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Addressing Infectious Disease Outbreaks in Adamawa State: Strengthening Healthcare Systems

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Abstract **Review Article**

Adamawa State, located in northeastern Nigeria, continues to face recurring outbreaks of infectious diseases such as cholera, Lassa fever, measles, meningitis, and COVID-19. These outbreaks disproportionately affect vulnerable populations and further strain an already under-resourced healthcare system. The region's health challenges are compounded by weak disease surveillance systems, poor healthcare infrastructure, insufficient workforce capacity, inadequate water, sanitation, and hygiene (WASH) facilities, and low levels of health literacy and community engagement. This paper analyzes the root causes and structural weaknesses in Adamawa's health system that undermine its ability to prevent, detect, and respond effectively to infectious disease outbreaks. Drawing on lessons from past and ongoing public health emergencies, it proposes a multi-pronged approach to strengthening health system resilience. Key recommendations include investing in disease surveillance and early warning systems, improving healthcare infrastructure and access, training and retaining skilled health personnel, enhancing WASH services, and fostering community trust through inclusive health communication. By aligning these interventions with state and national health priorities and leveraging partnerships with local and international stakeholders, Adamawa State can significantly improve its outbreak preparedness and response capacity. The ultimate goal is to build a robust, equitable, and responsive healthcare system that ensures the health and well-being of all residents, even in the face of recurring public health threats.

Keywords: Infectious Disease Outbreaks, Public Health, Healthcare System Strengthening, Adamawa State, Disease Surveillance, Health Infrastructure, WASH (Water, Sanitation, and Hygiene), Health Workforce, Community Engagement, Outbreak Preparedness, Health Policy, Health Security, Lassa Fever, Cholera, Nigeria.

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1. INTRODUCTION TO ADAMAWA STATE

Geography and Climate

Adamawa State, located in northeastern Nigeria, spans approximately 36,917 square kilometers, making it the eighth-largest state in the country. It shares borders with Borno to the northwest, Gombe to the west, and Taraba to the southwest, while also bordering Cameroon to the east. The state's topography includes the Mandara Mountains, the Adamawa Plateau, and valleys formed by the Benue, Gongola, and Yedsarem rivers. *adsbs.ad.gov.ng+2Adamawa State Government+2Wikipedia+2Wikipedia.* Adamawa experiences a tropical climate characterized by two distinct seasons: the dry season (October to April) and the rainy season (May to September). The average annual rainfall varies, with 79 mm in the northern regions (e.g., Michika and Madagali) and 179 mm in the southern regions (e.g., Ganye and Toungo). Temperatures range from 15.2°C during the Harmattan season to 43°C during the hot season. *Adamawa State Government+1adsbs.ad.gov.ng+1.*

Population and Demographics

As of the 2006 National Population Census, Adamawa had a population of 3,178,950, with a near-equal distribution between males (1,606,101) and females (1,561,978). The projected population in 2021 was approximately 4.9 million. The state is divided into 21 Local Government Areas (LGAs) and is home to various ethnic groups,

including the Fulani, Mumuye, and Bata.*Adamawa State Government+1adsbs.ad.gov.ng+1*

Health Indicators

Access to healthcare in Adamawa is limited, with only about 20% of households reporting access to healthcare facilities within a 30-minute walk without barriers. Common health issues among children under five include fever (37%) and malaria (23%). Barriers to healthcare access include long waiting times (28%), unavailability of specific treatments (19%), and cost (18%) *factfoundationint.org*

1.1 Infectious Disease Outbreaks

1.1.1 Cholera

- **September 2022**: In Guyuk and Shelleng LGAs, **11 suspected cases** of cholera were reported, with **1 laboratory-confirmed** and **1 death** (CFR ~9.1%) *ncdc.gov.ng+5ncdc.gov.ng+5ncdc.gov.ng+5.*
- **2019 data**: During the first 11 weeks, **337 suspected cholera cases** from 16 LGAs in 8 states (including Adamawa) with **21 deaths** (CFR ~6.23%) *ncdc.gov.ng.*
- In **week 37 of 2019**: Adamawa recorded **20 suspected cases**, but **no lab confirmations or deaths** *ncdc.gov.ng.*

1.1.2 Measles

- National levels from **2017–2019** show widespread measles outbreaks across multiple states, including Adamawa, though **state-specific numbers aren't publicly disaggregated** in recent weekly reports *Wikipedia+15ncdc.gov.ng+15ncdc.gov.ng+15.*
- Example: In **March 2019**, Nigeria reported **11,603 suspected cases**, **535 confirmed**, and **27 deaths** (CFR ~0.23%) across all states and FCT *ncdc.gov.ng+2ncdc.gov.ng+2ncdc.gov.ng+2.*

1.1.3 Cerebrospinal Meningitis (CSM)

- In **week 11 of 2019**, Adamawa reported **1 suspected case of CSM** (among seven confirmed cases across 12 states), with **1 total death (CFR ~0.78%)** ncdc.gov.ng.
- Earlier in **2017**, nationwide there were **6,485 suspected** and **78 confirmed cases**, with **458 deaths** (CFR ~7.1%) from weeks 1–15, but state-level Adamawa breakdown wasn't specified *ncdc.gov.ng.*

Summary Table

Disease	Period / Year	Suspected Cases	Confirmed Cases	Deaths (CFR)
Cholera	Sep 2022 (Guyuk, Shelleng)	11 suspected	1 lab-confirmed	1 death (~9.1%)
	Early 2019 (first 11 weeks)	337 (across 16 LGAs, incl. Adamawa)	6 confirmed	21 deaths (~6.23%)
	2019, week 37	20 (Adamawa only)	0	0

Disease	Period / Year	Suspected Cases	Confirmed Cases	Deaths (CFR)
Measles	2019 (nationwide)	~11,603 suspected	535 confirmed	27 deaths (~0.23%)
CSM (Meningitis)	Week 11, 2019	1 suspected (Adamawa)	part of 7 total	1 death (~0.78%)

1.1.4 Meningitis Outbreak (2025)

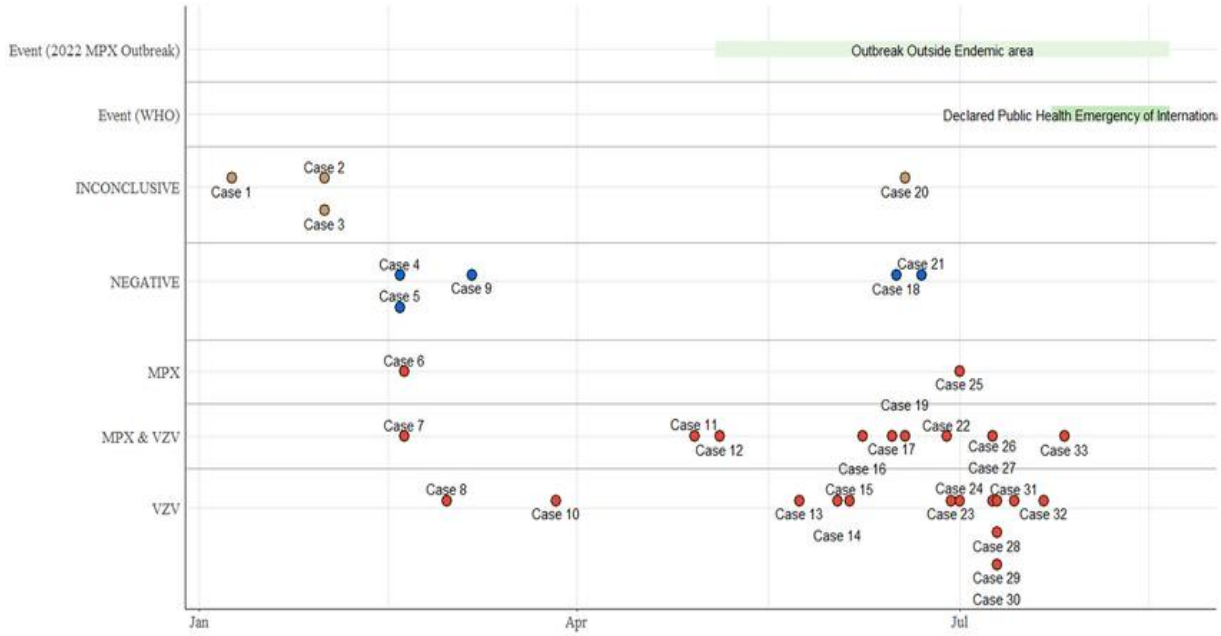
In early 2025, Nigeria faced a significant meningitis outbreak, with 151 reported deaths across 23 states, including Adamawa. The outbreak primarily affected children in remote northern regions. Delayed access to medical care contributed to the high fatality rate. The Nigeria Center for Disease Control (NCDC) and local partners have initiated vaccination campaigns and public awareness efforts to curb the spread.

1.1.5 Monkeypox Outbreak (2022)

In 2022, Adamawa experienced a monkeypox outbreak, with cases reported in several LGAs. The outbreak prompted local health authorities to enhance surveillance and response measures to prevent further spread.

1.1.6 Tuberculosis (TB) Trends (2010–2016)

Between 2010 and 2016, Adamawa observed a fluctuating trend in tuberculosis (TB) cases, with a notable increase in notifications during periods of political instability. This highlights the impact of socio-political factors on disease surveillance and control efforts. *ResearchGate*.



Epidemiological-timeline-of-the-outbreak-of-MPX-in-Adamawa-State

Characteristics	2010	2011	2012	2013	2014	2015	2016
All	2900	2644	3382	3460	2821	2794	3075
Female	1080 (37.2)	974 (36.8)	1326 (39.2)	1359 (39.3)	1061 (37.6)	1016 (36.4)	1146 (37.3)
Male	1820 (62.8)	1670 (63.2)	2016 (59.6)	2101 (60.7)	1760 (62.4)	1778 (63.6)	1929 (62.7)
Age group							
0–4	61 (2.1)	66 (2.5)	62 (1.8)	77 (2.2)	72 (2.6)	80 (2.9)	80 (2.6)
5–14	145 (5.0)	107 (4.0)	128 (3.8)	117 (3.4)	115 (4.1)	89 (3.2)	123 (4.0)
15–24	442 (15.2)	382 (14.4)	478 (14.1)	462 (13.4)	373 (13.2)	367 (13.1)	418 (13.6)
25–34	825 (28.4)	750 (28.4)	929 (27.5)	849 (24.5)	690 (24.5)	692 (24.8)	740 (24.1)
35–44	622 (21.4)	570 (21.6)	731 (21.6)	752 (21.7)	669 (23.7)	643 (23.0)	620 (20.2)
45–54	402 (13.9)	334 (12.6)	511 (15.1)	549 (15.9)	449 (15.9)	434 (15.5)	474 (15.4)
55–64	233 (8.0)	251 (9.5)	293 (8.7)	324 (9.4)	248 (8.8)	255 (9.1)	298 (9.7)
≥65	170 (5.9)	184 (7.0)	250 (7.4)	330 (9.5)	205 (7.3)	234 (8.4)	322 (10.5)
TB category							
Extrapulmonary	92 (3.2)	156 (5.9)	193 (5.7)	321 (9.3)	244 (8.6)	238 (8.5)	230 (7.5)
Smear +ve PTB	1506 (51.9)	1299 (49.1)	1977 (58.5)	1839 (53.2)	1594 (56.5)	1727 (61.8)	1917 (62.3)
Smear –ve PTB	1302 (44.9)	1189 (45.0)	1212 (35.8)	1300 (37.6)	983 (34.8)	829 (29.7)	928 (30.2)
Patient category							
New	2651 (91.4)	2357 (89.1)	3147 (93.1)	3195 (92.3)	2631 (93.3)	2682 (96.0)	2941 (95.6)
Relapse	122 (4.2)	106 (4.0)	105 (3.1)	119 (3.4)	100 (3.5)	47 (1.7)	72 (2.3)
Treatment failure	18 (0.6)	27 (1.0)	17 (0.5)	22 (0.6)	15 (0.5)	10 (0.4)	15 (0.5)
Loss to follow-up	50 (1.7)	36 (1.4)	36 (1.1)	26 (0.8)	17 (0.6)	22 (0.8)	13 (0.4)
Other	59 (2.0)	118 (4.5)	77 (2.3)	98 (2.8)	58 (2.1)	33 (1.2)	34 (1.1)

PTB, pulmonary tuberculosis ; TB, tuberculosis.

Characteristics-of-patients-with-TB-in-Adamawa-State-Nigeria-2010-2016

SOCIO-ECONOMIC IMPACTS

Health Sector Strain

The frequent outbreaks of infectious diseases place a significant strain on Adamawa's healthcare infrastructure, which is already challenged by limited resources and accessibility issues. The state's health sector struggles to provide adequate services, particularly in rural areas, affecting overall public health outcomes.

Educational Disruptions

Health crises often lead to school closures and absenteeism, disrupting education for children. The 2022 flood, for instance, submerged several schools, displacing students and teachers *alike.Wikipedia*

Economic Consequences

Infectious disease outbreaks and natural disasters like floods have detrimental effects on agriculture, trade, and local economies. The 2022 flood displaced over 131,000 individuals and caused extensive damage to infrastructure, including roads, bridges, and markets, leading to significant economic losses. In summary, Adamawa State faces considerable challenges in managing infectious disease outbreaks due to limited healthcare access, infrastructural deficits, and socio-economic vulnerabilities. Addressing these issues requires coordinated efforts in improving healthcare infrastructure, enhancing disease surveillance, and implementing preventive measures to mitigate the impact on health, education, and the economy, (UNICEF Nigeria, 2023).

2. STRATEGIC INTERVENTIONS FOR STRENGTHENING HEALTHCARE IN ADAMAWA STATE

1. Integrated Disease Surveillance & Reporting (IDSR)

- **Upgrade LGA-level IDSR systems**: Strengthening Nigeria's IDSR platform remains crucial. The Nigeria Centre for Disease Control (NCDC) now implements both indicator-based and event-based surveillance across states, including use of the Surveillance and Outbreak Response Management Analysis System (SORMAS) for contact tracing, diagnostics, rumor verification, and analytics *Wikipedia+10ijidonline.com+10Guardian Nigeria+10Wikipedia*.
- **Expand community-based surveillance**: A recent cholera outbreak in Guyuk and Shelleng LGAs demonstrated use of event-based surveillance by Disease Surveillance Notification Officers (DSNOs) activated through both rapid reporting and laboratory confirmation VON.
- **Leverage digital tools**: SORMAS has been adopted nationwide since 2020, supporting geospatial mapping and predictive analytics for outbreaks *Wikipedia*.
- **Laboratory capacity**: NCDC supports state-level public health laboratories for confirmation of cholera, meningitis, diphtheria, measles, yellow fever, and other priority diseases *reddit.com+5Wikipedia+5Guardian Nigeria+5*.

2. Health Infrastructure & Service Delivery

- **Rehabilitate and equip PHCs**: WHO's Health Resource Availability Monitoring System (HeRAMS) found that in 2017, in Adamawa, out of 1,120 assessed health facilities, 12 % were destroyed and only 20 % of partially-damaged PHCs were fully functional Wikipedia.
- **Ensure essential supplies**: In past cholera responses, freezing or isolation facilities at tertiary centers like the Federal Medical Centre Yola were overwhelmed, requiring patient transfers *NEMA Nigeria+1Wikipedia+1*.
- **Mobile outreach & IDP camps**: Flood responses in Adamawa in 2022 included deployment of mobile clinics, disease surveillance, immunization, and WASH interventions in affected LGAs *Wikipedia+1VON+1*.
- **Cold-chain expansion**: During the 2024 cholera outbreak in Yola-North/South, nearly half a million oral cholera vaccine (OCV) doses were received and used to vaccinate ~199,371 people, supported by training for 680 health workers *Punch+1Peoples Gazette Nigeria+1*.

3. Water, Sanitation, and Hygiene (WASH)

- **High-risk LGA focus**: Guyuk, Shelleng, and Yola-North LGAs were recurrent cholera hotspots tied to flood-contaminated water sources *VON+1Punch+1*.
- **Infrastructure rehab**: In 2024, NEMA and partners chlorinated water, treated contaminated sources, built latrines, and distributed hygiene kits as part of flood and outbreak interventions *NEMA Nigeria+1Wikipedia+1*.
- **Community-led sanitation**: A case-control study during the 2018 Mubi cholera outbreak identified key risk factors: uncovered water storage, lack of handwashing after toilet use, reliance on truck-vendor water, and contact with symptomatic individuals. Interventions included household disinfection, chlorination, and community sensitization ijidonline.com.
- **Regulatory enforcement**: Flood-prone zones along the Benue and Gongola Rivers require strict environmental oversight to prevent waterborne transmission in future events *WikipediaThe Nation Newspaper*.

4. Health Workforce Capacity Development

- **Training priority cadres**: Evidence underscores the need for epidemiologists, DSNOs, lab technicians and clinical staff at LGA and state levels to meet surveillance and outbreak response demands *Wikipediancdc.gov.ng*.
- **Rapid Response Teams (RRTs)**: NCDC and partners have deployed RRTs during major outbreaks (e.g. cholera in 2018) with training in IPC, case management, and risk communication *ncdc.gov.ngncdc.gov.ng*.
- **Continuous education & simulations**: After the 2018 cholera events, NCDC conducted After-Action Reviews (AAR) and training for health workers including those managing cholera treatment centers *ncdc.gov.ngncdc.gov.ng*.

5. Emergency Preparedness & Response Coordination

- **PHEOC implementation**: NCDC has supported establishment of State Public Health Emergency Operations Centres (PHEOCs) in nearly all states, including Adamawa, to coordinate outbreak and disaster responses *Wikipedia*.
- **Pre-position supplies**: In the 2024 cholera outbreak, emergency medical supplies including water purification and hygiene kits were distributed in affected communities alongside OCV deployment *NEMA NigeriaNairametrics*.
- **Emergency communication strategy**: During outbreaks, authorities engaged local leaders and deployed community outreach and hygiene education via public platforms to raise awareness *NEMA NigeriaPunch*.
- **Cross-border & partner coordination**: NCDC's cholera technical working group collaborates with Federal Ministry of Water Resources, WHO, and state governments. Those partnerships are vital given Adamawa's proximity to Cameroon and flood exposure, (UNICEF Nigeria, 2023).

2.1 Strengthen Disease Surveillance and Early Warning Systems

2.1.1 Digitalization and Real-Time Reporting

The outdated, paper-based disease notification system used by most PHCs in Adamawa contributes to delays in data aggregation, underreporting, and sluggish outbreak response. Transitioning to a digital, real-time system such as the **District Health Information Software (DHIS2)**, compatible with Nigeria's **Integrated Disease Surveillance and Response (IDSR)** strategy, will improve case-based monitoring and expedite reporting from the facility to the LGA and state levels.

Action Points:

- Equip all functional PHCs with mobile devices (e.g., tablets or smartphones) with DHIS2 pre-installed for digital surveillance data entry.
- Train **Disease Surveillance and Notification Officers (DSNOs)** and facility focal persons in the use of digital platforms and outbreak notification procedures.
- Leverage **SMS-based alert systems** in remote areas to enable community-level health workers to report symptoms of epidemic-prone diseases. This model has been piloted in **Borno** and **Sokoto States** for polio and cholera alerts, resulting in improved timeliness of response, (NCDC, 2021).

Rationale:

Real-time digital surveillance reduces reporting delays, enables data triangulation, and supports decision-makers in predicting outbreaks and deploying targeted responses more effectively.

2.1.2 Community-Based Surveillance (CBS)

Formal surveillance systems often miss outbreaks in remote and insecure locations due to limited staffing and

infrastructure. CBS offers a grassroots model where trained community members report early signs of unusual health events to LGA authorities for verification and response.

Action Points:

- Identify and train **community informants** (e.g., traditional birth attendants, schoolteachers, religious leaders) to recognize and report symptoms of diseases such as cholera, measles, and Lassa fever.
- Link CBS networks with existing LGA Disease Surveillance Units and provide incentives for timely reporting.
- Use **risk-based GIS mapping** tools to guide CBS expansion in priority LGAs like **Mubi South**, **Fufore**, and **Girei**, identified as hotspots for recurrent cholera outbreaks, (UNICEF Nigeria, 2023).

Rationale:

CBS bridges the gap between formal health structures and rural communities, enabling faster detection and containment of emerging disease threats, particularly in humanitarian contexts.

2.2 IMPROVE INFRASTRUCTURE, WASH, AND MEDICAL SUPPLY CHAINS

2.2.1 Water, Sanitation and Hygiene (WASH) Interventions

Access to clean water and sanitation is crucial for preventing waterborne diseases. In many IDP camps and PHCs in Adamawa, poor WASH conditions increase exposure to pathogens like *Vibrio cholerae* and *E. coli*.

Action Points:

- Rehabilitate or install **solar-powered boreholes** at PHCs, IDP camps, and schools to ensure continuous access to potable water.
- Construct gender-segregated **latrines** and repair broken sewage and drainage systems in flood-prone LGAs.
- Partner with **WaterAid Nigeria**, **UNICEF**, and **RUWASSA** to improve water quality testing and chlorination.
- Distribute **WASH kits** (including soap, chlorine tablets, buckets, sanitary pads) to vulnerable households during the rainy season (June–September), (WaterAid Nigeria, 2022).

Rationale:

Improved WASH infrastructure can reduce diarrhoeal incidence by up to 60% and significantly lower the risk of cholera outbreaks in overcrowded settings.

2.2.2 Strengthen Cold Chain and Logistics

To ensure uninterrupted vaccination campaigns and epidemic control, robust cold chain systems and reliable last-mile delivery are vital, especially in underserved LGAs.

Action Points:

- Expand the use of **solar direct-drive refrigerators** for vaccine storage in off-grid locations across all 21 LGAs.
- Implement a **Last Mile Distribution (LMD)** framework to transport medicines, vaccines, and PPEs directly to the PHC level, using mapped delivery routes and regional stock depots.
- Maintain **emergency buffer stocks** of essential items such as ORS, IV fluids, chlorine, antibiotics, and cholera beds at state and zonal warehouses, (NPHCDA, 2023).

Rationale:

Cold chain failures compromise immunization efforts, while stockouts of life-saving supplies during outbreaks can cost lives, especially in high-risk areas.

2.3 EXPAND AND EQUIP THE HEALTH WORKFORCE

2.3.1 Health Worker Recruitment and Retention

Adamawa's health workforce is insufficient to meet routine and emergency needs. Rural LGAs face high vacancy rates, aggravated by security concerns and lack of incentives.

Action Points:

- Recruit **mid-level health personnel** (e.g., CHEWs, nurses, DSNOs) under the **State Primary Healthcare Development Agency (SPHCDA)** to improve staffing ratios.
- Offer **rural service packages** including transportation allowances, housing support, and security insurance to staff deployed in hard-to-reach LGAs.
- Collaborate with health training institutions to build a **pipeline of professionals** with specialization in outbreak control and emergency medicine, (WHO Nigeria, 2022).

Rationale:

Adequate staffing with motivated and trained personnel is foundational to effective disease surveillance, case management, and community mobilization.

2.3.2 Capacity Building

Ongoing professional development is necessary to ensure that healthcare workers can respond effectively to disease outbreaks.

Action Points:

- Conduct **quarterly in-service trainings** on IDSR protocols, outbreak triage, IPC, and community case detection.
- Establish a **Public Health Emergency Operations Centre (PHEOC)** at the state level with emergency simulation capability, case database management, and multi-sectoral coordination, (NCDC, 2023).

Rationale:

Regular training enhances preparedness, builds institutional knowledge, and strengthens local leadership during health emergencies.

2.4 ENHANCE COMMUNITY ENGAGEMENT AND HEALTH EDUCATION

2.4.1 Behavior Change Communication (BCC)

Public awareness is often low in rural communities, where cultural beliefs and misinformation can delay care-seeking or reduce vaccine acceptance.

Action Points:

- Design and disseminate **multilingual health messages** in Hausa and Fulfulde via local radio, town criers, and community theatre.
- Engage **trusted influencers** such as religious leaders, youth organizations, and women's associations to address myths around vaccines and promote preventive behaviors, (UNICEF Nigeria, 2023).

Rationale:

Behavior change interventions are proven to increase handwashing rates, reduce stigma, and boost vaccine uptake in low-literacy settings.

2.4.2 Community-Led Total Sanitation (CLTS)

Open defecation remains prevalent in parts of Adamawa, fueling cholera and other faecal-oral diseases.

Action Points:

- Scale up CLTS in cholera-endemic LGAs, providing community mobilization, behavior change sessions, and small grants for latrine construction.
- Train and deploy **"WASH Champions"** among school pupils and women's groups to promote household hygiene practices, (FMWR, 2022).

Rationale:

CLTS empowers communities to take ownership of sanitation, reinforcing sustainability beyond donor-driven WASH projects.

2.5 DEVELOP EMERGENCY PREPAREDNESS AND FINANCING MECHANISMS

2.5.1 Establish a State-Level Health Emergency Fund

Delays in accessing emergency funds during the 2024 cholera outbreak exposed the limitations of ad hoc financing.

Action Points:

- Allocate a **ring-fenced health emergency line** in the state's annual health budget for outbreak preparedness and response.
- Adopt transparent and **rapid disbursement mechanisms** that can be activated within 72 hours of outbreak confirmation.

Rationale:

Dedicated emergency funds reduce reliance on federal or donor assistance and ensure fast mobilization of outbreak response resources.

2.5.2 Strengthen Intersectoral Coordination

A siloed approach undermines outbreak preparedness. Coordination across sectors ensures harmonized and efficient response.

Action Points:

- Formalize a **State Outbreak Coordination Committee (SOCC)** involving representatives from the ministries of health, water, environment, education, and disaster management.
- Conduct **annual simulation exercises**, including tabletop drills and real-time response scenarios (e.g., cholera in IDP camps, Lassa fever in border LGAs), in alignment with Nigeria's **National Action Plan for Health Security (NAPHS),** (NCDC, 2022).

Rationale:

Strong inter-agency coordination prevents fragmentation, ensures clear roles and accountability, and improves overall health security governance.

ICIR Nigeria. (2024, September 20). *Cholera: Seven dead, 71 hospitalised in Adamawa council*. Retrieved from https://www.icirnigeria.org/cholera-seven-dead-71-hospitalised-in-adamawa-council.

3. POLICY RECOMMENDATIONS

Achieving long-term public health security in Adamawa State requires embedding epidemic preparedness and response into the foundational structures of health governance, financing, workforce development, and community engagement. The recommendations below provide a roadmap to institutionalize resilience, ensuring the state can effectively detect, respond to, and mitigate infectious disease outbreaks in the future.

3.1 Institutionalize Disease Preparedness in State Health Planning

Recommendation:

Integrate epidemic preparedness, surveillance, and emergency response frameworks into the State Strategic Health Development Plan III (SSHDP III) and the annual Medium-Term Sector Strategy (MTSS). This integration should include specific targets, activities, and budget lines dedicated to outbreak readiness and response, (UNICEF Nigeria, 2023).

Justification:

Embedding disease preparedness in formal state health policies guarantees sustained political commitment and predictable funding across administrations. States like Lagos, which institutionalized epidemic preparedness in their strategic health plans during COVID-19, demonstrated enhanced resilience and faster mobilization of resources, (NCDC, 2022). Aligning Adamawa's SSHDP III with Nigeria's National Action Plan for Health Security (NAPHS) will ensure consistency with national health security priorities and access to technical and financial support.

3.2 Establish a Health Emergency Response and Contingency Fund

Recommendation:

Create a dedicated, ring-fenced contingency fund within the state health budget specifically for health emergencies. The fund should include clear provisions for rapid disbursement mechanisms activated immediately upon declaration of an outbreak or health emergency, (UNICEF Nigeria, 2023).

Justification:

During the 2024 cholera outbreak in Yola North, response efforts were hampered by delays in accessing funds necessary for procurement of essential drugs, hygiene supplies, and deployment of health workers. A pre-

established emergency fund enables rapid logistics and operational flexibility, which are critical in containing outbreaks and minimizing mortality, (Vanguard, 2024).

3.3 Strengthen State Surveillance and Laboratory Networks

Recommendation:

- Digitize Integrated Disease Surveillance and Response (IDSR) reporting systems across all Primary Health Care centers using platforms such as DHIS2 or mobile surveillance applications to enable real-time data flow.
- Establish at least one zonal public health laboratory in each senatorial district to decentralize diagnostic capacity and reduce turnaround times.

Justification:

Efficient and timely case detection is fundamental to effective outbreak control. Presently, Adamawa relies on transporting samples to Abuja or Gombe for confirmation, which delays critical public health actions. Enhancing local laboratory capacity will reduce diagnostic delays and improve epidemiological intelligence, enabling swift containment of diseases like cholera, Lassa fever, and measles, (WHO Nigeria, 2023).

3.4 Revamp WASH Infrastructure in High-Risk Communities

Recommendation:

Prioritize water, sanitation, and hygiene (WASH) infrastructure upgrades in cholera-vulnerable Local Government Areas (LGAs) such as Yola North, Fufore, and Numan. Interventions should focus on:

- Ensuring reliable and safe potable water supplies in health facilities, schools, and internally displaced persons (IDP) camps.
- Constructing and maintaining sanitation facilities, proper sewage systems, and effective solid waste management.

Justification:

Cholera outbreaks in Adamawa in recent years were intensified by widespread open defecation and lack of safe drinking water. Evidence from global cholera control efforts shows that improving WASH infrastructure can reduce cholera incidence by up to 80%, (UNICEF Nigeria, 2023). Additionally, WASH improvements confer broader health benefits, including reductions in other diarrheal diseases and improvements in maternal and child health outcomes.

3.5 Scale Up Community Health Workforce and Capacity Building

Recommendation:

- Expand recruitment and training of frontline health workers, including Community Health Extension Workers (CHEWs), Environmental Health Officers (EHOs), and Disease Surveillance Notification Officers (DSNOs).
- Implement incentives for rural service, such as housing allowances, hardship bonuses, and clear career progression pathways, to improve retention in underserved areas.

Justification:

Adamawa State faces a significant shortage of healthcare personnel, with ratios well below WHO recommended thresholds. Many rural LGAs operate with limited or no trained health staff, which compromises surveillance and service delivery during outbreaks. Strengthening the community health workforce is vital for effective outbreak detection, case management, and public health education, (WHO, 2021).

3.6 Integrate Risk Communication and Social Mobilization

Recommendation:

Develop and institutionalize a Risk Communication and Community Engagement (RCCE) strategy within the Ministry of Health, featuring:

- Development of culturally sensitive and linguistically appropriate health messages in Hausa and Fulfulde.
- Active engagement of religious, traditional, and community leaders as trusted messengers to promote behavior change and dispel misinformation.

Justification:

During the 2024 cholera outbreak, misinformation and mistrust hindered early care-seeking and acceptance of interventions such as water chlorination. An RCCE framework fosters trust, encourages compliance with preventive measures, and combats rumors, which is essential in complex emergencies involving displaced populations and vulnerable groups, (NCDC RCCE Guidelines, 2023).

3.7 Foster Multi-Sectoral Coordination and Partnerships

Recommendation:

Establish a State Inter-Ministerial Outbreak Coordination Committee (IM-OCC) comprising representatives from:

- Ministries of Health, Water Resources, Environment, Education
- Civil society organizations (CSOs), non-governmental organizations (NGOs), and donor partners
- The State Emergency Management Agency (SEMA)

This committee should coordinate joint planning, resource mobilization, and simulation exercises modeled after the National Public Health Emergency Operations Centre (PHEOC).

Justification:

Disease outbreaks impact multiple sectors beyond health, including education, water supply, food security, and emergency management. A coordinated multi-sectoral approach prevents duplication, ensures resource optimization, and improves the effectiveness of outbreak response. The PHEOC model adopted by the NCDC provides a tested framework for such integrated coordination, (NCDC, 2022).

Summary of Key Policy Levers

Policy Area	Recommendation
Health Planning	Mainstream epidemic preparedness into SSHDP III and MTSS
Financing	Create a dedicated health emergency contingency fund
Surveillance & Labs	Digitalize IDSR and establish zonal diagnostic laboratories
WASH	Upgrade water, sanitation, and hygiene in high-risk LGAs
Human Resources	Recruit and incentivize CHEWs, EHOs, and DSNOs
Risk Communication	Institutionalize RCCE with culturally adapted messaging and local leaders
Coordination	Form a multi-sectoral outbreak coordination committee modeled on the PHEOC

4. POLICY RECOMMENDATIONS

To build a resilient health system capable of preventing, detecting, and responding effectively to infectious disease outbreaks, Adamawa State must implement comprehensive policy reforms. These reforms should focus on strengthening public health infrastructure, enhancing disease surveillance, ensuring rapid mobilization of emergency funds, fostering multi-sectoral partnerships, and mainstreaming infectious disease response within broader health programs. The following recommendations align with national protocols and international best practices, serving as critical steps toward sustainable health security.

4.1 Invest in Public Health Infrastructure with a Focus on Outbreak Preparedness

Recommendation:

Prioritize sustained investment in core public health infrastructure that underpins outbreak preparedness and rapid response. This includes upgrading laboratory capacity, establishing functional Public Health Emergency Operations Centres (PHEOCs) at sub-national levels, and enhancing Water, Sanitation, and Hygiene (WASH) facilities in vulnerable and high-risk communities.

Justification:

Strong infrastructure is foundational for timely disease detection, diagnosis, and outbreak containment. The NCDC highlights the role of PHEOCs in coordinating outbreak responses efficiently across Nigeria's states, enabling real-time decision-making and resource allocation (NCDC, 2022). Furthermore, WASH infrastructure investments have proven critical; UNICEF reports that improvements in safe water and sanitation can reduce cholera incidence by over 80% (UNICEF Nigeria, 2023). Inadequate infrastructure often leads to delayed outbreak detection and response, increasing preventable disease burden and mortality, (WHO, 2021).

4.2 Scale Up State-Level Disease Surveillance Systems in Line with NCDC Protocols

Recommendation:

Upgrade and expand Integrated Disease Surveillance and Response (IDSR) systems across all health facilities in Adamawa State. Leverage digital health platforms such as DHIS2 and mobile surveillance applications to facilitate real-time case reporting, data aggregation, and analysis.

Justification:

Effective surveillance systems are critical for early outbreak detection and timely response. The NCDC mandates the use of IDSR as Nigeria's standard for harmonized disease surveillance, which improves coordination and reporting accuracy, (NCDC, 2021). Digital tools reduce delays and errors in reporting, enabling data-driven outbreak responses, (WHO Nigeria, 2023). Evidence from states that have adopted digital IDSR platforms indicates significant improvements in case detection rates and response times, which is essential for curbing the spread of diseases, (Okonjo *et al.*, 2022).

4.3 Introduce a Health Emergency Response Fund for Quick Mobilization during Outbreaks

Recommendation:

Create a dedicated, ring-fenced health emergency response fund within the state health budget. This fund should allow for rapid and flexible disbursement of financial resources immediately following the declaration of a public health emergency or outbreak.

Justification:

Financial constraints often delay critical outbreak response activities such as procurement of drugs, medical supplies, and deployment of rapid response teams. The 2024 cholera outbreak in Adamawa exposed the impact of delayed funding on outbreak control efforts, (Vanguard, 2024). Establishing an emergency fund ensures that operational and logistical requirements are met promptly, minimizing outbreak duration and adverse health outcomes, (WHO, 2022). This aligns with Nigeria's National Emergency Preparedness and Response Framework, which underscores emergency financing as a key component of health security, (Federal Ministry of Health, 2020).

4.4 Partner with NGOs, Development Agencies, and the Private Sector for Funding and Technical Support

Recommendation:

Develop and strengthen strategic partnerships with non-governmental organizations, international development agencies, and private sector stakeholders. These collaborations should focus on mobilizing additional funding, providing technical assistance, and facilitating innovation in outbreak preparedness and response.

Justification:

External partnerships bring critical resources, technical expertise, and innovative solutions that complement state efforts. Organizations such as UNICEF, WaterAid, and WHO have successfully supported improvements in WASH and surveillance systems within Nigeria's Northeast, including Adamawa, (UNICEF Nigeria, 2023). The private sector contributes vital capacities in logistics, information technology, and supply chain management, which enhance outbreak preparedness, (Kruk *et al*., 2018). Moreover, multi-sectoral collaborations promote sustainability, community, engagement, and resource optimization, (Global Health Security Agenda, 2019).

4.5 Integrate Infectious Disease Response into Existing Health Programs like Maternal and Child Health

Recommendation:

Institutionalize infectious disease preparedness and response within existing health programs, particularly maternal and child health (MCH), immunization, and nutrition services, to leverage established platforms and community trust.

Justification:

Integration promotes efficiency and ensures continuity of essential services during outbreaks, avoiding disruptions in care. For example, incorporating cholera surveillance and health education into antenatal and immunization visits improves early case detection and preventive behavior, (NCDC, 2023). MCH programs provide effective channels for vaccine delivery and health messaging during outbreaks, enhancing coverage and reducing disease morbidity among vulnerable populations, (UNICEF Nigeria, 2022). This approach aligns with WHO guidance on maintaining essential health services during health emergencies, (WHO, 2020).

5. CONCLUSION

Effectively tackling infectious disease outbreaks in Adamawa State necessitates a comprehensive, multi-sectoral approach underpinned by sustained commitment and collaboration across various sectors. Strengthening the health system is fundamental to this effort, requiring not only increased funding but also strategic investments in key areas. Addressing the root causes such as weak disease surveillance systems, inadequate healthcare infrastructure, and critical shortages in trained healthcare personnel is essential for building a more resilient health environment. Enhanced surveillance will enable earlier detection and timely response to outbreaks, while improved infrastructure will ensure adequate facilities and equipment to manage cases effectively. Equally important is the development and retention of a skilled health workforce capable of responding swiftly and efficiently to health emergencies. By focusing on these foundational elements, Adamawa State can significantly improve its capacity to prevent, detect, and control infectious diseases. Ultimately, these measures will help safeguard the health and well-being of its communities, reducing morbidity and mortality associated with outbreaks, and contributing to the overall socio-economic development of the state.

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