# Updates in Mpox

**Raaka Kumbhakar, MD, MPH**
Clinical Assistant Professor
University of Washington, Division of Allergy and Infectious Diseases

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# Disclosures

None

# Disclaimer

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AETC AIDS Education & Training Center Program Mountain West

# Data Considerations

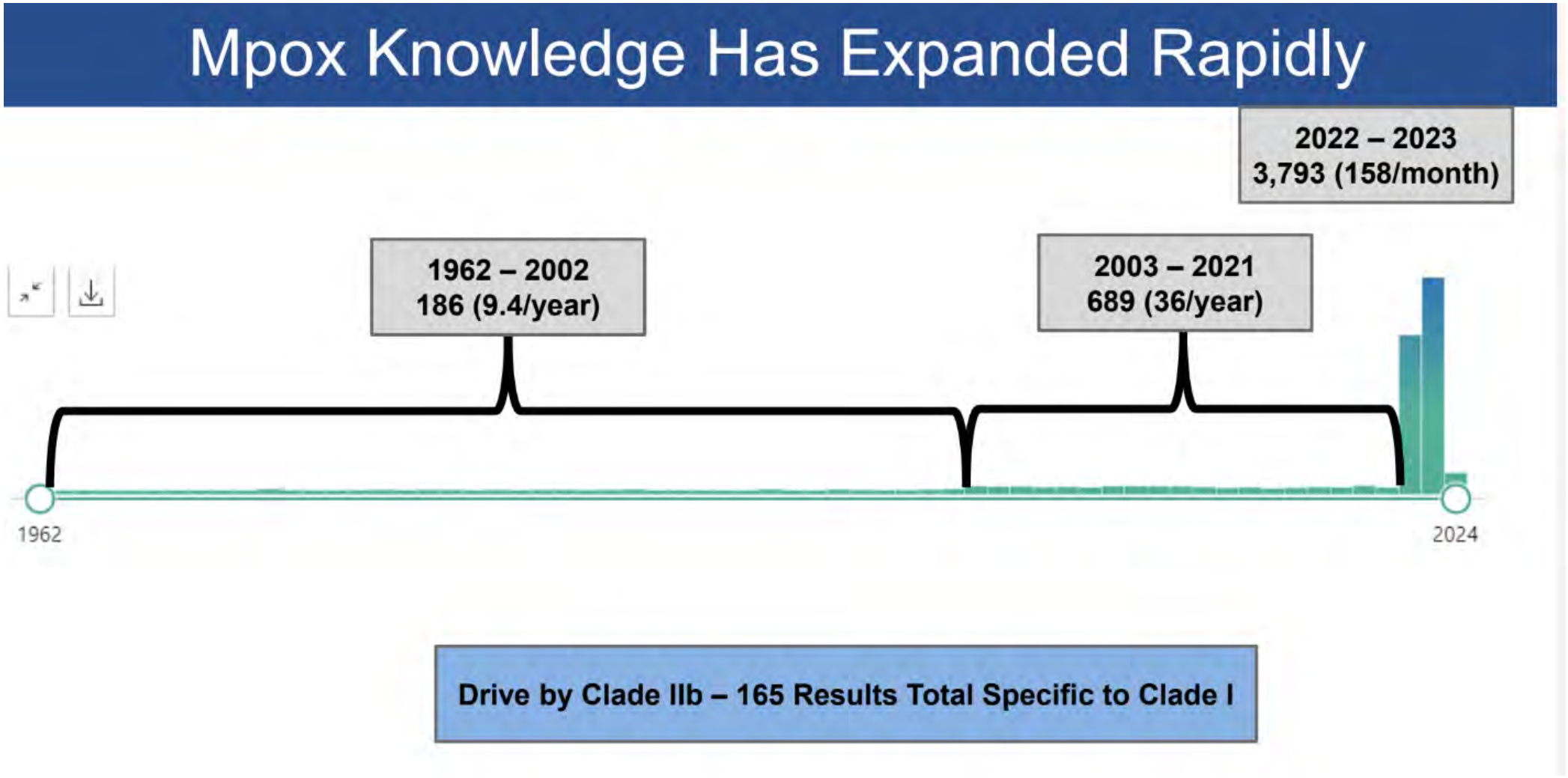
*Data in this presentation offer a limited perspective of how systemic, social, and economic factors impact health. We recognize that racism, not race, creates and perpetuates health disparities.*

**To Learn More:**
**https://www.cdc.gov/minorityhealth/racism-disparities**

# Mpox in 2024

- Epidemiology
- Clinical Manifestations
- Treatment
- Vaccination as Prevention

# What do we know now?

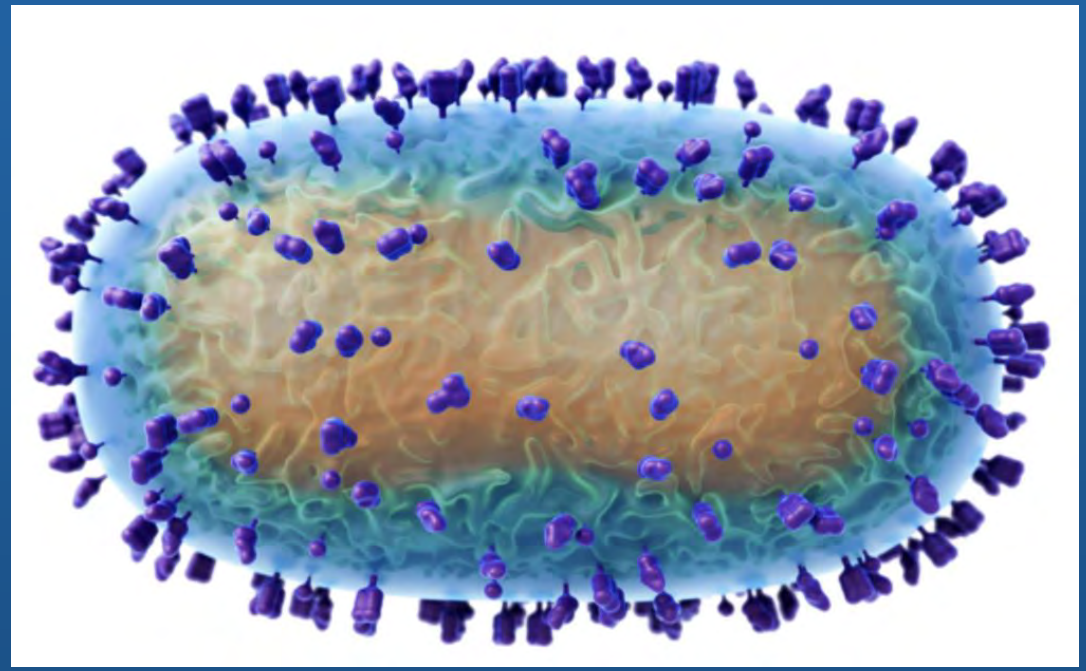



Slide credit : Dr. Jason Zucker

# Epidemiology

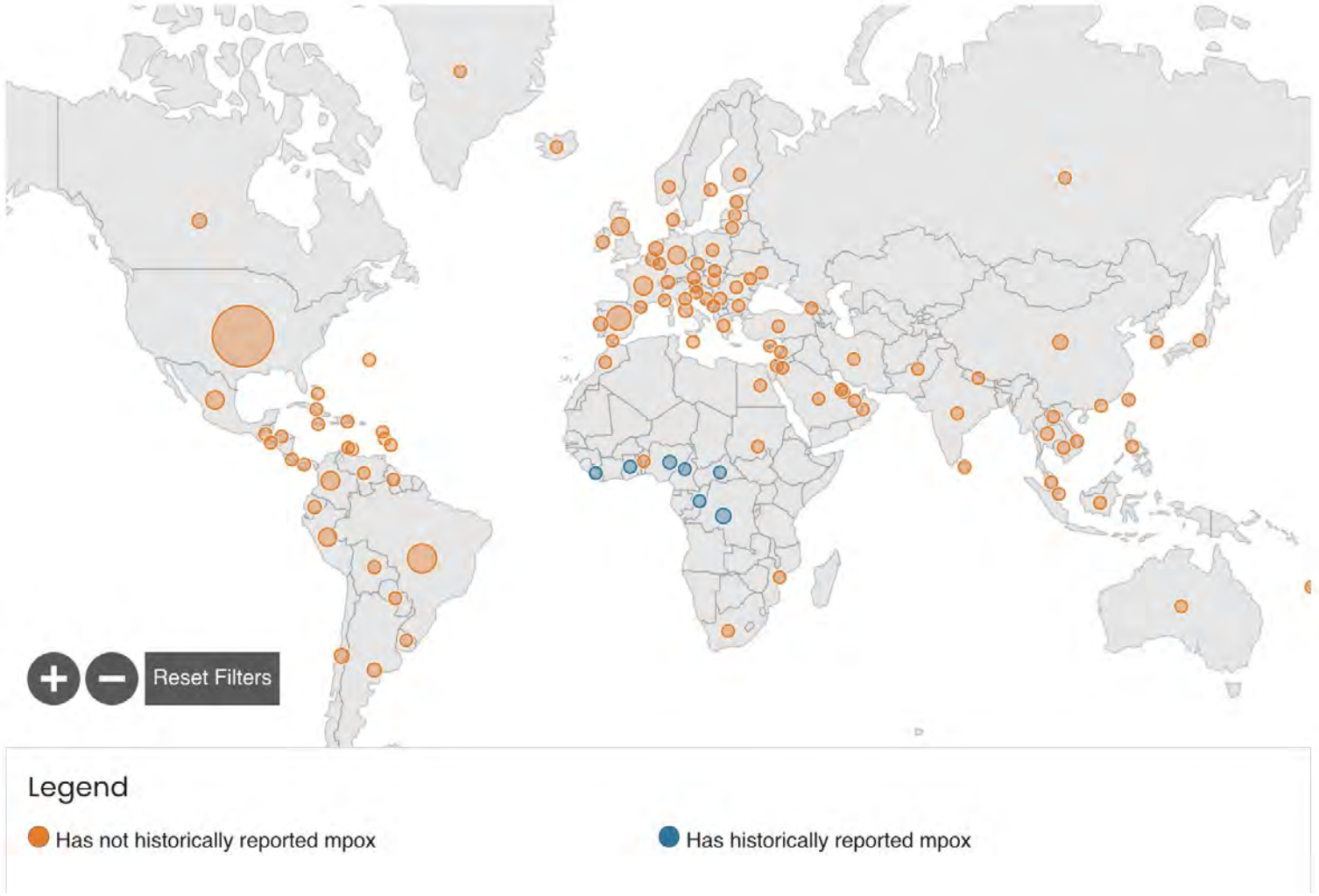
# Epidemiology: prior to 2022

- Mpox virus first identified in 1970s in West/Central Africa, associated with animal host exposure
- Two clades of virus: Clade I associated with more severe disease than Clade II
- Previous US outbreaks:
  - spillover events from imported mammals from West Africa; or
  - travel associated without subsequent transmission



# Epidemiology: 2022 Multinational Mpox Outbreak

- **Clade II** global outbreak
- **97,821 cases** in 118 locations, only 7 of which have historically reported mpox
- Human to human transmission, majority via sexual networks (primarily MSM)




CDC, data as of 12 Jun 2024

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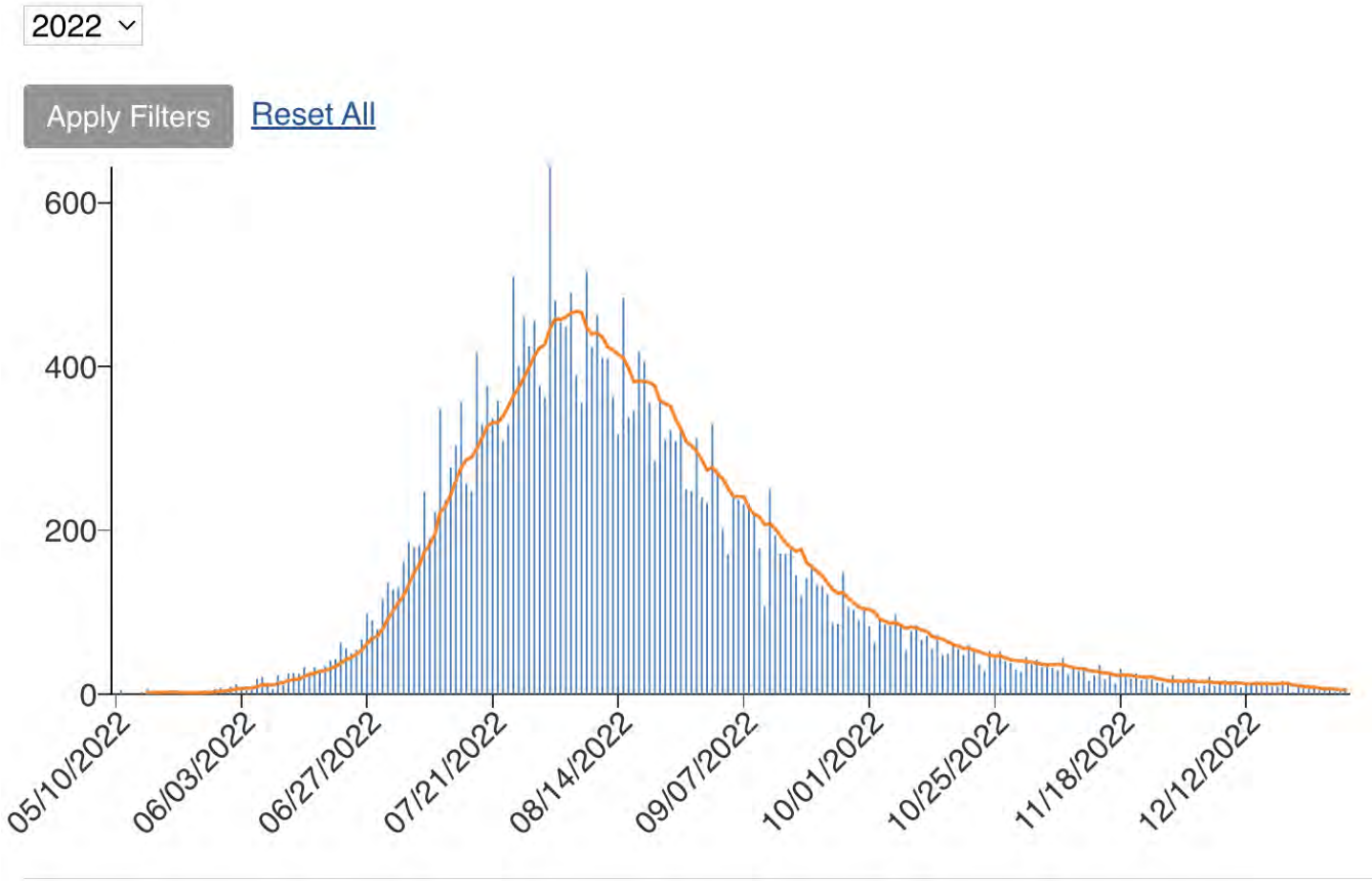
# Epidemiology: 2022 United States Mpox Outbreak

- 32,063 cases from January 2022 through January 11, 2024
- 56 mpox associated deaths
- Disproportionately has affected:
  - Men who have sex with men (MSM)
  - Hispanic/Latino and Black persons
  - Transgender and gender-diverse adults
  - People with HIV
  - People with STIs in previous year




CDC Mpox, accessed June 2024

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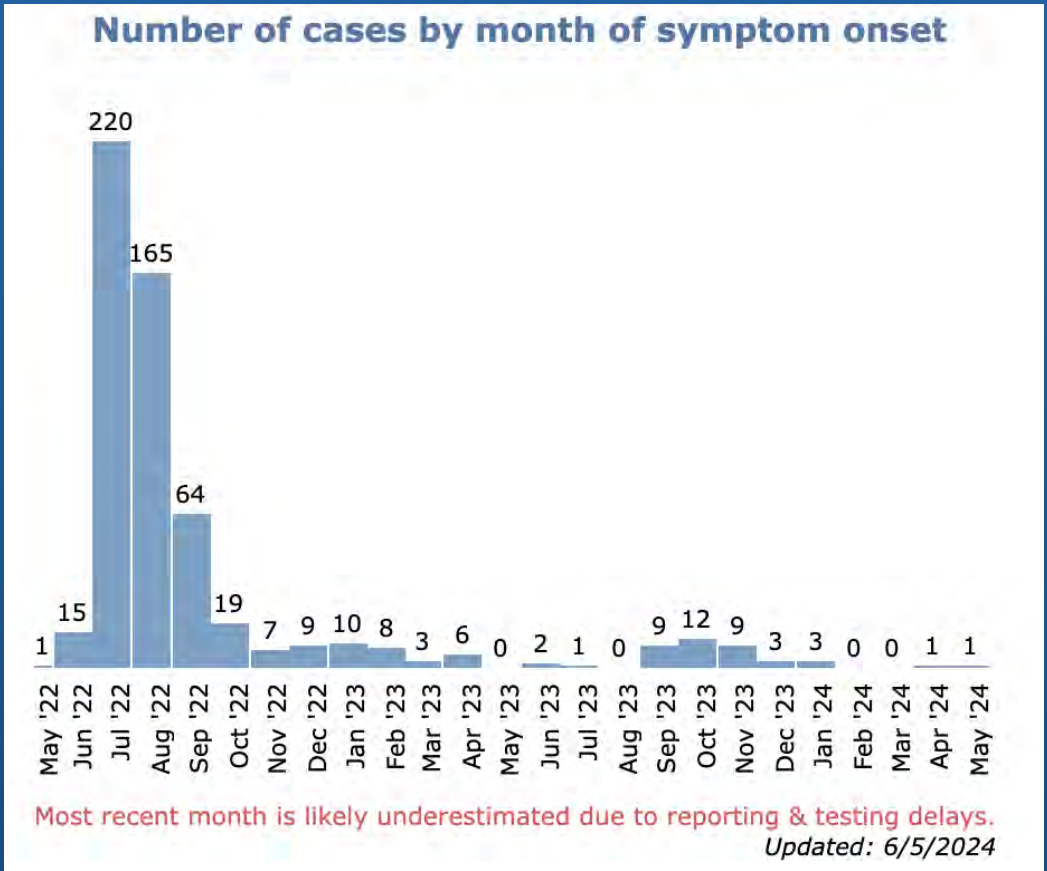
# Epidemiology: What's happening now?

## Cases among King County residents




NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE
Ashwin Vasan, MD, PhD
*Commissioner*

**2024 Health Advisory #12: Updates on Mpox in New York City**

Among NYC cases from 10/2023 – 4/2023:

- 73% (188) not vaccinated or incompletely vaccinated
- 94% among MSM
- Majority Black or Hispanic and between ages 25-44
- Most mild; 10 (3.9%) hospitalized

**NYC DOH; Public Health Seattle-King County**

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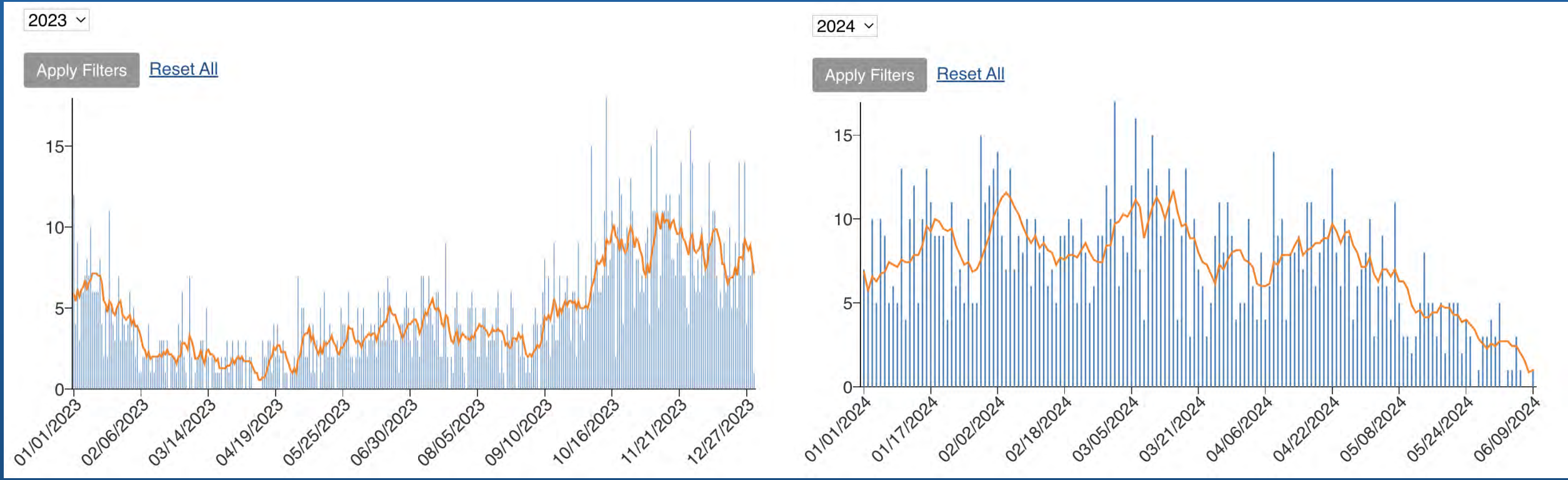
# Epidemiology: What's happening now?




**CDC Mpox, last accessed June 2024**

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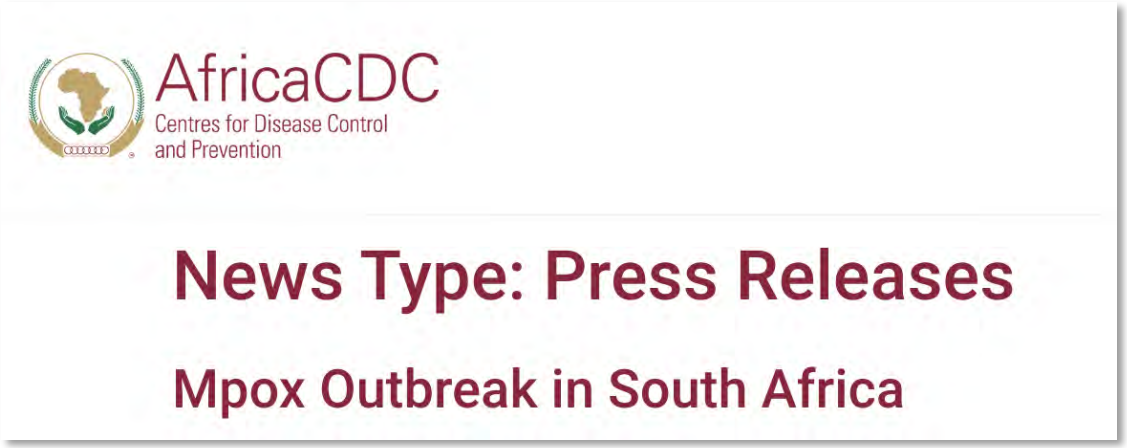
# Epidemiology: What's happening now?

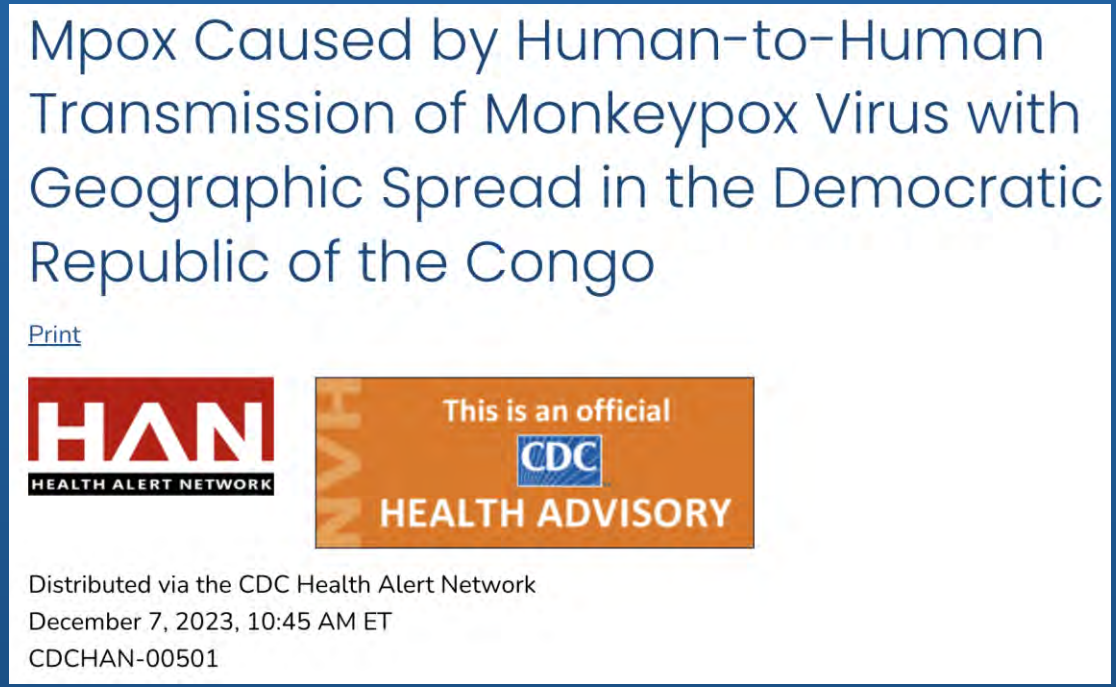
- South Africa outbreak
- From 1 January to 6 June 2024, seven confirmed mpox cases have been reported:
  - **Clade II**
  - Men between 30 and 39 years old, all with HIV; 5/7 MSM
  - Multiple provinces; no international travel history
  - **Two deaths**




Africa CDC, 13 June 2024

# Epidemiology: Clade I outbreak in DRC

- Since January 2023 more than 12,000 suspected cases of Clade I mpox reported in the Democratic Republic of the Congo.
  - One cluster associated with sexual contact
  - 581 deaths (5%)
- To date, **no Clade I mpox infections have been reported in the United States**.
- Consider in patients with a clinical illness who report travel to the Democratic Republic of the Congo within 21 days of the illness onset
- Vaccination is expected to be protective against Clade I; no difference in management and/or treatment options


Mpox Caused by Human-to-Human Transmission of Monkeypox Virus with Geographic Spread in the Democratic Republic of the Congo

Print

HAN HEALTH ALERT NETWORK

This is an official CDC HEALTH ADVISORY

Distributed via the CDC Health Alert Network
December 7, 2023, 10:45 AM ET
CDCHAN-00501

**National STD Curriculum; Kibungu et al. Emerg Infect Dis. 2024.**

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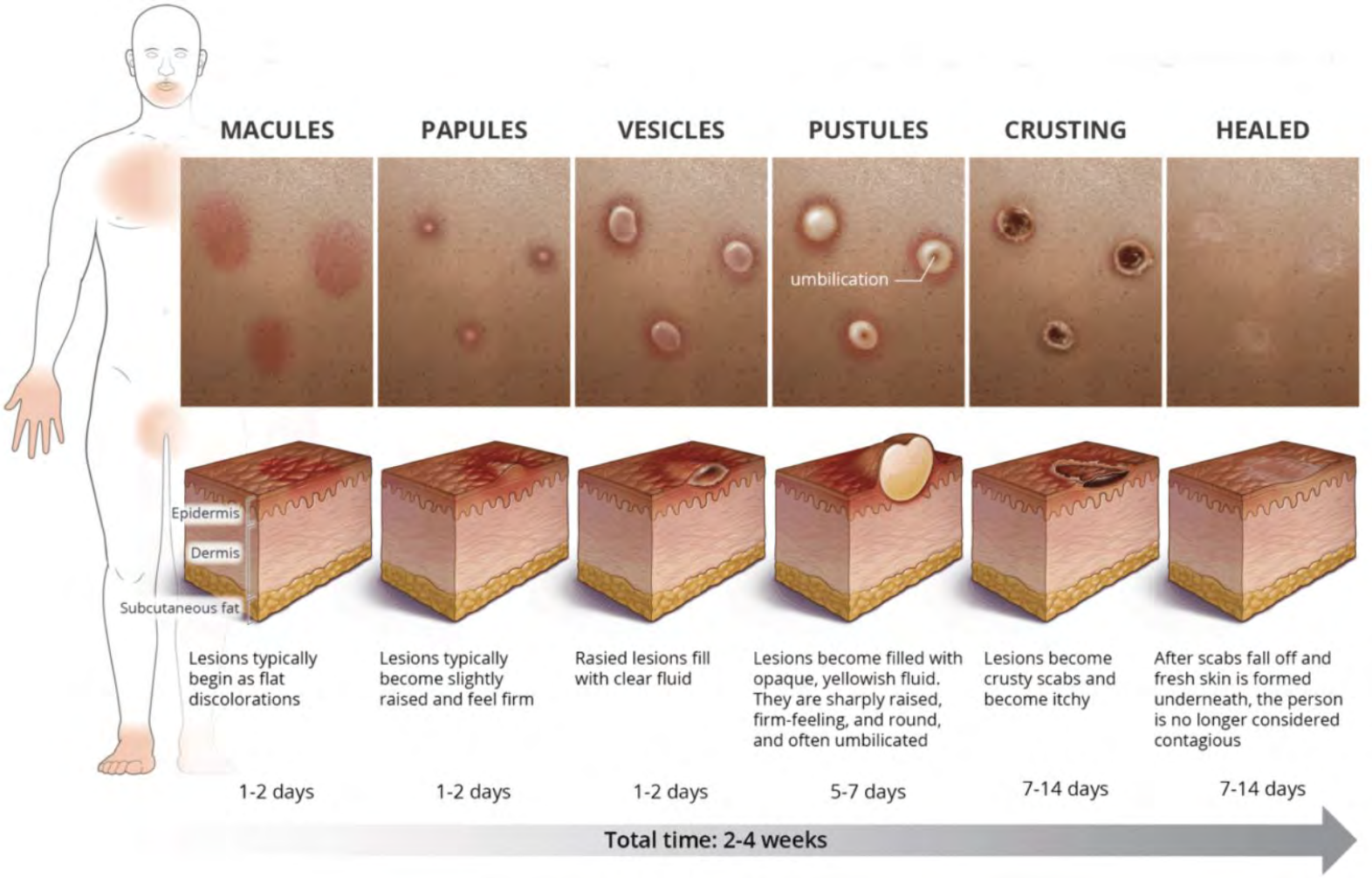
# Clinical Manifestations

# Typical Presentation




- +/- prodrome
- Rash
- Anorectal symptoms
- Oropharyngeal symptoms
- Ocular manifestations
- Pain
- Secondary bacterial infection
- Concomitant STI

# Severe mpox

- Among those with significant immunocompromise
  - Bowel obstruction, rectal wall perforation, urethritis, necrotizing lymphadenopathy, myopericarditis
- Severe Necrotizing Mpox in Advanced HIV (CD4 < 350 cells/mm3)
  - Necrotizing skin lesions
  - Visceral involvement
  - Sepsis
  - Secondary Infection
  - High mortality rate (25%)
- Nearly all mpox associated deaths in US in immunocompromise; almost 90% of mpox associated deaths in Black men

National STD Curriculum; Mitja et al. Lancet 2023; Riser et al. MMWR 2023

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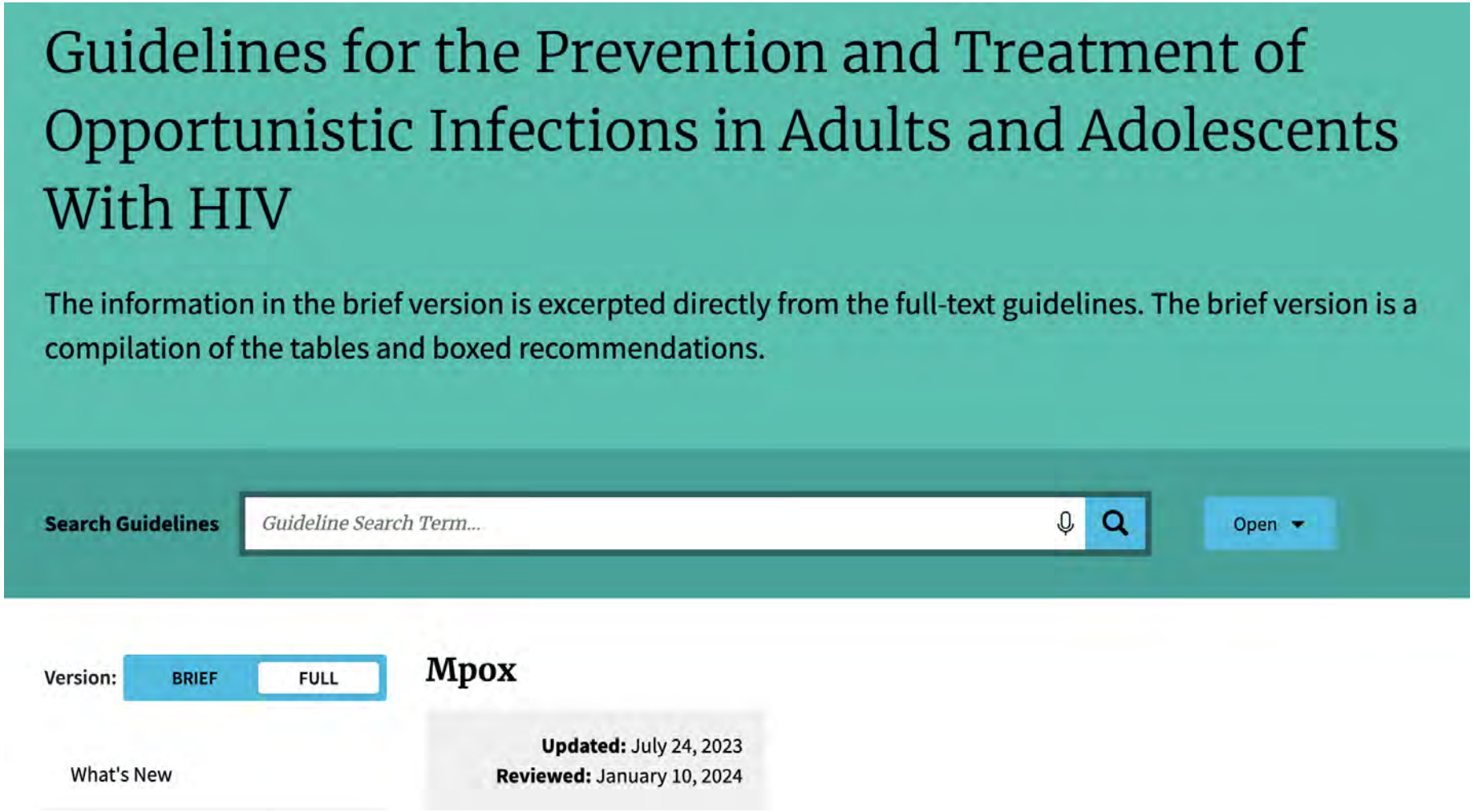
# Mpox in HIV


Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents With HIV
The information in the brief version is excerpted directly from the full-text guidelines. The brief version is a compilation of the tables and boxed recommendations.
Search Guidelines
Guideline Search Term...
Open
Version:
BRIEF
FULL
Mpox
Updated: July 24, 2023
Reviewed: January 10, 2024
What's New

# Treatment

# Treatment

- Supportive Care
  - Most patients fully recover
  - Symptomatic treatment

→ Clinical Experience: No data

- Antibody Therapy
  - Vaccinia Immunoglobulin (VIGIV)
- Antivirals
  - Tecovirimat (EA-IND)
  - Cidofovir
  - Brincidofovir
  - Trifluridine (eye disease)

→ Medical Countermeasures: No clinical trial data

Severe or at risk for severe disease

Slide Credit Dr. Jason Zucker

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# Tecovirimat

- First-line treatment under CDC EA-IND protocol; initially developed for smallpox

Does it work for mpox?

- No RCT data exists; several cohort studies with mixed results
- Safety data encouraging
- Maybe shorter duration of viral shedding
- Early treatment may result in more rapid symptom improvement in those with severe illness; no impact on illness resolution

National STD Curriculum; Karmarkar et al. OFID 2024

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# Tecovirimat: Resistance

- Single amino acid changes in MPXV F13L gene can cause resistance
- Tested 124 isolates from 68 patients with suspected resistance; 96 isolates from 46 patients found to have resistant phenotype
- Most resistant isolates associated with severely immunocompromised patients on multiple courses of tecovirimat treatment
- Overall <1% resistance in population
- Tecovirimat can lead to transmitted resistance

Smith et al. Emerg Infect Dis. 2023; Garrigues et al. Antimicrob Agents Chemother 2023.

# Tecovirimat: RCT

ACTG AIDS CLINICAL TRIALS GROUP

STOMP Study of Tecovirimat for Human Monkeypox Virus

IMPAACT International Maternal Pediatric Adolescent AIDS Clinical Trials Network

| ACTG A5418 STUDY POPULATION: SYMPTOMATIC MONKEYPOX VIRUS INFECTION | |
|---|---|
| RANDOMIZED ARMS: TPOXX vs. placebo (2:1) | OPEN LABEL TPOXX ARM |
| • Primary efficacy objective: To show that TPOXX reduces time to clinical resolution.<br>• If progressing to severe or experiencing severe pain, then can move to open-label TPOXX | • Children, pregnant and breast-feeding people<br>• Severe disease (hospitalized, ocular disease, facial lesions, complicated ulcers)<br>• Severe skin disease or immune suppression |
| • IN PERSON enrollment and follow-up for 8 weeks with detailed virologic assessments, daily diary, and telemedicine<br>• COMPLETELY REMOTE option is forthcoming in a version change<br>• Up to 80 sites in US with possibility for international sites | |

| STOMPTPOXX.ORG | (855) 876-9997 | NCT05534984 |
|---|---|---|
| Website with list of active sites | Call center to connect to sites | See clinicaltrials.gov for details |

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# Tecovirimat (TPOXX): what's happening now?

## Oral TPOXX Via NIH's STOMP vs. CDC's EA-IND Protocol

### STOMP Inclusion Criteria

- Illness duration <14 days;
- At least 1 active lesion (i.e., not scabbed) or proctitis; and
- No prior or concomitant TPOXX receipt*

### Randomized STOMP Arm Only

- **Non-pregnant** or **non-lactating adults** with **mild illness** who **do not have severe immunocompromise** or **active skin conditions**
  - Those who develop severe mpox or have persistent severe pain will move to the open-label arm and receive oral TPOXX

### Open-Label STOMP Arm or EA-IND

- **Severe immunocompromise**
- **Active skin conditions**
- **Pregnant or lactating**
- **Child < 18 years**
- **Severe mpox† or protracted or life-threatening manifestations of mpox§**

### EA-IND Eligibility Criteria§

- **Severe immunocompromise** (e.g., HIV with CD4 < 200 cells/mm$^3$, leukemia, solid organ transplantation)
- **Active skin condition(s)** affecting skin integrity (e.g., eczema, impetigo)
- **Pregnant or lactating**
- **Child <18 years**
- **Protracted or life-threatening manifestations** (i.e., lesions affecting ≥ 25% of body surface that may be confluent, necrotic, and/or hemorrhagic in appearance or cause sepsis; disease resulting in airway compromise or affecting the nervous system; cardiac and/or neurologic disease; ocular or periorbital infection)

**EA-IND Only: patients who meet EA-IND eligibility but not STOMP inclusion criteria** (e.g., illness onset ≥ 14 days and/or prior TPOXX receipt)

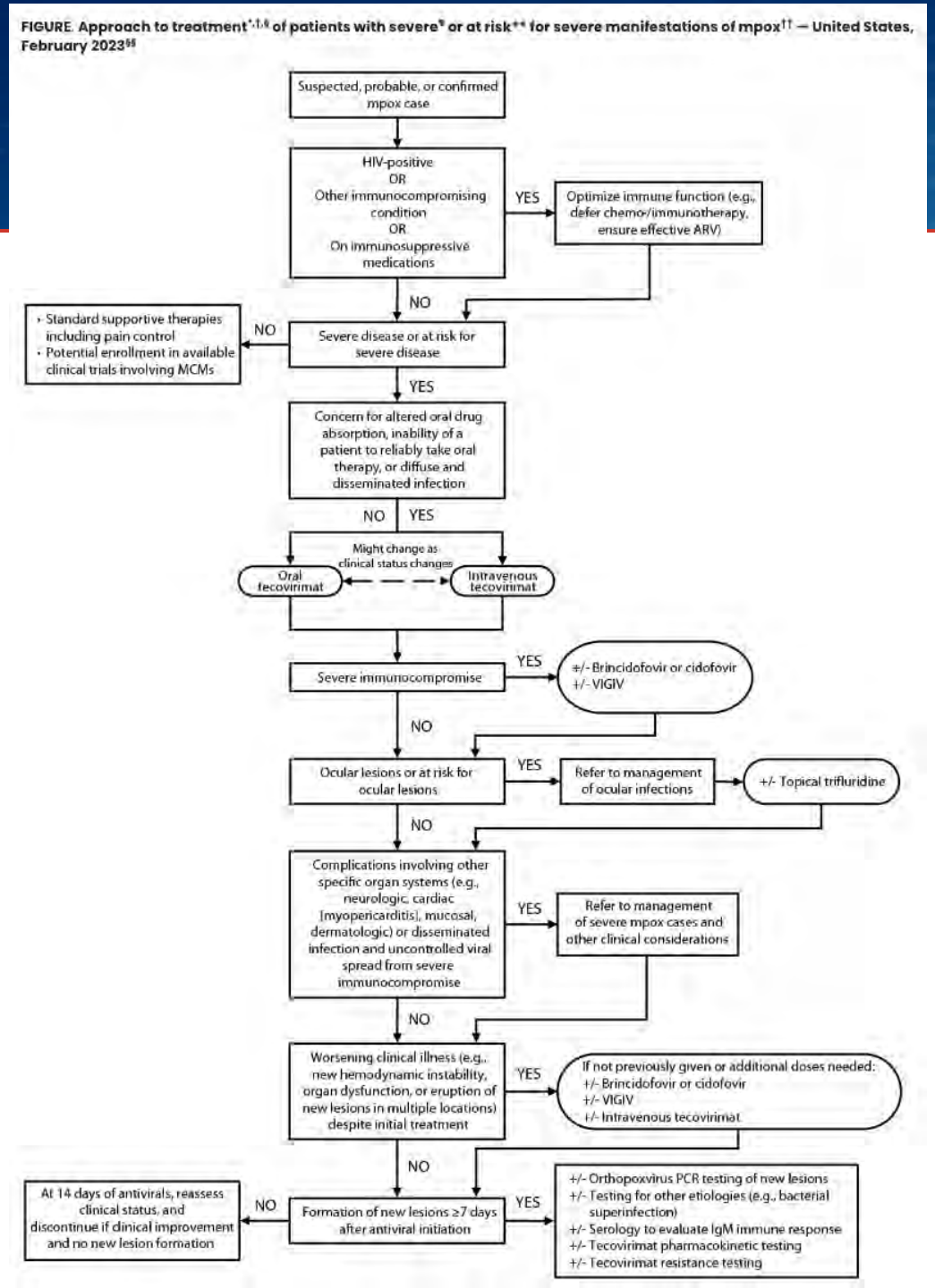
* Children <18 years and pregnant and/or lactating persons may have received up to 3 days of TPOXX immediately prior to enrollment

† STOMP severe mpox definition (e.g., ocular involvement; facial lesions on the malar, nose, or eyelid; confluent facial lesions; hospitalization due to monkeypox virus infection) is broader than the EA-IND's protracted or life-threating manifestations

§ As defined in Section 2.1 of the EA-IND protocol

# Treatment

- CDC approach to medical countermeasures (MCM)




Rao et al. MMWR 2023

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# Prevention

# Vaccination as Prevention

**February 22-24, 2023**

ACIP approved the following recommendation by majority vote at its February 22-24, 2023 meeting:

- ACIP recommends the 2-dose* JYNNEOS vaccine series for persons aged 18 years and older at risk of mpox during an mpox outbreak§.

*Dose 2 administered one month after dose 1
§Public health authorities determine whether there is an mpox outbreak; a single case may be considered an mpox outbreak at the discretion of public health authorities. Other circumstances in which a public health response may be indicated include ongoing risk of introduction of mpox into a community due to disease activity in another geographic area.

This recommendation has been adopted by the CDC Director and is now official.

- Persons who are gay, bisexual, and other MSM, transgender, or nonbinary people who in the past 6 months have had:
  - A new diagnosis of at least 1 sexually transmitted disease
  - More than 1 sex partner
  - Sex at a commercial sex venue
  - Sex in association with a large public event in a geographic area where mpox transmission is occurring
- Persons who are sex partners of the persons described above.
- Persons who anticipate experiencing any of the situations described above

# Vaccination as Prevention: is it effective?

| | 2 doses | 1 dose |
|---|---|---|
| Deputy , NEJM | 66% | 36% |
| Dalton, MMWR | 86% | 75% |
| Rosenberg, MMWR | 76% | 68% |
| Ramchandani, OFID | 83% | 81% |
| Bertran, Lancet ID | | 76% |
| Sagy, Nature Medicine | | 86% |

- Reduced odds of hospitalization among vaccinated California residents

Image Credit Jason Zucker, MD; Schildhauer et al. MMWR 2023

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# Infection after vaccination and/or previous infection

- Global series of 37 individuals: primarily solitary lesions, no deaths, one hospitalizations
  - Severity scores lower in reinfection and post-vaccination
- Chicago cluster: all those vaccinated with self limited disease; those fully vaccinated less likely to experience mucosal lesions
- Seattle: mpox testing in asymptomatic and symptomatic patients at SHC
  - Study subjects who were vaccinated were more likely to have asymptomatic mpox than unvaccinated (4.4 times for one dose, 11.9 times for two)
  - Less severe/asymptomatic disease associated with vaccination

Hazra et al. Lancet Infectious Diseases 2024; Faherty et al MMWR 2023; Golden et al. Sex Transm Dis 2024.

# Vaccination: what's happening now?

## JYNNEOS Vaccine Commercial Transition

**ASPR**/CDC Mpox Vaccination Operational Planning Guide - HHS Mpox Vaccination Program

**As of April 1, 2024, JYNNEOS mpox vaccine is commercially available. As an ACIP-recommended vaccination for high-risk people 18 years and older, the vaccine is covered under Medicare and Medicaid and is expected to be covered by private payers.**

"During the transition to commercial supply, providers may continue to access the HHS JYNNEOS supply as commercial availability ramps up, especially to support access in circumstances in which commercial supply is not yet accessible….if additional supply is needed after that time [*April 30th 2024*], jurisdiction and federal entity partners can use the established OOC request process. **On or near August 1, 2024, HHS anticipates that requests and ordering of USG-procured JYNNEOS will fully close."**

# Take Home Points

- Though not near levels of 2022 outbreak, mpox continues to circulate at low levels within the US and worldwide
- In the US, mpox continues to disproportionately affect MSM, Black, and Hispanic/Latinx individuals
- Clinical manifestations include severe disease in those who are immune compromised
- Ongoing investigation is needed to assess clinical impact of medical countermeasures
- Vaccination of populations who may be impacted by mpox remains a critical intervention, with a specific lens on equity of distribution

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# Acknowledgements

Jason Zucker, MD

National STD Curriculum

# Acknowledgment

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