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| Student Name  Monkeypox Virus: The New Old outbreak? |  |
| Course title  Date |  |

# Introduction

Once an endemic disease bound to the geographies of several African countries, Monkeypox (MPX) is now making headlines in specific communities across the Americas, Europe, the Middle East and Australia. How did the Monkeypox Virus (MPXV) spread like wildfire across the globe in particular communities, and why did this change in epidemiology occur in recent years? Why has the disease spread beyond the continent of Africa, and why is it predominantly infecting men who have sex with men (MSM)? These questions baffle doctors, epidemiologists, and virologists right now. In this paper, we will look at the history of MPX its distribution and control of spread pre- and post-2022 and examine some of the factors that are believed to have contributed to its recent changes in epidemiology.

# The Virus

Monkeypox is a re-emerging zoonotic disease caused by a DNA virus - *orthopoxvirus*(1). The virus is closely related to the smallpox virus, and infected individuals suffer similar symptoms(2). The first case of MPX found in humans was in the 1970s(1). Since its first human infection in the Democratic Republic of the Congo (DRC), the disease has primarily been endemic to several African countries, including the DRC, Nigeria, and Liberia(1). During the 1970s, 48 cases were reported in the Central and West regions of Africa(2), but there was a drastic increase (a 9-fold increase) in confirmed cases in the 1980s, especially in the DRC(2). During this time, the disease began to spread within Africa and continued into the 1990s. Now there are 511 cases confirmed in the continent of Africa(2). Before the year 2000, the DRC was the country most affected by MPX, with cases being reported continuously since the 1970s(2). Cases outside of Africa before 2022 can be tied to travels to and from Africa(3). The first non-endemic MPX case reported was in 2003 in the United States from an exotic animal imported from Ghana(2). Since May, 2002, there has been a massive increase in the number of MPX outside of Africa, mainly concentrated in the United States, Canada, Brazil, Europe, the Middle East and Australia(4). The incidence of MPX rose from 0.64 per hundred thousand in 2001 to 2.82 per hundred thousand in 2013(2). Since May 2022, there have been 23 reported non-endemic countries of MPX and more than 200 confirmed laboratory cases (5). The number of nonendemic cases confirmed since May 2022 has already exceeded the number of nonendemic cases from 1970 to 2022 (1). This drastic increase is highly concerning for scientists as the virus has already infected more than 3,000 people in more than 30 countries in the past few months(3).

There are two distinctive clades of the MPXV, the Central African or aka Congo Basin clade, and the West African clade(4). Most of the endemic cases were infected with the Congo Basin clade, and most nonendemic cases were infected with the West African clade, including the most recent international outbreaks(2,4). In endemic countries, the route of transmission is described as through respiratory droplets. Males adults represented approximately 50% of the cases, and human-to-human contact was suggested as the primary method of transmission, for example, sleeping, living and food consumption in the same household(2). Although animal-to-human contact was rare, it has been reported as well, in smaller numbers(2). Among nonendemic countries post-2022, sexual contact is described as the main method of transmission. In the United States, 99% of confirmed cases were males, 94% of which reported homosexual male sexual contact and 41% of which had human immunodeficiency virus (HIV) infections(6). Data from the Centre for Disease Control suggest that MPX disproportionally affects homosexual, bisexual, racial and ethnic minority groups(6). This finding is corroborated by two other studies suggesting that the majority of MPX cases are amongst men who have sex with men (MSM) and that community or sexual contact was the main method of transmission(7).

# Factors Contributing to its Changing Epidemiology

**Fear of Stigma**

There has been a delay in action from public health and the scientific community due to the nature of the recent outbreaks, which are mainly circulating among the MSM community. Data suggest that the current nonendemic outbreaks disproportionally affect the MSM community, especially those with multiple sexual partners and behaviours associated with other STDs(6). In addition, although additional data needs to be collected to confirm this hypothesis, scientists do not think MPX is spreading among heterosexuals with similar high-risk sexual behaviours in the same manner(6). There is a general understanding amongst the scientific community that there is hesitancy amongst scientists to draw attention to and focus on the MSM community in prevention efforts. Scientists feel like they are stuck in a tricky position(3). The risk of the stigma that could worsen existing discrimination caused a delay in systematic prevention and treatment efforts(3). Although the evidence clearly suggests that sexual encounters play a role in transmission, many are reluctant to label MPX as a sexually ttransmittable disease because of the stigma it could bring to the MSM community(3). Countries are getting ready for immunization campaigns targeting individuals with multiple sexual partners, but scientists suggest that doing it the right way is the most important(3). Public health officials are urging resources to be directed towards the MSM community, but first there is a need to address issues such as stigma, equity and discrimination(4).

Scientists believe that the lack of reporting of circulating cases with the MSM community have also contributed to its wide spread in the current outbreak. Due to the stigma MPX brings, there is great fear amongst the MSM community to come forward with suspected cases, those who have symptoms or knows someone with symptoms usually do not seek medical help until it is too late(4). In addition, individuals who might have contact with MPX are difficutl to find. Traditional contact tracing methods are unlikely to work in a tightly connected community like the MSM comunity(4). There is also the media’s project of MPX which might have further stigmatized the MSM community making individuals reluctant to come forward(1). This reluctance is worsened in countries where being homosexual is a crime like many in the Middle East and Africa(7). In the United Kingdom, study results suggest that merely 14% individuals and 69% of healthcare workers were willing to be vaccinated(7). Currently, no cases of MPX among the MSM community have been reported in Africa(8), but the number of death in the continent of Africa has far exceeded those elsewhere with 365 death in 3 years(8). Scientists believe this lack of MPX amongst the MSM community is due to limited testing capacity as well as the lack of cultural acceptance in Africa(8). The stigmatization of MPX in Africa has prevented individuals from seeking healthcare services or come forward to report suspected cases(8). The social taboo associated with MPX is so strong that if no efforts are taken to de-stigmatize MPX, public health and vaccination efforts are inevitably going to fail in Africa(8).

**Termination of the Smallpox Vaccination program**

Scientists believe that the eradication of smallpox and subsequently the termination of the vaccination program may have contributed to the spread of the MPX(9). Data have suggested that smallpox vacciation was ~85% effective at protecting individuals against MPX(2). This cross-protection is believed to have kept the spread of MPX at bay for many years. This is backed up by data suggsting an increase in MPX incidence in endemic regions of people aged 15-30 years(10). Scientists believe that the termination of the smallpox vaccination created an ideal ‘immunologic niche’ for MPXV to thrive, especially in the DRC(10). However, it was found among individuals with MPX in the United States that prior smallpox vaccination does not completely protect individuals from MPXV(10). Scientists believe that the route of exposure, does of the vaccine, and the time elasped since vaccination can all affect the protective benefits of smallpox vaccines(10). Evidence suggest that a single dose of the smallpox vaccination would not provide lifelong immunity and thus the same logic would apply to monkeypox as well(10). Scientists believe that although reintroducing the smallpox vaccine may help with the spread of MPX in endemic and nonendemic regions, a vaccine for MPX would be more optimal and safe(10).

**Conclusion**

Although the situation is dire, there is hope on the horizen. Several smallpox therapeutics are now approved for use for MPX patients, including brincidofovir, Cidofovir, VIG, and VACV and MVA-based vaccines(7). Scientists are urging the international community to act swiftly to contain the spread of MPX. Several actions could be taken: continue with smallpox vacciation can provide cross-protection against MPX for high-risk individuals and provide post-exposure protection for individuals who had contact with infected individuals(11); bolster contact tracing and disease surveillance amonst high-risk population, in endemic and nonendemic regions(7); conduct periodic epidemiological surveys of MPX in endemic regions especially(11); stricly regulates the trade and ownership of exotic pets and animals from endemic regions(11); and de-stigmatize the association of MPX and the MSM community such that individuals who are or might be infected are not afriad to seek medical attention(7).

**References**

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