

**REPORT ON THE IDENTIFICATION OF
PRIORITY AREAS FOR MULTISECTORAL
INTERVENTIONS (PAMIs) FOR CHOLERA
CONTROL IN GHANA**

JANUARY 2026



FOREWORD

Ghana has strived for decades to control cholera using diverse public health interventions. These interventions have seen varied levels of success. The conduct of identification of Cholera Priority Areas for Multisectoral Interventions (PAMI) using the new GTFCC tool provided the country with a new perspective into understanding of the distribution of risk for cholera in the country.

The analysis indicates that cholera still remains a major public health threat among districts along our coastal lines and the major metropolitan districts with large population in the country. The maps produced clearly show the status of risk of cholera for each district. The designation of PAMI districts based on the agreed consensus among key stakeholder is the foundational call to action from a multisectoral and multi-disciplinary dimension for all stakeholders in the fight against cholera in Ghana.

The Ghana Health Service together with the Ministry of Health acknowledge that efforts to control cholera in Ghana will only achieve success through collective, synchronized and consistent multisectoral implementation of specific interventions that directly and indirectly allure to prevention of cholera.

We will continue on this systematic engagement of multisectoral stakeholders, partners and other actors until sustainable control of cholera is achieved in Ghana.

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ABBREVIATIONS AND ACRONYMS

CHPS	Community-based Health Planning and Services
NMIMR	Noguchi Memorial Institute of Medical Research
CFR	Case Fatality Rate
DHMT	District Health Management Team
GDP	Gross Domestic Product
GMet	Ghana Meteorological Service
GHS	Ghana Health Service
GTFCC	Global Task Force on Cholera Control
GSS	Ghana Statistical Service
IDSR	Integrated Disease Surveillance and Response
MoH	Ministry of Health
NADMO	National Disaster Management Organization
NCP	National Cholera Plan
NHIA	National Health Insurance Authority
NPHRL	National Public Health and Reference Laboratory
PAMI	Priority Areas for Multisectoral Interventions
RDT	Rapid Diagnostic Test
SORMAS	Surveillance Outbreak Response Management and Analysis System
WHO	World Health Organization

EXECUTIVE SUMMARY

Background

Cholera is one of the oldest epidemic-prone public health diseases in the world. Ghana has had several outbreaks of cholera in the past couple of decades. Several interventions have been implemented to control cholera in the country. These have generally helped to contain the disease. However, the risk of cholera outbreaks persists in the country with variations in the epidemiology of the disease in different parts of the country. It is therefore important to continuously assess the burden, risk and predictors of cholera outbreaks in Ghana to inform the most appropriate interventions to combat the disease. In recent years, the COVID-19 pandemic brought to the fore the need and benefits of multisectoral collaboration or whole-of-society's approach in tackling public health threat has become more apparent. Furthermore, in the light of dwindling resources from partners for many public health interventions, there is the need to carefully prioritize interventions that will yield optimum impact.

Method

The district (administration level 2) and the period of 2020 to 2025 were selected for data collection and analysis for PAMI identification. Case-based data on cholera for all 261 districts of Ghana for the period was collected, triangulated with cholera data from the laboratory, cleaned, aggregated and inputted into the new GTFCC tool. Also, data on cholera vulnerability factors was collected from relevant agencies and institutions for all districts. The resulting outputs were exported for further evaluation. Priority index scores were calculated based on cholera incidence rate, mortality and persistence of transmission. All the data inputted into the GTFCC tool was reviewed by relevant actors. The outputs and results were validated by a broad representation of stakeholders. As part of the validation process, a **priority index threshold of 3** was decided by consensus among the stakeholders.

Results

The results of the analysis were summarized in tables, charts and maps. In all, **7760 cases** of cholera were detected for the period of analysis. The calculated priority index ranged from **0 to 9**. The cholera Weekly Testing Representativeness was found to be insufficient for the country. A total of **93 districts** were classified as **PAMIs** per the priority index threshold of **3**. At this threshold, 98% and 100% of cases and deaths will be averted respectively. The maps show the predominance of PAMIs located along the coastal lines and metropolitan districts with high population in Ghana.

Limitations

Some case records were excluded from the analysis due to persistent data gaps. There was limited data on some vulnerability factors especially for WASH indicators at the district.

Recommendations

To disseminate the PAMI report to relevant stakeholders. Improve testing for cholera cases throughout the country. Proceed to develop a National Cholera Control Plan for Ghana based on these identified PAMIs. Use the PAMI report as an advocacy tool for multiple sectors to mobilize resources towards cholera control.

Conclusion

The identification of Priority Areas for Multisectoral Interventions (PAMIs) in Ghana has provided a robust evidence-based framework for targeting cholera prevention and control activities. The process highlighted key gaps, including limited testing coverage, incomplete case data and constraints in district-level WASH indicator vulnerability information.

1.0 BACKGROUND

Cholera remains a persistent public health threat in Sub-Saharan Africa, exacerbated by poor sanitation, unsafe water, and climate variability. Despite multiple interventions, periodic outbreaks continue, particularly in urban slums and flood-affected communities. It is estimated that there are 1.4 to 4.3 million cases of cholera, and 28 000 to 142 000 deaths worldwide annually. (**Cholera outbreak in the West and Central Africa: Regional Update, 2014 - Week 52**). Although the provision of safe water and sanitation is critical to control cholera and other waterborne diseases, these efforts have not kept pace with the recent adverse impacts of climate change on the environment in most of the affected countries and sub-regions. In Ghana, cholera has been a recurrent public health problem since 1970. (Ashitey, 1994).

Priority Areas for Multisectoral Interventions (PAMIs) is a strategic framework for identifying and targeting geographic units/ zones most vulnerable to cholera and other public health threats through evidence-based evaluation process and targeting them for multisectoral interventions. The framework represents a transformative approach to public health crisis management, enabling countries to strategically allocate resources where they can achieve maximum impact. Developed under the Global Task Force on Cholera Control (GTFCC) framework, PAMIs serve as the foundation for evidence-based disease control and elimination strategies.

1.1 Ghana Country Profile

Ghana is a country located in West Africa bordering Côte d'Ivoire, Burkina Faso, Togo and the Atlantic Ocean. The country covers an area of 238,540 km² spanning diverse biomes that range from coastal savannas to tropical rainforests with an estimated urban-rural split of 56.7 %, 43.3% respectively (GSS, 2021). It has an estimated population of approximately 35 million people comprising of 50.7% female and 49.3% male and an annual growth rate of 2.1 percent. The population of Ghana is mainly concentrated in the southern sector with four regions alone contributing over 50% (Greater Accra-17.7%; Ashanti- 17.6%; Eastern- 9.5% and Central-9.3%) to the total population. Ghana has 16 administrative regions which are further divided into 261 local Metropolitan, Municipal, and District Assemblies (MMDAs). These MMDAs develop, plan, and mobilize resources for the development of their localities.

Ghana is also a multi-ethnic country with a diverse population, linguistic and religious groups. Most of the population (more than 70 percent) are Christian; close to one-fifth are Muslims; and one-tenth practise traditional faiths or report of no religion. Over the years, the country has performed relatively well in healthcare, economic growth, and human development.

Economically, Ghana's economy is driven by agriculture, mining, and services. Key exports include gold, cocoa, and oil. The country has made significant progress in reducing poverty and improving living standards. The country's GDP grew at an average rate of 7 percent per year between 2017 and 2019. This growth, however, was halted by the COVID-19 pandemic, the March 2020 lockdown, and a sharp decline in commodity exports, among other factors. The economic slowdown had a considerable impact on households. The poverty rate is estimated to have increased slightly from 25 percent in 2019 to 25.5 percent in 2020. After slowing to 0.5 percent in 2020, growth rebounded to 5.4 percent in 2021, largely influenced by the agriculture and services sectors (World Bank, 2022) Ghana: Recent economic development and outlook for Ghana). Gross Domestic Product (GDP) growth is average 4.0 percent over 2024-2025.

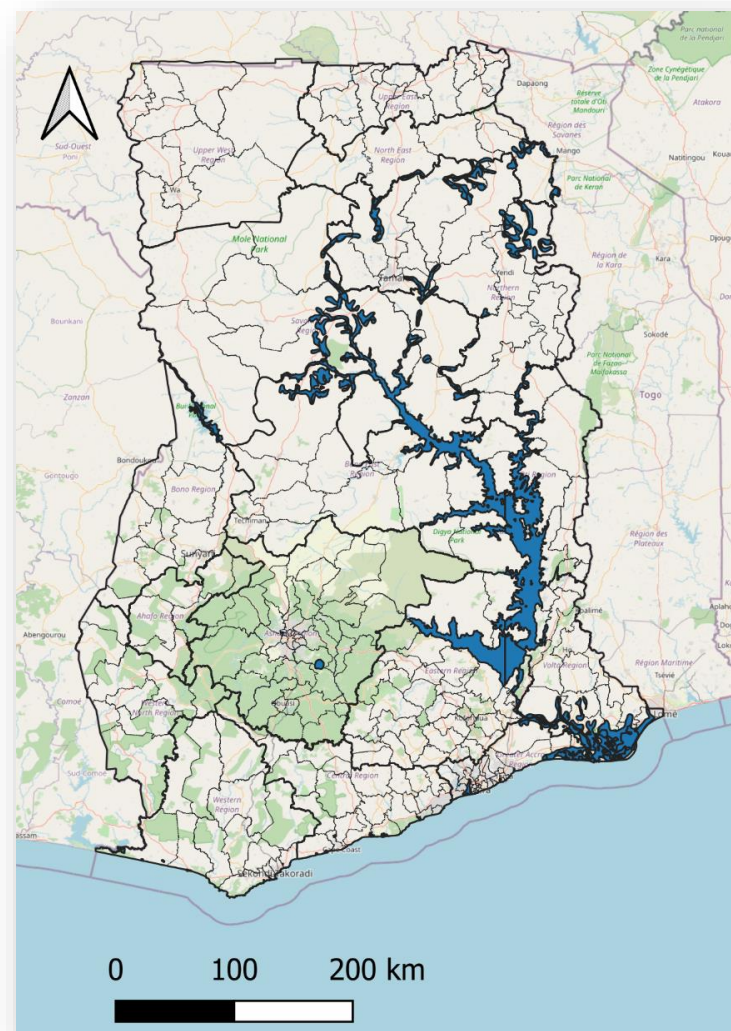


Figure 1. 1: Map of Ghana

1.2 Ghana's Health System

Ghana's health system follows the same decentralized system for planning, budgeting, reporting, information systems, performance measurement and financial transfer mechanisms as the assemblies (GSS-PHC, 2021). The health sector is administered by the Ministry of Health (MOH) which is responsible for policy formulation, monitoring and evaluation of health service delivery throughout the country, resource allocation for health services and regulating health services delivery. The MOH also develops the framework for food, drugs and health service delivery regulations.

The Ghana Health Service (GHS) is an autonomous executive agency responsible for implementing national health policies under the MOH. There are three levels of management in the Ghanaian health sector. It comprises of the national, regional and district-level management systems. Functionally, however, the Ghana Health Service is organised at the National, Regional, District, Sub-district and Community Levels and health services are delivered under primary, secondary and tertiary health care systems. The Teaching Hospitals function as semi-autonomous health institutions with responsibility for tertiary-level healthcare. Tertiary and specialized care is provided through teaching hospitals, university hospitals and psychiatric hospitals. They are also the places for training health professionals and the provision of tertiary health services to clients referred from the lower levels in the country. Secondary-level health care services are delivered at the regional hospitals. Regional hospitals provide both public health and clinical services and serve as referral points for facilities from the district level and below.

Each region has a regional health administration. The Regional Health Administration or Directorate provides supervision and management support to the districts and sub-districts health service delivery within each region. The District Health Management Team (DHMT) provides supervision over the sub-districts. Within these sub-districts are the hospitals, health centres, clinics and community-based health planning and services (CHPS) compounds. Ghana developed the CHPS approach as part of its primary healthcare strategy to address gaps in access to quality health services at the community level. Basic preventive and curative services for minor ailments are addressed at the community and household level within the CHPS system. Funding mechanism for the health sector is primarily through the National Health Insurance scheme. The institutional structure of the health sector is made up of the Ministry of Health (MOH) as policy maker and regulator, the Ghana Health Service, the Teaching Hospitals

and the Faith-based and Private-for-Profit practitioners as care providers and the National Health Insurance Authority (NHIA) as the purchaser of health care services for its insured members. The public health services are delivered through linkages at the district (hospitals) and sub-district level (health centres, maternity homes and clinics)

1.3 Previous Identification of PAMIs/Hotspots

Cholera hotspots are areas where there is a high cholera burden, with outbreaks usually starting from these areas and spreading to other areas. In the latter part of 2022 up to 2023, Ghana conducted cholera hotspot analysis to serve as a basis for developing a National Cholera Elimination Plan and Roadmap. The 2019 Global Task Force for Cholera Control (GTFCC) Tool for cholera hotspot mapping was used. However, the findings from the analysis could not be translated into the development of the National Cholera Elimination Plan and Roadmap.

1.4 Cholera Situation in Ghana

Since 1970 when the first case was recorded in Ghana, cholera has become a recurrent public health problem. The first case was reported to have been imported by infected fishermen from neighbouring countries. The cases spread across the country quickly (Ashitey, 1994). Since then, cholera has been reported almost every year with high peak focal outbreaks occurring periodically. In 1991, a nationwide outbreak occurred with thousands of cases reported across several regions. Then between 1999 and 2005 there were sporadic outbreaks mainly in coastal and urban slum areas. In 2011/2012, a significant outbreak was recorded, affecting multiple regions including the Greater Accra Region. The outbreak was linked to poor socio-economic status, inadequate sanitation, and poor access to safe drinking water in many cities.

In 2014, Ghana was hit by a massive cholera outbreak which recorded the highest number of cases in the past 30 years claiming many lives. During that outbreak, a total of 28,975 cases including 247 deaths were reported from all 10 regions of the country. In 2016, the Government of Ghana in collaboration with key stakeholders through a systematic assessment, developed a road map targeting on-going preparedness activities and long-term intervention in cholera prone areas following the 2014 outbreak. From 2015, there was a steady decline in the incidence of cholera cases, up until 2021 and 2022 where zero incidence of confirmed cholera cases was recorded. With continuous heightened surveillance, in 2023, the country recorded one confirmed case.

More recently, in August 2024, a total of sixty-five (65) suspected cases, five (5) confirmed cases with no deaths were reported in Ada East District in the Greater Accra Region. Subsequently, in October 2024, an outbreak emerged in the Ada West District in the Greater Accra Region and spread to other districts in the Greater Accra, Central, and Western Regions, with a few sporadic cases reported in the Eastern and Ashanti Regions. This outbreak extended into 2025, with the last confirmed case recorded in April 2025. By the end of this period, a total of 7,114 suspected cases, including 626 laboratory-confirmed cases and 79 deaths (CFR 1.1%), had been reported.

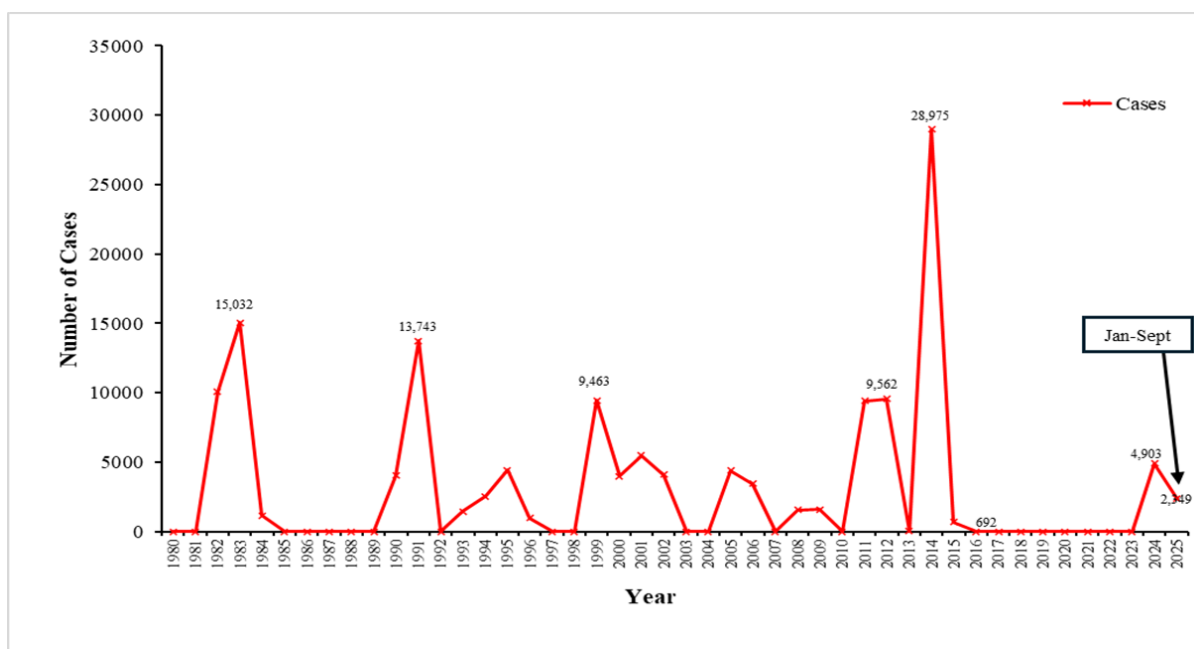


Figure 1. 2: Reported cholera cases in Ghana, 1980 – 2025 (Source: updated Cholera SOPs)

1.5 Cholera Surveillance System

Cholera is one of the immediately reportable diseases in Ghana. The cholera surveillance system is set within the Integrated Disease Surveillance and Response (IDSR) 3rd Edition Strategy, which guides systematic detection, reporting, investigation and response to all suspected cholera cases. This system operates through various levels involving communities, sub-districts, districts, regional and national levels. Suspected cholera cases are initially identified at the community or health facility level, where case definitions (standard and community level), and Event-based predefined signals are used to detect and report cases and signals.

Immediate notification is required for any suspected cholera case, and this is done through the fastest means available. An electronic platform, Surveillance Outbreak Response Management and Analysis System (SORMAS), is Ghana's reporting tool, which supports both case-based and event-based reporting. Tablets and laptops have been distributed to all health facilities throughout the country to facilitate timely reporting of data from all levels. Alerts are also communicated via phone calls, emails, and other media platforms. Within the communities, the system relies on event-based community informants and community-based surveillance volunteers, who have been provided with some basic equipment and training to aid immediate reporting to the next level for action through a surveillance focal person at nearest health facility.

Suspected cholera cases are tested using Rapid Diagnostic Tests (RDTs). Stool samples or rectal swabs for cases with positive RDT results, are sent to designated laboratories for confirmation by culture and PCR testing. Results for all laboratory investigations conducted on samples are updated on the electronic IDSR platform, SORMAS. Surveillance data was exported from SORMAS, reviewed and analyzed by person, place and time, regularly at the facility, subdistrict, district, regional and national levels to monitor already identified hotspots, disease trend and burden, help guide response activities and public health interventions. Information products including situational reports, epidemiological bulletin and investigation reports are also developed using this data and shared with all stakeholders.

Aside the IDSR, Ghana has developed Cholera Standard Operating Procedures (SOPs), case management and laboratory guidelines to guide preparedness, response and post-outbreak actions and activities. Training and orientations on these documents have been conducted at all levels to ensure capacity among healthcare workers and community-based surveillance volunteers to respond accordingly to reports, signals, alerts, and outbreaks of cholera.

1.6 Cholera Case Definitions

Suspected cholera case

- A. In areas where a cholera outbreak has not been declared: Any patient aged two years and older presenting with acute watery diarrhoea and severe dehydration or dying from acute watery diarrhoea.

- B. In areas where a cholera outbreak is declared: any person presenting with or dying from acute watery diarrhoea.

Confirmed cholera case

A suspected case with *Vibrio cholerae* O1 or O139 confirmed by culture or PCR

Cholera Deaths

Community Cholera Death

A person suspected or confirmed with cholera who died in the community or on the way to a healthcare facility.

Facility Cholera Death

A person suspected or confirmed with cholera who died in the health facility after admission regardless of the time or period on admission.

1.7 Cholera Testing Strategy

1.7.1 Laboratory Network System

Cholera testing follows national testing algorithm structure of testing priority diseases with the National Public Health and Reference Laboratory (NPHRL) at the top. NPHRL is mandated to provide training, quality assurance, genomic sequencing, and assist in outbreak investigations. There are three other Public Health laboratories which are strategically positioned to serve the entire country. Beside these, there are regional and some district hospitals laboratories with adequate capacities to perform culture, serotyping and antimicrobial susceptibility testing (AST) to support surveillance and case confirmation. Other district laboratories handle basic culture and refer complex cases to higher levels. At the primary healthcare level which include CHPS, clinics and Health Centers, use rapid diagnostic tests (RDTs) and collect samples for referrals. The system is strengthened through collaboration with the research laboratories such as Noguchi Memorial Institute of Medical Research (NMIMR), Kumasi Centre for Collaborative Research for Tropical Medicine (KCCR) providing support.

1.7.2 Testing Strategies

Whenever a case is suspected, rapid diagnostic tests (RDTs) are used for early detection, with culture and or PCR used for confirmation. Selective Antimicrobial Susceptibility Testing (AST) conducted is conducted to determine and monitor antibiotic sensitive patterns of the organism especially during outbreaks. For each new area affected by a cholera outbreak, a laboratory confirmation is required. Stool is sample once the outbreak is confirmed, sample collection and testing is tapered down to maintain monitoring of the outbreak in that given

community/ area. However, testing continues until the outbreak is declared over then surveillance is heightened for cholera among acute watery diarrhoea cases.

1.7.3 Laboratory Diagnostics

The cholera testing approach employs multiple methods to ensure accurate detection and monitoring. Rapid Diagnostic Tests (RDTs) are used for initial screening at peripheral sites due to their ease of use and timeliness in getting results. Culture remains the gold standard for confirming cholera cases and therefore each sample or aliquots are sent to the Reference Laboratories for confirmation by culture and PCR.

1.8 Justification

Despite the interventions by Government of Ghana in collaboration with key stakeholders through a systematic assessment in 2016 and development of a road map targeting on-going preparedness activities and long-term intervention in cholera prone areas, in 2024 to 2025 another significant outbreak broke out. This 2024/2025 cholera outbreak extended to multiple areas with high morbidity and mortality. It affected five (5) regions in the country with fifty-eight (58) out of the two hundred and sixty-one (261) districts reporting outbreaks. This calls for a multisectoral approach such as PAMIs to holistically tackle the menace of cholera. As the initial hotspot analysis for the country could not be translated into an actionable strategic plan, and with the new guidance from Global Task Force Cholera Control (GTFCC) on identification of Cholera Priority Areas for Multisectoral Interventions, there is a need to carry out this exercise and subsequently develop the National Cholera Control Plan to control the disease in the country.

Additionally, identification of cholera priority areas for multi-sectoral interventions (PAMIs) is essential for generating information that may lead to early detection of outbreaks to enable rapid investigation and implementation of early response; forecasting cholera outbreaks; monitor trends of the cholera; and evaluation of control measures being instituted. The Priority Areas for Multisectoral Interventions framework is a transformative approach to public health crisis management, that will enable Ghana to strategically allocate resources to achieve maximum impact. **Figure 1.4** shows affected districts in the recent outbreak.

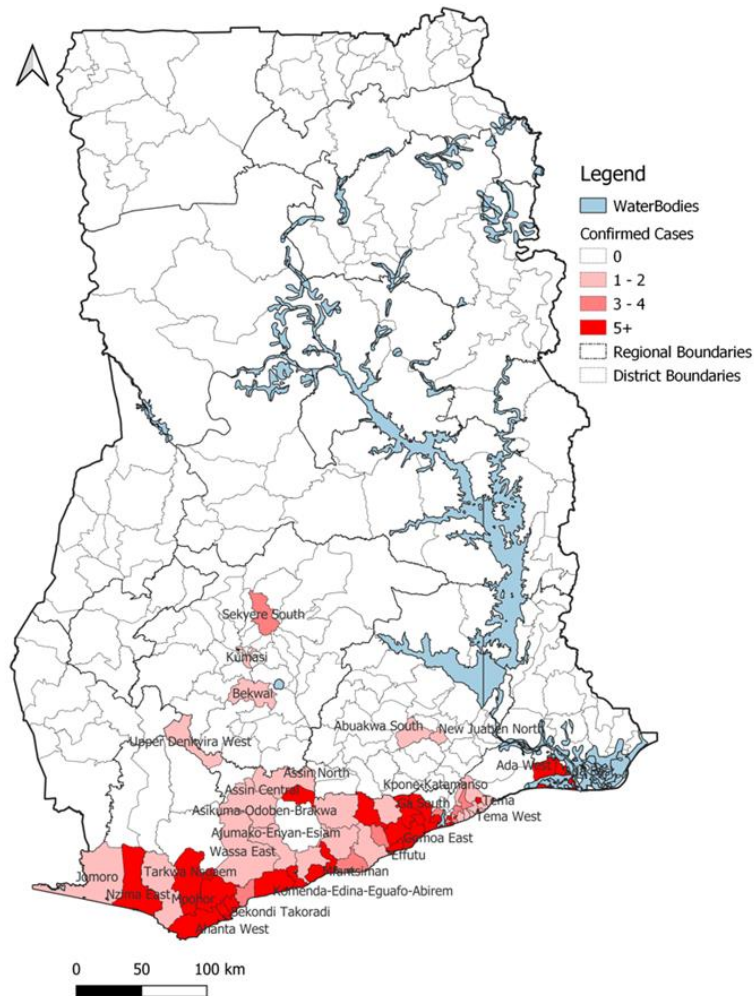


Figure 1. 3: Distribution of Cholera Affected Districts in Ghana, 2024-2025

1.9 Objectives

The main objective is to identify priority areas for multi-sectoral interventions for the control and eventually elimination of cholera in Ghana

Specific objectives include:

1. To evaluate the cholera PAMI priority index for all geographic units across the country (District level).
2. To set a priority index threshold and list Priority Areas for Multisectoral Intervention (PAMIs) for cholera in Ghana.

2.0 METHODS

The identification of PAMIs for Ghana was a collective effort aimed at the involvement of as many stakeholders of the numerous multiple sectors and disciplines that are relevant in the identification and control of cholera in Ghana, either directly or indirectly.

2.1 Pre-commence Work

The process began with engagement of partners (WHO) and dialogue on the suitability and the need of conducting cholera PAMI for Ghana. Once it was agreed by all that Ghana stands to benefit significantly from the identification of PAMIs, a team of technical experts was constituted from the Public Health Division of the Ghana Health Services. This technical group consisted of personnel from surveillance, EPI, laboratory, and data management. The technical team was then trained by the WHO AFRO team on the Cholera PAMI process and how it should be conducted. Besides the training, materials, GFTCC tools, and documents relevant for the process were shared with the team for reference and guidance. Subsequent to this, the technical team worked with the WHO Country Office of Ghana to identify all relevant stakeholders, agencies, ministries, and institutions that should be invited to constitute Ghana's "Cholera PAMI Coordination Group".

The Cholera PAMI Coordination Group for Ghana was constituted by officially writing to all the relevant ministries, agencies, sectors, and institutions to nominate qualified personnel to represent their respective agencies in the process. This coordination group is the main body responsible for the identification of Cholera PAMIs for Ghana, while the technical group served as the secretariate and liaison for the coordination group. After the constitution of the coordination group, an orientation and training on cholera PAMI identification process was conducted for all members of the coordination group. This training was conducted by the WHO AFRO office and facilitated by the Ghana Health Service and the WHO Country Office. Once the coordination team was familiar with the process, they guided the process forward.

2.2 Step 1. Datasets

2.2.1 General

Definition and Administrative Level of NCP Operational Geographic Units

In alignment with the Global Task Force on Cholera Control (GTFCC) guidance, Ghana adopted the district level (administrative level 2) as the operational unit for identifying Priority Areas for Multisectoral Interventions (PAMIs). Within Ghana's administrative structure which

comprises of national, regional, district, sub-district, and community levels, the district level is the best-fit administrative level for data availability, decision-making authority, resource mobilization and allocation. The district level was therefore identified as the most appropriate and functional level for conducting PAMI identification to guide targeted, high-impact cholera control strategies.

Definition of analysis period

From the year 2020 to September 2025, case-based cholera patient data is available for all 261 districts of Ghana. Prior periods do not have this level of detail for cholera cases for all districts of the country. The coordination team agreed to use all available case-based level data for the period from 2020 to September 2025. Thus, the Priority index calculation was based on retrospective data collected over the last six (6) years. This period exceeds the minimum required period of five years for the PAMI analysis. Furthermore, there were changes in the number and names of districts in Ghana, making the alignment of cases from earlier periods to the newly created districts extremely difficult.

2.2.2 Priority Index

Sources of data for calculation of priority index

Cholera surveillance data from the Surveillance Outbreak Response Management and Analysis System (SORMAS) platform was extracted in a spreadsheet format as case-based data. In addition, district-level yearly population data were obtained from the District Health Information Management System (DHIMS2). The list of operational geographic units (District) and geospatial data on the shapefiles for all 261 districts of Ghana was obtained from the Ghana Statistical Service. The case-based line list of cholera data was analyzed and aggregated per district per epidemiological week for each year of the analysis. Based on these, all the priority index attributes were calculated. For each NCP operational geographic unit and for each year within the analysis period, the following data were collected:

- Estimated population
- Number of reported cholera cases (both suspected and confirmed, regardless of the testing method-RDT or culture or PCR)
- Number of reported cholera deaths (both suspected and confirmed, regardless of the testing method- RDT or culture or PCR)

- Number of suspected cholera cases tested (regardless of the testing method- RDT or culture or PCR)
- Number of confirmed cholera cases (regardless of the testing method- RDT or culture or PCR)
- Number of weeks with at least one reported cholera case (suspected or confirmed)
- Number of weeks with at least one suspected cholera case tested

Table 2.2.2: Definitions of Data by NCP operational geographic units

Category	Data by NCP operational geographic units	No/Periodicity	Data Source
Administrative	List of NCP operational geographic units	261/ 2020 to 2026	DHIMS2/ GSS - StatsBank
	Geographic units in geospatial vector data format for geographic information system (e.g., shape file)	261/ 2020 to 2026	GSS - StatsBank
Demography	Population	261/ 2020 to 2026	DHIMS2/ GSS - StatsBank
Surveillance	Number of reported cholera cases (suspected and tested positive)	7760/ 2020 to 2026	SORMAS/ NPHRL Registers/ RHD linelists
	Number of reported cholera deaths (suspected and tested positive)	79/ 2020 to 2026	SORMAS/ NPHRL Registers/ RHD linelists
Test for cholera	Number of reported suspected cholera cases tested for cholera (regardless of the testing method)	2,655 / 2020 to 2026	SORMAS/ NPHRL Registers/ RHD linelists
	Number of reported cases that tested positive for cholera	658 / 2020 to 2026	SORMAS/ NPHRL Registers/ RHD linelists

Assessment of quality of the data

The cholera surveillance data from the SORMAS was triangulated with available laboratory data and regional level linelists for the analysis period and any discrepancies corrected.

Management of missing data

Missing variables for the SORMAS dataset were supplemented, wherever possible, using information from the laboratory dataset and vice versa. However, if a key variable could not

be obtained from any available source, the corresponding case was excluded from the analysis. To ensure full district representation with complete datasets, the following measures were implemented:

- The regional and where applicable the district health management teams were contacted to obtain and update case-level data whenever necessary.
- Some additional linelists were obtained from the regional levels to fill in on what was missing from the SORMAS database.
- Regional and district surveillance officers were called to provide clarity on missing data.

Data completeness checks

Data quality checks were conducted to identify missing key variables (such as district name, age, sex, date of onset, and outcome) before analysis. Records failing these checks were flagged for correction.

Feedback mechanism

During data collection, feedback on some gaps identified was presented to the respective region, district, institution or agency for corrections or updates. Further feedback was provided during the process of validation. Data gaps identified during cleaning were communicated back to district and regional surveillance units for immediate correction in the case-based linelist prior to compilation.

Data triangulation

Records from SORMAS, laboratory databases, and region/district surveillance linelists were systematically compared to identify and resolve missing or inconsistent entries.

Validation with surveillance teams

Region/District Disease Surveillance Officers were contacted to verify and update incomplete records using facility registers, linelists, and case investigation forms.

2.2.3 Vulnerability factors

List of vulnerability factors emphasizing their relevance in the country context

All the 12 vulnerability factors in the GTFCC tool were assessed using a combination of knowledge from the regional actors and nationally relevant institutional data on specific parameters. The country assessed cholera vulnerability factors; however, this assessment was **not incorporated/considered** into the current PAMI identification as the country preferred to consider the cholera burden (priority index). Instead, the vulnerability assessment serves as a **baseline benchmark** to inform and guide multisectoral interventions in the identified PAMIs and for performance monitoring.

Criteria to identify NCP operational geographic units to undergo a vulnerability assessment

Although a vulnerability assessment was conducted for all 261 districts, its results were not used for the identification of Priority Areas for Multisectoral Interventions (PAMIs). Instead, the country adopted a burden-based prioritization approach, using the cholera priority index as the primary criterion for selecting priority districts.

However, the six regions in Ghana that experienced cholera outbreaks during the 2024–2025 period were prioritized for the assessment of vulnerability factors, with field visits conducted to these regions to obtain context-specific and operationally relevant information that the country considered essential for designing packages for multisectoral interventions for cholera control.

Data sources for vulnerability factors

Agencies responsible for the routine collection and management of vulnerability-related data were engaged to facilitate access to relevant datasets. For example, data on major population gatherings, high-density settlements, high-risk populations, unimproved sanitation facilities, households without handwashing facilities, and populations using unimproved sanitation types were obtained from the Ghana Statistical Service (GSS) through the Demographic and Health Survey (DHS) and the 2021 Population and Housing Census (PHC). Data on areas at high risk for extreme weather and climate-related events were sourced from the Ghana Meteorological Agency (GMet) and data on complex humanitarian emergencies and hard to access population was sourced from the National Disaster Management Organization (NADMO) to ensure completeness and reliability. Location adjacent to cross-border cholera affected areas or

identified PAMIs was obtained from WHO AFRO Cholera Focal Point; vaccination data was obtained from the EPI Programme.

Information on locations along major travel routes was gathered from the Regional Coordinating Council (local government authority), using Google Maps and contextually relevant knowledge. Additional data were collected from all 261 districts nationwide to supplement and validate the existing datasets. Table 2.2.3 provides a summary of specific data received from other agencies, google map and from the officers of the Regional Coordinating Councils.

Table 2.2.3: Vulnerability factors and information source

No.	Vulnerability Factor	Organization/Institution Information Obtained
1	Major population gatherings	Ghana Statistical Service (GSS); Regional Coordinating Council (local government authority); National Disaster Management Organization (NADMO)
2	Areas with high density or overcrowded settings	
3	Areas with high-risk populations	
4	Hard to access populations	
5	Areas with more than 50% of the population with access to unimproved sanitation facility type	
6	Areas with more than 50% of the population with no handwashing facility on premises	
7	Areas with more than 30% of the population with access to unimproved sanitation facility type	
8	Areas at high risk for extreme climate and weather condition	Ghana Meteorological Agency (GMet); Regional Coordinating Council (local government authority)
9	Areas with complex humanitarian emergencies	National Disaster Management Organization (NADMO)
10	Location along major travel routes with transportation hubs	Google maps, Region/ District Health Directorate; Regional Coordinating Council (local government authority)
11	Location adjacent to cross-border cholera affected areas or identified PAMIs	WHO AFRO
12	Population received oral cholera vaccine more than three years ago (two-dose campaign with a coverage for both rounds >70%)	EPI Programme

Method for assessing vulnerability factors

Assessment of vulnerability factors followed the standardized scoring methodology recommended by the Global Task Force on Cholera Control (GTFCC). In line with this guidance, each predefined vulnerability factor was systematically reviewed for all districts using available epidemiological, environmental, and WASH-related datasets. To ensure consistency and objectivity across all operational geographic units, a binary scoring system was applied. Under this approach, each vulnerability factor was assigned a score of “**Yes**” if the factor was present within the district and “**No**” if absent.

2.2.4 Calculate Weekly Testing Coverage

The weekly testing coverage indicator determines whether the representativeness of testing allows for test positivity indicators to be included in the calculation of the priority index. Depending on the value of the weekly testing coverage indicator, the positivity rate, or the number of years with cases tested positive may be included as test positivity indicators. If the representativeness of testing is determined to be insufficient, test positivity indicators are excluded altogether. The weekly testing coverage for each NCP geographical unit was calculated using the automated Excel-based tool developed by GTFCC. Step-by-step instructions as per GTFCC instructions were followed during the calculations (see Part II: User guide for the GTFCC Excel-based tool)

Assess Cholera Testing Representativeness

The assessment of the representativeness of testing used the automated GTFCC Excel tool and was based on the weekly testing coverage indicator. **Figure 2.2.4.1** below describes the criteria for assessing representativeness of cholera testing and determining the Cholera test indicator to be included in the priority index. In brief, if testing coverage (For what percentage of weeks with reported suspected case(s) was at least one suspected cholera case tested?) is greater equal to or greater than 50% in at least 80% of geographical units, then testing representativeness is deemed acceptable. On the other hand, if the weekly testing coverage is less than 50% but > 0% in at least 80% of NCP geographical units, then the testing representativeness is deemed suboptimal. However, if weekly testing coverage is > 0% in less than 80% of NCP geographic units, the testing representativeness is deemed insufficient

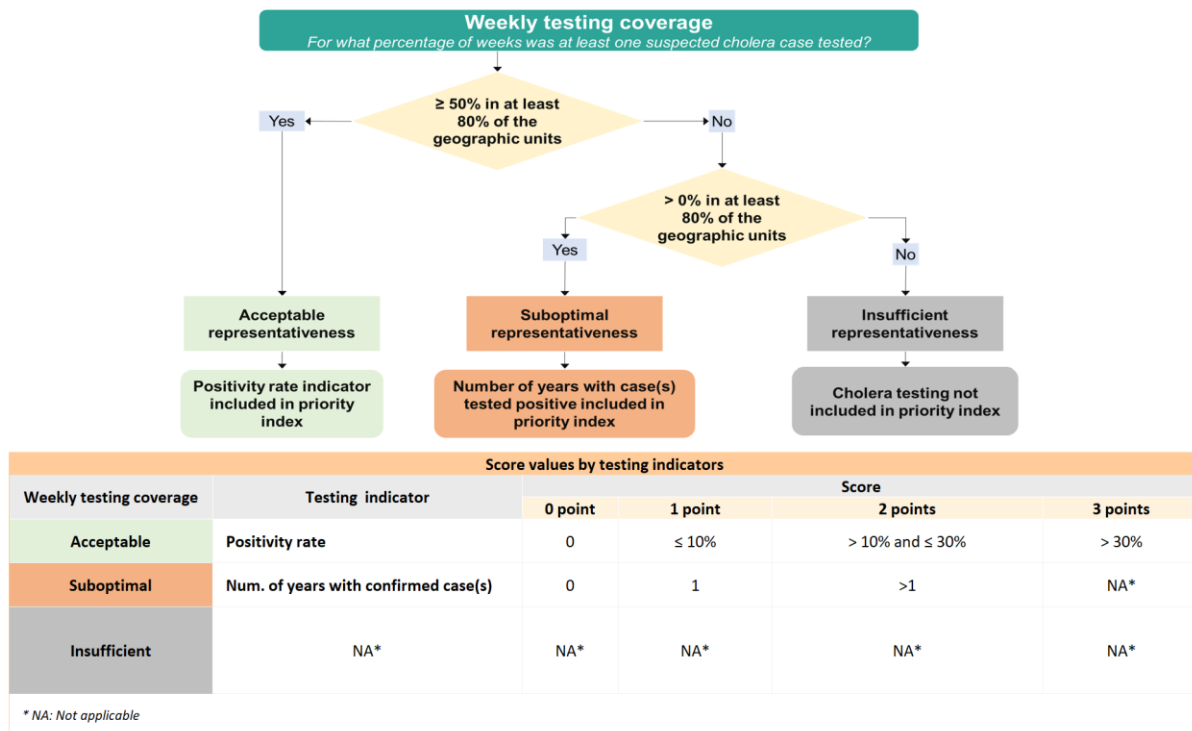


Figure 2.2.4. 1: Schematic showing the criteria for scoring and interpretation of the representativeness of cholera testing coverage

2.3 Step 2. Priority index scoring

In Ghana, each operational geographic unit was assigned a numerical priority index to support evidence-based targeting of interventions. The priority index was derived by combining epidemiological indicators (cholera incidence, mortality, and persistence of transmission); calculated using routine surveillance and laboratory data over the defined analysis period. The resulting output was a consolidated data table in which each operational geographic unit was assigned its corresponding indicator values, population data, standardized indicator scores, and the priority index.

Table 2.3.1: Scoring of epidemiological indicators for each NCP geographic Unit

Epidemiologic Indicator	Score			
	0 Point	1 Point	2 Points	3 Points
Incidence*	No case	> 0 and < median	≥ median and < 80th percentile	≥ 80th percentile
Mortality*	No death	> 0 and < median	≥ median and < 80th percentile	≥ 80th percentile
Persistence*	No case	> 0 and < median	≥ median and < 80th percentile	≥ 80th percentile

The Priority index was calculated for each NCP operational geographic unit by summing the scores of the indicators as follows:

Priority Index value= incidence score + persistence score + mortality score

2.4 Step 3. Stakeholder validation

The stakeholder validation exercise was conducted as a week-long programme in-person workshop in Accra from 19-23 January 2026, during which all relevant stakeholders were engaged at different stages:

- On the first day (19th January 2026), the Cholera PAMI Technical team met with representatives from WHO AFRO and the WHO Ghana Office to present findings from the data collection and analysis; vulnerability assessment; output of the GTFCC completed tool; some data challenges identified and yet to be resolved; data was shared for review and; developed and shared initial maps of priority index scores and vulnerability factors.
- On the second day (20th January 2026), The Cholera PAMI Technical Team meet in-person at the WHO Country Office and were joined by the rest of the Cholera PAMI Coordination Group online. There was a refresher session on the PAMI process and the tools deployed; Feedback and update on data collection and process of the PAMI process was provided; detailed planning for the larger stakeholder engagement and validation was done.
- On the third day (21st January 2026), the entire Cholera PAMI Coordination Group (including the Cholera PAMI Technical Team) convened at the WHO Country Office in-person. The data, findings and outputs from the completed GTFCC Tool was presented, shared, and review by all for inputs; priority index scores were critically

examined and vulnerability factors and scores perused; maps were evaluated; inputs and correction were effected; limitations of the data and process were documented; and an initial range of possible priority index thresholds range was determine as from **3 to 6** awaiting the final decision form the large stakeholder validation meeting. Also, plans for the final validation meeting were firmed up.

- On the fourth day (22nd January 2026), the meeting took place at the Erata Hotel in Accra. The meeting brought together all stakeholders for the final validation of the Cholera PAMIs and to deliberate on the way forward for implementation. An overview of the Ghana cholera situation and thus the need for PAMI identification was presented; an overview of the entire process of PAMI identification and associated processes and tools was presented; the stakeholders were given ample opportunity to seek clarifications; the data, process of analysis, the analysis tools, and findings were presented and outputs shared with each stakeholder; printouts of maps and lists of districts with their respective priority index scores were given to each stakeholder for perusal; also electronic interactive maps showing priority indices for each district and the entire list of districts with the corresponding priority indices shown.
- This elaborate provision of data and information to the stakeholders was to enable each of them thoroughly examine the data for an informed final validation. The participants were allowed to opportunity to suggest an appropriate threshold based on the provided information and provide justification for it. Consensus was then build together on the final threshold and list of PAMIs for Ghana.
- On the fifth (23th January 2026), the technical team met at the WHO Country Office. The team commenced work on the GTFCC report for cholera PAMIs per the template provided in the GTFCC user guide. The limitations and recommendations of the final validation meeting were incorporated into the report as well.

These were the processes used in the building consensus on the priority index threshold and the identification of cholera PAMIs for Ghana collaboratively with partners and multisectoral stakeholders to ensure accuracy and ownership of the final output. **Table 2.4** provides a list of the participating stakeholders.

Table 2.4: List of Stakeholders for Cholera PAMI Identification and Validation

No.	Stakeholder	No.	Stakeholder
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	Ministries		28	Ghana Statistical Service
1	Ministry of Health		29	Ghana Medical Association
2	Ministry of Finance		30	Private Health Facilities Association of Ghana
3	Ministry of Local Government Chieftaincy and Religious Affairs		31	Veterinary Services Directorate
4	Ministry of Works Housing and Water Resources		32	Ghana Police Service
5	Ministry of Transport		33	National Health Insurance Authority
6	Ministry of Education		34	Ghana Education Service
7	Ministry of Interior		35	Food and Drugs Authority
	Agencies and Institutions		36	Ghana Meteorological Agency
8	Ghana Health Service - Disease Surveillance Department		37	Land Use and Spatial Planning Authority
9	Ghana Health Service - National Public Health Laboratories Department		38	Ghana prison service
10	Ghana Health Service - Expanded Programme on Immunization		39	Ghana Standard Authority
11	Ghana Health Service - Institutional Care Division		40	School of Public Health, University of Ghana
12	Ghana Health Service - Port Health Department		41	Korle-Bu Teaching Hospital
13	Ghana Health Service - Ghana Infectious Disease Centre			Partners
14	Ghana Health Service - Policy Planning Monitoring and Evaluation		42	Fhi360
15	Ghana Health Service - Health Promotion Division		43	UNICEF
16	Ghana Health Service - Regional Health Directorates		44	Jhpiego
17	District Directors of Health Services Group		45	KOFIH
18	Ghana Veterinary Medical Association		46	KOICA
19	Medical Superintendent Group		47	US-CDC
20	National Disaster Management Organization		48	PATH
21	Ghana Water Company		49	WHO Country Office
22	Customs Division Ghana Revenue Authority		50	WHO-AFRO
23	Ghana Immigration Service		51	Water Aid
24	Fisheries Commission		52	Food and Agriculture Organization Reg. Office
25	Mineral Commission		53	Food and Agriculture Organization Country Office
26	National Ambulance Service			

3.0 RESULTS

All the data for cholera cases for the period of analysis was inputted into the GTFCC tool in the “Data input table” sheet. The following results were generated by the tool’s output:

3.1 Priority Index

3.1.1 Data Overview

In all, the distribution of the country's cholera data for the period is summarized in **Table 3.1.1**. There was a total of 261 geographical units (districts) at Administration level 2. The period of analysis was from the year 2020 to 2025. During this period, at least 157 geographic units detected at least one case of cholera. In all a total of 7760 cases of cholera were detected from all the geographical units during the period. Among the cases, 79 deaths were recorded constituting approximately 1.0% case fatality rate.

Table 3.1.1: Overall Summary of Cholera Data Used for Calculating the Priority Index for PAMIs identification in Ghana for the Period 2020 to 2025

Data Description	Value
Number of NCP operational geographic units	261
Study period: start year	2020
Study period: end year	2025
Study period: number of years	6
Number of NCP operational geographic units with at least one case	157
Total number of cases	7760
Total number of deaths	79
Overall case fatality	1.0%
Total number of suspect cases tested **	2655
Total number of suspect cases tested positive **	658
Overall positivity rate **	24.8%

* The totals are calculated for the entire set of geographical units over the study period

** Regardless of the testing method applied

Testing for cholera included RDT, culture, and PCR results. Overall, out of the 7760 cases, 2655 were tested with at least one of the testing modalities. Of those tested, 658 were positive, giving a test positivity of 24.8%.

3.1.2 Epidemiologic Indicators Score Thresholds

Epidemiological indicators of incidence (100,000 persons per year), mortality (100,000 persons per year), and persistence (% of weeks with \geq one case) were calculated. Based on the results of these indicators, “Epidemiological Indicator Scores” were calculated per the GTFCC tool and guidelines. A summary of the outputs of the overall indicator values and scores is provided in **Table 3.1.2**.

Table 3.1.2: Epidemiological Indicators, Scoring values and Thresholds

Epidemiological indicators score thresholds				
Incidence (100,000 pers.y-1)*	Median			0.79
	80th percentile			3.55
Mortality (100,000 pers.y-1)*	Median			0.19
	80th percentile			0.46
Persistence (% of weeks with \geq one case)*	Median			1.30
	80th percentile			5.60
* Calculated out of geographic units with indicator value >0				
Score values by epidemiological indicators				
Epidemiological indicator	Score			
	0 point	1 point	2 points	3 Points
Incidence	No case	> 0 and $<$ median	\geq median and $<$ 80th percentile	\geq 80th percentile
Mortality	No death	> 0 and $<$ median	\geq median and $<$ 80th percentile	\geq 80th percentile
Persistence	No case	> 0 and $<$ median	\geq median and $<$ 80th percentile	\geq 80th percentile

3.1.3 Assessment of Representativeness of Testing

Representativeness of testing scores is one of the four score parameters used in the calculation of the priority index for the geographical units. This is obtained based on the testing rates and the proportion of geographical units with testing rates equal to or greater than 50%. The assessment matrix and rates obtained are summarized in **Table 3.1.3**.

In the first Step: only, 95 geographical units had a weekly testing coverage $\geq 50\%$; the percentage of NCP operational geographic units (with at least one case) with testing coverage $\geq 50\%$ is 60.5%; the weekly testing coverage is **not** $\geq 50\%$ in at least 80% of the NCP

operational geographic units of the country; the weekly testing coverage was **not** greater than or equal 0% in at least 80% of the geographical units (districts).

Table 3.1.3: Performance of Representativeness of Cholera Testing

Assessment of representativeness of cholera testing *	
Step 1	NO./ Rate / %
Number of NCP operational geographic units with weekly testing coverage $\geq 50\%$	95
Percentage of NCP operational geographic units (with at least one case) with testing coverage $\geq 50\%$	60.5%
Is weekly testing coverage $\geq 50\%$ in at least 80% of the NCP operational geographic units of the country?	No
Level of representativeness of testing	See step 2: check if weekly testing coverage is > 0 in at least 80% of geo. units
Inclusion of positivity rate score into the priority index	No inclusion of the positivity rate score, see next step 2
Step 2	NO./ Rate / %
Number of NCP operational geographic units with weekly testing coverage $> 0\%$	113
Percentage of NCP operational geographic units with testing coverage $> 0\%$	72%
Is the weekly testing coverage > 0 in at least 80% of the NCP operational geographic units of the country?	No
Level of representativeness of testing	Insufficient
Inclusion of the num. of years with case(s) tested positive score into the priority index	No test-derived score included in the priority index

In the second Step: the percentage of NCP operational geographic units with testing coverage $> 0\%$ was found to be 72.0%; the weekly testing coverage was **not** > 0 in at least 80% of the operational geographic units of the country; thus, the Level of representativeness of testing was found to be **insufficient**. This indicator was therefore excluded from the overall priority index calculations.

3.1.4 Priority Index Scoring

The scoring of the priority index for the districts was done using the combined scores of the following indicators:

- Incidence Score (based on the incidence rates)

- Persistence (based on the proportion of weeks with at least one case)
- Mortality Score (based on the case fatality rates)

The assessment for the representativeness of test was excluded from the priority index calculations because this was found to be “insufficient” thus excluded per GTFCC protocol. The highest priority index for any given district was therefore 9. This represents the districts with the highest identified risk for cholera in the country.

Out of 261 districts, **six (2.3%)** were found to have a priority index score of **9** (the highest score). Together, these districts cover a population of 974,605 while accounting for 39.0% and 48.1% of cholera cases and deaths, respectively. The least priority index of 0 was scored by 104 (39.8%) districts, constituting a total population of **9,500,270**. In all, there was no district with a score of 1. However, a total of 64 districts scored a priority index of 2. **Table 3.1.4** provides a summary of the distribution of priority index value and the corresponding number/proportion of districts (geographical units) involved as well as other key parameters.

Table 3.1.4: Key parameters stratified by priority index value

Summary table of key parameters stratified by priority index values														
Assessment of representativeness of cholera testing														
Level of representativeness of testing														
Testing indicator score included into the priority index														
Acceptable														
Positivity rate														
Priority index values	Number of geographic units	Cum. number of geographic units	Rel. % of num. of geographic units	Total population	Rel. % of population	Cum. % of population	Num. of cases	Rel. % of num. of cases	Cum. % of num. of cases	Num. of deaths	Rel. % of num. of deaths	Cum. % of num. of deaths	Average of positivity rate	Mean of number of years
(blank)		0	0.0%		0.0%	0.0%		0.0%	0.0%		0.0%	0.0%		
9	6	6	2.3%	974,605	3.0%	3.0%	3,030	39.0%	39.0%	38	48.1%	48.1%	31.1	3.8
8	8	14	3.1%	1,289,045	4.0%	7.0%	2,021	26.0%	65.1%	25	31.6%	79.7%	32.8	3.3
7	3	17	1.1%	609,863	1.9%	8.9%	520	6.7%	71.8%	5	6.3%	86.1%	39.0	3.7
6	12	29	4.6%	2,108,333	6.6%	15.5%	1,156	14.9%	86.7%	3	3.8%	89.9%	29.1	2.4
5	15	44	5.7%	2,909,855	9.0%	24.5%	456	5.9%	92.6%	6	7.6%	97.5%	19.5	2.6
4	28	72	10.7%	4,229,688	13.1%	37.7%	337	4.3%	96.9%	1	1.3%	98.7%	17.0	2.6
3	21	93	8.0%	2,986,191	9.3%	46.9%	112	1.4%	98.4%	1	1.3%	100.0%	8.9	2.1
2	64	157	24.5%	7,576,730	23.5%	70.5%	128	1.6%	100.0%	0	0.0%	100.0%	5.1	1.3
0	104	261	39.8%	9,500,270	29.5%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%	0.0	NA
Grand Total	261		100.0%	32,184,578	100.0%		7,760	100.0%		79	100.0%		8.4	2.1

3.2 Stakeholder Validation

3.2.1 Priority Index Threshold

The Priority Index scores ranged from 0 (minimum) to 9 (maximum). The “Weekly testing coverage” was scored as “insufficient,” thus excluded automatically from the calculation of the priority indices for the geographical units.

Based on the public health impact assessment and feasibility of implementation of multisectoral interventions at the district level (Admin level 2), a threshold for PAMI identification for the period of analysis was reached. To agree on this threshold, the stakeholders were given the opportunity to evaluate all the data, seek clarification on the data and debate each proposed threshold providing justification or otherwise for any threshold suggested by a stakeholder.

After a period of rigorous discussion on the most appropriate and acceptable threshold to select, the threshold of **three (3)** was selected. Based on this, **all districts (Admin level 2) with Priority Index from 3 to 9** were identified as PAMIs for Ghana. Also, consensus was reached **not to add any additional PAMIs**, as the districts of interest were already sufficiently captured.

3.2.2 Initial / Final list of PAMIs

Some of the rationale for the Priority Index threshold of 3 are that:

- This threshold ensures that all mortalities from cholera are potentially avoided. As a single death from cholera is not acceptable to the stakeholders in Ghana.
- Only 35.6% of geographical units of the country will be covered, making the volume of work feasible and manageable. These geographical units however content 46.9% of the national population.
- ***Newly Available Government of Ghana Funding to Districts***
The local government at the district level (known as **District Assembly**), receives government subventions in the form of financial allocation from the Government of Ghana to every district every three months (quarterly). This fund is called “**The District Assembly Common Fund**”. Following the change of government in Ghana in 2025 a new implementation arrangement has been instituted for “**The District Assembly Common Funds**” as follows:

- Since 2025, government funding has been fashioned to have specific allocation for interventions focused on improving **WATER**. This was put at **10%** of the “**The District Assembly Common Fund**”.
- Also, since 2025, government funding has been fashioned to have specific allocation for interventions focused on improving **SANITATION**. This was put at **10%** of the “**The District Assembly Common Fund**”.
- Since 2025, beyond the above two allocations from the “**The District Assembly Common Fund**”, every district has been mandated to allocate **15%** of “**Internally Generated Fund**” (i.e. revenue generated by the individual local authorities) for **WASH** interventions at the district level.
- All these three new developments are to be implemented in all **261** districts of the country.
- Above all, the allocation of funding (**The District Assembly Common Fund**) to the districts from the central government (**Government of Ghana**) for the districts is also partly based on the category of district (the districts are graded into districts, municipalities and metropolis). Metropolises have more populations than municipalities and municipalities have more populations than districts. In this light and order, Metropolis get more funding than Municipalities, and Municipalities get more funding than Districts.

With this new setup in Ghana’s local government and financial administration, the geographical units with more populations thus more PAMIs are positioned to get more funding for the WASH interventions or multisectoral interventions targeting cholera control.

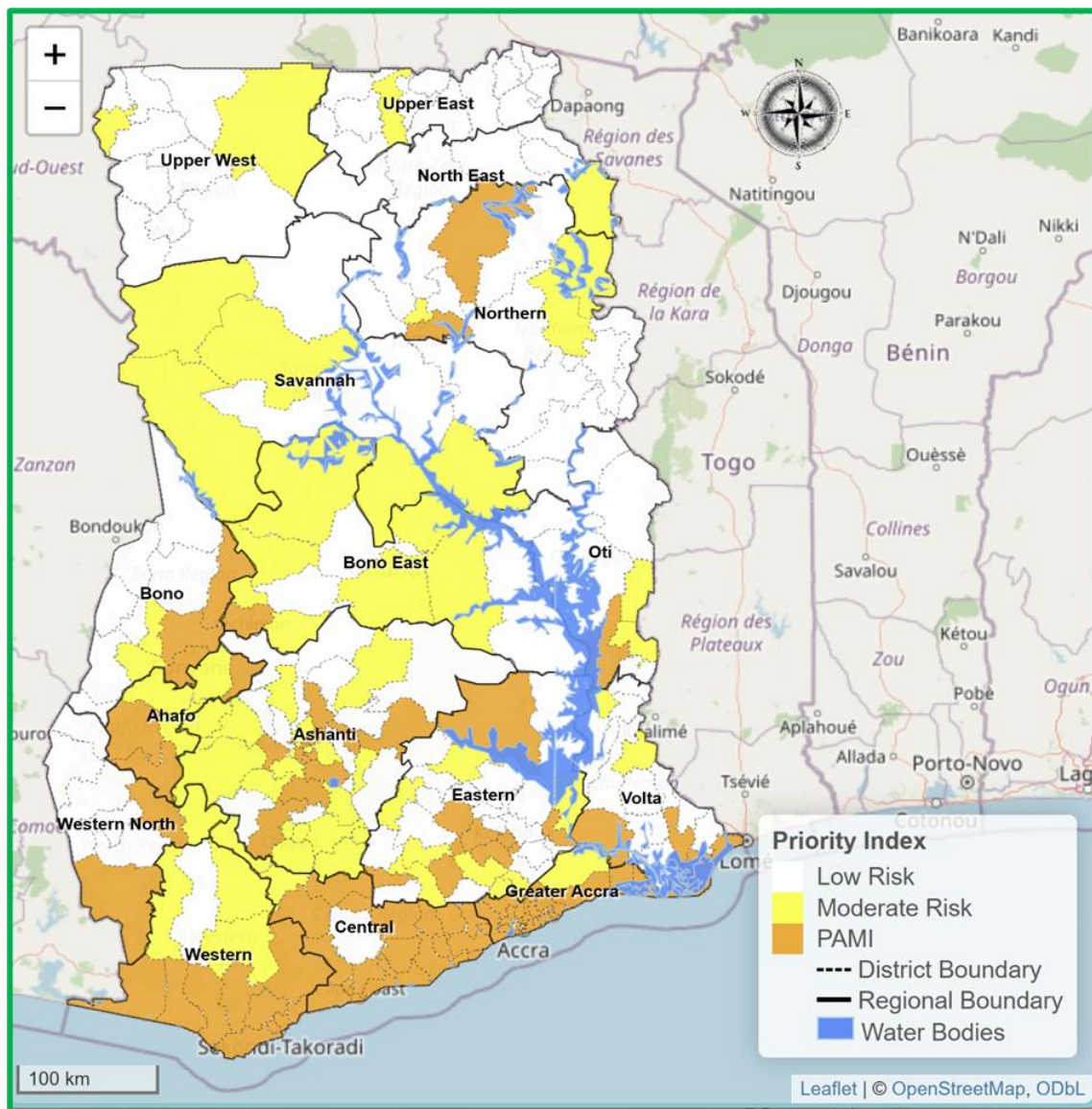
- The majority of cholera cases i.e. 98.4% are covered at this threshold.
- Implementation of multi-sectoral interventions will be staggered and stratified even among the identified PAMIs. The specific package of interventions for each geographical unit will be determined by its Priority Index score on a case by case basis, ensuring that interventions are tailored to the needs and priorities of each unit rather than applying a uniform, one-size-fits-all approach
- No additional PAMIs were to be selected using any criteria other than the calculated Priority Index values.

At this threshold, there are a total of **93 PAMIs** identified for Ghana; the distribution of the number of PAMIs per region of the country is provided in **Table 3.2.2.a**. There are 64 districts at moderate risk and 104 districts with low or minimal risk of cholera. **Figure 3. 1. 4** is a map showing the PAMIs for Ghana.

Table 3.2.2.a: Summary of the Distribution of Cholera PAMIs in Ghana per Region, 2025.

Region (Admin_1)	N0 of Districts (Admin_2)	N0 of PAMIs
Ahafo	6	3
Ashanti	43	12
Bono	12	3
Bono East	11	1
Central	22	19
Eastern	33	9
Greater Accra	29	26
North East	6	0
Northern	16	2
Oti	9	1
Savannah	7	0
Upper East	15	0
Upper West	11	0
Volta	18	5
Western	14	10
Western North	9	2
Grand Total	261	93

Figure 3. 1. 4: Map of the Distribution of Identified Cholera PAMIs in Ghana, 2025



The distribution of cholera PAMIs in Ghana as per the regional (Admin level 1) level is shown in Tables 3.1.5 to 3.1.14 below by maps and the list of PAMIs per region are included in the tables.

Table 3.1.5: Location and Distribution of Identified PAMIs in Ahafo Region

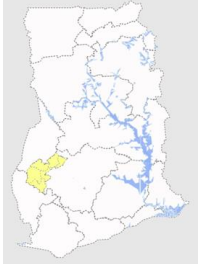
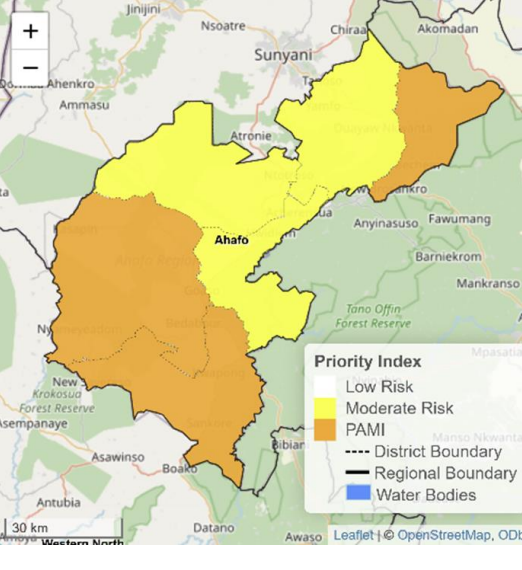
National Location of Region	Ahafo Regional PAMI Map	Ahafo Regional List of Districts and PAMI Status																															
		<table border="1"> <thead> <tr> <th>Region (Admin_1)</th> <th>District (Admin_2)</th> <th>Priority index</th> <th>PAMI Status</th> </tr> </thead> <tbody> <tr> <td>Ahafo</td> <td>Asunafo North</td> <td>4</td> <td>PAMI</td> </tr> <tr> <td>Ahafo</td> <td>Asunafo South</td> <td>3</td> <td>PAMI</td> </tr> <tr> <td>Ahafo</td> <td>Tano South</td> <td>3</td> <td>PAMI</td> </tr> <tr> <td>Ahafo</td> <td>Asutifi North</td> <td>2</td> <td>Moderate Risk</td> </tr> <tr> <td>Ahafo</td> <td>Asutifi South</td> <td>2</td> <td>Moderate Risk</td> </tr> <tr> <td>Ahafo</td> <td>Tano North</td> <td>2</td> <td>Moderate Risk</td> </tr> </tbody> </table>	Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status	Ahafo	Asunafo North	4	PAMI	Ahafo	Asunafo South	3	PAMI	Ahafo	Tano South	3	PAMI	Ahafo	Asutifi North	2	Moderate Risk	Ahafo	Asutifi South	2	Moderate Risk	Ahafo	Tano North	2	Moderate Risk			
Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status																														
Ahafo	Asunafo North	4	PAMI																														
Ahafo	Asunafo South	3	PAMI																														
Ahafo	Tano South	3	PAMI																														
Ahafo	Asutifi North	2	Moderate Risk																														
Ahafo	Asutifi South	2	Moderate Risk																														
Ahafo	Tano North	2	Moderate Risk																														

Table 3.1.6: Location and Distribution of Identified PAMIs in Bono Region


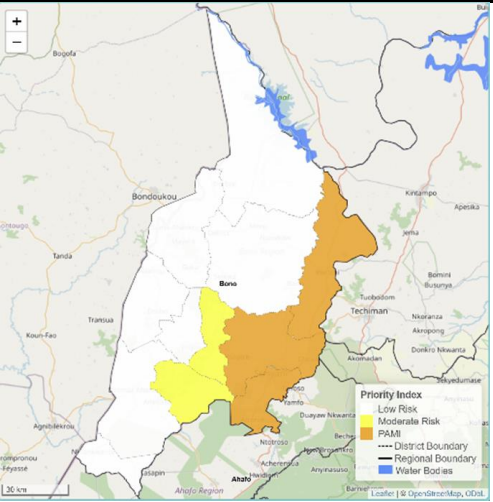
National Location of Region	Bono Regional PAMI Map	Bono Regional List of Districts and PAMI Status																																																							
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Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status																																																						
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Bono	Jaman South	0	Low Risk																																																						
Bono	Tain	0	Low Risk																																																						

Table 3.1.7: Location and Distribution of Identified PAMIs in Ashanti Region


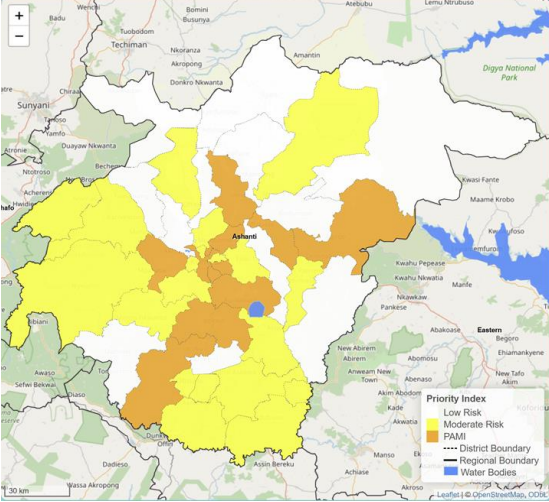
National Location of Region	Ashanti Regional PAMI Map	Ashanti Regional List of Districts and PAMI Status			
		Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status
Ashanti	Kumasi	5	PAMI		
Ashanti	Amansie Central	4	PAMI		
Ashanti	Asokwa	4	PAMI		
Ashanti	Atwima Nwabiagya	4	PAMI		
Ashanti	Bekwai	4	PAMI		
Ashanti	Bosomtwe	4	PAMI		
Ashanti	Oforikrom	4	PAMI		
Ashanti	Old Tafo	4	PAMI		
Ashanti	Sekyere East	4	PAMI		
Ashanti	Asante Akim North	3	PAMI		
Ashanti	Kwabre East	3	PAMI		
Ashanti	Sekyere South	3	PAMI		
Ashanti	Adansi Akrofuom	2	Moderate Risk		
Ashanti	Adansi Asokwa	2	Moderate Risk		
Ashanti	Adansi South	2	Moderate Risk		
Ashanti	Afigya Kwabre South	2	Moderate Risk		
Ashanti	Ahafo Ano North	2	Moderate Risk		
Ashanti	Ahafo Ano South West	2	Moderate Risk		
Ashanti	Amansie West	2	Moderate Risk		
Ashanti	Asante Akim Central	2	Moderate Risk		
Ashanti	Asokore Mampong	2	Moderate Risk		
Ashanti	Atwima Kwanwoma	2	Moderate Risk		
Ashanti	Atwima Mponua	2	Moderate Risk		
Ashanti	Bosome Freho	2	Moderate Risk		
Ashanti	Ejisu	2	Moderate Risk		
Ashanti	Kwadaso	2	Moderate Risk		
Ashanti	Obuasi	2	Moderate Risk		
Ashanti	Obuasi East	2	Moderate Risk		
Ashanti	Offinso	2	Moderate Risk		
Ashanti	Sekyere Central	2	Moderate Risk		
Ashanti	Suame	2	Moderate Risk		
Ashanti	Adansi North	0	Low Risk		
Ashanti	Afigya Kwabre North	0	Low Risk		
Ashanti	Ahafo Ano South East	0	Low Risk		
Ashanti	Amansie South	0	Low Risk		
Ashanti	Asante Akim South	0	Low Risk		
Ashanti	Asante Mampong	0	Low Risk		
Ashanti	Atwima Nwabiagya North	0	Low Risk		
Ashanti	Ejura-Sekyedumase	0	Low Risk		
Ashanti	Juaben	0	Low Risk		
Ashanti	Offinso North	0	Low Risk		
Ashanti	Sekyere Afram Plains	0	Low Risk		
Ashanti	Sekyere Kumawu	0	Low Risk		

Table 3.1.8: Location and Distribution of Identified PAMIs in Bono East Region

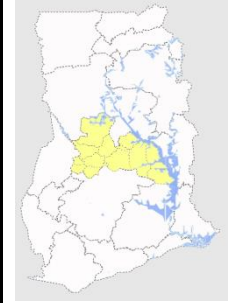
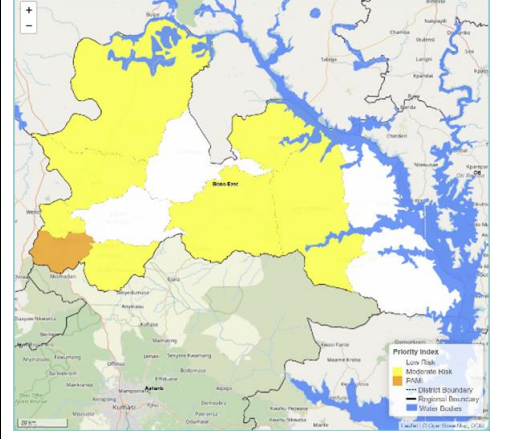
National Location of Region	Bono East Regional PAMI Map	Bono East Regional List of Districts and PAMI Status																																																			
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Table 3.1.9: Location and Distribution of Identified PAMIs in Central Region


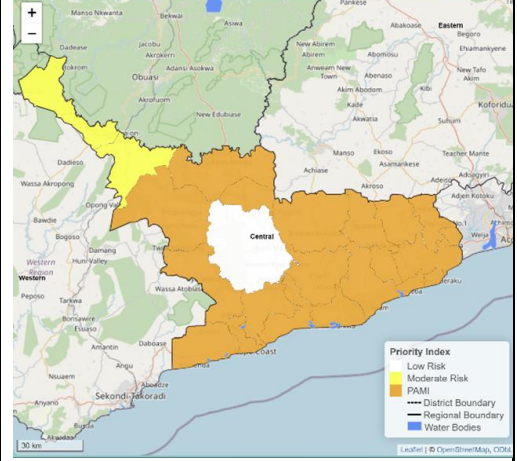
National Location of Region	Central Regional PAMI Map	Central Regional List of Districts and PAMI Status																																																																																															
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Table 3.1.10: Location and Distribution of Identified PAMIs in Eastern Region


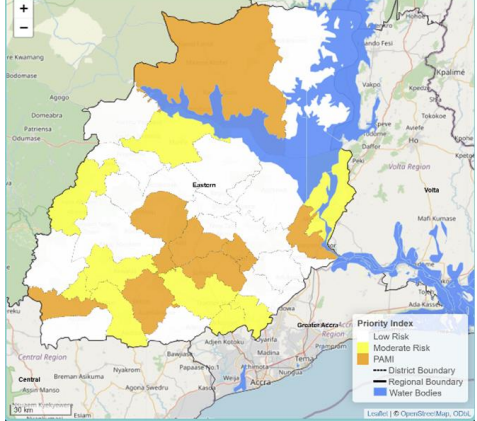
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Table 3.1.11: Location and Distribution of Identified PAMIs in Greater Accra Region


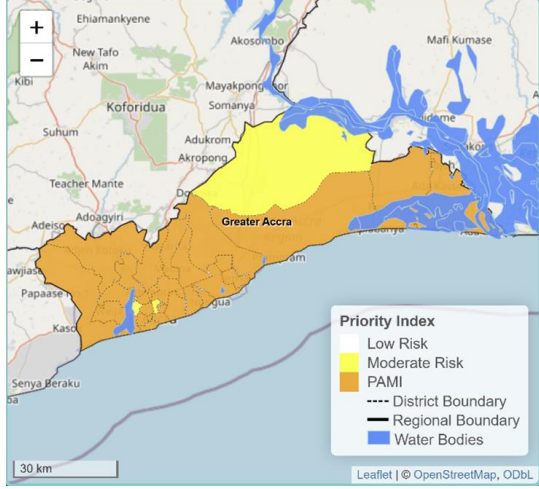
National Location of Region	Greater Accra Regional PAMI Map	Greater Accra Regional List of Districts and PAMI Status							
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		Greater Accra	Ayawaso East	9	PAMI				
		Greater Accra	Ayawaso North	9	PAMI				
		Greater Accra	Accra Metro	8	PAMI				
		Greater Accra	Ada East	8	PAMI				
		Greater Accra	Ayawaso West	8	PAMI				
		Greater Accra	Ga South	7	PAMI				
		Greater Accra	Ada West	6	PAMI				
		Greater Accra	Ga Central	6	PAMI				
		Greater Accra	Korle-Klottey	6	PAMI				
		Greater Accra	Okai Koi North	6	PAMI				
		Greater Accra	Weija-Gbawe	6	PAMI				
		Greater Accra	Ablekuma West	5	PAMI				
		Greater Accra	Ashaiman	5	PAMI				
		Greater Accra	Ga East	5	PAMI				
		Greater Accra	Ga North	5	PAMI				
		Greater Accra	Kpone-Katamanso	5	PAMI				
		Greater Accra	La-Dade-Kotopon	5	PAMI				
		Greater Accra	Ledzokuku	5	PAMI				
		Greater Accra	Ablekuma Central	4	PAMI				
		Greater Accra	Adentan	4	PAMI				
		Greater Accra	Ga West	4	PAMI				
		Greater Accra	La-Nkwantanang-Madina	4	PAMI				
		Greater Accra	Ningo Prampram	4	PAMI				
		Greater Accra	Krowor	3	PAMI				
		Greater Accra	Tema	3	PAMI				
		Greater Accra	Tema West	3	PAMI				
		Greater Accra	Ablekuma North	2	Moderate Risk				
		Greater Accra	Ayawaso Central	2	Moderate Risk				
		Greater Accra	Shai-Osudoku	2	Moderate Risk				

Table 3.1.12: Location and Distribution of Identified PAMIs in Oti Region


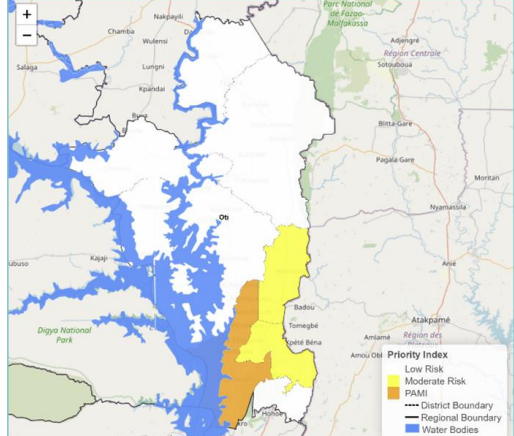
National Location of Region	Oti Regional PAMI Map	Oti Regional List of Districts and PAMI Status																																											
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Table 3.1.13: Location and Distribution of Identified PAMIs in Northern Region


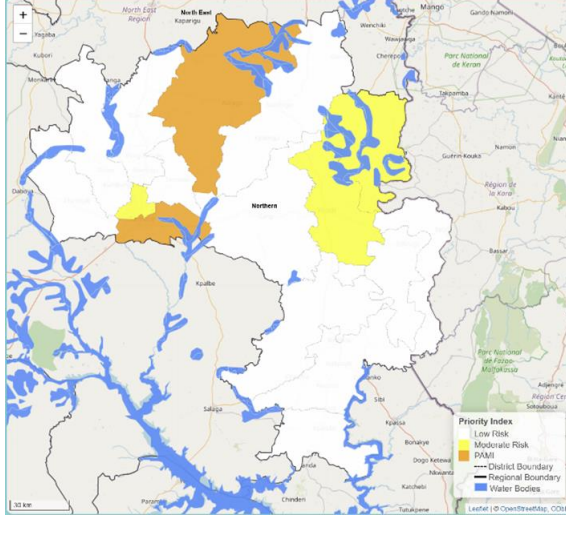
National Location of Region	Northern Regional PAMI Map	Northern Regional List of Districts and PAMI Status																																																																							
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Table 3.1.14: Location and Distribution of Identified PAMIs in Volta Region


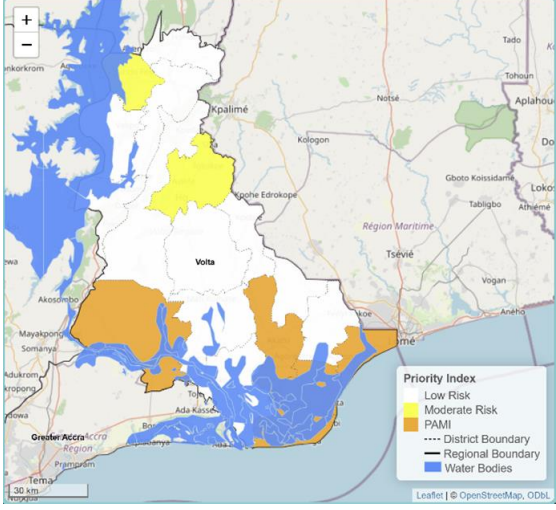
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Table 3.1.15: Location and Distribution of Identified PAMIs in Western Region


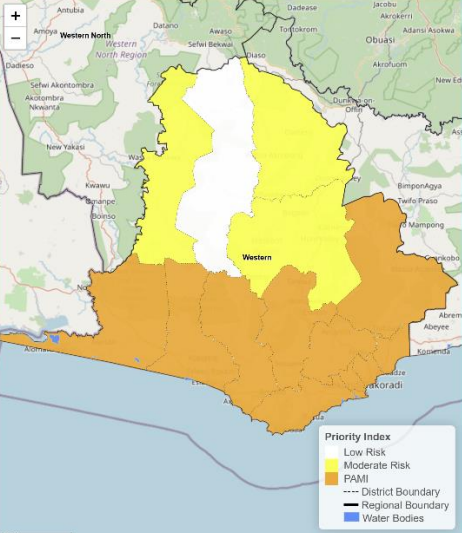

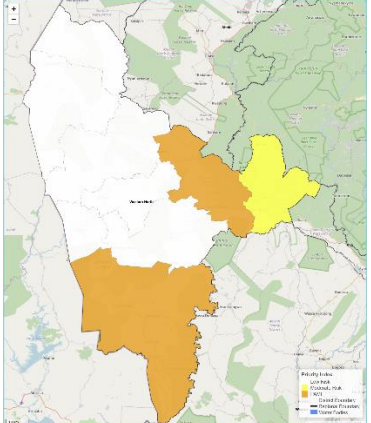
National Location of Region	Western Regional PAMI Map	Western Regional List of Districts and PAMI Status																																																												
		<table border="1"> <thead> <tr> <th data-bbox="813 1317 965 1373">Region (Admin_1)</th> <th data-bbox="965 1317 1220 1373">District (Admin_2)</th> <th data-bbox="1220 1317 1332 1373">Priority index</th> <th data-bbox="1332 1317 1551 1373">PAMI Status</th> </tr> </thead> <tbody> <tr><td>Western</td><td>Effia-Kwesimintsim</td><td>9</td><td>PAMI</td></tr> <tr><td>Western</td><td>Sekondi-Takoradi</td><td>9</td><td>PAMI</td></tr> <tr><td>Western</td><td>Ahanta West</td><td>8</td><td>PAMI</td></tr> <tr><td>Western</td><td>Tarkwa-Nsuaem</td><td>8</td><td>PAMI</td></tr> <tr><td>Western</td><td>Ellembelle</td><td>7</td><td>PAMI</td></tr> <tr><td>Western</td><td>Shama</td><td>7</td><td>PAMI</td></tr> <tr><td>Western</td><td>Jomoro</td><td>5</td><td>PAMI</td></tr> <tr><td>Western</td><td>Mpohor</td><td>5</td><td>PAMI</td></tr> <tr><td>Western</td><td>Nzema East</td><td>5</td><td>PAMI</td></tr> <tr><td>Western</td><td>Wassa East</td><td>4</td><td>PAMI</td></tr> <tr><td>Western</td><td>Prestea-Huni Valley</td><td>2</td><td>Moderate Risk</td></tr> <tr><td>Western</td><td>Wassa Amenfi East</td><td>2</td><td>Moderate Risk</td></tr> <tr><td>Western</td><td>Wassa Amenfi West</td><td>2</td><td>Moderate Risk</td></tr> <tr><td>Western</td><td>Wassa Amenfi Central</td><td>0</td><td>Low Risk</td></tr> </tbody> </table>	Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status	Western	Effia-Kwesimintsim	9	PAMI	Western	Sekondi-Takoradi	9	PAMI	Western	Ahanta West	8	PAMI	Western	Tarkwa-Nsuaem	8	PAMI	Western	Ellembelle	7	PAMI	Western	Shama	7	PAMI	Western	Jomoro	5	PAMI	Western	Mpohor	5	PAMI	Western	Nzema East	5	PAMI	Western	Wassa East	4	PAMI	Western	Prestea-Huni Valley	2	Moderate Risk	Western	Wassa Amenfi East	2	Moderate Risk	Western	Wassa Amenfi West	2	Moderate Risk	Western	Wassa Amenfi Central	0	Low Risk
Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status																																																											
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Western	Sekondi-Takoradi	9	PAMI																																																											
Western	Ahanta West	8	PAMI																																																											
Western	Tarkwa-Nsuaem	8	PAMI																																																											
Western	Ellembelle	7	PAMI																																																											
Western	Shama	7	PAMI																																																											
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Western	Wassa Amenfi West	2	Moderate Risk																																																											
Western	Wassa Amenfi Central	0	Low Risk																																																											

Table 3.1.16: Location and Distribution of Identified PAMIs in Western North Region

National Location of Region	Western North Regional PAMI Map	Western North Regional List of Districts and PAMI Status			
		Region (Admin_1)	District (Admin_2)	Priority index	PAMI Status
		Western North	Aowin	5	PAMI
		Western North	Sefwi-Wiawso	3	PAMI
		Western North	Bibiani-Anhwiaso-Bekwai	2	Moderate Risk
		Western North	Bia East	0	Low Risk
		Western North	Bia West	0	Low Risk
		Western North	Bodi	0	Low Risk
		Western North	Juaboso	0	Low Risk
		Western North	Sefwi-Akontombra	0	Low Risk
		Western North	Suaman	0	Low Risk

The Cholera PAMIs in Ghana are listed in **Table 3.2.2** below per descending order of the priority index scores from **9 to 3**.

Table 3.2.2.b: List of Cholera PAMIs in Ghana, 2025.

Region	District	Priority Index
Central	Awutu Senya East	9
Central	Efutu	9
Greater Accra	Ayawaso East	9
Greater Accra	Ayawaso North	9
Western	Effia-Kwesimintsim	9
Western	Sekondi-Takoradi	9
Central	Agona West	8
Central	Cape Coast	8
Central	Gomoa Central	8
Greater Accra	Accra Metro	8
Greater Accra	Ada East	8

Greater Accra	Ayawaso West	8
Western	Ahanta West	8
Western	Tarkwa-Nsuaem	8
Greater Accra	Ga South	7
Western	Ellembelle	7
Western	Shama	7
Central	Abura-Asebu-Kwamankese	6
Central	Ajumako-Enyan-Essiam	6
Central	Awutu Senya	6
Central	Gomoa East	6
Central	Gomoa West	6
Central	Komenda-Edna-Eguafo-Abirem	6
Central	Mfantseman	6
Greater Accra	Ada West	6
Greater Accra	Ga Central	6
Greater Accra	Korle-Klottey	6
Greater Accra	Okai Koi North	6
Greater Accra	Weija-Gbawe	6
Ashanti	Kumasi	5
Central	Assin Foso	5
Central	Assin North	5
Central	Ekumfi	5
Greater Accra	Ablekuma West	5
Greater Accra	Ashaiman	5
Greater Accra	Ga East	5
Greater Accra	Ga North	5
Greater Accra	Kpone-Katamanso	5
Greater Accra	La-Dade-Kotopon	5
Greater Accra	Ledzokuku	5
Western	Jomoro	5
Western	Mpohor	5
Western	Nzema East	5
Western North	Aowin	5
Ahafo	Asunafo North	4
Ashanti	Amansie Central	4
Ashanti	Asokwa	4
Ashanti	Atwima Nwabiagya	4
Ashanti	Bekwai	4
Ashanti	Bosomtwe	4
Ashanti	Oforikrom	4
Ashanti	Old Tafo	4
Ashanti	Sekyere East	4
Bono	Wenchi	4

Bono East	Techiman Municipal	4
Central	Agona East	4
Central	Asikuma-Odoben-Brakwa	4
Central	Twifo Ati Morkwa	4
Central	Twifo-Hemang Lower Denkyira	4
Eastern	Abuakwa South	4
Eastern	Lower Manya-Krobo	4
Eastern	New Juaben North	4
Greater Accra	Ablekuma Central	4
Greater Accra	Adentan	4
Greater Accra	Ga West	4
Greater Accra	La-Nkwantanang-Madina	4
Greater Accra	Ningo Prampram	4
Northern	Karaga	4
Volta	Anloga	4
Volta	Ketu South	4
Volta	North Tongu	4
Western	Wassa East	4
Ahafo	Asunafo South	3
Ahafo	Tano South	3
Ashanti	Asante Akim North	3
Ashanti	Kwabre East	3
Ashanti	Sekyere South	3
Bono	Sunyani Municipal	3
Bono	Sunyani West	3
Eastern	Atiwa West	3
Eastern	Birim South	3
Eastern	Kwahu Afram Plains South	3
Eastern	New Juaben South	3
Eastern	Suhum	3
Eastern	West Akim	3
Greater Accra	Krowor	3
Greater Accra	Tema	3
Greater Accra	Tema West	3
Northern	Tamale	3
Oti	Biakoye	3
Volta	Akatsi South	3
Volta	Keta	3
Western North	Sefwi-Wiawso	3

Table 3.2.2: Number of geographical units selected as initial PAMIs and associated population, number of cases and deaths

Indicator	Number (%)
NCP operational geographic units selected as initial PAMIs	93 (35.6)
Population and percentage of population living in these units	15,107,579 (46.9)
Numbers and percentages of cholera cases in these units over the analysis period	7632 (98.4)
Numbers and percentages of cholera deaths reported in these units over the analysis period	79 (100)

The distribution of vulnerability score for the 261 districts of the country is shown in **Figure 3.2.4** below.

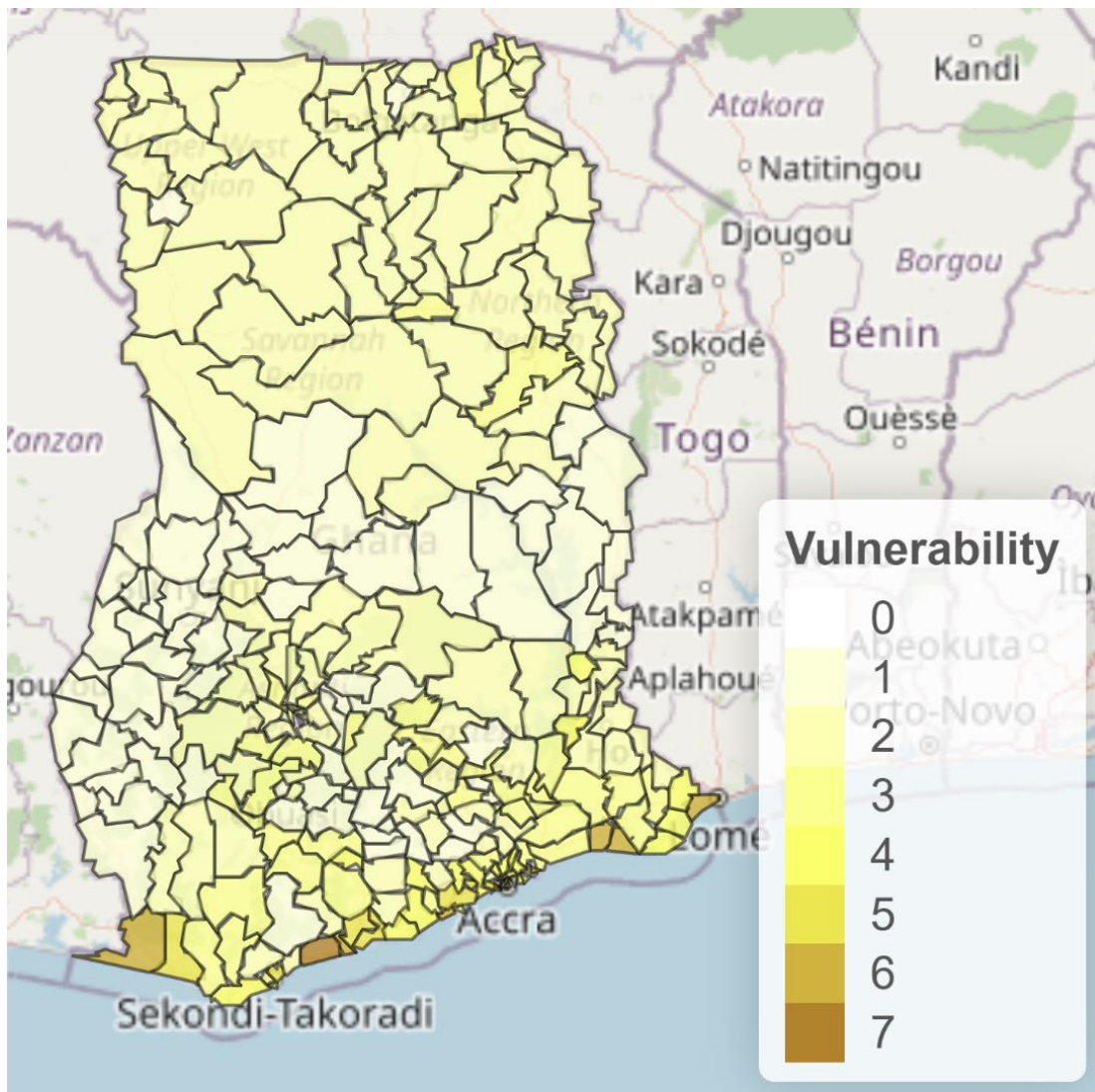


Figure 3. 2. 4: Map of the Distribution of Cholera Vulnerability Scores by Districts in Ghana, 2025.

4.0 WAY FORWARD, RECOMMENDATIONS AND CONCLUSIONS

4.1 Way Forward

Considering the progress made in the identification of cholera Priority Areas for Multisectoral Interventions (PAMIs) in Ghana, the country will proceed to develop a National Cholera Control Plan (NCP) based on the identified PAMIs. The broad group of stakeholders engaged in the PAMI identification process would continue to be involved to ensure multisectoral ownership, coordination and alignment of interventions

The findings indicated that testing coverage is low, highlighting the need to strengthen and expand cholera diagnostic testing

4.2 Limitations

- Some case records were excluded from the analysis due to the unavailability of key variables across all accessible data sources
- Limited available source data on some vulnerability factors such as the WASH indicators at the district level for all 261 districts.
- Exclusion of Weekly Cholera Testing Score from the overall calculation of Priority Index score due to “insufficient testing” level.
- Not all stakeholders were present in all our engagements due to communication gaps.

4.3 Recommendations

- Dissemination of PAMI report to relevant stakeholders.
- Health facilities and system should increase testing of cholera cases to meet a minimum of 80% of districts testing at least 50% of cases.
- Advocacy for increased investment in WASH infrastructure at district levels from avenues such as the district assembly common fund.
- Engage MMDAs and relevant ministries such as the local government and water and sanitation ministries on the outcome of the Cholera PAMIS and establish how support can be mobilized.
- Engage with stakeholders/partners to incorporate PAMI implementation plan into their strategic development plan

- Advocacy efforts should be directed at parliamentarians to increase their engagement and support in Ghana’s cholera PAMI plans, ensuring sustained political commitment, resource allocation and multisectoral coordination
- There is a need to improve cholera diagnostic capacity through enhanced use of Rapid Diagnostic Tests (RDTs), culture methods, and polymerase chain reaction (PCR) testing
- Strengthening cholera testing and case management at points of entry (PoEs) including the provision of improved isolation facilities
- Conduct an annual review of progress towards PAMI implementation activities
- Strengthen multisectoral collaboration to ensure coordinated planning, implementation and monitoring of cholera prevention and control activities across health, water, sanitation, education and other relevant sectors.
- Enhance cholera management capacity through training and simulation exercises for health workers and relevant stakeholders, including utility companies.
- Undertake a biannual revision of the PAMI maps to ensure they reflect updated epidemiological data and changes in cholera risk
- Create PAMI performance maps for all the 16 regions of Ghana.

4.4 Conclusion

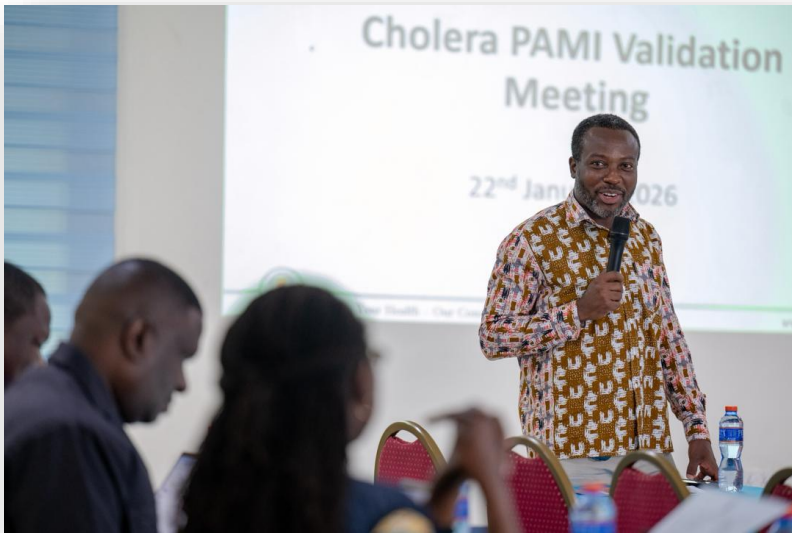
The identification of Priority Areas for Multisectoral Interventions (PAMIs) in Ghana has provided a robust evidence-based framework for targeting cholera prevention and control activities. Although vulnerability assessments were conducted for all 261 districts, the selection of PAMIs was guided primarily by cholera burden using the priority index. The process highlighted key gaps, including limited testing coverage, incomplete case data and constraints in district vulnerability information.

5.0 REFERENCES

1. Cholera outbreak in the West and Central Africa: Regional Update, 2014 - WEEK 52
2. World bank (2022) Ghana: Recent economic development and outlook for Ghana
3. Ashietey, G. A (1994). An epidemiology of Disease Control in Ghana, 1901 –1990)
4. Ghana Statistical Service (GSS 2021) Ghana Population and housing Census, 2020

6.0 ANNEX

6.1: Annex I: Facilitators and Partners Engaging Cholera Stakeholders Pictures



6.2: Annex II: Participants, and Partners at the Final Cholera Validation Meeting

