



ACUTE WATERY DIARRHOEA- CHOLERA MANUAL

A result of EMERGENCY experience in Port Sudan, Red Sea State



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Acknowledgments

This Manual was developed through a significant collection of the existing literature already available. Although we provide a bibliography and references, we would like to highlight the contribution of the following guidance:

- UNICEF, Cholera Toolkit, 2013;
- WHO, Technical notes on drinking-water, sanitation and hygiene in emergencies: Water, sanitation and hygiene (WASH) in cholera treatment centres in emergencies, 2012.

This work is also based on the experience of EMERGENCY in Port Sudan (Red Sea State, Sudan).

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1.DEFINITION

Diarrhea is defined as passage of abnormally liquid or unformed stools at an increased frequency.

Acute watery diarrhea is defined as water-like diarrhea lasting less than 2 weeks.

Cholera is a condition of having acute watery (watery rice) diarrhea and signs of severe dehydration in endemic cholera areas. The result of stool culture will be positive for *V. Cholerae* O1 or O139.

Diagnosis	In favour
Acute (watery) diarrhoea	 More than three loose stools per day No blood in stools
Cholera	 Profuse watery diarrhoea with severe dehydration during cholera outbreak Positive stool culture for <i>Vibrio cholerae</i> 01 or 0139
Dysentery	 Blood mixed with the stools (seen or reported)
Persistent diarrhoea	 Diarrhoea lasting ≥ 14 days
Diarrhoea with severe malnutrition	 Any diarrhoea with signs of severe acute malnutrition (see section 7.4 (p. 200)
Diarrhoea associated with recent antibiotic use	 Recent course of broad-spectrum oral antibiotics
Intussusception	 Blood and mucus in stools Abdominal mass Attacks of crying with pallor in infant or young child

Image 1: WHO, Hospital care for children (2013). Differential diagnosis in a child presenting with diarrhoea (page 127)



2.EPIDEMIOLOGY¹

To date, there have been seven cholera pandemics, six of which have been most likely due to the classical biotype. The current pandemic began on the Indonesian island of Sulawesi in 1961 and resulted from the El Tor biotype. During this current pandemic, the classical form seems to have been almost entirely replaced by El Tor, which survives well on zooplankton and other aqueous flora and fauna. This fact is commonly cited as one reason for the persistence of the current pandemic, along with the fact that El Tor evokes less durable immunity than does the classical biotype.

From a clinical standpoint, cholera caused by the El Tor biotype has a higher proportion of asymptomatic cases, who are silent excretors of infectious *V. cholerae*. However, most experts agree that recently the proportion of all cases of symptomatic cholera presenting with severe dehydration has increased and that this trend is attributable to the emergence of a variant strain of El Tor that produces the classical cholera toxin. Generally, the majority of people infected are asymptomatic (approximately 75 per cent). Of the symptomatic cases (25 per cent), a minority leads to severe cholera (20 per cent of those with symptoms, or 5 per cent of all infected cases) with a greater proportion presenting mild to moderate disease (80 per cent of those with symptoms, or 20 per cent of all infected).

3.TRANSMISSION²

The predominant route for cholera transmission is faecal-oral. In an epidemic, there is only one way to contract cholera: by swallowing something (usually water or food) that has been contaminated with faecal matter that contains *V. cholerae*. Consequently, if faecal material is not ingested orally, the spread of cholera can be completely stopped and infection can be entirely prevented.

Occasionally cholera is acquired from eating inadequately cooked shellfish that have accumulated *V. cholerae* in their natural environment; however, during an epidemic it is the faecal-oral route that is significant.

Cholera is not transmitted through the air or merely by being in close proximity to someone else who has it. Transmission may occur through water, food, hands or other means. Cholera can also be transmitted by vomitus; however, since there are more *V. cholerae* per gram of watery diarrhea then of vomitus, the transmission is more frequent from contamination of water or food with fecal material.

Cholera cannot occur where the bacterium is not present, but if the bacterium is already present or is introduced within a setting, adequate levels of public sanitation, safe water supply and personal hygiene will inhibit its transmission.

¹ UNICEF, Cholera Toolkit, 2013, p. 13.

² UNICEF, Cholera Toolkit, 2013, p. 17.



4.CLINICAL MANIFESTATIONS

4.1 DIARRHOEA AND VOMITING³

The deadly effects of cholera are the result of a potent toxin called CTX that the bacteria produce in the small intestine. CTX binds to the intestinal walls, where it interferes with the normal flow of sodium and chloride. This causes the body to secrete enormous amounts of water, leading to **diarrhoea** and a rapid loss of fluids and salts (electrolytes). In the most severe cases, the rapid loss of large amounts of fluids and electrolytes can lead to death within two to three hours. In less extreme situations, people who do not receive treatment may die of dehydration and shock hours to days after cholera symptoms first appear. The severe fluid loss occurs from diarrhoea and vomiting. Diarrhoea is usually painless, without fever and comes on suddenly. In adults in the most severe cases diarrhoea can reach a stool output of 1 liter per hour. In children, the maximal rate of stool excretion is between 10 to 20 ml/kg/hr. Severe diarrhoea has profuse "rice water" stool, a watery stool with flecks of mucous.



Image 2: "Rice Water" Stools in Cholera

Vomiting is frequently watery; it can last for hours at a time. Vomiting impairs the ability to drink and therefore rehydration and electrolyte imbalance becomes a challenge to restore.

³ http://www.mayoclinic.org/diseases-conditions/cholera/symptoms-causes



4.2 SEVERE DEHYDRATION

WHO classifies dehydration in 3 levels of severity; the following are the signs and symptoms that correspond to the three different levels:

	FLUID DEFICIT AS % BODY WEIGHT	FLUID DEFICIT in ml/Kg BODY WEIGHT	SIGNS AND SYMPTOMS
No sign of dehydration	<5%	<50 ml/Kg	usually no objective signs of dehydration but the patient may be very thirsty and be mildly dehydrated
Some dehydration	5-9%	50-90 ml/Kg	poor skin turgor, rapid and / or weak pulse, weakness, dry mouth and eyes, RESTLESSNESS, IRRITABILITY AND THIRST
Severe dehydration	>10%	>100 ml/Kg	very poor skin turgor, weak or absent pulse, decreased or absent urine flow, sunken eyes, increased or gasping respirations, wrinkled skin of the fingers ("washer woman's fingers"), and altered mental status (e.g. stupor or coma) Patients with severe dehydration often have severe muscle cramps which resolve after rehydration, UNABLE TO DRINK.

4.2.1 HYPOVOLEMIC SHOCK AND ELECTROLYTE IMBALANCE

Severe dehydration leading to hypovolemic shock and electrolyte imbalance may manifest as follows:

1. Central nervous system

- a) irritability and restlessness;
- b) lethargy
- c) unconsciousness
- d) possible generalized convulsions

2. Skin and mucous membrane

- a) sunken eyes
- b) dry mouth
- c) wrinkled skin



d) skin pinch goes back very slowly >2 seconds

3. Cardiovascular

- a) cold extremities
- b) pulse weak and fast
- c) tachycardia
- d) arrhythmia
- e) Systolic blood pressure less than 80 mmHg (in adults)
- 4. Kidney
- a) Oliguria/anuria

5. Ventilation

- a) tachypnea
- 6. Muscles
- a) cramps and weakness
- **7.** Hypokalemia Hypomagnesemia Very low potassium and magnesium levels interfere with heart and nerve function and are life-threatening. Weakness and cramps and arrhythmias are all involved in electrolyte imbalance.
- **8.** Zinc Deficiency Zinc is an important micronutrient for a child's overall health and development and is lost in great quantity during diarrhea. REPLACEMENT OF LOSSED ZINC assists in THE RECOVERY PROCESS and has been shown to decrease the duration and severity of the episode.

4.3 OTHER MAJOR COMPLICATIONS

4.3.1 Hypoglycaemia

Dangerously low levels of blood sugar (glucose) – the body's main energy source – may occur when people become too ill to eat. Children are at greatest risk of this complication, which can cause seizures, unconsciousness and death.

4.3.2 Pneumonia

Pneumonia has been described as a frequent comorbidity among children with cholera, potentially from aspiration in the setting of vomiting, and has been associated with mortality [35]. Blood stream invasion by the organism is rare. Fever is also infrequent, so the presence of an elevated temperature should prompt consideration of a concurrent infection or complication.



4.3.3 "Cholera sicca"

"Cholera sicca" is an unusual form of the disease in which fluid accumulates in the intestinal lumen; circulatory collapse and even death can occur in the absence of diarrhoea.

5.CHOLERA IN MALNURISHED PATIENTS

Malnutrition can make the diarrhoea **more severe, more prolonged** and **more frequent** as compared to diarrhoea in non-malnourished children. During the diarrhoea, there is a decrease in food intake and nutrient absorption while simultaneously there is an increase in requirements. This cycle often combines to cause weight loss and augments the severity of the illness.

6.DIAGNOSIS OF CHOLERA

6.1 STOOL CULTURE

The diagnosis of cholera is confirmed through stool culture, which isolate *Vibrio Cholerae* O1 and O139. WHO suggests that all samples will be confirmed using classic laboratory procedures.

However, in order to guarantee a prompt management of cholera, the disease should be presumptively diagnosed on the basis of clinical suspicion.

According to WHO, cholera should be suspected when:

- a patient aged 5 years or more develops severe dehydration or dies from acute watery diarrhoea, even in an area where the disease is not known to be present;
- a patient aged 5 years or more develops acute watery diarrhoea, with or without vomiting, in epidemic areas⁴.

6.2 RAPID TEST

Cholera rapid diagnostic tests (RDT) could play a central role in outbreak detection and surveillance in lowresource settings, but their modest performance has hindered their broad adoption. Presently, research is

⁴ <u>http://www.who.int/cholera/technical/prevention/control/en/index1.html</u>



ongoing to determine if the addition of an enrichment step may improve test specificity. Crystal VC RDT (Span Diagnostics, India) with enrichment step is an example. The RDT with enrichment showed performance comparable to that of culture and could be a sustainable alternative to culture confirmation where laboratory capacity is limited⁵.

7.TREATEMENT GUIDELINES: CASE MANAGEMENT AND TREATMENT OF CHOLERA

Case Management and treatment of Cholera

Steps in the management of cholera:

Step 1. Dehydration assessment and Triage.

Step 2. Assess for any other co-morbidities, e.g. assessment for malnutrition, rehydration of severe acute malnutrition (SAM) according to guidelines.

Step 3. Rehydrate the patient, monitor frequently and maintain hydration until diarrhoea stops: dehydration treatment guidelines.

Step 4. Give an oral antibiotic to patient with severe dehydration.

Step 5. Feed the patient.

7.1 STEP 1.

Dehydration assessment and Triage

Use the following table to determine whether the patient has:

- No signs of dehydration (code green)
- Moderate dehydration (code yellow)
- Severe dehydration (code red).

DEHYDRATION ASSESSMENT				
GENERAL CONDITION	LETHARGIC, UNCONSCIOUS			
EYES	NORMAL	SUNKEN	SUNKEN	
THIRST NONE		VERY	UNABLE TO DRINK	
SKIN TURGOR	IMMEDIATE RETURN	SLOW RETURN	VERY SLOW RETURN	

⁵ <u>https://www.ncbi.nlm.nih.gov/pubmed/27992488</u>



		IF 2 OR MORE:	IF 2 OR MORE:
EVALUATION	NO DEHYDRATION	MILD DEHYDRATION	SEVERE DEHYDRATION
			INSERT IV CANNULA
			START RL FLUID
		ORS AFTER EACH LOOSE	MONITOR PULSE,
		STOOL	RESPIRATORY RATE AND
(SEE DEHYDRATATION		INSERT IV CANNULA	BLOOD PRESSURE
TREATMENT CHART)	LOUSE STOOL		EVERY 15 MIN.
		INSERT NGT IF NEEDED	GIVE ORS ONCE ABLE
			TO DRINK OR INSERT
			NGT

According to the first assessment do a second evaluation:

- CODE GREEN PATIENTS: reassessment of dehydration status and vital signs after 4 hours
- CODE YELLOW PATIENTS: reassessment of dehydration status and vital signs after 1 hour
- **CODE RED PATIENTS**: reassessment of dehydration status every **30 minutes**, vital signs **every 15 min**.

7.2 STEP 2.

Assess for any other co-morbidities, e.g. assessment for malnutrition

Assessment for any other co-morbidities (e.g. malnutrition, HIV, etc.) in order to adjust the therapy (see Step 3).

7.3 STEP 3.

<u>Rehydrate the patient, monitor frequently and maintain hydration until diarrhoea stops: dehydration</u> <u>treatment procedures</u>

The treatment consists in rehydration as a first priority through the administration of oral or IV fluids (depending on the hydration status), by correcting electrolytes imbalance (in case of needs) and by giving zinc sulphate supply for paediatric patients. According to WHO, supplementary administration of zinc has been shown to reduce the duration, the volume and subsequent episode of diarrhoea. Zinc is administrated with ORS at oral rehydration point of the treatment (children below 15 years old: 10 mg – 20 mg per day along with ORS during the treatment, continue 10 - 14 days at home after discharge).

CODE GREEN:

- i. **Breastfeed** frequently and longer at each feed.
- ii. If the child is exclusively breastfed give ORS in addition to breast milk
- iii. If the child is not exclusively breastfed give one or more of the following: **ORS solution, food based fluids** (soup or rice water)
- iv. Give **Zinc** supplement
- v. Give **ORS** according to the following chart



AGE	AMOUNT OF ORS TO GIVE AFTER EACH LOOSE STOOL	
< 2 YEARS	50-100 ML	
2 – 9 YEARS	100-200 ML	
10 YEARS AND UP	AS MUCH AS WANTED	

CODE YELLOW:

i. Give **ORS** over 4 hours according to the following chart (75ml x weight kg)

WEIGHT	AMOUNT OF ORS TO GIVE OVER 4 HOURS	
2 KG	150ML	
4 KG	300ML	
6 KG	450ML	
8 KG	600ML	
10 KG	750ML	
12 KG	900ML	
14 KG	1050ML	
16 KG	1200ML	
18 KG	1350ML	
20 KG	1500ML	
20-30KG	1.5-2.2ML	
>30KG	2.2-4LT	

- ii. Reassess every 4 hours
- iii. If the patient is vomiting wait 10 minutes before giving ORS solution slowly
- iv. If signs of severe dehydration develop see code red chart
- v. Continue to breastfeed whenever the child wants, begin feeding by normal diet as tolerated
- vi. Give Zinc supplement

CODE RED:

i. IV rehydration with Ringer's Lactate according to the following chart

AGE	FIRST GIVE 30 ML/KG IN:	THEN GIVE 70 ML/KG IN:
<1 YEAR	ONE HOUR	5 HOURS



> 1 YEAR	30 MINUTES	2 and ½ HOURS
ADULTS	GIVE FIRST LITER IN 15 MINUTES	

- ii. Reassess every 30 minutes begin ORS 5ml/kg/hr as soon as patient tolerates without difficulties
- iii. Maintenance for cholera: **100 ml/kg for 24 hours**
- iv. If severe dehydration is still present repeat the IV fluid infusion
- v. If severe dehydration is improving discontinue IV fluid infusion and begin ORS per oral see yellow chart
- vi. Give Zinc supplement when severe dehydration is corrected

IF iv ACCESS IS NOT AVAILABLE WITHIN 30 MINUTES OF EFFORT USE NASOGASTRIC TUBE:

- I. Start rehydration with ORS solution at 20ml/kg/hr for 6 hours (total of 120ml/kg)
- II. Reassess the patient every hour
 - a. If there is repeated vomiting or increasing abdominal distention reduce fluid intake rate
 - b. If dehydration status is not improving check for IV access again

3a. TREATMENT OF HYPOVOLEMIC SHOCK

In case of a child arriving in shock: Capillary Refill > 3 seconds; Pulse weak and fast; Cold hands

- Rapid administration of IV fluid for SHOCK in a child WITHOUT SEVERE ACUTE MALNUTRITION:
 10 20 ml/kg Ringer's Lactate or normal saline over 30-60 minutes
- Rapid administration of IV fluids for SHOCK in a child WITH SEVERE ACUTE MALNUTRITION:
 10 15ml/ kg over 1 hour half Ringer's Lactate + half dextrose 5%

3b. REHYDRATION IN CASE OF SEVERE ACUTE MALNUTRITION (SAM):

First GIVE **ORS: 5ml/kg every 30 minutes for the first 2 hours** Then GIVE **ORS: 5-10 ml/kg/hour for the next 4-10 hours alternate with F75** If after 10 hours the child is still dehydrated, give **F75 at 5-10ml/kg/hour** until the child is rehydrated.

3c. CORRECTION OF HYPOGLYCAEMIA

In case of Hypoglycaemia (Glucose < 45 mg/dl in Normal nutritional status, Glucose <54 mg/dl in SAM): Administer **5ml/kg of dextrose 10% IV**

- i. Recheck the blood glucose after 30 minutes and repeat the dextrose in same dose if level remains low.
- ii. Give glucose orally or by NGT if IV access is not available



7.4 STEP 4.

Oral antibiotic to patient with moderate to severe presentation

Although antibiotics are not necessary for the survival of the patient, various guidelines recommend the use of them in cholera-infected patients with moderate or severe illness and who have begun IV hydration. Treatment with an antibiotic reduces the stool volume, and the duration of the disease.

PAHO/WHO antibiotic recommendations

Case type	Option 1	Option 2
Adults	Doxycicline, 300mg po single dose	Ciprofloxacin, 1g po single dose OR Azithromycin, 1g po single dose
Pregnant women	Erythromycin, 500mg/6 hours for 3 days OR Azithromycin, ¹ 1 g po single dose	-
Children over 3 years, who can swallow tablets	Erythromycin, 12.5mg/Kg/6 hours for 3 days OR Azithromycin, 20 mg/kg, in a single dose, without exceeding 1g	Ciprofloxacin, suspension or tablets, 20mg/kg, in a single dose OR doxycycline, suspension or tablets, 2-4mg/kg po in single ² dose
Children over 3 years, or infants who cannot swallow tablets	Erythromycin, suspension, 12.5mg/kg/6 hours for 3 days OR Azithromycin, suspension 20 mg/kg, in a single dose	Ciprofloxacin, suspension, 20mg/kg, in a single dose OR Doxycycline, syrup, 2-4 mg/kg po in a single dose



With regard to the antibiotic treatment, EMERGENCY suggests to use:

- Azithromycin (as first line option);
- Erythromycin (if the first line option is not available).

In patients with complications such as sepsis or pneumonia consider IV antibiotics accordingly.

7.5 STEP 5.

Feed the patient

Feed the patient when he/she is able to eat. Start normal diet of patient as tolerated gradually increasing to normality. If patient is breast-feeding encourage breast feeding immediately, while if patient is on normal diet, keep the initial 4 hours of rehydration NPO, then encourage the child to eat. In case the child continues to have some signs of dehydration after 4 hours, continue ORS and encourage feeding every 4 hours. WHO suggests



mashed bananas, fresh fruit juice, cereal and other starchy food mixed with pulses vegetables and meat of fish with 1-2 teaspoons of vegetable oil.

<u>Pregnancy⁶</u>

Cholera patients who are pregnant have additional risk factors for more severe outcomes that can affect both the mother and newborn. Women who are pregnant typically have increased severity of diarrhoeal disease with greater dehydration in the third trimester. However, there is no increased risk of mortality with appropriate treatment. The greatest potential impact of maternal infection affects the outcome of the newborn because cholera infection in the third trimester poses a greater risk of spontaneous abortion and premature delivery.

8.PREVENTION AND CONTROL

8.1 HEALTH PROMOTION

In order to prevent the spread of a cholera outbreak and to raise awareness among the population some measures should be implemented. Health education sessions should be provided within the health facilities and at community level. Local media and community leaders should also be involved in disseminating health education messages. Coordination of health promotion practices is a key factor to ensure a correct and consistent spread of information. Information dissemination should occur at national, regional and local level.

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 promoted practices 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 maybe difficult to accept among the population if not extensively discussed and explained, especially funeral practices. 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).

For an effective health promotion:

- Patients and relatives must be informed about hygiene practices to keep in case of cholera cases (both in the CTU's and CTC's) and at home after discharge, in order to avoid the spread of the disease.
- Specific sessions on good hygiene practices for prevention of cholera and on how to recognize the symptoms of cholera have to be held both within a hospital (to patients and relatives) and at community level.

The promotion of hygiene practices should focus on behaviours deemed to be key transmission routes of cholera, preventable only with the participation of the population.

⁶ UNICEF, Cholera Toolkit, 2013.



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)

The messages for the promotion of hygiene are (including potential actions to be taken to promote hygiene at household level):

- Food:
- Cooking food food should be well cooked and served hot (markets, street vendors)
- Storage of food protected from contamination/flies
- Handling hand-washing before preparation of food or before 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
- Promotion of hand-washing with soap (or other) after defecation
- Distribution of soap
- 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
- 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)
- Additional information:
- There is a cholera outbreak in (place, area)
- Cholera can cause death if not treated quickly
- Suspect cholera in a patient presenting with a condition of acute watery (watery rice) diarreah and signs of severe dehydration in endemic cholera area (use a simple language for the population)
- Go immediately for treatment in (give location of CTC/CTU and ORPs)
- All treatment at the cholera structure is free of charge

8.2 COORDINATION

Before a cholera or AWD outbreak occurs, it is important to put in place some actions, in order to be prepared and to give a more effective response in case of an outbreak. Human resources training (health related personnel,



hygiene promotion and community-based workers, support staff in health facilities), data collection, monitoring tools, supply and stock of medicines and consumables at national and regional level help in a preparatory phase.

The national government and stakeholders define a preparedness plan, a contingency plan and a response plan in order to identify who will do what, where and when.

National government should put in place a framework for the control of cholera cases before an outbreak occurs. According to WHO, the main tools for cholera control are:

- proper and timely case management in cholera treatment centres;
- specific training for proper case management, including avoidance of nosocomial infections;
- sufficient pre-positioned medical supplies for case management (e.g. diarrhoeal disease kits);
- improved access to water, effective sanitation, proper waste management and vector control;
- enhanced hygiene and food safety practices;
- improved communication and public information⁷.

8.3 VACCINATION⁸

Use of oral cholera vaccines in emergency situations is accepted but remains a challenge. To date, there is no specific indication for use of oral cholera vaccines in endemic situations. Evidence gained on the use of oral cholera vaccines is evolving rapidly. Work is under way to investigate the role of mass vaccination as a public health strategy for protecting at risk populations against cholera. Issues being addressed include logistics, cost, timing, vaccine production capacity, and criteria for use of mass vaccination to contain and prevent outbreaks.

Recommendations on vaccine use

Oral cholera vaccines should be used in certain endemic and epidemic situations. The use of these vaccines must be complementary to existing strategies for cholera control (in the long term, improvements in water supply, sanitation, food safety and community awareness of preventive measures are the best means of preventing cholera and other diarrhoeal diseases).

⁷ <u>http://www.who.int/cholera/technical/prevention/control/en/index3.html</u>

⁸ <u>http://www.who.int/topics/cholera/vaccines/en/</u>



9.PATIENT FLOW AND PROTOCOLS

9.1 GENERAL PATIENT FLOW:

Patients suspected of cholera arriving in a health facility



Patients suspected of cholera arriving in a CTC/CTU



ISOLATE SUSPECTED PATIENTS FROM THE HOSPITAL FACILITY

ISOLATE SUSPECTED PATIENTS FROM EACH OTHER

ISOLATE THE SUSPECTED PATIEN'S BODILY WASTE FROM FURTHER COMMUNITY CONTAMINATION



9.2 ARRIVAL IN CTC/CTU

Patients might arrive in two ways in a CTC/CTU:

- AMBULANCE: The ambulance will stop in the area that is marked as the ambulance bay; a handbarrow will collect the patient out of the ambulance. The ambulance driver will be instructed by the guard to go back inside of the vehicle and to wait for instruction. Once the patient is confirmed for admission, the driver will be given all means to wash down the vehicle with already prepared chlorine solutions. Following the vehicle wash down, he may depart.
- 2) WALKING PATIENT. Patients will enter, sit on designated benches, they may have one relative or caregiver each and will be processed according to triage area procedure protocols.

In both cases, the patient will proceed to triage area.

9.3 TRIAGE AREA

- 'Admission questionnaire' for each patient. ANNEX 1 ADMISSION QUESTIONAIRRE
- 'Registration Book' documenting each patient
- If the patient answers positively to the screening questions, he/she will be isolated immediately. The <u>isolation</u> of the patient is a priority
- After being <u>isolated</u>, the patient will have a <u>hydration assessment</u> to determine where to be admitted. The staff will then enter the patient's information in the 'Admission Book', assemble the patient file, and write the patients' data on a board. ANNEX 2– TRIAGE CARD
- Patient allocation and all patient treatment plan will be documented in the patient file





9.4 TRIAGE AND ALLOCATION



TRIAGE IS AN ONGOING DYNAMIC PROCESS THAT NEEDS FREQUENT RE ASSESMENT AND ACCORDINGLY ACTION

CODE GREEN PATIENTS

REASSESSMENT OF DEHYDRATION STATUS AND VITAL SIGNS AFTER 4 HOURS

CODE YELLOW PATIENTS

REASSESSMENT OF DEHYDRATION STATUS AND VITAL SIGNS AFTER **1 HOUR**

CODE RED PATIENTS

REASSESSMENT OF DEHYDRATION STATUS EVERY **30 MINUTES,** VITAL SIGNS EVERY **15 MIN**



PATIENT CARD, REGISTRATION, STABILIZATION AND TREATMENT WILL BE DECIDED AND IMPLEMENTED ACCORDING TO DOCTORS ORDERS THAT WILL BE DOCUMENTED IN PATEITN FILE

9.5 RECOVERY TENT

Patients admitted in red tent arrive in the CTC in severe condition (severe diarrhea, vomiting, severe AWD in combination with other medical conditions). Usually this type of patients, thanks to a strong resuscitation with fluids and an antibiotic therapy, plus therapy for other medical conditions if needed, improve drastically after 24h of treatment. Therefore, after morning doctor's round, based on physical examination and data of the previous 24h, the doctor can decide to transfer the patient to the recovery tent, where he/she will receive additional oral therapy until he/she is well enough to be discharged home.

Nurses are in charge of stopping all drips that are running, disconnecting and emptying the urine bag, cleaning the patients together with hygienists, collecting all medical documentation of patients, making sure that the copatients collect all belongings of patients, and moving each patient together with one hygienist and co-patient into the recovery tent.

Hygienist: hygienists will discard all waste according to waste management, remove linen and other materials and send to laundry for washing, they will wash bed, bedside table and chair, and the area around the bed. They will also prepare the bed unit for admission of a new patient.

9.6 DISCHARGE OF PATIENTS

The patient can be discharged if he/she has had less than 3 diarrhea episodes in last 6 hours of admission or in in hospital stay. The doctor will prepare a discharge letter.

At discharge

- 1. Data TO BE collected and documented on DC paper:
 - i. Date of admission, date of discharge
 - ii. Body weight at discharge
 - iii. Diagnosis
 - iv. Brief history during admission. If significant, results of investigations
 - v. Treatment done (drugs, oxygen, fluids), Hb value when relevant
 - vi. Physical examination at discharge if relevant
 - vii. Plan: Medication (Prescription : ORS, ZINC), follow up appointment and investigations to be done on follow up should be documented on DC letter
- 2. The <u>messages</u> to be given throughout the in-center stay and at discharge:
 - i. How to make ORS along with written instructions ANNEX 3
 - ii. Drink safe water chlorinated or boiled
 - iii. Dispose of feces safely
 - iv. Wash hands with soap and water
 - v. Prepare food safely
 - vi. Feeding and Nutritional information



9.7 REFERRAL OF PATIENTS

After finishing the treatment for cholera/acute watery diarrhea, patients requiring ongoing hospitalization for co morbidities, will be discharged and transferred to another hospital for further treatment.

The following steps must be followed for each referral:

- i. All referrals must have both a referral form as well as a discharge paper
- ii. The patient cannot be sent to the receiving facility until approval has been obtained
- iii. All referrals will be sent by ambulance, accompanied by one medical staff

10.LOGISITICS

10.1 LIST OF POINTS TO BE REMEMBERED OF CTC/CTU

UNICEF TOOLKIT - https://www.unicef.org/cholera/Cholera-Toolkit-2013.pdf

ACCESS TO FACILITY / ENTRY POINT:

- I. The entrance of the facility must be clearly identified
- II. Handwashing stations must be available at point of entry with chlorine solution 0.05%
- III. Foot bath or spraying of shoes must be available at the point of entry with chlorine solution 0.2%
- IV. A staff member is posted at the entry to ensure washing of hands and shoes 24 hours a day

ORGANIZATION OF THE AREA

- I. The layout and access to different areas must be organized in a logical way
- II. Patients are separated according to severity of illness
- III. All areas are maintained properly ordered, clean and tidy
- IV. Handwashing stations with chlorine solution 0.05% must be placed at the entry and exit of the wards

SCREENING/ADMISSION AND OBSERVATION AREAS (MILD TO MODERATE)

- I. Patients are greeted well
- II. The time of arrival of patients is clearly noted
- III. Information is correctly filled in and the address of the patient noted
- IV. The age range < 5 years, < 2 years and >5 years must be clearly noted
- V. Patients must be evaluated and their level of severity defined according to protocol
- VI. All staff uniforms are kept and cleaned at the center (Immerse 10 min in chlorine solution 0,05%, rinse then wash as usual). Drying lines should be available near to the laundry area.
- VII. All bed linen and gowns are washed at the center
- VIII. The clothes that belong to the patient are washed (as indicated above) and given back when they reach the recovery area



KITCHEN AND MEALS

- I. Food is provided at the center and there is a designated area for food preparation
- II. Only kitchen staff are allowed to enter the kitchen and handle food
- III. If food is brought to center by relative or caregiver of patient it should be it should be evaluated and preferably transferred to a new container at the gate (the new container should be washed and kept at the centre).
- IV. Handwashing stations are available with chlorine solution 0.05%

DISHES

- I. There is a designated area to wash dishes
- II. Cups used for ORS are washed with a chlorine solution 0,05%
- III. Dishes are washed with a chlorine solution 0,05%

WATER

- I. Water is available at all times and in all critical locations (for cooking and preparation of ORS, handwashing, bathing and cleaning purposes).
- II. Water for consumption has turbity less than 5NTU and chlorine residual of 0.5 1.0 mg/l and must be tested regularly
- III. The quantity of water stored is enough for at least 3 days (based on 60 litres/patient/day + 15 litres/carer/day)

HYGIENE

- I. Handwashing stations have drainage into a covered soak pit or buckets. If buckets are used they are emptied when they are full into a soak pit/latrine.
- II. Health staff and relatives wash hands after each manipulation of the patient
- III. The center has 2 private/showers room per 50 patients or caregivers (minimum 2, male/female)
- IV. The center has minimum 2 private/shower room (male/female) for staff in the neutral area
- V. There are cleaners employed 24 hours a day in the facility

DISINFECTION

- I. Chlorine solutions 0.2% and 0.05% are prepared daily
- II. The foot bath is regularly soaked with the appropriate solution
- III. The floor of each tent must be cleaned with chlorine solution 0.2% 3 times per day and each time it is necessary
- IV. Beds are disinfected after each use with chlorine solution 0.2% and then sun dried (wooden beds are recommended in order to avoid damages by chlorine)

LATRINES

- I. The center has 1 latrine per 20 patients or caregiver in the observation/screening and recovery area (min.
 2 latrines, male/female)
- II. The center has 1 latrine per 50 patients in the in-patients area (min. 2 latrines, male/female)
- III. The center has at least 2 latrines (male/female) for staff in the green area
- IV. The center has at least 2 latrines (male/female) for visitors outside of the centre
- V. Latrines are easy to clean and are cleaned several times a day with chlorine solution 0.2% (this includes the slabs and the walls up to 1m or higher if splashes are present).



VI. Handwashing stations with chlorine solution 0.05% are provided at all latrines (separate for men and women)

WASTE MANAGEMENT

- I. The dustbins are emptied and cleaned regularly
- II. The center has a designated area to bury the faeces and vomit of the severe cases (or another safe disposal method such as pit latrine)
- III. Waste management is ensured in an optimal manner (incinerator/ septic tank)
- IV. Latrines are desludged at a regular basis by trained designated staff and sludge is disposed safely.
- V. The area for the disposal of faeces is isolated from the rest of the facilities
- VI. Handwashing stations with chlorine solution 0.05% are available

DEAD BODIES MANAGEMENT

- I. The center has a designated isolated area for the dead bodies
- II. Handwashing stations with chlorine solution 0.05% are available
- III. Designated staff are trained to prepare and disinfect dead bodies
- IV. The area has plastic chairs, buckets, basins and 1-2 cholera cots (with central hole)
- V. Disinfect the body of a person who has died of cholera with a 2% chlorine solution and plug all orifices (mouth, anus) with cotton soaked in a 2% chlorine solution.
- VI. Do not empty the intestines of the deceased.
- VII. Undertake preparation of the body in a well-ventilated area.
- VIII. Bandage the head so that the mouth remains shut (the face can be left showing).
- IX. Wrap the body in a plastic sheet, to catch any fluids when transporting it.
- X. Bury the body as soon as possible, preferably within 24 hours of death.
- XI. The body should be buried as close as possible to the location where the person died, to limit risks of transport.
- XII. Disinfect clothing, bedding and all surfaces that have been in contact with the body with a 0.2% chlorine solution. Clothes and bedding can alternatively be boiled and dried in direct sunlight.
- XIII. People who are preparing or carrying the corpse should wear rubber gloves and the rubber gloves should then be disposed of through burning, burial or disposal in a pit latrine.
- XIV. After finishing the process wash hands thoroughly with 0.05% chlorine solution or soap.
- XV. The body should be buried at least 50m from a water source and at least 1.5m deep.

IN-PATIENTS AREA

- I. A staff is stationed 24 hours a day at the entry of the area to ensure hands and shoes are washed
- II. The empty bags of Ringer's lactate are kept close to the bed of the patient for a quick evaluation and the number of liters of Ringer's already used is clearly registered
- III. All the beds are cholera beds (with a hole in the middle) without pillow
- IV. The patients are provided with a gown by the center for the duration of their stay
- V. The patients clothes are sent to laundry services (see below on how they should be washed)
- VI. There is a plastic chair besides each bed
- VII. Only one relative per patient is authorized
- VIII. Approx. 1 cm (half a cup <> 100-125 ml) of chlorine solution 2% is put into the buckets for faeces and vomit before placement



- IX. Half a cup (100-125 ml) of chlorine solution 2% is poured in the buckets when they are 2/3 filled with faeces and vomits, covered for 30 minutes and disposed into a pit/latrine.
- X. The empty buckets and basins are cleaned with chlorine solution 2%
- XI. Each patient has ORS available and is encouraged to drink

UNIFORMS OF STAFF, BED LINEN AND LAUNDRY

- I. Staff in charge of disinfection activities use mask, googles, gloves and rubber boots
- II. There is a designated area for laundry

STOCKS⁹

- I. Ringer's Lactate
- II. Normal Saline
- III. Dextrose
- IV. IV Cannula
- V. Plaster (silk and texil)
- VI. Gloves/sterile gloves
- VII. Tourniqet
- VIII. Cotton woll
- IX. Povidone
- X. Chlorexidine
- XI. IV set
- XII. Oxygen Mask
- XIII. Ambu bag
- XIV. CPR Mask
- XV. NG Tube
- XVI. Bandage
- XVII. Guedel Airway
- XVIII. Face mask
- XIX. Urin bag
- XX. Sphyngometer
- XXI. Puls oximeter
- XXII. Paediatric and adult scale
- XXIII. Probe
- XXIV. Scissors
- XXV. Tourch
- XXVI. Glucometer
- XXVII. Accu check
- XXVIII. Thermometar
- XXIX. O2 Cylindar
- XXX. Hand Board, markers and pen
- XXXI. Consultation book, pharmacy request, fluid balance chart
- XXXII. Plastic bags
- XXXIII. Safety box
- XXXIV. Health card
- XXXV. ORS

⁹ For stocks quantities see Annex 4.



- XXXVI. Doxycylline XXXVII. Erythromycin XXXVIII. Zinc tab/ Zinc Syr XXXIX. Azitromicyne
 - XL. Furosemide Vial

DATA MANAGEMENT

- I. The number of cases received in the center is correctly registered
- II. The number of ill perfused is correctly registered
- III. The number of deaths is registered and the day and hour are noted
- IV. The data of the center are regularly transmitted to the MoH and other relevant stakeholders if appropriate.

EXIT AREA

- I. The center has a designated recovery area
- II. The exit point is different and separated form the entry point
- III. A staff is stationed at the exit point 24 hours a day to make sure hands and shoes are washed

10.2 TREATMENT CENTRE LAYOUT

How to choose a site for a CTC

The CTC may be in an existing health facility, or other existing building, such as a school or community hall. If there is no suitable building, the CTC could be set up with tents in a field. Health authorities and communities should be involved in the selection of sites and their preparation. The CTC should not be close to a water source or any other functioning public structures (e.g., schools, dispensaries, markets).

The field where to set up a center should have the following characteristics:

- Total surface around 5000 m2 (similar to the size of a football field). The dimensions proposed in the project are for a square parcel of more or less 70 m length.
- Constant inclination maximum at 7%.
- The field should not be in a depression with risk of flooding during the rainy season.
- In case of absence of a public water system, the possibility of digging some shafts will be valuated
- The center must be at least 300m from the closest community but as nearest as possible to a regional roadway.
- In an urban contest, the field should be clearly defined, bounded and separated from the surrounding residential compounds.
- Mobile telephone coverage is suggested.
- Good access for patients and supplies (consider the distance and availability of transports).



Division of the treatment centre by area

The hospital infrastructure is divided in two areas according to the level of risks linked to the potential presence of the germ. The basic concept is the compartmentalization which allows to control the movements of the vectors inside the facility and from the facility to the "external world".

Green zone: it's the area where the center communicate with the outside.

The access is allowed to the staff, suppliers and authorized visitors. The access is allowed with casual clothes and shoes. The area is monitored at the entrance with the obligation of washing hands with a chlorine solution at 0.05%.

This area includes stores, administration, generators, waters tanks, canteen, laundry room and toilets.

Red Zone: it's the treatment and the recovery area. The access is authorized to all patients, medical staff, technical staff and to the cleaning staff that wear the uniforms, boots, gloves and masks, if necessary.

Buffer zone: it's a strip that separates through a double fence the red zone and everything that is around it. It's a strip without access **(unless particular exception like technical interventions).** The transition between the different zones is marked and monitored so that the staff is obligated to respect all the procedures. The following pattern illustrate **the outlines of the flow** of the operators (clinical and supporting staff).











• Inside the tent:













The pictures above refers to EMERGENCY treatment centre set up in Port Sudan on February 2017.



The treatment centre has to be delimited by a **metal net**, at least 2 meters high and covered by plastic sheets to avoid the possibility to see inside. The division of the different zones (red zone, green zone) must be marked by a red plastic wire at least one meter high.

Distinguishing elements:

- It's important to take into consideration that the "triage" area will have to be made so that the suspected cholera patient will be able to transit directly inside the CTC without passing other zones.
- Changing room: it must be the only passage for the staff from the green zone to the red zone and vice versa. It will be necessary to separate men and women. In this structure, the operators will change, wear a uniform and rubber boots. A bucket where any person that go through the zones will have to immerse its boots will be placed at the entry/exit of the green zone. For moving big-size goods between the red and the green zones special passages will be allocated (for example in the buffer zone).
- <u>It will never be allowed to pass any goods from the red zone to the green zone without cleaning it</u> properly with chlorine 0.5%.

Laundry:

In this area patients' clothes and staff uniforms (medical and non medical staff) are washed and disinfected. It is important in this phase to provide the staff with adequate protection disposals (gloves and masks). The washing scheme must provide for three baths for: disinfection with chlorine 0.5%, washing with soap and rinsing.

Outside the laundry there must be an area for drying the clothes and boots.

Kitchen:

The kitchen should be located in the green zone. Two to three meals per day will have to be prepared mostly for the staff, who should not leave the centre whilst on duty. An estimation of material is required. For semi-permanent shelter (60 m² building) the furniture required is: tables, chairs, shelving units, cupboard or cabinet, cooking pots, kitchen utensils.

Food hygiene

For CTCs or health facilities with kitchens, strict rules should be set for preparing and serving food including:

- Upon entering the kitchen (each time), hands must be washed.
- 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.
- Disinfect plates and cutlery by soaking them for 5 minutes in a basin filled with 0.5% chlorine solution.

Solid waste disposal system:

All the waste produced inside the structure must be disposed inside the same structure and a "burning pit" must be created.

It can be a simple pit in the field or a metal box put in a safe place where the smoke can be dissipated without creating any problem in the centre or in the nearby structures.

The material to get rid of must be put in the burning pit (up to maximum of 1/3 of its volume) and covered with gasoil (diesel). At this point the fire can be set.



Never use petrol! The possibility of explosion is too high and too dangerous.

The burning pit can be dug inside the field or can be e metal box, or a brickwall. All the material coming from the admission units must be burned, including big size items like mattresses. The area should be well bounded to avoid accidents.

The pit will have the following minimal dimension: side 2meters x 1,5m and 2 meters deep.

It would be useful to put an iron grind in the bottom, raised up to 40 cm. This will help the combustion and will contribute to bring the ashes down.

In this case the combustion residues can be left in the pit which will be, at the end of the procedure, reclaimed and covered with cement.

Morgue:

The morgue should be located apart from the tents or other buildings.

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

Cholera Cot:

A bed with a hole for passage of stool. Cover the bed with plastic sheeting or reinforce plastic mats. It is possible to use natural mats, but they would be difficult to clean after each patient. One bucket should be placed underneath the bed to collect stool and another bucket by the patient's side to collect vomit.

We suggest do not use mental for its high corrosion to chlorine but to use a wood material, because chlorine solution have a corrosive effect on metallic surfaces unless chemically treated epoxy powder coated.



Rain water:

Rain water should be contained in drainage channels surrounding each structure and drained into an infiltration system (pit, trench, or absorbent platform, which is a very large shallow trench).

A drainage belt should be dug around the entire camp to avoid any contamination from the outflow. This will require extensive excavation especially if the soil is not very absorbent during the rainy seasons. The drains should be enclosed to prevent any access.



Electrical Installation:

Unless it is possible to ensure a stable and safe connection to the local electrical network, it is recommended to have a generator. The main idea is to have two different sources of alternative power supply: the local electrical network and a back up generator if needed.

Without a local electrical network, the structure should have at least two generators, so one could be a back up if needed. They must have the same characteristics (brand, model, power), so that maintenance and management is simplified.

The installation must guarantee the following characteristics:

- All the switchboards must be easy to reach from the green zone or at least from the main electrical board;
- Every tent must have two lines (lights and plugs);
- The lights in the red zone and others high level risks zone (changing room, guard post, etc.) must have emergency lights;
- A night lighting system must be provided inside and outside the structure;

External lightening: pole 5 meters high with headlights 50W, double headlights every 50 meters with sensors for the night;

Internal lightening: neon lights with double tubes 36W each, three light in every tent (hospital, laundry, changing room). In the other tents, light with neon with double tubes 18W each. For the bathroom and other area light with neon 18W single tube with sensors for the night.

Plugs: 16 A x 2 for every hospital tent, 6 for triage, 6 for the doctors tent, 5 for the canteen.

Water System (for 50 patients):

6 tanks installed on a 3000mm high frame, divided as follows:

- 2 x 2000 lt water + chlorine 0,05%
- 2 x 2000 lt water + chlorine 0,5 %
- 2 x 1000 lt water + chlorine 2 %

The pipes with different concentration of chlorine must reach the red zone where taps are installed to collect the water with different concentration (0.05%, 0.5% or 2%).

- For water distribution we suggest to use pipes, cuts and junctions in PVC and PPR, do not use metal.
- We suggest a 3000 lt tank without chlorine for the laundry in a 50 patients facility.

Sewer System:

Because of the danger of the organic liquids collected by the sewer system in the red zone the following rules must be considered to limit problems once the structure is open:

• The waste water pits size must be 20% larger than the water production in order to avoid full pits in case of a rapid change of the activity.



- Pipework, dimension, material: the pipes must be in **PVC or in polypropylene (PP).** The pipework in plastic have a better grip and low roughness. This allows to operate really quickly and easily. The usual section is 120/140mm.
- Inclination of the straight sections must be between 0.5% and 0.7%. Under this grade, the speed will not be enough for sliding solid wastes. Over this grade, the sliding of the liquid wastes will be too much and the probability of creating some objurgating plug is high.
- **Manholes**: every change of direction and connection between different sections must be inspected through manholes.

If the field does not have the capacity to drain the wastes, it is important to add some accumulation tank and to organize, in agreement with the local authority, a system of external elimination.

Latrines:

The number of latrines required is calculated on one latrine per 20 patients. In the green zone 2 latrines should be installed for staff. The latrines should be clearly identified as male or female.

Latrines should be cleaned several times a day with 0.5 % chlorine solution with mops and sprayed. This includes the slabs and the walls up to 1 m (or higher in case of splashes). Additional chlorine does not need to be poured into the latrine.



ection 1:50



10.3 HUMAN RESOURCES

Staff required for a CTU or CTC must include medical and non medical staff, working on a shift basis ensuring time off and 24-hour cover. Staff should be recruited from the affected community if possible and able to implement their roles with a proper training (both theoretical and on the job).

Staff needed:

- Doctors
- Nurses
- Pharmacists
- Health promoters
- Hygienists
- Cleaners
- Laundry workers
- Guards

- Nurses:

Their responsibilities are:

- Check and monitor vital signs, as well as output and other patient observations as needed or as ordered by the doctor; alert the doctor or senior nurse immediately in case of worsening of the patient status.
- Assess patients and monitor to establish if they have cholera or another acute watery diarrhoea.
- Keep accurate records of patient condition and therapies received, as well as keeping CTC paperwork up to date.
- Follow rehydration protocols for moderate and severe dehydration.
- Give the patient all treatments prescribed by the doctor.
- Provide personal care (example: washing) for the patients when needed. May be assisted by the copatient or hygienist.
- Transfer of patients between different areas of the centre. This includes complete and detailed handover to the receiving nurse.
- Supervise cleaning and waste disposal.
- Supervise Health Promoters and Hygienists.
- Instruct patients and co-patients on proper oral hydration with ORS. Follow ORS intake.
- Teaching patients and co-patients about medications, signs and symptoms indicating they need to return for further treatment, and how to prevent further spread of disease or reinfection.
- Discharge patients, ensuring that they understand hygiene teachings, further follow up, when to return to seek medical attention, and discharge medications.



- Health promoters

Their responsibilities are:

- Orient patients and co-patients to the area and instruct them on rules (to stay to their own beds, not to wander around, etc.)
- Teach patients proper hydration with ORS (how to mix, how much to take).
- Teach patients about recovery care at home.
- Teach patients about proper hygiene (water, hand, and stool) and how to avoid the spreading of the infection.
- Teach patients about warning signs of illness and when to return (themselves or a family member) for medical attention.
- Assist the nurse if needed.

- Hygienists

Hygienists are non-medical staff in charge of hygiene in red zone and assistance of medical staff in their activities when it is needed.

Their responsibilities are:

- Assistance during admission and discharge of patient
- Cleaning area around tents
- Cleaning of tents and bed units
- Assistance during hygiene of patients
- Cleaning and disinfection of latrines
- Waste disposal and waste management
- Observation of patients and co-patients
- Distribution of food and drinks to patients and co-patients
- Spraying procedure
- Chlorine management (refueling of buckets, preparation of central chlorine supply)

For startup of center there should be hygienists divided in 3 shifts, each shift should include a team leader.

- Cleaners

Cleaners are working in the green zone.

Their responsibilities are:

- Cleaning of green zone area and buildings belonging to green zone
- Helping laundry department in collection and distribution of material
- Helping kitchen department in distribution of food and drinks for national and international staff in green zone and coordination and distribution food to red zone together with hygienist



- Clearing and washing of dishes
- Helping in the receiving of pharmacy items together with medical staff
- Assistance to logistic department in activities
- Checking of bucket of chlorine and refilling same in green zone
- Helping in preparation of chlorine
- Keeping in order changing room for red zone and checking if there is enough items

They are working in 24 hour shift with a team leader that is always in the morning shift.

- Laundry workers

They are in charge for washing all uniforms from green and red zone, all linens and other materials in center.

They should have as protection: boots, goggles, mask, and heavy duty gloves

Material that should be washed in laundry:

- boots
- uniforms of patients
- uniforms of co-patients
- uniforms from green zone
- personal clothing of patients and relatives on arrival
- aprons
- uniforms from red zone
- linen.

- Guards

Their responsibilities are:

- control the identity of people coming in and out of camp or isolation area
- Control of the material getting in and out of the isolation are in order to avoid risk of contamination outside of isolation area
- Check if the patient is just with one co-patient
- Ensure that everybody disinfect feet using footbath
- Preventing unknown people from entering CTC without permission
- Patrolling regularly the area assigned from the logistician or international staff
- Check the contents of any kind of bags that enter inside the CTC;
- Keeping clean and in good order the area of the main gate of the CTC, the internal yards, the guard room and the area along the external perimeters of the CTC.



10.4 CHLORINE PREPARATION

The initial form of chlorine is variable according to the local market's available material or the national supply stock and preparedness plan material.

Most common chlorine generating products:

- Calcium hypochlorite 70% active chlorine,
- Chlorinate lime 30% active chlorine,
- NaDCC Tablets 1 gr active chlorine per tablet,
- Sodium Hypochlorite at 15%
- Sodium Hypochlorite at 5% (Bleach).

Most commonly available is the bleach (Sodium Hypochlorite) however, because of the lack of information on the label it is difficult to be sure of the percentage of free chlorine. In western countries, the initial percentage of free chlorine in store bought bleach is 5% at a 55,000 ppm with no dilution. Guidelines from official health sites take this liquid as the initial material when they suggest percentage ratios in potency and ppm dilutions. The below table clarifies the relationship between percentage, ppm and dilution requirements.

BLEACH SOLUTION	DILUTION RATIO	CHLORINE (PPM)
5.25% - 6.15%	NONE	52,500 – 61,500 ppm
0.5%	1:10	5,250 ppm
0.1%	1:50	1000 ppm
0.05%	1:100	500 ppm
0.01%	1:500	100ppm
0.005%	1:1000	50 ppm
2%	1:2 (2.5)	20,000ppm
0.2%	1: 25	2000ppm

The most common percentages or ppm of free chlorine referred to in all protocols is the following:

Emergency has the below strips available in all projects in order to define the initial free chorine content in ppm of the available products. Our strips are: **EXTRA HIGH LEVEL OF CHLORINE from 0 -10.000 ppm** <u>https://www.indigo.com/test_strips/disinfectants_sanitizers/chlorine_and_iodine/hi-level-chlorine-bleach-test-strips.html</u>





According to the above table, we may convert the ppm into the concentrations of free chlorine needed to address the multiple needs of disinfection.



Mixing chlorine:

	0.05%	0.2%	2%	Stability of chlorine
Uses	Hands, showering, washing clothes, utensils and dishes	Disinfection of shoes, floors, walls, beds, and footbaths	Faeces, vomit (the resultant fluid will not be 2% - see the note below) Dead bodies (2% used neat)	
How often to make solutions?	Make daily	Make daily	Stable for one week if stored properly	
Calcium hypochlorite (HTH) at 70% active chlorine	0.7g/litre Half (0.5) soupspoons/10 litres	3g/litre 30g/10litre 2 level soupspoons/ 10 litres	30g/litre 2 level soupspoons/1 litres	Looses about 2% of active chlorine per year
Chlorinated lime at 30% active chlorine	1.5g/litre 1 level soupspoon/10 litres	6g/litre 60g/10 litres 4 level soupspoons/ 10 litres	60g/litre 4 level soupspoons/1 litre	Unstable and should be used within 3 months of manufacture if stored in good conditions
Sodium dichloro- isocyanurate (NaDCC) at 1g active chlorine per tablet	5 tablets/10 litres	2 tablets/litre	20 tablets/litre	The most stable product
Sodium hypochlorite (bleach) at 5% active chlorine	10 ml/litre	40 ml/litre	400 ml/litre	Unstable and should be used within 3 months of manufacture if stored in good conditions
Sodium hypochlorite concentrate at 15% active chlorine	3.3 ml/litre 33 ml/10 litres	16 ml / litre	166 ml / litre	Unstable and should be used within 3 months of manufacture if stored in good conditions

UNICEF, Cholera Toolkit, 2013, "Mixing Chlorine", Annex 8E (C).

10.5 KEY RESOURCES

10.5.1 WASH PROTOCOL

http://www.washclustermali.org/sites/default/files/wash_in_cholera_treatment_centers_in_emergencies_tec h_brief_who.pdf



UNICEF TOOLKIT - https://www.unicef.org/cholera/Cholera-Toolkit-2013.pdf

10.5.2 WATER TREATMENT AND SAFE STORAGE

UNICEF TOOLKIT - https://www.unicef.org/cholera/Cholera-Toolkit-2013.pdf

10.5.3 SAFE EXCRETA DISPOSAL

UNICEF TOOLKIT - <u>https://www.unicef.org/cholera/Cholera-Toolkit-2013.pdf</u>

10.5.4 SAFE CARE OF THE DEAD

UNICEF TOOLKIT - https://www.unicef.org/cholera/Cholera-Toolkit-2013.pdfwow o



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ANNEX ACUTE WATERY DIARRHOEA - CHOLERA



ANNEX 1 ADMISSION QUESTIONAIRE :

QUESTIONNAIRE				
Admission date				
ID N°	WARD: Moderate Severe			
Name				
Surname	Age			
SexAddress	BLOCKSTATE			
TEL:				
Number of members in				
household:				
Occupation:				
□ Diarrhea □ Vomiting □ Abd	ominal Pain 🛛 Fever			
Onset of symptoms D	ehydration: None Level 1 Level 2 Level 3			
Shock/pre-shock				
Diarrhea: Onset: Num	iber of times per day			
Malnutrition:	erate 🗆 No			
MUAC :Weight :	Height :			



Notes :		



ANNEX 2 TRIAGE CARD

PATIENT SUSPECTED OF ACUTE WATERY DIARRHOEA

DATE:	TIME:	PATIEN	IT NUMBER:				
NAME:	AGE: SEX:						
WEIGHT:							
HEIGHT/LENGTH:	NUTRITIO	NAL STATUS: NORMAL	MAM SAM				
MUAC:							
PRESENTING SYMPTOMS:							
DIARRHO	EA VOMITTING	MUSCLE CRAMPS					
INITIAL VITAL SIGNS:							
BP: PULSE:	TEMPERATURE:	RESPIRATION RATE:	SpO2				
	DEHYDRATION ASSESSMENT AND TRIAGE:						
	ASSESS (CIRCLE ON	E FOR EACH ROW):					
GENERAL CONDITION	WELL, ALERT	RESTLESS, IRRITABLE	LETHARGIC, UNCONSCIOUS				
EYES	NORMAL	SUNKEN	SUNKEN				
THIRST	NONE	VERY	UNABLE TO DRINK				
SKIN TURGOR	IMMEDIATE RETURN	SLOW RETURN	VERY SLOW RETURN				
EVALUATE	NO DEHYDRATION	IF 2 OR MORE: MILD DEHYDRATION	IF 2 OR MORE: SEVERE DEHYDRATION				
(SEE DEHYDRATATION TREATMENT CHART)	ORS AFTER EACH LOOSE STOOL	ORS AFTER EACH LOOSE STOOL INSERT IV CANNULA	INSERT IV CANNULA START RL FLUID MONITOR PULSE, RESPIRATORY RATE AND BLOOD PRESSURE EVERY 15 MIN. GIVE ORS ONCE ABLE TO DRINK OR INSERT				



CODE GREEN PATIENTS: REASSESSMENT OF DEHYDRATION STATUS AND VITAL SIGNS AFTER 4 HOURS

CODE YELLOW PATIENTS: REASSESSMENT OF DEHYDRATION STATUS AND VITAL SIGNS AFTER 1 HOUR

CODE **RED** PATIENTS: REASSESSMENT OF DEHYDRATION STATUS EVERY 30 MINUTES, VITAL SIGNS EVERY 15 MIN.

Doctor's

Notes:____



ANNEX 3 ORS PREPARATION:

UNICEF, Cholera Toolkit, ANNEX 8C.

Prepare ORS solution

- 1. Wash your hands with soap and water
- Pour the entire cotents of 1 packet of ORS into a clean container (mixer bowl or jar) for mixing the ORS. The container should be large enough to hold at least 1 litre.
- Measure 1 litre of clean water (or correct amount for packet used). Use the cleanest drinking water available. In your community, what are common containers caregivers use to measure 1 litre of water?
- Pour the water into the container. Mix well until the salts completely dissolve





How to prepare ORS solution:

How to give and store ORS solution

1. Explain to the caregiver the importance of replacing fluids in a child with diarrhea. Also explain that the ORS solution tastes salty. Let the caregiver taste it. It might not taste good to the caregiver. But a child who is dehydrated drinks it eagerly.

2. Ask the caregiver to start giving the child the ORS solution in front of you. Give frequent small sips from a cup or spoon. (Use a spoon to give ORS solution to a young child.)

3. If the child vomits, advise the caregiver to wait 10 minutes before giving more ORS solution. Then start giving the solution again, but more slowly. She should offer the child as much as the child will take, or at least ½ cup ORS solution after each loose stool.

4. Check caregiver understands. For example:

- Observe to see that she is giving small sips of the ORS solution. The child should not choke.
- Ask her: How often will you give the ORS solution? How much will you give?

5. The child should also drink the usual fluids that s/he drinks, such as breast milk. If the child is not exclusively breastfed, the caregiver should offer the child clean water. Advise the caregiver not to give sweet drinks and juices to the child with diarrhoea who is taking ORS.

6. How do you know when the child can go home? A dehydrated child, who has enough strength to drink, drinks eagerly. If the child continues to want to drink the ORS solution, have the mother continue to give the ORS solution in front of you. If the child becomes more alert and begins to refuse to drink the ORS, it is likely that the child is not dehydrated. If you see that the child is no longer thirsty, then the child is ready to go home.
7. Put the extra ORS solution in a container and give it to the caregiver for the trip home (or to the health facility, if the child needs to be referred). Advise caregivers to bring a closed container for extra ORS solution when they come to see you next time.

8. Give the caregiver 2 extra packets of ORS to take home, in case she needs to prepare more. Encourage the caregiver to continue to give ORS solution as often as the child will take it. She should try to give at least ½ cup after each loose stool.

How to Store ORS solution

1. Keep ORS solution in a clean, covered container.

2. Ask the caregiver to make fresh ORS solution when needed. Do not keep the mixed ORS solution for more than 24 hours. It can lose its effectiveness.



ANNEX 4: EMERGENCY BOX FOR CHOLERA: stocks for consumables, equipment and drugs.

EMERGENCY BOX FOR CHOLERA OUTBREAK

CONSUMABLES	QUANTITY	EQUIPMENT	QUANTITY	DRUGS	QUANTITY
RINGER LACTATE 500 ML	50 BOTTLES	SPHYNGOMETER ADULT	3	ORS	500
NORMAL SALINE 500 ML	25 BOTTLES	PULS OXYMETER	1	DOXYCYLLINE 200 MG	500
33 % DEXTROSE	5	FINGER PULS OXYMETER	1	ERYTROMICIN TAB 500 MG	500
IV CANNULA 18	20	PED. + ADULT SCALE	1	ERYTROMICIN 125 MG SYR	30
IV CANNULA 20	20	PEDIATRIC 02 PROBE	2	ERYTROMICIN 250 MG SYR	30
IV CANNULA 22	20	SCISSORS	2	ZINC TAB 20 MGR	200
IV CANNULA 24	20	TOURCH	3	ZINC SYR	30
PLASTER SILK	10	GLUCOMETER	1	AZITHROMICINE SYROP	10
PLASTER TEXTIL	10	ACCU CHECK	1	DOXYCYCLINE SYROP	10
TOURNIQET	3	THERMOMETAR	3	AZITHROMICINE 300MGR	10
COTTON WOLL	2	O2 CYLINDAR	1	FUROSEMIDE VIAL	20
POVIDONE	2	FLOW METER	1		
CHLORHEXIDINE	2	KEY FOR O2 CYLINDAR	1		
IV SET	100	HAND BOARD	2		
GLOVES MEDIUM	300	MARKERS blu and red	6		
GLOVES SMALL	200	PEN BLUE	6		
GLOVES LARGE	300	PEN RED	6		
STERILE GLOVES No 8	30	WHITE PAPER	1 BOX		
STERILE GLOVES No 7	30	CONSULTATION BOOK	1		
OXYGEN MASK PED	5	PHARMACY REQUEST	5		
OXYGEN MASK ADULT	5	FLUID BALANCE CHART	100		
AMBU BAG ADULT	1	PLASTIC BAGS	5		
AMBU BAG PED	1	SAFETY BOX	10		
CPR MASK 4	1	HEALTH CARD	100		
CPR MASK 3	1				
CPR MASK 2	1				



CPR MASK 1	1		
CPR MASK 0	1		
NG TUBE ALL SIZE	20		
BANDAGE	20		
GUEDEL AIRWAY ALL	1 EACH		
FACE MASK	200		
URIN BAG	10		