

# Guidelines for Cholera Control

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# Preface

These guidelines have been prepared by the Global Task Force on Cholera Control of the World Health Organization to help managers of national diarrhoeal disease control programmes and others responsible for implementing cholera control activities. They may also be useful to international, bilateral, and non-governmental agencies in deciding on appropriate means of assisting countries to control cholera outbreaks.

The WHO Global Task Force on Cholera Control was created in April 1991, and is comprised of representatives from the Programme for Control of Diarrhoeal Diseases, the Community Water Supply and Sanitation unit, the Food Safety programme, the Strengthening of Epidemiological and Statistical Services unit, the Office of Information, the Microbiology and Immunology Support Services unit, the Office of External Coordination, the Division of Health Education, the Division of Emergency Relief Operations, and the Action Programme on Essential Drugs. A staff member of the United Nations Children's Fund (UNICEF) regularly contributes to the work of the Task Force.

Additional information may be obtained by contacting the Programme for Control of Diarrhoeal Diseases, World Health Organization, 1211 Geneva 27, Switzerland.

# Acknowledgements

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The laboratory methods described in Annex 5 are based on the *Manual for laboratory investigations of acute enteric infections*.<sup>1</sup> Dr John Albert of the International Centre for Diarrhoeal Disease Research, Bangladesh, Dr Dhiman Barua formerly of the Programme for Control of Diarrhoeal Diseases, World Health Organization, Geneva, Switzerland, Dr Bradford Kay of Johns Hopkins University School of Hygiene and Public Health, Baltimore, MD, USA, and Dr Kaye Wachsmuth of the Centers for Disease Control, Atlanta, GA, USA assisted in preparing the guidelines.

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<sup>1</sup> *Manual for laboratory investigations of acute enteric infections*. Geneva, World Health Organization, 1987 (unpublished WHO document CDD/83.3 Rev. 1, available on request from the Programme for Control of Diarrhoeal Diseases, World Health Organization, 1211 Geneva 27, Switzerland).

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# 1

## Introduction

Cholera has spread widely since 1961 and now affects at least 98 countries. Extensive experience has shown that the introduction of cholera into a country cannot be prevented; its spread *within* a country, however, *can* be contained by appropriate control measures.

During the past three decades, intensive research has contributed substantially to our understanding of the epidemiology and clinical management of cholera. It is now known that:

- in more than 90% of cases cholera is mild, and may therefore be difficult to distinguish from other types of acute diarrhoeal disease;
- asymptomatic carriers of the disease are common;
- improved treatment, in most cases by oral rehydration therapy, can reduce case fatality rates for cholera to less than 1%;
- where cholera is present but not epidemic, it causes fewer than 5% of all cases of acute diarrhoea;
- vaccination, mass chemoprophylaxis, and *cordon sanitaire* are ineffective in preventing or controlling outbreaks;
- care in drinking and eating habits, safe disposal of excreta, and personal cleanliness are the most effective ways for individuals to reduce the risk of cholera.

Because cholera can be an acute public health problem, with the potential to spread quickly and cause many deaths, special attention must be given to surveillance and control. These guidelines provide information to assist national diarrhoea control programmes, emergency task forces, and others in their efforts to control cholera.

## 2

# About cholera

Most cholera infections are mild; patients may have no symptoms or only mild diarrhoea. In a minority of cases, however, there is rapid onset of severe watery diarrhoea and vomiting, resulting in the loss of large amounts of fluid and salts from the body. Patients become thirsty, stop urinating, and quickly become weak and dehydrated. Patients with severe cholera often complain of cramps in the stomach, arms, or legs.

All cases of cholera should be treated immediately. If treatment is delayed or inadequate, death from dehydration and circulatory collapse may follow very shortly.

There are more than 60 serogroups of *Vibrio cholerae*, but only serogroup O1 causes cholera. *Vibrio cholerae* O1 occurs as two biotypes — classical and El Tor. Each biotype also occurs as two serotypes — Ogawa and Inaba. The El Tor biotype has caused almost all of the recent cholera outbreaks, although cases caused by the classical biotype still occur on the Indian subcontinent. The El Tor biotype also causes a higher proportion of asymptomatic infections than the classical biotype and survives longer in the environment. It can live in association with certain aquatic plants and animals, making water an important reservoir for infection.

Cholera is acquired by the ingestion of an infectious dose of cholera vibrios. Faecally contaminated water is usually the vehicle for transmission of infection, either directly or through the contamination of food. Food may also be contaminated by the soiled hands of infected persons.

The dose of *Vibrio cholerae* O1 required to produce illness depends on the susceptibility of the individual. It can be affected by the level of acidity in the stomach (the vibrio is destroyed at pH 4.5 or lower), and by immunity produced by prior infection with *Vibrio cholerae* O1. In endemic areas, breast-feeding protects infants and young children.

### **Box 1. Common sources of infection**

- **Drinking-water**

that has been contaminated at its source (e.g. by faecally contaminated surface water entering an incompletely sealed well) or during storage (e.g. by contact with hands soiled by faeces), and ice made from contaminated water.

- **Food contaminated during or after preparation**

e.g. milk, cooked rice, lentils, potatoes, beans, eggs, and chicken.

- **Seafood**

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

- **Fruit and vegetables**

grown at or near ground level and fertilized with night-soil, irrigated with water containing human waste, or "freshened" with contaminated water, and then eaten raw.

# 3

## Preventing cholera

The only sure means of protection against cholera epidemics are adequate water supplies and sanitation.

### 3.1 Ensuring a safe water supply

Access to safe water is a basic requirement for health, made more critical when cholera threatens. Since contaminated water is the usual source of cholera infection, all efforts must be made to provide safe drinking-water, as well as safe water for food preparation and bathing. The supply of water must be of good quality, affordable, and available to all — continuously and in sufficient quantity for all domestic purposes.

#### **Box 2. Recommended chlorine levels in water distribution systems in areas affected by cholera**

The minimum levels of free residual chlorine necessary for safe water are:

- at all sampling points in a piped water system ..... 0.5 mg/litre
- at standposts in systems with standposts ..... 1.0 mg/litre
- in tanker trucks, at filling ..... 2.0 mg/litre

Active monitoring is required to ensure that these minimum levels of chlorine are maintained.

In urban areas, properly treated drinking-water should be made available to the entire population through a piped system, at standposts, or from tanker trucks. In rural areas, where there is

no source of treated water and where water from tube wells, protected dug wells, or protected springs is not available, people must be taught that water can be made safe at home by bringing it to a vigorous, rolling boil or by adding a chlorine-releasing chemical.

A supply of suitable chemicals for treating water, and narrow-mouthed pots with covers for storing water, are helpful in reducing secondary transmission of cholera within a family. Household filtration of water can also help to eliminate the vibrio, but should always be followed by disinfection with chlorine or by boiling. (Further information on providing safe water in communities and individual homes can be found in *Fact sheets on environmental sanitation for cholera control*.<sup>1</sup>)

Boiling is an effective method of water sterilization, but is not practical for the needs of most populations, especially when fuel is scarce. The method is expensive and should be recommended chiefly for emergency situations when the disinfection of water by chlorination or other methods is not possible.

### Box 3. Making water safe by boiling

To make water safe for drinking and other uses, bring water to a vigorous, rolling boil and keep it boiling for 1 minute. This will kill, or inactivate, *Vibrio cholerae* O1 and most other organisms that cause diarrhoea.

Even when drinking-water is safe, infection may still be transmitted by contaminated surface water used for bathing or for washing cooking utensils. When surface water is contaminated, as confirmed by laboratory tests, appropriate measures — including closing affected areas — should be taken to reduce the danger of infection. Indeed, special care should be given to *any* source of water shown to be contaminated. The water should be made safe or, if this is not possible, an alternative water source should be provided.

<sup>1</sup> *Fact sheets on environmental sanitation for cholera control*. Geneva, Health World Organization (in preparation). Will be available on request from Community Water Supply and Sanitation, World Health Organization, 1211 Geneva 27, Switzerland.

#### Box 4. Making water safe by chlorination

*The following guidelines should be translated into messages that take appropriate account of locally available products and measuring devices, and of whether the instructions are for home or institutional use.*

**Make a stock solution of chlorine** (1% concentration by weight of available chlorine). Add to 1 litre of water:

<i>Product (percent concentration by weight of available chlorine)</i>	<i>Amount</i>
Calcium hypochlorite (70%)	15 g
<i>or</i>	
Bleaching powder or chlorinated lime (30%)	33 g
<i>or</i>	
Sodium hypochlorite (5%)	250 ml
<i>or</i>	
Sodium hypochlorite (10%)	110 ml

If products with these concentrations of chlorine are not available in the local market, adjust the amount used according to the available concentrations.

Store the stock solution in a cool place in a closed container that does not admit light. The stock solution loses effectiveness with time and must be used no later than one month after it has been made.

**Use the stock solution to make safe water.** Add water to the stock solution to ensure proper mixing:

<i>Water .....</i>	<i>added to .....</i>	<i>Stock solution</i>
1 litre		0.6 ml or 3 drops
10 litres		6 ml
100 litres		60 ml

Allow the chlorinated water to stand for at least 30 minutes before using it. The residual chlorine level after 30 minutes should be between 0.2 and 0.5 mg/litre.

If the water is turbid (not clear, with a lot of suspended solid matter):

- filter it before chlorination, or
- boil it vigorously (as indicated in Box 3) instead of treating it by chlorination.

## 3.2 Sanitation

Good sanitation can markedly reduce the risk of transmission of intestinal pathogens, including cholera vibrios; this is especially true where the lack of good sanitation may lead to contamination of clean water sources. High priority should be given to observing the basic principles of sanitary human waste disposal, as well as to ensuring the availability of safe water supplies.

Appropriate facilities for human waste disposal are a basic need of all communities; in the absence of such facilities there is a high risk of cholera. Sanitary systems that are appropriate for the local conditions should be constructed with the cooperation of the community. (Designs for latrine construction in different types of soils and climatic conditions can be found in the WHO publication, *A guide to the development of on-site sanitation*.<sup>1</sup> See also Annex 1 for instructions on building a ventilated improved pit latrine.)

People will need to be taught how to use latrines, about the dangers of defecating on the ground, or in or near water, and about the importance of thorough hand-washing with soap or ash after any contact with excreta. The disposal of children's excreta in latrines needs to be emphasized.

When large groups of people congregate, for fairs, funerals, religious festivals, etc., particular care must be taken to ensure the safe disposal of human waste and the provision of adequate facilities for hand-washing.

<sup>1</sup> Franceys R, Pickford J, Reed R. *A guide to the development of on-site sanitation*. Geneva, World Health Organization, 1992.

### Box 5. 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 metre, have a depth of 0.5 metre, and be at least 30 metres from a well or other source of drinking-water. Where possible, the pit should be at least 6 metres 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.

## 3.3 Food safety

Since food can be an important vehicle for disease organisms, each country should establish adequate controls for the handling and processing of food through a national programme on food safety.

Health education activities, which should be intensified where there is a threat of cholera, should stress the importance of:

- avoiding raw food (exception: undamaged fruits and vegetables from which the peel can be removed are safe if hygienically handled);
- cooking food until it is hot throughout;
- eating food while it is still hot, or reheating it thoroughly before eating;
- washing and thoroughly drying all cooking and serving utensils after use;
- handling and preparing food in a way that reduces the risk of contamination (e.g. cooked food and eating utensils should be kept separate from uncooked foods and potentially contaminated utensils); and
- washing hands thoroughly with soap (or ash) after defecating, or after contact with faecal matter, and before preparing or eating food, or feeding children.

### **Box 6. WHO Centres for Environmental Health**

For additional information and assistance on water supply and sanitation measures contact:

Regional Centre for Environmental Health Activities (CEHA)  
P.O. Box 926967  
Amman  
Jordan

Centre for Promotion of Environment Planning and Applied  
Sciences (PEPAS)  
P.O. Box 12550  
Kuala Lumpur 50782  
Malaysia

Centro Panamericano de Ingenieria Sanitaria y Ciencias  
del Ambiente (CEPIS)  
Casilla 4337  
Lima 100  
Peru

WHO Collaborating Centre for Environmental and Epidemiological  
Aspects of Diarrhoeal Diseases  
Department of Epidemiology and Population Sciences  
London School of Hygiene and Tropical Medicine  
Keppel Street  
London WC1E 7HT  
England

WHO Collaborating Centre for Water Quality and Human Health  
Robens Institute  
University of Surrey  
Guildford  
Surrey GU2 5XH  
England  
*or*

Community Water Supply and Sanitation  
World Health Organization  
1211 Geneva 27  
Switzerland

Street food-vendors and restaurants may pose a special risk during an epidemic. Environmental health workers, or their equivalent, must be especially vigilant in inspecting food-handling practices. They should be given the authority to stop street sales or close restaurants when their inspections reveal insanitary practices.

Houseflies play a relatively small role in spreading cholera, but their presence in large numbers indicates poor sanitary conditions which favour transmission of the disease.