Public health surveillance for cholera

Guidance Document
2024

GLOBAL TASK FORCE ON
CHOLERA CONTROL

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EXECUTIVE SUMMARY

This GTFCC guidance document sets out the minimum recommendations for countries to implement adaptive, fit-for-purpose cholera surveillance. Cholera surveillance aims to generate reliable and timely evidence; this is needed to support the early detection of and response to cholera outbreaks, to guide the development of targeted multisectoral strategies for cholera control and elimination, and to track progress towards the goals set in ***Ending Cholera–A Global Roadmap to 2030***.[1]

Cholera surveillance should be integrated within a country's existing national public health surveillance system to ensure the stability of its core functions:

- the **rapid detection and testing** of suspected cholera cases;
- the **routine collection and reporting of epidemiological and laboratory data**;
- the **immediate notification and verification** of suspected, probable, and confirmed cholera outbreaks;
- **case and field investigation**;
- the **analysis and interpretation of data, and the dissemination of findings** to inform public health interventions; and
- the **monitoring of surveillance performance**.

For a country's cholera surveillance system to be continuously fit-for-purpose, its objectives and the surveillance strategies it employs should evolve with the prevailing cholera situation at the local level. The following surveillance strategies should be adapted depending on the presence or absence of a probable or confirmed cholera outbreak:

- **case definitions**;
- **testing strategies**;
- **reporting timelines**;
- **frequency of data analysis and interpretation**;
- **case investigation strategies**; and
- **performance indicator definitions**.

In addition, non-endemic countries (including countries on the path to eliminating cholera) are encouraged to adapt their local cholera surveillance strategies depending on whether clustered or community transmission is occurring.

Implementing the minimum in-country surveillance recommendations set out in this GTFCC guidance document will be essential for detecting and containing cholera outbreaks, and for informing the multisectoral strategies needed to control and eliminate cholera. Countries are encouraged to consider strengthening their cholera surveillance systems beyond these minimum requirements.

Questions about this guidance document and requests for technical support for cholera surveillance can be addressed to gtfccsecretariat@who.int.

CONTENTS

Abbreviations and acronymns

AST	Antimicrobial Susceptibility Testing
AWD	Acute Watery Diarrhoea
CBS	Community-Based Surveillance
CFR	Case Fatality Ratio
CTC	Cholera Treatment Centre
CTU	Cholera Treatment Unit
EBS	Event-Based Surveillance
GTFCC	Global Task Force on Cholera Control
NCP	National Cholera Plan
OCV	Oral Cholera Vaccine
ORP	Oral Rehydration Point
PCR	Polymerase Chain Reaction
RDT	Rapid Diagnostic Test
SOP	Standard Operating Procedure
VC	*Vibrio cholerae*
WaSH	Water, Sanitation and Hygiene
WGS	Whole Genome Sequencing
WHO	World Health Organization

Glossary

Case investigation	In-depth documentation of a suspected or confirmed cholera case to: classify the case by geographic origin of infection (i.e., locally acquired or imported), explore exposure(s) to potential source(s) of contamination, and document epidemiological links (or lack of thereof).
Clustered cholera transmission	Occurrence of confirmed cholera cases that are all epidemiologically linked (based on the findings of case investigations). Clustered transmission is more likely to occur at the onset (or towards the end) of a cholera outbreak and for a limited period of time when the number of cholera cases is low. Non-endemic countries (including countries on the path to eliminating cholera) are encouraged to differentiate between clustered cholera transmission and community cholera transmission.
Community cholera death	Death of a (suspected or confirmed) cholera case, with no other known cause of death, that occurs before reaching a health facility. This includes cases dead on arrival at a health facility.
Community cholera transmission	Occurrence of confirmed cholera cases that are not all epidemiologically linked. By default, any probable or confirmed cholera outbreak is considered as community transmission unless it has been demonstrated that transmission is clustered (see applicable definition) based on the findings of case investigations.
Deterioration of a cholera outbreak	Worsening of epidemiological indicators – such as incidence, case fatality ratio, and spatial extension – indicating that response activities are not effective in mitigating a cholera outbreak. The deterioration of a cholera outbreak should be investigated and appropriate response measures initiated.
Elimination of cholera	According to Ending Cholera – A Global Roadmap to 2030, a country is defined as having eliminated cholera when it: *"reports no confirmed cases with evidence of local transmission for at least three consecutive years and has a well-functioning epidemiologic and laboratory surveillance system able to detect and confirm cases"*.
Field investigation	On-site assessment of the outbreak situation to evaluate potential source(s) of contamination, contexts of transmission, and risk factors for spread, in order to guide response measures.
Health facility	For the purpose of health facility-based cholera surveillance: any institution (public, private, faith-based, or non-governmental organization) with outpatient and/or inpatient facilities. This includes health centres, hospitals, clinics, private practices, cholera treatment centres (CTCs), and cholera treatment units (CTUs). In addition, it is recommended that oral rehydration points (ORPs) be included in the facility-based surveillance reporting stream.

Immediate notification	Formalized mandatory communication process through which immediately notifiable events are communicated to the next level of the surveillance system within 24 hours. For the purpose of cholera surveillance, immediately notifiable events include the detection of a suspected, probable, or confirmed cholera outbreak as well as (if applicable, depending on country's strategy) the detection of community transmission. Immediate notification should trigger verification, followed by an investigation of verified events.
Institutional (or health facility) cholera death	Death of a suspected or confirmed cholera case, with no other known cause of death, that occurs after arrival at a health facility.
O1 and O139	The two serogroups of the bacterial species *Vibrio cholerae* – among the more than 200 O-serogroups identified[2]– that have been associated with cholera outbreaks.
Routine data collection	Collection of standard minimum data on any individual that meets the applicable suspected cholera case definition.
Routine reporting	Process by which standard epidemiological and laboratory data on suspected cholera cases is routinely communicated to health authorities at a predefined frequency.
Surveillance unit	Lowest administrative level at which: i) decisions are made to trigger cholera prevention and control measures; and ii) surveillance findings are used to inform local public health interventions. The corresponding administrative level is country specific. It should be no bigger than the scale of geographic operational units defined in a country's National Cholera Plan (NCP) (typically administrative levels two or three).
Surveillance core functions	Functions that should be continuously performed in order for surveillance to effectively serve its purpose. Cholera surveillance core functions include: detection of suspected cholera cases; testing of suspected cholera cases; collection and routine reporting of epidemiological and laboratory data on suspected cholera cases; verification and immediate notification of suspected, probable, and confirmed cholera outbreaks; case and field investigation; analysis and interpretation of epidemiological and laboratory data, and dissemination of findings; and monitoring of surveillance performance.
(Adaptive) surveillance strategies	Changes in how surveillance core functions are performed at the surveillance-unit level depending on the prevailing cholera situation. Adaptive surveillance strategies include: case definitions; testing strategies; reporting timelines, frequency of data analysis and interpretation; case investigation strategies; and performance indicator definitions.

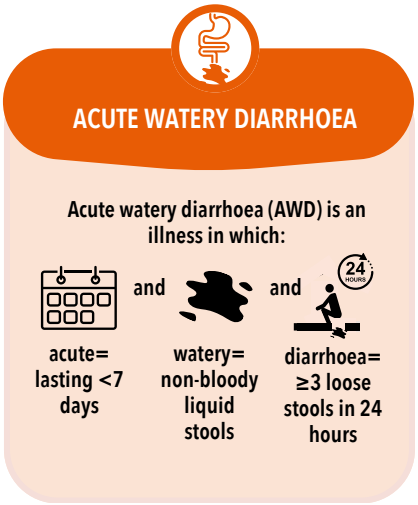
Verification	Proactive cross-checking of the validity (veracity) of information related to immediately notifiable events in order to discard hoaxes, false rumours, and artefacts.
Zero reporting	Reporting of the absence of suspected cholera cases.

CASE & OUTBREAK DEFINITIONS

Below are graphics illustrating some key definitions for detecting suspected and confirmed cholera cases and outbreaks. **Note that some definitions will vary depending on the prevailing cholera situation in the surveillance unit.** Detailed descriptions of these case and outbreak definitions can also be found in **Section 2 – II. Definitions.**

I. Case definitions

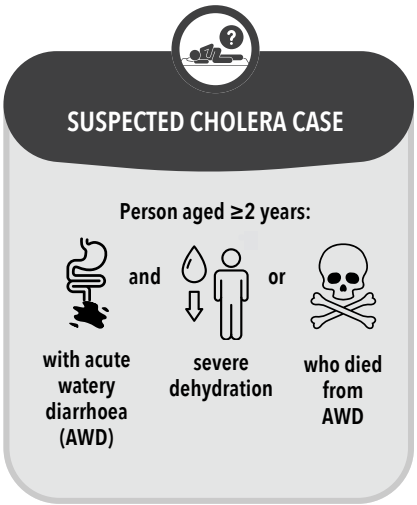
1. In all cholera situations:



Acute watery diarrhoea (AWD) is an illness in which:

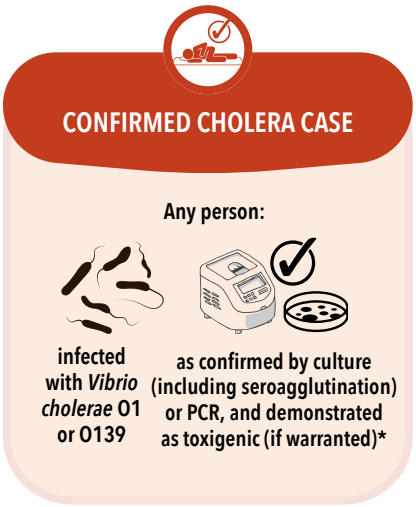
- **Acute is** defined as **lasting less than seven days**;
- **Watery is** defined as **non-bloody liquid stools** that may contain mucous;
- **Diarrhoea is** defined as **three or more loose stools within a 24-hour period**.

2. In the absence of a probable or confirmed cholera outbreak:



A suspected cholera case is a person aged two years or older:

- **with acute watery diarrhoea and severe dehydration**; **or**
- **who died from acute watery diarrhoea** with no other known cause of death.

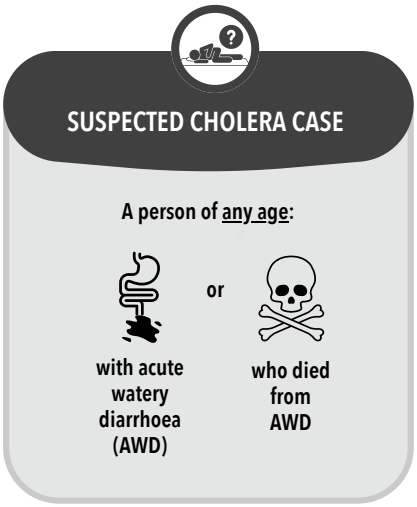


A confirmed cholera case is any person:

- **infected with *Vibrio cholerae* O1 or O139, as confirmed by culture** (including seroagglutination) **or PCR.**

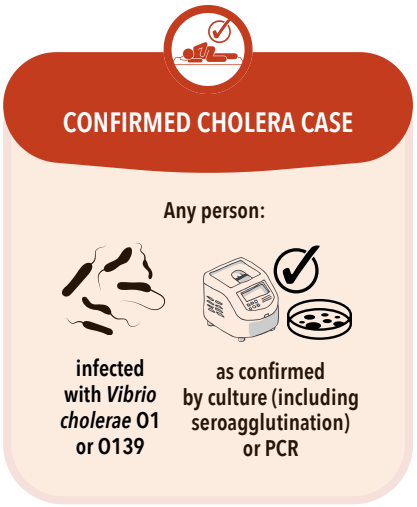
*The bacterial strain should also be demonstrated as toxigenic (by PCR) if there is no confirmed cholera outbreak in other surveillance unit(s), and no established epidemiological link to a confirmed cholera case or source of exposure in another country.

3. In the presence of a probable or confirmed cholera outbreak:



A suspected cholera case is any person:

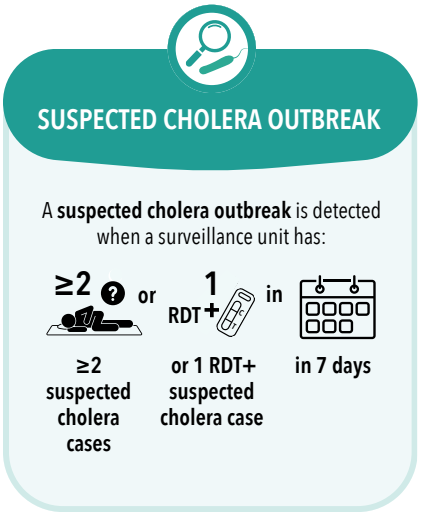
- **with acute watery diarrhoea**;
  or
- **who died from acute watery diarrhoea.**



A confirmed cholera case is any person:

- **infected with *Vibrio cholerae* O1 or O139, as confirmed by culture** (including seroagglutination) **or PCR.**

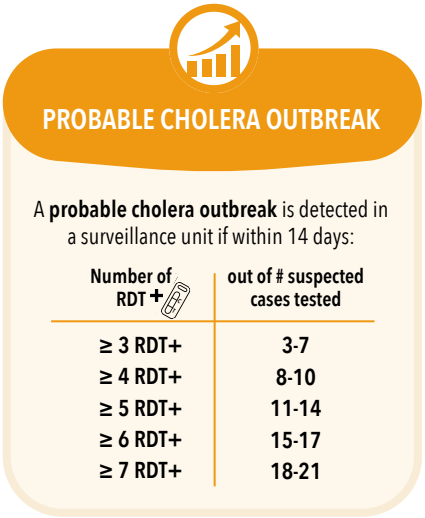
2. Outbreak definitions



A suspected cholera outbreak is detected when:

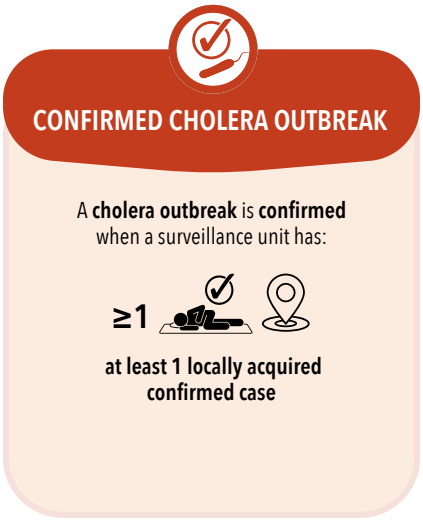
- **Two or more suspected cholera cases;**
  or
- **One suspected cholera case with a positive RDT result (RDT+)**

is/are reported in the same surveillance unit within seven days.



A probable cholera outbreak is detected when:

- **the number of suspected cholera cases with a positive rapid diagnostic test (RDT+) achieves or surpasses a defined threshold** (see graphic on the left), **while taking into account the number of suspected cases tested.**



A confirmed cholera outbreak is detected when:

- **a surveillance unit has at least one locally acquired, confirmed cholera case.**

INTRODUCTION

I. Importance and principles of cholera surveillance

1. Critical role of surveillance to control and eliminate cholera

Cholera is an acute diarrhoeal disease caused by the ingestion of toxin-producing (i.e., toxigenic) *Vibrio cholerae* serogroup O1 or O139. This bacteria's short incubation period, from a few hours to five days, may lead to an exponential rise in cases during an outbreak. While most infected people only show mild or no symptoms, some of them develop severe dehydration that can lead to death within hours if not treated.

Cholera is a global threat to public health that disproportionally impacts the world's poorest and most vulnerable populations. Areas with poor sanitation, limited access to safe water and deficient hygiene practices are at high risk for cholera transmission. In addition, limited access to healthcare and inadequate treatment of cases are factors associated with high cholera-related mortality.

Cholera transmission can be ended, and the number of cholera deaths drastically reduced through the multisectoral interventions set out in **National Cholera Plans** (NCPs).[3] These interventions include community engagement, improved Water, Sanitation, and Hygiene (WaSH), the use of Oral Cholera Vaccines (OCV), and the strengthening of health systems (**Figure 1**).

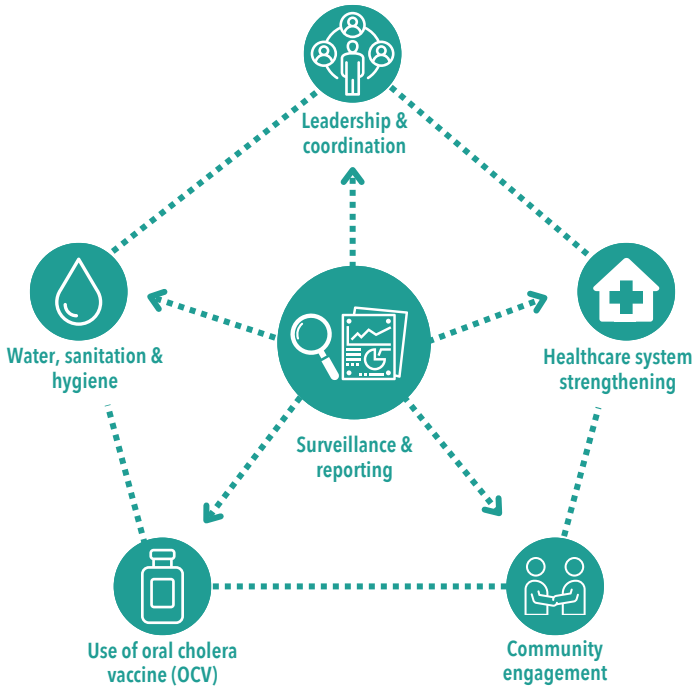


Figure 1. Surveillance plays a pivotal role in multisectoral interventions for cholera control

To be effective, such multisectoral strategies must be guided by timely and reliable local cholera surveillance data; surveillance not only supports the early detection of and quick response to an outbreak, but also plays a central role in providing stakeholders in other cholera prevention and control pillars with the data they need to target, design, implement, and evaluate interventions.

2. Key principles

Public health surveillance for cholera should be conducted in accordance with the following principles:

- **Cholera surveillance aims to generate the reliable and timely evidence** needed to support the early detection of and response to cholera outbreaks, and to guide the development of targeted multisectoral strategies for cholera control and elimination, as set out in NCPs.

- **Cholera surveillance should be integrated within a country's existing national public health surveillance system** to ensure the stability of its core functions, which include: the detection and testing of suspected cholera cases; the routine collection and reporting of epidemiological and laboratory data on suspected cholera cases; verification and immediate notification of suspected, probable, and confirmed cholera outbreaks; (case and field) investigation; data analysis, interpretation, and dissemination of findings; and the monitoring of surveillance performance.

- **National Standard Operating Procedures (SOPs) and adequate infrastructure and resources should be established to operationalize cholera surveillance**, including but not limited to: supply planning; systems for sample collection, packing, and specimen transport; laboratory testing capacity; information systems for data collection and integration of epidemiological and laboratory data; established reporting channels; data analysis capacity; rapid response teams; and a trained workforce familiar with cholera epidemiology and surveillance recommendations.

- **Health facility-based surveillance, community-based surveillance, and event-based surveillance should be routinely integrated** to detect cholera cases. Health facility-based surveillance should integrate the public sector (i.e., public healthcare facilities) and other sectors (e.g., private and non-governmental healthcare facilities).

- **Testing of suspected cholera cases should be routinely undertaken in accordance with systematic sampling schemes**, and the use of Rapid Diagnostic Tests (RDTs) should be expanded to support early outbreak detection and monitoring. In addition, laboratory capacity should be strengthened across all levels of the health system to accurately confirm *Vibrio cholerae* as the causative agent, to monitor outbreaks, and to allow testing for antimicrobial susceptibility and the characterization of strains through genotyping, if warranted.

- **Standard case-based data on any suspected cholera case should be reported via health facility-based surveillance.**

- To maximize the operational use of surveillance to inform targeted multisectoral interventions, **the coordination of surveillance activities and the analysis and interpretation of surveillance data should be performed at the local level (i.e., surveillance unit level).**

- **Cholera surveillance objectives and strategies should be adapted depending on the prevailing cholera situation in surveillance units.** Adaptive cholera surveillance strategies include: case definitions; testing strategies; reporting timelines; frequency of data analysis and interpretation; requirements for case investigation; and definitions of performance indicators.

- **Surveillance findings should be disseminated to relevant stakeholders at all levels** through established mechanisms, such as open-access epidemiological reports. **This should include regular (e.g., weekly) reporting of data to international organizations and partners.**

- **Cholera surveillance findings should be interpreted in conjunction with other information sources** to monitor factors that might be associated with an increased risk of cholera outbreaks, and provide an holistic understanding of outbreak dynamics to support evidence-based decision-making.

- **The performance of cholera surveillance should be routinely monitored at all levels of the surveillance system**, and performance monitoring outcomes should trigger timely corrective/supportive measures, as appropriate.

II. How to use this guidance document

1. Content

This guidance document sets out the minimum recommendations for countries to implement adaptive, fit-for-purpose cholera surveillance. It consists of two main sections, plus appendices:

- **Section 1 — Cholera surveillance: core functions** defines the essential functions of cholera surveillance that should be conducted at all times and in all places, independent of the cholera situation;

- **Section 2 — Cholera surveillance strategies** defines how to implement adaptive, fit-for-purpose cholera surveillance depending on the prevailing cholera situation in a surveillance unit (i.e., adaptive surveillance);

- **Appendices — Supporting material for cholera surveillance** provides additional material and tools for countries to use in implementing cholera surveillance, in accordance with the minimum recommendations set out in this guidance document.

GTFCC recommendations on environmental surveillance are addressed in a distinct **technical document**.

2. Target audience and intended use

This guidance document provides the minimum recommendations for Ministries of Health, local public health professionals, public health institutes, WHO Country Offices, and partners to implement adaptive, fit-for-purpose surveillance to support cholera control and elimination. It addresses commonly encountered cholera transmission scenarios, and how key surveillance strategies can be adapted to those situations. That said:

- this document is not a surveillance protocol — its recommendations should be adapted in-country to ensure their effective and sustainable operationalization as part of an integrated surveillance system;

- the scenarios considered may not capture the full diversity of cholera outbreak dynamics that can be found at the local level; again, the recommendations may need to be tailored to local contexts.

Importantly, when tailoring the recommendations provided in this guidance document, all cholera surveillance core functions should be maintained, and surveillance objectives should always: i) be explicitly defined, and updated, as necessary — preferably in consultation with multisectoral stakeholders involved in cholera prevention and control; and ii) taken into account when adapting surveillance strategies.

Defining surveillance objectives, and adapting local surveillance strategies to be consistent with these will ensure that surveillance is always fit-for-purpose and can adequately support cholera control and elimination.

CHOLERA SURVEILLANCE: CORE FUNCTIONS

This section describes the core functions of cholera surveillance; these functions should be carried out at all times and in all surveillance units, independent of the cholera situation, in order for surveillance to effectively inform interventions for cholera control and elimination. These core functions are outlined in **Figure 2** and **Box 1**.

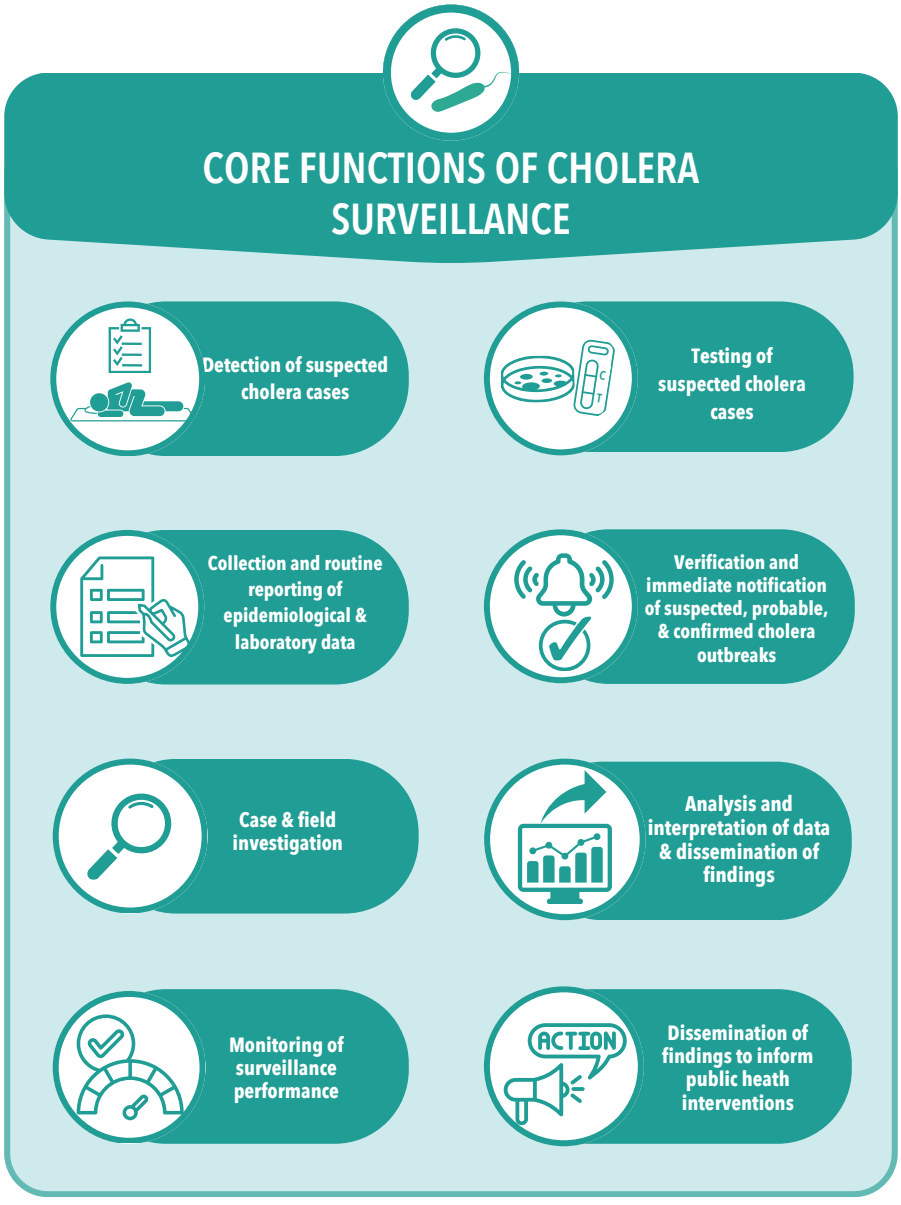


Figure 2. Core functions of cholera surveillance

Box 1. Core functions of cholera surveillance

- **Detection** of suspected cholera cases
- **Testing** of suspected cholera cases
- **Collection and routine reporting** of epidemiological and laboratory data on suspected cholera cases
- **Verification and immediate notification** and of suspected, probable, and confirmed cholera outbreaks
- **Case and field investigation**
- **Analysis and interpretation** of epidemiological and laboratory data
- **Monitoring of surveillance performance**
- **Dissemination of findings** to inform public health interventions

I. Detection

1. Surveillance streams

Cholera surveillance should routinely integrate **health facility-based surveillance** and **community-based surveillance** (CBS) to detect suspected cholera cases, as well as **event-based surveillance** (EBS) to detect cholera signals (see **Table 1** and **Figure 3**).

Definition of *health facility* for the purpose of health facility-based cholera surveillance

Any institution (public, private, faith-based, or non-governmental organization) with outpatient and/or inpatient facilities.

This includes health centres, hospitals, clinics, private practices, cholera treatment centres (CTCs), and cholera treatment units (CTUs). In addition, it is recommended that oral rehydration points (ORPs) be included in the facility-based surveillance reporting stream.

Detailed guidance on the design and implementation of CBS and EBS systems is beyond the scope of this guidance document. Key resources are listed in **Appendix IX – Additional resources**.

Table 1. Description of cholera surveillance streams

Surveillance stream	Description
Health facility-based surveillance	**The detection, recording, and reporting of patients who meet the applicable standard definition of a suspected cholera case when presenting at a health facility for care.**
Community-based surveillance (CBS)	**The systematic detection and reporting of events of public health significance within a community by community members** [4] (e.g., community-based surveillance volunteers, community health workers). CBS complements health facility-based surveillance through the detection and reporting of individuals in the community who meet the applicable definition of a suspected cholera case or cholera death. These individuals may not seek medical attention and consequently may not be captured by health facility-based surveillance, making CBS particularly important in remote areas with difficult access to health facilities. It is recommended that the standard definitions of suspected cholera cases and cholera deaths be adapted using simplified and local language(s) for CBS. Sick individuals identified through CBS should be evaluated, treated, and referred as necessary according to national protocols.
Event-based surveillance (EBS)	**A non-disease-specific surveillance method which complements other surveillance efforts by capturing unstructured information** such as rumours and other ad-hoc reports transmitted from formal and informal channels; this includes online content, radio broadcasts, print media, and accounts from health workers, nongovernmental organizations, and communities, etc. EBS supplements health facility-based surveillance and CBS by considering additional sources, and providing a channel for health facilities and communities to share unstructured information. This can be especially valuable for the early detection of an outbreak, particularly in exceptional circumstances such as when routine reporting has not been undertaken.

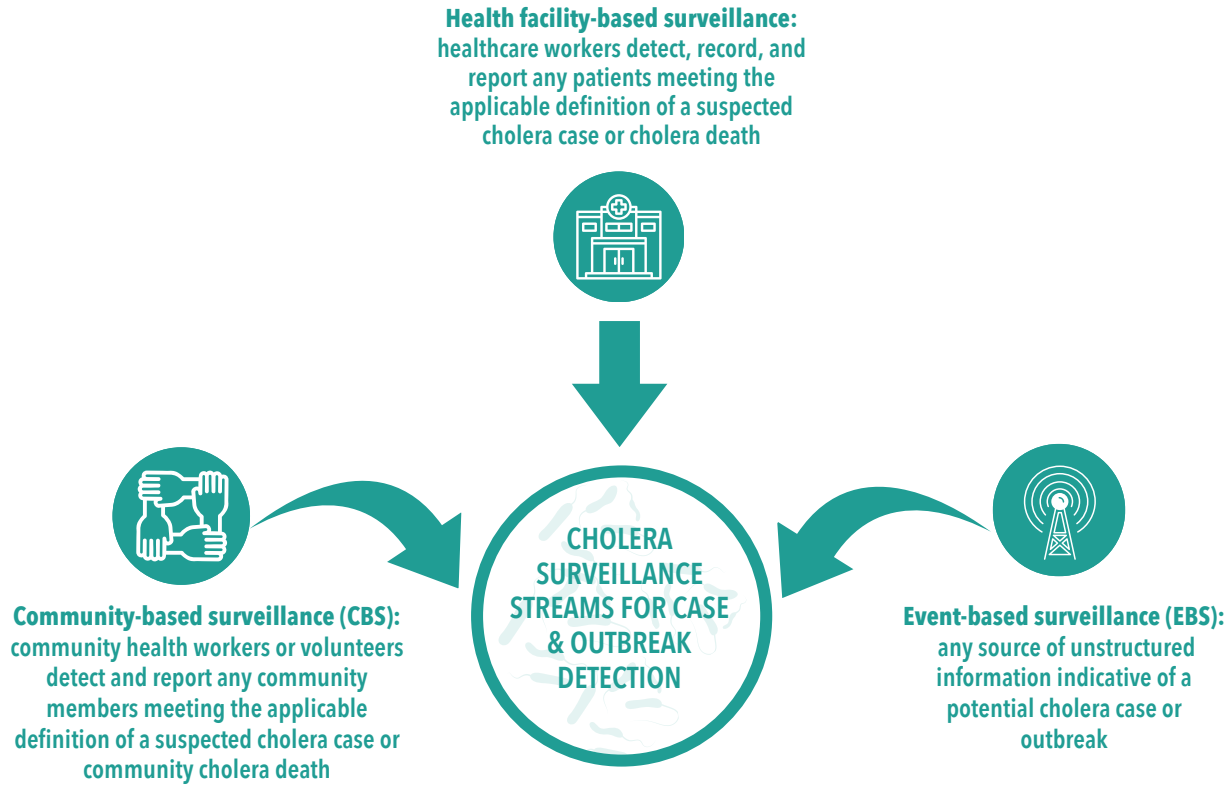


Figure 3. Cholera surveillance streams

II. Testing

1. Testing strategies

Suspected cholera cases should be routinely tested with an appropriate testing method and in accordance with systematic sampling schemes adapted to the prevailing cholera situation in the surveillance unit.

2. Testing methods

Testing methods for cholera surveillance include Rapid Diagnostic Tests (RDTs), culture and Polymerase Chain Reaction (PCR), antimicrobial susceptibility testing (AST), and Whole Genome Sequencing (WGS) (**Table 2**). It is important to note that aside from AST, other testing results do not impact patient care or treatment.

Table 2. Description of laboratory testing methods for cholera surveillance

Method	Test function	Description	Recommended resource
Rapid Diagnostic Tests (RDTs)	**Screening tool, non-confirmatory**	RDTs are intended for use at the health facility level and should be performed as described in the GTFCC Job Aid and in accordance with manufacturer instructions. Commercially available **RDTs can be used to rule out cholera** because they have a high negative predictive value, particularly when there is a low prevalence of cholera (e.g., at the beginning or towards the end of an outbreak, or in clustered cholera transmission). However, commercially available **RDTs cannot be used to confirm individual cholera cases** (due to insufficient positive predictive value). That said: • **results of multiple RDTs allow for the early detection of probable cholera outbreaks** with a level of confidence comparable to other laboratory methods when using GTFCC recommended thresholds (see **Table 8** and **II. Definitions - 5. Probable cholera outbreak**). • **RDTs are helpful tools to monitor outbreak trends** (see **IV. Surveillance strategies (community transmission) - 3. Testing**). Similar recommendations apply for the use of RDTs and for the interpretation of RDT results regardless of whether or not they are performed after an enrichment step.	GTFCC – Job Aid Rapid Diagnostic Test (RDT) for Cholera Detection[5]
Culture	**Diagnostic tool for confirmation of *Vibrio cholerae* O1/O139**	**Culture methods**, including isolation of suspected *Vibrio cholerae*, oxidase testing, and seroagglutination testing with specific antisera, **are a quick and simple way of confirming *Vibrio cholerae* O1 or O139**.	GTFCC – Job Aid Culture of *Vibrio cholerae*[6] GTFCC – Fact Sheet Culture of *Vibrio cholerae*[7]
Polymerase Chain Reaction (PCR)	**Diagnostic tool for confirmation of toxigenic *Vibrio cholerae* O1/O139**	**PCR provides an alternative to culture for the identification of O1/O139 *Vibrio cholerae* strains, and is used to confirm toxigenicity if warranted** (refer to **Section II.2 Confirmed case definition**).	Interim technical note on an introduction of DNA-based identification and typing methods to public health practitioners for epidemiologic investigation of cholera outbreaks[8]

Antimicrobial Susceptibility Testing (AST)	**Not for diagnostic purposes; to inform case management and further characterisation of a strain**	**AST is used to characterise** and periodically monitor the antimicrobial susceptibility of the circulating ***Vibrio cholerae*** **strains** in order to provide information **to guide antimicrobial treatment.**	GTFCC - Job Aid Antimicrobial Susceptibility Testing [9]
Whole Genome Sequencing (WGS)	**Not for diagnostic purposes; for further characterisation of a strain**	WGS, as well as other advanced genotyping methods, can provide important additional information which be used to establish a relationship between ongoing and previous outbreaks, track the genetic evolution of *Vibrio cholerae* strains, detect the emergence of new clones, and conduct phylogenetic analyses to enable the visualisation of the worldwide circulation and evolution of strains.[10] **WGS does not aim to confirm *Vibrio cholerae* as the causative agent in an outbreak**, but can confirm that strains belong to the seventh pandemic El Tor lineage (7PET) or any lineage that might emerge with similar clinical and epidemiological properties (referred to hereafter as "epidemic *Vibrio cholerae*").[11]	Interim technical note on an introduction of DNA-based identification and typing methods to public health practitioners for epidemiologic investigation of cholera outbreaks [8]

3. Minimum testing capacities and operational considerations

Countries should assess their laboratory capacity to ensure that they can accurately perform all of the necessary tests for cholera surveillance, and implement a plan to reconcile any identified gaps, if need be. Cholera-affected countries are encouraged to decentralise their testing capacity to confirm, or at minimum perform the first isolation of *Vibrio cholerae*. Decentralisation expands the network of laboratory expertise, improves the turnaround time for test results, reduces the cost and time required for sample transport, and improves the overall performance of a country's cholera surveillance system. Furthermore, an effective and decentralised laboratory network will mitigate the risk of overwhelming the national laboratory if concurrent outbreaks occur.

- **In-country reference laboratory**

  At least one in-country laboratory should:

  - Have the capacity to isolate and identify *Vibrio cholerae* by culture
  - Have the capacity to perform PCR (at least for toxin testing)
  - Have the capacity to perform AST
  - Support the analysis, interpretation, and reporting of laboratory results at a national level
  - Support sample collection and transport (e.g., through training of field staff)
  - Ensure that all laboratories under its supervision are provided with the necessary materials and supplies for sample collection, preparation, and transport, as well as the reagents and supplies needed for confirmation

- Ensure the initial training and ongoing competency of technicians
- Monitor laboratory testing quality

- **International/regional reference laboratories**

  Countries should collaborate with international reference laboratories for external quality assurance, and to temporarily offset a lack of capacity for PCR toxin testing. Such collaborations may also be established to perform WGS and WGS data analysis, if in-country capacity does not exist.

  Should this service be needed, national laboratories and cholera control programmes are encouraged to reach out to the GTFCC: **GTFCCsecretariat@who.int**

- **Supply planning and procurement**

  RDTs

  RDT supply planning should consider the feasibility, cost-effectiveness, long-term sustainability, and risk of wasting RDTs (particularly in surveillance units where the number of suspected cholera cases in recent years has been nil or very low).

  Rather than supplying all health facilities in a surveillance unit with RDTs, the tests may be stored in a subset of health facilities (i.e., those most likely to encounter suspected cholera cases, such as sub-district hospitals and Cholera Treatment Centres) or with local health authorities of the surveillance unit, where they can be rapidly deployed as needed. Should a cholera outbreak occur, a rapid increase in RDT supply to all health facilities of the surveillance unit is strongly recommended.

  Of note, countries eligible for Gavi's vaccine support (see **https://www.gavi.org/types-support/sustainability/eligibility**) may also apply for cholera diagnostic test (i.e., RDT) procurement funding support. More information is available at: **https://www.gavi.org/news/document-library/cholera-diagnostics-application**.

  Specimen collection, preservation, and transport supplies

  Similar to RDTs, specimen collection and transport supply-planning should ensure that minimum stocks of sample-collection supplies are maintained in those health facilities most likely to see suspected cholera cases (in surveillance units where there is a confirmed outbreak) and prepositioned in a subset of health facilities (in surveillance units at risk for outbreaks).

  Laboratory supplies

  Adequate supplies of reagents and consumables are needed for reliable and systematic testing. It is the responsibility of each laboratory to ensure that these supplies are verified before use (e.g., that they successfully pass visual inspection and quality control testing) and are maintained according to the manufacturer's recommendations.

4. Collection, packaging, transport, and storage of samples

Accurate and reliable test results rely on samples that have been adequately collected, packed, transported, and stored.

- **Sample collection**

Faecal specimens such as liquid stool should be collected in a clean container that is free of disinfectant or detergent residue. Specimens should not be collected from bedpans as these may contain residual disinfectant or other contaminants. If a stool specimen cannot be produced, rectal swabs may be collected and stored in Cary Blair media.

Faecal specimens should be collected in the early stage of the illness when pathogens are usually present in the stool in highest numbers (i.e., within the first four days of illness, and before antibiotic therapy has been initiated). However, if antimicrobial therapy has been initiated prior to sample collection, information regarding the prescribed antibiotic, dosage, and duration of treatment should be clearly documented in the request form for laboratory testing. Antibiotic therapy may negatively impact laboratory results.

Rehydration treatment of patients should not be delayed for specimen collection. Specimens may be collected after rehydration protocols have been initiated.

Additional information on the procedure for sample collection may be found in the GTFCC - Job Aid for Specimen Packaging and Domestic Transportation[12] and the CDC Job Aid – How to collect a fecal specimen and transfer to transport medium.[13]

- **Packaging, transport, and storage of samples**

Recommended methods for the preparation, storage, packaging, and transport of specimens are described in the GTFCC - Job Aid for Specimen Packaging and Domestic Transportation.[12] The chosen method(s) should take into consideration the availability of supplies, the expected delay between sample collection and arrival at the testing laboratory, and the testing method that will be applied to the sample.

All specimens should be accompanied by a laboratory request form.

Samples should be received by the laboratory within 6 days of sample collection.

III. Routine data collection

1. Standard health-facility case-based data

The minimum standard case-based data provided in **Table 3** should be collected on any patient meeting the applicable definition of a suspected cholera case presenting at any health facility, at any point in time, independent of the prevailing cholera situation.

Data should be recorded, preferably in an electronic format, in a standard register of cases (line list) or in a surveillance case report form.

A template cholera surveillance case report form aligned with the minimum standard case-based dataset is provided in **Appendix I – Template cholera case report form**. **An editable version of the form can also be downloaded here.**

An example of an Excel line list aligned with the minimum standard case-based dataset is provided in **Appendix II – Example of a cholera line list (Excel)**. **An editable version of the line list can also be downloaded here**.

The minimum standard case-based data set /data collection tools may be customised for use at ORPs (e.g., variables on cholera testing may not be applicable).

Table 3. Minimum standard case-based data to be collected on all suspected cholera cases at health facilities

Information	Variable	Description	
GENERAL INFORMATION			
Date of reporting	DATEREPORT	Date (yyyy-mm-dd) of reporting by the health facility	
Reporting health facility	REPFACILITY	Name of the reporting health facility	
1. PATIENT INFORMATION			
Patient unique identifier	RECORDID	Unique patient identifier	
First name	FIRSTNAME	First name(s)	
Last name	LASTNAME	Last name(s)	
Age in years	AGE	Age in years	
Sex	SEX	Sex at birth	Female Male
Admin 1 of residence	ADMIN1NAME	Admin level 1 (e.g., region or province) of residence	
Admin 2 of residence	ADMIN2NAME	Admin level 2 (e.g., district) of residence	
Admin 3 of residence	ADMIN3NAME	Admin level 3 (e.g., health area or commune) of residence	
Admin 4 of residence	ADMIN4NAME	Admin level 4 (e.g., ward, municipality, sector, or village) of residence	
Address of residence	ADDRESS	Address complement (neighbourhood, street, house)	
2. CLINICAL INFORMATION			
Date of visit	DATEOFVISIT	Date (yyyy-mm-dd) the patient was consulted or was admitted to the health facility	

Readmission	READMITTED	Was the patient readmitted within 5 days of discharge from any health facility where he/she was previously admitted for a clinical condition suggestive of cholera?	Yes No Unknown
Referred	REFERRED	Was the patient referred from another health facility?	Yes No Unknown
Referring facility	REFERRINGFACILITY	If the patient was referred, name of the referring health facility	
Date of symptom onset	DATEOFONSET	Date (yyyy-mm-dd) the patient had the first symptoms of acute watery diarrhoea	
Hospitalisation	HOSPITALIZATION	How has the patient been admitted to the reporting health facility? *Inpatient care requires a hospital stay. Outpatient care, also called ambulatory or day patient care, does not require hospitalisation.*	Inpatient Outpatient Unknown
Level of dehydration	DEHYDRATION	What was the patient's level of dehydration at admission? *See **Section 2 – II. Definitions – 1. Signs and Symptoms** for the criteria used to assess a patient's level of dehydration.*	No dehydration Some dehydration Severe dehydration Unknown
Outcome	OUTCOME	What was the patient's outcome? *Institutional death corresponds to the death of a (suspected or confirmed) cholera case, with no other known cause of death, that occurs after arrival at the health facility.* *Community death corresponds to the death of a (suspected or confirmed) cholera case, with no other known cause of death, that occurs before reaching a health facility.*	Alive and discharged Alive and transferred Died at health facility (institutional death) Dead on arrival at a health facility (community death)
Date of discharge/transfer/death	DATEOFOUTCOME	Date (yyyy-mm-dd) the patient was discharged or transferred (if alive), or date of death	

3. CHOLERA TESTING			
Specimen collected	SPECIMEN	Was a specimen collected for cholera testing?	Yes No Unknown
Date of specimen collection	DATEOFSPECIMEN	If a specimen was collected for cholera testing, date (yyyy-mm-dd) of specimen collection	
RDT result	TESTED_RDT	What was the result of the RDT test? *An inconclusive RDT result is neither positive nor negative (e.g., absence of control line, uncertain test line due to obscuring anomaly or poor background clearance of the test strip)*	Positive O1 Positive O139 Positive O1 and O139 Negative Inconclusive Not performed
Specimen sent to laboratory	SPECIMENTOLAB	Was a specimen sent to the laboratory for culture or PCR testing?	Yes No Unknown
Date of specimen receipt at the laboratory	DATESPECIMENATLAB	Date (yyyy-mm-dd) of specimen receipt at the laboratory	
Date of laboratory result	DATEOFLAB	If a specimen was sent to the laboratory for culture or PCR testing, date (yyyy-mm-dd) of laboratory result	
Culture and seroagglutination result	TESTEDCULTURE	What was the result of culture and seroagglutination?	Positive O1 Positive O139 Negative Inconclusive Not performed Pending
PCR result: serogroup	TESTEDPCR	What was the PCR result for the serogroup?	Positive O1 Positive O139 Negative Inconclusive Not performed Pending
PCR result: toxigenicity	VCTOXIGEN	What was the PCR result for toxigenicity?	Toxigenic Nontoxigenic Inconclusive Not performed Pending

Antimicrobial susceptibility testing (AST)	TESTEDAST	What were the results of the antimicrobial susceptibility testing?	Susceptibility to Azithromycin (AZ) Susceptibility to Ciprofloxacin (CIP) Susceptibility to Pefloxacin (PEF) Susceptibility to Tetracycline (TE) Susceptibility to Doxycycline (DO) Susceptibility to Erythromycin (EM) Not performed Pending

In addition to this minimum standard case-based data, countries may also consider collecting data on variables such as pregnancy, severe acute malnutrition, or other comorbidities.

2. Standard community-based surveillance data

The aggregate number of suspected cholera cases and cholera deaths occurring in a community, stratified by age group and sex, should be recorded and reported within 24 hours to support the early detection of a suspected cholera outbreak. Daily aggregate numbers should be routinely reported (e.g., weekly) for the monitoring of an outbreak.

To the extent possible, data should be stratified according to the following age groups: <2, 2-4, 5-14, 15-44, 45-59, ≥60 years old. When this cannot be reported in a timely or reliable manner, data should be stratified at a minimum by the following age groups: <5 years old, ≥5 years old.

An example of a community-based surveillance form is provided in **Appendix III – Community-based surveillance – template reporting form**. **An editable version of the form can also be downloaded here.**

IV. Routine reporting

Both epidemiological and laboratory data on suspected cholera cases should be routinely reported. The minimum frequency of routine reporting depends on the prevailing cholera situation; this is addressed in **Section 2** of this guidance.

1. Epidemiological data

Health facility staff and community-based surveillance volunteers should routinely report standard data on all suspected cholera cases, including zero reporting if no suspected cholera case is detected.

2. Laboratory data

Laboratories should report case-based data on samples received, tested, and the results (both positive and negative) by

type of test (i.e., RDT, culture including seroagglutination, PCR, and toxigenicity) to local health authorities and to the health facilities where samples were collected. Results for culture/PCR should be available within a maximum of 4 days after specimen receipt at the laboratory. Information regarding antimicrobial susceptibility should also be reported, if available, to guide the treatment of patients.

3. Integration of epidemiological and laboratory data

Case-based epidemiological data and case-based laboratory data should be merged. If a joint electronic information system is available for health facilities and laboratories, laboratory results will be automatically updated in the health facility records. Otherwise, laboratory results should be manually recorded and added to the epidemiological data collection file.

4. Reporting to the next upper level

Local health authorities are responsible for compiling and cleaning the data reported by all local surveillance streams. When cleaning the data, efforts should be made to remove duplicate records; these can result when suspected cholera cases are readmitted or referred from one reporting health facility to another, or referred from the community to a reporting health facility. Ideally, a unified data dictionary for collected variables should be created to provide guidance on the formatting of names, numbers, and dates, to ease data cleaning and consolidation at a higher level (see **Appendix II – Example of a cholera line list (Excel)**). Once cleaned, the case-based epidemiological and laboratory data should be reported to the next level of the surveillance system, up to the national level (**Figure 4**). When reporting is done through an electronic information system, several levels may be informed simultaneously.

Epidemiological and laboratory data (aggregated at the surveillance-unit level) should be reported by the national level to the regional and global levels on a weekly basis, in accordance with applicable GTFCC recommendations.

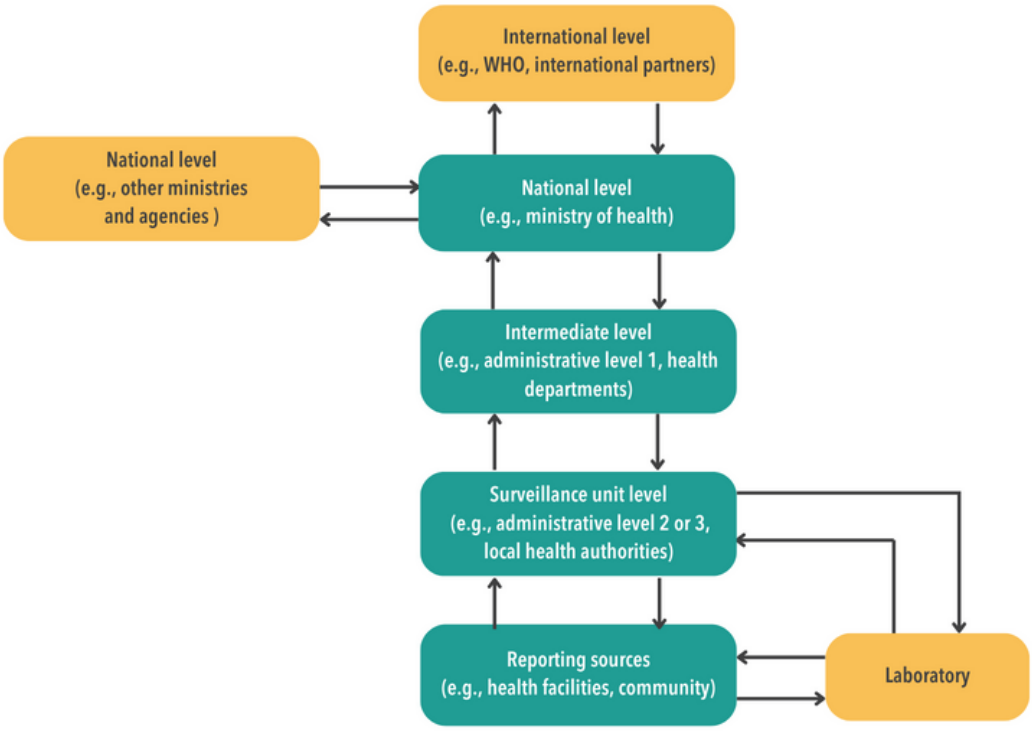


Figure 4. Reporting flow

V. Immediate notification, verification, and investigation

Immediately notifiable events (i.e., detection of a suspected, probable, or confirmed cholera outbreak; detection of community transmission, if applicable, depending on country's strategy) should be subject to verification, immediate notification, and initiation of investigation, as appropriate, within 24 hours[14] of detection.

1. Verification

Immediately notifiable events should be immediately verified by local health authorities. Verification is a rapid process which aims to assess the validity (veracity) of the event.

Verification may, for example, be performed by contacting the reporting source(s) to check on the patients' clinical presentations, the case definition used, date of symptom onset, test results, etc.

A conservative approach is recommended at the verification step: if the event cannot be discarded with confidence, it should be considered verified.

Additional information on the verification process can be found in **Early warning alert and response (EWAR) in emergencies: an operational guide**.[15]

2. Notification

Once verified, health authorities at the next level of the surveillance system (see **Figure 4**) should be immediately notified of the event, and case investigation should begin.

3. Case investigation

Case investigation aims to collect additional information about suspected cholera cases, beyond standard case-based data (**Table 3**), in order to:

- support the classification of cholera cases by geographic origin of infection (i.e., locally acquired or imported;
- guide field investigations by generating hypotheses about exposure(s) to potential source(s) of contamination, and contexts of transmission;
- document epidemiological links (or lack of thereof).

Case investigation should be conducted by a local health authority officer interviewing the patient. At a minimum, the following should be documented, with a focus on the five days before the onset of illness:

- whether the patient was living in a displacement camp/refugee camp;
- patient's travel history outside their usual place of residence, including dates of travel and places visited;

- social interactions and gatherings, including contact with people with a similar illness or symptoms (AWD); contact with people who travelled outside the patient's usual place of residence; attendance at social events, communal, or mass gatherings by the patient and/or by other people in the household/compound of the patient;
- patient's occupation/work, including place(s) of occupation/work;
- water, sanitation, and hygiene exposures; and
- patient's food consumption.

A template case investigation form is provided in **Appendix IV - Template cholera case investigation form**. **An editable version of the form can also be downloaded here.**

4. Field investigation

If, based on the findings of the case investigation, the occurrence of an immediately notifiable event is determined (for example, if a locally acquired cholera case is identified or cannot be ruled out), a field investigation should be initiated.

The field investigation aims to document the outbreak situation by assessing potential source(s) of contamination, contexts of transmission, and risk factors for spread in order to guide response measures. It should be conducted by a multidisciplinary team and combined with risk and needs assessments and immediate control measures. Detailed guidance on field investigation, initial risk assessment, needs assessment, and response is beyond the scope of this document and can be found in the **GTFCC Cholera outbreak response field manual**.[16]

Of note, contact tracing (i.e., the identification of asymptomatic individuals who have been in contact with a suspected or confirmed cholera case) is not recommended for cholera investigation. Nevertheless, individuals who meet the applicable definition of a suspected cholera case can be looked for (i.e., active case finding) among individuals at risk of exposure (e.g., household members and close neighbours living in proximity to a suspected cholera case or using the same water source).

VI. Analysis, interpretation, and dissemination

Effective cholera surveillance is dependent on timely and systematic data analysis, interpretation, and the dissemination of findings at a predefined frequency. Of note, the minimum frequency of data analysis, interpretation, and dissemination depends on the prevailing cholera situation in the surveillance unit; this is addressed in **Section 2** of this guidance.

After consolidation and cleaning, data reported through the different surveillance streams should be analysed and interpreted at each level of the surveillance system (**Figure 4**). Importantly, CBS data and health facility-based surveillance data should be analysed separately but interpreted jointly.

To maximise the operational use of cholera surveillance, data analysis at the level of surveillance units is particularly important to ensure contextually appropriate interpretations are drawn and prompt action is triggered. Findings should be disseminated to all relevant stakeholders (e.g., health professionals, community health workers/CBS volunteers, health authorities, and other relevant agencies, such as water and sanitation, environmental, and international partners). An example of a surveillance unit level epidemiological report is provided in **Appendix VI - Cholera epidemiological report—surveillance unit level. A PDF of the sample report can also be downloaded here.**

In addition to a surveillance unit level report, a national bulletin should be produced and shared with regional and international organizations and networks, and with other countries (in particular, neighbouring countries) to inform cholera preparedness and readiness activities. An example of a national epidemiological report is provided in **Appendix VII - Cholera epidemiological report—national level.** **A PDF of the sample report can also be downloaded here.**

VII. Monitoring of surveillance performance

1. Principles

Performance monitoring refers to the weekly assessment of surveillance performance, focusing on the implementation of critical surveillance strategies to assess whether they are performed according to established procedures and targets. If not, this should trigger corrective/supportive measures.

Performance monitoring should be conducted at each level of the surveillance system (from the surveillance unit level up to the national level) as part of routine data analysis.

Surveillance performance should also be taken into consideration when interpreting surveillance data. It is therefore recommended that performance indicators be included in routine epidemiological reports.

All reporting sites should receive feedback on their performance, including recommendations for improvement. Corrective/supportive actions should be implemented in a timely manner and documented.

Performance targets should be set at a minimum of 80% for all performance indicators, consistent with common benchmarks,[17] however higher performance targets may be set by countries.

2. Minimum performance indicators to be monitored at the surveillance unit level

The monitoring of cholera surveillance performance at the surveillance unit level should at minimum ensure that:

- reporting is undertaken according to applicable procedures, by monitoring **the completeness and timeliness of reporting (separately for health facility-based surveillance and CBS)**;
- testing of suspected cholera cases by RDTs, if applicable (i.e., if RDTs are in use), and by culture and/or PCR is undertaken in accordance with recommended strategies, and samples are received at a laboratory for testing in a timely manner, by monitoring **the adherence to the testing strategy and the timeliness of sample receipt**;
- reported data trigger appropriate actions by local health authorities, according to applicable procedures, by monitoring **the completeness of case investigation and the timeliness of field investigation**.

Generic definitions of the minimum performance indicators to be monitored at the surveillance unit level are provided in **Table 4**.

Of note, some criteria (in **orange** in **Table 4**) depend on the prevailing cholera situation in the surveillance unit; this is addressed in **Section 2** of this guidance and in **Appendix VIII - Minimum performance indicators to be monitored in surveillance units.**

Table 4. Generic definitions of minimum performance indicators at the surveillance unit level

Indicator	Numerator	Denominator	Minimum performance target
HEALTH FACILITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week	Number of health facilities expected to report	80%
Timeliness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline* in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline* in a given week	Number of health facilities expected to report	80%
COMMUNITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week	Number of active CBS volunteers	80%

Timeliness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline* in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline* in a given week	Number of active CBS volunteers expected to report	80%
INVESTIGATION			
Completeness of case investigation			
Proportion of cholera cases subject to case investigation* that were investigated in a given week (%)	Number of cholera cases investigated in a given week	Number of cholera cases subject to case investigation* in a given week	80%
Timeliness of field investigation			
Proportion of cholera events subject to field investigation* for which field investigation was initiated within 24 hours of detection in a given week (%)	Number of cholera events subject to field investigation* for which field investigation was initiated within 24 hours of detection in a given week	Number of cholera events subject to field investigation* in a given week	80%
TESTING			
Adherence to testing strategy (RDT, if applicable)			
Proportion of occurrences subject to testing by RDT* that were tested by RDT in a given week (%)	Occurrences subject to testing by RDT* that were tested by RDT in a given week	Occurrences subject to testing by RDT* in a given week	80%
Adherence to testing strategy (culture and/or PCR)			
Proportion of occurrences subject to testing by culture and/or PCR* that were tested by culture and/or PCR in a given week (%)	Occurrences subject to testing by culture and/or PCR* for which a sample was sent to a laboratory for testing by culture and/or PCR in a given week	Occurrences subject to testing by culture and/or PCR* in a given week	80%

Timeliness of sample receipt by the laboratory			
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Number of samples received by the laboratory within 6 days of sample collection	Number of samples sent to a laboratory for testing by culture and/or PCR in a given week	80%

***to be adapted depending on the prevailing cholera situation in the surveillance unit** – see **Section 2** of this guidance

3. Minimum performance indicators to be monitored at upper levels (e.g., provincial, national)

The monitoring of cholera surveillance performance at the upper levels of the surveillance system should at minimum monitor that:

- lower-level units (e.g., surveillance units) report to the upper levels according to applicable procedures, by monitoring **the completeness and timeliness of reporting**;
- laboratories provide results in a timely manner, and that these are recorded and integrated into a surveillance database along with epidemiological data, by monitoring **the timeliness of laboratory results and the completeness of recording of laboratory results**;
- data reported by lower-level units is duly processed and disseminated to inform interventions, by monitoring **the completeness of cholera epidemiological reports at the upper level**.

Minimum performance indicators to be monitored at upper levels are provided in **Table 5**.

Of note, one criteria in these definitions (in **orange** in **Table 5**) depends on the prevailing cholera situation; this is addressed in **Section 2** of this guidance.

Table 5. Generic definitions of minimum performance indicators at upper levels (e.g., national, provincial)

Indicator	Numerator	Denominator	Minimum performance target
Completeness of reporting			
Proportion of lower-level units that reported cholera surveillance data (including zero reporting) to the next upper level in a given week (%)	Number of lower-level units that reported cholera surveillance data (including zero reporting) to the next upper level in a given week	Number of lower-level units expected to report	80%
Timeliness of reporting			
Proportion of lower-level units that reported cholera surveillance data (including zero reporting) to the next upper level in a given week by the applicable deadline* (%)	Number of lower-level units that reported cholera surveillance data (including zero reporting) to the next upper level in a given week by the applicable deadline*	Number of lower-level units expected to report	80%
Completeness of cholera epidemiological reports at the upper level			
Proportion of weeks since the beginning of the year for which a weekly cholera epidemiological report was published at the upper level (e.g., national or provincial cholera epidemiological report) (%)	Number of weeks since the beginning of the year for which a weekly cholera epidemiological report was published at the upper level	Number of weeks since the beginning of the year with a probable or confirmed cholera outbreak in at least one surveillance unit of the upper-level unit considered (e.g., country or province)	80%
Timeliness of laboratory results			
Proportion of culture and/or PCR results reported within 4 days of sample receipt at the laboratory (%)	Number of culture and/or PCR results reported within 4 days of sample receipt by at the laboratory	Number of samples received for testing by culture and/or PCR in a given week	80%

Completeness of recording of laboratory results			
Proportion of suspected cases for which a sample was received at a laboratory for testing by culture and/or PCR with an associated laboratory result (i.e., not pending) recorded in a surveillance database (integrating epidemiological and laboratory data) (%)	Number of suspected cases with a culture and/or PCR result recorded in a surveillance database	Number of samples received for testing by culture and/or PCR in a given week	80%

***to be adapted depending on the prevailing cholera situation in the surveillance unit** – see **Section 2** of this guidance

To ensure the continuous monitoring of surveillance performance, cholera surveillance systems should also be evaluated periodically using the GTFCC recommended method and criteria.

CHOLERA SURVEILLANCE STRATEGIES

This section first introduces the rationale for adaptive surveillance strategies, and provides the definitions used to determine the prevailing cholera situation in a surveillance unit. Next, the cholera surveillance strategies applicable to each cholera situation are described.

Adaptive surveillance strategies describe *how* surveillance core functions should be performed at the surveillance unit level (as defined below) depending on the prevailing cholera situation.

Surveillance unit

The lowest administrative level at which: i) decisions are made to trigger cholera prevention and control measures; and ii) surveillance findings are used to inform local public health interventions.

The corresponding administrative level is country specific. It should be no bigger than the scale of geographic operational units defined in a country's National Cholera Plan (NCP) (typically administrative levels two or three).

I. Overview

1. Cholera situations

At any point in time, the prevailing cholera situation in a surveillance unit should at minimum be classified as either (**Figure 6**, **Table 6**):

- **the absence of a probable or confirmed cholera outbreak; or**
- **the presence of a probable or confirmed cholera outbreak**

In non-endemic countries (including countries on the path to eliminating cholera), it is recommended that the presence of a probable or confirmed cholera outbreak be further classified as either (**Figures 5 & 6**; **Table 6**):

- **clustered transmission;** or
- **community transmission**

Where this further classification is not made, any probable or confirmed cholera outbreak is considered by default to be community transmission.

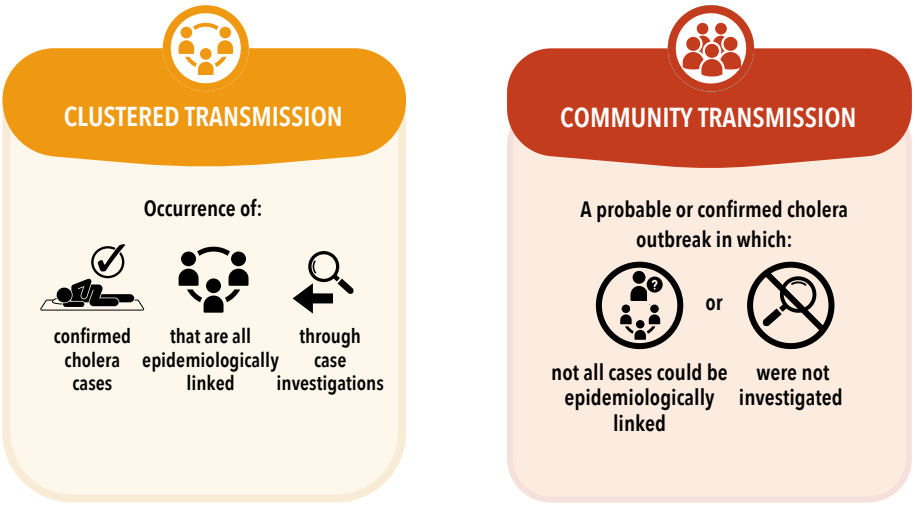


Figure 5. Definitions: clustered and community transmission

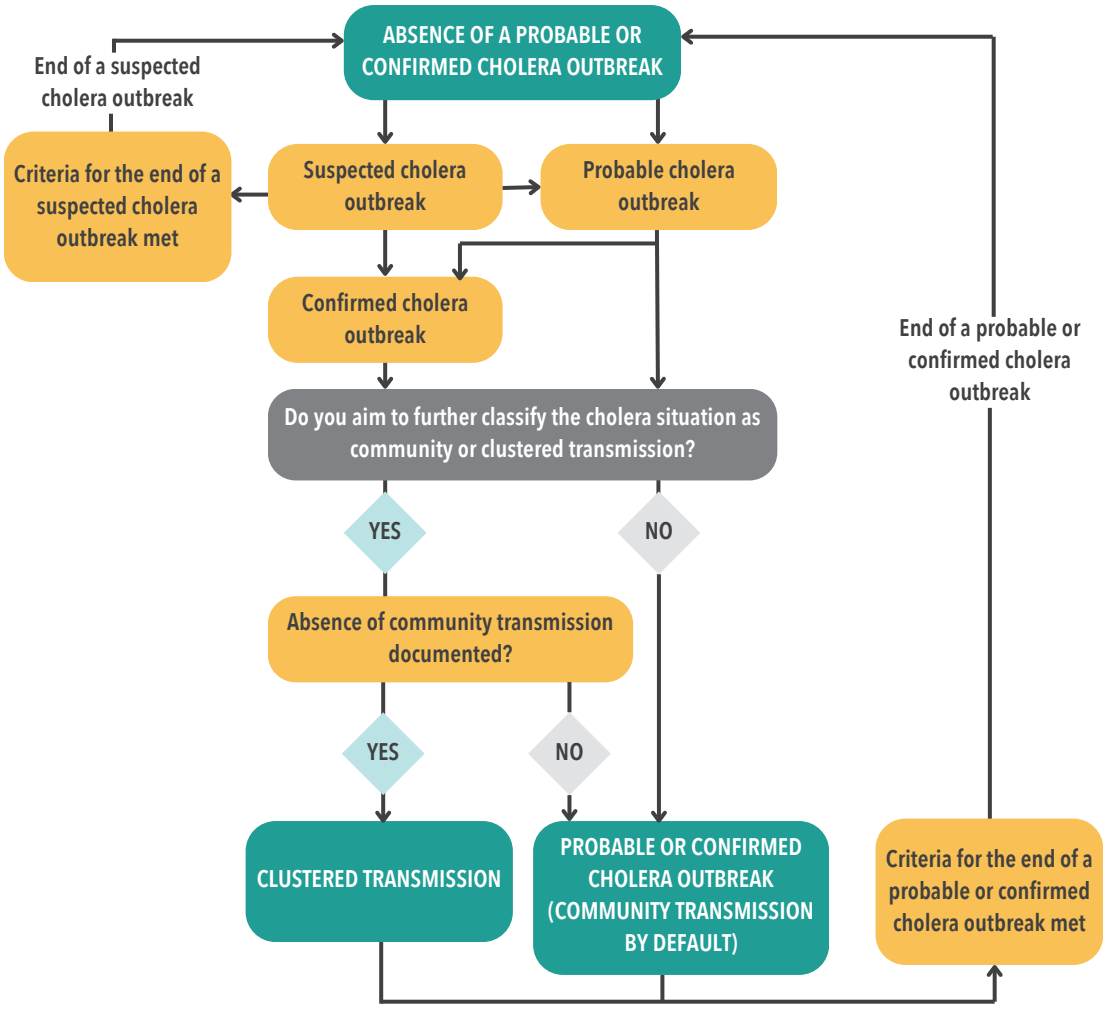


Figure 6. Flow chart for the characterization of the cholera situation in a surveillance unit

2. Adaptive surveillance objectives

Cholera surveillance objectives depend on the prevailing cholera situation in a surveillance unit (**Table 6**):

- **In the absence of a probable or confirmed cholera outbreak, the main surveillance objective is** the **early detection** of any suspected or probable cholera outbreak in order to trigger rapid investigation and response measures to contain its spread;

- **In the presence of a probable or confirmed cholera outbreak** (by default community transmission), **the main surveillance objective is the monitoring of the outbreak** to guide interventions to mitigate its impact and spread;

- **In clustered cholera transmission, the main surveillance objective is to rapidly identify and investigate cluster(s) of cholera cases** in order to target interventions to rapidly interrupt transmission and prevent the onset of community transmission.

Table 6. Cholera situations and corresponding surveillance objectives

CHOLERA SITUATION		SURVEILLANCE OBJECTIVES
Absence of a probable or confirmed cholera outbreak		
	Possible occurrence of suspected cholera case(s), confirmed imported cholera case(s), or a suspected cholera outbreak.	**Rapidly detect**, investigate, and respond to any suspected, probable, or confirmed **cholera outbreak to contain its spread**.
Presence of a probable or confirmed cholera outbreak		
Community transmission	A probable or confirmed cholera outbreak in which confirmed cholera cases are not all epidemiologically linked, or the documentation of epidemiological links was not undertaken. By default, any probable or confirmed cholera outbreak is considered to be community transmission, unless the absence of community transmission has been demonstrated based on the findings of case investigations.	**Monitor the morbidity, mortality, and case fatality ratio** in affected populations to guide interventions **to mitigate the impact and spread of the outbreak**.
Clustered transmission **(if applicable, depending on the country's strategy)**	A confirmed cholera outbreak for which it has been demonstrated (based on the findings of case investigations) that all confirmed cholera cases are epidemiologically linked (i.e., there is no community transmission). In non-endemic countries (including countries on the path to eliminating cholera), documenting epidemiological links to differentiate between clustered and community transmission is encouraged.	**Rapidly detect, confirm, investigate, and respond to cluster(s) of cholera cases to interrupt transmission** and prevent the onset of community transmission

3. Adaptive surveillance strategies

Surveillance objectives depend on the prevailing cholera situation in a surveillance unit; likewise, the surveillance strategies used to meet these objectives also need to be adapted to the current situation. These strategies include:

- **case definitions;**
- **testing strategies;**
- **reporting timelines;**
- **frequency of data analysis and interpretation;**
- **case investigation strategies;** and
- **performance indicator definitions.**

Table 7 provides the main justifications for why these surveillance strategies should be adapted to ensure that cholera surveillance is always fit-for-purpose.

Local health authorities should ensure that the surveillance strategies employed in their surveillance unit are consistent with the prevailing cholera situation. When the prevailing cholera situation changes, local health authorities should actively inform all relevant stakeholders (e.g., health facilities, CBS volunteers, community health workers, and laboratories) of the newly applicable surveillance strategies.

Table 7. Justifications for adapting surveillance strategies to ensure fit-for-purpose cholera surveillance

Surveillance strategy	Key reasons for adapting the strategy to the prevailing cholera situation in a surveillance unit
Case definitions	Because AWD can be of diverse aetiology, a more specific clinical definition of suspected cholera cases should be applied in surveillance units where there is no probable or confirmed cholera outbreak. This will help to prevent frequent, false suspected cholera cases/outbreaks from being detected that could overwhelm the response capacity of the surveillance system, and as a result, decrease its effectiveness at early detection.
Testing strategy	In surveillance units where there is no probable or confirmed cholera outbreak, it is necessary to test all suspected cholera cases to allow for the early detection of a potential outbreak and a rapid response. In contrast, in surveillance units where there is a probable or confirmed cholera outbreak (community transmission), there is no need to test all suspected cholera cases as the clinical management of the disease is primarily guided by the degree of patient dehydration, independent of cholera test results. However, regular testing of a subset of suspected cases using a systematic sampling scheme is required to estimate and monitor (true) cholera incidence. In surveillance units where there is clustered transmission, it is necessary to test all suspected cholera cases to ensure that the interpretation of the type of transmission (i.e., clustered or community transmission) remains sound, based on epidemiological links.
Case investigation strategy	In surveillance units where there is no probable or confirmed cholera outbreak, investigating suspected cholera cases is essential for classifying cases by geographic origin of infection (i.e., locally acquired or imported) — a key epidemiological criterion for confirming the occurrence of a cholera outbreak. In surveillance units where there is a probable or confirmed cholera outbreak (community transmission), investigating suspected cholera cases is useful at the onset to classify cases by geographic origin of infection and to generate hypotheses about potential exposures to help guide the field investigation and response. However, beyond the onset phase, exhaustive case investigation is no longer necessary. In surveillance units where there is clustered transmission, exhaustive investigation of all confirmed cases (at a minimum) is necessary to document epidemiological links and determine the type of transmission (i.e., clustered or community transmission).

Frequency of routine reporting, data analysis, and interpretation	In surveillance units with no probable or confirmed cholera outbreak, daily reporting of suspected cholera cases and daily analysis and interpretation of the corresponding data is necessary to ensure early outbreak detection and response. In surveillance units with a probable or confirmed cholera outbreak (community transmission), weekly reporting of suspected cholera cases and routine analysis and interpretation of the corresponding data is generally sufficient to monitor the outbreak situation. In surveillance units with clustered transmission, daily reporting of suspected cholera cases and daily analysis and interpretation of the corresponding data is necessary to allow for timely case investigation and rapid implementation of measures to prevent the establishment of community transmission.
Performance indicators	Since performance monitoring aims to assess whether cholera surveillance is being performed effectively, and since some key cholera surveillance strategies are adaptive, performance indicator definitions should also be adaptive to serve their purpose.

II. Definitions

This part of the guidance document provides definitions to be used in determining the prevailing cholera situation in a surveillance unit.

1. Signs and symptoms

- **Acute watery diarrhoea (AWD)**

  Acute watery diarrhoea (see **Figure 7**) is an illness in which:

  - Acute is defined as lasting less than seven days;
  - Watery is defined as non-bloody liquid stools that may contain mucous;
  - Diarrhoea is defined as three or more loose stools within a 24-hour period.

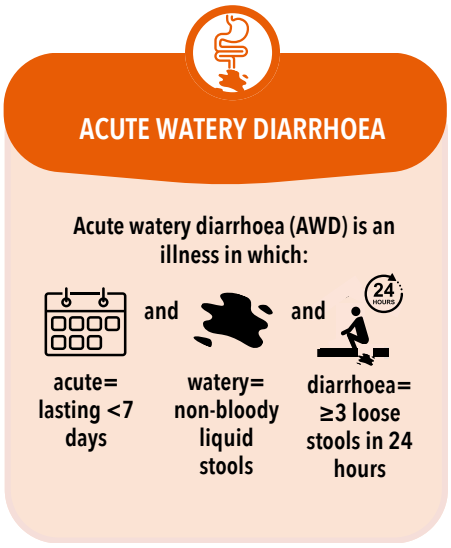


Figure 7. Definition: acute watery diarrhoea

- **Degree of dehydration**

Figure 8 lists the criteria for assessing a patient's level of dehydration.[16] Assessing dehydration is critical, primarily for determining a suitable treatment plan (i.e., patients with no or some signs of dehydration are generally treated with oral rehydration solution, and patients with severe dehydration require intravenous rehydration). More information on cholera treatment can be found in the GTFCC Cholera outbreak response field manual.[16]

The degree of patient dehydration is also used for surveillance purposes; this criterion is included in the definition of a suspected cholera case in surveillance units where there is no probable or confirmed cholera outbreak.

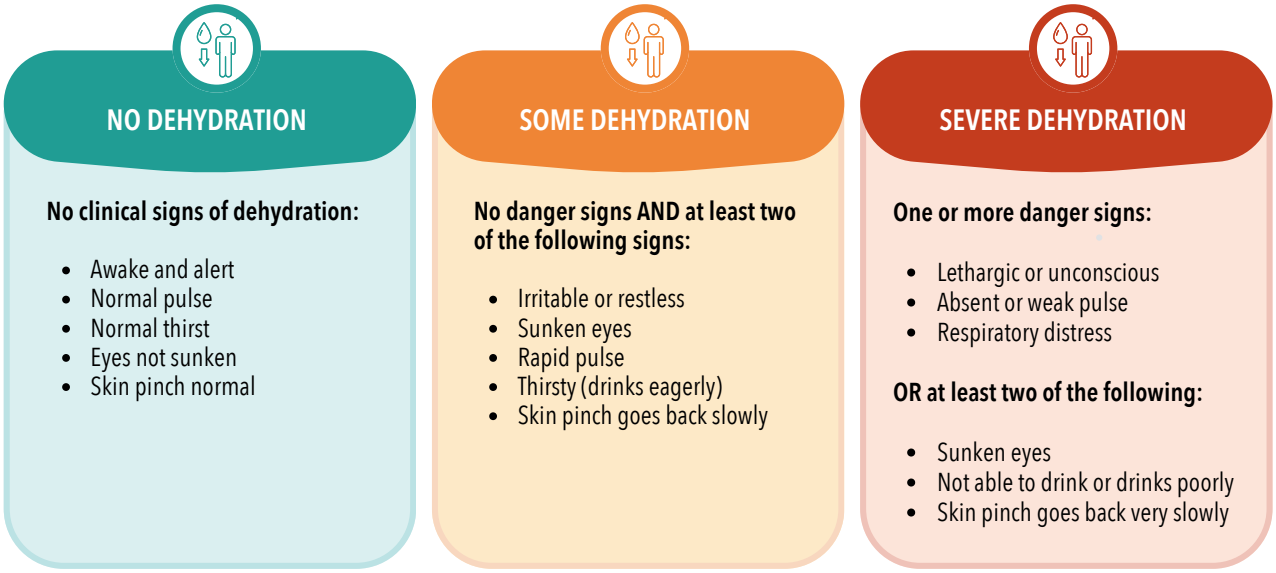


Figure 8. Criteria for assessing level of dehydration at admission

2. Cholera case definitions

- **Suspected cholera case**

The definition of a suspected cholera case depends on whether or not there is a probable or confirmed cholera outbreak in a surveillance unit (**Figures 9 & 10**). As AWD can be of diverse aetiology, a more specific clinical definition applies in surveillance units where there is no probable or confirmed cholera outbreak. This helps to avoid frequent, false suspected cholera cases/outbreaks from being detected that could overwhelm the capacity of the surveillance system, and decrease its effectiveness at early detection.

For the purpose of CBS, it is recommended that the standard definitions listed below be adapted using simplified and local language(s).

In surveillance units where there is no probable or confirmed cholera outbreak:

A suspected cholera case is **a person aged two years or older:**

- **with acute watery diarrhoea and severe dehydration;** or
- **who died from acute watery diarrhoea** with no other known cause of death.

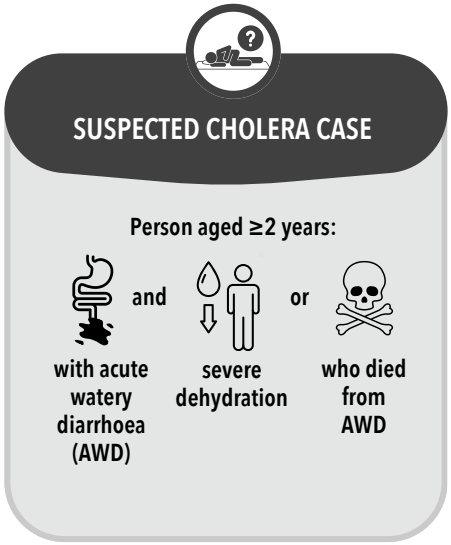


Figure 9. Case definition: Suspected cholera case in the absence of a probable or confirmed cholera outbreak

In surveillance units where there is a probable or confirmed cholera outbreak:

A suspected cholera case is **any person:**

- **with acute watery diarrhoea;** or
- **who died from acute watery diarrhoea**

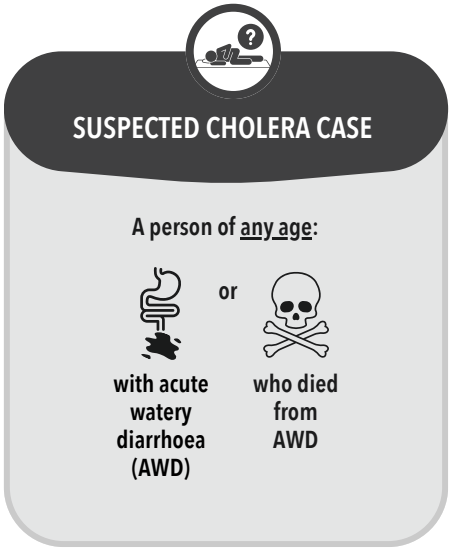


Figure 10. Case definition: Suspected cholera case in the presence of a probable or confirmed cholera outbreak

- **Confirmed cholera case**

A confirmed cholera case (see **Figure 11**) is **any person infected with *Vibrio cholerae* O1 or O139, as confirmed by culture (including seroagglutination) or PCR.**

The bacterial strain should also be demonstrated as toxigenic (by PCR) if there is no confirmed cholera outbreak in other surveillance unit(s), and no established epidemiological link to a confirmed cholera case or source of exposure in another country.

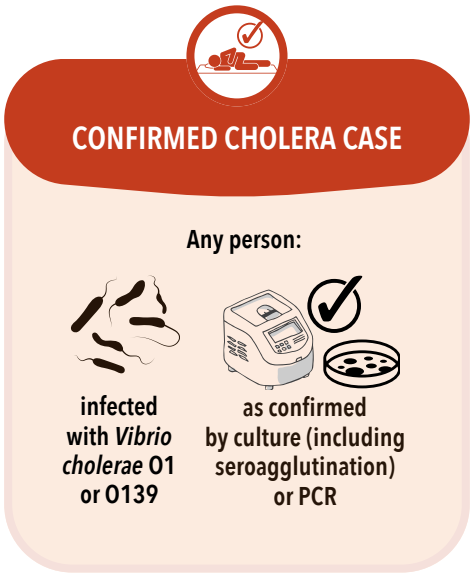


Figure 11. Case definition: Confirmed cholera case

3. Classification of cholera cases by geographic origin of infection

The classification of cholera cases by geographic origin of infection (**Figure 12**) is critical for confirming the occurrence of a confirmed cholera outbreak in a surveillance unit (i.e., the occurrence of at least one locally acquired case).

- **Imported cholera case**

An imported cholera case is a suspected or confirmed cholera infection that was acquired outside of the surveillance unit, as supported by the epidemiological evidence generated through case investigation, or microbiological evidence, or both.

There are two types of imported cholera cases:

- **internationally imported cases** (where the infection was acquired in another country); or
- **domestically imported cases** (where the infection was acquired in another surveillance unit, but in the same country).

The origin of the case (i.e., where the infection was acquired) should be documented.

When a domestically imported case is detected, local health authorities in the surveillance unit where the infection was acquired should be notified. Similarly, when an internationally imported case is detected, it is recommended that health authorities in the country of exposure be informed.

When reporting to the international level, cases should only be considered imported if the infection was acquired in another country (i.e., internationally imported cases). Domestically imported cases should be considered as locally acquired cases, since the infection was acquired in the reporting country.

- **Locally acquired cholera case**

A locally acquired cholera case is a suspected or confirmed cholera infection which was acquired in the surveillance unit where it was detected.

The identification of a locally acquired cholera case is a key epidemiological criterion for confirming the occurrence of a cholera outbreak in a surveillance unit.

When reporting to the international level, locally acquired cases should include all cases infected in the country, including those classified as domestically imported cases.

Uncertainty may arise when classifying cholera cases as imported or locally acquired based on the findings of case investigations. Recent travel to a country or area known as endemic for cholera is not sufficient for concluding that a cholera case was imported. Case classification should be supported by documented evidence regarding the date(s) and place(s) visited, and the prevailing cholera situation in the corresponding area(s). A conservative approach is recommended; a cholera case should be assumed to be locally acquired unless there is strong evidence to conclude otherwise. As a result, a cholera case with insufficient evidence of being an imported case should be classified as locally acquired.

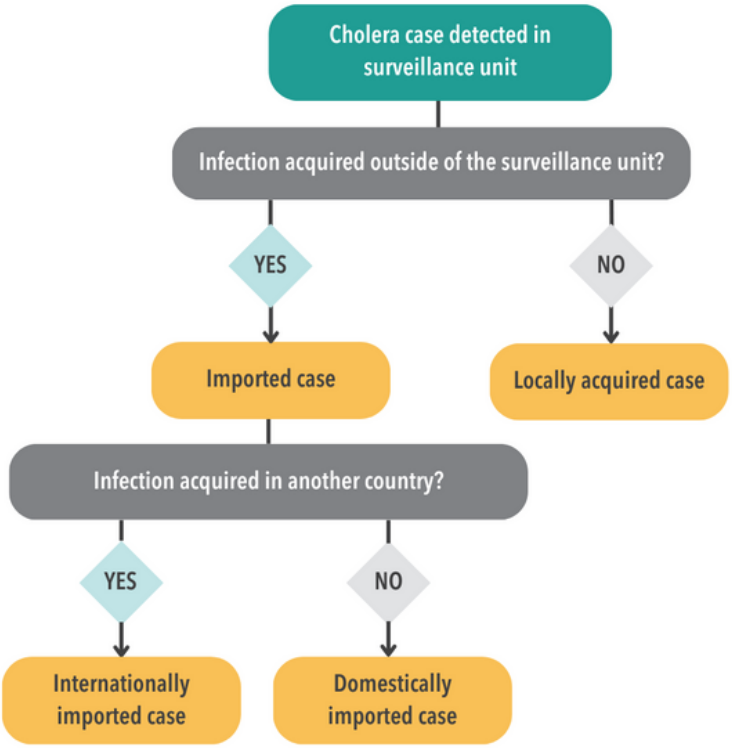


Figure 12. Flow chart for classifying cholera cases by geographic origin of infection

4. Epidemiological links

Countries aiming to differentiate between clustered and community transmission should document the epidemiological links between cholera cases.

- **Epidemiologically-linked cholera case**

An epidemiologically linked cholera case is one in which, in the five days before the onset of illness, the patient:

- had contact with one or more confirmed cholera cases during their infectious period that plausibly led to infection (see definition below); or
- was exposed to the same source or vehicle of infection as a confirmed cholera case (e.g., contaminated food, contaminated well), provided the source or vehicle of infection was clearly established.

Contact with a confirmed cholera case that may plausibly lead to infection includes:

- contact with vomit/faeces;
- provision of direct care, or a bedside visit;
- shared housing;
- shared sanitary facilities;
- shared meal (ate/drank together) or consumed food/beverage prepared or handled by a confirmed cholera case.

5. Cholera outbreak definitions

- Suspected cholera outbreak

Suspected cholera outbreak

Two or more suspected cholera cases reported in the same surveillance unit within seven days; or

One suspected cholera case with a positive RDT result (RDT+).

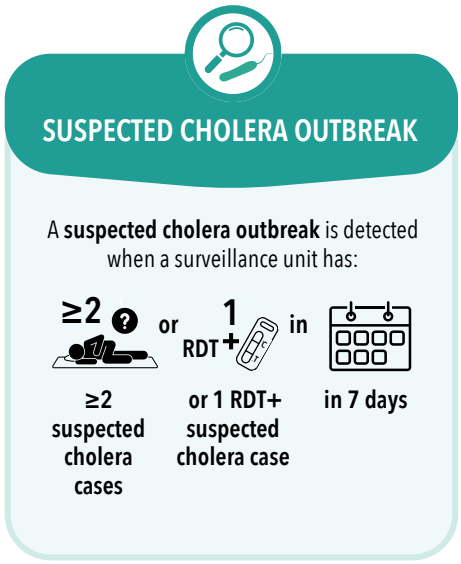


Figure 13. Definition: Suspected cholera outbreak

A suspected cholera outbreak (Figure 13) **should trigger immediate public health measures for acute diarrhoeal diseases** (e.g., case management based on the degree of patient dehydration, promotion of handwashing with soap, food hygiene, health education about how diarrhoeal infections spread, etc.) without waiting for laboratory confirmation of cholera.

Of note, the detection of one suspected case does not represent a suspected cholera outbreak; this is to prevent frequent, false suspected cholera outbreaks from being detected that could overwhelm the response capacity of the surveillance system. However, the detection of one suspected cholera case should prompt all health facilities in the surveillance unit to review cholera case definitions, recommended sample collection and testing schemes, case-based data collection and reporting requirements, and treatment protocols for cholera cases.

- Probable cholera outbreak

Probable cholera outbreak

A probable cholera outbreak is occurring in a surveillance unit **when the number of suspected cholera cases with a positive rapid diagnostic test (RDT+) in the past 14 days achieves or surpasses one of the thresholds defined in Table 8**, while taking into account the number of suspected cases tested.

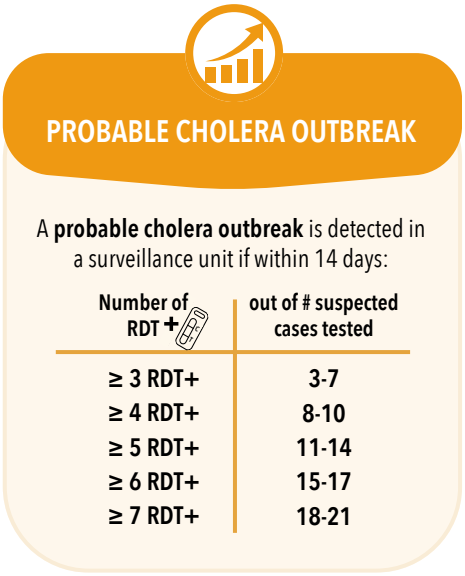


Figure 14. Definition: Probable cholera outbreak

A probable cholera outbreak (Figure 14) **corresponds to a situation where, based on RDT results, there is high confidence that a cholera outbreak is occurring.**

Considering that laboratory confirmation of cholera often takes time, and the disease can spread very rapidly, **detecting a probable outbreak through RDTs allows for the rapid implementation of cholera response measures to contain the outbreak before it becomes widespread.**

Table 8. Detection of a probable cholera outbreak based on a minimum number of suspected cholera cases testing positive by RDT in the surveillance unit

Number of suspected cholera cases tested by RDT *(all suspected cholera cases should be tested by RDT)*	Number of suspected cholera cases that tested positive by RDT	Interpretation
3 to 7 suspected cases tested	At least 3 RDT+	Probable cholera outbreak detected
8 to 10 suspected cases tested	At least 4 RDT+	
11 to 14 suspected cases tested	At least 5 RDT+	
15 to 17 suspected cases tested	At least 6 RDT+	
18 to 21 suspected cases tested	At least 7 RDT+	

The thresholds recommended in Table 8 provide high confidence (>95%) that at least one suspected cholera case that tested positive by RDT is truly infected with *Vibrio cholerae* O1. Calculations for these thresholds assumed that the specificity of RDTs for *Vibrio cholerae* O1 is 80%.[18] Higher specificity of RDTs would result in higher confidence. Of note, should the cholera outbreak be caused by *Vibrio cholerae* O139 (which is very uncommon), the level of confidence is expected to be lower (although there is insufficient evidence to quantify the associated level of confidence).

To detect a probable cholera outbreak, health authorities should review surveillance data daily to assess the number of suspected cholera cases reported and tested by RDT in the past 14 days, and the number of suspected cases that tested positive by RDT, and compare these to the thresholds defined in **Table 8**. This is illustrated in **Box 2**.

Once the threshold for a probable cholera outbreak has been met in a surveillance unit, this status will remain until the cholera outbreak is confirmed, or the criteria for the end of a probable cholera outbreak are met.

A probable cholera outbreak should trigger a rapid, extensive, and comprehensive cholera outbreak response (e.g., community engagement, cholera-specific health promotion activities, WaSH activities, preparation of an Oral Cholera Vaccination reactive request as appropriate, etc.) without waiting for laboratory confirmation.

BOX 2. Hypothetical example — Use of RDT test results to determine the occurrence of a probable cholera outbreak in a surveillance unit

Day 1:

Situation: In the past 14 days, combining all reporting sources, three suspected cholera cases were reported in a surveillance unit. All of them were tested by RDT, and two tested positive. **Interpretation:** Local health authorities review surveillance data daily, and refer to **Table 8**. Three suspected cholera cases were tested by RDT in the past 14 days, of which two tested positive. The threshold for detecting a probable cholera outbreak has not been met. **Conclusion: There is no probable cholera outbreak in the surveillance unit.** However, there is a suspected cholera outbreak, as more than two suspected cholera cases were reported in seven days, and at least one suspected case had an RDT+ result. Local health authorities should implement immediate public health measures for acute diarrheal diseases (not specific to cholera) without waiting for laboratory confirmation of cholera.

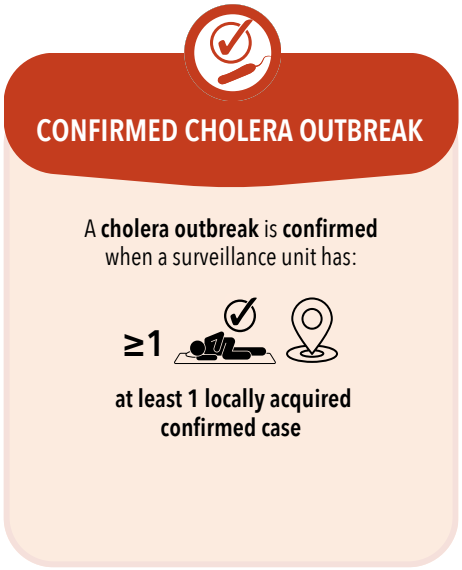
Day 2:

Situation: The next day, two more suspected cholera cases were detected in the surveillance unit. Both were tested by RDT, and both tested positive. **Interpretation:** Local health authorities review surveillance data daily and refer to **Table 8**. Five suspected cases were now tested by RDT in the past 14 days, of which four tested positive. The threshold for a probable cholera outbreak has been met. **Conclusion: A probable cholera outbreak has been detected in the surveillance unit.** Local health authorities should initiate an extensive and comprehensive cholera outbreak response without waiting for laboratory confirmation.

- **Confirmed cholera outbreak**

Confirmed cholera outbreak

The surveillance unit has at least one locally acquired, confirmed cholera case.



A confirmed cholera outbreak (Figure 15) **should trigger a rapid, comprehensive, and multisectoral cholera outbreak response** (including coordination, epidemiology, case management, WaSH, logistics, community engagement, and risk communication).

Figure 15. Definition: Confirmed cholera outbreak

- **Start date of a cholera outbreak**

Start date of a cholera outbreak

The date of onset of symptoms of the first locally acquired suspected cholera case detected in the surveillance unit.

- **End of a cholera outbreak**

End of a suspected cholera outbreak

A suspected cholera outbreak is considered over when all suspected cholera cases that triggered the suspected outbreak **have a negative test result** by RDT, culture, or PCR.

A cholera outbreak is considered to be ongoing as long as the criteria for the end of a cholera outbreak are not met.

When a suspected cholera outbreak is considered over, it is recommended that clinical and laboratory investigations continue in order to determine the aetiology of AWD in the patients that triggered the outbreak. In addition, suspected cholera cases should continue to be reported and tested to detect any new suspected cholera case/outbreak.

End of a probable or confirmed cholera outbreak (community or clustered transmission)

A probable or confirmed cholera outbreak can be considered over when, **for a minimum of four consecutive weeks**, **all suspected cholera cases have a negative test result** by RDT, culture, or PCR.

This definition for the end of a probable or confirmed cholera outbreak applies in the presence of a well-performing surveillance system and adequate laboratory capacity for cholera testing. When there are concerns that cholera surveillance might lack sensitivity and/or cholera testing might be unreliable, it is advisable to consider a period longer than four weeks, and to strengthen the surveillance system, including laboratory capacity for cholera testing.

III. Surveillance strategies: absence of a probable or confirmed cholera outbreak in a surveillance unit

In the absence of a probable or confirmed cholera outbreak in a surveillance unit, surveillance aims to rapidly detect, investigate, and respond to any suspected, probable, or confirmed cholera outbreak to contain its spread. Key surveillance strategies to reach these objectives are summarized in **Figure 16** below, and further described hereafter.

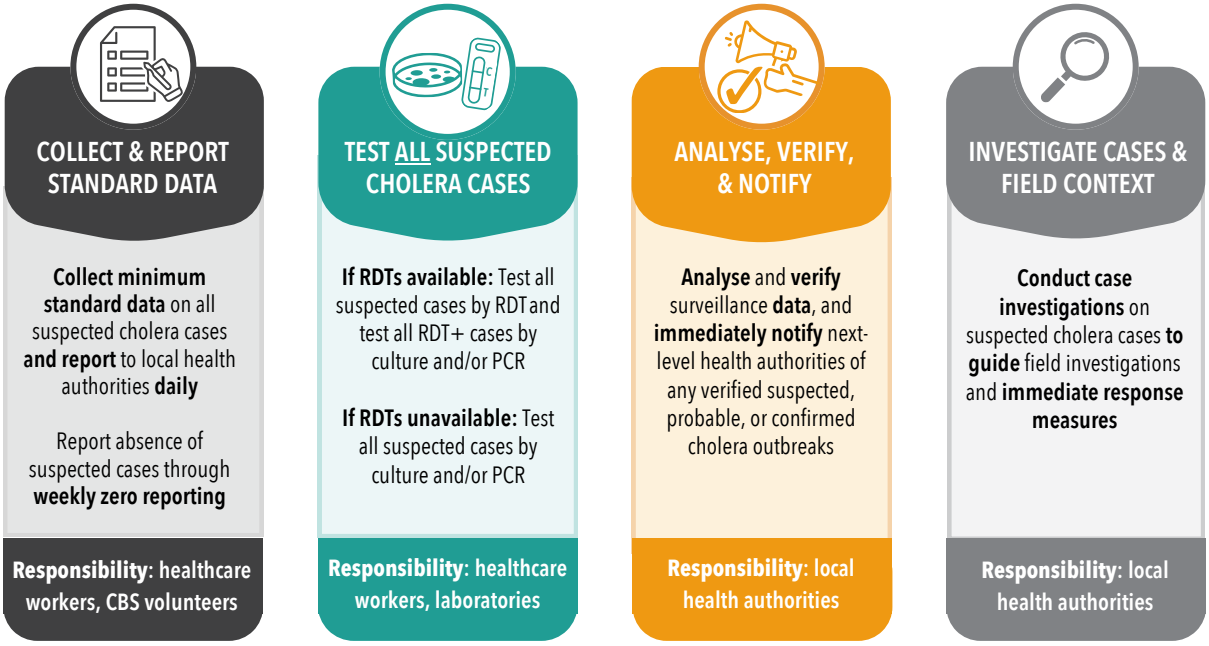


Figure 16. Surveillance strategies: Absence of a probable or confirmed cholera outbreak

Key surveillance strategies to be used in the absence of a probable or confirmed cholera outbreak in a surveillance unit

- **Detection** of suspected cholera cases **using a more specific clinical case definition**;
- **Exhaustive testing** of suspected cholera cases;
- **Reporting any suspected cholera case within 24 hours** of detection (or weekly zero reporting);
- **Daily data analysis** and interpretation to detect a suspected or probable cholera outbreak;
- **Case investigation and field investigation** at the onset of a suspected cholera outbreak.

1. Detection of suspected cases and data collection

Standard data (as defined in **Section 1** of this guidance) should be collected on all patients meeting the applicable definition of a suspected cholera case (i.e., a person aged two years or older with AWD and severe dehydration, or who died from AWD with no other known cause of death) detected via health facility-based surveillance or community-based surveillance.

Of note, in the absence of a probable or confirmed cholera outbreak, any patient with AWD that does not meet the definition of a suspected cholera case (regardless of their age and degree of dehydration) should:

- receive appropriate treatment (see **GTFCC Cholera outbreak response field manual**);[16]
- be recorded and reported as part of AWD surveillance.

2. Testing

All suspected cholera cases should be tested.

In the absence of a probable or confirmed cholera outbreak in a surveillance unit, the definition of a suspected cholera case includes a criterion on severe dehydration. All individuals meeting this clinical definition require intravenous rehydration and should be referred to a health facility for treatment and cholera testing.

- **Overview of the testing strategy**

Figure 17 and **Table 9** summarize recommendations for cholera testing in the absence of a probable or confirmed cholera outbreak in a surveillance unit.

It is recommended that all suspected cholera cases be tested by RDT to facilitate the early detection of a probable cholera outbreak, and that any RDT+ samples be triaged for further laboratory testing (i.e., culture or PCR confirmation, and antimicrobial susceptibility testing).

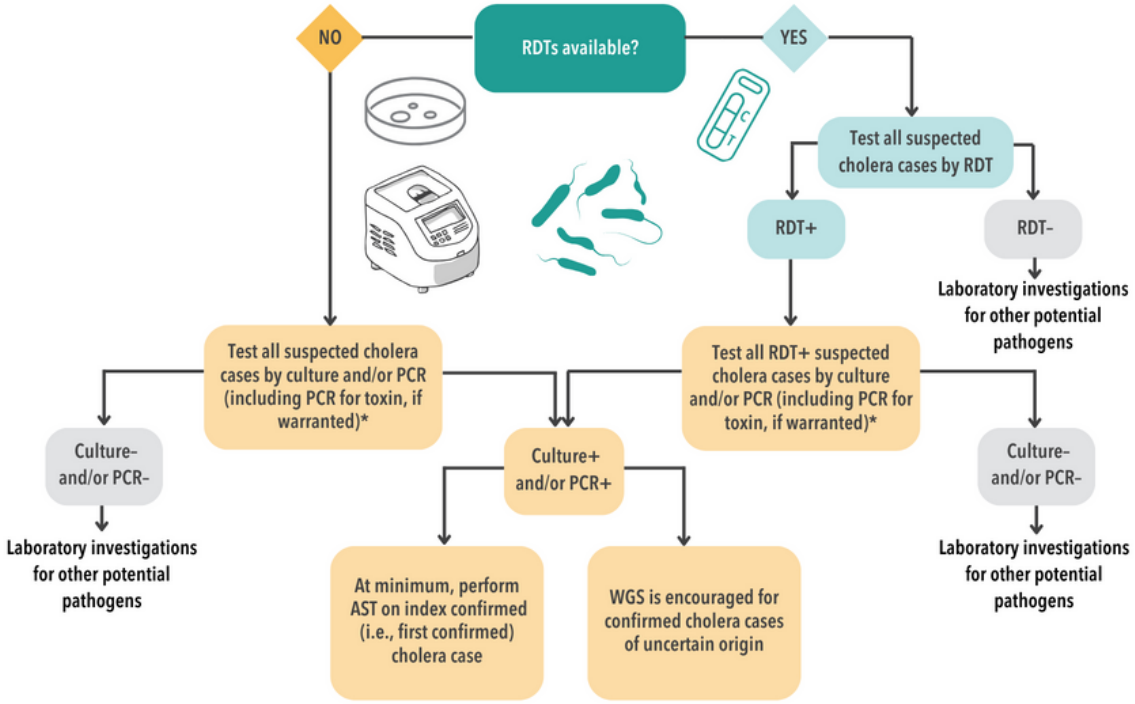


Figure 17. Testing strategy in the absence of a probable or confirmed cholera outbreak in a surveillance unit

Table 9. Summary of recommendations for cholera testing in the absence of a probable or confirmed cholera outbreak in a surveillance unit

ABSENCE OF A PROBABLE OR CONFIRMED OUTBREAK: Testing strategy for confirmation of cases and characterisation of strains	
Testing strategy for confirmation of cases if RDTs are available	
RDT testing	**Test all suspected cholera cases by RDT**
Laboratory testing (culture or PCR)	**Test all suspected cholera cases with RDT+ results by culture and/or PCR** including, if warranted, testing for toxigenicity
Testing strategy for confirmation of cases if RDTs are unavailable	
Laboratory testing (culture or PCR)	**Test all suspected cholera cases by culture and/or PCR** including, if warranted, testing for toxigenicity*
Testing strategy for characterisation of strains in confirmed cases	
AST	**Perform AST** at minimum **on the index confirmed cholera case** (first confirmed case)
WGS	**WGS is encouraged for confirmed imported cholera case(s)** (when there is uncertainty about the origin of importation) but it is not required for public health interventions

*See **Section II - 2 Confirmed cholera case** for an explanation of when toxigenicity testing is warranted.

- **Recommendations for testing where RDTs are available**
  - **RDT testing**

    All suspected cholera cases detected at health facilities should be tested by RDT.

  - **Laboratory testing of RDT+ samples**

    All RDT+ samples should be tested by:

    - **culture** (including seroagglutination) for confirmation of *Vibrio cholerae* O1/O139 and, if warranted, PCR for confirmation of toxigenicity

      or

    - **PCR** for species identification (*Vibrio cholerae*) and serogroup identification (O1/O139) and, if warranted, confirmation of toxigenicity.

    Confirmation of toxigenicity, if warranted (as defined in **II. Definitions - 2. Cholera case definitions**), is only to be conducted on the first confirmed cholera case in a country.

- **Recommendations for testing where RDTs are unavailable**

  All suspected cholera cases detected at health facilities should be tested by:

  - **culture** (including seroagglutination) for confirmation of *Vibrio cholerae* O1/O139 and, if warranted, PCR for confirmation of toxigenicity

    or

  - **PCR** for species identification (*Vibrio cholerae*) and serogroup identification (O1/O139) and, if warranted, confirmation of toxigenicity.

- **Antimicrobial Susceptibility Testing**

  AST should be performed at minimum on the index confirmed cholera case (first confirmed case).

- **Whole Genome Sequencing**

  WGS can be used to confirm that a strain belongs to the seventh pandemic El Tor lineage (7PET), or any newly defined epidemic *Vibrio cholerae* lineage, when there is no established epidemiological link to a confirmed cholera case or source of exposure (particularly in countries on the path to eliminating cholera). However, WGS is not necessary for public health intervention or action. Samples may be preserved for WGS to be conducted at a later time.

3. Routine reporting

Any suspected cholera case(s) and RDT results (positive, negative, inconclusive) **should be reported daily** to local health authorities.

If no suspected cholera cases are detected, the absence of cases should be reported on a **weekly** basis (i.e., **zero reporting**).

4. Analysis and interpretation of surveillance data

When suspected cholera cases are reported, **surveillance data should be analysed and interpreted daily** in order to detect any suspected or probable cholera outbreak.

Other information sources (such as EBS) can support the early detection of a cholera outbreak. In addition, monitoring risk factors that might be associated with cholera outbreaks (including but not limited to natural disasters, deteriorated access to water and water quality, conflicts, etc.) can strengthen cholera surveillance and support the early detection of an outbreak (e.g., through awareness-raising about cholera case definitions, sample collection procedures for testing, recommended testing schemes, case-based data collection and reporting, and treatment of cholera cases, etc.).

5. Detection of a suspected cholera outbreak

If a suspected cholera outbreak is detected (i.e., two or more suspected cholera cases reported in the same surveillance unit within seven days, or one suspected cholera case with a positive RDT result), **the following key steps must be undertaken within 24 hours** of detection without waiting for laboratory confirmation of the outbreak:

- **verification should be completed by local health authorities**; if the suspected cholera outbreak is deemed to be invalid (e.g., definition of suspected cholera case or of a suspected cholera outbreak are not met after verification), the AWD event should nonetheless be further investigated to identify the causative agent and trigger response measures as appropriate;

- **health authorities at the next level should be immediately notified about a verified suspected cholera outbreak**;

- **case investigation should be initiated by local health authorities** on suspected cholera cases;

- **if the case investigations do not conclude with confidence that all suspected cholera cases are imported, field investigation and immediate response measures should be initiated**.

Of note, if only imported cholera case(s) are detected through case investigations, active case finding might be considered to rule out secondary transmission. This can be achieved by contacting or visiting health facilities and community health workers/volunteers to review registers and surveillance records, inquiring in the community, or conducting door-to-door screening.

The detection of a suspected cholera outbreak does not trigger any changes in surveillance strategies until the criteria for a probable or a confirmed cholera outbreak are met.

6. Confirmation of a suspected cholera outbreak and changes in the applicable surveillance strategies

If a suspected cholera outbreak is confirmed, health authorities at the next level should be immediately notified within 24 hours of confirmation. The prevailing cholera situation in the surveillance unit then changes from "absence of a probable or confirmed cholera outbreak" to "presence of a probable or confirmed cholera outbreak", and surveillance strategies must be adapted accordingly.

7. Detection of a probable cholera outbreak and changes in the applicable surveillance strategies

If a probable cholera outbreak is detected, the following key steps must be undertaken within 24 hours of detection without waiting for laboratory confirmation of the outbreak:

- **verification should be completed by local health authorities**; if the probable cholera outbreak is deemed to be invalid (e.g., definition of suspected cholera cases or of a probable cholera outbreak are not met after verification), the AWD event should nonetheless be further investigated to identify the causative agent and trigger response measures as appropriate;

- **health authorities at the next level should be immediately notified** about a verified probable cholera outbreak.

Once a probable cholera outbreak is verified, the prevailing cholera situation in the surveillance unit changes from "absence of a probable or confirmed cholera outbreak" to "presence of a probable or confirmed cholera outbreak", and surveillance strategies must be adapted accordingly.

8. Monitoring of cholera surveillance performance

Table 10 and **Appendix VIII** describe how the minimum performance indicators defined in **Table 4** should be adapted in surveillance units with an absence of a probable or confirmed cholera outbreak, to best reflect (and monitor the implementation of) the applicable surveillance strategies**.**

Table 10. Definitions of the minimum performance indicators applicable in surveillance units in the absence of a probable or confirmed cholera outbreak

Generic definition from Table 4	Adaptive criteria in the absence of a probable or confirmed cholera outbreak
HEALTH FACILITY-BASED SURVEILLANCE	
Completeness of reporting	
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Definition independent of the cholera situation in the surveillance unit
Timeliness of reporting	
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline in a given week (%)	**Maximum applicable deadline:** If a suspected cholera case is detected: within 24 hours of detection; or If no suspected cholera case is detected: within 7 days of the end of the reporting week. *Note: the same deadline should be applied in monitoring the timeliness of reporting to upper levels*

COMMUNITY-BASED SURVEILLANCE	
Completeness of reporting	
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Definition independent of the cholera situation in the surveillance unit
Timeliness of reporting	
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline in a given week (%)	**Maximum applicable deadline:** If a suspected cholera case is detected: within 24 hours of detection; or If no suspected cholera case is detected: within 7 days of the end of the reporting week.
INVESTIGATION	
Completeness of case investigation	
Proportion of cholera cases subject to case investigation that were investigated in a given week (%)	**Cholera cases subject to case investigation:** All suspected cholera cases when there is a verified suspected cholera outbreak
Timeliness of field investigation	
Proportion of cholera events subject to field investigation for which field investigation was initiated within 24 hours of detection in a given week (%)	**Events subject to field investigation:** A verified suspected cholera outbreak (i.e., if case investigations did not conclude with confidence that all reported cholera cases were imported)
TESTING	
Adherence to testing strategy (RDT, if applicable)	
Proportion of occurrences subject to testing by RDT that were tested by RDT in a given week (%)	**Occurrences subject to testing by RDT:** Suspected cholera cases

Adherence to testing strategy (culture and/or PCR)	
Proportion of occurrences subject to testing by culture and/or PCR that were tested by culture and/or PCR in a given week (%)	**Occurrences subject to testing by culture and/or PCR:** If RDTs are used: Suspected cholera cases with a positive RDT result If RDTs are not used: Suspected cholera cases
Timeliness of sample receipt by the laboratory	
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Definition independent of the cholera situation in the surveillance unit

IV. Surveillance strategies: presence of a probable or confirmed cholera outbreak in a surveillance unit (community transmission)

In the presence of a probable or confirmed cholera outbreak — either demonstrated to be community transmission or considered by default to be community transmission (in countries that do not differentiate between clustered and community transmission) — **surveillance aims to monitor the morbidity, mortality, and case fatality ratio in affected populations to guide interventions to mitigate the impact and spread of the outbreak**. Key surveillance strategies to reach these objectives are summarized in **Figure 18**, and further described hereafter.

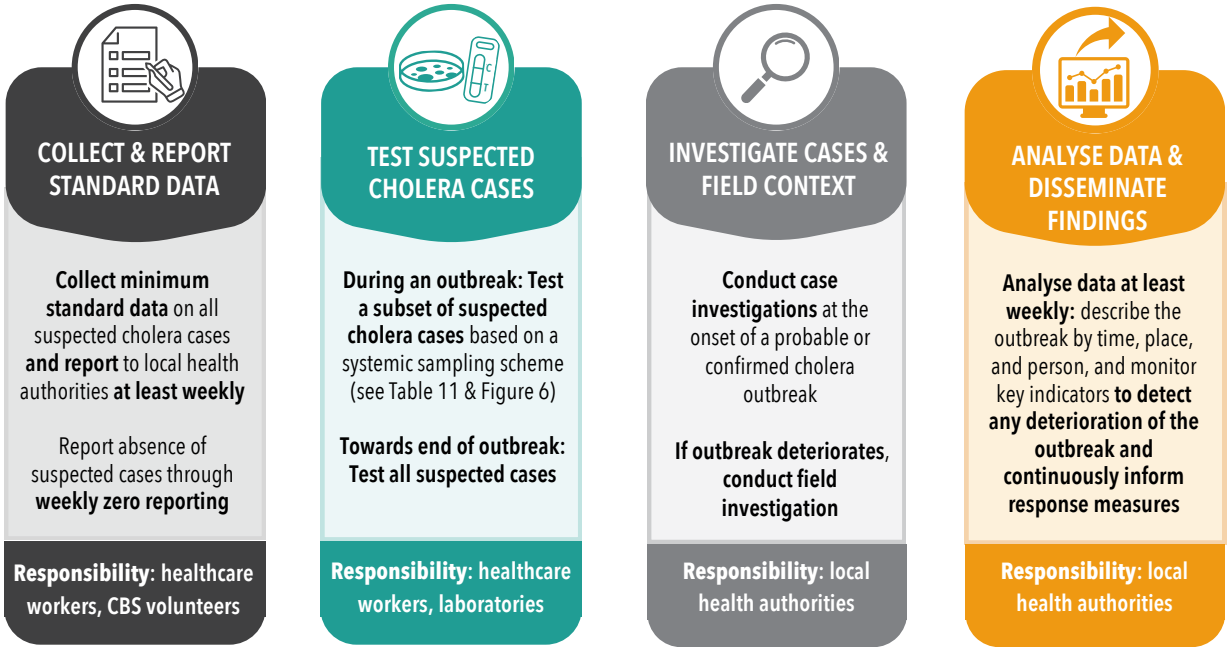


Figure 18. Surveillance strategies: Presence of a probable or confirmed cholera outbreak (community transmission)

Key surveillance strategies to be used in the presence of a probable or confirmed cholera outbreak in a surveillance unit (community transmission)

- **Testing of a subset of suspected cholera cases** according to a systematic sampling scheme;
- **Case investigation and field investigation at the onset** of a probable or confirmed outbreak;
- At minimum, **weekly reporting of standard data** (including zero reporting);
- **Weekly data analysis,** interpretation, and dissemination.

1. Detection of suspected cases and data collection

Standard data (as defined in **Section 1** of this guidance) **should be collected on all patients meeting the applicable definition of a suspected cholera case** (i.e., any person with or who has died from AWD) detected via health facility-based surveillance or community-based surveillance.

2. Investigation

At the onset of a probable cholera outbreak, **case investigation should be initiated by local health authorities within 24 hours of detecting the outbreak** (and within 24 hours of reporting any suspected case during the onset phase of the outbreak).

Field investigation and immediate response measures should be undertaken if the case investigations do not conclude with confidence that all reported suspected cholera cases are imported.

If only imported cholera case(s) are detected through the case investigations, conducting active case finding might be considered to rule out secondary transmission. This can be achieved by contacting or visiting health facilities and community health workers to review registers and surveillance records, inquiring in the community, or conducting door-to-door screening.

If a probable cholera outbreak is later characterised as a confirmed cholera outbreak (i.e., at least one locally acquired cholera case is confirmed), **health authorities at the next level should be immediately notified (within 24 hours of confirmation of the first case).**

During the onset phase of a confirmed cholera outbreak, **case investigation should be conducted by local health authorities within 24 hours of reporting any suspected case**, and a field investigation and immediate response measures should be undertaken.

3. Testing

If not previously done, laboratory confirmation (via culture/PCR) of the first cholera case should be undertaken (see **III. Surveillance strategies in the absence of a probable or confirmed cholera outbreak in a surveillance unit**). Also, confirmation of toxigenicity may be warranted in rare instances (i.e., if there is no confirmed cholera outbreak in other surveillance units of the country, and there is no established epidemiological link to a confirmed cholera case/source of exposure in another country). However, this is only to be conducted on the first confirmed case in the country.

Once a probable outbreak has been detected or an outbreak has been confirmed by the laboratory, **a subset of suspected cholera cases should be routinely tested in accordance with a systematic sampling scheme** to monitor the incidence of cholera as well as its microbiological characteristics (e.g., circulating strains, antimicrobial susceptibility, etc.). **There is no need to test all suspected cholera cases to monitor the outbreak.** The clinical management of cholera cases should be based on clinical signs (i.e., the degree of patient dehydration), independent of laboratory confirmation or RDT results. However, **towards the end of an outbreak** (i.e., when the occurrence of suspected cholera cases is sporadic), **all suspected cholera cases should be tested** to support the documentation of the end of the outbreak (in accordance with the definition for the end of a probable or confirmed cholera outbreak).

- **Overview of the testing strategy**

Figure 19 and **Table 11** summarize recommendations for cholera testing in the presence of a probable or confirmed cholera outbreak in a surveillance unit.

It is recommended that health facilities test a subset of suspected cholera cases by RDT each day (based on a systematic sampling scheme) and that laboratory testing be performed on a subset of suspected cholera cases that tested positive by RDT each week (also based on a systematic sampling scheme).

The number of samples collected and tested by the laboratory depends on laboratory capacity and on the outbreak dynamics in the surveillance unit. However, **ideally, each health facility would send a minimum of three samples weekly** (from suspected cases and, when available, samples pre-selected by a positive RDT result) **for laboratory confirmation and antimicrobial susceptibility testing.**

Towards the end of an outbreak (i.e., when the occurrence of suspected cholera cases is sporadic), testing all suspected cases by RDT or culture or PCR is recommended to confirm the end of the outbreak.

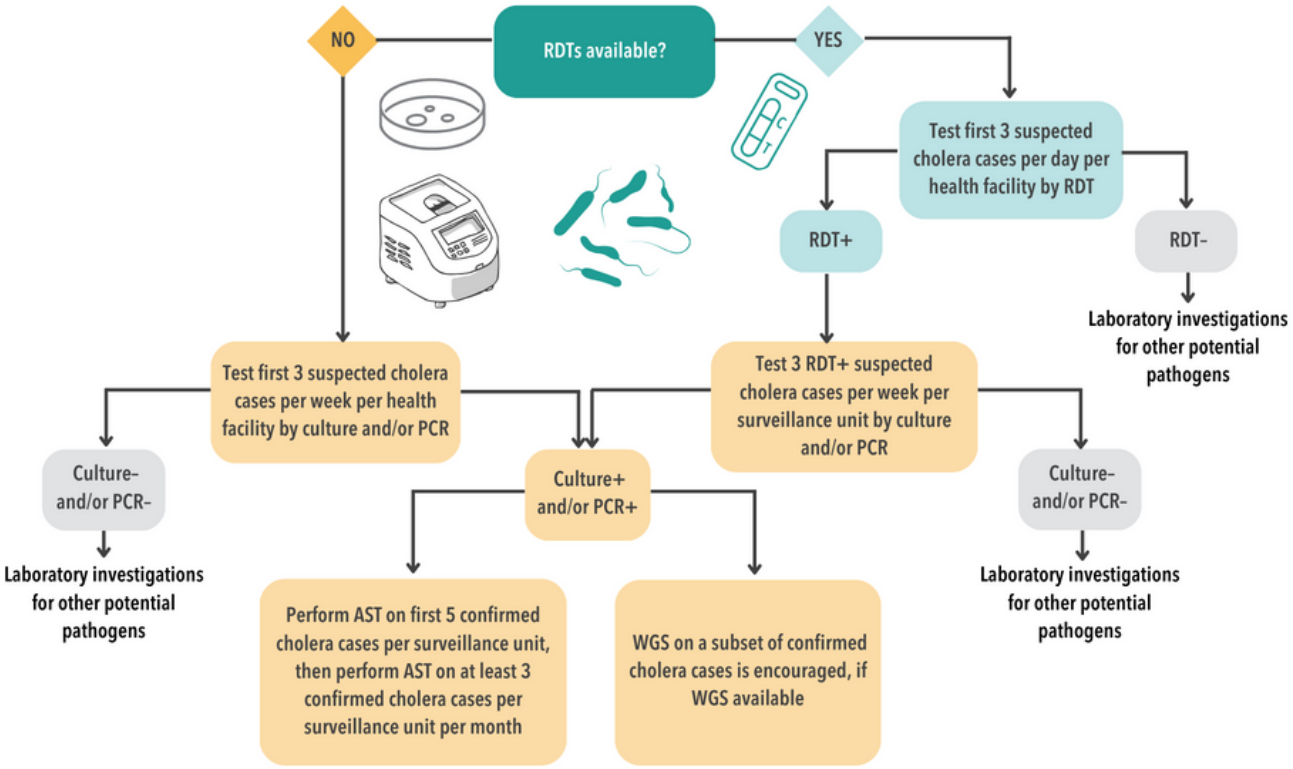


Figure 19. Testing strategy in the presence of a probable or confirmed cholera outbreak in a surveillance unit (community transmission)

Table 11. Summary of recommendations for cholera testing in the presence of a probable or confirmed cholera outbreak in a surveillance unit (community transmission)

PRESENCE OF A PROBABLE OR CONFIRMED OUTBREAK (COMMUNITY TRANSMISSION): Testing strategy for confirmation of cases and characterisation of strains	
Testing strategy for confirmation of cases if RDTs available	
RDT testing	**Test the first 3 suspected cholera cases per day per health facility by RDT**
Laboratory testing (culture or PCR)	**Test 3 RDT+ per week per surveillance unit by culture and/or PCR**
Alternative testing strategy for confirmation of cases if RDTs are unavailable	
Laboratory testing (culture or PCR)	**Test the first 3 suspected cholera cases per week per health facility by culture and/or PCR**
Testing strategy for characterisation of strains in confirmed cases	
AST	**Perform AST on first 5 confirmed cholera cases** per surveillance unit. **Then, perform AST on at least 3 confirmed cholera cases per surveillance unit per month.**
WGS	**Performing WGS on a subset of confirmed cholera cases is encouraged** (if access to WGS is available) but this is not required to support public health interventions.

- **Recommendations for testing where RDTs are available**
  - **RDT testing**

RDT testing of suspected cholera cases should be carried out using a systematic sampling scheme (i.e., the sampling scheme should be consistent over time).

For the purpose of monitoring cholera incidence*, **it is recommended that each health facility** in the surveillance unit **use RDTs to test the first three suspected cholera cases detected each day**. Unpublished studies have shown that this sampling scheme allows for true cholera incidence to be estimated with high confidence when compared to exhaustive testing. Importantly, no additional criteria should be applied in selecting the suspected cases for testing (e.g., no consideration should be given to clinical severity or age). This is key for deriving reliable estimates of true cholera incidence using this systematic sampling scheme.

If fewer than three suspected cases are detected in a health facility on a given day, all suspected cases should be tested by RDT.

*Methods to estimate true cholera incidence from the incidence of suspected cholera using the results of a systematic sampling scheme are addressed separately.

If RDT supply does not allow for three suspected cases to be tested per day per health facility, the maximum number of suspected cases that can be tested in a systematic manner over time should be tested (e.g., the first suspected case per day or the first two suspected cases per day).

A higher number of suspected cholera cases (> 3 cases) may be tested by RDT per day in each health facility if this is expected to provide a benefit for cholera control, and if the corresponding sampling scheme can be applied in a systematic manner over time.

- **Laboratory testing of RDT+ samples**

Three RDT+ samples per week from each surveillance unit should be tested by:

- **culture** (including seroagglutination) for confirmation of *Vibrio cholerae* O1/O139

  or

- **PCR** for species identification (*Vibrio cholerae*) and serogroup identification (O1/O139).

If fewer than three suspected cholera cases are detected in a surveillance unit in a given week, all suspected cases should be tested.

When selecting RDT+ samples for further laboratory testing, the goal should be to test from all affected geographic areas in the surveillance unit, and from multiple timepoints.

- **Recommendations for testing where RDTs are unavailable**

The first three suspected cholera cases per week from each health facility should be tested by:

- **culture** (including seroagglutination) for confirmation of *Vibrio cholerae* O1/O139

  or

- **PCR** for species identification (*Vibrio cholerae*) and serogroup identification (O1/O139)

- **Antimicrobial Susceptibility Testing**

At the onset of a confirmed cholera outbreak, AST should be performed on the first five confirmed cholera cases per surveillance unit.

Then, AST should be performed on at least three confirmed cholera cases per month per surveillance unit. If fewer than three cholera cases are confirmed in a surveillance unit in a given month, AST should be performed on all confirmed cases.

- **Whole Genome Sequencing**

The use of WGS to characterise the strains of a subset of confirmed cholera cases is encouraged (particularly in countries on the path to eliminating cholera). However, this is not necessary for public health intervention or action. Samples may be preserved for WGS to be conducted at a later time.

4. Routine reporting

Health facility staff and community-based surveillance volunteers (or Community Health Workers) should **report standard data to local health authorities on a weekly basis, including zero reporting**.

More frequent reporting (e.g., daily) is encouraged at the onset and towards the end of an outbreak (i.e., when the occurrence of suspected cholera cases is sporadic).

Under exceptional circumstances, if the reporting of standard case-based data cannot be sustained in a timely manner due to overstretched capacity, aggregate reporting may be considered. However, reporting of standard case-based data should be resumed as soon as possible.

5. Analysis and interpretation of surveillance data

Local health authorities should perform data analysis at least on a weekly basis.

More frequent analysis (e.g., daily) is encouraged at the onset and towards the end of an outbreak to help ensure timely implementation of interventions to interrupt transmission, and to confirm the end of the outbreak.

Data analysis should be conducted primarily at the level of the surveillance unit, and if possible, disaggregated to a lower level (e.g., health facility catchment areas) to inform targeted interventions.

Analysis should include both weekly data for the last epidemiological week (or daily data for the last day), and cumulative data starting from the beginning of the calendar year (or the start date of the outbreak). Weekly (or daily) values should be compared with those of the previous week(s) or day(s).

Data analysis should include the description of cases by person, place, and time, and the monitoring of key morbidity and mortality indicators (i.e., incidence rate, cumulative incidence rate, case fatality ratio, community deaths, test positivity rate). Further details are provided in **Boxes 3, 4 & 5** and in **Table 12**.

Cholera cases and deaths reported in health facilities and in the community should be analysed separately (i.e., should not be added up) but interpreted jointly.

Of note, deaths reported as "Dead on arrival at a health facility (community death)" should be counted as community cholera cases and deaths (i.e., included in the analysis of CBS data for cholera).

BOX 3. Key figures for describing cholera cases and deaths by person, place, and time

Person

- Number of suspected cholera cases
- Number of suspected cases tested by RDT or by culture or PCR
- Number of cases tested positive by RDT or by culture or PCR
- Number of cholera deaths that occurred in health facilities (institutional cholera deaths)
- Number of community cholera deaths
- Number of cholera cases stratified by age group and sex (the following age groups should be considered: <2, 2-4, 5-14, 15-44, 45-59, ≥60 years old)
- Number of cholera deaths stratified by age group and sex (the following age groups should be considered: <2, 2-4, 5-14, 15-44, 45-59, ≥60 years old)
- Proportion of cases hospitalised as inpatients
- Proportion of cases by level of dehydration (at least severe dehydration)

Place

The analysis of the spatial distribution of suspected and confirmed cholera cases and deaths in a surveillance unit aims to describe the geographic extent of the outbreak, to identify the areas most affected, and to formulate hypotheses regarding potential source(s) of contamination and contexts of transmission.

Spatial analysis may include mapping of cases and deaths, or tabulations or graphical representations (e.g., bar charts).

If mapping is done, it is advisable to include other geographic variables or points of interest that might be associated with cholera transmission (e.g., water sources, major transportation routes, markets, etc.).

Time

Cholera cases and deaths should be plotted over time to monitor the outbreak dynamics (e.g., the epidemic curve of the number of suspected cholera cases by date of symptom onset or date of consultation/admission). Important dates can be indicated alongside the epidemic curve to facilitate the interpretation of outbreak dynamics (e.g., date of the first case reported, changes in surveillance, declaration of the outbreak, response efforts including OCV campaigns, etc.).

BOX 4. Key epidemiological indicators for cholera surveillance

The key morbidity and mortality indicators listed in **Table 12** should be monitored.

These indicators can be stratified by age group (e.g., at the very minimum for <5 and ≥5 years old), sex, and place using a fine geographic scale to provide further insights about population groups and areas affected.

Rates and percentages (e.g., case fatality ratio, test positivity rate) should be interpreted with caution when calculated from a small number of cases or deaths (e.g., at the beginning or towards the end of an outbreak).

Table 12. Key epidemiological indicators for cholera surveillance

Indicator	Definition	Numerator	Denominator	Interpretation
Incidence rate	Occurrence of new (suspected and confirmed) cholera cases reported in a population during a given time interval (for example, per week). Often expressed as a rate per 1,000, 10, 000 or 100, 000.	Number of new (suspected and confirmed) cholera cases reported during a given time interval	Population at-risk during the same time interval	Indicates the evolution of the outbreak and the speed of its spread, and allows comparison between geographic units and time units (e.g., weeks)
Cumulative incidence rate	Proportion of the population at-risk that has contracted cholera during a given time interval (for example one year, or the whole duration of the outbreak). Often expressed as a percentage (%).	Total number of (suspected and confirmed) cholera cases reported since the beginning of the outbreak or since the beginning of the year	Population at-risk at the beginning of the outbreak or at the beginning of the year	Indicates the impact of the outbreak in the population

Case fatality ratio (CFR)	Proportion of institutional cholera deaths among (suspected and confirmed) cholera cases reported at health facilities during a specified time interval. Often expressed as a percentage (%).	Number of institutional cholera deaths reported at health facilities during a given time interval	Number of (suspected and confirmed) cholera cases reported at health facilities within the same time interval	Indicator of adequate case management and access to cholera treatment. A CFR >1% is usually due to one or a combination of different factors such as poor access to health facilities, lack of healthcare seeking behaviour, and/or inadequate case management. Monitoring the CFR should be complemented by monitoring of the number of community deaths.
Test positivity rate (stratified by test method: RDT, or culture/PCR)	Proportion of tests performed (stratified by test method) that are positive. Expressed as a percentage (%).	Number of positive test results (stratified by test method)	Number of tests performed (stratified by test method)	To be triangulated with the epidemic curve to support the interpretation of cholera outbreak trends. For example, a low test positivity rate combined with an increase in suspected cholera cases may indicate a concomitant outbreak of diarrhoeal illness caused by a different pathogen, or issues with laboratory confirmation.

- **Data visualisation and interpretation**

  Outputs should be presented in concise summary tables, graphs (e.g., age-sex pyramids, pie charts, histograms, or line charts), and maps, and interpreted to ensure that the information is clear and useful for public health action.

  Interpretation focuses on why the observed cholera patterns have occurred, and what this implies for interventions. Interpretation should consider areas and populations at-risk, as well as contextual information (e.g., policy changes; behavioural practices; care-seeking behaviours; access to healthcare; physical, social, and financial barriers to cholera prevention; social and community dynamics; seasonality; climate, etc.) and interventions (e.g., WaSH, OCV, case management, community engagement, etc.) that might explain the trends in epidemiological indicators, and provide an holistic understanding of the outbreak dynamics to support evidence-based decision-making for response activities. Additional information on integrating multiple sources of information for interpreting cholera outbreak dynamics can be found in **Integrated Outbreak Analytics (IOA) and Cholera**.[19]

  The analysis and interpretation of surveillance data should be disseminated in weekly epidemiological reports to health authorities, health professionals, and other sectors (e.g., water and sanitation, environmental, etc.) to inform decisions and actions for multisectoral cholera control and response interventions.

6. Detection and investigation of the deterioration of an outbreak

A deterioration of a (probable or confirmed) cholera outbreak corresponds to the worsening of the epidemiological situation over a few weeks (i.e., at least two consecutive weeks) in a surveillance unit, indicating that response activities are not effective in mitigating cholera morbidity, mortality, or spread.

A deteriorating outbreak may be detected through the routine analysis and interpretation of surveillance data, and the epidemiological criteria listed below might be considered as indications of a deteriorating cholera situation.

A deteriorating outbreak may be detected if, over at least two consecutive weeks, there is:

- an increase in weekly cholera incidence;
- a spatial extension of the outbreak;
- an increase in the case fatality ratio (CFR) or in the number of community deaths (note: during outbreaks, a CFR below 1% is commonly considered the minimum standard, but with appropriate access and quality of care every death from cholera is preventable);
- a shift in the socio-demographic profile of cases.

Applying the "increase in weekly cholera incidence" criterion may require a comparison with weekly baseline incidence thresholds. To that end, it is recommended that surveillance units (those regularly affected by cholera outbreaks and where weekly historical data are available) update their calculations of weekly baseline incidence thresholds annually to facilitate the detection of deviations from "the expected baseline level". The recommended method to be used for these calculations is described in **Appendix V - Calculation of weekly baseline incidence thresholds to detect the deterioration of a cholera outbreak**. **An Excel tool to automate the calculations can also be downloaded here.**

In surveillance units not regularly affected by cholera outbreaks, or where reliable weekly historical data are not available, "increase in weekly cholera incidence" should be identified based on a qualitative assessment of epidemiological trends (e.g., new cases >20% in two consecutive weeks) (**Box 5**).

The detection of a deteriorating cholera outbreak should trigger a field investigation to determine the conditions that led to this. The deterioration may be due to internal or external factors (e.g., overstretched response capacity, breakdown or failure of control measures, ill-targeted interventions, change in the drivers or context of transmission, etc.). Taking into account the findings of the field investigation, the outbreak response should be strengthened and adapted to mitigate the situation and control the outbreak more effectively (e.g., scaling up interventions, allocating additional capacity or resources for response, etc.).

Of note, the detection of a deteriorating cholera outbreak does not trigger any changes in the applicable surveillance strategies.

BOX 5. Hypothetical example — Illustration of the detection of a deteriorating cholera outbreak

In **Figure 20**, weekly cholera incidence in a surveillance unit is compared to the expected weekly incidence baseline level for this period of the year (calculated through a moving 80th percentile method applied to historical data for the surveillance unit over the past five years). In week 8, weekly cholera incidence has exceeded the expected baseline level for two consecutive weeks. This indicates a deterioration of the outbreak, which should be investigated in order to support adapting and strengthening the response.

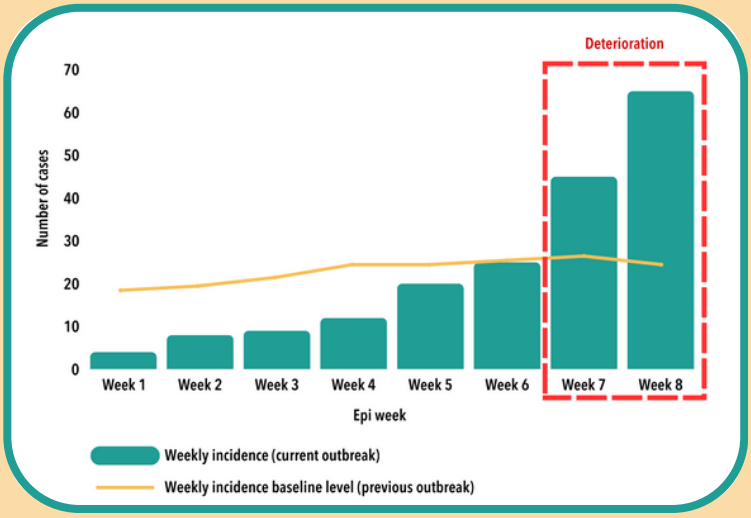


Figure 20. Illustration of the quantitative detection of a deteriorating cholera outbreak in a surveillance unit

In **Figure 21**, the qualitative analysis of the weekly CFR trend in a surveillance unit shows a marked increase in CFR starting from week 43. This indicates a deterioration of the outbreak, which should be investigated in order to support adapting and strengthening the response.

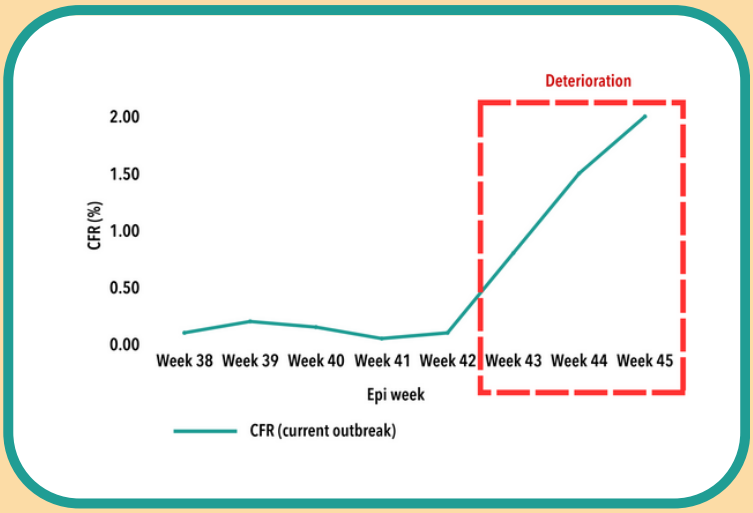


Figure 21. Illustration of the qualitative detection of a deteriorating cholera outbreak in a surveillance unit

7. Monitoring of cholera surveillance performance

Table 13 and **Appendix VIII** describe how the minimum performance indicators defined in **Table 4** should be adapted in the presence of a probable or confirmed cholera outbreak in a surveillance unit, to best reflect and monitor the implementation of the applicable surveillance strategies.

Table 13. Definitions of the minimum performance indicators applicable in the presence of a probable or confirmed cholera outbreak (community transmission)

Generic definition from Table 4	Adaptive criteria in the presence of a probable or confirmed cholera outbreak
HEALTH FACILITY-BASED SURVEILLANCE	
Completeness of reporting	
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Definition independent of the cholera situation in the surveillance unit
Timeliness of reporting	
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline in a given week (%)	**Maximum applicable deadline:** Within 7 days of the end of the reporting week. *Note: the same deadline should be applied in monitoring the timeliness of reporting to upper levels*
COMMUNITY-BASED SURVEILLANCE	
Completeness of reporting	
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Definition independent of the cholera situation in the surveillance unit
Timeliness of reporting	
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline in a given week (%)	**Maximum applicable deadline:** Within 7 days of the end of the reporting week.

INVESTIGATION		
Completeness of case investigation		
Proportion of cholera cases subject to case investigation that were investigated in a given week (%)	**Cholera cases subject to case investigation:** All suspected cholera cases at the onset of a probable or confirmed outbreak	
Timeliness of field investigation		
Proportion of cholera events subject to field investigation for which field investigation was initiated within 24 hours of detection in a given week (%)	**Events subject to field investigation:** A verified probable or confirmed cholera outbreak Deterioration of the cholera outbreak	
TESTING		
Adherence to testing strategy (RDT, if applicable)		
Proportion of occurrences subject to testing by RDT that were tested by RDT in a given week (%)	**Occurrences subject to testing by RDT:** Sum of number of days per health facility with at least one suspected cholera case reported	Illustration of calculation: In a fictional surveillance unit, there are 3 health facilities (A, B, and C). In the past week, suspected cholera cases were reported on: • 2 days by health facility A • 0 days by health facility B • 4 days by health facility C The "*sum of number of days per health facility with at least one suspected cholera case reported*" in the past week in the surveillance unit is 6 (i.e., 2+0+4).
Adherence to testing strategy (culture and/or PCR)		
Proportion of occurrences subject to testing by culture and/or PCR that were tested by culture and/or PCR in a given week (%)	**Occurrences subject to testing by culture and/or PCR:** If RDTs are used: Number of health facilities reporting suspected cholera cases with RDT+ results If RDTs are not used: Sum of number of days per health facility with at least one suspected cholera case reported	Illustration of calculation if RDTs are not used: Same as above

Timeliness of sample receipt by the laboratory	
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Definition independent of the cholera situation in the surveillance unit

8. End of a probable or confirmed cholera outbreak and changes to the applicable surveillance strategies

Once the criteria for the end of a probable or confirmed cholera outbreak are met in a surveillance unit, the prevailing cholera situation reverts to "absence of a probable or confirmed cholera outbreak", and the corresponding surveillance objectives and strategies apply.

V. Surveillance strategies: clustered cholera transmission in a surveillance unit

It can be concluded that there is clustered cholera transmission in a surveillance unit if case investigations demonstrate that all confirmed cholera cases are epidemiologically linked.

Non-endemic countries (including countries on the path to eliminating cholera) **are encouraged to characterise the occurrence of clustered transmission in order to rapidly detect, confirm, investigate, and respond to cluster(s) of cases and interrupt cholera transmission before it spreads in the community**. Key surveillance strategies to reach this objective are summarized in **Figure 22** below, and further described hereafter.

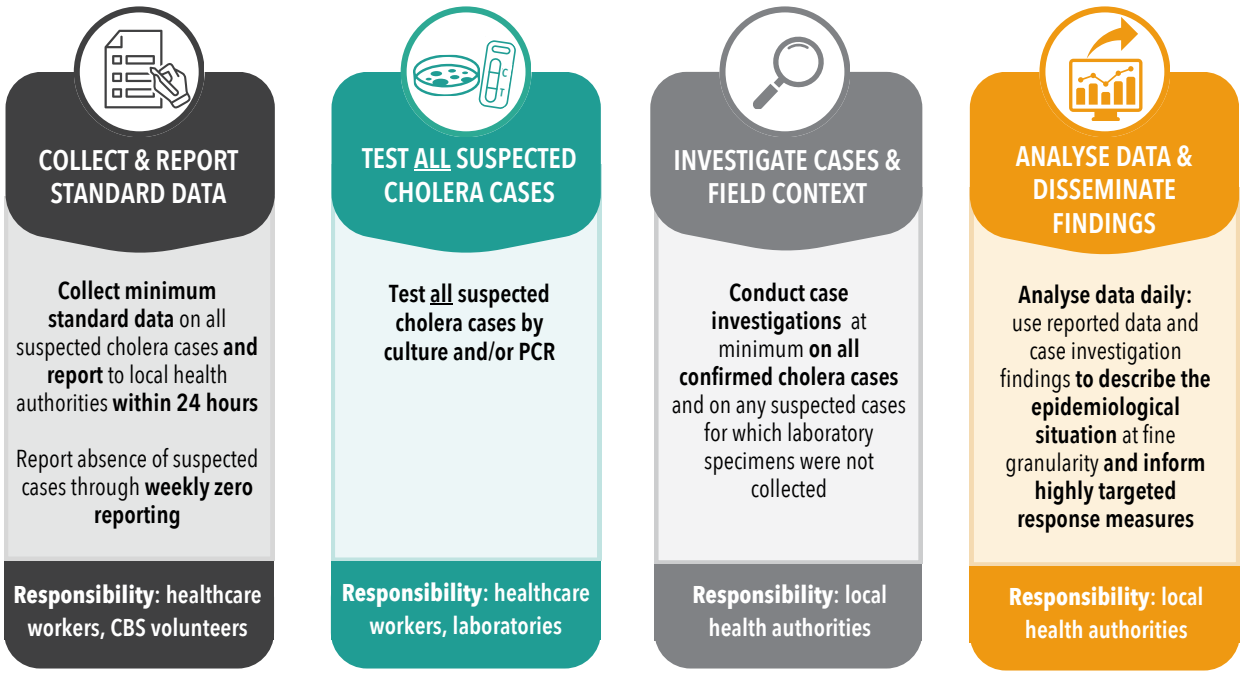


Figure 22. Surveillance strategies: Surveillance units with clustered transmission

Key surveillance strategies to be used in surveillance units with clustered transmission

- **Reporting any suspected cholera case within 24 hours** of detection (or weekly zero reporting);
- **Exhaustive testing** of suspected cholera cases;
- **Exhaustive case investigation** of at least confirmed cholera cases (and suspected cases for which laboratory specimens were not collected); and
- **Daily data analysis** and interpretation of surveillance data.

1. Detection of suspected cases and data collection

Standard data (as defined in Section 1 of this guidance) **should be collected on all patients meeting the applicable definition of a suspected cholera case** (i.e., any person with or who has died from AWD) detected via health facility-based surveillance or community-based surveillance.

2. Testing

All suspected cholera cases should be tested.

- **Overview of the testing strategy**

Figure 23 and **Table 14** summarize recommendations for cholera testing in surveillance units with clustered transmission.

All suspected cholera cases should be tested by culture and/or PCR for confirmation. Antimicrobial susceptibility testing should be performed on the first confirmed cholera case. Confirmation of toxigenicity may be warranted (i.e., if there is no established epidemiological link to a confirmed cholera case/source of exposure in another country) however it should only be conducted on the first confirmed case in the country.

RDTs are not expected to be readily available in settings where clustered transmission occurs; the logistics involved with maintaining stocks of tests, their shelf life, and their infrequent use means RDTs are typically in short supply in such locations.

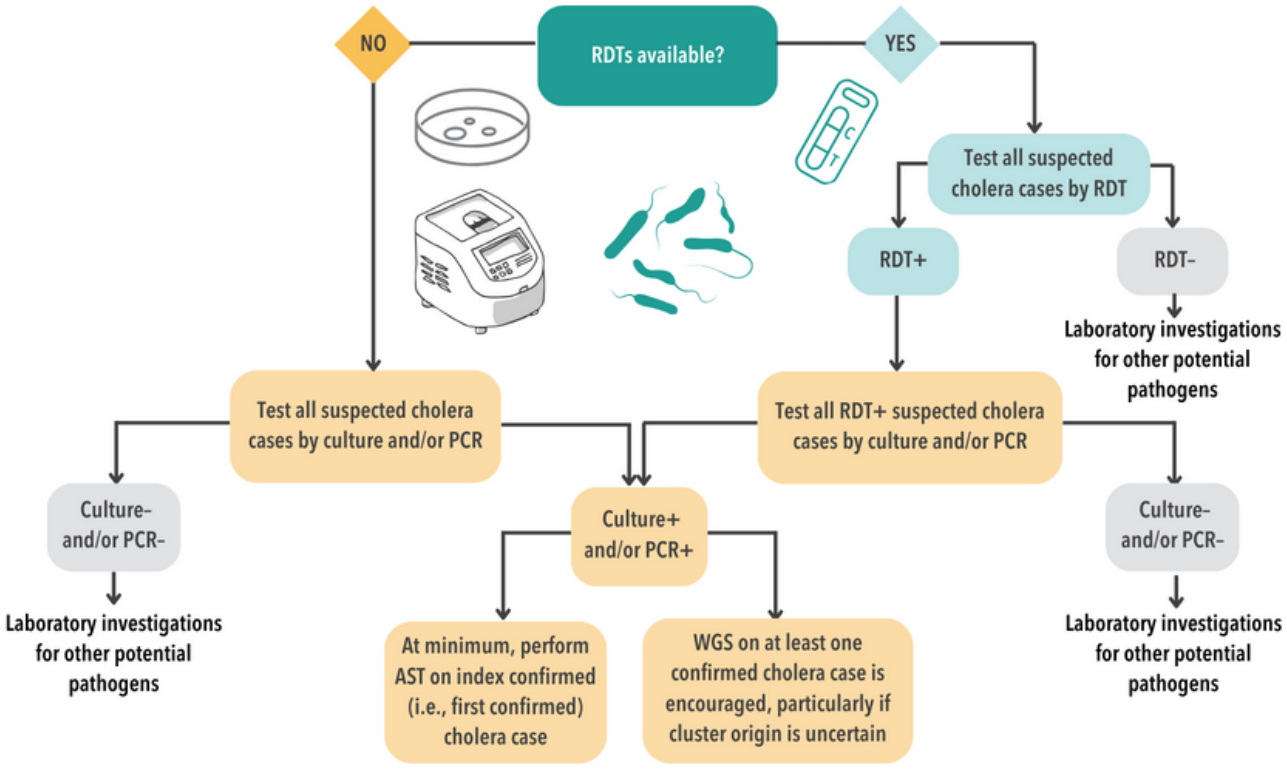


Figure 23. Testing strategy in surveillance units with clustered transmission

Table 14. Summary of recommendations for cholera testing in the presence of a probable or confirmed cholera outbreak in a surveillance unit (clustered transmission)

CLUSTERED CHOLERA TRANSMISSION: Testing strategy for confirmation of cases and characterisation of strains	
Testing strategy for confirmation of cases if RDTs are unavailable	
Laboratory testing (culture or PCR)	**Test all suspected cholera cases by culture and/or PCR**
Alternative testing strategy for confirmation of cases if RDTs are available	
Testing by RDTs	**Test all suspected cholera cases by RDT** **Test all suspected cholera cases with RDT+ results by culture and/or PCR**
Testing strategy for characterisation of strains in confirmed cases	
AST	**Perform AST** at minimum **on the index confirmed** (first confirmed) **cholera case**
WGS	If access to WGS is available, **performing WGS on at least one confirmed cholera case is encouraged** particularly if there is uncertainty about the origin of the cluster. However, WGS is not required for public health intervention.

- **General recommendations for testing**

  All suspected cholera cases in health facilities should be tested by:

  - **culture** (including seroagglutination) for presumptive identification of *Vibrio cholerae* O1/O139

    or

  - **PCR** for species identification (*Vibrio cholerae*) and serogroup identification (O1/O139).

- **Recommendations for testing where RDTs are available**

  - **RDT testing**

  If RDTs are available, all suspected cholera cases in health facilities should be tested by RDT.

  - **Laboratory testing of RDT+ samples**

  All RDT+ samples should be tested by:

  - **culture** (including seroagglutination) for presumptive identification of *Vibrio cholerae* O1/O139

    or

  - **PCR** for species identification (*Vibrio cholerae*) and serogroup identification (O1/O139).

- **Antimicrobial Susceptibility Testing**

  AST should be performed at minimum on the index confirmed cholera case (the first confirmed case).

- **Whole Genome Sequencing**

  The use of WGS to characterise the strains of a subset of confirmed cholera cases is encouraged. However, this is not necessary for public health intervention or action. Samples may be preserved for WGS to be conducted at a later time.

3. Routine reporting

All suspected cholera cases should be reported daily to local health authorities. If no suspected cholera cases are detected, **the absence of cases should be reported on a weekly basis (i.e., zero reporting)**.

4. Investigation

Case investigation aims to document epidemiological links (or lack of thereof), to characterise transmission (i.e., clustered or community transmission), and identify exposure(s) to potential source(s) of contamination and risk factors for spread to guide response.

Case investigation should at a minimum be performed on all confirmed cholera cases, as well as any suspected cases for which a specimen for laboratory testing was not collected (specimen collection should then occur as part of the case investigation). However, given the delays involved with laboratory confirmation of cholera, it is advisable to undertake case investigation without waiting for laboratory results on all suspected cases so as to not delay intervention. That said, only the epidemiological links of confirmed cases should be interpreted in determining the type of transmission (i.e., clustered or community transmission).

Field investigation may also be undertaken to further guide the response.

5. Analysis and interpretation of surveillance data

Data and findings from case investigations should be analysed daily by local health authorities.

The principles for data analysis are generally similar to those applied in community transmission (see **IV. Surveillance strategies in the presence of a probable or confirmed cholera outbreak in a surveillance unit (community transmission)**). However, in clustered transmission, a more granular data visualisation or description is useful for guiding highly targeted response measures.

6. Monitoring of cholera surveillance performance

Table 15 and **Appendix VIII** describe how the minimum performance indicators defined in **Table 4** should be adapted in surveillance units with clustered transmission, to best reflect and monitor the implementation of the applicable surveillance strategies.

Table 15. Definitions of the minimum performance indicators applicable in surveillance units with clustered cholera transmission

Generic definition from Table 4	Adaptive criteria in the presence of clustered transmission
HEALTH FACILITY-BASED SURVEILLANCE	
Completeness of reporting	
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Definition independent of the cholera situation in the surveillance unit
Timeliness of reporting	
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline in a given week (%)	**Maximum applicable deadline:** If a suspected cholera case is detected: within 24 hours of detection; or If no suspected cholera case is detected: within 7 days of the end of the reporting week *Note: the same deadline should be applied in monitoring the timeliness of reporting to upper levels*
COMMUNITY-BASED SURVEILLANCE	
Completeness of reporting	
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Definition independent of the cholera situation in the surveillance unit
Timeliness of reporting	
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline in a given week (%)	**Maximum applicable deadline:** If a suspected cholera case is detected: within 24 hours of detection; or If no suspected cholera case is detected: within 7 days of the end of the reporting week.

INVESTIGATION	
Completeness of case investigation	
Proportion of suspected cholera cases subject to case investigation that were investigated in a given week (%)	**Cholera cases subject to case investigation:** At a minimum, all confirmed cholera cases and any suspected cases for which a specimen for laboratory testing was not collected
Timeliness of field investigation	
Proportion of cholera events subject to field investigation for which field investigation was initiated within 24 hours of detection in a given week (%)	**Events subject to field investigation:** Detection of community transmission
TESTING	
Adherence to testing strategy (RDT, if applicable)	
Proportion of occurrences subject to testing by RDT that were tested by RDT in a given week (%)	**Occurrences subject to testing by RDT:** Suspected cholera cases
Adherence to testing strategy (culture and/or PCR)	
Proportion of occurrences subject to testing by culture and/or PCR that were tested by culture and/or PCR in a given week (%)	**Occurrences subject to testing by culture and/or PCR:** If RDTs are used: Suspected cholera cases with a positive RDT result If RDTs are not used: Suspected cholera cases
Timeliness of sample receipt by the laboratory	
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Definition independent of the cholera situation in the surveillance unit

7. End of clustered cholera transmission and changes to the applicable surveillance strategies

Clustered cholera transmission ends in a surveillance unit when:

- the criteria for the end of a probable or confirmed cholera outbreak are met, at which point the prevailing cholera situation reverts to the "absence of a probable or confirmed cholera outbreak", and the corresponding surveillance objectives and stategies apply; or

- health authorities can no longer demonstrate the absence of community transmission (i.e., not all confirmed cholera cases are epidemiologically linked, or the documentation of epidemiological links was not undertaken) at which point the prevailing cholera situation is reclassified as a "probable or confirmed cholera outbreak (community transmission)", and the corresponding surveillance objectives and strategies apply.

If community transmission of cholera is detected and verified (i.e., at least one confirmed cholera case cannot be epidemiologically linked based on case investigation), **health authorities at the next level should be notified within 24 hours of detection, and a field investigation should be initiated to describe and assess the local situation and guide response measures.**

VI. Surveillance strategies: summary

Key cholera surveillance strategies, summarized according to the prevailing cholera situation in the surveillance unit, are outlined in **Table 16**.

Table 16. Summary of key cholera surveillance unit strategies

	Absence of a probable or confirmed cholera outbreak	Presence of a probable or confirmed cholera outbreak	
		Community transmission	Clustered transmission (if applicable, depending on country's strategy)
Suspected cholera cases	A person aged two years or older with AWD and severe dehydration, or who died from AWD	Any person with or who has died from AWD	Any person with or who has died from AWD
Suspected cholera cases to be tested	All suspected cases	**During an outbreak:** a subset of suspected cases based on a systematic sampling scheme **Towards the end of an outbreak:** all suspected cases	All suspected cases
Methods/strategy for cholera confirmation if RDTs are available	Testing of all suspected cholera cases by RDT, and testing of all RDT+ cases by culture and/or PCR	Testing of the first 3 suspected cholera cases per day per health facility by RDT, and testing of 3 RDT+ per week per surveillance unit by culture and/or PCR	Testing of all suspected cholera cases by RDT, and testing of all RDT+ cases by culture and/or PCR
Methods/strategy for cholera confirmation if RDTs are unavailable	Testing of all suspected cholera cases by culture and/or PCR	Testing of the first 3 suspected cholera cases per week per health facility by culture and/or PCR	Testing of all suspected cholera cases by culture and/or PCR
Data collection	Minimum standard data	Minimum standard data	Minimum standard data
Routine reporting	Daily reporting of suspected cases Weekly zero reporting	At least weekly reporting (including zero reporting)	Daily reporting of suspected cases Weekly zero reporting
Events subject to verification within 24 hours & requiring immediate notification of next-level health authorities if verified	Suspected, probable, confirmed outbreak	Confirmed outbreak	Confirmed outbreak Community transmission
Case investigation	At the onset of a suspected outbreak	At the onset of a probable or confirmed outbreak	At a minimum, on all confirmed cholera cases and any suspected cases for which a specimen for laboratory testing was not collected
Field investigation	At the onset of a suspected outbreak	At the onset of the outbreak If there is a deterioration of the outbreak	As necessary to supplement case investigation If community transmission is detected
Analysis	Daily	At least weekly	Daily
Performance monitoring	Weekly	Weekly	Weekly

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SUPPORTING MATERIAL FOR CHOLERA SURVEILLANCE

I. Template cholera case report form

Below is a template cholera surveillance case report form (**Table I-1**; **Figure I-1**) for use in collecting minimum standard case-based data on any patient meeting the applicable definition of a suspected cholera case (see definitions below) at any health facility, at any point in time. This template can be customised for use at ORPs (e.g., variables on cholera testing may not be applicable), and an editable version of the form can be downloaded here.

In surveillance units where there is no probable or confirmed cholera outbreak

A suspected cholera case is **a person aged two years or older:**

- **with acute watery diarrhoea and severe dehydration;** or
- **who died from acute watery diarrhoea** with no other known cause of death.

In surveillance units where there is a probable or confirmed cholera outbreak

A suspected cholera case is **any person:**

- **with acute watery diarrhoea;** or
- **who died from acute watery diarrhoea**

Table I-1. Template cholera case report form

General information	
Date of reporting by the health facility: [_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]	
Name of the reporting health facility:	
1. Patient information	
Unique patient identifier	
First name(s) of the patient	
Last name(s) of the patient	
Age of the patient (in years) [if the patient is under 1 year, record 0]	_____ years
Patient's sex at birth	☐ Female ☐ Male

Place of residence	**Admin level 1** [e.g., region or province of residence of the patient]	
	Admin level 2 [e.g., district of residence of the patient]	
	Admin level 3 [e.g., health area or commune of residence of the patient]	
	Admin level 4 [e.g., ward, municipal sector or village of residence of the case]	
	Address of residence [neighbourhood, street, house]	

2. Clinical information	
Date of visit [Date the patient was consulted or admitted]	[_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]
Readmission [within 5 days of discharge from any health facility where the patient was previously admitted for a clinical condition suggestive of cholera]	☐ Yes ☐ No ☐ Unknown
Referral from another health facility	☐ Yes ☐ No ☐ Unknown
If the patient was referred, name of referring health facility	
Date the patient had the first symptoms of acute watery diarrhoea [Acute: lasting less than seven days; Watery: non-bloody liquid stools that may contain mucous; Diarrhoea: three or more loose stools within a 24-hour period]	[_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]
How has the patient been admitted to the reporting health facility? [Inpatient: Inpatient care requires a hospital stay; Outpatient: Outpatient care, also called ambulatory or day patient care, does not require hospitalisation]	☐ Inpatient ☐ Outpatient ☐ Unknown
What was the patient's level of dehydration at admission? [See Figure I-1 at the bottom of the form for the criteria used to assess a patient's level of dehydration.]	☐ None ☐ Some dehydration ☐ Severe dehydration ☐ Unknown
What was the patient's outcome? [Institutional death: death of a suspected or confirmed cholera case, with no other known cause of death, that occurs after arriving at a health facility; Community death: death of a suspected or confirmed cholera case, with no other known cause of death, that occurs before reaching a health facility]	☐ Alive and discharged ☐ Alive and transferred ☐ Died at health facility (institutional death) ☐ Dead on arrival at health facility (community death)

Date the case was discharged or transferred (if alive) or date of death (if died)	[_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]	
3. Cholera testing		
Was a specimen collected for cholera testing?	☐ Yes ☐ No ☐ Unknown	If yes, date of specimen collection: [_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]
RDT result [Inconclusive RDT result: neither positive nor negative (e.g., absence of control line, uncertain test line due to obscuring anomaly or poor background clearance of the test strip)]	☐ Positive O1 ☐ Positive O139 ☐ Positive O1 and O139 ☐ Negative ☐ Inconclusive ☐ Not performed	
Was a specimen sent to the laboratory for culture or PCR testing?	☐ Yes ☐ No ☐ Unknown	
Date of specimen receipt at the laboratory	[_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]	
Date of laboratory result	[_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]	
Culture (including seroagglutination) result	☐ Positive O1 ☐ Positive O139 ☐ Negative ☐ Inconclusive ☐ Not performed ☐ Pending	
PCR result – serogroup	☐ Positive O1 ☐ Positive O139 ☐ Negative ☐ Inconclusive ☐ Not performed ☐ Pending	
PCR result – toxigenicity	☐ Toxigenic ☐ Non-toxigenic ☐ Inconclusive ☐ Not performed ☐ Pending	
Antimicrobial susceptibility testing (AST) [Check all that apply]	☐ Susceptibility to Azithromycin (AZ) ☐ Susceptibility to Ciprofloxacin (CIP) ☐ Susceptibility to Pefloxacin (PEF) ☐ Susceptibility to Tetracycline (TE) ☐ Susceptibility to Doxycycline (DO) ☐ Susceptibility to Erythromycin (EM) ☐ Not performed ☐ Pending	

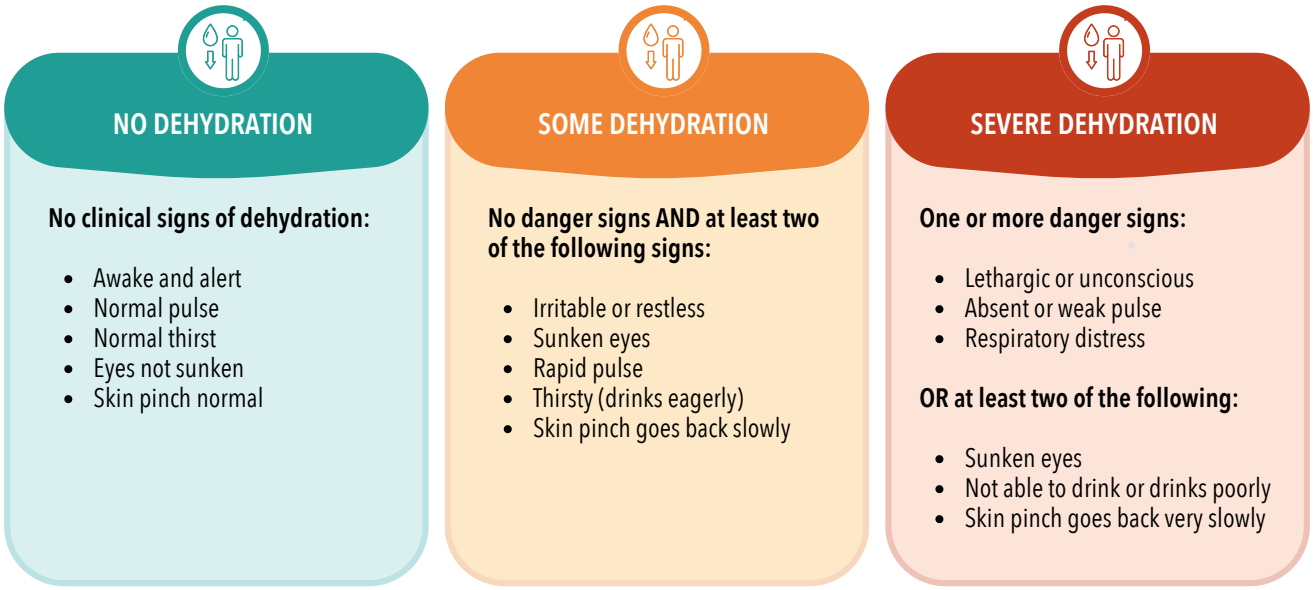

Figure I-1. Criteria for assessing level of dehydration at admission

II. Example of a cholera line list (Excel)

An example of a cholera line list can be downloaded here (Excel format).

This tool can be used to support the collection and reporting of minimum standard case-based data on all suspected cholera cases detected at the health facility level.

III. Template community-based surveillance reporting form

Below is a template community-based cholera surveillance reporting form (**Table III-1**) for use in collecting daily aggregate data on individuals meeting the applicable definition of a suspected cholera case or death in the community. **An editable version of the form can be downloaded here**.

Surveillance unit: _____

Community/Village: _____

Date of reporting: _____

Telephone number: _____

Name of community health worker/volunteer: _____

Table III-1. Template community-based surveillance reporting form

Date (YYYY-MM-DD)	Number of suspected cholera cases per day												Number of community cholera deaths per day												Number of suspected cholera cases referred to health facilities per day
	Male age groups*						Female age groups*						Male age groups*						Female age groups*						
	<2	[2-4]	[5-14]	[15-44]	[45-59]	≥60	<2	[2-4]	[5-14]	[15-44]	[45-59]	≥60	<2	[2-4]	[5-14]	[15-44]	[45-59]	≥60	<2	[2-4]	[5-14]	[15-44]	[45-59]	≥60	
Total																									

**If reporting by these age groups is not possible, at a minimum the following age groups should be used in community-based surveillance reporting: <5 years old, ≥5 years old.*
If no suspected cholera cases or community cholera deaths were detected on a given date, mark "0".

Note: Should RDTs be used in community-based surveillance programmes, information on the number of RDTs performed and RDT results should be included in community-based surveillance reporting.

IV. Template cholera case investigation form

The template form below (**Table IV-1**) can be used to collect information on a suspected cholera case during a case investigation. **An editable version of the form can be downloaded here.**

Case investigation aims to collect additional information about suspected cholera cases beyond routine reporting. It should be conducted by a local health authority officer by interviewing the patient, and the completed form should be sent to local health authorities immediately upon completion of the investigation.

When a suspected, probable, or confirmed cholera outbreak is detected, case investigation is used to classify cases by geographic origin of infection (i.e., locally acquired or imported) and to generate hypotheses about exposure(s) to potential source(s) of contamination and contexts of transmission to orient field investigations. To that end, **case investigation should be initiated within 24 hours of detecting a suspected, probable, or confirmed cholera outbreak, and should be performed on all suspected cholera cases (within 24 hours of reporting) during the onset phase of an outbreak.**

In addition, in countries that aim to differentiate between community transmission and clustered transmission, case investigation is used to document epidemiological links and to demonstrate the absence of community transmission. To that end, **in surveillance units with clustered transmission, case investigation should be performed, at a minimum, on all confirmed cholera cases and on any suspected cases for which a specimen for laboratory testing was not collected** (specimen collection should then be conducted as part of the case investigation).

Table IV-1. Template cholera case investigation form

General information	
Date of case investigation: [_Y_][_Y_][_Y_][_Y_] - [_M_][_M_] - [_D_][_D_]	
Surveillance unit:	
Name of interviewer:	
1. Case information	
Unique patient identifier	
First name	
Last name	
Age (in years)	_____ years
Place/address of residence	Place/address: _____ • **Does the case live in a displacement camp/refugee camp?** ☐ Yes, specify name/location: _____ ☐ No ☐ Unknown

2. Travel history in the 5 days before illness onset

- **Did you travel outside your place of residence in the 5 days before your illness started?** Includes travel abroad and/or within the country outside the surveillance unit of residence of the case.

  ☐ Yes, specify below
  ☐ No
  ☐ Unknown

- **If yes, list destination(s) and dates of travel:**

	Location specify region, district, city/village, etc.	**Country** If travelled abroad	**Date arrived**	**Date left**
1.	_____	_____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]
2.	_____	_____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]
3.	_____	_____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]

3. Social interactions and gatherings in the 5 days before illness onset

- **Have you been in contact with or did you visit anyone who had a similar illness or symptoms (acute watery diarrhoea) in the 5 days before your illness started?**

  ☐ Yes, specify below
  ☐ No
  ☐ Unknown

- **If yes, specify:**

Relation Such as spouse, children, etc.	**Types of interaction** Check all that apply	**Date of last interaction**	**Location/place of interaction**
1._____	☐ Contact with vomit/faeces, provision of direct care or bedside visit ☐ Shared housing ☐ Shared sanitary facilities ☐ Shared meal (ate/drank together) or consumed food/beverage prepared or handled by the sick person ☐ Other, specify: _____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]

2. _____	☐ Contact with vomit/faeces, provision of direct care or bedside visit ☐ Shared housing ☐ Shared sanitary facilities ☐ Shared meal (ate/drank together) or consumed food/beverage prepared or handled by the sick person ☐ Other, specify: _____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]
3. _____	☐ Contact with vomit/faeces, provision of direct care or bedside visit ☐ Shared housing ☐ Shared sanitary facilities ☐ Shared meal (ate/drank together) or consumed food/beverage prepared or handled by the sick person ☐ Other, specify: _____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]

- **Have you been in contact with or did you visit anyone who had travelled outside your place of residence in the 5 days before your illness started (including anyone from your household/compound)?** Contact may include sharing housing or sanitary facilities, visiting, eating/drinking together, etc. Includes travel abroad and/or within the country outside the surveillance unit of residence of the case.

☐ Yes, specify below
☐ No
☐ Unknown

- **If yes, specify:**

Relation Such as spouse, children, etc.	**Where did they come from?** Specify country, region, district, city/village, etc.	**Start date of travel**	**End date of travel**	**Last date of interaction**
1. _____	_____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]
2. _____	_____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]
3. _____	_____	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]	[_M_][_M_] /[_D_][_D_]

- **Did you attend any social event, communal gathering, or mass gathering event (such as a funeral ritual or ceremony, wedding reception, festival, religious gathering, etc.) in the 5 days before your illness started?**

☐ Yes, specify below
☐ No
☐ Unknown

- **If yes, specify:**

Event	**Type of event**	**Date of event**	**Location/venue of event**
1. _____		[_M_][_M_] /[_D_][_D_]	_____

2. _____ [_M_][_M_]/[_D_][_D_] _____

3. _____ [_M_][_M_]/[_D_][_D_] _____

- **Did anyone else in your household/compound attend any social event, communal gathering, or mass gathering event (such as a funeral ritual or ceremony, wedding reception, festival, religious gathering, etc.) in the 5 days before your illness started?**

  ☐ Yes, specify below
  ☐ No
  ☐ Unknown

- **If yes, specify:**

Event	Type of event	Date of event	Location/venue of event
1.	_____	[_M_][_M_]/[_D_][_D_]	_____
2.	_____	[_M_][_M_]/[_D_][_D_]	_____
3.	_____	[_M_][_M_]/[_D_][_D_]	_____

4. Occupation/work in the 5 days before illness onset

- **What was your main occupation/work in the 5 days before your illness started?** _____
- **Specify the place(s) of occupation/work:** _____

5. Water, Sanitation, and Hygiene in the 5 days before illness onset

- **What were your household's main sources of drinking water in the 5 days before your illness started?** Check all that apply (could be more than one source; double-check that it is the water used for DRINKING)

  ☐ Piped into dwelling
  ☐ Piped into compound, yard or plot
  ☐ Piped to neighbour
  ☐ Public tap / standpipe
  ☐ Borehole or tube well
  ☐ Protected dug well
  ☐ Unprotected dug well
  ☐ Protected spring
  ☐ Unprotected spring
  ☐ Rainwater collection
  ☐ Tanker-truck
  ☐ Cart with small tank / drum
  ☐ Water kiosk
  ☐ Bottled water
  ☐ Sachet water
  ☐ Surface water (river, stream, dam, lake, pond, canal, irrigation channel)
  ☐ Other, specify _____

- **Were there any other sources of water you consumed over the 5 days before your illness started (while at work, while away from home, etc.) Refer to the place of occupation/work cited in section 4.** Check all that apply.

  - ☐ Piped into dwelling
  - ☐ Piped into compound, yard or plot
  - ☐ Piped to neighbour
  - ☐ Public tap / standpipe
  - ☐ Borehole or tube well
  - ☐ Protected dug well
  - ☐ Unprotected dug well
  - ☐ Protected spring
  - ☐ Unprotected spring
  - ☐ Rainwater collection
  - ☐ Tanker-truck
  - ☐ Cart with small tank / drum
  - ☐ Water kiosk
  - ☐ Bottled water
  - ☐ Sachet water
  - ☐ Surface water (river, stream, dam, lake, pond, canal, irrigation channel)
  - ☐ Other, specify _____

- **Have you or any other household members done anything to make the drinking water safer to drink in the 5 days before your illness started?**

  - ☐ Yes
  - ☐ No
  - ☐ Unknown

- **If yes, specify what:** Check all that apply.

  - ☐ Boil water
  - ☐ Add bleach/chlorine
  - ☐ Strain it through a cloth
  - ☐ Use a water filter
  - ☐ Solar disinfection (SODIS)
  - ☐ Let it stand/settle
  - ☐ Other, specify: _____

- **Did your household store drinking water in containers in the 5 days before your illness started?**

  - ☐ Yes
  - ☐ No
  - ☐ Unknown

- **If yes, specify what type:**

  - ☐ Narrow mouthed containers/Jerrycans
  - ☐ Other, specify: _____

- **Where did members of your household mainly go to defecate in the 5 days before your illness started?** Check all that apply.

  - ☐ Flush
  - ☐ Flush/pour flush to piped sewer system
  - ☐ Flush/pour flush to septic tank
  - ☐ Flush/pour flush to pit latrine
  - ☐ Flush/pour flush to open drain
  - ☐ Flush/pour flush to don't know where
  - ☐ Pit latrine with slab
  - ☐ Pit latrine without slab / Open pit
  - ☐ Twin pit with slab
  - ☐ Twin pit without slab
  - ☐ Other composting toilet
  - ☐ Bucket
  - ☐ Container based sanitation
  - ☐ Hanging toilet / Hanging latrine
  - ☐ No facility / Bush / Field
  - ☐ Other, specify: _____

- **Did you share this facility with others who are not members of your household in the 5 days before your illness started?**

  - ☐ Yes
  - ☐ No
  - ☐ Unknown

- **Can you cite the key moments when you usually wash your hands (at home or at work)?** Do not read out the answers below. Check all that are mentioned. If the response is, "When the hands are dirty," probe to determine when hands become dirty.

  - ☐ Before preparing food or cooking
  - ☐ Before eating/before feeding children
  - ☐ After cleaning or changing baby/after contact with a sick person
  - ☐ After using the toilet
  - ☐ Do not wash hands with soap
  - ☐ Other, specify: _____
  - ☐ Don't know

- **Any other observations to share (e.g., known risk factor, environmental exposure, etc.)?**

6. Food consumption in the 5 days before illness onset

- **In the 5 days before your illness started, did you eat any of the following food from outside your house:** Check all that apply.

  - ☐ Raw fruits or vegetables
  - ☐ Fish or shellfish
  - ☐ Fresh fruit juices purchased from street vendors or restaurants
  - ☐ Water/drinks with ice cubes or crushed ice purchased from street vendors or restaurants
  - ☐ Food purchased from street vendors or restaurants
  - ☐ Market food

  If yes, specify name of vendor(s) or place(s) of purchase:_____

7. Conclusions of the case investigation	
Case classification by geographic origin of infection	☐ Locally acquired case ☐ Internationally imported case (infection acquired in another country) ☐ Domestically imported case (infection acquired in another surveillance unit but within the same country) **If internationally or domestically imported case, specify the place of importation:** _____
Epidemiological link	• **Is the case epidemiologically linked to another suspected or confirmed cholera case?** ☐ Yes (specify if linked to a suspected or confirmed case: _____) ☐ No ☐ Unknown • **Specify the epidemiological link:** ☐ Unknown/not identified ☐ Contact with an imported cholera case, specify: _____ ☐ Contact with a locally acquired cholera case, specify: _____ ☐ Environmental source (same common source or vehicle of infection as another cholera case), specify: _____
Hypotheses on exposure(s) to potential source(s) of contamination and contexts of transmission	Describe any hypotheses on exposure(s) to potential source(s) of contamination and contexts of transmission to orient field investigations:
Additional comments	

V. Calculation of weekly baseline incidence thresholds for detecting the deterioration of a cholera outbreak

This section provides guidance on how to calculate weekly baseline incidence thresholds for detecting the deterioration of a probable or confirmed cholera outbreak. Detection relies on the epidemiological criterion "increase in weekly cholera incidence" observed in surveillance units regularly affected by cholera outbreaks, and assumes that weekly historical data are available.

Below is a description of the data required to calculate weekly baseline incidence thresholds, an explanation of the recommended method (i.e., 80th moving percentile method), and an example illustrating its application.

A tool (Excel format) can be downloaded here to automate the calculations.

- **Objective**

  In a surveillance unit with a probable or confirmed cholera outbreak, **the deterioration of the outbreak may be detected when the weekly incidence exceeds a predefined threshold for at least two consecutive weeks.**

  To support this, a weekly cholera incidence threshold should be calculated annually for each surveillance unit. **This corresponds to the incidence level above which weekly cholera incidence would be considered "above the expected baseline level" for the surveillance unit for any given week of the year.**

- **Data requirements**

  The computation of a surveillance unit's weekly cholera incidence threshold requires the following:

  - **weekly data on (suspected and confirmed) cholera incidence or the cholera incidence rate** (note: the incidence rate (i.e., cases per unit of population) is preferred over the number of cases when the size of the population in the surveillance unit differs markedly over the years);
  - **three to five years of retrospective weekly cholera data** to define the expected baseline level;
  - **the calculation of a threshold using a documented method** (note: the current year of interest should be excluded from the threshold calculation, as should retrospective weeks with abnormally high incidence (i.e., weeks in which the incidence was above the threshold, or weeks identified by examining the epidemic curve and determining visually when the incidence clearly exceeded that of other years)).

  In surveillance units not regularly affected by cholera outbreaks, or where reliable weekly historical data are not available, the deterioration of a cholera outbreak based on an "increase in weekly cholera incidence" should be detected based on a qualitative assessment of the incidence trend over at least two consecutive weeks (e.g., new cases >20% in two consecutive weeks). However, countries should aim to improve reporting and record keeping in surveillance units lacking reliable weekly historical data as part of their National Cholera Plan (NCP).

- **Method**

The moving percentile method is recommended for calculating the weekly cholera incidence threshold. This method is relatively simple and can be completed using a calculator or spreadsheet. Countries may use other methods to calculate thresholds provided this is documented.

The moving percentile method compares the number of cholera cases reported in the current week to the weekly number of cholera cases reported during a corresponding historical baseline period (usually, over the past three to five years). **The recommended threshold for a given week is the 80th percentile of the corresponding historical baseline data.**

The corresponding historical baseline period includes the same current week, the two preceding weeks, and the two following weeks in each of the past three to five years. This aims to smooth out artificial variations in weekly reported data so that the thresholds do not change substantially from week to week. For example, if the historical period covers the past five years, 25 weeks of historical baseline data are taken into account to define the weekly threshold (i.e., 5 weeks*5 years). The current week of observation and corresponding historical period are then dynamically moved forward week by week.

For example, the threshold for week 23 of 2023 would be the 80th percentile derived from historical baseline data in weeks 21 and 22 (two preceding weeks), week 23 (same current week), and weeks 24 and 25 (two following weeks) from each of the previous five years (2018-2022), (n=25). Subsequently, the threshold for week 24 of 2023 would be the 80th percentile derived from historical baseline data in weeks 22 and 23 (two preceding weeks), week 24 (same current week), and weeks 25 and 26 (two following weeks) from each of the previous five years (2018-2022), and so on for each week of 2023. If any of the 25 historical baseline weeks used to calculate the percentiles was known to be during a deterioration of the outbreak (based on excess case load or incidence), this/these weeks should be excluded from the calculation, and the percentile should be calculated using fewer than 25 weeks.

Using the 80th percentile as the threshold means that 80% of the time, the weekly cholera incidence will fall at or below this weekly threshold if there are similar levels of transmission over the years. Therefore, a weekly incidence above this weekly threshold has a 20% chance of occurring if there are similar levels of transmission over the years. The chances of observing an incidence above the threshold for two weeks in a row (indicating the deterioration of the outbreak) would be less than 5% (0.2*0.2).

Health authorities may decide to use a different percentile value, however:

- a lower percentile value (i.e., a lower threshold) would result in higher chances of weekly cholera incidence exceeding the threshold;

- a higher percentile value (i.e., a higher threshold) would result in lower chances of weekly cholera incidence exceeding the threshold (note: using a percentile value above the 90th percentile is not recommended as this would result in an insufficiently sensitive threshold).

- **Illustration**

Table V-1 provides an example of the moving percentile method being used to detect the deterioration of a cholera outbreak in a fictional surveillance unit in 2023. The weekly threshold (moving 80th percentile) is computed from baseline historical data from the past five years (2018-2022). The weekly cholera incidence in the current year (2023) is

computed from baseline historical data from the past five years (2018-2022). The weekly cholera incidence in the current year (2023) is then compared to the threshold. A deterioration of the outbreak is detected on in week 9, since the weekly cholera incidence has exceeded the threshold for two consecutive weeks (in weeks 8 and 9). Health authorities should conduct a field investigation to determine the conditions that led to this deterioration and to strengthen the response in the surveillance unit.

The weekly threshold can be plotted against the current data to visually identify weeks in the current year in which the cholera incidence exceeds the threshold (**Figure V-1**).

Table V-1. Example of the application of the moving 80th percentile method to detect the deterioration of an outbreak in a surveillance unit in 2023 (current year of interest) using historical data from 2018-2022

Week	Weekly incidence (number of suspected and confirmed cholera cases)						Weekly threshold: 80th percentile	
	Historical data					Current year	Value	Interpretation: *Week in current year below or above threshold?*
	2018	2019	2020	2021	2022	2023		
1	7	45	11	88	2	13	45	Below threshold
2	9	28	23	34	2	16	29	Below threshold
3	11	27	16	26	3	9	27	Below threshold
4	18	25	22	26	2	24	26	Below threshold
5	18	20	23	35	4	21	26	Below threshold
6	16	20	23	14	4	31	33	Below threshold
7	32	18	50	37	4	30	35	Below threshold
8	36	28	44	29	7	39	36	Above threshold
9	31	15	39	12	3	44	36	Above threshold
10	28	5	40	10	0	…	29	…
…	…	…	…	…	…	…	…	…

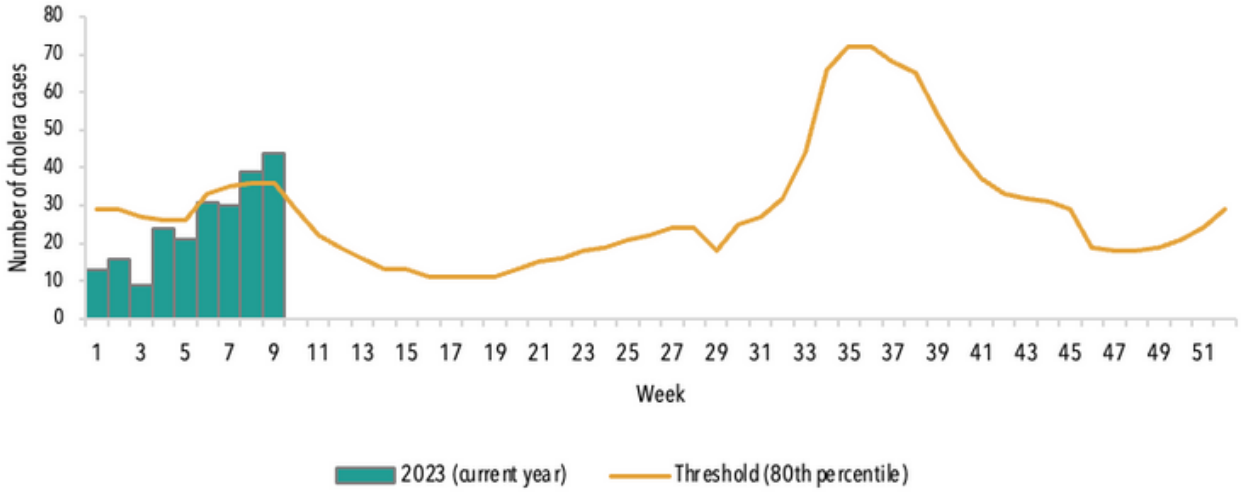

Figure V-1. Illustration of the moving 80th percentile threshold calculated from historical data (2018-2022) compared with the current year (2023) (from data in Table 1)

- **GTFCC Excel tool**

  An Excel tool is available for download to automate the calculation of weekly cholera incidence thresholds using the recommended moving percentile method. Users will be able to enter the required weekly data for the year of interest and for a retrospective period of three to five years. The tool allows users to calculate the recommended threshold (80th percentile) or to set a customized value. The weekly threshold is then automatically calculated. Outputs include a summary table and figures that can be used to assess if the weekly cholera incidence exceeds the threshold in order to detect a deterioration of the cholera outbreak. years. The tool allows users to calculate the recommended threshold (80th percentile) or to set a customized value. The weekly threshold is then automatically calculated. Outputs include a summary table and figures that can be used to assess if the weekly cholera incidence exceeds the threshold in order to detect a deterioration of the cholera outbreak.

VI. Example of a cholera epidemiological report at the surveillance unit level

An example of a surveillance unit cholera epidemiological report can be downloaded here. This report was prepared using fictitious data and illustrates how surveillance data can be analysed and interpreted at the surveillance unit level.

…

VII. Example of a cholera epidemiological report at the national level

An example of a national cholera epidemiological report can be downloaded here. This report was prepared using fictitious data and illustrates how surveillance data can be analysed and interpreted at the national level.

VIII. Minimum performance indicators to be monitored at the surveillance unit level

Below are detailed definitions of the minimum performance indicators to be used to monitor cholera surveillance performance in surveillance units (**Tables VIII-1, VIII-2, & VIII-3**). These definitions vary depending on the prevailing cholera situation, and include applicable deadlines, descriptions of which cases are subject to case investigation, which events are subject to field investigation, and which occurrences are subject to testing by RDT and/or culture or PCR.

Table VIII-1. Definitions of minimum performance indicators applicable in surveillance units in the absence of a probable or confirmed cholera outbreak

Indicator	Numerator	Denominator	Minimum performance target
HEALTH FACILITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week	Number of health facilities expected to report	80%
Timeliness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities within 24 hours of detection (on all days suspected cholera cases were detected) or within 7 days of the end of the reporting week (if no suspected cholera case was detected)	Number of health facilities expected to report	80%
COMMUNITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week	Number of active CBS volunteers	80%

Timeliness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities within 24 hours of detection (on all days suspected cholera cases were detected) or within 7 days of the end of the reporting week (if no suspected cholera case was detected)	Number of active CBS volunteers expected to report	80%
INVESTIGATION			
Completeness of case investigation			
Proportion of cholera cases subject to case investigation that were investigated in a given week (%)	Number of cholera cases investigated in a given week during a verified suspected cholera outbreak	Number of suspected cholera cases reported in a given week during a verified suspected cholera outbreak	80%
Timeliness of field investigation			
Proportion of cholera events subject to field investigation for which field investigation was initiated within 24 hours of detection in a given week (%)	Number of field investigations initiated within 24 hours of detecting a verified suspected cholera outbreak in a given week	Number of verified suspected cholera outbreaks	80%
TESTING			
Adherence to testing strategy (RDT, if applicable)			
Proportion of occurrences subject to testing by RDT that were tested by RDT in a given week (%)	Number of suspected cholera cases tested by RDT in a given week	Number of suspected cholera cases reported in a given week	80%

Adherence to testing strategy (culture and/or PCR)			
Proportion of occurrences subject to testing by culture and/or PCR that were tested by culture and/or PCR in a given week (%)	**If RDTS are used:** Number of suspected cholera cases with a positive RDT result for which a sample was sent to a laboratory for testing by culture and/or PCR in a given week	Number of suspected cholera cases with a positive RDT result in a given week	80%
	If RDTs are not used: Number of suspected cholera cases for which a sample was sent to a laboratory for testing by culture and/or PCR in a given week	Number of suspected cholera cases in a given week	
Timeliness of sample receipt by the laboratory			
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Number of samples received by the laboratory within 6 days of sample collection	Number of samples sent to a laboratory for testing by culture and/or PCR in a given week	80%

Table VIII-2. Definitions of minimum performance indicators applicable in surveillance units in the presence of a probable or confirmed cholera outbreak (community transmission)

Indicator	Numerator	Denominator	Minimum performance target
HEALTH FACILITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week	Number of health facilities expected to report	80%
Timeliness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities (including zero reporting) within 7 days of the end of the reporting week	Number of health facilities expected to report	80%
COMMUNITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week	Number of active CBS volunteers	80%
Timeliness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) within 7 days of the end of the reporting week	Number of active CBS volunteers expected to report	80%

INVESTIGATION			
Completeness of case investigation			
Proportion of cholera cases subject to case investigation that were investigated in a given week (%)	Number of suspected cholera cases investigated in a given week at the onset of a probable or confirmed outbreak	Number of suspected cholera cases reported in a given week at the onset of a probable or confirmed outbreak	80%
Timeliness of field investigation			
Proportion of cholera events subject to field investigation for which field investigation was initiated within 24 hours of detection in a given week (%)	Number of field investigations initiated within 24 hours of detecting a verified probable or confirmed cholera outbreak, or the deterioration of a cholera outbreak	Number of verified probable or confirmed cholera outbreaks or outbreak deteriorations	80%
TESTING			
Adherence to testing strategy (RDT, if applicable)			
Proportion of occurrences subject to testing by RDT that were tested by RDT in a given week (%)	Sum of number of days per health facility with at least one suspected cholera case tested by RDT in a given week	Sum of number of days per health facility with at least one suspected cholera case reported in a given week	80%
Adherence to testing strategy (culture and/or PCR)			
Proportion of occurrences subject to testing by culture and/or PCR that were tested by culture and/or PCR in a given week (%)	**If RDTS are used:** Number of health facilities that sent samples from suspected cholera cases with RDT+ results to a laboratory for testing by culture and/or PCR in a given week	Number of health facilities that reported suspected cholera cases with RDT+ results in a given week	80%
	If RDTs are not used: Sum of number of days per health facility in which samples were sent to a laboratory for testing by culture and/or PCR in a given week	Sum of number of days per health facility with at least one suspected cholera case reported in a given week	

Timeliness of sample receipt by the laboratory			
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Number of samples received by the laboratory within 6 days of sample collection	Number of samples sent to a laboratory for testing by culture and/or PCR in a given week	80%

Table VIII-3. Definitions of minimum performance indicators applicable in surveillance units with clustered cholera transmission

Indicator	Numerator	Denominator	Minimum performance target
HEALTH FACILITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities (including zero reporting) in a given week	Number of health facilities expected to report	80%
Timeliness of reporting			
Proportion of health facilities that reported cholera surveillance data to health authorities (including zero reporting) by the applicable deadline in a given week (%)	Number of health facilities that reported cholera surveillance data to health authorities within 24 hours of detection (on all days suspected cholera cases were detected) or within 7 days of the end of the reporting week (if no suspected cholera case was detected)	Number of health facilities expected to report	80%
COMMUNITY-BASED SURVEILLANCE			
Completeness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) in a given week	Number of active CBS volunteers	80%

Timeliness of reporting			
Proportion of active CBS volunteers that reported cholera surveillance data to local health authorities (including zero reporting) by the applicable deadline in a given week (%)	Number of active CBS volunteers that reported cholera surveillance data to local health authorities within 24 hours of detection (on all days suspected cholera cases were detected) or within 7 days of the end of the reporting week (if no suspected cholera case was detected)	Number of active CBS volunteers expected to report	80%
INVESTIGATION			
Completeness of case investigation			
Proportion of cholera cases subject to case investigation that were investigated in a given week (%)	Number of cholera cases investigated in a given week	Number of confirmed cholera cases plus the number of suspected cholera cases for which a specimen for laboratory testing was not collected in a given week	80%
Timeliness of field investigation			
Proportion of cholera events subject to field investigation for which field investigation was initiated within 24 hours of detection in a given week (%)	Number of outbreaks with community transmission for which field investigation was initiated within 24 hours of detection	Number of outbreaks with community transmission	80%
TESTING			
Adherence to testing strategy (RDT, if applicable)			
Proportion of occurrences subject to testing by RDT that were tested by RDT in a given week (%)	Number of suspected cholera cases tested by RDT in a given week	Number of suspected cholera cases reported in a given week	80%

Adherence to testing strategy (culture and/or PCR)			
Proportion of occurrences subject to testing by culture and/or PCR that were tested by culture and/or PCR in a given week (%)	**If RDTS are used:** Number of suspected cholera cases with a positive RDT result for which a sample was sent to a laboratory for testing by culture and/or PCR in a given week	Number of suspected cholera cases with a positive RDT result in a given week	80%
	If RDTs are not used: Number of suspected cholera cases for which a sample was sent to a laboratory for testing by culture and/or PCR in a given week	Number of suspected cholera cases in a given week	
Timeliness of sample receipt by the laboratory			
Proportion of samples received by the laboratory within 6 days of sample collection (%)	Number of samples received by the laboratory within 6 days of sample collection	Number of samples sent to a laboratory for testing by culture and/or PCR in a given week	80%

IX. Additional resources

1. Open access online trainings on cholera

- **WHO. OpenWHO – Open Course on cholera, Introduction** (Arabic, English, French, Portuguese, Hausa, Pashto, Urdu)
- **WHO. OpenWHO – Open Course on cholera, Cholera Outbreaks: emergency preparedness and response** (English)

2. Cholera control and response

- **GTFCC. Cholera outbreak response field manual. 2019.** Available here.
- **GTFCC. Cholera App.** Available here.
- **GTFCC. Ending cholera – A global roadmap to 2030.** Available here.
- **GTFCC. Interim guiding document to support countries for the development of their National Cholera Plan. August 2020.** Available here.
- **Red Cross Red Crescent. Guidelines and tools for cholera.** Available here.

3. Testing for cholera

- **CDC. Job Aid - How to collect a fecal specimen and transfer to transport medium.** Available here.
- **GTFCC. Job Aid – Specimen packaging & domestic transportation for laboratory confirmation of *Vibrio cholerae* O1/O139.** Available here.
- **GTFCC. Job Aid – Rapid Diagnostic Test (RDT) for cholera detection.** Available here.
- **Gavi. Request form for cholera diagnostic test (i.e., RDT) procurement funding support.** Available here.
- **GTFCC. Culture of *Vibrio cholerae* O1/O139 from fecal specimens.** Job aid available here; Factsheet available here.
- **GTFCC. Job Aid – Antimicrobial susceptibility testing for treatment and control of cholera.** Available here.
- **GTFCC. Job Aid – Strain conditioning for international transportation of *Vibrio cholerae* O1/O139.** Available here.
- **GTFCC. Interim technical note on an introduction of DNA-based identification and typing methods to public health practitioners for epidemiologic investigation of cholera outbreaks.** Available here.
- **GTFCC. Technical Note – Environmental Surveillance for cholera control.** Available here.

4. Clinical documentation of cholera cases

- **WHO. Clinical cholera case report form.** Available here.

5. Updates on global cholera situation

- **WHO. Multi-country outbreak of cholera, External cholera situation reports.** Available here.
- **WHO. Weekly Epidemiological Record (WER)** (annual cholera situation officially reported to WHO). Available here.
- **WHO. Cholera dashboards – Interactive summary visuals of cholera data officially reported to WHO since 2000.** Available here.

6. Analysis and interpretation of cholera outbreak dynamics

- **Integrated Outbreak Analytics (IOA). IOA Field Exchange.** Available here.

7. Event-based surveillance

- **WHO. Early detection, assessment and response to acute public health events: Implementation of early warning and response with a focus on event-based surveillance.** 2014. Available here.
- **WHO. A guide to establishing event-based surveillance.** 2014. Available here.

8. Early warning and response

- **WHO. Early detection, assessment and response to acute public health events: Implementation of early warning and response with a focus on event-based surveillance.** 2014. Available here.
- **WHO. Early warning alert and response (EWAR) in emergencies: an operational guide.** 2022. Available here.

9. Community-based surveillance

- **IFRC. Community-Based Surveillance: knowledge platform.** Available here and here.
- **IFRC. Community-Based Surveillance: guiding principles. 2017.** Available here.
- **IFRC. Community-Based Surveillance: Protocol template. 2019.** Available here.