

# MONKEY POX, A PUBLIC EMERGENCY OF INTERNATIONAL CONCERN

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## Abstract

As the fear of the coronavirus disease 2019 (COVID-19) pandemic subsides, countries around the globe are now dealing with a fear of the epidemic surrounding the prevalence of monkeypox cases in various regions. Scientific studies and media are far and wide with various aspects of monkeypox including rapid spread, symptoms, prevention and treatment aspects.

As a physician, working initially in the COVID-19 pandemic and ongoing epidemic of monkeypox, it has become immensely obligatory for us physicians to recognize, treat, educate, counsel people and also protect ourselves to minimize the risk of acquiring the disease.

**Keywords:** Monkeypox, Lymphadenopathy, Rash, Preventive methods, Treatment modalities.

## What Is Monkeypox?

The disease Monkeypox (MPXV) is caused by a virus which taxonomically, is currently part of the genus Orthopoxvirus, which belongs to the subfamily Chordopoxvirinae in the family Poxviridae. That family is part of the order Chitovirales included in the class Pokkesviricetes. This class belongs to the phylum Nucleocyotoviricota, in the kingdom Bamfordvirae, in the realm Varidnaviria.

For this test, samples should be effective and must be collected from skin lesions – the roof or the fluid from vesicles and pustules, and dry crusts. Lesion sample must be stored in a dry, sterilized tube (no viral transport media) and kept at low temperatures in order to maintain its viability. PCR blood tests are not preferable as they usually are indeterminate due to short duration of viremia comparative to the timing of specimen collection and should not be routinely collected from patients.

As orthopoxviruses are serologically cross-reactive, antigen and antibody detection methods do not provide monkeypox-specific confirmation. Serology and antigen detection methods are therefore advisable for diagnosis or case investigation where resources are scarce. In recent or past vaccination with a vaccinia-based vaccine (e.g. people vaccinated before smallpox eradication, or more recently vaccinated due to higher risk such as orthopoxvirus laboratory personnel) might lead to false positive results.

In order to explicate test results, it is critical that patient information be provided with the specimens' including a) date of onset of fever, b) date of onset of rash, c) date of specimen collection, d) current status of the individual (stage of rash), and e) age.

## Treatment Modalities

When a patient is diagnosed or suspected to have acquired monkeypox, isolation of the patient followed by symptomatic treatment and care of the lesions in various areas by cleaning gently with antiseptic solution, light protective clothing, topical anti-inflammatory based gels, rehydration and nutritional support are to be taken care of.

## Discovery Of Monkeyox

Monkeypox (MPXV) was first isolated in Copenhagen, Denmark in 1958 during two outbreaks of a nonfatal rash disease among captive cynomolgus macaques imported from Singapore. In the subsequent decade, several similar outbreaks in primate colonies in Europe and the U.S. were reported. Not until 1970 that the first human case was discovered and MPXV recognized as a human pathogen.

Monkeypox virus (MPXV) is closely related to the infamous variola (smallpox) virus, causing a febrile rash illness in humans similar to but milder than smallpox. In the twentieth century, human monkeypox had been mostly a rare zoonotic disease confined to forested areas in West and Central Africa. However, the case number and geographic range have increased significantly in this century. The outbreak of human monkeypox in multiple countries since May 2022 has been unusual in its large case number and the absence of direct links to endemic countries, raising concerns for a possible change in monkeypox transmission pattern that could pose a greater global threat.

## So, What Are The Ways This Virus Is Transmitted?

Monkeypox is typically a zoonosis involving contacts with animals or their bodily fluids, respiratory droplets, and lesion materials. The current monkeypox outbreak involves human-to-human transmission which occurs through close contacts with the infected person's bodily fluids, respiratory droplets, lesions. The current outbreak amongst many men who have sex with men have raised concerns about possible sexual transmission.

## Spectrum Of Features In A Person Suffering From Monkeypox

Human monkeypox is similar to but milder than the now-extinct smallpox, with three distinct phases: incubation, prodrome, and rash. The incubation phase ranges from 7 to 14 days, with an average of 13 days. The prodrome phase typically includes fever and lymphadenopathy, the latter being a feature that distinguishes monkeypox from smallpox and chickenpox. The rash follows a distinct pattern of development: starting with a macular rash and progressing through papular, vesicular, and pustular stages before crusting over and falling off.

## Antiviral drugs

There are two FDA- approved drugs as of present, in severe cases.

ST-246 (Tecovirimat) and Brincidofovir are two antivirals that have been approved in the U.S. for treating smallpox. ST-246 targets a OPXV and inhibits virus release. Brincidofovir is an orally bioavailable lipid conjugate of cidofovir, an acyclic nucleoside analog that has been accepted for treating human cytomegalovirus infection. The mechanism of action of cidofovir is inhibition of poxvirus DNA replication. The use of the drugs in human monkeypox cases suggest tecovirimat is effective while brincidofovir has poor efficacy.

## Prevention

At this time, research and numbers suggest that gay, bisexual, and other men who have sex with men make up the majority of cases in the ongoing monkeypox outbreak. However, anyone, in any case, who has been in close, personal contact with someone who has monkeypox is at risk.

Following the recommended prevention steps, guidelines and getting vaccinated if you were exposed to monkeypox or are at greater risk of being exposed to monkeypox and can help protect you and your community.

The following ways can be used to prevent monkeypox,

1) Avoid close, skin-to-skin contact with people who have a rash that looks like monkeypox.

- Do not touch the rash or scabs of a person with monkeypox.

- Do not kiss, hug, cuddle or have sex with someone with monkeypox.

2) Avoid contact with objects and materials that has been used by a person with monkeypox.

- Do not share eating utensils or cups with a person with monkeypox.

- Do not handle or touch the bedding, towels, or clothing of a person with monkeypox.

Rash is mostly on the face, trunk, and extremities, but may involve other areas including the genitalia.

Rash lesions on the body are all in the same stage of development, a distinguishing feature of monkeypox and smallpox from other more common rash illnesses such as chickenpox . The lesions contain infectious virus that can be transmitted through direct contact. The cutaneous lesions are mostly monomorphic with centrifugal distribution on hands, head and neck, foot ,soles, pelvic area, groin, oral cavity , mucosae of genitals. Rash with pruritus, fever, and lymphadenopathy are critical clinical findings, but now, in connection with the potential sexual transmission or transmission due to close contact during sex, is associated more in the 2022 outbreak with rash in the pelvic area and groins.



Source: [https://www.cdc.gov/poxvirus/monkeypox/resources/images/Monkeypox-Visuals-1200x675-02.jpg?\\_=01808](https://www.cdc.gov/poxvirus/monkeypox/resources/images/Monkeypox-Visuals-1200x675-02.jpg?_=01808)

## Complications

As per numerous research and studies taking place currently , complications following cutaneous infection include bacterial skin infection, gastroenteritis, sepsis, bronchopneumonia, encephalitis, and keratitis. After healing it can also cause hyper- and hypo-pigmented atrophic scars, patchy alopecia, hypertrophic skin scarring, and contractures/deforimities of the facial muscles. Patients with HIV and the immunocompromised are more prone to develop these secondary bacterial skin infections which are associated with higher mortality and morbidity.

## Diagnostics

Polymerase chain reaction (PCR) is the preferred laboratory test due to high accuracy and sensitivity.

3)Wash your hands often.

- Wash your hands often with soap and water or use an alcohol-based hand sanitizer, especially before eating or touching your face and after you use the bathroom.

4) Personal protective equipment, hand hygiene, contaminant care and disposal of the contaminants, handling with care the patient used equipment, disinfection of environmental surfaces and patient surroundings are additional preventive methods.

**Vaccine protection:** There are now two FDA-approved vaccines , which are expected to be effective against monkeypox.

The first next-generation smallpox vaccine is ACAM2000, which is similar to the Dryvax vaccine (which is not used now). Smallpox vaccines like the Dryvax are known to produce long lasting immunity, with specific antibodies and memory B cells that can be detected more than 60 years after the vaccination and provide upto 85% protection against human monkeypox . The vaccine is contraindicated in individuals with pregnancy, atopic dermatitis, or immune deficiencies.

Myopericarditis has also been reported among some vaccines. ACAM2000 is a single-dose vaccine, and it takes four weeks after vaccination for its immune protection to reach its peak. It is not usually advocated for people with severely weak immunity and several other morbidities.

The second next-generation smallpox vaccine is MVA-BN (JYNNEOS in the U.S.), which is manufactured with the Modified vaccinia Ankara strain (MVA). The MVA-BN vaccine is administered by two subcutaneous injections 4 weeks distant. No life-threatening adverse events are noted. The vaccine is approved in the US for use against both smallpox and the monkeypox.

The preferred vaccine to protect against monkeypox is JYNNEOS, which is a two-dose vaccine. It takes 14 days after getting the second dose of JYNNEOS to get it's utmost immunity.

## Conclusions

Monkeypox virus is majorly associated with only consequential cutaneous compromise, hence, most patients will not require hospitalization. Monkeypox presents as a progressive fever in majority of the cases alike the typical viruses. A notable discriminating factor includes lymphadenopathy. Anyone with a history of recent travel to areas with ongoing outbreaks of this emerging pathogen or contact with a confirmed case of monkeypox should prompt clinicians to initiate isolation precautions and obtain laboratory confirmation by Polymerase chain reaction.

Has the MPXV mutated or has it's potential to mutate become dangerous and more human transmissible? A common presumption for DNA viruses is that they are genetically steady and have lower transformation potential. While poxviruses definitely have a slower replication rate than the RNA viruses, they have demonstrated a high recombination capacity and can evolve through large structural changes of the genome that can result in gene amplification, gene gain, or gene loss.

Similar queries have arisen: Does the current outbreak demonstrate a new transmission pattern for MPXV? Has MPXV mutated or has the potential to mutate increased to be more human transmissible? What necessary steps can we add to prevent or put together for a worst-case scenario? It's still the beginning of the new outbreak to be able to fully answer these questions with clarity, but a better appreciation of the MPXV history and biology can provide some answers to this conundrum.

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