Monkeypox (hMPXV)

Investigative Guidelines

August 8, 2022

1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To identify and prevent chains of person-to-person transmission.
2. To identify potential outbreaks of monkeypox.
3. To better characterize the epidemiology of this infection.
4. To identify communities most at risk for disease or severe illness and inform equity-centered outreach.

1.2 Laboratory and Clinician Reporting Requirements

Healthcare providers and laboratories are required to report probable (presumptive) and confirmed cases of monkeypox to the local public health authority (LPHA) immediately.

1. Collect and report information about the ill person's clinical presentation and epidemiological risk factors to inform risk assessment.
2. Provide additional information to public health as requested during case investigation.

1.3 Local Public Health Authority (LPHA) Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive cases not already transmitted electronically (e.g., cases identified through clinical evaluation or in advance of ELR) by entering them into Orpheus with disease "Orthopox" and subtype "Monkeypox."
2. Interview presumptive and confirmed cases and trace their contacts.
3. Provide education for confirmed and presumptive cases on best practices to prevent disease spread, including self-isolating to limit additional close contacts, informing their close contacts about monitoring for symptoms, testing and seeking care when appropriate.
4. Encourage symptomatic persons to be tested and follow isolation recommendations; encourage high-risk close contacts of confirmed and presumptive cases of monkeypox to be vaccinated.
5. Consult with OHA as needed about patient isolation and protection of contacts, including healthcare personnel, and about strategies for vaccination, and access to therapeutics.

2. THE DISEASE AND ITS EPIDEMIOLOGY

Overview

Monkeypox (hMPXV) is a rare disease caused by infection with human monkeypox virus. The *Orthopoxvirus* genus, which includes monkeypox, also includes variola virus (which causes smallpox), vaccinia virus (used in the ACAM2000® smallpox vaccine), and cowpox virus.

Historically, monkeypox has been a zoonotic disease and is endemic to forested areas of Central and West Africa. Reservoir species in endemic areas aren't well documented, but rodents are prime suspects. The name "monkeypox" stems from the first recognized outbreak, which occurred among monkeys in a Danish laboratory in 1958. The first human case was identified in 1970.

In May 2022, monkeypox emerged in humans in several countries without enzootic or endemic disease. CDC maintains a list of these countries. Anyone may be infected with monkeypox if they have close contact with the rash of an infected person, regardless of gender identity or sexual orientation. In the current outbreak, many of those affected had intimate, skin-to-skin contact, frequently among men who have sex with men. Household transmission has also been documented.

2.1 Etiologic Agent

Monkeypox is a double-stranded DNA virus of the genus *Orthopoxvirus*. There are two distinct strains. To avoid stigma and discrimination against people from the areas after which these two strains originally were named, we refer to them as MPXV-1, which is typically more severe and has a case-fatality rate of up to 10% and MPXV-2, which causes milder illness with an estimated case fatality rate in endemic countries of about 1%. Severe illness might be more common in certain groups (See §2.7.1.). MPXV-1 is regulated as a Category A select biological agent, whereas MPXV-2 is regulated as Category B. The 2022 outbreak involving non-endemic countries is caused by MPXV-2.

2.2 Description of Illness

Historically, the distinctive rash has typically been preceded by fever, headache, and muscle aches. However, in the 2022 outbreak, many patients have not reported prodromal symptoms. Lymphadenopathy is common and is a distinctive feature of monkeypox compared to other common febrile rash illnesses. When the prodrome is present, it is typically followed within 1–3 days by a rash. In the current outbreak lesions often are present on the genitals or in the perianal area, and there may be scattered lesions elsewhere, including the face, trunk and limbs. The rash typically evolves through several stages — starting with flat macules or patches that progress to firm, deep-seated papules, which then may fill with fluid or pus, and eventually scab and crust over. Lesions can display umbilication. The illness typically lasts 2–4 weeks.

2.3 Modes of Transmission

Historically transmission of monkeypox has often resulted from animal exposure in endemic areas; however, most cases in the current outbreak have resulted from direct, prolonged skin-to-skin contact with active lesions. Although not observed in the current outbreak, theoretically, contact with contaminated objects (e.g., towels, bedding, or other fomites containing body fluids) or prolonged face-to-face close contact (i.e., >3 hours, within 6 feet) with an ill person could result in transmission. Transmission risk overall is low (basic reproduction number ~2), and the greatest risk occurs following intimate, skin-to-skin contact.

2.5 Incubation Period

The typical incubation period is 7–14 days (range: 5–21 days).

2.6 Period of Communicability

The communicable period is from symptom onset until the lesions scab over and fall off leaving a healed and fresh layer of skin.

2.7 Treatment, Prevention, and Limitation of Spread

2.7.1 Treatment

Many people infected with monkeypox have relatively mild, self-limited disease that resolves without treatment. However, antiviral treatment should be considered for people with severe disease requiring hospitalization and certain other complications. Immunocompromised people, children younger than eight years old, and those experiencing clinical complications might also be candidates for treatment because they are considered at increased risk for severe illness. Those who are pregnant or breastfeeding are also candidates due to the risk of transmitting monkeypox to infants.

No medication is currently FDA-approved for treatment of monkeypox infection. However, several are available from the Strategic National Stockpile (SNS) for the treatment of *Orthopoxviruses*, under Expanded Access Investigational New Drug (EA-IND) Protocols, including Tecovirimat (TPOXX), Cidofovir, and Vaccinia Immune Globulin Intravenous (VIGIV).

Clinicians seeking to initiate treatment for a presumptive or confirmed monkeypox patient can order tecovirimat through OHA using the following link.

2.7.2 Vaccine (options, source, indications)

JYNNEOS™ (also known as Imvamune or Imvanex) is a replication-deficient vaccinia-based live virus vaccine approved for prevention of monkeypox infection. It may be used for post-exposure prophylaxis (PEP), and in certain circumstances, for pre-exposure protection (PrEP) of health professionals or others at increased risk of orthopox exposure. It is given subcutaneously, typically as a 2-dose series (0 and 4 weeks). Current OHA guidance on use of JYNNEOS, including eligible recipients, is available in OHA's Interim hMPXV Vaccination Guidance. For Post-exposure prophylaxis, the initial dose should

be administered as soon as possible following exposure and ideally within 4 days in order to prevent illness. It may provide benefit in decreasing illness severity if given within 14 days of exposure. Given current supply constraints, first doses should be prioritized, with second doses administered 2-3 months later rather than at 28 days except for people who are immunocompromised or pregnant, who should receive their second dose four weeks after the initial dose. JYNNEOS is the preferred *Orthopoxvirus* vaccine, given its favorable adverse event profile.

ACAM2000 is a replication-competent vaccinia-based live virus vaccine. Because the vaccine is replication competent, it has a higher side effect profile and can result in virus spread to others. ACAM2000 should only be used if JYNNEOS is not available and if it is not contraindicated for the patient or individual at risk for monkeypox infection.

LPHAs, clinics and health systems seeking vaccine may order JYNNEOS through OHA using the following link. Distribution of vaccine is prioritized to ensure access to those who are the highest risk of infection. OHA is taking an intersectional approach to ensure equitable access to vaccine by coordinating with LPHAs, community based organizations, and health care partners.

3. CASE DEFINITIONS, DIAGNOSIS AND LABORATORY SERVICES

3.1 Confirmed Case

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

3.2 Probable (Presumptive) Case

- No suspicion of other recent *Orthopoxvirus* exposure (e.g., *Vaccinia* virus in *Orthopoxviruses* vaccination) **AND** demonstration of the presence of
  - *Orthopoxvirus* DNA by PCR testing 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 to 56 days after rash onset.

3.3 Suspect Case

- New characteristic rash[1]
  OR

[1] The characteristic rash associated with monkeypox lesions involve the following: deep-seated and well-circumscribed lesions, often with central umbilication; and lesion progression through specific sequential stages—macules, papules, vesicles, pustules, and scabs.

- Meets one of the epidemiologic criteria **AND** has a high clinical suspicion for monkeypox. Clinical suspicion may exist if presentation is consistent with illnesses confused with monkeypox (e.g., secondary syphilis, herpes, and varicella zoster).

  Epidemiologic Criteria (within 21 days before illness onset)

  - Reports having contact with a person with a similar appearing rash or who received a diagnosis of confirmed or presumptive monkeypox
    OR
  - Had close or intimate in-person contact with individuals in a social network experiencing monkeypox 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 U.S. to a country with confirmed cases of monkeypox or where monkeypox is endemic
    OR
  - Had contact with a dead or live 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.).

3.4 Exclusion Criteria

A case may be excluded as a suspect, presumptive, or confirmed case if:

- An alternative diagnosis can fully explain the illness

OR

- An individual with symptoms consistent with monkeypox 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* monkeypox virus or antibodies to *Orthopoxvirus*.

3.5 Services Available at the Oregon State Public Health Laboratories

OSPHL performs real-time PCR testing for *Orthopox* viruses. Commercial laboratory testing for *Orthopox* viruses is also available and may be more expedient than testing at OSPHL.

Submission of specimens for testing does not require approval from public health. *Orthopox* virus testing could be considered for suspect cases **OR** if the clinician has a strong clinical suspicion for monkeypox. Clinical suspicion may exist if presentation is consistent with illnesses confused with monkeypox (e.g., primary or secondary syphilis, herpes, varicella zoster, or lymphogranuloma venereum). Patients with a characteristic rash should be considered for testing, even if other tests are positive as co-infections with STI and varicella zoster virus have been reported among monkeypox cases.

OSPHL's *Orthopox* DNA PCR assay will detect the following species but will not differentiate or report which species is present: variola; smallpox; vaccinia; cowpox; monkeypox; camelpox; ectromelia; gerbilpox.

- If *Orthopox* species are **detected** at OSPHL, given epidemiologic data currently available, it is reasonable to assume that this represents monkeypox infection and begin public health interventions as outlined in this investigative guideline.
- If *Orthopox* species are **not detected** at OSPHL, no further testing will be conducted on specimens submitted, unless additional testing has specifically been requested.

Each specimen submitted to OSPHL must be accompanied by an OSPHL Virology/Immunology Test Request Form (www.bitly.com/phl-forms) (one per specimen). Specify the location of the lesion collected in the *Specimen Source* section.

3.6 Specimen Collection

If testing will be done through OSPHL, have the submitting facility collect, prepare, and store specimens for transport to OSPHL.

Complete instructions are available on the OSPHL Test Menu for *Orthopox* Virus, Real-Time PCR. CDC's Monkeypox – Laboratory Procedures webpage might also be useful.

1. More than one lesion should be sampled, preferably from different anatomic sites or from lesions with different appearances. Collect paired swabs from each lesion sampled. Swab or brush lesion vigorously with two dry swabs. Place each swab in a separate, sterile container.
2. Use sterile synthetic swabs, such as polyester, to collect. DO NOT use cotton swabs or wooden-shafted swabs. DO NOT place swab in transport medium or saline.
3. Label each specimen with at least two unique patient identifiers **and** a brief description of anatomic site of the lesion.
4. Refrigerate or freeze within one hour after collection. Refrigerate at 2-8° C.

3.7 Specimen Transport

Transport specimens to OSPHL promptly. **Note: OSPHL cannot receive specimens on weekends or state holidays.**

1. Specimens should be transported using fully frozen cold packs to maintain necessary temperature during transit. Specimens must be *tested* within 7 days of collection.
2. If specimens cannot be tested within 7 days, store frozen (-20°C or below) and ship to OSPHL to maintain frozen temperatures during transit. If shipping on dry ice, store at -70°C prior to shipping.

Per CDC, specimens may be packaged and shipped to OSPHL as Category B.

4. ROUTINE CASE INVESTIGATION

4.1 Case Investigation

If OSPHL or commercial laboratory testing identifies the presence of *Orthopox* virus, create a presumptive case in Orpheus and conduct a case investigation. If CDC subsequently confirms presence of monkeypox, change the case status in Orpheus to "Confirmed." (Few specimens are likely to have confirmatory testing.) If CDC does not confirm the presence of monkeypox, keep the case status as presumptive.

During the case investigation, complete the Orpheus interview, which includes questions about the following: 1) timeline and progression of signs and symptoms, 2) recent domestic or international travel history and places visited, 3) any contact with a person ill with confirmed or presumptive monkeypox or symptoms compatible with it, and 4) any intimate contact with persons and any contacts with their clothing, skin lesions, bodily fluids, soiled linens, or dressings. Ask cases to describe their symptoms and record in Orpheus.

If consultation or support is needed during the case investigation or contact tracing, contact the ACDP on-call line at 971-673-1111.

4.2 Contact Tracing

Identify anyone exposed to a confirmed or presumptive monkeypox case-patient. Ask about family, friends, sexual contacts, work/school contacts, and any medically fragile persons who might have been exposed. A person is considered exposed if, during the time that the confirmed or presumptive case was ill and still had a rash (see note), any of the following occurred:

- Had contact with a confirmed or presumptive case's skin or bodily fluids
- Had oral, anal, or vaginal sex with a confirmed or presumptive case
- Had contact with the soiled clothing, bedding, dressings, or other garments or personal items, including fetish gear and sex toys, used by an ill confirmed or presumptive case
- 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
- Was otherwise within 6 feet for at least 3 hours of an unmasked confirmed or presumptive case without wearing a surgical mask

Request from the confirmed or presumptive case the name, age, and contact information of any person meeting the exposure criteria. Enter the information into Orpheus as contacts to the case. Contact each of the identified contacts to conduct a risk assessment, as described in **§5.2.**

NOTE: While monkeypox is considered transmissible from the time of symptom onset, cases may not always notice or accurately recall their earliest symptoms (e.g, rash not readily visible to case, imprecise recollection of timing). If a case had high-

risk contact with individuals in the 5 days preceding symptom onset, they may be considered a contact and/or eligible for PEP at LPHA discretion.

5. CONTROLLING FURTHER SPREAD

5.1 Isolation and Prevention

Home isolation precautions are recommended for all suspect monkeypox cases (those awaiting Orthopox testing results) until PCR results come back negative. All presumptive and confirmed cases must isolate until they meet criteria for discontinuation of isolation. A handout describing home isolation precautions is available in multiple languages at www.oregon.gov/orthopox in the Resources for Healthcare Providers section. Full CDC guidance on home isolation can be found at: www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-home.html.

Home waste disposal for monkeypox patients isolating at home should continue as normal, using existing municipal waste management systems. The person infected with monkeypox should use a dedicated, lined trash receptacle in the room where they are isolating. Any gloves, bandages, or other waste and disposable items that have been in direct contact with skin should be sealed in plastic bags and thrown away in the dedicated trash receptacle. The person infected with monkeypox or other household occupants should use gloves when removing garbage bags and handling and disposing of trash.

5.2 Assess the risk to identified contacts

LPHAs should conduct a risk assessment for each identified contact using the following criteria:

A. **High-risk** exposures include any of the following:
   1. Unprotected contact between a person's skin or mucous membranes and the rash, lesions, or bodily fluids from a case or contaminated materials, **OR**
   2. Being inside the case's room or within 6 feet of a case 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 and eye protection, **OR**
   3. Exposure that, at the discretion of public health authorities, was recategorized to this risk level because of unique circumstances.

Management: Monitoring as described in §5.3; post-exposure vaccination recommended. Those with a high-risk exposure should also be informed that CDC discourages travel by public conveyances during the monitoring period.

B. **Intermediate-risk** exposures include any of the following:
   1. Unprotected contact between a person's skin or mucous membranes and the intact, rash-free skin of a case, **OR**

2. Being within 6 feet of an ill, unmasked case for **at least three hours** without wearing a surgical mask, **OR**
3. 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**
4. Exposure that, at the discretion of public health authorities, was recategorized to this risk level because of unique circumstances.

Management: Monitoring as described in §5.3; post-exposure vaccination could be considered through individual-informed clinical decision-making.

C. **Low/uncertain risk** exposures include either of the following:

1. Being within 6 feet an unmasked case for **less than three hours** without wearing a surgical mask, **OR**
2. During all entries in the case's room wore gown, gloves, eye protection, and at minimum a surgical mask, **OR**
3. Entered the case's room without wearing eye protection.

Management: Monitoring as described in §5.3; post-exposure vaccination not indicated.

5.3 Monitor for Symptoms

Develop a plan with any contacts of persons or animals confirmed to have monkeypox to monitor for fever and symptoms for 21 days after the last exposure. Contacts who remain asymptomatic can continue routine daily activities (e.g., work, school, sexual activity). Contacts should not donate blood, cells, tissue, breast milk, semen, or organs while they are under symptom surveillance. For high-risk contacts as defined in **§5.2**, direct, daily symptom checks by public health via phone or email can be considered but aren't required.

Instruct contacts to monitor for symptoms and to check their temperature twice daily. Signs and symptoms that should prompt a call to public health include fever ≥100.4°F (38°C), chills, swelling of lymph nodes, or new skin rash. If fever or rash develop, contacts should self-isolate and contact their LPHA immediately. Medical evaluation should follow, with a heads-up to the evaluating provider that the person has been exposed to monkeypox.

5.4 Post-Exposure Prophylaxis

As noted, those with a high- or intermediate-risk exposure may consider post-exposure prophylaxis as described in **§2.7**.

UPDATE LOG

June 2022. Original (Bonner, DeBess, Leman, Sutton)

August 8, 2022. Significant modifications throughout. Shifted reporting to LPHA first; no longer require reporting of suspect cases; no need to send rash photos.

Commercial laboratories now testing; ACDP not required to approve OSPHL test requests; updates to disease transmission, outbreak information, risk assessment. (Meagan McLafferty, Richard Leman, Kelly Cogswell, Amanda Faulkner, Dean Sidelinger, Emilio DeBess, Paul Cieslak).