

# Mpox: the latest global health emergency

## Abstract

The declaration of a disease as a Public Health Emergency of International Concern (PHEIC) by the World Health Organization is not new to the world. Since 2007, the WHO has declared six PHEICs, the first one for the H1N1 in 2009 and the sixth one for COVID-19 in 2020. After that within a period of two years, 2022- 2024 mpox was declared a PHEIC two times, the first one in July 2022 and the second in August 2024. As the mpox virus was found in monkeys as early as 1958, it was called monkey pox and then after detecting it among human beings, the first case found out in 1970, it was called mpox. The spread of mpox was only here and there up to the end of May 2022. After that, it becomes a multi-country and -continental disease though both the outbreaks occurred first in the Democratic Republic of Congo (DRC). As on 21<sup>st</sup> August 2024 it spread over 122 countries. It affected 27,000 people and killed more than 1,100 persons including children and pregnant women in the DRC alone. There are two clades and two sub-clades, thus four sub-forms, 'Ia', 'Ib', 'IIa' and 'IIb'. Among these four forms 'Ib' is more serious and dangerous than other forms. The 'IIb' clade is the cause for the first outbreak while the 'Ib' is the cause for the second outbreak. Infections occur only when there is a physical contact with persons affected by the virus or with respiratory droplets or oral fluids or when one touches contaminated objects with the virus. It also spreads from animals to humans. The usual symptoms of mpox are: a) painful rashes all over the body, particularly in the palms and feet; 2) enlarged lymph nodes; and 3) there are symptoms like fever, headache, muscle ache, and back pain, and a feeling of low energy apart from symptoms like chills and exhaustion. The cure is automatic, last only 2-4 weeks. A few may require hospitalization. Children and pregnant women are at high risk of infection apart from healthcare workers and sexual workers. There is no medicine to cure it, but smallpox vaccine can be applied to control the spread. However the stock of it is almost zero as smallpox is declared eradicated in 1980. So one can avoid the infection of mpox only by taking a few precautionary steps.

**Keywords:** public health emergency of international concern, pandemics, monkey pox, smallpox, poxvirus, rashes and fever.

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## Introduction

The declaration of a disease as a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) is not new to the world. A PHEIC requires the cooperation of all countries, international health organizations, and NGOs for its containment.<sup>1</sup> Since 2007, the WHO has declared six PHEICs, the first one for the H1N1 in 2009.<sup>2</sup> Four years earlier, i.e., on the 30<sup>th</sup> January 2020, COVID-19 was declared a PHEIC by the WHO. Its global threat level was upgraded to 'very high' on the 28<sup>th</sup> of February 2020<sup>3</sup> and declared a pandemic on the 11<sup>th</sup> of March 2020.<sup>4</sup> In phase II (2021), COVID-19 threatened the whole world with widespread infections and a huge number of deaths; at the global level, infections and deaths were in the millions; infected 700 million and killed seven million people. However, it was contained, and the PHEIC declaration has been withdrawn in May 2023, though its threats and havocs continue across the world even now.<sup>5</sup> The declaration of a disease as a pandemic is also not new to the world. So far the world has seen 249 pandemics, i.e., from 1200 BC up to COVID-19.<sup>6</sup> Cholera was considered the worst disease, killed millions of people, and so was declared a pandemic seven times in two centuries, starting with the first from 1817 to 1824 and ending with the seventh one in 1961. The seventh outbreak of cholera has been the longest as it has been threatening the world since 1961; as the longest period, it entered the Guinness Book of World Records.<sup>7</sup>

Another dangerous infectious disease was smallpox. But due to efforts taken by health professionals and international and national

health authorities, smallpox was declared eradicated in 1980. At present, mpox, a close relative of smallpox, is declared a PHEIC both by the WHO (on 14<sup>th</sup> August 2024, and the outbreak as an 'acute' grade -3, emergency on the 12<sup>th</sup> August 2024)<sup>8</sup> and by the Africa Centres for Disease Control and Prevention (ACDC).<sup>1</sup> It is the second declaration in just two years, i.e., between 2022 and 2024. The first one was in July 2022, as the outbreak is multi-country and -continent.<sup>9</sup> The first emergency call ended in May 2023. But within a few months, it reappeared in the Democratic Republic of the Congo (DRC). Though mpox has not yet been declared a pandemic, it has been declared a PHEIC two times within a short period. It makes healthcare professionals, including doctors, pharmacists, and health economists, think seriously about the future course of action. At this backdrop, it is better to understand certain facts about mpox: what is the mpox virus, its history, types, symptoms, infections, and consequences, people who are at high risk, treatment available, and precautions to be followed to avoid its infections.

## Its history and types

Mpox virus is a close relative of smallpox. Mpox was previously called monkey pox as it was found on a wide scale among monkeys that were kept in captivity for research in Denmark in 1958 and after it infected humans, the first case of human monkey pox virus (MPXV) was diagnosed in 1970 in a nine-month-old boy in the DRC, it was called human monkey pox and later mpox.<sup>1,10-12</sup> Though mpox is not a severe disease like smallpox, it is an important health issue at the global level as it spreads across countries and continents very fast.<sup>10</sup>

Followed by the DRC it spreads to other countries, particularly to countries in central, east, and West Africa. In the US, the outbreak happened in 2003, which was due to the import of infected wild animals. Thousands of cases have been reported in the DRC since 2005.<sup>12</sup> The mpox virus is a member of the poxvirus family.<sup>8,13</sup> It belongs to the orthopox virus genus; the genus consists of variola virus, vaccinia virus, and cowpox virus.<sup>12,14</sup> Variola virus is the cause of smallpox, while vaccinia virus is the basis for the invention of smallpox vaccine. Cowpox virus is also an infectious disease with large blisters in the skin, fever, and swollen glands, spreading from cows and cats.<sup>14</sup> As far as the outbreak of mpox is concerned, the CEPI report - 2024<sup>13</sup> highlights that, like the previous outbreak (2022), the current one also occurred in the DRC.

There are two clades of mpox virus, clade 'I' and clade 'II'. It is informed that there are two clades of mpox, one found in central and east Africa and the other found in West Africa.<sup>8</sup> Specifically speaking, there are also two sub-clades/forms 'a' and 'b'. Thus there are two clades of mpox with two sub-clades 'a' and 'b', four sub-forms, 'Ia' and 'Ib' and 'IIa' and 'IIb'. Among the four forms, the 'Ib' clade is serious and spreading very quickly, and the death rate related to it is also very high in comparison with other clades; fatality ranges between 0.1% and 10%.<sup>10,14</sup> The current mpox infection is having a death rate of 3%, particularly in African countries. It is very much higher than the death rate of 0.1%, which is caused by a less virulent strain. The infection speed of 'Ib' is also very high. At the global level, the speed of the current outbreak is very high, 160% higher than that was in 2023; 10 countries have been affected within 10 days.<sup>15</sup> Clade 'Ib' is much more serious to children and pregnant women than other clades.<sup>16</sup> While clade 'IIb' is the cause for the first outbreak in 2022, which continues even today, clade 'Ib' is the cause for the current outbreak.<sup>12,17</sup>

## Spreading, symptoms, and consequences

Mpox disease is endemic in West and central Africa. As it quickly spreads and spreads even to non-endemic countries, in total it affected people in 111 countries; it was declared a PHEIC for the first time in July 2022. Nigeria experienced a re-emergence after about 40 years in 2017.<sup>10</sup> Until May 2022, the spread was only here and there. However, after May 2022, there was a sharp increase in cases reported from throughout the world, including Europe, the US, and all six regions of the WHO. There was an upsurge in clade I-type infections in the Republic of Sudan's refugee camps in 2022.<sup>12</sup> It spreads very quickly after that. In India, since the first declaration of PHEIC, 30 cases of mpox infection were reported,<sup>18</sup> including two cases from Kerala.<sup>20</sup> At the end of May 2023, there were more than 87,000 cases and 140 deaths across the world.<sup>10</sup>

After lifting the first global emergency call by the WHO in May 2023, mpox re-emerged in the DRC and spread very quickly, reported even from countries like Burundi, Kenya, Rwanda, and Uganda that had no mpox infections earlier. It spread over 122 countries, and as of 21<sup>st</sup> August 2024, it affected 27,000 people, and more than 1,100 people died in the DRC alone.<sup>13</sup> This year alone, the reported cases were 15,600, and the death cases were 537. It is spreading fast; even Americans were affected much, affected to the extent of 19% of the total, and in Europe it is 11%, though it is concentrated only in African countries.<sup>8</sup> At the global level, there were 99,176 cases and 208 deaths related to mpox from 116 countries since 2022. In the DRC alone there are suspected 19,000 cases and 650 deaths; in Africa, the number of confirmed cases of mpox is 3,900 with a death of 52.<sup>17</sup> In the second outbreak, mpox entered Asia. The first case from Asia, on the 14<sup>th</sup> of August 2024, was reported from Thailand by a person

from the Kingdom of Africa.<sup>19</sup> In Kerala, the second case of mpox is reported on the 27<sup>th</sup> of September 2024, a man of 29 years old, a native of Ernakulam district.<sup>21</sup>

Infections occur only when there is a physical contact with persons affected by mpox through skin-to-skin contact with sores, scabs, and respiratory droplets or oral fluids, or there is a physical contact with a surface where there are respiratory droplets or oral fluids. The disease is widely found among men who have the habit of homo sex. It also spreads from animals to humans and also humans to animals, but only through physical contact. Infection from animal to human occurs when infected animal bites or scratches human or through hunting the infected animal, skinning and trapping, cooking, and eating non-well-cooked flesh of infected animal.<sup>9,10,12,14</sup> As far as spreading of mpox is concerned, WHO (2024)<sup>12</sup> has the same view as mentioned earlier: the mpox disease is an infectious disease that spreads not by the factors connected with the environment but only through close contact; close contact here means skin-to-skin contact or skin-to-mouth or mouth-to-skin, including sex or face-to-face, between persons; one of them is already infected by the virus. There may also be a chance for transmission of mpox when one touches contaminated objects with the mpox virus. The reason is that the virus may also stay for some time on the infected person's bed, clothes, or objects handled by him or on the surfaces where there are respiratory droplets of the infected person.<sup>9</sup> To put it in simple words, the mpox virus spreads in the following way: 1) contact with lesions on the skin or infectious bodily fluids; 2) contact with contaminated materials, including clothing and linen; 3) contact with respiratory droplets from the mouth or throat of infected persons, 4) contact with infected animals and 5) passing of the virus from a pregnant woman to her unborn baby.<sup>16</sup>

The infected people with mpox have certain symptoms that are almost similar to flu fever. The common symptoms of mpox patients are: fever, headache, muscle aches, low-energy and swollen lymph nodes, along with skin rashes having pus-filled lesions and blisters.<sup>12-14</sup> WHO (2024)<sup>12</sup> and UNICEF (2024)<sup>16</sup> list out the symptoms of mpox as follows: a) painful rash all over the body, particularly in the palms and feet; 2) enlarged lymph nodes; and 3) there are symptoms like fever, headache, muscle ache, and back pain, and a feeling of low energy. Gavi Staff (2024)<sup>10</sup> further informs that apart from the usual symptoms of fever and other things, there are symptoms like chills and exhaustion. The rashes may also appear on the genital organs and cornea. However, the WHO - 2024<sup>12</sup> informs that there may be no symptom for some patients; there are mpox patients without any symptom. The order of symptoms may be different for different persons. To some, rashes appear first, and to others, fever is the first symptom. In the same way, the number of rashes and lesions may be different. Some patients have only a few, while others have a few hundreds. But a researcher indicates that in some persons the number of sores may be one and in some others it may be thousands.<sup>9</sup>

The health impact of mpox on patients is also different for different persons. A report of the WHO<sup>12</sup> points out those symptoms of mpox may last generally 2-4 weeks. It may be longer for immune-compromised persons, such as people living with HIV, pregnant women, and children. Symptoms usually appear within a week. But after the exposure, it may take 1-21 days. The same view was expressed by Travers (2024)<sup>9</sup> and Gavi Staff (2024),<sup>10</sup> recovery takes a maximum period of four weeks. Severe infections require hospitalization, supportive care, and antiviral medicines, which are required for reducing the severity of lesions and the period of recovery. At once rashes heal, the dried skin falls off, and there will be no infection if new skin covers the infected area. It means that patients pass on the virus to others until all sores are fully healed and a new

layer of skin has formed. There are also mpox-related complications such as pneumonia, corneal infection, which may end in the loss of vision, difficulty in swallowing, vomiting, diarrhea, and its resultant complications like dehydration, sepsis, etc. Contract of the virus at the time of pregnancy may lead to the following consequences: infection of the virus to the fetus or to the newborn, loss of the pregnancy, stillbirth and death of the newborn and mpox-related complications to its mother, father, and siblings.<sup>12</sup>

## People of high risk

Mpox virus affects different people differently. Some people are more prone to mpox diseases, while others are not so. For example children are more exposed to this disease than others. A report says that among different groups of people, young people are affected more by the mpox virus than others.<sup>10</sup> The same is also confirmed by another report published in 2024;<sup>16</sup> in the DRC, more than 50% of the infected cases are children under the age of 15. The death among children due to mpox is also higher than that is among other groups. It is reported that children's death rate is 80% out of the total deaths caused by mpox, and children constitute 62% of total patients.<sup>17</sup> It is also asserted that children, pregnant women, and persons with less immunity power are having more chances of getting infected with mpox than others as their immunity is very weak.<sup>8,12</sup> Apart from these groups of people, the following people have a good chance of getting infected: healthcare workers, members of a family where someone is infected with the mpox virus, persons who have multiple sex partners and homosexual practice, and sex workers as they have good chance of having close contact with infected people or articles.<sup>12,14</sup> The spread is also wide among countries where malnutrition is vast, the living conditions are crowded, there is a wide-spread presence of other infectious diseases, and there are limited healthcare facilities. Mpox is widespread in poor countries where healthcare facilities available are meager and under-resourced. As poor countries, the spread is very fast in the DRC and in Africa.<sup>16</sup>

## Treatment and precautions to be taken

Before the close of five years from the occurrence of the great pandemic, the world is again struggling to find solutions to the outbreak of mpox disease. At the time of the spread of COVID-19, there was no vaccine to control the spread of it. However, as far as mpox is concerned, though there is no antiviral medicine to cure mpox and no vaccine to control its spread, as the mpox virus is a close relative of smallpox, the vaccine meant for smallpox is able to control the spread of mpox to the extent of 85%, and so in the present situation, the vaccines meant for smallpox can be used to control the spread of the virus.<sup>10</sup> Unfortunately, as the WHO declared that the world is free of smallpox in 1980 the stock of vaccines for smallpox is almost zero. There are only two pharmaceutical companies producing vaccines for smallpox; they are Denmark's Bavarian Nordic and Japan's KM Biologics. These vaccines can be used for the current use in case of emergency. Many countries, including the USA, the UK, Switzerland, Canada, and some European countries, have already approved these vaccines. However, the supply is much less than the demand. For example, the Congo (South Africa CDC) demands 10 million doses from the Danish company; only 0.21 million doses are available for immediate delivery. As supply of vaccines is limited at the global level, the cost is also very high, not accessible: \$100-\$110 per shot.<sup>11,17</sup> It is also said that the DRC, which is the epic center of mpox, requires 3.5 million vaccines apart from a demand of 10 million doses from other African countries as the speed of infection is very fast; in just eight months in 2024, more than 18,000 mpox cases have been reported from the DRC alone.<sup>17</sup> But the DRC got only

99,000 from the EU so far and is expected to get 1.1 million within a few weeks. Though there is enough stock of vaccines in the US- seven million doses by mid-2023- it has donated just 50,000 to Africa, particularly for Nigeria.<sup>11</sup> It means that doses of vaccines supplied to the DRC and other African countries to control the outbreak of mpox are just a fraction of the total requirement. As far as India is concerned, all healthcare authorities, including testing laboratories (32), were alerted for handling any situation arising out of the spread of mpox.<sup>18</sup>

At the same time, a report laments that though mpox was first reported as early as 1970, it attracted the attention of the world and international organizations, only after the infection was reported from Europe and North America. In reality, it is the inaction of world bodies such as the WHO, as no step has been taken for the past 52 years, a universal scare.<sup>17</sup> The only solace is that the vaccine meant for smallpox can be used in case of emergency. On the other side, treatment requires diagnosis, but diagnosis is a difficult process. A report of the WHO - 2024 highlights that the diagnosis of mpox is not very simple as many diseases may cause similar symptoms of mpox. Mpox symptoms should be distinguished from chickenpox, measles, bacterial skin infections, some sexually transmitted infections, and some medication-related allergies. Confirmation can only be made by testing of lesions or swabs of either the throat or anus; testing of blood is not appropriate. As prevention is better than cure, the best way to control the spread of the mpox disease is to take care of us by following certain precautions, which are given below.

As it is spreading only through close contact, one can avoid it by having no close contact with anyone who has mpox infection and also with animals infected by mpox virus. As mpox is also contracting through items or objects used by mpox patients, it is better to avoid touching such items also. As infection occurs through touch, it is also suggested to wash hands very often with soap and water. Any infected person from a family should be isolated from others so as to avoid infections of the virus to other family members.<sup>16</sup> If an mpox patient is serious, it is good to get advice from a physician, and if need arises, admit him/her to a hospital. It is also advised to disinfect surfaces and objects infected with the mpox virus. It is good to avoid touching animals in an unprotected way and to eat animal flesh only after thorough cooking as partially cooked infected animal's flesh also causes infections.<sup>9</sup>

## Conclusion

Mpox, a relative of smallpox, is not a dangerous disease like smallpox. However it attracted the attention of the WHO as it spreads very quickly across countries and continents and so it was declared a public health emergency of international concern two times within a short period of two years, 2022 and 2024, the first one in July 2022 and the second one in August 2024. The first case of human mpox infection was reported in 1970 in the DRC. After that it spread to other countries and until May 2022 its spread was only here and there. But after May 2022 it spread quickly across countries. In the first outbreak people from 111 countries were affected. In the current outbreak as on 21<sup>st</sup> August the virus spread over 122 countries. It spread only when there is a physical contact with infected persons or animals or with respiratory droplets or oral fluids or objects with the virus. The common symptoms of the disease are: painful rashes all over the body, enlarged lymph nodes and other symptoms like fever, headache etc. Children, pregnant women, sex workers, persons having multiple sex partners and health workers are the most risky groups. At present there is no vaccine to control the spread and no drug to cure the disease. However vaccines meant for smallpox can be used for controlling the

spread, but its supply is almost zero. At this situation one can avoid its infection only by taking some precautionary steps.

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## Conflicts of interest

The author declares that there are no conflicts of interest.

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