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Intra-Action Review of Sierra Leone's 2025 Mpox Outbreak Response: Insights for Advancing Decentralized Public Health Systems

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Abstract

In complying with the International Health Regulations Monitoring and Evaluation Framework (IHR-MEF), the National Public Health Agency (NPHA) mounted a phased Intra-Action Review (IAR), beginning at the regional level and proceeding to the national level, to assess response activities, identify best practices, and recommend corrective actions. The paper aims to report on Sierra Leone's decentralized response to the 2025 mpox outbreak through the lens of a structured IAR process. The IAR employed an interactive approach, using a user-friendly approach and systematic facilitation techniques. The focus was not on the individual performance of the mpox response but rather on the health system's overall performance.

The IAR revealed that operationalization of the Incident Management System, decentralization of response structures, and engagement of community and partner institutions strengthened response capacity across districts. These approaches contributed to improved coordination, expanded access to services, and enhanced collaboration among stakeholders at national and subnational levels. At the same time, the review shows persistent systemic weaknesses that limited operational efficiency. Delays in funding disbursement, logistical constraints, data management challenges, and gaps in community engagement affected the timeliness and consistency of interventions.

Improving emergency preparedness requires more efficient and reliable financing systems so that response activities can begin quickly at both the national and district levels. Funds should be released on time, and districts should have greater control over resources. This will improve response speed and reduce delays in carrying out important interventions.

Keywords: Intra Action Review (IAR); Incident management system; Incident Action Plan (IAP); mpox

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Introduction

An Intra-Action Review (IAR) is a qualitative review of activities taken so far in response to an emergency to identify best practices, lessons learnt, and gaps in a national public health response (Wubu et al., 2022). IAR mainly examines the personal experiences and perceptions of those involved in the response to identify what worked, what didn't, and how to improve. On the 10th of January 2025, Sierra Leone confirmed the case of mpox from the Western Areas District (A. A. Jalloh et al., 2025; M. B Jalloh et al; 2025). Mpox, previously known as monkeypox, is a viral zoonotic disease caused by the monkeypox virus, which belongs to the Orthopoxvirus genus (M. B. Jalloh et al., 2025; Karagoz et al., 2023). It primarily affects animals but can also be transmitted to humans, leading to significant health implications. The disease is characterized by fever, rash, and swollen lymph nodes, and can result in severe complications, particularly in immunocompromised individuals (Johri et al., 2022). The impact of mpox outbreaks extends beyond immediate health concerns; they can strain healthcare systems, disrupt economies, and challenge public health infrastructures (Nannie Conteh et al., 2023).

To effectively mitigate these risks, the Incident Action Plan (IAP) encompasses comprehensive strategies for outbreak detection, response coordination among healthcare entities, and clear communication with the public to enhance awareness and preventive measures. Addressing mpox through a structured response plan is pivotal for safeguarding communities and curbing the potential spread of the disease.

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Consequently, and in accordance with the IHR 2005, Sierra Leone conducted an IAR of the mpox pandemic response involving all sectors involved in and/or affected by this outbreak. The review allowed the identification of what has been done, the best practices, gaps and lessons learned to further inform response strategies, and to propose actions to build more resilient health systems to better manage the response.

In complying with the International Health Regulations Monitoring and Evaluation Framework (IHR-MEF), the National Public Health Agency (NPHA) mounted a phased Intra-Action Review (IAR), beginning at the regional level and proceeding to the national level, to assess response activities, identify best practices, and recommend corrective actions. The paper aims to report on Sierra Leone's decentralized response to the 2025 mpox outbreak through the lens of a structured IAR process. This paper may be the first IAR manuscript on mpox across Africa, therefore providing insight to responders across the region. The findings present the outcomes IAR, detailing key outbreak milestones, identified best practices, persistent challenges, and practical recommendations.

2. Materials and Methods

2.1 Study Design

The intra-action review adhered to the WHO methodology and principles for conducting an IAR (Talisuna et al., 2021). The mpox outbreak response IAR was a qualitative analysis of the mpox response's fundamental pillars from the onset of the outbreak in January to July 2025. It employed an interactive approach, using a user-friendly approach

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and systematic facilitation techniques. The focus was not on the individual performance of the mpox response but rather on the health system's overall performance. It enabled district-level responders to evaluate and reflect on their response efforts, identifying best practices and areas that need improvement, while also generating ideas to strengthen both current and future responses. The event was organized in phases, beginning with a two-day regional conference (in Bo for South & Eastern districts, Makeni for North and North-Eastern districts and Freetown for West and North-Western districts) with plenary sessions and breakout working groups, followed by a two-day national plenary.

2.2 Study Settings

The response to the outbreak in 2025 was managed using an Incident Management System with technical and operational support from local and international partners, including the WHO, Africa CDC, US CDC, UNICEF, WORLD BANK HEADA, JHIPIEGO, and others. The IAR was conducted in person from July 22 to August 6, 2025, at different locations across Sierra Leone. Sierra Leone has five regions, namely the Western Area Region, the Northern Region, the Southern Region, the North-West Region, and the Eastern Region. All these regions were affected by the outbreak, and each of these regions recorded a case and therefore was represented in the IAR process.

2.3 Study Population and Sample

The IAR included a diverse group of responders and stakeholders who were

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highly involved in the mpox response. The regional IAR meetings involved approximately 52–53 participants per region. Specifically, 53 participants attended in both the South-Eastern and North-Northwest regions, while 52 participants attended in the Northwest region, comprising national pillar leads and district representatives. A total of 160 people attended the IAR plenary workshop in Freetown, resulting in a 100% response rate. Participants were purposefully chosen based on their active involvement in the response activities, ensuring representation from different operational levels across the country.

These participants included leads from the National IMS core function pillars, representatives from the National Public Health Agency, the Ministry of Health, the Ministry of Agriculture, Civil Society Organizations, District Medical Officers who are the District Incident Managers, Paramount Chiefs/Tribal Heads and City Councils Representatives. Additionally, experts from partner organizations such as WHO, Africa CDC, US CDC, HEADA, UNICEF, and others attended. A summary of the participants' composition is shown in Table 1.

2.4 Data Collection Phase

To conduct the IAR, the national head office (Freetown) formed an eighteen-member coordinating team. These included the mpox IMS core function pillar leaders (10) as well as eight representatives from partners (WHO, HEADA, JHIPIEGO, etc.) that supported the response. The team was in charge of developing the IAR's objectives, scope, and methodology, identifying important stakeholders, and bringing in external

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lead facilitators, report writers, and notetakers.

An overview of the response, which provides a summary of the country's mpox response strategy and plan, detailing both national and regional level trends, was developed during the planning phase. Additionally, mpox-related materials such as policies, response plans, guidelines, and activity reports were reviewed. In addition, facilitators attended a one-day orientation meeting to familiarize them with the IAR tools to be used in the exercise. Following the exercise, sixteen teams were allocated to specific regions to facilitate consensus-building and compile lessons learned from the diverse stakeholders at the regional levels. Key members of the different response pillars will convene for two days at regional levels, using the IAR guidelines provided to hold pillar level deliberations during which they documented their best practices, gaps and challenges encountered during the Mpox response in the country. During this process, partners and other stakeholders join the respective pillar meetings based on their area of support to contribute and help guide the process. Following the regional exercise, key stakeholders were gathered together for two days at the national level to present findings to key stakeholders and discuss observations and recommendations for verification, inputs, validation and adoption of their contribution. Partners and other stakeholders joined separate pillars depending on their expertise to technically support the process.

The IAR started with introductory sessions that outlined the methodology, aims, agenda, and an epidemiological

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summary of Sierra Leone's mpox situation. The IAR concentrated on six primary IMS functional areas: Coordination &Research, Surveillance and Points of Entry, Vaccine and Operational Support, Risk Communication and Community Engagement, Case Management and IPC, and Laboratory Services. These were structured into six specific response pillars, each accompanied by its own working group.:

2.5 Data Analysis

The IAR qualitative data was collected in real time using the WHO note-taking template, which is systematically structured on Root Cause Analysis (RCA) principles (Munemo et al., 2025) . For each of the six response pillars, note takers documented best practices with their enabling factors and impacts,, as well as challenges with their limiting factors and effects. This approach enabled a comprehensive understanding of both what happened and why. Following the IAR, the completed note-taking templates were consolidated into a final report, adhering to the WHO's final IAR report template.

A systematic application of the "5 Whys" questioning technique was utilized across each domain to identify the fundamental root causes. This template-driven approach ensured consistency throughout the pillars and directly aided in the development of evidence-based, pillar-specific prioritized actions.

3. Results

A total of 210 participants attended the regional level IAR while 160 participants attended the IAR plenary session. Table 1 outlines the roles and affiliations of the

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participants involved in the IAR plenary. The IAR evaluated the mpox response activities carried out from January to July 2025. The index case was confirmed on 10th January 2025, in the Western Area Rural. The epidemic curve (Fig. 1) illustrates the typical temporal progression of a localized epidemic, which is characterized by distinct phases. The outbreak began with a small number of sporadic cases reported between weeks 2 and 9. From week 11 onwards, there was a progressive and continuous increase in confirmed mpox cases, with a significant surge observed around weeks 14 and 15. The epidemic reached its peak in week 19, with more than 650 confirmed positive cases reported, indicating sustained person-to-person transmission.

From January to mid-May, all cases reported in the Western Area were handled at different facilities, such as 34 Military Hospital, University Teaching Hospital Complex Connaught, Police Hospital at Kingtom, and Chinese Friendship Hospital at Jui. In light of the increasing number of cases in the Western Area, additional healthcare capacity was established, with the Police Training School providing 400 beds and the Freetown City Council offering 40 beds, both located in Hastings and Calaba Town, Freetown. Following the spread of mpox across the country, all regional and district government hospitals were utilized to improve access to care at the community level. Although the number of new cases began to decline progressively after week 21, the country still reported ongoing cases. The IAR served as a mid-response evaluation. Surveillance and other response activities continued after the

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IAR. Table 2 summarizes the best practices, challenges, and priority activities identified within each of these six mpox response pillars.

3.1 Coordination & Research Pillar

Sierra Leone's mpox response was organized through the IMS, which was recognized as best practice. The IMS provided a decentralized framework for planning and carrying out response activities that were organized around its core functions. This approach was operationalized through the use of an Incident Action Plan (IAP), which included pillar-specific activities and performance indicators to allow for progress tracking throughout the response.

The IMS also enabled the continuous refinement of the IAP to provide targeted interventions that reflect the national and regional case trends (see figure 1). In week 8, operation find them all (OFTA) uncovered the growing number of cases in the Western Area Urban & Rural districts. In week 13 health workers and high-risk contacts in Western Area were vaccinated; nationwide vaccination began in week 18 and after which a sustained decline in case numbers was observed. In week 22 vaccination targets were expanded to include contacts of suspected cases with the launch of the nationwide Enhanced Integrated Mpox Response (EIMR) strategy. These strategies were partly informed by a Knowledge Attitude and Practice study on mpox conducted in late 2024 when mpox was first declared a public health concern by Africa CDC and WHO (A. A. Jalloh et al., 2025; Africa CDC, 2024; WHO, 2024; Zumla et al., 2025.) and the successful in-country sequencing and

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publication of the existing strains of the virus.

Figure 2 shows the structure of the IMS used during the mpox response in Sierra Leone. Another good practice was the decentralization of the National Emergency Operation Center (NEOC). This enabled effective coordination and allowed districts to deploy resources, provide technical support, and clearly define roles and responsibilities based on local needs. Further to this, a daily inter-pillar debriefing meeting was held to enable evidence-based decision-making. Enabling factors which supported these best practices included the existence of community structures like the Facility Management Committee (FMC) and Community Led Approach (CLA). Despite these best practices, several challenges under the coordination pillar were also identified. A late disbursement of funds for response weakened the operational timeliness of the response resulting into late activation of the District Emergency Operation Center (DEOC), creating delays and poor coordination at the districts. While the availability of an emergency fund was proposed emphasis was given to national and district IMS teams being provided with the required administrative support to quickly liquidate funds they have received to avoid delays in the subsequent disbursement of funds.

3.2 Surveillance

The operation "find them all" (active case search) exemplified an effective response to an outbreak within the Surveillance and Point of Entry Pillar. It successfully identified cases that had not been reported to health facilities, as well as contacts that had been overlooked during contact tracing. Another notable

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practice was the deployment of the Rapid Response Team (RRT) at both national and district levels, which facilitated the isolation of cases. Several challenges were identified during the operation. Late detection of cases in certain districts hindered the response, leading to increased transmission within the community. Additionally, difficulties in documenting cases in the DHIS2 resulted in incomplete datasets, which in turn hindered data analysis. Furthermore, non-compliance among patients in disclosing their exposure history heightened the risk of person-to-person transmission. To address these issues, the proposed priority action was the distribution of tablets and data bundles to field teams to enable real-time data capture in DHIS2 and the use of tailored messaging to encourage early presentation at designated facilites for the diagnosis and management of mpox.

3.3 Case Management and IPC

Under the case management/IPC pillar, a notable best practice was the decentralization of holding centers down to the chiefdom level. This method enabled chiefdoms to isolate suspected or probable cases while awaiting laboratory confirmation. Additionally, it alleviated the burden on district hospitals regarding suspected cases, allowing for greater focus on severe cases. Conducting facility-level IPC assessments and mentorship was another best practice. The IPC interventions employed during the response ensured that health facilities and healthcare workers would not be a source of infection. Irrespective of the best practices, several challenges were

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identified. There were inadequate supplies of IPC commodities (such as PPE and disinfectant), insufficient supportive supervision, and poorly maintained isolation units. Priority actions recommended were the provision of IPC supplies (Veronica buckets, liquid soap, ABHR) and the release of funds to conduct proper supportive supervision.

3.4 Vaccines and Operation Support and Logistics

Under the vaccine, operational support, and logistics pillar, a notable best practice was the use of an electronic system for monitoring and distributing vaccines. This system facilitated timely requisition and helped reduce vaccine wastage. The effective mobilization efforts made by the Honorable Minister of Health and key partners in getting more than 200,000 doses of vaccines. This was a best practice too which was enabled by the strong collaboration that exists between the NPHA leadership and the leadership of the Ministry of Health. Another best practice involved the vaccination of all frontline workers, which contributed to a low infection rate among healthcare personnel, as well as the vaccination of contacts (including contacts of suspected cases) in areas with a high burden of mpox infection. The enabling factors for these best practices included the availability of computers, internet access using STAR link across mpox facilities and response coordination centres, and human resources, which allowed for effective electronic monitoring of vaccines. Despite the implementation of these best practices, various logistical challenges were faced. The selection and procurement of commodities at the national level, conducted without a

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thorough needs assessment or reference to treatment protocols, resulted in stockouts of essential medicines. Additionally, a backlog in vaccination data during the enhanced integrated response strategy in WAR and WAU resulted in delayed data sharing for action. These were addressed through the employment of data clerks for the documentation of backlog data with the financial support of partners like Jhpiego.

3.5 Risk Communication and Community Engagement (RCCE)

Best practices included stakeholder engagement, cross-border coordination meetings, and a multimedia communication strategy using radio, television, posters, flyers, daily briefings, and an evening online WhatsApp meeting. The availability of existing cross-border structures and strong leadership commitment were key enabling factors for rapid and real-time information sharing. Nonetheless, several challenges persisted, including a limited number of Information, Education and Communication (IEC) materials for mpox, reduced community engagement at the ward and chiefdom levels, and inadequate mobility support for RCCE within the chiefdoms. Moving forward, it was proposed that the response employs the Community Led Action (CLA) model with Paramount Chiefs at the helm to enhance effective community engagement.

3.6 Laboratory Services

The availability of trained personnel for sample collection was identified as a best practice within the laboratory services. Additionally, the deployment of mobile laboratories in remote areas enhanced

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the capacity for testing specimens closer to communities, thereby reducing the turnaround time for results. The enabling factors for these best practices included the availability of sample collection materials and standard operating procedures for sample collection, packaging, and transportation. Additionally, the ability of the lab to conduct mpox genomic sequencing beyond the threshold recommended by WHO (>8%) thereby informing the response on the prevailing clades throughout the outbreak. An enabling factor for this was the professional will at the top of the NPHA to move away from shipping samples to other countries and the technical and financial support provided by Africa CDC & WHO to train local lab scientists on the bench work as well as bioinformatics analysis of the results.

However, the response encountered two key challenges, including the absence of a differential diagnosis for mpox-negative results and delays in the entry of laboratory results into DHIS2. These issues limited the use of laboratory data in informing response decisions. Getting a platform to conduct differential diagnostic testing was proposed and at the time of writing this manuscript, the Central Public Health Laboratory had installed Biofire with the help of US CDC for differential diagnostic testing.

4. Discussion

Sierra Leone's experience of outbreaks influenced response efforts in 2025, particularly the implementation of the Incident Management System for better outbreak management. The IAR assisted in identifying pillar-specific and cross-cutting best practices, response gaps,

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and challenges, as well as making recommendations for improving multisectoral response activities across districts and pillars. One of the best practices highlighted during the IAR was the successful operationalization of the IMS, which allowed for coordinated decision-making and response implementation. The timely implementation of the IMS guided by incident action plans, resulted in an organized approach to outbreak control that allowed for the mobilization of resources and operational effectiveness. Other outbreak studies conducted in Liberia, Uganda, Sudan, and the Congo observed similar findings (Olu et al., 2016 ; Sane et al., 2023 ; Ninsiima et al., 2025 ; Ayesiga et al., 2025). The implementation of IMS enhanced coordination, clarified authority and accountability, and stimulated operational follow-up (Waqar et al., 2025). In addition, the decentralization of the National Emergency Operation Centre (NEOC) and regular inter-pillar debriefing meetings provided effective coordination, allowing districts to deploy resources, give technical support, and make evidence-informed decisions. This outcome is in contrast to findings from a 2020 outbreak in Indonesia, which highlighted difficulty in coordinating multiple actors with differing capacities, characteristics, and competing agendas at the subnational level (Kuswandi et al., 2023). Despite these best practices, significant issues with the coordination pillar were identified. A late disbursement of funding for the response decreased the operational effectiveness of the entire response. In line with this, a study conducted in Nigeria found that a lack of emergency response funds hindered

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DHMT's active involvement during a response (Oyedokun et al., 2023).

Many detailed and country-specific findings were covered in all of the reviews. Best practices under the surveillance pillar included daily data analysis and the production of Situational Report (Sitreps) that informed response decisions. The CHWs played an important role in the operation 'Find Them All' strategy (active case search), which was used during the response. This strategy facilitated early case discovery and real-time reporting, leading to timely interventions. Multiple studies show how effective community health workers are at early case detection through event-based surveillance (Clara et al., 2018; Ngongo et al., 2025). Research in Haiti found that case detection and community engagement by CHWs significantly reduced the spread of infection (Jerome & Ivers, 2010). Regardless of best practices, several bottlenecks were identified. The use of paper-based data collection tools led to delays in documenting cases and contacts in the DHIS2, which created a backlog and resulted in low-quality data, further causing delays in data analysis, situation report production, and real-time decision-making. Studies have shown that digital monitoring systems improve data accuracy and timeliness, resulting in better public health response results (Maddah et al., 2023). A major best practice for case management and the IPC pillar was the decentralization of holding centers down to the chiefdom level. This helped reduce congestion at the main district hospital and expanded access to patients with symptoms. As stated in outbreak studies, timely access

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to treatment or isolation centers within the community has been proven to minimize morbidity and mortality and help maintain a low case fatality rate (Maddah et al., 2023 ; Skrip et al., 2020). Another best practice used in the response was conducting facility-level IPC assessments and mentorship. Infection prevention and control (IPC) is critical for preventing healthcare-associated infections (HAIs) in healthcare settings, and it is one of the eight core components (CCs) of the World Health Organization's (WHO) IPC framework ("Assessment of Infection Prevention and Control (IPC) in Healthcare Facilities in Complex Humanitarian Emergencies - Cox's Bazar Rohingya Refugee Camps - 2020," 2025).

The best practice for the vaccine pillar was the deployment of an electronic system for vaccine monitoring and distribution, which guided prompt requisition and reduced vaccine wastage. Despite these best practices, several logistical challenges were encountered; selection and procurement of commodities at the national level without the need for treatment protocols resulted in a stockout of most essential medicines, shortage of IPC commodities (PPEs and disinfectants), and inadequate supportive supervision hampered the response. Different authors identified similar issues in Ethiopia and Zimbabwe, where a lack of essential medications and personal protective equipment hindered the investigation of an outbreak (Atnafu et al., 2025; Berihun et al., 2024).

Additionally, the RCCE used a multimedia approach, which included social media, radio broadcasts, news

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channels, and community leader engagements, and was beneficial in raising awareness among people and encouraging appropriate health-seeking behavior. Furthermore, enlisting mpox-recovered patients in community outreach activities boosted trust, improved message understanding, reduced stigma, and aided their reintegration into the community. This approach has been recommended and proven effective for survivors of Ebola virus disease in West Africa (Berihun et al., 2024). Furthermore, the presence of qualified laboratory personnel for sample collection, along with the deployment of mobile laboratories, has been recognized as a best practice for laboratory services during the IAR. This strategy resulted in reduced turnaround times for patient results. Studies indicate that deployable mobile laboratories can offer specialized capacity while significantly decreasing test turnaround times during an epidemic, from several days to same-day results (Presser et al., 2021; Trojnacki et al., 2025).

Conclusion

The IAR of Sierra Leone's 2025 mpox outbreak response shows the importance of structured coordination and decentralized implementation during public health emergencies. The operationalization of the Incident Management System, decentralization of response structures, and engagement of community and partner institutions strengthened response capacity across districts. These approaches contributed to improved coordination, expanded access to services, and enhanced collaboration among stakeholders at national and subnational levels. At the

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same time, the review shows persistent systemic weaknesses that limited operational efficiency. Delays in funding disbursement, logistical constraints, data management challenges, and gaps in community engagement affected the timeliness and consistency of interventions. These challenges reflect broader health system limitations, especially in financing mechanisms, digital infrastructure, supply chain management, and workforce distribution. The IAR process provided a structured platform for collective reflection and learning. It showed the importance of regularly reviewing response performance during an outbreak and emphasized the need to make decentralized preparedness a routine part of strengthening the public health system.

Recommendations

Improving emergency preparedness requires more efficient and reliable financing systems so that response activities can begin quickly at both the national and district levels. Funds should be released on time, and districts should have greater control over resources. This will improve response speed and reduce delays in carrying out important interventions.

There is also a need to improve digital surveillance and data management systems by expanding electronic reporting tools across districts and providing regular training for surveillance officers and data staff. Reliable internet access and appropriate data equipment will improve data quality, timeliness, and informed decision-making.

Supply chain systems should be enhanced through procurement that is guided by treatment protocols and

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disease trends. Regular forecasting, better inventory management, and consistent availability of essential medicines, vaccines, and infection prevention and control materials are necessary to avoid shortages during outbreaks.

Continued investment in the health workforce is essential. Ongoing training, supportive supervision, and mentorship across all response areas, such as laboratory services, surveillance, and case management, will improve technical skills and maintain readiness beyond outbreak periods.

Community engagement structures should also be strengthened to build trust, reduce stigma, and improve adherence to public health measures. Supporting community leaders, civil society groups, and frontline health workers will encourage more inclusive and culturally appropriate interventions. Maintaining district emergency operations and cross-border coordination will further improve the public health system and improve preparedness for future outbreaks.

Declaration of Interests

We declare no competing interests

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References

Africa CDC Declares Mpox a Public Health Emergency of Continental Security, Mobilizing Resources Across the Continent. (n.d.). *Africa CDC*. Retrieved October 15, 2024, from https://africacdc.org/news-item/africa-cdc-declares-mpox-a-public-health-emergency-of-continental-security-mobilizing-resources-across-the-continent/

©SLJBR Volume 16. Number 3. May 2026 ISSN (Print), ISSN (Online First)

Assessment of Infection Prevention and Control (IPC) in Healthcare Facilities in Complex Humanitarian Emergencies—Cox's Bazar Rohingya Refugee Camps—2020. (2025). *TEXILA INTERNATIONAL JOURNAL OF PUBLIC HEALTH*, *13*(01). https://doi.org/10.21522/TIJPH.2013.13.01.Art056

Atnafu, A., Teshale, G., Dellie, E., & Park, Y. S. (2025). Exploring health system challenges and gaps for crisis response in Ethiopia: A scoping review of publications and reports from 2020-2024. *BMC Health Services Research*, *25*(1), 928. https://doi.org/10.1186/s12913-025-13084-y

Berihun, G., Gizeyiatu, A., Berhanu, L., Sewunet, B., Ambaw, B., Walle, Z., Abebe, M., & Gasheya, K. A. (2024). Adherence to infection prevention practices and associated factors among healthcare workers in Northeastern Ethiopia, following the Northern Ethiopia conflict. *Frontiers in Public Health*, *12*, 1433115. https://doi.org/10.3389/fpubh.2024.1433115

Clara, A., Do, T. T., Dao, A. T. P., Tran, P. D., Dang, T. Q., Tran, Q. D., Ngu, N. D., Ngo, T. H., Phan, H. C., Nguyen, T. T. P., Lai, A. T., Nguyen, D. T., Nguyen, M. K., Nguyen, H. T. M., Becknell, S., Bernadotte, C., Nguyen, H. T., Nguyen, Q. C., Mounts, A. W., & Balajee, S. A. (2018). Event-Based Surveillance at Community and Healthcare Facilities, Vietnam, 2016–2017. *Emerging Infectious Diseases*, *24*(9), 1649–1658. https://doi.org/10.3201/eid2409.171851

Jalloh, A. A., Boie Jalloh, M., Lansana, P., Sahr, F., Alex Vandi, M., Thomas, H., Sylvester Squire, J., Chikodiri Nwosu, L. (2025). Awareness, knowledge, risk perception, and attitude of Mpox infection among community members in Sierra Leone. *BOHR International Journal of General and Internal Medicine*, *4*(1), 36–46. https://doi.org/10.54646/bijgim.2025.29

Jalloh, M. B., Jalloh, A. A., Sahr, F., Vandi, M. A., Squire, J. S., Koroma, Z., Jalloh, M., Bah, A., Nwosu, L. C., Lakoh, S. (2025). Emergence of mpox in Sierra Leone: Investigating the index case, January 2025. *BOHR International Journal of General and Internal Medicine*, *4*(1), 52–55. https://doi.org/10.54646/bijgim.2025.31

Jerome, G., & Ivers, L. C. (2010). Community health workers in health systems strengthening: A qualitative evaluation from rural Haiti. *AIDS*, *24*(Suppl 1), S67–S72. https://doi.org/10.1097/01.aids.0000366084.75945.c9

Johri, N., Kumar, D., Nagar, P., Maurya, A., Vengat, M., & Jain, P. (2022). Clinical manifestations of human monkeypox infection and implications for outbreak strategy. *Health Sciences Review*, *5*, 100055. https://doi.org/10.1016/j.hsr.2022.100055

Karagoz, A., Tombuloglu, H., Alsaeed, M., Tombuloglu, G., AlRubaish, A. A., Mahmoud, A., Smajlović, S., Ćordić, S., Rabaan, A. A., & Alsuhaimi, E. (2023). Monkeypox (mpox) virus: Classification, origin, transmission, genome organization, antiviral drugs, and molecular diagnosis. *Journal of Infection and Public Health*, *16*(4), 531–541.

https://doi.org/10.1016/j.jiph.2023.02.003

Kuswandi, A., Nuraini, S., Dian, S., & Ramadhina, K. A. (2023). Indonesia Government Responsiveness during COVID-19. *Journal of Social Politics and Governance (JSPG)*, *5*(2), 68–81. https://doi.org/10.24076/jspg.v5i2.1266

Maddah, N., Verma, A., Almashmoum, M., & Ainsworth, J. (2023). Effectiveness of Public Health Digital Surveillance Systems for Infectious Disease Prevention and Control at Mass Gatherings: Systematic Review. *Journal of Medical Internet Research*, *25*, e44649. https://doi.org/10.2196/44649

Munemo, C., Zibanayi, C., Gomba, H., Banda, P., Tengawarima, S., Moyo, S., & Chirundu, D. (2025). Intra action review of the cholera outbreak response in Kadoma city, Zimbabwe, 2024. *BMC Public Health*, *25*(1), 2904. https://doi.org/10.1186/s12889-025-24147-4

Nannie Conteh, I., Chisaka Kasolo, F., Olaiya Abiodun, P., Obi Daniel, E., Fouard Kanu, A., Fouard Kamara, R., Amina Sahid, A., Felix Sanni, O., Tigiedankay Koroma, A., Amie Koroma, J., Foray-Rhall, L., Kenneth Fahnbulleh, M., Keimbe, C., Sam Kanu, J., Vandy, M., & Ganu, D. (2023). Infectious Disease Outbreaks in Sierra Leone: Exploration of the Emergency Preparedness and Response in a Decade. *World Journal of Public Health*. https://doi.org/10.11648/j.wjph.20230804.16

Ngongo, N., Boum Ii, Y., Mercy, K., Tsague, L. D., Cho, W. N., Folefack Tengomo, G. L., Gaye, A. B., Ambe, L. N., Dereje, N., & Kaseya, J. (2025). Community health workers: A key to halting Africa's mpox outbreak. *Journal of Public Health in Africa*, *16*(4), a1439. https://doi.org/10.4102/jphia.v16i4.1439

Olu, O. O., Lamunu, M., Chimbaru, A., Adegboyega, A., Conteh, I., Nsenga, N., Sempiira, N., Kamara, K.-B., & Dafae, F. M. (2016). Incident Management Systems Are Essential for Effective Coordination of Large Disease Outbreaks: Perspectives from the Coordination of the Ebola Outbreak Response in Sierra Leone. *Frontiers in Public Health*, *4*. https://doi.org/10.3389/fpubh.2016.00254

Oyedokun, T. O., Islam, E. M., Eke, N. O., Oladipo, O., Akinola, O. O., & Salami, O. (2023). Out of hospital emergency care in Nigeria: A narrative review. *African Journal of Emergency Medicine*, *13*(3), 171–176. https://doi.org/10.1016/j.afjem.2023.06.001

Presser, L. D., Coffin, J., Koivogui, L., Campbell, A., Campbell, J., Barrie, F., Ngobeh, J., Souma, Z., Sorie, S., Harding, D., Camara, A., Tohonamou, P., Traore, B., Hamill, F. A., Bogan, J., Altmann, S., Ross, C., Mansheim, J., Hegerty, R., … Krcha, S. (2021). The deployment of mobile diagnostic laboratories for Ebola virus disease diagnostics in Sierra Leone and Guinea. *African Journal of Laboratory Medicine*, *10*(1). https://doi.org/10.4102/ajlm.v10i1.1414

Talisuna, A. O., Iwu-Jaja, C. J., Okeibunor, J., Stephen, M., Onuche, E. M., Herring, B. L., Otim, P. R., Yota, D., Nanyunja, M., Mpairwe, A., Banza-

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Mutoka, F., Diallo, B. A., Wango, R., Massidi, C., Njenge, H. K., Traore, M., Antonio, O., Bonkoungou, B., Mayigane, L. N., … Gueye, A. S. (2021). Intra Action Review of the COVID-19 Pandemic Response in Africa: Best Practices, Challenges, and Perspectives for the Future. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3876269

Trojnacki, A., Nguinkal, J. A., May, J., Rainer, K., Duscher, G. G., Winkelmayer, L., Ungureanu, A., Jaho, E., Vlachostergiou, A., Suciu, G., Stalidi, C., Marcu, L., Annus, H., Kamdron, K., Aasamäe, A., Groschup, M., Dietze, K., Knauf, S., Keller, M., … Gehre, F. (2025). Assessing rapid response mobile laboratory (RRML) capacities in Europe and Africa to improve One Health disease surveillance activities and pandemic preparedness across two continents. *One Health Outlook*, *7*(1), 53. https://doi.org/10.1186/s42522-025-00180-6

Waqar, A., Nisar, S., Muddassir, M., & Benjeddou, O. (2025). An integrated management system (IMS) approach to sustainable construction development and management. *Journal of Infrastructure Intelligence and Resilience*, *4*(1), 100126. https://doi.org/10.1016/j.iintel.2024.100126

World Health Organization. (2024). WHO Re-Declares Monkeypox as a Public Health Emergency of International Concern. *WHO. Available at: https://www. who. int/news/item/14-08-2024-who-director-general-declares-mpox-outbreak-a-public-health-emergency-of-international-concern. Accessed September*, *26*, 2024.

Wubu, M., Habebe, S., Kassa, D. Z., Belete, D. T., Abayneh, A., Teferi, D. M., Woldeab, A., & Hassen, M. (n.d.). *Intra-Action Review of Ethiopian's Response to the COVID-19 Pandemic, July 2022*.

Zumla, A., Rosenthal, P. J., Sam-Agudu, N. A., Ogoina, D., Mbala-Kingebeni, P., Ntoumi, F., Nakouné, E., Njouom, R., Ndembi, N., Mills, E. J., Muyembe-Tamfum, J.-J., & Nachega, J. B. (2025). The 2024 Public Health Emergency of International Concern: A Global Failure to Control Mpox. *The American Journal of Tropical Medicine and Hygiene*, *112*(1), 17–20. https://doi.org/10.4269/ajtmh.24-0606

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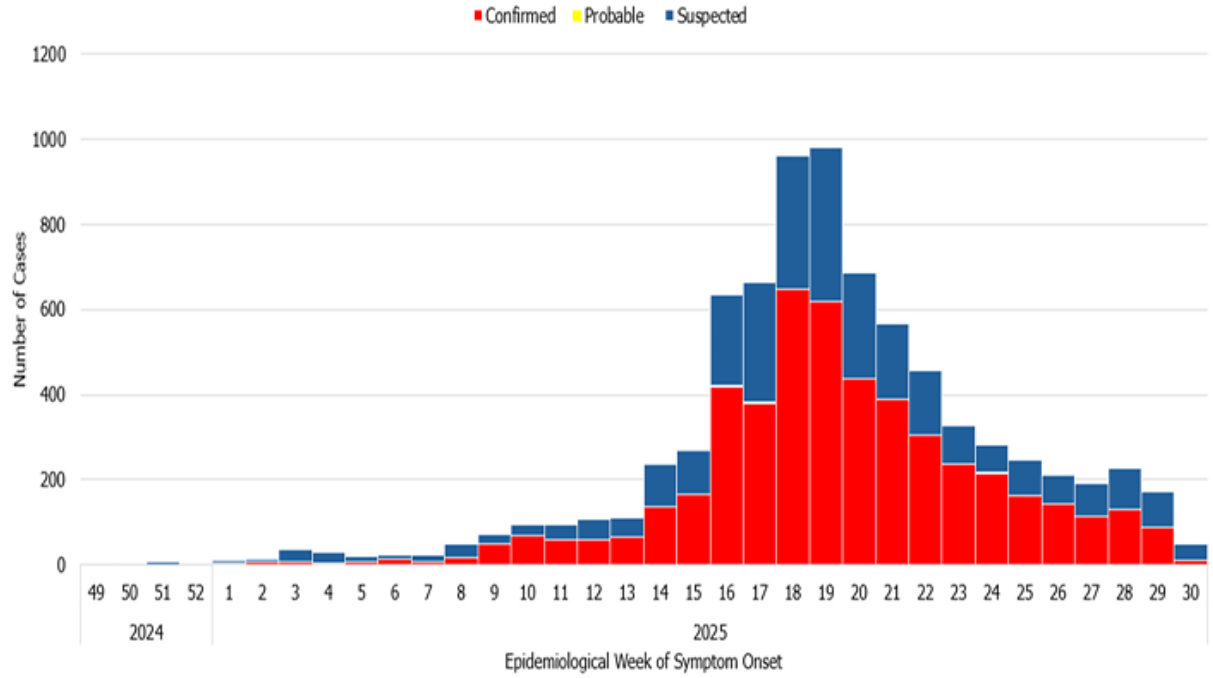

Figure 1: Epidemic Curve of Mpox Outbreak in Sierra LEONE (Epi weeks 1-29)

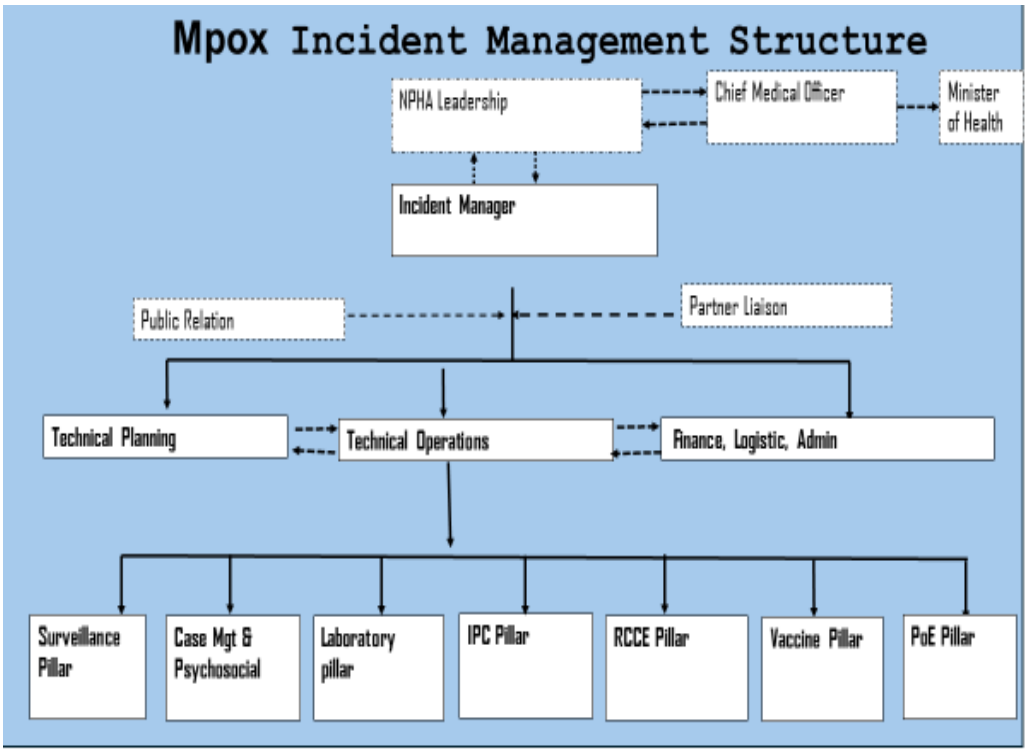

Figure 2: mpox Incident management structure

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List of Tables

Table 1: IAR participants' composition at national level

Group participants	No. of participants
Planning Chief	1
Medical Superintendent	4
City Council representatives	1
Ministry of Agriculture, Forestry and Food Security	2
Paramount Chiefs	8
Civil Society Organization	2
Partners	8
Private sector representatives	6
District Medical Officers	16
Planning/operations leads	16
Case management leads	16
Risk communication and community engagement leads	16
Surveillance leads	16
Laboratory leads	16
Vaccine leads	16
Infectious Prevention and Control leads	16

Table 2: Best practices, challenges and priority actions from the mpox IAR, Sierra Leone, 2025

Response Pillar	Best practices	Challenges	Priority Actions
Coordination	- Decentralization of NEOC - Daily debriefing meeting, Inter-pillar meetings - Regular engagement of community stakeholders - Strong cross-border collaboration - Strong partner collaboration	- Reduced commitment by the district council to Mpox response - Late disbursement of funds for response from NPHA & partners - Limited and late partner support at the district level to the response - Late activation of DEOC in some districts - Limited accessibility to some high-risk/ key populations	- Budget Advocacy meeting with local partners, Councils, NPHA, etc., for resource mobilization for Mpox at the district level - Conduct mapping and profiling of the key population and high-risk group - Engagement of key population and high-risk group on mpox sensitization, prevention and treatment

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Surveillance	- Operation find them all (Active case search) - Deployment of RRT (SURGE staff, FETP graduate, AvoHC SURGE) at National and district levels - Decentralization of Mpox response at the district and chiefdom level - Orientation of the District Surveillance Officer on case investigation - Integrated training on Enhanced Integrated Mpox Response (EIMR) for responders Existing mpox electronic information system	- Difficulties in tracing contacts - Late detection of cases in some districts - Difficulties in documenting cases into DHIS2 platform - Non-compliance of patients to reveal exposure - Difficulty in tracing contacts due to cross-border issues (Kambia) - Unavailability of designated data officers	- Engagement of local authorities at the community level to reveal the mpox case - Provide training for data officers on the use of the DHIS 2 - Cross-border coordination meeting with border communities - Distribution of Tablets and data bundles to field teams for real-time data capture
Case Management and IPC pillar	-Decentralized holding centers at chiefdom level - Adherence to WHO 5 moments of hand hygiene - Conducted facility level IPC assessments and mentorship	- Inadequate supplies of IPC commodities (PPEs & disinfectants) - Inadequate supportive supervision - Dilapidated isolation units	- Provision of IPC supplies (Veronica buckets, liquid soap, ABHR) - Release of funds to conduct proper supportive supervision - Procurement of environmental cleaning materials, including waste bins for isolation units - Sustained supplies of medicines, and

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			400 beds sanitary packs (linens, paste, soap, toothbrush, sanitary pads) for mpox patients in isolation units
Vaccine and Operations Support and Logistics	- Use of the electronic system for vaccine monitoring and distribution - Vaccination of all frontline workers - Selection of well-trained Mpox vaccination teams - Vaccination of contacts in areas of high burden of the infection - Regular inventory management	- Difficulty in reaching key population - Limited coverage of areas requiring vaccination - Selection and procurement of commodities at national without needs assessment reference to treatment protocols - Inadequate supplies of most essential commodities - Vaccination data backlog during enhanced integrated response strategy in WAR & WAU - Delayed payment of vaccination teams - Non-provision of rain gears to responders	- Micro Planning to identify target population for vaccination - Community and stakeholder engagement - Deployment of mobile vaccination teams to enhance vaccination coverage
Risk Communication and Community Engagement	- Daily briefing and online evening (WhatsApp) meetings - Stakeholders' engagement and integration in the response. - Cross border coordination meetings - Decentralized case investigation and response	- Limited IEC materials for mpox - Limited community engagement at ward/chiefdoms level - Community resistance to Mpox interventions in Kaffu Bullom Portloko district - Fear of stigmatization of confirmed cases - Limited mobility support for RCCE activities	- Review and update by laws of current issues at regional levels - conduct community dialogue sessions and empower local champions (community champions, councilors, traditional healers, religious leaders etc) - Review and tailored messages to

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	- Community resource mobilization		fit targeted population - Print and distribute IEC materials - Deployment of trusted influencers for dissemination of Mpox messages
Laboratory Services	- Availability of trained personnel for sample collection - Well established sample referral system - Deployment of mobile Laboratories (Port Loko & Koinadugu) - Routine laboratory briefings and meetings	- Delayed sample collection - - Laboratory personnel not well- represented in laboratory training. - Inadequate laboratory workforce - Inability to print laboratory request forms - Delayed entry of laboratory results into DHIS2 - Incomplete genomic sequencing data - Lack of differential diagnosis for Mpox-negative results	- Provide Logistics for sample management in all 16 districts (Fuel, Collection Kits, Lab Data Tools) - Conduct 2 days Training of sample collectors and transporters at chiefdom/ward level in all districts (199) - Provide onsite mentorship to district testing labs on Quality Assurances and Sample Management

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