A Comprehensive Review on Monkeypox Virus Transmission, Pathogenesis, Treatments and its Preventive Measures

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Abstract

As the threat of a coronavirus disease 2019 (COVID-19) pandemic subsides, governments throughout the world are dealing with epidemic concerns due to the occurrence of monkeypox cases in various areas. Previously limited to African countries, the majority of monkeypox cases associated with the 2022 epidemic have been recorded in countries throughout Europe and the Western Hemisphere. While multiple organisations are doing contact-tracing operations, it is still unclear how this outbreak began. Monkeypox virus is one of several zoonotic viruses in the Orthopoxvirus genus of the Poxviridae family. Following the universal abolition of smallpox in the 1970s, monkeypox outbreaks drew international attention. The smallpox immunisation provided immunity against the monkeypox virus. Monkeypox cases rose when smallpox vaccine was halted. It wasn't until the 2003 US pandemic that monkeypox became well known. The virus did not originate in monkeys, despite the name "monkeypox." Although other rodents and small animals have been recognised as the virus's origins, the precise origin of monkeypox is uncertain. The viral infection was originally observed in macaque monkeys, thus the term monkeypox. Although human-to-human transmission of monkeypox is exceedingly rare, it is usually associated with respiratory droplets or direct contact with infected people's mucocutaneous sores. There is presently no treatment available for infected people; however, supportive therapies can be utilised to relieve symptoms; drugs such as tecovirimat may be used in severe cases. Many therapy are subjective since there are no unambiguous guidelines for symptom relief.

Key Words: Orthopoxvirus, Poxviridae, Monkeypox, Zoonotic Disease, Corneal infection.

Introduction

Monkeypox virus belong to the Poxviridae family and the genus Orthopox. Orthopox also comprises the virus's smallpox, cowpox, and rabbitpox. These are often observed in work settings and are spread through contact with infected animals. Monkeypox is tightly linked to smallpox, and smallpox vaccine is thought to be protective against Monkeypox. Monkeypox had first been discovered in 1958 in monkey research colonies, hence the term "monkeypox".
Monkeypox was first detected in the Democratic Republic of the Congo in 1970, and it has since spread to several other countries both in and outside of Africa, however it is mostly seen in Central and Western African countries. The first monkeypox epidemic outside of Africa was reported in the United States of America in 2003, and it was linked to contact with infected pet prairie dogs. The animals were already kept alongside Gambian pouched rats and dormice that had been brought from Ghana. Monkeypox virus has two genetic kinds, central African or Congo-type and West African type, and the geographical split between the two types is Cameroon, where both genetic forms of the virus may be detected. According to a systematic assessment of papers published up to September 2020, monkeypox has occurred in 10 African nations and four non-African countries, including Singapore, Israel, the U.K., and the U.S. [1]

Despite the reality that the monkeypox virus had been circulating for several years in areas where it had historically prevalent, monkeypox research had been ignored and underpaid. Over 3000 monkeypox virus cases were already documented over 50 countries across 5 regions since early May 2022, causing the World Health Organization to designate monkeypox an "evolving danger of moderate public health concern" on June 23, 2022. [2,3] Monkeypox is most commonly seen in rodents, although it has also been reported in African squirrels and monkeys. Monkeypox spreads both zoonotic and human-to-human dissemination. Zoonotic dissemination occurs through direct contact with the blood, body fluids, or monkeypox lesions of infected animals. Incompletely cooked flesh might also have a role. Human-to-human dissemination occurs by respiratory droplets, direct touch with infected people's skin sores, or coming into contact with contaminated items. [4]

Sexual transfer of Monkeypox or even other orthopoxvirus members has not yet been proven. Researchers only discovered a few cases report in the literatures about smallpox dissemination while sexual contact with someone who had freshly immunised against smallpox, yet all of them indicating that it wasn't truly sexually transmitted in the true sense; rather, it appeared to possess been transferred as a result of close sexual interaction with the vaccine's skin lesion against smallpox. [5-8] There has also been evidence of intrauterine dissemination. [9,10] The disease is largely self-limiting, with case fatality rates range between 1 to 10% [11]. Many papular, vesiculopustular, and ulceration sore on the face and body, as well as substantial lymphadenopathy, are generally preceded by fever. [11, 12] Complications include pneumonia, encephalitis, keratitis, and recurrent bacterial infections. [12] Young children's and those who have compromised immunity system, particularly those infected to the human's immunodeficiency virus (HIV), was reported to be at greater risk of catastrophic outcomes, while it is unknown if effective antiretroviral therapy for humans' immunodeficiency virus infection alters the risk. [13] The World Health Organization says (WHO), this will be the first instance that chains of dissemination have been detected in Europe without established epidemiological ties to West or Central Africa. Monkeypox endemcity has been documented in Cameroon, Central African Republic, Cote d'Ivoire, Democratic Republic of the Congo, Gabon, Liberia, Nigeria, Republic of the Congo, and Sierra Leone. It spread over 78 countries and more than 18,000 cases arises till now. Non-endemic countries have also been documented, including the United States, United Kingdom, Belgium, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Australia, Canada, Austria, the Canary Islands, Israel, and Switzerland. The Indian Ministry of Health and Family Welfare, as well as the Government of India, issued recommendations for the diagnosis and management of monkeypox on May 31, 2022. [14] There have been 7 recorded instances of monkey-pox virus in India as of July 31, 2022. However, considering the rising number of reported cases in nonendemic countries, India must be ready.
History
Preben Von Magnus discovered monkeypox in laboratory cynomolgus monkeys in Denmark in 1958, after two outbreaks of a disease comparable to smallpox in colonies of monkeys captured in Malaysia and smuggled via Singapore.[15] The Rotterdam Zoo experienced a monkeypox outbreak in 1964. [16] The very first reported occurrence in humans occurred in 1970, in an unvaccinated 9 year old boy.[17] From 1970 and 1979, around 50 instances were reported, with Zaire the Democratic Republic of the Congo accounting for more than two thirds of them.[18] Over 400 human cases had been documented by 1986. Small viral outbreaks with a death rate of 10% and a human-to-human infection rate of roughly the same amount occur on a regular basis in Central and West Africa.[19]

Prior to the year 2000, outbreaks were common throughout Africa. Monkeypox was first detected in people outside of Africa in the United States, and it was linked to pet prairie dogs. These dogs interacted with imported Gambian Pouched rats and Dormice from Ghana. There were around 70 cases of Monkeypox in the United States during that pandemic, but no deaths occurred. Other nations, including Israel, the United Kingdom, and Singapore, have also reported cases, largely after 2018.[20] In 2017, Nigeria saw a severe outbreak, impacting approximately 500 people with a case fatality ratio of 3%. Monkeypox appears to have recently spread to a number of countries, including Spain, Canada, Australia, and the UAE.[21] Monkeypox instances have lately been recorded in Spain, and they have been linked to sexual contact during raves in

Figure 1: Taxonomy and categorization of monkeypox within the Poxviridae

Chordopoxvirinae
- Capripoxvirus
- Avipoxvirus
- Centapoxvirus
- Cervidpoxvirus
- Crocodylidpoxvirus
- Macropopoxvirus
- **Orthopoxvirus**
- Salmonpoxvirus
- Parapoxvirus
- Suipoxvirus
- Oryzopoxvirus

Entomopoxvirinae
- α-entomopoxvirus
- β-entomopoxvirus
- δ-entomopoxvirus
- γ-entomopoxvirus

- **Monkeypoxvirus**
- Volepoxvirus
- Variola virus
- Cowpoxvirus
- Vacciniavirus
- Camelpoxvirus
Belgium and Spain.[22] Cases of monkeypox have been reported in Australia and Canada as well.[23,24] In 2022, the United Kingdom will be the most badly affected country, with instances on the rise. As per WHO record approximately 18,000 cases have been documented in over 78 countries as of now with more than 70% of cases reported from the European Region, and 25% from the Region of the Americas. So far, five deaths have been reported, and about 10% of cases are admitted to hospital to manage the pain caused by the disease.

**Etiology and Pathophysiology**

Monkeypox is a zoonotic disease that can be transmitted by direct contact, respiratory droplets, or infected products.[25, 1] The monkeypox virus is a member of the Poxviridae family and belongs to the genus Orthopoxvirus.[1] It is a linear double stranded DNA virus that dwells in the cytoplasm of infected cells.[26] Monkeypox normally takes 7-14 days to incubate, although it can take anything from 5 to 21 days.[14, 27] Infected cells are likely to generate two types of infectious virions: intracellular mature virus (IMV) and extracellular enveloped virus (ECEV).[26] The most likely infections virions generated by infected cells are IMV and ECEV. While internal mature viruses are responsible for cell-to-cell spread, EEVs are responsible for the virus’s rapid transit to remote areas of the body within infected individuals. [26]

The monkeypox virus has been separated into two genetic clades: the Congo Basin (CB) clade (also known as the Central Africa clade) and the West African (WA) clade.[25] The CB clade has been identified from Central and Southern Cameroon to the Democratic Republic of the Congo, whereas the WA clade has been identified from Western Cameroon to Sierra Leone.[28] While the WA clade is thought to be the milder of the two, the CB clade is thought to be the more virulent of the two, with substantially higher rates of interhuman transmission, serial transmission events, and secondary attack rates.[26] Furthermore, the CB clade is expected to create epidemics mostly by spill over from animal hosts, whereas the WA clade is thought to produce epidemics primarily through interhuman transmission.[26]
Epidemiology
For the first time, a 9-year-old kid from Zaire's (now DRC) equatorial region was diagnosed with monkeypox in 1970.[29] The illness has been widespread in Western and Central Africa since then.[29] Between 1970 and 1971, cases of monkeypox infection were also documented in the Ivory Coast, Sierra Leone, Nigeria, and Liberia. The United States reported the first incidence of monkeypox outside of Africa in 2003, when infected African rats containing the WA lineage of the virus were imported from Ghana.[29] The epidemic was documented in six US states: Wisconsin, Ohio, Missouri, Kansas, Indiana, and Illinois.[29] Monkeypox infection resurfaced in Nigeria in recent years, with a case recorded in 2017 in an 11-year-old child, following 39 years of no documented cases in the country.[29, 26]

Even in 2018-2019, there were 132 verified cases and 7 fatalities recorded through January 2019.[26] Because of the ease with which people may currently travel, a visitor...
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from Nigeria transmitted the monkeypox virus to a number of other countries in 2018. Three cases were reported in the United Kingdom in 2018, with two people having been to Nigeria before, while Israel and Singapore each reported one case in 2018.[29, 28] In 2021, two and one confirmed cases of travel related illness were recorded in the United States and the United Kingdom, respectively.[25,30] From January 2021 to May 2021, 32 suspected cases were recorded in Nigeria, with 7 instances subsequently verified and no known deaths.[31] Since May 12, 2022, 12 nonendemic countries have reported instances of monkeypox infection to the WHO, with 92 confirmed cases as of May 21, 2022.[32] The United States, Canada, the United Kingdom, the Netherlands, Spain, and Germany are among them, as are Italy, Portugal, Belgium, France, Sweden, and Australia. The United Kingdom, Portugal, and Spain have had the most confirmed cases, with between 21 and 30 confirmed cases.[32] No cases have been documented in India as of May 31, 2022; nevertheless, because to the increasing trend of cases in nonendemic countries, India should be prepared.[14] Males have a greater prevalence of monkeypox cases, albeit the specific reason for this is uncertain.

Diagnosis and Complications

The prevalence of rash disorders such as syphilis, measles, chickenpox, bacterial skin infections, scabies, and medication-related allergies distinguishes monkeypox infection in clinical terms. The occurrence of lymphadenopathy during the prodromal stage of sickness differentiates monkeypox from chickenpox or smallpox infection.[33] The diagnosis can be confirmed further by employing the polymerase chain reaction (PCR), which is the usual laboratory test for skin lesion samples, to test for the monkeypox virus. Because the virus cannot survive long in the blood, PCR blood tests are usually inconclusive. The date of fever starts, rash, current stage of rash, patient age, and specimen collection must all be supplied in order to interpret test findings.[33] The incidents are categorised as suspected, likely, or confirmed based on Indian standards. A person of any age who has visited any of the affected countries in the previous 21 days and has an unexplained rash as well as one or more of the cardinal signs and symptoms is considered a suspected case (fever, headache, body ache, swollen lymph nodes, and weakness). A probable case is one that has a clinically compatible condition and an epidemiological link, such as direct contact with skin or skin lesions, sexual intercourse, or contact with infected clothing, utensils, or bedding. A confirmed case of monkeypox is one that has been confirmed by PCR or sequencing.[14] According to Indian regulations, even a single case of monkeypox will be considered an epidemic unless suitable surveillance procedures are implemented as soon as possible to identify and control cases and clusters of infection. Following the identification of probable or confirmed cases, primary surveillance strategies include hospital-based and targeted monitoring, contact tracing, and testing of all symptomatic patients.[14] Diagnostic approaches include serological testing and the Polymerase Chain Reaction test. It is crucial for PCR to get a sufficient sample from skin eruptions, which should be stored in a sterile tube, transported, and kept at a low temperature. While serological testing cannot confirm monkeypox, it can discover Orthopoxviruses in general because Orthopoxviruses are cross reactive.[20] Tecovirimat, albeit not widely accessible, has just been approved by the European Medicines Agency (EMA) for treatment against monkeypox.[34] Treatment options include intravenous cidofovir and brincidofovir, with brincidofovir being the safest alternative.[35]
Swollen glands distinguish the illness from chickenpox, measles, and smallpox. Headache, muscular pains, fever, and weariness are common early symptoms. Lesions usually occur on the face after a few days of fever before spreading to other regions such as the palms of the hands and soles of the feet in a centrifugal distribution.[17, 33, 36] The rash normally lasts 10 days.[17] Individuals who are affected may be sick for 2 to 4 weeks. When the lesions heal, they may leave pale marks before transforming into black scars.[37] Complications include pneumonia, encephalitis, visual loss, and subsequent infections.[33] There is a risk of stillbirth or birth abnormalities if an infection arises during pregnancy.[38] Those who were inoculated against smallpox as youngsters may get a milder illness.[39]

**Signs and Symptoms**

The incubation period (interval from infection to onset of symptoms) of monkeypox is usually from 6 to 13 days but can range from 5 to 21 days. The infection can be divided into two periods:

- The invasion period (lasts between 0–5 days) characterized by fever, intense headache, lymphadenopathy (swelling of the lymph nodes), back pain, myalgia (muscle aches) and intense asthenia (lack of energy). Lymphadenopathy is a distinctive feature of monkeypox compared to other diseases that may initially appear similar (chickenpox, measles, smallpox)

- The skin eruption usually begins within 1–3 days of appearance of fever. The rash tends to be more concentrated on the face and extremities rather than on the trunk. It affects the face (in 95% of cases), and palms of the hands and soles of the feet (in 75% of cases). Also affected are oral mucous membranes (in 70% of cases), genitalia (30%), and conjunctivae (20%), as well as the cornea. The rash evolves sequentially from macules (lesions with a flat base) to papules (slightly raised firm lesions), vesicles (lesions filled with clear fluid), pustules (lesions filled with yellowish fluid), and crusts which dry up and fall off. The number of lesions varies from a few to several thousand. In severe cases, lesions can coalesce until large sections of skin slough off.[50]

Monkeypox is usually a self-limited disease with the symptoms lasting from 2 to 4 weeks. Severe cases occur more commonly among children and are related to the extent of virus exposure, patient health status and nature of complications. Underlying immune deficiencies may lead to worse outcomes. Although vaccination against smallpox was
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protective in the past, today persons younger than 40 to 50 years of age (depending on the country) may be more susceptible to monkeypox due to cessation of smallpox vaccination campaigns globally after eradication of the disease. Complications of monkeypox can include secondary infections, bronchopneumonia, sepsis, encephalitis, and infection of the cornea with ensuing loss of vision. The extent to which asymptomatic infection may occur is unknown. The case fatality ratio of monkeypox has historically ranged from 0 to 11% in the general population and has been higher among young children. In recent times, the case fatality ratio has been around 3–6%.[50]

**Figure 5: Symptoms of monkeypox**

Treatment

BMJ Best Practice suggests using tecovirimat or the smallpox medicine brincidofovir as first-line antiviral treatment and supportive care (including oxygenation, antipyretic, and fluid balance).[40] If a second varicella or bacterial infection is suspected, empirical therapy or acyclovir may be used.[41] The drugs that can be used to treat monkeypox infection are listed in Table 1.[26,42] Thus far in the, India has primarily advised supportive management and isolation of confirmed cases, which includes protecting the compromised mucus membranes and skin (rash, conjunctivitis, oral, and genital ulcers), oral rehydration and adequate nutrition, and symptom relief of fever, nausea/vomiting, pruritus, and malaise/headache with paracetamol, antihistaminic, topical ointments, antiemetics, and other medications. Furthermore, issues including eye pain or impaired vision, dyspnoea, altered awareness, seizures, poor oral intake of meals, and extreme weariness must be properly watched.[14] The smallpox immunisation has been confirmed to give 85 percent cross protection against monkeypox.[20] As population immunity declines and the first generation smallpox vaccine is no longer available to the public, following generation vaccines have been developed. In the United States, both the ACAM2000 and MVA-BN (modified vaccinia Ankara-Bavarian Nordic) vaccines are licenced for usage. MVA-BN is a non-replicating, live vaccination based on modified vaccinia Ankara, a live attenuated variant of the vaccinia virus. It was developed specifically for monkeypox. In the United States, it is marketed as Jynneos, Imvanex in Europe, and Imvamune in Canada.[20, 43]
Table 1: Potential medicine effective against monkeypox virus.

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Category</th>
<th>Mechanism of Action</th>
<th>Stage of Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cidofovir</td>
<td>Antiviral</td>
<td>Inhibit viral DNA polymerase</td>
<td>FDA approved for treating CMV retinitis [44]</td>
</tr>
<tr>
<td>Ribavirin</td>
<td>Antiviral</td>
<td>IMP dehydrogenase inhibitor</td>
<td>FDA approved for treating HCV infection [44]</td>
</tr>
<tr>
<td>HPMA</td>
<td>Antiviral</td>
<td>DNA polymerase inhibitor</td>
<td>In-vivo testing [44]</td>
</tr>
<tr>
<td>ANO</td>
<td>Antiviral</td>
<td>Blocks the translation of viral mRNAs</td>
<td>In-vivo testing [44]</td>
</tr>
<tr>
<td>C3-Npc A</td>
<td>Antiviral</td>
<td>SAH hydrolase inhibitor</td>
<td>In-vivo testing [44]</td>
</tr>
<tr>
<td>N-MCT</td>
<td>Antiviral</td>
<td>Nucleoside analog inhibitor</td>
<td>In-vivo testing [45]</td>
</tr>
<tr>
<td>KAY-2-41</td>
<td>Antiviral</td>
<td>Nucleoside analog inhibitor</td>
<td>In-vivo testing [46]</td>
</tr>
<tr>
<td>NIOCH-14</td>
<td>Antiviral</td>
<td>Blocks the release of intracellular virus from the cell</td>
<td>In-vivo testing [47]</td>
</tr>
</tbody>
</table>

Management and Prevention

**Principles of Management**
- Patient isolation
- Protection of compromised skin and mucous membranes
- Rehydration therapy and Nutritional support
- Symptom alleviation
- Monitoring and treatment of complications

**Patient Isolation**
- Isolation of the patient in an isolation room of the hospital/ at home in a separate room with separate ventilation
- 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

**Monitoring and treatment of complications**
- The patient should closely monitor for the appearance of any of the following symptoms during the period of isolation:
  - Pain in eye or blurring of vision
  - Shortness of breath, chest pain, difficulty in breathing
  - Altered consciousness, seizure
  - Decrease in urine output
  - Poor oral intake
  - Lethargy

In case any of the above symptoms appear, the patient should immediately contact nearby healthcare facility/specialist.

Table 2: Supportive Management of Monkeypox

<table>
<thead>
<tr>
<th>Component of Management</th>
<th>Sign and Symptom</th>
<th>Managements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection of compromised skin and mucous membranes</td>
<td>Skin rash</td>
<td>Clean with simple antiseptic Mupironicacid/Fucidin Cover with light dressing if extensive lesion present Do not touch/scratch the lesions In case of secondary infection relevant systematic antibiotics may be considered</td>
</tr>
</tbody>
</table>
Genital ulcers | Sitz bath
---|---
Oral ulcers | Warm saline gargles/ oral topical anti-inflammatory gel
Conjunctivitis | Usually, self-limiting
Consult Ophthalmologist if symptoms persist or there are pain/ visual disturbances

Rehydration therapy and nutritional support
Dehydration can occur in association with poor appetite, nausea, vomiting and diarrhoea | Encourage ORS or oral fluids
Intravenous fluids if indicated
Encourage nutritious and adequate diet

Symptom alleviation
Fever | Tepid sponging
Paracetamol as required
Itching/Pruritus | Topical Calamine lotion
Antihistaminics
Nausea and vomiting | Consider anti-emetics
Headache/ malaise | Paracetamol and adequate hydration
Respiratory depression/ Bronchopneumonia | Oral/ Intravenous antibiotics for prophylaxis, non-invasive ventilation and nebulizer treatments.
Sepsis | Oral/ Intravenous antibiotics, Supplemental oxygen, corticosteroid and insulin.
Corneal infection | Ophthalmic antibiotics, antiviral and corticosteroids.

Several observational studies have revealed that the smallpox vaccine is 85% effective in preventing human monkeypox.[33] This might be due to the close relationship between smallpox and monkeypox viruses, as well as immunisation protecting experimental animals against lethal monkeypox challenges.[48] Smallpox immunisation has been shown to minimise the incidence of monkeypox in previously immunised Africans [36]. Smallpox immunisation is recommended by the Centers for Disease Control and Prevention for those investigating monkeypox outbreaks or caring for infected individuals. Anyone who has had close or intimate contact with monkeypox-infected people or animals should be immunised as well.[49]

**Preventive Measures**
The primary prevention strategy for monkeypox is to improve knowledge of risk factors and educate people about the activities they may take to reduce their exposure to the virus. To avoid infection with the monkeypox virus, take the following precautions:

- Anybody with confirmed or suspected monkeypox should be isolated in a hospital or at home, as recommended by their doctor. Infected persons can help protect those around them by avoiding close contact.
- Those suffering with monkeypox at home should keep others safe by staying in a separate room, ensuring enough ventilation, using separate utensils, doing their own laundry, and cleaning shared areas such as toilets after each use.
- If close contact with someone with monkeypox is unavoidable, individuals should open windows for good ventilation, wear a well-fitted medical mask, wear disposable gloves, clean hands before and after touching and monitor oneself carefully for symptoms for 21 days after the last exposure and ask the person with monkeypox to cover any skin lesions by wearing clothing over the rash.
- Health workers caring for people suspected or diagnosed with monkeypox
should implement transmission-based precautions, including use of personal protective equipment (PPE) when providing care. For additional information, refer to the Clinical management and infection prevention and control for monkeypox: Interim rapid response guidance, 10 June 2022.[50]

- People who are experiencing symptoms compatible with monkeypox should not attend events, parties, or gatherings.
- Reducing the number of sexual partners, including anonymous partners, may help to prevent monkeypox.
- Condoms do not protect from monkeypox which spread through skin-to-skin contact, but they do provide protection against a range of sexually transmitted infections.

![Figure 6: Preventive Measures of Monkeypox](image)

**Key facts**

- Vaccines used during the smallpox eradication programme also provided protection against monkeypox. Newer vaccines have been developed of which one has been approved for prevention of monkeypox
- Monkeypox is caused by monkeypox virus, a member of the Orthopoxvirus genus in the family Poxviridae.
- Monkeypox is usually a self-limited disease with the symptoms lasting from 2 to 4 weeks. Severe cases can occur. In recent times, the case fatality ratio has been around 3–6%.
- Monkeypox is transmitted to humans through close contact with an infected person or animal, or with material contaminated with the virus.
- Monkeypox virus is transmitted from one person to another by close contact with lesions, body fluids, respiratory droplets and contaminated materials such as bedding.
- Monkeypox is a viral zoonotic disease that occurs primarily in tropical rainforest areas of central and west Africa and is occasionally exported to other regions.
- An antiviral agent developed for the treatment of smallpox has also been licensed for the treatment of monkeypox.
- The clinical presentation of monkeypox resembles that of smallpox, a related orthopoxvirus infection which was declared eradicated worldwide in 1980. Monkeypox is less contagious than smallpox and causes less severe illness.
- Monkeypox typically presents clinically with fever, rash and swollen lymph nodes.
and may lead to a range of medical complications.

**Conclusion**

The sudden re-emergence of the monkeypox virus in recent years and its importation to non-endemic areas is a matter of concern. With 58 countries having reported to the WHO for monkeypox cases, the physicians across the globe need to be alert to identify any possible cases. This pressures the need of implementing a strict surveillance system, especially for travellers coming from different countries as well as the building of containment zones for the identified suspected cases. In the absence of vaccines as well as therapeutic interventions against the monkeypox virus, this virus has the potential to turn into a pathogen capable of posing a serious threat to the general public worldwide. With the world already dealing with the impact of the COVID-19 pandemic, this is an outbreak that can be stopped, if countries, communities and individuals inform themselves, take the risks seriously, and take the steps needed to stop transmission and protect vulnerable groups. The best way to do that is to reduce the risk of exposure. That means making safe choices for yourself and others. For men who have sex with men, this includes, for the moment, reducing your number of sexual partners, reconsidering sex with new partners, and exchanging contact details with any new partners to enable follow-up if needed. The focus for all countries must be engaging and empowering communities of men who have sex with men to reduce the risk of infection and onward transmission, to provide care for those infected, and to safeguard human rights and dignity. Stigma and discrimination can be as dangerous as any virus, and can fuel the outbreak. As we have seen with COVID-19, misinformation and disinformation can spread rapidly online, so we call on social media platforms, tech companies and news organizations to work with us to prevent and counter harmful information. Although 98% of cases so far are among men who have sex with men, anyone exposed can get monkeypox, which is why WHO recommends that countries take action to reduce the risk of transmission to other vulnerable groups, including children, pregnant women and those who are immunosuppressed. Corneal scarring is the most feared consequence, as it might lead to vision loss. It is vital to be able to provide appropriate supportive care in order to limit the risk of these disorders to the greatest extent possible. Supportive therapy, such as applying wet occlusive bandages to areas where the rash is concentrated, may be employed. As fresh cases of monkeypox are reported throughout the world, researchers are attempting to determine why these outbreaks occur so seldom in Europe and the Western Hemisphere. It is vital to examine any prospective treatments as well as understand the actual extent of all monkeypox symptoms as well as the long-term consequences of the virus and symptoms.

In addition to transmission through sexual contact, monkeypox can be spread in households through close contact between people, such as hugging and kissing, and on contaminated towels or bedding. WHO recommends targeted vaccination for those exposed to someone with monkeypox, and for those at high risk of exposure, including health workers, some laboratory workers, and those with multiple sexual partners, at this time, we do not recommend mass vaccination against monkeypox.

One smallpox vaccine, called MVA-BN, has been approved in Canada, the European Union and the U.S. for use against monkeypox. Two other vaccines, LC16 and ACAM2000, are also being considered for use against monkeypox. However, we still lack data on the effectiveness of vaccines for monkeypox, or how many doses might be needed. That’s why we urge all countries that are using vaccines to collect and share critical data on their effectiveness. WHO is developing a research framework that countries can use to generate the data we need to better understand how effective these vaccines are in preventing both infection and disease, and how to use them most effectively. It’s important to emphasise that vaccination will not give instant protection against infection or
disease, and can take several weeks. That means those vaccinated should continue to take measures to protect themselves, by avoiding close contact, including sex, with others who have or are at risk of having monkeypox. There are also challenges with the availability of vaccines. There are about 16 million doses of MVA-BN globally. Most are in bulk form, meaning they will take several months to “fill and finish” into vials that are ready to use. Several countries with monkeypox cases have secured supplies of the MVA-BN vaccine, and WHO is in contact with other countries to understand their supply needs. WHO urges countries with smallpox vaccines to share them with countries that don’t. We must ensure equitable access to vaccines for all individuals and communities affected by monkeypox, in all countries, in all regions. While vaccines will be an important tool, surveillance, diagnosis and risk reduction remain central to preventing transmission and stopping this outbreak.

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