



2024 - Interim version (partial update)

# CHOLERA OUTBREAK RESPONSE FIELD MANUAL

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# Introduction

The response to a cholera outbreak must focus on limiting mortality and reducing the spread of the disease. It should be comprehensive and multisectoral, including epidemiology, case management, water, sanitation and hygiene, logistics, community engagement and risk communication. All efforts must be well coordinated to ensure a rapid and effective response across sectors.

This document provides a framework for detecting and monitoring cholera outbreaks and organizing the response. It also includes a short section linking outbreak response to both preparedness and long-term prevention activities.

# **Objectives**

The content of this document is based on recommendations and guidance from the World Health Organization (WHO) and the Global Task Force on Cholera Control (GTFCC). The objectives are to:

- provide a comprehensive overview of cholera outbreak response;
- improve prevention, preparedness and timely response to cholera outbreaks.

# **Target audience**

This document is intended primarily for public health professionals and programme managers who are directly involved in cholera outbreak detection and response. These include, for example, staff working at ministries of health, public health institutions, United Nations agencies including WHO country offices, and partners including nongovernmental organizations.

# When can the document be used?

This document can be used:

- before an outbreak for prevention and preparedness
- when a cholera outbreak is suspected
- during an outbreak to organize and monitor the response
- after an outbreak to assess the response and improve prevention and preparedness

# Structure of the document

This document contains an introduction to cholera, 10 technical sections and 17 appendices covering the key information, tools and action points. At the beginning of each section, a quick-reference box provides the contents of the section and a list of additional resources.

# Cholera

Cholera is an acute diarrhoeal disease caused by infection of the intestine with the bacterium *Vibrio cholerae*, either type O1 or type O139. Both children and adults can be infected.

About 20% of those who are infected with V. cholerae develop acute watery diarrhoea; approximately 20% of these individuals develop severe watery diarrhoea, many also with vomiting. If these patients are not promptly and adequately treated, the loss of fluid and salts can lead to severe dehydration and death within hours. The case fatality rate in mav be 30-50%. However. treatment untreated cases is straightforward (rehydration) and. if provided rapidly and appropriately, the case fatality rate should remain below 1%.

Cholera is transmitted by ingestion of faecally contaminated water or food and remains an ever-present risk in many countries. New outbreaks can occur in any part of the world where water supply, sanitation, food safety and hygiene are inadequate. The risk of cholera is considerably increased in humanitarian emergencies, when there are significant population movements and crowding in sites where displaced persons gather and frequent disruption of, or inadequate, access to healthcare services, clean water, sanitation and hygiene. Because the incubation period of cholera is short (2 hours to 5 days), the number of cases can rise quickly and many deaths can occur, creating an acute public health problem.

Spread of the disease within an area can be reduced through early detection and confirmation of cases, followed by an appropriate, well-coordinated multisectoral response. A strong multisectoral cholera preparedness plan that is well implemented will contribute to a more effective outbreak response.

In the long term, improvements in water supply, sanitation, food safety and community awareness of preventive measures are the best means of preventing cholera and other diarrhoeal diseases. In addition, WHO recommends that oral cholera vaccine use should be systematically considered as one of the measures to contribute to controlling cholera during outbreaks, in endemic areas and in humanitarian crises where there is a high risk of cholera.

# **Abbreviations and acronyms**

ABHR	Alcohol-based hand rubs
AWD	Acute watery diarrhoea
AST	Antimicrobial susceptibility testing
CFR	Case fatality rate
CHW	Community health worker
СТС	Cholera treatment centre
CTU	Cholera treatment unit
FRC	Free residual chlorine
GIS	Geographic information system
GPS	Global positioning system
GTFCC	Global Task Force on Cholera Control
IDP	Internally displaced person
IDSR	Integrated disease surveillance and response
IEC	Information, education and communication
IPC	Infection prevention and control
IR	Incidence rate
IV	Intravenous
KAP	Knowledge, attitudes, and practices
NCP	National cholera control and elimination plan
NGO	Non-governmental organization
OCV	Oral cholera vaccine
ORP	Oral rehydration point
ORS	Oral rehydration solution
PCR	Polymerase chain reaction
RDT	Rapid diagnostic test
SAM	Severe acute malnutrition

UN	United Nations
UNICEF	United Nations Children's Fund
WaSH	Water, sanitation and hygiene
WGS	Whole genome sequencing
WHO	World Health Organization

# Section 1. Outbreak detection and investigation

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- This section describes the cholera surveillance strategies in surveillance units where there is no probable or confirmed cholera outbreak to ensure the early detection of a potential outbreak.
- A surveillance unit corresponds to the lowest administrative level at which decisions are made to trigger cholera prevention and control measures, and at which surveillance findings are used to inform local public health interventions. The corresponding administrative level is country specific (e.g., Administrative level 2 or Administrative level 3).

# Definitions

## Acute watery diarrhoea

- An illness in which:
  - o Acute is defined as lasting less than seven days
  - o 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.

## Suspected cholera case

- 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.
- Patients with severe dehydration display:
  - o one or more danger signs:
    - lethargic or unconscious
    - absent or weak pulse
    - respiratory distress

or

- o at least two of the following:
  - sunken eyes
  - not able to drink or drinks poorly
  - skin pinch goes back very slowly

## Suspected cholera outbreak

- A suspected cholera outbreak is detected when:
  - o 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.

## Probable cholera outbreak

- A probable cholera outbreak corresponds to a situation in which, based on RDT results, there is high confidence that a cholera outbreak is occurring.
- Detecting a probable outbreak through RDTs without waiting for laboratory confirmation – allows for the rapid implementation of cholera response measures to contain the outbreak before it becomes widespread.
- A probable cholera outbreak is detected when the number of suspected cholera cases with a positive rapid diagnostic test (RDT+) result in the past 14 days achieves or surpasses a defined threshold, while taking into account the number of suspected cases tested (see Table 1).

#### Table 1. Detection of a probable cholera outbreak based on RDT+ results

Number of suspected cholera cases tested by RDT	Number of suspected cholera cases with RDT+ result	Interpretation	
3 to 7 suspected cases tested	At least 3 RDT+		
8 to 10 suspected cases tested	At least 4 RDT+	Probable	
11 to 14 suspected cases tested	At least 5 RDT+	outbreak detected	
15 to 17 suspected cases tested	At least 6 RDT+		
18 to 21 suspected cases tested	At least 7 RDT+		

# **Key surveillance strategies**

 In the absence of a probable or confirmed cholera outbreak, surveillance aims to rapidly detect, investigate, and respond to any potential outbreak to contain its spread.

#### **Detection and reporting of cases**

- Three complementary surveillance streams are used to detect cholera cases: health-facility based surveillance, community-based surveillance, and event-based surveillance (unstructured information such as rumours, media content, or reports from nongovernmental organizations, community members, etc.).
- Standard data is collected on all suspected cholera cases detected in health facilities and community settings. See Appendix 2 for a template cholera case report form, Appendix 3 for a template cholera line list and Appendix 4 for a community-based surveillance template reporting form.
- Standard data on suspected cholera cases is reported to health authorities within 24 hours.
- If no suspected cholera cases are detected, the absence of cases is reported on a weekly basis (i.e., zero reporting).

#### Testing

- Test all suspected cholera cases.
- If RDTs are available:
  - o Test all suspected cholera cases by RDT and
  - Collect stool samples from all RDT+ patients and send them to a reference laboratory for confirmatory testing (culture/PCR) (see Section 2 – Outbreak confirmation.

- If RDTs are unavailable:
  - Collect stool samples from all suspected cholera cases and send them to a reference laboratory for microbiological confirmation (see Section 2 – Outbreak confirmation).
- Remember:
  - RDTs can be used to rule out cholera but cannot be used to confirm individual cholera cases. However, results of multiple RDTs allow for the early detection of a probable cholera outbreak.
  - o Clinical management of cholera cases is guided by the degree of patient dehydration and does not require any test results.
- Report RDT results to the health authorities and the laboratory if the sample is being sent there. The health authorities need the RDT results to take action and adapt the response to an outbreak; the laboratory takes into consideration the field RDT results during their own testing.

## **Case investigation**

- If a suspected or probable cholera outbreak is detected in a surveillance unit, case investigations are conducted at the onset of the outbreak.
- Health officials interview patients to classify cases by geographic origin of infection (i.e., locally acquired or imported cases) and generate hypotheses about potential exposures and risk factors.
- Case investigations focus on the five days before illness onset, and findings should be used to guide field investigations. See Appendix 5 for a template cholera case investigation form.

# **Field investigation**

## **Timelines and objectives**

 If case investigations do not conclude with confidence that all suspected cases are imported, a field investigation is initiated quickly, preferably within 24 hours.

- Field investigation is an on-site assessment of the outbreak situation that aims to identify potential source(s) of contamination and contexts of transmission, as well as risk factors for spread.
- Field investigation should be combined with an initial needs assessment, and implementation of initial control measures (see Appendix 6 for a field investigation and initial response checklist).

### **Investigation team**

- Field investigation is conducted by a multisectoral team. Ideally, this should include a clinical specialist with experience in case management of cholera patients, an epidemiologist, a water and sanitation expert, an infection prevention and control expert, an expert in social mobilization, community engagement, and risk communication, and a laboratory technician to support and train local laboratory staff, and oversee stool collection from suspected cases.
- All members of the investigation team should be aware of the elements to investigate and the procedures to confirm or rule out an outbreak, and should adopt a multidisciplinary approach.
- The team should work quickly and report its findings including risks and assessed needs – to decision-makers as quickly as possible in order to provide a rapid and focused response.
- Teams should carry enough supplies to collect and transport stool samples, to treat any patients present on site, to ensure basic infection prevention and control (IPC) measures in the treatment centre, and to conduct community water, sanitation, and hygiene (WaSH) investigations. Guidelines, protocols, and information, education, and communication (IEC) materials should also be taken and left in the field.

## Activities

 Engage in active case finding (i.e., look for individuals who meet the applicable definition of a suspected cholera case among individuals at risk of exposure), explore possible sources of contamination, and identify risk factors and transmission pathways. If possible, test patients' drinking water sources for faecal contamination, or if the water is reported to be chlorinated, test for free residual chlorine (FRC).

- Map the locations of homes and water sources where people have been found to have cholera to help identify areas at risk, target interventions, and monitor disease spread.
- Implement prevention and control measures for suspected or potential risk exposures. If resources permit, a case-control or KAP study may help to identify these. Do not wait to implement prevention and control measures.

# **Risk assessment**

- Assess the risk of spread, magnitude, and potential impact of the outbreak.
  - O Likelihood of transmission is based on factors such as access to safe water and improved sanitation; population behaviour (including water sources used, chlorination, open defecation, handwashing); geographical, environmental and climate conditions (expected cholera season, expected weather patterns, flooding, drought); areas with high population density (slums, camps for refugees or internally displaced persons [IDPs]), and areas with high transit of people or an influx of travellers.
  - O Potential impact of the disease is based on factors including existing cholera preparedness, access to treatment (oral rehydration solution [ORS] and intravenous [IV] fluids), capacity of healthcare workers to provide case management, available supplies, health-seeking behaviour, malnutrition status, and population immunity, as determined by previous exposure to cholera or previous cholera vaccination.

# **Needs assessment**

- Identify the available resources (human and supplies) and estimate the needs based on the risk assessment.
- Communicate these estimates quickly to local and national authorities so the necessary resources can be rapidly procured and/or provided by the government or partners.
- Calculate the supplies needed based on the expected cumulative incidence rates and the population (see Appendix 7 for a district-level supply forecasting tool).
  - In rural communities with low population density, the cumulative incidence rates may vary (0.1–2%).
  - In crowded places (such as urban settings and camps for internally displaced persons and refugees), the cumulative incidence rates tend to be higher (1–5%).
- The above actions can be taken before an outbreak is confirmed or declared.

# **Initial response**

 During the field investigations include an intervention component, such as distribution of water treatment products and ORS, and deliver key messages for health education. Interventions should be prioritized for the household and neighbours of individuals with cholera.

# **Additional resources**

 Public Health Surveillance for Cholera – Guidance Document 2024. Global Task Force on Cholera Control. April 2024. https://www.who.int/cholera/task\_force/GTFCC-Guidancecholerasurveillance.pdf?ua=1https://www.gtfcc.org/wpcontent/uploads/2024/04/public-health-surveillance-for-cholera-guidancedocument-2024.pdf

- Global Taskforce on Cholera Control. Job Aid: Rapid Diagnostic Test (RDT) for cholera detection. Revised 2024. https://www.gtfcc.org/wpcontent/uploads/2022/01/gtfcc-job-aid-rapid-diagnostic-test-for-choleradetection-en-1.pdf
- World Health Organization Regional Office for Africa. Technical guidelines for integrated disease surveillance and response in the WHO African Region – Booklet four. 3<sup>rd</sup> ed. 2019.https://iris.who.int/bitstream/handle/10665/312364/WHO-AF-WHE-CPI-02.2019-eng.pdf
- World Health Organization. Early warning alert and response (EWAR) in emergencies: an operational guide. 2022. https://www.who.int/publications/i/item/9789240063587

# Section 2. Outbreak confirmation

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# Definitions

#### **Confirmed cholera case**

- 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 units, and no established epidemiological link to a confirmed cholera case or source of exposure in another country.

### **Confirmed cholera outbreak**

• A confirmed cholera outbreak is detected when a surveillance unit has at least one locally acquired, confirmed cholera case.

# Laboratory confirmation

- Declare the outbreak if *V. cholerae* O1 or O139 is confirmed by culture or PCR with evidence of locally-acquired infection (exclude imported cases).
- The bacterial strain should also be demonstrated as toxigenic (by PCR) if there is no confirmed cholera outbreak in other surveillance units, and no established epidemiological link to a confirmed cholera case or source of exposure in another country.
- Conduct antimicrobial susceptibility testing on the index confirmed (i.e., first confirmed) case at a minimum to guide antimicrobial treatment.
- Conducting Whole Genome Sequencing on confirmed cholera cases of uncertain origin (i.e., imported cases) is also recommended. However, this is not required for public health intervention.

# Collection, conditioning, storage and transport of samples for confirmation by culture and PCR

- Accurate and reliable test results rely on samples that have been adequately collected, packed, transported, and stored.
- Testing for cholera is performed on patients' stool.
- Collect faecal specimens (stool or rectal swabs) from suspected cases within the first 4 days of illness (when pathogens are usually present in highest numbers) and, if possible, before any antimicrobial therapy has been started.
- 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.
- Do not delay rehydration of patients to take a specimen. Specimens may be collected after rehydration protocols have been initiated.

### **Specimen collection**

- Able patients: Provide the patient with a container such as a bucket/bedpan without traces of detergent or disinfectant or a new plastic bag (like zip-lock bag) or ideally a wide biodegradable paper cup with a wide enough opening. Instruct the patient to: 1) urinate before using the container and 2) pass stool into the container. The loose stool collected can then be transferred into a stool cup or onto a swab.
- Patients who cannot move: Use a clean, unused bedpan or bucket. A bedpan or bucket must be washed, bleached, thoroughly rinsed and well dried before being reused. The bedpan or bucket must not have any residue of chlorine or any other disinfectant. Place it under the hole of a cholera bed or under the patient. Collect freshly passed stool. The loose stool collected can then be transferred into a stool cup or onto a swab.

• Rectal swab: In rare instances, a rectal swab may need to be performed. Ask the patient to lie on his side and to bend and lift his knee that is most on top. Moisten the swab in sterile transport medium or with saline. Insert the swab through the rectal sphincter 3–4 cm. Rotate for 5 to 10 seconds, and withdraw with care. Examine to ensure there is faecal material visible on the swab.

#### Specimen conditioning for transport

- There are 5 commonly recommended methods to condition cholera samples for transport to the laboratory.
- The selection of the method will depend on what resources are available (stool cups, Cary Blair swabs, etc.), when the sample is expected to be tested (within 2 hours, >2 hours, longer) and what type of tests are to be performed by the laboratory (RDT, culture, PCR etc..). The selection of the method should be made in conjunction with the laboratory.
- All samples should be kept and transported at ambient temperature  $(22^{\circ}C 25^{\circ}C)$  and kept out of direct sunlight.
- Fresh sample in a stool cup
  - If a sample can reach the laboratory within less than 2 hours, then it is possible to send it directly in the stool cup.
- Cary-Blair swab
  - If transport to the laboratory may take up to 7 days, it is important to preserve the sample in Cary-Blair medium. Cary-Blair transport medium has a shelf life of up to 1 year from the date of manufacture and does not require refrigeration (neither before use nor once inoculated). The medium can be used as long as it does not appear dried out, contaminated, or discoloured.
  - Dip a sterile cotton or polyester-tipped swab into a fresh stool sample and immediately place the swab in a tube of Cary-Blair transport medium, pushing it to the bottom of the tube. If a rectal

swab was performed, place the rectal swab directly in a tube of Cary-Blair transport medium, pushing it to the bottom of the tube.

- Break off and discard the top portion of the stick that extends beyond the tube.
- Sample in Alkaline Peptone Water (APW)
  - Alkaline Peptone Water (APW) is not a transport medium but a medium that favors growth of Vibrio cholerae bacteria. This method should only be used if the sample can reach the laboratory within less than 24 hours.
  - Tubes containing sterile APW must be prepared by the laboratory in advance. Transfer fresh stool from the initial container into the tube of APW in a way that the faecal matter should not exceed 10% of the total volume of the APW.
- Sample on wet filter paper
  - If Cary-Blair transport medium is not available and the specimen will not reach the laboratory within 2 hours, culture can be performed from liquid stool samples on filter paper and kept in a moist environment (i.e wet filter paper). Samples prepared this way can be tested within 15 days.
  - Using tweezers, dip a small filter paper disc into a fresh stool sample that has not been in contact with chlorine or other disinfecting agent. Put the sample in a screw-cap microtube and add two or three drops of normal saline solution to stop the sample from drying out. Close the tube well and store at room temperature.
- Sample on dry filter paper
  - Dry filter paper can be used for transport of faecal specimens for specific DNA detection by PCR only. These samples can be stored for a long time.
  - Place a drop of liquid stool on dry filter paper and allow it to air dry.
    Once dry, use tweezers to place the filter paper in a screwcap micro

tube or place in an individual pouch and store at room temperature. Do not add saline.

- All specimens should be sent to the laboratory, addressed to the cholera focal person, accompanied by a laboratory request/referral form containing, at minimum, the following information: healthcare centre, cholera treatment unit or centre (CTU/CTC) or hospital, patient name or initials, age, place of residence, date and time of collection, symptoms (or treatment plan), RDT results (if performed) and type of testing requested (culture and/or PCR for cholera).
- For all samples:
  - Maintain specimens at ambient temperature at all times. Do not refrigerate specimens, as refrigeration can greatly decrease the population of V. cholerae.
  - Do not allow specimens to dry (unless sending on dry filter paper for PCR). Add additional drops of normal saline solution if necessary.
  - o Transport in a well-marked, leakproof container at ambient temperature.
  - Ensure that each specimen and container is properly identified and accompanied by a laboratory request/referral form.
  - Prior to sending, ensure that the accepting laboratory has the knowledge and capacity to treat the type of sample (for example, wet filter paper for culture, dry filter paper for PCR).

#### Specimen transport

- Triple packaging is required to transport samples collected from cholera suspected cases.
- Ensure adherence to national and/or international regulations and train transport services adequately.

- Ensure that there are readily available standardised procedures for transport of cholera samples and these take into account local conditions (type of transport, duration of transport).
- Samples and sample request/referral forms should be transported together.
- For the best quality of stool samples for cholera testing, stool should be kept at temperature ranging between 22°C and 25°C. No ice packs are needed unless temperature is expected to go above 35°C. If ice packs are required, they should be placed between the secondary and tertiary containers and not in direct contact with the stool samples.

# **Reporting of laboratory results**

- Laboratories should maintain an updated database with all samples received and tested and the results of all testing performed.
- Ensure that there are national standardised laboratory reporting procedures and reporting forms with built in quality control measures to ensure minimum levels of reporting and accuracy of reporting.
- Laboratories should send results immediately after completion of testing to:
  - the health facility where the patient was admitted, with identifying information where available, so the results can be added to the register and clinic records; and
  - o the health authorities to update the epidemiological information.
- Report results of antimicrobial susceptibility testing immediately to the Ministry of Health Clinical Care Services and the health facility to ensure appropriate antimicrobial treatment.

# **Additional resources**

- 1. Public Health Surveillance for Cholera Guidance Document 2024. Global Task Force on Cholera Control. April 2024. https://www.gtfcc.org/wp-content/uploads/2024/04/public-healthsurveillance-for-cholera-guidance-document-2024.pdf
- Global Taskforce on Cholera Control. Job Aid: Rapid Diagnostic Test (RDT) for cholera detection. Revised 2024. https://www.gtfcc.org/wpcontent/uploads/2022/01/gtfcc-job-aid-rapid-diagnostic-test-forcholera-detection-en-1.pdf
- Global Taskforce on Cholera Control. Information on specimen collection, preparation and packaging for transport. https://www.gtfcc.org/resources/specimen-collection-preparation-andpackaging-for-transport/
- Global Taskforce on Cholera Control. Example laboratory request/referral and results reporting forms. https://www.gtfcc.org/resources/gtfcc-laboratory-referral-and-resultsreporting-forms/
- Global Taskforce on Cholera Control. Guidance on culture methods for testing for Vibrio cholerae. https://www.gtfcc.org/resources/isolationand-presumptive-identification-of-vibrio-cholerae-o1-o139-from-fecalspecimens-2/
- Global Taskforce on Cholera Control. Guidance for antimicrobial susceptibility testing. https://www.gtfcc.org/resources/antimicrobialsusceptibility-testing-for-treatment-and-control-of-cholera-2/
- World Health Organization Regional Office for Africa. Technical guidelines for integrated disease surveillance and response in the WHO African Region – Booklet four. 3<sup>rd</sup> ed.
   2019.https://iris.who.int/bitstream/handle/10665/312364/WHO-AF-WHE-CPI-02.2019-eng.pdf

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# Sectors to include in a multisectoral response

#### Coordination

- Activate or establish a cholera coordination committee or task force that meets regularly to coordinate the response, identify challenges and mobilize resources to address those challenges. This committee is composed of relevant multisectoral government institutions, agencies and local authorities, and national and international partners and NGOs.
- Based on the extent of the outbreak, this committee can be activated at national and/or subnational levels.
- This committee receives timely information and publishes and distributes daily updates and weekly situation reports that cover indicators on surveillance and epidemiology, WaSH, social mobilization, logistics and case management.
- This committee should estimate overall needs, orient and coordinate action, and ensure that human resources and supplies for case management, WaSH, social mobilization, and IEC materials are available when and where needed.

#### Epidemiological & Laboratory surveillance

- Continuously implement the applicable surveillance strategies to monitor the outbreak (see Section 4 Monitoring the outbreak).
- Analyse and interpret data at least weekly (see Section 4 Monitoring the outbreak).
- Disseminate findings 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).
- Report to regional and global levels on a weekly basis.

#### WaSH

- Assess the current conditions and identify risks for transmission in the community, including access to safe water and sanitation, environmental hygiene and key risk behaviours.
- Intervene with prompt WaSH measures; assure drinking water sources are adequately chlorinated at point of use at 0.5 mg/L of free residual chlorine (FRC). These measures can be prioritized in any hightransmission areas identified during the risk assessment.
- Water quality monitoring data should be shared with the coordination committee.
- Interventions to ensure access to chlorinated drinking water may include support to municipal systems or household water treatment.
- At household level, provide soap and water treatment products. Deliver WaSH messages to prevent cholera. This action is often oriented to the household and neighbours of patients admitted to cholera treatment structures, and should be coordinated with hygiene promotion colleagues.
- Visit the homes of cholera patients (when there are few and resources permit) and the affected communities to conduct active case finding, gather information and provide health education, water treatment products, soap and ORS.
- Work closely with case management and logistics colleagues to ensure adequate IPC in treatment structures.

#### **Case management**

- Immediately set up oral rehydration points (ORPs) and cholera treatment facilities (CTUs/CTCs). Ensure staff are trained on treatment protocols, adequate supplies are available and job aids are in place.
- Ensure that ORPs and CTUs/CTCs are accessible to the most-affected populations.
- Work closely with epidemiology and logistics to predict supply needs and pre-position them as needed.

- Train health-care workers on the use of RDTs, specimen collection and transport procedures.
- Work closely with WaSH and logistics colleagues to ensure adequate IPC measures in treatment structures.

#### Oral cholera vaccination

- Consider vaccination with oral cholera vaccine (OCV) to contain ongoing outbreaks (if implemented early) and to limit the spread of the outbreak into new areas.
- OCV can also be used to prevent outbreak occurrence in settings with high risk of cholera (such as refugee camps and slums) and to reduce disease transmission and the incidence of the disease in endemic areas or hotspots.
- Clearly define the geographical areas and population to be targeted by vaccination based on the epidemiological situation, risk factors and the current local infrastructure and capacities.
- OCV should be used in conjunction with other cholera prevention and control strategies.

#### Social mobilization and community engagement

- Investigate hygiene and sanitation infrastructure available in the area, including access to and use of these services. Identify at-risk populations and prioritize areas for rapid intervention.
- Engage the community to transmit health promotion and cholera prevention messages and to promote early treatment for diarrhoea.
- Messages should focus on recognizing symptoms of cholera and how it is transmitted, encouraging early treatment-seeking behaviour and increasing awareness of prevention practices and strategies.
- Focus messaging over time to address main risks and gaps (identified through field investigations and case-control or knowledge, attitudes and practices [KAP] studies), with positive actions that can be taken (such as increasing household water chlorination, bringing sick people to

the clinic immediately, improving handwashing and preparing food safely).

# First steps to control a cholera outbreak

#### Activate the cholera coordination committee

- Create a multidisciplinary cholera coordination committee for coordination between relevant sectors (such as WaSH, education, communication, hygiene promotion) with representatives from relevant ministries and local authorities, international agencies, NGOs, and others as appropriate.
- Clearly establish the lead organization or institution of the committee. It is usually led by the Ministry of Health in the country.
- During large outbreaks, there may be a national committee and subcommittees to treat more technical subjects (such as surveillance, laboratory, WaSH, case management, logistics, social mobilization). Not all members in a technical group will attend the national committee meetings, but at least one representative from each group should attend to ensure communication exchange and coordination across sectors.
- If a cluster approach is activated, facilitate the participation of all relevant partners. Roles and responsibilities of the different coordination bodies must be clearly defined.
- Assess the need for subnational coordination structures. Depending on the extent and magnitude of the outbreak, the size of the country and its health service structure, similar committees may be created at subnational or more peripheral levels.
- The cholera coordination committee should meet frequently during the outbreak period (at least once or twice a week, and even daily in the initial phases) and should be action-oriented based on the context and progress of the outbreak.
- The committee should try to coordinate fundraising for the emergency response.

#### Functions of the cholera coordination committee

This committee provides strategic direction, including the rapid and efficient development, execution and monitoring of the outbreak response plan, as well as implementation and monitoring of activities. Main functions include the following:

- Estimate the potential amplitude of the outbreak and the expected number of cases based on risk assessment and available epidemiological data. Identify priority areas for all interventions.
- Identify human resources and supplies available and needed (see Appendix 7 – district-level supply forecasting tool). List unfulfilled needs with required external support.
- Establish cholera treatment facilities in the affected areas to ensure prompt access to treatment. The committee can identify a partner or institution with sufficient capacity to do this or to provide additional support as necessary.
- Provide health-care professionals with approved case management protocols. If these are not available, a subcommittee may be created to develop them.
- Procure and distribute necessary supplies in a timely manner to avoid any shortages.
- Coordinate all partners involved in the response to avoid duplication and overlaps, and to maximize overall response efficiency and effectiveness (see Appendix 8 – matrix for coordination of cholera control activities).
- Develop or update a multisectoral cholera response plan as rapidly as possible.
- Create and distribute regular situation reports (at least weekly) on surveillance and epidemiology, laboratory, WaSH, case management, and social mobilization. Include needs identified, implemented measures and recommended actions. Share with donors, government and the public.

- Organize regular briefings and meetings and provide regular, concise and updated information on the epidemiological situation and on the effectiveness of the outbreak response, including:
  - description and monitoring of the outbreak: magnitude, evolution over time (epidemiological graphs to show improvement or deterioration of the situation), geographical extent including maps, other significant features (elements such as AR, case fatality rate [CFR], and other relevant information such as displaced populations or difficult to-reach populations and rainfall or flooding);
  - o regularly updated needs for resources, including personnel and supplies; and
  - o control activities undertaken and planned.
- Organize relevant trainings in surveillance, case management, laboratory sampling, chlorine solution preparation, IPC measures and other topics as needed.
- Produce or update IEC materials adapted to the context for health education. Ensure best practices for effective risk communication and use adequate dissemination means (such as radio, posters, TV and local leaders).
- Mobilize, train, and equip community focal points (for example, community health workers, local leaders, village chiefs, heads of household) for health promotion messaging, rapid case detection, dehydration management at home with ORS and treatment-seeking behaviour.
- Arrange provision and ensure access to sufficient quantities of safe water and sanitation in all affected areas.
- Assess potential use of OCVs and, if necessary, support the Ministry of Health in preparing and submitting the request to the global stockpile. Conduct microplanning and implement and coordinate OCV campaigns (see section 9 – oral cholera vaccines).
- Supervise, monitor and evaluate control activities and interventions implemented.

# Develop a cholera response plan and a preparedness for areas at risk

- Develop an integrated and multisectoral cholera response plan based on risk and needs assessments.
- Objectives:
  - a) reduce the mortality due to cholera.
  - b) reduce transmission of the disease in affected areas.
  - c) prevent and/or minimize the risk of introduction of the outbreak to other high-risk areas.
- The cholera response plan should include sections on coordination, early warning and surveillance, case management and IPC measures, WaSH, OCV, risk communication and community engagement, essential supplies and logistics, measures to prevent spread into neighbouring areas and countries, and budget.
- Each section should have clear activities and indicators for monitoring and evaluation.
- Integrate and strengthen prevention activities, mainly WaSH, social mobilization and surveillance in areas that are unaffected but at high risk.

#### Implement control measures

- Control measures should be implemented rapidly, as soon as there is an indication of a cholera outbreak. Control measures focus on reducing mortality and limiting the spread of the disease. See sections 6, 7 and 8.
- Key actions to reduce mortality include:
  - Set up decentralized cholera treatment facilities (CTUs/CTCs) and oral rehydration points (ORPs) for rapid access to treatment.
  - Distribute ORS in the community and to households. Explain how to prepare and administer the ORS.
  - Employ early detection, triage and transfer of severe cases for IV fluid treatment.

- o Train health professionals using standard case management protocols and IPC measures.
- o Distribute validated treatment protocols to health facilities and CTUs/ CTCs.
- Estimate supplies; procure and distribute needed supplies to avoid any shortage.
- Inform the public about what people should do if someone is ill with diarrhoea; include instructions about rehydration with ORS at home or on the way to a treatment facility and how and where to seek immediate treatment.
- Key actions to reduce the spread of the disease:
  - Identify possible sources of contamination and main transmission routes to target interventions.
  - Provide safe water in sufficient quantity and improve sanitation and safe excreta disposal and management.
  - Monitor water sources regularly for free chlorine levels and report findings to coordination committee; emphasize gaps in chlorination.
  - Identify gaps and promote hygienic conditions and practices (such as handwashing, household water treatment and storage, safe preparation of food, safe burials) and report findings to the coordination committee for immediate action.
  - Strengthen IPC measures and WaSH at CTUs/CTCs.
  - o Strengthen epidemiological and laboratory capacity for surveillance.
  - Conduct epidemiological studies (such as KAP and case-control studies) to identify risks and gaps.
  - Communicate often to the public through appropriate means (including press releases, TV, radio, social media) and strengthen community engagement.
- Conduct GIS mapping of cases, water sources and other features to identify regions of high disease burden or emerging areas of high transmission to target interventions.
- o Include oral cholera vaccine (OCV) as part of the multisectoral interventions to control cholera.

### Procure cholera kits

- Cholera kits help countries to prepare for a potential cholera outbreak and to support the initial response.
- The overall package consists of six different kits, each divided into several modules. The kits and modules can each be ordered separately.
  - Three kits are designed for the treatment of cholera patients within existing structures at the central, peripheral and community levels.
  - One kit provides the necessary material to set up a provisional structure for patient care when no existing structure is in place.
  - Two kits list the equipment needed for the investigation of cholera outbreaks and for the laboratory confirmation of suspected cholera cases.
- Some items especially in regards to water abstraction, treatment and distribution, safe excreta disposal and management, and IPC – may not be included in the cholera kits and will require local procurement.

### Procurement

- United Nations (UN) agencies can order cholera kits via WHO or United Nations Children's Fund (UNICEF) procurement.
- Non-UN entities should contact WHO Procurement Services at procurement@who.int. Put the words "Cholera kits" in the subject line of the email message. WHO Procurement Services will provide guidance for a direct procurement.

## **Additional resources**

- World Health Organization. Early warning alert and response (EWAR) in emergencies: an operational guide. 2022. https://www.who.int/publications/i/item/9789240063587
- World Health Organization Regional Office for Africa. Technical guidelines for integrated disease surveillance and response in the WHO African Region – Booklet four. 3rd ed. 2019.https://iris.who.int/bitstream/handle/10665/312364/WHO-AF-WHE-CPI-02.2019-eng.pdf
- https://www.who.int/cholera/publications/OutbreakAssessment/en/R evised cholera kits and cholera kit calculation tool. World Health Organization. 2019 https://www.who.int/cholera/kit/en/

## Section 4. Monitoring the outbreak

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- This section describes the cholera surveillance strategies that implemented in surveillance units where there is a probable or confirmed cholera outbreak.
- The applicable surveillance strategies differ depending on whether there is community transmission or clustered transmission in a surveillance unit.

## Definitions

### Start date of a cholera outbreak

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

### Suspected cholera case

- In the presence of a probable or confirmed cholera outbreak a suspected cholera case is any person:
  - with acute watery diarrhoea; or
  - o who died from acute watery diarrhoea.

### **Community transmission**

- There is community transmission if confirmed cholera cases are not all epidemiologically linked.
- By default, an outbreak is classified (and monitored) as community transmission unless clustered transmission has been demonstrated through case investigation.

### **Clustered transmission**

- There is clustered transmission if confirmed cholera cases 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 when the number of cholera cases is low.

### End of a probable or confirmed cholera 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.

## Classification of outbreaks: community transmission or clustered transmission

- In non-endemic countries (including countries on the path to eliminating cholera), it is recommended that a probable or confirmed cholera outbreak be further classified as either community transmission or clustered transmission.
- If this classification is not undertaken, the outbreak is classified as community transmission by default.
- Different surveillance strategies apply for monitoring community transmission and clustered transmission.

## Monitoring the outbreak: community transmission

 In a probable or confirmed cholera outbreak with community transmission, surveillance aims to monitor the morbidity, mortality, and case fatality ratio to guide interventions and mitigate the impact and spread of the outbreak.

### **Detection and reporting of cases**

 Standard data is collected on all suspected cholera cases detected in health facilities and community settings. See Appendix 2 for a template cholera case report form, Appendix 3 for a template cholera line list and Appendix 4 for a community-based surveillance template reporting form.  Data is reported to local health authorities at least weekly (including zero reporting). More frequent reporting (i.e., daily) is recommended at the onset or towards the end of an outbreak when cases are sporadic.

### Testing

- Test a subset of suspected cholera cases tested a according to a systematic sampling scheme (i.e., the sampling scheme is be consistent over time).
- If RDTs are available:
  - Test the first 3 suspected cases per day per health facility by RDT and
  - Collect stool samples from 3 RDT+ patients per week per surveillance unit and send them to a laboratory for testing by culture and/or PCR.
- If RDTs are unavailable:
  - Collect stool samples from the first 3 suspected cases per week per health facility and send them to a laboratory for testing by culture and/or PCR.
- Perform antimicrobial susceptibility testing (AST) on the first 5 confirmed cholera cases per surveillance unit. Then, perform AST on at least 3 confirmed cholera cases per surveillance unit per month.
- Conducting whole genome sequencing (WGS) on a subset of confirmed cholera cases is also encouraged. However, this is not required for public health intervention.
- Towards the end of an outbreak, test all suspected cases by RDT or culture or PCR.

### Data analysis and interpretation

- Analyse and interpret data 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.

- Conduct data analysis primarily at the level of the surveillance unit to inform targeted interventions.
- Analyse community-based and health facility-based surveillance data separately but interpret these data streams jointly.
- Include both weekly data for the last epidemiological week and cumulative data starting from the beginning of the calendar year (or the start date of the outbreak) in the analysis. Compare weekly values with those of the previous week(s).
- Include a description of cases by person, place, and time, as well as key morbidity and mortality indicators in the analysis. See below for more information about descriptive epidemiology and key indicators.
- Disseminate findings in weekly epidemiological reports to health authorities, health professionals, and other sectors. See Appendix 9 for an outline of an epidemiological report.

### **Descriptive epidemiology**

- By person
  - Cases
  - Number of suspected cholera cases
  - 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.
  - o Tests
  - Number of suspected cases tested by RDT or by culture or PCR
  - Number of suspected cases tested positive by RDT or by culture or PCR

- O Deaths
- Number of cholera deaths in health facilities
- Number of community cholera deaths
- 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.
- Severity & hospitalization
- Proportion of cases hospitalized as inpatients
- Proportion of cases by level of dehydration (at least severe dehydration)
- By place
  - Provide a spatial distribution of cases and deaths to describe the geographic extent of the outbreak, identify the areas most affected, and formulate hypotheses about sources of contamination and contexts of transmission.
  - Include other geographic variables or points of interest that might be associated with cholera transmission (e.g., water sources, major transportation routes, markets, etc.).
- By time
  - Plot cholera cases and deaths over time to monitor the outbreak dynamics (i.e. the epidemic curve of the number of suspected cholera cases by date of symptom onset or consultation/admission).
  - Important dates can be indicated alongside the epidemic curve to facilitate the interpretation of outbreak dynamics (e.g., date of the first reported case, changes in surveillance, declaration of the outbreak, response efforts including OCV campaigns, etc.)

### **Key indicators**

- The following key morbidity and mortality indicators are monitored throughout the outbreak:
- Incidence Rate (IR)
  - IR indicates the evolution of the outbreak and the speed of its spread; this indicator allows for a comparison of geographic units and time periods.
  - IR is calculated for a given time interval (e.g., week) and for a given geographic unit (e.g., surveillance unit).
  - o IR is often expressed per 1,000, 10,000, or 100,000 population.

### o Calculation:

Numerator: Number of new (suspected and confirmed) cholera cases reported during a given time interval Denominator: Population during the same time interval

### Cumulative incidence rate

- The cumulative incidence rate is the proportion of the population that has contracted cholera over a given time interval (for example, one year or the whole duration of the outbreak).
- Often expressed as a percentage, it indicates the impact of the outbreak on the population.

### o Calculation:

Numerator: Total number of (suspected and confirmed) cholera cases reported since the beginning of the outbreak or since the beginning of the year

Denominator: Population at the beginning of the outbreak or at the beginning of the year

### • Case fatality ratio (CFR)

- The CFR is the proportion of health facility cholera deaths that occur among cholera cases (suspected and confirmed) during a specified time interval.
- Often expressed as a percentage, the CFR is an 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 the number of community deaths.
- o Calculation:

Numerator: Number of cholera deaths reported in health facilities during a given time interval

Denominator: Number of (suspected and confirmed) cholera cases reported in health facilities within the same time interval

### Test positivity rate

- The test positivity rate is the proportion of tests performed (stratified by testing method) that are positive, expressed as a percentage.
- The test positivity rate should be reviewed along with the epidemic curve to interpret outbreak trends. For example, a low test positivity rate that coincides 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.

### • Calculation:

Numerator: Number of positive test results (stratified by test method) Denominator: Number of tests performed (stratified by test method)

## Detecting and investigating outbreak deterioration

- A deteriorating outbreak may be detected if, over at least two consecutive weeks, there is:
  - o an increase in weekly cholera incidence;
  - o a spatial extension of the outbreak;
  - an increase in the case fatality ratio (CFR) or in the number of community deaths;
  - o a shift in the socio-demographic profile of cases.
- If a deteriorating cholera outbreak is detected, a field investigation should be conducted. 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.).
- Based on the findings of the field investigation, the response should be strengthened and adapted to control the outbreak more effectively (e.g., scaling up interventions, allocating additional capacity or resources for response, etc.).

## Monitoring the outbreak: clustered transmission

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

### **Detection and reporting of cases**

 Standard data is collected on all suspected cholera cases detected in health facilities and community settings. See Appendix 2 for a template cholera case report form, Appendix 3 for a sample cholera line list and Appendix 4 for a community-based surveillance template reporting form.  Standard data on suspected cholera cases should be reported to health authorities within 24 hours.

### Testing

- Test all suspected cholera cases.
- If RDTs are unavailable:
  - Collect stool samples from all suspected cholera cases and send them to a laboratory for testing by culture and/or PCR.
- If RDTs are available:
  - Test all suspected cases by RDT and
  - Collect stool samples from all RDT+ patients and send them to a laboratory for testing by culture and/or PCR.
- Perform antimicrobial susceptibility testing (AST) on the index confirmed (first confirmed) case at a minimum.
- Performing whole genome sequencing (WGS) on at least one confirmed cholera case is encouraged, particularly if the cluster origin is uncertain.
- Confirmation of toxigenicity may also be warranted if there is no established epidemiological link to a confirmed cholera case or source of exposure in another country.

### **Case and field investigation**

- To document epidemiological links between cases, conduct case investigations on all confirmed cholera cases (at a minimum) and on any suspected cases for which laboratory specimens were not collected (specimen collection should then occur as part of the investigation). See Appendix 5 for a template cholera case investigation form.
- Conduct case investigations without waiting for laboratory results on suspected cases.
- Field investigation may also be undertaken to further guide the response.

### Data analysis and interpretation

- Analyse daily surveillance data and case investigation findings.
- The principles for analyzing surveillance data are generally similar to those applied in an outbreak with community transmission. However, in clustered transmission, a more granular data visualization or description is useful for guiding highly targeted response measures.

## **Environmental surveillance**

- During a suspected or confirmed cholera outbreak, the primary objective of environmental testing is to determine if sources of drinking water (surface and stored) are contaminated with faecal matter.
- If the water source is part of a chlorination system or program, testing of free residual chlorine (FRC) is warranted. Drinking water quality monitoring should focus on FRC levels and basic tests for faecal contamination (such as testing for *E.coli*).
- Environmental sampling to detect outbreak strains of V. cholerae does not serve an immediate public health purpose, other than in unusual circumstances where cholera is rare or unknown and a single source seems likely.
- The benefits of testing for *V. cholerae*, such as long-term monitoring and strain identification, are primarily of research interest or elimination monitoring and thus beyond the scope of this document.

## **Additional resources**

- Public Health Surveillance for Cholera Guidance Document 2024. Global Task Force on Cholera Control. April 2024. https://www.gtfcc.org/wp-content/uploads/2024/04/public-healthsurveillance-for-cholera-guidance-document-2024.pdf
- World Health Organization Regional Office for Africa. Technical guidelines for integrated disease surveillance and response in the

WHO African Region – Booklet four. 3rd ed. 2019.https://iris.who.int/bitstream/handle/10665/312364/WHO-AF-WHE-CPI-02.2019-eng.pdf

- 3. Interim Technical Note Introduction of DNA-based identification and typing methods to public health practitioners for epidemiological investigation of cholera outbreaks. Global Task Force on Cholera Control. June 2017 https://www.who.int/cholera/task\_force/GTFCC-Laboratory-supportpublichealth-surveillance.pdf?ua=1
- 4. Managing a cholera epidemic. Chapter 2. Outbreak investigation. MSF. August 2017.

https://medicalguidelines.msf.org/en/viewport/CHOL/english/chapter-2-outbreak-investigation-23448695.html

 World Health Organization. Early warning alert and response (EWAR) in emergencies: an operational guide. 2022. https://www.who.int/publications/i/item/9789240063587

# Section 5. Risk communication and community engagement

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## **Risk communication**

- Communication with the public during a cholera outbreak is critical not only for the rapid control of the outbreak, but also to keep the public informed and reduce the risk of social, political and economic turbulence.
- Risk communication is defined as the real-time exchange of information, advice and opinions between experts or officials and people who face a threat to their survival, health or economic or social well-being.
- The purpose of risk communication is to ensure that everyone at risk for cholera is informed about how to reduce the risk of spreading the disease, take personal protective and preventive measures, and proceed if someone gets sick.
- Public health officials must report, fully and rapidly, what they know, what they suspect and what they are doing to control the outbreak.
- Best practices for effective risk communication include the following:
  - o Create and maintain trust.
  - O Acknowledge and communicate even in uncertainty.
  - Be transparent and fast with the first communication and all communications.
  - Be proactive in public communication, using a mix of preferred channels of affected populations, such as TV, radio, SMS, internet, social media, mass awareness initiatives, and social mobilization.
  - Understand local knowledge and behaviours (including beliefs and barriers) towards cholera and adapt the messages accordingly.
  - Involve and engage the community in the outbreak response through community leaders and influencers.

## **Clarifying rumours and community concerns**

 Trusted information should reach people and rumours should be addressed by maintaining a very open flow of information from the beginning of the outbreak; rumours spread easily when information is incomplete or delayed.

- Define a strategy to disseminate accurate information promptly, rather than responding to rumours.
- Provide information that is easily understood, complete and free of misleading information.
- Key messages to the public should help people to recognize symptoms of cholera and how it is transmitted and provide information about what to do for prevention and treatment, encouraging early treatment-seeking behaviour.
- Information should include what cholera is, how it can be prevented, why, when and where to seek help, and how to care for family members with diarrhoea (see Appendix 10 – key messages for health education).

## Media involvement in the outbreak response

- Establish partnerships with the media to contribute to controlling the outbreak by providing:
  - o information to people within and outside the affected area;
  - o information in the appropriate language;
  - o information through the appropriate channels (radio, press, TV);
  - o the right type of information, with the right frequency.
- When an outbreak starts, designate a single spokesperson who will be the focal point for the media.
- Plan regular press releases and conferences. Prepare a set of frequently asked questions (FAQ) with responses.
- Public health authorities are generally interested in using the media to provide information on preventive and control measures via public service announcements, while journalists may focus on disseminating news. A balance between the two interests should be established by negotiation.
- The kind of information to be disseminated will depend on the level of the media local, national or international.

## **Community engagement**

- Community engagement is a process of including at-risk and affected communities in the cholera control response throughout the process, from planning and surveillance to implementation and monitoring. It promotes and facilitates community ownership in the response.
- The purpose of community engagement as a complementary strategy to risk communication – is to multiply the effect of information and communication about preventive actions.
- Community engagement proceeds through in-depth interpersonal outreach and dialogue to plan local solutions that are specific to a community's (or individual's and family's) needs. It recognizes challenges and builds upon locally defined opportunities for people to be able to practice behaviours that stop cholera transmission.
- Outcomes of effective community engagement are foremost about community ownership of the response and include increasing trust, confidence and cooperation with response teams, community feedback and uptake of preventive practices.
- Best practices for community engagement include:
  - identifying and using trusted, community-appointed people as entry points for response teams to work with the at-risk community;
  - facilitating a local risk assessment and using locally generated data to develop an implementation plan for the community to remain cholera free or to rapidly interrupt transmission;
  - o forming a small local task team comprising trusted leaders, respected members of the community, religious representatives and youth and women's group members who are responsible for engaging with the response teams and monitoring implementation of the local plan;
  - facilitating routine feedback and engagement between the community and the cholera response team to be able to change the strategy if needed;

- supporting and building on the mass mobilization efforts of local churches, networks, teachers and vendors to improve the community's confidence;
- linking up and using mass media to promote community engagement activities and using local structures to discuss public health advice promoted in the media; and
- using local communication channels (such as information boards, meetings, social media) to communicate which parts of the response are working, which are not working and how to improve the response.

## **Additional resources**

- Outbreak communication: best practices for communicating with the public during an outbreak: Report of the WHO Expert Consultation on Outbreak Communications held in Singapore, 21-23 September 2004. World Health Organization. 2005 https://apps.who.int/iris/handle/10665/69138
- Communicating for cholera preparedness and response. UNICEF Cholera Toolkit. 2013 https://www.unicef.org/cholera/index\_71215.html
- 3. Health promotion materials. Centre for Disease Prevention and Control https://www.cdc.gov/cholera/materials.html

## Section 6. Cholera treatment facilities

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## **Overview of treatment**

- Rapid access to rehydration therapy is the primary treatment for the full clinical spectrum of patients with cholera.
- Patients with no signs of dehydration are treated with oral rehydration solution (ORS) at household level, in the community or in health care facilities. Oral rehydration points (ORPs) are used to deliver ORS.
- Patients with some signs of dehydration are treated with ORS and monitored closely at a cholera treatment facility.
- Patients with severe dehydration require intravenous rehydration, antibiotics, and close monitoring at a cholera treatment facility.

## Access to cholera treatment

- Select the location of ORPs and inpatient cholera treatment structures (CTUs/CTCs) to ensure rapid access for patients from affected communities.
- ORPs should be as decentralized as possible and can refer patients to more centralized CTUs/CTCs.
- Factors to be considered in site selection:
  - o areas with high incidence rates, large number of patients, high CFR or many deaths reported in the community;
  - areas with poor access to health care for geographic, economic or social reasons.
- Involve the community and local authorities in the site selection, if possible.

## **Oral Rehydration Points (ORPs)**

- Providing rapid access to oral rehydration solution (ORS) saves lives.
- ORPs provide first-line, community-level rehydration, as a highly decentralized element of case management services.
- No specific structure is necessary for the delivery of ORS: ORPs can be fixed or mobile or integrated as part of a healthcare structure, but there is no provision for overnight care for patients. However, basic IPC measures should be implemented to prevent ORPs from being a source of infection.
- ORPs provide oral treatment for patients with suspected cholera and dehydration and refer patients with some or severe dehydration to cholera treatment facilities (after starting ORS if possible).
- ORPs should provide care during all daylight hours, 7 days per week.
- Whenever possible, involve and train community health workers or community volunteers in the preparation and distribution of ORS in the community, assessment and treatment of patients, and referral of patients with some or severe dehydration for further treatment.
- Any programme delivering ORS is also a good mechanism for delivering health and hygiene education messages.

## Inpatient cholera treatment facilities (CTUs/CTCs)

- Cholera treatment centres (CTCs) and smaller cholera treatment units (CTUs) are inpatient health-care structures set up during outbreaks to isolate and treat patients with cholera.
- Traditionally, CTUs have a smaller capacity and are attached to existing health facilities, and CTCs are independent structures with larger capacity. However, there is no strict definition of a CTU or CTC, and the names are sometimes used interchangeably. The principles for patient care and hygiene are the same for both.

- CTUs/CTCs should be open 24 hours a day and provide oral and IV rehydration.
- CTUs/CTCs should be established to provide access to treatment for as many patients as possible in the affected areas. When setting up a CTU/ CTC, involve the community to ensure that they will use the facilities.
- Although there is no standard design for CTUs/CTCs, several principles should be followed, such as one-directional patient flow and the separation of patient care areas from staff-only areas.
- CTUs/CTCs can be established in isolated wards in hospitals or health centres, in a tent on the grounds of a health centre or in special units in community buildings such as sports facilities.
- During large epidemics, tent-based structures designed to accommodate large numbers of cholera patients may be easier to manage than other options.
- In urban centres or in specific contexts, an intermediate structure, sometimes referred to as a stabilization centre, may be used to provide oral rehydration and, when the patient is severely dehydrated, initiate IV fluid treatment before the patient is transferred to a CTU/CTC.
- CTUs/CTCs must follow strict IPC measures to minimize the risk of propagation.

## Staff and supplies at CTUs/CTCs

- During the outbreak, CTUs/CTCs must be functional 24 hours a day. Establish a plan for rotation of staff.
- Conduct training in clinical case management so health professionals are able to treat dehydration and common complications. Use protocols validated by the country's Ministry of Health.
- Conduct training in IPC measures, including prevention of transmission at the facility level, use of protective equipment such as gloves and

aprons, safe preparation and use of different chlorine solutions, disinfection procedures and waste management.

- Post job aids with treatment and IPC protocols in work areas for quick reference.
- Provide sufficient supplies at every healthcare facility and ORP that might have to treat cases of cholera. Supplies should not be limited to IV fluids; most patients can be treated with ORS alone.
- Prepare sufficient quantities of ORS, using safe water, to cover daily needs.
- ORS should be discarded after 12 hours if kept outside a refrigerator or 24 hours if refrigerated.
- A 3-day supply of water should be stored on site at all times.
- Organize adequate provision of WaSH supplies, including chlorine, residual chlorine testers, cleaning materials, buckets for chlorine solution preparation, protective gear, handwashing stations, waste bins and trolleys/wheelbarrows, body bags, etc.
- Stock management is a key part of running CTUs/CTCs and ORPs. The rate of use of supplies can vary greatly during the course of an epidemic.
   A minimum supply to cover 3 days or longer should be kept on site, depending on reliability and regularity of supply delivery. There should be dedicated staff to manage supplies, if possible.

## **Organization and functions of CTUs/CTCs**

- •The organization of CTUs/CTCs should facilitate caring for patients with cholera while minimizing the risk of becoming a source of infection.
  - The different areas of the structure (such as patient treatment areas and areas for staff only) must be clearly delineated.
  - o Patient flow is one-directional and follows strict rules.
  - o Only one caregiver should be present with each patient.

- o There are clear entry and exit points.
- CTUs/CTCs must have separate latrines and baths/showers for patient use only. If possible, staff should have separate facilities.
- o Patient care areas should be gender segregated whenever possible.
- Special considerations should be made for vulnerable groups, such as persons with disabilities, elderly people and pregnant women, when constructing latrines and showers/bathing units.
- Main functions to be ensured in CTUs/CTCs include:
  - o assessment of patients' dehydration status;
  - o registration of patients;
  - provision of treatments, including IV fluids, ORS therapy, zinc, and antibiotic therapy;
  - provision of direct patient care, including feeding and personal hygiene;
  - prevention and control of infection through appropriate measures related to water treatment, cleaning and disinfecting the treatment structure, food preparation, laundry, waste management, cleaning and disinfecting patient transport vehicles and the handling of corpses;
  - offering health and hygiene education for patients, relatives and caregivers; and
  - ensuring security and a protected environment by having a watchman for information and patient flow control and protection of stocks (food, drugs, supplies) and fences, as needed.
- Organize the CTUs/CTCs into the following areas (figure 2):
  - o entrance and exit (screening of patients and handwashing area)
  - o observation area for patients with no or some dehydration (plan A and B)
  - o hospitalization area for patients with severe dehydration (plan C)

- o staff area for supplies, offices, etc.
- o recovery area for patients with no remaining signs of dehydration
- o waste area (laundry, waste pits, etc.)

### o morgue

### Figure 2. Layout of a CTU/CTC



## **IPC measures at a CTU/CTC**

- IPC measures are critical to prevent treatment structures from being a source of cholera infection. Adequate WaSH services are indispensable elements for patient care and for IPC in and around CTUs/CTCs.
- Organize the CTUs/CTCs in clearly separated areas and with a oneway flow of patients.
- Ensure that handwashing facilities with soap and safe water are available and maintained in the CTU/CTC for health professionals and patients' caregivers in each ward and at the entrance and exit.

- Guarantee regular provision of buckets, clothes, chlorine, cleaning materials, protective gear, sprayers, waste bins and cholera cots.
- Ensure there are measures in place for the safe disposal of excreta and vomit. When possible, latrines for cholera patients should be separate from latrines used by others. When possible, latrines should be gender segregated.
- Ensure there is enough water to cover the daily needs of patients, caregivers and staff, estimated to be 60 litres per patient per day and 15 litres per person per day for caregivers, although this might vary according to context, culture and climate. If there is not a water source on site or nearby that is protected from contamination and well managed, and which can provide sufficient water for the facility, then ensure provision with water trucks.
- Prepare chlorine solution for disinfection according to use (see Appendix 11 chlorine solutions according to use).
  - Use 2% chlorine solution for disinfecting corpses and body fluids (including vomit, faeces).
  - O Use 0.2% chlorine solution for disinfecting all parts of the cholera wards, floors, latrines, kitchen, toilets and shower/bathing units, beds or cots, patient's bedding and linens, clothing, utensils, containers and dishes, waste containers and covers, vehicles used for transporting patients and personal protective equipment (gloves, aprons, goggles, etc.).

### Table 2. Mode of transmission and essential rules at the CTU/CTC

Mode of transmission	Essential rules at the CTU/CTC
People	• Limit access to treatment structure only to patients, one caregiver per patient and staff.
Water	<ul> <li>Provide safe water.</li> <li>Ensure a large quantity of safe water is available (approximately 60 litres per patient per day and 15 litres per person per day for caregivers).</li> <li>Store a 3-day supply of water on site at all times.</li> </ul>
Hands	<ul> <li>Provide handwashing stations with safe water and soap in sufficient quantities.</li> <li>Wash hands with water and soap: <ul> <li>before and after taking care of patients</li> <li>after using latrines</li> <li>before cooking or eating</li> <li>after leaving the admission ward.</li> </ul> </li> <li>If soap is not readily available, use ABHR or ultimately 0.05% chlorine solution.</li> </ul>
Food	<ul> <li>Cooked food should be eaten hot.</li> <li>Ideally, food should be provided by the CTU/CTC.</li> <li>Food handlers should follow strict hygiene practices.</li> <li>No leftover food should be taken home by patients, caregivers or staff. It should be disposed of on site.</li> </ul>

#### Section 6. Cholera treatment facilities

Patients' clothes and bedding	<ul> <li>Wash clothes and bedding with the appropriate chlorine solution (0.2%).</li> <li>If chlorine is not available, patients' bedding and clothing can be disinfected by stirring for 5 minutes in boiling water and drying in direct sunlight, or by washing with soap and drying thoroughly in direct sunlight.</li> </ul>	
Mode of transmission	Essential rules at the CTU/CTC	
Environmental contamination (faeces and waste)	<ul> <li>Ensure exclusive gender-separated latrines and baths/showers for cholera patients.</li> <li>Disinfect buckets, soiled surfaces and latrines regularly with 0.2% chlorine solution.</li> <li>Use an incinerator for medical waste.</li> </ul>	
Corpses	• Create a separate specific area for a morgue. Disinfect corpses with 2% chlorine solution.	

- Soapy water should be used in hand-washing stations for bare hands and skin. If soap is not available, use alcohol-based hand rubs (ABHR).
   If soap and ABHR are not available, use 0.05% chlorine solution.
- Healthcare workers should perform handwashing according to WHO's "Five moments of hand hygiene":
  - o before touching a patient
  - o before performing clean or aseptic procedures
  - after body fluid exposure/risk (that is, after handling any potentially contaminated equipment or material such as laundry, wastes, dishes, vomit and stool buckets)
  - o after touching a patient
  - o after touching patients' surroundings

- Other important moments when healthcare workers should wash their hands include upon entering and exiting patient areas, after using a latrine (or handling a child's faeces), after handling corpses and before food preparation and handling.
- Patients' bedding and clothing should be disinfected with 0.2% chlorine solution and dried in the sun. If chlorine is scarce or not available, they can be disinfected by stirring for 5 minutes in boiling water and drying in direct sunlight, or by washing with soap and drying thoroughly in direct sunlight.
- Ensure adequate management of waste, as well as drainage.
  - Establish a functional drainage system in the CTU/CTC to avoid flooding of contaminated areas (latrines, laundry, waste area).
  - Ensure CTC/CTU site drainage is managed and does not flow into neighbouring areas or contaminate the water table.
  - o Ensure body fluids (including stool and vomit) are emptied regularly in the latrines of cholera patients.
  - o Pouring chlorine directly into latrines is not recommended.
  - Plastic buckets or other containers used to transport body fluids should be disinfected using 2% chlorine solution.
  - Cleaners, staff working with chlorine, and waste managers should be adequately trained in IPC and equipped with appropriate protective equipment. Protective equipment and clothing should be washed with a 0.2% chlorine solution and dried in the sun.
  - Ensure essential rules are respected at the CTU/CTC to minimize the risk of propagation (table 1).

## **Evaluation of the CTU/CTC**

 Timely access to appropriate rehydration is key in preventing deaths due to cholera. If treatment is managed appropriately, no admitted patient should die due to cholera.

- Deaths can occur from delays in arriving to the CTU/CTC or from delays in receiving adequate emergency treatment due to, for example, overwhelmed staff, lack of adequately trained staff or insufficient supplies.
- During an outbreak, many patients may require emergency care at the same time, therefore it is essential that CTUs/CTCs and other health facilities be prepared in advance to respond.
- Conduct an evaluation of the health facilities to identify gaps and actions that should be implemented to ensure appropriate access to treatment (see Appendix 12 – CTU/CTC evaluation form).
- Main elements that should be assessed include:
  - o water supply, storage and quality
  - o IPC measures
  - o facility layout and organization
  - o screening, admission and observation areas
  - o hospitalization area
  - o kitchen and meal preparation areas
  - water and sanitation, latrines, laundry and baths/showers, including drainage and potential to contaminate the water table
  - o waste management
  - o management of corpses
  - o procedures and protocols in place
  - o stocks and supplies
  - o data management
  - o staffing
  - o health and hygiene education.

## **Additional resources**

 Technical Note Organization of Case Management during a Cholera Outbreak. Global Task Force on Cholera Control. June 2017 https://www.who.int/cholera/task\_force/GTFCC-Case-Management. pdf?ua=1

- Cholera outbreak: assessing the outbreak response and improving preparedness. Global Task Force on Cholera Control. 2010 https://www.who.int/cholera/publications/OutbreakAssessment/en
- Managing a cholera epidemic. Chapter 6. Setting up cholera treatment facilities and chapter 7. Organisation of cholera treatment facilities. MSF. August 2017. https://medicalguidelines.msf.org/en/viewport/CHOL/english/chapt er-7-organisation-of-cholera-treatment-facilities-25296986.html
- Case management and infection control in health facilities and treatment sites. UNICEF Cholera Toolkit. 2013 https://www.unicef.org/cholera/index\_71215.html
- 5. Technical Note: Water, Sanitation and Hygiene and Infection Prevention and Control in Cholera Treatment Structures. Global Task Force on Cholera Control. January 2019 https://www.who.int/cholera/task\_force/technical-note-WASH-IPCCTCCTU-2019.pdf?ua=1

# Section 7. Case management in treatment facilities

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## **Overview of case management**

- Without treatment, cholera can kill up to 50% of patients with severe disease. Timely and appropriate treatment significantly reduces the risk of death.
- Although the benchmark for cholera treatment is a CFR of less than 1%, deaths from dehydration from cholera should not occur.
- Approximately 80% of people infected with cholera do not develop symptoms of the disease; these individuals can still transmit the disease by shedding *V. cholerae* bacteria in the environment. Bacteria are present in their faeces for up to 14 days after infection.

## Table 3. Degree of dehydration, signs and treatment plans for cholera patients

Degree of dehydration	Signs	Treatment	Admission to CTU/CTC
Severe dehydration	One or more danger signs: • Lethargic or unconscious • Absent or weak pulse • Respiratory distress OR at least 2 of the following: • Sunken eyes • Not able to drink or drinks poorly • Skin pinch goes back very slowly (>2 seconds)	PLAN C	Yes
Some dehydration	No danger signs AND at least 2 of the following: • Irritable or restless • Sunken eyes • Rapid pulse • Thirsty (drinks eagerly) • Skin pinch goes back slowly	PLAN B	Yes

#### Section 7. Case management in treatment facilities

No dehydration Sormal pulse Normal thirst Eyes not sunken Skin pinch normal (disappears immediately)	PLAN A	No
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- Among symptomatic patients, approximately 20% will develop profuse watery diarrhoea that leads to severe dehydration and death if not treated.
- Severity of illness correlates with the number of *V. cholerae* bacteria ingested, lack of immunity acquired by prior exposure to the infection or vaccination, lack of breastfeeding and consequent lack of passive immunity for infants, malnutrition, immunocompromised state, reduced ability to produce gastric acid (which neutralizes the pathogen) and having blood group O.

## Assessment and triage of the patient

- Assessing the degree of dehydration of the patient will determine the treatment plan (table 2).
- Severe dehydration is a medical emergency. Rapid diagnosis and treatment can save lives.
- Patients with no signs or some signs of dehydration can be treated successfully by prompt administration of ORS.
- Patients with some dehydration or severe dehydration should be admitted to CTU/CTC. Patients with no dehydration can be treated at home, at an ORP or in the outpatient area at the CTU/CTC.

## Patient registration and admission

- Record the patient in the line list/register used at the CTU/CTC or ORP.
- For each patient, complete the admission and triage form with personal information, clinical data, physical exam and diagnosis, treatment and

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laboratory data (RDT results, specimens taken and sent for culture). The outcome (discharged, dead, self-discharged, referred) should be completed at later stages. See Appendix 14 – admission and triage form.

## **Treatment plans**

- Treatment is based on the degree of dehydration of the patient: no dehydration, some dehydration or severe dehydration. Patients with no signs or some signs of dehydration are treated with ORS (plan A and plan B, respectively). Patients with severe dehydration require IV rehydration (Plan C). See Appendix 13 flow chart for cholera case management.
- Treatment plan A requires rehydration with ORS. It can take place at home, at an ORP or in the outpatient area at the CTU/CTC. Plan A does not require admission to the inpatient area of the CTU/CTC, however, patients who are treated at a structure should be observed for 2 - 4 hours prior to discharge. These patients should also be included in the patient linelist/register.
- Treatment plans B and C require admission to the inpatient area of a CTU/CTC to correct fluid loss that has already occurred at the time of admission.
- Only patients with severe dehydration require treatment plan C, administration of IV fluids. ORS should also be given when the patient is able to drink safely.
- Antibiotics are indicated in patients with severe dehydration and, regardless of degree of dehydration, in patients with high purging (at least one stool per hour during the first 4 hours of treatment) or treatment failure (the patient is still dehydrated after completing the initial 4 hours of treatment) or in patients with coexisting conditions or comorbidities that pose elevated risk in cholera illness (see antibiotic treatment below).
- In children aged 6 months to 5 years regardless of the degree of dehydration — zinc supplementation (20 mg p.o. zinc sulphate per day for 10 days) should be started immediately to reduce diarrhoea volume and duration.
#### Preparing and administering ORS

- ORS must be prepared with safe water treated with appropriate methods (see Appendix 15 methods for household water treatment).
- ORS should be made fresh daily. It should not be stored for more than 12 hours, or 24 hours if refrigerated. Ready-made sachets containing salts and minerals are available for preparing ORS.
- ORS should be given regularly, in small amounts. If a patient vomits the ORS, slow the administration of ORS and then slowly increase again when vomiting stops.
- In addition to amounts of ORS specified in the treatment plan, patients must receive additional ORS to compensate for ongoing losses from continuing diarrhoea and vomiting.

# Plan A. Oral rehydration for patients with no signs of dehydration

- Patients with no signs of dehydration should be treated with ORS.
- There is no need to admit patients with no signs of dehydration to the inpatient area of the CTU/CTC. They can be treated with ORS at home, at ORPs or at the outpatient area at the CTU/CTC.
- If the patient is seen at an ORP or CTU/CTC:
  - keep the patient under observation for 2–4 hours to ensure the person is tolerating ORS; and
  - during observation and before sending patients home, provide clear instructions for care. Advise the patient or caregiver to continue giving ORS after each loose stool and to come back immediately if the patient's condition deteriorates (repeated vomiting, number of stools increased or the patient is drinking or eating poorly).
- Patients should receive ORS after each loose stool to maintain hydration until diarrhoea stops.
- Following each loose stool, provide the following amounts of ORS (table 3).

#### Plan B. Oral rehydration for patients with some dehydration

- Patients presenting with signs of some dehydration must be admitted to the CTU/CTC.
- For initial treatment, give ORS according the weight of the patient (75 ml/kg) in the first 4 hours.
- Add the specified quantity of ORS to replace on-going diarrhoeal losses (per table 3).

#### Table 3. Quantity of ORS to be given after each loose stool by age group

Age	Quantity of ORS
< 2 years	50–100 ml
2–9 years	100–200 ml
≥10 years	As much as wanted

- Cholera patients with some signs of dehydration do not need IV therapy, but they need to be monitored closely during the first 4 hours.
  - If the patient has severe vomiting or is not able to drink, or if at any time signs of severe dehydration appear, then shift immediately to treatment plan C.
  - If there are still signs of some dehydration after the first 4 hours, repeat treatment plan B for 4 hours and reassess.
  - If there are no signs of dehydration after the first 4 hours of treatment, the patient can be discharged and sent home. Advise patients or caregivers to continue giving ORS after each loose stool and to come back immediately if condition deteriorates (repeated vomiting, number of stools increased or the patient is drinking or eating poorly).

#### Plan C. Intravenous (IV) therapy for severe dehydration

• Severe dehydration is a medical emergency and patients must be treated urgently. Seconds can make a difference.

- Patients with severe dehydration should start IV fluids immediately.
- As soon as the patient can drink, give ORS solution (per table 3) in addition to IV fluids.
- Ringer's lactate is the first choice of IV fluid. If Ringer's lactate is not available, the following IV solutions can be used:
  - o normal saline
  - 0 5% glucose in normal saline
  - o cholera saline.
- Plain 5% glucose (dextrose) solution is not recommended.
- Give a total of 100 ml/kg Ringer's lactate solution divided in two periods. The rate of infusion in each period is slower for children younger than 1 year (see table 4).

#### Table 4. Quantity of Ringer's lactate solution by age group

Age	First period/ bolus	Second period	Total
< 1 year	30 ml/kg in	70ml/kg in	100 ml/kg in
	1 hour	5 hours	6 hours
≥ 1 year	30 ml/kg in	70 ml/kg in	100 ml/kg in
and adults	30 min	2 1/2 hours	3 hours

- More than one IV line may be necessary to give adequate fluid during the first period (bolus treatment).
- When IV rehydration is not possible, and the patient cannot drink, ORS solution can be given by nasogastric tube. Switch to IV rehydration as soon as possible. Do not use nasogastric tubes for patients who are vomiting.
- Other systemic access such as femoral vein or intra-osseous may be used if staff are trained and necessary supplies are available.
- Patients should be encouraged to drink ORS once they are fully conscious and are not vomiting.

- Fluid output should be measured and equivalent volumes of fluid added to the amount described for initial treatment. This fluid can initially be given as IV fluid, but should be given as ORS once patients can drink safely.
- Monitor the patient closely and perform frequent reassessment (every 15–30 minutes).
- After 6 hours in children younger than 1 year or 3 hours in all other patients, perform a full reassessment. If hydration is improved and the patient can drink, switch to treatment plan B if there is still some dehydration or treatment plan A if there are no signs of dehydration.

## Complications

- Children with severe acute malnutrition (SAM), elderly people and those with uncontrolled chronic conditions (such as congestive heart failure, diabetes, hypertension) are especially vulnerable to complications.
- Pulmonary oedema can occur if excessive IV fluid is given and renal failure can occur if too little fluid is given; hypoglycaemia and hypokalaemia can occur, especially in children with malnutrition who are rehydrated with Ringer's lactate alone.

## Antibiotic treatment

- Antibiotics can reduce the volume and duration of diarrhoea and the period of *V. cholerae* shedding.
- Antibiotics are indicated for:
  - o cholera patients hospitalized with severe dehydration
  - patients with high purging (at least one stool per hour during the first 4 hours of treatment) or treatment failure (the patient is still dehydrated after completing the initial 4 hours of rehydration therapy), regardless of the degree of dehydration; and
  - patients with coexisting conditions (including pregnancy) or comorbidities (such as SAM, HIV), regardless of the degree of dehydration.

- Antibiotics are given as soon as the patient is able to take oral medication (once vomiting has stopped).
  - Doxycycline single dose (300 mg for adults; 2–4 mg/kg for children under 12 years of age) — is the antibiotic of choice for all patients, including pregnant women.
  - If resistance to doxycycline is documented, give azithromycin 1 g or ciprofloxacin 1 g orally as a single dose for adults. For children under 12 years of age, give azithromycin 20 mg/kg (max 1 g) or ciprofloxacin 20 mg/kg (max 1 g) orally as a single dose. See table 5.

	First-line	Alternative
Adults (including pregnant women)	Doxycycline 300 mg p.o. single dose	Azithromycin 1g p.o. single dose or ciprofloxacin 1g p.o. single dose
Children < 12 years old	Doxycycline 2-4 mg/ kg p.o. single dose	Azithromycin 20 mg/kg (max 1g) p.o. single dose, or ciprofloxacin 20 mg/kg (max 1g) p.o. single dose

#### Table 5. Antibiotic Treatment

- The laboratory should monitor patterns of resistance of the strain at the beginning of and during the outbreak and keep the clinical staff updated to adapt the treatment accordingly (see section 4 – monitoring the outbreak).
- Mass chemoprophylaxis is not recommended. Selective chemoprophylaxis can be considered in high-risk settings such as prisons.

## Zinc supplementation for children

 Zinc supplementation in the management of children aged 6 months to 5 years with watery diarrhoea (regardless of the cause or degree of Cholera outbreak response field manual dehydration) reduces diarrhoea volume and duration. When available, supplementation (20 mg p.o. zinc sulphate per day for 10 days) should be started immediately.

- Zinc may reduce the absorption of some classes of some antibiotics, including ciprofloxacin. For the best effect with these classes of drugs, antibiotics should be administered 2 hours before zinc or 4–6 hours after zinc.
- Children receiving therapeutic food for the treatment of SAM do not require zinc supplementation, as these foods contain sufficient zinc.

## Discharge and health and hygiene education

#### Consider discharge if the patient:

- has no signs of dehydration
- is able to take ORS without vomiting
- has no watery stools for 4 hours
- is able to walk without assistance
- is passing urine

#### Prior to discharge:

- Patients should be given instructions on when to return to CTU/CTC and on how to prevent cholera.
- Provide patients and their caregivers with ORS and confirm they can correctly prepare and give ORS at home without supervision.
- Inform the patient, family members and caregivers about precautions and instructions at the household level, as follows:
  - O Drink and use safe water.
  - O Wash your hands with safe water and soap or with ABHR at critical times, including after using a toilet or handling a child's faeces and before preparing and eating food. If caring for a patient, always wash your hands before and after providing

care, after handling any soiled items (such as clothes, linens) or after touching any bodily fluids.

- Cook food thoroughly and eat it while it is still hot.
- Remove and wash any bedding or clothing that may have had contact with diarrhoeal stool with 0.2% chlorine solution. If chlorine is not available, patients' bedding and clothing can be disinfected by stirring for 5 minutes in boiling water and drying in direct sunlight, or by washing with soap and drying thoroughly in direct sunlight.
- If a household member develops acute watery diarrhoea, administer ORS and seek health care immediately.
- While caring for persons who are ill with cholera, do not serve food or drink to persons who are not household members.
- Visitors may be allowed if the ill person wants company; visitors should also observe hand hygiene recommendations.

## **ORS preparation**

- ORS must be prepared with safe water treated with appropriate methods (see Appendix 15 methods for household water treatment).
- ORS should be prepared daily and should not be stored for more than 12 hours at room temperature, or up to 24 hours if refrigerated.
- Ready-made sachets containing salts and minerals are available for preparing ORS. The volume of clean water to be used to dissolve one sachet of ORS is marked on the sachet.

## Treatment of cholera in children with SAM

- Malnourished children with cholera are at risk of complications and death.
- Refer children with SAM and suspected cholera for immediate treatment at a cholera treatment facility (CTU/CTC).

- Assessment of the child's malnutrition status and dehydration level will determine the treatment plan.
- For oral rehydration of children with SAM during an outbreak of cholera, give standard ORS. Do not give ReSoMal (Rehydration Solution for Malnutrition).
- For severe dehydration requiring IV therapy, follow rehydration guideline for malnourished children.
- Rehydration of children with SAM must be closely monitored; there is a serious risk of overhydration.
- Breastfeeding and feeding with therapeutic milk should continue throughout rehydration.

## **Treatment of cholera in pregnancy**

- Pregnant women with cholera are at much higher risk of losing their foetuses, compared to the general population of pregnant women. There is no evidence to show that the risk of infection or the severity of a cholera episode is higher among pregnant women.
- The risk of foetal loss depends on the degree of dehydration and vomiting, with more severe dehydration and the occurrence of vomiting increasing the risk of foetal loss.
- Antibiotic treatment should be given to all pregnant women with cholera, regardless of the degree of dehydration. See antibiotic treatment above.
- Dehydration can be difficult to assess in the later stages of pregnancy, resulting in an underestimate of the severity of dehydration. The degree of dehydration and treatment of pregnant women should be closely monitored to maintain dehydration and adequate systolic blood pressure to ensure appropriate uterine blood flow.
- The use of OCV as a preventive measure is considered to be safe and is recommended in pregnancy (see section 9 oral cholera vaccine).
- In large outbreaks, organize the CTCs/CTUs to ensure privacy for pregnant women, especially during labour and delivery, and ensure access to reproductive health services.

## **Additional resources**

- Technical Note Organization of Case Management during a Cholera Outbreak. Global Task Force on Cholera Control. June 2017 https://www.who.int/cholera/task\_force/GTFCC-Case-Management. pdf?ua=1
- Cholera outbreak: assessing the outbreak response and improving preparedness. Global Task Force on Cholera Control. 2010 https://www.who.int/cholera/publications/OutbreakAssessment/en/
- Managing a cholera epidemic. Chapter 5. Cholera case management. MSF. August 2017. https://samumsf.org/sites/default/files/2018-10/Management%20 of%20a%20Cholera%20Epidemic.pdf
- 4. Technical Note Use of antibiotics for the treatment and control of cholera. Global Task Force on Cholera Control. May 2018 https://www.who.int/cholera/task\_force/use-of-antibiotics-forthetreatment-of-cholera.pdf?ua=1
- 5. Updates on the management of severe acute malnutrition in infants and children. World Health Organization. 2013. https://medicalguidelines.msf.org/en/viewport/CHOL/english/chapter-5-cholera-case-management-25296927.html

# Section 8. Reducing the spread of cholera in the community

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Spread of the disease within an area can be reduced through early detection and confirmation of cases, followed by an appropriate, well-coordinated multisectoral response. To facilitate rapid and effective response to outbreaks, countries at-risk of cholera should develop and implement cholera preparedness plans and programmes.

# Common sources of cholera infection in the community

- Faecal contamination of drinking water at the source (unprotected wells, boreholes, standpipes), during transport or supply, or during storage (for example, by contact with hands soiled by faeces);
- Uncooked food made with or washed with contaminated water, drinks made with contaminated water that are not later boiled, ice made with contaminated water;
- Cooking and eating utensils washed in contaminated water;
- Food contaminated during or after cooking or preparation and allowed to remain at room temperature for several hours provide an excellent environment for the growth of V. cholerae;
- Seafood, particularly crustaceans and other shellfish, taken from contaminated water and eaten raw or insufficiently cooked or contaminated during preparation;
- Fruit and vegetables grown at or near ground level and fertilised with night soil, irrigated with water containing human waste or rinsed with contaminated water, and then eaten raw, or contaminated during handling, washing and preparation;
- Many of the above sources will be found at markets and/or food vendor stalls and at transport hubs (e.g. bus stations);
- Additional sources of contamination include bodies of people who have died of cholera, including during burial ceremonies where corpses are touched or where food is shared; and
- Household members and close neighbours of cholera patients are at increased risk of cholera in the days immediately following the patient's illness. Risk decreases with time and distance.

## Social mobilization and community engagement

- An epidemic of cholera can be controlled more quickly when the affected people know how to protect themselves and their relatives and the community is engaged to help limit the spread of the disease.
- Develop or use a prepared set of harmonized messages on the prevention of cholera, pre-test them in the community and ensure that they are validated by the Ministry of Health and used by all partners. Focus group discussions, direct observations, KAP surveys, etc. can help to determine local knowledge and practices in relation to cholera to guide messages.
- The messages should have limited text and contain illustrations of practical demonstrations (such as images showing procedures for chlorination of water, preparation of ORS, handwashing) and be aligned with ongoing cholera prevention programmes (for example, if water treatment products are being distributed, adapt messages to these products).
- Adapt messages to local cultural beliefs about the disease and to the capacity for implementing control measures in the community (for example, if soap or chlorine are unavailable, recommend ash or lime for washing hands).
- Select the best way to disseminate messages to the community.
  - O Communicate messages through mass media (such as radio, TV, press releases, social media, SMS), small media (including leaflets, posters, caps, T-shirts, songs), interpersonal communication (for example, briefing sessions with community or religious leaders and talks in places where people usually gather, such as healthcare facilities, hairdressers, churches, mosques, transport hubs, markets).
  - Adapt messages to target groups (such as males, females, adolescents, people who are illiterate) and give them in the local language.
  - This type of messaging should be part of multisectoral approach targeting areas reporting high numbers of patients.

For additional information see Section 5 – risk communication and community engagement.

## Access to safe water

- Access to safe drinking water for the affected population is essential to reduce the spread of the disease in the community. When possible, also provide access to safe drinking water in the unaffected areas that are at high risk for cholera.
- Even if the drinking water source is safe, water can easily be contaminated during its collection, transportation and storage in the household. A safe water intervention should therefore begin with an improved water source and be followed by safe water collection, handling and storage.
- Analysis of the context will determine the best method for water treatment (at the source or at point of use). Selection of the water treatment method (such as filtration, disinfection, chlorination) will depend on the resources and techniques available and the parameters (physical and microbiological) of the water to be treated. Combining treatments (used together, either simultaneously or sequentially) will increase the effectiveness.
- In high-turbid water, a pre-treatment (sedimentation, flocculation or coagulation) might be necessary to remove suspended particles and reduce turbidity before disinfection or chlorination. Turbidity levels can be tested with a turbidity tube.
- If water is chlorinated, regularly monitor FRC levels and maintain the appropriate level by adapting the dosing and frequency of chlorination as necessary.
  - Recommended FRC after 30 minutes of contact time is 1 mg/L for water at the source (wells and boreholes) and 0.5 mg/L at the point of use (at the tap, or storage container).
  - The optimal pH range in which chlorine is effective is 6.5–8.5. FRC levels and pH can be tested with a photometer or colorimeter (commonly known as a pool tester).

- When the quality of water at the source cannot be guaranteed, a treatment process is needed to disinfect the water at point of use (at the tap, vessels or storage containers).
- Various methods of household water treatment are available, including: boiling, disinfection, chlorination and filtration.
  - If household water treatment products are promoted, ensure that households understand the water treatment techniques and the residual effect of chlorine (if used).
  - To facilitate the correct preparation of household water treatment products, ensure that households have appropriately sized water containers, preferably closed and narrow-mouthed.
  - Ensure that households are involved in water quality monitoring programmes when chlorine is used for household water treatment.
- Safe water collection, transport, handling and storage also need to be ensured and water quality monitored regularly to minimize the risk of microbial regrowth. To minimize the risk of contamination:
  - encourage the use of closed, narrow-mouthed containers with a protected dispenser (spigot, spout) for extracting water. Containers should be cleaned regularly and good hand hygiene should be ensured to reduce potential contamination when filling or extracting water; and
  - if not available, ensure drinking water is kept in a clean, covered container such as a bucket or large pot.
- Deliver WaSH messages to prevent cholera. Provide household water treatment products and closed, narrow-mouthed water containers in the community to support good hygiene practices, as appropriate. Areas reporting cases should be prioritized.
- Ensure health workers and staff or volunteers working in the community are trained to teach local people about safe water treatment methods, including collection, transport, handling and storage. Education around hand hygiene when filling or extracting water is also important to reduce the risk of contamination.
- Involve the community in development and monitoring of interventions that provide access to safe water to prevent cholera.

For additional information see Appendix 15 - methods for household water treatment and Appendix 16 - preparation and use of 1% chlorine solution to disinfect water.

## Safe food preparation

- Safe food preparation is important to reduce the transmission of cholera in the community.
- Food can be contaminated with *V. cholerae* during production, preparation or consumption.
- The basic rules for safe food preparation should be included as part of health and hygiene promotion programmes.
- For details on safe food preparation see Appendix 17 rules for safe preparation of food to prevent cholera.
- Street vendors and marketplaces with inadequate access to safe water and sanitation or inadequate hand hygiene can play an important role in spreading cholera.
  - Reinforce food safety laws and inspection of restaurants, food vendors and food processing factories and avoid unsafe agricultural practices (such as using sewer water to irrigate crops).
  - Train on or reinforce safe food preparation practices.
  - Promote hand hygiene and set up handwashing stations with soap and safe water in markets and places selling food.
  - Distribute IEC materials on safe food preparation and hygiene messages.

## Hygiene and access to improved sanitation

- It is important to isolate faeces to avoid contamination of food and water with faecal matter.
- Improve access to sanitation facilities (for example, latrines connected to a public sewer or to a septic tank, pour-flush latrines, simple pit latrines, ventilated improved latrines). Latrines should be placed in locations that will

not contaminate any drinking water source (at least 30 metres away from any water source and 2 meters above groundwater).

- Discourage open defecation and work with the community to ensure safe disposal of excreta.
- Ensure safe excreta management and disposal during the outbreak. However, avoid latrine emptying during cholera outbreaks. If latrines must be emptied, take all precautions to avoid contamination during emptying and ensure excreta is disposed of safely.
- Involve the community in all phases of design and implementation of on-site sanitation projects to ensure access to and use of the facilities. Set up handwashing stations with soap and safe water near all latrines.
- Ensure health workers are properly trained to teach local people about good hygiene practices and the links between sanitation, water supply, health and hygiene behaviours.
- Promote strong hygiene programmes to ensure the success of sanitation programmes. Focus should include handwashing after defecation and after handling the faeces of a child.

# Safe funeral practices and handling corpses in the community

- Funerals for persons who have died of cholera can contribute to the spread of an epidemic.
  - Bodies of people who have died of cholera pose a risk of transmission because body fluids contain high concentrations of *V. cholerae.*
  - Funerals can contribute to the geographical spread of cholera, as people who attend the ceremony may be infected and take the disease back to their communities.
  - Contamination may occur during funerals when food and drinks are prepared by individuals who prepared or touched the body.
- Always consider social, cultural and religious beliefs and practices. The family must be fully informed about the dignified burial process

and their religious and personal rights. Ensure that they agree to all modifications of cultural practices before starting the burial.

- It is important to have a discussion with community leaders to find a way to respect community practices and keep the population safe through preventive measures, including the following.
  - Avoid large funeral gatherings. If not possible, ensure all protective measures are in place, including handwashing facilities (soap and safe water, ABHR or, if these are not available, 0.05% chlorine solution) available to funeral participants.
  - o Avoid allowing people attending funerals to touch the body of the deceased. If the body must be touched, those in contact with the body should immediately wash their hands and avoid touching their mouths. Disposable gloves that are immediately discarded can also be used. Kissing the body should not be allowed.
  - Avoid serving food at the funeral. If food is served, it should be eaten hot and handwashing should be compulsory before preparing or eating food. A designated health worker present at the funeral gathering can be helpful in supervising and supporting the use of hygienic practices.
- To prevent the spread of cholera, handling of corpses should be kept to a minimum and burial should take place as quickly as possible (preferably within 24 hours after death).
- Trained staff who wash and prepare the body must wear gloves, aprons and masks. The body should be cleaned with 2% chlorine solution. Do not empty the intestines. Trained staff should fill the mouth, nose and anus of the body (but not the vagina) with cotton wool soaked with chlorine solution.
- Minimize the handling of bodies of people who have died of cholera. For transport of people who have died of cholera, individuals carrying the body should wear gloves. The body should be carefully wrapped, preferably in a body bag. Only trained personnel should handle bodies during the burial process.
- Disinfect the dead person's clothing and bedding with the appropriate chlorine solution (0.2%). If chlorine is not available, bedding and clothing can be disinfected by stirring for 5 minutes in boiling water and drying in direct sunlight, or by washing with soap and drying thoroughly in direct sunlight.
- If requested, family members may be present during the preparation of the body for burial. They must be informed of how to protect themselves from

infection and be provided with necessary personal protective equipment and handwashing facilities.

## **Additional resources**

- Cholera outbreak: assessing the outbreak response and improving preparedness. Global Task Force on Cholera Control. 2010 https://www.who.int/cholera/publications/OutbreakAssessment/en/
- Communicating for cholera preparedness and response. UNICEF Cholera Toolkit. 2013 https://www.unicef.org/cholera/index 71215.html
- Hygiene promotion in emergencies. World Health Organization. July 2013. https://www.who.int/water\_sanitation\_health/emergencies/WHO\_ TN\_10\_Hygiene\_promotion\_in\_emergencies.pdf
- 4. Managing a cholera epidemic. Chapter 4. Strategies for epidemic response. MSF. August 2017. https://medicalguidelines.msf.org/en/viewport/CHOL/english/chapter-4strategies-for-epidemic-response-23448908.html
- 5. Guidelines for drinking-water quality, fourth edition. World Health Organization. 2011 https://www.who.int/water\_sanitation\_health/publications/2011/ dwq\_guidelines/en/

## Section 9. Oral cholera vaccine

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## Use of oral cholera vaccine (OCV)

- WHO recommends that the use of OCVs should be systematically considered as an additional measure to limit the spread of disease during cholera outbreaks, to contribute to cholera control in humanitarian crises with high risk of cholera, and in endemic areas.
- OCVs should be used in conjunction with other cholera prevention and control strategies.
- Vaccination should not disrupt the provision of other high-priority health interventions to control or prevent cholera.
- Geographical areas and populations to be targeted for OCVs should be clearly identified following a thorough investigation of the current and historical epidemiological situation and the current local infrastructure and capacities.
- Vaccination should cover as many people who are eligible to receive the vaccine as possible and should be conducted as quickly as possible.
- The global OCV stockpile was created in 2013 for deployment of OCV to countries in need.

## **Mass vaccination campaigns**

Mass vaccination campaigns with OCV can be used during cholera outbreaks, in humanitarian crises with high risk of cholera, or as part of cholera control in endemic settings.

- Vaccination during cholera outbreaks is used to contain ongoing outbreaks (if implemented early) and to limit the spread of the outbreak into new areas (such as neighbouring communities and those across borders, or areas linked by river systems or water and sanitation systems).
  - The geographic areas and populations to vaccinate are determined following in-depth analysis of the historical and current epidemiological data and current risk factors.
  - Based on current evidence on short-term protection, a single-dose strategy could be considered. Administering a second dose should be

considered to ensure longer-term protection if the risk of cholera persists.

- Vaccination in humanitarian crises with high risk of cholera is used to prevent outbreak occurrence.
  - o The decision to vaccinate should be guided by a thorough investigation of the current and historical epidemiological situation, an assessment of the risk of cholera and the WASH context. This information should be used to clearly identify the geographic areas and populations to target.
  - Campaign planning should be carried out to ensure that vaccination takes place prior to any known cholera season.
  - Preparation, including microplanning, cold chain preparation, logistics and social mobilization should be carried out to ensure high vaccine coverage as soon as vaccines become available in the area.
- Vaccination in endemic areas or hotspots is used to reduce disease transmission and to reduce the incidence of the disease. Preventive vaccination should be considered as an additional control measure and implemented in conjunction with other long-term and sustainable measures.

## **Prequalified OCVs**

- Three OCVs are currently prequalified by WHO: Dukoral<sup>®</sup>, Shanchol<sup>™</sup> and Euvichol-Plus<sup>®</sup>.
- All are oral, killed, whole-cell vaccines that provide sustained protection of greater than 60% for at least 2 years in endemic populations, induce an immune response relatively quickly and have a good safety profile.
- Shanchol<sup>™</sup> and Euvichol-Plus<sup>®</sup> are the two vaccines available through the global stockpile for use in mass vaccination campaigns.
- Shanchol<sup>™</sup> and Euvichol-Plus<sup>®</sup> are killed modified whole-cell bivalent (O1 and O139) vaccines. Shanchol<sup>™</sup> and Euvichol-Plus<sup>®</sup> have the same formulation and comparable safety and immunogenicity profiles. Shanchol<sup>™</sup> and Euvichol-Plus<sup>®</sup> are each recommended to be given as a two-

dose regimen, with the two doses given a minimum of 14 days apart. The recommended age for vaccination is 1 year or older.

- These OCVs are effective tools for cholera control. Two doses provide protection against cholera for at least 3 years. One dose provides shortterm protection (at least 6 months), which has important implications for outbreak management.
- Several additional cholera vaccines are in different stages of development; these are mainly live attenuated vaccines that have the potential to provide longer-term protection with a single dose.

## Use of OCV in pregnant and lactating women and HIVinfected individuals

 Based on analysis of the risks and benefits, there are considerable benefits and very few risks from including pregnant and lactating women and HIVinfected individuals in a vaccine campaign.

## Monitoring and evaluation of OCV campaigns

- OCVs have been used extensively in multiple settings globally and have been proven to be safe. Passive surveillance of adverse events following immunization should be conducted systematically following national policies.
- Monitoring and evaluation following vaccination (such as coverage surveys, cost-effectiveness analysis, impact assessment on disease burden, etc.) provide essential information to ensure quality provision of services and the development of future recommendations for OCV use.

## **Additional resources**

1. Cholera vaccines: WHO position paper. Weekly Epidemiological Record. World Health Organization. August 2017 https://apps.who.int/iris/bitstream/handle/10665/258763/%20WER9234. pdf?sequence=1

#### Cholera outbreak response field manual

- Oral Cholera Vaccine stockpile for cholera emergency response. World Health Organization. 2013 https://www.who.int/cholera/vaccines/Briefing OCV stockpile.pdf?ua=1
- 3. Technical Note. Evidence of the risks and benefits of vaccinating pregnant women with WHO pre-qualified cholera vaccines during mass campaigns. Global Task Force on Cholera Control. November 2016 https://www.who.int/cholera/vaccines/Risk\_Benefits\_vaccinating\_ pregnant\_women\_Technical\_Note.pdf?ua=1

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## **Preparedness plans**

- Preparedness is the process of ensuring readiness for a cholera outbreak in advance so that the response will be more effective.
- Preparedness can lead to a faster, more efficient response, reducing both morbidity and mortality.
- A preparedness plan identifies the steps required to prepare for a cholera outbreak, including gap analysis and capacity-building activities, prepositioning of supplies, adapting and pre-positioning of IEC materials, identification of partners and pre-defined agreements for response implementation and coordination. If a preparedness and response plan already exists, review the plan and update it regularly.
- When an outbreak is over, a retrospective evaluation is essential to pinpoint strengths and weaknesses of the response in order to help improve preparedness for and response to future outbreaks.
- In countries where cholera outbreaks occur regularly, in addition to outbreak preparedness and response, long-term cholera control and elimination should be a priority. If not already initiated, outbreaks provide a good opportunity to initiate this type of discussion.
- Many programmes and activities that are part of preparedness planning will contribute to longer-term efforts.
- National cholera control and elimination plans (NCPs) should be developed in line with GTFCC's Ending Cholera: A Global Roadmap to 2030.
- Preparedness activities include the following:
  - Reinforce surveillance and ensure reporting on cholera, including zero reporting.
  - Conduct periodic meetings with all key stakeholders involved in outbreak coordination and response to define and/or reassess the cholera coordination and information management system.
  - O Identify geographic areas and populations at-risk by reviewing epidemiological data, past situation reports and maps, WaSH and health coverage and any other contextual information, such as climate information, conflict updates and locations of refugee camps and migration routes.

- Review key guidelines, protocols and procedures as available. If they are out of date, update them in line with the latest WHO standards.
- Identify the national workforce, map all partners and describe their roles and areas of action. Assess the partners' capacity to prepare for and respond to cholera outbreaks.
- Identify and map the current availability of supplies and estimate the needs. Include these needs in the existing procurement system for storage and distribution.
- Estimate the available funds and funding sources for prevention, preparedness and response.
- Conduct periodic training and, if possible, conduct a simulation exercise, to practice the response process before an outbreak occurs.
- In countries vulnerable to cholera, preparedness plans should also be in place at subnational levels, by region, district or equivalent area, depending on the size and structure of the country.

## **Recommendations for improved preparedness**

#### **Outbreak detection**

- Based on previous outbreaks, assess how health authorities were notified of the outbreak and identify the main weaknesses of the surveillance system, resources available and procedures in place in order to increase sensitivity of detection of cholera outbreaks and improve the timeliness and effectiveness of the response.
- Conduct periodic training sessions for health professionals and community health workers to increase their awareness of the disease, case definitions, data collection and reporting procedures (this should be part of training on case management).
- Reinforce or implement community-based surveillance for early detection of cases, immediate reporting and rapid implementation of control measures.
- Consider including private clinics, traditional healers, NGOs and National Red Cross and Red Crescent Societies, and use unofficial sources of information (such as journalists, community leaders, school teachers).

- Pre-position RDTs, specimen collection supplies (stool cups or rectal swabs and transport media) at all health facilities in the areas at high risk of cholera. Conduct training on the use of RDTs and collection, conditioning and transport of stool samples.
- Establish multidisciplinary teams trained and prepared for rapid deployment to conduct field investigations and implement initial control measures.

#### **Outbreak confirmation**

- Disseminate standard case definitions to healthcare workers before the expected cholera season to help increase awareness and ensure adequate diagnosis.
- Assess and reinforce, if necessary, efficiency of supply distribution and sample transport services.
- Ensure regular provision of relevant health facilities with laboratory supplies for collection and transport of stool samples to the reference laboratory for confirmation.
- Ensure that national reference laboratory and peripheral laboratories in areas with recurrent outbreaks have adequate supplies to perform confirmatory testing (culture/PCR) and antimicrobial susceptibility testing.
- Review national testing strategies and standard operating procedures.
- Train laboratory staff on standard operating procedures for culture *V. cholerae* and antimicrobial susceptibility testing. Ensure that testing capacity is maintained.
- Establish links with international reference laboratories for external quality control and for shipment of specimens for further characterization (such as DNA-based molecular testing) if needed.

#### **Organization of the response**

- Establish a multisectoral cholera coordination committee and ensure that they meet regularly in areas where cholera outbreaks are recurrent.
- Identify all stakeholders and their scopes of action and capacities and involve them in planning. Strengthen collaboration among the Ministry of

Health, other government institutions and agencies in charge of WaSH, and partners.

- Develop and maintain good relationships with donors by organizing regular briefings to provide regular information on the epidemiological situation, the effectiveness of the outbreak response and any remaining gaps.
- Prepare a list of available supplies and anticipated needs before the outbreak.

#### Monitoring the outbreak

- Periodically train healthcare workers in surveillance (case definitions, data collection and reporting) even when there is no outbreak. As with outbreak detection, this should be part of training that includes case management.
- Conduct regular analysis of baseline data (time, place, person) before the cholera season to be able to compare data between years.
- It may be valuable to conduct epidemiological studies to identify high-risk activities or practices and to develop programmes to modify them in order to prevent cholera transmission.

#### **Treatment and cholera treatment facilities**

- Organize regular specific training in case management aimed at health professionals. Establish a training plan to achieve the goal of training all healthcare workers. Training should also include case definitions, data collection and reporting to improve outbreak detection and monitoring.
- Identify sites for CTUs/CTCs before an outbreak occurs. Ensure provision of adequate supplies to treat patients.
- Prepare in advance individual job descriptions for personnel in CTUs/ CTCs.
- Reinforce IPC measures through regular trainings for all staff working in health care facilities.
- Provide standard treatment protocols to all health facilities.
- Ensure that WaSH activities, including waste management, are in place at healthcare facilities and based on national standards. Organize specific training as necessary.
- Store supplies at district levels in areas at high risk of cholera to facilitate rapid distribution.

- Do not limit pre-positioned supplies to supplies to treat patients, such as IV fluids and ORS. Include IPC and WaSH supplies such as soap, chlorine, water quality monitoring equipment, buckets, handwashing stations, cholera cots and personal protective equipment.
- In remote health facilities, ensure provision of supplies and drugs to treat the first 10–20 patients as it may take time to deliver supplies to these areas once an outbreak begins.

# Health and hygiene promotion, social mobilization and community engagement

 Engage at-risk communities in the cholera preparedness plan. Identify and train community-appointed people, such as respected members of the community, religious representatives and youth and women's group members.

In advance of the cholera season, organize focus group discussions in highrisk communities to identify gaps in knowledge about cholera prevention.

- Prepare, update and distribute IEC materials in at-risk areas before an outbreak occurs.
- Check whether soap and products to treat water are available and affordable for the community and develop programmes accordingly.
- Assess the impact of the messages used previously and improve or adapt the communication with communities.
- Maintain social mobilization and community engagement about the prevention of diarrhoea throughout the year as part of community-level activities, with intensification before the cholera season, especially in highrisk areas.
- Conduct long-term promotion on hygiene and sanitation practices such as handwashing with soap, safe disposal of children's faeces and use of sanitary facilities for defecation.

#### **Risk communication**

• Develop a communication strategy and define key cholera prevention messages before an outbreak. Identify effective means of communication with the population.

- Designate a spokesperson and define risk communication procedures to answer the most common questions about cholera and how to prevent it.
- Link with and use mass media to promote community engagement activities, and use local structures to discuss public health advice.
- Use local communication channels (such as information boards, meetings, social media) to deliver preventive messages.

#### Access to safe water and hygiene

- Include emergency provisions of water treatment chemicals, water-quality testing equipment and supplies, standby power generators, and materials and supplies for emergency prefiltration, storage and sedimentation as part of emergency stocks.
- Reinforce food safety, including handwashing stations in public places (such as marketplaces, street vendors) and at gatherings such as funerals.

#### Safe and dignified burial practices

- Before the cholera season, prepare a simple list of the main recommendations for healthcare workers to safely prepare corpses for burial.
- Train appropriate community members for safe and dignified burials.
- If possible, investigate local funeral practices to identify any that may transmit cholera, and identify alternative practices.

#### Vaccination with OCV

- Ensure all procedures for vaccination importation, such as registration, are completed for OCV.
- Inform decision-makers and health staff on OCV, including how to access it and how to conduct a campaign.
- Develop tools for a vaccination campaign such as model tally sheets and communication messages for the use of OCV to prepare for its use in the event of an outbreak or humanitarian crisis.

## Long-term interventions

- In many countries, cholera occurs seasonally and in limited areas (Priority Areas for Multisectoral Interventions (PAMIs)). Comprehensive and multisectoral interventions targeted at PAMIs should lead to long-term control and even elimination of cholera.
- Long-term measures to control cholera and other diarrhoeal diseases should focus on sustainable improvements in water supply, sanitation, food safety and community awareness of preventive measures.
- Cholera-endemic countries or countries experiencing recurrent cholera outbreaks should consider cholera as a high-priority public health problem and develop and implement NCPs.
- NCPs should include a multidisciplinary approach to ensure that long-term interventions are complementary and implemented in synergy.
- Interventions should target identified PAMIs throughout the country and should focus on:
  - WaSH implementation of adapted, long-term, sustainable WaSH solutions for the population most at risk of cholera;
  - surveillance and reporting effective routine surveillance and laboratory capacity at peripheral levels to confirm suspected cases, inform the response and track progress towards elimination;
  - healthcare system strengthening enhanced readiness for cholera outbreaks through capacity-building for staff, prepositioning of resources and supplies for diagnosis, patient care and emergency WaSH interventions;
  - use of OCV large-scale vaccination to immediately reduce disease burden while long-term cholera control measures are put in place;
  - community engagement enhanced communication on cholera control strategies, hygiene promotion, cholera risks and accessing treatment by mobilizing community leaders; and
  - leadership and coordination intersectoral coordination and building of a strong preparedness and response strategy.

## **Additional resources**

- Cholera outbreak: assessing the outbreak response and improving preparedness. Global Task Force on Cholera Control. 2010 https://www.who.int/cholera/publications/OutbreakAssessment/en/
- Ending Cholera. A Global Roadmap to 2030. Global Task Force on Cholera Control. 2017. https://www.who.int/cholera/publications/globalroadmap/en/

## **APPENDICES**

## Appendix 1. Case and outbreak definitions

## Acute watery diarrhoea (AWD)

Acute watery diarrhoea 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.

## Suspected cholera case

#### 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.

#### 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.

## **Confirmed cholera case**

- 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 units, and no established epidemiological link to a confirmed cholera case or source of exposure in another country.

## **Community cholera death**

 The death of a suspected or confirmed cholera case, with no other known cause of death, that occurs before reaching a health facility.

## Health facility cholera death

 The death of a suspected or confirmed cholera case, with no other known cause of death, that occurs after arriving at a health facility.

## Suspected cholera outbreak

- 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.

## Probable cholera outbreak

 A probable cholera outbreak is detected when the number of suspected cholera cases with a positive rapid diagnostic test (RDT+) result achieves or surpasses a defined threshold within 14 days, while taking into account the number of suspected cases tested (see table below).

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

## **Confirmed cholera outbreak**

 A confirmed cholera outbreak is detected when a surveillance unit has at least one locally acquired, confirmed cholera case.

## **Community transmission**

- Community transmission is the occurrence of confirmed cholera cases that are not all epidemiologically linked.
- Unless clustered transmission has been demonstrated through case investigation, an outbreak is classified as community transmission by default.

## **Clustered transmission**

- Clustered cholera transmission is the 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 when the number of cholera cases is low.

## Appendix 2. Template cholera case report form

- Below is a template cholera surveillance case report form for use in collecting minimum standard case-based data on any patient meeting the applicable definition of a suspected cholera case 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)

General information		ieneral information
Date of reporting by the health facility: [_Y_]/_Y_]/_Y_]/_[M_]-[_M_]/_M_]-[_D_]/_D_]		[_M_][_M_] - [_D_][_D_]
Name of the reporting	health facility:	
		Patient information
Unique patient identi	ier	
First name(s) of the pa	tient	
Last name(s) of the pa	tient	
Age of the patient (in years) [if the patient is under 1 year, record 0]		years
Patient's sex at birth		☐ Female ☐ Male
	Admin level 1 [e.g., region or province of residence of the patient]	
	Admin level 2 [e.g., district of residence of the patient]	
Place of residence	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]	

• An editable version of the form can be downloaded here.
2.	Clinical information
Date of visit [Date the patient was consulted or admitted]	LYIYIYIY]·[MIM]·[DID]
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 diarthoea <u>Acute</u> : lasting less than seven days; <u>Water</u> : none biody liquid stools that may contain muccus; <u>Diarthoea</u> : three or more loose stools within a 24-hour period]	LATATATA MINI (DIDI
How has the patient been admitted to the reporting health facility? Ingatient: Ingatient care requires a hospital stay: <u>Cultabilities</u> : Outpatient care, also called ambulatory or day patient care, does not require hospitalisation]	Inputient Outputient 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     Snore dehydration     Snere dehydration     Unknown
What was the patient's outcome? <u>Institutional death</u> , death of a suspected or confirmed cholera case, with no other known cause of death, that occurs after arriving at a health facility. <u>Community, death</u> ; death of a suspected or confirmed cholera case, within 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)	LATATATA: (WIW] (DID]

#### Appendix 2. Template case report form

	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 <u>Inconclusive RDT resul</u> : 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 01     Positive 0139     Positive 01 and 0139     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_].Y_]	_][_M_]-[_D_][_D_]
Date of laboratory result	[_Y_]_Y_]_Y_]_Y_]_Y_]	<u>i</u> M_]-[_D_][_D_]
Culture (including seroagglutination) result	Positive 01 Positive 0139 Negative Inconclusive Not performed Pending	
PCR result - serogroup	Positive 01 Positive 0139 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 Arithro     Susceptibility to Ciprofi     Susceptibility to Deflox     Susceptibility to Dertracy     Susceptibility to Exptnce     Not performed     Pending	imycin (AZ) oxadn (CDP) bcin (PEF) cline (CD) cline (DO) imycin (EM)

## Appendix 3. Template cholera line list

- A cholera line list 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.
- An example of a cholera line list can be downloaded <u>here</u> (Excel format).
- The variables included on a line list are the same as those on the standard case report form, and include:
  - O Date of reporting by the health facility
  - o Name of the reporting health facility
  - O Unique patient identifier
  - O Name
  - O Age
  - o Sex
  - Place of residence house, street, neighbourhood, village, section of camp
  - O Date of visit
  - O Readmission
  - o Referral from another health facility
  - O Referring facility
  - O Date of symptom onset
  - O Hospitalization
  - o Level of dehydration at admission
  - o Patient outcome
  - O Date of outcome
  - o Specimen collection for cholera testing

Cholera outbreak response field manual

#### Appendix 3. Template cholera line list

- O Date of specimen collection
- O RDT result
- O Specimen sent to laboratory
- O Date of specimen receipt at the laboratory
- O Date of laboratory result
- o Culture and seroagglutination result
- O PCR result serogroup
- O PCR result toxigenicity
- o Antimicrobial susceptibility testing result

# Appendix 4. Community-based surveillance template reporting form

- Below is a template community-based cholera surveillance reporting form 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:	

	Number of suspected cholera cases per day					Number of community cholera deaths per day							Number of												
		Male age groups*				Nale age groups*				je grou	ips*		Male age groups* Female age groups			ips*		cholera							
(YYYY-MM- DD)	<2	[2-4]	[5-14]	[15- 44]	[45- 59]	≥60	4	[2-4]	[5-14]	[15- 44]	[45- 59]	≥60	<2	[2:4]	[5-14]	[15- 44]	[45- 59]	≥60	~1	[2-4]	[5-14]	[15- 44]	[45- 59]	≥60	referred to health facilities per day
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.

# Appendix 5. Template cholera case investigation form

- The template form below 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.

General information					
Date of case investigation: [_Y_][_Y	_jĭ_Y_j`_(_M_j`_M_)- [_D_jĭ_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 the surveillance unit of residence of the surveillance unit of the surveillance	of residence in the 5 days before your illness started? I he case.	ncludes travel abroad and/o	r within the country outside					
Yes, specify below No Unknown								
• If yes, list destination(s) and dates	of travel:							
Location specify region, district, city/village,	Country Da etc. If travelled abroad	te arrived	Date left					
1	LM_L	M_)/[_D_]L_D_] [_/	M_][_M_]/[_D_][_D_]					
2	LM_L	N_]/[_D_][_0_] [_	M_][_M_]/[_D_][_D_]					
3	LM_I.	v_)/[□_]_□_] [J	M_IL_M_] /[_D_]L_D_]					
3. Se	ocial interactions and gatherings in the 5 days be	fore illness onset						
<ul> <li>Have you been in contact with or o your illness started?</li> </ul>	lid you visit anyone who had a similar illness or sympt	oms (acute watery diarrho	ea) in the 5 days before					
Yes, specify below No Unknown								
<ul> <li>If yes, specify:</li> </ul>								
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 beddide visit Shared housing Shared oneal (ate/draft Kogether) or consumed food/bevreage prepared or handled by the sick person Other, specify:	LMIN](DID]	[MIM]{DID]					

2	Contact with voi or bedside visit Shared housing Shared sanitary Shared sanitary Shared meal (at food/beverage person Other, specify:	; [_M_]_M_]/[_D_]_D_	] [_M_I_M_]/[_D_I_D_]					
3	Contact with vomit/facess, provision of direct care or bediade visit Shared housing Shared anatay facilities Shared anatay facilities Shared anatay facilities food beverage prepared or handled by the sick person Other, specify							
Have you been in contact with started (including anyone fron together, etc. Includes travel abi Yes, specify below No Unknown     If yes, specify:	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 santary 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							
Relation WH Such as spouse, children, etc.	here 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_]				
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:     Fvent Ture of event Date of event Location/menus of event								
1		[_M_]_M_]/[_D_][_D						

· · · · · · · · · · · · · · · · · · ·								
2								
3	[_M_]_M_]/[_0_][_0_]							
<ul> <li>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?</li> </ul>								
Yes, specify below No Unknown								
<ul> <li>If yes, specify:</li> </ul>								
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/w	ork in the 5 days before illness or	nset						
<ul> <li>What was your main occupation/work in the 5 days before</li> </ul>	re your illness started?							
Specify the place(s) of occupation/work:								
5. Water, Sanitation, an	d Hygiene in the 5 days before il	lness onset						
What were your household's main sources of drinking water in the S 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, you or plot     Piped into compound, you or plot								
Fortexted dug well     Protected dug well     Protected dug nell								
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, irri Other, coecify	Sacht water Sacht water Suface water (river, stream, dam, lake, pond, canal, irrigation channel)							

Were there any other sources of water you consumed over Refer to the place of occupation/work cited in section 4. Ch	the 5 days before your illness started (while at work, while away from home, etc.) eck all that apply.
Piped into dwelling     Piped into compound, yard or plot     Piped on neighbour     Public tap / standpipe     Borshole or tube well     Protected dug well     Unprotected dug well     Unprotected spring     Unprotected spring     Rainwater collection     Tanker-truck     Cart with romal tank / drum     Water kiosk     Bottied water     Surface water (river, stream, dam, lake, pond, canal, irrig     Other, specify	ation channel)
Have you or any other household members done anything     started?	to make the drinking water safer to drink in the 5 days before your illness
starteer Yes No Unknown	
If yes, specify what: Check all that apply.	
Boil water     Add bleach/chlorine     Strain ithrough a doth     Use a water filter     Solar disinfection (SODIS)     Let it stand/settle     Other, specify:	
Did your household store drinking water in containers in t	he 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.
Fluch         Fluch/pour fluch to piped sever system         Fluch/pour fluch to opt show where         Pet latine with dab         Pt latine with dab         Pt latine with dab         Other composing toilet         Bucket         Container based sanitation         Hanging toilet / Hanging latine         No facilly / Buch / Field         Other coperfy:
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 paraging food or cooking      Before asting/before feeding children      After using the toilet      Do not two hands with scap      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 S 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     Fich schellish     Fich fruits usizes purchased from street vendors or restaurants     Water/dinks: with ice outers or crucked ice purchased from street vendors or restaurants     Market food     Hyse, specify name of vendor(c) 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:					
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						

# Appendix 6. Field investigation and initial response checklist

### **Prior to departure**

#### 1. Verify the source of the alert

• Verify that the information is from a reliable source and reflects conditions suggesting a true outbreak.

#### 2. Obtain the required authorizations

• In addition to official authorizations, make sure to include permission from local leaders or persons of influence in the community.

## **3.** Prepare materials and supplies for surveillance and to collect and transport specimens

- Standard line lists or registers, case definitions and procedures for surveillance;
- Materials for handwashing (water, soap and bleach to disinfect water), gloves, boxes for collection and disposal of contaminated supplies and equipment; and
- Rapid diagnostic tests (RDTs) and materials for specimen collection and transport: stool containers, rectal swabs and Cary-Blair transport medium.

## 4. Prepare supplies for patient care, infection prevention and control (IPC) and health and hygiene education

- Copies of treatment protocols, oral rehydration solution (ORS), chlorine for water treatment, medical supplies (such as Ringer's lactate, giving sets, IV cannulas), soap;
- Information, education and communication (IEC) materials and body bags.

- 5. Arrange transport, security and other logistics
- Organize transport under secure conditions for the team and supplies.
- Organize transport of specimens to the reference laboratory.

### In the field

- 6. Review the registers at the health facilities
- Check the register, if available, or speak to clinicians about any previous cases.
- Collect data from the register, including numbers of patients and deaths from suspected cholera per age category (under 5 years of age and 5 years of age and older) per week.
- Try to collect data from at least 1 month prior to the first suspected cases to identify when the number of cases increased.
- Collect data on where patients live when available.
- Provide data collection tools (register, line list) and training in case definition, data collection and reporting.
- 7. Examine patients and review clinical management
- Assess the clinical presentation of the cases.
- Review current case management practices and protocols.
- Ensure adequate patient flow and adapt as necessary, anticipating arrival of additional patients if appropriate.
- If the CFR is greater than 1%, conduct an assessment of the health facility to identify gaps and priority actions to ensure appropriate access and treatment.
- Provide protocols and job aids, training and medical supplies as needed.

#### 8. Collect laboratory specimens to confirm the diagnosis

- Collect faecal specimens (liquid stool or rectal swabs) from suspected patients.
- If RDTs are available, prioritize sending specimens from RDT-positive samples to the laboratory for confirmation.
- Send stool samples to the laboratory following standard procedures.
- Verify that health-care workers can safely collect, store and transport samples.
- Provide training in sample collection, storage and transport and provide job aids and supplies, if needed.
- Collect faecal specimens (liquid stool or rectal swabs) from suspected patients and send them to the laboratory for confirmation under appropriate conditions. See section 2 – outbreak confirmation.

## 9. Review water, sanitation and hygiene (WaSH) and IPC measures at the health facility

- Evaluate water supply and sanitation facilities and IPC measures and reinforce good practices, as appropriate.
- Ensure there is enough water to cover the daily needs of patients and caregivers and adequate measures for the safe disposal of excreta and vomit.
- Ensure that handwashing facilities and chlorine solutions for disinfection are available. As needed, provide protocols, training and supplies (such as buckets, clothes, soap, alcohol-based hand rubs, chlorine, cleaning materials, and personal protective equipment such as gloves, waste bins and cholera cots).

#### 10. Conduct a community WaSH investigation

 Investigate the possible sources of contamination and likely modes of transmission (such as water sources, markets, gatherings, funerals and cultural practices).

- If possible, test for free residual chlorine (FRC) in water that is expected to be chlorinated and test for faecal contamination in other water sources. Chlorinate these sources if FRC levels are low.
- Engage with the community through health and hygiene promotion, using IEC materials to deliver cholera prevention messages and to promote early treatment for diarrhoea.

## **11. Conduct active case finding, social mobilization and community engagement**

- Actively search in the community for additional cases with similar symptoms and refer to the health facility for treatment.
- Train community health workers in case definition, data collection and reporting. Community health workers can also carry out active case finding.
- Assess the knowledge of the community on cholera prevention and control measures. Deliver key messages to the community to prevent cholera.
- Deliver ORS, soap for handwashing and products for water treatment.
- As with community WaSH investigations, engage with family and neighbours of sick people through health and hygiene promotion, using IEC materials to deliver cholera prevention messages and promote early treatment for diarrhoea.

#### 12. Conduct household visits and interviews

- Interview sick people and their relatives to identify water sources and potential risk exposures. If possible, test chlorinated drinking water sources for FRC and other drinking water sources for faecal contamination. Chlorinate these sources if FRC levels are low.
- Provide prevention messages to the family members.
- Deliver soap for handwashing and products for household water treatment.

#### 13. Conduct risk and needs assessments

- Conduct a risk assessment to evaluate the risk of spreading and the impact of the disease.
- Conduct a needs assessment to identify the available resources (human and supplies) and list the additional necessary resources.

### After the field visit

## **14.** Debrief with appropriate authorities, summarize main findings and provide recommendations

- Describe cases and laboratory findings.
- Define areas and populations affected and at risk.
- Identify possible causes of the outbreak and the potential mode(s) of transmission.
- Describe the preventive and control measures already implemented.
- Identify the resources needed for responding to the outbreak.
- Provide specific recommendations and actions to be implemented.

#### 15. Report the findings of outbreak investigation

- Prepare an outbreak investigation report.
- Disseminate the report among appropriate authorities and partners.

## Appendix 7. District level supply forecasting tool

- The below is a description of elements included in the tool.
- The full Excel-based, modifiable tool can be found at: www.gtfcc.org
- This tool is designed to help teams estimate basic supply needs at a district level.

#### For each district, teams input the following elements:

- Population
- Cases and deaths reported to date
- Estimated final cumulative incidence rate

#### The tool provides the following outputs per district and overall:

- Estimated cases to the end of the outbreak (excluding those already reported)
- Estimated needs
  - Sachets of ORS
  - Litres of Ringer's Lactate
  - 100 mg tablets of doxycycline
  - 10 mg tablets of zinc
  - Number of beds during peak

For those ordering via UN procurement, a tool to help guide ordering of the WHO cholera kits is available here: https://www.who.int/cholera/kit/en/

# Appendix 8. Matrix for coordination of cholera control activities

This appendix can be downloaded from the GTFCC website www.gtfcc.org

Matrix for coord	ination of cholera control activ	ities
Indicate the activit	as conducted by each partner/NG	1
	Partner/NGO:	Partner/NGO:
Activities	Name of the person:	Name of the person:
	Tel:	Tel:
	District:	District:
Case management		
Oral renyaration Points		
Out-patient clinics		
Choiera treatment tabilities		
Active care finding		
Transact of patients		
Other		
Laboratory		
Confirmation by culture or PCR		
Antibiotic resistance testing		
Provision of reagents		
Other:		
WaSH		
Household chlorination		
Hygiene education		
Provision of safe water		
Provision of chlorine, soap, etc.		
Latrine maintenance		
Food safety in markets, street food vendors		
Hygiene education		
IPC in health facilities		
Umen		
Sumeillance		
Outbrack investigation		
Collection, reporting and data analysis		
Reports and dissemination		
Other:		
Health education		
In community		
In camps		
Other:		
Collection of courses		
Connection of corpses		
Menitering of functors		
Other activities		
Other activities		
Vaccination		
Training		
Supervision		

# Appendix 9. Outline of an epidemiological report

- An example of a surveillance-unit level epidemiological report can be downloaded <u>here</u>.
- An example of a national epidemiological report can be downloaded here.
- These reports were prepared with fictitious data and illustrate how surveillance data can be analysed and interpreted.

#### Elements to be included in a cholera epidemiological report:

- Place and time
  - O Location (including surveillance unit [if applicable], country name)
  - o Weekly epidemiological report number
  - Date (including epidemiological week)

#### • Highlights/Executive Summary

- Number of suspected cholera cases and deaths reported at health facilities, and case fatality ratio for the reporting week and for the cumulative period (since the beginning of the year or the start of the outbreak)
- Number of suspected cholera cases and deaths reported in the community in the reporting week and for the cumulative period (since the beginning of the year or the start of the outbreak)
- For national reports: number and proportion of surveillance units per cholera epidemiological situation (i.e., absence of a probable or confirmed cholera outbreak, presence of a probable or confirmed cholera outbreak [community transmission], clustered transmission)
- Any key changes in the cholera situation (e.g., detection of a deterioration of the cholera outbreak)

#### Background

- For national reports: ongoing probable or confirmed outbreaks in the country
- O How and when outbreak(s) was/were detected
- Date and method of laboratory confirmation, if applicable
- o Date of outbreak declaration by Ministry of Health, if applicable
- Key context relevant to cholera (e.g., seasonality of cholera, previous OCV campaigns if any, etc.)

#### • Analysis and Interpretation of Epidemiological and Laboratory Data

- Description of cases by time. Draw and describe the epidemic curve and the case fatality ratio.
- O Cholera testing. Describe the number of suspected cases tested by RDT, the number of suspected cases that tested positive by RDT, and the RDT positivity rate for each surveillance unit. Describe the number of suspected cases tested by culture or PCR, the number of suspected cases that tested positive by culture or PCR, and the culture or PCR test positivity rate for each surveillance unit.
- Spatial distribution of cases and deaths. Describe the geographical distribution of suspected cholera cases and deaths in each surveillance unit. It is preferable to display this distribution using maps and bar charts.
- Description of cases and deaths reported in health facilities by age and sex. Describe the number of suspected cases and deaths reported in health facilities, as well as the case fatality ratio (and cumulative incidence rate for surveillance-unit reports) by age group and sex.
- Description of cases and deaths reported in the community by age group and sex. Describe the number of cases and deaths reported in the community by age group and sex.
- Severity: Inpatient hospitalization and dehydration level.
   Describe the proportion of suspected cases hospitalized as

#### Appendix 9. Outline of an epidemiological report

inpatients and the proportion of suspected cases by level of dehydration.

#### • Monitoring of Surveillance Performance

o Report relevant indicators for the monitoring of cholera surveillance performance.

#### • Results of investigations

 Describe the results of case and field investigations, if applicable (e.g., place, date, method of investigation, findings (such as geographic origin of infection of suspected cases), documentation of epidemiological links, hypotheses on potential source(s) of contamination).

#### • Challenges/Gaps

• Explain the main challenges and/or gaps in epidemiology and laboratory surveillance.

#### Recommendations & Priority Follow-up Actions

- State any recommendations or priority actions to be taken.
- o Echo key messages for urgent attention.

#### Annex

- Case definitions
- o Testing strategy

# Appendix 10. Key messages for health education

### What is cholera?

- Cholera is a diarrhoeal illness caused by a bacterial infection in the intestine.
- Cholera causes severe watery diarrhoea and may cause vomiting.
- Cholera can cause death from dehydration (the loss of water and salts from the body) within hours if not treated.

### How is cholera spread?

- Cholera bacteria are present in the faeces of infected people.
- Cholera is not likely to spread directly from one person to another. However, household contacts of cholera cases and persons living in proximity of a confirmed cholera case are at higher risk of disease.

## How to protect yourself, your family and your community from cholera

#### a) Personal hygiene and sanitation

- Wash your hands with soap, ashes or lime and safe water:
  - o before cooking
  - o before eating and before feeding your children
  - after using the latrine (or cleaning your children after they have used the latrine)
  - o after taking care of and/or touching a sick person.

- Wash all parts of your hands front, back, between the fingers and under the nails.
- Use the latrine to defecate. If latrines are not available, defecate away from a body of water and then bury your faeces. Children's faeces should be disposed of in the same way.
- Keep the latrine clean.

#### b) Food: cook it, peel it or leave it

- Cook raw food thoroughly.
- Eat cooked food immediately, while it is still warm.
- Cover cooked food and store it carefully in a cool place.
- Reheat cooked food thoroughly before eating.
- Avoid contact between raw food and cooked food.
- Wash hands before preparing, cooking or eating food.
- Wash vegetables thoroughly with soap and safe water before eating.
- Eat fruit and vegetables you have peeled yourself.
- Wash your cutting board especially well with soap and safe water.
- Wash your utensils and dishes with soap and safe water.

#### c) Safe drinking water

- Collect water from a known safe source (where quality is being monitored on a frequent basis).
- Even if it looks clear, water can contain the bacteria causing cholera.
- Boil water for at least 1 minute or add drops or tablets of chlorine to it before drinking or using it to wash vegetables or food preparation items.
- Keep drinking water in a clean, covered pot or bucket or other container with a small opening and a cover. It should be used within 24 hours of collection.

- Pour the water from the container; do not dip a cup into the container.
- If dipping into the water container cannot be avoided, use a cup or other utensil with a handle to scoop the water.

#### d) Water sources

- Regularly monitor water quality as per protocol.
- Conduct a water safety assessment with the community to eliminate potential or suspected sources of contamination.
- Do not defecate in or near a source of drinking water (stream, river or water hole).
- Do not wash yourself, your clothes or your pots and utensils in the source of drinking water.
- Cover open wells and seal properly when not in use to avoid contamination.
- Hang the buckets used to collect water when not in use; they must not be left on a dirty surface.
- Keep areas surrounding wells and hand pumps as clean as possible.
- Get rid of refuse and stagnant water around a water source.

## What to do if you or your family is ill with diarrhoea

- The biggest danger of cholera is loss of fluid from the body.
- Do not panic, but act quickly.
- The sick person should drink a solution of oral rehydration salts (ORS) made with safe (boiled or chlorinated) water.
- Go immediately to see the community health worker or to the health centre. The sick person should continue to drink ORS while seeking care.

 Encourage continuation of breastfeeding while a child or mother has cholera.

### Taking care of sick people

- Wash your hands with soap and safe water after taking care of sick people, touching them or their clothes or bedding, or handling or cleaning up their stools or vomit.
- Do not wash a sick person's bedding or clothing in a water source.
- Avoid direct contact with stools and vomit from a person who is sick with cholera. The fluids should be dumped in the latrine and the carrying vessel carefully cleaned/disinfected.
- Disinfect the sick person's clothing and bedding with a solution of chlorine (0.2%). If chlorine is not available, the sick person's bedding and clothing can be disinfected by stirring for 5 minutes in boiling water and drying in direct sunlight, or by washing with soap and drying thoroughly in direct sunlight.

# Appendix 11. Chlorine solutions according to use

Chlorine Solutions According To Use				
	0.05%	0.2%	2%	
HTH (70% active chlorine	0.7 grams in 1 litre of water or half tablespoon in 10 litres of water	3 grams in 1 litre of water or 2 level tablespoons in 10 litres of water	30 grams in 1 litre of water or 2 level tablespoons in 1 litre of water	
Sodium hypochlorite (bleach) at 5% active chlorine	10 ml of bleach in 1 litre of water or 1tablespoon in 1 litre of water	40 ml of bleach in 1 litre of water or 4 tablespoons in 1 litre of water	400 ml of bleach in 1 litre of water or 2 cups in 1 litre	
Use	Washing hands (when soap and alcohol-based hand rubs [ABHR] are not available), utensils and dishes, personal protective equipment (gloves, apron, goggles, etc.)	Disinfection of all parts of the cholera wards, floors, latrines, kitchen, toilets and shower/bathing units, beds or cots, patients' bedding and linens, clothing, utensils, containers and dishes, waste containers and covers, vehicles used for transporting patients	Disinfection of vomit and stool Disinfecting corpses	
Precautions	Solution must be changed every day and protected from heat and light	Use with gloves Solution must be changed every day and protected from heat and light	Use with gloves Solution must be changed every 2 days and protected from heat and light	

Notes:

- One cup is 200ml, one tablespoon is 10ml (or 14-15 g).
- Chlorine can corrode and damage metals. Therefore, it is important to never prepare chlorine solutions in metallic containers (unless they are properly enamelled or painted) or use metallic spoons for measurement or stirring. The recommendation is to use plastic containers for preparation of chlorine solutions and wooden spoons for measurement and stirring.

## Appendix 12. CTU/CTC evaluation form

Below is a description of elements included in the tool.

The full Excel-based, modifiable tool can be found at: www.gtfcc.org

This tool is designed to support field evaluation of cholera treatment facilities. The tool is organized by topic with colour coding to highlight priority areas.

The tool can be shared and used to compare progress from one supervision visit to another.

#### The structure of the tool is as follows:

- Name of the evaluators
- Description of the treatment facility
- IPC
- Facility layout/organization
- Screening/admissions and observation areas
- Hospitalization area
- Kitchen and meals
- Water
- Latrines and showers
- Waste management
- Dead body management
- Procedures/protocols
- Stocks
- Data management
- IEC and community services
- Recommendations from the visit for improvements
- Recommendations for immediate improvement

### Appendix 13. Flow chart for cholera case management



# Appendix 14. Admission and triage form

#### This appendix can be downloaded from the GTFCC website www.gtfcc.org

desTime: des to slongificof ni uninaled?		<ul> <li>Awake and alert</li> <li>Normalpulse</li> <li>Normalthirst</li> <li>Eyes not surken</li> <li>Skin pinch rormal</li> </ul>	) No dehydrationPlan A '
Admission date If female, any passibility date s, when?	🗆 No danger signs	<ul> <li>Irritable or estless</li> <li>Sunkeneyes</li> <li>Rapid puise</li> <li>Thirsty, drinks eagerly</li> <li>Skin pinch gres back slowly</li> </ul>	If no danger signs AND2 above are checked Some dehydration (Plan B).
1. Paliest name. <u>southutframul</u> Age: <u>southutframul</u> CCV Job <u>Seston 1 if ya</u> Adness: <u>rever x</u> Waeney Job X Fever x Waeney Job X Fever x Wanny Job State X Fore x With war Warney Job State State Manup Page list any other symptom: 3. PHYSICAL EXAM AND	Lethargic or unconsciou:     Absent of weak pulse     Respiratory distress	<ul> <li>Notable to drink or drinks poorl;</li> <li>Surkeneyes</li> <li>Skin pinch ges backlowly</li> </ul>	If one or more danger signs OR2 above are checked Severe dehydration (Plan C)
	Danger signs	Signs	Treatment Plan

4. TREATMEN	Т		
	Severe dehydration (Plan C)	Some dehydration (Plan B)	No dehydration (Plan A)
	<ul> <li>IV fluids: Ringer's lactate bolus</li> <li>Yr: 30m/kg in 60 min</li> <li>1 yr: 30m/kg in 30 min</li> </ul>	ORS 75ml/kg over 4 hours     Quantity:ml over 4 hours     Tire supplementation	<ul> <li>After each loose stool, give:</li> </ul>
	Quantity:ml overmin	(20mg/day) in children 6	Age <2-9 >10
Treatment	□Reassess after bolus If absent/weak pulse →repeat	Reassess after ORS	ORS 50- 100- As much (ml) 100 200 as
	bolus Quantity:ml overmin	-Severe: Give IV fluids -Some: Repeat ORS amount -No dehydration: Discharge	<ul> <li>Zinc supplementation</li> <li>Zinc /drov) in children &amp; months -</li> </ul>
	IV fluids: Ringer's Lactate bolus      1 year: ZOml/kg in 5 hours      2 year: ZOMl/kg in 2 hours	with ORS	5 years
	Quantity: ml over hours	Consider discharge if: - Has no signs of dehydration	Before discharge, check following:
	Reassess hydration after IV fluids	- Can take ORS without vomiting	<ul> <li>Insam messaging completed</li> <li>ORS given for home</li> </ul>
Discharge instructions	-Severe: Repeat IV fluids -Some: ORS (see 'Some' box)	<ul> <li>No watery stools for 4 hours</li> <li>Can walk without assistance</li> </ul>	<ul> <li>Assure caregiver can correctly mix and give ORS without</li> </ul>
	Give antibiotics	<ul> <li>Is passing urine</li> <li>Has been advised when to</li> </ul>	super vision
	Drug & dose	return to hospital/CTC - Health messaging completed	
1. LABORA Stool sample t	TORY DATA: iaken? = No = Yes Date taken:	Cholera RDT res	ult: □+ve □-ve □ Not conducted
Stool culture s	ent: No Yes Date stool o	culture sent://	
2. OUTCOM Date of outcor	lE:Discharged	⊔Dead ⊡Self-discharged ⊔Refe	srred (where: 🛛 🖉 🖉
Name of admi	itting clinician	Signature:	Date: _/ _/

#### Appendix 14. Admission and triage form

# Appendix 15. Methods for household water treatment

	Thermal treatment (Boiling)	Chemical disinfection with free chlorine	Chemical coagulation– filtration and chlorine disinfection
Disinfectant residual	No	Yes	Yes
Chemical changes in water	No	Yes, may cause taste and odour	Yes, may cause taste and odour
Microbial regrowth potential in treated water	Yes, with storage beyond 1–2 days	No, if chlorine residual is monitored and maintained	No, if chlorine residual is monitored and maintained
Skills level and ease of use	Low skills, easy to use	Low skills, easy to use with training	Moderate training needed
Availability of needed material	Requires a source of fuel	Requires source of free chlorine, regular monitoring of chlorine residual and safe storage vessels (See Appendix 16)	Requires chemical coagulants, free chlorine, two containers, a filter cloth
Acceptability	High	High to moderate	High to moderate
Length of treatment time	Minutes to tens of minutes	30 minutes	30 minutes
Comments	High cost (fuel)	Not effective against Giardia and Cryptosporidium oocysts	Combined treatment with coagulant and disinfectant effect

Notes

 Effective dosage of chlorine may be affected by the parameters of the water to be treated (temperatur recommended FRC levels than low-turbid water.

 Recommendations are to dose with free chlorine at about 2 mg/L to clear water (< 10 nephelometric tur

of at least 30 minutes. However, even low-turbid water can have high chlorine demand due to the total o chlorine requirements. Regular testing of FRC and dose adjustment of free chlorine is therefore essential.

In high-turbid waters, additional treatment may be needed (filtration, sedimentation, coagulation or flocc

Sources: World Health Organization. Guidelines for drinking-water quality. Fourth edition. Geneva: WHO;201 World Health Organization. WHO International Scheme to Evaluate Household Water Treatment Technologi round-1/en/)

OXFAM. Technical Brief - Household water treatment and Storage. 2007 (https://supplycentre.oxfam.org.uk/

#### Appendix 15. Methods for household water treatment

Solar disinfection with UV + heat (SODIS system)	UV disinfection with lamps	Membrane, porous ceramic or composite filters	Granular media filters Slow sand filters
No	No	No	No
No	No	No	No
Yes, with storage beyond 1–2 days	Yes, with storage beyond 1–2 days	Yes, but container provides safe storage	Yes, but container provides safe storage
Low skills, easy to use	Moderate training needed	Low skills, easy to use with training	Low skills, easy to use with training
Requires plastic bottle and dark surface	Requires UV radiation units, replacement lamps, and reliable source of electricity	Requires a filter, regular cleaning and maintenance	Requires a sand filter, regular cleaning and maintenance
High to moderate	Moderate to low	Moderate to low	Moderate to low
6—12 hours (full sun) to days (if cloudy)	Seconds to minutes, depending on the water volume treated and the reactor design	Depending on the filter 1–3 litres/hour	1 litre per minute
Suitable in areas with high sunlight exposure	Ineffective in turbid- waters, Considerable maintenance and high cost	Depends on the pore size and use of silver or other chemical agents	Considerable maintenance and high cost

re, pH, turbidity and total organic carbon). High-turbid water will require more free chlorine to reach the

bidity units) and twice that (4 mg/L) to turbid water (> 10 nephelometric turbidity units), with a contact time organic carbon load that is not detected by nephelometric testing. Temperature and pH may also affect

culation) to remove suspended particles and reduce turbidity.

17 (http://www.who.int/water sanitation health/publications/2011/dwg\_guidelines/en/) ies. Geneva: WHO; 2016 (http://www.who.int/household\_water/scheme/household-water-treatment-report-

(water-treatment-11-c.asp)

# Appendix 16. Preparation and use of 1% chlorine solution to disinfect water

### Preparation of 1% chlorine stock solution<sup>2</sup>

To make 1 litre of the stock solution, mix the quantity shown of one of the following chemical sources with water and make up to 1 litre in a glass, plastic or wooden container

Product	1% chlorine stock solution	Notes	
HTH at 70% active chlorine	15 grams in 1 litre of water or 1 level teaspoons in 1 litre of water	Loses about 2% of active chlorine per year The quantity of HTH (70% of active chlorine) necessary for all needs is approximately 100 to 110 g per patient per day	
NaDCC at 1 g active chlorine per tablet	10 tablets in 1 liter of water	The most stable product	
Chlorinated lime At 30% active chlorine	33 grams in 1 liter of water or 2 level teaspoons in 1 liter		
Sodium hypochlorite (bleach) at 5% active chlorine	250 ml of bleach in 1 litre of water or 1 glass in 1 litre of water	Unstable and should be used within 3 months of manufacture(if stored in good conditions)	
Sodium hypochlorite concentrate at 15% active chlorine	70 ml of concentrate in 1 litre of water	good conditions)	

#### Notes:

- 1 tablespoon = 10 ml or 15 g; 1 glass = 250 ml
- A 1% solution contains 10 g of chlorine per litre = 10 000 mg/litre or 10 000 ppm (parts per million).
- Avoid skin contact with any of the chemical sources or the stock solution, and avoid inhaling chlorine fumes.
- Never prepare chlorine solutions in metallic containers (unless they are properly enamelled or painted) or use metallic spoons for measurement or stirring. The recommendation is to use plastic containers for preparation of chlorine solutions and wooden spoons for measurement and stirring.
- This stock solution should be made fresh every day and protected from heat and light.

## Disinfecting water using a 1% chlorine stock solution3

To produce an initial chlorine concentration sufficient to leave a free residual chlorine (FRC) concentration: 0.2–0.5 mg/litre for water at point of use and 1 mg/litre for water at source.

- 1) Prepare a 1% chlorine solution as indicated above.
- Take four non-metallic water containers (such as 20-litre plastic buckets) and put 10 litres of the water each one.
- 3) Using a syringe, add progressively greater doses of 1% chlorine stock solution to the containers:
- 1st container: 1 ml
- 2nd container: 1.5 ml
- 3rd container: 2 ml
- 4th container: 5 ml
- 4) Stir the solution in the containers and wait at least 30 minutes (wait 60 minutes below 10°C as soon as possible and then cover and store them in a refrigerator or icebox if pH is > 8).
- Measure the FRC of each container using a comparator or test strip.

Choose the container that shows an FRC between 0.2–0.5 mg/litre. This is the required concentration of chlorine for the disinfection of water at point of use. For chlorination of water at source, recommended FRC is 1 mg/litre.

- 6) If no container has the right FRC, repeat the exercise with different quantities in step 3 (that is, 2, 4, 8 and 16 ml).
- 7) Calculate the amount of 1% chlorine solution needed for the quantity of water to be treated. Test the chlorine levels of the containers regularly to ensure adequate levels of FRC.

<sup>&</sup>lt;sup>2</sup> United Nations Children's Fund. Chlorine Mixing, in Cholera Toolkit, 2013, Annex 8E(C), p. 217. New York: UNICEF; 2013 (https://www.unicef.org/cholera/Cholera-Toolkit-2013.pdf); and Médecins Sans Frontières. Preparation of chlorine solutions for cholera structures, in Cholera Guidelines 2004, p. 113. MSF; 2004 (https://www.humanitarianresponse.info/sites/www.

humanitarianresponse.info/files/documents/files/choleraguide.pdf).

<sup>&</sup>lt;sup>3</sup> Source: Delmas, G., Courvallet, M. (1994). Public Health Engineering in Emergency Situation, WHO.

# Appendix 17. Rules for safe preparation of food to prevent cholera

# 1. Cook (raw) foods thoroughly

Fish, shellfish, and vegetables are often contaminated with cholera bacteria. Therefore, heat all the parts of the food to at least 70°C. Do not eat uncooked foods unless they can be peeled or shelled.

# 2. Eat cooked foods immediately

When there is a delay between cooking and eating food, as when food is sold in restaurants or by street vendors, it should be kept over heat, at  $60^{\circ}$ C or more, until served.

## 3. Cover cooked foods and store carefully

If you must prepare foods in advance or want to keep leftovers, be sure to cool them to below 10°C as soon as possible and then cover and store them in a refrigerator or icebox below 10°C. Cooked foods that have been stored must be thoroughly reheated before eating. Foods for infants should be eaten immediately after being prepared, and should not be stored at all.

### 4. Reheat cooked foods thoroughly

Proper storage at low temperature slows the growth of bacteria but does not kill them. Once again, thorough reheating means all parts of the food must reach at least 70°C. Eat food while it is still hot.

### 5. Avoid contact between raw and cooked foods

Safely cooked food can become contaminated through even the slightest contact with raw food (directly or indirectly through cutting surfaces or knife blades, for example).

## 6. Choose foods processed for safety

Canned, acidic and dried foods should be without risk.

## 7. Wash hands repeatedly

Wash hands thoroughly before preparing food and after every interruption, especially if you have to change or clean a baby or have used the toilet or latrine. After preparing raw foods such as fish or shellfish, wash your hands again before handling other foods.

### 8. Keep all kitchen surfaces clean

Since foods are so easily contaminated, any surface used for food preparation must be kept absolutely clean. Think of every food scrap, crumb or spot as a potential source of bacteria. Cloths used for washing or drying food, or for preparation of surfaces, dishes and utensils, should be changed every day and boiled before reuse. Separate cloths that are used for cleaning the floors also require daily washing.

## 9. Use safe water

Safe water is just as important for food preparation as it is for drinking.

