Summary

Situation
• Since 1 January 2022 and as of 6 July 2022, 7107 cases of monkeypox have been reported to WHO from 60 countries/territories in five WHO Regions.

Recommended priority actions
• Surveillance: Sensitization of clinicians working at relevant health services at public and private sectors is critical for detection of monkeypox. Once a suspected case is identified, clinicians should report immediately to national or local public health authority, specimens be collected and shipped for laboratory testing of monkeypox and contact tracing should be initiated. Probable and confirmed monkeypox cases should be reported to WHO through national IHR focal points. Case investigations should examine possible sources of infection. Engagements with existing networks of affected populations should be considered to facilitate disease surveillance and contact tracing.

• Laboratory testing: Laboratory will confirm monkeypox infection on the basis of nucleic acid amplification testing (NAAT), using the real-time or conventional polymerase chain reaction (PCR) method. Planning for genomic sequencing for characterization of monkeypox viruses and sharing data for public health decision making are important and strongly promoted.

• Clinical management & Infection Prevention and Control (IPC): Health workers caring for suspected or confirmed patients of monkeypox need to implement standard, contact and droplet precautions. Management of mild or uncomplicated monkeypox patients can be done at home after fulfilling recommended IPC conditions. Patients at high risk for complications or those with severe or complicated monkeypox should be managed in a health care facility. Mild or uncomplicated patients with monkeypox may be given symptomatic treatment such as antipyretics for fever and pain, and conservative treatment for rash lesions. Special considerations need to be given when caring for sexually active populations, women during and after pregnancy, children with monkeypox, and feeding of young infants of mothers with monkeypox and the severe disease.

• Vaccination: Based on current risks-benefits assessment and regardless of vaccine supply, mass vaccination is not required nor recommended for monkeypox at this time. The clinical decision for immunization with monkeypox vaccines will have to be made on the basis of a joint risks – benefits assessment between a health care provider and prospective vaccinee, on a case-by-case basis. WHO recommends Post-Exposure Prophylaxis (PEP) for contacts of cases, with an appropriate second- or third-generation vaccine, ideally within four days of first exposure (and up to 14 days in the absence of symptoms), to prevent onset of disease. Pre-exposure prophylaxis (PrEP): PrEP is recommended for health workers at high risk of exposure, laboratory personnel working with orthopoxviruses, clinical laboratory personnel performing diagnostic testing for monkeypox, and outbreak response team members as may be designated by national public health authorities. The MS are requested to make all efforts to administer vaccines for monkeypox within a framework of collaborative research and randomized clinical trial (RCT) protocols with standardized data collection tools for clinical and outcome data. Please note that these interim recommendations will be updated as more information becomes available to WHO

• 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 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, monkeypox 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 (CFR) compared to 10.6 percent CFR for the Congo Basin clade.

Monkeypox virus was first identified in 1958 when two outbreaks of a pox-like disease occurred in crab-eating macaque monkeys in an animal facility in Copenhagen, Denmark that were being used for research. Although the name “monkeypox” comes from the first documented cases of the illness in monkeys, the monkeypox virus did not jump from monkeys to humans, nor are monkeys major carriers of the disease. While an animal reservoir for monkeypox virus is unknown, African rodents are suspected to play a part in transmission. The disease occurs primarily in wildlife population in tropical rainforest areas of Central and West Africa and is occasionally exported to other regions. As a zoonotic agent, monkeypox virus is far less sensitive to typical eradication measures since it is maintained in wild-animal populations.

In the current multi-country outbreak of monkeypox, since 1 January 2022 and as of 6 July 2022, a cumulative number of 7107 cases of monkeypox including one death, has been reported to WHO from 60 countries/territories in five WHO Regions. The situation of the multi-country outbreak of monkeypox is evolving and who expects that there will be more cases of monkeypox identified as surveillance expands.

Epidemiological investigations are ongoing; however, the majority of reported monkeypox cases have presented through sexual health or other health services in primary or secondary health care facilities. The history of travel was linked primarily to countries in Europe, North America or other countries rather than to countries where the virus was historically known to be present, and increasingly, to recent travels locally or no travel at all. Based on currently available information, the outbreak continues to primarily affect men having sex with men (MSM) who have reported recent sex with new or multiple partners.

The sudden and unexpected appearance of monkeypox simultaneously in several newly affected countries and without direct travel ties to a previously affected region\(^1\) is a highly unusual event. It suggests that there has been an undetected transmission for a period of time.

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.

WHO convened the meeting of the International health regulations (IHR) Emergency Committee (EC) regarding the multi-country outbreak of monkeypox on 23 June 2022. The WHO Director-General accepted the advice of the IHR EC that at present the multi-country monkeypox outbreak event does not constitute a Public Health Emergency of International Concern (PHEIC).

\(^1\) Countries where monkeypox previously reported prior to the current multi-country outbreak 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
For more details refer to following links


2. Risk assessment for WHO South-East Asia Region

The overall risk of monkeypox for the WHO South-East Asia Region (SEAR) is considered to be “moderate”, as the occurrence of the event is possible, while its consequences could be moderate. The level of confidence is considered moderate as well.

So far, there have been no recent reports of monkeypox cases detected in the SEAR, although some suspected cases have been tested for monkeypox (which were all tested negative) and the media too have reported some suspected events of monkeypox cases (which were assessed as not meeting the case definition of a monkeypox case). However, since the transmission pattern in the recently affected countries is atypical, and cases could easily travel across continents during the incubation period, importation into and subsequent transmission within the WHO's South-East Asia Region could happen anytime as far as the current outbreak continues globally. Once monkeypox virus is introduced in the Region, it may grow into outbreaks unless timely detection and response activities for breaking chains of onward transmission are made. In such a scenario, from the point of view of a regional risk assessment, at least moderate consequences could be expected.

Timely confirmation of monkeypox could be a challenge in some countries in the WHO’s SEAR, as in-country access to facilities of laboratory diagnosis of monkeypox is still limited (shipments to regional laboratories- the list of such laboratories is given later in this document- may be required in such countries). The event-based surveillance, including case reports from clinicians, may provide signals once incident cases occur in the Region. In this regard, awareness of clinicians on monkeypox outbreaks is critical. Given that men who have sex with men (MSM) is reported to be predominantly affected, targeted communications and interventions capitalizing on existing MSM networks should be considered, while efforts should be made to address stigma and challenges related to cultural or religious context in some countries.

The regional risk assessment takes in to account the fact that countries in the Region do not stockpile vaccines or antivirals for monkeypox, and access to the recommended countermeasures is limited. Also noted is the fact that countries have strengthened various aspects of epidemic response through the on-going response to the COVID-19 pandemic, which may provide the foundation for responses to a possible monkeypox outbreak in the region.

The regional risk assessment will be updated as more information becomes available to the WHO SEARO.
3. Priority Actions for countries in the SEA Region

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

1. Surveillance: Sensitize clinicians and use event-based surveillance for detection of suspected monkeypox cases

Cases of monkeypox are most likely to be detected and reported by astute clinicians. Therefore, it is crucial to sensitize clinicians to raise awareness on the monkeypox disease and the current multi-country outbreak.

- Reach out and provide information to clinicians working in public and private health sectors at services where the monkeypox patients are likely to attend to, e.g., primary care clinics, fever clinics, dermatology clinics, infectious disease units, sexual health and/or human immune deficiency virus (HIV) services, obstetrics and gynecological care services.
- In anticipation that monkeypox cases may be identified among international travelers, sensitize those working at points of entry (POE), especially at airports, on the monkeypox infection including appropriate actions to be taken in such incidence.
- Engage with key stakeholders to effectively communicate to clinicians, e.g., via medical associations, professional organizations, POE authority or using any other effective method/s.
- Provide relevant clinical information on signs and symptoms, surveillance case definitions (Table 1), current epidemiology, prevention, diagnosis and treatment of monkeypox, how to collect and ship samples for laboratory testing, and the disease reporting procedures.
- Request clinicians to report suspected case(s) immediately to the national or local public health authority as per national requirements.

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

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

2. Once monkeypox infection is suspected: Conduct Assessment, laboratory testing for monkeypox and disease reporting

Countries in WHO’s SEAR have already established surveillance case definitions for monkeypox either by applying WHO-proposed case definitions, or those that are adjusted to local circumstances. The updated WHO surveillance case definition is available at this link, and also is shown in the Table 1. It should be noted that these definitions have been developed for surveillance purposes and should not be used to guide clinical management (please refer to the WHO interim guidance for Clinical Management and Infection Prevention and Control for monkeypox for clinical management purposes).
### Table 1: WHO-proposed surveillance case definitions

#### Suspected case:
- A person of any age presenting since 01 January 2022 with an unexplained acute rash or one or more acute skin lesions

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

AND
- The following 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);
  - Any other locally relevant common causes of papular or vesicular rash.

N.B. Not necessary to obtain negative lab results for listed common causes of rash illness in order to classify a case as suspected. If suspicion of monkeypox infection is high, the identification of an alternate pathogen which causes rash should not preclude testing for monkeypox virus (co-infection possible).

#### Probable case:
- A person meeting the case definition for a suspected case

AND
- Has an epidemiological link to a probable or confirmed case of monkeypox in the 21 days before symptom onset
  - Prolonged face-to-face exposure in close proximity, including health workers without appropriate PPE (gloves, gown, eye protection and respirator);
  - Direct physical contact with skin or skin lesions, including sexual contact; or
  - Contact with contaminated materials such as clothing, bedding or utensils

AND
- Has had multiple or anonymous sexual partners in the 21 days before symptom onset and has serological evidence of infection (retrospective) either
  - Has detectable levels of anti-orthopoxvirus (OPXV) IgM antibody; or
  - A four-fold rise in IgG antibody titre based on acute (up to day 5-7) and convalescent (day 21 onwards) samples.

in the absence of a recent smallpox/monkeypox vaccination or other known exposure to OPX virus (during the period of 4 to 56 days after rash onset)

AND
- Has a positive test result for orthopoxviral infection (e.g., OPXV-specific PCR without monkeypox virus-specific PCR or sequencing)

#### Confirmed case:
- Laboratory confirmed monkeypox virus by detection of unique sequences of viral DNA by real-time polymerase chain reaction (PCR) and/or sequencing.

N.B. Not necessary to obtain negative lab results for listed common causes of rash illness in order to classify a case as suspected. If suspicion of monkeypox infection is high, the identification of an alternate pathogen which causes rash should not preclude testing for monkeypox virus (co-infection possible).
2a. Assessment

When a presenting patient is suspected of having monkeypox virus infection, clinicians are expected to assess the patient based on monkeypox surveillance case definition.

- The assessment may involve asking questions on the travel history, possible exposures to confirmed or probable monkeypox cases, or related risk behaviors.
- All efforts should be made to avoid unnecessary stigmatization of individuals and communities potentially affected by monkeypox.

2b. Laboratory testing

Once laboratory testing for monkeypox is accessible, any individual meeting the surveillance case definition of a suspected monkeypox case should be offered laboratory testing for monkeypox, as much as resources allow. Due to the range of other conditions that cause skin rashes, it can be challenging to differentiate monkeypox solely based on the clinical presentation. Samples should be collected from suspected case(s) and be referred to laboratories designated/identified for testing for monkeypox viruses. It is necessary to follow the standard SOPs for specimen referrals as described in the “laboratory diagnosis” section below in this document.

- The decision to test should be based on both clinical and epidemiological factors, linked to an assessment of the likelihood of the monkeypox infection.
- When suspicion of monkeypox infection is high due to the history and/or clinical presentation, the identification of an alternate pathogen which causes rash illness should not preclude testing for monkeypox virus, as coinfections are possible.
- Given the epidemiological patterns in the current outbreak, criteria such as being a MSM, reporting a high number of sexual partners in the previous three weeks, and having attended a gathering where a confirmed case was reported may indicate a need for testing of a suspected case for monkeypox virus.
- Severely ill suspected cases should be tested if at all possible.

Laboratory confirmation of suspected cases is important but that should not delay case reporting and implementation of public health actions to control and prevent the spread of monkeypox.

2c. Reporting to the public health authority

Once suspected, probable or confirmed case(s) is(are) identified, the health care services should report such cases immediately to national or local public health authorities regardless of whether other potential diagnosis is also being explored. Suggested minimum data set for monkeypox case reporting is listed in the Annex 1a, or readers may also refer to WHO’s Monkeypox minimum dataset case reporting form (CRF). Procedures and variables for reporting may be defined by the national public health authority in respective SEAR Member States.

- Following the national guidelines or standard operating procedures (SOPs), health care services are requested to collect and report the minimum data on the monkeypox case to the public health authorities immediately.

3. Case investigation

Once suspected, probable or confirmed cases of monkeypox is identified, the investigation of case(s) is encouraged potentially engaging appropriate institutes, aiming to address key unknowns on monkeypox virus.
WHO has published a WHO Monkeys case investigation form (CIF) designed as a tool for Member States and researchers to conduct in-depth epidemiological investigation of monkeys case(s), and their contacts, either prospectively or retrospectively.

The CIF is intended for in-country use and the data are not required to be reported to WHO.

4. Contact tracing

4a. Definition of a contact

A contact is defined as a person who has had one or more of the following exposures with a probable or confirmed case of monkeypox, in the period beginning with the onset of the source case’s first symptoms and ending when all scabs have fallen off.

- **direct skin-to-skin physical contact** (such as touching, hugging, kissing, intimate or sexual contact)
- **contact with contaminated materials** such as clothing or bedding, including materials dislodged from bedding or surfaces during handling of laundry or cleaning of contaminated rooms
- **prolonged face-to-face respiratory exposure** in close proximity
- Respiratory exposure (i.e., possible inhalation of) or eye mucosal exposure to lesion materials (e.g., scabs/crusts) from an infected person
- The above definition also applies to health workers potentially exposed in the absence of proper use of appropriate personal protective equipment (PPE)

Based on the recommendation to offer smallpox or monkeypox vaccines for post-exposure prophylaxis, WHO has also established three levels of risks for contacts of a MONKEYPOX case – high, medium, and lower/minimum risks. Please see the link for details.

4b. Contact identification

In the current context, as soon as a suspected case is identified, contact identification and contact tracing should be initiated, while further investigation of the source case is ongoing to determine if the case can be classified as probable or confirmed; in the event that the case is discarded, the contact tracing may be aborted.

- Case-patients should be interviewed to elicit the names of contacts and contact information of all such persons, as well as to identify places visited where contacts with other people may have occurred.
- Contacts should be notified to relevant public health authority within 24 hours of identification.
- Public health authorities should also encourage case patients to directly notify their contacts, especially when case patients may be reluctant to provide the names of all contacts.
- Partner notification approach, used for sexually transmitted diseases or HIV, i.e., voluntarily notifying a partner who has been exposed to an infection, is reportedly yields good contact tracing results.
  - Cases should be offered adequate counselling on how to notify their contacts. Communication materials (e.g., leaflets, website) could also be provided to assist in notification.
- There could be existing networks of MSM which are already familiar with or trained in partner notification approach. Such networks could be important partners in tracing and monitoring contacts, considering the current epidemic patterns of the multi-country monkeypox outbreak.
4c. Contact monitoring

Contacts should be monitored, or should self-monitor, daily for the onset of signs or symptoms for a period of 21 days from the last contact with a probable or confirmed case or their contaminated materials during the infectious period.

- Asymptomatic contacts that adequately and regularly monitor their status can continue routine daily activities such as going to work and attending school (i.e., no quarantine is necessary).
- During the 21 days monitoring period contact should regularly practice hand hygiene and respiratory etiquette.
- Contacts should also try to avoid physical contact with children, pregnant women, immunocompromised individuals and animals, including pets.
- Options for monitoring by public health authorities are dependent on available resources. Contacts can be monitored passively, actively, or directly.
- Non-essential travel is discouraged for contacts.

5. Reporting to WHO

Probable and confirmed cases of MONKEYPOX should be reported immediately to WHO through International Health Regulations (IHR) national focal points (NFP-IHR).

- WHO has published a case reporting form (CRF) which constitutes the minimum data countries are requested to report to the respective WHO Regional Office. Please see the Annex 1a, or WHO Monkeypox minimum dataset case reporting form (CRF).
- WHO has prepared a macro-enabled Microsoft Excel form that countries have received through IHR communication channels for the reporting to WHO.


3.2 Laboratory testing for the Monkeys pox 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 the infection.

In performing the range of activities related to laboratory testing, 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 materials, including swabs of lesion surface and/or exudate, roofs from more than one lesion, or lesion crusts (Table 2). 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 type and time of specimen collection

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

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 B, UN3373 "infectious substance, affecting humans.” All specimens being transported should have appropriate triple packaging, labelling and documentation. For accessing regional referral laboratories (Box 1), kindly contact WHO SEARO through WHO country offices.

Box 1: 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
- Thailand: 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. Please refer to annex 3 for draft bio-risk assessment template.

Monkeypox virus is a double-stranded DNA virus and the confirmation of monkeypox 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 annex 4 for proposed testing algorithm.

Genomic sequencing (GS) and characterization of monkeypox 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.
In recent weeks, nucleic-acid amplification testing (NAAT) assays have become commercially available. The majority of these commercially available assays are designed for research use only and should be validated as per standard protocols for diagnostic purposes. It is recommended to select assays for procurement which include multigene MPXV-specific, internal control, positive control and all reagents to perform the reaction. A list of commercial assays can be found at: https://www.finddx.org/mpx-test-directory/

For further 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>
<thead>
<tr>
<th>Box 2: Basic information on monkeypox for clinicians</th>
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<tbody>
<tr>
<td>• Incubation period is usually 6 to 13 days and can range from 5 to 21 days</td>
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<tr>
<td>• Typical symptoms include fever, headache, muscle aches, backache, lack of energy, swollen lymph nodes and a skin rash or lesions</td>
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<tr>
<td>• Swelling of the lymph nodes is a distinctive feature of monkeypox compared to other diseases that may initially appear similar (chickenpox, measles)</td>
</tr>
<tr>
<td>• 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</td>
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<tr>
<td>• 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</td>
</tr>
<tr>
<td>• However, many cases in this outbreak are not presenting with the above classically described clinical picture for monkeypox. Atypical features described include: presentation of only a few or even just a single lesion; lesions that begin in the genital or perineal/perianal area and do not spread further; lesions appearing at different (asynchronous) stages of development; and the appearance of lesions before the onset of fever, malaise and other constitutional symptoms.</td>
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</tbody>
</table>

Monkeypox 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, fill 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 monkeypox cases, among others.

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

In health facilities, health workers caring for suspected or confirmed patients need to implement standard, contact and droplet precautions. In addition to contact and droplet precautions, respirators should be used. These precautions need to be followed in all health facilities including outpatient services and hospitals. When suspecting varicella zoster virus (i.e., chickenpox) and until it is excluded, airborne precautions should be additionally implemented.

However, in the situation of aerosol generating procedures (AGPs), airborne precautions must be implemented.
Management of suspected or confirmed monkeypox patients with mild, uncomplicated disease and not at high risk for complications, can be done at home as long as IPC conditions are fulfilled at home settings such as isolation of the patient in an area separate from other household members and away from shared areas of the home (i.e., a separate room, or area with a curtain or screen). Caution should be taken when handling and cleaning linens, household surfaces and during waste disposal.

Patients with monkeypox who are cared for at home should remain in isolation and refrain from close contact until their skin lesions have crusted, the scabs have fallen off and a fresh layer of skin has formed underneath.

Mild or uncomplicated patients with monkeypox may be given symptomatic treatment such as antipyretics for fever and pain, and conservative treatment of rash lesions.

Considerations should be given to assessments and management of nutritional status and mental health of the patients.

Special considerations need to be given when caring for sexually active populations, women during and after pregnancy, children with monkeypox, and feeding of young infants of mothers with monkeypox.

Patients at high risk for complications (i.e., young children, pregnant women and those who are immunosuppressed) or those with severe or complicated monkeypox should be managed with optimized supportive care interventions in a health care facility under close monitoring and appropriate isolation precautions to prevent transmission of monkeypox virus.

Given the stage of their development, antiviral agents for monkeypox should be used only in a clinical research context with prospective data collection to evaluate standardized clinical and outcome data to rapidly increase evidence generation on efficacy and safety. And when this is not possible, antivirals may be used under expanded access protocols, such as MEURI (Monitored Emergency Use of Unregistered and Investigational Interventions).

For details refer to WHO’s Clinical management and infection prevention and control for monkeypox: Interim rapid response guidance, 10 June 2022. Available at https://www.who.int/publications/i/item/WHO-MPX-Clinical-and-IPC-2022_1

### 3.4 Vaccination

In 2013, WHO provided Recommendations on the use of smallpox vaccines. The additional interim recommendations included in this technical brief from the WHO Secretariat apply for prevention and control of monkeypox only. They will be updated as more information becomes available.

The supply of newer vaccines is limited, the global supply is being assessed with manufacturers and partners to support sufficient supply, and mechanisms for access are being developed.

**Vaccines and immunization for monkeypox: Summary of interim recommendations- 14 June 2022.**

Based on currently assessed risks and benefits and regardless of vaccine supply, mass vaccination is not required nor recommended for monkeypox at this time.

Human-to-human spread of monkeypox can be controlled by public health measures including early case-finding, diagnosis and care, isolation and contact-tracing. While smallpox vaccines are expected to provide some protection against monkeypox, clinical data are limited.

All decisions around immunization with smallpox or monkeypox vaccines should be by shared clinical decision-making, based on a joint assessment of risks and benefits, between a health care provider and prospective vaccinee, on a case-by-case basis.
**Post-exposure prophylaxis (PEP):** For contacts of cases, PEP is recommended with an appropriate second- or third-generation vaccine, ideally within four days of first exposure (and up to 14 days in the absence of symptoms), to prevent onset of disease.

**Pre-exposure prophylaxis (PrEP):** PrEP is recommended for health workers at high risk of exposure, laboratory personnel working with orthopoxviruses, clinical laboratory personnel performing diagnostic testing for monkeypox, and outbreak response team members as may be designated by national public health authorities.

Vaccination programmes should be accompanied by a strong information campaign, robust pharmacovigilance, and conduct of vaccine effectiveness studies.

All efforts should be made to administer vaccines for monkeypox within a framework of collaborative research and randomized clinical trial (RCT) protocols with standardized data collection tools for clinical and outcome data.

Please refer to Table 3 for summary of priority actions on monkeypox immunization for SEAR MS and Table 4 for recommendations for choice of vaccines for monkeypox for pre- and post-exposure prophylaxis, based on risk categories vaccinees.

The full recommendations are available at: [https://www.who.int/publications/i/item/WHO-mpx-immunization-2022.1](https://www.who.int/publications/i/item/WHO-mpx-immunization-2022.1)

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**Table 3: Summary of priority actions on monkeypox immunization for SEAR MS**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Recommendation</th>
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<tbody>
<tr>
<td>Vaccination policy development</td>
<td>• Consider the context of the current multi-country outbreak of monkeypox, convene the National Immunization Technical Advisory Group (NITAG) to review the evidence and be guided by the NITAG to develop policy recommendations for monkeypox vaccination.</td>
</tr>
<tr>
<td>Vaccination strategy and outbreak response</td>
<td>• Indicate in the strategy that mass vaccination is not recommended for outbreaks of monkeypox at this time at the country level</td>
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<td></td>
<td>• Put in place a robust surveillance and monkeypox outbreak containment strategy²</td>
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<td></td>
<td>• Nationally define “selected close contacts” of monkeypox patients for recommending post-exposure prophylaxis</td>
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<tr>
<td></td>
<td>• Nationally define groups at risk of occupational exposure for pre-exposure vaccinations</td>
</tr>
<tr>
<td>Post-exposure prophylaxis (PEP)</td>
<td>• If the need arises, provide post-exposure prophylaxis to contacts of cases as defined in the national strategy to prevent onset of the disease within four days and up to 14 days in the absence of symptoms.</td>
</tr>
<tr>
<td>Vaccination for pre-exposure prophylaxis - (PrEP)</td>
<td>• Prioritize health workers at high risk of exposure, laboratory personnel working with orthopoxviruses; and clinical laboratory personnel performing diagnostic testing for monkeypox; and outbreak response team members for pre-exposure prophylaxis</td>
</tr>
<tr>
<td>Vaccination for special population groups</td>
<td>• Prioritize PEP for special population groups, i.e., during pregnancy, for children, or for persons with immune suppression</td>
</tr>
<tr>
<td></td>
<td>• Also highlight in the national vaccination strategy, PrEP is not generally recommended for special population groups</td>
</tr>
<tr>
<td>Global coordination and vaccine supply</td>
<td>• All Member States are strongly encouraged to make information on their smallpox and monkeypox vaccine reserves available to WHO</td>
</tr>
</tbody>
</table>

Table 4: Recommendations for choice of vaccines for monkeypox

<table>
<thead>
<tr>
<th>Vaccine (Manufacturer)</th>
<th>PEP</th>
<th>PrEP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High risk</td>
<td>Medium risk</td>
</tr>
<tr>
<td><strong>MVA-BN</strong> (Bavarian Nordic) 3rd generation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>LC16</strong> (KM Biologics) 3rd generation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>ACAM20</strong> (Emergent BioSolutions) 2nd generation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Health workers at risk of exposure, research laboratory personnel, clinical laboratory personnel performing diagnostic testing for orthopoxviruses, and designated response team members at risk for occupational exposure to monkeypox

# Individuals for whom standard replicating vaccine is contraindicated because of young age (children), pregnancy, immune deficiencies, immunosuppression therapies or atopic dermatitis, breastfeeding women,

3.5 Risk communication and community engagement

The national authorities should proactively communicate information related to monkeypox and potential implications to the public in timely and transparent manner to further foster trust and address concerns. Communication provided to the public, especially to key populations, needs to be direct, explicit, engaging and sensitive.

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.

National authorities will have to make note that in the context of high level of uncertainties, rumour and misinformation are likely to spread. Hence, it is important to manage them at all stages of the outbreak response by providing right information at the right time to the right people through trusted channels (e.g., doctors in primary or secondary health care facilities, community leaders, civil society (CSO) and community-based organizations (CBO), and other trusted, influential members of society).

- For effective communication, there should be a monitoring system in place to capture emerging trends to enable delivery of a targeted communication package.

Provision of information on monkeypox is required to key populations who may be more likely affected by the disease. As 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, they have been identified as a key targeted population.

- Providing information on monkeypox to the public, particularly to the key populations likely affected in the current outbreak, may facilitate health-seeking and risk reduction behaviors among them.

- Engaging with existing key population networks, and CSO and CBO 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 monkeypox outbreak. They are already a stigmatized population. Therefore, it is critical to address the stigma and discrimination against such populations.

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

Key messages include the below:

- **Prevention** – Messages for prevention need to include that anyone who has direct contact with an infected person (e.g., face-to-face, skin-to-skin, mouth-to-mouth, mouth-to-skin), including but not limited to sexual contacts can get monkeypox. The steps for self-protection in preventive messages include (a) avoiding close contact with someone who has symptoms consistent with possible monkeypox infection (b) avoiding sharing of personal items (e.g. eating utensils, clothing, electronic devices, bedding);(c) avoiding sexual contact with someone with a localized anogenital rash or skin lesions (d) limiting the number of sex partners;(e) keeping hands clean with water and soap or alcohol-based hand rub, and (f) maintaining respiratory etiquette.

- **Detection and care** – Messages should focus on the fact that if people develop symptoms, such as a rash with blisters on face, hands, feet, eyes, mouth, and/or genitals and peri-anal areas; fever; swollen lymph nodes; headaches; muscle aches; and fatigue they should contact their health care provider and get tested for monkeypox. Communications’ that target someone who is suspected or confirmed as having monkeypox, should include that they should isolate, be tested, undergo clinical evaluation to assess for complications, avoid skin-to-skin and face-to-face contact with others and avoid sex, including receptive and insertive oral, anal, or vaginal sexual intercourse, until all lesions have crusted, the scabs have fallen off and a fresh layer of skin has formed underneath. Also needed to educate is that during this period, cases can get supportive treatment to ease monkeypox symptoms. The targeted messages for anyone caring for a person sick with monkeypox should clarify that appropriate personal protective measures as mentioned above should be used. Messages also should contain that as a precaution, WHO suggests the use of condoms consistently during the sexual activity (receptive and insertive oral/anal/vaginal) for 12 weeks post recovery to reduce the potential transmission of monkeypox for which the risk is as yet not known.

- **Reporting** -Messages targeting travelers will have to highlight that 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 (17 June 2022). Disease Outbreak News; Multi-country monkeypox outbreak in non-endemic countries. Available at: [https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON393](https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON393)

### 3.6 Points of entry (POE)

Based on available information at this time, WHO does not recommend that Member States adopt any measures that restrict international traffic for either incoming or outgoing travelers.

However, precautionary measures are advised for those planning or those who undertook international travels.
• Any individual feeling unwell, including having a fever with rash-like illness, or who is considered a suspected or confirmed case of monkeypox by jurisdictional health authorities, should avoid undertaking non-essential travels, including international, until the prospective traveler is declared as no longer constituting a public health risk.

• Any individual who has developed a rash-like illness during travel or upon return should immediately report to a health professional, providing information about all recent travel, immunization history including whether they have received smallpox vaccine or other vaccines (e.g., measles-mumps-rubella, varicella zoster vaccine, to support making a diagnosis), and information on close contacts as per WHO interim guidance on surveillance, case investigation and contact tracing for monkeypox (please refer to the relevant section in this document).

Public health officials should work with travel operators and public health counterparts in other locations to contact passengers and others who may have had contact with an infectious person while travelling.

Risk communication targeting international travellers on public health risks related monkeypox should be considered. Health promotion and risk communication materials should be available at POE, including information on how to identify signs and symptoms consistent with monkeypox; on the precautionary measures recommended to prevent its spread; and on how to seek medical care at the place of destination when needed. In providing this information, consider engaging appropriate stakeholders, such as airline operators, airport authorities and travel agents.

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

In line with core capacities required by International Health Regulations (IHR) (2005), MS are requested to 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. Procedures and systems to refer ill travellers to an appropriate medical facility should also be maintained.

3.7 Knowledge gaps, research needs and One Health

Over time, most human infections have resulted from a primary, animal-to-human transmission. Unprotected contact with wild animals, especially those that are sick or dead, including their meat, blood and other parts must be avoided. Some countries have put in place regulations restricting importation of rodents and non-human primates. Any animals that might have come into contact with an infected animal should be quarantined, handled with standard precautions and observed for monkeypox symptoms for 30 days. There is a need of One Health approach to address emerging zoonoses at the human-animal interface and existing One Health coordination mechanism at country level should be used.

We do not know much about evolving epidemiology of the monkeypox. Better understanding of the extent and cause of an outbreak of monkeypox is need of the time including knowledge gaps, research needs and priorities. The WHO R&D Blueprint organized a consultation to discuss knowledge gaps and priority research questions for Monkeypox research from 2 to 3 June 2022.

For more details refer to WHO monkeypox research: What are the knowledge gaps and priority research questions? Available at https://www.who.int/news-room/events/detail/2022/06/02/default-calendar/who-monkeypox-research--what-are-the-knowledge-gaps-and-priority-research-questions
List of resources

- **WHO Guidance and Public Health Recommendations**
  - WHO Technical brief (interim) and priority actions: enhancing readiness for monkeypox in WHO South-East Asia Region, 28 May 2022. [https://cdn.who.int/media/docs/default-source/searo/whe/monkeypox/searo-mp-techbrief_PRIORITY-ACTIONS_300522.pdf?sfvrsn=ae7be762_1](https://cdn.who.int/media/docs/default-source/searo/whe/monkeypox/searo-mp-techbrief_PRIORITY-ACTIONS_300522.pdf?sfvrsn=ae7be762_1)

- **Data management**
  - WHO Monkeypox minimum dataset case reporting form (CRF), 14 June 2022. [https://www.who.int/publications/m/item/monkeypox-minimum-dataset-case-reporting-form-(crf)](https://www.who.int/publications/m/item/monkeypox-minimum-dataset-case-reporting-form-(crf))
  - The WHO Global Clinical Platform for monkeypox, 14 June 2022. [https://www.who.int/tools/global-clinical-platform/monkeypox](https://www.who.int/tools/global-clinical-platform/monkeypox)
  - Case and contact investigation form (CIF), 16 June 2022. [https://www.who.int/publications/m/item/monkeypox-minimum-dataset-case-reporting-form-(crf)](https://www.who.int/publications/m/item/monkeypox-minimum-dataset-case-reporting-form-(crf))
  - WHO Go.Data: Managing complex data in outbreaks. [https://www.who.int/tools/godata](https://www.who.int/tools/godata)

- **Risk communication and community engagement**

- **Laboratory and genomic studies**
  - WHO Guidance on regulations for the transport of infectious substances 2021-2023, 25 February 2021. [https://www.who.int/publications/i/item/9789240019720](https://www.who.int/publications/i/item/9789240019720)
  - Genomic epidemiology of monkeypox virus. [https://nextstrain.org/monkeypox/hmpxv1](https://nextstrain.org/monkeypox/hmpxv1)

- **Disease Outbreak News**
• Training and Education
  o WHO factsheet on monkeypox, publishing date, 19 May 2022. https://www.who.int/news-room/fact-sheets/detail/monkeypox
  o Health topics – Monkeypox: https://www.who.int/health-topics/monkeypox#tab=tab_1
  o Open WHO. Extended training. Monkeypox epidemiology, preparedness and response. 2021.English: https://openwho.org/courses/monkeypox-introduction (link is external);

Acknowledgement

This document was developed with inputs from technical leads and other staff members in the Incident Management Support Team (IMST) of the WHO’s Health Emergencies Department and the Immunizations and Vaccines Development (IVD) unit of the Communicable Diseases and Surveillance (CDS) department of the WHO Regional Office for the South-East Asia Region (SEARO)
Annex 1. **Monkeys (MPX) surveillance, investigation and contract tracing in SEA Region**

### Public Health Authorities
(suggested actions in light blue boxes)

- Sensitize clinicians (HCW EBS)
  - Primary care, dermatology, STI
  - Public and private
  - Engage professional networks
  - Request reporting suspected cases

- **Awareness raising of those at risk**
  - Engagement of communities at risk

- **Media-based EBS**
  - Signals on suspected cases/clusters
  - Request 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

- **Case investigation** (may engage relevant stakeholders – clinical/public health)
  - 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 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.

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

- **Monkeys suspected? - Case definition for the suspected case**
  A person (any age) presenting since 01 January 2022 with an unexplained acute rash or acute skin lesions AND
  - Headache
  - Acute onset of fever (>38.5°C)
  - Lymphadenopathy (swollen lymph nodes)
  - Myalgia (muscle pain/body aches)
  - Back pain
  - Asthenia (profound weakness)
  AND
  - Common causes of acute rash do not explain the clinical picture (not necessary to obtain negative lab results to rule out other causes of rash illness)

- **Assess if the case meet one or more of the following? – Case definition for probable case**
  - Has an epidemiological link to a probable or confirmed case of monkeypox in the 21 days before symptom onset;
  - Has had multiple or anonymous sexual partners in the 21 days before symptom onset and has serological evidence of infection or orthopoxviral infection (e.g. OPXV-specific PCR without MPXV-specific PCR or sequencing)

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

- **Report probable and confirmed cases to WHO via IHR NFP with minimum data** (WHO case reporting form available)
Annex 1a: Suggested minimum variables for Monkeypox case reporting

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

<table>
<thead>
<tr>
<th>Sections</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case demographics</td>
<td>• Record ID</td>
</tr>
<tr>
<td></td>
<td>• Reporting Country*</td>
</tr>
<tr>
<td></td>
<td>• Reporting location (subnational)</td>
</tr>
<tr>
<td></td>
<td>• Date of Notification</td>
</tr>
<tr>
<td></td>
<td>• Case classification (Suspected**, Probable, Confirmed, Unknown)</td>
</tr>
<tr>
<td></td>
<td>• Date of diagnosis</td>
</tr>
<tr>
<td></td>
<td>• Age, Sex, Gender, Sexual orientation</td>
</tr>
<tr>
<td></td>
<td>• Is the case a healthcare worker?</td>
</tr>
<tr>
<td>Medical history</td>
<td>• Medical history (pregnancy, immunosuppression, HIV status)</td>
</tr>
<tr>
<td></td>
<td>• Smallpox vaccination status and vaccination date</td>
</tr>
<tr>
<td>Clinical presentation</td>
<td>• Clinical signs or symptoms</td>
</tr>
<tr>
<td></td>
<td>• Date of onset of first symptoms</td>
</tr>
<tr>
<td></td>
<td>• Presence of rash</td>
</tr>
<tr>
<td></td>
<td>• Date of rash onset</td>
</tr>
<tr>
<td></td>
<td>• Concurrent sexually transmitted infections</td>
</tr>
<tr>
<td></td>
<td>• Monkeypox treatment (antiviral treatment)</td>
</tr>
<tr>
<td></td>
<td>• Hospital admission</td>
</tr>
<tr>
<td></td>
<td>• Intensive care unit (ICU) admission</td>
</tr>
<tr>
<td></td>
<td>• Outcome/Status of case at time of reporting (if died, date of death)</td>
</tr>
<tr>
<td>Exposure</td>
<td>• Recent travel history (in the 21 days before onset of illness)</td>
</tr>
<tr>
<td></td>
<td>• Recent exposure to a probable or confirmed case (in the 21 days before onset of illness)</td>
</tr>
<tr>
<td></td>
<td>• Nature of contact with probable or confirmed case (where relevant)</td>
</tr>
<tr>
<td></td>
<td>• Contact with animals</td>
</tr>
<tr>
<td></td>
<td>• Mode of transmission</td>
</tr>
<tr>
<td>Laboratory information</td>
<td>• Specimen collection date**</td>
</tr>
<tr>
<td></td>
<td>• Specimen for the diagnosis</td>
</tr>
<tr>
<td></td>
<td>• Laboratory method</td>
</tr>
<tr>
<td></td>
<td>• Genomic characterization / clade (if available)</td>
</tr>
<tr>
<td></td>
<td>• Accession number of the genomic sequence uploaded to public database</td>
</tr>
</tbody>
</table>

* Indicates that it is required when reporting to WHO, but in-country reporting.
** Indicates that it is suggested for in-country reporting, but not for reporting to WHO. All other items are suggested as minimum data sets for both in-country reporting and reporting to WHO.

Please see [WHO Monkeypox minimum dataset case reporting form (CRF)](https://www.who.int/health-topics/monkeypox) for further details.
## Annex 2: Specimen collection, storage and testing

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

*Negative result with Oro Pharyngeal swab should be interpreted with caution*

- Two lesions should be collected and placed in one single tube. The lesions should preferably be from different locations on the body and differ in appearance.
- Lesions, crusts and vesicular fluids should not be mixed in the same tube
- Two tubes per a 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](https://www.who.int) for additional sample types to be collected for research purposes.
Annex 3: Laboratory risk assessment
Procedure/pathogen: Monkeypox Virus

1. Hazard identification

<table>
<thead>
<tr>
<th>Describe the biological agents and other potential hazards</th>
<th>Pathogen: Monkeypox virus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Characteristics: genus Orthopoxvirus, family Poxviridae (1)</td>
</tr>
<tr>
<td></td>
<td>Risk Group Classification: Risk group 3 (2)</td>
</tr>
<tr>
<td></td>
<td>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)</td>
</tr>
<tr>
<td></td>
<td>Sources/Specimens: skin lesion including the roof/fluid from vesicles and pustules and dry crusts, respiratory secretions, and tissues of infected hosts (1-3)</td>
</tr>
<tr>
<td></td>
<td>Route(s) of transmission: (1, 2)</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>Human-to-human: close contact with respiratory secretions, skin lesions of an infected person or recently contaminated objects</td>
</tr>
<tr>
<td></td>
<td>Treatment: No specific treatment. Tecovirimat, Brincidofovir, Cidofovir, Vaccinia Immunoglobulin can be approved for the control (1, 2)</td>
</tr>
<tr>
<td></td>
<td>Prophylaxis: Smallpox vaccination (1, 2)</td>
</tr>
<tr>
<td></td>
<td>Disinfection: 0.5% sodium hypochlorite, chloroxylenol-based household disinfectants, glutaraldehyde, formaldehyde, and paraformaldehyde (2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical or laboratory procedures</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Specimen collection</td>
</tr>
<tr>
<td></td>
<td>2. Needlestick injury</td>
</tr>
<tr>
<td></td>
<td>3. Sample transport</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Specimen reception</td>
</tr>
<tr>
<td></td>
<td>2. Testing of blood samples such as haematology or clinical chemistry</td>
</tr>
<tr>
<td></td>
<td>3. Virus isolation</td>
</tr>
<tr>
<td></td>
<td>4. PCR-based assays</td>
</tr>
</tbody>
</table>
2. **Evaluate the risks**

Instructions: describe how exposure and/or release could occur.

<table>
<thead>
<tr>
<th>What potential situations are there in which exposure or release could occur?</th>
<th>Clinical</th>
</tr>
</thead>
</table>
|  | 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 |
| Laboratory | 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 |
<table>
<thead>
<tr>
<th>Laboratory activity/procedure</th>
<th>Initial risk without control mitigations (Very low, low, medium, high, very high)</th>
<th>Is the initial risk acceptable? (yes/no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen collection</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>Sample transport/sample reception</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>Testing of blood and urine samples</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>NAAT/PCR</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td><em>In vitro</em> isolation</td>
<td>High</td>
<td>No</td>
</tr>
<tr>
<td>Waste Disposal &amp; Incomplete decontamination</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>Exposure to chemicals</td>
<td>High</td>
<td>No</td>
</tr>
</tbody>
</table>
3. **Risk control strategy**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Sample type</th>
<th>Hazard</th>
<th>Initial risk</th>
<th>Risk mitigation</th>
<th>Residual risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical sample collection</td>
<td>Skin lesion, respiratory secretions, and tissues of infected hosts</td>
<td>Aerosol or splash exposure during sample collection (Clinical collection or necropsy) Needlesick injuries</td>
<td>High</td>
<td>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 ↑↑↑</td>
<td>Low</td>
</tr>
<tr>
<td>Sample transport</td>
<td>Skin lesion, respiratory secretions, and tissues of infected hosts</td>
<td>Leaking sample causing aerosol or splash exposure</td>
<td>Medium</td>
<td>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 ↑↑↑</td>
<td>Low</td>
</tr>
<tr>
<td>Sample reception and/or sample processing</td>
<td>Skin lesion, respiratory secretions, and tissues of infected hosts</td>
<td>Leaking sample Aerosol exposure during sample processing Eye splash during sample processing Infectious culture material spill</td>
<td>Medium/High</td>
<td>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† Standard disinfection and decontamination↑↑ Emergency response procedures and associated staff training practiced ↑↑↑</td>
<td>Low</td>
</tr>
<tr>
<td>Testing of blood or urine samples</td>
<td>Blood or urine</td>
<td>Aerosol exposure during sample processing Eye splash during sample processing</td>
<td>Medium</td>
<td>As per Sample collection Note 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</td>
<td>Low</td>
</tr>
<tr>
<td>PCR</td>
<td>Skin lesion, respiratory secretions, and tissues of infected hosts</td>
<td>Aerosol exposure during sample processing Eye splash during sample processing Infectious culture material spill</td>
<td>Medium</td>
<td>As per Sample reception/processing for nucleic acid extraction only 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.</td>
<td>Low</td>
</tr>
<tr>
<td><strong>In vitro isolation</strong></td>
<td>Skin lesions, respiratory secretions, and tissues of infected hosts</td>
<td>Aerosol exposure during sample processing; Eye splash during sample processing; Infectious culture material spill; High virus concentration and volume</td>
<td>High</td>
<td>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††; Emergency response procedures and associated staff training practiced †††</td>
<td>Low</td>
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</tr>
<tr>
<td><strong>Waste Disposal &amp; Incomplete decontamination</strong></td>
<td>Samples Consumables Waste</td>
<td>Aerosol exposure during handling; Eye splash during sample handling; Contamination of environment</td>
<td>Medium</td>
<td>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 †††</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Exposure to chemicals</strong></td>
<td>Not applicable</td>
<td>Chemicals used for Nucleic acid extraction and disinfection</td>
<td>High</td>
<td>Consult material safety data sheets for each chemical prior to commencing work. ‡‡</td>
<td>Low</td>
</tr>
</tbody>
</table>

* 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 for the laboratory risk assessment


Annex 4: Testing algorithm for monkeypox virus

Patient meets case definition

Orthopoxvirus PCR

* positive  →  Negative  →  MPXV ruled out

Differential diagnosis: varicella zoster virus, HIV, syphilis, hand-foot mouth disease

Sequencing

AND/OR

successful

confirmed

• Lineage confirmation
• Transmission chains

MPXV PCR

• In house assays for species specific lineage: West Africa and/or Congo Basin
• Commercial assays may or may not stipulate lineage details

positive  →  Negative/inconclusive

Based on clinical and epidemiological information
ELISA may be performed to determine prior infection

confirmed  →  ELISA

serum samples: 1) baseline, 2) acute 2-3 weeks and (3) convalescent 7-14 weeks samples from suspect or contact cases.

* Sufficient to report as positive in non-endemic countries
* Negative result using oropharyngeal swabs to be interpreted with caution due to limited data