



Mpox: Another Public Health Emergency in Times of Climate Change

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Editorial

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Abbreviations

WHO: World Health Organization; PNI: National Immunization Program; MPXV: Monkeypox virus.

Editorial

On August 14, 2024, the World Health Organization (WHO) declared a global emergency related to Monkeypox or Mpox, due to the increase in cases in African countries and the identification of a new, more aggressive strain that has spread to European countries. Monkeypox is a double-stranded DNA virus belonging to the Orthopoxvirus genus and the Poxviridae family. It got its name from the initial discovery of the virus in monkeys in 1958 in a Danish laboratory. However, the name Monkeypox is not appropriate since it is a zoonosis, i.e. the virus has animal reservoirs, wild rodents of an as yet unknown number of species. Monkeys are only accidental hosts of the Mpox virus, as are humans. The main animals are small rodents native to the tropical forests of West and Central Africa, and this virus is commonly found in these regions [1].

The first human case was identified in 1970 in a child in the Democratic Republic of Congo. Before 2017, Mpox occurred mainly in central and western Africa, with sustained transmission of MPXV (Monkeypox virus) in local animal reservoirs and sporadic transmission to human populations, mainly in rural areas. Continuous person-to-person transmission in West Africa has occurred since 2017 and led to occasional export to other countries from 2018

to 2021. In this period, almost all cases of Mpox in people outside Africa have been related to international travel to countries where the disease commonly occurs or through imported animals. The first confirmed cases occurred in the UK, mainly among men who have sex with men (MSM), and quickly spread to other countries. The first case of human MPX in the USA was discovered in 2003 and, although the outbreak was associated with contact with sick prairie dogs, there was still a risk of person-to-person transmission [2].

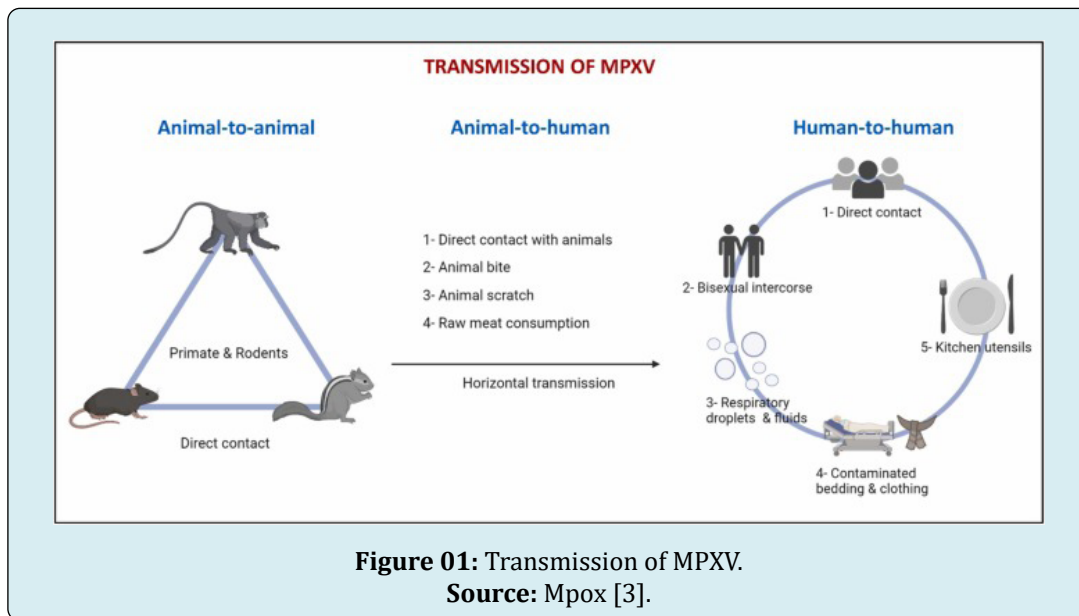
In May 2022, countries with no history of community transmission of Mpox began reporting cases without recent travel or links to imported animals. Therefore, in July 2022, the WHO declared the Mpox outbreak a Public Health Emergency of International Concern and issued temporary recommendations to support a coordinated global response. A public health emergency is characterized as a situation that requires the urgent use of measures to prevent, control and contain risks, damage and harm to public health in situations that may be epidemiological (outbreaks and epidemics), disasters, or lack of assistance to the population. The current mpox outbreak is more worrying than previous ones because it involves a new variant of the virus, which experts say is the most dangerous version ever seen [3].

Approximately 12,000 cases of Mpox were confirmed in Brazil between 2022 and 2024, without presenting severity. Recent data from the Brazilian Ministry of Health reveals that the city of São Paulo has the highest number of Mpox cases in Brazil. In 2023, 853 confirmed or probable cases were recorded, while in 2024, to date, the number has risen to 945, with 16 deaths [4].

The virus is mainly transmitted from person to person through direct contact with infected lesions and body fluids, but transmission can occur through respiratory droplets

and contact with fomites (inanimate objects that carry pathogenic microorganisms and can thus serve as a source of infection), such as clothing, towels, bedding, or objects such as utensils and dishes [5]. Despite controversy, some studies have shown that sexual transmission can be a significant way of transmitting the Mpox virus [3]. The lesions can be flat or slightly raised, filled with clear or yellowish liquid, and can form crusts, which dry up and fall off. The number of lesions

on a person can vary from a few to thousands. The rash tends to be concentrated on the face, palms of the hands and soles of the feet, but can occur anywhere on the body, including the mouth, eyes, genitals and anus [6]. The rash, together with the associated lymphadenopathy, is a clue to Mpox infection, but the polymerase chain reaction is necessary for confirmatory diagnosis [3]. Transmission of MPXV (Figure 1).



With an average incubation period of between six and 13 days, the disease is characterized by a period of between zero and five days of fever, body aches, headaches, lymphadenopathy, adenomegaly, asthenia and myalgias, and weakness. These are followed by rashes or skin lesions (such as blisters, peeling or non-peeling sores) around one to three days after the onset of fever and are usually self-limiting, tending to resolve in two to four weeks [7]. Although the virus generally does not cause high mortality in immunocompetent individuals, however, severe illness and mortality can occur if the virus spreads to immunocompromised individuals, children, the elderly, pregnant women and individuals with comorbidities such as diabetes. In addition, there are two genetic clades of MPXV: clade I and clade II, which includes subclades IIa and IIb.3 Clade I is present in the Congo Basin, causes up to 10% of human mortality and is transmitted by rodents with little spread between humans; clade IIa exists in West Africa, has low mortality and is also a zoonosis; clade IIb is currently spreading globally by human transmission [8].

The global spread of MPXV infection and human-to-human transmission has triggered a rapid public health response, including surveillance to identify cases. However, access to testing is limited due to social stigma and the

difficulty of recognizing the disease outside Africa. A complementary approach is wastewater monitoring, which provides information on the presence of pathogens in the community without the need for individual testing, helping public health agencies and doctors to gain situational awareness. A therapy developed to treat common smallpox may also be useful in treating Mpox, but there is limited research into the effectiveness of the remedy. Furthermore, mpox outbreaks can be controlled by preventing infection - and the best way to do this is with vaccines. There are three immunizers available, but generally only people at risk or who have had close contact with an infected person can take them, as the WHO does not currently recommend mass vaccination of entire populations and further studies are still needed to find out the level of protection of current vaccines against new versions of the virus [9].

Since the beginning of the 20th century, communicable diseases have concerned public health, such as human smallpox, one of the greatest scourges of humanity because it is a highly contagious infectious disease caused by viruses, which was combated in Brazil with vaccination, declared compulsory since 1846 [10]. As the last case of smallpox occurred in 1978 and the disease was eradicated in 1980, vaccination was removed from Brazil's National

Immunization Program (PNI). However, Mpox can be more difficult to exterminate completely, as smallpox is an essentially human disease, with only humans as its reservoir. Prevented by vaccination, the virus had nowhere else to go and disappeared, existing today only in maximum security laboratories, as a potential weapon of bioterrorism. Therefore, the existence of animal reservoirs makes it difficult to control the disease, given that rodents are the natural reservoirs of many viruses in the pox family [11]. In this way, the virus will have somewhere to hide, even if an outbreak or epidemic is controlled in humans, and finding viruses and their hosts in forests is very complex.

Some diseases are not just related to medical conditions, but are intertwined with structural deficiencies and social dysfunction. The quest for economic growth and productivity has affected the foundations of contemporary society to such an extent that it has created risky situations all over the planet, even though science and government institutions have already signaled the urgency of adopting practices aimed at sustainable development. In this sense, climate change is the most immediate existential threat to our planet and will probably only get worse in the near future, and among its numerous adverse effects on human health, there is strong evidence linking climate change to outbreaks of infectious diseases. Studies have revealed that, of 375 infectious diseases affecting humans, 218 (58%) could be aggravated by climate risks [12]. This is because climate change and environmental degradation accelerate the risk of contagion, as wild rodents come closer and closer to urban areas. Africa is therefore a concern because it has more people in contact with wild areas, but the Amazon could be another potential virus reservoir.

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