# Is Southeast Asia and the Western Pacific ready for potential monkeypox virus outbreaks?

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## Summary

**The new variant of the monkeypox virus (MPXV) clade Ib has recently spread to other African countries outside the Democratic Republic of the Congo (DRC), prompting the World Health Organisation to declare the outbreak as a public health emergency of international concern (PHEIC). This comes just two years after the initial PHEIC that was issued for the clade IIb outbreaks. Compared to the clade IIb outbreaks, clade Ib shows a demographic shift, including higher case fatality rates for younger individuals, indicating a possibility of additional transmission pathways through heterosexual and household contacts. Given that many countries in the Western Pacific (WPR) and the Southeast Asian region (SEAR) hold a disproportionate burden of endemic infectious diseases and have difficulties engaging key at-risk populations, an outbreak of the potentially more virulent clade Ib virus could have devastating impacts on the health care systems. Thus, strategy planning against the potential emergence of clade Ib MPXV in the regions is required, including surveillance systems for detection, modelling studies to perform risk assessments, implementation of non-pharmaceutical interventions, and vaccination, and regional collaboration to ensure equitable distribution of vaccinations.**



Keywords: mpox; Emerging infectious disease; Outbreak readiness

The monkeypox virus (MPXV) clade I epidemic affecting the Democratic Republic of the Congo (DRC), has recently spread to several African countries including Burundi, Rwanda, Kenya, and Uganda as the new variant clade Ib.[1] Public health emergencies of continental and international concern were declared on 13 and 14 August 2024 by the Africa Centres for Disease Control and Prevention and the World Health Organisation.[1,2] Countries reporting MPXV clade Ib cases are facing resource strains which hinder the ability of local health systems to enhance surveillance, diagnostics, and contact tracing.[3,4] Coordinated efforts between global stakeholders and local authorities are required to build sustainable surveillance and diagnostic infrastructures, including investments into mobile laboratories and reliable rapid tests. Processes to increase vaccine access in resource-limited areas and support local control strategies have been triggered,[1] although it is unclear if these efforts will be sufficient to curb further cross-border transmission.

The emergence of the multiple-country clade Ib MPXV outbreak could pose a threat to countries within the Asia Pacific Region - covering the Western Pacific (WPR) and Southeast Asian (SEAR) regions - which are still affected by the clade IIb MPXV global outbreak that started in 2022. A total of 6215 cases of MPXV have been reported by countries in WPR and SEAR and three countries - Thailand, India and China - have reported cases of MPXV Clade Ib[4] (Table 1), raising concerns of future outbreaks of a clade I variant.

During the clade IIb outbreak in the Asia Pacific, which occurred from 2022 to 2023, a shift in the outbreak profile was observed from sporadic cases to outbreaks in many countries, with sustained human-to-human transmission.[5] Surveillance data of cases outside the WHO African region, mostly attributed to cases of clade IIb, showed that 97% of MPXV clade IIb cases were in male individuals, with men who have sex with men (MSM) mostly affected.[4] Sexual contact is the most reported transmission route for clade IIb.[4] This contrasts with the clade Ib outbreak in the DRC in 2024 where 41% of the 852 confirmed cases were female and 50% were children under the age of 15.[3] While the cause for this demographic shift in cases has not been identified, additional transmission routes affecting the wider population, such as direct physical contact in households, raises concerns that clade Ib could potentially be

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| Country | WHO region | Total | Clade Ib cases |
|---|---|---|---|
| Thailand | South-East Asia | 865 | 4 |
| Indonesia | South-East Asia | 88 | 0 |
| India | South-East Asia | 36 | 1 |
| Sri Lanka | South-East Asia | 4 | 0 |
| Nepal | South-East Asia | 3 | 0 |
| China | Western Pacific | 2806 | 7 |
| Australia | Western Pacific | 1554 | 0 |
| Japan | Western Pacific | 252 | 0 |
| Viet Nam | Western Pacific | 209 | 0 |
| Republic of Korea | Western Pacific | 172 | 0 |
| Singapore | Western Pacific | 68 | 0 |
| New Zealand | Western Pacific | 69 | 0 |
| Philippines | Western Pacific | 63 | 0 |
| Cambodia | Western Pacific | 13 | 0 |
| Malaysia | Western Pacific | 10 | 0 |
| Guam | Western Pacific | 1 | 0 |
| Lao People's Democratic Republic | Western Pacific | 1 | 0 |
| New Caledonia | Western Pacific | 1 | 0 |

*Table 1:* **Cumulative number of laboratory-confirmed MPXV cases between January 2022 to 31 December 2024 for total MPXV cases, and till 10 February 2025 for MPXV Clade Ib.[4]**

more transmissible than clade IIb, though this remains to be confirmed.[1,3]

A further difference between the clades is the potential increase in case fatality rates (CFRs). Although the CFR of clade IIb has been estimated at around 0.1%, this is most likely representative of high-income countries and it is not directly comparable with data for clade Ib, which is mostly restricted to African settings as of October 2024. However, according to data comparing clades Ia and IIa from African countries prior to the 2022 global epidemic, clade Ia had a higher reported CFR of 10.6% (95% CI 8.4–13.3%) than clade IIa at 4.6% (95% CI: 2.1–8.6%).[6] Additionally, age-specific CFR data from the DRC in early 2024 (Ia and Ib aggregated) showed an increased CFR in younger age groups with CFRs of 2.4% for those aged 15 and above, 3.7% for ages 5–15, and 7.8% for children under 4.[3] Although recent reports suggested lower CFRs in the clade Ib-circulating provinces in DRC,[7] uncertainty remains on the extent to which this is attributable to difference in background populations.[8] A more comprehensive comparison of the epidemiological characteristics of clade Ib and clade IIb, including transmissibility, virulence and at-risk groups is needed, especially considering that the African continent has been experiencing outbreaks of multiple clades.[4]

Many health systems in SEAR and in the WPR handle a disproportionate amount of the global burden for endemic infectious diseases, including flaviviruses, such as dengue (55.3% SEAR; 6.5% WPR), hepatoviruses, such as Hepatitis B (38.2% SEAR; 24.0% WPR), and bacterial diseases, such as tuberculosis (46% SEAR; 18% WPR).[9–11] Additionally, the COVID-19 pandemic profoundly impacted the SEAR and WPR regions with 243.7 million cases and 1.13 million deaths reported from January 2020 to December 2022.[12] This highlighted inequities in the accessibility of vaccines as relative to high-income countries, that reached 74.72% COVID-19 vaccination coverage by December 2022, while, for example, Indonesia and Laos reached 61.88% and 69.09% in the same period, respectively.[13] A MPXV epidemic could be highly detrimental for the health systems in SEAR and in the WPR, which are not prepared for emerging threats of non-endemic infectious diseases.[14]

Strategic planning in response to the possible emergence of clade Ib MPXV is further complicated by the uncertainty of the current estimations of risk of infections, severe illness and death in the region. While less than 5% of the global case burden of MPXV clade IIb was reported for the Western Pacific,[4] this could be an underestimation, considering limited surveillance and stigma associated with infections.[15] Real-time detection via surveillance systems and serosurveys for prevalence estimation are urgently required to gather important data on the spread of MPXV across the population.

Real-time detection requires immediate regional prioritisation to establish robust MPXV PCR testing capacities, until reliable rapid antigen tests are available. Intra and cross regional collaboration is also urgently required to efficiently set up such facilities, especially in settings in need of financial and technical support, where the sharing of case detection data could be greatly informative in planning responses in case of an outbreak. The availability of testing facilities can also support contact tracing efforts for confirmed cases, which can allow for swift and effective isolation and treatment, as well as for the characterisation of the transmission profile. Additionally, geospatial wastewater surveillance could identify hidden transmission clusters.[16]

In addition, we propose the implementation of serosurveys in three key groups to inform response efforts. First, populations aged 45 and older who may have received smallpox vaccination, as immunity cannot be assumed. A study in Spain found that 68.5% of individuals over 50 had detectable antibodies,[17] but data for SEAR and WPR is lacking. Second, serosurveys should target those under 45, as vaccination coverage in this group is unknown. Lastly, individuals who have been vaccinated in private healthcare settings or abroad, or who have previously travelled to areas reporting MPXV cases, should have their exposure and immunity profiles characterised.

Modelling studies can leverage detection and serosurvey data to better understand the epidemiological profile of both mpox clades and support risk assessment and the planning of control measures. However, MPXV spread across different demographic groups requires additional data. As sexual contact is an important

mechanism of clade Ib and clade IIb transmission,[3,4] useful data would include information on sexual contacts across time. Non-sexual contact transmission,[3,4] although not fully characterised, requires data on both intra- and inter-household contact patterns, as well as the role of environmental contamination profile in terms of infection rates. These data are lacking in the region, thus requiring modelling efforts to be estimated.

Throughout the COVID-19 pandemic, countries and territories within the WPR and SEAR have made significant strides in implementing targeted non-pharmaceutical interventions (NPIs) such as isolation, quarantining, behavioural interventions, and border control, alongside vaccination programs. These efforts have developed varying levels of infrastructures designed to control infection outbreaks in hospitals, workplaces, and schools.[18] While the transmission routes for SARS-CoV-2 and MPXV differ, existing infrastructure developed for the COVID-19 response can be adapted and utilised for mpox control. Behavioural interventions could focus on promoting sexual health and encouraging frequent sexually transmitted infections testing. In addition, quarantine and isolation facilities and protocols developed for COVID-19 can be adjusted to mitigate MPXV spread. However, the implementation of NPIs may be insufficient as a response to an outbreak with high susceptibility in the population. An alternative option could be the implementation of pre-emptive vaccination programs, using the vaccination deployment methods implemented during the COVID-19 response. Vaccine prioritisation to key populations would be an important strategy, especially when real-time surveillance is limited, although public acceptance of the MPXV vaccine in most countries within the SEAR and WPR remains uncertain.[19]

Currently, travels between affected African countries and Asia are limited but if cases spread to new countries and territories which share higher travel volumes with SEAR and WPR, the risk for outbreaks could change and increase. In this event, we may observe a similar series of outbreaks across Asia, as observed for MPXV clade II.[4] Before this occurs, it is important to immediately prepare populations for outbreak control. This includes enhancing public knowledge of MPVX and providing person-centred and stigma-free services.

The stockpiling of JYNNEOS vaccines is currently being explored by multiple countries in the region as a national priority but stockpile sizes and strategies could vary, making a homogeneous regional approach to prioritise key populations across multiple countries simultaneously difficult, as reflected also by COVID-19 vaccines access disparities.[13] It is important to evaluate the effectiveness of border controls in conjunction with vaccination coverage in each country or territory. This approach can lead to determining how to balance both these strategies. International co-benefit analyses between countries with vaccination programs and travel restrictions are also needed for a more optimal and collaborative outbreak control.

Many countries in WPR and SEAR have faced many challenges in engaging key populations like MSM, as indicated by low uptakes of the MPXV vaccines in the WPR region.[19] During the 2022 clade II MPX outbreak, studies addressing attitudes towards MPXV vaccines were conducted in both regions.[15,20] They found that MSM were motivated to take up the vaccine not only to protect themselves from MPXV but also to avoid stigma associated with sexual orientation or sexual activity. Concerns on confidentiality and anonymity when accessing MPXV vaccines were also expressed. Building on the WHO's guidance for addressing stigma and discrimination[21] and successful case studies of community engagement and stigma reduction,[22] stigma reduction campaigns should be considered in the region.

As we grapple with an outbreak of clade Ib cases while on the heels of a clade IIb global outbreak, we must consider looking not only into engagement with at-risk populations, but also with the public, using established community networks to raise awareness and prevent misinformation.

Modelling work suggested that pre-emptive vaccination can assist in both delaying and reducing outbreak peaks by 50.6% (30.1%–77.8%) for modelled MPXV clade IIb outbreaks, reducing healthcare resource strain, and that retrospective rollout is less effective to mitigate epidemic curves.[23] The effectiveness of JYNNEOS vaccines is estimated at 35.8% for the first dose and 66% for two doses, which may therefore require high coverage rates to suppress outbreaks.[24] Additionally, the use of third-generation smallpox vaccines, including the JYNNEOS vaccine, as post-exposure prophylaxis was found to be 88.8% (95% CI: 76.0–94.7) effective in preventing breakthrough infections, and 85.5% (95% CI: 26.7–97.1) effective in avoiding polysymptomatic disease in people who developed the disease.[25] However, global shortages and limited production capacity of JYNNEOS pose significant challenges, with vaccine equity likely to be a concern.[26] The WHO and regional bodies must advocate strongly with manufacturers and donors to prevent disparities in access, particularly given the high vaccine costs.[27] Considering these challenges, a needs-based financing approach that considers health gains and economic costs of different vaccination scenarios (e.g., targeted versus national campaigns, integration with other interventions such as screening, contact tracing and quarantine) is essential for equitable and effective resource allocation. In the event of JYNNEOS vaccine shortages, other vaccines such as ACAM2000, may need to be utilised.[28] Other than the JYNNEOS and ACAM2000 vaccines, newer vaccines are also under investigation in clinical trials, including mRNA vaccines (mRNA-1769, BNT166a) in the United Kingdom and in the United States of America, with both studies (ClinicalTrials.gov IDs: NCT05995275 and NCT05988203) estimated to be completed in mid-2025.[29,30]

It seems conceivable that MPXV will continue to re-emerge due to challenges in controlling a zoonotic virus, and particularly one that circulates in resource-limited settings with insufficient healthcare access. Additionally, stigma associated with the disease hinders identification and treatment, and the high cost of vaccines remains prohibitive for many, especially in the absence of support from the government. Both WPR and SEAR are mobilising now, having learnt lessons through the COVID-19 pandemic on the importance of pre-emptive response and planning. Several of the above-mentioned surveillance strategies and interventions will not be feasible in all contexts and will require regional and global support and tailoring. Decisionmakers, healthcare professionals, and public health experts should not wait for the emergence of imported cases and outbreaks before planning and executing outbreak mitigation measures.

#### Contributors

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#### Declaration of interests

None to report.

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