Strengthening Epidemic Preparedness and Response in Resource-Constrained Settings: A Stakeholder-Based Analysis

Rabi Usman*[1], Ibrahim Attah[2], Suleiman I. Egyegini[2], Bamidele Gbenga[3], Ibrahim A. Jibril[4], Ubong Akpan Okon[5], Dennis Paul Dogo[2], Mukhtar Salihu Anka[6]

[1.] Department of Public Health, Ministry of Health, Zamfara State. [2]Nigeria Centre for Disease Control and Prevention, Abuja. [3]Angels Signature College of Health and Management Sciences, Nasarawa State. [4]Future Hope Foundation, Zamfara State. [5]APIN Public Health Initiative, FCT Abuja. [6]National Open University of Nigeria.

1. 0 ABSTRACT

Despite advancements in public health and medical science, epidemic preparedness and response remain a challenge, particularly in resource-constrained settings. This study explores the current state, desired outcomes, and existing gaps in epidemic preparedness across Bauchi and Kano states and the Federal Capital Territory (FCT) in Nigeria. Using a qualitative research design, key informant interviews (KIIs) were conducted with eight public health officials and surveillance officers. Data were analyzed using NVivo11 software, applying deductive coding to identify key themes. Findings highlight key strengths, including the availability of epidemic preparedness strategies, capacity-building initiatives, and multi-sectoral collaborations. Respondents emphasized that structured preparedness plans enable timely response and resource mobilization. Training and continuous capacity building for healthcare personnel were identified as crucial in strengthening response efforts, while partnerships with organizations such as WHO and UNICEF enhance coordination and resource availability. However, significant challenges persist, including inadequate funding, bureaucratic delays in fund disbursement, staff attrition, and limited health infrastructure. Respondents noted that despite dedicated budget lines for epidemic preparedness in Kano, delays in accessing funds impact timely response. Similarly, laboratory capacity constraints hinder effective disease surveillance and early detection. The study also identified gaps in coordination among health and non-health sectors, with communication barriers limiting collaborative efforts. Addressing these challenges requires sustainable financing mechanisms, enhanced workforce retention strategies, and improved infrastructure to support epidemic preparedness and response. Strengthening inter-sectoral collaboration and ensuring timely resource allocation will enhance Nigeria's ability to respond to disease outbreaks effectively. The findings offer actionable insights for policymakers and stakeholders to improve epidemic preparedness and response systems, ultimately enhancing resilience against future outbreaks.

Keywords: Epidemic Preparedness, Public Health, Emergency Response, Nigeria, Surveillance, Capacity Building, Funding Barriers, Health Systems

1.1 INTRODUCTION

The global community continues to face a persistent challenge in effectively preparing for and responding to disease outbreaks despite advancements in public health and medical science (J Olumade et al., 2020); (Madhav et al., 2017); (Tulane University - School of Public Health and Tropical Medicine, 2020); (Shang et al., 2021) and throughout history, epidemics have left lasting imprints on human societies, from the medieval Black Death to the 1918 Spanish flu pandemic to recent outbreaks like Ebola in West Africa and the global COVID-19 pandemic (World Health Organization, 2023); (Heymann & Rodier, 2022). Moreso, recent events have underscored the urgent need for improved emergency preparedness and response measures to address emerging infectious disease threats. One significant issue is the rapid emergence of novel pathogens with pandemic potential, exemplified by viruses such as COVID-19, Ebola, and Zika (Madhav et al., 2017); (Dhaka et al., 2021); (Haider et al., 2020); (World Health Organization, 2023b); Council on (Foreign Relations, 2020). These outbreaks highlight the unpredictable nature of infectious diseases, capable of rapidly escalating into global crises, overwhelming healthcare systems, and posing significant threats to public health and economic and societal stability.

Epidemic preparedness plays a crucial role in protecting public health, especially in resource-constrained settings where the challenges posed by infectious diseases are intensified by inadequate infrastructure, limited funding, and a shortage of skilled human resources (Lee et al., 2023); (Olliaro & Torreele, 2022); (Lal et al., 2022). It is essential for safeguarding public health, particularly in resource-constrained settings where the impact of infectious diseases is magnified by limited infrastructure, funding, and human resources. Key components of epidemic preparedness and response include robust surveillance systems, capacity-building initiatives, and streamlined communication and coordination mechanisms. Surveillance entails the continuous collection, analysis, and interpretation of health data to detect outbreaks early, monitor disease trends, and assess the efficacy of control measures (US Centres for Disease Control, 2020).

Like many other countries, Nigeria is prone to outbreaks of diseases and other public health emergencies. The country's public health system typically focuses on health-related risk factors as triggers for outbreak response, overlooking non-health events that could increase disease transmission risks, such as population movement, natural disasters, and climatic conditions. Other risk factors that exacerbate these emergencies include poor vaccine coverage, inefficient cold chain, insufficient commitment from authorities, corruption, and mismanagement in the healthcare system (Nasir Abdulrasheed et al., 2023; World Health Organization, 2023b; E. Tobin et al.; Utulu et al., 2022). In addition, poverty and a low standard of living among affected populations reflect the country's economic challenges, contributing to delayed diagnosis and management of diseases. It is important to note that non-health sectors such as Agriculture and the Environment play a crucial role in outbreak prevention and response, yet their data is limited to disease surveillance systems.

In addition, the COVID-19 pandemic has highlighted the urgent need for well-established systems capable of responding promptly and effectively to disease outbreaks. This study examines the current state, desired state, and existing gaps in epidemic preparedness across two states—Bauchi and Kano—and the Federal Capital Territory. By analyzing key themes derived from stakeholder interviews, the research aims to identify actionable recommendations that can enhance epidemic preparedness in these regions. Through this exploration, the research seeks to provide insights that not only address immediate gaps but also contribute to the long-term strengthening of public health systems, ultimately improving resilience against future outbreaks.

1.2 METHODS

Study Setting

The study was conducted in three selected states in northern Nigeria: Bauchi (northeast), the Federal Capital Territory (FCT) (northcentral), and Kano (northwest). These states are characterized by diverse socio-economic conditions, varying levels of healthcare infrastructure, and high susceptibility to disease outbreaks such as cholera and meningitis. The region's population density and significant cross-border movements further influence public health dynamics.

Study Design

This qualitative research design was adopted using Key Informant Interviews (KIIs) to gather perspectives from public health officials and key stakeholders across two states—Bauchi and Kano—and the Federal Capital Territory (FCT) of Nigeria to elicit information on the unique challenges and strengths in epidemic preparedness within resource-constrained environments.

Sample Technique

A purposive sampling technique was used in the selection of respondents based on their role in epidemic preparedness and response activities in the selected States.

Data Collection

Semi-structured interviews were conducted among key surveillance officers and custodians of disease surveillance data in the State. A total of 8 KIIs were conducted for this study cross the study across the two states, Kano, Bauchi and the Federal Capital Territory (FCT),

Data Analyses

Interviews were transcribed and analyzed using NVivo11 software, employing deductive coding to identify key themes focused on the current state, desired outcomes, and gaps in epidemic preparedness and response.

1. 3 RESULTS

A total of 8 participants were interviewed for the study. The majority were male (62.50%), aged 40 years and above (25%), with a mean age of 44.6 years. Based on their education status, more than half of the respondents (87.5%) hold a tertiary degree, and (37.50%) have 11-20 years of experience working in the public health space (Table 1).

Table 1. Socio-Demographic Characteristics of Study Participants

Characteristics	Frequency (%)
Sex	
Male	5 (62.50)
Female	3 (37.50)
Age	
25–34	2 (25.00)
35–44	2 (25.00)
45–54	2 (25.00)
≥ 55	2 (25.00)
Educational Status	
Primary education	0 (0.00)
Secondary education	1 (12.50)
Tertiary education	7 (87.50)
Years of Experience	
0–10	3 (37.50)
11–20	3 (37.50)
21–30	1 (12.50)
≥ 31	1 (12.50)

Our findings revealed several key themes which emerged from the qualitative data that describe and underscore the current state of epidemic preparedness in Bauchi, Kano, and the Federal Capital Territory. These themes highlight both the strengths and challenges faced by public health systems in these regions, providing a nuanced understanding of the factors that influence effective responses to infectious disease

outbreaks.

EPR System Strengths

The study findings highlighted current strengths available across the three selected States, which include: (1) availability of epidemic preparedness strategies, (2) training and capacity building on EPR, (3) collaboration and coordination among stakeholders

Availability of Epidemic Preparedness Strategies

The study identified that pre-established protocols and resource mobilization plans are crucial for ensuring timely responses to outbreaks. These strategies include clear guidelines for various scenarios, allowing health officials to act swiftly and efficiently when an outbreak occurs. Having a structured plan in place not only aids in mobilizing resources but also provides a roadmap for coordinating efforts across different agencies, minimizing confusion during crises. One of the stakeholders mentioned that:

> *"A well-prepared health system with a detailed EPR plan will ensure that we can respond swiftly to outbreaks before they escalate" (FCT, interview 1)*

The interviews emphasized that effective EPR allows for proactive planning and resource mobilization during non-epidemic periods, enabling timely and efficient responses when outbreaks occur. This was corroborated by another respondent who said that:

> *"Preparedness isn't just about response; it's about anticipating needs before crises arise." (Kano, Interview 2)*

Another respondent corroborated this by saying:

> *"Our EPR strategies must be comprehensive, covering risk communication and community readiness." (FCT, interview 2)*

Capacity building on Emergency Preparedness and Response and Human Resource Development

Training healthcare workers and stakeholders is a cornerstone of the state's epidemic preparedness strategy. Continuous training of healthcare professionals, especially clinicians, is essential for identifying priority diseases early and improving response times. The states have implemented workshops and training sessions that focus on both emergency preparedness and response phases, ensuring that frontline workers are equipped with the necessary skills. Continuous training of health personnel emerged as a critical component of effective epidemic preparedness. Respondents highlighted the need for regular updates on emerging infectious diseases, changes in response strategies, and best practices in outbreak management:

> *"Training equips us with the tools we need to tackle health emergencies effectively." (Bauchi, Interview 1)*

By investing in ongoing education and training, health workers can enhance their skills and knowledge, better equipping them to handle new challenges as they arise; this was highlighted by other respondents who mentioned that:

> *"Knowledge transfer within teams ensures that everyone is prepared and confident in their roles." (Kano, Interview 2)*

> *"Training and retraining healthcare workers, especially clinicians, would raise their index of suspicion for priority diseases." (Kano, Interview 1)*

> *"Investing in training is investing in our community's health security." (Bauchi, Interview 3 – Bauchi)*

Moreover, ongoing training is seen as vital for strengthening Rapid Response Teams (RRTs), as the respondent shared:

> *"Many of my DSNOs in the LGS have really been responding to it, and it is really building their capacity to know how to respond to specific incidents of these hazards when they see one." (Kano, Interview 1)*

> *"We have strong health facilities and dedicated personnel ready to respond to challenges." (Bauchi, Respondent 1)*

> *"Our strength is that we have trained personnel and capable health workers who understand the disease surveillance system." (FCT, Respondent 2)*

Multisectoral Collaboration and Established Partnerships

The study noted that strong community engagement and established partnerships with local and international organizations are significant strengths within the public health system. These collaborations facilitate resource sharing, improve access to information, and enhance the overall capacity to respond to public health threats. This was echoed by one of the respondents who said:

> *"We have trained people in epidemic preparedness and response. We also have supportive partners who ensure resources are available for emergency preparedness and response. We have an EOC for coordination." (FCT, Interview 1)*

In addition, respondents also mentioned that:

> *"We have representatives from various ministries, security agencies, and partners, all working together under the EPR committee." (Bauchi, Respondent 3)*

> *"Our partnerships with organizations like WHO enhance our ability to tackle health crises." (Bauchi, Interview 2)*

Cross-sector training, including collaboration with agriculture, security, and environmental sectors, is also important for a holistic response. One of the respondents adduced this fact when he said:

> *"Improving coordination could be achieved by organizing regular workshops or meetings and appointing focal points for agencies that can attend meetings when directors are unavailable." (FCT, Respondent 2)*

Respondents also emphasized the importance of collaboration with international organizations like WHO and UNICEF for surveillance and risk communication. One respondent stated:

> *"We work closely with WHO, UNICEF, and other partners for surveillance and risk communication." (Kano, Respondent 3)*

While effective collaboration among health agencies, local governments, and non-governmental organizations (NGOs) was recognized as crucial for a cohesive response to epidemics, the study revealed that misaligned priorities and communication barriers often impede this collaboration. Participants stressed the need for more workshops and better communication structures to strengthen the collaboration across agencies:

> *"The main challenge is communication, as we come from different MDAs, and this can sometimes hinder effective coordination." (Kano, Respondent 2)*

> *"FCT has strong collaborations with partners like WHO and NGOs, but sometimes stakeholders' objectives don't align with state goals. (FCT, Respondent 1)*

Findings from the interviews also highlighted the role of the Public Health Emergency Operations Center (PHEOC) as a crucial platform in facilitating seamless, multisectoral collaboration and coordination, including information sharing and decision-making.

> *"We collaborate through the Public Health Emergency Operations Center, and joint training and exercises help build teamwork among agencies."(FCT, Respondent 2)*

EPR Weaknesses and Gaps in the States

Several significant challenges were identified, including inadequate funding, high staff turnover, and insufficient infrastructure. These weaknesses hinder effective epidemic preparedness and response and limit the capacity to implement necessary health interventions. Addressing these gaps is essential for strengthening the public health system's overall resilience, ensuring it can withstand the pressures of potential outbreaks.

Staff Attrition

Concerning staff attrition, respondents had this to say:

> *"High attrition rates in staff affect the consistency and capacity of the response... Delays in funding affect timely response." (FCT, Respondent 1)*

"One weakness is the turnover of skilled health personnel. When experienced staff retire, new hires often aren't trained enough to handle the demands of epidemic response." (Bauchi, Respondent 1)

Resource Allocation, Funding and Infrastructure

Delays in accessing emergency funds due to bureaucratic processes were frequently cited as obstacles to timely responses. Streamlining these funding mechanisms is necessary to ensure that resources are readily available when crises arise. Establishing dedicated budgets for epidemic preparedness can help mitigate these delays, allowing for quicker mobilization of resources in response to outbreaks.

Several respondents highlighted the specific challenge of bureaucratic delays in securing emergency funds.

"The biggest challenge is funding and infrastructure. The lengthy approval process for emergency funds is a major bottleneck."(FCT, Respondent 1)

"A key weakness is the delay in cash backing for approved resources. Even when we get approvals, it affects the timely response." (Bauchi, Respodnet 1)

"We do not have contingency funds that we can activate... we can write a memo, and we follow up with the governor to secure his approval and that money is immediately released for us to access and continue with the response." (Bauchi, Respondent 2)

The findings were a bit different in Kano State, where there is availability of an EPR budget, but delays in getting approval usually lead to dire consequences. Respondents noted the following:

"Yes, we have a dedicated EPR budget line for public health threats... but accessing these funds within 24 hours of activating the response is challenging." (Kano, Respondent 1)

"Despite having a dedicated budget line for epidemic preparedness, the process of mobilizing funds is slow due to the need for approval from multiple government levels." (Kano, Respondent 2)

"The bureaucratic process of accessing funds is a major challenge. Even when we have a budget for EPR, there are delays in getting approval and disbursement." (Kano, Respondent 3)

Funding is crucial, but so is the infrastructure that supports it, especially the capacity for laboratories and monitoring. Respondents mentioned inadequate health infrastructure as a major challenge in the States.

"One of the weaknesses in our system is the inadequate laboratory capacity, which hinders effective surveillance and early detection of emerging diseases." (Kano, Respondent 3)

"Laboratory capacity is crucial for surveillance; without it, we cannot confirm cases swiftly, which delays our response." (Bauchi, Respondent 3)

"We need to build a more robust laboratory network to support real-time surveillance and improve our detection capabilities." (FCT, Respondent 2)

"However, the health system is not perfect—some facilities need more equipment, and there's still a gap in human resources." (Bauchi, Respondent 1)

1. 4 DISCUSSION

This study highlights not only the strengths but also the multifaceted challenges facing epidemic preparedness and response in resource-constrained settings. Despite existing strengths, such as the availability of healthcare workers' training on epidemic preparedness and response (EPR), multisectoral collaboration and partnerships, significant gaps in funding, infrastructure, and availability of skilled personnel, and coordination need urgent attention. The emphasis on continuous training for health personnel reflects a crucial area for capacity building, ensuring that the workforce is equipped to handle emerging threats. Several studies have emphasized the need for continuous capacity building for health workers. A study by DeCorby-Watson et al., 2018 reports that capacity-building interventions can enhance knowledge, skill, self-efficacy (including confidence), changes in practice or policies, behaviour change, application, and system-level capacity, all of which are important in strengthening epidemic preparedness and response capacities.

While the findings highlight considerable investment in EPR training, persistent gaps in the availability of skilled personnel remain, particularly at the local government level, which undermines the sustainability of epidemic preparedness and response capacities. These gaps

disproportionately affect rural and underserved areas, where health systems are already strained. The qualitative interviews emphasize the importance of addressing the issue of staff attrition and continuous training to equip healthcare workers with the skills needed to manage evolving epidemic threats. Addressing this gap will require employing more staff and prioritizing their training. A decentralized approach to training that prioritizes local contexts and integrates lessons learned from previous outbreaks should be encouraged. This is evidenced by the COVID-19 pandemic, which highlights the implications of chronic underinvestment in health workforce development, particularly in resource-constrained health systems (Armstrong et al., 2020). Also, studies have shown that inadequate health workforce diversity, insufficient training and remuneration, and limited support and protection reduce the health system's capacity to equitably maintain health service delivery while meeting urgent health emergency demands (Deussom et al., 2022).

Moreso, inadequate funding emerged as a critical challenge, with most respondents identifying it as a significant limitation. Findings from this study highlight the delays in resource mobilization and bureaucratic bottlenecks, particularly in Bauchi and FCT. The lack of funding and, when available, delayed fund disbursement often result in missed opportunities for timely interventions during outbreaks (Kimchy, 2024). This finding is consistent with global evidence, which shows that underfunding not only delays responses but also hampers the ability to sustain long-term preparedness and response initiatives (Lal et al., 2022), (Garrett Wallace Brown et al., 2023), (Olliaro & Torreele, 2022). Addressing this funding gap will require a strategic shift towards sustainable financing mechanisms, including increased domestic investment and donor support. Streamlining funding processes and establishing dedicated budgets for epidemic preparedness can greatly enhance response capabilities.

Multi-sectoral collaboration and coordination were also identified as a cornerstone of epidemic preparedness and response, enabling timely decision-making and information sharing. These findings align with existing literature that highlights the critical role of coordination and partnerships across sectors, levels, and stakeholders (Groseclose & Buckeridge, 2017), (Sasie et al., 2024), (Alemu et al., 2019). The synergy created through multi-sectoral partnerships facilitates a more comprehensive approach to epidemic preparedness by integrating diverse expertise and resources. For instance, collaborations between government health agencies, non-governmental organizations (NGOs), and global partners like WHO have improved disease surveillance and response efficiency (Raviglione & Rieder, 2021). Research highlights that partnerships with international organizations often provide crucial support in areas such as funding, capacity building, and technical assistance before and during public health emergencies (Meslin & Garba, 2016), (Doble et al., 2023), (Alderwick et al., 2021). Fostering inter-agency collaboration and aligning stakeholder objectives will facilitate a more cohesive response strategy.

1.5 CONCLUSION

This study provides valuable insights into the state of epidemic preparedness in Bauchi, Kano, and the Federal Capital Territory of Nigeria. It identifies critical gaps and challenges that need to be addressed to enhance public health responses to infectious disease outbreaks. Key findings reveal that while notable strengths exist, such as EPR training and multisectoral partnerships, significant weaknesses persist, including inadequate funding, high staff turnover, and insufficient infrastructure.

1.5 RECOMMENDATIONS

To enhance epidemic preparedness and response, we recommend establishing dedicated contingency funds to ensure immediate financial access and minimize bureaucratic delays. Strengthening the healthcare workforce through recruitment and regular training programs is essential, alongside fostering inter-agency collaboration by defining roles and facilitating multi-sectoral coordination. Advocacy for stronger political will and legal frameworks is crucial to support policy development. Bureaucratic processes should be streamlined to allow faster funding approvals and the establishment of rapid response protocols. Investments in health system infrastructure are necessary to improve outbreak management capacity. Lastly, implementing regular monitoring and evaluation frameworks will help assess preparedness effectiveness and identify gaps.

1.6 REFERENCES

Armstrong, D., Moore, J., Fraher, E. P., Frogner, B. K., Pittman, P., & Spetz, J. (2020). COVID-19 and the Health Workforce. Medical Care Research and Review, 107755872096931. https://doi.org/10.1177/1077558720969318

Council on Foreign Relations. (2020, October). Findings | Pandemic Preparedness: Lessons From COVID-19. Council on Foreign Relations. https://www.cfr.org/report/pandemic-preparedness-lessons-COVID-19/findings

DeCorby-Watson, K., Mensah, G., Bergeron, K., Abdi, S., Rempel, B., & Manson, H. (2018). Effectiveness of capacity building interventions relevant to public health practice: a systematic review. BMC Public Health, 18(1). https://doi.org/10.1186/s12889-018-5591-6

Deussom, R., Lal, A., Frymus, D., Cole, K., Politico, M. R. S., Saldaña, K., Vasireddy, V., Khangamwa, G., & Jaskiewicz, W. (2022). Putting health workers at the centre of health system investments in COVID-19 and beyond. Family Medicine and Community Health, 10(2), e001449. https://doi.org/10.1136/fmch-2021-001449

Dhaka, P., Bedi, J., Vijay, D., Singh Gill, J., & Barbuddhe, S. (2021). Emergency preparedness for public health threats, surveillance, modelling & forecasting. Indian Journal of Medical Research, 153(3), 287. https://doi.org/10.4103/ijmr.ijmr_653_21

Garrett Wallace, B., Rhodes, N., Tacheva, B., Loewenson, R., Shahid, M., & Poitier, F. (2023). Challenges in international health financing and implications for the new pandemic fund. Globalization and Health, 19(1). https://doi.org/10.1186/s12992-023-00999-6

Haider, N., Rothman-Ostrow, P., Osman, A. Y., Arruda, L. B., Macfarlane-Berry, L., Elton, L., Thomason, M. J., Yeboah-Manu, D., Ansumana, R., Kapata, N., Mboera, L., Rushton, J., McHugh, T. D., Heymann, D. L., Zumla, A., & Kock, R. A. (2020). COVID-19—Zoonosis or Emerging Infectious Disease? Frontiers in Public Health, 8(596944). https://doi.org/10.3389/fpubh.2020.596944

Heymann, D. L., & Rodier, G. R. . (2022). WHO Operational Support Team to the Global Outbreak Alert and Response Network. Hot spots in a wired world: WHO surveillance of emerging and re-emerging infectious diseases. Lancet Infect. Dis., 1, 345−353. The Lancet Infectious Diseases, 1(5). https://www.researchgate.net/publication/11490224_Heymann_DL_Rodier_GR_WHO_Operational_Support_Team_to_the_Global_Outbreak_Alert_and_Response_Network_Hot_spots_in_a_wired_world_WHO_surveillance_of_emerging_and_re-emerging_infectious_diseases_Lancet_I

J Olumade, T., A Adesanya, O., J Fred-Akintunwa, I., O Babalola, D., U Oguzie, J., A Ogunsanya, O., E George, U., D Akin-Ajani, O., & G Osasona, D. (2020). Infectious disease outbreak preparedness and response in Nigeria: history, limitations and recommendations for global health policy and practice. AIMS Public Health, 7(4), 736–757. https://doi.org/10.3934/publichealth.2020057

Kimchy, J. (2024, July 9). The hidden dangers of delayed funding. 8fig. https://www.8fig.co/blog/the-hidden-dangers-of-delayed-funding/

Lal, A., Abdalla, S. M., Chattu, V. K., Erondu, N. A., Lee, T.-L., Singh, S., Abou-Taleb, H., Morales, J. V., & Phelan, A. (2022). Pandemic preparedness and response: exploring the role of universal health coverage within the global health security architecture. The Lancet Global Health, 0(0). https://doi.org/10.1016/S2214-109X(22)00341-2

Lee, J. M., Jansen, R., Sanderson, K. E., Guerra, F., Keller-Olaman, S., Murti, M., O'Sullivan, T. L., Law, M. P., Schwartz, B., Bourns, L. E., & Khan, Y. (2023). Public health emergency preparedness for infectious disease emergencies: a scoping review of recent evidence. BMC Public Health, 23(1). https://doi.org/10.1186/s12889-023-15313-7

Legal Preparedness - Global Health Security Agenda. (2024, September 12). Global Health Security Agenda. https://globalhealthsecurityagenda.org/legal-preparedness-2/

Liu, E., Kirpalani, D., & Berman, A. (2024). Legal frameworks for outbreak response. NUS Press EBooks, 29–44. https://doi.org/10.56159/emergencies-4

Madhav, N., Oppenheim, B., Gallivan, M., Mulembakani, P., Rubin, E., & Wolfe, N. (2017). Pandemics: Risks, Impacts, and Mitigation (D. T. Jamison, H. Gelband, S. Horton, P. Jha, R. Laxminarayan, C. N. Mock, & R. Nugent, Eds.). PubMed; The International Bank for Reconstruction and Development / The World Bank. https://www.ncbi.nlm.nih.gov/books/NBK525302/

Nasir Abdulrasheed, Lawal, L., Abdulazeez Biodun Mogaji, Abdulkareem, A. O., Shuaib, A., Adeoti, S. G., Amosu, O. P., Abdulmujeeb Opeyemi Muhammad-Olodo, Abdulwahab Oluwatomisin Lawal, Jaji, T. A., & Toufik Abdul-Rahman. (2023). Recurrent diphtheria outbreaks in Nigeria: A review of the underlying factors and remedies. Immunity, Inflammation and Disease, 11(11). https://doi.org/10.1002/iid3.1096

Olliaro, P., & Torreele, E. (2022). Global Challenges in Preparedness and Response to Epidemic Infectious Diseases. Molecular Therapy, 30(5). https://doi.org/10.1016/j.ymthe.2022.02.022

Shang, Y., Li, H., & Zhang, R. (2021). Effects of Pandemic Outbreak on Economies: Evidence From Business History Context. Frontiers in Public Health, 9(1). Frontiersin. https://doi.org/10.3389/fpubh.2021.632043

Tobias Ide. (2021). COVID-19 and armed conflict. World Development, 140, 105355. https://doi.org/10.1016/j.worlddev.2020.105355

Tulane University - School of Public Health and Tropical Medicine. (2020, April 28). Disease Outbreak Response: Exploring the Critical Roles of Epidemiologists, Disease Detectives, and Other Public Health Experts. Publichealth.tulane.edu. https://publichealth.tulane.edu/blog/disease-outbreak/

US Centres for Disease Control. (2020, July 15). Introduction to Public Health Surveillance|Public Health 101 Series|CDC. Www.cdc.gov. https://www.cdc.gov/training/publichealth101/surveillance.html

Utulu, R., Ajayi, I. O., Bello, S., Balogun, M. S., Madubueze, U. C., Adeyemi, I. T., Omoju, O. T., Adeke, A. S., Adenekan, A. O., & Iyare, O. (2022). Risk factors for COVID-19 infection and disease severity in Nigeria: a case-control study. Pan African Medical Journal, 41.

https://doi.org/10.11604/pamj.2022.41.317.34307

World Health Organization. (2023a). Health emergencies. Www.who.int. https://www.who.int/our-work/health-emergencies

World Health Organization. (2023b, April). Ebola virus disease. Www.who.int. https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease?gclid=Cj0KCQiAzoeuBhDqARIsAMdH14HWPdBqXPeuAV1voyjtmGNx7cDPnUYk1o-0vLQwMTZNUXgywrqi1B4aAkMJEALw_wcB

Citation: Rabi Usman, Ibrahim Attah, Suleiman I. Egyegini, Bamidele Gbenga, Ibrahim A. Jibril, Ubong Akpan Okon, Dennis Paul Dogo, Mukhtar Salihu Anka (2025) Strengthening Epidemic Preparedness and Response in Resource-Constrained Settings: A Stakeholder-Based Analysis. *Nigerian Journal Journal of Social Health* 2 (1) 28 - 34