

## Mpox (Monkeypox Virus)

### Summary

Monkeypox (Mpox) virus is an acute viral disease characterized by painful papulopustular rash, swollen lymph nodes, and often fever, chills, myalgias, and headache. The rash may be located on hands, feet, chest, face, or mouth or near the genitals, including penis, testicles, labia, and vagina, and anus. The diagnosis should be confirmed by laboratory testing using polymerase chain reaction assay (PCR), Next-Generation sequencing of a clinical specimen, or isolation of mpox virus in culture from a clinical specimen.

### Agent

Mpox virus is a double stranded DNA virus that belongs to the genus *orthopoxvirus*, family *poxviridae*. There are two types of the virus that causes mpox: clade 1 and clade 2. Both types spread similarly and can be prevented using the same methods.

### Transmission

#### Reservoir:

- Exact reservoir is unknown, but it is likely that African rodents and primates harbor the virus.

#### Mode of transmission:

- Direct contact with mpox lesions, saliva, or upper respiratory secretions of infected persons or animals. Mpox is usually transmitted through close, sustained physical contact and has been almost exclusively associated with sexual contact in the 2022 global outbreak. Fomite transmission can occur by touching objects, fabrics, and surfaces recently used by someone with mpox and not disinfected, such as clothing, bedding, towels, fetish gear, or sex toys. It is critical that clinicians take a detailed sexual history for any patient with suspected mpox.

#### Period of communicability:

- 1-4 days before the onset of symptoms and/or rash until the rash has fully healed and a fresh layer of skin has formed. Illness typically lasts 2-4 weeks.

### Clinical Disease

#### Incubation period:

Onset of prodromal symptoms typically occur within 3-17 days from exposure, can occur as late as 21 days from exposure.

#### Illness:

Mpox typically is a self-limiting disease with a characteristic rash that can appear 3-17 after exposure. Other symptoms of mpox include fever, chills, swollen lymph nodes, exhaustion, myalgias, and headache; these symptoms can occur before rash, but may occur after rash or not be present at all. Rashes may be located on hands, feet, chest, face, or mouth or near the genitals, including penis, testicles, labia, vagina, and anus. Rash lesions are firm or rubbery,

well-circumscribed, deep-seated, and often develop umbilication (resembles a dot on the top of the lesion). The evolution of lesions progresses through four stages—macular, papular, vesicular, to pustular—before scabbing over and desquamation. Lesions have been described as painful until the healing phase when they become itchy. The risk of severe mpox infection is higher for persons with immunosuppressive conditions such as HIV or pregnancy. Complications include severe pain, ocular infections, myopericarditis, uncontrolled viral spread, neurologic complications, and complications associated with mucosal lesions.

## Laboratory Diagnosis

Due to the rarity of smallpox and limited availability of mpox-specific tests, mpox can be diagnosed with either molecular or virologic testing for *orthopoxvirus* or *monkeypox virus*.

Virus can be isolated or detected by *Orthopoxvirus* DNA PCR or culture from swabs of the lesions, including skin lesion surface, exudate, or lesion crust. False positive PCR results are possible, and suspect cases with no risk factors (travel or recent new sexual partners) should be retested. False negative results are also possible when swabs are collected at the macule (early) or scab (late) stages. If clinically indicated, those tested at the early stage should be retested when lesions progress to papules.

## Treatment

Patients with mpox benefit from supportive care and pain control implemented in early-stage illness. Illness depends on a person's immune response. Mpox can commonly cause severe pain and can affect vulnerable anatomic sites, including the genitals and oropharynx, which can lead to other complications.

Assess pain in all patients with mpox virus infection and recognize that substantial pain may exist from mucosal lesions not evident on physical exam. Topical and systemic strategies should be used to manage pain. Pain management strategies should be individualized and patient-centered, tailored to the needs and context of an individual patient.

Currently there is no treatment approved specifically for monkeypox virus. Most non-immunocompromised patients will recover with supportive care and pain control only. Although nonspecific antiviral therapy is available for mpox, Tecovirimat, an antiviral developed to treat smallpox, is available via the national strategic stockpile in [consultation with CDC](#). Tecovirimat is only prescribed to people with severe mpox disease including persons with ocular infections, neurologic complications, myopericarditis, and complications from uncontrolled spread due to immunocompromise (particularly advanced HIV infection).

## Surveillance

### Case Definition (2023):

#### Suspect –

- New characteristic rash\* **OR**
- Meets one of the epidemiologic criteria and has a high clinical suspicion† for mpox

*Probable* – No suspicion of other recent *Orthopoxvirus* exposure (e.g., *Vaccinia virus* in ACAM2000 vaccination) **AND** demonstration of the presence of

- *Orthopoxvirus* DNA by polymerase chain reaction of a clinical specimen **OR**
- *Orthopoxvirus* using immunohistochemical or electron microscopy testing methods **OR**
- Demonstration of detectable levels of anti-orthopoxvirus IgM antibody during the period of 4-56 days after rash onset

*Confirmed* –

- Demonstration of the presence of monkeypox virus DNA by polymerase chain reaction testing or Next-Generation sequencing of a clinical specimen **OR**
- Isolation of monkeypox virus in culture from a clinical specimen

*Epidemiologic Criteria* (within 21 days of illness onset):

- Reports having contact with a person or people with a similar appearing rash or who received a diagnosis of confirmed or probable mpox **OR**
- Had close or intimate in-person contact with individuals in a social network experiencing mpox activity, this includes men who have sex with men (MSM) who meet partners through an online website, digital application (“app”), or social event (e.g., a bar or party) **OR**
- Traveled outside the US to a country with confirmed cases of mpox or where mpox virus is endemic **OR**
- Had contact with a dead or live wild animal or exotic pet that is an African endemic species or used a product derived from such animals (e.g., game meat, creams, lotions, powders, etc.)

*Exclusion Criteria* – A case may be excluded as a suspect, probable, or confirmed case if:

- An alternative diagnosis can fully explain the illness **OR**
- An individual with symptoms consistent with mpox does not develop a rash within 5 days of illness onset **OR**
- A case where high-quality specimens do not demonstrate the presence of *Orthopoxvirus* or mpox virus or antibodies to *orthopoxvirus*

†Clinical suspicion may exist if presentation is consistent with illnesses confused with mpox (e.g., secondary syphilis, herpes, and varicella zoster).

\*The characteristic rash associated with mpox lesions involve the following: deep-seated and well-circumscribed lesions, often with central umbilication; lesion progression through specific sequential stages—macules, papules, vesicles, pustules, and scabs. This can sometimes be confused with other diseases that are more commonly encountered in clinical practice (e.g., secondary syphilis, herpes, and varicella zoster). Historically, sporadic accounts of patients co-infected with mpox virus and other infectious agents (e.g., varicella zoster, syphilis) have been

reported, so patients with a characteristic rash should be considered for testing, even if other tests are positive.

Categorization may change as the investigation continues (e.g., a patient may go from suspect to probable).

### Reporting:

Report all suspected, probable, or confirmed cases of mpox immediately (24/7/365) to the **Center for Health Protection (CHP)** at (833) 796-8773. Information needed includes: patient's name, age, sex, race, ethnicity, home address, home phone number, occupation, and health care provider.

### Case Investigation:

Complete the CDC Short Case Report Form and mail to the **Center for Health Protection (CHP)**, P.O. Box 26110, Santa Fe, New Mexico 87502-6110, or (preferably) fax to 505-827-0013. Investigation information should also be entered in NM-EDSS per established procedures.

## Control Measures

### 1. Case management

1.1. Isolation: People with mpox and symptomatic with fever or any respiratory symptoms (sore throat, nasal congestion, or cough) should be isolated at home and away from others (aside from medical visits) until (1) fever and respiratory symptoms have resolved and (2) mpox lesions have healed and a new layer of skin has formed. Wear a well-fitting mask and keep all lesions covered when around others. Avoid close contact with others and do not share linens, clothing, cups, eating utensils etc. Avoid contact with pets or other animals; minimize touching/petting.

1.1.a In hospitals and institutions, patients should be placed in a single-person room with a dedicated bathroom with a door that can be kept closed. Special airborne precautions are not necessary. If the patient is transported outside of their room, they should use well-fitting source control (e.g., medical mask) and have any exposed skin lesions covered with a sheet or gown. Any procedures likely to spread oral secretions (e.g. Intubation or extubation) should be performed in an airborne infection isolation room.

### 2. Contact management

2.1. Evidence of mpox vaccination:

2.1.a Written documentation of mpox vaccination series: receipt of two doses of JYENNOS vaccine administered in or after 2022. Some adults may have received vaccination against smallpox as a child prior to 2022. People vaccinated during those years are not considered to have adequate immunization and the recommendation is for them to be re-vaccinated if eligible.

2.1.b During a case investigation or outbreak, post-exposure prophylaxis (PEP) should be considered for adults who had direct, skin-to-skin contact with index case during the

infectious period. Prior vaccination, and how recently the exposed case completed their series, may impact the receipt of PEP in exposed contacts.

2.2. Isolation: Individuals exposed to mpox virus can continue their routine daily activities (e.g., go to work or school) if they do not have signs or symptoms consistent with mpox.

2.3. Post-Exposure Prophylaxis (PEP):

2.3.a Smallpox vaccination (JYENNOS), if given within 4 days of mpox exposure, may prevent disease in susceptible persons. PEP may be administered between 4-14 days after last exposure, but within 4 days is ideal.

### 3. Prevention

3.1. Immunization:

3.1.a A single dose of JYENNOS vaccine reduced mpox occurrence by 37%, while two doses reduced mpox occurrence by 69% among vaccine eligible men aged 18-49. In the 2022 outbreak, mpox incidence was 14 times higher among unvaccinated persons compared to persons who had received at least one dose of JYENNOS. After vaccination, it is not known how long protection may last or if protection decreases over time. These data and analyses are forthcoming.

## References

Heymann D, ed. Control of Communicable Diseases Manual. 20<sup>th</sup> ed. Washington, DC: American Public Health Association; 2015.

Payne AB, Ray LC, Kugeler KJ, et al. Incidence of Mpox Among Unvaccinated Persons Compared with Persons Receiving  $\geq 1$  JYNNEOS Vaccine Dose — 32 U.S. Jurisdictions, July 31–September 3, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:1278–1282. DOI: <http://dx.doi.org/10.15585/mmwr.mm7140e3>

Payne AB, Ray LC, Cole MM, et al. Reduced Risk for Mpox After Receipt of 1 or 2 Doses of JYNNEOS Vaccine Compared with Risk Among Unvaccinated Persons — 43 U.S. Jurisdictions, July 31–October 1, 2022. *MMWR Morb Mortal Wkly Rep*. ePub: 8 December 2022. DOI: [https://www.cdc.gov/mmwr/volumes/71/wr/mm7149a5.htm?s\\_cid=mm7149a5\\_w](https://www.cdc.gov/mmwr/volumes/71/wr/mm7149a5.htm?s_cid=mm7149a5_w)

Centers for Disease Control and Prevention. (2023). *Mpox*. <https://www.cdc.gov/poxvirus/mpox/index.html>

See Mpox Fact Sheets ([English](#)) ([Spanish](#))