CD Alert

National Centre for Disease Control,
Directorate General of Health Services, Government of India

October, 2024

Mpox

INTRODUCTION

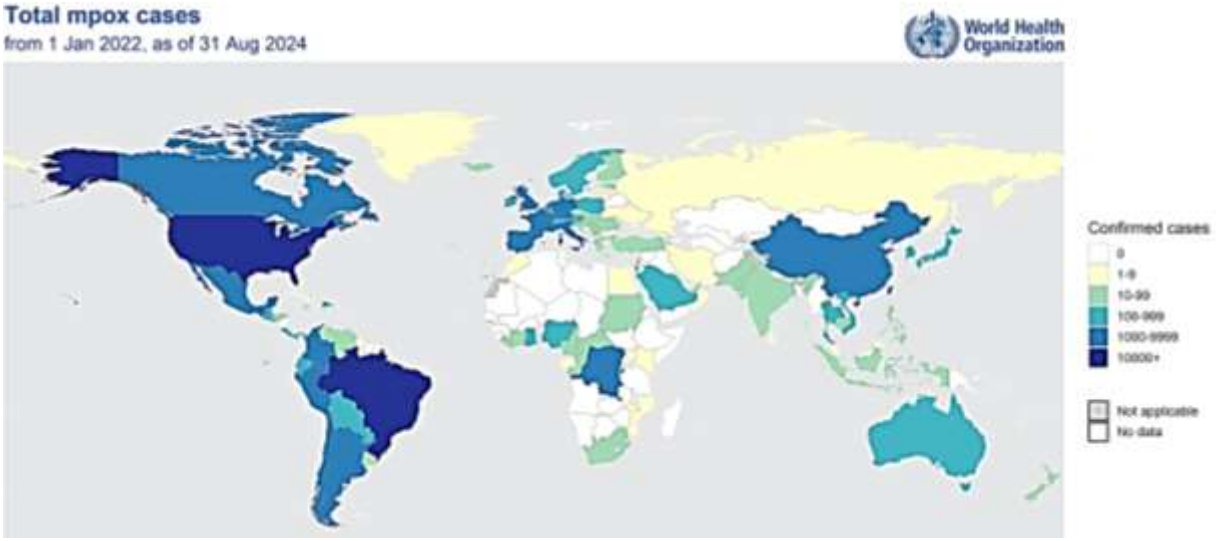
Mpox, earlier referred to as Monkeypox, is a viral disease of zoonotic origin with Smallpox like symptoms, but with less clinical severity. Recognizing the global threat posed by Mpox, WHO had declared it as a Public Health Emergency of International Concern (PHEIC) first in July 2022 and now again in August 2024. True burden of disease is not known yet.

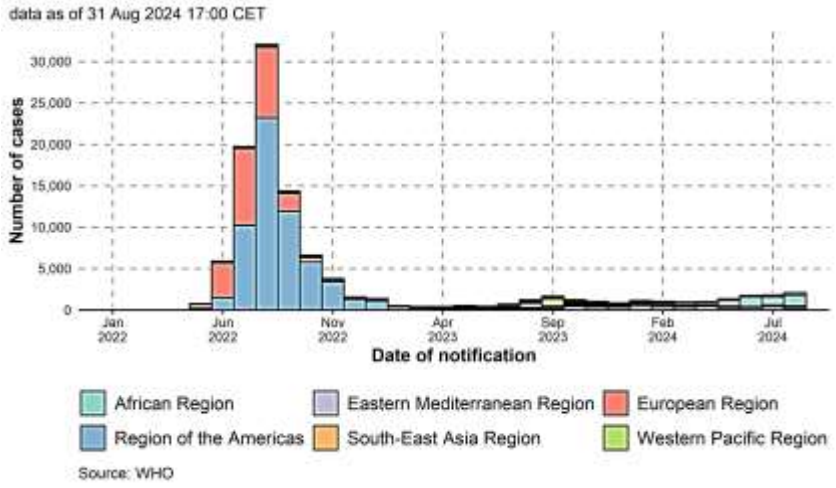
HISTORICAL BACKGROUND

Mpox was first discovered in 1958 in colonies of monkeys kept for research, hence the name 'Monkeypox.' It was first identified in humans in 1970 in the Democratic Republic of the Congo (DRC) in a 9-year-old boy in a region where smallpox had been eliminated in 1968. Since 1970, cases of Mpox have been reported in 15 African countries. In 2003, the first Mpox outbreak outside Africa was reported in USA and was linked to contact with infected pet prairie dogs. Spillover of Mpox virus is likely linked to specific latitude and ecological conditions in Africa.

GLOBAL AND INDIAN SCENARIO

Earlier regarded as a disease largely confined to Africa, in a series of outbreaks reported from Europe in 2022, it was the first time that chains of transmission were without known epidemiological links to West or Central Africa. Since 1st January 2022, Mpox cases have been reported to WHO from 123 Member States across all 6 WHO regions. As of 31st Aug 2024, a total of 1,06,310 laboratory confirmed cases and 234 deaths, have been reported to WHO. As of August 2024, the number of monthly reported new cases has increased by 15.6%, compared to the previous month. Majority of cases reported in the past month were mainly notified from African Region (62.3%) and the European region (13.7%). The 10 most affected countries globally since 1 Jan 2022 are: USA (n = 33,812), Brazil (n = 12,206), Spain (n = 8,240), DRC (n = 6,092), France (n = 4,307), Colombia (n = 4,262), Mexico (n = 4,155), UK (n = 4,058), Peru (n = 3,939), and Germany (n = 3,909). Together, these account for 79.9% of cases reported globally.





Source: https://worldhealthorg.shinyapps.io/mpx_global/

In India, in the year 2022, the first case of Mpox was reported in Kollam, Kerala on 14th July 2022. A total 30 laboratory confirmed cases of Clade II were reported from Kerala (15 cases) and Delhi (15 cases). On 27th March 2024, the last case was reported from Kerala. Thereafter, on 9th September, 2024, a 26-year, male with a travel history from China was confirmed as Mpox positive due to West African clade-II. On 18th September, a 38-year, male working abroad with a travel history from Dubai was confirmed as Mpox positive that was later confirmed as clade 1b. On September 27, A 29-year-old male with a travel history from Dubai was confirmed as Mpox virus infection with Clade II lineage. No secondary cases have been identified in these cases so far.

EPIDEMIOLOGY

Agent

Mpox virus (MPXV) is an enveloped double-stranded DNA virus that belongs to the genus Orthopoxvirus and family Poxviridae. There are two distinct genetic clades of the Mpox virus – the Central African (Congo Basin) clade and the West African clade. WHO renamed the Congo Basin Clade (more virulent and transmissible) as Clade I and West African Clade as Clade II. Further Clade II, is divided into two sub clades- Clade II a and b. Till recently, all the sequences in the present global outbreak were associated with Clade IIb. However, since early 2024, there has been an upsurge in the number of cases and deaths due to Mpox (Clade Ib) in African region. The latest outbreak involves a new variant, called 'clade Ib. It's an offshoot of clade I, which is endemic to African Congo. The virus is continuing to evolve, including several small changes in the genetic code, minor gene variants and a deleted gene.

Host:

Natural reservoir is yet unknown. However, certain rodents (including rope squirrels, tree squirrels, Gambian pouched rats, dormice) and non-human primates are known to be naturally susceptible to infection of Mpox virus.

Incubation period: The incubation period (interval from infection to onset of symptoms) of Mpox is usually from 6 to 13 days but can range from 5 to 21 days. A person is not contagious during this period. Physicians are currently recommended to monitor patients up to 21 days.

Period of communicability: 1-2 days before the rash to until all the scabs fall off/get subsided.

Mode of transmission: As per reports, clade Ib is spreading primarily through household contacts and frequently infects children. Clade IIb, which had prompted the previous WHO global warning in 2022, spread mainly through sexual contact. While clade Ib causes a similar illness to clade IIb, it is considered capable of spreading faster and killing more people.

Human-to-human transmission is known to occur through large respiratory droplets generally requiring a prolonged close contact with infected person. Being face-to-face (talking or breathing close enough for droplets to carry) with an infected person is a risk factor. It can also be transmitted through direct contact with body fluids or lesion material, and indirect contact with lesion material, such as through contaminated clothing or linens of an infected person. Transmission between sexual

partners, having skin-to-skin contact, including sex and mouth-to-mouth or mouth-to-skin contact are among the risk factors. Pregnant women with Mpox can pass the virus to the foetus during pregnancy or to the new-born during and after birth. Studies have not found a clear link between Mpox and water in pools, hot tubs, or splash pads. The Mpox virus is killed in water at the chlorine levels recommended for disinfection in recreational water venues. The mode of transmission is evolving.

Animal-to-human transmission of Mpx virus may occur by bite or scratch of infected animals like small mammals including rodents (rats, squirrels) and non-human primates (monkeys, apes) or through bush meat preparation. Skinning such animals or eating their meat if it's not cooked thoroughly also exposes one to the disease. People with low or compromised immunity are at a higher risk.

People are less likely to get Mpox from a pet, but it's possible. Close contact with a pet that is infected, including petting, cuddling, hugging, kissing, licking, and sharing sleeping spaces or food, can spread Mpox to a person.

Transmission in Children:

It is currently unclear why more children are contracting Mpox. However, it is postulated that in endemic areas, long-term exposure to the virus may have allowed adults to develop immunity over time, making them less vulnerable to the disease. In contrast, children are immunologically naïve and, therefore, more likely to contract the disease compared to adults.

CASE DEFINITION

Suspected case:

A person of any age having **history of travel to affected countries within the last 21 days** presenting **with an unexplained acute rash AND** one or more of the following signs or symptoms

- Swollen lymph nodes
- Fever
- Headache
- Body aches
- profound weakness

Modes of Transmission in Children:

1. **Zoonotic Transmission:**
   - Spill over from Animals: Sequencing suggests that zoonotic spill over events are occurring in endemic areas, leading to infections in humans, including children.
2. **Human-to-Human Transmission:**
   - Household Transmission: Epidemiological investigations indicate that some cases involve person-to-person transmission, particularly within households. This mode of transmission is especially significant for children under five, who may contract the disease from infected family members. Infant Transmission: Infants are likely to acquire the disease from their mothers or close caregivers.
   - Person-to-Person Transmission: Approx. 50-60% of cases in children are believed to result from person-to-person transmission.
3. **Consumption of Contaminated Animal Products:**
   Direct Infection from animals/meat: Older children may contract the disease through direct contact with infected animals or by consuming contaminated meat.

Probable case:

A person meeting the case definition for a suspected case, clinically compatible illness and has an **epidemiological link to a confirmed case** (Examples of epidemiological link include face-to-face exposure, including health care workers without appropriate PPE; direct physical contact with skin or skin lesions, including sexual contact; or contact with contaminated materials such as clothing, bedding or utensils).

Confirmed case:

Any case which is laboratory confirmed for Mpox virus (by detection of unique sequences of viral DNA either by **polymerase chain reaction (PCR) and/or sequencing).**

Surveillance Strategies

The aims of the surveillance strategy are to rapidly identify cases and clusters of infections and their sources as soon as possible to:

- ✓ isolate cases to prevent further transmission
- ✓ provide optimal clinical care
- ✓ identify and manage contacts

- ✓ protect frontline health workers
- ✓ Effectively control and take preventive measures based on the identified routes of transmission.

The key stakeholders in surveillance are NACO, IDSP, points of entries (PoEs), Hospitals (Derma OPDs, RTI/STI clinics, Antenatal clinics & pediatric OPDs) and the designated lab network.

Surveillance outline

a) Use of Standard Case Definitions by all stakeholders

b) Even one case of Mpox is to be considered as an outbreak. A detailed investigation, including contact tracing, jointly by all the concerned stakeholders is urgently required.

c) Report any suspected case immediately to the DSU/State Surveillance Units (SSUs) and CSU (Central Surveillance Unit), which shall report the same to Dte. GHS MoHFW.

d) Send the samples as per the guidelines to the designated laboratories. A record of all the samples sent for testing & their results is to be maintained by the IDSP SSUs.

Core Surveillance Strategy

a) **Hospital based Surveillance:** - Health facility-based surveillance & testing – esp. in dermatology clinics, STI clinics, medicine, pediatrics OPDs & emergency depts. etc.

b) **Targeted Surveillance**: This can be achieved by:
   - ➢ Targeted intervention sites identified by NACO for MSM, FSW populations
   - ➢ Measles surveillance by Immunization division

c) Initiate contact tracing and testing of the symptomatic after the detection of the probable/confirmed case.

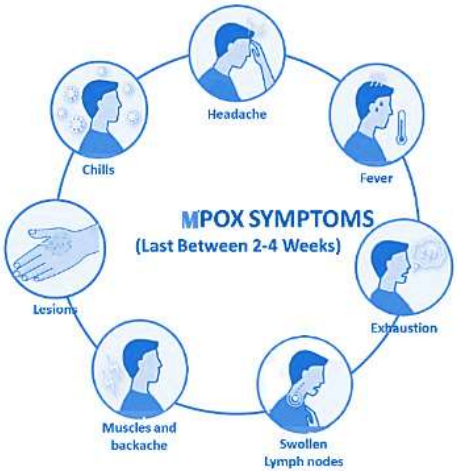
Reporting

Reporting of cases is to be done in the specified format as per MoHFW Guidelines for Management of Mpox Disease. For suspected cases, alert the surveillance system via this link: https://ihip.mohfw.gov.in/cbs/#!/

CLINICAL FEATURES

Mpox is usually a self-limiting disease with symptoms lasting from 2-4 weeks. Severe cases occur more commonly among children and are related to extent of virus exposure, patient health status and nature of complications. The extent to which asymptomatic infection occurs is unknown.

Mpox disease is characterized by an incubation period, prodrome, and rash.



Common symptoms and signs

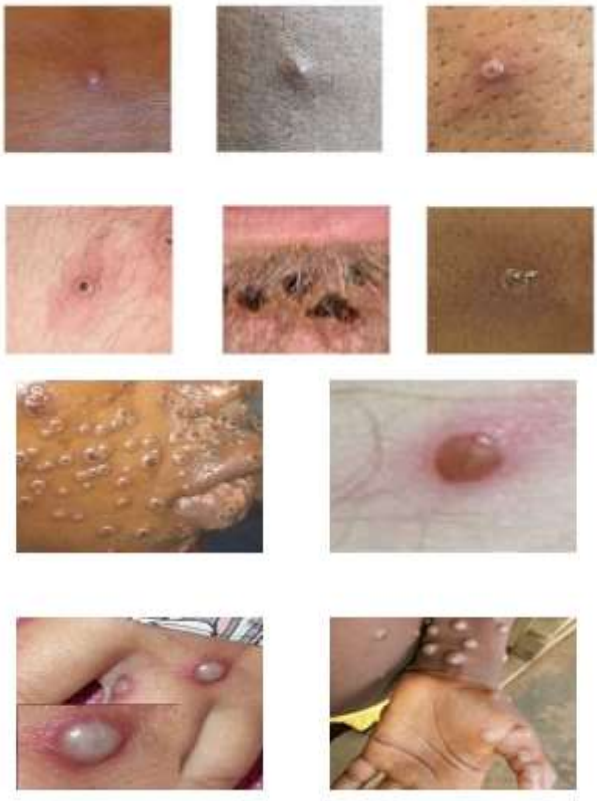
Prodrome (0-5 days) - A person may be contagious during this period. Instruct the patients to isolate if they develop symptoms like:

a. Fever
b. Lymphadenopathy
   - ➢ Typically occurs with fever onset
   - ➢ Peri-auricular, axillary, cervical or inguinal
   - ➢ Unilateral or bilateral
c. Headache, muscle aches, exhaustion
d. Chills and/or sweats
e. Sore throat and cough

Skin involvement (rash) - Lesions typically develop simultaneously and evolve together on any given part of the body. The evolution of lesions progresses through four stages —macular, papular, vesicular, to pustular —before scabbing over and desquamation. A person is contagious until after all scabs on the skin have fallen off and a fresh layer of intact skin has formed underneath.

a. Usually begins within 1-3 days of fever onset, lasting for around 2-4 weeks
b. Deep-seated, well-circumscribed and often develop umbilication
   Lesions are often painful until healing phase when they become itchy (in crust stage)

c. Stages of rash (slow evolution)
   - Enanthem- first lesions on tongue and mouth
   - Macules starting from face spreading to arms, legs, palms, and soles (centrifugal distribution), within 24 hours
   - The rash goes through a macular, papular, vesicular and pustular phase. Classic lesion is vesico-pustular.



Examples of Mpox Rashes
Photo credit: UK Health Security Agency

e.Involvement by area: face (98%), palms and soles (95%), oral mucous membranes (70%), genitalia (28%), conjunctiva (20%). Generally skin rashes are more apparent on the limbs and face than on the trunk. During the 2022 outbreak in the European Region, most of the cases were picked up in sexual health clinics, with patients presenting with lesions on their genitals and anus.

The lesion heals with hyper-pigmented atrophic scars, hypo-pigmented atrophic scars, patchy alopecia, hypertrophic skin scarring and contracture/deformity of facial muscles following healing of ulcerated facial lesions.

A notable predilection for palm and soles is characteristic of Mpox. At any one point in time pleomorphic forms can also be seen in a patient.

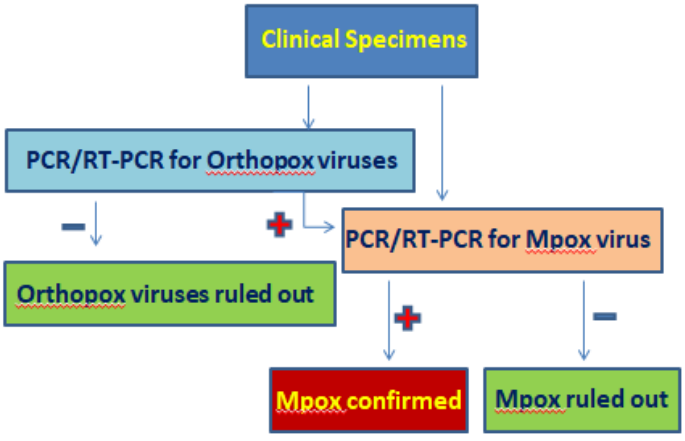
f. The skin manifestation depends on vaccination status, age, nutritional status, associated HIV status. Mpox chiefly occurs in communities where there is often a high background prevalence of malnutrition, parasitic infections, and other significant heath-compromising conditions, any of which could impact the prognosis of a patient with MPX.
g. The total lesion burden at the apex of rash can be quite high (>500 lesions) or relatively slight (<25).
h. **Complications of Mpox in children** can be severe and may include secondary bacterial infections, severe skin infections, dehydration, pneumonia, encephalitis, ocular complications and even longer sequelae such as scarring of skin lesions.

DIFFERENTIAL DIAGNOSIS

Varicella (Chicken pox), disseminated herpes zoster, disseminated herpes simplex, measles, chancroid, secondary syphilis, hand foot & mouth disease, infectious mononucleosis, molluscum contagiosum and Buffalopox.

DIAGNOSIS

Use Personal Protective Equipment for handling the clinical specimens. The recommended specimen type for laboratory confirmation of Mpox is skin lesion material from multiple sites, including swabs of lesion surface and/or exudate, roofs from more than one lesion, or lesion crusts. Oropharyngeal



Flowchart for Lab diagnosis of Mpox

swab is recommended for diagnosis, if feasible, in addition to skin lesion material. Detailed procedure for sample collection and transport of the clinical specimen are included in MoHFW Guidelines for management of Mpox Disease. (https://mohfw.gov.in/?q=diseasealerts-0)

All the clinical specimens should be transported to NCDC/NIV Pune/VRDLs routed through the IDSP network of the respective district/state. A network of testing laboratories is being enhanced for early diagnosis, with 36 labs equipped for testing so far and 22 labs currently ready (List enclosed). Three commercial PCR kits validated by ICMR and approved by CDSCO are also available now.

MANAGEMENT

Treatment of Mpox is primarily supportive.
Principles of Management include:

- ✓ Patient isolation
- ✓ Protection of compromised skin and mucous membranes
- ✓ Rehydration therapy and nutritional support
- ✓ Symptom alleviation
- ✓ Antibiotics to treat secondary bacterial infections if they develop
- ✓ Monitoring and treatment of complications

Drugs may be considered in special severe cases, strictly as per treating physician and are NOT to be self-administered. These include:

- ✓ Tecovirimat
- ✓ Vaccinia Immune Globulin Intravenous
- ✓ Cidofovir & Brincidofovir - effective against orthopoxviruses in *invitro* & animal studies

Patient Isolation

- ✓ Isolation of the patient in an isolation room of the hospital/ at home in a separate room
- ✓ Patient to wear a triple layer mask
- ✓ Skin lesions should be covered to the best extent possible (e.g. long sleeves, long pants) to minimize risk of contact with others
- ✓ Isolation to be continued until all lesions have resolved and scabs have completely fallen off and a fresh layer of intact skin transformed.

Case fatality rate: While clade Ib causes a similar illness to clade IIb, it is considered capable of spreading faster and killing more people. Clade II, which originated in west Africa, has a fatality rate of up to 1% but reports say clade I has a fatality rate of up to 10%.

CONTACT TRACING

Definition of a contact

A contact is defined as any person, who has one or more of the following exposures with a probable or confirmed case of Mpox during the period of communicability:

- 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 household, workplace, school/nursery, sexual contacts, healthcare, houses of worship, transportation, sports, social gatherings, and any other recalled interactions.

Contact monitoring

Home quarantine & active follow up for contacts of confirmed cases and self-monitoring for contacts of probable cases is recommended. Contacts should be monitored at least daily for the onset of signs/symptoms for a **period of 21 days** (as per case definition above) from the last contact with a patient or their contaminated materials during the infectious period. In case of occurrence of fever clinical/lab evaluation is warranted.

a) Asymptomatic contacts should not donate blood, cells, tissue, organs or semen while they are under surveillance.
b) Pre-school children may be excluded from day care, nursery, or other group settings.
Health workers who have unprotected exposures to patients with Mpox or possibly contaminated materials do not need to be excluded from work duty if asymptomatic but should undergo active surveillance for symptoms for 21 days.

c) Advisory for International Passengers and surveillance at Airports/ports and Role of APHOs/PHOs is elaborated in MoHFW Guidelines for Management of Mpox Disease.

PREVENTIVE MEASURES

Raising awareness of risk factors and educating people about the measures to reduce exposure to the virus is the main prevention strategy for Mpox. There are number of measures that can be taken to prevent infection with Mpox virus:

- Avoid contact with any materials, such as bedding, clothing etc. that has been in contact with a sick person.
- Isolate infected patients from others.
- Practice good hand hygiene after contact with infected animals or humans. For example, washing hands with soap and water or using an alcohol-based hand sanitizer.
- Use appropriate personal protective equipment (PPE) when caring for patients.
- Correct containment and disposal of contaminated waste (e.g., dressings) in accordance with **Biomedical Waste Management guideline** for infectious waste.

VACCINATION

- Three vaccines are currently licensed for mpox: 1) modified vaccinia Ankara-BN (e.g., MVA-BN or JYNNEOS, Imvamune or Imvanex), a 2-dose 3rd generation smallpox vaccine that is a highly-attenuated replication-deficient vaccinia virus vaccine, approved in the USA, Canada and Europe; 2) LC16-KMB (licensed in Japan) and 3) OrthopoxVac (licensed in the Russian Federation).
- WHO advises vaccination for only individuals at high risk of exposure, such as those with certain occupations or circumstances, and travelers who may be at risk, as determined by a healthcare provider.
- Based on currently assessed risks and benefits, mass vaccination is NOT recommended by WHO for Mpox at present. India has also not issued any advisory pertaining to Mpox vaccination at present.

Infection Prevention practices in healthcare facilities to prevent transmission/spread of Mpox virus:

- Since Mpox virus can spread to others through close contact, managing Mpox infections in healthcare facilities requires strict adherence to standard and contact isolation precautions. For standard and contact precautions refer to National Guidelines for Infection Prevention and Control in Healthcare facilities at https://ncdc.mohfw.gov.in/wpcontent/uploads/2024/07/National-Guidelines-for-IPC-in-HCF-final1.pdf

  Patients with suspected Mpox infection should remain under contact isolation precautions until the infection is definitely ruled out, while those with confirmed cases must stay isolated until all lesions have crusted, separated, and new healthy skin has formed.
- Healthcare workers are required to implement standard precautions, including meticulous hand hygiene and wearing appropriate personal protective equipment (PPE), including gowns and gloves.
- Environmental cleaning and disinfection should be conducted using hypochlorite /other appropriate virucidal disinfectants; special attention must be given to high-touch surfaces like door knobs etc.
- Waste management is to be done in accordance with existing biomedical waste management rules.
- Any visitors must be carefully instructed on hand hygiene and proper use of PPE to prevent the spread of infection.

IPC at home

Patients who do not require hospitalization may be managed at home taking all preventive measures as laid down in MoHFW Guidelines for Management of Mpox Disease.

Duration of Isolation Procedures

Affected individuals should avoid close contact with immune-compromised persons and pregnant women until all crusts are gone. Isolation precautions should be continued until **all lesions have resolved and a fresh layer of skin** has formed.

RISK ASSESSMENT

WHO conducted the latest global Mpox risk assessment in August 2024. Based on the available information, the Mpox risk was assessed as follows:

a. In Eastern Democratic Republic of the Congo and neighboring countries, the overall risk is assessed as **high**.
b. In areas of the Democratic Republic of the Congo where Mpox is endemic, Mpox risk is assessed as **high**.
c. In Nigeria and countries of West, Central and East Africa where Mpox is endemic, Mpox risk is assessed as **moderate**.
d. In all other countries in Africa and around the world, the risk is assessed as **moderate**.

RISK COMMUNICATION

This includes providing public health advice through the channels that target audiences for dissemination of information on disease transmission, 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 STD/Dermatology clinics, and civil society organizations.

Communication should be informed by insights from social listening detecting public sentiment and should timely address possible misinformation and rumours. Health information and advice should be provided avoiding any form of stigmatization of certain groups such as men who have sex with men (MSM). The community reporting tool of IDSP-IHIP (https://ihip.mohfw.gov.in/cbs/#!/) may be used by the community for alerting the surveillance system.

Laboratories actively performing MPoX testing (n=22)

a. ICMR-National Institute of Virology, Pune
b. NCDC Lab, New Delhi
c. Government Medical College, Trivandrum, Kerala
d. Kasturba Hospital for Infectious Disease, Mumbai, Maharashtra
e. Gauhati Medical College, Gauhati, Assam
f. Gandhi Medical College, Secunderabad, Telangana
g. All India Institute of Medical Sciences (AIIMS), Delhi
h. Bangalore Medical College & Research Institute, Bangalore, Karnataka
i. National Institute of Virology (NIV) Field Unit, Kerala
j. All India Institute of Medical sciences, Nagpur
k. King Institute of Preventive Medicine and Research (KIPM&R), Chennai
l. ICMR – National Institute of Research in Bacterial Infection, Kolkata
m. SMS Medical College, Jaipur
n. Govt. Medical College, Amritsar
o. King George's Medical University (KGMU), Lucknow
p. B.J. Medical College, Ahmedabad
q. Govt. Medical College, Thrissur
r. Govt. Medical College, Kozhikode
s. Sher-e-Kashmir Institute of Medical Sciences, Srinagar
t. Zoram Medical College, Mizorum
u. Maulana Azad Medical College, New Delhi
v. Institute of Post Graduate Medical Education & Research (IPGMER), Kolkata

KEY MESSAGES

- Mpox, previously known as monkeypox, is a viral disease of zoonotic origin, caused by the monkeypox virus, a species of the genus *Orthopoxvirus*. There are two distinct clades of the virus: clade I (with subclades Ia and Ib) and clade II (with subclades IIa and IIb). In 2022–2023 the global outbreak of Mpox was caused by the clade IIb strain.
- Mpox, endemic in African countries, continues to be a threat today, and an upsurge of cases in the Democratic Republic of the Congo and other countries caused by clades I has raised concern.
- Mpox can be transmitted through close intimate physical contact with someone who has Mpox, with contaminated materials, or with infected animals. During pregnancy, the virus may be passed on to the fetus, or to the newborn during or after birth.
- Common symptoms of Mpox are skin rash (like in chicken pox) or mucosal lesions which can last 2–4 weeks accompanied by fever, headache, muscle aches, back pain, low energy and swollen lymph nodes.
- Mpox is treated with supportive care for symptoms such as pain and fever, with close attention to nutrition, hydration, skin care, prevention of secondary infections and treatment of co-infections, including HIV where present.
- Human-to-human spread of Mpox can be controlled by public health measures including enhanced surveillance, early case-finding, diagnosis and care, isolation and contact-tracing.
- There is a need to strengthen awareness among healthcare providers and community at large, on recognizing symptoms and the necessity of timely notification to the surveillance system. NCDC can facilitate need based training of public health professionals on request, which can be emailed at dirnicd@nic.in.
- Coordinated response across sectors at local, national, regional and global level is ongoing to combat this public health threat. Accordingly, all States/districts in the country should take appropriate actions as per the MoHFW guidelines. For more details, refer to https://ayush.gov.in/images/whatsnew/Monkey_Pox_Guidelines_Final.pdf