The Monkeypox Outbreak: Insights and Impacts

Please note that the following presentation slides contain graphic and sexually explicit imagery which may not be suitable for all audiences.
Monkeypox Clinical Update

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Disclosures

- Roche – Honorarium for panel talks
Presentation Outline

• Current Monkeypox Outbreak
• Clinical Presentation
• Transmission
• Testing
• Vaccination
• Treatment
• Messaging and Stigma

Disclaimer: all of this is constantly evolving
What is Monkeypox?

• Zoonotic DNA virus in the genus *Orthopoxvirus*

• Previously reported from Central Africa and West Africa

• 2003 US outbreak associated with pet prairie dogs that came into contact with imported rodents from West Africa

• Current outbreak associated with Clade 2 (from West Africa, associated with less severe disease)
Current Outbreak

- Origin: first case in 2017 in Nigeria (after 40 years)
- 2018-2021: sporadic travel and animal related cases
- May 2022: new outbreak reported in Europe -> global
- July 2022: WHO declares a public health emergency of international concern

Global Cases: 36,589
Current Outbreak

• August 2022: US declares a Public Health Emergency

10,768 Total confirmed monkeypox/orthopoxvirus cases
*One Florida case is listed here but included in the United Kingdom case counts because the individual was tested while in the UK.

As of 8/16/2022:
US Total: 12,689
MO Cases: 24
Important Global/Public Health Lesson

• If we neglect certain diseases because they are occurring elsewhere, then they may spillover and affect us in the long term

• Parallels between COVID-19 emerging variants and monkeypox
Important Initial Points

• Usually a mild illness that self-resolves in about 2-4 weeks
  • Mortality varies: ~3-6% historically with Clade 2 (current outbreak: <1%)
  • Many patients will not need treatment
  • Primarily an outpatient disease (hospitalization rate 8-13%)

• Vast majority of cases occurring in individuals who identify as MSM (priority population = focus on equity)

• Although sexual contact is primary means of transmission in this outbreak monkeypox, it is not the only way

• Very, very few cases of healthcare associated transmission (1 in 2018, 1 in current outbreak)
Monkeypox: Signs and Symptoms

- 1-2 week incubation period
- Prodromal symptoms (flu-like symptoms) followed 1-5 days later by characteristic rash

Prodrome not present in many patients
Monkeypox: Signs and Symptoms

Traditional Rash Progression
- Macules → Papules → Vesicles → Pustules → Scabs
- Tongue/Mouth → Face → Arms/Legs → Hands/Feet (including palms/soles)

Firm, deep seated, sometimes umbilicated, and painful
Monkeypox: Signs and Symptoms

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Monkeypox: Signs and Symptoms

- First symptoms can be lesions developing in the genital and/or perianal region or rectal pain/proctitis (sometimes no visible lesion)

Monkeypox: Signs and Symptoms

- Lesions on the same body site can be at different stages of progression

- Lesions can be much smaller and fewer than expected
  - Still presenting as firm, deep seated, sometime umbilicated and painful

- 2-4 week course – considered contagious until crusted over and healed

- Usually self-limited without severe illness (even without treatment)
Monkeypox: Clinical Presentation
(as of July 25, 2022)

- Rash (99%)
- Malaise (70%)
- Fever (64%)
- Lymphadenopathy (63%)
- Rectal Pain (45.5%)
Monkeypox: Epidemiology (as of July 25, 2022)

• **Median Age:** 35 (18-76 years)

• **Male sex at birth:** 1,373 (99.1%) (13 females)

• **MSM:** 304/309 (98.4%)

• STI co-infection rates are high

• **Epidemiology is changing** – children (household contacts) and females have been diagnosed (but very few cases comparatively)
Monkeypox Epidemiology

Data as of 21 Aug 2022 2:00 PM EDT

Monkeypox cases reported to CDC: Age and Gender

- Men
- Women
- Transgender men
- Transgender women
- Additional gender identity

Monkeypox cases reported to CDC: Race/Ethnicity

- American Indian/Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Multiple Races
- Native Hawaiian or Other Pacific Islander
- White

Washington University Physicians • Barnes-Jewish Hospital
Rash Presentations – Prior Outbreaks

Lesions observed in endemic countries

Lesions observed during 2003 U.S. monkeypox outbreak

https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html
Rash Presentations – Prior Outbreaks

Shared with permission from patients, CDC 2022
Rash Presentations – 2022 Monkeypox Outbreak

Shared with permission from patients, CDC 2022

Washington University Physicians • Barnes-Jewish Hospital

Department of Internal Medicine
Division of Infectious Diseases
Rash Presentations – 2022 Monkeypox Outbreak
# Monkeypox: Differential Diagnosis

## Rash
- Herpes simplex virus (HSV)
- Varicella Zoster (VZV)
- Syphilis
- Molluscum contagiosum
- Disseminated fungal infection
- Disseminated gonococcal infection

## Proctitis
- HSV
- Gonorrhea
- Chlamydia (including Lymphogranuloma Venereum)
- Syphilis

**Non-infectious:** Behcet’s disease, recurrent aphthous stomatitis, trauma, squamous cell carcinoma, drug induced, etc

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![Behçet disease - tongue](image1)
![Behçet disease - pustular lesion on arm](image2)
### Monkeypox: Differential Diagnosis

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Remember to also check for HIV
## Transmission

<table>
<thead>
<tr>
<th>Stage of Disease</th>
<th>Transmissibility</th>
<th>Symptom monitoring or isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation Period</td>
<td>Not contagious</td>
<td>Monitor for symptoms</td>
</tr>
<tr>
<td>Prodrome</td>
<td>Possibly contagious</td>
<td>Isolate (at home or healthcare facility)</td>
</tr>
<tr>
<td>Rash</td>
<td>Contagious*</td>
<td>Isolate (at home or healthcare facility)</td>
</tr>
</tbody>
</table>

**Human to human:** contact with body fluids, scabs, and skin lesions

**Fomites:** objects, fabrics (clothing, bedding, towels)

**Respiratory secretions:** can be infectious with very close, face to face contact
  - No reported long-range (airborne) transmission (e.g. no transmission on airplanes)
PPE: Airborne and Contact Precautions

**Gown, gloves, eye protection** (face shield or goggles), **N95 respirator** (or PAPR/CAPR)

Negative pressure ventilation (NPV) room only required for aerosol-generating procedures and ICU patients
Transmission: Healthcare Workers

• 1 documented case of healthcare associated transmission

• Healthcare assistant with ≥1 episode of close contact with the bedding and clothing of a patient prior to the patient’s diagnosis of monkeypox (only wearing gown and gloves, no mask or eye protection)
Testing

• Epic Order for Monkeypox (*Orthopoxvirus*) PCR Test

• Collect 2 dry swabs from 2-3 lesions (swab vigorously)

• In setting of proctitis/isolated rectal pain – okay to swab a perceived rectal lesion

• Commercial labs ($90, 3-4 day turn around?)

• BJC send-out to Mayo: ???
Medical Countermeasures

• Mostly a mild, self-limiting disease
  • Prognosis depends on multiple factors – prior vaccination, baseline health, concurrent comorbidities

• No specific therapy, smallpox therapies may be beneficial

JYNNEOS
ACAM2000
Tecovirimat (TPOXX)
Cidofovir
Brincidofovir
Vaccinia immune globulin
Vaccination Strategy

• Limited vaccine supply – currently focusing on Post Exposure Prophylaxis (PEP)
  • 8/9: new alternate dosing for Jynneos to increase doses
  • 8/12: MO has started vaccinating for PEP++

• Vaccine Equity: vaccines currently being distributed to highest risk population (MSM with certain risk factors)

• Main vaccine being used is Jynneos (replication-deficient) – no data on specific effectiveness in current outbreak

• Overall Strategy: PEP -> PEP++ -> and then PreP
  • More vaccines expected in the fall
Vaccines: JYNNEOS and ACAM2000

**JYNNEOS:** live *Vaccinia virus*, replication-deficient
- 2 injections 28 days apart, immune response 14 days after 2\(^{nd}\) dose
- Standard: subcutaneous 0.5, **alternative:** 0.1mL intradermal
- FDA approved to prevent smallpox or monkeypox in people ≥18
- **Safe for immunocompromised patients**

**ACAM2000:** live *Vaccinia virus*, replication competent
- 1 dose via multiple puncture – a lesion (“take”) will develop at site of inoculation
- Immune response takes 4 weeks
- FDA licensed for smallpox; allowed for monkeypox under Expanded Access protocol
- Contraindicated in immunocompromised patients
Vaccination Strategy

Post-Exposure Prophylaxis

• **Known contacts** identified by case investigation, contact tracing, and risk exposure assessments

• Administer within 4 days of exposure, if given 4-14 days after may not prevent disease but may reduce symptoms
  • No benefit if administered after monkeypox symptoms develop
Vaccination Strategy

Expanded Post-Exposure Prophylaxis (PEP++)

• Vaccination after known or presumed exposure to monkeypox

• Aware that a recent sex partner within the past 14 days was diagnosed with monkeypox

• Certain MSM or transgender individuals who have had any of the following in the past 14 days: sex with multiple partners, sex at a commercial sex venue, or sex in association with an event, venue, or defined geographic area where monkeypox transmission is occurring

In MO: have started vaccinating this group
## Vaccination Strategy

| Pre-Exposure Prophylaxis (PrEP) | Vaccination before exposure to monkeypox | People in certain occupational risk groups* |

*People at risk for occupational exposure to orthopoxviruses include research laboratory workers performing diagnostic testing for *Monkeypox virus*, and members of health care worker response teams designated by appropriate public health and antiterror authorities (see [ACIP recommendations](https://www.cdc.gov/vaccines/acip/index.html)).
Post-Exposure Prophylaxis (PEP):

- **High Degree of Exposure:**
  - Unprotected contact between skin or mucous membranes with skin, lesions, or body fluids from a patient or contaminated materials (e.g. linens)
  - Being inside the patient’s room or within 6 feet of a patient during aerosol generating procedures or resuspension of dried exudates without appropriate PPE

PEP Recommended

- **Intermediate Degree of Exposure:**
  - Within 6 feet for 3 hours or more of an unmasked patient without wearing, at a minimum, a surgical mask
  - Contact between sleeves and other parts of an individual’s clothing with the patient’s skin lesions, body fluids, or soiled linens/dressings while wearing gloves but not a gown
  - Informed clinical decision making for PEP

Vaccination Strategy: Exposed Healthcare Workers

Call Occupational Health if concerned about an exposure
Emphasis on Equity!!
Medical Countermeasures: Tecovirimat

CDC holds EA-IND allowing Tecovirimat to be used for orthopoxviruses in adults and children – available PO and IV

Efficacy to treat monkeypox infection
  • Animal studies suggest mortality benefit
  • Case reports in humans suggest possible benefit on duration of illness, viral shedding

Efficacy as PEP uncertain

Safety and side effects
  • Minor side effects in healthy subjects (injection site pain/swelling/redness, headache, nausea, abdominal pain, fatigue, myalgias)
Monkeypox: Treatment Considerations

• Severe disease—including pain

• High risk of severe disease, including
  • Immunocompromising conditions
  • Children, particularly ≤8 years of age
  • Pregnant or breastfeeding
  • Atopic dermatitis or exfoliative skin conditions
  • Additional complications
  • Aberrant infections, including accidental implantation in eyes, mouth, or other anatomical areas where monkeypox lesions might constitute a special hazard, including genital and perianal areas

• Empiric treatment may be appropriate in some cases

• Benefit likely greatest when antiviral treatment is started early
## Tpoxx Uptake

<table>
<thead>
<tr>
<th>Demographics</th>
<th>N (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (N=288)</td>
<td>37.0 (median)</td>
</tr>
<tr>
<td></td>
<td>20-76 (range)</td>
</tr>
<tr>
<td>Missing</td>
<td>1 (N/A)</td>
</tr>
<tr>
<td>Sex at birth (N=288)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>281 (98.9%)</td>
</tr>
<tr>
<td>Female</td>
<td>3 (1.1%)</td>
</tr>
<tr>
<td>Not reported</td>
<td>4 (N/A)</td>
</tr>
<tr>
<td>Race and ethnicity (N=288)</td>
<td></td>
</tr>
<tr>
<td>Asian, non-Hispanic</td>
<td>8 (3.1%)</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>40 (15.6%)</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>103 (40.2%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>90 (35.2%)</td>
</tr>
<tr>
<td>Unknown Race, non-Hispanic</td>
<td>6 (2.3%)</td>
</tr>
<tr>
<td>Multiple Races, non-Hispanic</td>
<td>5 (2.0%)</td>
</tr>
<tr>
<td>Other, non-Hispanic</td>
<td>4 (1.6%)</td>
</tr>
</tbody>
</table>
Key Points: Clinical

• Patients can present with subtler rash findings; may also only present with proctitis or genital/anal lesions

• Mainly an outpatient disease – does not require ED for testing or treatment (unless they are clinically unstable)

• Test for common co-infections and mimics: syphilis, HSV, VZV, gonorrhea/chlamydia; don’t forget HIV

• Patients with severe disease (including rectal pain or involvement of high risk areas) or high risk of severe disease warrant treatment with Tecovirimat (TPOXX)

• Currently vaccinating for PEP and individuals with high risk epidemiologic factors (trying to decrease transmission)
Brief Point on Stigma

- LGBTQIA+ individuals have experienced stigma at the hands of healthcare system for years
  - 9% of LGB report doctor refusing seeing them
  - 29% of Trans folks report doctor refusing to see them

- No such thing as a “gay disease”
- Fear -> stigma
- PPE as a barrier
- Paperwork as a barrier
- Comparing COVID-19 response to Monkeypox response
- Normalizing sexual health
Thanks for listening!

Questions?

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