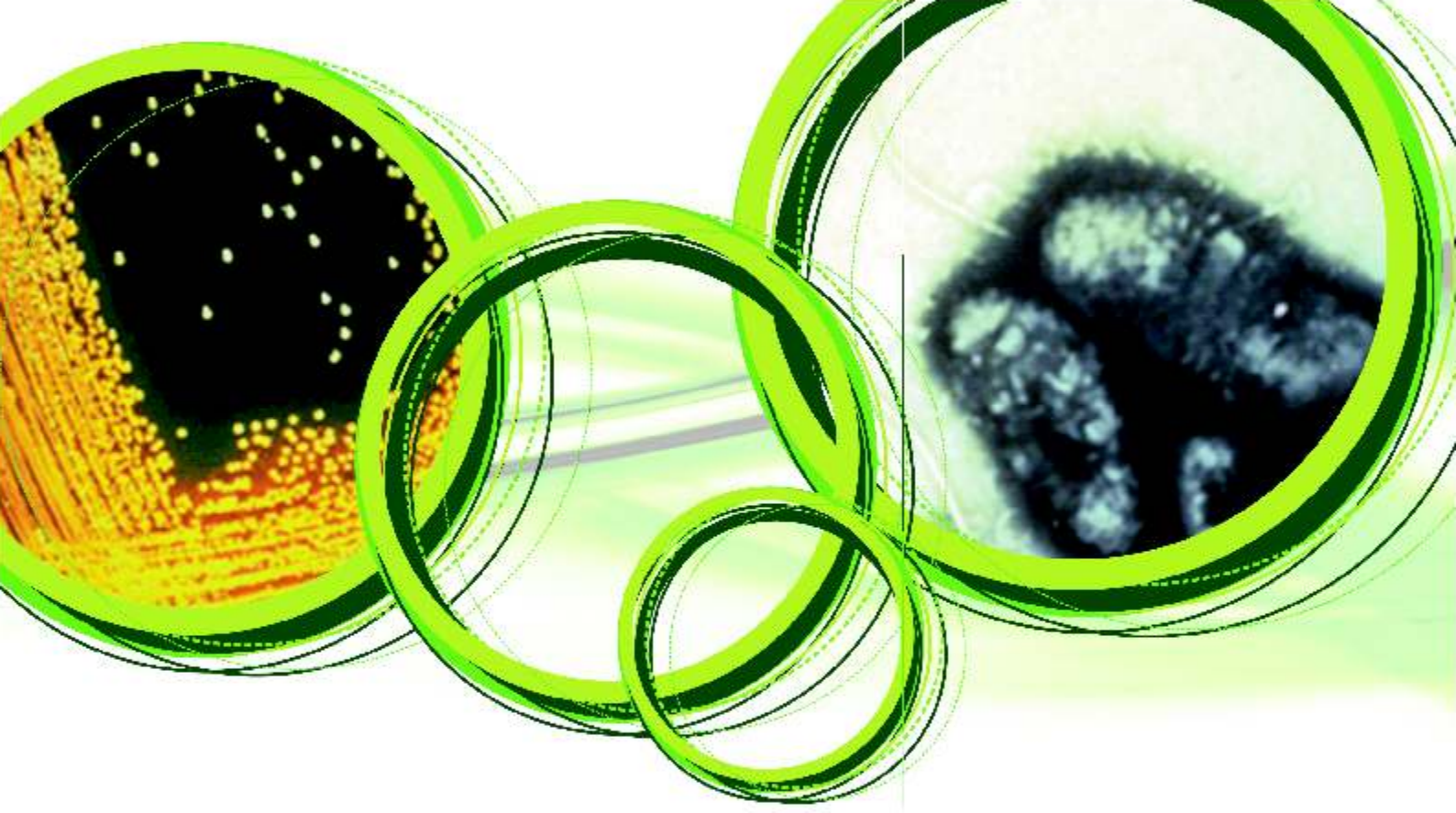

NATIONAL GUIDELINES FOR CHOLERA CONTROL

2014

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

Table of Contents

PREFACE

Cholera has been prevalent worldwide since the early 19th century, but the number of cases has steadily risen worldwide due to cholera outbreaks. The World Health Organization (WHO) estimates that globally 3-5 million cases and 100 000-120 000 deaths occur annually. This disease is endemic in Sub-Saharan African countries, including South Africa. South Africa experienced large epidemics of cholera in the past. Among these, a major epidemic was experienced during the period 2000-2002 particularly in the rural areas of KwaZulu-Natal. The last major outbreak was experience in 2008 in South Africa and sporadic outbreaks continue to be reported.

Cholera prevention and control remains a public health priority as the case fatality rate may go up to 50%. In approximately 90% of cholera cases, the disease is mild and it is difficult to differentiate from other diarrheal diseases. It is therefore important for all the stakeholders in cholera prevention and control to use correct intervention strategies useful in curbing the epidemic.

The response staged to the 2008/2009 cholera outbreak highlighted some gaps in the National Guidelines for Cholera Control developed in 2002. The guidelines were then revised to update the content, including diagnosis and case management. Included in these guidelines are recommendations useful during and in the absence of cholera outbreaks. Issues on prevention of disease outbreak, control of cholera, treatment of patients, surveillance, equipment and supplies are also outlined.

It is envisaged that these guidelines will enable everyone involved in the prevention and control of cholera, particularly the health care providers to identify, effectively manage and report cholera patients. As a result, the morbidity and mortality due to cholera will be mitigated successfully.

Dr A Motsoaledi, MP
Minister of Health
2014

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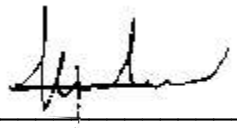
- Provincial Communicable Disease Control Coordinators
- The World Health Organisation
- Centres for Disease Prevention and Control - Atlanta



Ms MP Matsoso
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2014

1 INTRODUCTION

Cholera has been reported worldwide since the early 19th century and the world is currently in the so-called 7th pandemic. Globally, the World Health Organisation (WHO) estimates that 3-5 million cases and 100 000-120 000 deaths occur annually (1). This includes Sub-Saharan Africa including South Africa.

South Africa experienced large epidemics of cholera in the past. Among these, a major epidemic was experienced between 2000-2002 particularly in the rural areas of KwaZulu-Natal (2) as well as that of 2008 – 2009 (3).

Research has contributed a great deal in providing health practitioners with knowledge on the aetiology and epidemiology of the disease, including the clinical management of patients. Both public and clinical research continues to shed light on the understanding of many aspects of this epidemic-prone disease:

- epidemiology
- pathogenesis
- case management
- outbreak management
- prevention

These guidelines contain evidence-based information useful in the control and prevention of cholera.

2 BACKGROUND ON CHOLERA

2.1 Etiologic agent

Cholera is caused by the gram negative, mobile bacterium called *Vibrio cholerae*. This bacterium has the ability to survive both in fresh and salt water, which is an important virulence factor, along with the ability to produce a powerful toxin, encoded on a filamentous phage, which leads to the rapidly dehydrating, secretory diarrhoea. There are more than 200 serogroups of *V. cholerae* (based on the serological classification of the O antigen of the lipopolysaccharide). However, only two are epidemic-prone: *V.cholerae* O1 and O139. *V. cholerae O*1 is further subdivided into the so called classical and El Tor biotypes. The former has caused the previous two pandemic waves, while the ongoing 7th pandemic has been attributed to the El Tor biotype. In the early 1990's a new serogroup was reported from south Asia, O139. Serogroups are further differentiated into serotypes, either Inaba or Ogawa.

In Africa, most outbreaks are caused by the EI Tor biotype, *V. cholerae.* serotype Inaba. However, about 98% of the cases isolated during the November 2008-April 2009 cholera outbreak in South Africa were serotype Ogawa . No *V.cholerae* O139 cases have been reported in Africa (4) .

2.2 Clinical Presentation of Cholera

Clinical presentation depends on epidemiological setting. In endemic settings, most cholera infections are asymptomatic or mild, and indistinguishable from other mild diarrhoea. The most severe cases in endemic settings occur in children or previously unexposed individuals. In epidemic settings the disease occurs in all age groups. This is also dependant on other host and pathogen, as well as environmental factors.

Overall, an estimated 10-20% of those who develop symptoms have a clinically severe presentation which may rapidly progress to death. In its severe form, the following signs and symptoms characterize cholera:

- Onset of diarrhoea is typically sudden
- Diarrhoea is profuse, painless and watery, with flecks of mucus in the stool (“rice water” stools). The presence of blood in stools is not a characteristic of cholera
- Nausea and profuse vomiting may occur, usually early in the illness
- Majority of patients are febrile, children are more often febrile than adults

- All complications result from effects of loss of fluids and electrolytes in stool and vomitus; dehydration occurs rapidly (up to 1 000 ml/hour of diarrhoea may be produced). Dehydration usually manifests in the form of loss of skin turgor and sunken eyes. The correct assessment of the degree of dehydration is important for case management (see below)

- Muscle cramps, acidosis, peripheral vasoconstriction, and ultimately renal and circulatory failure, arrhythmias and death may occur if treatment is not given timeously.

2.3 Reservoir and Mode of Transmission

The main reservoir of cholera is humans, although environmental survival in both fresh and brackish water in relation to zooplankton is increasingly being recognised as an important reservoir, particularly in endemic settings. Faecally contaminated water or food, either directly or indirectly, is the most important source of infection. Person-to-person transmission has also been documented.

Some of the best-known sources of infection are as follows:

- Drinking water that has been contaminated at its source, during storage or usage

- Contaminated foods and vegetables that have been fertilized with human excreta (night soil) or “freshened” with contaminated water

- Beverages, ice and bottled water prepared with contaminated water: soiled hands can also contaminate clean drinking water and food

- Fish, particularly shellfish, taken from contaminated water and eaten raw or insufficiently cooked.

2.4 Incubation Period

The incubation period ranges from a few hours to five days, usually two to three days, dependant on the infectious dose and host factors such as achlorhydria.

2.5 Period of Communicability

Cholera is communicable as long as the bacteria are secreted in stool. Both asymptomatic as well as symptomatic persons secrete infective bacteria, with the latter group secreting for longer (5).

2.6 Population at Risk

The people most at risk of contracting cholera are those who do not have access to potable water and adequate sanitation. These can be found in areas with inadequate environmental management, peri-urban slums, large populations of poor people, overcrowding as in refugee or Internally Displaced Persons (IDP) camps or post-disaster where the water and sanitation systems are disrupted.

3 DIAGNOSIS

3.1 Case definition and laboratory confirmation

A case of cholera should be suspected when:

- *In an area where the disease is not known to be present - a patient, irrespective of age, develops severe dehydration or dies from acute watery diarrhoea*
- *In an area where there is cholera outbreak - a patient develops acute watery diarrhea with or without vomiting*

3.2 Specimen collection for laboratory diagnosis

A case of cholera is confirmed when *V. cholerae* O1 or O139 is isolated from any patient with diarrhoea. Information on serogroup of *Vibrio* (O1 or O139) and antimicrobial sensitivity should be gathered at the laboratory as antibiotic susceptibility has been shown to be area specific.

3.2.1 Instructions for collection of stool specimens for cholera investigations

General information:

i. Specimen labels must be properly filled in.

ii. Specimens should be collected before antibiotic treatment.

iii. Delays between collection of specimens and dispatch to the laboratory should be avoided.

iv. If stool is to reach the laboratory within 2 hours, stools may be sent:

(a) In normal specimen containers for isolation of all pathogens including V*. cholerae,* or

(b) In single strengths alkaline peptone water, specifically for accelerated *V. cholerae* isolation. Dip a swab into the stool and express fluid against the inside of the bottle; repeat. Discard swab into disinfectant, or

(c) If a delay of more than 2 hours is anticipated, the specimen should be submitted in Cary-Blair transport medium. Swabs should be plunged deeply

into the medium, left in position for at least 30 seconds, then twisted gently and the shaft broken off, so that the transport medium bottle, may be closed.

NOTE: If plastic-stemmed swabs are used they may be removed from the medium after 30 seconds, but it is preferred that the swab be submitted in transport medium to the laboratory. Specimen containers with alkaline peptone water and Cary-Blair transport medium may be ordered from the National Health Laboratory Services (NHLS) stores in Johannesburg or from the laboratory serving the respective hospitals.

3.2.2 Instruction for collection and sending of sewer pads (Moore pads) for cholera determination

i. Special wide-necked bottles containing double strength alkaline peptone water are obtainable from the NHLS stores in Johannesburg and the NHLS laboratory serving that area.

ii. Commercially available plain sterile surgical gauze swabs measuring approximately 10 cm square should be used. Tie one corner with a length of wire (or string if no rats present) and immerse the pad to hang below the surface of the effluent. The swab should remain in place for 24-72 hours, after which it should be pulled out.

iii. Hold a 2-3 m long piece of the swab with sterile forceps, cut it off with sterile scissors and place the piece in the peptone water bottle. Close the lid tightly.

iv. Place the used instruments in a jar or flat container with methylated spirits. The instruments must be completely immersed. On arrival at the next sewer pad site, remove the instruments from the jar, close the jar and then hold a lighted match to the instruments to remove all traces of alcohol.

v. Complete the attached label and send the specimen to the laboratory serving the specific hospital, clinic, etc. Specimens should arrive at the laboratory within 6-12 hours of collection.

4. PREVENTION AND CONTROL

There are 2 main objectives in cholera prevention and control. These are:

i. To reduce transmission of the disease and morbidity

ii. To reduce mortality (CFR <1%) by ensuring access to timely and good quality treatment

Morbidity reduction activities include:

a. Provision of good quality and quantity of water

b. Promotion and provision of good hygiene conditions and practices

c. Provision of adequate and effective sanitation

d. Mobilization and education of the community

e. Infection control, both at the community and health facility levels

Mortality reduction activities include:

a. Organization of early case detection and referral system through active case searches

b. Establishment of cholera treatment centres and units and oral rehydration therapy (ORT) Corners and ensure that they are decentralized and functional

c. Development of case management protocols, prevention and control guidelines

d. Training of health workers on case management

e. Ensuring availability of supplies:

   i. Drugs & medical supplies

   ii. Water

   iii. Chlorine

   iv. Logistic materials: tents, beds, plastic sheets, food, NFIs

4.1 Cholera Morbidity Reduction

The community should be informed about sources of contamination and ways to avoid infection. Attention to sanitation can markedly reduce the risk of transmission of cholera including other intestinal pathogens. This is especially true where lack of good sanitation may lead to contamination of water sources. High priority should be given to observing the basic principles of sanitary human waste disposal and particularly the protection of water sources from faecal contamination.

The development of sanitary systems appropriate to local conditions should be facilitated and their sitting in relation to water sources emphasized. Basic hygiene involving thorough hand washing with soap following possible contact with excreta should be encouraged for adults, infants and children.

Preparing an Emergency Pit Latrine

In an emergency, while a more permanent latrine is being built, a simple pit can be dug as a temporary solution for the disposal of human excreta. It should measure 0.3 x 0.3 meter, have a depth of 0.5 meters, and be at least 30 meters from a well or other source of drinking water. Where possible, the pit should be at least six meters from the nearest house. It should not be located uphill from the water source or dug in marshy soil. The bottom of the pit should never penetrate the groundwater table. After each use, a layer of soil should be laid down in the pit. In an area affected by cholera, the pit should also be coated each day with a layer of unslaked lime.

Where water supplies are at risk of contamination, households should be taught about the necessity and the techniques of sanitizing water in the home. The simplest and most cost effective method is chlorination of water in the storage container using household bleach. Add one teaspoon (5 ml, or one capful if bottle has a screw cap) of household bleach to 20-25 litres of water. Thoroughly mix solution with the water and allow to stand for at least two hours (preferably overnight) before use.

Boiling is also effective. However, there is a potential for microbial re-growth if the boiled water is stored beyond 1 - 2 days. Filtration may be necessary in addition to boiling if the only water available contains much particulate matter. For filtration, use a piece of clean white cloth to cover the opening of a 20-25 litre water container. Pour water through the clean cloth into the container. Clean the cloth and make sure it is always clean for future use. Chlorination alone is not sufficient in such circumstances. Even when drinking water is rendered safe, infection may still be transmitted by contaminated surface water used for bathing and washing clothes, food or cooking utensils. In an outbreak situation all water sources with potential for contamination must be tested and rendered safe. If contaminated, close for usage and provide alternative sources.

Since food is an important vehicle for the transmission of enteric pathogens, attention to food safety is an essential preventive measure, which should be intensified when there is a threat of cholera. Street vendors and communal food sources will require particular attention, since they pose a special risk. Flies play a relatively small role in spreading cholera but their presence in large numbers indicates poor sanitary conditions, which favour

4.2 Control of the environment

Safe water

An arrangement should be made for the protection of water sources as an important measure for reducing the risk of contamination. Treatment of the source may be the best way to prevent the spread of cholera in the community. Enabling safe water chain at the household level is also important. Provision of safe water may play a role in controlling outbreaks (when suspected as the source) as well as preventing additional settings within the household setting. Response measures may include:

- **In areas with access to municipal water systems:** enhanced monitoring of water throughout the supply systems (from point of treatment to consumer outlets), and ensuring appropriate water treatment (e.g. adequate chlorine concentrations to disinfect the water).
- **In areas without access to treated water:**
  - Monitoring of drinking water sources, and treating of these if practical (e.g. in the case of JoJo tanks and wells).
  - Provision of alternative water sources (e.g. supply safe/treated water using water-tankers, JoJo tanks)
  - Distribute resources and conduct health promotion activities for point-of-use disinfection of water within households. Disinfection methods may include boiling and/or chemical disinfectants (chlorine bleach, tablets, etc.). Safe storage and use of water also plays an important role in preventing secondary spread in households (for example: use plastic narrow-mouthed containers with covers to avoid recontamination after treatment).

Food safety

Contaminated food plays an important role in the transmission of cholera. Following identification of a case, food safety should be promoted within households to prevent transmission to close contacts. This should include:

- Wash hands with soap and clean water before preparing and eating food, and after going to the toilet.
- Wash all surfaces and equipment used for food preparation with soap and clean water.
- Cook food thoroughly, avoid raw (uncooked) food (especially shellfish and meat). Eat only cooked and still hot food or reheat it.
- Use only safe or disinfected water for preparing food, beverages and ice (or treat water before using).

- Wash and peel all fruit and vegetables before eating (especially when eaten raw)
- Do not use manure that contain human-waste (excreta or faeces) on vegetable gardens or crops.

Acute cases and proven carriers who handle, process and/or serve food (especially in commercial settings) should be excluded from these activities pending treatment and follow-up testing (as per Section 5).

In outbreak situations, food safety behaviours should be reinforced at a community level. Food safety inspections at restaurants and street vendors, and ensuring compliance with regulations, will also play an important role in preventing infections.

Sanitation

Provision of proper sanitation infrastructures will also reduce the burden of typhoid fever, as well as other enteric diseases, within a community. Ensure appropriate systems for human-waste disposal and sewage treatment for all community members, monitor these systems continually, and maintain proper functioning at all times. In areas without municipal sewage systems, toilets (e.g. pit-latrines) should be built, regularly serviced and maintained to ensure safe functioning. Restrict access of the general public to sanitation infrastructure to prevent human-excreta from being used as fertilisers. Rapid provision of safe sanitation infrastructures (e.g. building pit-latrines) or investigating and fixing faults in existing sanitation systems, may also play a role in controlling outbreaks.

5. CHOLERA MORTALITY REDUCTION

5.1 Surveillance

Cholera is a notifiable medical condition that needs immediate verbal reporting on clinical suspicion within 24 hours. Investigation of suspected and confirmed cholera outbreaks is important in order to determine:

- The magnitude of the outbreak
- The source of infection
- The community at risk
- The possible intervention measures, and later the impact of these
- The type of circulating strain.

Important information can be gathered from various sources depending on the type of the outbreak e.g. media, community, schools, non-governmental organizations, clinicians, laboratory, nurses and patients.

The important surveillance information is number of cases and deaths by area, time and population sub-groups; calculation of attack and case fatality rates to allow comparison of different areas and periods. A line list should be developed to assist in gathering information on cases. Include the following information in the line list:

- Identification
- Demographics
- Clinical
- Exposure and risk factors.

Active case-finding - if possible, active case-finding in communities should be organized to allow:

- detection of cholera patients at an early stage of the disease;
- advice to be given to family members and the community about protecting themselves from contamination.

Case fatality rate = [(number of deaths/number of cases) x 100] in a given period of time. Higher case fatality rate (>1%) indicates the following:

- That case management is poor (check whether health care workers are sufficiently trained, supplies are lacking, or the health care centre is overwhelmed by the sudden increase in the number of patients);
- That people arrive too late at health care centres (establish community cholera treatment units, e.g. in schools, promote early use of oral rehydration solution [ORS]);
- Bias of surveillance (deaths are better registered than cases).

Attack rate = (number of cases/ population at risk) in a given period of time. When attack rate is high, it indicates that:

- There is a common source of infection;
- The area is very crowded (as in urban areas, for example).

Environmental surveillance is important in the control and preparedness of the cholera epidemic. The following are to be taken into consideration when conducting an environmental surveillance:

- Identify communities at risk (unsafe water supplies or inadequate sanitation) and ensure that they are informed about sources of contamination and ways to avoid infection.

- Investigate all bacteriologically proven cases to identify the sources of infection;

- Monitor the spread of cholera in risk areas by periodically sampling strategic sewage effluent (hospitals, prisons, hostels, sewage purification works) as an early warning system.

- Surveillance using Moore pads should only be done in high-risk areas where there is a definite chance of cholera being identified. Selected sentinel sites should be monitored in large cities. Moore pads should be used to monitor the end on an epidemic. *Vibrio cholerae* isolated from Moore pads should be tested to determine whether they are indeed *Vibrio cholerae* O1 or not, since *Vibrio cholerae* O1 results in diarrhoea.

5.2 Clinical Management of Cholera

Assess any person with suspected cholera immediately and refer to appropriate level of care. Persons with cholera can deteriorate rapidly and must be assessed on arrival at a healthcare facility, since prompt appropriate treatment can be life-saving.

5.2.1 Assess degree of dehydration

Table 1. Assessment of dehydration

Dehydration criteria	Observation		
General condition	Well/alert	Restless/irritable	Lethargic/unconscious
Eye	Normal	Sunken	Very sunken
Thirst	None	Drinks eagerly and/or is thirsty	Drinks poorly or unable to drink
Radial pulse	Full volume	Low volume	Weak/absent
Skin pinch	Goes back quickly	Goes back slowly (≥ 2 seconds)	Goes back very slowly (≥ 3 seconds)
Dehydration status	No dehydration	SOME dehydration (if ≥ 2 criteria above present)	SEVERE dehydration (if ≥2 criteria above present)
% dehydration	0-5%	5-<10%	≥10%

5.2.2 Treatment plan

Table 2. Treatment plan based on dehydration status

Dehydration status	No Dehydration	SOME dehydration (if = 2 criteria above present)	SEVERE dehydration (if = 2 criteria above present)
% dehydration	0-5%	5-<10%	=10%
Treatment plan	Maintenance hydration: ORS volume to match stool volume. If no danger signs (see below), then NO need for hospitalisation	Correction of SOME dehydration: Hydration with ORS. KEEP for observation	Correction of SEVERE dehydration: Rapid IV hydration. Monitor closely un treatment center

a. No dehydration

- Patients can be managed as outpatients. Ideally, they should be observed for 1-2 hours to ensure that they can tolerate ORS and are not clinically deteriorating.
- Patients can be discharged with ORS to continue use at home, with instructions to continue to drink ORS in adequate volumes as follows:

Table 3. Maintenance of rehydration with ORS

Maintenance Rehydration with ORS		
Age	Approximate ORS amount following each stool; by millilitres (ml)	Approximate ORS amount following each stool; by household measures
Children < 2 years	50 – 100 ml	10 – 20 teaspoons
2 - 10 years	100 – 200 ml	½ 1 glass
> 10 Years	As much as is tolerated	Minimum 1 glass
* In children: if the caretaker knows the weight of the patient, advise the patient caretaker to administer one teaspoon of ORS per kilogram for each loose stool. ORS should be given in small amounts (small spoons of 5ml for children < 2 years and sips from a cup for older patients) frequently (every 1-2 minutes). If the patient vomits, wait 10 minutes and continue to give ORS but more slowly.		

b. Some dehydration

- Calculate amount of fluid needed to replace lost fluid, assuming that patient has lost 7.5% body weight (i.e. 75 ml/kg). For example: a patient weighing 10 kg will require 750 ml for rehydration. Give this volume of ORS (the correction fluid) over the next four hours. For children <1 year, give the correction fluid over six hours. Refer to Table 4 for general guidelines for calculation of correction fluids.

Table 4. General guidelines for ORS rehydration of patients with 'some' dehydration

Age	Weight (kg)	Amount of ORS in first FOUR* or SIX* hours (ml)
< 4 months	<5	200-400
4-11 months	5-7.9	400-600
1-2 years	8-10.9	600-800
2-4 years	11-15.9	800-1200
5-14 years	16-29.9	1200-2200
>14 years	=30	2200-4000
	60	4200
	70	About 5 litres
* The correction fluids of 75ml/kg should be given within the first FOUR HOURS FOR ADULTS/CHILDREN and within the first SIX HOURS FOR INFANTS (<1 yr), with regular follow-up. Give fluids more slowly (half the rate) for severely malnourished children/infants.		

- Give ORS as small amounts frequently, to reduce vomiting. Older children and adults should be given as much additional fluid (e.g. water) as they want.
- Infants should continue breastfeeding in addition to ORS. Infants who are not breastfed should receive their normal milk formula/feeds in addition to ORS.
- In addition to the correction fluid, additional ORS fluids are needed to replace ongoing losses from continued diarrhoea – therefore, continue to give maintenance ORS as in Table 3.
- Patients must be regularly re-assessed: monitor hydration status, vital signs and general wellbeing. Note the volume of stools and vomitus and reassess rehydration fluid requirements.

c. Severe dehydration

- Patients with severe dehydration are in danger of death from hypovolaemic shock and require immediate and rapid replacement of fluids intravenously.
- Ringer's lactate is the only solution that should be used for IV rehydration. DO NOT administer normal saline or any other intravenous solution as they do not contain the appropriate electrolytes and can exacerbate the metabolic acidosis and electrolyte imbalances in cholera patients.
- Calculate correction fluids to replace 10% of body weight (i.e. 10 ml/kg). Example: a 50 kg patient will require 5 litres of IV Ringer's lactate. This volume should be given over the first 3 hours. For children <1 year, give the correction fluid over six hours. Refer to Table 5 for general guidelines on IV hydration.

Table 5. General guidelines: IV hydration for patients with severe dehydration

Correction of SEVERE dehydration with IV hydration*		
Age	Amount of time to give first 30ml/kg	Amount of time to give remaining 70ml/kg
= 1 year	1 hour	5 hours
> 1 year	½ hour	2 ½ hours
* Severe dehydration requires rapid replacement of a total 100ml/kg of fluids by IV		

- If the patient has a weak/absent radial pulse, the IV Ringer's lactate should be given as rapidly as possible; insert two IV lines (using large bore needles) to administer the IV fluids. Once the pulse is re-established, the remaining volume can be given such that the total correction fluid requirements are given within the first 3 hours.
- Patients must be re-assessed continuously – at least every 1-2 hours. The rate of IV fluids can be increased if the patient is not improving.
- In addition to the correction fluids calculated at initial assessment, ongoing fluid losses must also be replaced with IV fluids.
- ORS should be given as soon as the patient can drink (usually within 2-3 hours, when the vomiting stops). If tolerated, ORS can be given to replace the ongoing fluid losses, as per Table 3.

5.2.3 Antibiotics

Antibiotics should be given to patients suspected of having cholera with some or severe dehydration. Patients with no dehydration do not require antibiotics. Ciprofloxacin is the recommended drug of choice at present.

Table 6. Antibiotic treatment of cholera Antibiotic

Antibiotic	Paediatric dose	Duration of therapy	Adult dose	Duration of therapy
Ciprofloxacin	15 mg/kg per dose po, 12 hourly	3 days	500 mg po 12 hourly	3 days

5.2.4 Zinc

All children ≤5 years should be given zinc treatment in addition to fluids and antibiotics as needed.

Table 7. Zinc supplementation for children ≤5 years with cholera

Zinc supplementation		
Age	**Dose of Zinc**	**Duration**
0-6 months	10mg once a day	10 – 14 days
6 months - 5 years	20mg once a day	10 – 14 days

5.2.5 Feeding

Patients should be fed as soon as they can eat. Breasted infants should continue breastfeeding throughout treatment.

5.2.6 Discharge criteria

Patients should be discharged as soon as possible. As a general rule, a patient can be discharged when:

- They are no longer dehydrated
- Are able to take ORS adequately
- Have a decreased level of purging (stool frequency and volume) such that fluid losses can be easily corrected with ORS.

5.2.7 Ineffective treatments

- NEVER use anti-diarrhoeal/anti-motility drugs (e.g. loperamide)
- NEVER use sweetened drinks instead of ORS

6 PUBLIC HEALTH RESPONSE TO OUTBREAKS

6.1 Investigation of a suspected outbreak of cholera

When a cholera outbreak is suspected, a multi-disciplinary team should be sent to the field to conduct investigations and confirm the outbreak. The investigations should include:

- Verification of the clinical symptoms – This should be done with the use of the standard case definition mentioned in section 3.1 above.
- Collection of stool samples for laboratory confirmation –Treatment of patients should not be delayed until laboratory test results are available. Laboratory confirmation of the first 10 – 20 samples is essential to confirm an outbreak and identify the circulating strain. The rest of the cases should be detected through the clinical case definition mentioned above. However, random samples should be taken at regular intervals to ensure the antimicrobial sensitivity pattern of the pathogen has not changed. At the end of the outbreak, 20 stool samples are required to confirm the end of the outbreak.
- Assessment of how the community reacts to the outbreak, and dissemination of key messages
- Epidemiological data collection and analysis to characterize the epidemic and identify challenges and the impact of the instituted control measures
- Investigation of possible sources of contamination, and treatment of these sources.

6.2 Investigation of the cause of the outbreak

After verification of an outbreak, the vehicles of transmission must be investigated.

This includes:

- Assessment of drinking water that may have been contaminated at source or during transport and storage, or ice made with contaminated water;
- Food that may have been contaminated during or after preparation;
- Seafood;
- Fruits and vegetables.

An epidemiological survey such as a case control or cohort study may be useful in situation where the disease is spreading and the source of infection is unclear.

6.3 Multi-sectoral coordination

Cholera is a disease that requires multiple sectors to control, hence the importance of ensuring multi-sectoral coordination cannot be overemphasized. This multi-sectoral team should include clinicians, epidemiologists, public health experts, water, sanitation and hygiene experts, communication specialists, logisticians etc. The existing multi-sectoral outbreak response team should be convened during an outbreak. The team should immediately develop a cholera emergency plan which should list essential elements of outbreak preparedness and response. The emergency plan should address:

- Logistics (what is available and what is needed, including an inventory of the available essential supplies listed in Table 8).
- Staff responsibilities (reassignment of staff according to needs, decision on who is responsible at each level).
- Availability of financial support for preparation and response (costs of the investigation and response, sources of funding).
- Plan for implementation of the control measures (what should be done, when and who should do it, the resources that are needed and available).
- Plan for providing safe water and ensuring safe disposal of excreta.
- Plan for education campaigns (material, methodology, staff)

Members of the committee should meet regularly to discuss progress, challenges and possible solutions. Daily situational reports should be compiled and circulated to all stakeholders and the International Health Regulations (IHR) National Focal Point.

6.4 Buffer and emergency stocks of essentials

For the first week of the cholera outbreak, buffer and emergency stocks of essential supplies should already be in place before an epidemic starts. Emergency supply requirements should be determined and individuals assigned to coordinate their procurement and distribution.

The supplies and equipment needed have been calculated on an attack rate of 0.2, that is 200 cases may be expected to occur in a population of 100 000. This is only for calculating initial stocks to cope with the beginning of an epidemic of cholera. A review based on weekly actual figures will help to reassess actual needs and prompt replacements.

Table 8. Estimated minimum supplies needed to treat 100 patients during a Cholera Epidemic

Rehydration Supplies

- 650 Packets Oral Rehydration Salt (for one litre each)
- 120 Bags Ringers Lactate Solution
- 10 Scalp Vein Set
- 3 Nasogastric Tubes (Paediatric)
- 3 Nasogastric Tubes (Adults)

Other Treatment Supplies

- 2 large water containers with tap (marked at 5-10 litre levels)
- Oral Rehydration Solution in Bulk
- 20 bottles (1 litre) or ORS e.g. Empty IV Bottles
- 40 Tumblers, 200 ml
- 20 Teaspoons
- 5 kg Cotton wool
- 3 Reels of adhesive tape

The supplies are sufficient for IV fluids followed by Oral Rehydration Salts for 20 patients, and for Oral Rehydration Salts alone for the other 80 patients.

Using the above estimates for 100 patients (Table 8) and current population in an area and an attack rate of 0.2, the needs may be calculated for stocking of supplies in preparing for an epidemic for the first week. Reassessment on a weekly basis for actual attack rate must be done.

6.5 Involvement of the community

It is important to involve the community and organize focus group discussion in high risk communities in order to identify gaps in knowledge and the kind of reinforcement needed. For the communities that do not have access to safe clean water, it is crucial to determine the availability of soaps and chemicals to treat water. During the focus group discussions and other community awareness campaign, the public should be addressed in such a way that they understand how they can assist in limiting the spread of the diseases. The best way to communicate with the public is through:

- Radio, talks (e.g. during community gatherings, at the waiting areas in the health facilities, at schools, at churches etc), local newspapers, television, posters etc.
- Giving clear and precise information.
- Adapting messages to the social, cultural, and economic circumstances of the community and to its ability to cope with a change of behaviour (for example, chlorine and soap may not be affordable in poor communities)

Example of the key messages to give to the community

- Drink safe water
- Water purification - add one teaspoon (5 ml, or one capful if bottle has a screw cap) of household bleach to 20-25 litres of water. Thoroughly mix solution with the water and allow to stand for at least two hours (preferably overnight) before use.
- Safe disposal of human waste without contaminating water sources and control of flies is important in preventing diarrhoea.
- Avoid any potentially contaminated food especially raw or partially cooked fish and shellfish.
- Foods of vegetable origin should be peeled or shelled.
- Boil or pasteurise all milk.
- Come to the health care facility as soon as possible in case of acute watery diarrhoea.

Actively inform and educate health workers and the community about the extent and severity of the outbreak and the effectiveness and simplicity of treatment methods, and benefits of reporting cholera cases promptly. The free flow of information would prevent panic spreading through the community.

Street food-vendors and restaurants may contribute in the spread of the disease. Environmental Health Practitioners need to be vigilant in inspecting food-handling practices, and should be authorized to stop street sales or close restaurants if insanitary practices are revealed. Health education activities for food handlers in areas under the threat of cholera should stress the following:

- Exclude infected persons from handling food;
- Wash vegetables and fruit in treated water before use;
- Prepare and store food under proper hygienic conditions;
- Cook food thoroughly in treated water and eat it while still hot, or reheat it thoroughly before eating;
- Prevent contamination of food by contact with other contaminated raw food, contaminated surfaces or flies;
- Wash hands thoroughly with soap after defecation and before preparing or eating food;
- Encourage individuals to use clean cutlery when eating;
- Discourage the habit of several people eating simultaneously from a communal food container;
- Leftover food should be reheated before eating; and
- Encourage breast-feeding of infants.

It is very important to liaise with local media such as press, radio and television to ensure that correct health education messages are passed on to the general public.

6.6 Handling of Cholera Corpses

Cholera is an extremely resistant and tenacious organism that can survive in a dead body for a considerable period of time. Corpses decaying in close contact with surface or underground water sources can play an important role in increasing the rate of infections in cholera endemic areas. Handlers of cholera dead bodies can become transmitters of the disease if necessary standard hygiene practices are not observed (6).The following practice is recommended:

- Prevent direct contact between corpses and family members by limiting ritual washing, funeral gatherings and funeral feasts (7) (8). Those involved in preparation of the corpse should:

- Wear gloves, face masks and apron;
- Disinfect the body with 0.5% chlorine;
- Fill the mouth and anus of the body with cotton wool soaked with chlorine, followed by bandaging the head to keep the mouth shut
- Wrap the corpse carefully.
- Thoroughly wash hands with disinfectant soap and not be allowed to prepare food.

· Bodies should be transported in airtight boxes for rapid burial. Site of burial should be considered in consultation with the affected community and local authority. Type of soil and water table levels must be taken into account (7). Avoid exposure of dead bodies to animals or water sources by proper burial of bodies.

· Corpse carriers should wear gloves.

· Transport vehicles should be thoroughly cleaned and disinfected.

· Deceased clothing and linen should be disinfected by stirring them in boiling water and drying them thoroughly in the sun.

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