

One Health: A must-needed approach for dealing with monkeypox

Md. Saiful Islam^{1,2}, Al-Muksit Mohammad Taufiquer Rahman³, and Md. Tanvir Rahman²

¹Department of Animal Sciences, University of California—Davis, CA, United States

²Department of Microbiology and Hygiene, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh, Bangladesh

³Department of Medicine, Rajshahi Medical College, Rajshahi, Bangladesh

ABSTRACT

Monkeypox (Mpox), a zoonotic disease like smallpox, is caused by the monkeypox virus and transmitted to humans via infected animals or contaminated materials. Human-to-human transmission occurs through respiratory droplets or contact with infected bodily fluids and objects. Symptoms include fever, headache, muscle aches, and a rash, with severe cases leading to pneumonia, meningitis, and encephalitis. First identified in monkeys in 1958 and humans in 1970, Mpox has since caused sporadic outbreaks, with the largest starting in May 2022. Integrating human, animal, and environmental health into the One Health approach is crucial for early detection, surveillance, research, education, and community engagement to prevent and effectively control Mpox outbreaks.

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Mpox (formerly known as Monkeypox), a zoonotic disease, is caused by the monkeypox virus and is like human smallpox [1]. Mpox disease is transmitted to humans through contact with infected animals, primarily rodents and monkeys, or contaminated materials, such as bedding, clothing, or food [2]. Human-to-human transmission of Mpox is also possible, primarily through respiratory droplets or contact with infected bodily fluids, such as through respiratory droplets, direct contact with skin lesions, or contact with contaminated objects [3].

The regional and epidemiological particularities of Mpox outbreaks show significant variation across different areas and populations. Historically, Mpox has been endemic in Western and Central Africa, with cases primarily reported from countries such as the Democratic Republic of the Congo (DRC), Nigeria, and Cameroon [4]. The disease was first identified in 1958 when outbreaks occurred in monkeys kept for research purposes [5]. However, human cases were first identified in 1970 in the DRC [6]. Between 1970 and 1980, 59 cases were documented in countries such as Liberia, Nigeria, Sierra Leone, Cameroon, and Côte d'Ivoire [7].

These regions remain hotspots for disease due to close contact between humans and potential animal reservoirs, such as rodents and primates, which facilitate zoonotic transmission. Between 1980 and 1985, 282 cases of Mpox were documented in Zaire, with an average fatality rate of 11% in unvaccinated individuals, higher in children (15%), and no fatalities in vaccinated patients [8]. The first case of Mpox in a nonendemic country in 2022 was reported in the UK on May 6, after a traveler from Nigeria developed symptoms and tested positive [9]. Subsequent cases emerged in London and other regions, with the UK reporting more than double to 57 cases by mid-May [10].

The 2022 Mpox outbreak marked a significant shift, with cases emerging in non-endemic regions, including Europe, North America, and Asia. This spread was notably linked to international travel and globalization, with confirmed cases in countries such as Australia, Belgium, Canada, France, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, the UK, and the USA [11]. Starting from 06 May 2022, the world has been witnessing the largest outbreak of Mpox, with 97,745 confirmed cases, 203 deaths, and 116 countries reporting cases

Contact Md. Tanvir Rahman ✉ tanvirahman@bau.edu.bd 📧 Department of Microbiology and Hygiene, Bangladesh Agricultural University, Mymensingh, Bangladesh.

[12]. Among them, the USA constituted the highest number of Mpox confirmed cases, followed by Brazil, Spain, France, Colombia, Mexico, the United Kingdom, Germany, Peru, China, and the DRC [12]. Because of the highly contagious nature of this disease, the World Health Organization declared it a global public health emergency on July 23, 2022 [13]. The rapid global dissemination highlighted the necessity for coordinated international public health responses and the importance of global surveillance systems.

The clinical presentation of Mpox in humans varies depending on the viral clade. The West African clade, known as Clade II, generally has a lower-case fatality rate of around 1%, while the Congo Basin clade, known as Clade I, has a higher fatality rate of up to 11%. Symptoms of Mpox are similar to those of smallpox but are generally less severe. They include fever, headache, muscle pain, backache, swollen lymph nodes, chills, and exhaustion, followed by a rash that forms blisters and crusts [11]. However,

severe cases can lead to complications such as pneumonia, meningitis, encephalitis, and even death [2]. The mortality rate in resource-limited settings can be as high as 17% [14], which underscores the need for adequate medical infrastructure and access to healthcare in affected regions.

The One Health approach is a holistic and collaborative approach to health that recognizes the interconnectedness of human, animal, and environmental health. This approach recognizes that human health is intimately connected with the health of animals and the environment and that the health of all three is essential for a healthy and sustainable world. The One Health approach brings together experts from a variety of fields, including public health, veterinary medicine, environmental science, and social science, to work together to address complex health issues. By working together across disciplines and sectors, the One Health approach seeks to promote a more integrated and effective approach to health promotion

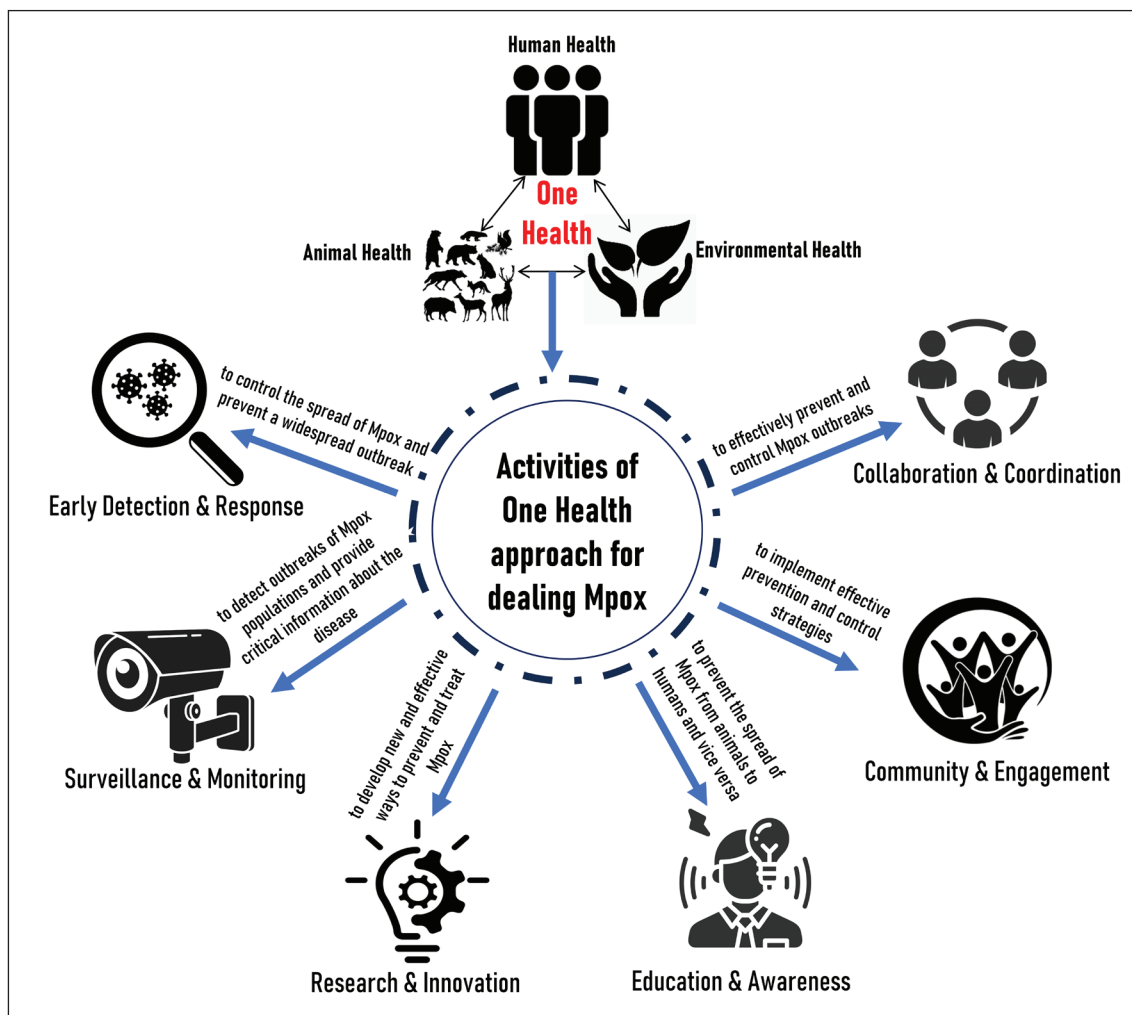


Figure 1. One Health approach to address the challenges of Mpox.

and disease prevention [15]. One Health approach is essential for dealing with zoonotic diseases. One Health recognizes that humans and animals share many diseases, and it is crucial to understand how these diseases are transmitted and how they can be prevented.

Public awareness and understanding of Mpox vary widely, with significant knowledge gaps, particularly in non-endemic regions. Healthcare workers in various countries often have limited knowledge about Mpox transmission, clinical presentation, and prevention measures [11]. This lack of awareness can hinder early diagnosis and appropriate management of Mpox cases, leading to delayed interventions and increased risk of transmission. This necessitates the implementation of One Health strategies in every health sector to prevent and control Mpox globally. Figure 1 provides a narrative idea about the One Health approach to address the challenges of Mpox.

One Health primarily highlights the significance of detecting and promptly addressing infectious disease outbreaks. Prompt identification and rapid response play a vital role in managing the transmission of Mpox and averting a large-scale epidemic. Accomplishing this objective necessitates efficient cooperation among public health authorities, veterinary specialists, and environmental health professionals in promptly recognizing and containing the outbreak. Early detection is essential as it aids in mitigating the virus's dissemination prior to its escalation into an epidemic.

Surveillance and monitoring serve as essential strategies within the One Health framework to address Mpox. Implementing efficient systems for surveillance and monitoring is crucial for identifying Mpox outbreaks in both human and animal populations, offering vital insights into the disease's epidemiology and transmission. This valuable information plays a pivotal role in developing effective interventions to curb the spread of Mpox. One Health approaches to surveillance and monitoring entail close cooperation between professionals in human health and animal health professionals, alongside the utilization of advanced laboratory techniques and data analytic tools.

In addition, the One Health approach underscores the importance of conducting research and fostering innovation to devise novel and efficient approaches to prevent and treat Mpox. Research plays a vital role in enhancing our understanding of the virus, its transmission patterns, and preventive measures. Furthermore, it aids in the development

of groundbreaking treatments and vaccines to safeguard both humans and animals against the virus. The imperative for research and innovation cannot be overstated as it ensures that we possess the essential tools to effectively tackle Mpox outbreaks. One Health methodologies for research and innovation entail collaborative efforts between researchers in human health and animal health domains, as well as the integration of data from diverse sources and disciplines.

An additional crucial element of the One Health approach to handle Mpox involves emphasizing the significance of education and raising awareness. Education and awareness play an essential role in curbing the transmission of Mpox. Within the One Health framework, it is recognized that education and awareness efforts need to encompass both human and animal populations to achieve effectiveness. The educational and awareness campaigns should prioritize promoting proper hygiene practices, such as thorough handwashing and appropriate food handling. These measures are instrumental in preventing the transmission of the virus from animals to humans.

Alongside education and awareness, the One Health approach acknowledges the significance of actively involving communities in preventing the transmission of Mpox. Community engagement entails collaborating with local communities to formulate and execute strategies aimed at halting the virus's spread. These efforts encompass the establishment of hygienic practices, fostering safe food handling, and implementing animal vaccination initiatives. Community engagement plays a pivotal role in guaranteeing that prevention and control strategies align with the cultural context and gain acceptance from the local population.

Finally, the One Health approach emphasizes the importance of collaborative and coordinated efforts among diverse sectors and stakeholders. Collaboration and coordination keep critical impacts in effectively preventing and controlling outbreaks of Mpox. Within the One Health framework, it is important that collaboration should involve public health authorities, veterinary professionals, environmental health experts, and community members. Through effective collaboration and coordination, disease prevention and control efforts can be enhanced by facilitating the exchange of information, resources, and expertise. This approach promotes a cohesive and integrated strategy toward disease prevention and control. Therefore, it is crucial to prioritize One Health

approaches in our endeavors to combat emerging infectious diseases like Mpox. By fostering collaboration, we can collectively work toward the effective prevention and control of Mpox outbreaks.

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Conflict of interest

The authors declare no conflicts of interest.

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