

Mpox in Africa (2022-2024)

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Background

In December 2022, the Democratic Republic of Congo (DRC) declared a national outbreak of mpox as cases increased and spread at rapid rates¹. While the DRC is the most affected country in Africa, 18 other African countries across all five regions of Africa have reported cases in 2024, including previously non-endemic countries². Overall, mpox cases in Africa have increased by more than 500% in 2024 compared to 2023 and by 79% in 2023 compared to 2022^{3,4}. Mpox is a zoonotic infectious disease caused by the monkeypox virus (MPXV)⁵. It is closely related to smallpox caused by the variola virus which is part of the same genus as MPXV; the *Orthopoxvirus* genus⁶. Mpox was first discovered in the DRC (formerly Zaire) in 1970 around the same time the last smallpox case was reported^{7,8}. Shortly after, several other West and Central African countries began reporting mpox cases with repeated zoonotic spillovers and limited human-to-human transmission⁸. Before 2022, mpox was endemic to 11 West and Central African countries affected by two distinct clades of the MPXV: clade I (formerly the Central African clade) and clade II (formerly the West African clade) which can be further subcategorised into clade IIa and clade IIb⁹. Clade I MPXV is suggested to be more deadly with a case-fatality ratio (CFR) of 10.6% compared to a CFR of 3.6% for clade II¹⁰.

Transmission, Clinical Presentation, Diagnosis, and Treatment

Mpox spreads from infected animals to humans or from infected humans to humans through direct contact with skin, bodily fluids, or contaminated objects^{5,11}. Although it is less common, infected pregnant individuals can also transmit the virus to their foetus or newborn¹¹. The incubation period ranges from approximately 1 to 21 days but on average, symptoms present within a week^{5,12}. Individuals suffering from mpox typically develop fever, lymphadenopathy, malaise, muscle aches, and a rash^{5,12,13}. The rash begins as an ulcer which becomes fluid-filled, itchy, and painful, before crusting and falling off as it heals⁵. In most cases, mpox is a self-limiting disease however, in people with a weakened immune system the disease can be fatal and complications such as bacterial skin infections, encephalitis, myocarditis, and eye problems can develop^{5,13}.

The preferred laboratory test for confirming mpox is a polymerase chain reaction (PCR) test to detect viral DNA⁵. Swabs tested are taken directly from the rash⁵. Blood samples are not recommended, and antibody testing cannot distinguish between orthopoxviruses⁵. Laboratory confirmation is necessary as mpox is difficult to distinguish from similar diseases such as measles or herpes⁵. Antivirals such as tecovirimat have been used to treat mpox however, recent preliminary evidence demonstrates that tecovirimat is ineffective at treating clade I MPXV and further research is needed to understand its effectiveness^{5,14–16}. Bavarian Nordics Modified Vaccinia Ankara vaccine (MVA-BN) known as JYNNEOS in the United States (US) or Imvamune and Imvanex outside the US is a licensed mpox vaccine that is safe and effective however, further research is needed to understand the vaccine's effectiveness in different at-risk groups^{14,17–19}. These vaccines have been recommended for use by the World Health Organization (WHO) Strategic Advisory Group of Experts on Immunization and from 7 August 2024, Emergency Use Listing of the vaccines enabled GAVI and UNICEF to procure them for distribution without national regulatory approval^{20–22}. The MVA-BN vaccine is the first mpox vaccine to be prequalified by the WHO²³. Recent findings from a clinical trial based in the United States demonstrate that the MVA-BN vaccine is safe in adolescents aged 12 to 17 years old²⁴. These results provide encouraging evidence supporting the extended use of the vaccine to younger individuals²⁴. There is a need to continue evaluating the vaccine in even younger age groups²⁴.

Global 2022 mpox outbreak

In May 2022, the United Kingdom (UK) reported a mpox case in an individual who had recently travelled to mpox-endemic Nigeria²⁵. Shortly after, several community-acquired cases with no links to endemic countries were reported²⁵. By July 2022, the WHO declared a Public Health Emergency of International Concern (PHEIC) as mpox spread globally²⁶. The US became the most affected country, with 32,820 cases reported between January 2022 and April 2024²⁷. The global mpox outbreak was driven by clade IIb MPXV and differed in transmission and clinical presentation from what was traditionally known^{5,28}. It spread predominantly via sexual contact and heavily affected men who have sex with men²⁸. Some cases would present with only a few genital lesions before prodromal symptoms such as fever or malaise²⁸. Mpox cases globally began to decline and the PHEIC was no longer in place by May 2023²⁶. In August 2024, a PHEIC for mpox was declared again due to the rapid rise of cases in Africa^{29,30}.

Mpox in the DRC

Mpox cases in the DRC have increased at an exponential rate since December 2022. From 1 January to 3 November 2024, there were 39,501 cases (8,662 confirmed) and 1,073 deaths². Many suspected mpox cases remain unconfirmed due to limited diagnostic capacity and it is estimated that only 40% of suspected cases are tested with almost half testing positive^{2,31}. Rapid Diagnostic Tests (RDTs) to boost testing at a community level is urgently needed³². A systematic review by Africa CDC's Diagnostic Advisory Committee (DAC) found that there are no independently validated RDTs with a sensitivity of at least 80% suitable for use in Africa³². The WHO Emergency Use Listing (EUL) of three diagnostic tests aims to improve global access to mpox testing (**Table 1**)^{33,34}. Individuals less than 15 years old remain the most impacted and represent 66% of total mpox cases and 82% of deaths³⁵. Children may be more affected due to their reduced immunity exacerbated by high malnutrition rates and a lack of protection that previously administered smallpox vaccines would have provided to older populations^{36,37}. In addition, an increasing number of children in the DRC are presenting with mpox-measles co-infection particularly in South Kivu, Eastern DRC heightening the risk of co-infection in treatment centres where measles vaccination rates are low³⁸.

WHO EUL listing date	Manufacturer	Product name
3 October	Abbott Molecular Inc.	Alinity m MPXV assay (Alinity m AMPXV Amplification (AMP) Kit & Alinity m MPXV Control (CTRL) Kit)
14 October	Roche Molecular Systems Inc.	Cobas MPXV Qualitative assay for use on the cobas 6800/8800 Systems
28 October	Cepheid	Xpert Mpox

Table 1: Diagnostics listed under WHO Emergency Use Listing³³

The DRC is affected by the clade I MPXV strain, which has suggested increased lethality¹. Traditionally, transmission mainly occurred via zoonotic spillover events and household contacts in provinces close to tropical rainforests⁸. However, this outbreak has seen sustained human-to-human transmission of clade I MPXV and geographical spread to urban provinces including the densely populated capital city, Kinshasa³⁹. Previously, 11 out of 26 provinces in the DRC were affected by mpox but by 25 August 2024, this increased to all 26 provinces³⁵. Concerningly, mpox has spread to highly mobile populations, including displaced people, in Eastern DRC which suffers from ongoing conflict and insecurity^{1,40,41}. This region, particularly North and South Kivu, is most affected by the outbreak⁴². In North Kivu, approximately a third of the people affected are internally displaced people (IDP)³¹. Half of the cases within this province are children and this increases to 75% within IDP camps³¹. As of 5 November 2024, South Kivu, which has reported a dramatically increasing trend of mpox cases, continues to have the highest number of cases in the DRC^{2,34}.

In August 2024, mpox crossed beyond DRC borders to neighbouring, previously non-endemic, East African countries (**Figure 1**)^{43–47}.

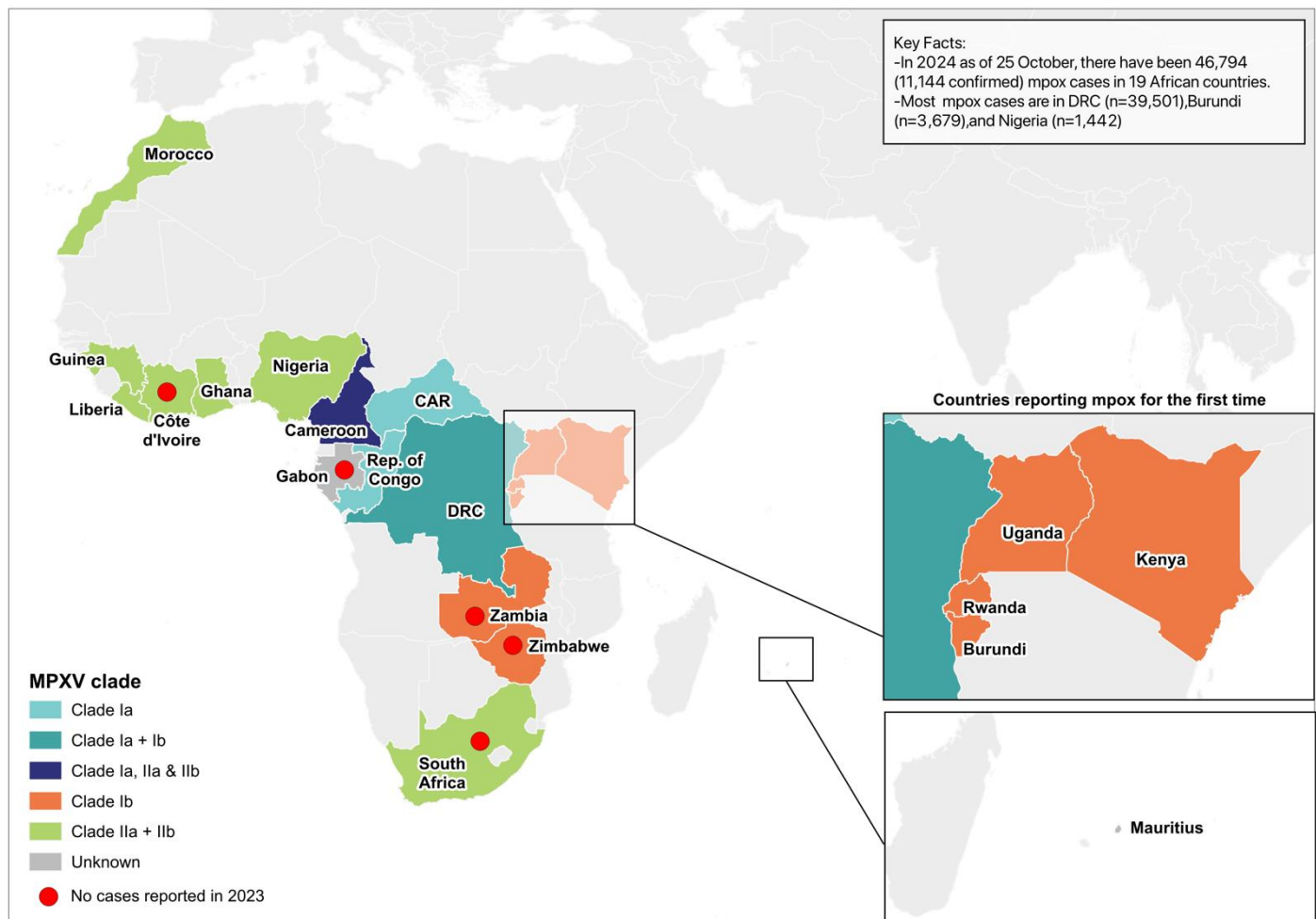


Figure 1: Mpxv cases in Africa (2024)

Abbreviations: CAR (Central African Republic); Rep. of Congo (Republic of Congo); DRC (Democratic Republic of Congo)

Map made in QGIS using Natural Earth Data. Data on mpxv cases was obtained from the WHO [2022-24 Mpxv Outbreak: Global Trends](#) (5 Nov 2024)².

In April 2023, sexual transmission of clade I MPXV was reported for the first time from the Kwango province in DRC³⁹. The case (case 1) was a Belgian male resident who frequently travels to the DRC³⁹. After arriving in the DRC in March 2023, the individual had several sexual encounters (six men and three women)^{39,48}. Five sexual and non-sexual contacts of case 1 tested positive for mpxv. Epidemiological investigations reveal that the exposure to MPXV likely occurred in Belgium and genomic sequencing confirms that the cluster of sexually transmitted cases from Kwango is being driven by clade I MPXV³⁹. Belgium has not identified the circulation of clade I MPXV yet⁴⁹. Between September 2023 and February 2024, South Kivu province in DRC reported clade I MPXV cases driven by sexual transmission, and female professional sex workers were especially affected comprising 29% of cases⁵⁰. Concerningly, mpxv has spread to displaced people in Goma, one of the most affected regions in the North Kivu province, where rates of sexual violence are high increasing the likelihood of spread to victims of sexual violence^{31,51}. Transmission in North Kivu is exclusively human-to-human with a significant portion reporting sexual transmission, particularly among professional female sex workers³¹.

Genomic sequencing from South Kivu samples obtained between October 2023 and January 2024 revealed a novel variant of clade I MPXV had emerged with APOBEC3-type mutations^{1,52}. This is now referred to as clade Ib. Mutations represent the deletion of a gene in the same position as the clade IIb MPXV and have led to the failure of the clade I specific RT-PCR diagnostic tests recommended by the CDC⁵³. However, a new RT-PCR test specific to clade Ib MPXV detection has recently been developed to mitigate this⁵⁴. The

novel variant is indicative of virus adaptation from sustained human-to-human transmission and recent evidence suggests that this variant is mutating at a higher rate compared to clade IIb MPXV^{50,55}. Further research is needed to determine if this novel variant is more transmissible or deadly¹. As of 13 October, clade Ib MPXV has been detected in South Kivu, North Kivu, Kinshasa, Kasai, Tshopo, and Tanganyika DRC provinces³⁴. The CFR differs between affected DRC provinces³⁴. Provinces affected by clade Ia MPXV have a CFR of more than 4%, whereas provinces where clade Ib MPXV is circulating have a CFR of <0.5%³⁴. Further research is needed to determine if this difference is due to the viral, population differences, or differences in case detection and reporting³⁴.

Mpox in Africa

Beyond the DRC, the spread of mpox in Africa is alarming. South Africa, Guinea, and Côte d'Ivoire reported clade II MPXV cases in 2024 after not reporting any cases in 2023⁵⁶. This is in addition to Nigeria, Ghana, Liberia, Morocco, and Cameroon, which continue to report clade II MPXV cases in 2024 (**Figure 1**)^{2,22,57–59}. This highlights the ongoing transmission of clade II MPXV and the continued threat it poses. Gabon has also reported mpox cases in 2024 after not reporting any in 2023, and Mauritius has confirmed an mpox case for the first time in the country in an individual who travelled from Nigeria via Kenya^{2,56,60}. The MPXV clade responsible in these countries is yet to be determined². Along with DRC, the Central African Republic and the Republic of Congo have continued to report cases of clade Ia in 2024²². In the Republic of Congo, cases have spread to Paoua, a region bordering Chad and increasing the risk of further spread to other countries⁴.

Even more concerning is the spread of clade I MPXV beyond the DRC to previously non-endemic East Africa. Four countries, Rwanda, Burundi, Uganda, and Kenya have reported mpox for the first time^{57,59}. Burundi is now reporting the second largest number of mpox cases in Africa after the DRC^{2,47}. Cases initially identified in Rwanda and Uganda had a history of travel to the DRC^{57,59}. As of 23 October, the mpox outbreak in Uganda has been expanding and predominantly affects sex workers however, household contacts, including children, are increasingly affected³⁴. This shift in transmission dynamics has been reported from Eastern DRC and Burundi³⁴. The initial case identified in Kenya was a long-distance driver who had driven from Kampala in Uganda to the Taita-Taveta County in Kenya at the Tanzanian border⁵⁷. He intended to travel through Tanzania to Rwanda, demonstrating the impact that highly mobile populations have on the spread of disease beyond country borders⁵⁷. Most cases reported in Kenya as of 20 October 2024, have been persons with a history of travel including long-haul truck drivers³⁴. By 23 October 2024, Kenya and Uganda reported their first deaths due to mpox in persons living with HIV, emphasising this population's high risk for poor mpox outcomes³⁴. Genomic sequencing revealed that cases detected in East Africa had been infected by the novel variant (clade Ib MPXV) mainly circulating in Eastern DRC^{57,59}. In addition, Zimbabwe and Zambia have also reported cases of clade Ib MPXV for the first time after not reporting any mpox cases in 2023^{2,60}.

Central Africa is the most impacted region and accounts for >85% of cases and >99% of deaths on the continent⁴.

Clade I MPXV outside of Africa

On 15 August 2024, mpox associated with the novel clade Ib MPXV was reported from Sweden in an individual with a recent travel history to an African country where clade Ib MPXV is circulating^{59,61,62}. This was the first reported case of clade Ib MPXV outside of Africa^{59,61}. By 18 October 2024, clade Ib MPXV cases had additionally been reported in Thailand (n=1), India (n=1), and Germany (n=1)³⁴. Similar to Sweden, cases reported in Thailand and Germany had recent travel history to an African country affected by mpox⁶³. However, the case reported in India had a travel history to the United Arab Emirates

(UAE)^{34,64,65}. The case reported from Germany is a male who has reported engaging in heterosexual contact during their travel⁶⁶.

As of 6 November 2024, the UK has reported 4 cases of clade Ib MPXV and is the first country outside of Africa to have secondary transmission of clade Ib MPXV⁶⁷. The first case identified was an individual who had a travel history to affected countries in Africa⁶⁷. The three additional cases identified are all household contacts of this case⁶⁷. Despite this new information, the European Centers for Disease Prevention and Control (ECDC) maintain that the risk of mpox to the European population remains low⁶⁷.

Public Health Response

The mpox situation in the DRC and Africa is especially concerning for the following reasons:

- Rapid human-to-human transmission is driving mpox as opposed to zoonotic spillover.
- The reports of sexual transmission associated with clade I MPXV for the first time have introduced a new mode of transmission that puts female sex workers and victims of sexual violence at increased risk.
- Children less than 15 years old are most impacted by mpox and represent the largest portion of deaths.
- A novel variant (clade Ib MPXV) has emerged and there is a lack of understanding about its transmissibility and ability to cause severe disease.
- Mpox has spread to highly mobile populations in Eastern DRC, which suffers from ongoing conflict and insecurity. This increases the risk of spread other countries. Four previously non-endemic East African countries and four non-African countries have already reported clade Ib MPXV cases (mostly imported).
- There is a lack of capacity and medical countermeasures in DRC to control the mpox outbreak and the situation is likely worse than what is being reported.
- Countries including South Africa, Côte d'Ivoire, Guinea, Zimbabwe, Zambia, and Gabon that reported no mpox cases in 2023 are reporting cases in 2024 indicating the threat of continued global mpox spread.

On 13 August 2024, Africa CDC declared a public health emergency of continental security (**Figure 2**)⁶⁸. This is the first time the declaration has been used⁶⁸. The declaration is designed to empower Africa CDC to coordinate a response and mobilise resources⁶⁸. The organisation has set up an Incident Management Team to support affected countries and while the situation is concerning, Africa CDC states that there is no need for travel restrictions at this time⁶⁸. In alignment with the Africa CDC, the WHO declared the mpox outbreak a PHEIC on 14 August 2024^{29,30}. The WHO Director-General emphasised the importance of an internationally coordinated response and UN agencies are working with the governments of affected countries^{29,30}. The WHO developed a regional response plan and anticipates that \$15 million is needed to support surveillance, preparedness, and response^{29,30}. The WHO Contingency Fund for Emergencies has released \$1.45 million so far and appeals are being made for donor support^{29,30}.

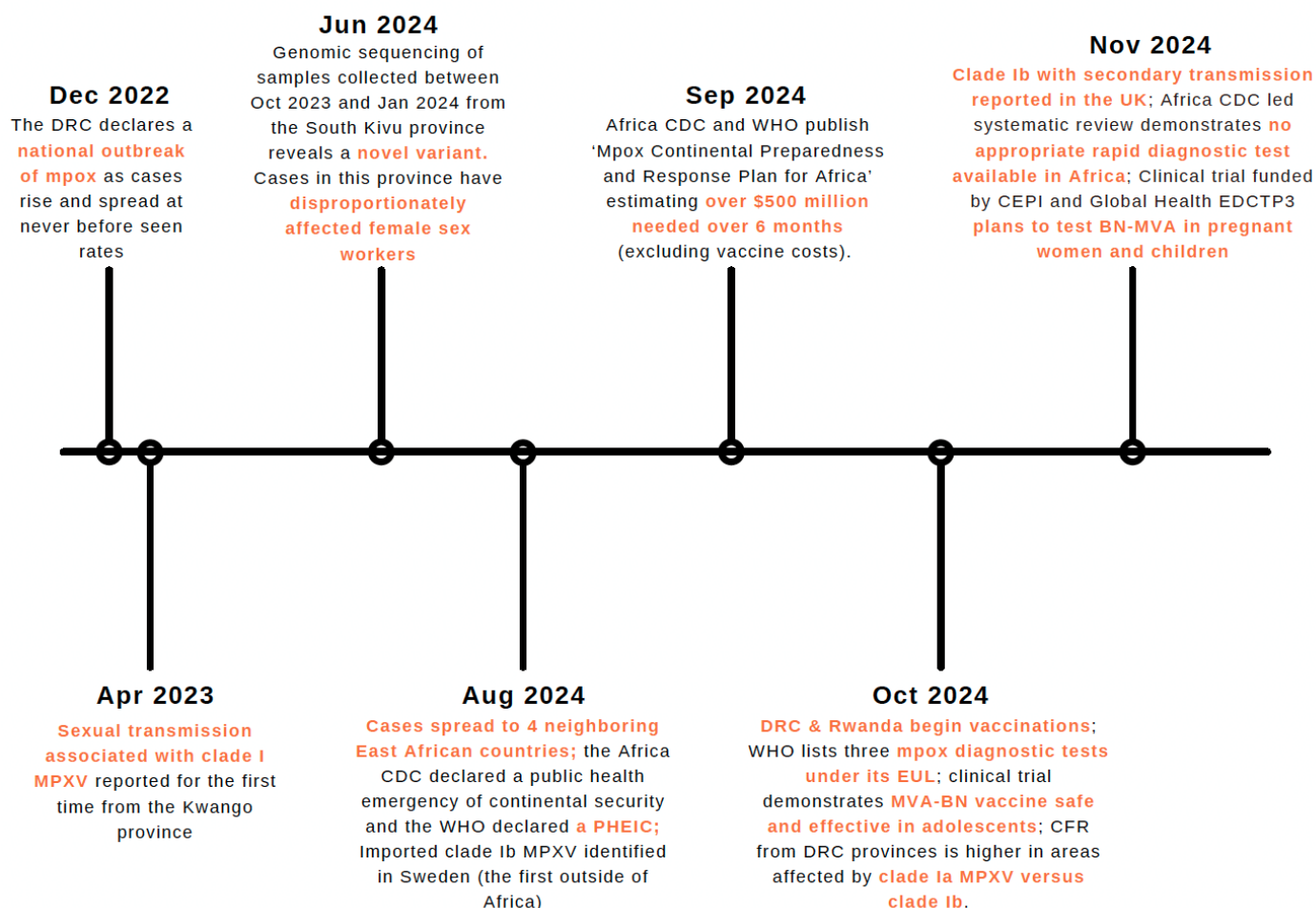


Figure 2: Summary timeline of significant events related to the DRC mpox outbreak

Africa CDC and the WHO published a Mpox Continental Preparedness and Response Plan for Africa and estimated a budget of over \$599 million needed between September 2024 and February 2025 (excluding vaccine costs)³. The preparedness and response plan outlines ten essential priorities considering cross-border transmission and highly impacted countries³. The document also developed mpox risk categories for African countries **as of 5 September 2024 (Table 2)**³.

1	Countries experiencing sustained human-to-human transmission	DRC, Burundi, Nigeria, South Africa, Cote d'Ivoire, CAR
2	Countries not in category 1 but experiencing sporadic human cases since 1 January 2022 and/or countries with zoonotic reservoirs	Rwanda, Kenya, Uganda, Sierra Leone, Liberia, Ghana, Cameroon, Gabon, Republic of Congo, Morocco, Egypt, Benin, Mozambique, Guinea, Sudan
3	Countries not in category 1 or 2 that are assessed as requiring enhanced readiness including due to proximity to category 1 countries by land, air, or sea	Angola, Zambia, Eswatini, Lesotho, Ethiopia, Somalia, South Sudan, Tanzania
4	All other countries	

Table 2: Mpox risk categorisation

As developed by Africa CDC and WHO, published in the '[Mpox Continental Preparedness and Response Plan for Africa](#)' (Sep 2024). Countries categorised are according to information available as of 5 September 2024.

As of 26 October, the WHO has assessed the mpox risk as high in DRC and moderate for all other countries³⁴.

The lack of medical countermeasures (MCMs) available is concerning. Africa CDC has called for international solidarity as it states that the continent needs 10 million vaccines⁶⁹. Several steps have been taken to support DRC and the wider African continent in obtaining MCMs. These include:

- The WHO-initiated process for Emergency Use Listing (EUL) for mpox vaccines enabling Gavi and UNICEF to procure vaccines and increase access to countries yet to obtain national regulatory approval^{29,30}.
- The establishment of an access and allocation mechanism for mpox medical countermeasures (including vaccines) by the WHO and partners⁷⁰.
- The prequalification of the MVA-BN mpox vaccine by the WHO. This will help accelerate the procurement of mpox vaccines²³.
- A UNICEF issued emergency tender that aims to secure mpox vaccines for the most impacted countries in collaboration with various partners, including Africa CDC, GAVI, WHO, and PAHO⁷¹. One outcome of this tender has been an agreement to secure MVA-BN vaccines at the lowest market price ensuring vaccine access to 77 low- and middle-income countries⁷².
- A partnership between Africa CDC and Bavarian Nordic to enhance vaccine manufacturing capacity in Africa⁷³.
- The MOSA clinical trial sponsored by PANTHER, which aims to advance mpox therapeutics across Africa⁷⁴.
- A clinical trial jointly funded by CEPI and Global Health EDCTP3, which will test the BN-MVA vaccine in pregnant women and children less than 2 years old⁷⁵.

As of 5 October 2024, the DRC has started vaccinating high-risk groups in Eastern DRC, the most affected region⁷⁶. They have also extended use to adolescents⁴. They obtained vaccines against mpox from Bavarian Nordic, the United States, Gavi, and Europe including the European Commission's Health Emergency Preparedness and Response Authority (HERA)^{76,77}. While over 280,000 vaccine doses have already arrived in Africa, 5.3 million doses have been pledged so far⁷⁷. Rwanda has also started vaccinations against mpox and Nigeria has plans in place to commence⁴.

Useful Resources

- Pandemic PACT has our dedicated [Mpox page](#) in the Outbreak section of the website which provides information and analyses of active mpox research and funding globally since 2020.
- The WHO Research & Development (R&D) Blueprint for Epidemics team has developed vaccine and therapeutic trackers for mpox which can be found in the 'Technical Areas' section of their [webpage](#) on Mpox^{78,79}.
- The WHO R&D Blueprint team has also developed '[A Coordinated Research Roadmap](#)' which suggests necessary research and a '[Mpox outbreak and study sites](#)' interactive online tracker with information on studies being conducted in the African region.

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