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Editorial

Challenges and opportunities in the face of Mpox in Latin America

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Introduction

Mpox, formerly known as monkeypox, is a zoonotic disease caused by the monkeypox virus, MPXV. This is a double-stranded DNA virus belonging to the genus *Orthopoxvirus* and the family *Poxviridae*, which is divided into clades I and II, which in turn are subdivided into Ia, Ib, Iia, and IIb (lineage A and B1).[1,2] The emergence of this virus as a human pathogen was described in 1970, and was established as endemic on the African continent with few isolated cases on other continents.[1] Between 2017 and 2021, an outbreak of Mpox was declared in Nigeria, and 2022 cases were documented in non-endemic countries on other continents, such as Europe, America, Oceania, and Asia, which led to it being considered a public health emergency of international concern (PHEIC), with the countries of the American continent being the most affected, with most of these cases corresponding to viral clade IIb, lineage B.1.[1–3] This PHEIC was declared terminated in May 2023 following a sustained decline in reported cases globally.[4] However, 15 months later, a further increase in cases was recorded for 2024 in the Democratic Republic of the Congo and other African countries attributed to two distinct outbreaks—the spread of MPXV clade Ia, IIa, and IIb and the emergence of a new MPXV clade (clade Ib).[4] The rapid dissemination and imminent spread outside the African continent of this new clade Ib led to the declaration of a new PHEIC in August 2024, which puts several countries internationally on alert about challenges and opportunities to prevent the emergence of new outbreaks by this clade.[5]

Current situation and challenges in Latin America

With a new global outbreak looming due to a viral clade recognized as having a greater transmission capacity and lethality, countries' preparedness is essential, and attention is focused on those with the highest number of cases in the previous outbreak.[1] The American continent is one of the most affected, with the United States being the country with the highest number of cases, with approximately 33,556, followed by several Latin American countries such as Brazil, Colombia, Mexico, and Peru (11,841, 4256, 4132, and 3939, respectively); adding a total of 64,184 cases in America.[1,3,6] The experience of the recent health emergencies caused by SARS-CoV-2 and MPXV suggests that efforts should focus on increasing surveillance, case detection capacity, and the allocation of resources for the prevention of the disease through vaccination in at-risk populations, among others[1,7,8]

The circulation of MPXV in the previous outbreak (2022–2023) occurred mainly in people with recent travel records to countries with high numbers of cases, people living with HIV, and men who have sex with men (MSM).[1,3] Given the possibility of a higher transmission rate with clade Ib, efforts should be directed toward evaluating other risk factors for transmission and expanding detection capacity in these population groups.[9] The first current challenge for Latin America corresponds to the training of health workers in the recognition and education for the timely detection of new cases of Mpox, especially in those workers who provide care in emergency services and primary care.[3] The second challenge corresponds to the increase in the technological capacity of molecular tests that allow the detection of the genome and different viral clades so that they are integrated with surveillance systems, allowing the timely notification of new confirmed and probable cases.[1] For the 2022–2023 outbreak, the main countries in Latin America increased their capacity for viral molecular detection, but many of these efforts decreased once the global emergency was declared over or was only maintained

in Public Health reference laboratories[9]; diagnosis needs to be taken to the first levels through point-of-care technologies. Understandably, economic resources are redistributed according to the current needs of the countries. Still, the threat of an MPVX clade with greater potential for transmissibility and lethality and the high impact that the previous strain had in Latin America with persistence in the positivity of a large number of cases to date suggest that epidemiological surveillance and molecular detection systems should be initiated early, and maintained for a longer period.[4,9]

Vaccination has proven to be one of the most important measures to contain viral outbreaks.[10] Since the 2022 public health emergency, four vaccines have been approved to prevent Mpox, initially designed against smallpox but generating neutralizing antibodies against multiple viruses of the *Poxviridae family*.[9] These correspond to the second-generation vaccine ACAM2000 recently approved by the FDA for Mpox,[11] and the third-generation vaccines MVA-BN (JYNNEOS)™, LC16-KMB (licensed in Japan), and OrthopoxVac.[9,12,13] Most studies that have evaluated the effectiveness of these vaccines against monkeypox viruses have focused mainly on the third-generation JYNNEOS vaccine, describing an effectiveness of 76% and 82% after the first and second doses respectively; and of 20% as post-exposure prophylaxis.[12] An overview of available vaccines, recommendations, and contraindications is presented in Table 1.[9,12–14] Vaccination in Latin America has lagged behind other countries, such as Canada and the United States. The latter has made the JYNNEOS™ vaccine available to the at-risk population, with more than 1 million vials distributed between 2022 and 2024.[15] Some Latin American countries, such as Chile, Peru and Brazil, acquired this same vaccine during the 2022–2023 outbreak and made it available to the most at-risk populations.[16] Brazil acquired about 47,000 doses of the JYNNEOS™ vaccine, of which 29,000 were applied, and is currently in studies to produce a new national vaccine.[17] Despite this, following the declaration of a new PHEIC in 2024, it was forced to start negotiations to procure an additional 25,000 doses of JYNNEOS™ on an interim basis while its research progresses.[17] Other countries, such as Colombia, received units of the LC16-KMB vaccine during the 2022–2023 emergency, which have been used in clinical research scenarios to evaluate their effectiveness in the population without initiating national vaccination programs.[18] The outlook is less favorable for other countries in Latin America, which have not initiated vaccination programs or research to guarantee immune coverage in at-risk populations since 2022.[19]

The delay in vaccination against Mpox in Latin American countries compared to Europe or the United States constitutes a great limitation to face a new outbreak due to clades of greater transmissibility and lethality.[8] While countries such as Brazil, Colombia, Chile, and Peru initiated vaccine marketing or research efforts, some were diminished once the PHEIC was terminated in 2023, resulting in a loss in the opportunity for immunization of approximately 15 months.[8,16,19] Many governments may have interpreted the end of the health emergency as the end of the risk of infection. Still, these terms should not be confused, especially given the persistence of positive cases in many Latin American countries.[4] The global shortage of vaccines should not be a limitation to maintaining government efforts to prevent disease. In case of economic limitations for acquiring the main vaccines, research efforts should be established to develop national or international alternatives, as in the case of Brazil or Colombia.[17,18] Many Latin American countries decreased their interest in Mpox prevention with the global decline in cases in 2023. However, this only exposed them to increased risk and a low preparedness for new outbreaks as projected for 2024.[8] In the vaccination scenario, Latin America faces two important challenges this year: the initiation or continuity of immunization research programs and the imminent need to deploy available vaccines to guarantee protection in the short and medium term in high-risk populations.[19]

Conclusion and recommendations

Preparation against a PHEIC such as Mpox requires each government's sustained and phased multidisciplinary efforts. These consist of adequate training of human talent in health, increased technological capacity for detecting new cases mainly through molecular tests, and strong immunization coverage in populations at higher risk of infection. Prevention programs in each country must be established promptly and maintained over time despite evidence of a decrease in cases of infection. The challenges Latin America

Table 1. Overview of vaccines, recommendations, and contraindications.

Designator	ACAM2000	MVA-BN (JYNNEOS)™	LC16-KMB
Manufacturer	Sanofi Pasteur Biologics	Bavarian Nordic A/S	KM Biologics
Generation	2nd generation	3rd generation	3rd generation
Vaccinia viability	Live-attenuated (replicating)	Live-attenuated (nonreplicating)	Live-attenuated (minimally replicating)
License/Approval for Mpox	U.S FDA – 2015	U.S FDA – 2019 Canada – 2019 EU – 2022 Switzerland – 2024	U.S FDA – 2014 Japan – 2022
Dosing regimen	One dose by scarification with 15 punctures of a bifurcated needle. Booster every 3–10 years	Two 0.5 mL subcutaneous doses at 4-week intervals. Booster every 2–10 years	One dose by scarification with 15 punctures of a bifurcated needle
Recommended	People at risk • Living in areas with high risk of exposure • Sex workers • Men who have sex with men with multiple sexual partners • Other individuals with multiple casual sexual partners • Health workers at risk of repeated exposure • Contacts of persons with Mpox ideally within 4 days of first exposure		
Age indication	Adults (18–64 years old). Use in younger people is contraindicated	Adults (⩾18 years old). Use in younger people is off label	All ages
Contraindications	• Immunocompromised • Immunosuppressive therapies • Proliferative skin conditions (atopic dermatitis) • Pregnancy	• Hypersensitivity to active substance or any excipient or trace residues (chicken protein, benzonase, gentamicin, ciprofloxacin) • Use in pregnancy is off label	• Immunocompromised • Immunosuppressive therapies • Acute fever • Acute disease • Anaphylaxis to ingredients • Proliferative skin conditions (atopic dermatitis) • Pregnancy

faces in the face of the increase in Mpox cases by clades other than Ib are greater than those faced by other countries worldwide. Although health systems in Latin America are exhausted after facing the COVID-19 pandemic, the resurgence of dengue, and the emergence of the Oropuche virus, there is a need to strengthen preparedness for the possibility of the circulation of a new Mpox variant and especially to learn from the failed strategies of the 2022–2023 Mpox outbreak. Besides, we considered necessary and complementary other strategies proposed by WHO to optimize the standard of care and scale up safe clinical supportive care for Mpox patients, such as core protocols, clinical platforms, data sharing, and the living lab of evidence-based medicine.[20] From the lessons learned in implementing some of them in Colombia during the outbreak of Mpox in 2022–2023, we consider that it is necessary, for example, to look for fast-track mechanisms for implementation in health emergencies in each institution or country core protocols. An adaptive clinical protocol to use potential drugs or vaccines is useful during an emergency. Still, valuable opportunities may be lost if the ethical, regulatory, legal import, and

implementation processes do not go as fast as the epidemic. There are aspects to update and improve in the public health emergency regulations that could facilitate the processes. The other aspect is the importance of inter-epidemic periods to advance the training of human resources in clinical research and good clinical practices, not only clinical researchers but also professionals in pharmacy, nursing, monitoring, clinical coordination, etc. In most Latin American countries, these resources are concentrated in large hospital centers. Still, it would be very useful to distribute and enhance these human resources in primary and outpatient care centers, where most of the patients diagnosed with Mpox are hospitalized.

Finally, concerning clinical platforms, we contemplate that it is a very good strategy to implement. Still, it can be improved with machine learning or artificial intelligence strategies that facilitate faster collection and the inclusion of more hospital centers. In the same way, we believe it is necessary to achieve greater coordination of different initiatives of scientific societies, hospital consortiums, or networks that seek similar objectives. It is possible that if they can be integrated, they could contribute more quickly.

Declarations

Ethics approval and consent to participate
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Consent for publication
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Author contributions
Diego Alejandro Cubides-Diaz: Formal analysis; Investigation; Methodology; Writing – original draft; Writing – review & editing.

Carlos Arturo Alvarez-Moreno: Conceptualization; Methodology; Project administration; Resources; Supervision; Validation; Visualization; Writing – review & editing.

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