Connecticut Department of Public Health
Provider Update
Monkeypox

8-July-2022

Lynn Sosa, MD

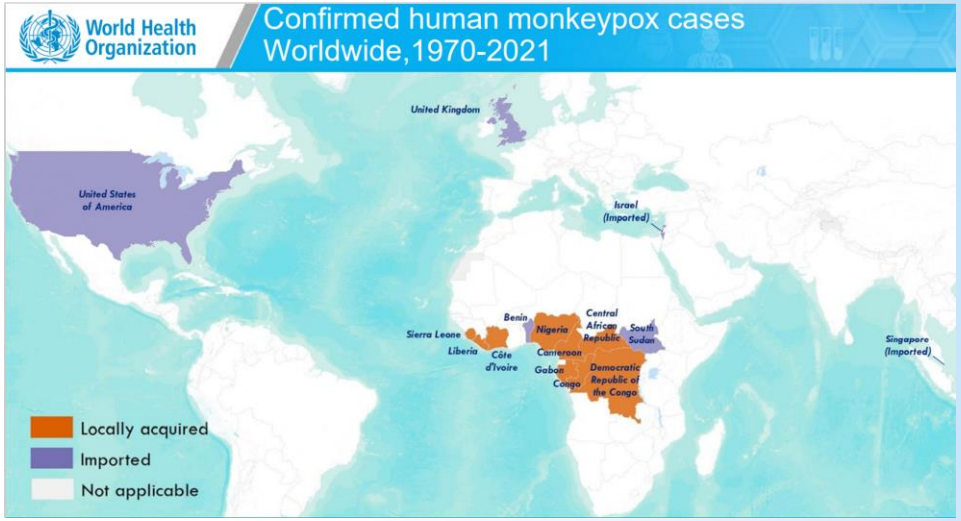
WARNING

THIS PRESENTATION CONTAINS GRAPHIC MEDICAL CONTENT

VIEWER DISCRETION IS ADVISED

Background on Monkeypox Disease

- Rare, sometimes life-threatening zoonotic infection
- Endemic in west and central Africa
- Caused by Monkeypox virus (an orthopoxvirus)
- Specific animal reservoir unknown, but likely small mammals
- Can spread from infected animals to humans and person-to-person
  - Respiratory secretions
  - Skin-to-skin contact with infected body fluids (e.g., fluid from vesicles and pustules)
  - Fomites (e.g., shared towels, contaminated bedding)
- Incubation period is long: 4-17 days (average 5-13 days); a person is not contagious until symptoms begin
- Previous cases in the US associated with travel and imported small mammals



2022 Monkeypox Outbreak: United States Situation Update

As of July 6, 2022

- 560 confirmed monkeypox/orthopox cases

Demographics of U.S. cases*, N=305 (as of 28-June-2022)

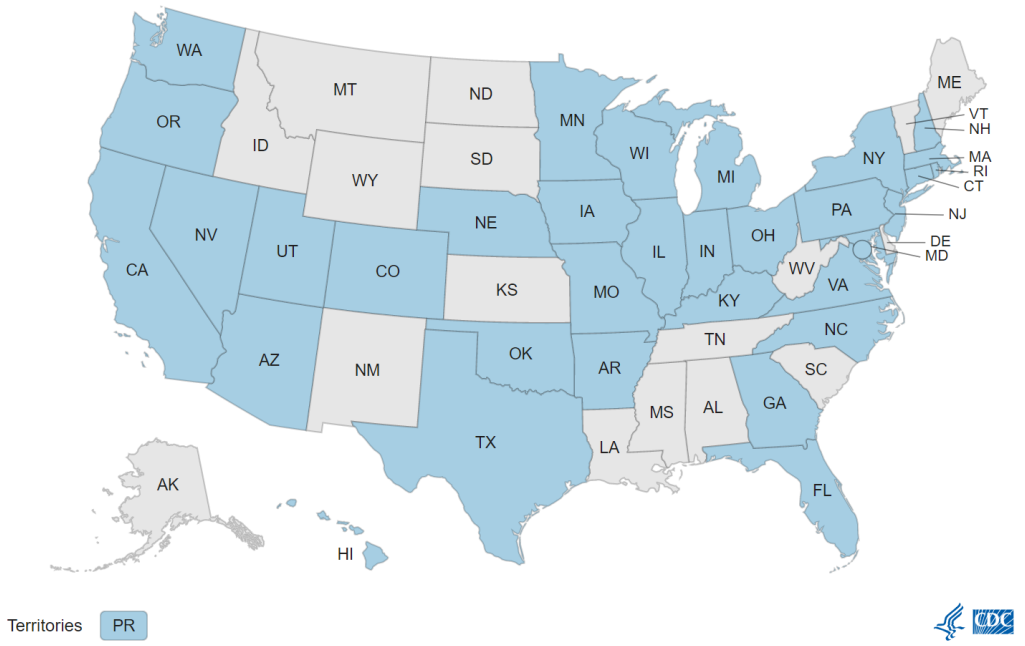
Any person, regardless of gender identity or sexual orientation, can acquire and spread monkeypox

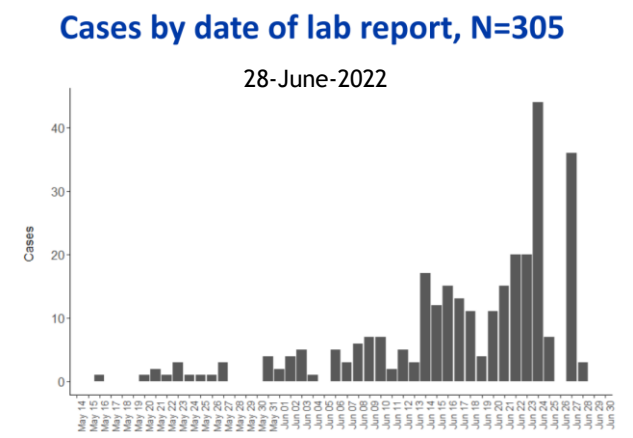
- Median age: 36 years (range 20-76 years)
- Male sex at birth: 271
  - All for whom gender identity was reported, are cisgender men
  - MMSC† : 193/195(99%); Unknown: 76
- Female sex at birth: 5
  - Some cisgender women
  - Some transgender men
- No cases in children
- No deaths; some hospitalizations primarily for pain control

Data will change pending ongoing investigations and additional cases*

†male to male sexual contact

2022 U.S. Map & Case Count





Monkeypox symptoms – an overview

Infectious Period

↓Average 5-13 days ↓

5-21 days	1-4 days	2-4 weeks	Days to weeks
Incubation period	Febrile stage	Rash stage	Recovery
No symptoms	Fever, lympadenopathy, headache, chills, sore throat, malaise, fatigue.	Rash on the skin	No symptoms

↑Prodrome may be absent↑

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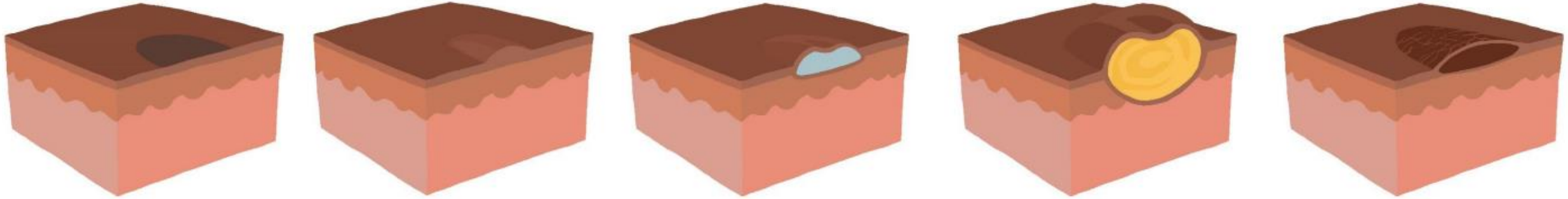
Disease progression III – Rash stage

→→Rash Progression 2-4 weeks; "recovery"/removal from isolation when lesions have healed, new skin has formed→→

Macule	Papule	Vesicle	Pustule	Crust



Credit: Emerg Infect Dis / N. Erez et al., 2018. Retrived from:https://wwwnc.cdc.gov/eid/article/25/5/19-0076-f1

Credit: NEJM/ D.Kurz et al .2004 Retrived from: https://www.nejm.org/doi/full/10.1056/NEJMoa032299

Credit: Andrea McCollum / CDC

Credit: Toutou Likafi/ Kinshasa School of Public Health

Credit: P. Mbala /Institut Nationale de recherche biomedicale. DRC

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World Health Organization

Monkeypox and other common rash illnesses

Often but not always

Symptoms	Monkeypox	Chickenpox	Measles
Fever	1-3 days before rash	1-2 days before rash	3-5 days before rash
Rash appearance	Lesions often in one stage of development	Lesions often in multiple stages of development	Lesions often in multiple stages of development
Rash development	Slow	Rapid	Rapid
Rash distribution	More dense on face; present on palms and soles	More dense on trunk; Absent on palms and sole	Starts on face and spreads, sometimes reaching hands and feet
Lymphadenopathy	Present	Absent	Occasional
Death	Up to 6% (West African Clade)	Rare	Varies widely

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Patients for whom there should be high clinical suspicion based on current epidemiology

Any person, regardless of gender identity or sexual orientation, can acquire and spread monkeypox

- Observation of a classic monkeypox rash OR
- Contact with a person or people
  - with similar appearing rash or
  - diagnosed with monkeypox
- Close or intimate in-person contact with people in a social network experiencing monkeypox activity (e.g., men who have sex with men who meet partners through an online website, digital app or social event)
- History of recent international travel to country currently with many cases
- Recent diagnosis of a sexually transmitted infection which is not responding to therapy
  - *Diagnosis of an STI does not rule-out co-infection with monkeypox; co-infections have been observed*

Atypical Presentations during 2022 Outbreak

Atypical features described include:

•Presentation of only a few or even just a single lesion

•Rash either scattered or diffuse; sometimes limited to one body site or mucosal ares (e.g. anogenital or lips/face)

•Absence of skin lesions in some cases

•Presenting complaint sometimes anorectal pain or tenesmus; physical examination yields visible lesions and proctitis

•Lesions in the genital or perineal/perianal area which do not spread further

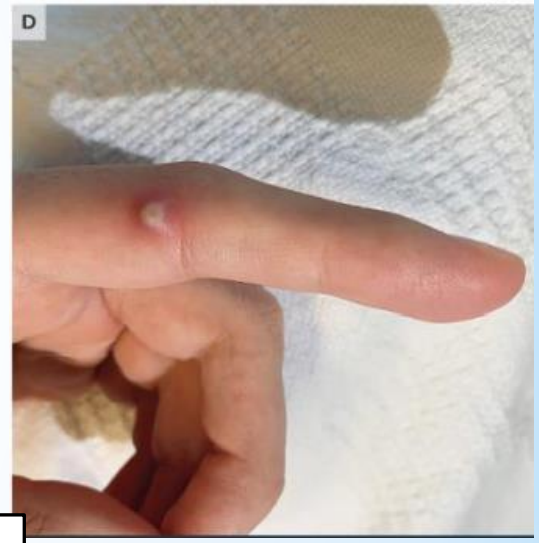
•Lesions appearing at different (asynchronous) stages of development see side-by-side

•Appearance of lesions before the onset of fever, malaise and other constitutional symptoms (absence of prodromal period)

•Fever, lymphadenopathy not as common

•Some co-infections with sexually transmitted infections

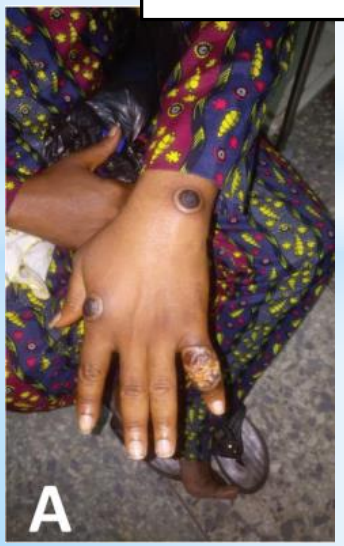
Clinical Presentation: Examples of Lesions- upper extremities, part 1



Firm, deep-seated, well-circumscribed, sometimes umbilicated

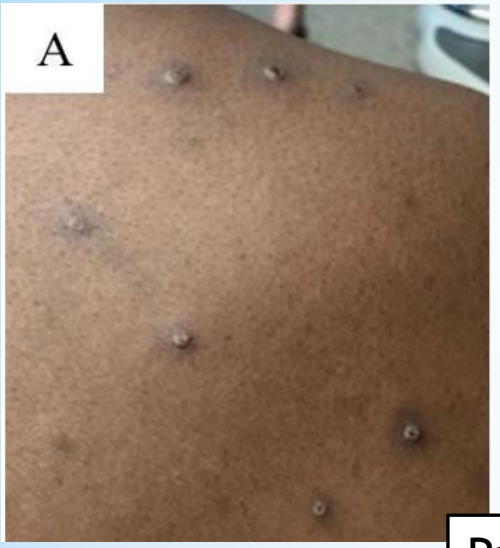
Clinical Presentation: Examples of Lesions- upper extremities, part 2

Lesions may rapidly progress through stages (papules, vesicles, pustules, and scabs)



Sub-ungual lesion

Clinical Presentation: Lesions - general body sites, part 1



Papulovesicular and pustular lesions may be seen on same body site

Clinical Presentation: Lesions - general body sites, part 2

WARNING

THE FOLLOWING SLIDES CONTAIN GRAPHIC MEDICAL CONTENT

VIEWER DISCRETION IS ADVISED

Clinical Presentation: Genital Lesions

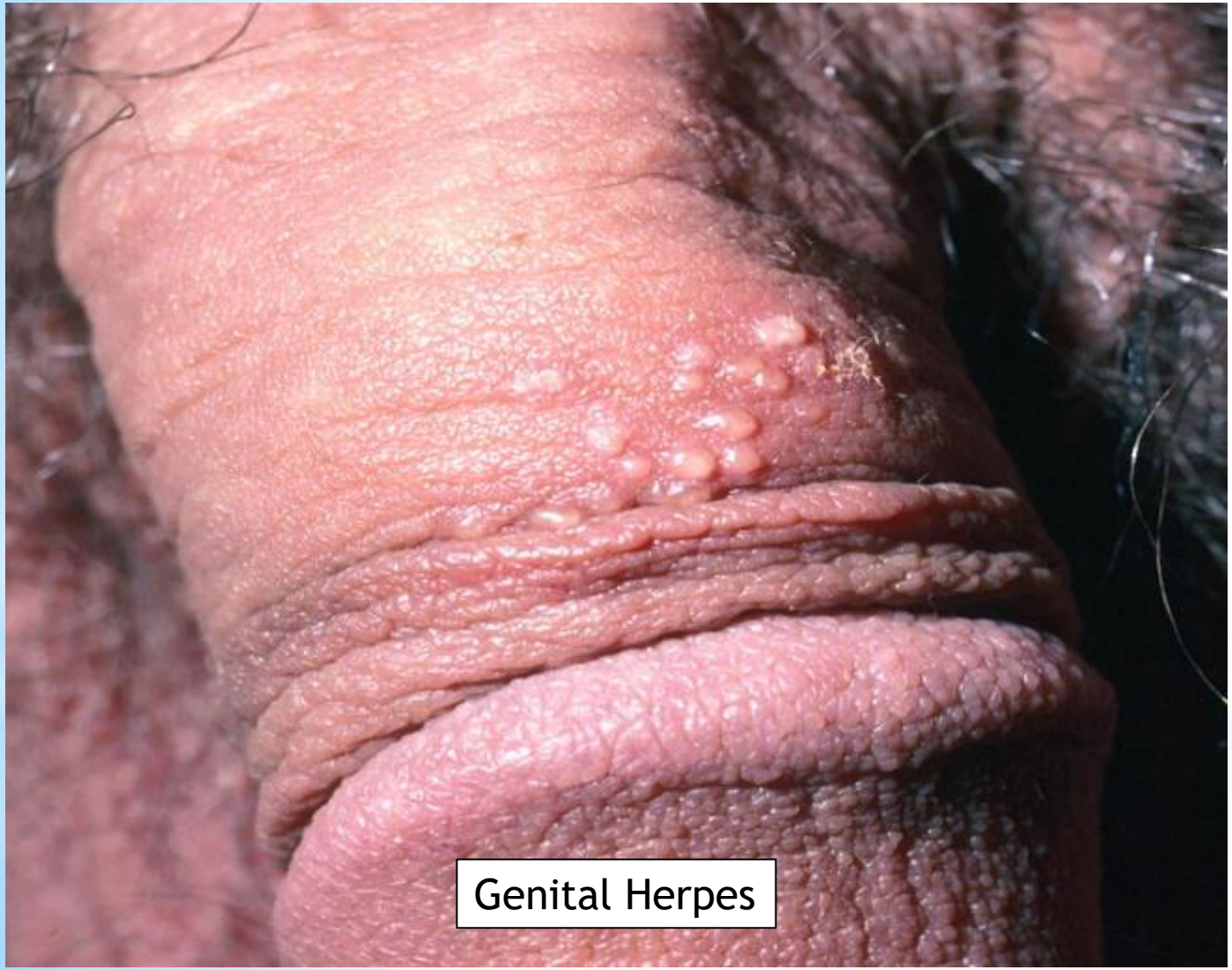
Same patient, same day

Clinical Presentation: Rash Comparisons

Clinical Presentation: Rash Comparisons

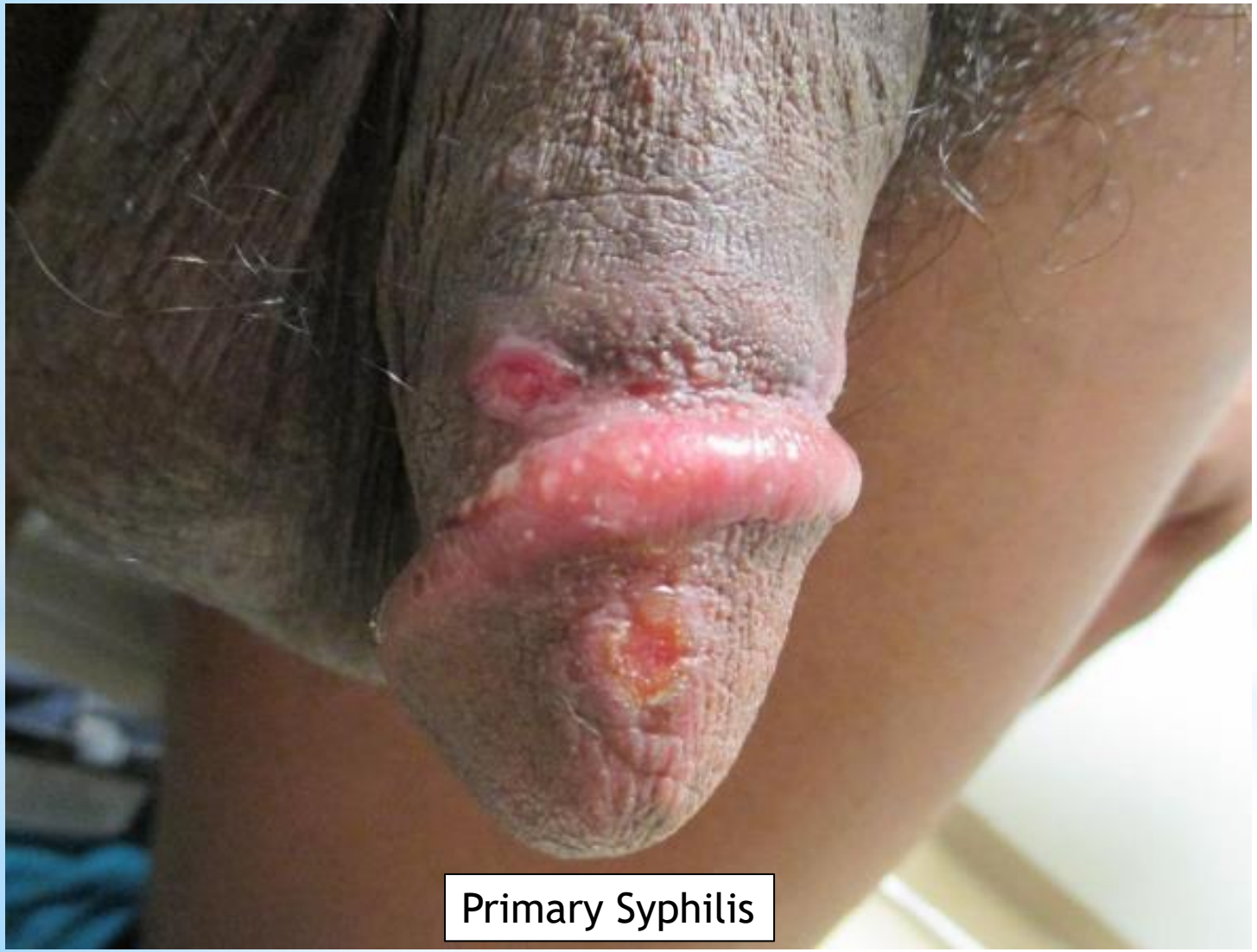
Clinical Presentation: Rash Comparisons

Co-infections are possible- be sure to test *multiple* lesions



Clinical Presentation: Rash Comparisons

Co-infections are possible- be sure to test *multiple* lesions



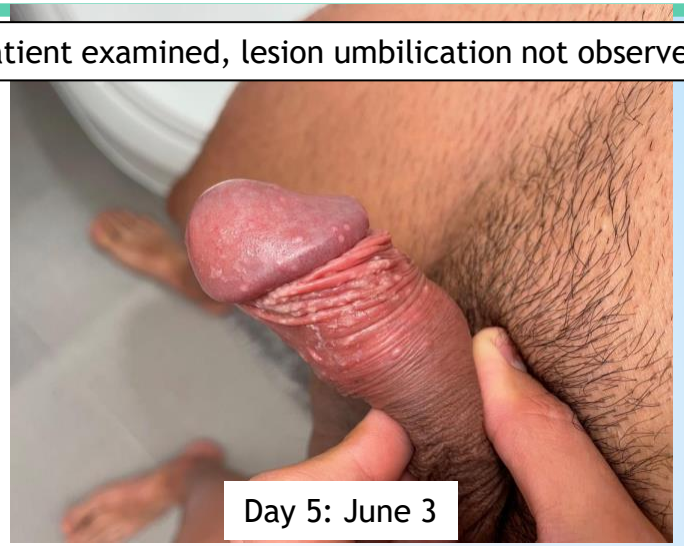
Clinical Presentation: Rash Comparisons

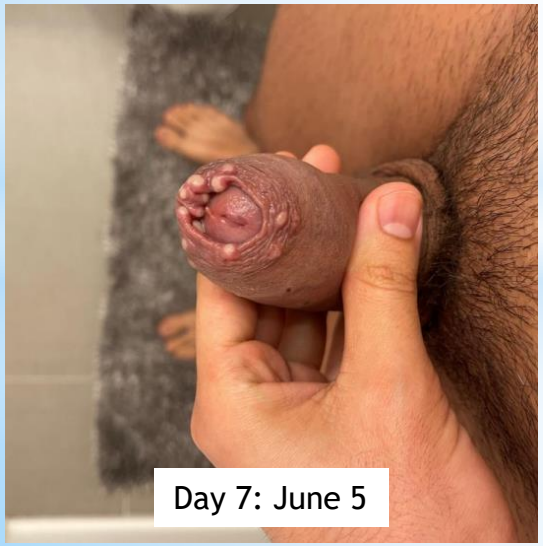
Clinical Course: Lesion Progression

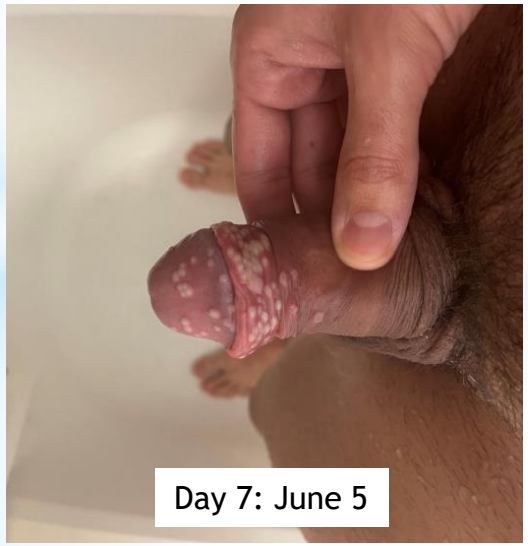
[Days are counted as days from exposure, single 2022 patient]

Day 4: June 2

patient examined, lesion umbilication not observed

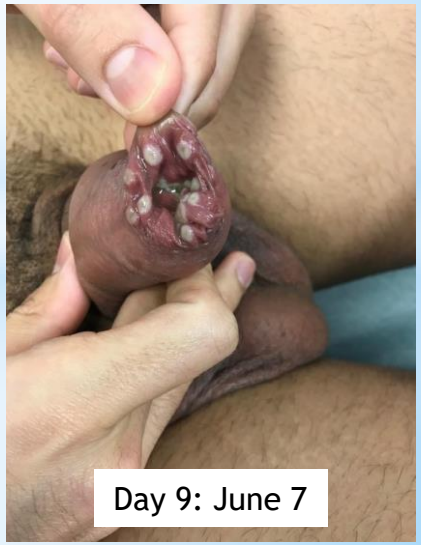

Day 5: June 3


Day 7: June 5


Day 7: June 5

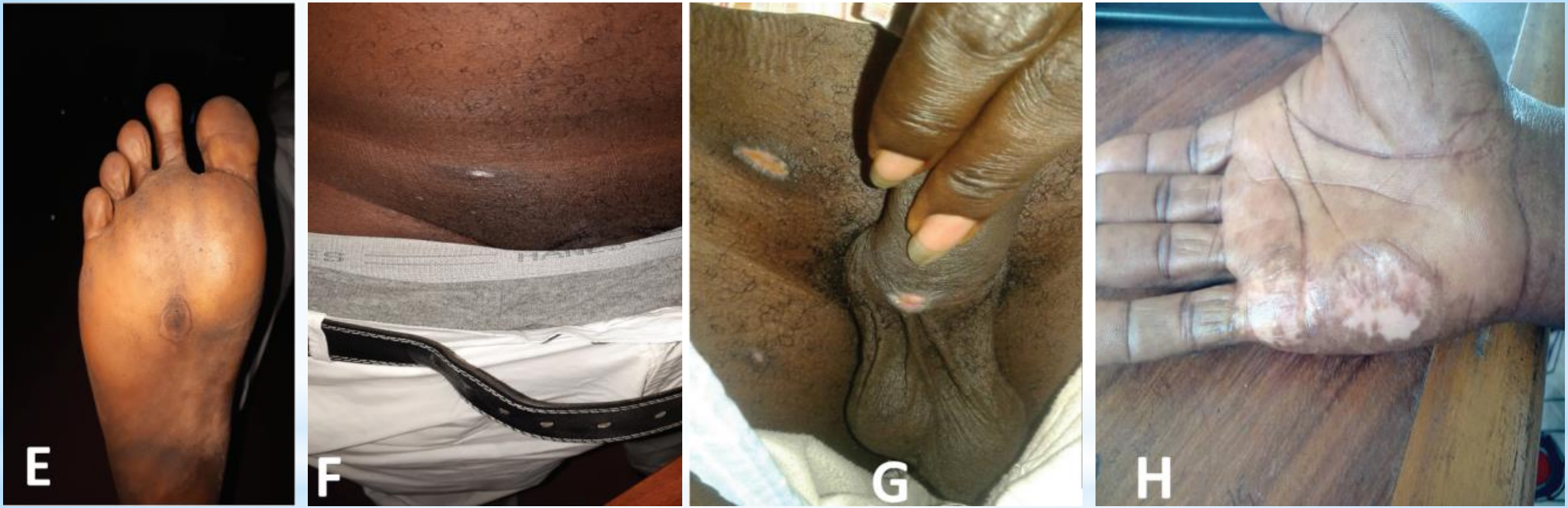
Day 9: June 7

Day 9: June 7


Day 9: June 7

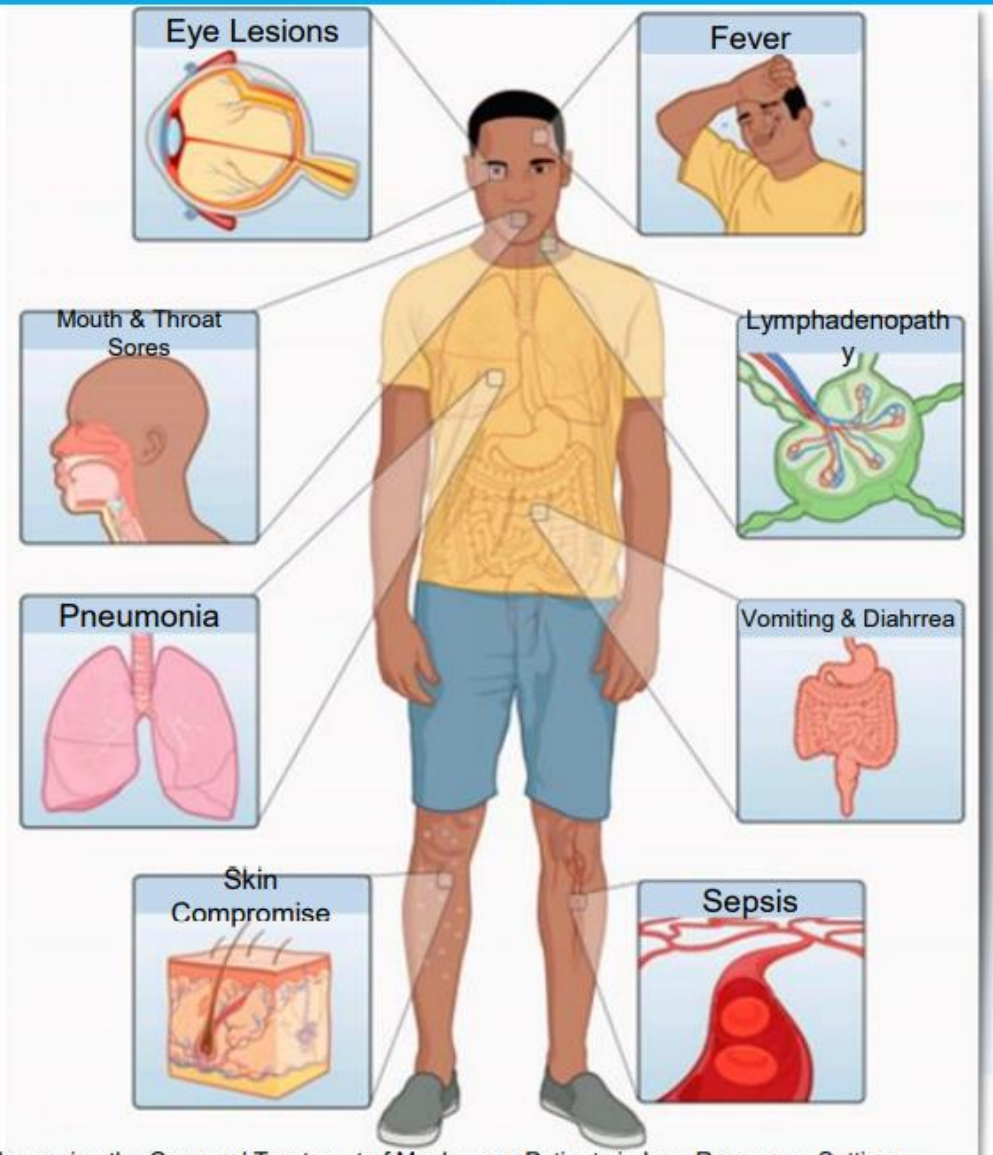
Additional case details can be found here: Webinar June 29, 2022 - Monkeypox: Updates about Clinical Diagnosis and Treatment (cdc.gov)

Clinical Course: Lesion Progression 2-6 weeks post onset



E and F, Hyperpigmented hypertrophic scars on sole of feet and groin
G and H, Atrophic hypopigmented scars on external genital and palm

Complications of monkeypox



Source: Improving the Care and Treatment of Monkeypox Patients in Low-Resource , Settings: Applying Evidence from Contemporary Biomedical and Smallpox Biodefense Research

The course of illness depends on a person's overall health status

Complications

- Bacterial infection of eyes (4%) or skin (20%)
- Diarrhea and vomiting leading to dehydration (7%)
- Abscess with airway obstruction
- Bronchopneumonia
- Encephalitis (<1%), sepsis (<1%)

Danger signs

- loss of vision
- delirium, loss of consciousness, convulsions
- respiratory distress
- bleeding, inability to produce urine
- signs of sepsis

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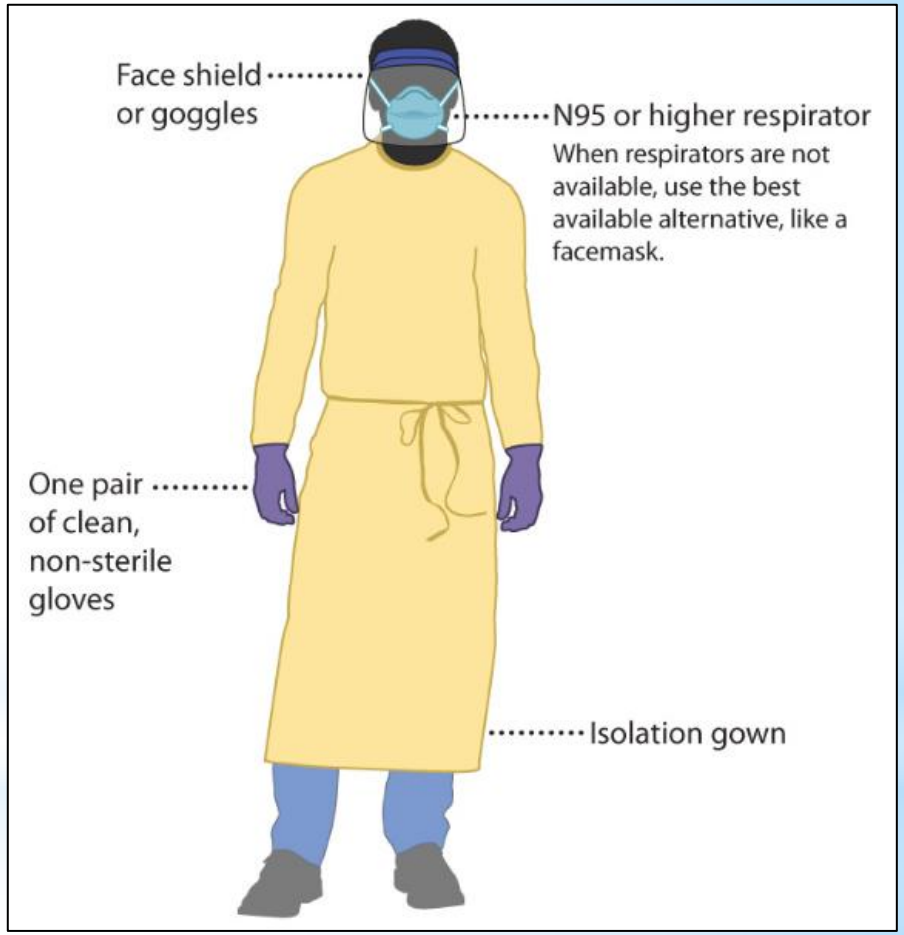
Infection prevention: healthcare settings

- Recommended PPE:
  - Gown
  - Fit-tested, NIOSH-approved particulate respirator equipped with N95 filters or higher
  - Eye protection
  - Gloves

- Patient with suspected or confirmed monkeypox infection should be placed in a single-person room
  - Special air handling is not required
  - The door should be kept closed (if safe to do so)

- Environmental cleaning should wear PPE as above and take special care not to shake linens to aerosolize lesion material

https://www.cdc. gov/hai/pdfs/ppe/PPE-Sequence.pdf



Infection Control: Healthcare Settings | Monkeypox | Poxvirus | CDC

Monkeypox: Which specimens to collect and when?

CURRENTLY AVAILABLE ONLY @ SPHLs/CDC, LabCorp

5-21 days	1-4 days	2-4 weeks	Days to weeks
Incubation period	Febrile stage	Rash stage	Recovery
No sample collected	Nasopharyngeal or oropharyngeal swab Not currently in use in US	Dry Swabs, VTM, or Lesion material	Serum Not currently in use in US

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Monkeypox Testing

- Testing is currently available at the State Public Health Laboratory; expansion to commercial laboratories is expected soon
- To initiate testing, call the DPH Epidemiology Program
  - (860) 509-7994 (weekdays)
  - (860) 509-8000 (after hours/weekends)
- Use sterile nylon, polyester, rayon or Dacron swabs with a plastic, wood, or thin aluminum shaft. Do not use cotton or any other type of swab.
- Dry swabs may be submitted in Sterile container (1 swab per container)
- Swabs may be submitted in Viral Transport Media (VTM); Universal Transport Media *should not* be used
- Lesion roof may be submitted in sterile containers, de-roofing is not required

OR

Dry swabs + sterile containers

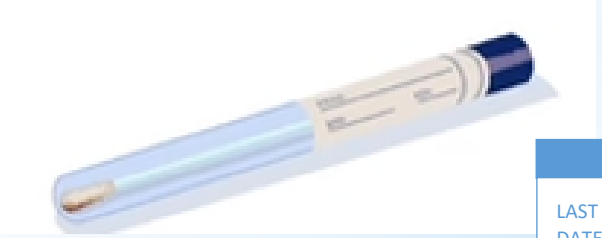
Swabs + VTM
(*UTM not accepted at this time*)

Sterile containers for lesion or crust material

Monkeypox Testing

Vigorously swab *multiple* lesions

- If more than one lesion is present, vigorously swab multiple lesions with *two* swabs per lesion
- Co-infection with other rash illnesses is possible, and has been observed in this outbreak
- Swab lesions from different anatomic sites or that appear to be in different stages of development
- Additional specimens may need to be collected to rule out other illnesses- *two* swabs per lesion are needed for Monkeypox testing



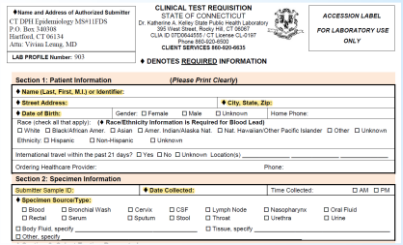
Place swabs in containers, label specimens

- Each swab should be placed in its own tube or container
- If lesions or crust material are sampled- use one container per lesion
- Label each collection tube with patient name, date of birth, date of collection, and source (e.g. lesion 1, lesion 2, etc)
- Note: There should be two collected swabs per lesion.

Monkeypox Testing

Complete Lab Submission Form

Complete highlighted areas of lab slip and ensure patient name, date of birth and date of collection matches information on collection tubes. Use separate lab slips for each body site sampled


CLINICAL TEST REQUISITION
STATE OF CONNECTICUT
Dr. Katherine A. Ashley State Public Health Laboratory
395 West Street, Rocky Hill, CT 06067
CLIA ID 07D0640855 - CT License CL-0187
Phone 860-620-6500
CLIENT SERVICES 860-620-6635

ACCESSION LABEL
FOR LABORATORY USE ONLY

♦ Name and Address of Authorized Submitter
CT DPH Epidemiology MS#11EDS
P.O. Box 340308
Hartford, CT 06134
Attn: Vivian Leung, MD

LAB PROFILE Number: 903

♦ DENOTES REQUIRED INFORMATION

Section 1: Patient Information (Please Print Clearly)
♦ Name (Last, First, M.I.) or Identifier:
♦ Street Address: ♦ City, State, Zip:
♦ Date of Birth: Gender: ☐ Female ☐ Male ☐ Unknown Home Phone:
Race (check all that apply): (♦ Race/Ethnicity Information Is Required for Blood Lead)
☐ White ☐ Black/African Amer. ☐ Asian ☐ Amer. Indian/Alaska Nat. ☐ Nat. Hawaiian/Other Pacific Islander ☐ Other ☐ Unknown
Ethnicity: ☐ Hispanic ☐ Non-Hispanic ☐ Unknown
International travel within the past 21 days? ☐ Yes ☐ No ☐ Unknown Location(s) _____
Ordering Healthcare Provider: Phone:

Section 2: Specimen Information
Submitter Sample ID: ♦ Date Collected: Time Collected: ☐ AM ☐ PM
♦ Specimen Source/Type:
☐ Blood ☐ Bronchial Wash ☐ Cervix ☐ CSF ☐ Lymph Node ☐ Nasopharynx ☐ Oral Fluid
☐ Rectal ☐ Serum ☐ Sputum ☐ Stool ☐ Throat ☐ Urethra ☐ Urine
☐ Body Fluid, specify _____ ☐ Tissue, specify _____
☐ Other, specify _____

Package Specimens for Transport

Place specimens into specimen bag and seal. Use one tube per specimen bag. Note: there should be 2 swabs per lesion. Put bag(s) and lab slip into biohazard envelope and seal.

Refrigerate specimens (2-8°C)

Arrange transport to State Public Health Laboratory

Arrange for a STAT courier delivery to the State Public Health Laboratory:

395 West Street, Rocky Hill, CT 06067

Package specimen(s) in Category B shipping container with a frozen ice pack.

Contact Diane Noel or Christina Nishimura at 860-509-6596 or 860-716-2705 (after hours & weekends) for assistance with specimen pick-up.

Infection prevention: home settings

- **Isolate** until rash has fully resolved, scabs have fallen off, and a fresh layer of intact skin has formed (this may take several weeks)
  - Avoid use of contact lenses to prevent inadvertent infection of the eye

- Do not leave the home except as required for emergencies or follow-up medical care; do not travel during isolation
  - If medical care is needed, call to notify healthcare providers of diagnosis before seeking care

- **Avoid close physical contact** with others
  - Wear well-fitting source control (e.g., medical mask) when in close contact with others at home
  - Do not engage in sexual activity that involves direct physical contact

- **Do not share potentially contaminated items**, such as bed linens, clothing, towels, wash cloths, drinking glasses or eating utensils

- Avoid close contact with pets in the home and other animals

World Health Organization

Monkeypox clinical care guide

Condition	Treatment objective	Treatment and care	Monitoring
Fever	Prevent and treat	External cooling Antipyretic medications	Regular temperature monitoring
Skin infections	Prevent or treat secondary bacterial infections Promote lesion healing	Oral or intravenous antibiotics; incision and drainage, Advanced wound management	Fever, pain, tenderness, erythema, oedema, exudate, warmth
Exfoliation, skin compromise	Avoid scratching Minimize insensible fluid loss Promote lesion healing	Wash with soap and water or povidone-iodine solution Moist dressings and topical antibiotics (e.g silver sulfadiazine or gentian violet) Surgical debridement, skin grafts	Lesion count/rash burden Skin turgor in non-affected areas Body weight Fluid intake/output
Eye infection	Prevent corneal scarring and visual impairment	Vitamin A supplementation Ophthalmic antibiotics/antivirals	Repeat examination and vision testing Slit lamp examination
Mouth and throat sores	Minimize mucosal pain Encourage food intake Promote lesion healing	Oral/topical analgesic medications	Lesion burden Pain scale Food and fluid intake/output
Vomiting and diarrhea	Minimize fluid loss Maintain nutrition	Oral or intravenous rehydration Oral or intravenous antiemetic Antidiarrheal medication	Frequency and volume of emesis and diarrhoea, Body weight, skin turgor Food and fluid intake/output
Lymphadenopathy	Minimize pain Reduce swollen lymph nodes	Oral or intravenous analgesic or anti-inflammatory medications	Size of lymph nodes Pain/tenderness
Respiratory symptoms or distress	Maintain open airways Prevent and treat infection Prevent and manage respiratory distress	Suctioning of nasopharynx and airways Incentive spirometry, chest physiotherapy Bronchodilation, nebulizer treatments Oral/intravenous antibiotics Oxygen, non invasive ventilation (e.g, BiPAP or CPAP) Intubation and ventilation	Respiratory rate and other vital signs Signs of distress such as indrawing, shortness of breath Pulse oximetry
Sepsis	Hemodynamic stabilization	Oral/intravenous antibiotics Intravenous fluid hydration, vasopressors Supplemental oxygen, corticosteroids, insulin	Pulse, blood pressure Fluid status

Adapted from: Viruses. 2017 Dec; 9(12): 380.

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Medical Counter Measures

JYNNEOS

ACAM2000

Tecovirimat (TPOXX)

Cidofovir

Brincidofovir *

Vaccinia immune globulin

Vaccines and TPOXX are available via the Strategic National Stockpile.
To request, contact DPH Epidemiology.

*Note: Brincidofovir is not currently available

TPOXX

- Antiviral developed and approved to treat smallpox in adults and children weighing at least 3 kg
- CDC holds EA-IND allowing its use for other orthopoxviruses in adults and children
- Treatment considerations:
  - Persons with severe disease
  - Persons at high risk of severe disease (e.g., immunocompromised, history of atopic dermatitis or exfoliative skin conditions, or lesions in anatomical areas that might constitute a special hazard, including perianal areas)
- To request, contact DPH Epidemiology

JYNNEOS

- Live, non-replicating vaccine
- Administered as subcutaneous injection in 2 doses at least 4 weeks apart
  - Fully vaccinated 2 weeks after the second dose
- Efficacy
  - Animal data, immunogenicity studies support efficacy as PrEP
  - Very limited evidence for efficacy for PEP
- Safe for use in people with immunocompromise, living with HIV, atopic dermatitis
  - Safety not established in pregnancy, breastfeeding, pediatrics; use might still be considered

JYNNEOS

- **Limited supply**

- Licensed for use in the prevention of smallpox or monkeypox in adults 18 years and older
  - Use in younger populations requires submission of a single patient Expanded Access Investigational New Drug (IND) application
    - Requires informed consent along with submission of additional forms

- CDC recommends JYNNEOS doses be prioritized for people who are:
  - At risk for severe adverse events with ACAM2000
  - At risk for severe disease from monkeypox (such as people with HIV or other immunocompromising conditions)

ACAM2000

- Live, replication competent *Vaccinia virus* vaccine

- Administered as 1 percutaneous dose via multiple puncture technique with a bifurcated needle
  - Lesion forms at site of successful inoculation ("take")
  - Fully vaccinated 4 weeks after inoculation

- Efficacy to prevent monkeypox infection
  - PrEP: likely similar to other live smallpox vaccines (>85%) in endemic countries (Fine et al 1988)
  - PEP: uncertain efficacy
  - Effectiveness supported by human and animal studies

cdc.gov

- **Significant side effect profile:** myo/pericarditis (1 in 175), progressive vaccinia, eczema vaccinatum, postvaccinial encephalitis, fetal vaccinia, inadvertent inoculation or autoinoculation
  - Should **not** be given to people with weakened immune systems, certain skin conditions such as eczema, heart disease, and pregnant or lactating

ACAM2000

- Ample supply

- Licensed for use in prevention of smallpox in children and adults
- Available under an Expanded Access IND for use as PEP against monkeypox in adults & children
  - Requires informed consent and submission of additional forms

- Use determined by shared decision-making between the provider and the recipient, taking into consideration individual and household risk profiles, ability to manage the vaccine site lesion, and medical history

- Providers should be properly trained on administration of ACAM2000 using a bifurcated needle

- People who are eligible for and offered ACAM2000 should be:
  - Tested for HIV to ensure they are HIV negative
  - Counseled on potential side effects
  - Advised on how to keep the vaccination site clean and covered and precautions to prevent onward transmission until the lesion completely heals (up to 6 weeks or more)

Post-Exposure Prophylaxis

- JYNNEOS and ACAM2000 are available for post-exposure prophylaxis
  - Recommended within 4 days after exposure; can be given up to 14 days after exposure
  - **Contact DPH Epidemiology to request**

- JYNNEOS vaccine is being allocated to states by HHS for use for the following individuals:
  - Known contacts who are identified by public health via case investigation, contact tracing, and risk exposure assessments (PEP)
  - Presumed contacts who may meet the following criteria (PEP++):
    - Know that a sexual partner in the past 14 days was diagnosed with monkeypox
    - Had multiple sexual partners in the past 14 days in a jurisdiction with known monkeypox

- Next allocation of JYNNEOS expected in July

Links to Vaccine and Treatment Resources

Considerations for Monkeypox Vaccination | Monkeypox | Poxvirus | CDC

Use of JYNNEOS (Smallpox and Monkeypox 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

Smallpox Vaccination and Adverse Reactions

CDC training video on ACAM2000 administration

Use of Vaccinia Virus Smallpox Vaccine in Laboratory and Health Care Personnel at Risk for Occupational Exposure to Orthopoxviruses — Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2015 | MMWR (cdc.gov)

Treatment Information for Healthcare Professionals | Monkeypox | Poxvirus | CDC

Guidance for Tecovirimat Use Under Expanded Access Investigational New Drug Protocol during 2022 U.S. Monkeypox Cases | Monkeypox | Poxvirus | CDC

Links to Articles Referenced

The Detection of Monkeypox in Humans in the Western Hemisphere | NEJM

Article | Infectious Diseases | JAMA Pediatrics | JAMA Network

Monkeypox in a Traveler Returning from Nigeria — Dallas, Texas, July 2021 - PMC (nih.gov)

Imported Monkeypox from International Traveler, Maryland, USA, 2021 - PMC (nih.gov)

Eurosurveillance | Family cluster of three cases of monkeypox imported from Nigeria to the United Kingdom, May 2021

Case 24-2022: A 31-Year-Old Man with Perianal and Penile Ulcers, Rectal Pain, and Rash | NEJM

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Thank you!

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