HOW TO DETECT AND MONITOR CHOLERA OUTBREAKS

A BRIEF GUIDE FOR HEALTH AUTHORITIES

This brief guide will help health authorities implement effective cholera surveillance to provide timely and reliable data for prevention and control.

For more information, please refer to the GTFCC's *Public health surveillance for cholera* guidance document, including the resources provided at the end of this guide.

1. ADAPTING CHOLERA SURVEILLANCE TO THE LOCAL CHOLERA SITUATION

Cholera is an acute diarrheal disease which can be deadly and which can spread rapidly if appropriate response and control measures are not initiated promptly. **Cholera surveillance is critical for guiding timely and targeted multisectoral interventions to limit the spread of cholera and reduce morbidity and mortality.**

To be effective, **cholera surveillance strategies should be adapted to the prevailing cholera situation at the local level** (i.e., "surveillance unit" level) depending on whether there is an outbreak occurring and, if so, what type of transmission is occurring.

A surveillance unit corresponds to the lowest administrative level at which decisions are made regarding cholera prevention and control measures. The corresponding administrative level is country-specific (typically administrative levels two or three). Local health authorities may be responsible for cholera surveillance in one or several surveillance units, and must adapt surveillance strategies to the prevailing cholera situation in each unit.

As health authorities, your role in cholera surveillance is pivotal to ensure that:

- All **surveillance stakeholders** (including health facilities, communities, laboratories) are aware of cholera, including cholera surveillance strategies, and **adequately test for and report suspected cholera cases** (as required by the cholera situation in their surveillance unit),
- **Cholera surveillance data is analysed** and **interpreted** in a sound manner to characterize the prevailing cholera situation and rapidly **disseminated** to a broad range of multisectoral stakeholders to guide multisectoral response measures to mitigate cholera morbidity and mortality,
- **Upper-level health authorities are continuously informed** of the local cholera situation and receive clean and comprehensive surveillance data in a timely manner.

2. CHARACTERIZING THE PREVAILING CHOLERA SITUATION

In order to adapt surveillance strategies to the cholera situation in a surveillance unit, health authorities must continuously characterize the cholera situation, using the standard definitions below:

Suspected cholera outbreak

2 or more suspected cholera cases reported in the same surveillance unit within 7 days, **or 1 suspected cholera case with a positive Rapid Diagnostic Test** (RDT) result

Probable cholera outbreak

The number of suspected cholera cases with an **RDT+ result** in a surveillance unit in the past 14 days achieves or surpasses the threshold defined below, while taking into account the number of suspected cases tested:

Number of suspected cholera cases tested by RDT in 14 days	Number of suspected cholera cases with RDT+ result
3 to 7	≥ 3 RDT+
8 to 10	≥ 4 RDT+
11 to 14	≥ 5 RDT+
15 to 17	≥ 6 RDT+
18 to 21	≥ 7 RDT+

A probable outbreak means there is high confidence an outbreak is occurring

Confirmed cholera outbreak

At least **1 locally acquired cholera case has been confirmed** through laboratory tests (culture and/or PCR) in a surveillance unit

Type of cholera transmission

If there is a probable or confirmed outbreak, cholera transmission can occur in the community ("community transmission") or in clusters ("clustered transmission").

Non-endemic countries (including countries on the path to eliminating cholera) are encouraged to characterize the type of transmission that is occurring at the level of a surveillance unit. By default, if the type of transmission is not characterized, the outbreak will be deemed to be occurring via community transmission.

Community transmission: confirmed cases have not all been epidemiologically linked

Clustered transmission: all confirmed cases have been epidemiologically linked through case investigations

End of probable or confirmed outbreak

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.

3. SURVEILLANCE OBJECTIVES DEPENDING ON THE ONGOING CHOLERA SITUATION

Depending on the ongoing cholera situation in a surveillance unit, the objectives of cholera surveillance evolve:

- In the **absence of a probable or confirmed cholera outbreak**, the main surveillance objective is the early detection of any (suspected, probable or confirmed) 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.

Surveillance strategies used also need to be adapted to the ongoing cholera situation in order to meet the surveillance objectives.

4. ADAPTING SURVEILLANCE STRATEGIES TO THE ONGOING CHOLERA SITUATION

CHOLERA SURVEILLANCE IN THE ABSENCE OF A PROBABLE OR CONFIRMED OUTBREAK

In the absence of a probable or confirmed cholera outbreak, cholera surveillance aims to **detect outbreaks early** and support rapid response. Below are the key principles for early detection, and the appropriate steps to take if a suspected, probable, or confirmed outbreak is detected in a surveillance unit.

To detect a suspected, probable or confirmed cholera outbreak

- **Ensure timely and comprehensive reporting and testing**

Health facilities and communities should **report any suspected cholera case** (i.e., any person ≥2 years with acute watery diarrhoea (AWD) and severe dehydration or who died from AWD) **within 24 hours.**

Health authorities should ensure the daily reporting of standard case-based data by health facilities (using case report forms or a line list) and of aggregate data by community-based surveillance volunteers (or Community Health Workers). If no suspected cholera cases are detected, weekly zero reporting is sufficient.

In addition, **all suspected cholera cases should be tested for cholera**. If Rapid Diagnostic Tests (RDTs) are available, all suspected cholera cases should be tested by RDT, and samples should be collected from all RDT+ cases for laboratory testing (culture and/or PCR). This is because RDTs cannot be used to confirm cholera; confirmation is achieved by PCR and/or culture. If RDTs are unavailable, samples should be collected from all suspected cases for laboratory confirmation.

Health authorities should periodically train/raise awareness about surveillance strategies (among health facilities, communities, laboratories). Health authorities should also monitor on a weekly basis surveillance performance indicators to ensure that surveillance is being implemented appropriately by all surveillance stakeholders including by monitoring the completeness and timeliness of reporting through health-facility based surveillance and community-based surveillance, the adherence to the testing strategy, the completeness of case investigation and the timeliness of field investigation. If performance targets are not reached, this should trigger corrective/supportive actions.

- **Interpret surveillance data and test results daily to detect outbreaks**

Health authorities should analyse the data reported by all surveillance stakeholders daily to detect a suspected, probable or confirmed cholera outbreak. Signals from event-based surveillance should also be considered. Health authorities also report the data to the next upper level of the surveillance system.

If a suspected, probable or confirmed cholera outbreak is detected

Immediately notify next-level health authorities of any verified suspected, probable, or confirmed cholera outbreak, and initiate the steps below within 24 hours.

- **Conduct case investigations on suspected cholera cases**

Interview patients about their: recent travel history; social interactions and attendance at gatherings; occupation/work; water, sanitation, and hygiene exposures; food consumption; and living conditions to generate hypotheses about exposure(s) to potential source(s) of contamination and contexts of transmission, and identify potential epidemiological links between cases.

- **Launch a field investigation**

Use case investigation findings to orient a field investigation to assess potential source(s) of contamination, contexts of transmission, and risk factors for spread.

- **Initiate immediate response measures**

If there is a suspected cholera outbreak, initiate immediate response measures for acute diarrheal diseases (i.e., not specific to cholera) without waiting for laboratory confirmation of cholera.

If there is a probable or confirmed cholera outbreak, initiate a rapid, comprehensive, multisectoral cholera outbreak response that includes coordination, epidemiology, case management, WaSH, logistics, community engagement, cholera-specific health promotion activities, and risk communication.

- **Adapt cholera surveillance strategies**

If there is a suspected cholera outbreak, encourage all reporting sites to review the cholera case definitions, recommended sample collection and testing schemes, data collection and reporting requirements, and treatment protocols.

If there is a probable or confirmed cholera outbreak, the surveillance strategy should be adapted (including the case definition, reporting frequency, and testing strategy). Health authorities should inform relevant stakeholders (ex. health facilities, community-based surveillance volunteers and health workers, and laboratories) of the new surveillance strategy applicable in the surveillance unit.

CHOLERA SURVEILLANCE IN THE PRESENCE OF A PROBABLE OR CONFIRMED OUTBREAK (COMMUNITY TRANSMISSION)

In the presence of a probable or confirmed cholera outbreak with community transmission (or deemed community transmission by default), cholera surveillance aims to **monitor the morbidity and mortality in affected populations** to guide interventions and mitigate the impact and spread of the outbreak. Below are the key principles for monitoring of an outbreak.

- **Ensure timely and comprehensive reporting and testing of a subset of suspected cases**

Health facilities and communities should **report any suspected cholera case** (i.e., any person with AWD or who died from AWD) **at least weekly**. Health authorities should ensure the timely reporting of standard case-based data by health facilities and data aggregated by day by community-based surveillance volunteers (or Community Health Workers) to support this objective. If no suspected cholera cases are detected, weekly zero reporting is sufficient.

A subset of suspected cholera cases detected at health facilities **should be tested** for cholera based on a systematic sampling scheme:

- If RDTs are available: the first 3 suspected cholera cases detected at each health facility each **day** should be tested by RDT, and health authorities are responsible for coordinating the collection of three samples on RDT+ cases in the surveillance unit each week for laboratory testing (culture and/or PCR).
- If RDTs are unavailable: samples should be collected from the first 3 suspected cholera cases in each health facility each **week** for laboratory testing (culture and/or PCR).

Towards the end of an outbreak (i.e., when the occurrence of suspected cholera cases is sporadic), all suspected cholera cases should be tested by RDT, culture or PCR.

Health authorities should periodically train/raise awareness about these reporting and testing requirements with surveillance stakeholders (ex. health facilities, community-based surveillance volunteers and health workers, and laboratories). Health authorities should also monitor on a weekly basis surveillance performance indicators to ensure that surveillance is being implemented appropriately by all surveillance stakeholders including by monitoring the completeness and timeliness of reporting through health-facility based surveillance and community-based surveillance, the adherence to the testing strategy, the completeness of case investigation and the timeliness of field investigation. If performance targets are not reached, this should trigger corrective/supportive actions.

- **Compile, clean, and report epidemiological and testing data**

Health authorities should compile and clean the data reported by surveillance stakeholders. Once cleaned, this should be reported electronically to the next level of the surveillance system.

- **Analyse and interpret surveillance data at least weekly**

  Health authorities should analyse the data reported by all surveillance stakeholders at least weekly to detect any deterioration of the outbreak and continuously inform response measures. **Data should be analysed at the surveillance unit level** or, if possible, disaggregated to the health-facility catchment area.

  The outbreak should be described by person, place, and time, and key morbidity and mortality indicators should be calculated including:

  - Incidence rate (number of new cases reported during a given time interval / population)
  - Case-fatality ratio (number of health facilities deaths during a given time interval / number of cases reported at health facilities within the same time interval)
  - Number of community deaths
  - Test-positivity rate - stratified by test method (number of positive test results / number of tests performed

  Community-based surveillance data and health facility data should be analysed separately but interpreted jointly.

  Health authorities should interpret **why the observed cholera trends occurred** by considering the areas and populations at risk, contextual information (ex. policy changes, barriers to cholera prevention, seasonal considerations, etc.) and the effects of interventions.

  Finally, health authorities should consider analysing data daily at the onset and towards the end of an outbreak.

- **Disseminate findings broadly**

  The analysis should be **disseminated to relevant stakeholders at least weekly** through established mechanisms (such as open-access epidemiological reports) to continuously guide effective outbreak response across all sectors.

- **Detect any outbreak deterioration and ensure rapid response**

  A deterioration of a cholera outbreak corresponds to the **worsening of the epidemiological situation** in a surveillance unit over at least two consecutive weeks.

  Signs of outbreak deterioration include an increase in weekly cholera incidence, the spatial extension of the outbreak, a rise in the health facility case fatality ratio (CFR) or the number of community deaths, or a shift in the socio-demographic profile of cases.

  Outbreak deterioration indicates that response activities are not effective in mitigating cholera morbidity, mortality, or spread. Therefore, if deterioration is detected, a **field investigation** should be immediately initiated to determine the conditions that led to it, mitigate the situation, and control the outbreak more effectively.

- **Adapt cholera surveillance strategies as needed**

  If/when the criteria for the end of an outbreak are met (for a minimum of four consecutive weeks, all suspected cholera cases have a negative test result by RDT, culture, or PCR),, surveillance strategies should be adapted (see cholera surveillance in the absence of a probable or confirmed outbreak). Health authorities should inform relevant stakeholders (ex. health facilities, community-based surveillance volunteers and health workers, laboratories) of the new strategies to be used.

CHOLERA SURVEILLANCE IN THE PRESENCE OF A PROBABLE OR CONFIRMED OUTBREAK (CLUSTERED TRANSMISSION)

In the presence of a probable or confirmed cholera outbreak with clustered transmission, cholera surveillance aims to **rapidly detect, confirm, investigate**, and respond to clusters of cases to interrupt cholera transmission before it spreads in the community.

Some key differences exist between the surveillance strategies used in outbreaks with clustered transmission versus community transmission, and are outlined below. Otherwise, the principles for the surveillance of community transmission apply.

- **Ensure timely and comprehensive reporting and testing**

  Health facilities and communities should **report any suspected cholera cases** (i.e., any person with AWD or who died from AWD) **daily.**

  All suspected cholera cases should be tested. If Rapid Diagnostic Tests (RDTs) are available, all suspected cholera cases should be tested by RDT, and samples should be collected from all RDT+ patients for laboratory testing (culture and/or PCR). If RDTs are unavailable, samples should be collected from all suspected cases for laboratory testing (culture and/or PCR).

- **Conduct case investigations**

  Health authorities should conduct **case investigations at a minimum on all confirmed cholera cases** and on any suspected cases for which samples for laboratory testing were not collected (samples should then be collected during the case investigation).

- **Analyse and interpret data daily**

  Health authorities should analyse surveillance data, test results, and findings from case investigations **daily**, and ensure that the analysis is sufficiently granular to guide highly targeted response measures.

- **Disseminate findings daily**

  The findings of the analysis should be disseminated to relevant stakeholders daily to guide rapid and targeted response measures to interrupt transmission.

- **Conduct field investigation**

  Health authorities should conduct field investigations as needed to supplement surveillance and case investigations, further document the outbreak situation, and better guide response measures.

- **Adapt cholera surveillance strategies as needed**

  - **Detection of community transmission**

    If epidemiological links can no longer be documented between all confirmed cholera cases, then community transmission is occurring. Surveillance strategies should be adapted (see cholera surveillance in the presence of a probable or confirmed outbreak (community transmission)), and health authorities should inform all relevant stakeholders (ex. health facilities, community-based surveillance volunteers and health workers, laboratories) of the new strategies to be used.

  - **End of an outbreak**

    If/when the criteria for the end of an outbreak are met (for a minimum of four consecutive weeks, all suspected cholera cases have a negative test result by RDT, culture, or PCR), surveillance strategies should be adapted (see cholera surveillance in the absence of a probable or confirmed outbreak). Health authorities should inform relevant stakeholders (ex. health facilities, community-based surveillance volunteers and health workers, laboratories) of the new strategies to be used.

4. ADDITIONAL RESOURCES

GTFCC resources to assist health authorities in implementing adaptive cholera surveillance are available at https://www.gtfcc.org/resources/public-health-surveillance-for-cholera/ or by scanning this QR Code:

Guidance from upper-level health authorities consistent with the cholera surveillance protocols applicable in the country should also be followed.

Questions and requests for technical support for cholera surveillance can be sent to gtfccsecretariat@who.int.