GLOBAL TASK FORCE ON CHOLERA CONTROL

Identification of Priority Areas for Multisectoral Interventions (PAMIs) for cholera control

Guidance Document

2023

EXECUTIVE SUMMARY

This guidance document describes the method recommended by Global Taskforce on Cholera Control (GTFCC) to **identify priority areas for multisectoral interventions (PAMIs) for cholera control. Following this guidance is among the first steps for a cholera-affected country with high to moderate transmission to develop or revise a National Cholera Plan (NCP) for cholera control**. It is accompanied by a step-by-step user guide as well as an Excel-based tool.

The adequate identification of PAMIs is critical to maximize the potential impact of NCP implementation on cholera control. This guidance document recommends a three-step process for the identification of PAMIs for cholera control:

- The **first step is a preparatory phase** to compile and consolidate all necessary data. Data will be prepared for the last five to fifteen years at a standard administrative level, which the country intends to use for coordinating NCP implementation (hereafter, "NCP operational geographic unit"). National authorities may need to coordinate with regional authorities to retrieve historical data on epidemiologic and context-specific vulnerability indicators (list of Vulnerability factors presented in **Annex I. Vulnerability factors**).
- The **second step aims to score all NCP operational geographic units of a country according to a numeric priority index**. This priority index represents multiple dimensions of cholera burden, and is calculated from the sum of four scored indicators: incidence, mortality, persistence, and cholera test positivity (if representativeness of testing for cholera allows).
- The **third step is for country stakeholders to validate a final list of PAMIs**. At this step, stakeholders will select a priority index threshold above which all NCP operational geographic units will be considered PAMIs. In finalizing the list of PAMIs, contextual local knowledge that incorporates vulnerability to cholera transmission may be considered optionally in NCP operational geographic units with lack of reliability of the priority index. Multistakeholder engagement in this process aims to maximize buy-in and multisectoral engagement in subsequent steps of NCP development and implementation.

The final list of PAMIs shall consist primarily of NCP operational geographic units:

- that have a priority index value above a (country-specific) priority index threshold**, and,**
- on an exceptional basis, those with lack of reliability of the priority index and presence of context-specific vulnerability factors.

The final list of PAMIs shall represent a comprehensive set of NCP operational geographic units that will be targeted for at least one intervention in an NCP.

Once the final list of PAMIs has been validated by country stakeholders, the next step of the NCP inception phase should be initiated (i.e., situational analysis). This should be followed by the NCP development phase which aims to develop operational plans for priority activities for each cholera prevention and control pillar (i.e., surveillance and reporting, health care system strengthening, use of Oral Cholera Vaccine (OCV), Water Sanitation and Hygiene (WASH), and community engagement pillars).

As a general principle, PAMI analysis should be updated when a new version of an NCP is developed (typically every 5 years). Earlier updates may be considered if there are significant changes in cholera epidemiology or vulnerability factors, or in surveillance implemented for cholera.

DEFINITIONS

Acute watery diarrhoea (AWD): An illness, where: i) acute is defined as lasting less than seven days, ii) watery is defined as non-bloody liquid stools that may contain mucous, and iii) diarrhoea is defined as three or more loose stools within a 24-hour period.

Cholera testing: Testing of suspect cholera cases by any method allowing identification of *V. cholerae* O1/O139 (e.g., Rapid Diagnostic Test (RDT), culture/seroagglutination, Polymerase chain reaction (PCR)).

Cholera case tested positive: Suspect cholera case with identification of *V. cholerae* O1/O139.

Geospatial vector data: Specific data format for geographic informtion, which provides the location of geographic features and associated geographic characteristics in an attribute table.

National cholera plan (NCP): Country-specific document that states a country's goal regarding cholera control or elimination and details operational aspects of multi-year and multisectoral cholera intervention planning.

(Country-specific) NCP operational geographic unit: Geographic unit that corresponds to the lowest administrative level where resources are allocated, and cholera control decisions are made. The corresponding administrative level is country specific.

Priority areas for multisectoral interventions (PAMIs): Subset of NCP operational geographic units that may be targeted at least one intervention in a National Cholera Plan.

(Cholera) priority index: Numeric index calculated for each NCP operational geographic unit of a country, based on retrospective data. It is used to rank and triage all geographic units according to their priority level for cholera intervention planning. The priority index is calculated by summing four scored indicators: cholera incidence, cholera mortality, cholera persistence, and cholera test positivity (if representativeness of testing for cholera allows).

(Country-specific) priority index threshold: Priority index value above which geographic units are classified as priority areas for multisectoral interventions (PAMIs). The appropriate priority index threshold shall be determined by each country based on stakeholder consensus after considering the objective of the National Cholera Plan and the resources available for its implementation.

ABBREVIATIONS AND ACRONYMS

GTFCC	Global Taskforce on Cholera Control
IDP	Internally Displaced Person
IOM	International Organization for Migration
JMP	WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene
NCP	National Cholera Plan for control or elimination
OCV	Oral Cholera Vaccine
OCHA	Office for the Coordination of Humanitarian Affairs
PAMIs	Priority Areas for Multisectoral Interventions
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organization

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ACKNOWLEDGEMENTS

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INTRODUCTION

The Global Roadmap to End Cholera by 2030 calls for a multisectoral approach for cholera control or elimination targeted to priority areas for multisectoral interventions (PAMIs, sometimes referred to as "hotspots"). Identifying PAMIs is therefore a key step for the development of a National Cholera Plan (NCP).

This guidance document is intended for the GTFCC target countries which have experienced high to moderate cholera transmission in the roughly five years prior to the identification of PAMIs and aims to develop an NCP for cholera control. It describes the method recommended for use by the GTFCC. It is accompanied by a step-by-step user guide (*'GTFCC user guide for the identification of PAMIS for cholera control',* hereafter GTFCC user guide) as well as an Excel-based tool *('GTFCC Excel-based tool _ PAMIs for cholera control',* hereafter GTFCC Excel-based tool).

Countries which have experienced limited to no cholera outbreaks in the five or more years prior to the identification of PAMIs and aim to develop an NCP for cholera elimination are invited to use the GTFCC-recommended method to identify PAMIs for cholera elimination. As an indicative guiding principle, this might correspond to countries where cholera outbreaks were reported in less than five percent of the NCP operational geographic units of the country over at least the past five years.

This guidance replaces the 2019 GTFCC interim guidance document to identify priority areas for interventions. It expands on the 2019 guidance by providing more detailed instructions to account for epidemiologic indicators, cholera test positivity, and vulnerability factors for the identification of PAMIs.

GENERAL PRINCIPLES

1. How does PAMI identification contribute to cholera control planning?

The identification of PAMIs is one of the first steps in NCP inception. Evidence-based identification of PAMIs, as described in this guidance document, aims to improve the targeting of cholera control interventions for optimised allocation of limited resources and overall effectiveness of NCP implementation.

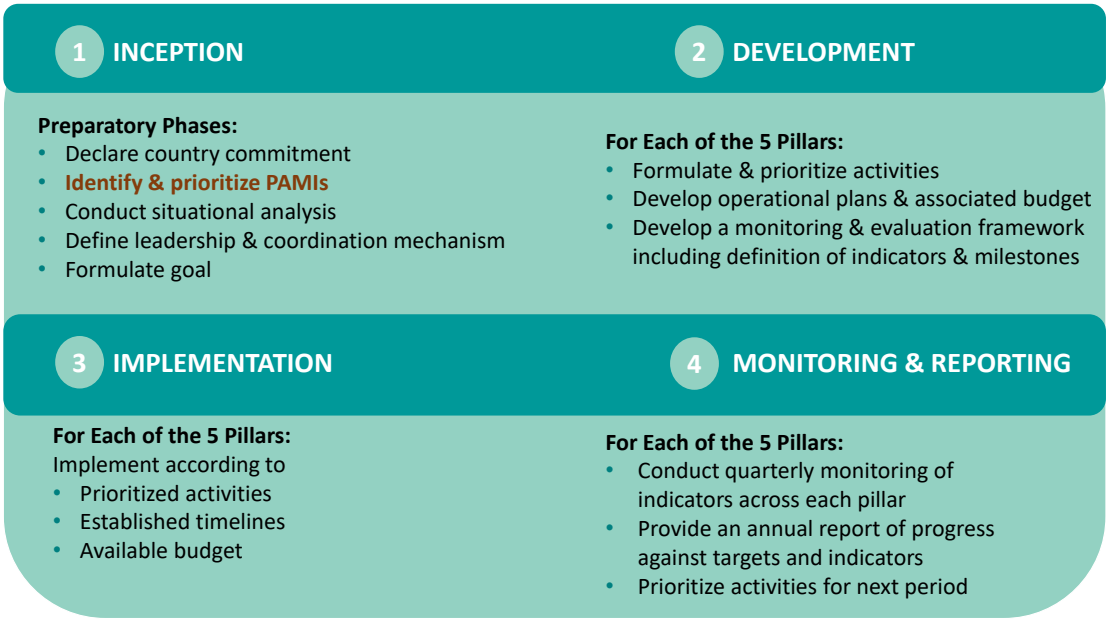
An NCP is a context-specific document that states a country's goal regarding cholera control or elimination and details operational aspects of multi-year, multisectoral cholera intervention planning in PAMIs.

It consists of four phases:

1) inception
2) development
3) implementation
4) monitoring and reporting

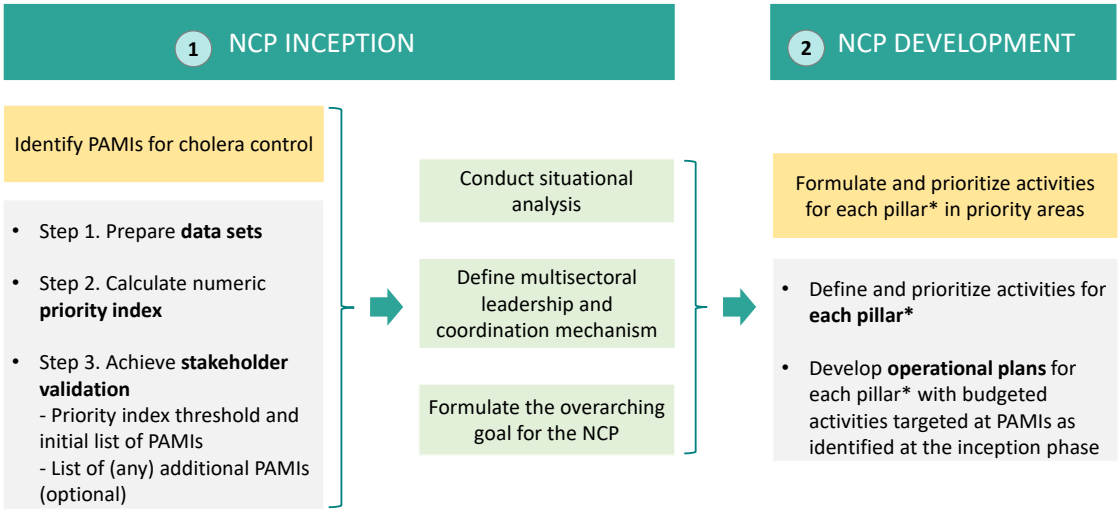
The identification of PAMIs shall be undertaken during the NCP inception phase (Figure 1). Detailed GTFCC guidance for the development of an NCP is available here.

Figure 1. Steps in the development of a National Cholera Plan



The identification of PAMIs is an essential step used to narrow the list of NCP operational geographic units that may be targeted for interventions in NCP development (**Figure 2**). Operational plans for priority activities in PAMIs for each cholera prevention and control pillar (i.e., surveillance and reporting, health care system strengthening, use of Oral Cholera Vaccine (OCV), Water Sanitation and Hygiene (WASH), and community engagement pillars) are developed at the NCP development phase. **Ultimately, PAMIs may not all receive the same package of interventions.**

Figure 2. Overview of National Cholera Plan inception and development phases



** In accordance with the Global Roadmap to End Cholera by 2030, pillars for cholera prevention and control are: surveillance and reporting, health care system strengthening, use of Oral Cholera Vaccine (OCV), Water, Sanitation and Hygiene (WASH), community engagement, leadership – coordination.*

2. Process

The identification of PAMIs for cholera control is a three-step process:

1. **Compile and consolidate all necessary data**
2. **Score all NCP operational geographic units according to a priority index**
3. **Validate a final list of PAMIs among relevant stakeholders**

3. NCP operational geographic unit

Identification of PAMIs for cholera control shall be undertaken in country-specific **NCP operational geographic units**. The corresponding administrative level varies by country and shall correspond to the lowest administrative level at which resources are allocated and cholera control decisions are made. In the past, countries have typically chosen the administrative levels two or three.

4. Analysis period

The priority index should be based on retrospective data collected over the last **five to fifteen years**. Analysis periods shorter than five years may be considered only when data is not available over longer periods.

5. Periodic updates

As a general principle, PAMI analysis should be updated when a new version of an NCP is developed (typically every **five years**). Earlier updates may be considered if there are significant changes in cholera epidemiology or vulnerability factors.

STEP 1: PREPARATION OF DATASETS

1. Overview

Activities undertaken at step 1 of PAMI identification for cholera control are outlined in **Figure 3** and described in the following sections. This step will result in datasets for:

- the calculation of the cholera priority index;
- the vulnerability assessment (if undertaken);
- the identification of an intervention package during the NCP development phase. While identifying a package of interventions is out of scope for this guidance document, it is recommended to anticipate data collection as similar data sources and metrics may be used[1].

Figure 3. Overview of step 1 (preparation of datasets)

1. Define scope of analysis [Mandatory]	• Define the administrative level of NCP operational geographic unit • Define the analysis period
2. Collect and prepare data for the calculation of the priority index [Mandatory]	• Compile annual cholera surveillance and testing data (see Table 1)
3. Collect and prepare data for the vulnerability assessment [Optional]	• Determine in consultation with stakeholders whether an optional vulnerability assessment will be undertaken at step 3 • If so, identify vulnerability factors relevant in the country context • Collect supporting data for the assessment of vulnerability factors • Prepare vulnerability factors dataset (presence/absence)
4. Collect and prepare data for next steps of NCP development [Recommended]	• Anticipate next steps of NCP development by collecting the data that will be required to prioritize for each pillar activities in PAMIs consistent with applicable GTFCC recommendations

[1] Future revisions of this guidance document may include additional documentation about data collection that supports intervention package design as GTFCC pillar-specific guidance becomes available.

2. Dataset for the priority index calculation

○ Data collection

Table 1 describes the data that should be collected for each NCP operational geographic unit over the analysis period.

National authorities may need to coordinate with regional authorities to retrieve historical data on epidemiologic and context-specific vulnerability indicators.

Refer to the GTFCC user guide for detailed guidance on the preparation of the data table (including naming convention rules) for upload into the GTFCC Excel-based tool for the calculation of the priority index.

Table 1. Data for the calculation of the priority index

Category	Data by NCP operational geographic unit	Periodicity
Administrative	List of NCP operational geographic units	Most recent*
	Geographic units in geospatial vector data format for geographic information system (e.g., shapefile)	Most recent*
Demography	Population	Annual
Surveillance	Number of reported cholera cases (suspected and tested positive)	Weekly
	Number of reported cholera deaths (suspected and tested positive)	Weekly
Testing for cholera	Number of reported suspected cholera cases tested for cholera (regardless of the testing method)	Weekly
	Number of reported suspected cholera cases tested positive for cholera	Weekly

** If there were any changes in the geometry of the geographic units of the country over the analysis period, refer to the GTFCC user guide.*

3. Dataset for the cholera vulnerability assessment (optional)

○ Considerations for undertaking vulnerability assessment

Undertaking a vulnerability assessment for the identification of PAMIs for cholera control is encouraged, especially if some NCP operational geographic units meet the following criteria, which could lead to a potential lack of reliability:

- **significant missing data** (in space or time) for the calculation of the priority index;
- **known surveillance gaps** in cholera surveillance, which would result in an underestimation of the cholera priority index (i.e., under-reporting or missing data during known outbreak periods);
- **recent OCV campaign(s)** resulting in apparent improvement of the cholera situation over the analysis period, thus artificially lowering the cholera priority index.

○ Indicative list of vulnerability factors

Should a vulnerability assessment for the identification of PAMIs for cholera control be undertaken, vulnerability factors considered in this assessment may vary according to the country context. The following indicative list of vulnerability factors may be considered:

- Location adjacent to cross-border cholera-affected areas or identified PAMIs
- Location along major travel routes with transportation hubs
- Major population gatherings
- Areas with high population density or overcrowded settings (e.g., urban slums, refugees/ID camps)
- Areas with high-risk populations (e.g., seasonal workers/fishermen/miners in informal settlements)
- Hard-to-access populations
- Population received oral cholera vaccine more than three years ago (two-doses campaign with a coverage for both round >70%)
- Areas at high-risk for extreme climate and weather conditions (e.g., heavy rains, floods, droughts)
- Areas affected by complex humanitarian emergencies
- Areas with more than 30% of the population using unimproved water facility type[2]
- Areas with more than 50% of the population using unimproved sanitation facility type[3]
- Areas with more than 50% of the population with no handwashing facility on premises[4]

○ Data collection

Should a vulnerability assessment for the identification of PAMIs for cholera control be undertaken, it is recommended that vulnerability factors be assessed as presence/absence in the NCP operational geographic units meeting one or several criteria indicative of a potential lack of reliability of the cholera priority index (such as missing data, known surveillance gap, OCV campaign).

If vulnerability factor information is easily available for all NCP operational geographic units, regardless of PAMI status, it advisable to collect such information for subsequent NCP inception steps.

[2] Use of unimproved water facility type is defined according to the JMP service ladder for drinking water.

[3] Use of unimproved sanitation facility type is defined according to the JMP service ladder for sanitation.

[4] No handwashing facility on premises corresponds to facility type is defined according the JMP service ladder for hygiene.

STEP 2: PRIORITY INDEX SCORING

1. Principle

Each NCP operational geographic unit is scored with a numeric priority index.

The priority index is calculated by combining four indicators: incidence, mortality, persistence, and cholera test positivity. These indicators are derived from epidemiologic and cholera testing data over the analysis period.

Activities undertaken in step 2 are outlined in **Figure 4** and described in the following sections. The outcome of step 2 is a data table, where indicators and population data, indicator scores, and the priority index are assigned to each NCP operational geographic unit in the country.

Of note, priority index values should be interpreted in the national context only. It is not appropriate to compare priority index values across countries.

Figure 4. Overview of step 2 (priority index scoring)

1. Address missing data	• Assess, and determine how to address, missing data
2. Determine appropriate cholera test positivity indicator	• Calculate weekly testing coverage • Assess cholera testing representativeness • Determine test positivity indicator to be included in the priority index
3. Calculate priority index	• Calculate indicators • Score indicators • Calculate priority index

2. Definition of indicators

Table 2 lists the indicators to be calculated to establish the priority index.

Epidemiologic indicators (i.e., incidence, persistence, and mortality) are directly used for the calculation of the priority index.

The weekly testing coverage indicator is used to assess the representativeness of cholera testing data. It is then used to determine which cholera test positivity indicator, if any, should be included in the calculation of the priority index. Depending on the representativeness of the cholera testing data, the cholera test positivity indicator may be included in the priority index as the positivity rate or number of years with confirmed cases or excluded altogether.

Table 2. Indicators to establish the priority index

Indicators	Calculation and definition
Epidemiologic indicators	
Incidence	Cholera incidence rate in an NCP operational geographic unit is calculated by dividing: - the total number of cholera cases (including suspected cases and cases tested positive) reported in the unit over the analysis period by - the cumulative person-time (i.e., the sum of population of the geographic unit for each year over the analysis period), then multiplied by 100,000. This indicator is the number of cholera cases reported per 100,000 person-years over the analysis period.
Mortality	Cholera mortality rate in an NCP operational geographic unit is calculated by dividing: - the total number of deaths attributed to cholera reported in the unit over the analysis period by - the cumulative person-time (i.e., the sum of the annual population over the period), then multiplied by 100,000. This indicator is the number of deaths attributed to cholera reported per 100,000 person-years in the unit over the analysis period.
Persistence	Cholera persistence in an NCP operational geographic unit is calculated by dividing: - the number of weeks with at least one reported suspected cholera case over the analysis period by - the total number of weeks over the analysis period This indicator is the percentage of weeks with at least one reported suspected cholera case in the unit over the period of interest.
Indicator to assess representativeness of cholera testing	
Weekly testing coverage	The weekly testing coverage for cholera in an NCP operational geographic unit is calculated by dividing: - the number of weeks with at least one reported suspected cholera case tested for cholera (regardless of the testing method and of the result) over the analysis period by - the number of weeks with at least one reported suspected cholera case over the analysis period This indicator is the percentage of weeks with at least one suspected case tested for cholera among weeks with at least one suspected case reported in the unit over the analysis period.
Cholera test positivity indicators	
Positivity rate (preferred indicator if representativeness allows)	The positivity rate in an NCP operational geographic unit is calculated by dividing: - the number of reported suspected cholera cases tested positive for cholera over the analysis period (regardless of the testing method) by - the number of reported suspected cholera cases tested for cholera over the analysis period (regardless of the testing method). This indicator is the cholera positivity rate in the unit over the analysis period.
Number of years with case(s) tested positive	This indicator is the number of years with at least one case tested positive for cholera (regardless of the testing method) reported in the NCP operational geographic unit over the analysis period.

3. Missing data

To limit bias, it is preferable that data is available for all NCP operational geographic units over the analysis period.

If data are missing for some NCP operational geographic units and/or for some time periods, first, a check should be performed with the surveillance focal point(s) to differentiate the active reporting of zero values from missing reports and to retrieve missing reports to the greatest extent possible.

If missing data remain, the following principles should be considered:

- if for a given year, data are missing for a **significant number of NCP operational geographic units and more than one indicator**, it is recommended to exclude the corresponding year from the calculation of the cholera priority index;
- if for a given year, data are missing for a **significant number of NCP operational geographic units and one indicator**, it is recommended to exclude the corresponding year from the calculation of the indicator score. Other indicators should be calculated for the full analysis period;
- if for a given year, data are missing for a **limited number of NCP operational geographic units**, it is recommended to exclude the corresponding units from the calculation of the cholera priority index (Step 2). Such unit(s) shall be further assessed at the stakeholder validation combining available indicators and the presence of vulnerability factors (Step 3);
- if data are missing for a **significant number of years**, it is recommended to assess the availability of any alternative data source(s) and to reconsider the selected analysis period as needed (Step 1); if the issue remains, the best course of actions should be determined on an *ad hoc* basis;
- measures to improve the comprehensiveness of routine reporting and recording of cholera surveillance data (epidemiological data and testing data) should be planned in the NCP.

4. Assessment of representativeness of cholera testing

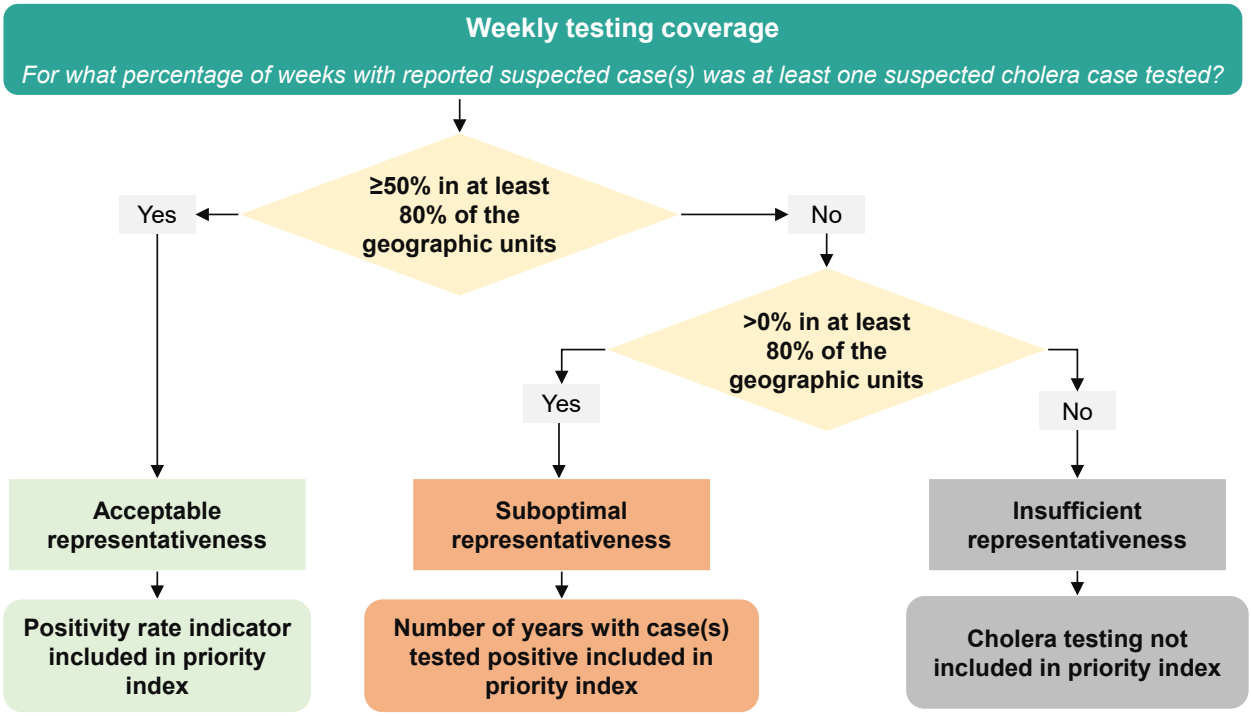
This step aims to assess the representativeness of cholera testing data to determine whether and how cholera test positivity should be included in the priority index. Testing for cholera according to systematic strategies is not yet common surveillance practice, so this step aims to mitigate the introduction of biases into the priority index calculation (e.g., by assigning higher priority to NCP operational geographic units with higher test positivity due to greater testing capacity).

Overall, consistent with GTFCC surveillance recommendations[5] at least one suspected case should be tested for cholera (using any type of test) for all weeks that suspected cholera cases are reported in an NCP operational geographic unit (i.e., weekly testing coverage should be 100%). However, as the reality of testing practice may vary substantially, it is essential to assess the representativeness of the available cholera testing data.

The assessment of the representativeness of cholera testing relies on the weekly testing coverage indicator (as defined in **Table 2**) and is described in **Figure 5**.

[5] GTFCC Interim guidance document on public health surveillance for cholera, Surveillance Working Group of the Global Task Force on Cholera Control (GTFCC), February 2023.

Figure 5. Assessing which cholera test-related indicator should be included in the priority index calculation



If the weekly testing coverage is ≥50% in at least 80% of the units, the representativeness of cholera testing is considered **acceptable**, and the positivity rate indicator should be included in the priority index.

If the conditions for including the positivity rate indicator are not met but the weekly testing coverage is >0 in at least 80% of units, the representativeness of cholera testing is considered **suboptimal**. Therefore, the cholera test positivity indicator should be based on the number of years with cases tested. In addition, the reinforcement of routine testing for cholera should be included in the NCP.

If the weekly testing coverage is not >0% in at least 80% of units, the representativeness of cholera testing is **insufficient** for inclusion in the priority index. Only three indicators will then be used to calculate the priority index (i.e., incidence, mortality, and persistence) and reinforcement of routine testing for cholera should be planned in the NCP with high priority.

If the weekly testing coverage cannot be calculated for all units, the cholera test positivity indicator cannot be included in the priority index. Improvement of routine testing and integration of epidemiologic data and test results should be planned in the NCP with high priority.

5. Scoring of indicators

○ Epidemiologic indicators

Epidemiologic indicators (i.e., incidence, mortality, and persistence) are scored in four categories based on the 50th (median) and the 80th percentiles of their distributions. The distribution thresholds (median and 80th percentile) should be calculated out of the NCP operational geographic units where at least one cholera case was reported over the analysis period.

A score ranging from zero to three points is attributed to each unit for each epidemiologic indicator (**Table 3**). For example, if the incidence is above the median but below the 80th percentile of the incidence distribution in all NCP operational geographic units, the incidence indicator scores two points.

Table 3. Scoring of epidemiologic indicators

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

** Calculated out NCP operational geographic units where at least one cholera case was reported over the analysis period*

- **Cholera test positivity indicator**

If the representativeness of cholera testing is acceptable, the positivity rate is used as the cholera test positivity indicator (**Figure 5**). The positivity rate is scored in four classes as described in Table 4 and a cholera test positivity score ranging from 0 to 3 points is attributed to each NCP operational geographic unit.

If the representativeness of cholera testing is suboptimal, the number of years with cases tested positive is used as the cholera test positivity indicator (**Figure 5**). The number of years with case(s) tested positive is scored in three classes as described in **Table 4** and a cholera test positivity score ranging from 0 to 2 points is attributed to each NCP operational geographic unit. The maximum score is lower than that of other indicators to reduce its relative weight in the priority index.

Table 4. Scoring of cholera test positivity indicator

Weekly testing coverage	Cholera test positivity indicator	Score			
		0 point	1 point	2 points	3 points
Acceptable	**Positivity rate**	0%	≤ 10%	> 10% and ≤ 30%	> 30%
Suboptimal	**Number of years with case(s) tested positive**	0	1	> 1	Not applicable
Insufficient	**Not applicable**	Not applicable	Not applicable	Not applicable	Not applicable

6. Results

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

Priority index = incidence score + mortality score + persistence score +

cholera test positivity score (if applicable)

It is advisable that the result of the priority index scoring (step 2) analysis is presented using:

- the sheet named 'R.3| Priority index summary' in the GTFCC Excel-based tool for comprehensive overview of the key indicators according to priority index values (notably population, case, and death relative percentages);
- A set of maps presenting each indicator and priority index scores for all NCP operational geographic units.

These tables and maps aim to support stakeholder validation activities at step 3 as detailed in the next section.

STEP 3: STAKEHOLDER VALIDATION

1. Objectives and format

The summary table of the priority index and maps generated at step 2 and the table on vulnerability factors generated at step 1 (if applicable) should be used to engage multisectoral stakeholders in a validation workshop.

During the workshop, stakeholders will validate the data, agree on a priority index threshold value, and finalize a list of PAMIs for intervention planning as part of the NCP. The final list of PAMIs shall comprise all NCP operational geographic units that may be targeted for at least one intervention.

All PAMIs will not necessarily receive the same package of interventions. The most adequate intervention(s) for each PAMI should be determined after conducting a situational analysis and further contextual assessments (subsequent stages of NCP development).

The validation process should include input of country-level and local-level stakeholders and experts across multiple sectors, including water, hygiene, sanitation, health, and finance. A consultative format in the form of a participative workshop is recommended. The objectives of the stakeholder validation process are as follows:

- reach a consensus on the **priority index threshold value**
- reach a consensus on the **final list of PAMIs**

Activities undertaken in step 3 are outlined in **Figure 6** and described in the following sections.

Figure 6. Overview of step 3 (stakeholder validation)

1. Plan and organize a stakeholder validation workshop	• Identify relevant stakeholders to be involved • Prepare supporting material • Coordinate the organization of the workshop
2. Facilitate stakeholder validation workshop	2.a. Achieve consensus on priority index threshold and initial list of PAMIs • Present different scenarios for setting the priority index threshold value • Discuss outcomes regarding resulting initial list of PAMIs using the sheet 'R.5| Table PAMIs export' sheet of the GTFCC Excel-based tool • Achieve consensus on priority index threshold and resulting initial list of PAMI considering feasibility and potential impact of NCP
	2.b. [optional] Achieve consensus on list of (any) additional PAMIs • Achieve consensus on any NCP operational geographic units that are additional PAMIs taking into account: I) risk of lack of reliability of priority index, ii) combination of vulnerability factors present
3. Document PAMI identification in a report	• Write report about methods and outcomes of PAMIs identification consistent with the report template presented in **Annex 2. Template report on the identification of PAMIs for cholera control .**
4. Launch next steps of NCP development	• Coordinate the launch of next steps of NCP development in accordance with the GTFCC Interim Guiding Document to Support Countries for the Development of their NCP.

2. Initial list of PAMIs based on priority index

All NCP operational geographic units with a priority index greater than or equal to the selected priority index threshold will be included in an initial list of PAMIs.

The threshold value should be chosen by country stakeholders based on consensus after considering how to balance the principles of feasibility and potential impact:

- **Feasibility** of targeting all PAMIs as part of the NCP considering the resources available to support implementation, as in "How many PAMIs and how much of the population would the NCP target with at least one intervention at the chosen threshold?"
- **Potential impact** towards achieving national cholera control objectives by targeting all PAMIs, as in "What percentage of cholera cases and deaths were reported in PAMIs at the chosen threshold?"

Setting the priority index threshold too low (i.e., resulting in a high number of PAMIs) may result in a particularly ambitious NCP that is not feasible with available resources. Setting the priority index threshold too high (i.e., resulting in low number of PAMIs) may have limited impact by serving few cholera-affected areas in the country.

3. Optional stakeholder assessment of vulnerability factors

The final list of PAMIs shall consist primarily of NCP operational geographic units:

- that have a priority index value above a (country-specific) priority index threshold**, and,**
- on an exceptional basis, those with lack of reliability of the priority index and presence of context-specific vulnerability factors.

NCP operational geographic units with a lack of reliability of the priority index was identified at step 1 (for more details, see section on **Considerations for undertaking vulnerability assessment**) may undergo an optional additional stakeholder review for inclusion in the final list of PAMIs. It is not recommended to assess all vulnerability factors for all NCP operational geographic units; only units with lack of reliability of the priority index that may be added to the final list of PAMIs shall be considered in the optional vulnerability assessment.

This assessment aims to reach a consensus regarding which of these units will be added to the list of PAMIs considering the combination of vulnerability factors present in these units. Various participative approaches might be considered to facilitate this decision among stakeholders. Approaches may include — but are not limited to —agreeing on the maximum number of additional NCP operational geographic units or maximum total percentage of the population that shall be included in the final list of PAMIs (for instance, the number of additional PAMIs should be less than X% of the number of NCP operational geographic units included in the initial list of PAMIs).

The **inclusion of additional NCP operational geographic units** in the final list of PAMIs shall be duly **justified and documented** in the report on PAMI identification.

4. Outcome - final list of PAMIs

The final list of PAMIs shall consist of all NCP operational geographic units with a priority index value above the priority index threshold ("initial list of PAMIs"), and optionally, a limited number of units with a priority index below the threshold that were identified as highly vulnerable to cholera transmission ("list of additional PAMIs"). Of note, it is not advisable to remove PAMIs from the initial list when creating the final list for any reason.

Once stakeholders have validated the final list of PAMIs, the PAMI identification process should be documented in a report (see **Annex 2. Template report on the identification of PAMIs for cholera control**) and the next step of the NCP inception phase should be initiated (i.e., situational analysis).

Notes from experience: The benefits of participative stakeholder validation

Countries that engaged in a participative approach at the stakeholder validation step reported that this was instrumental to maximize stakeholders' engagement and consensus for next steps of NCP development.

The most suitable format for participative stakeholder validation of the final list of PAMIs should be determined by country stakeholders, accounting for factors such as: administrative structure, size of the country, resources available for a workshop, etc.

Illustrative examples:

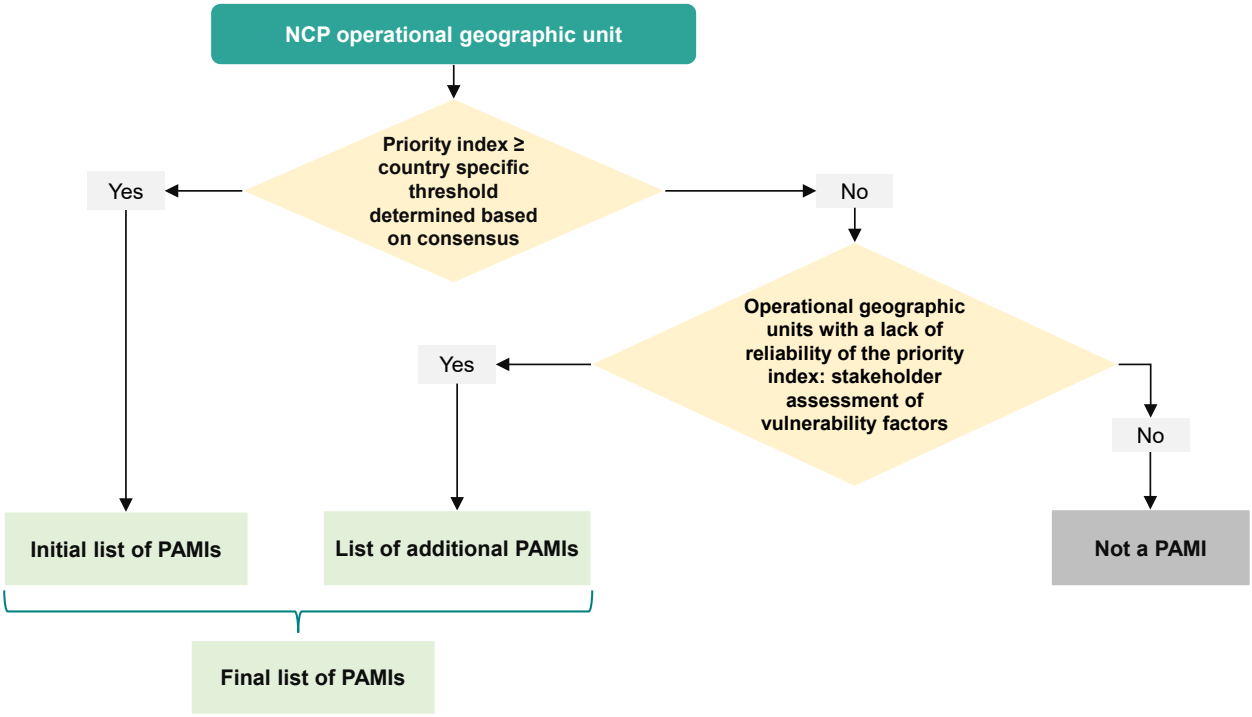
- In the Democratic Republic of the Congo, participative stakeholder validation took place at a five-day in-person workshop gathering stakeholders from the central and provincial levels including representatives from the health sector and the WASH sector. A consensus on the final list of PAMIs was built through guided break-out sessions with local level representatives followed by plenary restitution and discussions to define the final list of PAMIs. The added value of sub-national participation was ensuring that local context and experience was taken into account.

- In Mozambique, participative stakeholder validation took place as two-fold process. First, the national and sub-national levels worked closely together to ensure the collection of epidemiological data required to identify PAMIs. This was done through both face to face and remote interactions. Then, a participative validation workshop gathered stakeholders from the central and sub-national levels to process the collected data, present and discuss outcomes of the analysis, and determine the final list of PAMIs.

5. Summary

The decision process for identifying a final list of PAMIs for cholera control is summarized in **Figure 7**.

Figure 7. Decision tree at step 3 (stakeholder validation)



ANNEX I. VULNERABILITY FACTORS

This annex presents an indicative list of vulnerability factors that may be considered in the optional vulnerability assessment in Step 3.

1. Location adjacent to cross-border cholera-affected areas or identified PAMIs

This indicator aims to consider the probability of introduction of cholera cases in an NCP operational geographic unit from neighbouring units in other countries.

2. Location along major travel routes with transportation hubs

This indicator aims to consider the probability of introduction of cholera cases in an NCP operational geographic unit from geographical units connected along major transportation network.

The definition of major travel routes/junctions should be adapted according to the national context (e.g., transportation infrastructure, population density, pattern of population movement). When needed, detailed criteria could be used to define this indicator, e.g., at least one city > 200,000 population found on three or more main transportation pathway/travel routes.

3. Major population gatherings

This indicator aims to assess the probability of introduction of cholera in unaffected locations.

The indicative population gatherings at risk of cholera outbreak are:

- religious or pilgrimage gatherings
- large-scale seasonal marketplaces/animal markets
- seasonal nomadic/pastoralist population gatherings
- occupational-related population movement and gatherings (seasonal agricultural worker camps or settlements)

It is recommended to access this factor in conjunction with the expected WASH service levels during gathering and origin of gathering attendees (potentially travelling from cholera-affected areas from within the country or neighboring countries).

4. Areas with high population density or overcrowded settings (e.g., urban slums, refugees/ID camps)

It is recommended to access this factor in conjunction with the following factors: access to water, access to sanitation, access to hygiene. In the absence of good WASH service levels, high population density/overcrowded settings may amplify cholera transmission.

5. Areas with high-risk populations (e.g., seasonal workers/fishermen/miners in informal settlements)

It is recommended to access this factor in conjunction with the following factors: access to water, access to sanitation, access to hygiene. In the absence of good WASH service levels, such population are known to be at risk of cholera transmission.

6. Hard-to-access populations

A hard-to-access population is a population living in an area that is not regularly accessible to health and humanitarian actors for the purpose of sustained health services. Cholera outbreaks in such areas could challenge the capacity of surveillance and public health response.

Hard-to-access populations can be found under the following conditions:

- natural or human-made physical characteristics (terrain or limited transportation infrastructure)
- social, political, or cultural factors (insecurity, conflict, borders and other regulatory barriers)

7. Population received oral cholera vaccine more than three years ago (two-doses campaign with a coverage for both round >70%)

This indicator aims to identify NCP operational geographic units with a local population having been recently vaccinated (e.g., four or five years ago) indicative of areas with previous cholera outbreaks or previously identified as a PAMI. The OCV campaigns provided the population with short-term immunity to reduce the number of cases and deaths attributable to cholera in the years following its implementation. As a result, the corresponding NCP operational geographic units may have a priority index value below the priority index threshold based on the epidemiologic indicators used in its calculation.

While OCV campaign were implemented, it is reasonable to assume that local cholera vulnerability factors existed and might have been targeted by multisectoral interventions further to vaccination campaigns. It is recommended to access this factor in conjunction with the following factors: access to water, access to sanitation, access to hygiene. In the absence of good WASH service levels, the considered unit remains vulnerable to cholera outbreaks and may qualify as PAMI.

8. Areas at high-risk for extreme climate and weather conditions (e.g., heavy rains, floods, droughts)

During extreme weather conditions, cholera transmission may increase and the ability of the public health response to control outbreaks may be significantly reduced.

9. Areas affected by complex humanitarian emergencies

According to the United Nations High Commissioner for Refugees, "*A complex emergency can be defined as a humanitarian crisis in a country, region or society where there is a total or considerable breakdown of authority resulting from internal or external conflict, and which requires an international response that goes beyond the mandate or capacity of any single agency and/or the ongoing UN country program*." Such conditions render the affected populations at an increased risk of health emergencies, including infectious disease epidemics such as cholera, due to sub-optimal epidemiologic surveillance and limited response capabilities.

10. Areas with more than 30% of the population using unimproved water facility type

A high proportion of the population using unimproved water facility type may increase the vulnerability transmission especially when in conjunction with other vulnerability factors.

The access to unimproved water facility type is defined according to the JMP service ladder for drinking water. It corresponds to sum of the percentage of population using unimproved water source (JMP drinking

water ladder category: “Unimproved”) and the percentage of population using surface water (JMP drinking water ladder category: “Surface water”).

11. Areas with more than 50% of the population using unimproved sanitation facility type

A high proportion of the population using unimproved sanitation facility type may increase the vulnerability transmission especially when in conjunction with other vulnerability factors.

The access to unimproved sanitation facility type is defined according to the JMP service ladder for sanitation. It corresponds to sum of the percentage of population using unimproved sanitation facilities (JMP sanitation ladder category: “Unimproved”) and the percentage of population practicing open defecation (JMP sanitation ladder category: “Open defecation”).

12. Areas with more than 50% of the population with no handwashing facility on premises

A high proportion of the population without handwashing facilities (no soap and no water at home) may increase the vulnerability transmission especially when in conjunction with other vulnerability factors.

No handwashing facility on premises type corresponds to the percentage of population with no handwashing facility on premises (JMP drinking hygiene ladder category: “No facility”).

ANNEX 2. TEMPLATE REPORT ON THE IDENTIFICATION OF PAMIS FOR CHOLERA CONTROL

BACKGROUND

- Information on any previous identification of PAMIs (method, analysis period)
- Information on NCP status and targets (past, current, and future) in the country
- Concise description of the cholera situation in the country in recent years (up to last 10 years)
- Concise description of cholera surveillance system
- Concise description of cholera testing strategy

METHODS

Step 1. Datasets

General

- Definition and administrative level of NCP operational geographic units
- Definition of analysis period

Priority index

- Sources of data for calculation of priority index
- Assessment of quality of the data
- Management of missing data

Vulnerability factors [optional]

- List of vulnerability factors emphasizing their relevance in the country context
- Criteria to identify NCP operational geographic units to undergo a vulnerability assessment
- Data sources for vulnerability factors
- Method for assessing vulnerability factors

Step 2. Priority index scoring

- Scoring scales

Step 3. Stakeholder validation

- List of stakeholders involved and meeting format (e.g., in person workshop, online consultation, facilitation of consensus building)

RESULTS

Step 2. Priority index

- Copy of figures of sheet '**R.2| Overview tables**' of the GTFCC Excel-based tool: data overview, epidemiologic indicators score thresholds, assessment of representativeness of testing
- Copy of table of sheet '**R.3| Priority index summary**' of the GTFCC Excel-based tool: summary table of key parameters stratified by priority index value
- Map of NCP operational geographic units by priority index value

Step 3. Stakeholder validation

Initial list of PAMIs

- Value of selected priority index threshold and justification for the threshold selected considering feasibility and impact
- Number and percentage of NCP operational geographic units selected as initial PAMIs, population and percentage of population living in these units, numbers and percentages of cholera cases and cholera deaths reported in these units over the analysis period

List of additional PAMIs *-if optional assessment of vulnerability factors undertaken-*

- Description of vulnerability factors present in each NCP operational geographic unit selected as additional PAMIs as well as priority index value of each NCP operational geographic unit selected as additional PAMIs and justification for considering that the priority index underestimates the cholera priority level in these units

Final list of PAMIs

- Map showing initial PAMIs and additional PAMIs
- Attach the PAMI table generated from the sheet '**R.5| Table PAMIs export**' of the GTFCC Excel-based tool

WAY FORWARD

- Description of next steps of the NCP process including provisional timelines