

MONKEYPOX: UNDERSTANDING EPIDEMIOLOGY, PREPAREDNESS AND STRATEGIC RESPONSE**Background**

As the world recovers from the shock of the COVID-19 pandemic and reflects on lessons learnt from the weakness of global public health systems, the world is again battling with a reemerging infectious disease known as Monkeypox emerges. The unprecedented and unexpected outbreaks of human monkeypox cases and clusters since May 7, 2022, across Europe, the Americas, and Australia, yet again, have taken global public authorities by surprise. This clearly indicates that the emergence of infectious pathogens will not exit our world in a hurry.

Monkeypox is a zoonotic disease caused by a virus which belongs to the Poxviridae family, the same family as the smallpox virus. Monkeypox is similar to smallpox with many features, which is usually presented with flu-like symptoms: fever, chills, headache, muscle aches, fatigue, swollen lymph and lesion on hands lasting from 2 to 4 weeks. The virus is transmitted to humans through close contact with an infected person or animal or with material contaminated with the virus. The virus can also be transmitted during pregnancy from the mother to the fetus through the placenta.

The first viral strain was isolated in the Laboratory from Monkey before the detection of the first case in humans in 1970 in Zaire (now the Democratic Republic of the Congo, DRC). Since then, Monkeypox has become endemic in the DRC and spread to other African countries, mainly in Central and West Africa. In 2003, the first report of human Monkeypox outside of the African continent occurred in the midwestern United States and was acclaimed to be associated with imported African rodents. There are two distinct genetic clades of the monkeypox virus: the central African (Congo Basin) clade and the west African clade. The Congo Basin clade has historically caused more severe disease and was thought to be more transmissible. The geographical division between the two clades has so far been in Cameroon, the only country where both virus clades have been found.

Since the first reported case of Monkeypox in human being in the 1970s, researchers and doctors have documented a host of new dimensions to the epidemiology of the disease. The current outbreak of Monkeypox spreading rapidly across the globe presents several unique features, such as an increasing number of cases outside the endemic region of West and Central Africa and increase in the rate of transmission of the disease, especially outside Africa.

The encroachment of humans into forested areas and growing international mobility seems to be playing important roles in the epidemiology of monkeypox outbreaks, which can also contribute to this re-emergence. Monkeypox pathogen has been endemic in some African countries for decades, enabling stability of the pathogen through evolution.

The genome sequence of the virus obtained in several countries shows a degree of divergence from the West African clade. Research is ongoing to determine the connection of the observed genomic changes to phenotypic changes such as enhanced transmissibility, virulence, immune escape, resistance to antivirals, or reduced impact of countermeasures.

The World Health Organization WHO on July 23, 2022 declared the ongoing Monkeypox outbreak a Public Health Emergency of International Concern (PHEIC). However, the declaration has attracted a lot of reservations from some members of the organization's advisory committee. Members of the committee that opposed the declaration argued that the disease is treatable through targeted interventions; while those that support the declaration premise their argument on the outbreak being an extraordinary event and the disease is a global public-health risk that requires a coordinated response. While making the declaration, WHO recommends that nations should commit to ramping up the manufacturing and supply of diagnostic testing and vaccines to the citizens. The affected high-income countries have mobilized an efficient genomic surveillance capacity, prompt diagnostic detection, and local and national alert systems to curtail the spread of the disease. World Health Organization has equally supported global response efforts with the creation of an open-access database and visualisation to track the occurrence of cases in different countries.

Despite decades of Monkeypox outbreaks in West and Central Africa sub-region, most affected countries in Africa still lack the capacity for diagnostic detection, epidemiology surveillance and genomic sequencing of the virus. Although developed nations have pledged more than 31 million smallpox vaccine doses to WHO for use in smallpox outbreak emergencies, yet these doses have never been used against Monkeypox in Africa. It is quite

curious that there is a bold attempt for a ‘ring vaccination’ campaign in nations outside Africa for Monkeypox. However, the current Monkeypox outbreak has recorded about 70 fatality cases which were mostly in African countries.

Africa's response to the Monkeypox and many previous outbreaks were largely impeded by several factors, ranging from weak health systems, complex socio-cultural and political environments, ineffective messaging and community engagement, and civil insecurity. One of the mission statements of the Global Emerging Pathogens Treatment Consortium (GET), is to develop strategic tools for addressing and preventing infectious disease outbreak in Africa. It becomes imperative for the organisation to mobilise public health experts across the globe in the July edition of its monthly webinar series to discuss- how to raise awareness and assess epidemiology, preparedness and response of the African government toward managing the current monkeypox outbreak.

Strategic Public Health Response

Considering the rate of spread of the current monkeypox outbreak, it has attracted a great deal of attention and prompt response. The strategic response varies across the respective country. WHO, in its capacity, released updated guidance on surveillance, case investigation, and contact tracing to combat the outbreak effectively. The reason for the outbreak having a broader geographic reach is being investigated by the international and national public health communities. Some of the strategies adopted across the globe include:

- **Prompt Contact Tracing and effective Diagnostic Facility:** Timely deployment of strategic contact tracing layered with other nonpharmaceutical interventions provide an effective public health tool for mitigating and suppressing infectious disease outbreaks by decreasing disease incidence, transmission, and resulting hospitalisations and mortality.
- **Monitoring and Surveillance:** This facilitates the countries to rapidly identify cases and clusters to provide optimal clinical care; to isolate cases, to prevent further transmission. It also involves identifying, managing and follow up contacts to recognise early signs of infection; protect frontline health workers; identify risk groups, and to tailor effective control and prevention measures.
- **Social Mobilization and Community Engagement:** A robust, acceptable, and sustainable monkeypox response to recognise and address the structural drivers of

disease emergence, including social, cultural, and ecological factors is important. This prevented stigmatization and ostracizing of monkeypox patients.

- **Vaccines and Therapeutics:** Vaccines developed for smallpox has scientifically proven to be 85% effective against the new strain of the Monkeypox outbreak and was repurposed and rolled out to be administered. Antiviral treatments that have shown positive results *in vitro* and in animal research studies were also made available for patients.

Recommendations:

The ongoing Monkeypox outbreak has brought the disease to global discuss and different global approach are engaged to stop the spread the worldwide. African countries and leaders should leverage on this global fight against Monkeypox to find a lasting solution to the Monkeypox diseases that has been endemic in some countries in sub-Saharan Africa for decades. The following are recommended to enhance the capacity to address the Monkeypox outbreak in Africa:

1. African government should develop and implement effective biosecurity frameworks and policies that will be effective for disease surveillance, prevention, and control. Inadequate specialized institutions and human capacity are some of the factors responsible for inability to fully practice and observe the extant biosecurity policy within the region. Government should establish specialized institutions and supported with adequately trained human personnel to implement the National and regional biosecurity agenda.
2. African leaders should facilitate dedicated sustainable funds for disease surveillance and vaccine research. This can be achieved through strategic engagement of the private sector. Considering the paucity of funds across Africa countries, government can create incentive package such as: Tax waiver, International soft loan assessment and liberalize marketing structure to encourage private sector investment in biomedical institute to increase biomedical research, especially in the fields of genomic sequencing and vaccine manufacturing.
3. African governments should encourage a broad network of public health laboratories for genomic sequencing and active surveillance capacity collaboration within the region.

4. There is a need for African leaders to implement effective transdisciplinary One Health approach to address emerging disease outbreaks at federal, national, sub national and/or local levels.
5. Researchers and scientists should embark on detailed case investigations and studies to characterise transmission patterns, including suspected or documented spillovers from and spillback to animals.

Conclusion

The ongoing Monkeypox epidemic which has been declared as Public Health Emergency of International Concern (PHEIC) has brought global focus to a disease that has been endemic in sub-Saharan Africa for decades. Africa has the rare opportunity to leverage on this global awareness to find a lasting solution to Monkeypox outbreaks on the continent. There is need for a transdisciplinary One Health approach, and increase research especially in genomics and vaccine production to enhance infectious disease surveillance and control in Africa.

About GET

Global Emerging Pathogens Treatment Consortium (GET) was established in 2014 as a direct response to the 2014-16 Ebola virus disease outbreak in West Africa and ongoing outbreaks of Lassa Fever, Meningitis, Multidrug resistance (MDR) enteric fevers and Yellow Fever across the sub region. There was clearly a need to create an African-led multidisciplinary forum of experts capable of working together with international partners to strengthen Africa's preparedness and resilience in tackling such infectious disease outbreaks caused by emerging pathogens, public health emergencies and pandemics.

GET found the understanding of biosecurity to be a very underdeveloped area on the continent with clear opportunities for using biosecurity to dramatically improve on capacity for prevention and medical countermeasures during public health crises. GET now operates firmly in the African Biosecurity and pandemic preparedness, space and functions as a think tank, providing high level advocacy and operational and necessary expertise to support Countries and communities achieve improved resources to combat outbreaks and other public health emergencies that can threaten stability, peace and security thereby undermining economic growth and well being. The consortium is working with international collaborators with a goal of providing strategic recommendations and establishing infrastructure and research capacity to respond to highly infectious emerging Pathogens such Ebola, ongoing COVID-19 Pandemic. The Consortium creates a rapid informed response strategy and provides advice and guidance to African countries, and a point of reference for international funding and aid agencies.