

## Capacity assessment of Liberia for health emergencies and disaster preparedness and response

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### Abstract

**Introduction:** West Africa continues to experience recurrent epidemics of infectious diseases and other public health emergencies. Most of which have resulted in deaths, disabilities and loss of property due to the weak public health system including low capacity to respond, a lack of a preparedness. Liberia, one of the three countries hit by the Ebola epidemic has taken several steps to improve its preparedness and response to public health emergencies. We assessed Liberia's status of public health emergencies preparedness and response and to identify gaps which could prevent her from effectively responding according to IHR core capacities. **Methods:** We conducted a cross-sectional study which involved desk reviews and interviews with key stakeholders of the health sector in Liberia. Data collection was done in-country from April to July 2018. Findings from both sources were triangulated and described under the IHR core capacity themes. **Results:** Liberia has a well-organized public health institute and which coordinates and helps with the implementation of the various plans and policies. The country has plans and policies covering some aspects of the international Health regulation (IHR) core capacities developed. The national public health institute implements the plans and policies, and coordinates preparedness and response activities. There is no dedicated budget line for emergency preparedness and response activities. **Conclusion:** Liberia has made good strides in preparing and responding to public health emergencies. However, the lack of dedicated source of funding serves as a threat to the sustainability of the gains the country has made so far.

**KEYWORDS:** Liberia, IHR, emergency preparedness and response, public health institute

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## Introduction

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West Africa continues to experience recurrent epidemics of infectious diseases and other public health emergencies over the years which have resulted in deaths, disabilities and loss of property due to the weak public health system including low capacity to respond, a lack of a preparedness plan or inadequate execution where it exists. One major epidemic is the Ebola Virus Diseases (EVD) epidemic that devastated the region between 2014 and 2016 [1-4]; resulting in high morbidity and mortality, especially in Liberia, Sierra Leone, and Guinea with its subsequent adverse impact on the health systems of these countries [5]. This epidemic revealed weak regional response capacities to outbreaks in terms of disease surveillance, early warning, preparedness and response [6].

Furthermore, these emergencies are also exacerbated by unplanned and unregulated land use, weak environmental controls, poor enforcement of building standards, urbanization, and other development-linked factors that increase the vulnerability of people and livelihoods [7]. These show that the effects of public health emergencies are not limited to the health systems only; they also affect other sectors such as tourism, trade, agriculture, transport, etc with devastating social, economic and political consequences that are detrimental to regional stability [8,9].

Building the preparedness and response capacity of health systems to address public health events are therefore crucial to every country, especially in West Africa. Most West African countries including Liberia therefore subjected themselves to Joint External Evaluation (JEE) process to assess a country's capacity under the IHR 2005 to prevent, detect, and rapidly respond to public health threats and developed the National Action Plan for Global Health Security (NAPHS) take up certain actions to improve their response to public health emergencies based on the gaps identified [10 - 11]. However, these plans are at various stages of completion and implementation. Liberia was one of the three countries hit by the Ebola epidemic and has also had several disease outbreaks including Lassa Fever, monkey pox and other health emergencies such as flash floods.

Liberia's health services have been severely disrupted by years of conflict and the EVD outbreak in 2014 [12,13]. While revitalization of the health services has begun, it is still far from satisfactory. Communicable and infectious diseases like malaria, TB and HIV; outbreaks from epidemic prone diseases like Lassa

Fever, Yellow Fever and EVD are increasingly presenting threats to the already vulnerable and weak health system. However, the country has taken several steps to improve its preparedness and response to public health emergencies, especially after the Ebola Outbreak. We therefore conducted this study to determine Liberia's status of public health emergencies preparedness and response and to identify gaps which could prevent her from effectively responding according to IHR core capacities.

## Methods

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### Study site-brief about the country

Liberia is situated on the coast of West Africa and borders Sierra Leone on the west, Guinea to its north, and Ivory Coast on the east. It covers an area of 111,369 square kilometers with a projected population of 4.1 million, of which 17% are children below five years of age in 2014 [14]. Liberia is divided into 15 counties, which are subdivided into 93 health districts and managed by a progressively decentralizing health system from the county level [15].

The Ministry of Health (MoH) is the lead health sector agency and the National Public Health Institute of Liberia (NPHIL) compliments and supports MoH activities at all levels. Key divisions and units have transitioned from MoH to the newly established NPHIL in line with the Act establishing the NPHIL. These include the Division of Environmental and Occupational Health, Disease Prevention and Control, the National Reference Laboratory, and Liberian Institute for Biomedical Research. The functions of these units are maintained at the national level. However, at the county level these functions remained integrated as part of the county health team.

### Study design

We conducted a cross-sectional study which involved desk reviews and interviews with key stakeholders of the health sector in Liberia. Data collection was done in-country from April to July 2018.

## Study population

The Ministry of Health, NPHIL, all major health agencies, stakeholders and partners in health in the country were involved in the assessment. Representatives from the National Disaster Management (NDMA), United States Agency for International Development (USAID) and World Health Organization (WHO) were involved.

## Data collection tools

A structured questionnaire and interview guide were developed based on the WHO IHR core capacities under sixteen (16) major areas.

- Coordination, Policy and Plans
- Structure and Function of Disease Surveillance Institute and Epidemic Response and Recovery
- Cross-Border Response
- Laboratory
- Public Health Emergency Communication/Risk communication
- Logistics
- Rapid Response Capacity, IPC, Clinical Case Management
- Medical Countermeasures and Personnel Deployment
- Vector Control
- Availability of Epidemiology/ Surveillance and Related Capacity (Institutional Capacity)
- Health Sector Workforce Development Plan
- International Health Regulation (IHR) and Joint External Evaluation (JEE)
- Stakeholder Engagement
- One Health Approach
- Resource Mobilization and Sustainability
- Monitoring and Evaluation and Research

These tools were tested and validated by the West African Health Organizations (WAHO) and Ministers of Health in West Africa. We administered the validated tool and in addition we verified all policy documents where necessary.

## Data collection

Data collection was done from April to July 2018 in two phases. The first phase was the desk review of the country's IHR capacity scores, Joint External Evaluation (JEE) report and actions implemented after

JEE. Desk review of the national surveillance and response documents (policies, systems, plans, structures, coordination mechanisms, documents on simulation exercises, responsibilities and procedure, guidelines including available assessment reports) at the regional and country level was carried out.

In the second phase we conducted face to face interviews using a structured questionnaire based on the IHR core capacities to assess the status of the country's surveillance and response capacity and their respective roles in health emergency preparedness and response. Using the interview guide, we conducted key informant interviews with Country Representatives including Director of NPHIL, heads of the divisions of NPHIL, head of NDMA, representative of WHO, and two representatives of USAID. All relevant data on the policies, plans, guidelines and relevant literature available were verified during data collection.

## Data analysis

Data from key informant interviews was transcribed and analyzed under the sixteen (16) major areas using content analysis. Data from reviews and document verification were also analyzed under the sixteen (16) major areas and triangulated with the interviews. The major themes were: best practices (successes), problems, challenges, gaps, and suggested recommendations for improving on weaknesses.

## Ethical considerations

Approval was obtained from Ministries of Health of all West African countries in ECOWAS through WAHO. In Liberia, permission was sought from the head of the National Coordinating Institute, NPHIL. The purpose of the assessment was explained to participants who were interviewed, and their approval was obtained before interviews were conducted. Participants and countries were free to opt out of the assessment at any point they liked, and they were assured it would not affect them in any way as a nation.

## Results

A total of fifteen (15) key staff from various health stakeholder organizations in Liberia were interviewed. Most of them were heads of health units. We

interviewed 15 stakeholders: 11 from National Public Health Institute Of Liberia (NPHIL), one from National Disaster Management Agency (NDMA), two from United States Agency For International Development (USAID), and one from World Health Organization (WHO) [Table 1](#)

## **Coordination, Policy and Plans**

### *The situation*

The National Public Health Institute of Liberia was established by an Act of the Legislature in 2016. A public health law passed in 1976 is currently undergoing revision. The country also has a National Disaster Management Agency (NDMA) newly established by law. There are disease specific protocols that are used to manage outbreaks. These diseases include Ebola Virus Disease (EVD), Cholera, Lassa Fever, Dengue Fever, Monkey pox. A one health coordination platform has been established with five technical working groups.

There are legally backed functional coordinating mechanisms that ensure they work together from planning, implementation, monitoring, and evaluation of preparedness and response projects that mostly cut across mandates of state institutions and the commitments of donor partners. There is also a good political will and direct involvement of the executive arm of government in matters of health emergency preparedness and response. With the coordinated support of multiple donor partners, Liberia plays a key role in cross border surveillance among her immediate neighbors. Documented plans are in place for almost every aspect of health emergency preparedness and response. Some are undergoing revision to increase their scope and relevance to contemporary public health threats. These plans and structures hold great promise of making Liberia a model for the ECOWAS sub-region and beyond.

Teamwork was observed within the NPHIL and among NPHIL, MoH, NDMA, relevant line ministries and agencies, and the donor partners.

### *Gap*

- One health coordination platform has not yet been fully operational.

## **Structure and Function of National Public Institute of Liberia and Epidemic Response and Recovery**

### *The situation*

Liberia has a functional national coordinating institution, the National Public Health Institute of Liberia with the Ministry of Health serving as the anchoring institution. An organogram for NPHIL is available in its strategic plan. A multi hazard contingency plan exists and guides the management of health epidemics and disaster. There is an ongoing pilot of e-surveillance.

## **Cross-Border Response**

### *The situation*

Liberia developed a Memorandum of Understanding (MoU) with Côte d'Ivoire, Guinea, and Sierra Leone on cross-border collaboration to commission a technical working group to develop some instruments including Standard Operating Procedures (SOP) for data sharing of Epidemic Response and joint and cross-border simulation exercises. Resources available in Liberia at point of entry include staff trained in case detection, Infection, Prevention and Control (basic hygiene, disinfection and protective equipment). There is also a facility for secondary screening.

## **Laboratory**

### *The situation*

Liberia has biosafety level 2+ national public health reference laboratory with each county having a biosafety level 2 laboratory. There exists a well outlined laboratory transportation referral network. There is an inventory of all laboratories in the country. The One Health Concept is considered in laboratory testing.

### *Gap*

- Poor maintenance of laboratory equipment
- Lack of capacity to perform routine calibration and poor standardization of laboratory equipment
- Difficulty with certification and recertification of laboratories

## **Public Health Emergency Communication/Risk communication**

### *The situation*

Liberia has a national epidemic preparedness and response plan. Within this plan, there are systems and

mechanisms in place to provide health education and improve awareness to help reduce epidemics and health emergency risk.

### *Gap*

-Inadequate funding for continual health promotion programs especially in non-crisis times

-Poor road networks resulting in many hard to reach communities and this limits door to door engagement of residents of such communities.

## **Logistics**

### *The situation*

There is an inventory of resources needed to manage disasters and/or epidemics. The NPHIL is responsible for managing logistics for preparedness and response. The NPHIL together with the MoH are responsible for ensuring the availability of logistics before, during, and after health emergencies.

Additionally, the health emergency contingency plan is available and outlines supply needs. However, these are not strictly adhered to due to challenges of coordinating the support from multiple donors.

### *Gap*

- Donor partners are the main source support for stocking logistics.
- Currently, there are no stockpiles.

## **Rapid Response Capacity, IPC, Clinical Case Management**

### *The situation*

At the national and county levels, facilities have been identified for possible conversion to Treatment Centers in the event of emergencies. However, this has not been done at the district and local levels.

### *Gap*

At the district levels, facilities have not been identified for possible conversion to treatment centers in the event of emergencies.

## **Medical Countermeasures and Personnel Deployment**

### *The situation*

A draft national countermeasures and personal plan is being drafted as part of the national action plan for health security. There are also SOPs for the management and transport of potentially infectious patients in the community and entry points.

### *Gaps*

-There is no system in place for activating and coordinating medical countermeasures across borders during a public health emergency.

-There are no plans that outline a system for sending and receiving medical countermeasures and personnel during public health emergencies

## **Vector Control**

### *The situation*

The environmental health department has some capacity for vector control. There is a coordinator for vector control. County level Environmental Health Technicians (EHTs) exist. These staff have been trained in vector control.

### *Gap*

No written plans are available for targeted vectors. The malaria control program has guidelines for control of mosquitoes. Guidelines for the control of Lassa fever are being developed; a component of which deals with rodent control [Table 2](#)

## **Availability of Epidemiology/ Surveillance and Related Capacity (Institutional Capacity)**

### *The situation*

The country has all required cadre of expertise or professionals who can support health emergency preparedness and response. The numbers of experts in each category segregated by gender is available. A detailed excel sheet enlisting these cadre of staff is available. NPHIL has a database of experts who could be rapidly mobilized during health emergencies. Also, there is a contingency plan which can be activated immediately in case of health emergencies. NPHIL



ensures that an event-based surveillance system is in place and enable timely follow-up of information/rumors from all sources including the community, media, etc.

### *Gap*

There are no systems to welcome deployment.

## **Health Sector Workforce Development Plan**

### *The situation*

Liberia has a 6-year health sector strategic plan for the period 2015 to 2021. A workforce development plan is available. There is Field Epidemiology Training Program (FETP) at two levels: Frontline and Intermediate.

The main strategy for retention and motivation of staff is the upgrading of job titles which come with raised salaries. Liberia has rapid response team capacities at both the national and sub-national levels.

### *Gap*

A key challenge of the FETP is sustainability. CDC (through African Field Epidemiology Network) is the sole sponsor of the FETP.

## **International Health Regulation (IHR) and Joint External Evaluation (JEE)**

### *The situation*

Liberia performed satisfactorily in the recent JEE conducted in September 2016. A national action plan for health security addressing these and other IHR core capacities has been drawn, validated, and launched on the 27th of June 2018.

## **Stakeholder Engagement**

### *The situation*

Liberia has engagement with many stakeholders, mostly international partners who provide financial and technical support in the area of public health emergency preparedness and response. Overall, the sustained support from many stakeholders has enhanced both the

human resource and infrastructure capacity from the national to the subnational level.

### *Gap*

Some donor agencies like USAID would normally channel the financial support to the government or an implementing NGO. In these instances, these intermediates are not transparent enough on the amount of money allotted for activities.

## **One Health Approach**

### *The situation*

Liberia has a one health coordination platform (OHCP) chaired by the Vice President of the Republic of Liberia. There is a one health secretariat that coordinates all activities.

### *Gaps*

- There is neither a veterinary epidemiologist nor veterinary epidemiology unit to advise on this technical area. Technical advice in these areas are provided by international staff employed by the Food and Agriculture Organization (FAO).
- There are no legislative instruments on pesticide control and other related chemical hazards.

## **Resource Mobilization and Sustainability**

### *The situation*

There is formal document or framework or plan for mobilizing resources towards disaster and epidemic preparedness and response. Donor partners are the main sources of support before, during, and after public health emergencies.

### *Gaps*

- There are concerns of sustainability should these donor partners reduce or withdraw their support in the future.
- There is no clear dedicated budget line for emergency preparedness and response.

## **Monitoring and Evaluation and Research**

Liberia has a monitoring and evaluation plan in place to track the progress of activities in epidemic preparedness and response.

## Research

### *The situation*

The NPHIL has a research division as part of their mandate in public health preparedness and response. Research financing is through the budget of NPHIL which in turn is largely donor dependent. There is no direct donor support to research.

### *Gaps*

- Lack of adequate funding
- Getting the political and financial backing to implement recommendations emanating from research evidence. Thus, research evidence does not inform policy.

## Situational analysis and Evaluation of Liberia

The situational analysis of the country has been captured as strengths, weakness, opportunities and threats of epidemic preparedness and response in the country.

### *Strengths*

- The availability of legislative instruments establishing an autonomous NPHIL and supporting its operations
- Availability of strategic plans, SOPs, and other operational guidelines for use at all levels
- A substantial human resource capacity built during the Ebola Outbreak
- Infrastructure capacity enhancement during and post the Ebola Outbreak (Laboratories, and EOCs)
- The commitment (good will) and direct involvement of state in the preparedness and response
- The general appreciation of the importance of preparedness and response of the general public following their experiences during the Ebola outbreak

### *Weaknesses*

- No dedicated funding or budget line for preparedness and response (obtains state funding from a broader budget line for NPHIL)
- Resource mobilization is heavily dependent on donor partners
- Lack of capacity for e-surveillance

- Lack of training institutions for advance level capacity building, i.e. Masters, advance field epidemiology, doctoral, membership and fellowship postgraduate medical training

### *Opportunities*

- The support of REDISSE in surveillance and resource coordination
- The institutionalization of the One Health Coordinating Platform with commitment of the State at the level of the Vice President
- Support from the Global Health Security Agenda
- The in-country training of frontline and intermediate level field epidemiologist

### *Threats*

Over reliance on donor partner support for most activities

- A weak national economy
- Adequate health security at borders especially along the multiple illegal ground crossings

## **Discussion**

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Public health emergencies can occur at any time, and in some cases without warning signs. These emergencies always reveal the critical gaps that exist in the country's preparedness and response systems [16]. In the event of public health emergencies, preparedness and planning are essential to the successful response of the situation [17]. Thus, this paper assessed Liberia's preparedness and response towards epidemics.

Policies and regulations form integral pillars for effective coordination. The effectiveness in responding to various outbreaks depends on well-structured form of coordination. With experiences from the 2014 Ebola Outbreak, Liberia has developed a strong public health system with a number of policies and structures in place to handle any such emergency which may come up. The establishment of NPHIL, availability of strategic plans and operational guidelines and the enhancement of infrastructure are signs of an improved public health system poised for emergencies that may hit the county.

The country also has a good intersectoral coordinating system, a major area to be prioritized in public health preparedness activities [18].

From the 2014 EVD outbreak, the need for a strong cross-border collaboration was evident. This is because people cannot be restricted with geographical boundaries. Similarly, diseases and emergencies can cut across all boundaries. Liberia's ability to develop a point of entry contingency plan and development of an MoU for cross border coordination with Cote d'Ivoire, Guinea and Sierra Leone are steps in the right direction to handle cross-border emergencies. This shows collaboration between Liberia and its neighboring countries. Cross border collaborations have been found to be strengthened by long standing bilateral agreements which exist between countries [18].

It is therefore of importance to ensure every country fully implement the IHR regulations. Responding effectively to public health emergencies involves having the needed logistics and resources in stock, not only at the national level but also at the local level. Laboratories for example play a key role in disease outbreak investigations during public health emergency response. Liberia has a national public health reference laboratory, two regional public health laboratories and 15 clinical laboratories in all 15 counties. The number of diseases the laboratories in country are able to tests shows an extent of preparedness towards public health emergencies.

However, unavailability of stockpiles such as reagents, equipment and the like are key components that need to be addressed. When stock management skills of the country are improved, supply chain bottlenecks are eliminated [19]. There is the need for the country to adequately plan to have stockpiles and also improve on IPC.

Human resource and workforce are a major component of a good public health system. Structures without the requisite workforce and the needed capacity would lead to failure of the system. Thus, a workforce development plan for public health emergency preparedness and response is embedded in the Liberian six-year health sector plan. Currently, the required health workforce capacity of the country has still not been achieved. To help in building the required capacity, the country has training structures. However, sustainability of these training structures remains a challenge since it is largely funded by donor partners. Similarly, deployment during an outbreak is markedly affected by the

availability of personnel, technical know-how and the resources available.

Stakeholders in health have been a major pillar in the health system of Liberia. The country has stakeholders who are mostly international partners. Their financial and technical support they provide to the country has enhanced both the human resource and infrastructure capacity of the country's health system.

Unfortunately, most of these stakeholders are also major funders of the health system in the country. This leaves the country in a disadvantaged situation should a public health emergency occur when donors are not able to provide the sufficient amount of funds the country needs. The lack of funding and low resource mobilization capacity of the country puts their preparedness at risk of being unstable. This concern has been reported in various settings [18-20]. It is therefore recommended that in order to maintain an effective preparedness and response system, there is the need for the county to ensure a sustainable funding capacity and human resource [21].

One health encompasses human, animal and environmental threats and their inter-linkages with each other. Liberia has one health coordination platform that engages all relevant stakeholders for effective response to emergencies.

Monitoring and evaluation reveal the nature and effectiveness of every system in place. As a country, NPHIL has a M&E plan embedded in the country's six-year strategic plan under development puts her at an advantage. This is because the plans have been well laid, and indicators can be tracked to monitor their progress in preparedness and response. Public health emergencies evolve and require constant research to be prepared to tackle them. The essence of research in epidemic preparedness and response is to keep the public health system up to date to new developments and evolutions which are coming up. Though Liberia has a research department in the NPHIL, challenges such as lack of resources, inadequate funding and low human resource capacity are major challenges that can cripple this important area of preparedness and response. Though there has been improvement in the public health emergency preparedness and response for Liberia post Ebola, there is the need to consolidate the functions of the delicate health system and continuous commitment from both Government and partners to ensure the system is responsive to all emergencies.



## Limitation

The key stakeholders had limited time available for scheduled interviews. To reduce this limitation, some interviews were rescheduled. Also, for those who were not available, we made them suggest representatives who could provide responses to the interview.

## Conclusion

Liberia has well developed public health emergencies preparedness and response policies according to the IHR core capacities. The country also a well-organized public health institute and which coordinates and helps with the implementation of the various plans and policies the country has. However, in the area of One Health, the country lacks the required human resource capacity to deal with One Health emergencies. Again, there is no dedicated budget line for funding for implementing structures of the plans in place and activities to be undertaken during emergency situations. International partners are currently the main source of funds. Therefore, sustainability of structures in place remains a challenge.

## What is known about this topic

- There have been several public health emergencies in the region;
- Public health emergencies have resulted in deaths, disabilities and loss of property due to weak health systems;
- Liberia has been faced with public health emergencies.

## What this study adds

- Liberia has well developed public health emergencies preparedness and response policies according to the IHR core capacities;
- Liberia has a well-organized public health institute and which coordinates and helps with the implementation of the various plans and policies the country has.

## Competing interests

The Authors declare no competing interests.

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## Authors' contributions

Conceptualization: MF, DAB, EK, KMN, VL. Data collection: BBK, DAB, EK, KMN, VL, AN, IS, SNA. Report writing: DAB, EK, KMN, VL. Manuscript development and finalization: MF, BBK, DAB, EK, KMN, VL, SNA, IS, AN. All authors read and approved of the final version of the manuscript.

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## Tables

[Table 1](#): Stakeholders Interviewed

[Table 2](#): Summary Table of Key Findings under 16 Sections

## References

1. WHO. [Lassa Fever - Nigeria](#). WHO. 2022. Accessed 31 Jan 2022.
2. WHO. [Dengue fever - Burkina Faso](#). WHO. 2017. Accessed 9 Jul 2018.
3. WHO. [Rift Valley fever - Gambia](#). WHO. 2018. Accessed 9 Jul 2018.

4. Africanews. [WHO assists Ghana to deal with meningitis outbreak](#). Africanews. Accessed 9 Jul 2018.
5. WHO. [Ebola outbreak 2014-2015](#). WHO. Accessed 9 Jul 2018.
6. Gostin LO, Friedman EA. A retrospective and prospective analysis of the west African Ebola virus disease epidemic: robust national health systems at the foundation and an empowered WHO at the apex. *The Lancet*. 2015 May 9; 385(9980):1902-9. [https://doi.org/10.1016/S0140-6736\(15\)60644-4](https://doi.org/10.1016/S0140-6736(15)60644-4) [Google Scholar](#)
7. DARA. [Disaster Risk in West Africa](#). DARA Impact Matters. 2018. Accessed 9 Jul 2018.
8. Poletto C, Gomes MF, y Piontti AP, Rossi L, Bioglio L, Chao DL, Longini Jr IM, Halloran ME, Colizza V, Vespignani A. Assessing the impact of travel restrictions on international spread of the 2014 West African Ebola epidemic. *Eurosurveillance*. 2014 Oct 23; 19(42):20936. <https://doi.org/10.2807/1560-7917.ES2014.19.42.20936> [Google Scholar](#)
9. Bowles J, Hjort J, Melvin T, Werker E. Ebola, jobs and economic activity in Liberia. *J Epidemiol Community Health*. 2016 Mar; 70(3):271-7. <http://dx.doi.org/10.1136/jech-2015-205959> [PubMed](#) | [Google Scholar](#)
10. WHO EMRO. [IHR core capacities](#). WHO EMRO. 2018. Accessed 9 Jul 2018.
11. WHO. [Joint External Evaluations](#). WHO. 2018. Accessed 9 Jul 2018.
12. Cooper C, Fisher D, Gupta N, MaCauley R, Pessoa-Silva CL. Infection prevention and control of the Ebola outbreak in Liberia, 2014-2015: key challenges and successes. *BMC Med*. 2016 Jan 5; 14:2. <https://doi.org/10.1186/s12916-015-0548-4> [PubMed](#) | [Google Scholar](#)
13. Nagbe T, Naiene JD, Rude JM, Mahmoud N, Kromah M, Sesay J, Chukwudi OJ, Stephen M, Talisuna A, Yahaya AA, Rajatonirina S, Fallah M, Nyenswah T, Dahn B, Gasasira A, Fall IS. The implementation of integrated disease surveillance and response in Liberia after Ebola virus disease outbreak 2015-2017. *Pan Afr Med J*. 2019 May 28; 33(Suppl 2):3. <https://doi.org/10.11604/pamj.supp.2019.33.2.16820> [PubMed](#) | [Google Scholar](#)
14. Liberia Institute of Statistics and Geo-Information Services (LISGIS). [Liberia Households Income and Expenditure Survey 2014 Statistical Abstract](#). Monrovia, LISGIS. 2016. Accessed 12 Oct 2022.
15. United Nations Development Programme (UNDP). [Human Development Report 2014](#). New York, UNDP. 2014. Accessed 9 Jul 2018.
16. US CDC. [Public Health Preparedness and Response: 2018 National Snapshot](#). Atlanta, CDC. 2018.
17. Wamala JF, Okot C, Makumbi I, Natseri N, Kisakye A, Nanyunja M, Bakamutumaho B, Lutwama JJ, Sreedharan R, Xing J, Gaturuku P, Aisu T, Da Silveira F, Chungong S. Assessment of core capacities for the International Health Regulations (IHR[2005])--Uganda, 2009. *BMC Public Health*. 2010 Dec 3; 10 Suppl 1(Suppl 1):S9. <https://doi.org/10.1186/1471-2458-10-s1-s9> [PubMed](#) | [Google Scholar](#)
18. Bevc CA, Simon MC, Montoya TA, Horney JA. Institutional facilitators and barriers to local public health preparedness planning for vulnerable and at-risk populations. *Public Health Rep*. 2014;129 Suppl 4(Suppl 4):35-41. <https://doi.org/10.1177/00333549141296406> [PubMed](#) | [Google Scholar](#)
19. Heras-Mosteiro J, Sanz-Barbero B, Otero-Garcia L. Health care austerity measures in times of crisis: the perspectives of primary health care physicians in Madrid, Spain. *Int J Health Serv*. 2015; 46(2):283-99. <https://doi.org/10.1177/0020731415625251> [Google Scholar](#)
20. Legido-Quigley H, Otero L, la Parra D, Alvarez-Dardet C, Martin-Moreno JM, McKee M. Will austerity cuts dismantle the Spanish healthcare system? *BMJ*. 2013 Jun 13; 346. <https://doi.org/10.1136/bmj.f2363> . [Google Scholar](#)

21. Lurie N, Wasserman J, Stoto M, Myers S, Namkung P, Fielding J, Valdez RB. Local Variation In Public Health Preparedness: Lessons From California: Even in California—one of the best-prepared states—much work remains to ensure preparedness for a public health emergency. *Health Affairs*. 2004; 23(Suppl1):W4-341. <https://doi.org/10.1377/hlthaff.w4.341> [1 Google Scholar](#)

No.	Organization	Number of People interviewed	Department
1	NPHIL	11	Infectious Disease and Epidemiology & IHR National focal person
			Training and Capacity Building Division
			Epidemic Preparedness and Response Lead
			Infectious Disease and Epidemiology
			Healthcare Waste Management
			Chemical and Vector Control
			Logistics and Supply Chain
			REDISSE
			Monitoring and Evaluation
			National Reference Laboratory
			Public Health & Medical Research
2	NDMA	1	NDMA
3	USAID	2	Health Advisor Infectious Disease Team Lead
4	WHO	1	Emergency Preparedness and response Officer

**Table 2: Summary Table of Key Findings under 16 Sections**

<b>Sections</b>	<b>Situation</b>	<b>Gaps</b>
Coordination, Policy and Plans	A public health law passed in 1976 is currently undergoing revision	There is no clear budget line for emergency preparedness and response in the national budget although NPHIL primary role.
Structure and Function of Disease Surveillance Institute and Epidemic Response and Recovery	Liberia has a functional national coordinating institution (NPHIL), with the Ministry of Health serving as the anchoring institution	
Cross-Border Response	Has developed a MoU with Cote d'Ivoire, Guinea, and Sierra Leone on cross-border collaboration	
Laboratory	biosafety level 2+ national public health reference laboratory with each county having a biosafety level 2 laboratory	Difficulty with certification and recertification of laboratories
Public Health Emergency Communication/Risk communication	Has a national epidemic preparedness and response plan	In adequate funding for continual health promotion programs especially in non-crisis times
Logistics	There is an inventory of resources needed to manage disasters and/or epidemics	Currently, there are no stockpiles
Rapid Response Capacity, IPC, Clinical Case Management	At the national and county levels, facilities have been identified for possible conversion to Treatment Centers in the event of emergencies	At the district levels, have not been identified for possible conversion to treatment centers in the event of emergencies
Medical Countermeasures and Personnel Deployment	A draft national countermeasures and personal plan is being drafted as part of the national action plan for health security	There is no system in place for activating and coordinating medical countermeasures across borders during a public health emergency

Vector Control	The environmental health department has some capacity for vector control	No written plans are available for targeted vectors except malaria control
Availability of Epidemiology/ Surveillance and Related Capacity (Institutional Capacity)	has all required cadre of expertise or professionals who can support health emergency preparedness and response	There are no systems to welcome deployment
Health Sector Workforce Development Plan	has a 6-year health sector strategic plan for the period 2015 to 2021	Sustainability of the FETP
International Health Regulation (IHR) and Joint External Evaluation (JEE)	A national action plan for health security addressing these and other IHR core capacities has been drawn, validated, and launched on the 27th of June, 2018	
Stakeholder Engagement	the sustained support from many stakeholders has enhanced both the human resource and infrastructure capacity from the national to the subnational level	Some donor agencies like USAID would normally channel the financial support to the government or an implementing NGO
One Health Approach	Has a one health coordination platform (OHCP) chaired by the vice president of the republic	There is neither a veterinary epidemiologist nor veterinary epidemiology unit to advise on this technical area.
Resource Mobilization and Sustainability	There is formal document or framework or plan for mobilizing resources towards disaster and epidemic preparedness and response	Concerns of sustainability should these donor partners reduce or withdraw their support in the future
Monitoring and Evaluation and Research	Has a monitoring and evaluation plan in place to track the progress of activities in epidemic preparedness and response	