Surveillance, case investigation and contact tracing for mpox (monkeypox)

Interim guidance
22 December 2022

World Health Organization

Key points

- A multi-country outbreak of mpox (monkeypox) is ongoing since May 2022. The number of cases reported weekly at the global level peaked in August 2022, and since then has been steadily declining. The two most affected areas from this outbreak are the WHO Region of the Americas and the European Region.
- The overall goal of surveillance, case investigation and contact tracing in this context is to detect new outbreaks and stop human-to-human transmission in order to stop the global outbreak and minimize zoonotic transmission.
- The key objectives of surveillance and case investigation for mpox in the current context are to rapidly identify cases and clusters in order to provide optimal clinical care; to isolate cases to prevent further transmission; to identify, manage and follow up contacts to recognize early signs of infection; to identify risk groups for infection and for severe disease; to protect frontline health workers; and to tailor effective control and prevention measures.
- Key actions of the response to the outbreak include: informing those who may be most at risk for monkeypox virus (MPXV) infection with accurate information; offering pre- and post-exposure vaccination to at risk population groups; stopping further spread; and protecting vulnerable individuals and frontline workers.
- Clinicians should report suspected cases immediately to local and national public health authorities.
- Probable and confirmed cases of mpox should be reported to WHO as early as possible, including a minimum dataset of epidemiologically relevant information, to WHO through IHR national focal points (NFPs) under Article 6 of the International Health Regulations (IHR 2005).
- If mpox is suspected, case investigation should consist of clinical examination of the patient in a well-ventilated room while using appropriate personal protective equipment (PPE), questioning the patient about possible sources of exposure, and safe collection and dispatch of specimens for laboratory MPXV examination.
- As soon as a suspected case is identified, contact identification and contact tracing should be initiated.
- Contacts of probable and confirmed cases should be monitored, or should self-monitor, daily for any sign or symptom for a period of 21 days from last contact with a case or their contaminated materials during the infectious period.
- Quarantine or exclusion from work are not necessary during the contact monitoring period as long as no symptoms develop. During the 21 days of monitoring, WHO encourages contacts without any symptoms to rigorously practice hand hygiene and respiratory etiquette, avoid contact with immunocompromised people, children or pregnant women. While WHO continues to review evidence regarding possible transmission prior to onset of symptoms, it is advised that known contacts avoid sexual contact with others during the 21-day monitoring period, regardless of their symptoms. Non-essential travel is discouraged during this period.

Changes from earlier version

This is an updated version of the previous interim guidance on Surveillance, case investigation and contact-tracing published on 25 August 2022. After the third meeting of the International Health Regulations (2005) (IHR) Emergency Committee (EC) on 20 October 2022, the Director-General of WHO concurred with the EC that the multi-country outbreak of mpox continues to constitute a Public Health Emergency of International concern (PHEIC).

The interim guidance has been updated to consistently replace the name of the disease monkeypox with mpox, following the most recent WHO recommendations in this regard.[1] This version of the document includes a more detailed description of the investigation of a possible animal exposure, accompanied by an updated version of the Case Investigation Form (CIF).[2] The document contains a new chapter on use of wastewater surveillance for detection of mpox transmission in communities. The advice for known contacts of probable and confirmed cases has been updated as well. This guidance will be updated as further information becomes available.

Introduction

This guidance serves to provide interim recommendations for surveillance, case investigation and contact tracing for mpox in the context of the current global multi-country outbreak.[3] Since May 2022, the number of mpox cases reported globally rose steadily until the peak in August 2022 followed by a steady decline.[4] In 2022, around 100 countries reported mpox cases for the first time, with human-to-human transmission continuing for several months. This is the first time that sustained community transmission has occurred outside of previously known affected areas of west or central Africa.

The incubation period of mpox has historically ranged from 5 to 21 days.[3] Typically, the prodromal phase of clinical illness lasts 1-5 days during which time patients may experience fever, headache, back pain, muscle aches, and lymphadenopathy. This is followed by a second phase which typically occurs after the fever subsides, with the appearance of skin and/or mucosal rash, which might include a single or multiple lesions. Typically, the lesions progress through macules, papules, vesicles, and pustules, before crusting over and desquamating over a period of 2 to 4 weeks. In the context of this outbreak, patients are presenting more mucosal lesions than previously described, and often these are localized in the genital or perineal/perianal area as well as in the mouth and on the eyes.[5] Lesions might appear at different stages of progression and it has been observed that the rash can develop prior to typical prodromal or constitutional symptoms (such as fever, fatigue). Ano-rectal pain and bleeding (e.g., due to proctitis) has also been reported more often in this outbreak. Lymphadenopathy remains a common feature, usually appearing early in the course of illness.

Human-to-human transmission of mpox can occur through direct contact with infectious lesions of the skin or mucous membranes or body fluids from those lesions, this includes face-to-face, skin-to-skin, mouth-to-mouth or mouth-to-skin contact and respiratory droplets (and possibly short-range aerosols requiring prolonged close contact). The monkeypox virus (MPXV) then enters the body through broken skin, mucosal surfaces (e. g. oral, pharyngeal, ocular, genital or anal), or via the respiratory tract. The infectious period can vary, but generally patients are considered infectious from the time of symptom onset until skin lesions have crusted, the scabs have fallen off and a fresh layer of skin has formed underneath. Few studies have suggested that some patients might also be infectious before symptom onset, and emerging evidence continues to be monitored.[6–9] Transmission can also occur from the environment to humans from contaminated clothing or linens that have infectious skin particles (also described as fomite transmission). If shaken, these particles can disperse into the air and be inhaled, land on broken skin or mucosal membranes and lead to transmission and infection.[10,11]

For respiratory transmission, close proximity and extended exposure appear to be necessary. While sexual transmission of mpox was not well understood before this outbreak, the detection of virus in semen and anal swabs of affected patients,[5,8,12–14] as well as epidemiological reporting of sexual contact among cases, have clarified that mpox is transmissible through sexual activity.

During pregnancy, virus can cross the placenta causing intrauterine exposure of the foetus and congenital infection of the infant.[15]

The sudden appearance of mpox in many countries simultaneously where this disease was not previously reported or where in recent years there have only been cases linked to travel was unexpected. Transmission, initially amplified by travel and gatherings in several countries, has been sustained through sexual contact among cis and trans men who have sex with men, and this group currently represents those at highest risk of exposure. This is the largest mpox outbreak due to Clade II MPXV ever recorded and many women and children have also been infected globally.[4] In addition, newly emerging outbreaks due to Clade I MPXV are being detected in areas where mpox had not previously been documented, such as in Sudan.[16]

Most reported cases have not had severe disease,[5,13,17–19] although many have developed complications and/or required hospitalization for management of severe pain.[5,18] Persons with immune suppression, due to immunosuppressive treatments, untreated or inadequately managed HIV infection or other medical conditions, are at higher risk of severe disease.[20,21]

Several mpox-related deaths have been reported in affected countries.[4] Some, but not all, patients had underlying risk factors (e.g., being immunocompromised or immunosuppressed).

The overall goal of surveillance, case investigation and contact tracing in this context is to detect new outbreaks and stop human-to-human transmission in order to stop the global outbreak and minimize zoonotic transmission.

Mpox infection in animals

Mpox is a zoonotic infection which can be transmitted from animals to humans, from humans to humans, from animals to animals and potentially from humans to animals. Current evidence suggests that the 2022 multi-country outbreak is not driven by multiple zoonotic spillover events, and transmission is sustained through human-to-human spread. Nevertheless, there are countries in the African continent where transmission from animals to humans continues to occur. So far subsequent chains of transmission appear to not be sustained over time although information remains limited. When transmission from an animal to a human is suspected, it is important to collect information on the exposure as part of the case investigation[2] and inform relevant animal health authorities to collaborate in further investigation. Surveillance of mpox or MPXV infection in animal populations is beyond the scope of this document. Countries are encouraged to report cases of mpox or MPXV infection in animals to the World Organization for Animal Health (WOAH) with all relevant animal health information as described in Article 1.1.5 of the Terrestrial Animal Health Code[22], by email to information.dept@woah.org.

Surveillance Case Definitions

The case definitions for use in this outbreak may be reviewed as more evidence becomes available.

For further guidance on testing please refer to Laboratory testing for the monkeypox virus: Interim guidance.[23]

Suspected case:

i) A person who is a contact of a probable or confirmed mpox case in the 21 days before the onset of signs or symptoms, and who presents with any of the following: acute onset of fever (>38.5°C), headache, myalgia (muscle pain/body aches), back pain, profound weakness or fatigue.

OR

ii) A person presenting since 01 January 2022 with an unexplained acute skin rash, mucosal lesions or lymphadenopathy (swollen lymph nodes). The skin rash may include single or multiple lesions in the ano-genital region or elsewhere on the body. Mucosal lesions may include single or multiple oral, conjunctival, urethral, penile, vaginal, or ano-rectal lesions. Ano-rectal lesions can also manifest as ano-rectal inflammation (proctitis), pain and/or bleeding.

AND

for which the following common causes of acute rash or skin lesions do not fully 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.

N.B. It is not necessary to obtain negative laboratory results for listed common causes of rash illness in order to classify a case as suspected. Further, if suspicion of mpox or MPXV infection is high due to either history and/or clinical presentation or possible exposure to a case, the identification of an alternate pathogen which causes rash illness should not preclude testing for MPXV, as co-infections have been identified.

Probable case:

A person presenting with an unexplained acute skin rash, mucosal lesions or lymphadenopathy (swollen lymph nodes). The skin rash may include single or multiple lesions in the ano-genital region or elsewhere on the body. Mucosal lesions may include single or multiple oral, conjunctival, urethral, penile, vaginal, or ano-rectal lesions. Ano-rectal lesions can also manifest as ano-rectal inflammation (proctitis), pain and/or bleeding.

AND

One or more of the following:

- has an epidemiological link[a] to a probable or confirmed case of mpox in the 21 days before symptom onset
- Identifies as gay, bisexual or other cis or trans man who has sex with men
- has had multiple and/or casual sexual partners in the 21 days before symptom onset

[a] The person has been exposed to a probable or confirmed monkeypox case. Please see below definition of a contact.

- has detectable levels of anti-orthopoxvirus (OPXV) IgM antibody[b] (during the period of 4 to 56 days after rash onset); or a four-fold rise in IgG antibody titer based on acute (up to day 5-7) and convalescent (day 21 onwards) samples; in the absence of a recent smallpox/mpox vaccination or other known exposure to OPXV
- has a positive test result for orthopoxviral infection (e.g., OPXV-specific PCR without MPXV-specific PCR or sequencing)[c]

Confirmed case:

A person with laboratory confirmed MPXV infection by detection of unique sequences of viral DNA by real-time polymerase chain reaction (PCR)[c] and/or sequencing.

Discarded case:

A suspected or probable case for which laboratory testing of lesion fluid, skin specimens or crusts by PCR and/or sequencing is negative for MPXV[c]. Conversely, a retrospectively detected probable case for which lesion testing can no longer be adequately performed (i.e., after the crusts fall off) and no other specimen is found PCR-positive, would remain classified as a probable case. A suspected or probable case should not be discarded based on a negative result from an oropharyngeal, anal or rectal swab or from a blood test alone.

These case definitions were developed with a view to balance the importance of detecting cases and interrupting chains of transmission, while avoiding an overly sensitive definition that would overburden public health, diagnostic and treatment resources. Public health authorities may adapt these case definitions to suit local circumstances. All efforts should be made to avoid unnecessary stigmatization of individuals and communities potentially affected by mpox.

These definitions are for surveillance purposes and should not be used to guide clinical management. WHO interim rapid response guidance for clinical management and infection prevention and control for mpox has been published separately.[10]

Surveillance

The key objectives of surveillance and case investigation for mpox in the current context are to rapidly identify cases and clusters of infections as well as the sources of infection as soon as possible in order to: provide optimal clinical care; isolate cases to prevent further transmission; identify, manage and follow-up contacts to recognize early signs of infection; identify risk groups for infection and for severe disease; protect frontline health workers; and tailor effective control and prevention measures.

One case of mpox is considered an outbreak. Because of the public health risks associated with a single case of mpox, clinicians should report suspected cases immediately to national or local public health authorities regardless of whether they are also exploring other potential diagnoses, according to the case definitions above or nationally tailored case definitions. Probable and confirmed cases of mpox should be reported as early as possible, including

[b] Serology can be used for retrospective case classification for a probable case in specific circumstances such as when diagnostic testing through PCR of skin lesion specimens has not been possible, or in the context of research with standardized data collection. The primary diagnostic test for monkeypox diagnosis is PCR of skin lesion material or other specimen such as an oral or nasopharygeal swab as appropriate. Serology should not be used as a first line diagnostic test.

[c] PCR on a blood specimen may be unreliable and should also not be used alone as a first line diagnostic test. If blood PCR is negative and was the only test done, this is not sufficient to discard a case that otherwise meets the definition of a suspected for probable case. This applies regardless of whether the blood PCR was for OPXV or MPXV specific.

a minimum dataset of epidemiologically relevant information, to WHO through national IHR focal points (NFPs) under Article 6 of the International Health Regulations (IHR 2005).

Countries and clinicians should be on alert for signals related to patients presenting with mpox. It is important to note that patients may present to various community and other health facility settings including but not limited to primary care, fever clinics, sexual health services, infectious disease units, obstetrics and gynaecology, emergency departments, and dermatology clinics. Guidance for clinical management, infection prevention and control, and the safe collection of samples for confirmatory testing should therefore be disseminated widely.[10,23] In countries detecting cases of mpox, epidemiological and transmission patterns should be investigated wherever possible in order to inform ongoing response activities to control the outbreak.

At local and national level, countries should systematically document the number of suspected cases reported, the number of suspected cases which are tested, and the number of confirmed cases among those tested.

Indicators for monitoring the quality of mpox surveillance include:

1. Proportion of probable and confirmed cases with complete demographic information
2. Proportion of suspected cases with laboratory testing performed.
3. Proportion of probable and confirmed cases with complete clinical and risk factor information.

Indications for mpox testing

Any individual meeting the definition for a suspected case should be offered PCR testing for mpox, where resources allow. In the absence of skin or mucosal lesions, PCR can be done on an oropharyngeal, anal or rectal swab. However, the interpretation of results from oropharyngeal, anal and rectal swabs requires caution; while a positive result is indicative of mpox, a negative result is not enough to exclude MPXV infection. PCR testing of blood is not recommended for surveillance and diagnosis as MPXV viremia is likely to occur early in the course of infection, has a short duration and false negative test results are to be expected.[23]

Due to the range of conditions that cause skin and mucosal rashes, it can be challenging to differentiate mpox solely based on the skin and mucosal clinical presentation, particularly for cases with an atypical presentation. The decision to test should be based on both clinical and epidemiological factors, linked to an assessment of the likelihood of infection. When clinical suspicion for mpox is high due to history and/or clinical presentation, the identification of an alternate pathogen which causes rash illness should not preclude testing for MPXV, as coinfections have been identified. Given the epidemiological criteria observed in the outbreak, criteria such as being a man who has sex with men, reporting a high number of sexual partners in the previous three weeks, and having attended a gathering where a confirmed or probable case was reported can be suggestive of the need to test for MPXV.

For countries with animal to human transmission, epidemiological criteria to test for MPXV include known contact with wild animals (dead or alive) and/or sick animals in the 21 days before the onset of symptoms.

For study purposes, countries can retrospectively expand their testing to residuals of specimens collected before May 2022 from patients presenting for sexually transmitted infection (STI) screening and/or with symptoms suggestive of mpox.

Serological tests for OPXV antibodies can be appropriately used in an outbreak investigation or research setting but their results need to be interpreted with caution since they cannot distinguish between immunity due to mpox or another orthopoxvirus-related infection, or immunity generated by prior smallpox or mpox vaccination.

Reporting

WHO has published and updated the mpox Case Reporting Form (CRF)[2] which constitutes the minimum data countries are requested to report to the respective WHO Regional Office, and includes the following information:

- Record ID
- Reporting Country
- Reporting location (subnational ADM1 level)
- Date of notification
- Case classification
- Age, sex, gender, sexual orientation
- Health worker
- Sex worker
- Medical history (pregnancy, immunosuppression, HIV status, HIV PrEP use)
- Smallpox and mpox vaccination status and vaccination date
- Clinical signs or symptoms
- Date of onset of first symptoms
- Presence of rash
- Date of rash onset
- Name of concurrent sexually transmitted infections
- Number of sex partners in the last three months
- Mpox treatment
- Hospital admission
- Intensive care unit (ICU) admission
- Complications
- Recent travel history (in the 21 days before onset of illness)
- Recent exposure to a probable or confirmed case (in the 21 days before onset of illness)
- Nature of contact with probable or confirmed case (where relevant)
- Contact with animals (in the 21 days before onset of illness)
- Mode of transmission
- Type of specimen collected for diagnosis
- Method of confirmation (where done)
- Genomic characterization and clade (if available)
- Accession number of the genomic sequence uploaded to public database
- Outcome status at time of reporting

Case investigation

During the current multi-country mpox outbreak, close physical contact, including sexual intercourse, with infected persons is the most significant risk factor for MPXV infection. If mpox is suspected, the investigation should consist of:

(i) clinical examination of the patient using appropriate infection prevention and control (IPC) measures as reported in the specific guidance.[10]

(ii) questioning the patient about possible sources of infection and the presence of similar illnesses in the patient's community and contacts, both prior to becoming a case (backward contact tracing) to identify the source, and from the beginning of the infectious period through isolation (forward contact tracing) to reduce onward transmission. Current evidence suggest that a case is infectious from the symptom onset until their skin lesions have crusted, the scabs have fallen off and a fresh layer of skin has formed underneath.[24,25]

(iii) safe collection and dispatch of specimens for mpox diagnostic testing and laboratory examination.[23]

In addition to the minimum dataset (CRF), WHO has published and updated the mpox Case investigation form (CIF) designed as a tool for Member States and researchers to conduct in-depth epidemiological investigation of suspected, probable and confirmed cases of mpox, as well as their contacts, either prospectively or retrospectively. The CIF is designed to address the key unknowns about MPXV transmission in this outbreak, such as infectious period, most efficient route of transmission, clinical presentation and main risk factors for infection and severe disease. The full form is meant for in-country use and the data are not required to be reported to WHO.[26]

Exposure investigation should cover the period of 21 days prior to symptom onset. Any patient with suspected mpox should be isolated during the presumed and known infectious periods, that is during the prodromal and rash stages of the illness, respectively. Laboratory confirmation of suspected cases is important but should not delay implementation of public health actions.

Cases found by retrospective active search may no longer have the clinical symptoms of mpox (they have recovered from acute illness) but may exhibit scarring and other sequelae. It is important to collect epidemiological information from retrospectively identified cases in addition to active ones. Retrospective cases cannot be laboratory confirmed; however, serum from retrospectively identified cases can be collected and tested for OPXV IgM and/or IgG antibodies to aid in their probable case classification.

Samples taken from persons with suspected mpox should be safely handled by trained staff working in suitably equipped laboratories. National and international regulations on transport of infectious substances should be strictly followed during sample packing and transportation. Careful planning is required to consider national laboratory testing capacity. Clinical laboratories should be informed, in advance, of samples to be submitted from persons with suspected or confirmed mpox, so that they can minimise risk to laboratory workers and, where appropriate, safely perform laboratory tests that are essential for clinical care. For more details, please refer to the WHO Interim guidance on laboratory testing for MPXV.[23]

Investigating exposure to an infected animal

Cases of human mpox have been described in the African context since 1970. The introduction of MPXV from animals to humans plays an important role in mpox outbreaks in some countries with virus circulation in wildlife. Further investigations and studies are needed to understand the relative proportion (compared to human-to-human transmission) and risk factors for zoonotic transmission.

Routes of infection include direct contact with an infected animal (including bites, scratches etc.), their body fluids or potentially their faeces. MPXV infection has been reported in a wide range of mammal species such as monkeys, squirrels, dormice and pouched rats. However, neither the animal reservoir(s), which maintain the virus in nature,

nor the range of potential intermediate animal hosts which could play a role in animal-to-human transmission, are yet known. Therefore, it is critical to investigate the exposure to potentially MPXV-infected animals and to conduct animal investigations to prevent further introductions of the virus into the human population, and to provide useful insights to reduce future spillover risks.

When exposure to an infected animal is the suspected route of transmission for a case of mpox, as part of the case investigation, it is important to collect information on the animal type (preferably the exact species) with which the case came into contact, the time and place of the contact, as well as the type and frequency of contact and the information on whether the animal was alive or dead with or without signs of a disease.[2]

WHO has included a specific section on animal exposure on the updated mpox Case Investigation Form (CIF) which can be found on its webpage.[2] The standardized data collection for animal exposure across different countries where animal to human transmission occurs will allow animal and health authorities to more easily compile and compare this information so as to better quantify animal exposure risks.

Contact tracing

Contact tracing is a key public health measure to control the spread of infectious disease pathogens such as MPXV. It allows for the interruption of chains of transmission and can also help people at a higher risk of developing severe disease to more quickly identify their exposure, so they can monitor their health status and seek medical care quickly if they become symptomatic. Cases should be promptly interviewed as soon as possible to elicit the names and contact information of all potential contacts and identify places visited where contact with other people may have occurred. Contacts of cases should be notified within 24 hours of identification and advised to monitor their health status and seek medical care if they develop symptoms.

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, contact tracing may be stopped.

Definition of a contact

A contact is defined as a person who has been exposed to an infected person during the infectious period i.e the period beginning with the onset of the index case's first symptoms and ending when their skin lesions have crusted, the scabs have fallen off and a fresh layer of skin has formed underneath, and who has one or more of the following exposures with a probable or confirmed case of mpox:

- direct skin-to-skin and skin-to-mucosal or mouth-to-mucosal physical contact (such as touching, hugging, kissing, intimate oral or other sexual contact)
- contact with contaminated materials such as clothing or bedding, including material dislodged from bedding or surfaces during handling of laundry or cleaning of contaminated rooms
- prolonged face-to-face respiratory exposure in close proximity (inhalation of respiratory droplets and possibly short-range aerosols)
- respiratory exposure (i.e., possible inhalation of) or eye mucosal exposure to lesion material (e.g., scabs/crusts) from an infected person
- The above also apply for health workers potentially exposed in the absence of proper use of appropriate personal protective equipment (PPE)[10]

Contact identification

Cases can be prompted to identify contacts across a number of contexts, including household, workplace, school/nursery, sexual contacts, healthcare (including laboratory exposure), houses of worship, transportation, sports, bars/restaurants, social gatherings, festivals, and any other recalled interactions. Attendance lists, passenger manifests, etc. can be further used to identify contacts.

Experience during the ongoing multi-country mpox outbreak, as well as previous outbreaks, shows that some cases may be reluctant or unable to provide contact information for all contacts, especially of sexual contacts. To overcome this challenge, public health authorities should encourage cases to directly notify their contacts and provide them advice on how best to do this. Research in sexually transmitted diseases has shown that activities such as partner notification, i.e., voluntarily notifying a partner that they have been exposed to an infection, can yield good contact tracing results.[27] In the context of mpox, cases should be offered adequate counselling on how to notify their contact, the recommendations for the contact's movement and activities, and referral information about health providers who can support the contact with information, or in case of symptoms, with health services. If possible, all information should also be provided in written form (e.g., leaflets, cards, links to webpages, and QR codes) to avoid misinterpretation.

Organizers of events or managers of venues or community settings from which mpox cases have been identified may also be involved in contact notification. Such venues where physical contact, including sex, occurs among participants, may include saunas, bathhouses, nightclubs personal service settings such as tattoo parlours. If a confirmed mpox case reports having attended an event or a venue where close physical contact took place during the infectious period, but is unable to identify all possible contacts, public health authorities can, where possible, liaise with the event organizers to send a general notification to all participants about the potential risk of exposure. Also, in this case all relevant information about mpox, including referral to healthcare, needs to be provided together with the notification.

Once contacts have been identified, they should be informed of their exposure, their risk of developing infection, the symptoms of mpox, and when symptoms may appear.

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 the probable or confirmed case or their contaminated materials during the infectious period. Signs and symptoms of concern include headache, fever, chills, sore throat, malaise, fatigue, rash, and lymphadenopathy. Contacts should monitor their temperature twice daily.

During the 21 days monitoring period contacts should regularly practice hand hygiene and respiratory etiquette. As a precautionary measure, asymptomatic contacts should not donate blood, cells, tissue, organs, breast milk, or semen while they are under symptom surveillance. Contacts should also try to avoid physical contact with children, pregnant women, immunocompromised individuals and animals, including pets.

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). Although evidence on pre-symptomatic or asymptomatic transmission is still emerging and not conclusive, known contacts of confirmed cases are advised to avoid sexual contact with others during the 21-day monitoring period, irrespective of their symptoms. This is a precautionary measure to minimise the risk of onwards transmission from exposed contacts.

Local health authorities may choose to advise for pre-school children who have been exposed to a case of mpox to not attend day care, nursery or other group settings during the contact follow-up period. Options for monitoring by public health authorities are dependent on available resources. Contacts can be monitored passively, actively, or directly. In passive monitoring, identified contacts are provided with information on the signs and symptoms to monitor, permitted activities, and how to contact the public health department if signs or symptoms develop. Active monitoring is when public health officials are responsible for checking at least once a day to see if a person under monitoring has self-reported signs/symptoms. Direct monitoring is a variation of active monitoring that involves at least daily either physically visiting, visually examining via video for signs of illness, or connecting by telephone to enquire about onset of any symptoms.

A contact who develops prodromal symptoms or lymphadenopathy, without rash should be isolated and closely examined for signs of rash. In absence of skin or mucosal lesions, PCR can be done on an oropharyngeal, anal or rectal swab. However, the interpretation of results from oropharyngeal, anal or rectal swabs requires caution; while a positive result is indicative of mpox infection, a negative result is not enough to exclude infection. A contact with a positive oropharyngeal, anal or rectal swab is to be considered a confirmed case, while if it is negative the contact needs to continue monitor the signs of rash for the next five days. If no rash develops, the contact can return to temperature monitoring for the remainder of the 21 days.

If the contact develops skin or mucosal lesions, they need to be isolated and evaluated as a probable case, and a specimen from the lesions should be collected for laboratory analysis to test for mpox.

Any individual with signs and symptoms compatible with MPXV infection; or being considered a suspected, probable, or confirmed case of mpox by jurisdictional health authorities; or who has been identified as a contact of a mpox case and, therefore, is subject to health monitoring, should avoid undertaking any travel, including international, until they are determined as no longer constituting a public health risk. Exemptions include any individual who need to undertake travel to seek urgent medical care or flee from life-threatening situations, such as conflict or natural disasters; and contacts for whom pre-departure arrangements to ensure the continuity of health monitoring are agreed upon by sub-national health authorities concerned, or, in the case of international travel, by national health authorities. Cross-border workers, who are identified as contacts of a mpox case, and, hence, under health monitoring, can continue their routine daily activities provided that health monitoring is duly coordinated by the jurisdictional health authorities from both/all sides of the border. [28]

Monitoring exposed health workers

Any health worker who has cared for a person with probable or confirmed mpox or worked with a relevant laboratory specimen should be alert to the development of symptoms that could suggest mpox , especially within the 21-day period after the last date of care. WHO recommends that health workers with an occupational exposure to mpox or MPXV should notify infection control, occupational health, and public health authorities to receive an assessment and management plan for the exposure and potential infection.[10]

Health workers who have occupational exposure to patients with mpox or possibly contaminated materials (such as by a needlestick or other percutaneous sharps injury, fomites or contact with a case while not wearing appropriate PPE) should follow national infection control guidance. Such contacts do not need to be excluded from work duty if asymptomatic, but should actively monitor for symptoms, which includes measurement of temperature twice daily for 21 days following the exposure; conversely, they should not work with vulnerable patients during this period. Prior to reporting for work each day, the health worker should be interviewed regarding evidence of any relevant signs or symptoms as above.

Where vaccines are available, post-exposure vaccination within four days of exposure (or up to 14 days in the absence of symptoms) is recommended for health workers, including laboratory personnel, who came in contact with a case or potentially infectious material without use of appropriate PPE. For more details on vaccines and immunization for mpox, please consult the specific guidance.[29]

Travel-related contact tracing

Public health officials should work with transportation authorities, conveyance and points of entry operators, and other national health authorities to facilitate international contact tracing, when required, during travel or upon return, in order to assess potential risk of exposure and to identify contacts (passengers and others) who may have had exposure to a case while travelling. If a probable or confirmed case is reported in a long-distance travel conveyance (e.g., lasting more than 6 hours), travellers seated in the same row, two rows in front and two rows behind the sick traveller as well as the cabin crew who served the case, can be contacted to assess the risk of exposure and monitoring requirements. Any passenger or crew team member who did not report physical contact with a symptomatic case and was wearing PPE such as face mask for COVID-19 should not be considered a mpox contact. More specific evaluations for each scenario need to be assessed on a case-by-case basis by national and local health authorities.

Monitoring and evaluation of contact tracing quality

Indicators for monitoring the quality of mpox contact tracing include:

1. Proportion of probable and confirmed cases with identified contacts
2. Number of contacts reported per probable and confirmed case
3. Proportion of identified contacts with complete follow-up information
4. Proportion of cases coming from a contact tracing list
5. Proportion of high and medium risk contact who received post-exposure prophylaxis.

Definition of mpox death for surveillance purposes

A mpox death for surveillance purposes is defined as a death in a probable or confirmed mpox case, unless the alternative cause of death is trauma. The diagnosis for mpox can also be confirmed after the death has occurred if there is sufficient lesion material to perform PCR testing. There should be no period of complete recovery between the illness and death for the death to be recorded as a mpox death.

Most persons with mpox who died have had a co-existing health condition, and mpox may not fully explain the outcome for the case. Nevertheless, for surveillance purposes, it is important to count and report all cases that die with MPXV infection to improve understanding of the full spectrum of disease. Although countries undertake detailed medical investigations to decide on the most likely cause of death, WHO reiterates the importance of sharing information on all deaths among mpox cases.

Wastewater surveillance for mpox

Wastewater surveillance, also known as environmental surveillance (ES), has been shown to assist in public health decision making for a number of infectious diseases and risks – most notably for polio, typhoid, COVID-19, illicit drugs and to some extent antimicrobial resistance. ES provides cost effective additional population level data on trends that is most useful when it reveals information not reflected in clinical data because individuals are asymptomatic and/or do not access testing and treatment services.[30] ES can provide early warning of emergence,

re-emergence, or surges of disease and help detect hotspot areas for investigation. Additionally, information from ES can be integrated into risk communication as a reminder of ongoing risk in communities. Banking of samples allows retrospective analysis to be performed.[30]

Monkeypox viral DNA has been detected in urine, faeces, saliva, skin and mucosal lesions as well as semen samples of confirmed mpox cases in different countries. Live (replication competent) MPXV has been isolated from skin and mucosal lesions, semen, genital and rectal swabs. The concentration and persistence of virus or viral DNA shedding from the different sites varies based on the duration of the infection, and although no clear description of these dynamics is currently available, studies show that shedding can last up to 16 days from symptoms onset.[31]

The virus present in mucosal and skin lesions can be released into grey water during teeth brushing, hand washing, showers or baths, and from urine and faeces into toilets. Detecting MPXV DNA or live virus in wastewater is one method to detect ongoing community transmission in a specific area.

In previous months, several countries have started monitoring MPXV DNA presence in wastewater[32] and results have been made available for multiple countries.[33–37]Conversely, detection of replication competent MPXV in wastewater has not yet been reported. There is to date no known case of mpox infected from contact with contaminated wastewater.

Research studies have estimated that wastewater surveillance could feasibly detect 7 infections out of 100 000 people,[38] but currently standard procedures and methods, including sampling, virus concentration, DNA extraction, detection and data interpretation are lacking. Further analysis of MPXV DNA data obtained from wastewater monitoring in relation to local epidemiological reports is needed to further validate the idea of wastewater surveillance for mpox.[32] Additionally, where mpox vaccination is underway with vaccinia virus vaccines, it would be essential to select MPXV-specific PCR assays rather than generic OPXV assays.

WHO encourages countries to support research to clarify possible objectives, approaches, methods, and challenges for wastewater surveillance for mpox in different contexts.

Data collection and sharing

In order to facilitate data collection of cases following the requested minimum dataset, WHO has prepared a macro-enabled Microsoft Excel form that countries have received through IHR communication channels; however, any reporting format agreed with the respective Regional Office may be used.

WHO has also implemented the in-depth case investigation form (CIF) in the Go.Data platform[39] to facilitate local capture, analysis, and/or sharing of the relevant data. Countries that are using Go.Data can upload the mpox CIF and directly use to collect case-based data for their mpox cases. The Go.Data mpox outbreak template and associated metadata description can be obtained upon request by emailing godata@who.int, and technical support for implementation is available from WHO.

Analysis of transmission chains and network visualization have been used in past outbreaks to identify clusters, understand patterns of exposure, and quantify viral transmission across different settings. In the context of the global mpox outbreak, understanding patterns of transmission has been critical to finding effective control measures and will allow for further characterization of modes of transmission including in future determining where multiple introductions (human or zoonotic) continue to occur. To date, limited tools are available for countries to be able to graph these chains of transmission and identify clusters or contexts of transmission in real-time. Through its "visualization" feature, Go.Data allows Member States, partners and institutions to enhance outbreak response activities, particularly by visualizing, in real-time, chains of transmission. The visualization facilitates the monitoring of disease progression as well as identifying potential new cases that are missed through undetected circulation of the virus.

Data collected in a harmonized way through the WHO case investigation form could also be collated across multiple countries in a collaborative effort, increasing the sample size and allowing for more robust analyses.

WHO will use case-based surveillance data only for its own products, including external peer review publications, to better understand and explain the epidemiology of the mpox outbreak for the benefit of all countries. Data will not be shared with external third parties.

Methods

The recommendations in this guidance are based on the inputs of expert contributors (see below); and a rapid literature search conducted by WHO, focusing on case definitions, transmission routes, contact tracing and epidemiology guidance previously developed for other mpox outbreaks. WHO also monitors established and emerging literature about animal infections and use of wastewater surveillance for mpox.

Plans for updating

WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance will expire one year after the date of publication.

Contributors

This initial version of this guidance was developed through the contributions of an expert group from the WHO secretariat in headquarters and regional offices, in consultation with the Strategic and Technical Advisory Group on Infectious Hazards (STAG-IH) and clinical and laboratory experts in Portugal, Spain, Sweden, the United Kingdom of Great Britain and Northern Ireland, and the United States of America. Additional contributions have been provided by colleagues from the United States Centers for Disease Control and Prevention (CDC) and the European Centre for Disease Prevention and Control (ECDC). This update has been developed with contributions from experts working in the mpox Incident Management Team for WHO headquarters and WHO regional offices and continues to be informed by other interim guidance published and updated by WHO for this response.

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