

# Monkeypox: Important Facts

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*Prepared by*

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## Summary

**M**onkeypox is an infectious disease caused by the monkeypox virus. The signs and symptoms include flu-like illness (fever, headache, muscle pain, sore throat, cough) and rash. The virus is transmitted via direct contact with rash or body fluid of infected persons or animals. The best way to prevent its spread is to avoid physical contact with infected persons and their belongings, wash hands frequently, and vaccinate high risk groups with vaccines. The treatment of monkeypox is mainly supportive (to alleviate symptoms and prevent complications) but an antiviral agent tecovirimat may be helpful. There have been 84,318 global cases, among which 29,913 cases and 20 deaths reported in US (as of 01/04/2023).



Research Ambitions



## Definition <sup>1</sup>

**M**onkeypox is a zoonotic viral disease. Zoonotic means when a pathogen (virus, bacteria, parasite) is transmitted from animals to humans.

## Cause <sup>2-4</sup>

**M**onkeypox is caused by the monkeypox virus, which is from the same family as the variola virus. The virus is similar to the smallpox virus.

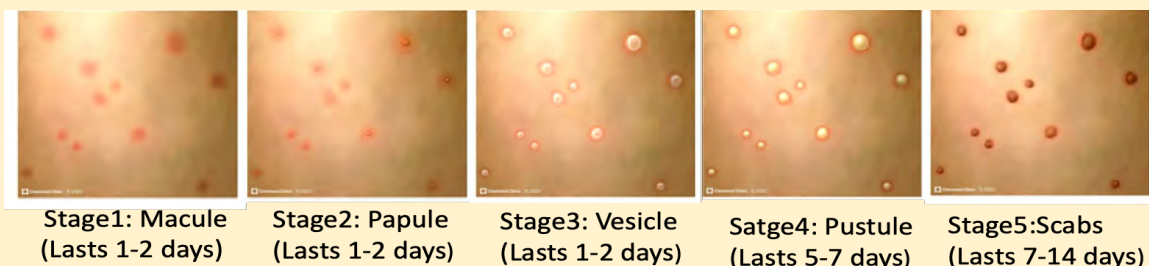
## Signs and Symptoms <sup>1,5-8</sup>



Figure 1: Monkeypox rashes in different parts of the body (Source WHO, CDC) <sup>1,6</sup>

**T**he usual signs and symptoms are:

- Flu-like illness (fever, headache, muscle ache, backache, fatigue, sore throat, cough, swollen lymph node).
- Painful rash on chest, face, mouth, palm, sole, genitals (penis, testicle, labia, vagina), and anal region.
- The rash evolves from macule (flat, red lesion) to papule (firm, raised, painful) to vesicle (fluid-filled) to pustule (pus-filled) form, then crust over and falls off.
- Rash may follow or precede the other signs and symptoms. The rash is infectious until the crust falls off and a new layer of skin is formed.
- The symptoms are similar to smallpox but are milder. Monkeypox is less contagious than smallpox and rarely fatal. 99% of people infected are likely to survive. However, immunocompromised children under eight years of age, and pregnant and breastfeeding women are more likely to get seriously ill or die.
- The signs and symptoms of monkeypox usually start within 3 weeks (incubation period is 5-21 days) of exposure to the virus. The illness usually lasts 2-4 weeks. It is a self-limiting condition.



Stage1: Macule  
(Lasts 1-2 days)

Stage2: Papule  
(Lasts 1-2 days)

Stage3: Vesicle  
(Lasts 1-2 days)

Stage4: Pustule  
(Lasts 5-7 days)

Stage5: Scabs  
(Lasts 7-14 days)

Figure 2: Five stages of monkeypox rashes (Source: Cleveland Clinic) <sup>7</sup>

## How It Spreads <sup>4,5</sup>



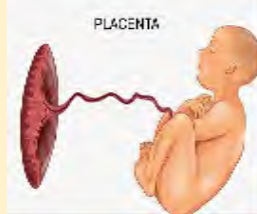
### Direct contact

**W**ith rash, scab, or body fluids (saliva, mucus, snot), and areas around the anus and vagina of infected persons or animals



### Touching objects

**U**sed by infected person e.g., bedding, towels, sex gear/toy



### Placental Transmission

**F**rom mother to fetus



### Prolonged face-to-face contact

**I**ncluding hugging, kissing (virus can roll out via respiratory secretion)



**I**t is still under research whether the virus can be transmitted via a person without symptoms, and if semen, urine, or feces can also spread the virus.

## Prevention <sup>9,10</sup>



**A**void physical contact (sexual, skin-to-skin) with people who have features/rash consistent with monkeypox.



**D**on't use belongings of affected person (e.g., bedding, towel, clothes, utensils).



**R**inse hands periodically with soap or alcohol-based sanitizer.



**K**eepest away from infected animals and dead animals.

### Vaccination

**C**urrently vaccination is not recommended for the masses but only for high-risk groups such as sexually active gay and bisexual men given the higher rate of infection in this community, and for people who are already exposed to the virus. These are two smallpox vaccines (JYNNEOS & ACAM 2000).

## Treatment<sup>1,8,20</sup>

There are no specific treatments for monkeypox at the time of writing this factsheet. The goal of the treatment is to alleviate symptoms and prevent complications. Most cases recover at home with pain medication, rest, and good care of rashes. However, in 2022 the European Medicines Agency (EMA) licensed an antiviral agent, tecovirimat (TPOXX) for treating monkeypox. This was developed for treating smallpox based on data in animal and human studies, as monkeypox has genetic similarities with smallpox. Recommended oral dose of tecovirimat (1 capsule= 200 mg) are below:

Weight in kg (lb)	Recommended dose
< 3 (7)	33.3 mg (1/6 cap) every 12 hours
3 – < 6 (7 – < 13)	50 mg (1/4 cap) every 12 hours
6 – < 13 (13 – < 28)	100 mg (1/2 cap) every 12 hours
13 – < 25 (28 – < 55)	200 mg (1 cap) every 12 hours
25 – < 40 (55 – < 88)	400 mg (2 cap) every 12 hours
40 – < 120 (88 – < 264)	600 mg (3 cap) every 12 hours
≥ 120 (≥ 264)	600 mg (3 cap) every 8 hours

## History<sup>1,5,11,12</sup>

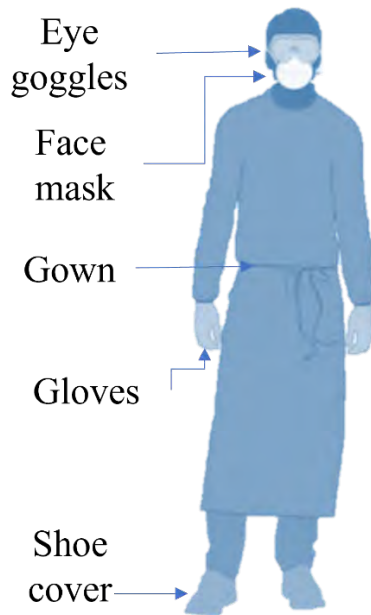
It was named "monkeypox" after it was found in monkeys kept for research in 1958. The actual source of the monkeypox virus remains unknown. African rodents and non-human primates are the suspected hosts. The first human case of monkeypox was reported in 1970. The first human case of monkeypox in the U.S. was reported in 2003. Before the 2022 outbreak, monkeypox was primarily found in tropical rainforest areas of central and west Africa, with occasional export to other regions. There are 84,318 total global cases. The US reported 29,913 cases, and 20 deaths (as of 01/04/2023).

## Incubation Period<sup>1</sup>

The incubation period is 5 to 21 days. Incubation period is the time period between the infection of an individual by the Monkeypox virus and the manifestation of the disease (i.e., onset of symptoms).



## Safety Measures and Use of Personal Protective Equipment (PPE) in Healthcare Setting <sup>14</sup>



**T**o prevent the spread of the virus in healthcare settings (e.g., among patients, patient visitors, doctors, nurses, ward staff, receptionists), patient placement and PPE are needed.

**Patient placement:** Ideally a patient should be stationed in a single-person room with a dedicated bathroom. A mask and a gown should be used before moving patient outside from the room.

**PPE:** All staff in healthcare settings should use PPE before entering the patient's room. These include:

- Gown
- Gloves
- Eye protection (goggles or face shield)
- Respirator equipped with N95 filter or higher (National Institute for Occupational Safety and Health/NIOSH) approved.
- If nothing is available, then use a surgical mask (surgical mask alone will not give full protection).

## Diagnosis <sup>1, 10</sup>

**D**iagnosis is performed by laboratory testing of appropriate tissue samples.

- Tissue sample is collected from the roof or fluid of the skin lesions (vesicles, pustules, crusts).
- Specimens/tissue sample must be preserved in a dry, uncontaminated tube (no viral transport media) and kept cold.

## Laboratory Test Orders <sup>15-17</sup>

- Polymerase Chain Reaction (PCR) is the preferred laboratory test for diagnosing monkeypox. Specimen is collected from swabbed lesions.
- Orthopoxvirus serology is done by Enzyme-Linked Immunosorbent Assay (ELISA). Specimen/sample is serum/blood.
- For severely immunocompromised patients, biopsy of affected organs might be done for better understanding of symptoms and appropriate patient management.

## Monkeypox in Children, Pregnant Women, and Immunocompromised People <sup>18,19</sup>

Some groups of people are at an increased risk of health hazard caused by monkeypox.

- Children with eczema and immunocompromised people are at increased risk of developing severe disease.
- Pregnant people with monkeypox can have serious outcomes like spontaneous abortion, preterm delivery, and stillbirth. Signs and symptoms are the same as non-pregnant people.
- Neonates can also be affected during or after delivery.
- Breastfeeding should be delayed until the mother's rash subsides and a new skin layer is formed. If breastfeeding is unavoidable then the infected mother has to wear a gown, gloves, mask and the baby needs to be fully clothed.
- Treatment options and prevention methods are the same for non-pregnant people. Treatment should be prioritized for those with higher risk factors including immunocompromised people, pregnant, recently pregnant, and breastfeeding women.





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