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# Re-emergence of the infectious Monkeypox Virus amidst the coronavirus pandemic: a cause for concern?

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## Abstract

Due to the effects of the COVID-19 pandemic, any other emerging infectious disease such as monkeypox will prove to be detrimental to the already struggling healthcare system and the economy. Recently, the WHO declared an investigation into over 31,800 suspected cases of MPXV in over 89 different countries. These recently identified cases are atypical, most (31,425 cases) being reported in non-endemic countries (82); therefore, requiring contact tracing. Additionally, haploid network mapping demonstrated an exaggerated number of single nuclear polymorphisms in exported MPXV variants as compared to local mutations. This signifies the rapid transmissibility of the virus and the need for urgent intervention. It is suggested that the media creates awareness regarding the preventative measures and risk factors of monkeypox, countries must accelerate the implementation of policies for use of the developed vaccines, and additional research must also be carried out. In our letter, we recognize the factors halting the efforts being made to curb the spread of the virus and we highlight the effects it has on the community.

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Since the beginning of the pandemic, Coronavirus-19 disease (COVID-19) has taken over the globe, posing a threat to the integrity of the health care systems worldwide. Mass vaccination programs have been initiated to combat the virus. However, with the immense number of cases and deaths being reported each day, the healthcare system is overwhelmed and near collapse. As of 10$^{th}$ August 2022, almost 595 million cases and over 6 million deaths due to COVID-19 have been reported worldwide and while vaccines are still being administered, any other emerging infectious disease such as monkeypox will prove to be detrimental to the already struggling healthcare system as well as the economy.[1]

Monkeypox, a viral zoonotic disease afflicting humans and wild animals for centuries, is caused by the Monkeypox virus (MPXV) belonging to the *Poxviridae* family and is related to the smallpox causative agent, Variola Virus. In July 2021 the Centers for Disease Control and Prevention (CDC) reported a confirmed case of Monkeypox in the United States (US).[2] This was the first case reported in the US since 2003 when 43 such positive cases were recorded.[2] The patient was known to have traveled to the US from Nigeria where the disease was prevalent from 2017 to 2019.[2] Additionally, more than 200 people, although not high risk, were tracked in the 27 US states for potential monkeypox infection.[3] Another monkeypox case was then identified in the US on November 16, 2021.[4] The case returned from Nigeria is similar to the first case of 2021 identified.[2][4] More recently, as of 10$^{th}$ August, the World Health Organization (WHO) declared the investigation into over 31,800 suspected cases of MPXV in over 89 different countries spread primarily across Europe, and a few cases in the US, Canada, Asia, and Australia.[5] According to the WHO, these recently identified cases are atypical with the majority (31,425 cases) being reported in non-endemic countries (82); therefore, requiring contact tracing of the confirmed cases in these countries. Although transmission amongst individuals within the US seems to be limited and most cases appearing are travelers, with more than one country reporting multiple confirmed cases, there is a cause for concern. Looking at the cases from the United Kingdom and based on the latest update, there are over 2,914 confirmed cases of MPXV of which 2,883 are from England.[6] This signifies the rapid transmissibility of the virus and the need for urgent intervention.

Monkeypox is a highly contagious disease capable of being transmitted between infected wild animals and humans as well as amongst humans by way of respiratory droplets, body fluids, and close contact with contaminated items. The West African clade has a fatality rate of 3.6% compared to 10.6% of the Congo Basin clade.[7] Although not as high as that of COVID-19, this still highlights the need for more precautionary measures, such as the 21-day designated quarantine for all MPXV patients, as imposed by Belgium.[8] However, the CDC is confident the transmittance of the virus to others onboard may be limited due to the obligation of masks.[2]

The commonly reported clinical manifestations of monkeypox include fever, headache, muscle ache, rashes, swollen lymph nodes, blisters, secondary infections, bronchopneumonia, sepsis, and encephalitis.[7] Some of these symptoms such as fever, headache, and muscle ache are also reported symptoms of COVID-19 and while most of the clinical tests

at the health care facilities are currently being conducted for SARS-CoV-2, with little attention to monkeypox virus, there is a chance of misdiagnosis which poses a risk to the health security.

Currently, no proven treatment has been discovered to cure monkeypox which is alarming; however, the transmission rate can be controlled by the administration of the smallpox vaccine (Imvanex and ACAM2000 for 18 years and older people) antivirals (Cidofovir and Brincidofovir), and vaccinia immune globulins.[9] Regardless, its re-emergence amidst the coronavirus disease-19 (COVID-19) pandemic raises concerns about a potential epidemic because studies have suggested there is reduced immunity against the monkeypox virus in the majority of the global population. During the early 1980s, based on an assessment of monkeypox cases in the Democratic Republic of Congo, it was believed that monkeypox has limited potential to cause an epidemic.[10] It should however be noted that the limited number of cases was reported because of the high number of individuals who were vaccinated against the smallpox virus which also provided immunity against its strain-the monkeypox virus.[10][11] However, Nguyen et al. suggest that with the surge in population size in recent years, the vaccinated population has decreased to 23.1% (CI 0.0%-58.1%).[12] Low population immunity between 10 to 25% can result in one infected individual transmitting the disease to 1.10-2.40 new cases.[10] This coupled with the high risk of exposure of the population to infected mammals, increases the chances of spread of MPXV exceptionally and may lead to an epidemic under current circumstances as the healthcare system is already overburdened by the influx of COVID-19-related cases.[11]

Additionally, haploid network mapping demonstrated an exaggerated number of single nuclear polymorphisms in exported MPXV variants as compared to local mutations; the discovery of a novel gene expansion mechanism amongst Orthopoxviruses is of utmost concern with the high probability of spread as the combinative effect can be synergistic to a potential epidemic.[12]

Several factors minimize the efforts being made to curb the spread of MPXV, which hints at a potential increase in its transmission[12][13] (Table 1). Hence, it is recommended that the public follow all social-distancing measures and remain calm to prevent panic amongst the wider population. Despite the threat of the spread of the MPXV, if the COVID-19 pandemic measures of social distancing are strictly followed, the chances of spread will be mitigated. This comes from the fact that reports from Australia suggest that non-pharmaceutical interventions (NPIs) implemented during the pandemic helped curb the positive cases of influenza.[14] A similar curve is expected in the case of MPXV as well since apart from MPXV's contact transmission, both influenza and monkeypox have an airborne mode of transmission. The physicians are also recommended to be on the lookout and play their part in debunking the myths. It is also suggested that the media creates awareness regarding the preventative measures and risk factors of monkeypox. Additionally, countries must accelerate the implementation of policies for use of the developed vaccines for monkeypox, especially for health care workers who are at an increased risk of exposure to the virus. Due to a lack of available literature regarding case management and efficient response strategies in case of an outbreak, additional research must also be carried out to better understand the ecology, epidemiology, and pathogenesis of the virus. This preparedness coupled with the NPIs which are in place across the globe would help curtail the spread of the MPXV.

**Table 1.** Factors halting the efforts to curb MPXV [12][13]

| Efforts | Factors hindering the efforts | Result |
|---|---|---|
| Vaccine | Lack of a thorough plan of action for vaccine use. | No permanent immunity towards the MPXV[1]. |
| Lab diagnosis of MPXV | No time-efficient strategy for early detection of MPXV is available. | Delayed confirmation leads to further transmission. |
| Longitudinal surveys | Lack of such systemic surveys. | No certainty regarding the type of wild animals which contain the virus in nature, making prevention strategies futile. |
| Management | Limits the use of wild animals for their medicinal properties and nutrients.<br><br>Lack of human data regarding the available antivirals as well as those with proven efficacy in non-human primates. | Sustained risk of transmission in semi-urban and peri-urban populations.<br>FDA-approved drug for MPX does not exist but it has driven trials to evaluate the efficacy of several classes of drugs. |

MPXV- Monkeypox virus

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