



# Mpxx

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## Key facts

*To better understand public health terms included in this Disease Tool (e.g. What is a case definition? or What is an infectious agent?), consult our page on Key concepts on epidemiology.*

## Importance

Mpxx is a zoonotic disease first discovered in monkeys and in humans in 1970 in the Democratic Republic of the Congo (DRC). However, it has now demonstrated sustained human-to-human transmission. While it mostly occurs in Central and Western African countries close to tropical rainforests, it has been exported as happened in the wave of outbreaks in 2022 across Europe, the Americas, and subsequently up to 110 countries. In 2024, outbreaks have spread to central and east African countries that had never previously reported the disease such as Burundi, Kenya, Rwanda, and Uganda.

There are two broad clades of the mpxx virus: clade I and II (which was behind the global mpxx outbreak that began in 2022). It is postulated that clade I leads to more severe disease and death than clade II in the populations where it is endemic. A new offshoot of clade I virus, called clade Ib, which was first reported in the DRC in 2023 and spread through close contact, including sexual contact, is implicated in the 2024 epidemic.

In light of this, WHO in August 2024, determined that mpxx a public health emergency of international concern (PHEIC) under the International Health Regulations (2005) (IHR) - the second mpxx PHEIC in 2 years.

Available data indicates that case fatality rate for mpxx can be as high as 10%. This may differ in different settings due to several factors, such as access to health care and underlying immunosuppression such as HIV disease.

## Case definition

A **case definition** is a set of uniform criteria used to define a disease for public health surveillance. It enables

public health officials to classify and count cases consistently.

*The following are standard case definitions to allow national health authorities to interpret data in an international context. However, during an outbreak, case definitions may be adapted to the local context and the Red Cross Red Crescent should use those agreed/established by national health authorities. NB: Consider that during community surveillance, **volunteers** should use broad (simplified) case definitions to recognize most or all possible cases and encourage them to seek care. Other actors such as **healthcare workers or investigators** studying the cause of a disease, on the other hand, can use more specific case definitions that may require laboratory confirmation.*

Clinical criteria: acute skin rash or lesions, fever (subjective or measured temperature of over 38.5° C [101.3° F], other clinical signs and symptoms (chills and/or sweats, headache, backache, muscle ache, lymphadenopathy, sore throat, cough, shortness of breath and fatigue).

Epidemiologic criteria: exposure to an exotic or wild mammalian pet with clinical signs of illness (e.g. conjunctivitis, respiratory symptoms, and/or rash) OR exposure to an exotic or wild mammalian pet with or without clinical signs of illness that has been in contact with either a mammalian pet or a human with mpox OR exposure to a suspect, probable, or confirmed human case of mpox.

Laboratory criteria: isolation of mpox virus in culture OR demonstration of mpox virus DNA by polymerase chain reaction (PCR) testing of a clinical specimen OR demonstration of virus morphologically consistent with an orthopoxvirus by electron microscopy in the absence of exposure to another orthopoxvirus OR demonstration of presence of orthopoxvirus in tissue using immunohistochemical testing methods in the absence of exposure to another orthopoxvirus.

### **Case classification**

Suspect case: meets one of the epidemiologic criteria AND fever or unexplained rash/lesions AND two or more other signs or symptoms with onset of first sign or symptom less than 21 days after last exposure meeting epidemiologic criteria.

Probable case: meets one of the epidemiologic criteria AND fever AND acute skin rash, mucosal lesions or lymphadenopathy, OR if rash is present but the type is not described, OR vesicular-pustular rash with onset of first sign or symptom less than 21 days after last exposure to a probable or confirmed mpox case, OR has had multiple and/or casual sexual partners within the 21 days before symptom onset, OR positive test result for orthopoxviral infection using OPXV-specific PCR and it demonstrates elevated levels of IgM antibodies reactive with orthopoxvirus between at least days 7 to 56 after rash onset.

Confirmed case: lesion samples/materials contain unique sequences of viral DNA detected through real-time polymerase chain reaction (PCR) and/or sequencing.

WHO case definition and classification source of information:

WHO Mpox (Monkeypox) outbreak toolbox

<https://www.cdc.gov/poxvirus/mpox/veterinarian/mpox-in-animals.html>

WHO laboratory testing information:

Diagnostic testing for the monkeypox virus (MPXV): interim guidance, 10 May 2024

## Alert / epidemic threshold

An **alert threshold** is the pre-defined number of alerts that suggest the beginning of a possible disease outbreak and therefore warrant immediate notification.

**Epidemic thresholds** are the minimum number of cases indicating the beginning of a particular disease's outbreak.

Single case

## Risk factors

- People in close contact with infected persons via skin-to-skin (such as touching or anal/vaginal sex) mouth-to-mouth, or mouth-to-skin (such as kissing the skin or oral sex) as well as face-to-face (including talking or breathing in close proximity).
- People in constant contact with clothing, bedding, towels, objects, electronics and other surfaces touched by an infected person
- People with multiple and/or casual sexual partners. It is important to note that during the global outbreak that began in 2022, the virus mostly spread through sexual contact.
- Men who have sex with men are also at risk
- People in close contact with infected animals (including the animal's blood and other bodily fluids).
- Eating inadequately cooked meat of infected animals.
- No proper sanitation and hygiene measures.
- Caregivers and healthcare workers in close contact with infected people when infection control precautions are not strictly practiced.

## Attack rate (AR)

The **attack rate** is the risk of getting a disease during a specific time period (such as during an outbreak).

***Attack rates will vary from one outbreak to another. In case of an outbreak, consult the latest information provided by health authorities.***

3—28 per cent in recent outbreaks among close contacts.

## Groups at increased risk of severe illness (most vulnerable)

- Infection is more severe and mortality is higher among children and young adults.
- Immunosuppressed persons such as those receiving chemotherapy, transplant recipients or HIV

carriers.

- People with chronic diseases such as renal disease, cancer, chronic lung or liver disease and diabetes.
- People who have multiple or new sexual partners are most at risk. Gay, bisexual and other men who have sex with men may be at higher risk of being exposed if they have sex or other form of close contact with someone who is infectious.

## Infectious agent

**Infectious agents** are bacteria, viruses, fungi, prions and parasites. A disease caused by an infectious agent or its toxic products is defined as an infectious disease.

Mpox virus

## Reservoir / host

A **reservoir of infection** is a living organism or material in or on which an infectious agent lives and/or usually multiplies. Reservoirs include humans, animals and the environment.

A **susceptible host** is a person at risk of being infected. The level of susceptibility depends on age, sex, ethnicity and genetic factors, specific immunity also depends on other factors that affect an individual's ability to resist infection or to limit its ability to cause infection.

A **zoonotic disease** or **zoonosis** is an infectious disease that has jumped from a non-human animal to humans.

**Zoonotic disease:** The natural reservoir of *mpox viruses* is not identified. Hosts include many animals such as rope squirrels, tree squirrels, Gambian rats, striped mice, dormice, prairie dogs, marmots and groundhogs, chinchillas, hedgehogs, shrews, and primates.

## How disease is spread (modes of transmission)

Categorisation of **modes of transmission** varies from one agency to another. In addition, some infectious agents can be transmitted by more than one mode. A list of modes of transmission can be found in the key concepts to serve as guidance to better understand the diseases included in this website.

- **Contact transmission:** Primarily transmitted to people through direct contact with the blood, body fluids, or cutaneous or mucosal lesions of infected persons or of infected animals (monkey, prairie dogs, rats, squirrels, and others), through bite or scratch. Human-to-human transmission can also occur through contact with the infected person's skin, mouth or contaminated objects (e.g. bedding) of an infected person.
- **Vehicle-borne transmission:** Eating inadequately cooked meat of infected animals is a possible risk

factor.

- **Droplet spread:** Human-to-human transmission is also possible via respiratory droplets usually requiring prolonged face-to-face contact.
- Mother-to-child transmission can also occur during or after birth.

## Incubation period

This time from when infection occurs to the onset of symptoms is called the **incubation period**. It is a range of days and it can be different for each disease.

6—16 days (range 1—21 days).

## Period of infectiousness

**Period of infectiousness** is the time interval during which an infected person can transmit the infection to other susceptible persons.

First week of rash.

## Clinical signs and symptoms

- The clinical presentation is similar to the eradicated disease smallpox.
- The invasion period (0—5 days) is characterized by fever, intense headache, swelling of the lymph nodes, back pain, muscle ache and an intense lack of energy.
- The skin eruption period (within one to three days after the appearance of fever) where the various stages of the rash appear, often begins on the face and then spreads elsewhere on the body. The face (in 95 per cent of cases), and palms of the hands and soles of the feet (in 75 per cent of cases) are most affected. Evolution of the rash from maculopapules (lesions with a flat base) to vesicles (small fluid-filled blisters), pustules, followed by crusts occurs in approximately ten days which may last up to three weeks.
- Some patients develop severe swollen lymph nodes before the appearance of the rash, which is a distinctive feature of mpox compared to other similar diseases.
- Although the clinical manifestation of mpox is milder than that of smallpox, the disease can kill up to 11 per cent of infected people. Complications are respiratory distress, secondary bacterial infections and encephalitis.

## Other diseases with similar clinical signs and symptoms

Smallpox, varicella (chickenpox), measles, bacterial skin infections, scabies, syphilis and medication-associated allergies.

## Diagnosis

- Polymerase chain reaction (PCR).
- Virus isolation by cell culture.
- Serology: IgM and IgG antibodies detection by enzyme-linked immunosorbent assay (ELISA). Recommended for use by the WHO at reference laboratories only.

## Vaccine or treatment

**Please refer to the appropriate local or international guidelines for clinical management. All clinical management including the administration of a treatment or vaccine should be conducted by a health professional.**

- There are no specific treatments or vaccines available for mpox infection.
- Early supportive care is advised to manage the symptoms and avoid complications.
- Because mpox virus is closely related to the virus that causes smallpox, the smallpox vaccine can protect from getting mpox. Experts also believe that vaccination after a mpox exposure may help prevent the disease or make it less severe, if given soon after exposure. New and safer vaccines have been approved for the prevention of smallpox and mpox since 2018. Following the worldwide eradication of smallpox, the smallpox vaccine is not available to the general public, but vaccine stockpiles are maintained by several countries and the World Health Organization (WHO).
- Also, antivirals initially developed to treat smallpox including tecovirimat have been used to treat mpox.
- Pre-exposure smallpox vaccination for high-risk groups (e.g. public health workers investigating the outbreak, animal control or veterinarian workers, healthcare and laboratory workers, close contacts without contraindications) has been effective.
- Post-exposure smallpox vaccination (within four days of initial exposure to mpox) can be discussed in outbreak areas.

## Immunity

There are two types of immunity:

- **Active immunity** results when exposure to an agent triggers the immune system to produce antibodies to that disease.
- **Passive immunity** is provided when a person is given antibodies to a disease rather than producing them

through his or her own immune system.

Past data suggest that the smallpox vaccine is at least 85 per cent effective in preventing mpox.

## Which interventions are most effective for prevention and control?

*The following is a list of activities considered for Red Cross Red Crescent volunteers to take part in. It is not an exhaustive list of all prevention and control activities for the specific disease.*

- Communicate risks about the disease or epidemic, not only to share information on prevention and mitigation measures, but also to encourage informed decision-making, positive behaviour change and maintenance of trust in the Red Cross Red Crescent response. This includes the identification of rumours and misinformation around disease—frequent during health emergencies—to manage them appropriately. Volunteers should use the most context-appropriate communication techniques (ranging from social media to face-to-face interactions).
- Community education and engagement activities to encourage the adoption of protective behaviours:
  - Avoiding hunting and eating small bush mammals. Meat should be appropriately cooked prior to consumption.
  - Avoiding contact with a sick or dead animal, their meat or blood.
  - Avoiding contact with a person infected with mpox.
  - Practice safer sex in communities with active transmission, including using male and female condoms.
- When caring for or visiting sick people:
  - Handwashing with soap
  - Wearing gloves and a mask as personal protective equipment
- Authorities may establish measures such as limiting or banning the movement of suspect animals, application of quarantine or discarding potentially infected animals.
- Early and rapid detection of cases and encouragement of early health-seeking behaviours at healthcare centres.
- Social mobilization for pre- or post-exposure smallpox vaccination, if required.
- Volunteers should support healthcare workers, veterinarians and wildlife professionals in implementing a One Health-informed prevention and control strategy.
- Illegal wildlife trading and trafficking should also be discouraged in communities.

# Epidemic characteristics and RCRC indicators and targets

The first table below includes data that should be gathered from health authorities and relevant non-governmental actors to understand the progress and characteristics of the epidemic in the specific country and area of intervention. The second table includes a list of suggested indicators that can be used for monitoring and evaluating Red Cross Red Crescent activities; wording of indicators may be adapted to specific contexts. Target values for a specific indicator can vary widely from one context to another and therefore managers should define them based on the specific population, area of intervention and programmatic capacity. Exceptionally, some indicators in this website may include target values when these are globally agreed as a standard; e.g. 80 per cent of individuals who slept under an insecticide-treated net (ITN) the previous night—the normative World Health Organization benchmark for universal coverage with ITNs.

Epidemic characteristics and progression
Suspected cases per week (disaggregate by age, sex)
Confirmed cases per week (disaggregate by age, sex)
Case fatality rate
Indicators for Red Cross Red Crescent activities
<p>Number of volunteers trained on a specific topic (e.g. Epidemic Control for Volunteers (ECV); Community-based surveillance (CBS); (WASH) training; CBHFA training, etc.)</p> <p><b>Numerator:</b> Number of volunteers trained Source of information: Training attendance sheets</p>
<p>Suspect cases detected by volunteers who were encouraged to seek healthcare and who arrived at a health facility (NB. This indicator requires the implementation of a system in collaboration with the health facility, whereby health workers specifically asked the patient how they heard about the service)</p> <p><b>Numerator:</b> Mpox suspect cases detected by volunteers in a determined period preceding this survey (e.g. two weeks) for whom advice or treatment was sought from a health facility <b>Denominator:</b> Total number of people who are Mpox suspect cases in the same period preceding the survey Source of information: Survey</p>

### Indicators for Red Cross Red Crescent activities

Percentage of people recognizing at least one transmission route and at least one measure for preventing it

**Numerator:** Total number of people who cited at least one transmission route and at least one measure for preventing it during the survey

**Denominator:** Total number of people surveyed

Source of information: Survey

Percentage of people who know the cause, symptoms, treatment or preventive measures

**Numerator:** Number of people who cite the cause, symptoms, treatment or preventive measures

**Denominator:** Number of people surveyed

### See also:

- For Community Engagement and Accountability (CEA) indicators for activities accompanying ECV actions, please refer to the IFRC CEA toolkit (Tool 7.1: Template CEA logframe, activities and indicators) at: <https://www.ifrc.org/document/cea-toolkit>

## Impact on other sectors

Sector	Link to the disease
<b>WASH</b>	The transmission can be reduced by proper hygiene and sanitation measures, especially when in contact with infected people.
<b>Food security</b>	Avoiding hunting and eating small bush mammals decreases the risk of infection.
<b>Nutrition</b>	Malnutrition increases the risk for severe Mpox infection.
<b>Shelter and settlements (including household items)</b>	Living in close proximity and neighbourhood to small bush mammals in endemic areas with potentially infected animals increases the risk for transmission of the <i>Mpox virus</i> .

Sector	Link to the disease
<b>Psychosocial support and mental health</b>	Like every disease, Mpox can have several negative impacts on psychological, social and emotional aspects of a person's life, apart from its physical effects only. Psychological reactions may include fear of social stigma, anxiety, social withdrawal, among others.
<b>Sex and Gender</b>	Gender roles influence exposure to mpox. While it's known to affect men more commonly than women, women and girls may be at risk through caregiving and close contact within households, which may increase exposure while delaying their own care and treatment. Men and boys may face exposure through occupational or caregiving roles. Recent outbreaks have shown increased transmission among men who have sex with men, highlighting the importance of inclusive, stigma-free services. Social and Gender norms can also affect timely care-seeking. Pregnant women may be at higher risk of complications, highlighting the need for early detection and access to maternal health services
<b>Education</b>	Schools play an important role in educating children not to touch sick animals, which could transmit mpox. As young people are at increased risk for a severe disease this is even more important. Children may be at risk of losing out on education if staying at home because of illness.
<b>Livelihoods</b>	Illness leads to reduction in productivity as people may not be able to work due to disease. This can lead to a loss of income due to the reduction in work activity and to the diversion of resources to seek medical treatment.

## Resources:

### Resources from World Health Organization (WHO)

- WHO Mpox Questions and Answers, 17 Aug 2024
- WHO Director-General declares mpox outbreak a public health emergency of international concern, 14 August 2024
- WHO Mpox Fact Sheets updated, 18 April 2023
- WHO Clinical management and infection prevention and control guideline, 10 June 2022

### Resources from Centers for Disease Control and Prevention (CDC)

- European Centre for Disease Prevention and Control. Factsheet for health professionals on mpox updated, 15 August 2024
- CDC Monkeypox and smallpox guidance updated, 22 April 2024
- CDC Mpox in Animals and Pets updated, 15 March 2024

**Resources from World Organization for Animal Health (WOAH)**

- WOAH Mpox (monkeypox) updated, 12 August 2022

**Resource from WASH Cluster**

- Guidance for WASH Practitioners on Mpox