Technical Brief (interim) and Priority Actions: Enhancing Readiness for monkeypox in WHO South-East Asia Region

WHO Regional Office for South-East Asia
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Summary

Situation

- Since 13 May 2022, cases of monkeypox have been reported to WHO from Member States that are not endemic for monkeypox virus.

Recommended priority actions

- **Surveillance:** Clinicians' awareness is the key for detection of monkey pox. Hence, sensitization of clinicians working at relevant health services at public and private sectors is critical. Once a suspected case is identified, clinicians should report immediately to public health authorities; the samples be referred for laboratory testing; and case investigation and contact tracing should be initiated.
- **Laboratory testing**: Laboratory will confirm monkey pox infection on the basis of nucleic acid amplification testing (NAAT), using real-time or conventional polymerase chain reaction (PCR). Planning for genomic sequencing for characterization of monkey pox viruses and sharing data for public health decision making are important.
- **Clinical management & Infection Prevention and Control (IPC)**: Health workers caring for suspected or confirmed patients need to implement standard, contact and droplet precautions. It is necessary to isolate patients and continue transmission-based precautions until resolution of symptoms. WHO interim guidance on clinical management and IPC is pending.
- **Vaccination**: Based on previous SAGE recommendations, Member States may consider vaccination of close contacts as post-exposure prophylaxis or pre-exposure vaccination of laboratory personnel and health workers. WHO interim guideline for vaccination for monkey pox prevention and control is pending
- **Risk communication and community engagement:** Proactively communicating information related to monkeypox and potential implications for the public in timely and transparent manner to further foster trust and address concerns is essential. Addressing the stigma and discrimination with particular focus on MSM populations is a need.

1. Background

Monkeypox (MPX) is a viral zoonosis (a disease transmitted to humans from animals) with symptoms very similar to that of smallpox patients seen in the past. However, MPX disease is clinically less severe. It is caused by the monkeypox virus, which is a member of the Poxviridae family's orthopoxvirus (OPXV) genus.

Monkeypox virus has two clades: the West African and the Congo Basin (Central African) clades. The West African clade appears to give rise to less severe illness than the Congo Basin clade with a 3.6 percent case fatality rate compared to 10.6 percent for the Congo Basin clade. MPX cases are often found close to tropical rainforests where there are animals that carry the MPX virus.

In the current multi-country outbreak of MPX, as of 27 May 2022, monkeypox cases have been reported to WHO from 22 Member States (MS) that are not endemic for monkeypox virus, across four WHO regions. The situation of the multi-country outbreak of MPX is evolving and WHO expects that there will be more cases of monkeypox identified as surveillance expands in non-endemic countries.

Epidemiological investigations are ongoing; however, the majority of reported MPX cases in non-endemic countries thus far have no established travel links to an endemic area. Based on currently available information, MPX cases have mainly but not exclusively been identified amongst men who have sex with men (MSM). To date, all cases whose samples were laboratory confirmed in this multi-country outbreak have been identified as being infected with the West African clade.

The sudden and unexpected appearance of monkeypox simultaneously in several non-endemic countries and without direct travel ties to an endemic region[1] is a highly unusual event. It suggests that there has been an undetected transmission for a period of time.

For details refer to World Health Organization (21 May 2022). Disease Outbreak News; Multi-country monkeypox outbreak in non-endemic countries. Available at: https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON385

[1] Monkeypox endemic countries are Benin, Cameroon, the Central African Republic, the Democratic Republic of the Congo, Gabon, Ghana (identified in animals only), Ivory Coast, Liberia, Nigeria, the Republic of the Congo, Sierra Leone, and South Sudan

2. Risk assessment for WHO South-East Asia Region

Overall, the risk of MPX for WHO South-East Asia Region is assessed as **moderate.** However, the level of confidence is low, as currently information pertaining to MPX is very limited in the WHO South-East Asia Region (SEAR).

There are no recent reports of monkeypox cases in the Region. Since the transmission pattern of MPX is atypical and the extent of transmission is still unknown in recently affected non-endemic countries, possible importation and subsequent transmission of MPX virus in SEAR cannot be ruled out. Considering the reported case fatality ratio (CFR) of around 3-6% in the recent outbreaks, once an outbreak occurs in the Region, impact is expected to be at least of moderate consequence.

As far as vulnerabilities are concerned, timely detection of MPX cases could be a challenge for many countries in the SEA Region. This may be due to lack of availability of laboratory confirmation facilities for the diagnosis in most local settings in the Region. Event-based surveillance, including reports from clinicians will have to be strengthened as it may provide important signals to detect and verify once incident cases of MPX occur in the SEAR. In this regard, building awareness among clinicians is critical.

To our knowledge, countries in the SEAR do not stockpile vaccines or antivirals that could be used for monkeypox. However, in terms of capacities, SEAR MS have strengthened various aspects of their epidemic response capacities during the COVID-19 pandemic. These capacities are likely to provide foundation to cope with the monkeypox event, as well as other future health emergencies.

The risk of MPX in SEAR will be updated as more information becomes available.

3. Priority Actions for countries in the SEA Region

3.1 Surveillance, case investigation, case reporting, and contact tracing

The key objectives of surveillance and case investigation for monkeypox in the current context for MS are to rapidly identify cases and clusters in order 1) to provide optimal clinical care; 2) to isolate cases to prevent further transmission; 3) to identify and manage contacts; 4) to protect frontline health workers; and 5) to tailor effective control and prevention measures.

Please see the Annex 1 for flowcharts summarizing suggested actions for surveillance, case investigation and contact tracing.

Sensitize clinicians and use event-based surveillance for detection of MPX cases

Cases of MPX are most likely detected and reported by astute clinicians. It is crucial to sensitize clinicians to raise awareness of monkeypox.

- Reach out and provide information to clinicians working in public and private health sectors at services where the monkeypox patients are likely to attend, e.g., primary care clinics, fever clinics, dermatology clinics, infectious disease units, sexual health and/or HIV services, obstetrics and gynecology services, and those working at points of entry (POE).
- Engage with key stakeholders to effectively communicate to clinicians, e.g., via medical associations, professional organizations.
- Provide relevant information on signs and symptoms (Table 4), case definitions (Table 1), current epidemiology, prevention, diagnosis and treatment of monkeypox, how to collect and send samples for laboratory testing, and reporting procedures.
- Request clinicians to report suspected case(s) immediately to public health authority

Ensure event-based surveillance is in place and functional to detect signals that may be associated with monkeypox cases or clusters.

- Once signals are detected, ensure verification by local teams
- Local teams may also identify cases based on syndromic surveillance on fever and rash

Table 1: Case definitions

Suspected case:	**Probable case:**
• A person of any age presenting with an unexplained acute rash **AND** • One or more of the following **signs or symptoms**, since 15 March 2022: ○ Headache ○ Acute onset of fever (>38.5oC) ○ Lymphadenopathy (swollen lymph nodes) ○ Myalgia (muscle pain/body aches) ○ Back pain	• A person meeting the case definition for a suspected case **AND** • One or more of the following: ○ has an **epidemiological link** to a probable or confirmed case of monkeypox in the 21 days before symptom onset ○ reported **travel history** to a monkeypox endemic country in the 21 days before symptom onset ○ has had **multiple or anonymous sexual partners** in the 21 days before symptom onset

○ Asthenia (profound weakness) **AND** • For which the following **common causes of acute rash do not explain the clinical picture** [1] *N.B.* ***Not necessary to obtain negative lab results*** *for listed common causes of rash illness in order to classify a case as suspected.*	○ has a positive result of an **orthopoxvirus serological assay**, in the absence of smallpox vaccination or other **known exposure to orthopoxviruses** ○ is **hospitalized** due to the illness **Confirmed case:** • A case meeting the definition of either a suspected or probable case **AND** • is **laboratory confirmed for monkeypox virus** by detection of unique sequences of viral DNA either by **real-time PCR and/or sequencing**.

Once a suspected case is identified – assessment, sample collection and reporting

When a patient is suspected of monkeypox infection, clinicians are advised to take following actions;

- Assess whether the suspected case may meet the case definition for a probable case (Table 1). This includes asking the patient on travel history and possible exposure to confirmed and probable cases of MPX.
- Report suspected cases of MPX immediately to public health authorities (see the next section).
- Once laboratory services are available, samples should be collected from the suspected case(s) and be referred to the laboratories for testing for MPX infection. Follow the standard SOPs for specimen referral described in the laboratory diagnosis section below in this document.

Laboratory confirmation of suspected cases is important but that should not delay implementation of public health actions.

Reporting to public health authorities

In coordination with public health authorities, health care services should obtain and report the minimum data for case reporting. See Annex 1a for the minimum data for case reporting.

Case investigation

If monkeypox is suspected, the investigations should be conducted, and such an investigation should address the followings;

- Clinical examination of the patient having adhered to appropriate IPC measures
- Asking the patient about possible sources of infection and the presence of similar illnesses in the patient's community and contacts (both backward to identify the source and forward contact tracing to reduce onward transmission)
- Safe collection and dispatch of specimens for laboratory investigation of MPX

[1] varicella zoster, herpes zoster, measles, herpes simplex, bacterial skin infections, disseminated gonococcus infection, primary or secondary syphilis, chancroid, lymphogranuloma venereum, granuloma inguinale, molluscum contagiosum, allergic reaction (e.g., to plants); and any other locally relevant common causes of papular or vesicular rash.

Any patient suspected of monkeypox infection should be isolated during the presumed and known infectious periods, that is during the prodromal and rash stages of the illness, respectively.

- Suspected presence of similar illnesses in the patient's community or amongst contacts should be further investigated to identify possible source of infection (also known as "backwards contact tracing") and to initiate contact tracing to prevent onward transmission.
- Assist clinicians and health care services to record the minimum data and report to public health authorities (see the Annex 1a for the minimum data to be reported).

Contact tracing

In the current context, as soon as a suspected case is identified, contact identification and contact tracing should be initiated. The definition of a contact is as follows:

- Face-to-face exposure [including health workers without appropriate personal protective equipment (PPE)].
- Direct physical contact, including sexual contact
- Contact with contaminated materials such as clothing or bedding

Contacts should be monitored at least daily for the onset of any signs/symptoms for a period of 21 days from last contact with a patient or their contaminated materials during the infectious period.
Quarantine or exclusion from work are not necessary during the contact tracing period as long as contact develops no symptoms.
If the contact develops a rash, they need to be isolated and evaluated as a suspected case, and a specimen should be collected for laboratory analysis for confirmation of monkeypox virus.

Reporting to WHO

Probable and confirmed cases of monkeypox should be reported immediately to WHO through International Health Regulations (IHR) national focal points (NFPs) under the IHR (2005).

For details refer to WHO interim guidance on Surveillance, case investigation and contact tracing for Monkeypox available at https://www.who.int/publications/i/item/WHO-MPX-surveillance-2022.1

3.2 Laboratory testing for the MPX virus

Any individual that meets the suspected case definition for monkeypox should be offered laboratory testing. The decision to conduct a laboratory test should be based on both clinical and epidemiological factors, linked to an assessment of the likelihood of infection

Use of adequate standard operating procedures (SOPs) must be ensured, and laboratory personnel must be trained for appropriate donning and doffing of PPE, collection, storage, packaging and transport of specimens. All specimens collected for laboratory investigations should be regarded as potentially infectious materials and handled with caution.

The recommended specimens for laboratory confirmation of monkeypox are skin lesion material, including swabs of lesion surface and/or exudate, roofs from more than one lesion, or lesion crusts. Swab the lesion vigorously, to ensure adequate viral DNA is collected. Dry swabs (without transport media) are the preferred specimens, while specimens placed in viral transport media (VTM) can be accepted under exceptional circumstances.

In addition to a lesion specimen, the collection of an oropharyngeal swab is encouraged. However, data on the accuracy of this specimen type for diagnosis is limited for monkeypox, therefore a negative throat swab specimen should be interpreted with caution.

Table 2: The suggested time of specimen collection

Phase	Type of specimens	Laboratory investigations	Purpose
Incubation (5-21 days)	No testing		
Febrile (1-4 days)	Nasopharyngeal or Oropharyngeal swabs	Nucleic acid amplification testing like PCR	Diagnosis
Rash (2-4 weeks)	Lesion fluid, roof or crust	Nucleic acid amplification testing like PCR	Diagnosis
Recovery (days – weeks)	Serum	Anti-body testing	To aid diagnosis

Specimens should be stored refrigerated or frozen within an hour of collection and transported to the laboratory as soon as possible after collection. Refer to annex 2 for appropriate storage conditions. Transport of specimens should comply with any applicable national and/or international regulations.

For international transport, specimens from suspected probable or confirmed cases should be transported as Category A, UN2814 "infectious substance, affecting humans." All specimens being transported should have appropriate triple packaging, labelling and documentation. Shipping requires a dangerous goods certified shipper. ***For accessing regional referral laboratories (Table 3), kindly contact the regional office (SEARO) through WHO country offices.***

Table 3: Regional reference laboratories for providing laboratory services to SEAR MS

- **India:** National Institute of Virology (NIV) of the Indian Council of Medical Research, Pune, Maharashtra, India
- **Australia:** Victorian Infectious Diseases Reference Laboratory (VIDRL), Melbourne, Australia
- **Thailan**d: National Institute of Health, Department of Medical Sciences, Thailand
- **Thailand:** Faculty of Medicine, Chulalongkorn University, Thailand

It is recommended that all manipulations of specimens originating from suspected, probable or confirmed cases of monkeypox in the laboratory be conducted according to a risk-based approach. Each laboratory should conduct a local (that is, institutional) risk assessment. When manipulating biological specimens, core biosafety requirements, similar to those previously referred to as biosafety level 2, must be met and heightened control measures should be applied based on local risk assessment. Kindly refer to the annexure for draft bio-risk assessment template.

Monkey pox virus is a double-stranded DNA virus and the confirmation of MPX infection is based on nucleic acid amplification testing (NAAT), using real-time or conventional polymerase chain reaction (PCR), for detection of unique sequences of viral DNA. The testing algorithms can be based on available testing kits and reagents. Refer to the annexure 3 for proposed testing algorithm and availability of commercial kits.

Genomic sequencing (GS) and characterization of MPX virus from as many positive specimens from different patients as possible, is recommended at this stage. WHO strongly encourages countries and laboratories to

share GS data, including raw data whenever possible in a timely manner through the available public access databases. GS data can be generated using Sanger or next generation sequencing (NGS) methods.

Antibody detection from plasma or serum should not be used alone for diagnosis of monkeypox. However, IgM detection from recent acutely ill patients or IgG in paired serum samples, collected at least 21 days apart, with the first being collected during the first week of illness, can aid diagnosis if tested samples yield inconclusive results. Recent vaccination may interfere with serological testing.

For details refer to WHO interim guidance on Laboratory testing for the monkeypox virus available at https://www.who.int/publications/i/item/WHO-MPX-laboratory-2022.1.

3.3 Clinical management and infection prevention and control (IPC)

Table 4: Basic information on monkeypox for clinicians

- Incubation period is usually 6 to 13 days and can range from 5 to 21 days
- Typical symptoms include fever, headache, muscle aches, backache, lack of energy, swollen lymph nodes and a skin rash or lesions
- Swelling of the lymph nodes is a distinctive feature of monkeypox compared to other diseases that may initially appear similar (chickenpox, measles)
- The skin eruption begins within 1 to 3 days after fever onset. The rash often begins on the face, then spreads to other parts of the body
- The rash evolves from macules (lesions with a flat base) to papules (slightly raised firm lesions), vesicles (lesions filled with clear fluid), pustules (lesions filled with yellowish fluid), and crusts which dry up and fall off

MPX spreads from one person to another through close physical contact, including sexual contact, respiratory secretions, and contaminated materials such as bedding.

As part of an overall national and facility level operational readiness assessment, MS should review clinical management and IPC related processes, infrastructure, complete identified gaps and needs in preparation for response to potential importation of cases, subsequent local transmission and case clusters. These preparedness measures should include supplies, including PPE, medicines /pharmaceuticals for clinical management, designated facilities to manage cases, and dedicated health staff to be trained and deployed for care of MPX cases, among others.

Patient care including clinical management of suspected or confirmed MPX requires early recognition of suspected cases , rapid implementation of appropriate infection prevention and control measure, testing of likely pathogens to confirm diagnosis, symptomatic management of patients with mild or uncomplicated MPX and monitoring for and treatment of complications and life-threatening conditions in severe cases, as per local clinical diagnosis and management protocols.

Health workers caring for suspected or confirmed patients need to implement standard, contact and droplet precautions. These precautions need to be followed in all health facilities including outpatient services and

hospitals. However, in the situation of aerosol generating procedures (AGPs), the health care workers must use a respirator (FFP2 or EN certified equivalent or US NIOSH-certified N95).

Patients should be kept in isolation and transmission-based precautions must be continued until resolution of symptoms (including the resolution of any rash and scabs that have fallen off and healed).

WHO is in the process of developing an interim guidance on clinical management and infection prevention and control. The guidance will provide clinical management protocols (including use of antivirals under investigational and compassionate use protocols in specific patient groups) and IPC measures to be followed in health care settings and for home-based care.

For details refer to World Health Organization (21 May 2022). Disease Outbreak News; Multi-country monkeypox outbreak in non-endemic countries. Available at: https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON385

3.4 Vaccination

Historically, vaccination against smallpox had been shown to be protective against monkeypox. While one vaccine (MVA-BN) was approved for monkeypox, in 2019, it is not yet widely available. WHO is working with the vaccine manufacturers to improve equitable access of these vaccines.

People who have been vaccinated against smallpox in the past may also have some protection against monkeypox. However, people below the age of 40–50 years are unlikely to have been vaccinated, since vaccination against smallpox ended in 1980 after it was eradicated

Globally, 1st, 2nd and 3rd generation of vaccines in use are LC16m8, Microgene, and ACAM2000. The 'LC16m8" vaccine is licensed in Japan for use against smallpox in 1975 and has shown good efficacy profile against monkeypox in several studies. However, no regulatory approval has been sought or granted for monkeypox. Vaccine "ACAM2000" is recommended by the USA for post- exposure prophylaxis (PEP) for monkeypox in addition to MVA/BN.

Vaccination for monkeypox is being deployed in some countries to manage close contacts, such as health workers. Member States may want to consider vaccination of close contacts as post-exposure prophylaxis or pre-exposure vaccination of laboratory personnel and health workers

WHO has convened experts to discuss recommendations on vaccination for the prevention of Monkey pox. Based on the expert recommendations, WHO is expected to issue an interim guidance on vaccination that will focus on groups and indications for vaccination, type of vaccines, their availability and access.

For details refer to World Health Organization (19 May 2022). Fact sheets; Monkeypox. Available at: https://www.who.int/news-room/fact-sheets/detail/monkeypox

3.5 Risk communication and community engagement

The authority should proactively communicate information related to monkeypox and potential implications for the public in timely and transparent manner to further foster trust and address concerns.

One of the most important and effective interventions in public health response to any public health event is to proactively communicate with the population what is known, what is unknown and what is being done by responsible authorities to get more information.

In the context of high level of uncertainties, rumour and misinformation may spread. It is important to manage them at all stages of the response by providing the right information at the right time to the right people through trusted channels (e.g., community and faith leaders, family doctors and other influential members of society).

- There should be a monitoring system in place to capture emerging trends to enable delivery of a targeted communication package.

It is necessary to provide information on monkey pox to key populations who may be more likely affected by the disease. In the current multi-country outbreak, cases have often been identified amongst men who have sex with men (MSM) seeking care in primary care and sexual health clinics.

- Providing information on monkeypox to the public, particularly the key populations likely affected in the current outbreak, may facilitate health-seeking and risk reduction behaviors.
- Engaging with existing key population networks and NGOs working with the key populations is needed to effectively reach them and provide information, including where to seek care when needed.

MSM are predominantly affected in the ongoing multi-country MPX outbreak. They are already a stigmatized population. Therefore, it is critical to address the stigma and discrimination.

In some countries or areas, the term to describe smallpox, chickenpox and monkeypox (and other diseases causing rash) are not clearly distinguished. Therefore, efforts to communicate and clarify the current event is essential.

Key messages include the below:

- **Prevention** - Someone who has direct contact with an infected person, including sexual contacts can get monkeypox. Steps for self-protection include avoiding skin to skin or face to face contact with anyone who has symptoms, practicing safer sex, keeping hands clean with water and soap or alcohol-based hand rub, and maintaining respiratory etiquette.
- **Detection and care** - If people develop a rash, accompanied by fever or a feeling of discomfort or illness, they should contact their health care provider. If someone is suspected or confirmed as having monkeypox, they should isolate until the scabs have fallen off and abstain from sex, including oral sex. During this period, patients can get supportive treatment to ease monkeypox symptoms. Anyone caring for a person sick with monkeypox should use appropriate personal protective measures, including wearing a mask, and cleaning objects and surfaces that have been touched.
- **Reporting** - Any rash-like illness during travel or upon return should be immediately reported to a health professional, including information about all recent travels, sexual history and smallpox immunization history.

For details refer to World Health Organization (21 May 2022). Disease Outbreak News; Multi-country monkeypox outbreak in non-endemic countries. Available at: https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON385

3.6 Points of entry (POE)

Based on available information currently, WHO does not recommend to Member States that they adopt any international travel-related measure for both, incoming and outgoing travellers.

Entry screening is unlikely to be cost effective, considering the low prevalence among travellers, having an incubation period up to 21 days which may allow infected travelers to complete the travel before the symptom onset, challenges in detecting symptoms even if the traveller is symptomatic, and extra costs that may be incurred to and burden for the POE workers and travellers.

In line with core capacities required by International Health Regulations (IHR) (2005), ensure that the designated POEs and if appropriate other POEs maintain a contingency plan, including appropriate medical services at the POE to allow prompt assessment and care for ill travellers. Also needed to maintain are procedures and systems to refer ill travellers to an appropriate medical facility. POE health officers should also be sensitized on the monkeypox situation.

In addition to above, risk communication targeting relevant international travellers should be considered. It is important to raise awareness on the current situation of monkeypox among travellers to and from the endemic and affected countries and provide appropriate information. This information includes but not limited to signs and symptoms of MPX, how the MPX virus could be transmitted, how to prevent the infection, what action to take and how to seek care, who and where to inform when the traveler develops symptoms or is suspected of having the disease during and after the travel.

The key messages delivered to travellers visiting monkeypox-endemic countries should include avoiding contact with sick mammals such as rodents, marsupials, non-human primates (dead or alive) that could harbour monkeypox virus and the need for refraining from eating or handling wild game (bush meat).

In providing communication, it is necessary to engage with appropriate stakeholders, such as airline operators and airport authorities.

List of resources

WHO website: Monkeypox https://www.who.int/health-topics/monkeypox/#tab=tab_1

Key facts about Monkeypox https://www.who.int/news-room/fact-sheets/detail/monkeypox

Monkeypox Q&A https://www.who.int/philippines/news/q-a-detail/monkeypox

Monkeypox outbreak toolbox https://www.who.int/emergencies/outbreak-toolkit/disease-outbreak-toolboxes/monkeypox-outbreak-toolbox

Monkeypox: public health advice for gay, bisexual and other men who have sex with men https://www.who.int/publications/m/item/monkeypox-public-health-advice-for-men-who-have-sex-with-men

OpenWHO. Monkeypox: Introduction. Online training module. 2020
https://openwho.org/courses/monkeypox-introduction

OpenWHO: Monkeypox epidemiology, preparedness and response
https://openwho.org/courses/monkeypox-intermediate

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Annex 1. Monkeypox (MPX) surveillance, investigation and contract tracing in SEA Region

Public Health Authorities
(suggested actions in light blue boxes)

Clinicians/Health care services
(suggested actions in orange boxes)

Sensitize clinicians (HCW EBS)
- Primary care, dermatology, STI
- Public and private
- Engage professional networks
- Request reporting suspected cases
- Advise case definition, lab testing, and reporting procedure

Media-based EBS
- Signals on suspected cases/clusters
- Request local team for timely verification

Local public health team verification
- Local team verifies the signals - case/cluster meets the case definition for the suspected case?
- Local team may also identify cases based on syndromic surveillance

Monkeypox suspected? - Case definition for the suspected case

A person with unexplained acute rash (any age)

AND

One or more of the following signs/symptoms:
- Headache
- Acute onset of fever (>38.5oC)
- Lymphadenopathy (swollen lymph nodes)
- Myalgia (muscle pain/body aches)
- Back pain
- Asthenia (profound weakness)

AND

Common causes of acute rash [1] do not explain the clinical picture (not necessary to obtain negative lab results to rule out other causes of rash illness)

Yes, meet criteria → **Suspected case**

No → Manage as another illness

Suspected case

Report to public health authority immediately
Request lab test

Receive report of suspected case

Facilitate laboratory testing
- See laboratory section

Assess if the case meet one or more of the following? – Case definition for probable case
- In the 21 days before symptom onset:
  - **close contact** (epi link) with a probable or confirmed MPX case
  - **travel history** to a MPX endemic country
  - multiple/anonymous **sexual partners**
- is **hospitalized** due to the illness
- (based on lab findings) an orthopoxvirus serological assay positive, in the absence of smallpox vaccination or other exposure to orthopoxviruses

Yes, meet criteria → **Probable case**

No → Manage as suspected case
Examine other causes

Case investigation
- **clinical examination** of the patient (ensure appropriate IPC)
- ask patients about **possible sources** of infection & the presence of **similar illnesses** in the patient's community
- safe collection & dispatch of **specimens for MPX laboratory test.**

Contact tracing
- Contact [2] identification/tracing should be initiated, as soon as a suspected case is identified.

Contact management
- Monitored for 21 days from last contact with a MPX case
- Quarantine or exclusion from work not needed unless symptomatic.
- If the contact develops a rash, need to be isolated & evaluated as a suspected case, & lab test for MPX to be arranged.

Suspected/probable cases lab-confirmed?
- Detecton of MPX viral DNA by PCR and/or sequencing?

Yes → **Confirmed case**

No → Discard as MPX case
Examine other causes

Report probable and confirmed cases to WHO via IHR NFP

Notes for the diagram on the previous page

1. Common causes of acute rash do not explain the clinical picture:

- varicella zoster, herpes zoster, measles, herpes simplex, bacterial skin infections, disseminated gonococcus infection, primary or secondary syphilis, chancroid, lymphogranuloma venereum, granuloma inguinale, molluscum contagiosum,
- allergic reaction (e.g., to plants); and
- any other locally relevant common causes of papular or vesicular rash.

2. Definition of contacts

- one or more of the following exposures with a probable or confirmed case of monkeypox:
    - face-to-face exposure (including health workers without appropriate PPE)
    - direct physical contact, including sexual contact
    - contact with contaminated materials such as clothing or bedding

3. Case reporting

- A minimum set of variables for case reporting – please see the Annex 1 a

Annex 1a: Suggested minimum variables for case reporting

Case reports should include at a minimum the following information as much as feasible:

Categories	Minimum variables to be reported
Reporting	• date of report • reporting location • person reporting (and contact information)
Case demographic information	• name, age, sex and residence of case
Symptom onset	• date of onset of first symptoms • date of fever onset • date of rash onset
Possible exposure	• recent travel history (in the five to 21 days before onset of illness) • recent exposure to a probable or confirmed case (in the five to 21 days before onset of illness) • relationship and nature of contact with probable or confirmed case (where relevant) • recent history of multiple or anonymous sexual partners (in the five to 21 days before onset of illness) • occupation (including whether health worker)
Smallpox vaccination	• smallpox vaccination status
Clinical and laboratory findings	• presence of rash • number and location of lesions on the body • presence of other clinical signs or symptoms as per case definition • date of specimen collection • date of lab confirmation (where done) • method of confirmation (where done) • genomic/lineage characterization (if available; in particular whether West or Central African clade) • other relevant clinical or laboratory findings, particularly to exclude common causes of rash as per the case definition • whether hospitalized • date of hospitalization (where relevant) • outcome status at time of reporting. (recovered, deceased, ill) • final case classification (suspected, probable, confirmed, discarded, lost to follow-up)

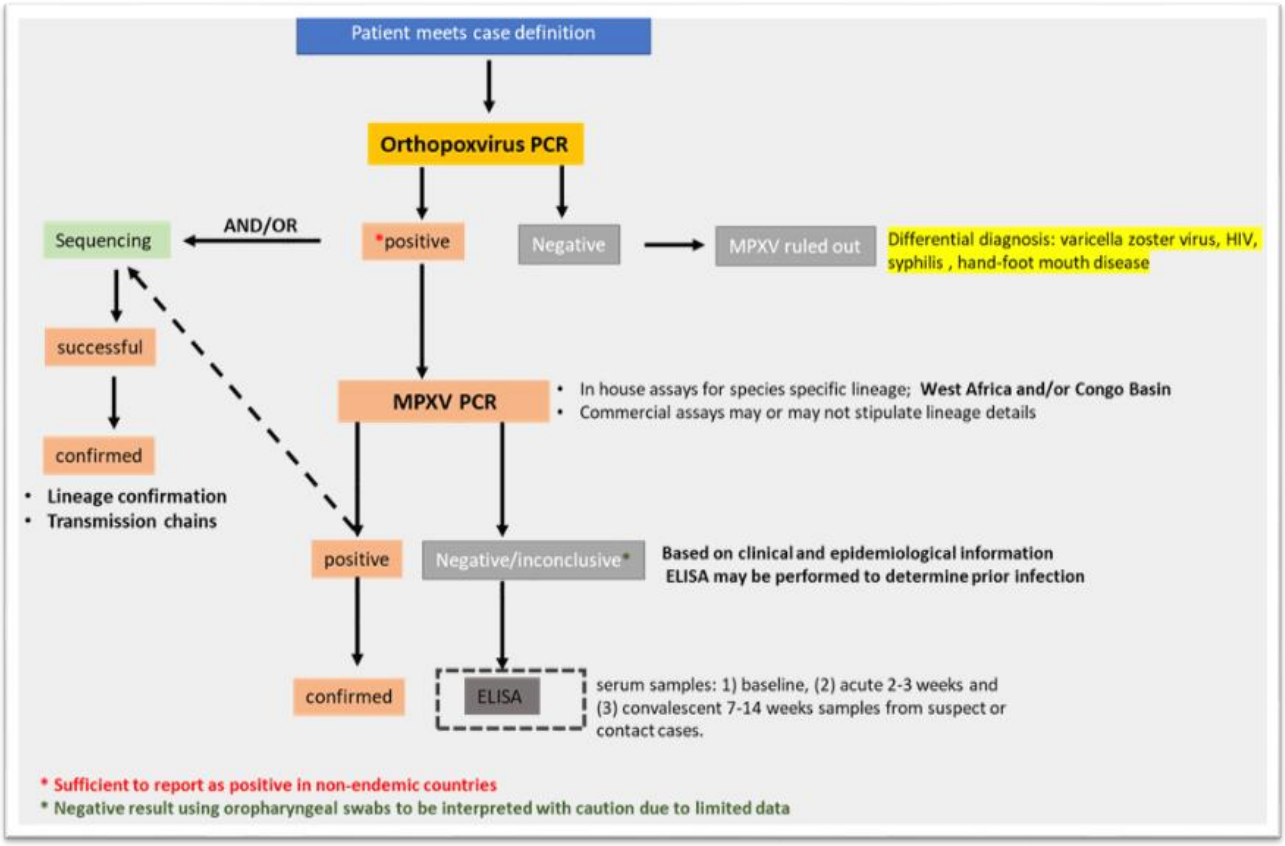
Annex 2: Specimen collection, storage and testing

Purpose	Clinical presentation	Sample type	Test type	Collection material	Storage	Transportation
Diagnosis	**Rash phase** • Suspect cases who meet case definition • Close contacts who develop fever or rash	Lesion tissue, lesion fluid, lesion crust, Oropharyngeal swabs (OP)*, or skin biopsy	RT PCR	nylon, polyester or Dacron swab.	Refrigerate (2-8 °C) or freeze (-20°C or lower) within 1 hour of collection; -20°C or lower after 7 days	For national and international purposes dry swab is preferred OP swab to be placed in VTM for transport
To aid diagnosis	**Post rash phase** • Suspect cases who meet case definition	Whole blood	serology	EDTA, serum separator tubes	Refrigerate (2-8 °C) or freeze (-20°C or lower) within 1 hour of collection; -20°C or lower after 7 days	Referral to WHO reference laboratory for serological testing

*Negative result with OP swab should be interpreted with caution

- Two lesions of the same type should be collected in one single tube, preferably from different locations on the body and which differ in appearance.
- Lesions, crusts and vesicular fluids should not be mixed in the same tube
- Two tubes per patient may be collected to minimize risk of poor sampling or inhibitors, however only one should be tested and the second should only be tested in case the first provides inconclusive results.
- Refer to WHO interim guidance for additional sample types to be collected for research purposes

Annex 3: Testing algorithm for MPX virus



Annex 3 a: List of available commercial assays

Source/Supplier	Product
altona	RealStar zoonotic Orthopoxvirus kit to be modified without VARV (*in validation*)
altona	RealStar® Orthopoxvirus PCR Kit 1.0 (*available only to certain laboratories*)
tib molbiol (distrib. By Roche)	LightMix® Modular Orthopox 14kDA *(primers/probes/pos control; master mix separate cat. No.)*
tib molbiol (distrib. By Roche)	LightMix® Modular Monkeypox *(primers/probes/pos control; master mix separate cat. No.)*
bei	Pan-Orthopox Virus E9L Gene-Specific Quantitative PCR Assay Detection Kit *(out of stock)*
thermo fisher	Monkeypox qPCR assay *(primers/probes only currently)*

	Creative biogene	Monkeypox Virus Real Time PCR Kit *(likely same as Liferiver)*
	Shanghai ZJ biotech	Liferiver Monkeypox Virus Real Time PCR Kit
	Bioperfectus	Bioperfectus real time PCR kit

Also refer to

- FINDdx test directory: https://www.finddx.org/mpx-test-directory/
- EVA positive controls: https://www.european-virus-archive.com/nucleic-acid/monkeypox-virus-dna-mpxv-uk2-2018

Annex 3 b: Laboratory risk assessment.

Procedure/pathogen: Monkeypox Virus

1. Hazard identification

Brief overview of the laboratory work and summarize the laboratory activities to be conducted that are included in the scope of this risk assessment.	
Describe the biological agents and other potential hazards	– **Pathogen**: Monkeypox virus – **Characteristics: genus Orthopoxvirus, family Poxviridae (1)** – **Risk Group Classification**: Risk group 3 (2) – **Host range:** wide range of non-human primates, rodents, squirrels, black-tailed prairie dogs, African brush-tailed porcupines, rats, pigs, shrews, and rabbits (1-3) – **Sources/Specimens:** skin lesion including the roof/fluid from vesicles and pustules and dry crusts, respiratory secretions, and tissues of infected hosts (1-3) – **Route(s) of transmission:** (1, 2) – Animal-to-animal: respiratory droplets, inhalation of aerosolized virus or organic matter containing virus particles, skin abrasions, the eye, or the ingestion of infected animal tissue – Animal-to-human: Direct contact with the blood, bodily fluids, or cutaneous or mucosal lesions via bite or scratch, bush meat preparation of infected animals. Indirect contact with lesion material such as contaminated bedding – Human-to-human: close contact with respiratory secretions, skin lesions of an infected person or recently contaminated objects

	– **Treatment:** No specific treatment. Tecovirimat, Brincidofovir, Cidofovir, Vaccinia Immuneglobulin can be approved for the control (1, 2) – **Prophylaxis:** Smallpox vaccination (1, 2) – **Disinfection:** 0.5% sodium hypochlorite, chloroxylenol-based household disinfectants, glutaraldehyde, formaldehyde, and paraformaldehyde (2)
Clinical or laboratory procedures	- **Clinical** 1. Specimen collection 2. Needlestick injury 3. Sample transport - **Laboratory** 1. Specimen reception 2. Testing of blood samples such as haematology or clinical chemistry 3. Virus isolation 4. PCR-based assays

1. Evaluate the risks

Instructions: describe how exposure and/or release could occur.	
What potential situations are there in which exposure or release could occur?	<u>Clinical</u> o Exposure to aerosols (Respiratory), skin scrapings or splashes (Mucus membranes) during sample collection o Needlestick injury o Leaking sample during transport resulting in exposure of staff and contamination of environment <u>Laboratory</u> o Exposure to aerosol (respiratory), skin scrapings or splashes (mucous membranes) or needle stick during laboratory testing o Exposure to infectious material via cuts and abrasions during laboratory activities o Spill of infectious material during *in vitro* propagation/virus isolation o Incomplete decontamination due to ineffective disinfection procedures (Chemical or autoclaving) o Incorrect Waste Disposal: Handling & Environmental contamination o Exposure to chemicals used for bacterial identification or decontamination

What is the likelihood of an exposure/release occurring (rare, unlikely, possible, likely, almost certain)?	– Specimen collection– Likely – Sample transport/Specimen reception - Possible – Testing of blood or urine samples – Possible – DNA/RNA extraction for PCR/NAAT – Possible – *In vitro* viral culture – Likely – Waste Disposal – Possible – Exposure to chemicals – Likely
What is the severity of the consequences of an exposure/ release (negligible, minor, moderate, major, severe)?	– Specimen collection – Moderate – Sample transport/Specimen reception – Moderate – Testing blood or urine samples - Moderate – Serology (ELISA/ rapid tests) & Rapid diagnostic tests – Moderate – DNA/RNA extraction for PCR/NAAT – Moderate – *In vitro* viral culture – Moderate – Waste Disposal & Incomplete decontamination – Moderate – Exposure to chemicals – Moderate

Laboratory activity/procedure	Initial risk without control mitigations (Very low, low, medium, high, very high)	Is the initial risk acceptable? (yes/no)
Specimen collection	High	No
Sample transport/sample reception	Medium	Yes
Testing of blood and urine samples	Medium	Yes
NAAT/PCR	Medium	Yes
In vitro isolation	High	No
Waste Disposal & Incomplete decontamination	Medium	Yes
Exposure to chemicals	High	No

2. Risk control strategy

Procedure	**Sample type**	**Hazard**	**Initial risk**	**Risk mitigation**	**Residual risk**

Clinical sample collection	Skin lesion, respiratory secretions, and tissues of infected hosts	Aerosol or splash exposure during sample collection (Clinical collection or necropsy) Needlestick injuries	High	Standard PPE* N95** GMPP*** Smallpox vaccination (desirable) and Hepatitis B vaccination Validated waste management for infectious materials† Standard disinfection and decontamination†† Emergency response procedures and associated staff training practiced †††	Low
Sample transport	Skin lesion, respiratory secretions, and tissues of infected hosts	Leaking sample causing aerosol or splash exposure	Medium	Samples should be packaged in triple layer packing: 1) water-proof primary container that contain samples and an absorbent 2) water-proof secondary packaging and 3) an outer packaging of adequate strength. Ensure staff are appropriately trained in IATA dangerous goods regulations and transport requirements Emergency response procedures and associated staff training practiced †††	Low
Sample reception and/or sample processing	Skin lesion, respiratory secretions, and tissues of infected hosts	Leaking sample Aerosol exposure during sample processing Eye splash during sample processing Infectious culture material spill	Medium/ High	Working under BSL 2 (CORE laboratory) biocontainment including associated practices and procedures Standard PPE* Work in certified Class II BSC‡ Centrifugation using sealed centrifuge cups or rotors GMPP*** Smallpox vaccination (desirable) and Hepatitis B vaccination Validated waste management for infectious materials†	Low

				Standard disinfection and decontamination†† Emergency response procedures and associated staff training practiced †††	
Testing of blood or urine samples	Blood or urine	Aerosol exposure during sample processing Eye splash during sample processing	Medium	As per *Sample collection* <u>Note</u> N95 Respirator only if risk assessment indicates Serology samples processed in certified Class II BSC with risk assessment Centrifugation using sealed centrifuge cups or rotors	Low
PCR	Skin lesion, respiratory secretions, and tissues of infected hosts	Aerosol exposure during sample processing Eye splash during sample processing Infectious culture material spill	Medium	As per *Sample reception/processing* <u>for nucleic acid extraction only</u> Consider inactivation using Roche MagNA Pure lysis buffer (4) Addition of extraction buffer must be done during sample processing and extraction step location dependent on risk assessment and on inactivation of sample by extraction buffer being used.	Low
In vitro isolation	Skin lesions, respiratory secretions, and tissues of infected hosts	Aerosol exposure during sample processing Eye splash during sample processing Infectious culture material spill High virus concentration and volume	High	Working under BSL2 (CORE) or BSL3 biocontainment (directional airflow) including practices and procedures associated with heightened control measures. Containment level will be dependent on risk assessment Standard PPE* Work in certified Class II BSC‡ Centrifugation using sealed centrifuge cups or rotors GMPP*** Validated waste management for infectious materials† Standard disinfection and decontamination††	Low

				Emergency response procedures and associated staff training practiced †††	
Waste Disposal & Incomplete deconta mination	Samples Consum ables Waste	Aerosol exposure during handling Eye splash during sample handling Contamination of environment	Mediu m	Validated waste management for infectious materials† Standard disinfection and decontamination†† Standard PPE* Note N95 Respirator only if risk assessment indicates GMPP*** Emergency response procedures and associated staff training practiced †††	Low
Exposure to chemicals	Not applica ble	Chemicals used for Nucleic acid extraction and disinfection	High	**Consult material safety data sheets for each chemical prior to commencing work.** ‡‡	Low

* Standard PPE – Lab Coat or Gown (or coverall as indicated by risk), Gloves, Eye protection or Face shield including documented training and competency in donning and doffing

** N95 Respirator - fit tested before using for the first time and perform fit-testing annually.

*** GMPP - Good Microbiological Practices & Procedures (i.e. confirm staff competency)

† Validated waste management - Best practice sharps and infectious biologicals disposal.

†† Standard chemical disinfection and decontamination (i.e., sodium hypochlorite (bleach) (e.g. 5,000 ppm (0.5%) for general surface disinfection and 10,000 ppm (1%) for disinfection of blood spills), 1% Virkon, 0.5% hydrogen peroxide, quaternary ammonium compounds and phenolic compounds) or steam sterilization at 121°C for 30 minutes. Note that all disinfection or sterilisation processes must be validated against the pathogen in question. Autoclaves cycles must be regularly validated for complete sterilisation.

††† Emergency response procedures- Including documented training and competency

‡ Work in certified Class II BSC. Staff must be trained in proper BSC operation and use.

‡‡ Identify hazards and implement risk mitigation strategies. Ensure that staff are trained in the safe use of chemicals, disposal and emergency situations.

Overall residual risk.	Low

References

1. World Health Organisation. Monkeypox. [cited 2022 25 May]; Available from: https://www.who.int/news-room/fact-sheets/detail/monkeypox
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3. Centres for Disease Control and Prevention. Monkeypox-information for laboratory personnel. [cited 2022 25 May]; Available from: https://www.cdc.gov/poxvirus/monkeypox/lab-personnel/index.html
5. Vinner L, Fomsgaard A. Inactivation of orthopoxvirus for diagnostic PCR analysis. J Virol Methods. 2007 Dec;146(1-2):401-4.