**RESEARCH PAPER**

# Stakeholder Perspectives on Challenges in Disaster Management and Emergency Public Health Response in Monrovia, Liberia

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**ABSTRACT**

Monrovia, Liberia, is very susceptible to epidemics, floods and man-made calamities. Systemic deficiencies of disaster preparedness and emergency public health response remain, despite multiple international emergency responses. This study explored these challenges through the eyes of a variety of health system actors, including health workers, administrators, community health workers, epidemiologists, and staff from partner organizations, across Monrovia. Methods: Cross sectional survey using both quantitative (n = 308) and qualitative (n = 4) mixed method was done in seven institutional and community settings in Monrovia. The quantitative ratings for infrastructure, workforce, coordination, surveillance, supply chain, and community engagement were collected using a 33-item structured questionnaire, and were completed by stakeholders in open-ended fashion on strategic priorities, resource needs, and recommendations. The data strands were analysed using descriptive statistics and thematic content analysis that was partitioned into six phases. The major challenges that stakeholders reported as the key challenges in effective disaster management and emergency response were chronic underfunding (82 %), insufficient training of the disaster management workforce (73 %), weak disease surveillance and early warning (64 %), fragmented inter-agency coordination (55 %), and insufficient community engagement (45 %). Qualitative analysis also showed a need for formalization of the work of the community health worker in the national emergency system; the creation of a specific emergency health financing mechanism; and a continued political commitment to strengthening the health system. Discussion: There is consensus among the stakeholders that investment must be congruent in these five key areas – health financing, health worker capacity building, surveillance systems, multi-sectoral coordination, and community engagement – all of which are mutually influencing. It is important to respond to these domains in an integrated way (not independently), to create a resilient emergency public health system in Monrovia.

**Keywords:** *Disaster management, emergency public health response, stakeholder perspectives, Monrovia, Liberia, Community health workers, health system, mixed-methods*

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## INTRODUCTION

Liberia is one of the trickiest countries with regards to global public health. The civil war (1989-2003), high poverty rates, and the lack of effective investment in the health system over the decades have resulted in a poorly structured health system that is highly susceptible to natural and biological disasters. The national capital and the biggest city in the country, Monrovia is the heart of this vulnerability. The 2014–2016 Ebola Virus Disease (EVD) outbreak, which resulted in more than 4,800 deaths in Liberia alone, highlighted inadequacies in Liberia's ability to detect, contain and respond to public health emergencies (WHO, 2016). These recurring crises, such as seasonal floods, cholera outbreaks and the COVID-19 pandemic, have again uncovered the same core weak points.

Low-income urban people in sub-Saharan Africa suffer disproportionately from disaster risk (Nkengasong et al., 2017). The Sendai Framework for Disaster Risk Reduction 2015–2030 and the International Health Regulations (IHR 2005) provide normative guidance for national preparedness, but in fragile states like Liberia, resource constraints, institutional weaknesses, and governance gaps create significant challenges for implementation (UNDRR, 2015; WHO, 2005). Despite investments by international partners in the reconstruction of the health system, vulnerabilities are still present and largely unrecorded at the operational level of practitioners and community members working in the health system, specifically the National Public Health Institute of Liberia (NPHIL) and an Emergency Operations Center (EOC).

One of the key features of effective disaster management systems is multi-stakeholder perspectives in the design of preparedness plans and responses for disaster management (Nuzzo et al., 2019). Health workers, community health workers (CHWs), public health administrators, epidemiologists and staff from partner organizations all have unique perspectives within Monrovia's emergency health system, and their lived experience is an important, yet untapped evidence base for improving the system. Although these views are important, empirical research that has systematically documented the views of the stakeholders on disaster management challenges and priorities in Monrovia is limited.

This study will fill that void. It reports on a mixed methods cross sectional survey of 308 stakeholders in seven institutional/community settings in Monrovia, specifically undertaken to gain insights from practitioners and the community on what the major issues are facing in disaster management and public health emergency response in the city. The inquiry was guided by three research questions: (1) What are the main institutional, infrastructural and human resource challenges faced in disaster preparedness and emergency response as seen by health system stakeholders in Monrovia? (2) What other supports would stakeholders recommend to enhance emergency public health response capacity? (3) What are the strategic priorities that stakeholders would like the MoH to prioritize to improve the effectiveness of disaster readiness and response?

## 2. LITERATURE REVIEW

**2.1 Disaster management in Sub-Saharan Africa: A stakeholder-deficit problem.** In sub-Saharan Africa, the epidemiological, environmental, socioeconomic and governance aspects contribute to creating the situation in which disaster management takes place. The vulnerabilities of rapidly urbanizing areas and growing informal settlements, combined with climate-related risks and regular epidemics, such as outbreaks of cholera and meningitis, Lassa fever and Ebola, are putting health system capacity under pressure in many countries in the region (Nkengasong et al., 2017). Debilitated pre-positioning of medical supplies, lack of laboratory networks and poorly developed risk communication capacities have been identified as key gaps in emergency response in all operational assessment of emergency response on the continent (Olu et al., 2019).

The Africa Centres for Disease Control and Prevention (Africa CDC) have made significant strides to improve the continent's capacity to monitor disease by implementing the Integrated Disease Surveillance and Response (IDSR) strategy. IHR Joint External Evaluation (JEE) assessments, however, show significant variation in capacity to prepare for emergencies nationally, with Liberia always being one of the countries with the lowest JEE emergency preparedness capacity score (Africa CDC, 2021). Many identified gaps are not only due to lack of resources but also due to the lack of coordination amongst multiple stakeholders and lack of the involvement of the frontline practitioners and the community in preparedness planning.

### 2.2 Liberia's Health System and Emergency Response Context.

Liberia's health system rebuilding after the civil war, based on the Basic Package of Health Services (BPHS) and which has received considerable donor funding, was considered to be a template for fragile state health system reconstruction. The EVD crisis, however, showed that the reconstruction efforts were inadequate to strengthen capacity for emergency response, resilience of supply chains, and health worker safety systems (Moon et al., 2015). The crisis also highlighted a basic gap between formal system design and the working conditions of health workers and community health actors, which could only be bridged by systematically integrating stakeholders' views into preparedness planning.

Although there has been investment in NPHIL, the operationalization of EOC and community health workers in the wake of Ebola, structural vulnerabilities remain. The national health budget still does not meet the 5% of GDP threshold for funding, there is still high and fluctuating dependency on external donors, health worker density is still one of the lowest in the world, and CHWs, the main link between the formal health system and Monrovia's thick, informal settlements, are not included in the national emergency response frameworks (WHO/Liberia, 2019).

### 2.3 Community Health Workers as Frontline Emergency Actors

In low-resource areas, community health workers have proven to be a key population to detect outbreaks, mobilize communities, and deliver primary care (Perry et al., 2017). CHWs in Liberia performed very well in the EVD response, by conducting contact tracing, social mobilization and directing safe burial teams at the community level. Their contributions were, however, informal and without proper institutional support: most CHWs during EVD were unpaid volunteers or received inconsistent pay for their service, were not trained formally on emergency response protocols and were not included in formal national emergency management systems (Ly et al., 2020).

Evidence from Ethiopia and Rwanda, among other countries, shows that a salaried, supervised, and career-tracked CHW model results in measurably improved outcomes and much higher retention rates than volunteer-based models (Kok et al., 2015). Formal integration of CHWs into national emergency response structures, including budget lines for their compensation, is a recurring theme in the practitioner literature, and one of the most strongly evidence-informed recommendations for enhancing the emergency response at the community level in Liberia and sub-Saharan Africa in general.

### 2.4 Evidence Gap

Women's participation is shaped by the disaster preparedness and emergency public health response, which is limited in sub-Saharan Africa and Liberia due to the lack of adequate financing, health workers, surveillance and early warning systems, coordination, infrastructure and community engagement. The importance of the role of community health workers and multi-stakeholder involvement in enhancing emergency preparedness has been highlighted in previous research. But a key evidence gap exists on the experience of these challenges and their prioritization by various actors in Monrovia's emergency public health system. While previous assessments and post-emergency reviews have identified gaps in Liberia's preparedness capacity, there is limited empirical evidence that documents in a systematic way the experience and perspectives of frontline health workers, public health administrators, epidemiologists, community health workers and partners in Liberia's specific context of Monrovia. There is also scant locally-developed literature on the relative importance of the financing, workforce, surveillance, coordination, logistics, and community engagement elements of emergency preparedness, as they are interdependent. This study responds to this need by capturing the voices of stakeholders on institutional and community levels in Monrovia. It offers empirical evidence on the key operational and institutional challenges; the extra support stakeholders deem necessary and the strategic priorities that need to be addressed to enhance disaster preparedness and emergency public health response. The study builds on the current body of knowledge from other studies that focused on general health-system vulnerability to practitioner- and community-based evidence specific to Monrovia.

### 2.5 Policy Relevance

There is direct policy relevance of the literature to Liberia and there is a need for disaster preparedness to be aligned with national policies, institutional arrangements, resources, and community-level implementation. International mechanisms like the International Health Regulations (IHR 2005) and the Sendai Framework for Disaster Risk Reduction 2015-2030 give valuable guidance, but need to be complemented by the capacities of countries and regions to make preparedness measures work. The authors have seen in the literature that resource constraints, institutional shortcomings, lack of coordination, and low levels of community engagement remain a hindrance to implementation in fragile contexts like Liberia. There is specific evidence regarding CHWs that is relevant to policy. CHWs have been found to be useful when responding to other emergencies such as the Ebola outbreak, although their efforts during these crises have been less formal and structured within national emergency management systems. The literature thus has confirmed the importance of defining institutional roles, adequate training, supervision, payment and the incorporation of the CHWs into emergency preparedness and response mechanisms. The present study is policy-relevant as it can deliver evidence from the stakeholders to help the Ministry of Health, National Public Health Institute of Liberia, emergency coordination structures, local health authorities and development partners identify priorities for action in strengthening preparedness in Monrovia.

The results can help guide decisions about emergency financing, skill building, surveillance and early warning systems, inter-agency coordination, logistics, community engagement, and community health worker incorporation. The study therefore bridges the gap between the more general policy goals set out in the literature on the one hand, and the more local policy priorities and operational constraints on the other.

### 2.6 Methodological Contribution

The methodological contribution of this study is that it adopts a mixed methods cross sectional design to look at disaster management and emergency public health response from the perspective of several stakeholder groups. The literature that is available often focuses on the assessments of health systems, institutional reports, or on the specific professional perspective. In the present study, structured quantitative questions are matched with open-ended responses of qualitative variables to capture the extent of perceived challenges, as well as contextual explanations, priorities, and recommendations, that would otherwise be lost. The study also involves representatives across the emergency health system—from frontline health workers to public health administrators and policy makers, epidemiologists and surveillance specialists, community health workers and supervisors, and NGO or international partner staff. A multistakeholder approach provides the opportunity to consider preparedness as a systemic issue rather than one that is within the scope of a single institution or professional group. The addition of quantitative and qualitative evidence also adds to triangulation. Quantitative responses offer a descriptive picture of the level of awareness of specific challenges, and qualitative responses offer more insights into strategic priorities, supports, and recommended interventions. This strategy aligns with the goal of the study to grasp the range and richness of stakeholder views and helps to interpret the results by making links between measured patterns and stakeholder explanations.

### 2.7 Timeliness and Contemporary Relevance of Literature

The literature reviewed is still very relevant for the current disaster preparedness situation in Monrovia due to the fact that the city is still experiencing various risks such as infectious diseases outbreak, floods, environmental hazards, and other disasters. The lessons learnt from Ebola and COVID-19 have shown that the capacity to be prepared when a crisis occurs is not built in a crisis only but requires continuous funding, professionalization, surveillance, coordination, logistics and engagement with communities. Further illustration of the ongoing policy and operational priority of disaster preparedness can be seen in the relevance of the International Health Regulations, the Sendai Framework and health-system resilience approaches. Previous emergency events in Monrovia therefore provide a timely opportunity to look at how the lessons learned have been incorporated into preparedness arrangements. The current study offers timely and context-specific evidence to support building emergency public health preparedness before the next big crisis by focusing on the current experience and priorities of stakeholders. It is also important in the context of maintenance of preparedness after the emergency and the linkages of community-level actors to the formal emergency response mechanism.

## 3. METHODOLOGY

### 3.1 Study Design

A cross-sectional survey design using mixed methods was used to address both the scope and the depth of stakeholder views on the disaster management and emergency public health response issues in Monrovia. The quantitative strand employed structured items in the form of the Likert scale and Multiple-Choice Questions (MCQs) to determine the perception of availability of infrastructure, capacity of workforce, coordination mechanism, adequacy of surveillance and level of preparedness in the study population. The qualitative strand included three open-ended questions (Questions 31-33) to solicit narrative perspectives from stakeholders on the strategic priorities of the Ministry of Health, the need for additional support, and overall recommendations. The findings enabled triangulation and a more in-depth analysis of the phenomena studied because both strands were integrated (Creswell & Plano Clark, 2018).

### 3.2 Study Setting

The research was carried out in Monrovia, the capital of Liberia, which has a population of about 1.5 million people. Monrovia has clusters of key emergency health facilities such as MoH Headquarters, John F. Kennedy Memorial Hospital (JFK), C.H. Rennie Hospital, the National Public Health Institute of Liberia (NPHIL), the Emergency Operations Center (EOC), and offices of key international health partnership organizations. The city is extremely urban, has a large informal settlement presence, little water infrastructure and sanitation, and is highly epidemiologically at risk, thus presenting the most complex and impactful public health emergency response location in Liberia.

### 3.3 Sampling and Participants

308 participants were selected using the purposive sampling technique due to their direct involvement in or experience of disaster management and emergency public health responses in Monrovia at the community level. The recruitment aimed to reach a wide diversity of health system actors who could offer experience and insightful, informed feedback on the institutional, infrastructural, and operational aspects of emergency preparedness and response. **Recruitment Sites**

Participants included from (i) MoH Headquarters (Sinkor); (ii) John F. Kennedy Memorial

Hospital; (iii) C.H. Rennie Hospital; (iv) NPHIL and associated reference laboratories; (v) Monrovia City Corporation District Health Offices; (vi) community health posts and CHW cluster meeting points in four informal settlements (West Point, Clara Town, New Kru Town and Logan Town); (vii) offices of NGOs and international partner organizations (local WHO, UNICEF and MSF affiliates). Purposive sampling was used to ensure a wide range of variation across policy, facility, surveillance, community, and partner level (Patton, 2015).

**Professional Categories Represented**

The five professional and community-based cadres included were: (1) frontline clinical health workers (physicians, registered nurses, midwives, emergency room technicians, and IPC officers); (2) public health administrators and policymakers (MoH programme officers, county health team directors, district health officers, and policy analysts); (3) epidemiologists and surveillance specialists (NPHIL epidemiologists, IDSR data managers, EOC coordinators, and public health laboratory scientists); (4) CHWs and supervisors (CHWs, community health assistants, and CHW cluster supervisors); and (5) NGO and international partner health staff (emergency health coordinators, programme officers, and logistics managers).

**Inclusion Criteria**

The criteria for participants were: (a) age of 18 years and older; (b) working or involved in the Monrovia public health system or a health-related NGO in an emergency or outbreak response role; (c) having resided or worked in Monrovia for at least 12 consecutive months before the data collection; (d) having experience in at least one emergency or outbreak response activity in Monrovia; and (e) willing to sign a written informed consent. Community health workers and community participants were included in the analysis using criterion (b) by adapting WHO (2007) definition of community health workers.

**Exclusion Criteria**

People were removed from the sample if they were: (a) younger than 18 years; (b) only worked out of country; (c) had worked overseas less than 12 months; (d) did not have experience in emergency response; (e) could not give informed consent; or (f) less than 20% of the questionnaires were completed (Fincham, 2008).

Recruitment Procedure

Recruitment was carried out in three stages in 10 weeks. Phase 1 was when formal institutional access was arranged by MoH, NPHIL and hospital superintendents. Phase 2 consisted of trained research assistants at each site identifying and inviting "eligible" people by means of role indicators and eligibility screening. In phase 3, informed consent was sought and questionnaires were administered in private by the researcher. A total of 308 questionnaires (91.9%) were completed out of the 335 that were sent out.

**Sample Size Justification**

The Yamane (1967) formula for sample size ($n = N / [1 + N(e^2)]$) was used to calculate the sample, with an estimated number of stakeholders of 3,500 and a 5% margin of error, resulting in a minimum sample size of about 360. A 15% non-response adjustment, as suggested by Cochran (1977), yielded a desired sample size of 308. The qualitative strand also met the criterion for a large enough sample of 12 to 20 responses to meet the criteria for thematic saturation in a "professionally homogenous population" (Guest et al., 2006) and for a mixed methods design of "qualitative and quantitative adequacy" (Creswell & Plano Clark, 2018).

**3.4 Data Collection Instrument**

The researcher developed a questionnaire specifically for this study after a comprehensive literature search on disaster management, emergency public health response, the International Health Regulations (IHR 2005), the Sendai Framework for Disaster Risk Reduction and other empirical studies. The questionnaire had 33 questions grouped into eight thematic sections: (i) demographic and professional background; (ii) health infrastructure assessment; (iii) human resource capacity and training; (iv) disease surveillance and early warning systems; (v) interagency coordination and communication; (vi) supply chain and logistics; (vii) community engagement mechanisms; and (viii) policy priorities and recommendations.

A mixed method was used in the instrument. The questions covered the topic of disaster preparedness and the emergency public health response from a stakeholder perspective and used a multiple choice and five-point Likert scale format to provide quantitative data. Questions 31-33 were open-ended to enable participants to give detailed comments, recommendations and experiences on current challenges and priority interventions.

The draft questionnaire was reviewed by experts prior to data collection to guarantee proper quality of the instrument. The questionnaire was reviewed independently by two high-level public health practitioners who have experience in disaster management and emergency preparedness to check for its clarity, relevance, comprehensiveness and suitability to address the study objectives. They included comments and suggestions by changing unclear terms, reordering questions and clarifying the answer options as appropriate. This expert review in advance of administration determined the face and content validity of this instrument. The finalised questionnaire was subsequently given to the eligible participants in a face-to-face data collection method, following informed consent. The quantitative responses obtained from the instrument were then analyzed by the appropriate descriptive statistical techniques, while the qualitative responses were analyzed thematically, to achieve the objectives of the study.

**3.5 Data Analysis**

The quantitative data (Likert-type) were analysed descriptively in terms of frequencies and proportions. Thematic analysis, as proposed by Braun and Clarke (2006), was used to analyse the qualitative open-ended responses. The six phases of thematic analysis described by Braun and Clarke (2006) were followed: data familiarization, initial code generation, theme identification, theme review, theme definition and naming, and narrative reporting. Two members of the

research team independently coded the themes and these were discussed iteratively to provide analytical rigour and inter-rater consistency.

### 3.6 Ethical Considerations

The study has been approved by Uttaranchal University Research Ethics Committee. Prior to data collection, all participants signed informed consent forms. All participation was voluntary and participants were assured that withdrawing from the study would not impact their results. The study data set did not contain any personal identifying information that was collected or retained. Completed questionnaires were retrieved in closed envelopes and given a numeric code that was anonymous for data entry and analysis.

## 4. RESULTS

### 4.1 Participant Characteristics

A complete survey was returned by all 308 participants. The sample included five professional/community cadres from seven institutional/community settings in Monrovia. 100% of all participants indicated they had direct contact with at least one emergency response or disaster preparedness activity in Monrovia. The multi-cadre and multi-site nature of the sample ensured that results were representative of the range of views of stakeholders within Monrovia's emergency health system.

Table1.Thematic Summary of Stakeholder Perspectives from Open-Ended Survey Responses (n-308)

| Theme/ Challenge Domain | No. of Responses Mentioning | % of Respondents |
|---|---|---|
| Funding and resource mobilization | 253 | 82% |
| Workforce training and capacity building | 225 | 73% |
| Surveillance and early warning systems | 197 | 64% |
| Inter-agency coordination and planning | 169 | 55% |
| Community engagement and risk communication | 139 | 45% |
| Supply chain and logistics improvement | 139 | 45% |
| Laboratory and ambulance services | 111 | 36% |
| CHW integration into health systems | 83 | 27% |
| Political commitment and governance | 83 | 27% |

**4.2 Stakeholder Perspectives on the strategic priorities for the Ministry of Health The** open-ended question about MoH strategic priorities for improved disaster preparedness and response was answered by all 308 respondents. Four priority domains emerged as a result of thematic analysis and are detailed below, ranked by the priority given by stakeholders.

- **Strengthening of disease surveillance and early warning systems:**

The most frequently mentioned MoH priority was strengthening of disease surveillance and early warning systems. Stakeholders urged that investment be made in real-time reporting infrastructure, community-based surveillance networks and systematic integration of surveillance data into response planning mechanisms. A specific response highlighted early warning and disease surveillance as the most important action that the MoH could take. The focus on surveillance is driven by the broad stakeholder recognition that late detection of outbreaks is a key driver of the severity of previous outbreaks in Monrovia, including the EVD epidemic.

- **Health Workforce Training and Emergency Preparedness Capacity:**

Workforce was a recurring theme among stakeholders as a critical vulnerability that needed immediate attention from MoH. There was a repeated call for more training for health workers in emergency preparedness, more simulations and sufficient protection and diagnostic materials. The participants in particular asked for the MoH to make the necessary training on emergency preparedness mandatory for all cadres in an ongoing manner, instead of being a one-

off training. One respondent echoed the feelings of many: there is a need for increasing resources and logistics to allow health workers to reach the communities to raise awareness and manage disasters.

- **Improving Coordination between Hospitals, Communities and Partners** Poor coordination between health facilities, community health networks, and international partners was noted as a frequent failure mode in emergency responses. Stakeholders emphasized the need for a clear response plan with clearly defined roles and accountabilities, better communication between health facilities, CHW networks and the EOC, as well as regular multi-agency simulation exercises for coordination to be tested and improved. Particularly a respondent suggested better communication between hospitals, communities and partners as a key priority.
- **Increased and Sustained Health Sector Financing**

Stakeholders also identified increased and sustained health sector financing as the root structural constraint that underlies all other constraints. Several respondents urged MoH to increase the national budget for health, increase stockpiles of critical drugs and emergency supplies and keep emergency treatment facilities functional with proper equipment. Financing must be adequate for all other preparedness enhancements, stakeholders noted.

**4.3 Stakeholder views on additional support needs**

After exploring the reasons for needing more assistance to enhance emergency public health response in Monrovia, stakeholders came up with four categories of needs, all of which address various dimensions of the operational gap at this time.

- **Financial Resources:** Many respondents gave direct and unambiguous responses that were a complete answer to the question about funding of 'Funding 'or 'Financial strength and good health facilities', showing the pervasiveness and acuity of the financial constraint as the most commonly cited additional support need. It was agreed that all these things need to be improved at the same time, otherwise none of them will have a significant impact without the others.
- **Emergency Infrastructure and Logistics:** Stakeholders highlighted the absence of an ambulance, the emergency treatment centres were not functional and the laboratory services were not reliable. Deficiencies in the supply chain, such as the lack of critical medicines and diagnostic supplies, were noted as often undermining the effectiveness of emergency responses. They emphasized that the infrastructure on logistics shall be strengthened in advance of the next emergency and not be built as an afterthought during the emergency.
- **Trained Emergency Response Teams**: Stakeholders noted that health workers often do not have the technical expertise to provide emergency triage, infection control and prevention during surge, and mass casualty management. A need for a standing emergency response work force that is readily deployable was identified as a priority support need.
- **Strengthened International and NGO Partnerships:** Stakeholders recognised the critical need for functional and effective collaboration with international organisations and NGOs in emergency preparedness and the need to strengthen partnership arrangements, which are not well established and are too often only called into action reactively in times of crisis. Structured partnerships for lab services, rapid diagnostic testing, and community health education were called for, to be proactively activated and sustained between emergencies.

**4.4 Additional Stakeholder Recommendations**

A sub-group of stakeholders gave longer qualitative responses for 3 further thematic recommendations which cut across the survey questions.

- **Community Engagement and Public Awareness as Preparedness Pillars:** Several participants highlighted that the positive engagement and public awareness to communities should be considered as a precondition for emergency response and not just an additional activity. Participants suggested that there should be a continuous public education programme, community-based activation of surveillance networks and social mobilization structures that can be quickly expanded in the event of an emergency. The framing was clearly systems oriented; community readiness cannot be separated from institutional preparedness.
- **Institutional Learning and Continuous Improvement:** Stakeholders noted that there is a risk of gains in preparedness slipping between times of emergencies, as experienced in Liberia after the strengthening period was implemented during the Ebola outbreak.
  Continuous training cycles, monitoring/evaluation frameworks and regular after-action reviews were recommended as mechanisms to maintain the preparedness over time. Participants highlighted that learning from previous emergencies such as Ebola and COVID-19 is an evidence-based way of enhancing future response and actions.

- **Formal Integration of Community Health Workers:** The explicit recommendations for the incorporation of CHWs into national and sub-national emergency response systems, including separate budget lines for their regular compensation, was perhaps the most structurally significant recommendation to come out. A specific recommendation was made by one respondent that CHWs should be included in national health planning, with a budget line for funding CHWs. This recommendation is based on an agreement among practitioners that CHWs are not effective emergency response resources if they are not recognised formally, are not compensated and are not included in the plan's organisation of emergency response.

## 5. DISCUSSION

### 5.1 Underfunding as the Foundational Structural Constraint

Chronic underfunding was the most ubiquitous theme for all stakeholder response categories. Financing is a major challenge that 82% of respondents identified as a central challenge, indicating a systemic issue in Liberia's public health system. It is worth noting that Liberia's health expenditure per capita is among the lowest in the world and the structural reliance on volatile donor financing for emergency preparedness capacity-building is difficult to sustain and reduces the stability of emergency preparedness capacity building (World Bank, 2022). The framing by the stakeholders of funding as the root of all other problems is analytically significant because the other problems, workforce gaps, surveillance gaps, logistics gaps, are all downstream issues, and therefore, they are not problems in their own right, but they are related to the primary issue of funding.

Reducing the overall emergency preparedness challenge to a resource acquisition problem, however, is the implicit risk indicated by stakeholder responses. However, good disaster management demands not only sufficient resources but also good institutions that are accountable, competent procurement and supply chain management, and the human resource capacity to convert investments into effective emergency services. Stakeholder recommendations, in particular on issues of integration of CHWs, coordination, and strengthening of surveillance systems, are based on an implicit assumption that structural and governance changes must go hand-in-hand with funding.

### 5.2 Workforce Capacity: Quantity, Competency and Deployment

The second top priority stakeholder identified was workforce development (73%), reflecting multiple health security assessments conducted after the 2014-2016 Ebola outbreak that identified health worker training, mentorship and deployment as the top priority gap in Liberia's emergency preparedness after Ebola (Nuzzo et al., 2019). The qualitative workforce deficit aspect of the study is relevant in relation to the quantitative aspect of workforce deficits in health reported in the literature and was highlighted by the interviewees when they spoke of the lack of health workers but also of the lack of skills and competencies in the field of emergencies, such as triage, infection prevention and control during surge situations, mass casualty management, etc.

One of the highlights from the systems strengthening viewpoint is the call for regular simulation exercises. The use of simulation-based training is known to be most effective in moving emergency protocols from a theoretical level to a level of practitioners' competence, as well as uncovering coordination failures in non-actual emergency settings (Nuzzo et al., 2019). The inclusion of regular simulations on the list of stakeholders' endorsements indicates a high level of understanding of what preparedness entails.

### 5.3 Surveillance and Early warning: Detection-Response Link.

Practitioners identified strengthening the surveillance system as a top priority for the MoH, with 64% indicating that this was a principal stakeholder priority (clear evidence of the practitioner understanding of the importance of the surveillance-response linkage – effective emergency response depends on timely and accurate information on emerging threats). This finding is consistent with the goals of IHR 2005 and Sendai Framework agreements and with evidence from several low-income countries that strong early warning systems significantly lower the economic and mortality impacts of public health emergencies (Gostin et al., 2019). Community-based surveillance (CBS) is also highlighted, with the cross-over of CHWs, especially in the Monrovia context where many people live in informal settlements that are not well-served by facility-based IDSR reporting. Standardized sentinel surveillance responsibilities given to community health workers are a cost-effective and contextually appropriate way of increasing coverage of a surveillance system to those populations at highest risk, who are systematically under-served by current surveillance systems.

### 5.4 Coordination Failures can be Recurrent and Preventable.

The 55% of stakeholders that cited inter-agency coordination failures was confirmed by several post emergency response Liberia and sub-Saharan Africa (SSA) after action reviews (Olu et al., 2019). The EVD response highlighted key deficiencies in command and control, communication systems and accountability for tasks and roles within the MoH, county health services and hospitals and with international partners. Stakeholder recommendations are precise, hitting the target of these coordination failures with a clear objective of how to respond, roles, communication, and regular simulation exercises.

There is currently an EOC in Monrovia which offers an institutional point of reference for development of

coordination, but stakeholders indicate that the EOC is not effectively staffed, tested frequently (using simulations), nor connected to community-level health actors. Increased investment in EOC capacity, such as continued staffing, information management systems and formal linkages of CHW networks into EOC response mechanisms, would directly mitigate the identified coordination gaps by stakeholders.

**5.5 Community Health Workers: From informal Assets to System Pillar**

The key change in this study is the recommendation of the stakeholders to formally include CHWs in national emergency response systems, including budget lines for remuneration. The evidence supporting this recommendation is very strong. The value of CHWs became evident during EVD response as the first point of contact for communities to receive care, having a presence in every community and their credibleness due to their social relationships cannot be matched during community-level emergencies (Perry et al., 2017). However, their informal nature, meaning their remuneration is often not consistent or present, emergency training is not formal, and they are not included in formal emergency management systems, restricts their ability to be reliable response assets throughout the disaster cycles (Ly et al., 2020).

Results from analyses in Ethiopia, Rwanda, and worldwide by the Community Health Worker Alliance of the Global Alliance for Health Outcomes (GAHO) show that paid, supervised, and career-tracked CHWs achieve substantially better health outcomes and have much higher retention rates than volunteer-based models of CHWs (Kok et al., 2015). The formalization of the CHW cadre (budgeting, emergency response training, national emergency response plans, and accountability to county health teams) would turn Liberia's current cadre of CHWs from a weak and fragile asset to one that is durable and deployable as part of the national emergency response system**.**

**5.6 Limitations**

The limitations of this study should be taken into consideration when interpreting the results of this study. The purposive sampling strategy was intentionally used to recruit individuals who have knowledge and experience related to disaster management and emergency public health response. This method could, however, have overrepresented those with higher degrees of involvement in formal professional networks, and who were more likely to voice informed viewpoints regarding health system issues. As such, the results do not necessarily represent the views of a larger population of Monrovia, especially those who are not directly engaged in the health system.

Second, the cross-sectional study design limited the analysis to a snapshot of the stakeholders' perceptions at one point in time and did not allow for the evaluation of changes in perceptions after policy changes, emergency events or health system interventions. Longitudinal studies would help to better understand the change of stakeholders' perspectives over time.

Thirdly, despite the efforts to reduce social desirability bias, for example through anonymous data collection and confidential handling of responses, the potential for response bias is not ruled out, especially in relation to answers to questions about institutional weaknesses and failures in the system.

Lastly, the questionnaire was not formally psychometrically validated including pilot testing and checking of reliability (Cronbach's alpha). This meant that the internal consistency and other measurement properties of the instrument were not statistically verified. Future studies should include pilot testing and psychometric analysis in order to further validate and strengthen the instrument's reliability and validity. Further studies should be conducted that overcome these limitations, such as using probability sampling methods to ensure the study sample is representative of the population, using longitudinal designs to assess changes over time, triangulating survey results with administrative health system data and other objective data sources and conducting thorough psychometric validation of the data collection instrument.

**6. POLICY RECOMMENDATIONS**

Based on the stakeholder voices that emerged in this study, the following policy recommendations are put forward:

- **Invest more in emergency health preparedness:** The Government of Liberia should increase its investments in emergency health preparedness in a dedicated budget line, with at least 15% of the national health budget, which will decrease structural dependency on volatile donor financing and will facilitate sustained, predictable investments in emergency health capacity between crises.
- **Create a National Emergency Preparedness Workforce Plan:** MoH to develop a workforce plan that includes training in emergency preparedness for every health worker cadre; pre-identified emergency preparedness trained cadre to be deployed during emergencies, and biannual simulation exercises at county and national level.
- **Improve IDSR System at All Levels:** NPHILs should be sustainably supported to increase coverage of IDSR to all health facilities and community health posts in Monrovia, including investments in real-time digital reporting systems and CHWsupported sentinel surveillance systems.
- **Formalize CHW integration and remuneration:** A dedicated budget line for remuneration of CHWs should be created; incorporate CHWs into national and subnational emergency response plans; and

include standardized emergency response competencies in CHW trainings.

- **Operationalise Multi-Sectoral Coordination Structures:** Ensure proper staffing of the EOC unit, regular conduct of multi-agency simulations, and establish linkages to community-level CHW networks. Incident command structure and inter-agency communication strategies should be formalized and shared with all concerned.
- **Adopt After-Action Review and Continuous Improvement Processes:** MoH should ensure that after-action review processes are carried out after all declared and undeclared public health emergencies and findings are systematically incorporated into the public health emergency preparedness plan updates and training curricula, as a way to prevent the loss of preparedness gains from public health emergencies between public health emergencies.

## CONCLUSION

This study offers an empirical, practitioner and community-based analysis of the problems facing disaster management and emergency public health response in Monrovia, Liberia. The shared diagnosis from stakeholders from across the five professional cadres and seven institutional and community settings is that there are five main challenges: chronic underfunding, workforce deficits, weak surveillance infrastructure, fragmented coordination, and the lack of a formal emergency response framework for community health workers. The stakeholder voices captured in this study do not simply diagnose the problem, but provide a practitioner-informed plan for improvement. The recommendations that are generated – integrated financing, workforce development, strengthening surveillance, multi-sectoral coordination, and formalization of CHWs – are not new concepts in the global health literature, but are consistent and articulated by global health system actors in Monrovia, giving them a listener's legitimacy and practical specificity that general concepts do not offer. The stakeholders of Monrovia's emergency health system are aware of what should be done. What's needed is the continued political will and planned investment needed to do something with the knowledge.

During the EVD response, Liberia proved that system-level transformation can be achieved in a timely fashion when commitment and investment are in place. The challenge now is to be able to continue that change between crises: what did they invest in Monrovia's health security infrastructure before the next crisis?

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