



Multi-country monkeypox outbreak in non-endemic countries

21 May 2022

Outbreak at glance

Since 13 May 2022, cases of monkeypox have been reported to WHO from 12 Member States that are not endemic for monkeypox virus, across three WHO regions. Epidemiological investigations are ongoing, however, reported cases thus far have no established travel links to endemic areas. Based on currently available information, cases have mainly but not exclusively been identified amongst men who have sex with men (MSM) seeking care in primary care and sexual health clinics.

The objective of this Disease Outbreak News is to raise awareness, inform readiness and response efforts, and provide technical guidance for immediate recommended actions.

The situation is evolving and WHO expects there will be more cases of monkeypox identified as surveillance expands in non-endemic countries. Immediate actions focus on informing those who may be most at risk for monkeypox infection with accurate information, in order to stop further spread. Current available evidence suggests that those who are most at risk are those who have had close physical contact with someone with monkeypox, while they are symptomatic. WHO is also working to provide guidance to protect frontline health care providers and other health workers who may be at risk such as cleaners. WHO will be providing more technical recommendations in the coming days.

Description of the outbreak

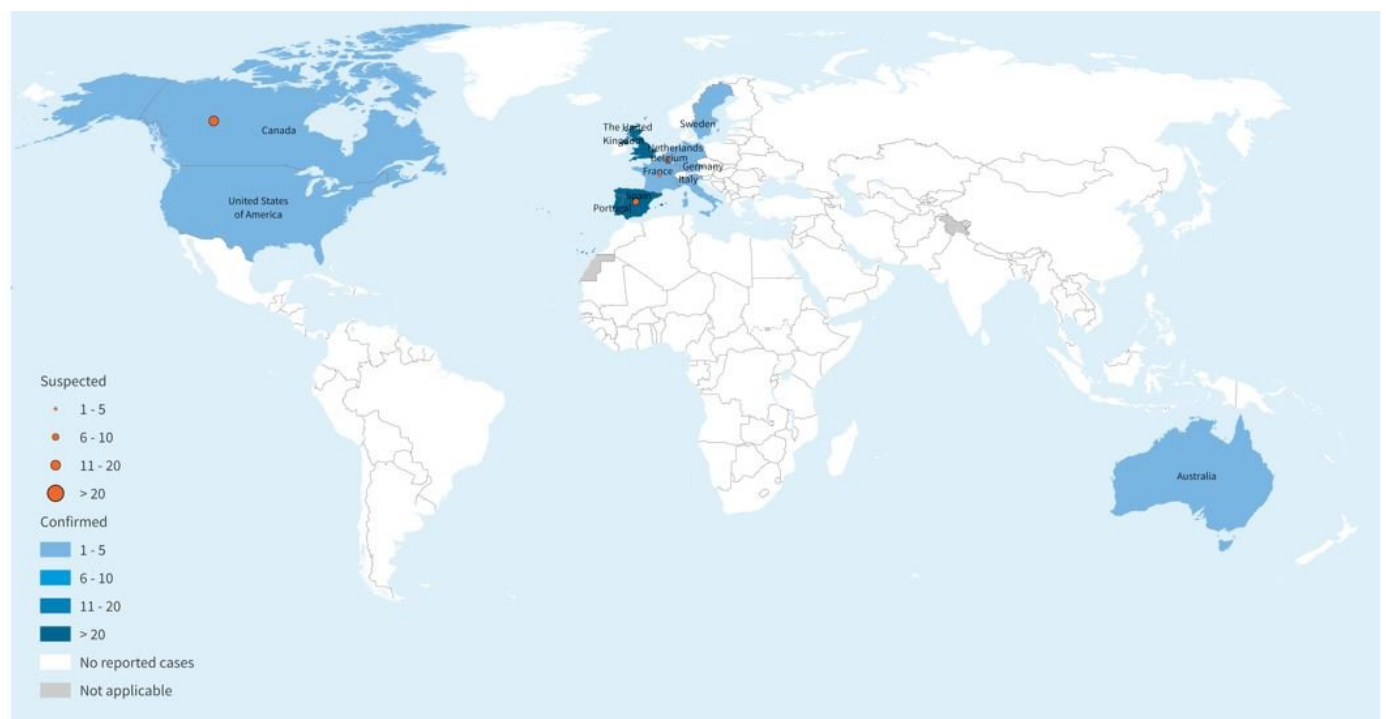
As of 21 May, 13:00, 92 laboratory confirmed cases, and 28 suspected cases of monkeypox with investigations ongoing, have been reported to WHO from 12 Member States that are not endemic for monkeypox virus, across three WHO regions (Table 1, Figure 1). No associated deaths have

been reported to date.

Table 1. Cases of monkeypox in non-endemic countries reported to WHO between 13 to 21 May 2022 as at 13:00

Country	Confirmed	Suspected
Australia	1-5	-
Belgium	1-5	1-5
Canada	1-5	11-20
France	1-5	1-5
Germany	1-5	-
Italy	1-5	-
Netherlands	1-5	-
Portugal	21-30	-
Spain	21-30	6-10
Sweden	1-5	-
United Kingdom	21-30	-
United States of America	1-5	-
Total	92	28

Figure 1. Geographical distribution of confirmed and suspected cases of monkeypox in non-endemic between 13 to 21 May 2022, as at 13:00.



The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: WHO Health Emergencies Programme
Map Date: 21 May 2022



Reported cases thus far have no established travel links to an endemic area. Based on currently available information, cases have mainly but not exclusively been identified amongst men who have sex with men (MSM) seeking care in primary care and sexual health clinics.

To date, all cases whose samples were confirmed by PCR have been identified as being infected with the West African clade. Genome sequence from a swab sample from a confirmed case in Portugal, indicated a close match of the monkeypox virus causing the current outbreak, to exported cases from Nigeria to the United Kingdom, Israel and Singapore in 2018 and 2019.

The identification of confirmed and suspected cases of monkeypox with no direct travel links to an endemic area represents a highly unusual event. Surveillance to date in non-endemic areas has been limited, but is now expanding. WHO expects that more cases in non-endemic areas will be reported. Available information suggests that human-to-human transmission is occurring among people in close physical contact with cases who are symptomatic.

In addition to this new outbreak, WHO continues to receive updates on the status of ongoing reports of monkeypox cases through established surveillance mechanisms (Integrated Disease Surveillance and Response) for cases in endemic countries ^[1], as summarized in table 2.

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

Table 2. Cases of monkeypox in endemic countries between 15 December 2021 to 1 May 2022

Country	Time period	Cumulative cases	Cumulative deaths
Cameroon	15 December 2021 to 22 February 2022	25	<5
Central African Republic	4 March to 10 April 2022	6	<5
Democratic Republic of the Congo	1 January to 1 May 2022	1238	57
Nigeria	1 January 2022 to 30 April 2022	46	0

For additional information please refer to [WHO AFRO Weekly Bulletin on Outbreaks and Other Emergencies](#).

Epidemiology of the disease

Monkeypox is a viral zoonosis (a virus transmitted to humans from animals) with symptoms very similar to those seen in the past in smallpox patients, although it is clinically less severe. It is caused by the monkeypox virus which belongs to the *orthopoxvirus* genus of the *Poxviridae* family. There are two clades of monkeypox virus: the West African clade and the Congo Basin (Central African) clade. The name monkeypox originates from the initial discovery of the virus in monkeys in a Danish laboratory in 1958. The first human case was identified in a child in the Democratic Republic of the Congo in 1970.

Monkeypox virus is transmitted from one person to another by close contact with lesions, body fluids, respiratory droplets and contaminated materials such as bedding. The incubation period of monkeypox is usually from 6 to 13 days but can range from 5 to 21 days.

Various animal species have been identified as susceptible to the monkeypox virus. Uncertainty remains on the natural history of the monkeypox virus and further studies are needed to identify the exact reservoir(s) and how virus circulation is maintained in nature. Eating inadequately cooked meat and other animal products of infected animals is a possible risk factor.

Monkeypox is usually self-limiting but may be severe in some individuals, such as children, pregnant women or persons with immune suppression due to other health conditions. Human infections with the West African clade appear to cause less severe disease compared to the Congo Basin clade, with a case fatality rate of 3.6% compared to 10.6% for the Congo Basin clade.

Public health response

- Further public health investigations are ongoing in non-endemic countries that have identified cases, including extensive case finding and contact tracing, laboratory investigation, clinical management and isolation provided with supportive care.

- Genomic sequencing, where available, have been undertaken to determine the monkeypox virus clade(s) in this outbreak
- Vaccination for monkeypox, where available, is being deployed to manage close contacts, such as health workers. WHO is convening experts to discuss recommendations on vaccination.

WHO has developed surveillance case definitions for the current monkeypox outbreak in non-endemic countries.

(case definitions will be updated as necessary)

Suspected case:

A person of any age presenting in a monkeypox non-endemic country^[2] with an unexplained acute rash

AND

One or more of the following signs or symptoms, since 15 March 2022:

- Headache
- Acute onset of fever ($>38.5^{\circ}\text{C}$),
- Lymphadenopathy (swollen lymph nodes)
- Myalgia (muscle and body aches)
- Back pain
- Asthenia (profound weakness)

AND

for which the following common causes of acute rash do not explain the clinical picture: varicella zoster, herpes zoster, measles, Zika, dengue, chikungunya, 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.

[2] Monkeypox endemic countries are: Benin, Cameroon, the Central African Republic, the Democratic Republic of the Congo, Gabon, Ghana (identified in animals only), Côte d'Ivoire, Liberia, Nigeria, the Republic of the Congo, and Sierra Leone. Benin and South Sudan have documented importations in the past. Countries currently reporting cases of the West African clade are Cameroon and Nigeria. With this case definition, all countries except these four should report new cases of monkeypox as part of the current multi-country outbreak.

Probable case:

A person meeting the case definition for a suspected case

AND

One or more of the following:

- has an epidemiological link (face-to-face exposure, including health workers without eye and respiratory protection); direct physical contact with skin or skin lesions, including sexual contact; or contact with contaminated materials such as clothing, bedding or utensils to a probable or confirmed case of monkeypox in the 21 days before symptom onset
- reported travel history to a monkeypox endemic country¹ in the 21 days before symptom onset
- has had multiple or anonymous sexual partners in the 21 days before symptom onset
- has a positive result of an *orthopoxvirus* serological assay, in the absence of smallpox vaccination or other known exposure to orthopoxviruses
- is hospitalized due to the illness

Confirmed case:

A case meeting the definition of either a suspected or probable case and is laboratory confirmed for monkeypox virus by detection of unique sequences of viral DNA either by real-time polymerase chain reaction (PCR) and/or sequencing.

Discarded case:

A suspected or probable case for which laboratory testing by PCR and/or sequencing is negative for monkeypox virus.

WHO risk assessment

Endemic monkeypox disease is normally geographically limited to West and Central Africa. The identification of confirmed and suspected cases of monkeypox without any travel history to an endemic area in multiple countries is atypical, hence, there is an urgent need to raise awareness about monkeypox and undertake comprehensive case finding and isolation (provided with supportive care), contact tracing and supportive care to limit further onward transmission.

Cross-protective immunity from smallpox vaccination will be limited to older persons, since populations worldwide under the age of 40 or 50 years no longer benefit from the protection afforded by prior smallpox vaccination programmes. There is little immunity to monkeypox among younger people living in non-endemic countries since the virus has not been present there.

Historically, vaccination against smallpox had been shown to be protective against monkeypox. While one vaccine (MVA-BN) and one specific treatment (tecovirimat) were approved for monkeypox, in 2019 and 2022 respectively, these countermeasures are not yet widely available.

Based on currently available information, cases have mainly but not exclusively been identified amongst men who have sex with men (MSM) seeking care in primary care and sexual health clinics. No deaths have been reported to date. However, the extent of local transmission is unclear at this stage, as surveillance has been limited. There is a high likelihood of identification of further cases with unidentified chains of transmission, including in other population groups. With a number of countries in several WHO regions reporting cases of monkeypox, it is highly likely that other countries will identify cases.

The situation is evolving and WHO expects there will be more cases of monkeypox identified as surveillance expands in non-endemic countries. So far, there have been no deaths associated with this outbreak. Immediate actions focus on informing those most at risk for monkeypox infection with accurate information, stopping further spread and protecting frontline workers.

WHO advice

Identification of additional cases and further onward spread in the countries currently reporting cases and other Member States is likely. Any patient with suspected monkeypox should be investigated and if confirmed, isolated until their lesions have crusted, the scab has fallen off and a fresh layer of skin has formed underneath.

Countries should be on the alert for signals related to patients presenting with an atypical rash that progresses in sequential stages – macules, papules, vesicles, pustules, scabs, at the same stage of development over all affected areas of the body – that may be associated with fever, enlarged lymph nodes, back pain, and muscle aches. These individuals may present to various community and healthcare settings including but not limited to primary care, fever clinics, sexual health services, infectious disease units, obstetrics and gynecology, urology, emergency departments and dermatology clinics. Increasing awareness among potentially affected communities, as well as health care providers and laboratory workers, is essential for identifying and preventing further secondary cases and effective management of the current outbreak.

Considerations relating to surveillance and reporting

Surveillance

The key objectives of surveillance and case investigation for monkeypox in the current context are to rapidly identify cases, clusters, and the sources of infection as soon as possible in order to provide optimal clinical care, isolate cases to prevent further transmission, identify and manage contacts and tailor effective control and prevention methods based on most commonly identified routes of transmission.

In non-endemic countries, one case is considered an outbreak. Because of the public health risks associated with a single case of monkeypox, clinicians should report suspected cases immediately to national or local public health authorities regardless of whether they are also exploring other potential diagnoses. Cases should be reported immediately, according to the case definitions above or nationally tailored case definitions. Probable and confirmed cases should be reported immediately to WHO through IHR National Focal Points (NFPs) under the International Health Regulations (IHR 2005).

Countries should be on the alert for signals related to patients presenting with unusual rash, vesicular or pustular lesions or lymphadenopathy, often associated with fever, in a range of community and health care settings, including but not limited to primary care, fever clinics, sexual health services, infectious disease units, obstetrics and gynecology, and dermatology clinics. Surveillance for rash-like illness should be intensified and guidance provided for collection of skin samples for confirmatory testing.

Reporting

Case reports should include at a minimum the following information: date of report; reporting location; name, age, sex and residence of the case; date of onset of first symptoms; recent travel history; recent exposure to a probable or confirmed case; relationship and nature of contact with probable or confirmed cases (where relevant); recent history of multiple or anonymous sexual partners; smallpox vaccination status; presence of rash; presence of other clinical signs or symptoms as per case definition; date of confirmation (where done); method of confirmation (where done); genomic characterization (if available); other relevant clinical or laboratory findings, particularly to exclude common causes of rash as per the case definition; whether hospitalized; date of hospitalization (where done); and outcome at time of reporting.

A global case reporting form is under development.

Considerations related to case investigation

During human monkeypox outbreaks, close physical contact with infected persons is the most significant risk factor for monkeypox virus infection. If monkeypox is suspected, the investigation should consist of (i) clinical examination of the patient using appropriate infection prevention and control (IPC) measures, (ii) questioning the patient about possible sources of infection and the presence of similar disease in the patient's community and contacts, and (iii) safe collection and dispatch of specimens for monkeypox laboratory examination. The minimum data to be captured are included above under 'Reporting'. Exposure investigation should cover the period between five and 21 days prior to symptom onset. Any patient with suspected monkeypox 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 suspect cases is important but

should not delay implementation of public health actions. Suspected presence of similar disease in the patient's community or amongst contacts should be further investigated (also known as "backwards contact tracing").

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

Samples taken from people with suspected monkeypox or animals with suspected monkeypox virus infection, 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 the sample packing and transportation to the testing laboratories. 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 monkeypox, so that they can minimise risk to laboratory workers and, where appropriate, safely perform laboratory tests that are essential for clinical care.

Considerations related to contact tracing

Contact tracing is a key public health measure to control the spread of infectious disease pathogens such as monkeypox virus. It allows for the interruption of transmission and can also help people at a higher risk of developing severe disease to more quickly identify their exposure, so that their health status can be monitored, and they can seek medical care faster if they become symptomatic. In the current context, as soon as a suspected case is identified, contact identification and contact tracing should be initiated. Case patients should be interviewed to elicit the names and contact information of all such persons. Contacts should be notified within 24 hours of identification.

Definition of a contact

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

- **face-to-face exposure (including health care workers without appropriate PPE)**
- **direct physical contact, including sexual contact**
- **contact with contaminated materials such as clothing or bedding**

Contact identification

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

Contact monitoring

Contacts should be monitored at least daily for the onset of signs/symptoms for a period of 21 days from the last contact with a patient or their contaminated materials during the infectious period. Signs/symptoms of concern include headache, fever, chills, sore throat, malaise, fatigue, rash, and lymphadenopathy. Contacts should monitor their temperatures twice daily.

Asymptomatic contacts should not donate blood, cells, tissue, organs, breast milk, or semen while they are under symptom surveillance. Asymptomatic contacts can continue routine daily activities such as going to work and attending school (i.e., no quarantine is necessary), but should remain close to home for the duration of surveillance. It may, however, be prudent to exclude pre-school children from daycare, nursery, or other group settings.

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/symptoms to monitor, permitted activities, and how to contact the public health department if signs/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 or visually examining via video for signs of illness.**

A contact who develops initial signs/symptoms other than rash should be isolated and closely watched for signs of rash for the next seven days. If no rash develops, the contact can return to temperature monitoring for the remainder of the 21 days. If the contact develops a rash, they need to be isolated and evaluated as a suspected case, and a specimen should be collected for laboratory analysis to test for monkeypox.

Monitoring exposed health workers and caregivers

Any health worker or household member who has cared for a person with probable or confirmed monkeypox should be alert to the development of symptoms that could suggest monkeypox infection, especially within the 21-day period after the last date of care. Health workers should notify infection control, occupational health, and public health authorities to be guided about a medical evaluation.

Health workers who have unprotected exposures (i.e., not wearing appropriate PPE) to patients with monkeypox or possibly contaminated materials do not need to be excluded from work duty if asymptomatic, but should undergo active surveillance for symptoms, which includes measurement of temperature at least twice daily for 21 days following the exposure. Prior to reporting for work each day, the health worker should be interviewed regarding evidence of any relevant signs/symptoms as above.

Healthcare workers who have cared for or otherwise been in direct or indirect contact with monkeypox patients while adhering to recommended IPC measures may undergo self-monitoring or active monitoring as determined by local public health authorities.

Post-exposure vaccination (ideally within four days of exposure) may be considered by some countries for higher risk contacts such as health workers including laboratory personnel.

Travel-related contact tracing

Public health officials should work with travel operators and public health counterparts in other locations to assess potential risks and to contact passengers and others who may have had contact with an infectious patient while in transit.

Considerations related to risk communication and community engagement

Two-way communication on monkeypox related risks and engagement of at-risk and affected communities on prevention, detection and care, is essential for preventing further spread of monkeypox and controlling the current outbreak.

This includes providing public health advice through the channels that target audiences use on how the disease transmits, its symptoms, preventive measures and what to do in case of suspect or confirmed infection. This should be combined with targeting community engagement to the population groups who are most at risk, working closely with health care providers, including sexual health clinics, and civil society organizations.

Risk communication should be informed by insights from social listening detecting public sentiment and should timely address possible rumours and misinformation. Health information and advice should be provided avoiding any form of stigmatization of certain groups such as men who have sex with men (MSM).

Key messages include the below:

- **Prevention - Someone who has direct contact with an infected person, including sexual contact can get monkeypox. Steps for self-protection include avoiding skin to skin or face to face contact with anyone who has symptoms, practicing safer sex, keeping hands clean with water and soap or alcohol-based hand rub, and maintaining respiratory etiquette.**

- **Detection and care** - If people develop a rash, accompanied by fever or a feeling of discomfort or illness, they should contact their health care provider and get tested for monkeypox. If someone is suspected or confirmed as having monkeypox, they should isolate until the scabs have fallen off and abstain from sex, including oral sex. During this period, patients can get supportive treatment to ease monkeypox symptoms. Anyone caring for a person sick with monkeypox should use appropriate personal protective measures, including wearing a mask, and cleaning objects, & surfaces that have been touched.
- **Reporting** - Any rash-like illness during travel or upon return should be immediately reported to a health professional, including information about all recent travel, sexual history and smallpox immunization history. Residents and travellers to monkeypox-endemic countries should avoid contact with sick mammals such as rodents, marsupials, non-human primates (dead or alive) that could harbour monkeypox virus and should refrain from eating or handling wild game (bush meat).

Considerations related to large gatherings

Concerns have been raised by the media with regard to the amplification of the spread of monkeypox virus in the context of large gatherings. Large gatherings may represent a conducive environment for the transmission of monkeypox virus as they entail close, prolonged and frequent interactions among people, which in turn can expose attendees to contact with lesions, body fluids, respiratory droplets and contaminated materials.

While the exact mechanisms of transmission of the present monkeypox outbreak are still being investigated, and they likely differ from those of SARS-CoV-2, it is important to remind that the general precautionary measures recommended against COVID-19 are also expected to largely protect from monkeypox virus transmission.

In addition, any person meeting the suspected, probable and confirmed case definition detailed above should refrain from close contact with any other individual and should not attend large gatherings.

WHO is closely monitoring the current monkeypox outbreak. While no specific measures are required at this time with regard to holding, postponing or cancelling a mass gathering in areas where monkeypox cases have been detected, information can be shared with prospective attendees of mass gatherings for them to make an informed decision.

Considerations related to clinical management and infection prevention and control in health care settings

Health workers caring for patients with suspected or confirmed monkeypox should implement standard, contact and droplet precautions. These precautions are applicable in any health facility including outpatient services and hospitals. Standard precautions include strict adherence to hand hygiene, appropriate handling of contaminated medical equipment, laundry, waste and cleaning and disinfection of environmental surfaces.

Prompt isolation of suspected or confirmed cases in a single room with adequate ventilation, dedicated bathroom and staff is recommended. Cohort (confirmed with confirmed, suspected with suspected) can be implemented if single rooms are not available, ensuring minimum of 1-meter distance between patients. Recommended personal protective equipment (PPE) includes gloves, gown, medical mask and eye protection – goggles or face shield. The patient should also be instructed to wear a medical mask when they come into close contact (under 1m) with health workers or other patients, if they can tolerate it. Additionally, a bandage, sheet or gown can be used to cover lesions in order to minimize potential contact with lesions. PPE should be disposed of prior to leaving the isolation area where the patient is admitted.

Should aerosol generating procedures (AGPs) (i.e. aspiration or open suctioning of respiratory tract specimens, bronchoscopy, intubation, cardiopulmonary resuscitation), be required for any reason and cannot be delayed, then as a matter of standard practice, a respirator (FFP2 or EN certified equivalent or US NIOSH-certified N95) must be used by health care workers instead of a medical mask.

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

Deployment of pharmaceutical countermeasures including specific antivirals (i.e. tecovirimat, which is approved for monkeypox, but not yet widely available) can be considered under investigational or compassionate use protocols, particularly for those who have severe symptoms or who may be at risk of poor outcomes (such as those with immune suppression). There is a vaccine recently approved for monkeypox which is not yet widely available. Some countries may hold smallpox vaccine products which could be considered for use according to national guidance. Any request for vaccine products may potentially be available in limited quantities through national authorities, depending on the country. Countries may want to consider timely vaccination of close contacts as post-exposure prophylaxis or for certain groups of health care workers for pre-exposure vaccination.

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

WHO will be providing interim technical guidance in the coming days.

Further information

- [WHO factsheet on monkeypox](#)
- [WHO monkeypox outbreak tool kit](#)
- [The UK Health Security Agency News story on 16 May 2022, Monkeypox cases confirmed in England – latest updates](#)

- [WHO disease outbreak news, monkeypox, United Kingdom of Great Britain and Northern Ireland, 16 May 2022](#)
- [WHO disease outbreak news, monkeypox, United Kingdom of Great Britain and Northern Ireland, 8 July 2021](#)
- [WHO disease outbreak news, monkeypox, all items.](#)
- [Weekly epidemiological record \(WER\) no.11, 16 March 2018, Emergence of monkeypox in West Africa and Central Africa 1970-2017](#)
- [Nigeria Centre for Disease Control. Monkeypox](#)
- [Monkeypox in the United States of America](#)
- OpenWHO. Monkeypox: Introduction. Online training module. 2020. [English](#) [Français](#)
- OpenWHO. Monkeypox epidemiology, preparedness and response. Extended training. 2021. [English](#) [Français](#)
- [WHO AFRO Weekly Bulletin on Outbreaks and Other Emergencies](#)
- [Public Health Agency of Canada confirms 2 cases of monkeypox](#)
- [US CDC media statement. CDC and Health Partners Responding to Monkeypox Case in the U.S. 18 May 2022](#)
- [Sweden Press Release](#)
- [UKHSA monkeypox guidance](#)
- [Ministry of Health Portugal Press Release, 18 May 2022](#)
- [First draft genome sequence of Monkeypox virus associated with the suspected multi-country outbreak, May 2022 \(confirmed case in Portugal\)](#)
- von Magnus P, Andersen EA, Petersen KB, Birch-Andersen A. A pox-like disease in cynomolgus monkeys. Acta Path Microbiol Scand. 1959; 46:159
- Bunge EM, Hoet B, Chen L, Lienert F, Weidenthaler H, Baer LR, et al. (2022) The changing epidemiology of human monkeypox—A potential threat? A systematic review. PLoS Negl Trop Dis 16(2): e0010141. <https://doi.org/10.1371/journal.pntd.0010141>

Citable reference: World Health Organization (21 May 2022). Disease Outbreak News; Multi-country monkeypox outbreak in non-endemic countries. Available at:

<https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON385>

[See all DONs related to this event](#)

[Read more about Monkeypox](#)
