondary syphilis

Secondary syphilis*

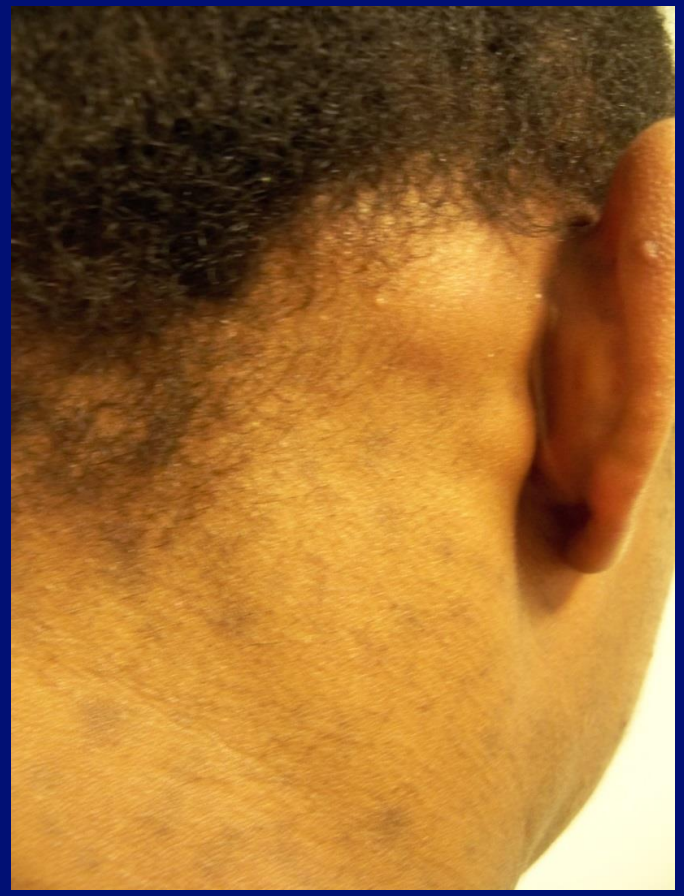
Monkeypox

*Slide attribution: Orange County Health Care Agency

Monkeypox

Secondary syphilis

Secondary syphilis



Secondary syphilis

www.cdc.gov

Secondary syphilis

Secondary syphilis – condyloma lata

Genital herpes

Genital herpes

Source: Cincinnati STD/HIV Prevention Training Center

Genital herpes

Source: Cincinnati STD/HIV Prevention Training Center

Herpes Zoster

Varicella Zoster Virus

Monkeypox

Molluscom contagiosum

Disseminated cryptococcal infection

Disseminated gonococcal infection

https://www.nejm.org/doi/full/10.1056/NEJMicm1811120

Diagnostic considerations for STIs

- **Genital ulcer disease diagnostic evaluation**
  - Syphilis serology tests
  - Darkfield examination from lesion exudate or tissue (or nucleic acid amplification test (NAAT) if available)
  - NAAT* or culture for genital herpes type 1 and 2
  - Serologic testing for type-specific HSV antibody
  - NAAT or culture for *Haemophilus ducreyi* in settings where chancroid prevalent
- **For unexplained rash, consider syphilis serology tests**

*Preferred

Workowski KA, Bachmann LH, Chan PA, et al. *MMWR Recomm Rep* 2021;70(4): 27-56

STI Treatment Guidelines

2021 RECOMMENDATIONS NOW AVAILABLE

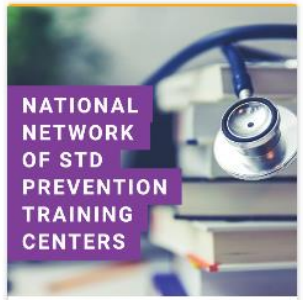
STI Treatment Guidelines Update

CDC's Sexually Transmitted Infections (STI) Treatment Guidelines, 2021 provides current evidence-based prevention, diagnostic and treatment recommendations that replace the 2015 guidance. The recommendations are intended to be a source for clinical guidance. Healthcare providers should always assess patients based on their clinical circumstances and local burden.

2021 Mobile App in Development
Learn how to use the interim, mobile-friendly solution.

View the full STI Treatment Guidelines.

Access print-friendly versions of the wall chart, pocket guide, and guidelines.



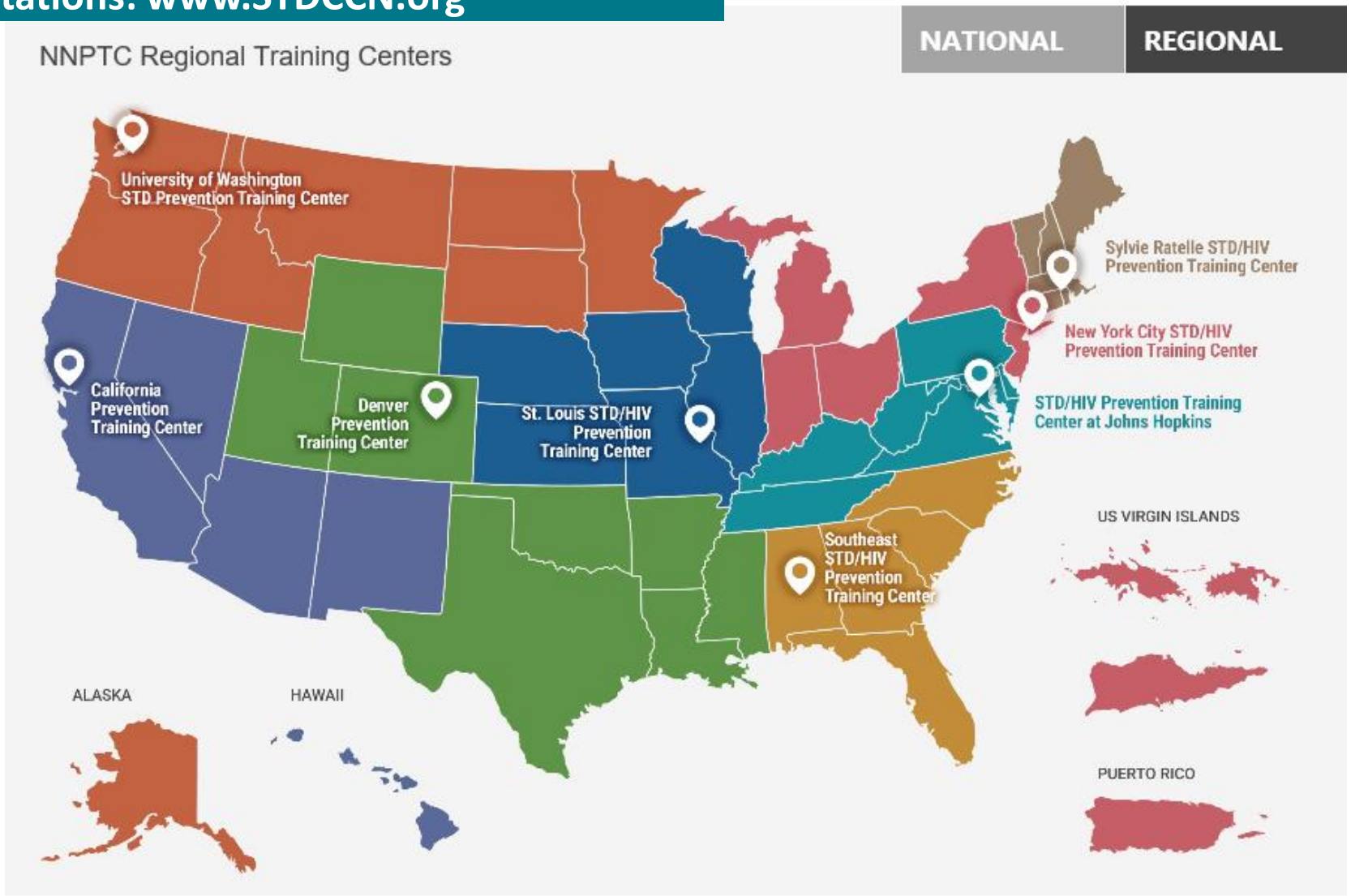
Explore STD trainings, technical assistance, clinical consultation services, and more.

Learn about recommendations and tools to help healthcare settings improve STD care services.

National Network of STD Clinical Prevention Training Centers

STD Treatment Resources: www.nnptc.org

Clinical Consultations: www.STDCCN.org



Medical Countermeasures Available for Prevention and Treatment of Monkeypox

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Centers for Disease Control and Prevention

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Medical Countermeasures Stockpiled for Orthopoxviruses

- **Vaccines**
  - JYNNEOS
  - ACAM2000
- **Treatment**
  - Tecovirimat
  - Vaccinia Immune Globulin Intravenous (VIGIV)

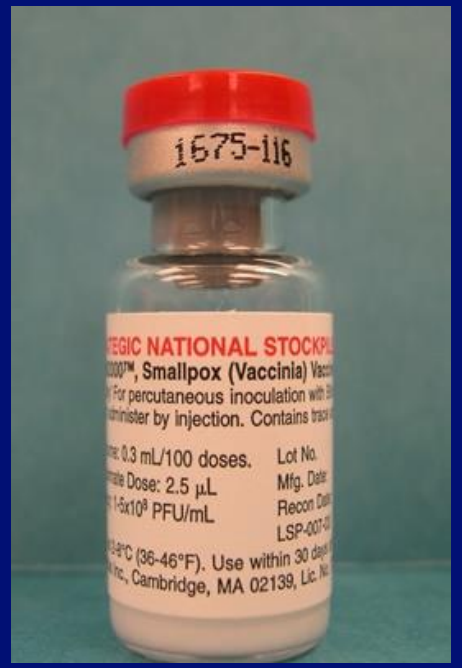
JYNNEOS

- **JYNNEOS is a live vaccine produced from the strain Modified Vaccinia Ankara-Bavarian Nordic (MVA-BN), an attenuated, non-replicating orthopoxvirus**
  - Also known as IMVAMUNE, IMVANEX, MVA
- **Licensed by FDA in September 2019**
- **Indication**
  - JYNNEOS is indicated for prevention of smallpox and monkeypox disease in adults 18 years of age and older determined to be at high risk for smallpox or monkeypox infection

https://www.fda.gov/vaccines-blood-biologics/jynneos

ACAM2000

- ACAM2000 is a live vaccina virus vaccine
- Licensed by FDA in August 2007
- Replaced Dryvax - license withdrawn by manufacturer and remaining vaccine destroyed
- Indication
  - ACAM2000 is indicated for active immunization against smallpox disease for persons determined to be at high risk for smallpox infection
  - CDC-held Emergency Access Investigational New Drug Protocol allows use for Non-Variola Orthopoxvirus Infection (e.g., monkeypox) during an outbreak



https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5708a6.htm
https://www.fda.gov/media/75792/download

ACAM2000 and JYNNEOS

	ACAM2000	JYNNEOS
Vaccine virus	Replication-competent vaccinia virus	Replication-deficient Modified vaccinia Ankara
"Take"	"Take" occurs	No "take" after vaccination
Inadvertent inoculation and autoinoculation	Risk exists	No risk
Serious adverse event	Risk exists	Fewer expected
Cardiac adverse events	Myopericarditis in 5.7 per 1,000 primary vaccinees	Risk believed to be lower than that for ACAM2000
Effectiveness	FDA assessed by comparing immunologic response and "take" rates to Dryvax*	FDA assessed by comparing immunologic response to ACAM2000 & animal studies
Administration	Percutaneously by multiple puncture technique in single dose	Subcutaneously in 2 doses, 28 days apart

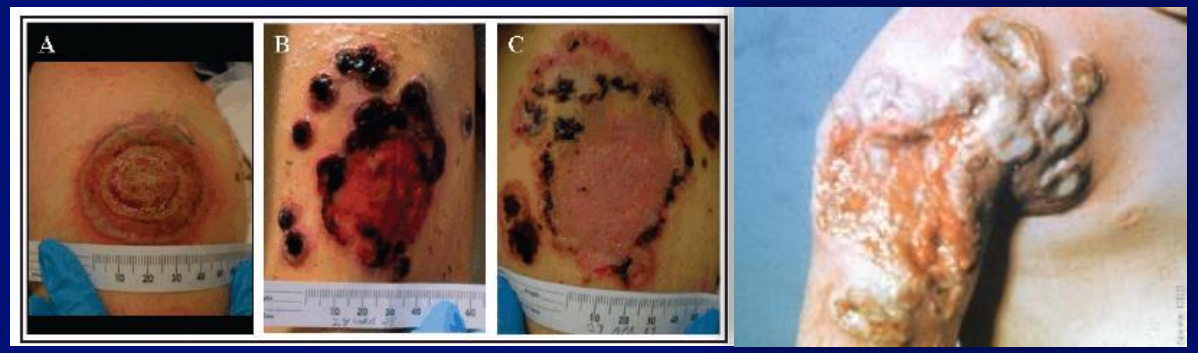
*Both ACAM2000 and Dryvax are derived from the NYC Board of Health strain of vaccinia; ACAM2000 is a "second generation" smallpox vaccine derived from a clone of Dryvax, purified, and produced using modern cell culture technology.

Pre-Exposure Prophylaxis

- **On November 3, 2021, the Advisory Committee and Immunization Practices (ACIP) voted to recommend vaccination for select persons at risk for occupational exposure to orthopoxviruses**
  - Research 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.

https://www.cdc.gov/poxvirus/monkeypox/

Severe Vaccinia Virus Complications
Uncontrolled Viral Replication

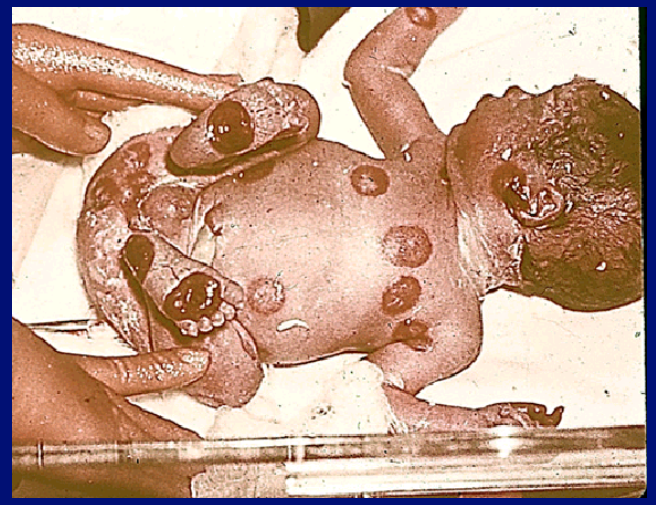


Progressive vaccinia

Eczema vaccinatum

Severe Vaccinia Virus Complications
Inadvertent Transmission

- **Fetal vaccinia**
- **Autoinoculation / inadvertent inoculation**
  - Ocular infections



Fetal vaccinia

Ocular vaccinia

Severe Vaccinia Virus Complications Uncertain Etiology

- Postvaccinial encephalitis
- Myopericarditis

ACIP Contraindications for ACAM2000 and JYNNEOS for PrEP

Contraindication	ACAM2000 Primary Vaccinees	ACAM2000 Revaccinees	ACAM2000 Household Contacts	JYNNEOS
History or presence of atopic dermatitis	X	X	X	
Other active exfoliative skin conditions	X	X	X	
Conditions associated with immunosuppression	X	X	X	
Pregnancy	X	X	X	
Aged <1 year	X	X	X	
Breastfeeding	X	X		
Serious vaccine component allergy	X	X		X
Known underlying heart disease (e.g., coronary artery disease or cardiomyopathy)	X	X		
Three or more known major cardiac risk factors	X			

Post-Exposure Prophylaxis

- Transmission of monkeypox requires prolonged close interaction with a symptomatic individual
- Brief interactions and those conducted using appropriate PPE in accordance with Standard Precautions are not high risk and generally do not warrant PEP

https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html#exposure

Post-Exposure Prophylaxis

Degree of exposure	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)

https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html#exposure

Post-Exposure Prophylaxis

Degree of exposure	Recommendations		Exposure characteristics
	Monitoring§	PEP¶	
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)

https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html#exposure

Post-Exposure Prophylaxis

Degree of exposure	Recommendations		Exposure characteristics
	Monitoring§	PEP¶	
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 Monkeypox virus was present on a surface and/or whether a person touched that surface)
No Risk	None	None	Exposure that public health authorities deemed did not meet criteria for other risk categories

https://www.cdc.gov/poxvirus/monkeypox/clinicians/monitoring.html#exposure

Tecovirimat

- **Tecovirimat is an antiviral medication that is approved by the FDA for the treatment of human smallpox disease in adults and pediatric patients weighing at least 3 kg**
  - Also known as TPOXX or ST-246
- **Oral capsule and IV formulations approved by FDA in July 2018 and May 2022, respectively**
- **Indication**
  - Tecovirimat is indicated for the treatment of human smallpox disease in adults and pediatric patients weighing at least 3 kg
  - CDC-held Emergency Access Investigational New Drug Protocol allows use of Tecovirimat for Non-Variola Orthopoxvirus Infection (e.g., monkeypox)
    - Includes allowance for opening an oral capsule and mixing its content with liquid or soft food for pediatric patients weighing less than 13 kg
- **Available from the Strategic National Stockpile as an oral capsule formulation or an intravenous vial**

https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/208627s000lbl.pdf

Guidance for Treatment of Monkeypox

- Many individuals infected with monkeypox virus have a mild, self-limiting disease course in the absence of specific therapy
- The prognosis for monkeypox depends on multiple factors such as previous vaccination status, initial health status, and concurrent illnesses or comorbidities

https://www.cdc.gov/poxvirus/monkeypox/

Guidance for Treatment of Monkeypox

- **Persons who should be considered for treatment following consultation with CDC might include:**
  - Persons with severe disease (e.g., hemorrhagic disease, confluent lesions, sepsis, encephalitis, or other conditions requiring hospitalization)
  - Persons who may be at high risk of severe disease:
    - Persons with immunocompromise
    - Pediatric populations, particularly patients younger than 8 years of age
    - Pregnant or breastfeeding women
    - Persons with one or more complications (e.g., secondary bacterial skin infection; gastroenteritis with severe nausea/vomiting, diarrhea, or dehydration; bronchopneumonia; concurrent disease or other comorbidities)
- **Persons with monkeypox virus aberrant infections that include its accidental implantation in eyes, mouth, or other anatomical areas where monkeypox virus infection might constitute a special hazard (e.g., the genitals or anus)**

https://www.cdc.gov/poxvirus/monkeypox/

Vaccinia Immune Globulin Intravenous (VIGIV)

- **VIGIV is licensed by FDA for the treatment of complications due to vaccinia vaccination, including:**
  - Eczema vaccinatum
  - Progressive vaccinia
  - Severe generalized vaccinia
  - Vaccinia infections in individuals who have skin conditions
  - Aberrant infections induced by vaccinia virus (except in cases of isolated keratitis)

- **CDC-held Emergency Access Investigational New Drug Protocol allows use of VIGIV for Non-Variola Orthopoxvirus Infection (e.g., monkeypox)**

https://www.fda.gov/vaccines-blood-biologics/approved-blood-products/vaccinia-immune-globulin-intravenous-human

Medical Countermeasure Requests

- **Medical Countermeasures for Monkeypox can be requested from the CDC Emergency Operations Center (770-488-7100)**
- **Requests for vaccines for PEP, Tecovirimat, or VIGIV should come from State or Territorial Health Authorities**
  - These products will be supplied by the Strategic National Stockpile
- **Vaccine for PrEP will be supplied by CDC Drug Service**
- **CDC is available for consultations to assist with medical countermeasure utilization including appropriate vaccine and antiviral use**

Questions?

For more information, please contact Centers for Disease Control and Prevention

Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: http://www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.