Cholera Guidelines

2004 – Second edition

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2004

Authors Second Edition
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Foreword

Poor hygiene and economic environment and precarious living conditions are triggering cholera outbreaks all over the world.

Therefore, this guideline will give guidance towards strategies on reduction of mortality as well as of reduction of transmission. As one cannot exclude the other in order to be sufficient to tackle this disease. Nevertheless, if resources are limited, first priority will be given to case management and proper isolation of those ones.

The implementation of the strategies will differ as well when be addressed to rural, urban or closed (camp settings) situations.

This guideline is closing with cholera preparedness, which can be applied as well as first step before an outbreak occurs.

Various practical tools are presented in the annexes. Those annexes and in addition training, health education material and data collection tools are available in the attached CD-rom.

The authors would welcome any remarks or critical comments from those using this guide, so as to allow revision in keeping with the realities of working in the field.

Comments should be addressed to:

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Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
AR	Attack Rate
HTH	High Test Hypochlorite or Calcium Hypochlorite
CFR	Case Fatality Ratio
CFU	Colony Forming Unit
CTC	Cholera Treatment Centre
CTU	Cholera Treatment Unit
CHW	Community Health Worker
HIV	Human Immunodeficiency Virus
IR	Incidence Rate
IV	Intra Venous
MSF	Médecins Sans Frontières
MoH	Ministry of Health
NTU	Nephelometric Turbidity Units
ORP	Oral Rehydration Point
ORS	Oral Rehydration Salt
PE	Protective Efficacy
RL	Ringer Lactate Solution
TV	Television
WC/BS	Whole Cell B-Subunit vaccine
WHO	World Health Organisation
WHS	Water Hygiene Sanitation
WIR	Weekly Incidence Rate

Chapter 1.

Features of cholera outbreaks

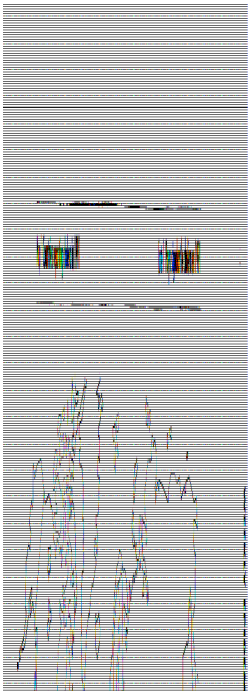
1. Epidemiology

History

Cholera is one of the oldest diseases affecting humans. It is caused by the gram-negative bacteria *Vibrio cholerae*. Six pandemics occurred between 1817 and 1923, which started from the Ganges delta and were caused by *Vibrio cholerae* O1, Classical biotype. The ongoing 7th pandemic is caused by *Vibrio cholerae* O1, El Tor biotype, which started in Indonesia in 1961, reached the Indian subcontinent in 1966 and then spread to the Middle East. It reached Africa in 1970 and extended rapidly throughout the continent, creating new endemic zones that had not seen cholera for over a century. It took another 20 years for the 7th pandemic to reach the Americas: the first cases were reported in Peru in 1991 and within one year the disease had spread throughout Latin America.

A new strain appeared in 1992: *V. cholerae O139* (Bengal). It is not known if this new strain will emerge as the 8th pandemic and replace *V.cholerae* O1 El Tor in Asia.

Figure 1. Spread of the 7th cholera pandemic (O1 El Tor, 1961-1991) and emergence of O139 strain



Causal agent

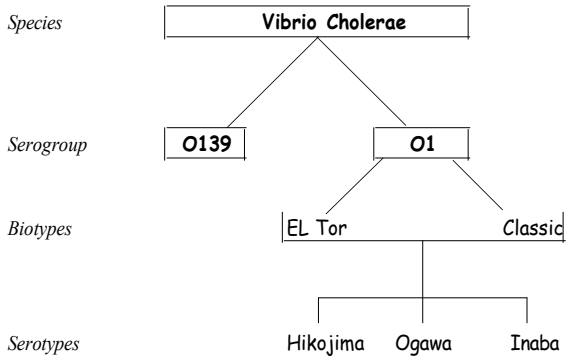
While over 100 vibrio species have been isolated, only the "cholerae" species are responsible for cholera epidemics. Vibrio cholerae species are divided into 2 serogroups:

- ***V. cholerae* O1**, subdivided into Classical and El Tor biotypes, was the causal agent for the 7th pandemic, which started in 1961; this still causes epidemics.
- ***V. cholerae* O139** serogroup was first identified in 1992 in India. It has since been isolated in other Asian countries between 1993 and 1998.

Both El Tor and Classic biotypes are divided into 3 **serotypes**: *Ogawa*, *Inaba* and *Hikojima*. The three serotypes can co-exist during an epidemic because the bacteria can mutate between serotypes. This does not affect the epidemic pattern:

– ***clinical features are the same, whatever the strain***

– ***regardless the strain, the response is the same.***



Reservoir

Humans are the main reservoir of *Vibrio cholerae*. Other potential reservoirs are water, some molluscs, fish and aquatic plants.

Vibrios grow easily in saline water and alkaline media. They survive at low temperatures but do not survive in acid media; they are destroyed by gastric acid in the stomach, by chlorine disinfectant solutions or by boiling during at least one minute.

2. Transmission and immunity

Carriers and transmission

The reservoir is mainly human: asymptomatic (healthy) carriers and patients carry huge quantities of vibrio in faeces and in vomit; up to 10^8 bacteria can be found in 1 ml of cholera liquid. The infective dose depends upon individual susceptibility, but in general a 10^6 dose is needed. Cholera is transmitted by a faecal-oral route:

- **Person to person transmission** is the most common means of infection, through direct contact (dirty hands)
- **Contaminated food and/or water** are also principal transmission modes. Seafood has been incriminated as well though less frequently.
- **Corpses of cholera patients are highly infectious** through their excreta. Physical contact during funerals is also a major medium.
- **Cholera treatment centres** can become main sources of contamination if hygiene and isolation measures are insufficient.

Protecting factors

Individual immunity provides a short-term protection for approximately 3 to 6 months. In endemic areas regular contact with vibrio create a persistent immunity; in epidemic areas immunity rapidly disappears: one cannot become ill twice by the same vibrio strain during the same epidemic, but can be newly infected in the following epidemic.

Cross immunity between *V. cholerae* O1 and O139 has not been reported.

In endemic areas, breast-feeding provides protection for infants.

Risk factors

- Poor social and economic environment, precarious living conditions associated with:
  - Insufficient water supply (quantity and quality)
  - Poor sanitation and hygiene practices
  - High population density: camps and slum populations are highly vulnerable.
- Underlying diseases such as malnutrition, chronic diseases and AIDS are thought to increase susceptibility to cholera, but this has not been proven.
- Environmental and seasonal factors

  Cholera epidemics often start at the end of the dry season or at the beginning of the rainy season, when water sources are limited. This forces people to concentrate at fewer water sources increasing risks of contamination and transmission. Furthermore, the salinity can increase during the dry season and favours the growth of vibrio. Heavy rains can also provoke the emergence of cholera: flooding of contaminated water from sewage systems, latrines or septic tanks may contaminate wells or other water sources and thereby increase the concentration of organic nutrients in the water.

3. Clinical features of cholera infection

Cholera is an acute enteric disease characterized by the sudden onset of profuse painless watery diarrhoea or rice-water like diarrhoea, often accompanied by vomiting, which can rapidly lead to severe dehydration and cardiovascular collapse.

> Cholera can cause as high as 20 to 50% mortality if case management is not adequate. Conversely, the death rate can be low (<2%) if well treated.

Pathogenesis

The large majority of ingested bacteria are destroyed by stomach acidity; surviving bacteria colonize intestinal cells, where they multiply and produce an enterotoxin. Vibrios do not cross the intestinal barrier and do not provoke septicaemia (barring exceptional cases). The toxin adheres to intestinal cells and causes an excretion of isotonic fluid in the intestinal lumen: it is the enterotoxin that causes fluid loss and diarrhoea.

Incubation

From a few hours to 5 days, most commonly 2 to 3 days.

Period of communicability

Infected persons (symptomatic or not) can carry and transmit vibrios during 1 to 4 weeks; a small number of individuals can remain healthy carriers for several months.

Clinical presentation

> **The typical presentation of cholera** is a sudden onset of profuse painless watery stools, sometimes rice-water like, often accompanied by vomiting. There is no fever. Dehydration appears within 12 to 24 hours.

- Asymptomatic and/or minor forms: in more than 80% of the cases, infection is asymptomatic or causes simple diarrhoea.
- In moderate forms there are frequent watery stools but fluid loss and dehydration are moderate.
- In severe forms there is intense diarrhoea and vomiting with significant fluid loss: more than 10 to 20 litres/day. Severe dehydration appears quickly, often in less than 12 hours.
- Dry cholera is extremely rare. There is little diarrhoea and/or vomiting but a rapid collapse due to severe acute dehydration and a high mortality rate. Death before arrival at the treatment centre is frequent.

Key points

- Cholera is extremely contagious.
- Cholera is characterized by acute watery diarrhoea and vomiting, regardless the strain.
- Dehydration occurs very rapidly and can kill if not quickly corrected.
- Poor social and economic environment are risk factors for cholera outbreaks.
- Population displacement and refugee camps are high-risk situations.

Chapter 2.
Outbreak investigation

As soon as there is a suspicion of cholera, investigation should start in order to verify the existence of an epidemic, to describe it and to initiate the response.

> Initial assessment must be quick: when cholera is confirmed, intervention must start without delay.
>
> The assessment team must be ready and equipped to intervene on the spot, as soon as cases are confirmed. This includes treating patients and setting up a surveillance system.

1. Triggering the alert

As soon as there is indication of adults dying from acute watery diarrhoea, in endemic or non-endemic areas, the alert must be systematically triggered and followed by an exploratory mission (annex 1, p. 90).

In refugee camps or slums, vigilance must be kept throughout the year, especially when nearing the epidemic season (end of the dry season) and when population displacements occur.

Always compare numbers of diarrhoeal cases with previous months or years.

Be alert when:

- In a non-endemic area, there is a sudden increase in adults with acute watery diarrhoea and/or there is an inversion in the proportion of diarrhoeal cases between adults and children.
- In an endemic area, there is an increase of diarrhoea compared to previous years.

Defining an outbreak

An outbreak is defined as an unusual increase in new cases:

- If no data exists, a duplication of the number of cases over 3 consecutive weeks.
- If data from previous years are available (same period), you can calculate the average number of expected cases (per month or per week) in non-epidemic periods. Double this non-epidemic average indicates risk of outbreak.

2. Confirming the diagnosis by laboratory tests

Bacteriological confirmation is compulsory on the first suspected cases, in order to:
– Confirm cholera
– Identify the strain, biotype and serotype
– Assess antibiotic sensitivity

Confirmation on 5 to 10 stool or vomit samples is sufficient. Samples can be taken using different methods (annex 2, p. 91): filter paper, Cary Blair medium or rapid tests. Rapid tests can give a quick confirmation of a cholera diagnosis, however, rapid tests do not provide information on antibiotic sensitivity nor can they be used for biotyping, and therefore must always be followed by sampling.

> Write down information on name, age, sex, address of patient, clinical symptoms and date and send together with the sample

3. Establishing and disseminating a case definition

A simple case definition for cholera based on clinical description is needed to **identify suspected cholera cases and to treat them as early as possible**.

This case definition will also provide reliable data for outbreak description and monitoring in order to determine priority interventions and to adapt the response accordingly.

Any case definition is a compromise, balancing the risk of including patients who are not real cholera cases (over- estimation due to low specificity of the definition) with the risk of excluding patients who are true cases (under-estimation, low sensitivity).

Ministries of Health (MOH) have pre-established case definitions, adapted from the World Health Organization (WHO) standard definition and variable from one country to another.

Whatever the definition, it should:
– Be simple
– Be agreed upon by all partners
– Remain the same throughout the epidemic.

Table 1: Example of case definitions for cholera

WHO Standard Case Definition	*In an area where the disease is not known to be present,*	A patient aged 5 years or more develops severe dehydration or dies from acute watery diarrhoea.
	In an area where there is a cholera epidemic,	A patient aged 5 years or more develops acute watery diarrhoea, with or without vomiting
MSF definition	*In an area where there is a cholera epidemic,*	Any patient presenting 3 or more liquid stools and/or vomiting for the last 24 hours

4. Describing the situation

Collect data

Number of cases and deaths

The daily number of cholera cases and deaths must be available in each health facility.

A register must be put in place and must include for each case: name, age, sex, address, symptoms, date of admission, treatment given (severity of the disease) and outcome. Recording of cases must be done from the start of the epidemic to its very end.

Provide registers to health structures if needed (annex 3, p. 93).

Trace the first case to mark the start of the outbreak; this is especially important in open settings. From then onwards, the number of cases and deaths are collected (annex 4, p. 94).

Demographic data

Population numbers by age group and location are essential to specifying the number of persons at risk and to calculate rates (denominators).

For age groups, < 5 years (under fives) and ≥ 5 years (5 and older) is sufficient. If unknown, the proportion of 17% of under fives can be used for a normal situation, 20% for a refugee camp.

It is important to get population numbers at the most finite level: district, village, refugee camp/section, city zone, quarter, etc. Demographic data is available from central/local authorities. If not, the most recent population census may be used; if obsolete, adjust with country's annual growth rate. In refugee camps, population numbers are easier to obtain, given existing registration processes and/or food distribution programmes.

Organising data (by Person, Time and Place)

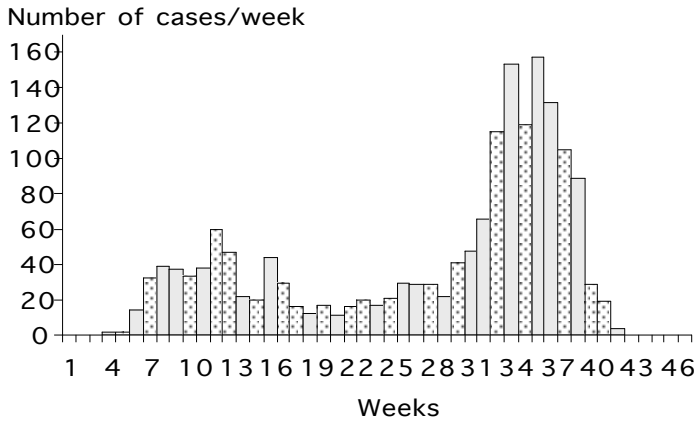
By person: individual characteristics

The number of cases and deaths per age group (<5y, $\geq$ 5y) are the only data needed at this level. Registers in each health facility will provide these essential numbers daily and for every place, allowing for data organisation by time and place.

By time

Draw an epidemic curve (bars) to show the evolution and amplitude of the epidemic over time with the number of cases and deaths **per week**.

Figure 2. Cholera epidemic in Malemba-Nkulu district (DRC), January-November 2002



Source: MOH/MSF

BY PLACE

Geographic distribution of cases per village/district can be used to identify areas at higher risk (Figure 3) and to monitor outbreak extension by using chronological maps (Figure 4).

Describe the place and draw a map focusing on places that represent a specific risk. Locate on the map for each area/zone: settlements, gathering places (markets, schools), water sources, health facilities and major transportation routes. Indicate whether water sources are of good or bad quality (treated or not, protected or not). Indicate latrine coverage (number of latrines per persons) and/or sewage system and drainage facilities.

Maps can be drawn by hand. Sophisticated techniques are also available (software, geographical information systems) but their use can be time consuming, therefore they are not recommended at field level except when they have been set up in advance

Figure 3. Example of a hand drawn map indicating location of cases according to place

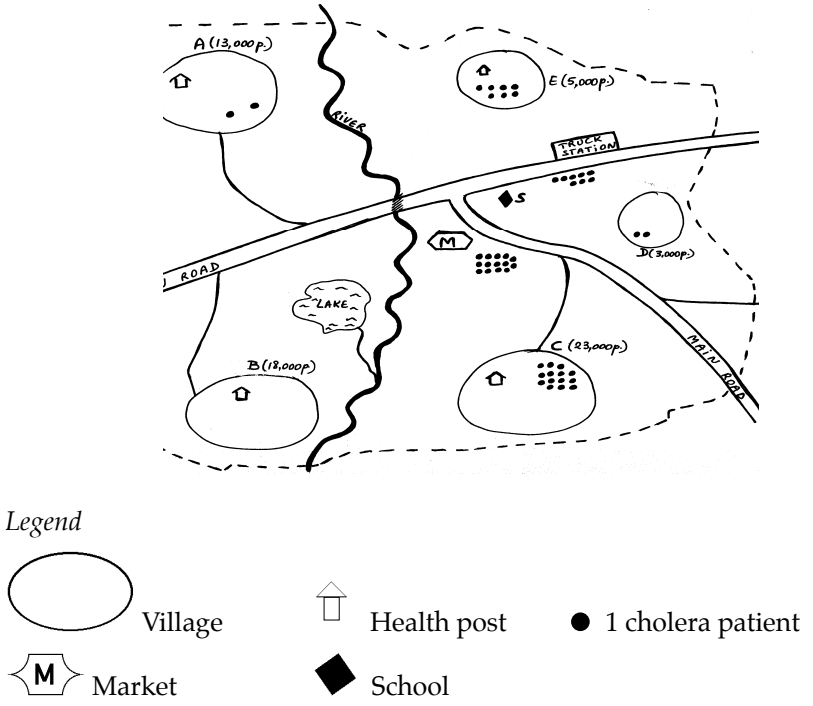
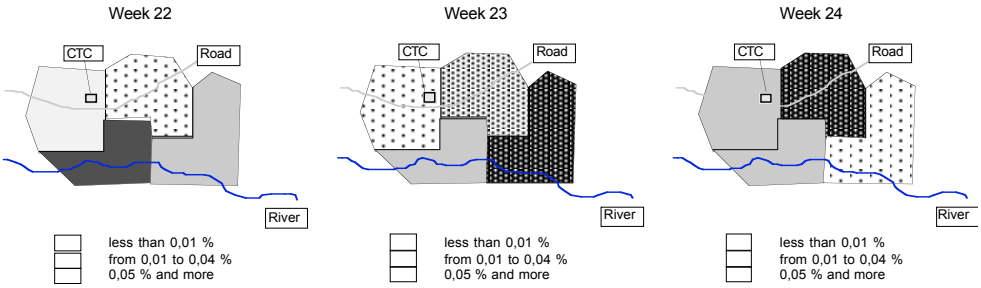


Figure 4. Cholera epidemic in district (X), country (Y), February-September
Evolution of the incidence rates of cholera, by place, from week 22 to week 24



Analysing the data: incidence, attack and case fatality rates

Once collected and organized, data must be analysed in order to obtain essential indicators: weekly incidence rate (WIR), weekly case fatality ratio (CFR) and attack rate (AR).

WEEKLY INCIDENCE RATE (WIR)

Incidence shows the rate at which new cases occur within a given period of time (usually one week). WIR can be expressed per hundred persons (percentage) or per 10.000 persons.

$$\text{WIR} = \frac{\text{Number of new cholera cases during the week x 100 (or 1.000 or 10.000)}}{\text{Population exposed to cholera during the same week}}$$

⚠ A patient who arrives deceased should be counted both as a case and a death.

CASE FATALITY RATIO (CFR)

CFR is the proportion of fatal cholera cases within a specified period of time, expressed in percentage.

$$\text{CFR} = \frac{\text{Number of deaths caused by cholera during the week x 100}}{\text{Number of new cholera cases diagnosed during the same week}}$$

⚠ Avoid counting deaths twice (in health facility and at home).

ATTACK RATE (AR)

AR is the cumulative incidence of cholera over a defined period of time, e.g. one year, or the whole duration of the epidemic. AR is usually expressed as a percentage.

$$\text{AR} = \frac{\text{Total number of cholera cases during the year x 100}}{\text{Population exposed to cholera during the same period}}$$

Example of data analysis:

In a province of 300,000 inhabitants; 150 new cases of cholera recorded between 17–23 June 2002 (Week 25).

WIR = 150 / 300.000 x 10.000 = 5/10.000 (or 150 / 300.000 x 100 = 0.05 %)

Among the 150 cases, 6 persons died during the same reporting week

CFR (week 25) = 6 / 150 x 100 = 4 %

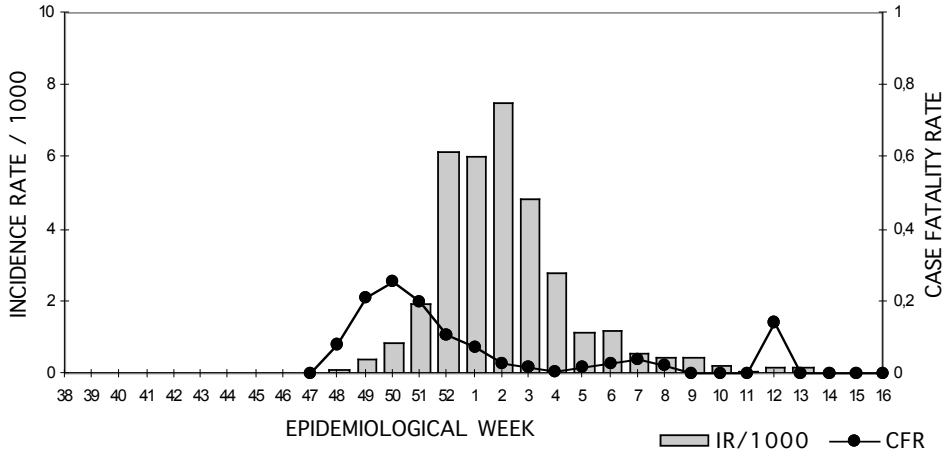
At the end of the epidemic there were a total of 1600 cholera cases and 46 deaths.

Population at risk was the same: 300,000 persons.

AR = 1600 / 300.000 x 100 = 0.53 %

CFR = 46 / 1600 x100 = 2.8%

Figure 5. Cholera epidemic in Ancuabe District (Mozambique), 1998-1999
Weekly incidence and case fatality rates



Source: MOH/MSF

Interpreting the data

CFR is an indicator of adequate case management; WIR indicates the extension of the epidemic and the rapidity of its spread.

By place

- **In densely populated scenarios** i.e. refugee camp (closed situation) or slums, when adequate response is provided, the epidemic is characterized by a *high* attack rate, a *short* duration of outbreak, a *rapid* peaking and a *low* case fatality rate.
- **In open situations** i.e. rural areas, epidemic patterns are: *low* attack rate, *longer* duration of outbreak, *later* appearance of peak and *higher* CFR.

AR is higher in a closed situation or in slums because of the high population density that facilitates person-to-person transmission. CFR is low because access to medical care and rehydration is quicker.

By time

CFR is high at the beginning of the outbreak due to a time-lapse in setting-up adequate response. It can also be high at the end of the epidemic due to staff exhaustion.

Incidence: A common source of contamination (contaminated water source or food) is frequent at the beginning of an epidemic; in such cases the peak is rapidly reached. Person-to-person transmission then takes over and progression slows down.

Common infection source and person-to-person infection can occur successively or simultaneously.

Specific risk factors

If weekly incidence rate is high in a specific area, investigate for any event leading to **population gatherings**: funeral, religious event, etc. This can explain a sudden outbreak in a specific place, followed by person-to-person transmission and by secondary dissemination of cholera when people go back to their homes. Contamination of point sources such as water supply would also show a clustering of cases in particular areas.

Comparison with previous years

Findings must be compared to other situations. As a general orientation, there is a difference in AR and CFR according to geographical settings, as summarized below in Table 2.

Information on the existence of previous outbreaks in the country or neighbouring countries is also important.

Table 2. Major cholera outbreak characteristics according to environment

	Open situation Rural, large scale	**Urban setting Slum**	**Closed situation Refugee camp**
Population density	Low	High	High to very high
Population number	High	High	Small
Population mobility	Mobile, scattered	Mobile	Not very mobile
Attack rate (%)	0.1 to 2%	1 to 5 %	1 to 5% *
Peak reached after	1.5 - 3 months	1-2 months	2 - 4 weeks
Proportion of cases seen before the peak	40%	40%	40%
Epidemic duration	3 – 6 months	2 - 4 months	1 - 3 months
Case Fatality Ratio **	< 5%	2 - 5 %	< 2%

Source: Review of MSF programmes in cholera epidemics, 1990-1997 (Epicentre)

* AR can be higher: example Goma refugee camp (1994)= 7.8%

** CFR figures are indicated when treatment is available.

5. Assessing response capacity of the health system

A task force or crisis committee may already exist and health personnel may be familiar with cholera response. Logistics and medical supplies can be facilitated as well as laboratory results.

The team conducting the outbreak investigation should also quickly assess the capacity of health structures to respond immediately to the needs. This will vary depending on whether there is previous experience of cholera or not. *Check all health facilities, public or private*, in the region / area. Assessment will focus on specific points (annex 5, p. 95):

– Buildings: quality, number, location
– Human resources and training (previous experience)
– Supplies
– Water and sanitation
– Accessibility: routes for supplies and access for patients

6. Identifying priority areas for intervention

Indicate areas at highest risk, where interventions will be prioritised

High risk areas are identified by:

- Epidemiological patterns; total numbers of cases and deaths, AR, change in incidence curve, case fatality ratio.
- Population size, density, mobility, displacements from endemic area or not.
- Risk factors: region of intensive trading activities, trade routes, heavy rainy season, poor sanitation, poor access to safe water (annex 6, p. 96).
- Previous existence of cholera: if none, population is not immune and is at higher risk. Displacement from endemic areas with asymptomatic carriers can be an additional risk, as well as displacement from non-endemic areas to endemic areas.
- Hindered access to treatment centres (distance, floods, security constraint, etc.).
- Available resources (human resources, health facilities, treatment facilities, etc.).
- Limited coping capacity of health authorities.

Priority areas can change with time: ongoing monitoring and flexibility are needed

Priority areas should be determined at the lowest level (e.g. village, health zone, etc.) but **they must not remain fixed**: re-location of activities must always be possible, according to surveillance reports, new environmental factors, population displacements, etc.

7. Reporting and formulating recommendations

A formal report must be provided, answering to the following questions:

- Is it cholera? Was it confirmed-how, where? Which strain is it?
- Is it an outbreak?
- When was the last outbreak?
- Is it an endemic or non-endemic area?
- What case definition is used or proposed?
- How many cases and how many deaths?
- What is the geographic distribution of cases?
- What population is at risk?
- What are the WIR, CFR and AR. what is the age distribution?
- How is the epidemic curve? Is the outbreak spreading?
- Can health services cope (human, material, logistic resources, access)?
- Where are the areas at highest risk? Why?
- Are the first steps of the response adequate (human resources, protocols, supplies)?
- Is it a rural, urban or closed (refugee/displaced camp) setting?

Recommendations for action

- If outbreak is confirmed: see next chapters.
- If no outbreak (sporadic cases or no cholera): strengthen diarrhoeal disease surveillance and establish cholera preparedness plan (see Chapter 9).

Key points

- Always be alert in high-risk scenarios: refugee camp, slum, and population displacement.
- Trigger the alert if there is report concerning high number of watery diarrhoea cases among adults, or adults dying of watery diarrhoea.
- Initial assessment must be timely, to confirm the outbreak and start immediate response. Assessment findings must include:
  - Confirmation of diagnosis with laboratory testing + antibiotic sensitivity
  - Simple case definition, to use in all health facilities
  - Standard data collection system in all health facilities
  - Description of the epidemic in terms of person, time and place
  - Analysis of incidence rate and case fatality rate, by time and by place
  - Health system capacity to respond
  - Environmental factors
- Report and formulate clear recommendations with priority interventions and priority areas.

Chapter 3

Intervention strategies

Whatever the environment, i.e. open or closed situations, there are two objectives in cholera interventions:

- To reduce mortality through better access to treatment
- To decrease the spread of the disease.

A systematic and strict organisation is needed to face all priorities:
Medical and logistic teams must work in close collaboration to ensure adequate case management, staff training, supplies, and availability of safe water and sanitation measures. Overall coordination and public information are also crucial for launching an adequate response but also to reduce panic and rumours leading to inadequate actions.

The number of cases per location will determine priority areas where treatment centres will be set up. Other interventions will subsequently be put in place.

1. Reducing mortality

Cholera case fatality ratio can vary from 0 to 5%, and it can reach 50% if no adequate treatment is provided. High CFR is mainly due to delays in reaching a treatment facility and/or poor case management.

Priority interventions to reduce CFR are:
- To set up cholera treatment structures, multiply their numbers and decentralize them.
- To establish case management protocols and train health personnel for implementation.
- To organize early case detection and referral of severe cases.
- To ensure regular supplies.

Setting-up treatment structures, multiplying their number and decentralizing

Cholera Treatment Centres (CTC) and *Units* (CTU) are hospital structures where severe patients are isolated and receive specialized care including IV rehydration. CTCs are placed at central level while CTUs are smaller, decentralized inpatient facilities.

Oral rehydration points (ORP) are simple structures that provide oral rehydration to moderate cases. They must be decentralised and widespread in order to provide early rehydration for moderate cases and to identify severe cases for quick referral.

- **CTC and CTU are hospital structures. They must function 24 hours.**
- **ORP can be open 12 hours/day.**

Case management

Case management protocols for cholera are standard and simple. They focus on providing early and rapid rehydration through oral rehydration solutions (ORS) and Ringer Lactate intravenous solutions.

Early case finding

Community workers must be trained and equipped in order to be able to assess dehydration levels, start oral rehydration protocols and organize quick referral of severe cases.

Regular supplies

Cholera centres must function as autonomous structures and must never run out of stocks.

2. Reducing the epidemic spread

Cholera epidemics develop in areas where access to clean water, personal and domestic hygiene and sanitation environment are precarious. Reducing the spread of the disease is based on individual and community interventions: (a) reduction of person-to-person transmission through personal hygiene and (b) identification and disinfecting of potential sources of contamination (water sources, markets, etc.).

However, because the number of activities to implement at the same time is high, prioritising interventions is needed: epidemiological findings, assessment of risk factors, expected impact of each intervention and available resources must be taken into consideration.

- Ensure access to water in sufficient quantity and quality
- Promote and enable hygienic conditions and practices
- Ensure effective sanitation
- Organise public information at various levels

Other reduction strategies include chemoprophylaxis and vaccination; these are specific measures that are not recommended as systematic interventions but can be beneficial in certain situations (described in chapter 6).

3. Coordination

At national/regional level, a crisis committee must be put in place

Many activities must be put in place at the same time: a crisis committee (or task force) should be created for coordination between partners. It involves various ministries or authorities: Health, Water/Sanitation, Education, etc. as well as international agencies.

This committee should coordinate and share all information regarding resources, needs and strategic orientations. The committee should remain the same during the epidemic, at least for the first weeks. Its tasks include:

- Determine priority areas for interventions
- Organise treatment structures, protocols and supplies
- Organise human resources, train and supervise them
- Set up /participate in public information
- Set up a surveillance/evaluation system
- Coordinate with all involved partners

Key points

- Reducing mortality
- Decreasing the spread of the epidemic
- Coordination

Chapter 4.
Interventions to reduce mortality

Interventions to reduce mortality aim at providing early rehydration treatment, either oral or intravenous. The organization of cholera treatment centres, their location and staffing are all based on this principle.

When the cholera outbreak is declared, public information should be given in order to advise patients to go to a treatment centre. There, patients will be screened and treated according to their status:

- If no cholera: refer to normal dispensary
- If moderate case (or "simple case"): admit for oral rehydration treatment
- If severe case: admit in hospitalisation ward for immediate IV rehydration.

The decision to open a cholera treatment centre must be taken very rapidly and without waiting for laboratory confirmation.

> Cholera is an emergency: the first treatment facility must function within 24 hours.
>
> Cholera is highly contagious: patients must be isolated immediately, without waiting for laboratory results.

1. Setting up treatment centres, multiplying their numbers and decentralising

Calculate the expected number of patients

Rough "standard" figures are used at the beginning in order to plan interventions. These first estimates must then be adapted to each specific situation.

Table 3. Expected numbers of cases (example of high AR, high proportion of severe cases)

Location	Refugee camp or slum	District town+rural villages
Population	30.000	120.000 = 30.000 in town + 90.000 scattered
Estimated AR	5%	1%
Peak reached at week	Week 3 to 4	Week 6 to 10
Nb cases during the peak	30%	10 – 30 %
Average length of stay *	2 days	3 days
Proportion of severe cases	75%	75%

*Length of stay is lower in closed situations for several reasons: delay before treatment is shorter, therefore patients arrive in a less severe state; case management is quicker and often of better quality in a CTC than in a CTU; patients in CTUs are kept longer under observation before they can be discharged (to their generally remote village, where access is difficult).

Table 4. Example of planning a CTC for a refugee camp and/or a central town

Population of Camp = 30.000						
AR	=	5%	=	30.000 persons x 0,05	=	1.500 expected cases
Severe cases	=	75%	=	1500 x 0.75	=	1.125 severe cases
Peak caseload (1 week)	=	30%	=	1.125 cases x 0,30	=	338 cases/1 w
Peak caseload per day	=	338/7 days	=	48 hospitalisations/d		
Average length of stay	=	2 days	=	48 cases x 2 days	=	96 beds

Establish 1 CTC for 96 beds (5 wards of 20 beds each)
Consider space (2m² per patient) in Oral Rehydration Points for 375 moderate cases

Table 5. Example of needs for the whole district (open setting)

Population = 90.000 persons, district (scattered)						
AR	=	1%	=	90.000 persons x 0,01	=	900 expected cases
Severe cases	=	75%	=	900 persons x 0,75	=	675 severe cases
Peak caseload (1 week)	=	30%	=	675 cases x 0,30%	=	202 cases
Peak caseload per day	=	202 cases/7 d	=	29 cases/day		
Average length of stay	=	3 days	=	29 cases x 3 days	=	87 beds

Need (n)* CTUs with a total capacity of 87 beds
Consider space (2m2 per patient) in ORPs for 225 moderate cases

**(n) is the number of CTUs. It will depend on the location of cases (see Figure 6 below)*

Determine the location of treatment facilities

In urban settings and refugee camps = 1 CTC + several ORP

Ideally the CTC should be located inside the existing hospital compound but clearly separated and isolated from the other departments, to avoid contamination of non-cholera patients. If the hospital compound is not suitable, another site must be found (football ground, school, etc.).

It is preferable to have one single CTC and several ORPs rather than multiplying CTCs.

When affected areas are too far from the CTC, access can become a problem. Ambulances can be provided for referral, or a CTU may be established as an intermediate structure. Use of taxis/buses should be discouraged given the high contamination risk during the journey.

In rural settings, decentralisation of hospitalisation capacity is recommended = CTU

The priority is to increase coverage and access. When a CTC is too far, a CTU is a valid intermediate step where severe cases can receive IV rehydration.

In extremely isolated regions with a long distance from any treatment facility, it may be possible to decentralise the CTU to level of the affected villages.

CTUs follow ideally the same patient flow (figure 8) and hygiene rules as the CTC.

The CTU should be located inside the health centre/health post, or close to it. If this is not possible, other existing structures may be used.

CTUs may paralyse routine health services: adequate case management is labour-intensive and other health services may suffer from staff shortage.

Oral rehydration points

ORPs have two objectives: to treat patients and to screen severely dehydrated patients for referral to CTC/CTU. They reduce pressure on overburdened CTCs or CTUs.

They can be decentralised to the community level. The community health worker should receive quick training and regular supplies, to be able to achieve given objectives.

Determine the type of treatment facilities

There are several criteria for selecting an existing building and/or a site for erecting a temporary shelter or a tent. Annex 7 (p. 98) provides information on advantages and disadvantages in selecting an existing structure (health facility, school, etc.) or building a new one. Nevertheless, health authorities and communities should be involved in the selection of sides and their preparation.

Important criteria to consider are:

- Drainage and hygiene
- Minimum distances from water sources and from other buildings
- Ventilation
- Access for trucks: this is crucial for regular supplies and for water trucking
- Light (ideally electricity), especially in hospital wards

⚠ **Surface is extremely important: always foresee a possible extension of the structure.**

Distribute the treatment facilities

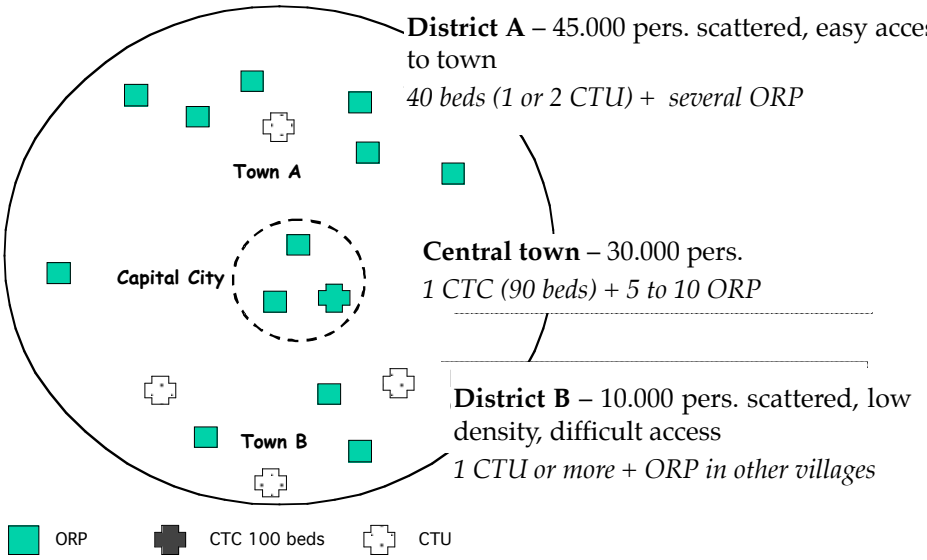
Distribute treatment facilities in order to shorten distances for care-seekers: the nearer the patients, the lower the CFR.

When ORPs and/or CTUs are multiplied, human resources organisation, supervision and supplies become difficult.

In large rural areas, several CTUs are needed: take into account existing health services and their level, outbreak evolution, availability of health personnel and distance between CTUs.

CTUs can be opened and closed very quickly, according to epidemiological findings: do not hesitate to move a CTU from one place to another if necessary. Flexibility must be kept throughout the course of the epidemic.

Figure 6. Example of distribution of cholera treatment facilities



2. Organization of cholera treatment facilities: example of a CTC

Design and architecture of a CTC: the principles

Organisation and design of a CTC are based on simple principles and rules. Patients are first screened and diagnosed, then sent to specific areas for treatment according to their status. The CTC is organised in separate areas, following two key principles :

- Isolation of the entire facility from other public structures (dispensary, school, market)
- Separation of patients (contaminated area) from the "neutral area" (not contaminated)

Figure 7.1. Patient screening

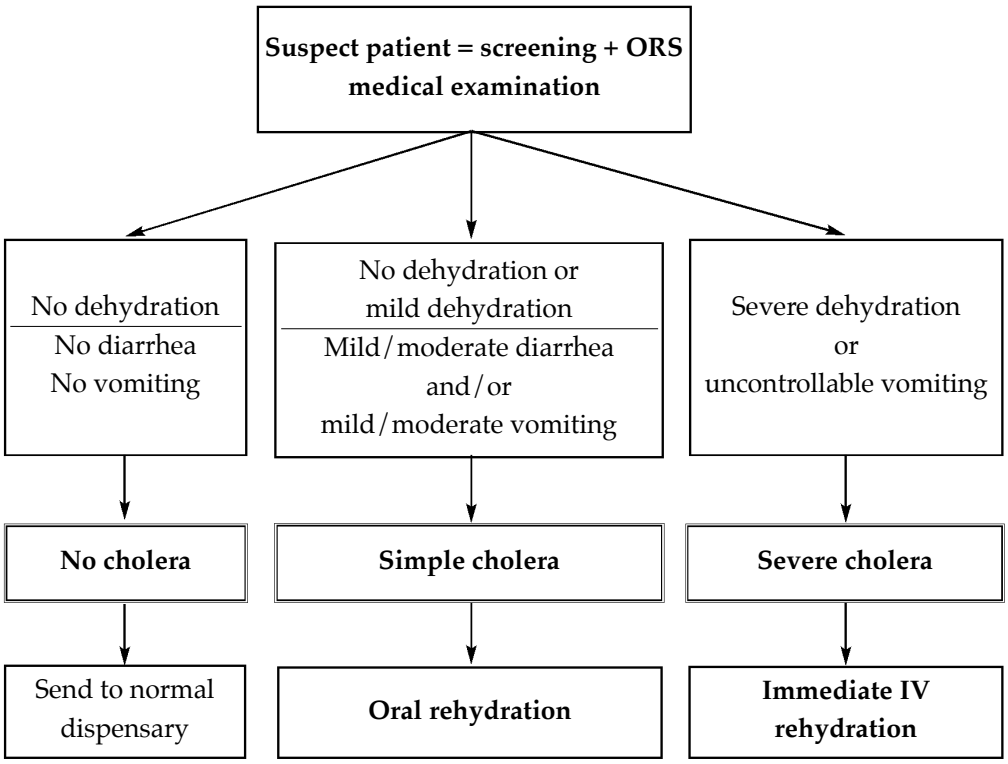
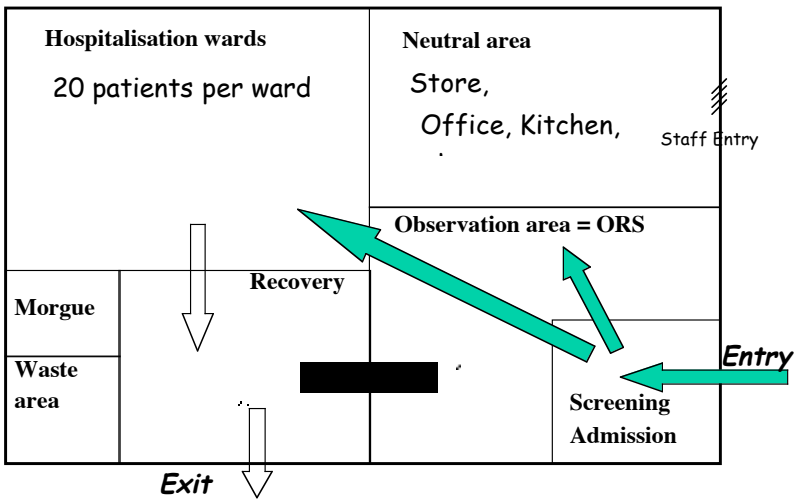


Figure 8. Simplified design of a CTC: patient flow (details are provided in annexes 7.1, p. 98 & 8.1, p. 100)



Screening, admission and observation

Patients are examined by a medical person for screening. If cholera, admit; otherwise send to normal dispensary.

Patients are admitted with **1 attendant** (caregiver).

Patients who are admitted are registered (cholera register).

Moderate or mild cases receive oral rehydration therapy in observation where they stay under medical observation for **6 hours**. Patients stay under tents or shelters, on mats or benches and will be discharged directly from there.

Severely dehydrated persons or those with uncontrollable vomiting should be hospitalised directly: see hospitalisation

Hospitalisation of severely dehydrated patients

Patients with severe dehydration and/or uncontrollable vomiting must be hospitalised for immediate rehydration.

Each patient lies on a **pierced bed** with 1 bucket for stool collection underneath + 1 bucket for vomit besides the bed (annex 8.2).

Patients needing specific management (children, elderly, pregnant women) should be regrouped in specific wards.

Do not exceed 20 patients per ward.

CTU: If set up in a health structure, clear separation of cholera patients from others has to be ensured.

Recovery

For oral rehydration after hospitalisation when less surveillance is required. Patients stay on mats or benches, as in the observation area.

Neutral area

Includes office space, rest area, changing room for staff, pharmacy and logistic stores, water storage, preparation of chlorine solutions, kitchen.

Logistic store and pharmacy must be organized **to ensure at least 7 days autonomy**. In case of reduced access/security constraints, stocks should be increased to **avoid any shortage**.

Mortuary

Must be isolated from other areas. See chapter 6: funerals and handling of corpses.

Water, Hygiene and Sanitation (annexes 7, 9 & 10)

- 60 litres of safe (chlorinated) water are needed per 1 CTC patient per day (this includes needs for drinking water, food, hygiene of the patient and the caregiver).
- Sufficient storage capacity for 3 days must be ensured in order to avoid any shortage.
- Label and clearly differentiate each container (drinking water, ORS, chlorine solutions).
- 0.05% chlorine for hand washing, dish rinsing and bathing of soiled patients, 0.2% chlorine for disinfecting floors, beds, clothes and footbaths, and 2% for disinfecting of vomit, faeces and corpses

All hygienic measures to be followed throughout the facility and related needs are described in annex 9, p. 102.

3. Human resources

Staff needs

A cholera epidemic means a rapid influx of patients, e.g. >200 patients present at the same time: it is crucial to ensure a good task distribution (annexes 8, p. 100 & 11, p. 115), to quickly train and to supervise the staff.

Planning must include all professions: medical, paramedical, cleaners, cooks, supervisors, assistants, logistic staff, watchmen, etc. The CTC should run 24 hours/day, independent from any other health structure. Duty shifts should be organised and staff hired consequently (day/night/rest).

An organisation chart should be established, known and clear to everybody. It should be decided upon before opening the centre and should be written. Be careful not to destabilise other on-going health programmes by removing personnel from their regular tasks.

For a CTC of 200 beds (100 admissions/day): 120 to 160 persons are needed

Table 6. Indicative list of staff required for a 200 beds CTC

	Day	Night	Off duty	Total
CTC Coordinator/supervisor	1	–	–	1
Administrator	1	–	–	1
Doctor	3	1	1	5
Nurse	15	15	15	45
Medical ward helper	15	15	15	45
Pharmacy responsible	1	–	1	2
Logistics, water and sanitation supervisor	1	–	–	1
Water-Sanitation officer	1	–	1	2
Logistic officer	1	–	1	2
Store keeper	1	1	1	3
Watchman/ sprayer	6	6	6	18
Cook	1	–	1	2
Cook assistant	4	–	4	8
Laundry worker	2	2	2	6
Cleaner	3	2	2	7
Chlorinator/solution preparer*	1	1	1	3
Hygiene educator*	1	–	1	2
Water carrier	2	2	2	6
Stretcher carrier	2	2	2	6
Total	**62**	**47**	**56**	**165**

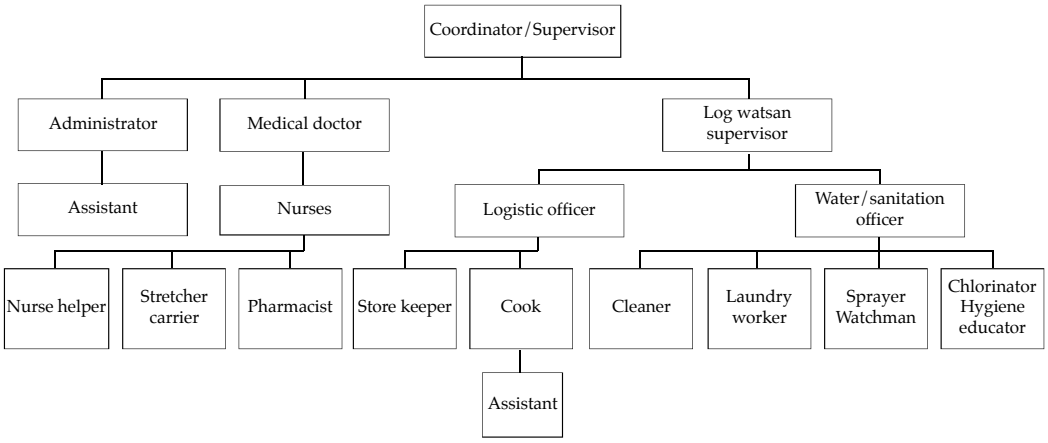
*These positions can be mixed according to needs

CTU: Minimum requirement for 20 (total) patients while involving caregivers are:

– 1 nurse/ per shift: screening, treatment, registration
– 1 ward helper/shift: assisting with ORS
– 1 cleaner-sprayer/shift: chlorine concentration, spraying, patients buckets
– 1 guard/shift: controlling movements, follow up of hygiene procedures before exit.

Note: The staff on duty should only be dedicated for those isolated cases and not shifting to other wards/patients without washing hands, disinfecting shoes and changing protective clothing. The community could provide non-medical personal.

Figure 8. Proposed staff organisation chart (without assistants/helpers)



Training

Even if there has been cholera preparedness in recent months, training must be done for all staff. Training includes hygiene and sanitation principles as well as the importance of early case detection. Medical personnel must be trained on diagnosis, case management protocols, early case identification and basic statistics.

Examples of job descriptions are listed in annex 11 (p. 115) to provide information on expected activities. Training can be organised accordingly.

Management and supervision

Epidemics create a heavy burden on national and expatriate personnel. It is therefore important to work closely to provide regular information in order to motivate the teams.

Regular team meetings are necessary to:

- provide regular feedback on work performed in the treatment centre
- provide updates on epidemic progress (graphs) and discuss information
- discuss management problems
- re-organize, explain and redistribute tasks and responsibilities if needed
- train and/or retrain personnel for precise tasks and responsibilities
- ensure that working conditions are acceptable (furniture, clothes, food, rest room space) especially if the personnel lives far away from home during the epidemic

ensure that regular rest periods are scheduled.

Cholera response involves national personnel that depend upon their MOH for salaries, incentives, etc. Regular meetings with authorities for feedback on the epidemic as well as discussing staff requirements or constraints are a must for maintaining good collaboration. Incentives and other compensation can lead to problems after the CTC is closed.

4. Supplies in a cholera treatment facility

The key principle is to avoid any shortage

Determine a minimum buffer stock for each setting, based on expected number of cases and delays in supply (accessibility)

Determining the expected number of cases and ensuring regular data collection will help in foreseeing needs.

The use of standard definitions and protocols is extremely useful to plan and organise supplies in a rational way.

Supplies include medical material for rehydration and other treatments, water facilities, chlorine for disinfection, and all logistic material needed to equip a cholera treatment facility. In addition, stationery, registers, etc. are needed as well as bags and linen for corpses. See details in annex 12, p. 127.

Drugs and kits

Kits are designed to facilitate epidemic response, especially at the beginning of the emergency in a CTC. The lists below apply for opening a cholera treatment facility, not taking into consideration pre-existing drugs and material in health facilities: normal activities should not be disrupted by the cholera outbreak and therefore we must supply all necessary items.

KITS FOR A CTC

Cholera Kit KMEDKCHO1 (see annex 12.1, p. 127) includes:

– 1 drug module
– 1 renewable supplies module
– 2 infusion modules of 2.000 litres each
– 1 logistic material module
– 1 stationery module
– 1 disinfection module
– 1 chlorination and water control kit

Note that this kit does not include tents/shelter, beds, electrical supplies

- **KMEDKCHO1** is designed for 625 patients of which 75% (± 500) are severe cases requiring IV rehydration and 25% are moderate cases (± 125 patients needing only ORS). This would cover the needs for a CTC of 50 beds or more. Calculations are based on experience showing that these severe cases reach hospital facilities, while the other patients are treated in ORP.

  Some items can be purchased on the spot, but this may provoke mistakes; in addition, shortage on the market is common. Kits save time, especially at the beginning of the outbreak. Renewable items can then be purchased locally, if necessary.

In high-risk areas, it is strongly recommended to have one kit available (in stock) in order to be able to start an emergency intervention quickly. This kit may be imported or prepared on the spot2. Regular checks on expiry dates must be done.

- **In addition to the cholera kit, 1 complete medical kit for 10.000 persons for 3 months (KMEDKEME1)** may be useful: it responds to the medical needs of 10.000 persons in an emergency. It especially applies in refugee camps or other isolated areas without any other available/equipped facility: in remote areas with cholera outbreaks, regular medical needs must be taken into consideration, since patients can also arrive at the treatment facility with another illness.

For a CTU and for ORPs

The same principles apply on a smaller scale. See annexes 12.2 through 12.3 & 4 (p. 140–144) for needs in a CTC, CTU and ORP.

Food

Food should also be foreseen. Patients, caregivers and staff receive 2 to 3 cooked meals per day. Meals are prepared in the neutral area of the CTC compound. Choice of food and amount must be taken into account, as well as the cultural habits of the population.

It is important to provide food for the staff to avoid their leaving the cholera centre while on duty.

In the case of a CTU, relatives might provide food; otherwise, dry food ration can be provided.

Key points

- Early adequate treatment of cholera cases is or utmost importance to quickly reduce CFR (from 50% to 2%)
- Cholera is an emergency: the first treatment facility must be available and functional within 24 hours
- Expected numbers of cases and their location are needed to determine the type and distribution of treatment structures (CTC, CTU, ORP).
- Cholera is extremely contagious: isolation and hygiene are priority rules.
- The design of CTC and CTU should follow standard rules in order to respect the steps of patient management: screening, admission, observation, hospitalisation, and recovery.
- Human resources organization, training and management are key activities especially in CTCs: remember that for a 200 beds CTC, up to 160 persons may be needed.
- Supplies must be organised in order to avoid any shortage.

Chapter 5.
Case management

In an epidemic situation, any patient with diarrhoea and/or vomiting is a suspect cholera case.

The most important element of cholera treatment is rapid replacement of the water and salts lost through diarrhoea and vomiting.

Most patients can be treated using oral rehydration solution (ORS) alone. Only severely dehydrated patients need the administration of intravenous fluid.

Antibiotic therapy may reduce the volume of diarrhoea and carriage time of *Vibrio* in severely ill patients; however most cholera patients do not need antibiotics.

1. Active case finding

- Active case finding should be organized during the outbreak season since suspected cholera cases must be rapidly identified for timely referral and rehydration:
  - Inform the population
  - Organize home visits
  - Organize referral system for severe cases
- Identification of suspect cases in the community must be simple, based on a standard case definition (see page 18).
- In refugee camps, slums, etc. community health worker (CHW) can conduct systematic home visits to detect new suspect cases and facilitate referral. See annex 11, p. 126, for job description.
- In rural areas, traditional leaders and authorities can help facilitate the work of outreach workers.
- Referral can be difficult in remote areas. Discuss with local authorities how to facilitate access to the closest facility and help organize ambulance services, etc. according to needs.

2. Assessment of the patient's hydration status

The degree of dehydration is graded according to symptoms and signs that reflect the amount of fluid lost. Clinical signs useful for detecting dehydration and assessing its degree are listed in the table below.

Table 7. Classification table for dehydration (adapted from the WHO)

CHECK PULSE			
• present • rapid, weak (thready) • none			
EXAMINE			
Condition	Well, alert	Restless, irritable	Lethargic or unconscious
Eyes (sunken)	No	Yes	Yes
Thirst	Drinks normally	Thirsty, drinks eagerly	Not able to drink
Skin pinch	Goes back quickly	Goes back slowly	Goes back very slowly (> 2 seconds)
CONCLUDE			
No dehydration		**Moderate dehydration**	**Severe dehydration**
TREAT			
Maintain hydration Use Treatment Plan A		Oral rehydration Use Treatment Plan B	IV + oral rehydration Use Treatment Plan C

No other examination is necessary at this stage: a cholera patient can deteriorate rapidly and rehydration must be initiated as quickly as possible; checking temperature[1], blood pressure or weight is not needed for an immediate decision.

Systematic assessment of pulse:

It is not necessary to count the pulse. Check only:

- if pulse is present or not,

and

- its strength: strong (beats easily felt) or thready (beats barely felt).
  A rapid, thready pulse (often only detected on major arteries) or the absence of pulse indicate hypovolaemic shock. Other signs include: cold extremities, altered consciousness, low blood pressure with narrow pulse pressure or blood pressure undetectable.

Shock is an emergency that requires continuous bedside evaluation, resuscitation (Treatment Plan C) and re-evaluation.

Note: qualified nurses should be posted in screening and observation areas since it is crucial to recognise emergency cases for immediate IV rehydration. The supervisor of the CTC (nurse or doctor) should visit these areas at least every 2 hours.

[1] Cholera patients usually have no fever. Check for associated infection if fever is present.

3. Rehydration therapy and monitoring

A medical file is opened for each cholera patient admitted. The file remains with the patient until exit (see annex 14, p. 150: simplified files for CTU).

Plan A: Oral rehydration therapy for patients with no dehydration

Patients should receive oral rehydration solution after each loose stool to maintain hydration until diarrhoea stops, as indicated below.

Because clinical status may deteriorate rapidly, these patients may initially need to be kept under monitoring, especially when they live far from the treatment centre or when correct home treatment cannot be guaranteed.

ORS amounts to prevent dehydration (WHO recommendation)

Age	Amount of ORS after each loose stool	ORS quantity needed
Less than 24 months	50 to 100 ml	Enough for 500 ml/day (1 sachet)*
2 to 10 years	100 to 200 ml	Enough for 1000 ml/day (1 sachet)*
Over 10 years	as much as wanted	Enough for 2000 ml/day (2 sachets)*

(*) ORS bags are usually for 1 litre. In some countries, ORS bags are conditioned for less than 1 litre.

If the treatment is administered at home, give enough ORS sachets for 2 days treatment and instruct the patient (or caregiver) to prepare ORS solution with clean water.

Advise patients or caregivers to come back immediately if condition deteriorates (repeated vomiting, increased number of stools, drinking or eating poorly).

Plan B: Oral rehydration therapy for patients with moderate dehydration

Patients must be admitted to the treatment centre, receive oral rehydration solution as indicated below and be monitored until diarrhoea/vomiting stops.

Oral rehydration during the first 4 hours

Age	Less than 4 months	4-11 months	12-23 months	2-4 years	5-14 years	14 years and older
Weight	Less than 5 kg	5-7.9 kg	8-10.9 kg	11-15.9 kg	16-29.9 kg	30 kg or more
ORS in ml	200-400	400-600	600-800	800-1200	1200-2200	2200-4000
ORS in 200 ml cup	1-2 cups	2-3 cups	3-4 cups	4-6 cups	6-11 cups	11-20 cups

Monitoring during oral rehydration therapy and reassessment of patient's condition

Fluids input

- Monitor the patient frequently to ensure that ORS solution is taken satisfactorily.
- Explain to caregiver the importance of helping the patient to drink.
- Check that the patient always has a cup and the ORS container within arm's reach.
- Count the number of cups drunk.
- If the patient wants more ORS, give more.
- If the patient vomits, wait 10 minutes and continue slowly.

Fluids output

- Number and aspect of stools and vomit.
- Detect patients with profuse and continuing diarrhoea who will require closer monitoring.

Assessment of the hydration status

- Check signs of dehydration as indicated in the assessment chart (table 7), at least every hour in the first 2 hours, or more frequently if the clinical condition requires closer monitoring.
- If there are no signs of dehydration *after the first 4 hours*: follow Treatment Plan A.
- If there are still signs of moderate dehydration *after the first 4 hours*: repeat Treatment Plan B for 4 hours and reassess.
- If ***at any time*** signs of severe dehydration appear (see table 7) or if the patient becomes confused or disorientated or if frequent, severe vomiting occurs: shift immediately to Treatment Plan C (IV therapy).

Plan C: Intravenous rehydration for patients with severe dehydration

IV treatment must be given quickly, to restore normal hydration within 3 to 6 hours. Hang the infusion bag as high as possible to facilitate rapid flow.

Ringer Lactate solution (Hartman's solution) is the best option. It provides an adequate concentration of sodium, some potassium and enough lactate, which is metabolised into bicarbonate for the correction of acidosis. If available, use 500 ml Ringer Lactate pouches for children.

Other routes of fluid administration should be used when attempts at peripheral venous access fail: see annex 13, p. 145, for indications, precautions and limitations.

If the patient can drink without difficulty, give ORS by mouth while the drip is set up. Start ORS only if the patient is conscious. Oral (or nasogastric) route should not be used in patients severely hypovolaemic or unconscious.

For patients aged 15 years and over

First 15 minutes:

- Administer 1 litre of Ringer Lactate very rapidly, until radial pulse is restored.

After first 15 minutes:

- If the pulse slows down or becomes stronger, reduce the amount and administer 1 litre in 45 minutes, followed by another litre in 2-5 hours.
- If the pulse remains weak or nondetectable: administer another litre of Ringer Lactate in 15 minutes.

The remaining amount of Ringer Lactate will depend on evolution: consciousness, pulse rate, skin pinch, and volume losses (vomit and diarrhoea). On average a severely dehydrated adult patient needs 8-10 litres Ringer Lactate and 10 litres of ORS for a full course of treatment.

Do not spend time calculating the number of drops/minute, but monitor patient's condition, especially during the first hours.

Large calibre catheters (16G, 18G) should be used. If large catheters cannot be placed, two parallel IV lines can be used, to ensure rapid administration of Ringer Lactate

For patients up to 14 years

Age	First give 30 ml/kg in:	Then give 70 ml/kg in:
Children less than 1 year	1 hour (repeat once if radial pulse is still very weak or nondetectable)	5 hours
Children aged 1 year to 14 years	30 minutes (repeat once if radial pulse is still very weak or nondetectable)	2 1/2 hours

Monitoring during IV rehydration therapy and reassessment of patient's condition

Assessment of the patient's condition

- Pulse: stay next to patient's bed until a strong radial pulse is present.
- Check signs of dehydration as indicated in the assessment chart (table 7), every 15 minutes in the first hour, then every 2 hours, or more frequently if the clinical condition requires closer monitoring.
- Respiratory rate: if the patient breathes with difficulty, look for acute pulmonary oedema due to overhydration (see complications, page 52).
- Except for patients in shock, monitoring blood pressure is not compulsory, especially when staff is not well trained.

Fluids input

- Count the amount of Ringer Lactate administered and number of cups of ORS drunk.
- Mark the quantity per hour on each infusion bag, especially for young children.
- Indicate with a marker pen the chronological number on the Ringer lactate bottle given or keep the empty infusion bags at the bedside to count overall amount given.
- Explain to caregiver the importance of helping the patient to drink.
- Check that the patient always has a cup and the ORS container within arm's reach.
- If the patient wants more ORS, give more.
- If the patient vomits, wait 10 minutes and continue slowly.

Fluids output

- Number and aspect of stools and vomit; urine present or not?
- Detect patients with profuse and continuing diarrhoea who will require closer monitoring.

IV line

- Extravasation injury (leakage of solution outside the vein)
- Dislodgement of catheter
- Leakage from catheter
- Catheter occlusion
- Damaged catheter
- Local infection
- When the planned amount of IV fluid has been given (after 3 hours for patients over one year and after 6 hours for patients less than one year), reassess the patient's hydration status, as indicated in the assessment chart (see table 7).
  - If signs of severe dehydration are still present and/or if frequent, severe vomiting continues, repeat the IV fluid infusion following Treatment Plan C

  - If there are still signs of moderate dehydration, give ORS following Treatment Plan B and run Ringer Lactate at "keep-the-vein-open" rate. Remove the IV line only when criteria below are met.
  - If there are no signs of dehydration, follow Treatment Plan A.
- Criteria for removing the infusion (only during day shift, not at night)
  - Dehydration signs no longer present.
  - Absence of vomiting for at least 12 hours.

Specific cases for close surveillance

Patients at higher risk should be admitted in a separate, specific ward under the supervision of qualified nurses, day and night.

- **Pregnant women**: risk of stillbirth and miscarriage, especially in the event of severe dehydration in the third trimester. Treatment remains the same (adult protocol).
- **Elderly, children**: increased risk of acute pulmonary oedema.
- **Severe anaemia in severely dehydrated patients**: reduce the rate of infusion as these patients are at high risk of acute respiratory decompensation during IV rehydration.
- **Severely malnourished patients**: see page 53.

4. Antibiotic treatment

In severe cases, antibiotics can reduce the volume of diarrhoea and carriage time of *Vibrio*, but they are known to induce a false sense of security, leading to underestimation of rehydration needs. Most cholera patients are cured by rehydration and do not need antibiotics. On the other hand, if not correctly rehydrated, patients will die even if antibiotics are given.

Antibiotics are indicated only for patients with severe dehydration and are given after IV rehydration.

Before introducing antibiotics, check sensitivity.

Doxycycline is the first choice antibiotic as it is given as a single dose (300 mg for an adult; 6 mg/kg for a child between 1 and 14 years of age).

Doxycycline is usually contra-indicated in pregnant or breast-feeding women and in children under 8 years of age. However, for treating (but not preventing) cholera, it may be used if indicated in the national protocol as the administration of a single dose should not, in theory, have any adverse effects.

Due to increasing resistance to tetracyclines, other oral antibiotics can be used (check sensitivity): erythromycin, cotrimoxazole, chloramphenicol or furazolidone, but not as a single dose.

5. Identifying and treating complications

Hypoglycaemia

After dehydration, hypoglycaemia is the most common lethal complication of cholera in children. Hypoglycaemia is the result of diminished food intake during acute illness.

Early intake of ORS and re-starting of feeding can prevent hypoglycaemia. For patients under IV rehydration who can drink without difficulty, give ORS orally as soon as possible.

If hypoglycaemia is suspected (lethargy, convulsions, eyes rolled-back, etc.) give 1 ml/kg of glucose 50% by slow IV injection.

Acute pulmonary oedema

Acute pulmonary oedema is related to overhydration, due to excessive IV rehydration. It is a common risk among elderly, young children and severely anaemic patients. Use of sodium chloride 0,9% instead of Ringer Lactate can also contribute. Oral rehydration does not cause pulmonary oedema.

Signs of IV fluid overload include: dry cough, dyspnoea, puffy eyelids in children, bulging fontanelle in infants, oedema of the lower limbs and crepitations on auscultation.

Management:

- Put patient in a half-sitting position, legs hanging out of the bed.
- Slow down infusion rate as much as possible.
- Administer ***furosemide*** by slow IV injection:
  - Children: 1 mg/kg/injection
  - Adults: 40 mg/injection
- If needed, repeat the same dose after 15 minutes, according to patient's condition (maximum dose in adults: 250 mg).

Renal failure (anuria)

This rare complication occurs when shock is not rapidly corrected.

Urine output normally resumes within 6 to 8 hours after starting rehydration. If not, check that patient is correctly rehydrated and try ***furosemide*** 1 mg/kg IV under close medical supervision.

Hypokalaemia

Hypokalaemia should be suspected if repeated episodes of painful cramps occur. This may happen after the first 24 hours of IV rehydration if patients do not eat or do not drink ORS (ORS provides enough potassium).

If cramps occur, try to correct with ORS. In patients with cramps who cannot drink ORS, add 1 or 2 grams of KCl in one litre of Ringer lactate if clearly needed, closely monitor the rate of infusion and reassess.

⚠ **Do not administer KCl by IM injection (risk of necrosis) or by rapid IV injection (risk of cardiac arrest). Do not administer KCl on the first day (the infusion rate is too high and hypokalaemia is unlikely).**

6. Cholera and severe malnutrition

Assessment of hydration status in severely malnourished patients is difficult. Many classical signs of dehydration are unreliable. For example, a child with marasmus has loose, lax skin even when he is not dehydrated. On the other hand, skin pinch may go back quickly in a child with kwashiorkor, even when he is dehydrated.

Rehydration must be clearly indicated and closely monitored by the medical staff. Malnutrition seriously disturbs the fluid and electrolyte balance. Excessive and indiscriminate use of rehydration fluid may rapidly result in overhydration and fatal heart failure.

Assessment of the patient's hydration status

Signs that remain useful for detecting dehydration are listed in the table below. It is clinically difficult to determine the degree of dehydration. Dehydration is classified as “some” or “severe”.

Clinical signs of some and severe dehydration

Signs	Some	Severe
Watery diarrhoea	yes	yes
Thirst	drinks eagerly	drinks poorly
Recent weight loss	between 5 to 10%	10% and more
Recent sunken eyes	yes	yes
Weak/absent radial pulse	no	yes
Cool hands or feet	no	yes
Mental state	restless and irritable	lethargic/coma
Urinary output	decreased	absent

IN PRACTICE

- Monitoring the weight is a good tool to confirm dehydration as dehydration is always associated with weight loss. Weigh the patient and compare to its previous weight. If there is no weight loss, there is no dehydration.
- Eyes may be sunken because of loss of subcutaneous fat in the orbit. When the child presents with sunken eyes, it is important to ask the mother if it coincided with the onset of diarrhoea.

- Dehydration is considered to be severe only if the patient shows signs of shock (rapid and thready pulse often only detected on major arteries or absence of pulse; low blood pressure with narrow pulse pressure or blood pressure undetectable; cold extremities; altered consciousness, etc.).

Oral rehydration therapy

Patients with signs of dehydration and without signs of shock should be rehydrated orally using ORS.

Use standard WHO-ORS instead of ReSoMal, since ReSoMal does not contain enough sodium to compensate the losses resulting from cholera.

The rate of rehydration should be slower for severely malnourished patients than other patients. Do not exceed the recommended doses.

- Child and adult: start with 20 ml/kg over the first 2 hours administered at the rate of 5 ml/kg every 30 minutes, followed by 50 ml/kg administered at the rate of 5 ml/kg/hour for up 10 hours (up to 10 ml/kg/hour if needed, until dehydration is corrected).

Use nasogastric tube only if the patient is conscious but too weak to drink.

Fluids given to maintain hydration after dehydration has been corrected should be based on the amount of ongoing stool losses.

The patient's condition must be assessed every 30 minutes during the first 2 hours, then every hour for the next 6-12 hours.

Monitoring is based on pulse and respiratory rates; and the frequency of urine, stool, and vomiting.

During treatment, the patient's respiratory rate and pulse rate should decrease. Regular urinary output (every 3-4 hours) is a good sign that enough fluid is given.

Increasing oedema is evidence of overhydration. Continued fast breathing and a rapid pulse rate during rehydration may be early signs of heart failure. ORS should be immediately stopped if a patient exhibits any of these signs. Reassess after one hour.

Note: therapeutic milk and breast-feeding must not be interrupted during oral rehydration.

Intravenous rehydration

IV fluid should be restricted to patients with signs of shock.

Use Ringer Lactate: 15 ml/kg/hour over 2 hours, then stop the infusion, and change to oral treatment with ORS: 10 ml/kg/hour until dehydration is corrected (for up to 10 hours if needed). At the same time that ORS treatment begins, re-start feeding.

Patients should always be placed under close medical supervision.

Monitor the vital signs every 15 minutes:

- reduced respiratory rate, reduced pulse rate, stronger radial pulse and increased blood pressure indicate that there is an improvement,
- increased respiratory rate (by 5 breaths/min), increased pulse rate (by 25 beats/min), puffy eyelids are early signs of overhydration.

Urine output usually resumes within 6 to 8 hours after starting rehydration.

If there are signs of fluid overload, temporarily stop all oral intake (food and fluid) and IV fluids, administer ***furosemide*** IV (1 mg/kg , maximum 20 mg/24 hrs), place the patient in a semi-sitting position with legs lowered.

7. Resumption of normal feeding

Resume feeding with a normal diet when vomiting has stopped. There is no reason to stop cholera patients eating.

Continue breast-feeding infants and young children. Mothers must wash their hands and breasts before feeding.

8. Other treatment procedures

Provide blankets to prevent hypothermia.

There is no indication for the use of anti-vomiting, anti-motility or anti-diarrhoeal agents: they do not prevent dehydration. The treatment of cholera does not include the use of antispasmodics, blood transfusions or plasma expanders either.

9. Discharging the patient

If hospitalised, first transfer to recovery area and keep under observation and ORS for 6 hours.

From recovery area, discharge when there are no more signs of dehydration and less than 3 liquid stools during the past 6 hours.

Advise the patient or caregiver to come back to the treatment centre immediately if:

- vomiting restarts,
- diarrhoea worsens,
- patient is drinking or eating poorly

Discharge with enough ORS bags for 2 days at home and instruct the patient to prepare the ORS solution with clean water.

Table 11. Number of ORS bags to give at home (from the WHO)

Age	Amount of solution after each loose stool	ORS sachets needed
Less than 24 months	50 to 100 ml	Enough for 500 ml/day
2–9 years	100-200 ml	Enough for 1000 ml/day
10 years or more	As much as wanted	Enough for 2000 ml/day

ORS bags are usually for 1 litre. In some countries ORS bags are conditioned for less than 1 litre.

Chapter 6.

Reducing the spread of the epidemic

Cholera epidemics mainly develop in areas where access to clean water, personal and domestic hygiene, and the sanitation environment are precarious.

Since the number of activities to implement at the same time is high, prioritisation of interventions is needed: epidemiological findings, assessment of risk factors, expected impact of each intervention and available resources must be taken into consideration. For these reasons, access to safe water and hygiene promotion will be selected as priority interventions in most places while sanitation, although important in breaking some of the faecal-oral transmission routes, has limited feasibility in epidemics (timeliness, resources, immediate impact).

There are additional strategies that can be effective in specific situations: mass prophylactic treatment and vaccination.

1. Ensuring access to water: quantity and quality

Water quantity

Poor access to water in sufficient quantities may negatively affect hygiene practices, leading to diarrhoeal disease and in some instances, cholera in a given population. Refugee camps, slums and peri-urban areas are usually at highest risk because of high population density associated with poor access to water. In addition, in rural and urban areas, water supplies can be affected by seasonal factors.

> The minimal individual requirement is 15 – 20 litres per person per day.

Water quality

Contaminated water can be a significant route of transmission. Tests for vibrio presence are not widely accessible but indirect measurement methods can provide a good indication of quality: water turbidity, free residual chlorine concentration in mg per ml and presence of faecal bacteria (coliforms).

When water is not chlorinated, the faecal bacteria concentration should not exceed 10 CFU[4] per 100 ml. This indirectly shows a potential contamination but does not prove the presence of vibrio.

Improve water quality: Chlorination

Chlorination (annex 15, p. 151) is the most simple and widely available means to ensure safe water; vibrio cholera are destroyed by chlorine, if one can achieve:

- a constant free residual chlorine concentration of 0.2 to 0.5 mg/l measured after 30 minutes contact time (annex 15.2, p. 153).
- a turbidity less than 5 NTU. The higher the turbidity, the less efficient the chlorination. In emergency, 20 NTU can be acceptable; if turbidity > 20 NTU, specialist advise is recommended.

Priority will be given to water sources identified as faecally contaminated and/or a high number of cholera patients who have used the same source. Several methods can be envisaged according to the existing water supply system:

Direct Water System/Batch Chlorination

When there is an organised water distribution system, chlorination can be implemented; either directly at the level of the reservoir, in-line (via special dosers directly into the pipeline) or batch chlorination of temporary bladders/water tanks with tap stands.

Protected wells

Chlorination of protected wells6 is not necessary, except after completion, maintenance or repair. However, when there is a high risk of secondary contamination, (e.g. during water collection, transportation, unsafe water storage practices) bucket chlorination (i.e. direct chlorination of household containers) at the protected source is recommended.

Bucket chlorination (annex 15.3, p. 156)

In situations where there is no organised water system or when effective and continual residual chlorine concentration cannot be obtained, bucket chlorination is the recommended option. It aims at providing effective chlorine residual (0.2 to 0.5 mg/litre) in a given water volume where chlorinating wells and/or other water sources is not feasible.

The size of the household container should be known by the person appointed at the well (the chlorinator). Usually in a given context, the population uses the same type of container and volumes are easily known (5, 10 or 20 litre jerrycans or buckets). The trained chlorinators are located next to water sources used for drinking water and chlorinate each family container after they have been filled, with the appropriate amount of chlorine. When there are several water sources, discussions with local authorities are needed to request support from the community, to select the best and most used water points: the goal is to have one chlorinator stationed at each point.

Chlorination of unprotected wells

This is only effective if continual residual chlorine can be achieved. Relying on other indicators can give a false sense of security.

> Disinfection of wells and other unprotected sources is not recommended where bucket chlorination can be implemented.

2. Promoting and enabling hygienic conditions and practices

Promoting hygienic conditions and practices can be very effective in interrupting transmission routes, but feasibility should be taken into consideration. For example, it is important to ensure that practices promoted have the necessary facilities/materials available, e.g. promoting the washing of hands where people have no access to soap and/or water can be counterproductive. In addition, some practices may be difficult to accept among the population if not extensively discussed and explained, especially funeral practices.

Promotion of Hygienic Practices

Hygiene practices concentrate on certain behaviours deemed to be key transmission routes of cholera, preventable only with the participation of the population. For example:

- hand-washing after defecation and before eating
- use, collection, storage and protection of clean drinking and cooking water
- food preparation, cooking and storage; dish washing
- defecation practices (e.g. defecating downstream from a drinking water collection point)

These can be targeted at a public level, e.g. public toilets and small restaurants in markets, or through group or household visits directly in the community.

Enabling Hygienic Conditions

It is difficult to promote certain hygiene practices if the targeted audience does not have the appropriate facilities. It is therefore often necessary to provide facilities or material:

- provision of hand-washing points, for example in public toilets
- provision of soap for effective hand-washing
- provision of appropriate containers, preferably with a tap or a narrow neck, to enable safe storage, protection and access to water and prevention of secondary contamination in the home
- additional quantities of water to enable households practice hygienic behaviour (e.g. hand-washing or dish washing).

Hygiene Practices and Conditions at Feasts/Public gatherings

Marriages, religious festivals, funerals and other public gatherings can be important points of transmission. Unhygienic hand washing practices, for example when everyone uses the same water in a single container (as opposed to clean water poured on hands) has been identified as a key risk factor during feasts. These risks are the same for any large gathering because of the presence of asymptomatic carriers. Discussions with authorities should therefore discourage such gatherings until after the end of the cholera outbreak in the area or be a focus of hygiene-promotion activities in order to minimise transmission.

Promotion of hygienic practices will need to occur both in public and household areas. Different communication methods and interlocutors will be needed, according to the different audiences: see Table 13 below in chapter "public information".

Safe Burial Practices and Funerals

Funeral gatherings can be a potential transmission event in themselves, but also may bring people together from uninfected areas to an infected area, from which they can carry cholera back home, spreading the disease over a wide area faster. Specifically, people who have participated in preparation/burial of the body are often involved in transmitting cholera by preparing/handling food or water for the funeral. Therefore outbreak control measures should focus on:

- preparation of the corpse
- targeting promotion of cholera transmission information with key community and religious leaders
- finding safe, appropriate and acceptable burial procedures
- discouraging funeral feasts to reduce the potential for transmission
- providing hygiene promotion and materials at feasts that cannot be postponed

There can also be resistance from communities in implementing adapted body preparation and burial practices. It is therefore important to take time to discuss with traditional authorities and religious leaders, in order to explain the risks of contamination and to decide together adapted burial methods for the duration of the epidemic, providing the required equipment if needed (linen, chlorine, etc.)

3. Ensuring Effective Sanitation

Excreta Disposal

Excreta (faeces and vomit) from cholera patients are highly infective, as they contain up to 10^8 vibrio per ml; their disposal in latrines is therefore crucial. However not all interventions will be feasible in an outbreak. Generally:

- Construction of family latrines at the start of an outbreak has poor impact on the epidemic spread as this takes too much time.
- Latrine construction in public locations e.g. markets, harbours, schools can be beneficial. However, public latrines may become a significant source of contamination and therefore must be maintained correctly. In urban areas or camps, cleaning of existing latrines can be considered, including hiring additional staff specifically for this task.
- In refugee camps, if shared latrines are used, ensure that they are clean and maintained.
- If needed, temporary measures such as defecation areas, trench latrines can be discussed.

Solid waste

Solid waste areas (garbage areas) can be a reservoir for vibrio cholera as well as a breeding site for vectors as usually there is no functioning removal system. These sites become significant if the waste contaminates the human environment: a drainage system leading to water supplies, or when people use the waste area to find left over food.

Locations for targeted waste control interventions may include markets and harbours, but solid waste management is difficult to manage and demands high levels of resources, therefore it is not likely to be an effective measure in reducing the epidemic spread.

Waste water

Wastewater includes surface water runoff, domestic waste water (e.g. from kitchens) and sewage. If not contained properly (e.g. drainage ditches) or if overflowing, it can be a vehicle for contamination of drinking water. Therefore keeping drainage systems open and flowing or providing alternative temporary water supply facilities can reduce the risks associated with waste water.

Waste water containing excreta used for irrigation can also be a major source of transmission: vegetables are often not cleaned properly before consumption.

Vector Control

Insects such as flies are not usually important vehicles of cholera transmission. Therefore only simple and specific measures are envisaged:

- covering food; flies are likely to be a significant source of transmission where warm food7 is stored and shared amongst many (e.g. in small market restaurants, street food vendors).
- reducing the fly population in waste areas by clearing the area and spraying insecticide at the specific breeding areas.

Some Potential WHS Actions for Cholera Outbreak Control

Table 12. Summary of potential water, hygiene and sanitation actions to reduce the spread of cholera

PUBLIC/COMMUNITY LEVEL	POTENTIAL ACTIONS
WATER SUPPLY	
Existing Water Supply Systems	• Repair pipelines/tapstands • In-line chlorination; batch chlorination • Additional temporary water points
Protected hand-pumps/ springs (wells/boreholes lined)	• Repair handpump/pipe • Repair/ensure sanitary seal • Bucket chlorination of water to reduce secondary contamination in the home due to poor hygiene practices
Existing Trucking Systems	• Chlorination of tankers; training in chlorination; quality monitoring; • Improve efficiency, capacity and/or management of system
Unprotected Water Sources (stream, well, spring etc)	• Organising the stream/river for use – drinking upstream, bathing/washing downstream • Bucket chlorination • Protect fully the spring/well
Where no water supply exists nearby (or not treatable)	• Transport/trucking of water and chlorination
HYGIENE	
Food (markets, street vendors)	• Cooking – food should be well cooked and served hot • Storage – protected from contamination/flies • Handling – hand-washing before preparation/eating • Washing – promote safe dishwashing after eating (3 bucket system) • Distribution of soap
Excreta Disposal	• Promotion of containment in existing or temporarily provided facilities/sites • Provision of hand-washing (with soap or chlorinated water) at public toilets
SANITATION	
Excreta Containment	• Mobile sanitation cleaning teams – residential areas or markets • Emergency public latrines (markets, schools, gathering points) – must ensure cleaning and closure at end of epidemic • Keep exiting public latrines clean
Solid Waste Management	• Support to existing system to ensure proper functioning • Clear existing waste public health hazard • Spray insecticide on waste where flies are deemed a nuisance (only in CTCs) or are a major concern as a significant transmission route
Waste Water	• Clearing of drains – ensuring free flowing, removal of obstructions • Construction of temporary channels
Burial Practices	• Disinfection of cholera corpses and plugging of orifices with cotton in a 2% chlorine solution (Note: only effective for short period) Bury as soon as possible • Discourage funeral feasts until the end of the cholera outbreak (or limit size)

HOUSEHOLD LEVEL	POTENTIAL ACTIONS
HYGIENE	
Water	• Distribution of appropriate water storage containers (narrow neck or tap) • Promotion of correct drinking water storage • Promotion of use of highest quality of water available • Promotion of boiling water if appropriate • Bring water access closer to population
Food	• Cooking – eat well cooked and served hot • Storage – protected from contamination/flies • Handling – hand-washing before preparation/eating • Washing–promote safe dishwashing after eating (3 bucket system) • Distribution of soap for hand-washing
Excreta Disposal	• Promotion of containment in existing or temporarily provided facilities/sites • Promotion of hand-washing with soap (or other) after defecation • Distribution of soap
SANITATION	
Excreta Containment	• Assign defecation areas to ensure containment in one area
Burial Practices	• Promotion of safe/adapted funeral ceremonies for cholera deaths • Ensure that those preparing the body do not prepare food • Minimise contact with corpse by mourners • Promote hand-washing with soap after contact (if unavoidable)

4. Public information

Informing the public is an integral and important part of cholera control strategies: the population must be informed of the epidemic and of the measures to be taken, including the importance of early case identification as well as knowledge that case management is free of charge (this is usually the case in most countries when an epidemic is declared).

Consult local authorities to adapt the messages to the local context and to know which media methods are most appropriate in each specific context. Local language should be used; MOH education departments might have material available.

Rumours regarding sources of the disease and individual protection are frequent during cholera outbreaks, especially in areas not previously hit by cholera. Public information should clarify these rumours with specific, adapted messages - aimed both at those potentially spreading false information (e.g. religious leaders, traditional healers), and those who may receive it. For such rumours, it is important to coordinate with local authorities before discussing with target groups.

What information?

PRIORITY INFORMATION

- There is a cholera outbreak in (place, area)
- Cholera can cause death if not treated quickly
- Suspect cholera in a patient if …(use case definition as agreed, adapted for the public)
- Go immediately for treatment in (give location of CTC/CTU and ORPs)
- All treatment at the cholera structure is free of charge

Transmitting the messages: how?

Coordination of health promotion is a key factor to ensure correct and consistent information. Information dissemination should occur at national and regional level.

- Health education messages should be spread at community level and use clear, simple language incorporating suitable local expressions.
- Any communication must attract attention so that people will make the effort to listen to /read it.
- Messages should be simple, consistent over time and limited in number (no more than 3 messages at once).
- All media are appropriate: television, radio, newspapers, posters, pamphlets, meetings and discussions.

Where?

In any gathering point such as local restaurants, private pharmacies, schools, religious settings, market, etc.

Who?

Outreach workers can be assigned to cholera information/promotion. Also staff in cholera treatment centres should transmit health messages before discharging patients.

Table 13. Summary of public information targets and methods

Communication method	Target Population	Interlocutors	Comments
Mass Media: Posters, Radio, TV	Non-specific; population with access to the media	Authorities, radio and TV groups	Simple messages only: awareness raising
Public Meeting	Religious groups, neighbourhood meetings, schools	Religious leaders, neighbourhood or school heads	Awareness raising; specific change behaviour targeted
Small Group Meeting	Neighbourhood/block meetings, market vendors, fishermen, water vendors, religious leaders, those working in washing areas	Sanitary officers, neighbourhood representatives, market supervisors, outreach workers	Target vulnerable group or influential group; can influence knowledge and practices; allow questions and answers.
Individual Visits	Religious leaders, traditional doctors/ healers, funeral organisers	Health workers, authority representatives	To enable key persons to have influence on risk traditional practices
House-to-House	Household hygiene responsible	Outreach workers	Needs resources, takes organisation and time: can be effective if well planned

5. Prioritisation of interventions

Surveillance based in health structures will provide weekly incidence rates and will show the extension of the epidemic by place and time (see chapter 2). In addition, *specific surveys* and/or *mapping* can be carried out in order to identify potential sources of transmission and to anticipate the spread of the disease: this will allow adapting the response according to priority areas, while also considering the available resources and the expected impact of an intervention.

Methods

- Assign someone specifically for surveillance.
- Start as soon as possible: impact will be greatest when the case curve is ascending.

A) Mapping method

- Locate on the map main risk factors.
- Locate cases on the map; determine attack rates for each defined area.
- Map cases to differentiate weeks to visualise spread of disease (e.g. different coloured pins, or different maps)
- Identify priority areas as shown below.

Water

- Streams, rivers and lakes
- Water pipelines and tapstands
- Water trucking sources/locations
- Boreholes and wells: mark if protected/not

Sanitation

- Types of excreta disposal and approximate coverage per area (sewage system, septic tank, latrines)
- Indicate if no excreta disposal system
- Sewage system pipelines and outlets
- Drainage canals

Infrastructure

- Communication lines: road, rail, rivers, sea
- Markets
- Ports/harbours/fishing areas
- Other public gathering points

Potential Events and Sources of Transmission

- Religious ceremonies marriage, funeral, meetings etc
- Commercial production of dairy products: ice, ice-cream, yoghurt etc
- Local beer/wine production: indicate source of water, storage, serving

• Initially prioritise for mapping:

- for camps/closed areas : water sources
- for urban areas: water network coverage and condition in different areas, water trucking systems, sewage systems
- for rural areas: routes and methods of communication and transport, types of water supply, specific water sources if few.

B) Rapid health risk survey

This rapid survey concentrates on public structures and on a few households, in one or several areas identified as priority areas (see risk factors, chapter2.). This will give initial information on which to base decisions regarding the first priority actions. Greater detail can be addressed later and actions refined.

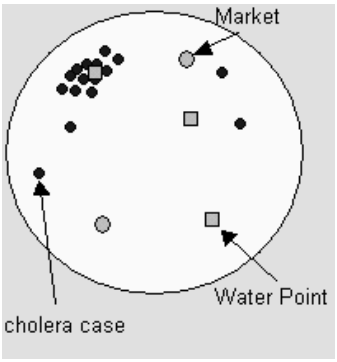
Where possible, experienced public health technicians and community health workers should be used to carry out the survey. It will also be necessary to co-ordinate with the local authorities in order to gather the information quickly. For household surveys, female members of the household should be interviewed if possible; in such cases, female public health technicians/community health workers could carry out the survey in some areas.

The responses to the survey can be categorised in terms of "minimal, possible or major health risks" (annex 6, p. 96). Major health risks automatically become priorities to be addressed first; "possible health risks" will be considered later, depending on time and resources available.

Interpretation and recommendations

The pattern of the epidemic, shown by locating cases on a map and following their weekly evolution, can give an idea if the outbreak is most likely due to a common source or linked with a person to person transmission. When many cases are regrouped in a specific area, try to see what setting is potentially responsible (e.g. unprotected well, market, slaughter area, etc.). If cases are spread (dispersed pattern), person to person transmission could be the cause: check communication lines/routes.

Figure 9.Clustering around a point source of contamination – e.g. water



Timing of Responses

Where attack rates have already reached their peak the impact of preventive interventions is likely to be low. Targeting areas that have not reached their peak could have much greater impact in reducing the spread of the disease.

6. Mass chemoprophylaxis

Mass prophylaxis does not stop cholera transmission: one dose protects only for one week and several doses would be necessary until the end of the outbreak: this is not feasible and never proved efficient. In addition it can create a false sense of security.

In specific situations however, antibiotic prophylaxis is considered:

- to protect health personnel with one dose every week until the end of the outbreak
- to stop transmission in a geographically limited area such as a therapeutic feeding centre or a prison. In such specific cases, giving one dose of antibiotic and implementing strict hygiene measures can stop vibrio transmission.

  For treatment the choice of antibiotic (and dosage) depends on antibiotic sensitivity results, but for prophylaxis only Doxycycline has potential impact as it requires a single dose (provided there is proven sensitivity).

7. Vaccination

There are a variety of vaccines currently being tested, but their protective efficacy is variable and there are some feasibility constraints, including the need to have two doses before getting protection for some of these new vaccines.

The killed whole-cell parenteral vaccine, available since the 1960s, showed moderate efficacy (50%) of short duration (3-6 months). It required two injections two weeks apart and produced side effects. *WHO no longer recommends this vaccine*.

Available vaccines and their efficacy

- **WC/(r)BS** oral vaccine, is a killed whole cell vaccine available since mid-1980. It consists of 1 mg recombinant cholera toxin B-subunit added to heat-killed classical Inaba and Ogawa, formalin-treated classical Ogawa, and formalin-treated El Tor Inaba.
  It must be given with 150 ml buffer (bicarbonate) for adults and 75 ml for children, because of instability of the B-subunit in gastric acid. The current recommendation is **two doses two weeks apart**. It is well tolerated. As a killed vaccine, its risk in pregnancy is likely to be minimal.
  Protective efficacy (PE) was reported 85-90% during the 6 months after the second dose, among people more than 2 years old.
- **WC oral vaccine** is a killed whole cell vaccine without the B-subunit. It has an increased concentration of El Tor biotype and is both cheaper to produce than the WC/rBS vaccine and does not require buffer for administration. Same regimen: **two doses, two weeks apart**.
  But protection (PE) is lower than with WC/rBS : 60% after 10 months
- **CVD 103-HgR live**, oral attenuated vaccine is given as a single dose, with buffer. Studies reported good tolerability. PE is lower than for WC-BS and WC forms.
- **Killed vaccines** and live attenuated vaccines against serogroup O139 are being tested.

In summary, for the effective vaccines (WC/Bsub unit or WC alone), their use implies a two-dose regimen, two weeks apart. In the objective of interrupting the course of an epidemic, this 2-dose regimen is a serious limiting constraint. Longer term protection is not high enough to promote such vaccines as a prevention measure.

Indications

- Treatment of patients remains the basis of controlling cholera epidemics
- Mass vaccination is not an effective control measure, once the epidemic is declared
- New vaccines have a too short protection time to be used routinely in endemic zone.
- New vaccines could be used to protect people arriving from a non-endemic area into an endemic area for temporary protection

> Oral cholera vaccine could be considered in identified high risk zones before next outbreak. However, it should be never the only measure!

8. Specific situations

Prisons

Cholera can spread rapidly in a prison because water is scarce, hygiene and sanitation are extremely poor and population density is high.

If a hospitalisation facility is available, it should be transformed into a CTU. For the entire prison, implement measures regarding water, hygiene and sanitation.

If no hospital facility is available (no space, no authorisation), patients must be transferred to the outside treatment facility. It can be difficult to get approval for police surveillance of these patients, who will possibly be chained and who cannot be accompanied. Therefore it is important to discuss with authorities in order to explain mortality risk and epidemic spread.

Mass chemoprohylaxis can be justified in such small, confined area if the vibrio causing the outbreak is sensitive to doxycycline.

Feeding centres

CFR among malnourished, immune-depressed children can be high. Therefore chemoprophylaxis, single dose, is justified for all children and their mothers present or admitted in the centre. Doxycycline (check sensitivity results) can be used even in small children over 1 year for cholera prevention, as it is only one single dose.

⚠ **Take into account the systematic antibiotic treatment given upon admission for the severely malnourished children: this might interfere with laboratory findings.**

⚠ **Laboratory samples should be taken among children who did not yet receive systematic antibiotic treatment (Cf. nutrition protocol); otherwise, indicate which antibiotic was given, dosage and duration; in addition, it is advised to take samples among adults (staff or mothers) if appropriate.**

Hygiene and sanitation measures must be implemented.

Other gathering places

Other gathering areas include vaccination centres, food distribution places, schools, etc. As much as possible, safe water and latrines must be put in place, especially in health structures where the population may be vulnerable.

Key points

- Access to clean water is crucial to reduce the epidemic spread
- Hygiene promotion is essential; pay special attention to public gatherings and funerals
- Discuss the feasibility of sanitation measures
- Organize public information

Chapter 7.
Monitoring and evaluation

Evaluation is necessary to adjust interventions and to plan further actions. In addition to data collected for regular monitoring, other information is needed.

> Overall interpretation of findings and comparison with known standards are crucial.

1. Practical points

Demographic data provide denominators for calculating incidence/attack rates.

- Agree with major partners for population figures that will be used. Once agreed, stick to these figures until the end of the outbreak unless a new influx or exodus occurs.

Collect data in separate cholera registers or files (Annex 3, p. 93), in all health facilities (CTC, CTU and ORP). Few variables are needed:

- number of new cholera cases per age group (< 5 years and ≥ 5 years)
- number of deaths due to cholera per age group (< 5 years and ≥ 5 years)

⚠ **Be sure not to count referred cases twice.**

Timely reporting is essential, as epidemics evolve quickly and adapted actions are based on available data. Transmit either by radio or telephone. Later, a written report can be sent for confirmation of the orally transmitted information. A copy of any declaration (written or oral) must be kept by the facility.

- To facilitate timely reports, forms, registers and definitions must be *standard for all* facilities.
- *Data collection, reporting and analysis are done on a weekly basis*. However, at the beginning daily collection and reporting may be needed.
- *All data* should follow the same reporting weeks (i.e. decide if weeks start on Monday or Sunday).
- Sometimes, data need retrospective updates: errors in collection or reporting can occur, or cases may be reported late. If late case reporting occurs, check that cases are registered in the week they occurred, not in the week they were reported.
- When in a certain period no new cases occur, this needs to be reported as well. This is called **zero reporting**: it is important to distinguish between zero case and missing data.

Analysis by time, place, and person should be done at each level and feedback provided: all staff involved in cholera response should receive regular updates, as well as all involved authorities.

- In an open setting MoH will define a central reporting site and a reference person. In camps, one agency will be in charge of centralising data.

2. Results and interpretation in a treatment facility

Weekly numbers and evolution

Numbers of cases and deaths per site and per week, Attack rates, Incidence rates, Graphs (see chapter 2).

Quality of care: Case fatality rate and time of death

Targets: CFR < 2% in refugee camps, < 5% in open settings and zero deaths 4 hours after admission

CFR IS THE KEY INDICATOR OF CASE MANAGEMENT QUALITY.

Time of death after reaching the CTC is important: if patient dies during first hour of arrival, this reflects late arrival (e.g. access problem). In principle if case management is adequate, no death should occur more than 4 hours after admission, but even if late arrival occurs, rapid initiation of IV rehydration leads to quick recovery.

In CTCs and CTUs, always record date and hour of entry and exit (exits include deaths).

IF CFR > 2% = CASE MANAGEMENT PROBLEM

- Check protocols, including quantity and rapidity of Ringer Lactate administration.
- Check medical files, age, sex, address, and time of arrival. Review files of dead patients as well as other patients. Check regular monitoring: how many times was the patient's condition checked after admission?
- Discuss the circumstances of each death with the staff
- Verify for other concomitant diseases: is there a high number of acute pulmonary oedema? Infections?
- If most deaths occur at night, check for problems in staffing and patient monitoring. Reorganise night duty.

IF DEATHS WITHIN 4 HOURS OF ADMISSION = ACCESSIBILITY AND/OR CASE MANAGEMENT PROBLEMS

- Check date and time of arrival, compare with date and time of death
- Assess delay before admission:
  - Check address and location: if many persons come from the same area, discuss opportunity to make a new CTU or to organize ambulance systems.
  - Check if population has been well informed about existence of treatment facilities
- Monitor staff reactivity upon admission: rapidity of screening, rapidity of hospitalisation of severe cases, rapidity of IV rehydration
- Check if protocols are correctly implemented
- If nocturnal deaths occur, supervise during several nights. If needed, add staff during night round.

Consumption

Average needs per adult patient = 8 – 10 litres Ringer Lactate, 10 ORS bags

Ringer Lactate

There is a tendency of *over-prescription* of IV treatments: IV prescribed for non-severe cases.

Under- dosing of IV fluids per patient can occur (shortage?).

ORS

Reduced use = rehydration started too late or quantity administered is too little; compare with the quantity of RL used for the same patient.

Antibiotics

No standard is available. However, there should not be too many antibiotics used in a CTC/CTU. If consumption is high, check medical files and verify quality of medical examination.

Case load

Number of admissions / week = cf. expected Attack rate
Bed occupancy rate > 80% – Length of stay = 2 days in CTC, 3 days in CTU

Number of admissions: compare Attack Rate with standards (see table 2)

Use for planning purpose: adapt supplies, staff requirements, etc.

If bed occupancy rate < 80%

- Less needs = end of epidemic? Are there fewer cases in a specific geographic area while epidemic continues in another district? If so, adapt staffing and location of CTC/CTU
- Under utilisation = lack of information, accessibility problem: analyse together with delay before arrival and time of death.

If bed occupancy > 100% = Overload

- Increase number of beds or open another treatment facility.
- Check average length of stay

If length of stay >2 (or 3) days

- If there is a high proportion of severe cases, improve active case finding, increase number of ORPs.
- Check if admission criteria (screening) and treatment protocols are well followed
- Check for other concomitant diseases

Table 14.1. Summary of indicators and their interpretation in a CTC

Indicator	Target	Interpretation	Analysis	Action
CFR	< 2% refugee camps < 5% open settings	Quality of care	If >2/5 %, check: • Protocols • Medical file, monitoring • Any other disease • Did death occur at night?	• Review case management • Protocols • Train staff • Reorganise staff duties/ roster • Check supplies
Time of death	No death 4 h after admission	Quality of care Accessibility	If many deaths during first 4 hours check: • Delay between onset/ arrival • Address, location • Staff reactivity • If this happens during night • Protocol implementation	• Public information • Strengthen early case detection (CHW) • Reorganise staff if needed • Train staff
Consumptions	RL: 8–10 litres ORS: 8–10 litres *(in adults)*	Quality of care Effectiveness	• RL low: under prescription • RL high: over prescription Check shortage ORS low: check why more severe cases	• Review supplies and protocols • Train staff
Bed Occupancy	100%	Effectiveness Accessibility	If < 80%, check: • Decrease AR = end of epidemic? • AR remains high = under utilisation	• Check other districts/ areas and reorient • Strengthen public information (check delay before admission)
Length of stay	2 days in CTC 3 days in CTU	Effectiveness Quality of care	If longer, verify: • Active case finding • Admission criteria • Discharge criteria • Treatment protocols • Other diseases	• Strengthen public info/ CHW • Review protocols and train staff

Overall evaluation

Target: CFR in refugee camps/big cities < 2%, in open settings < 5%

If CFR is high in health facility:

- Insufficient treatment facilities
- Access to care is poor
- Case management is inadequate

If CFR is high in community (deaths outside CTC/CTU):

- Population is not well informed
- There is a lack of confidence, rumours, panic
- There is a lack of accessible treatment centres

Accessibility / acceptability

- Proportion of severe cases reflects accessibility. Check if there are late arrivals and possible reasons for same:
  - Distance/transport problem?
  - Lack of awareness?
  - Insufficient confidence in care?
  - Alternative treatment seeking behaviour?
  - Stigma?
  - Weak population? (Malnourished/exhausted/other illness)
- Review public information strategy and reinforce active case finding (strengthen home visits and community health workers network, seek traditional leaders' support)

Effectiveness of treatment network

- Numbers of referrals from ORP, CTU
- Information from community leaders about cases and deaths occurring in the community without treatment contact:
  - Is information sharing and feedback sufficient?
  - Is input of CHW clear?
  - Are public information messages correct?

Resources / inputs for epidemic control

- Number of CTC, CTU, ORP set up in each area/region
- Overall number of persons treated (cases and deaths)
- Consumptions per patient: number of RL litres, ORS bags, water, chlorine
- Number of health education sessions, radiobroadcasts, etc
- Overall budget.

Table 14. 2: Summary of indicators and their interpretation, at global level (district, province)

Indicator	Target	Interpretation	Analysis	Action
CFR	<5% in open/ rural settings		If CFR higher, check for: Insufficient treatment structures? Poor access to care Poor case management	Review location and distribution of structures Increase number of structures Review protocols
Proportion severe cases	75% in treatment centres	Effectiveness Access	If higher, check: Number, type and distribution of treatment centres Late arrival? Check reasons Lack of information?	Review location and distribution of structures Increase number of structures Increase public awareness
Resources/ Inputs	List all resources utilised and needed		Compare with AR, CFR and geographical information	

Key points

- Analyse your data on a weekly basis
- Know the area (map, access, transports)
- Compare with reference values
- If discrepancies with targeted results check the reasons on site: deeper analysis can only be made on the spot.
- Supervisory visits must always ensure that data collection and analysis is correct and must provide on the spot answers if anything is wrong.
- Flexibility and adaptation of the intervention for better results are keys

Chapter 8.

The end of the oubreak

1. When to declare the end of the outbreak

The decision to declare the end of an outbreak depends upon several factors: the number of cases and deaths, the epidemiology of the vibrios and other criteria, as described below.

In endemic areas, the end of an epidemic can be declared before the last case has been reported, as there will always be a few cases throughout the year. The epidemic curve should be compared to non-epidemic years: if weekly incidence falls equal to previous years, the outbreak can be declared over.

In non-endemic areas, declaration of the end of an epidemic is more problematic as it is likely that it will evolve into an endemic situation with continuous sporadic cases.

Another important criteria is when there is an inversion in the age groups with diarrhoea (more children than adults affected).

Epidemiological factors

- A clearly descending curve (decrease of incidence rate), even with sporadic cases, in an endemic area
- No more cases in a non-endemic area
- When all geographical zones covered by CTC/CTUs have already been affected by cholera during this outbreak
- Laboratory findings: laboratory analysis is done every 6-8 weeks in selected places until the end of the epidemic, shown by the absence of vibrio cholerae in repeated samples, or by a small proportion of positive samples.

2. When and how to close a CTC/CTU

The key indicator is when the number of patients is small enough so that patients can be treated in separate wards within the existing health structures.

Managerial factors

- possibility of integration of remaining cholera patients into a regular health structure
- possibility to isolate patients
- staff remains in the health structure

Technical factors

- Spray all doors, floors, walls, stairs, handles, beds etc. with a 0.2% chlorine solution. Wash away after 10 minutes with clean water.
- Wash carefully wearing protective gear, all buckets that have been used for excreta/vomit with 2% chlorine solution and dry them in the sun. It is important to make sure there is absolutely no organic matter/residues remaining (as these can hide vibrio cholera).
- Close latrines and soak-away pits if they were made for the outbreak.
- Burn all mats made with natural materials (e.g. reeds)
- Immerse and disinfect blankets first in 0.5% solution for 10 minutes then wash as usual and hung to dry.
- Unless the CTC is located within the grounds of a medical structure wishing to continue using the waste zone upon closure of the CTC, the organics pit should be refilled, and the sharps filled with concrete (to encapsulate the sharps and to protect future users of the land).

Chapter 9.

Cholera preparedness

1. Objectives

Cholera preparedness creates awareness, designs plans for intervention and prepares coordination in order to optimise the response when outbreak occurs. This includes:

- Identification of cholera task force members (reviving or creating a task force)
- Tasks distribution
- Identification of coordination/supervision agency
- Identification of reference laboratories
- Identification and training of staff
- Stocks planning and allocation (drug, material and transport medium)
- Identification of potential treatment sites
- Designing a public information strategy
- Installation of a suspected case-detection and notification system through existing health structures.

Plans should be written by the task force and should be regularly updated. They are usually organised at country level; each agency should prepare its own internal plan. Background information is necessary:

- History of previous outbreaks
- Maps
- Roads, transport means, distances (in time)
- Population figures
- Organisation chart of the health system
- Health information system
- Climate, seasons

2. When is cholera preparedness appropriate?

> In a country or area at risk, cholera preparedness is *recommended* in open settings and *compulsory* in camps.

Cholera preparedness must be done before the start of the outbreak.

Organising cholera preparedness immediately after an epidemic for a possible future outbreak is not necessarily the best time as staff is too tired and therefore less motivated. However, if there is a request for cholera preparedness at such a time, the advantage is that lessons learned from the recent epidemic can be useful in designing a more appropriate plan for future needs.

3. How to organize cholera preparedness

Create a taskforce

Include members from all departments and sectors: health, water, education, administrative authorities and community leaders (religious leaders, counsellors, elders, etc.)

Draft a cholera preparedness plan

The task force will design a guide and training plan for a quick response. This includes detailed plans on what will be done, where and by whom (with an alternate person if possible), which resources and supplies will be needed. Some specific issues will be decided upon:

- A single, standard case definition
- Means and flows of communication
- A threshold in endemic areas (i.e. the number of cases per week to trigger the alert)
- Treatment protocols
- Identification of a reference laboratory and media for transportation of samples
- Tables, graphs and maps
- Calculations of medical and non medical needs based on expected numbers of cases
- Public information material
- Identification of high risk areas + potential prevention programmes
- Potential sites for setting up CTC/CTU
- Identification and training of staff
- Stock allocation in poor access areas
- Funding possibilities.

Cholera preparedness can also be organized on a smaller scale: district or health facility. An example of a framework is shown below for detailed activity and can also be applied to other levels. When identified, the name of the reference person should be added.

Table 15. Example framework

Activity	Responsible person	Resources/supplies needed	When?
Report cases and deaths	Medical officer	Phone, radio, Notification forms (paper)	As soon as 1 case is suspect
Investigate rumours	Health officer	Motorbike	As soon as 1 case is suspect
Send samples	Laboratory technician	Transport media, forms, transportation to laboratory	Initially: to confirm Later, every 6-8 weeks In any new area suspected
Draw map+ cases	Health officer	Paper, stationery, previous maps	Throughout the epidemic
Bucket chlorination	Water engineer	Chlorination training Chlorine, teaspoons	Throughout the epidemic

Keep preparedness alive

- Regularly check supplies and expiry dates
- Organize refresher courses
- Maintain regular meetings to ensure the role of everyone is well understood
- Include preparedness in annual district plans
- Organise a meeting before expected/ seasonal outbreak

Preparedness and Surveillance

In areas with regular cholera outbreaks, carrying out retrospective surveillance and mapping can help to establish preparations for the future, identifying the most likely affected areas and risk factors. This will assist in terms of:

- identifying target areas for support/intervention
- locating the most appropriate locations for future CTC/CTUs
- identifying sources of cholera and key risk factors in the transmission of the disease to be able to determine outbreak control activities for future epidemics
- determining potential prevention programmes to reduce or attempt to interrupt the next outbreak before it occurs

More recently, particularly for urban areas, geo-referenced maps have been used and incorporated into a GIS/GPS system. This type of system can help in analysing known risk factors in previous outbreaks and therefore support preparedness or prevention activities, as well as accelerate and assist in determining intervention strategies in future epidemics.

Key points

- Prepare before the next outbreak
- Involve all actors
- Keep it alive

Annexes

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Annex 1. Exploratory mission

Objective: Conduct outbreak investigation and assess needs for cholera response.

The team should include one medical person, one logistician with water/sanitation experience and one representative of the Ministry of Health. The team should bring material to respond to the first cases seen during the mission.

If cholera outbreak is confirmed, the team should not stay on the spot but should move to other places for further investigation and should be replaced by a permanent team.

Assess and describe risk factors for outbreak development

- population density
- population movements
- water and sanitation
- trade, harvest
- season

Describe cases and deaths by age group, by day (or week) and by place (see chapter 2)

Draw a map with total number of cases per location

Assess health system

- use evaluation form for health facilities and surveillance (annex 5)
- evaluate staff (number, level of training, organisation and supervision)
- assess condition of buildings which might be used as CTU/CTC/ORP (annex 7)
- describe preventive measures taken
- draw a map with health facilities, transportation routes
- analyse average travel distance of patients

Confirm if it is an outbreak.

- confirm cholera diagnosis of individual patients (case definition)
- collect samples for further diagnosis, typing and drug sensitivity testing
- describe epidemiological trends in diarrhoeal cases and where possible compare with same period in previous year

Formulate recommendations with report

Discuss further steps in coordination with partners

Annex 2. Transport media and testing

2.1. Transport method using filter paper (recommended technique)

Available in KMEDKCHO1 Cholera Kit, for the transport of samples to a medical laboratory

- Open the tube. It contains a filter paper disc.
- Pick-up the filter paper with clean metal forceps (burn the forceps between 2 samplings, to disinfect). A needle can be used for each sample if no forceps are available or to avoid disinfecting between two samplings.
- Dip the paper into the non-chlorinated stools or vomits (Figure a) and re-insert it into the tube (Figure b).
- Add 2 to 3 drops of normal saline solution – NaCl 0.9% (Figure c).
- Close the tube hermetically (Figure d).
- Identify each tube: code or name, date, place of sampling
- Indicate clearly that the research is for cholera.
- In the letter indicate clearly that the filter paper should be used for culture.
- Add basic clinical information and data regarding age and sex of the patient.
- Send to the medical department at ambient temperature or to a national reference laboratory (capital city). If tube is hermetically sealed, the sample can be kept up to 3 weeks maximum.

Note: some national laboratories are not used to process filter paper and alternative medium can be used as described below.

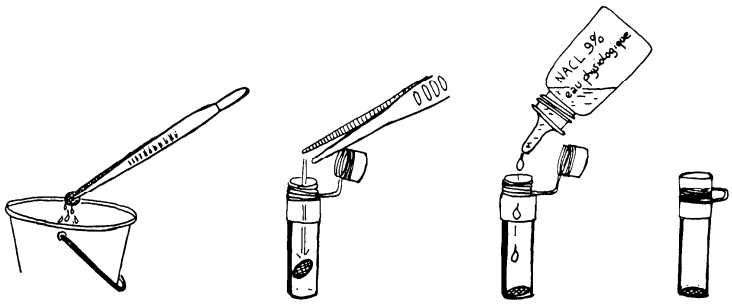


Figure a Figure b Figure c Figure d

2.2. Other transport methods

Vibrio can also be transported by other media. Some reference laboratories have their own media.

CARY BLAIR MEDIUM (THE MOST FREQUENT)

- Half-liquid gel in which a swab is planted after being soaked into the suspect stools.
- Before use: storage in cold chain
- After sampling, transport at normal temperature to the laboratory within 2 days maximum.

PEPTONIC WATER (TO BE AVOIDED)

- Hyper salted liquid medium in which the swab is put after being soaked into the suspect stools.

2.3. Rapid diagnosis methods

Cholera confirmation can be done by rapid methods, such as the Sensitive Membrane Antigen Rapid Test (SMART). It is based on detection of O:1, Classical and/or El Tor antigens in the stools. It does not detect vibrio O139 antigens. This test provides a result right at the patient's bed and is reliable (98% sensitivity, 95% specificity).

However, rapid tests do not provide strain confirmation nor antibiotic sensitivity testing. Therefore, because of high cost and limited use, a rapid test should always be accompanied by other tests for culture/antibiotic testing.

Rapid tests are useful at the beginning of an outbreak. Once the cholera epidemic is declared, it will not be used to test each suspected case.

The kit needs to be kept at ambient temperature (between 18 and 30° Celsius), until expiration date as indicated on the package. The validity period of the test is 12 months only.

Other rapid tests exist with similar sensitivity/specificity.

Annex 3. Cholera register

Name of structure: _____ District/Province _____

Type of structure: _____ Starting date: _____

N°	Date of onset	Date of admission	Name	Age <5	Age ≥ 5	Sex	Address	District	Treatment Plan* Oral	Treatment Plan* IV	Exit Date	Way out** C	Way out** A	Way out** T	Way out** D

Annex 4. Cholera weekly reporting form

Population:_____ week from:_____ to:_____ Province/District:_____

Context rural/urban:_____Collected by:_____Treatment Centre:_____

Season:_____ Risk factors:_____

	N° of new cases*		Total new cases	Deaths		Total deaths	CFR	IR
	<5	>=5		<5	>=5			
D1								
D2								
D3								
D4								
D5								
D6								
D7								
Total								

*How many of the new cases needed IV (Ringer Lactate) rehydration :

<5	>=5

Annex 5. Assessment of health structures

Date:		Name of structure:	
District: Province:		Type of structure:	
Population of the catchment area:		Evaluator:	
Average walking distance for the patients to the structure		Person in charge: Title:	
in hours <5hrs: >5hrs:		Service hours of the structure:	
Context	☐ Rural ☐ Urban	Cholera treatment for free	☐ Yes ☐ No
Regular salary for staff	☐ Yes ☐ No	National protocol applied	☐ Yes ☐ No

Case management		**Hygiene**		
Nb of 001cases present		Nb cases with basin/bucket		
Nb of present cases under	____ IV ____ ORS only	Nb of beds		
Ringer lactate used	☐ Yes ☐ No	**Disinfection**		used
ORS in reach of patient	☐ Yes ☐ No		Done	Desinfec.
Antibiotics given	☐ Yes ☐ No	Hands	☐ Yes ☐ No	
Type of antibiotic		Vomit & stool	☐ Yes ☐ No	
Space		Latrines	☐ Yes ☐ No	
Nb of rooms for patient/surface	☐ N° ☐ m2	Utensils	☐ Yes ☐ No	
Space for extension	☐ Yes ☐ No	Dead bodies	☐ Yes ☐ No	
For how many beds/surface	☐ N° ☐ m2	Beds	☐ Yes ☐ No	
		Fenced	☐ Yes ☐ No	
Nb Staff present	N° Performance o.k.	Guarded	☐ Yes ☐ No	
Doctor/Medical assistant	☐ ☐ Y/N	Crowd control	☐ Yes ☐ No	
Nurse/nurse assistent	☐ ☐ Y/N	**Water**		
Cleaner	☐ ☐ Y/N	Source		
Guard	☐ ☐ Y/N	Transparent	☐ Yes ☐ No	
		Chlorinated	☐ Yes ☐ No	
Material	Stock	Shortage	☐ Yes ☐ No	
Ringer Lactate		Storage capacity:		litres
IV giving sets		Water capacity within 24hrs:		litres
Canula/Scalp vein		**Latrines**		
ORS		Nb of latrines		
Desinfectant		Clean	☐ Yes ☐ No	
Plastic basin/bucket		**Garbage disposal**		
Hand washing container		Pit	☐ Yes ☐ No	
Container for ORS		Incinerator	☐ Yes ☐ No	
Water storage container		Sharp boxes	☐ Yes ☐ No	

Conclusion and Recommendations
(Concerned staff, able to cope, who is allowed to prescribe hygiene needs)

Annex 6. Watsan Risk factor assessment

PUBLIC/COMMUNITY LEVEL			
Risk Factors / Potential Health Risk	**Minimal**	**Possible**	**Major**
Water Quality / Water Treatment Station			
Do the processes give turbidity ≤5 NTU	❑ always	❑ sometimes	❑ rarely
Do the processes give FRC≥0.2mg/l	❑ always	❑ sometimes	❑ rarely
Are there interruptions of supply water point	❑ no	❑ irregularly	❑ frequent
Measurable Free Residual Chlorine (FRC) at tap/water point	❑ >0.2mg/l	❑ 0.1-0.2mg/l	❑ nil
Is the color or turbidity different to normal?	❑ no	❑ sometimes	❑ yes
Water point is exposed to contamination? (broken apron/seal; leaking/broken pipes; promiscuous defecation within 10m; standing water around point)	❑ no	❑ some	❑ a lot
Are there latrines/sewers/septic tank within?	❑ >30m	❑ 15-30m	❑ < 15m
Physical/chemical/bacteriological – where test possible			
pH of water	❑ 5-7.9	❑ > 8	
Turbidity of water	❑ 0-5	❑ 6-20	❑ >20
Nb of thermotolerant faecal coliforms/100ml	❑ 0-10	❑ 11-50	❑ > 51
Nb of litres produced per day/possible/day/	❑ >15	❑ 10-15	❑ 0-9
Average distance to collect drinking water	❑ 0-100m	❑ 100-500m	❑ >500m
Hygiene: Food – Markets, restaurants, etc.			
Is food served hot, freshly cooked and stored in a hygienic manner	❑ largely	❑ sometimes	❑ rarely
Is hand-washing available to customers	❑ largely	❑ sometimes	❑ rarely
Do customers use available hand-washing	❑ largely	❑ sometimes	❑ rarely
Is food sold off the ground?	❑ rarely	❑ sometimes	❑ largely
Sanitation			
Excreta Disposal			
What type of excreta disposal do most households in the community practice?	toilet & sewer ❑ septic tank ❑ pit	direct to ❑ drainage ditch ❑ canal	direct to ❑ water course ❑ open ground
Is there evidence of open defecation?	❑ none	❑ some	❑ a lot
Is there evidence of overflowing latrines, septic tanks, broken sewer pipes?	❑ no	❑ few	❑ a lot
If there are public toilets, are they kept clean?	❑ largely	❑ sometimes	❑ rarely
Waste			
Is there a central waste collection service working ?	❑ yes	❑ sometimes	❑ no
Is waste disposed away from human habitation?	❑ largely	❑ sometimes	❑ rarely
Do people enter into waste (recycling)?	❑ rarely	❑ sometimes	❑ usually
Flies are a potential hazard for transmission of cholera	❑ minimal	❑ possible	❑ major
Drainage			
Does a basic drainage system exist?	❑ yes	❑ partial	❑ no
Do people use drainage water for domestic/ personal purposes?	❑ rarely	❑ sometimes	❑ largely
Do the drains overflow (in rainy season)	❑ rarely	❑ sometimes	❑ largely

Is the final destination of drainage matter away from human habitation	❑ largely	❑ sometimes	❑ rarely
Disposal of the dead			
How are bodies disposed of?	❑ buried ❑ cremation	❑ river ❑ at home	❑ other (state) _____
Do ceremonial practices mean that family/friends must come into contact with the body?	❑ no	❑ sometimes	❑ always
Does disposal of the body involve open transportation?	❑ rarely	❑ sometimes	❑ largely

HOUSEHOLD LEVEL

Risk Factors/Potential Health Risk	**Minimal**	**Possible**	**Major**
Water			
Different water sources available and used – tick only those appropriate	Drinking	Cooking	Bathing/ Washing
Good protected spring or well	❑	❑	❑
Tap or system	❑	❑	❑
Water Vendors	❑	❑	❑
Lined well with rope and bucket	❑	❑	❑
Unprotected spring	❑	❑	❑
Stream	❑	❑	❑
Lake	❑	❑	❑
River	❑	❑	❑
Water – Quantity			
Nb of litres produced per day/possible/day/	❑ >15	❑ 10-15	❑ 0-9
Average Distance to collect drinking water	❑ 0-100m	❑ 100-500m	❑ >500m
Hygiene			
How is drinking water stored in the home?	❑ jerrycan/ narrow neck	❑ bucket with lid	❑ open bucket/ basin
How is water removed from the recipient?	❑ pouring	❑ hygienic cup	❑ any cup
Does the recipient look clean?	❑ yes	❑ partially	❑ no
Do people have access to soap?	❑ yes	❑ sometimes	❑ no
Do people wash hands after defecation?	❑ usually	❑ sometimes	❑ rarely
Do people wash hands before food preparation?	❑ usually	❑ sometimes	❑ rarely
Do people wash hands before eating?	❑ usually	❑ sometimes	❑ rarely
Is hand-washing done in shared water?	❑ rarely	❑ sometimes	❑ usually
Do people use the highest quality of water available?	❑ yes	❑ sometimes	❑ rarely
Do population use available excreta disposal facilities?	❑ mainly	❑ 50-50	❑ rarely
	Minimal Health Risk	Possible Health Risk	Major Health Risk

The survey is to be carried out in specific areas that have been identified in the initial surveillance and mapping of the cholera cases (see Surveillance chapter). However, depending on the context, there may be particular at-risk areas or at-risk groups (of the population) within the area being surveyed, which may be useful to prioritise where time is limited (e.g. fishermen, the harbour, washing areas). The survey covers generally the most significant issues in water, hygiene and sanitation that may be potential primary or secondary transmission routes. It is therefore useful to adapt the survey to the context of the epidemic if there are other important potential risk factors.

Other Issues that may be of importance to note when surveying an area: production of dairy products (yoghurt, ice-cream, etc.); local beer/wine production; source of water, storage, serving; movement of goods/food on rivers, roads etc; future public gatherings, marriage, funeral, meetings, etc.

Annex 7. Criteria for building a CTC/CTU

7.1. Using existing buildings: advantages and disadvantages

Building type	Advantages	Disadvantages
Temporary structure (to build)	Location is adapted, decided ad hoc Isolation (from town) Does not occupy other buildings	Takes time to build Needs resources + staff Access may be difficult
Tents	Location is adapted Isolation from rest of town Adding extra tents is possible	Hot No concrete floor Hygiene difficult to maintain
Health facility	Staff available Concrete floor Place is known by patients who come directly to seek treatment	Can disrupt normal health service function Isolation from other patients difficult or impossible
School	Available Big size, various rooms Easy to adapt, separate rooms Latrines available Concrete floor	Education is blocked
Warehouse	Big size Easily adaptable and available	Poor ventilation, very hot No separations, no light Blocks storage capacity of village/town
Private house		Too close to other buildings Small Last choice, if only available option

For the set up of a CTU, following could be assist by communities:

- fencing of the building
- digging or improving existing latrines
- digging of garbage pits
- providing food for staff
- assigning volunteers to assist in the CTU
- providing water

7.2. Summary of criteria for selecting a cholera treatment facility

POSITION

- Do not select low ground or depression. High ground with good drainage is the best option.
- Consult local leaders about the most appropriate spot

Distances

- to market = 100 m
- to water source = 40 m on sandy soil, 15 m if clay
- to other buildings and especially dwellings = 100m

Floor

- concrete floor, or, if temporary structure, a plastic sheeting cover

Ventilation

Access

- Trucks are needed for water, food, etc., therefore a good road is important.

Space and surface

- The space should be adequate for future expansion if required.
- Ward capacity = 2.5 m^2 per patient + 1 attendant
  - a 29m2 tent can accommodate 10 patients + attendants
  - a 82m2 tent can accommodate 30 patients + attendants

Walls and floor

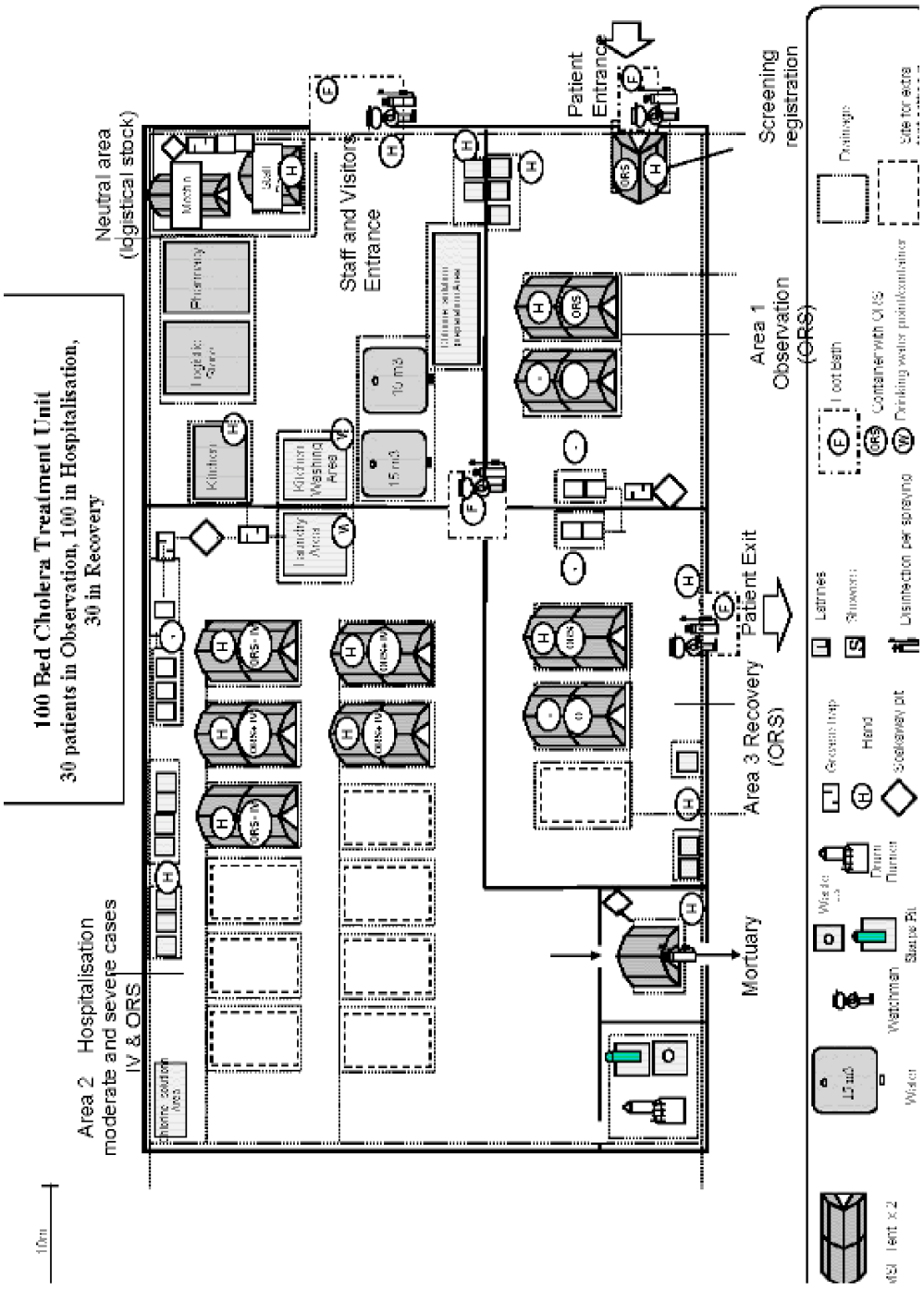
- Cement/concrete floors and stone/cemented walls are preferable.
- If tent, cover the ground with plastic sheeting to facilitate cleaning.

Light

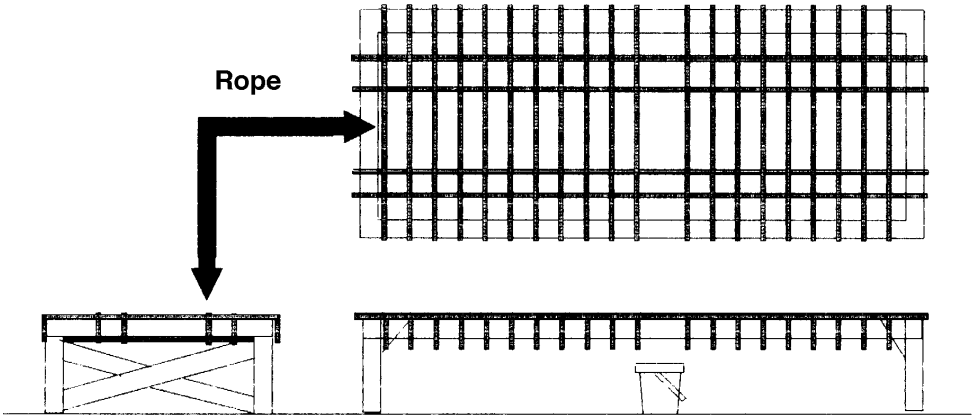
- Hospitalisation wards need good light (placing an IV line with a flashlight is not easy!)
- All available light sources are needed: kerosene lamps, solar lamps, generator, etc.
- Ensure regular supplies of kerosene, fuel, etc.
- For a CTC a generator is advised, even if there is local electricity, as a back up.
- For a CTU, electricity/generators can be replaced by kerosene lamps for general lighting and individual torches for the medical staff on night duty.

Annex 8. Organisation of a CTC

8.1. Overall map of a CTC



8.2. Beds



- Think about the height of the bucket.
- Plait with the rope leaving a hole for passage of the stools. Consider 25m of rope (5mm Polypropylene – 2000 m in the kit cholera KMEDCHO03-) or cut tubes of car tires.
- Cover the bed with plastic sheeting or reinforced plastic mats with a hole pierced for the stools. It is possible to use natural mats, but it would be difficult to clean after each patient. Therefore, they should be used ones and then incinerated.
- Think about reinforcing the beds' legs.

PIERCED MAT

When impossible to obtain/make beds, the mats should be put directly on the floor, over a hole (20 x 30 cm). Dug one hole for stools and one for vomit.

Annex 9. Water, Hygiene and Sanitation in Cholera Treatment Facilities

Included here are the principles and standards that are recommended for water, hygiene and sanitation activities in cholera treatment facilities. These are summarised in an example for a CTC of 100 beds, 160 patients (see CTC map annex 8.1). Additional detail is given in annex 9 and 13 on chlorine solution preparations, chlorine monitoring and bucket chlorination. However, supplementary information may be needed and consultation should be made with the appropriate documentation (e.g. Public Health Engineering, MSF 2003).

9.1. Principles and Standards

Water Supply

Water Quantity

- CTC/CTUs – 60 litres/patient/day
- Oral Rehydration Points – 10 litres/patient/day

Water Quality

- Water for consumption in a CTC/CTU should be chlorinated to give a residual of:
  - 0.2-0.5 mg/l where pH < 8 or
  - 0.4-1 mg/l where pH is ≥ 8
- Water can only be effectively chlorinated if turbidity is < 5 NTU and up to 20 NTU for minimum periods in times of emergency. Methods to reduce turbidity (physical/chemical), to less than 5 should be sought as soon as possible, but are beyond the scope of this guideline.

Water Storage

In principle, the quantity of water stored in a cholera treatment centre should be sufficient for 3 days autonomy.

Nb of Patients	Daily Needs	3 Days Storage	Typical Type of Tank
10	600	1,800	$2m^3$ bladder
50	3,000	9,000	$15m^3$ bladder
100	6,000	18,000	$15m^3$ bladder+ $5m^3$ bladder
200	12,000	36,000	2 x $15m^3$ bladder + $5m^3$ bladder

9.2. Chlorine solutions for Disinfection

Preparation and use of a chlorine solution in health care settings with clean water

Concentration solution in % of active chlorine	**Preparation [1] with HTH at 65%**	**Indications**	**Procedures**	**Remarks**
0.05%	0.75 gr for 1 litre 7.5 gr for 1 litre	• washing of hands and skin • rinsing dishes • washing of new patients on arrival, possibly with a spray	Clean and dry hands, then rub with chlorine solution during 30 seconds. Let dry.	0.05% solution is stable for 24 hours and should be renewed every day. Never mix the solution with a detergent.
0.2%	3 gr for 1 litre 30 gr for 10 litres	• disinfection of floors • spraying of homes of patients (floors, beds, latrines) • spraying of beds in CTC • foot-sprayer at all entrances • disinfection of clothes by soaking for 10 minutes, rinsing and washing afterwards	First sweep the floors and wash with soap and water. Then apply the chlorinated solution, leave it in contact for 10 minutes, rinse and let dry.	Rinse, wring and dry the floor cloth after use 0.2% solution is stable for 24 hours and should be renewed **every day**. **Never mix the solution with a detergent.**
		Foot bath (considering it's limitation)	Pour the solution in the footbath. Everybody entering or leaving the infected area must dip their feet in it	0.2% solution used in footbath should be replaced at least **twice a day**.
2%	30 gr for 1 litre 300 gr for 10 litres	• disinfection of vomit and faeces (to be used in excreta buckets) • disinfection of corpses.	Spray directly the body with the solution, after blocking all orifices and then place the body in body bag.	2% solution is stable for one week if stored properly. **Never mix the solution with a detergent.**

For preparation of these chorine solutions, see annex 10.
For preparation of safe drinking water, refer to the MSF handbook *Public Health Engineering in emergency situation and annex 15*

Quantity of chlorine generating product per patient per day for all needs (including storage/preparedness): approximately 100g of HTH/patient/day

Therefore, for a minimum of 7 days, supply in a CTC with 100 beds (160 patients) will be 112 kg of HTH (High Test Hypochlorite, 65 – 70%).

Preparation and Storage of Drinking Water and Disinfecting Solutions

It is advisable that only one person is in charge of preparing the different solutions per shift.

Often 125 litre containers with taps are used in the centres. These should be clearly marked with the solution that it is used for, to avoid accidents.

Different coloured containers can also be used to call attention to the different concentrations.

All containers used should be fitted with a lid and tap for hygienic access to the solutions.

Additional quantities of all the solutions are stored in the neutral area.

9.3. Hygiene

Movement Through the Facility

- Fence the cholera treatment centre and place a guard at entrance/exit:
  - to indicate the centre (physical barrier)
  - to show people were they are allowed to enter
  - to make sure that not everyone enters the center
  - to control that everybody follows hygiene rules
  - to avoid that animals have access to the centre.
- Patients and caregivers should enter through the patient entrance where their feet/shoes will be disinfected with a 0.2 % solution by a sprayer preferably or footbath
- They will then be asked to wash their hands upon entry at the container provided
- The vehicle bringing the patient should be cleaned and disinfected before leaving the centre with 0.05% solution. Advice should also be given to caregivers on how to clean soiled areas of their houses
- Soiled clothes should then be removed in the shower area and patients (via caregivers) provided with 0.05% solution for this initial bathing, and clean gowns provided. Clothes will then be taken to the laundry area for washing in 0.2 % solution.
- On moving through the different areas, feet should be sprayed or footbaths used
- Hand-washing is provided in all wards, especially for medical staff before, between and after attending to patients.
- Staff and caregivers should enter through the neutral area with the same process of spraying/footbaths and hand-washing.
- Staff and caregivers should change or put on protective clothing
- Staff should consume food in the staff room, washing hands first.

- On leaving the centre, protective clothing should be removed and left in the basket/area provided
- Hand-washing should be performed and feet sprayed on exit from the centre

Sprayers and Footbaths

The most important time for spraying of feet is upon entrance and exit from the centre to avoid contamination in and out of the centre. The spraying of all areas is to make staff and visitors aware of the contamination they are potentially bringing into the different areas.

Footbaths are rather inefficient as disinfectants, as they become dirty very quickly. Therefore, spraying is preferred. Footbaths should be trays with material/sponge soaked in 0.2 % solution and changed twice per day or when the material appears dirty. Spraying and footbaths can also be important psychological barriers between the outside and the centre

It is important to note that after chlorine solution preparation, the calcium deposits at the bottom of the container should not be used, particularly in the sprayers, as this will cause blockages. Sprayers adapted to resist strong concentrations of chlorine should be used.

Bathing Areas

- 1 shower room per 50 patients or caregivers /minimum 2 (male/female) in each area of the centre
- Minimum 2 shower rooms (m/f) for staff in neutral area
- Bathing areas should be connected to a grease trap and a soakaway that is contained inside the CTC/CTU.

The patient shower areas should be big enough for a minimum of 2 persons (caregiver and patient). The use of a sprayer may be useful for cleaning patients and initially soaking clothes on arrival. Care must be taken to preserve the dignity of patients during this process.

Hand-washing

Located at all latrines, all tents (patient and administrative), kitchen, mortuary, waste area

Concentration: 0.05% chlorine solution

Hand-washing is one of the most effective ways to prevent the transmission of cholera amongst patients, caregivers and staff. Hygiene rules must be set for working in the kitchen (e.g. for washing hands before preparation or handling of food). All drip trays for hand-washing should be emptied into the soakaways or latrines.

PROMOTION OF HYGIENE IN THE CTC/CTU

Hygiene should be promoted among the staff and caregivers to make them aware of the rules related to hygiene and the dangers of not adhering to them. To ensure this is done, a hygiene promoter should be employed.

- Promotion should concentrate on staff and caregivers in the CTC/CTU, emphasising:
  - How to clean the patient/caregiver's home that has been soiled with excreta/vomit
  - Hand-washing after dealing with each patient or after handling contaminated items
  - Hand-washing after defecation and before handling or eating food
  - Changing into protective clothing upon entering the area. On leaving, protective clothing should be removed in the CTC/CTU for washing on site and not taken home
  - Only kitchen staff allowed into the kitchen area
- Promotion for patients and caregivers prior to discharge should emphasise:
  - Any neighbour/family member should seek early treatment at the centre upon presenting symptoms (as defined in the case definition used)
  - Washing hands after defecation and before handling food
  - Using the cleanest available water, and hygienic storage of water in the home
  - Eating food hot
  - Other issues related to transmission in the present cholera epidemic

PROTECTIVE CLOTHING

Protective clothing should be made available for all staff working in the centre, including boots and overalls that can be easily removed before leaving the centre.

Gloves should also be made available for those manipulating blood, chlorine and the chlorinated solutions.

Gowns or clothes should be made available for patients on hospitalisation after bathing.

Sets of clothing should also be made available for caregivers and visitors to the centre. These should also be kept and washed in the centre.

FOOD HYGIENE

Strict rules should be set for those preparing and serving food including:

- Upon entering the kitchen (each time), hand-washing must be carried out
- Food must be stored so that it is only handled by kitchen staff
- Only kitchen staff is allowed inside the kitchen
- Only kitchen staff is to serve food
- Dishes should be rinsed initially in a 0.05% solution then washed by normal methods
- Food provided by relatives (in CTUs) should be handled following the same hygiene criteria.

LAUNDRY

The laundry area should be located in the area producing the most contaminated waste and should wash soiled materials from the entire centre. This will include: blankets, gowns, protective clothing.

Where sinks are not available, large plastic tubs will need to be made available. Materials should be immersed and disinfected first in 0.2 % chlorine solution for 10 minutes, then washed as usual and hung to dry.

CLEANING THE FACILITY

Floors of the centre should be made of concrete or covered with plastic sheeting for easier cleaning. Squeeze-mops or similar should be used with 0.2 % chlorine solution to disinfect the ward floors up to 4 times per day, depending on the movement through the wards.

Walls around patients, where not solid, can be cleaned as necessary using 0.2 % chlorine solution in a sprayer, taking care to clean preferably when patients are not around. Cholera beds should be sprayed with 0.2 % chlorine solution as appropriate and between each occupancy.

Latrines should be cleaned several times a day with 0.2 % chlorine solution with mops and or/sprayed. This includes the slabs and the walls up to 1 m (or height of splashes). There is no need to pour additional chlorine into the latrine.

9.4. Sanitation

EXCRETA DISPOSAL

Toilettes/Latrines

> 1 latrine/20 patients or caregivers in Observation/Screening and Recovery, minimum 2 latrines (male/female);
> 1 latrine/50 patients in Hospitalisation (most won't use them), minimum 2 latrines (male/female);
> 2 latrines minimum (male/female) for staff in Neutral area.

Plastic slabs are useful in an emergency as they are fast to install and easy to clean. Toilets should be independent and not connected to the main sewer system (this helps to contain the vibrio cholera).

Buckets for cholera beds

Since most of the hospitalised patients will not be able to use a latrine, buckets (10-15 litres) should be placed under the hole in the cholera bed and at the bedside for vomit. The bucket can be raised on a block to prevent splashing of the surrounding area. A number of buckets should also be provided for the Observation area. Approximately 1 cm of 2 % chlorine solution should be put into the bucket before placement. The bucket may be emptied into the toilet/latrine.

Note : latrines or toilets connected to a septic tank: chlorine will destroy bacterial activities and therefore the natural decomposition. It is preferable empty the buckets with 2% chlorine solution into a temporary pit.

AMBULANCE/VEHICLE CLEANING

Transport should be cleaned by centre staff with a 0.05 % chlorine solution. Be aware that if the inside of the vehicle is not plastic or similar, there may be effects (chlorine residue) on the material.

Vehicles fitted with anti-mine protection (ballistic blankets) may be sensitive to water and chlorine.

WASTE WATER

The most contaminated waste water will come from the mortuary, showers, laundry and kitchen washing area. It is therefore important to ensure that the waste water from this area is disposed of in soakaways after first going through grease traps (so that the soakaway does not become clogged).

If possible, the CTC should be located on a slight incline, so that rainfall can be easily drained from the area. Drains should be constructed around the outside of each of the structures in the centre to canalise rainfall and drain out of the CTC/CTU. While rainwater run-off may contain some contamination, it is considered to be of low risk. It is not usually feasible to dispose of all water from a rainfall event and therefore arrangements must be made to collect rainwater from the CTC and drain out where possible, to an existing drainage system.

VECTOR CONTROL

Where vector transmitted diseases exist and are of concern in the area of the cholera epidemic, implementing appropriate vector control measures is recommended. This may include:

- general hygiene measures (e.g. cleanliness, washing and exposure of bedding to direct sunlight)
- source reduction in terms of prevention of breeding or elimination of breeding sites (e.g. effective excreta disposal, solid waste management, waste water management)
- other methods may include, spraying residual insecticide, fly traps etc.

In areas where malaria is a problem, bed nets are often recommended in medical structures. However, in a CTC/CTU the use of bed nets is not appropriate because of the access that medical staff need to have to the patient. Therefore other methods must be sought.

Indoors residual spraying is often recommended, but the material to be sprayed (e.g. concrete, plastic, tent), must be compatible with the insecticide.

9.5. Waste Management

Segregation and Storage

There will be different types of waste produced in the CTC/CTU which need to be disposed of correctly in order to reduce both transmission of vibrio cholera, and other diseases related to medical waste (e.g. hepatitis B, tetanus, HIV). Waste can be divided for segregation and disposal purposes into 3 categories:

- *Softs*: cottons, gauze, plastics, syringes, paper (waste – contaminated or uncontaminated that can be burned)
- *Organic*: food residues, human tissue (waste that cannot be burned)
- *Sharps*: needles, lancets, ampoules, glass (waste that can cause injury and transmit disease if not disposed of appropriately)

There should therefore be three different types of containers assigned and labeled for the different waste:

- *Softs and organic waste* can be disposed in a waste bin with a lid that is washable.
- *Sharp Waste*: should be disposed in a puncture-proof plastic container. The lid, with a V shaped opening is glued (e.g. empty tablet plastic container). The container, once full, is disposed directly into the pit and replaced by a new one.

  Safety boxes can also be used to collect sharps and syringes with needles (no need to separate). The safety box, when full, should be incinerated on top of a grill, placed on the sharp pit to allow all remaining metals and ashes to fall through into the pit. Safety boxes should not be incinerated into a drum brurner.

Waste Zone

A waste area is planned within the CTC and comprises of:

- a drum burner (with a dry area to store the bins) – to burn softs
- an organic pit (with a lid to prevent flies/mosquitoes) – for organic waste and the ash produced from the burner
- a sharps pit to receive the containers collecting the needles, lancets, ampoules etc. The pit ideally should be lined so that it is fully enclosed. If safety boxes are used, a grill should be placed on the top of the pit.

Unless the CTC is located within the grounds of a medical structure whose staff wishes to continue using the waste zone, upon closure of the CTC, the organics pit should be backfilled and the sharps filled with concrete or similar to encapsulate the sharps and to protect the future users of the land.

9.6. Mortuary

The mortuary should be located alongside the waste zone.

A closed tent (plastic, material) should be for corpses to prevent access to the body.

The mortuary structure should enable effective cleaning inside, with drainage canals that flow into a soakaway pit (body fluids are likely to be highly contaminated).

It should have an entrance from inside the CTC and an exit to allow collection of the body.

If a CTU does not have the possibility to build up a Morgue, rapid burial should be promoted. The body will be prepared following the same criteria:

- The body should be moved as soon as possible to the mortuary as fluids will start to evacuate the body.

- Disinfection of the body should be done inside the mortuary, with 2% chlorine solution.
- All orifices should be plugged with cotton soaked in the 2% chlorine solution as soon as possible
- Where body bags are available, they should be used to transport the body for burial. If not available, the body can be wrapped in, a cloth sheet soaked in 2% chlorine.
- Where many bodies must be stored, quicklime (calcium oxide, CaO) can be used to dry up and neutralise liquids and reduce the odours produced.

The following table summarises the water, hygiene and sanitation needs of any cholera control facility and gives the example of a 100 bed (160 patient) CTC.

9.7. Table of Water, Hygiene and Sanitation Needs in a 100 Beds CTC (160 patients)

30 patients in Observation, 100 patients in Hospitalisation, 30 patients in Recovery, 1 care - giver/patient (160)

Facilities	Patient Area 1 Screening Observation	Patient Area 2 Hospitalisation Isolation	Patient Area 3 Recovery	Neutral Area	Mortuary	Waste Zone	Total
Water							
Containers for drinking water (typically 125 l container)	**2** (1/tent)	**5** (1/tent)	**2** (1/tent)	**1** (1/tent for staff)			**10**
Containers of ORS (typically 125 l container)	**2** (1/tent)	**5** (1/tent)	**2** (1/tent)				**9**
Taps (supplying drinking water)	**1** (at showers)	**2** (at laundry, shower)	**1** (at showers)	**1** (at kitchen)			**5**
Storage capacity (typically in bladders)				28.8 m^3 (2 x 15m^3)			
Bathing							
Showers (Minimum 2, 1 for male, 1 for female)	**2**	**4**	**2**	**2** (for staff)			**10**
Hygiene							
Containers for hand washing with 0.05% chlorine solution (typically 125 l container)	**4** (entrance, latrine area + 1/tent)	**7** (entrance, latrine area + 1/tent)	**4** (entrance, latrine area + 1/tent)	**4** (latrine, dish rinsing, 2 in chlorine prep. area)	**1** (outside tent)	**1** (for bin rinsing)	**21**
Containers for 0.2 % chlorine solution (typically 125 l container)		**2** (chlorine solution area)		**2** (chlorine prep. area)			**4**

Facilities	**Patient Area 1 Screening Observation**	**Patient Area 2 Hospitalisation Isolation**	**Patient Area 3**	**Neutral Area Recovery**	**Mortuary**	**Waste Zone**	**Total**
Sprayers for 0.2% chlorine solution	**1** (entrance)	**1** (entrance)	**1** (exit)	**1** (entrance)			**4**
Containers for 2% chlorine solution (typically 125 l container)				**2** (Preparation area)	**1** (inside tent)		**3**
Excreta							
Latrines (Minimum 2, 1 for male, 1 for female)	**3**	**7**	**3**	**2**			**15**
Faeces bucket	**5**	**100**	**5**	**10** extra			**120**
Vomit buckets	**5**	**100**	**5**	**10** extra			**120**
Solid Waste							
Softs bin	**2** (1/tent)	**5** (1/tent)	**2** (1/tent)	**2** (1/tent)	**1** (1/tent)		**12**
Organic bin	**2** (1/tent)	**5** (1/tent)	**2** (1/tent)	**2** (staff tent, kitchen)			**11**
Sharp container		**5** (1/tent)	**2** (1/tent)				**7**
Drum Burner						**1**	**1**
Organic pit						**1**	**1**
Sharp pit						**1**	**1**
Waste Water							
Rainwater drainage (connected to external drain)	Around all tents	Around all tents	Around all tents	Around all tents, structures			
Grease trap and soakaway	**1** shower	**3** shower, laundry, kitchen	**1** shower,	**1** shower,	**1**		**7**

Annex 10. Technical sheet chlorination

10.1. Disinfection

Disinfection in a medical structure

Disinfection describes a process that eliminates many or all pathogenic micro o rg a-nisms, with the exception of bacterial spores from inanimate objects.

Disinfection of water

The term disinfection is used to mean the destruction of infective organisms in water to such low levels that no infection of disease results when the water is used for domestic purposes including drinking.

For both type of disinfections, for water and in medical structures, chlorine is often used.

10.2. Chlorine-Generating Products

Chlorine

Chlorine is a chemical whose strong oxidizing properties are used for disinfection and decontamination. Other than its gaseous form (which is mentioned here just for information as it is complicated to use), chlorine is found in the form of «chlorine – generating products». Each product is described by its chlorine content.

The chlorine content should be labeled on the product's packaging and is expressed:

- either in % of chlorine
- or in chlorometric degrees (ochl)
- or in parts per million (ppm) or mg of active chlorine/litre.
  (1°chl = about 0.3% active chlorine; 1ppm = 1 mg/l = 0.0001 % active chlorine)

Different Products

Product	Chlorine content
Sodium hypochlorite solution (bleach) 12° chl	about 4% active chlorine
Sodium hypochlorite solution (bleach) 15° chl	about 5% active chlorine
Sodium hypochlorite concentrate 48° chl	about 15% active chlorine
Calcium hypochlorite or High Test Hypochlorite (often called HTH)	about 70% active chlorine
Chlorinated lime,(bleaching powder)	about 30% active chlorine
Sodium Dichloro-isocyanurate or NaDCC:	
– powder	60-65% active chlorine
– tablets	1,5g active chlorine

Note: when purchasing sodium hypochlorite (bleach) on the local market, some products have additives such as perfume. These should not be used, especially for disinfection of drin - king water.

STORAGE

- Store chlorine products in airtight, non-metallic containers sheltered from heat, light and humidity and guarded (chlorine is dangerous especially for children).
- Chlorinated lime and all forms of sodium hypochlorite are unstable and do not store well. All sodium hypochlorite solutions should not be used if they have been stored under good conditions for more than 3 months since manufactured.
- Calcium hypochlorite stores better (loss of active chlorine is about 2% per year under good storage conditions), but NaDCC is by far the most stable chlorine generating product.

Important

- Calcium hypochlorite (HTH) and sodium dichloro-isocyanurate (NaDCC) are recommended for general disinfections (greater stability and high chlorine content).
- NaDCC is completely soluble (while HTH leaves a deposit of calcium), is less corrosive and is not affected by IATA regulations on air transport of corrosive substances.
- Usually NaDCC is more expensive than HTH.
- Metal consumes chlorine: do not store chlorine solutions in metallic containers (unless they are enamelled or painted)
- When in contact with air and especially humidity, HTH, chlorinated lime and NaDCC produce corrosive and toxic chlorine gas heavier than air. The ventilation of chlorine generating products stores should therefore be by means of vents at the bottom of the walls.

10.3. Preparation of chlorine solutions for disinfection

GENERAL

In most cases, chlorine generating products in powder or tablets are not used directly because this is not practical. Chlorine generating products in powder or tablets are dissolved in clean water in which the required amount is added. HTH and chlorinated lime leave a deposit.

Sodium hypochlorite solutions need to be diluted in clean water because their concentrations in chlorine is most of the time too high.

It has to be highlighted here that although the same chlorine generating products are used, the solutions and their concentrations are not for the same purposes.

Preparation of chlorine solutions for cholera structures

Starting with	**0.05%**	**0.2 %**	**2%**
Calcium hypochlorite (HTH) at 70% active chlorine	0.7 g/litre or half (0.5) soupspoon/10 litres	3 g/litre or 30 g/10 l. or 2 level soupspoons /10 litres	30 g/litre or 2 level soupspoons/litre
Chlorinated lime at 30% active chlorine	1.5 g/litre or 1 level soupspoon/10 litres	6 g/litre or 60 grammes/10 litres or 4 level soupspoons /10 litres	60 g/litre or 4 level soupspoons/litre
Sodium dichloro-isocyanurate (NaDCC) at 1g active chlorine per tablet	5 tablets/10 litres	2 tablets/litre	20 tablets/litre
Sodium hypochlorite (bleach) at 5% active chlorine	10 ml/litre	50 ml/litre	700 ml/litre
Sodium hypochlorite concentrate at 15% active chlorine	33 ml/ 10 litres	16 ml/litre	166 ml/litre

Important

- Metal consumes chlorine, so **never** prepare chlorine solutions in metallic containers (unless they are enamelled or painted).
- 0.2% chlorine solution can be used to disinfect floors and walls in toilets/latrines, however the solution should not be poured into the toilette or latrine pit as it will stop the natural decomposition in the septic tank or pit which will fill very quickly and generate extremely bad smell. However, in isolation units during epidemics such as cholera, shigellosis or ebola, it is recommended to use chlorine solutions to disinfect all excreta from patients.

Annex 11. Human resources. Examples of job descriptions

General introduction

These are examples of job descriptions for a cholera treatment centre, to be adapted to local context and specific needs.

Always precise on the job description: Job title, Place of work, Place within the organisation (organigram), List of tasks.

Jobs for assistants/helpers are not detailed here. For example, if a job description is made for a nurse helper, he/she should refer either to the doctor or to the nurse: adapt the following texts accordingly.

Cholera treatment centre coordinator/supervisor

The position is designed for a person with medical or para-medical background (experienced).

Place of work: his/her permanent presence in the cholera treatment centre is compulsory.

Place within the organisation: Directly responsible to the medical coordinator.

List of tasks: Supervision of the functioning of the cholera treatment centre

Supervision of the medical management of patients

- Ensure that protocols are correctly followed and available at each level
- Supervise availability of necessary treatments in each area
- Ensure that staff is always present in each area.
- Decide building new wards / organisation according to needs (specific wards for paediatric cases, etc.)

Surveillance and monitoring of epidemiological data

- Collect the daily morbidity and mortality data
- Analyse and organise data on a weekly basis, using the weekly surveillance form (report)
- Update the graphs
- Analyse results in terms of additional needs
- Archive the data

Management of human resources

- Evaluation of staffing needs
- Selection and hiring of local medical staff
- Evaluation of needs in terms of training; organisation and supervision of training
- Planning, organisation and supervision of the work (schedules, time off)
- Organisation of staff meetings

MANAGEMENT OF MATERIAL RESOURCES (drugs, medical and non-medical items, food) IN COLLABORATION WITH THE LOGISTICS SUPERVISOR:

- Evaluation of needs
- Supervision of stocks and management of the orders.
- Management of supply and transport problem

Administrator

Place of work: CTC

Place within the organisation: under the responsibility of CTC supervisor

Lists of tasks:

- Ensures administrative management of the staff: salaries, contracts, etc.
- Assists the CTC supervisor in all administrative tasks concerning staff, equipment, supplies, food, etc. including responsibility for money.

Medical doctor

(Some tasks can be common, others can be dispatched if several doctors)

Place of work: Admission, observation and hospitalisation areas, as well as recovery

Place within the organisation: directly under responsibility of cholera treatment centre coordinator

Lists of tasks:

- Curative care of patients (patients management)
- Supervision of admissions done by nurses in screening
- Management of severe cases, following standard protocols
- Diagnosis and treatment of associated pathologies
- Ensures treatment in case of emergency
- Decides for discharge of the patients
- Follow-up of patients
- Controls that follow-up of patients is correctly done at each level
- Participates in training nurses and nurse helpers on case management
- If senior doctor available, he/she should be in charge of all protocols:
  - At screening level: medical examination
  - At observation level: ORS rehydration protocol
  - At hospital level: Ringer Lactate protocol + follow up
- Training and supervision
- Of nurses (pharmacist if needed)

Nurses and/or nurse helpers

These job descriptions are variable according to needs. The nurse helper is directly accountable to the nurse who is accountable to the medical doctor and/or to the CTC supervisor.

Place of work: observation room, hospitalisation room and recovery room

Place within the organisation: To determine (see above)

List of tasks:

- General tasks for all nurses, whatever their location:
- Management of the drugs and equipment in each specific unit
- Supervision of work of the medical ward helpers

Nurse in observation room

On admission:

- Admit any patient presenting diarrhoea and/or vomiting, with only one attendant
- Fill out the admission form and the register
- Take medical history:
  - date and time of start of first symptoms
  - signs of dehydration
  - admit in observation if moderate dehydration, refer to hospital if severe dehydration

During admission in observation room:

- Call the doctor immediately if patient presents moderate or severe dehydration
- Ask doctor or nurse to perform physical examination in case of other signs such as fever or cough
- Start oral rehydration with ORS and encourage the patient to drink
- Record the number of cups of ORS taken on the patient's surveillance form
- Inform the attendant about the importance of oral rehydration, on his personal role in the patient's management and on the treatment centre rules
- Check pulse, temperature, diuresis, stools and vomits, every 3 hours or more frequently if necessary
- Keep the patient in observation if condition remains stable and if no excessive vomiting is observed
- Alert the doctor or the nurse if patient's condition deteriorates (see protocol)

On discharge (decided by doctor):

- Give ORS bags to be used at home
- Instruct patient to return at health centre if the diarrhoea re-appears
- Record the patient's outcome on patient file (home, hospitalisation)

NURSE IN HOSPITALISATION UNIT

On admission:

- Examination of the patient: general condition, signs of dehydration, pulse
- Set up a infusion following the protocols. Remain near to the patient's bed for the first 30 minutes
- Give the patient ORS if he can drink
- Record all the information on patient monitoring form and complete registration of the patient

During hospitalisation:

- Observe the patient every hour for the 6 first hours, and then every 6 hours
- If the patient's condition is deteriorating, re-start hourly surveillance
- Check pulse, consciousness, number of stools and vomits, dehydration level, diuresis (see protocol)
- Check that the drip is running well and replace IV bags in time; put one bag in waiting position during the infusion. Keep the empty bags near the patient's bed after use in order to control the amount of liquid administrated
- Adapt flow of IV fluids according to pulse rate and signs of dehydration
- Encourage the patient to drink ORS.
- Give the patient additional treatment prescribed by the doctor or nurse
- Check that patient is given a blanket at night
- Alert the doctor or nurse immediately in case of problem (fever, convulsions, coma)
- On discharge (decision taken by doctor):
- Transfer the patient to the recovery area
- Check that the patient's clothes are returned to him after being washed and disinfected

NURSE IN RECOVERY AREA

- Install the patient on a mat
- Continue rehydration and encourage the patient to drink ORS
- Inform patient and attendant on the importance of oral rehydration, in CTC and at home
- Check and record on patient form: pulse, number and aspect of stools
- Alert the doctor or nurse immediately in case of problems (such as fever, convulsions, coma)
- Give hygiene advice before leaving the centre, if time allows

Medical ward helper

Place of work: (specify: these jobs are meant for any medical area of the CTC)
Place within the organisation: directly under the responsibility of the nurse.
List of tasks:

Care to patients

- Undress newly hospitalised patient and disinfect his clothes in a chlorine solution 0.05% before handing them to the laundry workers
- Clean the patient with a chlorine solution 0.05% and give him a loincloth
- Wash the bucket, the basin, the mat, and the floor at soon, as they are dirty
- Prepare and distribute the ORS to each patient able to drink
- Check that all ORS cups are always filled and encourage the patient to drink when stopped vomiting
- Distribute the meals to patient and attendant

Cleaning rooms and utensils:

- Change the chlorine solutions every morning and according to needs afterwards
- Clean drums containing water for washing hands and fill them with 0.05% chlorine solution every morning
- Clean the floor of each tent with a 0.2 % chlorine solution twice a day

After departure of a patient from the hospitalisation tent:

- Disinfect the bed, the bucket, the basin, and the floor with a 0.2 % chlorine solution.
- Put all items to dry in the sun.
- Burn the used mat.
- Prepare a new place (bed, bucket, basin, mats, 1 litre of ringer lactate hanging ready over the bed)

Treatment of excreta:

- Pour half a cup of 2 % chlorine solution before use, in the buckets and basins allocated for collection of excreta
- Pour half a cup of 2 % chlorine solution in the containers once full of excreta, and let them in contact for 10 minutes before emptying them into the indicated pit
- Rinse all the containers with a 0.2 % chlorine solution

Treatment of corpses (in mortuary):

- Wear gloves during the manipulation and wash hands afterwards
- Clean the body with a 2 % chlorine solution
- Block each orifices with cotton impregnated of the same solution
- Wrap the body in a plastic bag. Seal the bag
- Treatment of wastes:
- Collect the waste and bring to the area for waste disposal

Stretcher-carrier

Place of work: all medical areas of the CTC

Place within the organisation: The stretcher-carrier work under direct responsibility of the nurse

List of tasks:

- Transfer patients between various areas of the cholera treatment centre on demand of the medical staff
- Remain available for the medical staff in the observation area after each transfer of a patient
- Disinfect the stretcher with a 0.2 % chlorine solution after each transfer of patient

Pharmacy responsible

Place of work: Pharmacy in the CTC

Place within the organisation: under the CTC supervisor (or nurse, or doctor: see organigram)

List of tasks:

- Under the help of the CTC supervisor, makes a list of all necessary items for 7 days autonomy
- Ensures that all medical material is available for 7 days autonomy
- Checks expiry dates on boxes / vials / pouches
- Sends to each medical ward (admission, hospitalisation, recovery) the requested items on a daily basis
- Prepares weekly orders, to replace stocks on weekly basis
- Keeps record of all in and out
- Informs supervisor in advance if any risk of shortage

Logistics, Water and Sanitation supervisor

Place of work: CTC

Place within the organisation: under responsibility of the cholera treatment centre coordinator / supervisor

List of tasks:

Opening of the treatment centre:

- Selection and hiring of non-medical staff
- Training and supervision of the non-medical staff

Organises the cholera treatment centre:

- Construction / rehabilitation, purchase of logistical items
- Supervises supplies to the cholera treatment centre and organises the stocks management
- Supervision of daily activities

- Supervision (once or twice a day) of logistic activities and of the procedures for sanitation in the CTC
- Supervision of the regular maintenance of the centre

Closing of the treatment centre:

- Disinfection of the centre
- Inventory, storage and re-conditioning of the material

Logistic officer

Place of work: cholera treatment centre

Place within the organisation: under responsibility of the Log WatSan supervisor.

List of tasks:

Supervise preparation and distribution of meals:

- check that basic hygiene rules are respected for meals preparation and distribution
- daily calculation of the food consumption in the cholera treatment centre
- daily calculation of the fuel consumption for cooking
- check the cook's order sheets and stock cards

Supervise cleaning and disinfection of the kitchen and cholera treatment centre utensils:

- check that the kitchen is disinfected daily with a 0.2 % chlorine solution,
- check that dishes are cleaned and then disinfected with the 0.2 % chlorine solution after each meal.

Supervise control of movements between the various areas of the cholera treatment centre:

- check that watchmen are present at their post and respect the criteria for restrictions of movements according to the rules

Supervise the management of non-medical stocks and materials orders:

- check the procedures for ordering material and renewable items done by the store keeper
- check procedures for reception and distribution of materials and renewable items made by store keeper
- check that stocks of materials and renewable items are sufficient to respond to an increase of activity in the cholera treatment centre
- check that established rules and protocols are correctly respected in the store

Supervision of cook, cooks-assistant and storekeeper

Complete attendance sheets and forward to administrator

Store keeper

Place of work: stores of the cholera treatment centre

Place within the organisation: The store keeper works under the responsibility of the logistic officer

List of tasks:

- Keeps records of all items on a stock card with In, Out and Balance
- Informs logistic officer in case of possible shortage (an alarm stock should be marked on each card by the logistic supervisor)
- Organises items according to type (food / tools for logistics / stationery / etc.)
- Keeps all items well organised and clean

Cook

Place of work: kitchen of the cholera treatment centre

Place within the organisation: The cook works under responsibility of the logistic officer.

List of tasks:

- Count the number of patients present in observation, hospitalisation and recovery areas before each meal
- Prepare 3 meals a day (morning, noon, and evening) for the patients, attendants and for the staff.
- Evaluate food and cooking fuel needs according to the number of meals to prepare each day.
- Complete a daily order form specifying needs for food and fuel.
- Daily check and sign for receipt of food and fuel.
- Identify other items to be ordered according to needs for food preparation, distribution, cleaning and disinfection on the utensils.
- Supervise the cook-assistant.
- Supervise cleaning and disinfection of the kitchen and cooking utensils after each meal.

Cook-assistant

Place of work: kitchen of the cholera treatment centre

Place within the organisation: The cook assistant works under direct responsibility of the cook.

List of tasks:

- Collect the daily order for food and fuel
- Light the fire for cooking
- Assist the cook with meals preparation
- Distribute meals to patients, attendants and staff:
- Collect the plates and cutlery at the end of every meal
- Clean the plates, the cutlery and the cooking tools with clean water and soap

- Rinse the plates and cutlery with clean water
- Disinfect plates and cutlery by soaking them for 5 minutes in a basin filled with 0.2 % chlorine solution
- Clean the kitchen:
  - Carry the kitchen trash to the waste disposal area and disinfect garbage bins with 0.2 % chlorine solution
  - Disinfect the kitchen (floors, walls, work tables, etc.) with a 0.2 % chlorine solution
  - Always use protective gear when working with 0.2 % chlorine solution
- Ensure adequate water supply for cooking and cleaning

WatSan officer

Place of work: cholera treatment centre

Place within the organisation: The WatSan officer works under responsibility of the log WatSan supervisor

List of tasks:

Supervise the water supply and water quality in the cholera treatment centre:

- Check the procedures for water supply and storage
- Ensure that water distributed in the cholera treatment centre is disinfected with chlorine

Supervision of the water suppliers:

- Check the procedures for transport, storage and protection of the potable water in the CTC

Supervision of the chlorinators/hygiene educators:

- Check the procedures for preparation and storage of the 0.05 %, 0.2 % and 2 % chlorine solutions
- Check the procedures for disinfection and cleaning of the facilities and the equipment in the CTC
- Check regular supply of the hand-washing areas and sprayers with the 0.05 % chlorine solution
- Check that the chlorine solution in the footbaths (if used) is renewed at least every 4 hours
- Check that 0.2 % chlorine solution is supplied for sprayers
- Check the procedures for collection and disposal of the treatment centre's waste
- Check the procedures for vector control in the cholera treatment centre

Supervision of the laundry workers:

- Check the procedures for linen disinfections.

Team Management:

- Team under supervision of the Wat san officer includes water carriers, hygiene educators, sprayer-watchmen, chlorinators, laundry workers and cleaners.
- Complete attendance sheets and forward them to the administrator

Management of stocks:

- Calculate daily consumption of chlorine generating products and other consumables
- Assess needs for daily water consumption in the cholera treatment centre
- Complete the order forms and transmit them to the store-keeper

Cleaner

Place of work: cholera treatment centre

Place within the organisation: The cleaner works under the responsibility of the WatSan officer

List of tasks:

Clean and disinfect the facilities:

- Clean the latrines, the showers, the changing room and the general waste bins once a day
- Always use adequate protective clothing
- Fill up the sprayers with a 0.2 % chlorine solution
- Disinfect latrines, showers, washing areas, and cloth rooms 4 times/day by spraying 0.2 % chlorine solution
- Clean the sprayers with clear water once a day and leave them in the chlorine solution preparation area (end of working period).

Collection and disposal of waste:

- Check that a garbage bin with a cover is present in each tent or building in all areas
- Collect all garbage and dispose according to category and protocol
- Check that access to the waste area is always closed.

Vector control:

- In case it is needed, ensures that vector control actions are taken.

Laundry worker

Place of work: The laundry worker works in the cholera treatment centre laundry washing area

Place within the organisation: The laundry worker works under direct responsibility of the WatSan officer

List of tasks:

- Daily collection of the dirty clothes used by the staff
- Collect patients clothes and blankets from the hospitalisation area
- Soak the clothes and the blankets in a basin full of a 0.05 % chlorine solution for 5 minutes, and wash them with soap and. Renew the 0.05 % chlorine solution in the basin between each patient's batch
- Dry and store the linen and return to patient on discharge from the hospitalisation area

Sprayer-watchman

Place of work: work in the CTC at the entrance and between different areas within the centre.

Place within the organisation: under the responsibility of the WatSan officer.

List of tasks:

- Control the identity of people getting in and out of the cholera treatment centre
- Control of the material getting in and out of the cholera treatment centre in order to avoid robbery and risk of contamination outside of the cholera treatment centre
- Check that patients are accompanied by one attendant only
- Restrict entry in the cholera treatment centre to authorised people only (staff, patients, attendants and visitors authorised by the cholera treatment centre co-ordinator)
- Disinfects feet, of everyone getting in or out of the CTC using a sprayer filled up with a 0.2 % chlorine solution

Water carrier

Place of work: CTC wards and other patients areas

Place within the organisation: under responsibility of the WatSan officer.

List of tasks:

- Check availability of potable water drums in the observation, hospitalisation and recovery areas
- Ensure that potable water drums are always at least half filled
- Carry the potable water using covered containers in order to avoid contamination during transportation
- Check that the drums are always covered properly
- Check that all of the drums for potable water are filled up to full capacity before leaving the CTC at end of working period

Chlorinators

Place of work: The cholera treatment centre

Place within the organisation: under direct responsibility of the WatSan officer.

List of tasks:

Prepare and use the 0.05 % chlorine solution:

- In a plastic bucket, mix 1/2 a soup spoon (7gr) of calcium hypo chlorite (HTH 65-70 % available chlorine) with 10 litres of clean water; pour the mixture in a 125 litres drum used for the 0,05% chlorine solution. Repeat the same operation until the drum is filled up to its full capacity
- Ensure that 0.05 % solution drums are always at least half full.
- Continue checking the level of 0.05 % chlorine solutions every 2 hours
- Every hour, check the sprayers and fill them with the 0.2 % chlorine solution

Prepare and use of the 0.2 % chlorine solution:

- In a plastic bucket, mix 2 soup spoons (30gr) of hypochlorite of calcium with 10 litres of clean water; pour the mixture in a 125 litres drum used for the 0.2 % chlorine solution. Repeat the same operation until the drum is filled up to its full capacity
- Every 4 hours the 0.2 % chlorine solution of the CTC foot bath should be changed
- Ensure that 0.2 % drums solutions are always at least half full.

Prepare and use of the 2 % chlorine solution:

- In a plastic bucket, mix 20-soup spoon (300gr) of calcium hypo chlorite (HTH 65-70 % available chlorine) with 10 litres of clean water; pour the mixture in a 125 litres drum used for the 2 % chlorine solution. Repeat the same operation until the drum is filled up to its full capacity
- Ensure that 2% chlorine solution drums are always at least half full.
- Check before leaving the cholera treatment centre that the 125 litres drums containing the 0.05%, the 0.2% and the 2% chlorine solutions are filled up to full capacity).

Home visitor/Community health worker

Place of work: Village X

Place within the organisation: Under responsibility of the medical coordinator or his/her deputy

List of tasks:

Ensure the early identification of cases and referral of severe patients:

- Know the case definition for suspect cases, be able to assess clinical condition i.e. dehydration level
- If moderate case, give oral treatment + advice; if severe case, inform the patient and family to go quickly to the closest CTU/CTC, with ORS solution during transportation

Give oral rehydration treatment:

- Know how to prepare ORS with clean water; explain to patient how to take ORS; always ensure a 15 days stock of ORS.
- If needed, consult local authorities to reinforce public information + referral system
- Keep a cholera register

Annex 12. Equipment and supplies

12.1. Cholera kit for 625 patients

PRELIMINARY REMARKS ON CHOLERA KITS

DESCRIPTION

The cholera kit 001 is specially designed for refugee camps. It can also be used for urban or rural populations, altough being less adapted (in this case, small kits for 10 or 50 patients are to be made on the spot according to the needs and the available means).

This kit is meant for the treatment of 625 cholera cases, of which 75 % (500 cases) need IV and ORS, and 25 % (125 cases) need ORS only. These proportions are different from those recommended by the WHO and are based on the MSF experience showing an often high proportion of severely dehydrated cases. In urban or rural areas, only 20 % of the cholera cases need IV and ORS.

The antibiotics supplied cover all cholera cases plus 4 close contacts per case (2 500 contacts). MSF does not recommend chemoprophylaxis of close contacts, but supplies antibiotics for this purpose in case local circumstances demand their use (high secondary attack rate, political pressure, strategic reasons, etc.).

Composition

The complete kit (KMEDKCHO1--) is composed of a medical part with 2 infusions modules (2000 l each) and a logistic part.

If logistic modules are made locally, it is possible to order medical modules only:

- (KMEDKCHO2M-) with 4000 l infusions
- (KMEDKCHO3M-) with 2000 l infusions
- (KMEDKCHO4M-) without infusions module

These two last compositions are proposed because of the transport costs of infusions modules. It is recommended to purchase Ringer lactate (Hartmann) locally whenever possible, BUT ONLY AFTER THE MEDICAL/PUBLIC HEALTH DPT'S APPROVAL.

Caution

It is mandatory to have minimum 4000 l of Ringer Lactate (Hartmann) to one's disposal for the IV treatment of 500 cholera patients.

An underestimation of needs which could lead to infusion stocks running out during an epidemic is always more expensive than ordering 4000 l in the first place.

DIRECTIONS

Take 10 samples with the sample module 001 (KMEDMSAM1C-) and send them to headquarters for culture and sensitivity.

SUPPLIES TO BE GOT LOCALLY IF POSSIBLE

Ringer lactate (Hartmann), after the medical/public health dpt's approval
Plastic sheeting (for shelters, insulation...)
Oral Rehydration Salt (ORS)
Blankets
Tent 27 m_ (white)
Calcium Hypochlorite (HTH)
Watertight boots
Washing product (soap or powder)
Minimal medicine cabinet
Tubes (to make stretchers with plastic sheeting)

Related articles	MSF code
KIT, 001, 625 treatments, COMPLETE (LOG. + MED.) 4 000 L	KMEDKCHO1--
KIT, 001, 625 treatments, medical modules, 4 000 L	KMEDKCHO2M-
KIT, 001, medical modules, 2 000 L	KMEDKCHO3M-
KIT, 001, medical modules without infusion	KMEDKCHO4M-

KIT, 001, 625 treatments, COMPLETE (LOG. + MED.) 4 000 L

KMEDKCHO1--	*Gross weight/unit :*	*6,046.6 Kg*
	Volume/unit :	*15,795.5 dm_*
	Indicative price/unit :	*15,197.00 €*
	UN code for transport :	*To be checked*
	Justification code :	*PM*

EXAMPLE

Medical and logistic support, sent to a new health structure set up in an area where a cholera epidemic breaks out. Local purchases are not considered during the first phase of the emergency.

DESCRIPTION

This kit is specially designed for refugee camps. It can also be used for urban or rural populations, altough being less adapted.

It is composed of a medical part with 2 infusions modules (2000 l each) and a logistic part.

Caution

It is mandatory to have minimum 4000 l of Ringer Lactate (Hartmann) to one's disposal for the IV treatment of 500 cholera patients.

An underestimation of needs which could lead to infusion stocks running out during an epidemic is always more expensive than ordering 4000 l in the first place.

Composed of :	*MSF Code*	*Qty*
(module 001) DRUGS	KMEDMCHO01-	1
(module 001) RENEWABLE SUPPLIES	KMEDMCHO02-	1
(module 001) LOGISTIC MATERIAL	KMEDMCHO03-	1
(module 001) STATIONERY	KMEDMCHO04-	1
(module 001) DISINFECTION	KMEDMCHO05-	1
(module 001) INFUSIONS 2000 L	KMEDMCHO06-	2
KIT, CHLORINATION & WATER CONTROL (10.000 persons/1 week)	KWATKCHL01-	1

Related articles	*MSF code*
(calcium, hypochloride, "HTH") MEASURE, 15 ml	CWATYCAH1MS
(module 001) 500 BLANKETS	KMEDMCHO07-
MODULE, DRESSING EQUIPMENT	KMEDMDRE1--
MODULE, EXAMINATION EQUIPMENT	KMEDMEXA1--
Public health engineering in emergency situation	L018SANG01E
Technicien sanitaire en situation précaire	L018SANG01F

Detailed list of articles	*MSF Code*	*Qty*
(module 001) DRUGS	**KMEDMCHO01-**	1
CHLORINE, 5 mg (NaDCC 8.5 mg), (for disinf. 1 l water), tab.	CWATYCHN5T-	5000
IODINE POLYVIDONE, 10%, solution, 200 ml, dropper bot.	DEXTIODP1S2	10
POTASSIUM CHLORIDE, 100 mg/ml, 10 ml, amp.	DINJPOTC1A-	500
DOXYCYCLINE, 100 mg, tab.	DORADOXY1T-	10000
ORAL REHYDRATION SALTS (ORS) low osmol., sachet 20.5 g/1l	DORAORSA2S-	6500
MODULE, SAMPLE, 001, transport	**KMEDMSAM1C-**	1
MARKER, black, permanent, sharp	ASTAPENM2BS	1
FORCEPS, BRUCELLE, dissecting, 14 cm, straight, inox	ELAEFOBR1--	1
FILTER PAPER, DISK, not impregnated, 6 mm diam.	ELAEPAPF1D-	10
(sample, 001) BOOKLET french/english	ELAESAMC1B-	1
(sample, 001) INDENTIFICATION CARD french/english	ELAESAMC1I-	10
CRYOTUBE, plastic, 1.7 to 2 ml	ELAETUBE001	10
PHYSIOLOGICAL SALINE SOLUTION, NaCl, 0.9%, 5 ml, plas. vial	SLASSODC9B5	2
BAG, plastic, 10 cm x 10 cm	SMSUBAGP10-	10
BAG, plastic, for health card, 16 x 22 cm	SMSUBAGP16-	1
(module 001) RENEWABLE SUPPLIES	**KMEDMCHO02-**	1
APRON PROTECTION, plastic	ELINAPRP1P-	100
TROUSERS, SURGICAL, woven, large	ELINTROS1WL	5
TROUSERS, SURGICAL, woven, medium	ELINTROS1WM	10
TROUSERS, SURGICAL, woven, small	ELINTROS1WS	5
TUNIC, SURGICAL, woven, large	ELINTUNS1WL	5
TUNIC, SURGICAL, woven, medium	ELINTUNS1WM	10
TUNIC, SURGICAL, woven, small	ELINTUNS1WS	5
SPLINT, CRAMER TYPE, metallic, foldable, arm	EMEQSPLK1A-	25
TOURNIQUET, rubber band, 100 x 1.8 cm	EMEQTOUR1--	20
SCISSORS, OPER., blunt/blunt, straight 14.5 cm 03-02-14	ESURSCOP4SB	20
TRUNK, 100 cm, metallic, 220 l	PPACTRUN10M	1
TRUNK, 90 cm, metallic, 160 l	PPACTRUN90M	1
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH10	SCTDTUGA10-	80
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH16	SCTDTUGA16-	20
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH6	SCTDTUGL06-	20

Detailed list of articles	*MSF Code*	*Qty*
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH8	SCTDTUGL08-	80
BANDAGE GAUZE, 8 cm x 4 m, with list, 17/18 threads	SDREBANG084	100
COMPRESS, GAUZE, 10 cm, 12 folds, 17 threads, NON STERILE	SDRECOMP1N-	500
COTTON WOOL, hydrophillic, ROLL, 500 g	SDRECOTW5R-	10
TAPE, ADHESIVE, zinc oxide, ROLL, 2 cm x 5 m	SDRETAPA025	50
CONTAINER, needles syringes, 5 l, cardboard for incineration	SINSCONT5C-	25
IV CATHETER, SHORT, 16 G, (1.7 x 55 mm), grey	SINSIVPU16-	200
IV CATHETER, SHORT, 18 G, (1.3 x 45 mm), green	SINSIVPU18-	600
IV CATHETER, SHORT, (0.8 x 25 mm), blue	SINSIVPU22-	300
IV CATHETER, SHORT, 24 G, (0.7 x 19 mm), yellow	SINSIVPU24-	200
NEEDLE, disposable, Luer IV, 19 G (1.1 x 40 mm), cream	SINSNEED19-	300
NEEDLE, disposable, Luer IM, 21 G (0.8 x 40 mm), green	SINSNEED21-	200
SCALP VEIN INFUSION SET, 21 G (0.8 x 19 mm), green	SINSSCAV21-	100
SYRINGE, disposable, 60 ml, feeding, conical tip	SINSSYDF60C	5
SYRINGE, disposable, 60 ml, feeding, Luer	SINSSYDF60L	5
SYRINGE, disposable, Luer, 10 ml	SINSSYDL10-	200
BAG, body, plastic, white, 150 microns, 220 cm	SMSUBAGB2W-	30
BAG, plastic, for drugs, 6 x 8 cm	SMSUBAGP06-	100
GLOVES, CLEANING, rubber, reusable, pair, large	SMSUGLOC1L-	30
GLOVES, CLEANING, rubber, reusable, pair, medium	SMSUGLOC1M-	40
GLOVES, CLEANING, rubber, reusable, pair, small	SMSUGLOC1S-	30
GLOVES, EXAMINATION, latex, disposable, large	SMSUGLOE1L	400
GLOVES, EXAMINATION, latex, disposable, medium	SMSUGLOE1M-	300
GLOVES, EXAMINATION, latex, disposable, small	SMSUGLOE1S-	300
GLOVES, SURGICAL, latex, disp., sterile, 6.5	SMSUGLOS65-	50
GLOVES, SURGICAL, latex, disp., sterile, 7.5	SMSUGLOS75-	20
GLOVES, SURGICAL, latex, disp., sterile, 8.5	SMSUGLOS85-	20
RAZOR, disposable	SMSURAZO1D-	100
(module 001) LOGISTIC MATERIAL	**KMEDMCHO03-**	1
BOOTS, rubber, size (F) : 37 (pair)	ALIFBOOT37R	6
BOOTS, rubber, size (F) : 39 (pair)	ALIFBOOT39R	4
BOOTS, rubber, size (F) : 41 (pair)	ALIFBOOT41R	3
BOOTS, rubber, size (F) : 42 (pair)	ALIFBOOT42R	4
BOOTS, rubber, size (F) : 44 (pair)	ALIFBOOT44R	3
PLASTIC SHEETING, 4x60m, white/white, 6 bands, roll	CSHEPLASW4W	2
ROPE, diam. 5 mm, POLYPROPYLENE, endless fibers (per meter)	CSHEROPE05P	2000
BUCKET, food plastic, 15 l, round shaped, stackable	CWATBUCK15	70
BUCKET, food plastic, 20 l, graduated, stackable + LID	CWATBUCK20L	30
CONTAINER, plastic, 125 l, square-shaped, stackable + LID	CWATCONT12L	20
SPRAYER, 12 l, IK 12BS	CWATSPRA12-	4
(sprayer,12 l, IK 12BS) spare GASKET	CWATSPRA13G	4
VALVE 1", PVC (125 l container)	CWATVALV1PF	20
LONG-LEVERAGE END NIPPERS	F495.22EL	1

Detailed list of articles	*MSF Code*	*Qty*
ELECTRICIAN KNIFE	FS40B	2
CUP, 250 ml, plastic, graduated	PCOOCUPP2G-	100
LADLE, 250 ml, aluminium	PCOOLADL2A-	10
WIRE, TIE, galvanised, small diam. 1.1 mm, 50 m, roll	PHDWWIRET11	2
BAG, dustbin, plastic, 100 l, black, 70 microns	PPACBAGP1B-	400
(module 001) STATIONERY	**KMEDMCHO04-**	1
(module 001) STATIONERY.	**KADMMSTA05-**	1
BINDER with lever, 310 x 290 mm, green, 75 mm thick	ASTABIND3G7	1
BINDER with lever, 310 x 290 mm, red, 75 mm thick	ASTABIND3R/	1
CARD, bristol, white, 5 mm squared, 148 x 210 mm	ASTACARD1S2	5
PAPER HOLDER, hardback, with spring clip and A4 cover	ASTAHOLD1P-	50
NOTEPAD, A6, 140 x 105 mm, 5 mm squared	ASTANOTP1S1	2
PENCIL, BALL POINT, black	ASTAPENB1B-	50
PENCIL, BALL POINT, red	ASTAPENB1R-	50
MARKER, black, permanent, large, square tip	ASTAPENM3BB	12
MARKER, red, permanent, large, square tip	ASTAPENM3RB	12
STAPLER, medium, 24/6-8, for 50 sheets	ASTASTAP1M-	2
(stapler, medium) STAPLES 24/8, box of 5000	ASTASTAP1MS	2
Guidelines for cholera control	L004CHOB01E	1
Prise en charge d'une épidémie de choléra	L004CHOG01F	2
TAPE, adhesive, REINFORCED, translucent (roll)	PPACTAPE1R-	25
CARD, PATIENT FOLLOW-UP 001, fr./engl./span. A4, recto/verso	SMSTCARD2C-	500
(module 001) DISINFECTION	**KMEDMCHO05-**	1
CALCIUM HYPOCHLORITE (HTH) 70% granules, 500 g, IATA pack.	CWATYCAH7G5	580
DELTAMETRINE, 2.5%, powder, bag, 33 g (K-otrine)	CWATYDEL2P3	300
(module 001) INFUSIONS 2000 L	**KMEDMCHO06-**	2
RINGER LACTATE, 1 l, plastic pouch, + SET	DINFRINL1P1	2000
KIT, CHLORINATION & WATER CONTROL (10.000 persons/1 week)	**KWATKCHL01-**	1
BUCKET, food plastic, 20 l, graduated, stackable + LID	CWATBUCK20L	2
JERRYCAN, food plastic, 20 l	CWATJERR20-	3
TESTER, pool tester	CWATTESP1--	3
(pool tester) DPD1, tablet	CWATTESP1T1	1000
(pool tester) DPD3, tablet	CWATTESP1T3	50
(pool tester) PHENOL, red, tablet	CWATTESP2TP	100
TEST, TUBE, TURBIDITY, 5 to 2000 NTU, plastic	CWATTEST01-	1
TUBE, MEASURING, 1 l, graduated, plastic	CWATTUBE01-	1
(calcium. hypochloride. "HTH") MEASURE. 15 ml	CWATYCAH1MS	30
CALCIUM HYPOCHLORITE (HTH) 70% granules, 500 g, IATA pack.	CWATYCAH7G5	30
APRON PROTECTION, plastic	ELINAPRP1P-	1
Chlorination monitoring - leaflet	L018WATG01E	1
Techniques et controle de la chloration - notice	L018WATG01F	1
Packing list of the kit/module, bilingual en/fr	L045PLST0EF	1

SYRINGE, disposable, 60 ml, feeding, Luer	SINSSYDF60L	2
SYRINGE, disposable, Luer, 10 ml	SINSSYDL10-	4
GLOVES, CLEANING, rubber, reusable, pair, medium	SMSUGLOC1M-	1
FUNNEL, diam. 160 mm	TVEAFUNN16-	1

KIT, 001, 625 treatments, medical modules, 4 000 L

KMEDKCHO2M-	*Gross weight/unit :*	*5,102.6 Kg*
	Volume/unit :	*11,425.5 dm_*
	Indicative price/unit :	*7,920.00 €*
	Justification code :	*PM*

EXAMPLE

Medical support, sent to a pre-existing health structure located in an area where a cholera epidemic breaks out. The logistic supplies are purchased locally. Only medical modules are sent from Europe.

DESCRIPTION

This kit is specially designed for refugee camps. It can also be used for urban or rural populations, altough being less adapted.

It is composed of medical modules with 2 infusions modules (2000 l each).

Caution

It is mandatory to have minimum 4000 l of Ringer Lactate (Hartmann) to one's disposal for the IV treatment of 500 cholera patients.

An underestimation of needs which could lead to infusion stocks running out during an epidemic is always more expensive than ordering 4000 l in the first place.

Composed of :	*MSF Code*	*Qty*
(module 001) DRUGS	KMEDMCHO01-	1
(module 001) RENEWABLE SUPPLIES	KMEDMCHO02-	1
(module 001) INFUSIONS 2000 L	KMEDMCHO06	2

Related articles	*MSF code*
MODULE, DRESSING EQUIPMENT	KMEDMDRE1--
MODULE, EXAMINATION EQUIPMENT	KMEDMEXA1--
Guidelines for cholera control	L004CHOB01E
Prise en charge d'une épidémie de choléra	L004CHOG01F

Detailed list of articles	*MSF Code*	*Qty*
(module 001) DRUGS	**KMEDMCHO01-**	1
CHLORINE, 5 mg (NaDCC 8.5 mg), (for disinf. 1 l water), tab.	CWATYCHN5T-	5000
IODINE POLYVIDONE, 10%, solution, 200 ml, dropper bot.	DEXIIODP1S2	10
POTASSIUM CHLORIDE, 100 mg/ml, 10 ml, amp.	DINJPOTC1A-	500

Detailed list of articles	*MSF Code*	*Qty*
DOXYCYCLINE, 100 mg, tab.	DORADOXY1T-	10000
ORAL REHYDRATION SALTS (ORS) low osmol., sachet 20.5 g/1l	DORAORSA2S-	6500
MODULE, SAMPLE, 001, transport	**KMEDMSAM1C-**	1
MARKER, black, permanent, sharp	ASTAPENM2BS	1
FORCEPS, BRUCELLE, dissecting, 14 cm, straight, inox	ELAEFOBR1--	1
FILTER PAPER, DISK, not impregnated, 6 mm diam.	ELAEPAPF1D-	10
(sample, 001) BOOKLET french/english	ELAESAMC1B-	1
(sample, 001) INDENTIFICATION CARD french/english	ELAESAMC1I-	10
CRYOTUBE, plastic, 1.7 to 2 ml	ELAETUBE001	10
PHYSIOLOGICAL SALINE SOLUTION, NaCl, 0.9%, 5 ml, plas. vial	SLASSODC9B5	2
BAG, plastic, 10 cm x 10 cm	SMSUBAGP10-	10
BAG, plastic, for health card, 16 x 22 cm	SMSUBAGP16-	1
(module 001) RENEWABLE SUPPLIES	**KMEDMCHO02-**	1
APRON PROTECTION, plastic	ELINAPRP1P-	100
TROUSERS, SURGICAL, woven, large	ELINTROS1WL	5
TROUSERS, SURGICAL, woven, medium	ELINTROS1WM	10
TROUSERS, SURGICAL, woven, small	ELINTROS1WS	5
TUNIC, SURGICAL, woven, large	ELINTUNS1WL	5
TUNIC, SURGICAL, woven, medium	ELINTUNS1WM	10
TUNIC, SURGICAL, woven, small	ELINTUNS1WS	5
SPLINT, CRAMER TYPE, metallic, foldable, arm	EMEQSPLK1A-	25
TOURNIQUET, rubber band, 100 x 1.8 cm	EMEQTOUR1--	20
SCISSORS, OPER., blunt/blunt, straight 14.5 cm 03-02-14	ESURSCOP4SB	20
TRUNK, 100 cm, metallic, 220 l	PPACTRUN10M	1
TRUNK, 90 cm, metallic, 160 l	PPACTRUN90M	1
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH10	SCTDTUGA10-	80
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH16	SCTDTUGA16-	20
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH6	SCTDTUGL06-	20
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH8	SCTDTUGL08-	80
BANDAGE GAUZE, 8 cm x 4 m, with list, 17/18 threads	SDREBANG084	100
COMPRESS, GAUZE, 10 cm, 12 folds, 17 threads, NON STERILE	SDRECOMP1N-	500
COTTON WOOL, hydrophillic, ROLL, 500 g	SDRECOTW5R-	10
TAPE, ADHESIVE, zinc oxide, ROLL, 2 cm x 5 m	SDRETAPA025	50
CONTAINER, needles syringes, 5 l, cardboard for incineration	SINSCONT5C-	25
IV CATHETER, SHORT, 16 G, (1.7 x 55 mm), grey	SINSIVPU16-	200
IV CATHETER, SHORT, 18 G, (1.3 x 45 mm), green	SINSIVPU18-	600
IV CATHETER, SHORT, (0.8 x 25 mm), blue	SINSIVPU22	300
IV CATHETER, SHORT, 24 G, (0.7 x 19 mm), yellow	SINSIVPU24-	200
NEEDLE, disposable, Luer IV, 19 G (1.1 x 40 mm), cream	SINSNEED19-	300
NEEDLE, disposable, Luer IM, 21 G (0.8 x 40 mm), green	SINSNEED21-	200
SCALP VEIN INFUSION SET, 21 G (0.8 x 19 mm), green	SINSSCAV21-	100
SYRINGE, disposable, 60 ml, feeding, conical tip	SINSSYDF60C	5
SYRINGE, disposable, 60 ml, feeding, Luer	SINSSYDF60L	5

Detailed list of articles	*MSF Code*	*Qty*
SYRINGE, disposable, Luer, 10 ml	SINSSYDL10-	200
BAG, body, plastic, white, 150 microns, 220 cm	SMSUBAGB2W-	30
BAG, plastic, for drugs, 6 x 8 cm	SMSUBAGP06-	100
GLOVES, CLEANING, rubber, reusable, pair, large	SMSUGLOC1L-	30
GLOVES, CLEANING, rubber, reusable, pair, medium	SMSUGLOC1M-	40
GLOVES, CLEANING, rubber, reusable, pair, small	SMSUGLOC1S-	30
GLOVES, EXAMINATION, latex, disposable, large	SMSUGLOE1L-	400
GLOVES, EXAMINATION, latex, disposable, medium	SMSUGLOE1M-	300
GLOVES, EXAMINATION, latex, disposable, small	SMSUGLOE1S-	300
GLOVES, SURGICAL, latex, disp., sterile, 6.5	SMSUGLOS65-	50
GLOVES, SURGICAL, latex, disp., sterile, 7.5	SMSUGLOS75-	20
GLOVES, SURGICAL, latex, disp., sterile, 8.5	SMSUGLOS85-	20
RAZOR, disposable	SMSURAZO1D-	100
(module 001) INFUSIONS 2000 L	**KMEDMCHO06-**	2
RINGER LACTATE, 1 l, plastic pouch, + SET	DINFRINL1P1	2000

KIT, 001, medical modules, 2 000 L

KMEDKCHO3M-	*Gross weight/unit :*	*2,742.6 Kg*
	Volume/unit :	*6,225.5 dm_*
	Indicative price/unit :	*5,692.00 €*
	Justification code :	*PM*

EXAMPLE

Medical support, sent to a pre-existing health structure located in an area where a cholera epidemic breaks out. The logistic supplies are purchased locally, and the health structure has already 2000 l of infusions in stock.

DESCRIPTION

This kit is specially designed for refugee camps. It can also be used for urban or rural populations, altough being less adapted.

It is composed of medical modules with only one infusions module of 2 000 l. That implies that 2000 l infusions are available locally.

This kit is proposed because of the transport costs of infusions modules. It is recommended to purchase Ringer lactate (Hartmann) locally whenever possible, BUT ONLY AFTER THE MEDICAL/PUBLIC HEALTH DEPARTMENT'S APPROVAL.

Caution

It is mandatory to have minimum 4000 l of Ringer Lactate (Hartmann) to one's disposal for the IV treatment of 500 cholera patients.

An underestimation of needs which could lead to infusion stocks running out during an epidemic is always more expensive than ordering 4000 l in the first place.

Composed of :	*MSF Code*	*Qty*
(module 001) DRUGS	KMEDMCHO01-	1
(module 001) RENEWABLE SUPPLIES	KMEDMCHO02-	1
(module 001) INFUSIONS 2000 L	KMEDMCHO06-	1

Related articles	*MSF code*
MODULE, DRESSING EQUIPMENT	KMEDMDRE1--
MODULE, EXAMINATION EQUIPMENT	KMEDMEXA1--
Guidelines for cholera control	L004CHOB01E
Prise en charge d'une épidémie de choléra	L004CHOG01F

Detailed list of articles	*MSF Code*	*Qty*
(module 001) DRUGS	**KMEDMCHO01-**	1
CHLORINE, 5 mg (NaDCC 8.5 mg), (for disinf. 1 l water), tab.	CWATYCHN5T-	5000
IODINE POLYVIDONE, 10%, solution, 200 ml, dropper bot.	DEXTIODPIS2	10
POTASSIUM CHLORIDE, 100 mg/ml, 10 ml, amp.	DINJPOTC1A-	500
DOXYCYCLINE, 100 mg, tab.	DORADOXY1T-	10000
ORAL REHYDRATION SALTS (ORS) low osmol., sachet 20.5 g/1l	DORAORSA2S-	6500
MODULE, SAMPLE, 001, transport	**KMEDMSAM1C-**	1
MARKER, black, permanent, sharp	ASTAPENM2BS	1
FORCEPS, BRUCELLE, dissecting, 14 cm, straight, inox	ELAEFOBR1--	1
FILTER PAPER, DISK, not impregnated, 6 mm diam.	ELAEPAPF1D-	10
(sample, 001) BOOKLET french/english	ELAESAMC1B-	1
(sample, 001) INDENTIFICATION CARD french/english	ELAESAMC1I-	10
CRYOTUBE, plastic, 1.7 to 2 ml	ELAETUBE001	10
PHYSIOLOGICAL SALINE SOLUTION, NaCl, 0.9%, 5 ml, plas. vial	SLASSODC9B5	2
BAG, plastic, 10 cm x 10 cm	SMSUBAGP10-	10
BAG, plastic, for health card, 16 x 22 cm	SMSUBAGP16-	1
(module 001) RENEWABLE SUPPLIES	**KMEDMCHO02-**	1
APRON PROTECTION, plastic	ELINAPRPTP-	100
TROUSERS, SURGICAL, woven, large	ELINTROS1WL	5
TROUSERS, SURGICAL, woven, medium	ELINTROS1WM	10
TROUSERS, SURGICAL, woven, small	ELINTROS1WS	5
TUNIC, SURGICAL, woven, large	ELINTUNS1WL	5
TUNIC, SURGICAL, woven, medium	ELINTUNS1WM	10
TUNIC, SURGICAL, woven, small	ELINTUNS1WS	5
SPLINT, CRAMER TYPE, metallic, foldable, arm	EMEQSPLK1A-	25
TOURNIQUET, rubber band, 100 x 1.8 cm	EMEQTOUR1--	20
SCISSORS, OPER., blunt/blunt, straight 14.5 cm 03-02-14	ESURSCOP4SB	20
TRUNK, 100 cm, metallic, 220 l	PPACTRUN10M	1
TRUNK, 90 cm, metallic, 160 l	PPACTRUN90M	1
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH10	SCTDTUGA10-	80
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH16	SCTDTUGA16-	20
TUBE, GASTRIC, Luer lip, disposable, 40 cm, CH6	SCTDTUGL06-	20
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH8	SCTDTUGL08-	80
BANDAGE GAUZE, 8 cm x 4 m, with list, 17/18 threads	SDREBANG084	100
COMPRESS, GAUZE, 10 cm, 12 folds, 17 threads, NON STERILE	SDRECOMP1N-	500
COTTON WOOL, hydrophillic, ROLL, 500 g	SDRECOTW5R-	10
TAPE, ADHESIVE, zinc oxide, ROLL, 2 cm x 5 m	SDRETAPA025	50
CONTAINER, needles syringes, 5 l, cardboard for incineration	SINSCONT5C-	25
IV CATHETER, SHORT, 16 G, (1.7 x 55 mm), grey	SINSIVPU16-	200
IV CATHETER, SHORT, 18 G, (1.3 x 45 mm), green	SINSIVPU18-	600
IV CATHETER, SHORT, (0.8 x 25 mm), blue	SINSIVPU22-	300
IV CATHETER, SHORT, 24 G, (0.7 x 19 mm), yellow	SINSIVPU24-	200

KIT, 001, medical modules without infusion

KMEDKCHO4M-	*Gross weight/unit :*	*363.0 Kg*
	Volume/unit :	*1,011.0 dm_*
	Indicative price/unit :	*3,135.26 €*
	Justification code :	*PM*

EXAMPLE

Medical support, sent to a pre-existing health structure located in an area where a cholera epidemic breaks out. The logistic supplies are purchased locally, and the health structure has already 4000 l of infusions in stock.

DESCRIPTION

This kit is suitable for all situations: refugee camps, urban or rural population.

It is composed of medical modules without infusion. That implies that 4 000 l are available locally.

This kit is proposed because of the transport costs of infusions modules. It is recommended to purchase Ringer lactate (Hartmann) locally whenever possible, BUT ONLY AFTER THE MEDICAL/PUBLIC HEALTH DEPARTMENT'S APPROVAL.

Caution

It is mandatory to have minimum 4000 l of Ringer Lactate (Hartmann) to one's disposal for the IV treatment of 500 cholera patients.

An underestimation of needs which could lead to infusion stocks running out during an epidemic is always more expensive than ordering 4000 l in the first place.

Composed of :	*MSF Code*	*Qty*
(module 001) DRUGS	KMEDMCHO01-	1
(module 001) RENEWABLE SUPPLIES	KMEDMCHO02-	1

Related articles	*MSF code*
MODULE, DRESSING EQUIPMENT	KMEDMDRE1--
MODULE, EXAMINATION EQUIPMENT	KMEDMEXA1--
Guidelines for cholera control	L004CHOB01E
Prise en charge d'une épidémie de choléra	L004CHOG01F

Detailed list of articles	*MSF Code*	*Qty*
(module 001) DRUGS	**KMEDMCHO01-**	1
CHLORINE, 5 mg (NaDCC 8.5 mg), (for disinf. 1 l water), tab.	CWATYCHN5T-	5000
IODINE POLYVIDONE, 10%, solution, 200 ml, dropper bot.	DEXIIODP1S2	10
POTASSIUM CHLORIDE, 100 mg/ml, 10 ml, amp.	DINJPOTC1A-	500
DOXYCYCLINE, 100 mg, tab.	DORADOXY1T-	10000
ORAL REHYDRATION SALTS (ORS) low osmol., sachet 20.5 g/1l	DORAORSA2S-	6500
MODULE, SAMPLE, 001, transport	**KMEDMSAM1C-**	1
MARKER, black, permanent, sharp	ASTAPENM2BS	1
FORCEPS, BRUCELLE, dissecting, 14 cm, straight, inox	ELAEFOBR1--	1
FILTER PAPER, DISK, not impregnated, 6 mm diam.	ELAEPAPF1D-	10
(sample, 001) BOOKLET french/english	ELAESAMC1B-	1
(sample, 001) INDENTIFICATION CARD french/english	ELAESAMC1I-	10
CRYOTUBE, plastic, 1.7 to 2 ml	ELAETUBE001	10
PHYSIOLOGICAL SALINE SOLUTION, NaCl, 0.9%, 5 ml, plas. vial	SLASSODC9B5	2
BAG, plastic, 10 cm x 10 cm	SMSUBAGP10-	10
BAG, plastic, for health card, 16 x 22 cm	SMSUBAGP16-	1
(module 001) RENEWABLE SUPPLIES	**KMEDMCHO02-**	1
APRON PROTECTION, plastic	ELINAPRP1P-	100
TROUSERS, SURGICAL, woven, large	ELINTROS1WL	5
TROUSERS, SURGICAL, woven, medium	ELINTROS1WM	10
TROUSERS, SURGICAL, woven, small	ELINTROS1WS	5
TUNIC, SURGICAL, woven, large	ELINTUNS1WL	5
TUNIC, SURGICAL, woven, medium	ELINTUNS1WM	10
TUNIC, SURGICAL, woven, small	ELINTUNS1WS	5
SPLINT, CRAMER TYPE, metallic, foldable, arm	EMEQSPLK1A-	25
TOURNIQUET, rubber band, 100 x 1.8 cm	EMEQTOUR1--	20
SCISSORS, OPER., blunt/blunt, straight 14.5 cm 03-02-14	ESURSCOP4SB	20
TRUNK, 100 cm, metallic, 220 l	PPACTRUN10M	1
TRUNK, 90 cm, metallic, 160 l	PPACTRUN90M	1
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH10	SCTDTUGA10-	80
TUBE, GASTRIC, conical tip, 125 cm, disposable, CH16	SCTDTUGA16-	20
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH6	SCTDTUGL06-	20
TUBE, GASTRIC, Luer tip, disposable, 40 cm, CH8	SCTDTUGL08-	80
BANDAGE GAUZE, 8 cm x 4 m, with list, 17/18 threads	SDREBANG084	100
COMPRESS, GAUZE, 10 cm, 12 folds, 17 threads, NON STERILE	SDRECOMP1N-	500
COTTON WOOL, hydrophillic, ROLL, 500 g	SDRECOTW5R-	10
TAPE, ADHESIVE, zinc oxide, ROLL, 2 cm x 5 m	SDRETAPA025	50
CONTAINER, needles syringes, 5 l, cardboard for incineration	SINSCONT5C-	25
IV CATHETER, SHORT, 16 G, (1.7 x 55 mm), grey	SINSIVPU16-	200
IV CATHETER, SHORT, 18 G, (1.3 x 45 mm), green	SINSIVPU18-	600
IV CATHETER, SHORT, (0.8 x 25 mm), blue	SINSIVPU22-	300
IV CATHETER, SHORT, 24 G, (0.7 x 19 mm), yellow	SINSIVPU24-	200

Detailed list of articles	MSF Code	Qty
NEEDLE, disposable, Luer IV, 19 G (1.1 x 40 mm), cream	SINSNEED19-	300
NEEDLE, disposable, Luer IM, 21 G (0.8 x 40 mm), green	SINSNEED21-	200
SCALP VEIN INFUSION SET, 21 G (0.8 x 19 mm), green	SINSSCAV21-	100
SYRINGE, disposable, 60 ml, feeding, conical tip	SINSSYDF60C	5
SYRINGE, disposable, 60 ml, feeding, Luer	SINSSYDF60L	5
SYRINGE, disposable, Luer, 10 ml	SINSSYDL10-	200
BAG, body, plastic, white, 150 microns, 220 cm	SMSUBAGB2W-	30
BAG, plastic, for drugs, 6 x 8 cm	SMSUBAGP06-	100
GLOVES, CLEANING, rubber, reusable, pair, large	SMSUGLOC1L-	30
GLOVES, CLEANING, rubber, reusable, pair, medium	SMSUGLOC1M-	40
GLOVES, CLEANING, rubber, reusable, pair, small	SMSUGLOC1S-	30
GLOVES, EXAMINATION, latex, disposable, large	SMSUGLOE1L-	400
GLOVES, EXAMINATION, latex, disposable, medium	SMSUGLOE1M-	300
GLOVES, EXAMINATION, latex, disposable, small	SMSUGLOE1S-	300
GLOVES, SURGICAL, latex, disp., sterile, 6.5	SMSUGLOS65-	50
GLOVES, SURGICAL, latex, disp., sterile, 7.5	SMSUGLOS75-	20
GLOVES, SURGICAL, latex, disp., sterile, 8.5	SMSUGLOS85-	20
RAZOR, disposable	SMSURAZO1D-	100

12.2. Overall needs for a CTC of 100 patients

OBSERVATION: FOR 30 PATIENTS (ONE DOUBLE TENT)

Material

Register
1 sprayer at entrance, containing a chlorine solution 0,2%.
2 buckets of 20 l with cover for chlorine solutions 2% and 0,2 %
2 sprayers
1 drum 125 l for washing hands
Soap
1 broom, one floor cloth, 1 dustbin with cover
1 table, 1 chair
30 mats
2 pairs of rubber gloves
1 bucket of 20 l with tap, for ORS
1 bucket of 20 l with tap for drinkable water
60 cups, plates, spoons

Medical Material

1 calf for blood pressure
1 stethoscope
Thermometers + disinfectant
1 pair of scissors.

HOSPITALISATION: FOR 20 PATIENTS (ONE DOUBLE TENT)

For the ward
Patients follow up forms
Protocols
1 sprayer with chlorine solution 0,05% at central footbath
2 buckets of 20 l with cover for chlorine solutions 2% and 0,2 %
2 sprayers
1 table, 1 chair, 1 shelf
Rope: for hanging infusion bags and medical files
Hooks
1 broom, 1 floor cloth, 2 dustbins with cover
2 pairs of rubber gloves,
1 bucket of 20 l with tap for ORS
1 bucket of 20 l with tap for drinkable water
1 drum of 125 l with tap for hand washing
Soap
1 note book for transmission (shifts)
Pens, 1 permanent marker
40 cups, plates, spoons.

For each patient
1 pierced bed
1 mat
2 bucket of 10 l (1 for stool, 1 for vomit)
1 blanket
1 loincloth.

Medical Material
1 BP calf for adults, 1 paediatric BP Calf
2 stethoscopes
1 tray, 1 bottle, 1pair of scissors, 1 Kocher, 1 small dish (cupule), 1 kidney dish
5 thermometers + disinfectant
2 containers for dirty needles,

Medical – renewable: to replace
1 box examination gloves for single use
40 IV catheters 16 G, 18G, 22 G
30 infusion sets
10 syringes 10 ml
20 needles 21 G
Naso gastric tubes CH6, 8, 10, 16
Syringes 60ml feeding (Luer and conical tip)

1 roll cotton wool 500g
20 gauze bandages
2 adhesive tape
1 bottle of polyvidone iodine 10% (200 ml)
200 l Ringer lactate,
5 l Dextrose 5%,
5 vials Glucose hypertonic 50%,
5 ampoule Furosemide 10mg/ml
5 ampoule Diazepam 5mg/ml
5 ampoule Quinine Di-Hydrochloride 300mg/ml
100 tablets Doxycycline 100mg
50 tablets Artesunate 50mg
10 tablets Sulfadoxine Pyrimethamine (if no resistance)
20 tablets Acetyl Salicylic Acid 500mg
20 tablets Paracetamol 500mg
200 bags of ORS.

Recovery: for 40 persons (1 double tent)

1 sprayer containing chlorine solution 0,2% at exit
40 mats
1 table, 1 chair
2 sprayers
2 buckets of 20 l with a tap, for ORS
2 drums of 125 l for hand washing containing 0.05 % chlorine solution
soap
80 cups, plates, spoons

Neutral area and kitchen

1 store, shelves, 1 table, 1chair, 1 register, pens
Uniforms: 1 per worker
Kitchen
3 cooking-pots of 50 l
3 ladles
Fuel
20 cups, plates, spoons
2 drums of 125 l for hand washing contain 0.05% chlorine solution
Showers
1 bucket of 20 l with a tap in each shower
Sprayer for insecticide for the whole centre

12.3. Supplies for a CTU of 10 patients / 3 days

LOGISTICAL MATERIAL

Non renewable material

1 tent of 10 places

1 tank (bladder) of 2 m3 or 3 tanks of 125 litres (stock of chlorinated water, drinking water).

10 buckets of 10 litres each (stools).

10 buckets (vomits)

10 mats or cholera beds.

Rope or hooks to hand up infusions

2 pairs of rubber gloves

2 plastic aprons

1 sprayer

2 buckets with cover (20 litres): 1 for ORS, 1 for drinking water

20 cups

Renewable material

12 soaps

3 boxes of HTH

Bleach at 33° (quantity to be checked)

MEDICAL MATERIAL

Register

Patients follow up forms

Non renewable items

1 pair of scissors

5 pairs examination gloves

2 cotton pyjama suits

Renewable items

IV Catheter, 10 each: 16G, 18G, 22G

10 Scalp vein infusion set “Butterflies” 21G

15 infusion sets

Naso gastric tubes CH6, 8, 10, 16

Syringes 60ml feeding (Luer and conical tip)

1 roll cotton wool, 500g

10 gauze bandages

2 rolls adhesive tape

1 bottle polyvidone iodine 10%

50 tabs DOXYCYCLINE 100mg

100 litres RINGER LACTATE

100 bags ORS

12.4. Supplies for an ORP of 20 patients

1 bucket with lid and cup (or tap) for handwashing
1 jug of 1 litre with lid to prepare ORS
5 cups (people can bring their own)
NaDCC (0,5mg) tablets to prepare portable water for ORS
1 piece of soap
200 ORS sachets

Annex 13. alternative routes to classic intravenous route

13.1. Indications and precautions

Alternative parenteral routes to IV for severe dehydration: when peripheral venous access is impossible (collapsus), one can use: femoral or external jugular vein, intraperitoneal route, intraosseous route.

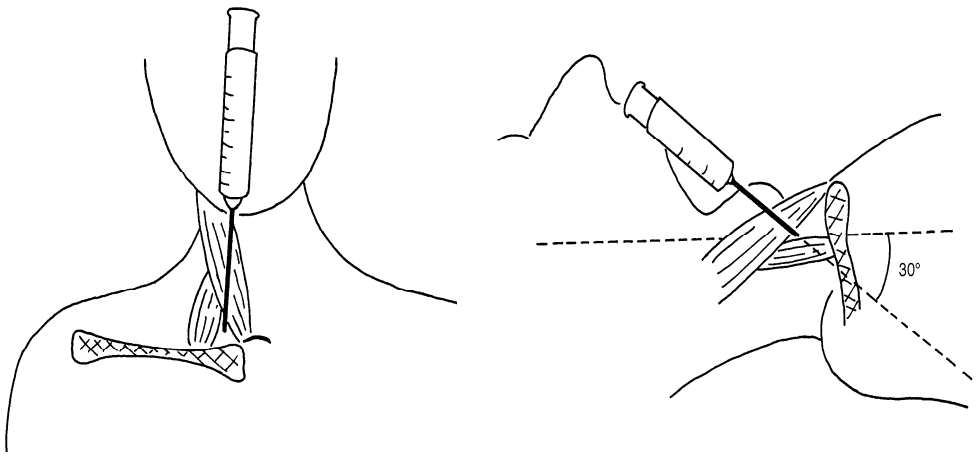
13.2. Access to large veins for quick infusion of Ringer Lactate

Introduction of a percutaneous catheter into a large vein, femoral or jugular.

Material : Large bore needles and catheters (16G,18G) and Ringer Lactate

EXTERNAL JUGULAR VEIN

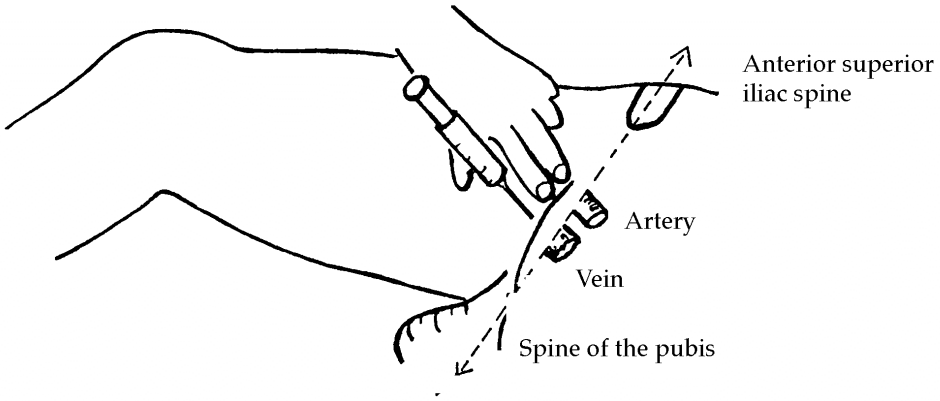
- Lower and turn the patient's head to opposite side of the chosen vein
- Follow rigorous asepsis: clean with polyvidone iodine 10% and use sterile gloves
- Place a large bore needle and IV catheter (eg 16 for adult) on a syringe
- Puncture the head of the triangle formed by the two heads of the sternocleidomastoid and the clavicle
- Direct the needle behind, parallel to the median line and at an angle of 30° to the horizontal. ⚠ Take care of the carotid!
- Gently advance the needle while aspirating with the syringe. ⚠ Do not advance too far under the clavicle because of the risk of pneumothorax!
- When blood appears in the syringe, ask patient to hold his breath and slowly advance the catheter
- Apply a sterile dressing



FEMORAL VEIN

The technique is easier than for the jugular vein but the region is more septic.

- Follow rigorous asepsis: clean with polyvidone iodine 10% and use sterile gloves
- Place a large bore IV catheter on a syringe
- Mark the crural arc; the line in the groin joining the anterosuperior iliac spine and the spine of the pubis (the spine of the pubis is marked by palpating the superior border of the bone)
- Mark the edges of the femoral artery in the crural arc and fix the vessel beneath two fingers
- In adults, puncture 1 cm on the inside of the wall of the artery and 2 cm below the crural arc
- Puncture almost vertically and a little obliquely while continuously aspirating with the syringe
- If bone is struck, withdraw while continue to aspirate
- When reaching the vein, gently lower the syringe towards the buttocks and advance the catheter. Ensure that catheter is in the vein by aspirating blood into the syringe then remove the introducer
- Apply a sterile dressing
- In case of arterial puncture, press for 10 minutes



13.3. Intraosseous infusion procedure

INDICATIONS

In infants and children under 6 years of age, intraosseous route is indicated in life-threatening situations when attempts at venous access fail.

CONTRA-INDICATIONS

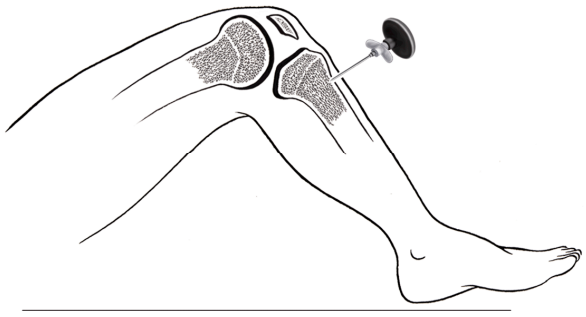
- Fracture of involved bone
- Osteomyelitis
- Infection overlying the site
- Femur fracture on the ipsilateral side

EQUIPMENT

- Polyvidone iodine 10%
- Sterile gauze pads
- Sterile 5-ml syringes
- Sodium chloride 0.9%
- Sterile gloves
- Intraosseous infusion needle. There are different needle sizes. The 16G are usually used for children > 10 kg and 18G for children < 10 kg; however any size can be used.
- Tape
- Local anaesthetic and needles for local anaesthesia (if needed)
- Infusion

SITE FOR PUNCTURE

The best site is the flat antero-medial surface of the tibia. The anterior surface of the femur and the superior iliac crest can also be used. The tibia is preferred since the antero-medial surface of the bone lies just under the skin and can easily be identified.



TECHNIQUE

- Bend the knee and stabilize the leg (put a sandbag or a pillow as support under the knee).
- Palpate the tibia tuberosity and locate the site for cannulation. It lies 1-3 cm below the tuberosity on the antero-medial surface of the tibia.
- Put on sterile gloves.
- Clean the skin over and surrounding the site.
- When the child is unconscious it is not necessary to use a local anaesthetic. If the child is conscious, inject a small amount of local anaesthetic into the skin and continue to infiltrate down to the periostium.
- Stabilize the proximal tibia with the left hand (this hand is not sterile anymore) by grasping the thigh and the knee above and lateral to the cannulation site, with the fingers and thumb wrapped around the knee but not directly behind the insertion site.
- Palpate the cannulation site again with the right hand (sterile glove).
- With trochar in place, insert the needle at a 90-degree angle with the bevel pointing toward the foot. Advance the needle using a gentle but firm, twisting or drilling motion.
- Stop advancing the needle when a sudden decrease in resistance is felt. The needle should be fixed in the bone.
- Remove the trochar and confirm that the needle is in the marrow cavity by aspirating one ml of marrow content (looks like blood), using a 5-ml syringe.
- Attach the second 5-ml syringe filled with sodium chloride 0.9%. Stabilize the needle and slowly inject 3 ml while palpating the area for any leakage under the skin.
- If there is infiltration, remove the needle and try the other leg.
- If there is no infiltration, the needle is correctly placed. Detach syringe and connect tubing to begin infusion. Stabilize in position with sterile gauze pads and secure with tape.

INFUSION

- Check that the flow rate is steady, and assess clinical response.
- Fluid administration may require active assistance: fluid can be infused under gentle pressure, manually by using a 50-ml syringe or by inflating a blood-pressure cuff around the infusion bag.
- Darrow solution, Ringer Lactate, blood products and drugs can be infused using this technique.
- Stop intraosseous infusion as soon as the venous access is possible. The longer the period of use the greater the risk of complications.

COMPLICATIONS

- Serious complications include tibial fracture especially in neonates, compartment syndrome, skin necrosis and osteomyelitis.

Strict compliance to asepsis is essential to avoid the risk of osteomyelitis and cellulitis. The incidence of osteomyelitis is less than 1% when asepsis is observed.

Annex 14. Patient follow up forms

14.1. CTC patient follow up form

Fiche de suivi du cholérique / Follow-up form of choleraic patient/ Ficha de vigilancia del colérico

IDENTIFICATION / *IDENTIFICACIÓN* / DATE D'ENTRÉE / DATE OF ENTRY / *FECHA DE ENTRADA* ..... / ..... / ..... HEURE / HOUR / *HORA* ..... NUMÉRO / NUMBER / *NÚMERO* .....

NOM / NAME / *NOMBRE* : ..... SECTION / VILLAGE / *ZONA / PUEBLO* ..... SEXE/SEX/*SEXO* : ..... (*F / M*)

AGE / EDAD : .....

OBSERVATIONS / *OBSERVACIONES*

EXAMEN PHYSIQUE À L'ENTRÉE / PHYSICAL EXAMINATION AT ENTRY / *EXAMEN CLÍNICO A LA ENTRADA* .....

COMMENTAIRES / COMMENTS / *COMENTARIOS* : .....

T.A. À L'ENTRÉE/ BLOOD PRESSURE AT ENTRY/ *TENSIÓN ARTERIAL A LA ENTRADA*

POULS À L'ENTRÉE / PULSE AT ENTRY / *PULSO A LA ENTRADA* : BON / GOOD / *BUENO* ❑ FAIBLE / WEAK / *DÉBIL* ❑ ABSENT / *AUSENTE* ❑

TEMPÉRATURE À L'ENTRÉE / TEMPERATURE AT ENTRY / *TEMPERATURA A LA ENTRADA* :

DIARRHÉE - DATE DE DÉBUT / DIARRHOEA - DATE OF BEGINNING / *DIARREA - FECHA DE COMIENZO* ...../ ..... / .....

– NOMBRE DE SELLES DEPUIS LE DÉBUT / – NUMBER OF STOOLS SINCE THE BEGINNING / – *NÚMERO DE DEYECCIONES DESDE EL COMIENZO* .....

– ASPECT / *ASPECTO* : AQUEUX / WATERY / *ACUOSO* ❑ SANGUIN / BLOODY / *SANGUÍNEO* ❑ MUQUEUX / MUCOUS / *MUCOSO* ❑

VOMISSEMENTS / VOMITING / *VÓMITOS* :

– DATE DE DÉBUT/DATE OF BEGINNING/*FECHA DE COMIENZO* : ...../...../ .....

– NOMBRE / NUMBER / *NÚMERO* : .....

URINES / *ORINES* : PRESENTES / PRESENT / *PRESENTES* ❑ ABSENTES / ABSENT / *AUSENTES* ❑

SURVEILLANCE / *VIGILANCIA*

HEURE / HOUR / *HORA* (TOUTES LES 2h. / EVERY 2h. / *CADA 2h.*)												
POULS / PULSE / *PULSO*												
DIARRHÉE / DIARRHOEA / *DIARREA*												
VOMISSEMENTS / VOMITING / *VÓMITOS*												
ORS / SRO (X = 1L)												

GUÉRI / CURED /*CURADO* : ❑

ABANDON / *ABANDONO* : ❑

TRANSFÉRÉ / TRANSFERED / *TRANSFERIDO* : ❑ À / TO / *A* : .....

DÉCÉDÉ / DEAD / *FALLECIDO* : ❑

DATE DE SORTIE / DATE OF EXIT / *FECHA DE SALIDA* ...../ ..... /.....

HOSPITALISATION / HOSPITALIZATION / *HOSPITALIZACIÓN* / DATE D'HOSPITALISATION / DATE OF HOSPITALIZATION / *FECHA DE HOSPITALIZACIÓN* ..... /...../..... HEURE / HOUR / *HORA* ..... N° TENTE / ABRI / N° TENT / SHELTER / N° *TIENDA / ABRIGO* .....

SIGNES PHYSIQUES DE DÉSHYDRATATION : / PHYSICAL SIGNS OF DEHYDRATION : / *SIGNOS CLÍNICOS DE DESHIDRATACIÓN* : ABSENTS / ABSENT / *AUSENTE* ❑ PRÉSENTS / PRESENT / *PRESENTE* ❑ CHOC / SHOCK / *CHOQUE* ❑

PRESSION ARTÉRIELLE À L'ENTRÉE / BLOOD PRESSURE AT ENTRY / *PRESIÓN ARTERIAL A LA ENTRADA* .....

POULS À L'ENTRÉE : BON / PULSE AT ENTRY : GOOD / *PULSO A LA ENTRADA* : *BUENO* ❑ FAIBLE / WEAK / *DÉBIL* ❑ ABSENT / NONE / *AUSENTE* ❑

CONSCIENCE : / CONSCIOUSNESS : / *CONCIENCIA* : NORMALE / NORMAL / *NORMAL* ❑ ALTÉRÉE / IMPAIRED / *ALTERADA* ❑

DATE / *FECHA*	...../ ...../							...../ ...../				...../ ...../				...../ ...../			
HEURE / HOUR / *HORA*								0	6	12	18	0	6	12	18	0	6	12	18
TEMPÉRATURE / TEMPERATURE / *TEMPERATURA*																			
PRESSION ARTÉRIELLE / BLOOD PRESSURE / *PRESIÓN ARTERIAL*																			
POULS / PULSE / *PULSO*																			
DIARRHÉE / DIARRHOEA / *DIARREA*																			
VOMISSEMENTS / VOMITING / *VÓMITOS*																			
URINE / *ORINA*																			
RINGER LACTATE 1 LITRE																			
ORS / SRO																			
ANTIBIOTIQUES / ANTIBIOTICS / *ANTIBIÓTICOS*																			
AUTRES TRAITEMENTS / OTHER TREATMENTS / *OTROS TRATAMIENTOS*																			

OBSERVATIONS/ COMMENTS /*OBSERVACIONES* :

DATE DE SORTIE / DATE OF EXIT / *FECHA DE SALIDA* : ..... / ..... / .....

GUÉRI / CURED / *CURADO* ❑

ABANDON / *ABANDONO* ❑

TRANSFERT / TRANSFERED /*TRANSFERIDO* ❑ À / TO / *A* : .....

DÉCÉDÉ / DEAD / *FALLECIDO* ❑

CAUSE PROBABLE DE LA MORT / PROBABLE CAUSE OF THE DEATH / *CAUSA PROBABLE DE LA MUERTE* .....

14.2. CTU patient follow up form

CTU PATIENT FOLLOW UP FORM
To be kept at patients bedside

Patient Number _____ Date of Admission _____/_____/_____ Time ___ ___:___ ___

Surname _____ Name _____

Neighborhood _____Village _____ District _____

Date of onset of Diarrhoea _____/_____/_____ Age _____ Estimated weight _____

1. Initial Evaluation

Pulse: ✶present ✶weak ✶none

Condition	✶ Well/Alert	✶ Restless/irritable	✶ Lethargic/unconscious
Eyes (sunken)	✶ No	✶ Yes	✶ Yes
Thirst	✶ Drinks normally	✶ Thirsty, drinks eagerly	✶ Not able to drink
Skin Pinch	✶ Goes back quickly	✶ Goes back slowly	✶ Goes back very slowly
Dehydration	✶ **No dehydration (A)**	✶ **moderate dehydration (B)**	✶ **Severe dehydration (C)**

2. In/ output follow up

	Day 1 Date ___/___/___						Day 2 Date ___/___/___				Day 3 Date___/___/____			Day 4 Date ___/___/___		
Time From day 2 onwards, adapt and specify recording hours to shifts.	First 15 min.	+ 30 min.	+ 1 hour	+ 3 hours			AM	PM	even -ing	Nigh	AM	PM	Night	AM	PM	Night
ORS cross (x) a circle for each cup (á 200 ml) of ORS given	o o o	o o o	o o o	o o o	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo	ooo ooo ooo
IVF cross (x) a circle for each litre of RL given	o o o	o o o	o o o	o o o	ooo ooo ooo	ooo ooo ooo	ooo ooo	ooo ooo	ooo ooo	ooo ooo	ooo	ooo	ooo			
Diarrhaea tick (•) number of stools passed in time period																
Vomit tick (•) number of vomit passed in time period																
Dehydration Re-assess dehydration status (A, B or C)																

Date of Exit ____/____/____ ✶ Cured ✶ Abandon (Defaulter) ✶ Transferred ✶ Died

If patient died: Probable reason patient died and time_____

Annex 15. Chlorination of drinking water

15.1. Method

Chlorination is one of the best methods of treating drinking water (relatively simple, effective and easy to measure). In spite of this relative simplicity, it should not be forgotten that in an emergency situation it is always preferable to use a groundwater source, which can be protected and monitored in terms of environmental hygiene (see technical brief Protecting a well in ???).

Chlorination requires staff being trained in the technique and in its monitoring, as well as good logistic (supply of chlorine generating product, storage, etc.).

IN PRACTICE

- Only the chlorination of a known volume of water in a reservoir is discussed here known as batch chlorination.
- The principle is to add enough chlorine to destroy all the organic matter (including micro-organisms) contained in the water and to leave a small fraction of chlorine available for dealing with possible reintroduction of organic matter. To determine how much chlorine or 1% chlorine solution to add, the chlorine demands measured.
- For chlorinating drinking water a stock solution (also called "mother" solution) of 1% chlorine is used, whichever chlorine generating product is used.
- Prepare 1 litre of 1% chlorine solution (stock solution):

- Take several (typically 3 or 4) non metallic containers of known volume (e.g. 20 litre bucket) with lids.
- Clean the containers and their lids 3 times (2 first times with your hands or a brush if needed, the last time only rinsing) with the water to be treated.
- Fill the containers with some of the water to be treated and label them (1 to 4).
- Add to each container a progressively greater dose of 1 % chlorine solution with a graduated syringe:
  - Container 1: 1 ml
  - Container 2: 1.5 ml
  - Container 3: 2 ml
  - Container 4: 2.5 ml
- Put back the lids and wait for 30 minutes (**essential:** this is the minimum contact time for the chlorine to react).
- Measure the free residual chlorine.
- Choose as a reference the container where the free residual chlorine is between 0.2-0.5 mg/ litre.
- Extrapolate the 1% dose needed to treat the volume of water to in the reservoir.
- Pour the solution in the reservoir, mix well (during filling) and wait for 30 minutes. Control the free residual chlorine before distribution.

EXAMPLE: CHLORINATION OF A 2000 L WATER RESERVOIR

- Follow the steps 1 to 5 above. The free residual chlorine levels in the containers measured 30 minutes after adding 1, 1.5, 2, 2.5 ml of 1% chlorine solution are respectively as follows:
  - 1: 0 mg/l
  - 2: 0. 1 mg/1
  - 3: 0. 4 mg/l
  - 4: 1 mg/l
- The reference dose chosen therefore will be that for container number 3 (as results are between 0.2-0.5 mg/l).
- If it needs 2 ml of 1% chlorine solution to chlorinate 20 litres of water at the correct dosage, it needs 100 times as much to chlorinate 2000 l,

  e.g.: 100 X 2 ml = 200 ml of 1% chlorine solution

INPUTS

- 1% chlorine solution
- Several containers of the same known volume (buckets with lids, jerry cans etc.)
- 5 ml syringe
- Measuring equipment (comparator and DPD1 tablets)
- Watch to measure the 30 minutes

The MSF "chlorination kit", available through MSF logistics, contains all the material nee - ded for chlorination, dosing and monitoring.

Starting with:	Preparation	Remarks
Calcium hypochlorite (HTH) at 70% active chlorine	15 g/litre = 1 level soupspoons / litre	Let the deposit of calcium settle and use only the supernatant.
Chlorinated lime at 30% active chlorine	33 g/litre = 2 level soupspoons/litre	
Sodium dichloro-isocyanurate (NaDCC) at 1 g active chlorine per tablet	10 tablets/litre	Ensure that the excipients in the tablets are non-toxic.
Sodium Dichloro-isocyanurate (NaDCC) at 5 mg active chlorine per tablet	2000 tablets/litre	These tablets are for emergency water chlorination (1 tab/litre). Their use to prepare a 1% solution should be limited due to the very high number of tablets needed.

Important

- Never chlorinate turbid water because the suspended particles can protect micro-organisms. The measurement of free residual chlorine may indicate a satisfactory result (between 0.2-0.5 mg/l), but there is no way of knowing if the chlorine actually comes in contact with all the pathogens. Water to be chlorinated must contain as little visible suspended material as possible or when measured with turbidity tube less than 5 NTU (less than 20 NTU in emergencies). If turbidity exceed the recommended values, a pre-treatment such as sedimentation or filtration should be done before chlorination
- Chlorination is less effective if the pH of the water is above 8 (see 15.2 monitoring chlorination)
- Chlorination is effective against practically all pathogenic micro-organisms in water except encysts protozoan. The only way to be sure of its effectiveness is to monitor the pH, the turbidity and the free residual chlorine after the optimum contact time. ***Important***: even if the chlorine dosage is correctly determined, the chlorine demand may vary over time with unexpected changes in amount of organic matter in the water. It is thus important to monitor the free residual chlorine, the pH, the turbidity frequently in order to be able to adjust the chlorine dosage accordingly.
- The doses of 1% chlorine solution given here for the example of calculating the chlorine demand are only an indication. It may be that the chlorine demand of water to be treated in the filed is very different form this example.
- The taste or odour of chlorine in water is not a proof of the presence of free residual chlorine (it could well be combined residual chlorine).

15.2. Monitoring chlorination

The simplest and surest way of monitoring the effectiveness of chlorination of drinking water is to measure the Free Residual Chlorine (FRC).

The presence of FRC in water (after a contact time of 30 min) proves that enough chlorine has been added to satisfy the chlorine demand or in other terms to oxidise all the oxidisable matter present in the water, including micro organisms, and leaving an excess of chlorine available to deal with possible recontamination (in the distribution system, during handling etc.).

The objective of chlorination is thus to add enough chlorine to leave 0.2-0.5 mg/l of RFC after the contact time.

The measurement is most easily done using a comparator also called a «Pool tester ».

- Rinse the Pool tester 3 times with the water to be tested, including the cover
- Fill the 3 compartments to the top with the water to be tested
- Put 1 Phenol Red tablet in the left hand compartment (measurement of pH)
- Put 1 DPD 1 tablet in the right hand compartment (measurement of Free Residual Chlorine)
- Replace the cover carefully
- Shake until the tablets are completely dissolved (about 20 seconds).
- Read the results in natural day light, comparing the colours in the outside compartments (sample) with those in the central compartment (reference).

INPUTS

- 1 Pool tester with cover
- 1 Phenol Red tablet (Phenol Red is marked in green on packaging)
- 1 DPD1 tablet (DPD1 is marked in green on packaging)
- Water to be tested

Important

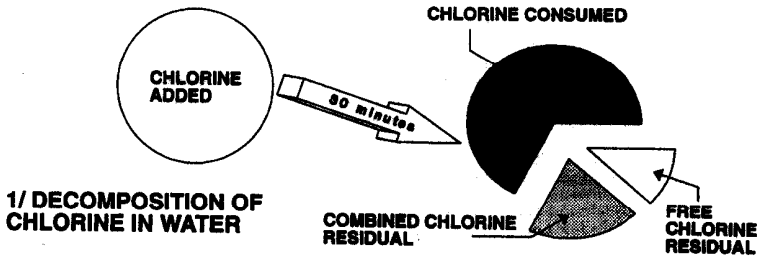
- Never touch the tablets, or the inside part of the cover with your fingers: this could affect the results.
- The printing « DPD1 or Phenol Red » must be in green (meaning rapid dissolving) on the packaging. There are other DPD1 and Phenol Red tablets with printing in black: they should never be used in this pool tester.
- One whole tablet must be used. Do not use broken tablets (while opening packaging or because of bad storage).
- Tablets have a shelf life of 5 years under good storage conditions (dry, cool place). Do not use tablets, which have lost their colour (dull grey instead of bright white for DPD1, and dull brown instead of bright orange for Phenol Red) or disintegrate on opening.
- Read the results within 60 seconds of the tablets dissolving to be sure of a reliable measurement. Results are not guaranteed after this time.
- Read the results in good lightning conditions (day light but not in direct sun light; do not wear sun glasses to read the results). Ideally, the reading should be made on a white surface (ex: a tent wall)
- The pH needs not to be measured every time. However, it must systematically be measured before starting chlorination as a pH > 8 requires higher contact time and a higher residual chlorine (see TB Chlorination of drinking water). pH of a given water may vary with time due to seasonal changes, so it needs to be controlled from time to time.

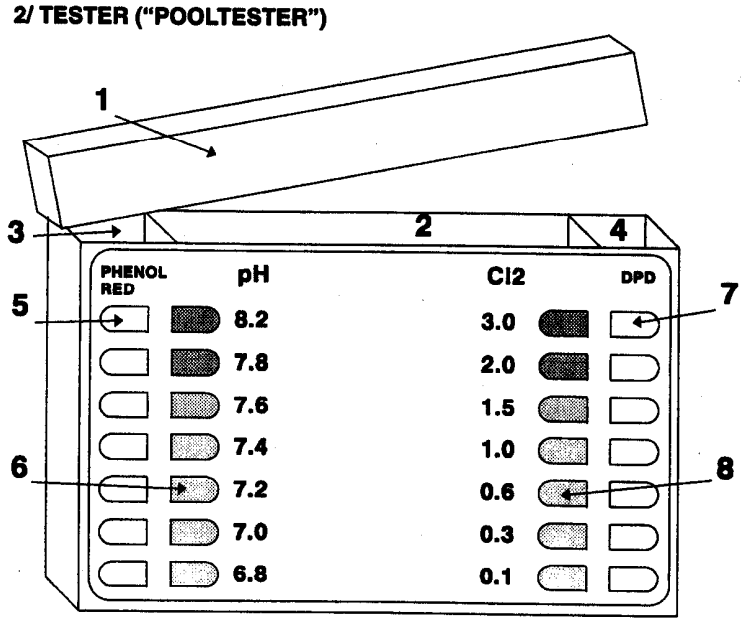
COMMENTS ON pH OF WATER

- pH = 7: neutral
- pH < 7: acidic
- pH > 7: alkaline (or = basic)

WARNING: In case of residual chlorine above 10 mg/l, the tablet will not develop any color, wrongly indicating zero residual chlorine.

Technical brief: Monitoring chlorination





Key

1 Cover
2 Central compartment
3 pH compartment (Phenol Red tablet)
4 FRC compartment (DPD1tablet)
5 pH reading scale
6 pH reference scale
7 FRC reading scale
8 FRC reference scale

15.3 Controlled bucket chlorination

Controlled bucket chlorination is the only effective method for chlorinating drinking water collected, by individuals, directly from unprotected water sources (open wells, lakes, rivers etc). The principle is to individually chlorinate each container filled from the unprotected water sources. However it is labour intensive and it should be restricted to short-term emergency use only. Typically, bucket chlorination will be replaced by some system of batch chlorination.

METHOD

The below points outline the bucket chlorination process:

- Measure the turbidity and pH of the water source to determine the appropriateness and waiting time of chlorination.
- Prepare a 1% chlorine solution (see p.).
- Carry out the bucket chlorination test (see the MSF handbook *Public Health Engineering in emergency situation*)
- Determine the volume of the water-collecting container and inject with a syringe the appropriate amount of 1% solution needed to result in a free residual chlorine of 0.2-0.2 mg/litre.

MANAGEMENT OF THE PROCESS

The system is run by a number of chlorinators and their supervisors. In a 12-hour period one chlorinator can treat approximately 45m^3 of water. The chlorinators are located next to areas where people collect drinking water from. In areas where there are many water points, try to organise with the community a smaller number of focal water points that are accessible to all. Typically one supervisor can manage a maximum of 30 chlorinators, though this will vary according to the situation. This method of chlorination will generally require promotion within the community

Chlorinator Tasks

- preparation of 1% chlorine solution.
- dosing of people's water containers
- recording details of the dosing
- providing basic information on chlorination to the beneficiaries e.g. the need to wait for 30 minutes before using the water

Supervisor Tasks

- monitoring chlorinator performance
- checking the chlorinators records
- spot checking the chlorinated water through free residual chlorine measurement.
- monitoring the water source for any changes in chlorine demand, turbidity or pH.
- promoting/publicising the chlorination programme

INPUTS

- Chlorine generating products*
- Protective clothing: gloves*,aprons*, glasses and boots
- Measuring cylinder 1 l*
- 20 l jerrycans for 1% solution storage*
- 20 l buckets for the chlorine test*
- Pool testers with DPD1 & phenol red tablets*
- Range of syringes (e.g. 5, 10 ml)*
- Turbidity tube*

* present in chlorination kit: KWATKCHL01

Important

- Chlorination of turbid water will be reduced in effectiveness. Water to be chlorinated should contain as little visible suspended material as possible, ideally less than 5 TU/ NTU and in exceptional situations up to 20 TU/ NTU.
- Chlorination is less effective if pH is above 8. In this case the free chlorine residual and the contact time should be doubled, to 0.4-1.0 mg/l and 1 hour respectively, for chlorination to be considered effective.
- Metal consumes chlorine; so do not prepare strong solutions in metal containers.
- Make-up 1% solution on a weekly basis
- Concentrated chlorine products should be kept in a dry, shaded place and guarded.
- The syringes for chlorine dosing are susceptible to wear so sufficient supplies should be stored
- The transport between the water point and a person's home will generally be sufficient for both the mixing and a 30 minute contact time. Where this is not the case a strategy will have to be implemented that insures the 30-minute contact time.

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