February 2024

Mpox

Surveillance and Investigation Protocol

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I. ABOUT THE DISEASE

Mpox is a zoonotic disease that typically presents with fever, rash, and swollen lymph nodes. It is transmitted through respiratory droplets or direct contact with infected secretions or body fluids. mpox can cause severe disease.

Mpox is rare in the U.S. On May 17, 2022, a case of mpox was reported in the country. During this time, multiple clusters of mpox have also been reported in several countries in Europe and North America involving people who self-identify as gay, bisexual, and other men who have sex with men (GBMSM) who report sexual (skin to skin) contact as the primary risk factor for transmission .

Mpox in West Virginia is a Category I disease and requires immediate reporting to the local health department for prompt action.

A. Clinical Presentation

Mpox begins with fever, headache, muscle aches, and exhaustion. The main difference between smallpox and mpox is that mpox causes swollen lymph nodes (lymphadenopathy) while smallpox does not. Swelling of lymph nodes may be more generalized or localized to several areas. The illness begins with:

- Fever
- Headache
- Muscle aches
- Backache
- Swollen lymph nodes
- Chills
- Exhaustion
- Weakness

Within 1 to 4 days after the appearance of initial symptoms, the patient develops a rash that may be located on hands, feet, chest, face, or mouth or near the genitals, including penis, testicles, labia, and vagina, and anus. Lesions progress through the following stages before falling off: Macules Papules Vesicles Pustules Scabs.
The illness typically lasts for 2−4 weeks.

B. Etiologic Agent

Mpox is caused by infection with mpox virus which belongs to the *Orthopoxvirus* genus in the family *Poxviridae*. The *Orthopoxvirus* genus also includes variola virus (which causes smallpox), vaccinia virus (used in the smallpox vaccine), and cowpox virus.

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C. Reservoir

The natural reservoir of mpox remains unknown. However, African rodents and non-human primates (monkeys) may harbor the virus and infect people.

D. Incubation Period

Typically, 3−17 days but can range from 5−21 days. A person is not contagious during this period.

E. Mode of Transmission

The virus enters the body through broken skin, respiratory tract, or the mucous membranes (eyes, nose, or mouth). Transmission of the mpox virus occurs when a person comes into contact with the virus from an animal, human, or materials contaminated with the virus.

- Animal-to-human transmission may occur by bite or scratch, bush meat preparation, direct contact with body fluids or lesion material, or indirect contact with lesion material, such as through contaminated bedding or clothing.
- Human-to-human transmission is thought to occur through large respiratory droplets. Prolonged face-to face contact is required.
- Other human-to-human methods of transmission include direct contact with body fluids or lesion material (such as sexual contact), and indirect contact with lesion material (such as through contaminated clothing or linens).

F. Period of Communicability

A person may be contagious from one to four days before symptoms appear until the rash is fully healed and a fresh layer of skin has formed.

II. DISEASE PREVENTION AND CONTROL

A. Disease Prevention and Control Objectives

Reduce disease risk through:

1. Public education regarding prevention and control measures – personal hygiene, respiratory precautions, sexual transmission, etc.
2. Public education regarding travel to areas where there is ongoing transmission of mpox.
3. Health care provider education on recognition and reporting of disease.
4. Detection of local transmission of mpox in West Virginia.

B. Disease Prevention and Control

1. Avoid contact with animals that could harbor mpox.
2. Avoid contact with any materials that have been in contact with a sick animal or person.
3. Isolate patients suspected of having mpox in a single patient room; special air handling is not required. Door should be kept closed and have a dedicated bathroom. Transport and movement of the patient outside of the room should be limited to medically essential purposes. 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. Intubation,

extubation, and any procedures likely to spread oral secretions should be performed in an airborne infection isolation room.

a. For more information on the duration of isolation precautions for patients, please visit https://www.cdc.gov/poxvirus/mpox/clinicians/infection-control-healthcare.html.

4. If a patient presenting for care at a health care facility is suspected of having mpox, infection control personnel should be notified immediately.
5. Practice good hand hygiene after contact with infected animals or humans, i.e., wash your hands with soap and water or use an alcohol-based hand sanitizer.
6. Use appropriate personal protective equipment (PPE) when caring for patients. Required PPE includes gown, respirator, face shield, and gloves. For more information, see Mpox Prevention.
7. Avoid activities that could resuspend dried material from lesions such as using portable fans, dry dusting, sweeping and vacuuming.
8. Required waste management practices and classification (i.e., assignment to a category under the HMR) currently differ depending on the mpox virus clade (strain). The DOT indicates that waste contaminated with Clade II [PDF – 4.06 MB] of mpox virus should be managed as UN3291 Regulated Medical Waste (RMW) in the same manner as other potentially infectious medical waste (e.g. soiled dressings, contaminated sharps). Clade I of mpox virus is classified as Category A under the HMR and should be managed accordingly. See the DOT website for more information. Facilities should also comply with state and local regulations for handling, storage, treatment, and disposal of waste, including RMW.
9. Standard cleaning and disinfection procedures should be performed using an EPA-registered hospital-grade disinfectant with an emerging viral pathogen claim. Products with Emerging Viral Pathogens claims may be found on EPA's List Q. Follow the manufacturer's directions for concentration, contact time, and care and handling.

C. Prophylaxis and Treatment

1. JYNNEOS™ (also known as Imvamune or Imvanex)

a. JYNNEOS is the only vaccine with an FDA-approved indication for mpox in adults 18 years and older.

b. It can be used for post-exposure prophylaxis (PEP) and for prevention for high risk adults as a two-dose series, four weeks apart.

i. PEP: The JYNNEOS vaccine should be given within 4 days from the date of exposure for the best chance to prevent onset of the disease. If given between 4 and 14 days after the date of exposure, vaccination may reduce the symptoms of disease, but may not prevent the disease.

ii. Prevention: recent studies from the 2022 U.S. mpox Outbreak have estimated that the effectiveness of the JYNNEOS vaccine in preventing mpox disease was 35-75% after one dose and 66-85% after two doses. Therefore, two doses of vaccine are recommended for the best protection. For those that do develop infection after vaccination, symptoms reported have been less severe.

c. Criteria for vaccination based on ACIP recommendations include:

i. Anyone that had known or suspected exposure to someone diagnosed with mpox

ii. Anyone that had a sex partner in the past 2 weeks who was diagnosed with mpox
iii. Any GBMSM or transgender, nonbinary, or gender-diverse person who has had any of the following in the past 6 months:
- A new diagnosis of one or more sexually transmitted infections (e.g., chlamydia, gonorrhea, or syphilis)
- More than one sex partner

iv. Anyone who has had any of the following in the past 6 months:
- Sex at a commercial sex venue (such as a sex club or bathhouse)
- Sex related to a large commercial event or in a geographic area (city or county) where mpox virus transmission is occurring
- Sex in exchange for money or other items (such as drugs or food)

v. Anyone with a sex partner who has any of the scenarios listed above
vi. Anyone that anticipates experiencing any of the above scenarios
vii. Anyone living with HIV or other causes of immune suppression and have had recent or anticipate future risk of mpox exposure from any of the scenarios listed above
viii. Anyone working in a setting where mpox exposure can occur (such as a laboratory working with orthopoxviruses)

2. Other vaccines (ACAM2000) and treatments (TPOXX, VIGIV, and CMX001/Tembexa) that have been recommended for mpox are currently not available through BPH.
   a. Additional Treatmemt Information for consideration by healthcare providers can be found on the CDC website.
   b. State health departments may request medical countermeasures through the Strategic National Stockpile on behalf of those needing post-exposure or treatment for mpox.

III. DISEASE INVESTIGATION

A. Case Detection

Mpox lesions may be disseminated or located on the genital or perianal area alone. Some patients may present with proctitis and their illness could be clinically confused with a sexually transmitted infection (STI) like syphilis or herpes, or with varicella zoster virus infection. Although some populations may have a greater chance of exposure right now, mpox infections are not exclusive to GBMSM communities.

B. Case Definition (2022)

(https://www.cdc.gov/poxvirus/Mpox/clinicians/case-definition.html)

- **Clinical Criteria**
  - New characteristic rash*
- **Epidemiologic Criteria**
  - Within 21 days of illness onset:
    - Report having had contact with a person or people with a similar appearing rash or 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 GBMSM 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 but who does not develop a rash within 5 days of illness onset **OR**
    - A case where specimens do not demonstrate the presence of *Orthopoxvirus* or *Mpox Virus* or antibodies to orthopoxvirus as described in the laboratory criteria.

* The characteristic rash associated with mpox 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. This can be confused with other diseases that are more commonly encountered in clinical practice (e.g., secondary syphilis, herpes, chancroid, and varicella zoster). Historically, sporadic reports of patients co-infected with mpox virus and other infectious agents (e.g., varicella zoster, syphilis) have been reported, so patients with characteristic rash should be considered for testing, even if other tests are positive.

C. Case Classification and Reinfection

1. **Suspect Case:**
   - New characteristic rash* **OR**
   - Meets one of the epidemiologic criteria and has a high clinical suspicion for mpox.

2. **Probable Case:**
   - 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 to 56 days after rash onset.

3. **Confirmed Case:**
   - Demonstration of *Mpox virus* DNA by polymerase chain reaction testing or Next-Generation sequencing of a clinical specimen **OR** isolation of *Mpox virus* in culture from a clinical specimen.

4. **<u>Mpox Reinfection</u>**

- Mpox reinfection occurs when a person who was classified as a confirmed or probable mpox case, has a recurrence of mpox symptoms after complete resolution of the initial confirmed or probable MPXV infection.
- **Suspect Mpox Reinfection Case:** fits the clinical description of mpox reinfection and meets any of the following criteria:
  - New rash*, OR
  - Meets one of the epidemiologic criteria and has a high clinical suspicion for mpox
- **Probable Mpox Reinfection Case:** meets the criteria for a suspect mpox reinfection case AND demonstrates one of the following from a patient specimen:
  - Orthopoxvirus or MPXV DNA by polymerase chain reaction of a clinical specimen OR
  - Orthopoxvirus using immunohistochemical or electron microscopy testing methods OR
  - Demonstrable increase in anti-Orthopoxvirus IgG antibodies in paired serum samples collected within 3 days of symptom onset and 7-14 days after symptom onset, for patients with no prior mpox/smallpox vaccination or vaccinated ≥180 days prior to symptom onset
- **Confirmed Mpox Reinfection Case:** meets criteria for a probable mpox reinfection case AND has significant single nucleotide polymorphisms (SNPs) or genetic variation between MPXV genetic sequences‡ from clinical specimens obtained from two or more episodes of MPXV infection separated by complete resolution of symptoms within the same individual.
- Additional considerations for mpox reinfection:
  - Persistent MPXV infection is defined as MPXV infection without clinical improvement or resolution of symptoms.
  - Relapsed MPXV infection is defined as MPXV infection that has improved, but not completely resolved, followed by clinical worsening or new mpox symptoms.
  - Patients with severe immunodeficiency such as in people living with HIV with CD4 counts <200 can be at risk for persistent and/or relapsed MPXV infections.
  - Patients may develop symptoms caused by other infections during MPXV infection or after their initial infection resolves.

D. Reporting Timeframe to Public Health

Suspect cases of mpox should be IMMEDIATELY reported to the local health department.

E. Outbreak Recognition

Mpox is not endemic in West Virginia. One case of mpox in the state is considered an outbreak.

F. Healthcare Provider Responsibilities

1. If mpox is suspected, report immediately to the local health department (LHD). If the LHD cannot be reached, contact the state epidemiologist on-call at (304) 558-5358, ext. 2. An epidemiologist is available 24/7/365 to assist.
2. If a clinician identifies a patient with a rash suspicious for mpox, especially those with a recent travel history to an area where mpox has been reported, mpox should be considered as a possible diagnosis and reported to the LHD.

3. A high index of suspicion for mpox is warranted when evaluating people with the characteristic rash, particularly for the following:
    a. Traveled outside the US to a country where mpox cases have been reported, during the month before their symptoms began,
    b. Reports having contact with a person with similar rash or who received a diagnosis of mpox,
    c. Had close or intimate in-person contact with individuals in a social network experiencing mpox, this includes GBMSM who meet partners through an online website, app, or social event.
4. Collect multiple specimens for preliminary and confirmatory testing as follows:
    a. Obtain specimen samples from more than one lesion, preferably from different locations on the body and/or from lesions with differing appearances.
    b. Vigorously swab or brush lesion with two separate sterile synthetic swabs.
    c. Break off the end of the applicator of each swab into a 1.5- or 2-mL screw-capped tube with O-ring, or place each entire swab in a separate sterile container. Do not add or store in viral or universal transport media.
5. Testing should occur after getting approval from the epidemiologist on-call. If testing is not approved by OEPS/OLS but still desired, ordering providers can send specimens to commercial laboratories including Aegis Science, LabCorp, Mayo Clinic Laboratories, Quest Diagnostics and Sonic Healthcare.
    a. SPECIMEN COLLECTION and STORAGE (West Virginia Department of Health, Bureau for Public Health - Office of Laboratory Services):
        1. Collect multiple specimens for preliminary and confirmatory testing as follows:
            a. Obtain **two** specimen samples for each site sampled. It is recommended that multiple sites are sampled if there are pustules on different parts of the body or from lesions with differing appearances.
            b. Use a sterile synthetic swab (including, but not limited to nylon, polyester, or Dacron) with a plastic, wood, or thin aluminum shaft. Do not use other types of swabs.
            c. Vigorously swab or brush lesion(s) to collect adequate DNA.
            d. Break off the end of the applicator of each swab into a 1.5- or 2-mL screw-capped tube with O-ring, or place each entire swab in a separate individual sterile container. Do not add or store in viral or universal transport media.
        2. All specimens should be sent through the WV Office of Laboratory Services (OLS). Coordinate specimen collection and shipment with the local health department.
        3. Freeze (-20°C or lower) specimens within an hour after collection.
        4. Maximum storage time for frozen specimens is for up to 60 days.
        5. Frozen specimens should be shipped within 60 days of collection. Shipping on dry ice is strongly recommended. Specimens received that are >8°C will be rejected.
    b. SPECIMEN SHIPMENT to OLS BIOTERRORISM LABORATORY
        1. Contact the WV OLS Bioterrorism Response Lab at 304-205-8917 prior to shipping.
        2. Ideally samples should be shipped immediately upon approval.

3. Complete the *WV OLS BT Lab Clinical Specimen Submission form*. https://dhhr.wv.gov/ols/labs/Documents/BT/BTClinicalTestRequestForm_8-07.pdf
4. Package the sample swabs in an insulated Category B box, with cold packs or dry ice.
5. Make sure you have enough dry ice to last for the whole transit time.
6. Place the submission form in the box (protected from the ice).
7. Ship the package as a Suspect Category B.
8. Ship the sample(s) **FedEx Next-business-day, delivery by 10:30 a.m**. to the WV OLS BT Lab at the address below. The recipient's contact number is 304-205-8917.
   WV Office of Lab Services
   ATTN: BT Lab
   167 11th Avenue
   South Charleston, WV 25303
9. As soon as the package is shipped, email the completed *WV OLS Bioterrorism Lab Clinical Specimen Submission form*, FedEx tracking number, patient initials and patient birth date to Lisa.M.Wallace@wv.gov, Rosemarie.E.Karlen@wv.gov and Nellie.M.Cooper@wv.gov.

6. Initiate infection prevention and control in the healthcare setting as soon as mpox is suspected on a patient. Immediately notify the Infection Preventionist.
10. Ordering providers are responsible for notifying the patient of the results of orthorpoxvirus/mpox testing. Public health investigator(s) will try to contact the patient after diagnosis to collect additional information.

G. Laboratory Responsibilities

The WV Office of Laboratory Services (OLS) will provide guidance and assistance on specimen collection, shipping, and handling to health care providers. Appropriately collected samples will be sent to CDC or an appropriate Laboratory Response Network (LRN) laboratory for testing by PCR. LRN laboratories can provide orthopoxvirus testing on lesion specimens that clinicians obtain from suspected patients. Confirmatory *Mpox virus*-specific testing at CDC requires a dry lesion swab specimen. If OLS performs the testing, they will notify the submitter of results.

H. Local Health Responsibilities

1. Educate the public about mpox. Based on the information available at this time, risk to the public is low. Some people who may have symptoms of mpox, such as characteristic rashes or lesions, should contact their healthcare provider for a risk assessment. This includes anyone who:
   a. Traveled outside the US to a country where mpox cases have been reported, during the month before their symptoms began,
   b. Reports having contact with a person with similar rash or who received a diagnosis of mpox
   c. Had close or intimate in-person contact with individuals in a social network experiencing mpox, this includes GBMSM who meet partners through an online website, app, or social event.
2. Provide the JYNNEOS vaccine to those who meet the appropriate recommendations and criteria (previously mentioned on pages 4-5).

a. Local Health Departments can request the JYNNEOS vaccine by contacting the STD Program at wvstd@wv.gov with "JYNNEOS Request" in the subject line. Please include how many doses (usually a minimum of 10 vials, and in multiples of two) and the shipping address in the email, as well as your name and contact information.
b. Refer to the JYNNEOS: Mpox Vaccine Guidance document for more information on inventory management in WVSIIS, vaccine storage and handling, redistribution, and intradermal and subcutaneous injection.

3. Notify DIDE immediately via phone once an individual is suspected of mpox.
4. Educate health care providers (especially STI providers) about mpox, including infection control and prevention measures.
4. Assist the health care provider in collecting information and facilitate specimen collection, shipping and handling.
5. Disseminate mpox information provided by the West Virginia Department of Health, Bureau for Public Health to health care providers.
6. Following the diagnosis of mpox (suspect/probable/confirmed cases), initiate isolation for the case and contact tracing of individuals who may have been exposed (including evaluating healthcare personnel for high risk exposures) while the patient was symptomatic.
   a. Please consider contacting and collaborating with your jurisdiction's Disease Intervention Specialist (DIS) for assistance in collecting information on intimate/sexual contacts.
   b. Contacts should be monitored for 21 days after their last date of contact with the patient.
7. The ordering provider is responsible for notifying the patient of the positive orthopoxvirus/mpox results, however in some situations the LHD is the first to inform the patient of the positive results.
8. Use the Mpox Close Contact Investigation Questionnaire and/or Healthcare Personnel Exposure Risk Assessment to evaluate contacts who have been exposed to mpox.
   a. Symptomatic contacts: should be treated as a potential case and isolated immediately and Recommend testing and notify DIDE immediately.
   b. Asymptomatic contacts:
      i. Should be monitored for 21 days after their last date of contact with the patient. Monitoring includes ascertainment of signs and symptoms of mpox including thorough skin and mouth exam in good lighting. Quarantine is not routinely necessary unless it is determined, in conjunction with DIDE, that an individual should quarantine. For more information on how to monitor those exposed, visit https://www.cdc.gov/poxvirus/mpox/clinicians/monitoring.html.
      ii. Can be permitted to continue routine daily activities (e.g., go to work, school). Contacts should not donate blood, cells, tissue, breast milk, semen, or organs while they are under symptom surveillance.
      iii. High risk asymptomatic contacts should be offered PEP with JYNNEOS. It is recommended that the vaccine be administered within 4 days of exposure to prevent disease.

a. If given between 4 and 14 days after the date of exposure, vaccination may reduce the symptoms of disease, but may not prevent the disease.
b. If PEP is needed, please contact DIDE.

iv. The *Mpox Close Contact Investigation Questionnaire* and/or *Healthcare Personnel Exposure Risk Assessment* should be completed prior to requesting prophylaxis.

v. If a rash occurs: Individuals should follow isolation and control precautions until the rash can be evaluated by a healthcare provider, testing is performed, and the results are available and are negative.

vi. If other signs and symptoms develop, but there is no rash: Individuals should follow isolation and control precautions for 5 days after the development of any new sign or symptom, even if this 5-day period extends beyond the original 21-day monitoring period. If 5 days have passed without the development of any new sign or symptom and a thorough skin and oral examination reveals no new skin changes such as rashes or lesions, isolation and prevention practices for mpox can be stopped. If a new sign or symptom develops at any point during the 21-day monitoring period (including during a 5-day isolation if applicable), then a new 5-day period should begin where the individual follows isolation and prevention practices.

I. State Health Responsibilities

1. Submit all mpox cases to the CDC.
2. Coordinate medical countermeasure requests of the Strategic National Stockpile through the Office of Laboratory Services (OLS).
3. Share CDC's Health Advisory on mpox with relevant healthcare provider networks, including STI clinics that may not always receive CDC Health Advisory messages.
4. Provide guidance in the investigation and control of mpox.
5. Assist LHDs in contact tracing of individuals who may have been exposed to the patient while the patient was symptomatic. Contacts should be monitored for 21 days after their last date of contact with the patient.
6. Facilitate specimen collection: For patients who have been evaluated in conjunction with the CDC and determined to meet the CDC's case definition to require further testing, OLS recommends the following:
   - Notify the WV OLS Bioterrorism Response lab that a patient is being tested for mpox.
   - Email the following information to Lisa.M.Wallace@wv.gov, rosemarie.e.karlen@wv.gov, and nellie.m.cooper@wv.gov.
     i. Name of facility submitting the sample.
     ii. Contact person at facility and phone number.
7. Inform the submitting facility to contact the WV Office of Laboratory Services Bioterrorism Response Lab at 304-205-8917 prior to shipping the sample. OLS will answer shipping questions.
8. For more information about specimen collection, storage, shipping and handling recommendations from OLS, see section *III. F. Healthcare Provider Responsibilities.*
   - OLS will not test specimens that do not meet the suspect definition.

9. The Epi on-call is responsible for notification to the LHD if a positive orthopoxvirus specimen result is received from OLS or commercial laboratory.
    - The Epi on-call should notify the State Epidemiologist and LHD of any positive orthopoxvirus results. Written communication should then be forwarded to the State Epidemiologist, , OLS, Regional Epidemiologist, and LHD.

J. Occupational Health

1. Avoid contact with any materials, e.g., bedding, that has been in contact with a sick person.
2. If a patient presenting for care at a hospital or other health care facility is suspected of having mpox, infection control personnel should be notified immediately.
3. Use appropriate personal protective equipment (PPE) when caring for the patient. Required PPE includes gown, respirator, face shield, and gloves.
    a. For additional information about infection control in the hospital: https://www.cdc.gov/poxvirus/mpox/clinicians/infection-control-hospital.html.
    b. Patients who do not require hospitalization for medical indications may be isolated at home using protective measures. For additional information about infection control in the home: https://www.cdc.gov/poxvirus/mpox/clinicians/infection-control-home.html.
4. Practice good hand hygiene after contact with infected humans, i.e., wash hands with soap and water or use an alcohol-based hand sanitizer.
5. Vaccination for select persons at risk for occupational exposure to orthopoxviruses (ACIP, 2022):
    a. For research laboratory personnel,[1] clinical laboratory personnel performing diagnostic testing for orthopoxviruses,[2] and for designated response team members[3] at risk for occupational exposure to orthopoxviruses, the use of JYNNEOS for primary vaccination as an alternative to ACAM2000 is recommended.
    b. For healthcare personnel who administer ACAM2000 or care for patients infected with orthopoxviruses,[4] the use of JYNNEOS (as an alternative to ACAM2000) is recommended, based on shared clinical decision-making.
    c. Persons who are at continued risk[5] for occupational exposure to more virulent orthopoxviruses (like Variola virus or mpox virus) should receive booster doses of JYNNEOS every 2 years after the primary JYNNEOS series.
    d. Persons who are at continued risk[5] for occupational exposure to less virulent orthopoxviruses (like Vaccinia virus or Cowpox virus) should receive booster doses of JYNNEOS at least every 10 years after the primary JYNNEOS series.
    e. Persons who are at continued risk[5] for occupational exposure to orthopoxviruses, and who received an ACAM2000 primary vaccination, should receive a booster dose of JYNNEOS as an alternative to a booster dose of ACAM2000.

[1] Research laboratory personnel are those who directly handle cultures or animals contaminated or infected with replication-competent vaccinia virus, recombinant vaccinia viruses derived from replication-competent vaccinia strains (i.e., those that are capable of causing clinical infection and producing infectious virus in humans), or other orthopoxviruses that infect humans (e.g., mpox, cowpox, and variola).
[2] Clinical laboratory personnel who perform routine chemistry, hematology, and urinalysis testing, including for suspected or confirmed patients with orthopoxvirus infections, are not included in this recommendation as their risk for exposure is low.

[3] Public health authorities, at their own discretion, may approve a cohort of healthcare and/or public health personnel to receive primary vaccination against orthopoxviruses for preparedness purposes (e.g., first responders who might participate in a smallpox or mpox outbreak).
[4] For example, those caring for patients enrolled in clinical trials for replication-competent orthopoxvirus vaccines and those caring for persons with suspected or confirmed orthopoxvirus infections (e.g., clinicians and environmental services personnel).
[5] Continued risk refers to persistent risk due to occupational work performed. Designated public health and healthcare worker response teams approved by public health authorities are not at "continued risk" because they are vaccinated for the purposes of preparedness.

IV. DISEASE SURVEILLANCE

A. Public Health Significance

Mpox is a zoonotic disease that typically presents with fever, rash, and swollen lymph nodes. It was first discovered in 1958 following outbreaks of pox-like disease in monkeys kept for research, hence the name "Monkeypox." Mpox was first documented in humans in 1970 in the Democratic Republic of Congo. Since then, mpox has been reported in people in several central and western African countries. Mpox can cause severe disease. The case fatality ratio was estimated at 3-6%.

Mpox is a rare disease in the U.S. In May of 2022, a case of mpox was reported in a U.S. resident returning from Canada. Following that time, multiple clusters of mpox were reported in several countries in Europe and North America involving people who self-identify as GBMSM.

B. Disease Surveillance Objectives

1. To identify and characterize the epidemiologic features of mpox.
2. To detect and monitor trends of mpox.

C. Surveillance Indicators

1. Proportion of cases with complete clinical, laboratory, and exposure information.
2. Proportion of cases that were reported to public health in a timely manner.

V. REFERENCES

1. Centers for Disease Control and Prevention. Mpox at https://www.cdc.gov/poxvirus/mpox/index.
2. Centers for Disease Control and Prevention. 2022-2023 U.S. Mpox Outbreak at https://www.cdc.gov/poxvirus/mpox/outbreak/current.
3. CDC Health Advisory. Mpox Virus Infection in the United States and Other Non-endemic Countries, 2022. May 20, 2022.
4. World Health Organization at https://www.who.int/news-room/fact-sheets/detail/mpox.
5. U.S. Federal Drug Administration. JYNNEOS at https://www.fda.gov/media/131078/download.
6. Advisory Committee on Immunization Practices. Orthopoxviruses (Smallpox and Mpox) Vaccine Recommendations at https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/smallpox.