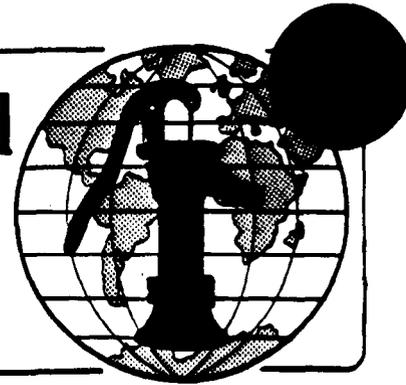


# Water for the World



## Methods of Controlling Enteric Diseases Technical Note No. DIS. 2.M.4

Enteric diseases are those that affect the gastrointestinal tract of humans. They are caused by bacteria, parasites or viruses. The disease organisms are passed from infected people in their feces or urine. Others become infected when they take in the disease causing agents by eating soiled food or by drinking water contaminated with fecal matter. Enteric diseases are common throughout the world and, in most areas, some part of the population is always infected.

This technical note discusses measures which can be instituted to control the spread of enteric diseases. Special emphasis is given to basic preventive measures that should be taken to provide hygienic conditions in individual households and in the entire community.

### Useful Definitions

**DEHYDRATION** - A condition in which the body loses more liquid than it takes in.

**FECES** - The waste from the body, moved out through the bowels.

**PARASITE** - Worms, insects or mites which live in or on animals or people.

**STOOL** - Human excrement, or a single bowel movement.

**VIRUS** - Germs smaller than bacteria which cause some infectious (easily spread) diseases.

### Disease Transmission

The transmission of enteric diseases is by the fecal-oral route. The bacteria, parasites or viruses (germs) pass from the body of an infected person in excreta. The germs later enter the body of an uninfected person through the mouth. There are two main ways that germs can enter an uninfected person or re-enter the same person:

- Through the water that people drink. In many situations, water supplies are contaminated by enteric disease germs. If a person drinks fecally contaminated water, he is likely to suffer from an enteric disease.

- Through the consumption of food. Food can be contaminated by dirty hands or raw infected water, or by being exposed to fecally contaminated organic fertilizer or garden soil. Vegetables thus contaminated would only be safe to eat after being cooked or sterilized. Flies can carry germs to food. Flies that light on and taste food can inoculate food with germs that are consumed with the food.

Table 1 lists the principal enteric diseases and their routes of transmission. Diarrhea is a major symptom of all enteric disease. Many types of germs can grow on food if it is not refrigerated. Cholera and typhoid fever are dangerous to people of all ages. Cholera is an especially dangerous enteric disease. Among children, enteric diseases are a major cause of high mortality. Diarrhea is the leading killer of small children in most developing countries. It kills by dehydration.

### Controlling Enteric Diseases

The control of enteric diseases involves three important interrelated activities: a health education program, a safe water and sanitation program, and home treatment of patients. These three activities should be implemented simultaneously and continuously.

### Health Education

Most enteric diseases result from poor sanitation and a lack of safe (good quality) water in the community. Effective health education is necessary to help people understand the connection between improved hygiene and

**Table 1. Principle Enteric Diseases and Their Common Transmission Routes.**

Diseases	Causative organisms	Common transmission route
Cholera	Vibrio cholerae, including biotype El Tor	Man - feces - water and food - man
Typhoid fever	Salmonella typhi	Man - feces - food and water - man
Paratyphoid fevers	Salmonella paratyphi: A, B, C,	Man - feces - food and water - man
Bacillary dysentery	Shigellae	Man - feces ( <u>flies</u> ) food (water) - man
Amoebic dysentery	Entamoeba histolytica	Man - feces ( <u>flies</u> ) food (water) - man
Infectious hepatitis	Hepatitis virus A	Man - feces - water and food - man
Diarrheal diseases	Shigellae, salmonellae, Escherichia coli, parasites, viruses	Man - feces ( <u>flies</u> ) food (water) - man

Improved health. Health education aimed at eliminating the enteric disease should include the following:

- Formation of a community sanitation committee to coordinate the various activities and work needed to attack the problem.
- Participation of community groups. Teachers should be trained in the basics of disease transmission and prevention so that they can teach their students. Community groups, 4-H clubs, women's groups, other clubs, and the like should be active in health education.
- Development of audio-visual materials. Films, puppets, slides, songs, flashcards, and other methods can be used to make the problem and its solution clear to the members of the community. Students and clubs should be taught how to prepare their own audio-visual materials for demonstration.
- Implementation of specific education programs in clinics and hospitals.

Health education should start people thinking about the problem and create a desire to change their behavior to solve the problem. When people recognize the need to use a latrine and wash their hands, and understand the ways in which water is contaminated and

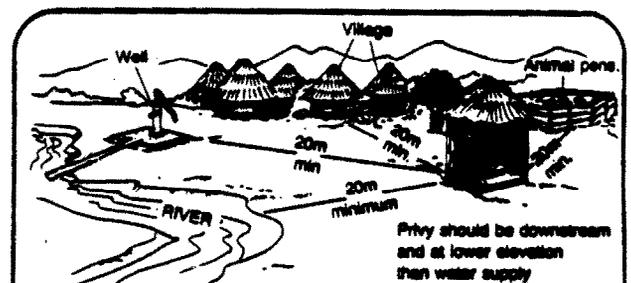
the role of flies and other vectors in the spread of disease, they will be more willing to do something to change the situation.

#### Preventive Measures

Several measures can be taken to either remove sources of disease transmission or to prevent the sources from ever existing.

#### Latrines

- Build latrines at least 15m from any water supply or household. Be sure to site latrines so that they are downhill from any water source. Do not excavate pits into the water table. See Figure 1.



**Figure 1. Proper Location of Privy**

- Make sure that all latrines are sanitary. Ideally, the latrine should have a concrete floor. When not in use, the hole through the floor should

be covered. Uncovered latrines permit the breeding of flies which can carry disease agents from feces to food. See Figure 2.

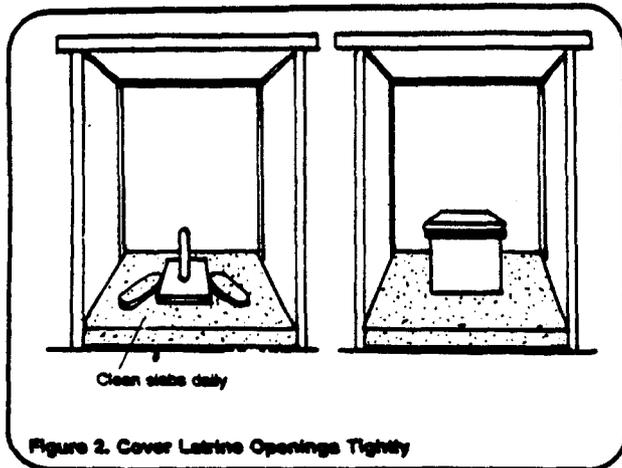


Figure 2. Cover Latrine Openings Tightly

• Accustom people to use latrines. One of the biggest problems is getting young children to use a latrine. Parents may use it but allow their children to defecate on the ground. Latrine openings should be sized so that children do not fear falling in. For more information on latrine design and construction, read the appropriate technical notes on sanitation. See "How to Use Technical Notes," HR.G, for a full list of technical notes. If latrines are not used, water sources can easily be contaminated by surface run-off.

## Water Supply

• Provide for a safe supply of water for the community. Read the appropriate technical notes on rural water supply. Protect all wells from the entrance of surface run-off. A well-head and a pump should be installed in order to prevent contamination from entering the wells.

• Cap springs to prevent their contamination from surface run-off. See Figure 3.

• Where wells and springs are not protected or where surface water sources are used, water should be treated. Individual or community treatment should be used depending on the situation. Boiling and chlorination are the most common methods. For information on water treatment methods, see "Methods of Water Treatment," RWS.3.M.

## Hygiene

Personal and household cleanliness is important for preserving health. The following practices are essential for controlling the spread of enteric diseases. Figure 4 shows some of these practices.

• Always wash hands with soap and water before eating and after using the latrine.

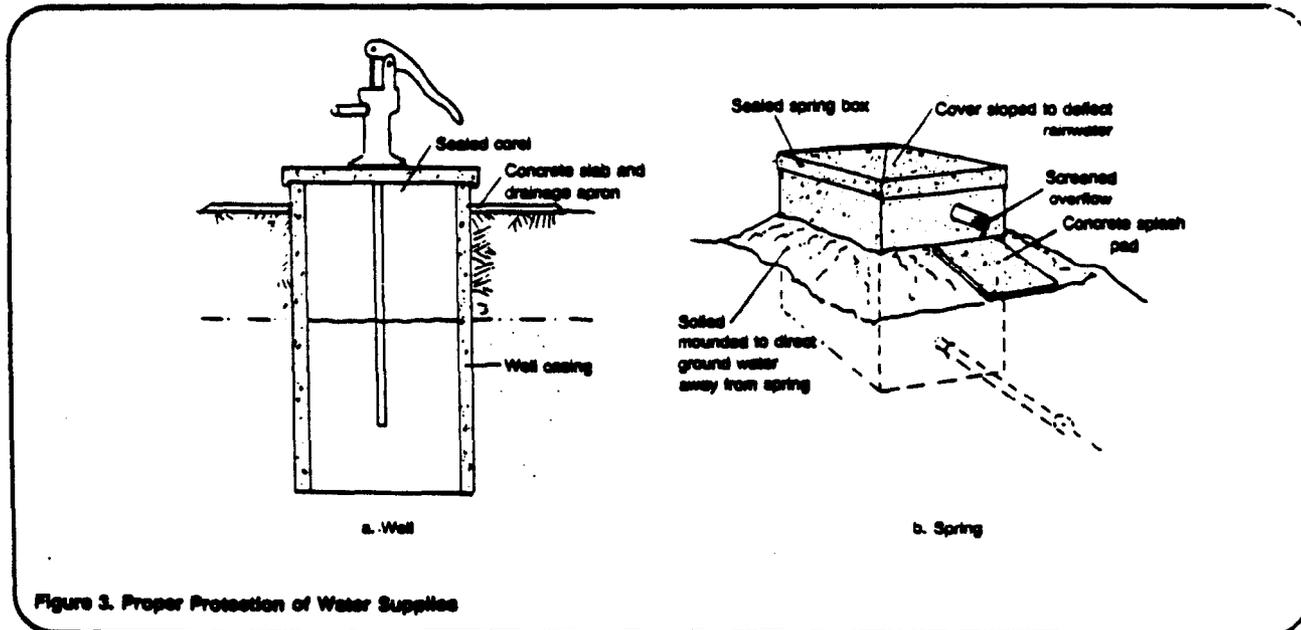


Figure 3. Proper Protection of Water Supplies

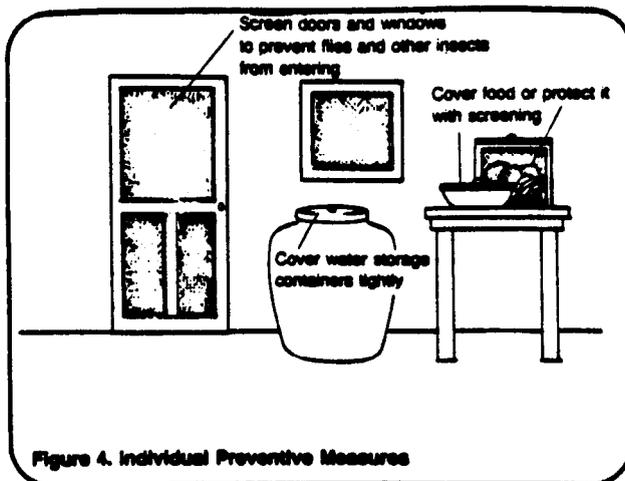


Figure 4. Individual Preventive Measures

- Wash fruits and vegetables before eating them. Be sure to scrub those vegetables which grow in ground that may be infected.

- Do not allow animals to enter the house.

- Store food in screened areas or in refrigerators and cover food with netting. These measures will keep flies away from food and help prevent the spread of disease.

- Keep the house clean by sweeping it daily.

- Require that food handlers are trained in personal hygiene and are aware of the need to store and cook food correctly.

- Dispose of all garbage properly. Make sure that garbage does not accumulate in such a way that flies can breed in it.

- Eat well. Diseases such as dysentery are more dangerous to people suffering from malnutrition.

### Treatment Measures

At the same time that health education and preventive measures are being implemented, measures to treat patients with enteric diseases should be adopted. When diarrhea is present, liquid and salt are rapidly lost and must be restored to the body. Many children die from diarrhea or dysentery when they do not have enough water in their bodies. Persistently and frequently give liquids to a person with diarrhea. In severe cases in children, rehydration liquid should be given. Preparation of a rehydration drink: to a liter of boiled water, add two tablespoons of sugar, one-quarter teaspoon of salt, and one-quarter teaspoon of baking soda. Give the dehydrated person sips of this drink every five minutes, day and night, until he begins to urinate normally. An adult needs at

Table 2. Foods for a Person with Diarrhea

<p>When the person is vomiting or feels too sick to eat, he should drink:</p> <p>teas</p> <p>ice water</p> <p>chicken, meat, egg, or bean broth</p> <p>Kool-Aid or similar sweetened drinks</p> <p><b>REHYDRATION DRINK</b></p> <p>Breast milk</p>	<p>As soon as the person is able to eat, in addition to giving the drinks listed at the left, he should eat a balanced selection of the following foods or similar ones:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p><b>energy foods</b></p> <p>ripe or cooked bananas</p> <p>crackers</p> <p>rice</p> <p>oatmeal or other well-cooked grain</p> <p>fresh maize (well cooked and mashed)</p> <p>potatoes</p> <p>applesauce (cooked)</p> <p>papaya</p> </td> <td style="vertical-align: top;"> <p><b>body-building foods</b></p> <p>milk (sometimes this causes problems)</p> <p>chicken (boiled or roasted)</p> <p>eggs (boiled)</p> <p>meat, well cooked, without fat or grease</p> <p>beans, lentils, or peas (well cooked and mashed)</p> <p>fish (well cooked)</p> </td> </tr> </table>	<p><b>energy foods</b></p> <p>ripe or cooked bananas</p> <p>crackers</p> <p>rice</p> <p>oatmeal or other well-cooked grain</p> <p>fresh maize (well cooked and mashed)</p> <p>potatoes</p> <p>applesauce (cooked)</p> <p>papaya</p>	<p><b>body-building foods</b></p> <p>milk (sometimes this causes problems)</p> <p>chicken (boiled or roasted)</p> <p>eggs (boiled)</p> <p>meat, well cooked, without fat or grease</p> <p>beans, lentils, or peas (well cooked and mashed)</p> <p>fish (well cooked)</p>	
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least 3 liters of water each day while a child needs 1 liter. Table 2 lists foods that should and should not be eaten by a person with diarrhea.

Where diarrhea is very severe and looks like it will not stop, keep giving liquids to the patient and seek medical help immediately. Seek medical help when:

- Diarrhea lasts more than four days and is not getting better or more than one day in a small child with severe diarrhea.

- A person is dehydrated and getting worse.

- A child vomits everything it drinks.

- The child begins to have fits or its feet and face swell.

- The person was sick or malnourished before the diarrhea began.

- There is blood in the stool.

Under these conditions, a more serious enteric disease may be present in the system and some type of drug treatment will be necessary.