

# **Presenter's Guide and Notes**

**SHORT VERSION**

## **CHOLERA PREVENTION AND CONTROL**

**Assessing the Options in Water, Sanitation, and Hygiene Education**

A Storyboard Live! Presentation

Prepared by

The Water and Sanitation for Health (WASH) Project  
Office of Health, Bureau for Research and Development  
U.S. Agency for International Development

February 1993

Water and Sanitation for Health Project  
Contract No. DPE-5973-Z-00-8081-00, Project No. 936-5973  
is sponsored by the Office of Health, Bureau for Research and Development  
U.S. Agency for International Development  
Washington, DC 20523

## INTRODUCTION

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LO: 245.11 93 PR

### Background

This Storyboard presentation was prepared by the Water and Sanitation for Health Project (WASH) as an experiment in using non-print media to communicate information about water supply and sanitation. Originally the presentation was to be about WASH capabilities and the importance of water and sanitation. However, in the early stages of the task, the topic was switched to cholera preparedness assessment because of its timeliness and potential utility.

The thrust of the presentation is an explanation of how countries facing cholera can assess their options for action in water, sanitation, and hygiene education to halt or slow the spread of the disease. It is based on the work done under Task 323, which consisted of preparation of a manual for consultants on how to carry out a rapid assessment of cholera vulnerability, and it draws heavily on WASH's experience in conducting such an assessment in Peru shortly after the epidemic first broke out in 1991.

The presentation argues that an effective assessment must take into consideration both the direct causes of the disease and the indirect or contributing factors, such as weak sector institutions, lack of administrative ability, or the absence of appropriate laws and regulations. Thus, it promotes a broad view of water, sanitation, and health and looks at both short- and long-term interventions. In addition, the presentation seeks to broaden the discussion from cholera to fecal-oral diseases in general and to stress that prevention through provision of water and sanitation is the cheapest cure in the long term.

The Cholera Fact Sheet and the Cholera Assessment Guide, both publications prepared by WASH, function as print supplements to the presentation.

While it might be possible for an individual to use this presentation as a self-instructional tool, it was designed mainly to be used by WASH staff or consultants meeting with small groups in missions or bureaus. The Storyboard is a way of capturing people's attention so that the message can be conveyed more effectively. It is also a way for the presenter to get a better idea of what the audience knows and where they are coming from. It provides an environment for the exchange of information and ideas—one that is crucial to development assistance and is often lacking.

Marketing WASH capabilities via the presentation of a Storyboard requires more resources than simply mailing out brochures or fact sheets, or mailing out copies of the Storyboard diskettes. The Storyboard facilitates two-way communication. It should help the presenter to articulate his or her message more clearly and to engage the audience in dialogue. This innovative approach has been used with great success in other sectors (i.e., raising awareness among decisionmakers of the consequences of rapid population growth).

The presentation is usable by anyone with an IBM-compatible personal computer with a color monitor. No other special equipment is needed unless the group to which the presentation is to be made is large. Then it could be projected via an adapter and overhead projector.

## **Tips for Presenters**

### ■ *How to Install the Cholera Storyboard*

Make a new subdirectory on the hard disk of your computer. For example, type: `md cholera`. (You may use any name up to 8 characters.) Then change to that subdirectory and copy all the files from the 8 diskettes of this presentation into the subdirectory. For example, if your hard disk is drive C: and your floppy drive is A:, at the prompt, `C:\CHOLERA>`, type: `copy a:*.*`. Repeat this command for each diskette.

### ■ *How to Operate the Program*

To begin the program you must be positioned within the new subdirectory that you created for the Storyboard presentation. Once in that subdirectory, simply type: `st cholera`, and the StoryTeller identification screen will appear. (ST is the Storyboard Live! Program, StoryTeller; CHOLERA is the name of the story.)

Hit "Enter" to begin the presentation. Many of the slides have several phases, or "builds." For example, the first build of a slide may be a line-drawn map. In the second phase, certain countries might be colored in; in the third phase, cholera morbidity figures might be given. When all builds have appeared, a white dot will appear in the lower right-hand corner and you can move on to the next slide by hitting "Enter" or (almost) any other key. To quit at any time in the presentation, hit "Esc." To back up to the previous slide, hit the minus key in the numerical keyboard pad. (You may have to hit that key several times to back up through all builds of the previous slide.)

The presentation is divided into five sections, which are displayed in the menu (see Slide 2):

**Why there is a problem.**

**Assessing the options.**

**Transmission and prevention.**

**Epidemiology.**

**Review.**

Make a selection by typing the first letter of the section you wish to view: `w`, `a`, `t`, `e`, `r`. Wait for the grey box to appear in the lower left corner of the menu and then hit "Enter." At the conclusion of each section, you are returned to the menu.

### ■ *How to Use the Presenter's Notes*

The accompanying notes have been prepared to assist you in presenting the Storyboard Live! Program. For each slide, there is a suggested commentary. You can keep track of where you are in the presentation by referring to the photocopies of the slides on the right-hand side of the page.

You may wish to read the notes as a commentary or narrative. However, it is more likely that you will use the notes as a guide and as background material for your own remarks. For that reason it is very important to familiarize yourself with the notes and the slides well in advance of the scheduled presentation so that you can tailor your remarks on the presentation to the audience and the setting.

Note that for some slides there are additional comments or background material the use of which is optional. These sections are labeled "Additional Information."

### ■ *How to Make Your Presentation*

As mentioned above, this Storyboard Live! Program and accompanying script is intended to be used with small groups (four or five people) on a VGA color monitor or with larger groups (twenty or so) projected via an overhead projector.

The overall goal of the Storyboard on cholera is to describe what the WASH Project/USAID can offer in terms of assessment and planning for countries facing cholera. Since the assessment/planning process described is based on a broad framework for understanding cholera, the presentation attempts to provide background material on the disease and its transmission and on the ways it can be prevented.

The suggested order in viewing the presentation is **Epidemiology**, **Transmission and prevention**, **Why there is a problem**, **Assessing the Options**, and **Review**. Depending on the audience, you may wish to leave out certain segments of the menu or rearrange the menu to suit your own purposes, or hurry through some parts and linger over others. As mentioned above, the first step in preparing for your presentation is to familiarize yourself completely with the slides and the presenters' notes.

### **Your Comments Are Important**

This is the first Storyboard Presentation prepared by the WASH Project. We at WASH have learned a great deal about working with this medium and already have some ideas about how the final product could be improved and used. We would appreciate suggestions for improving the product and are looking for opportunities to field test it.

## Presentation Notes to Accompany Storyboard Presentation

### Introduction

**Slide 1: Cholera Prevention and Control: Assessing the options in water, sanitation, and hygiene education**

In 1991, cholera reappeared in Latin America after a 100 year absence. The epidemic in Latin America is part of a worldwide pandemic that has resulted in 16,000 deaths and 2.3 million cases over the past 30 years, and it is still going strong.

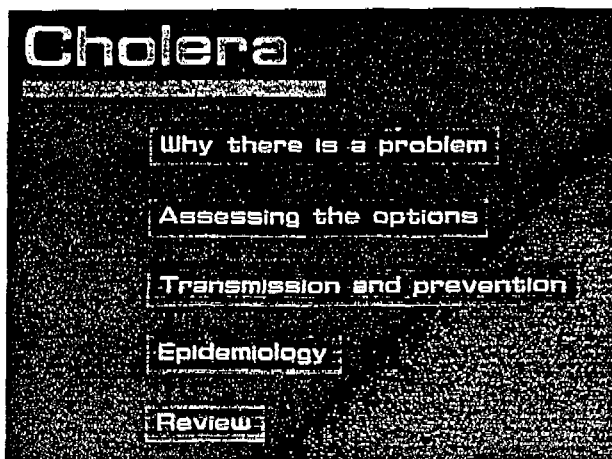
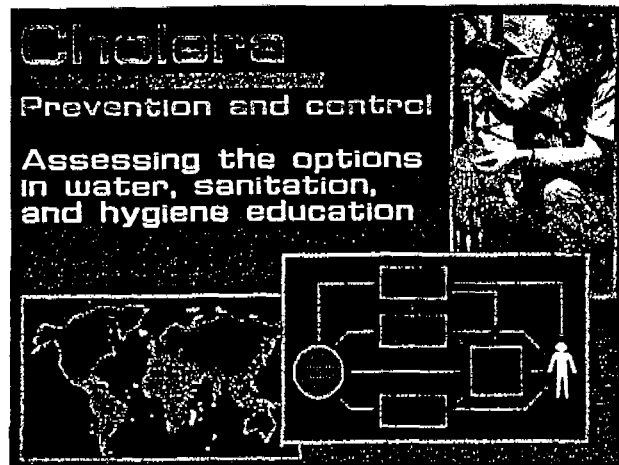
The permanent solution to cholera is prevention and blocking disease transmission. This involves providing safe water and adequate sanitation, as well as promoting healthy hygiene practices.

Many countries of the developing world are vulnerable to cholera because they lack safe water and adequate sanitation and the necessary resources to provide these services. Because universal water and sanitation coverage is not a realistic option at present, careful planning is required to allocate limited resources to situations where they are needed most. However, the most vulnerable countries also lack the capacity to do this planning.

A.I.D.'s Office of Health, Bureau of Research and Development, through the WASH project, has developed a planning process to assist countries in assessing their options for preventing and curbing the spread of cholera.

The heart of this presentation is a description of the planning process. In addition, background information on how cholera is transmitted and how the transmission cycle can be broken is presented. This information provides a sturdy framework for thinking about cholera prevention.

We see that cholera, and other fecal-oral diseases, can be prevented only through the combined efforts of various agencies and ministries, from those which



deal with the technical problems of providing potable water, to those which regulate irrigation, to those involved in public education. Many disciplines are involved: engineering, institutional development, training, legal and regulatory services, policymaking, financial management, and so on.

When the multifaceted nature of cholera prevention efforts is understood and appreciated, it becomes obvious that there are many options for prevention, even for countries with scarce resources.

**Slide 2: Menu: Cholera Prevention and Control**

This presentation is divided into five sections:

**W** Why there is a problem

**A** Assessing the options

**T** Transmission and prevention

**E** Epidemiology

**R** Review

Make a selection by typing in the first letter of the section you want to view:

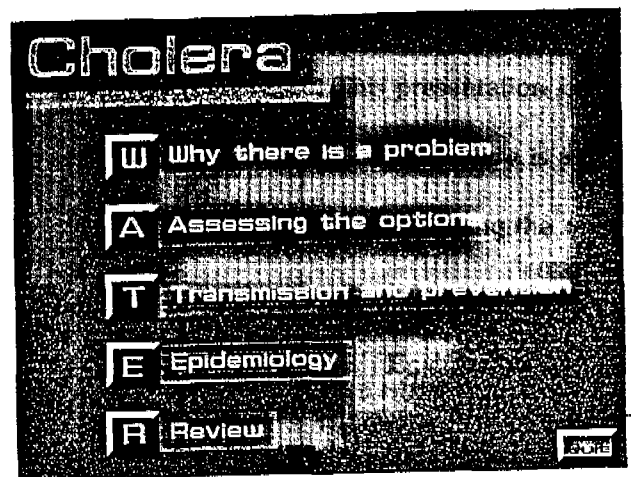
w, a, t, e, or r. To quit, type q.

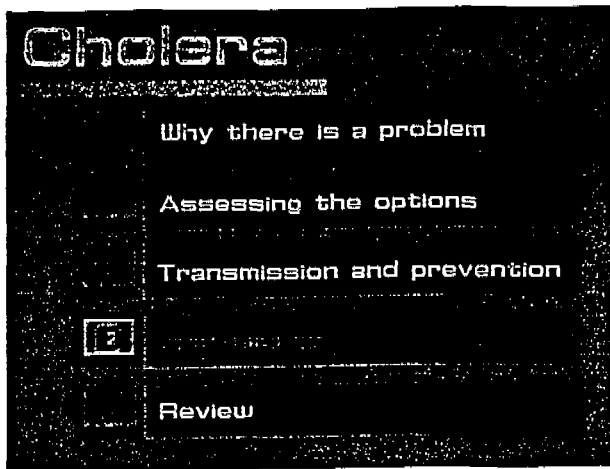
Note: Wait for the grey box to appear in the lower left corner.

You must hit "Enter" after the letter.

If viewing the full presentation, the suggested order is: Epidemiology, Transmission and prevention, Why there is a problem, Assessing the options, and Review.

At the conclusion of each section, you are returned to the menu.



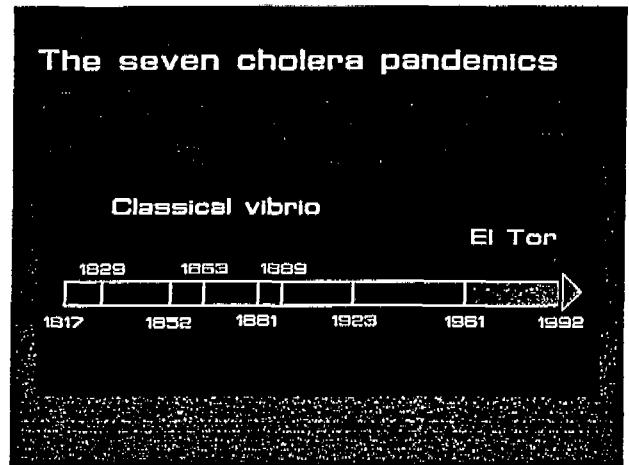


## Epidemiology

### Slide E.1: *The seven pandemics*

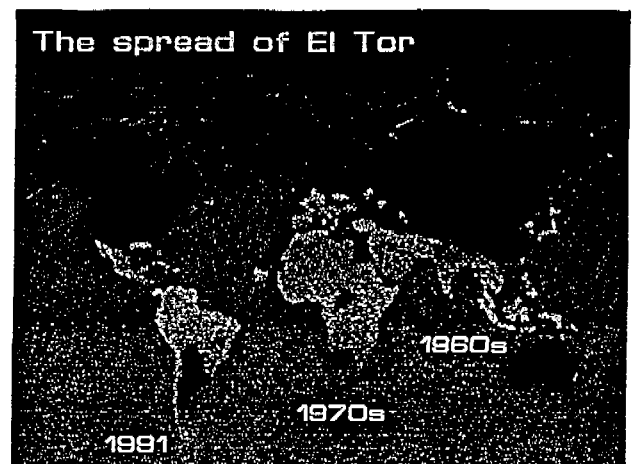
This timeline shows the seven pandemics of the nineteenth century—the current pandemic, El Tor, began in 1961 and is still ongoing. “Modern” cholera began in Jessore, near Calcutta, in 1817. Unlike earlier cholera, this one seemed to have the ability to travel long distances.

[Additional Information: The five subsequent pandemics reached Western Europe; two reached the United States. These pandemics were deadly. The 1829 pandemic killed 150,000 to 250,000 in the U.S. The fourth pandemic killed half a million people on the continent of Europe.]



### Slide E.2: *The spread of El Tor*

The current pandemic began in the Celebes Islands in 1961 and quickly spread to other Asian countries during the 1960s. By 1970 it had traveled westward to the Middle East. In August 1970, the first cases in Africa this century were identified in Guinea. The epidemic spread along the West African coast and then moved inland. Within two years, 29 countries were infected with El Tor. Like Latin America in 1991, Africa had been free of the disease for more than 70 years.



Towards the end of January 1991, cholera struck the coast of Peru with great intensity, causing on average over 1,700 reported cases per day during the first four months. By mid-1992, the disease had spread to all but a handful of Latin American countries. The reported cases totalled close to 650,000 and the death toll was reported to be over 5,500. Reported cases may underestimate actual cases. It is likely that the microorganism was introduced into Latin America via maritime traffic from the Pacific.

**Slide E.3: Cholera cases reported to WHO**

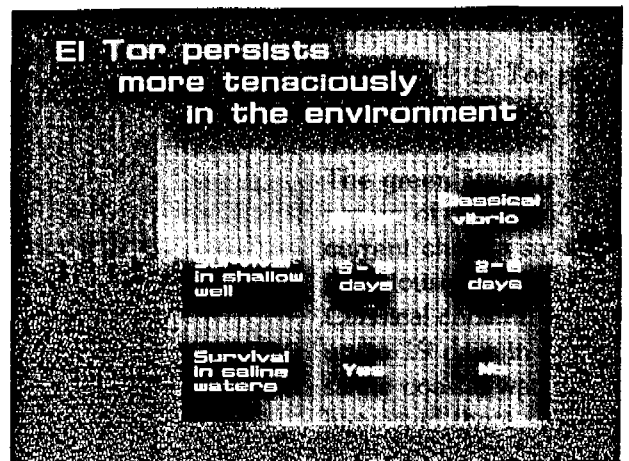
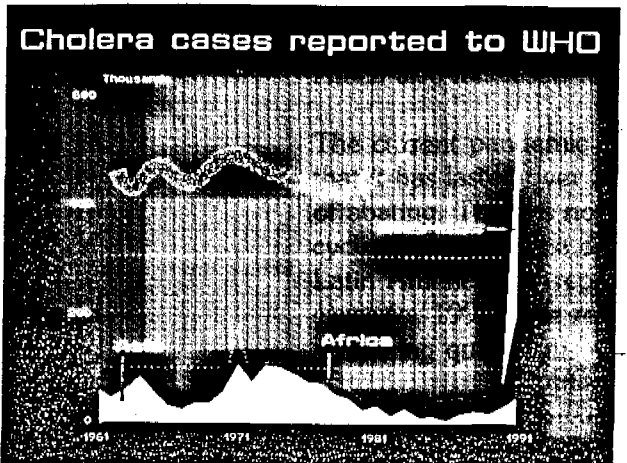
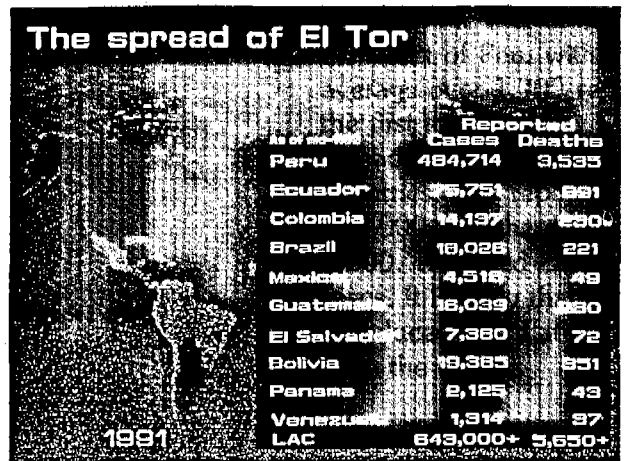
This graph shows the cholera cases in thousands reported to the World Health Organization since the onset of El Tor in 1961. The outbreak in Latin America in 1991 was severe. The number of cases in Africa also increased markedly in 1991.

The current pandemic differs from previous ones in that it has lasted over 30 years and shows no signs of abating. There is no clear explanation for the cyclical nature of the disease. By the end of July Latin America had reported approximately 240,000 cases for 1992. The red line on the graph is remaining quite high.

[Additional Information: At the end of 1991, over 2.3 million cases had been reported for this pandemic worldwide. Very likely many cases go unreported or are not differentiated from other diarrheal diseases. Also, some countries do not report cases to WHO.]

**Slide E.4: El Tor persists more tenaciously in the environment**

The green line represents the persistence and cyclical nature of cholera. As shown on the screen, the current cholera strain, El Tor, persists more tenaciously in the environment than vibrios of Classical cholera. El Tor has been known to survive up to 19 days in well water and also can survive in saline coastal waters and in fish and shellfish harvested there.





[Additional Information: Investigators have reported cholera vibrio survival times of up to two months in 4° C seawater and one month in untreated freshwater, also at 4° C. The cholera vibrio can survive five days in a slice of papaya and up to two weeks in refrigerated fish and shellfish or cooked rice.]

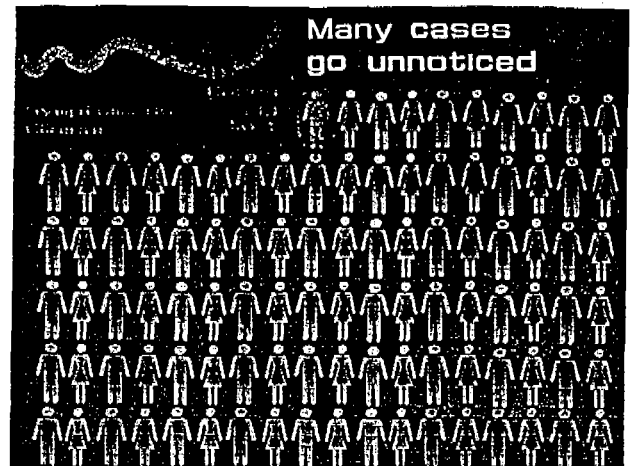
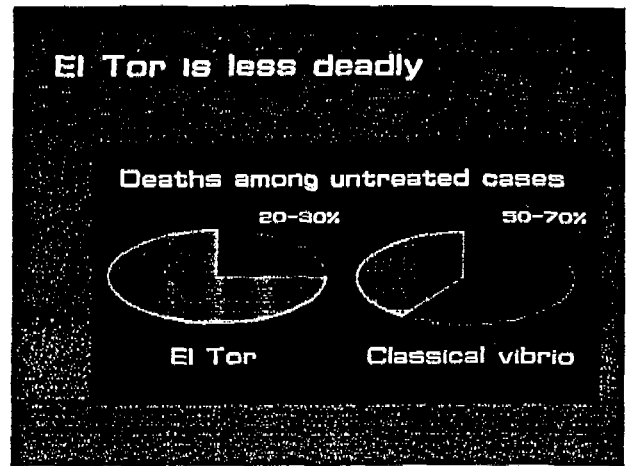
**Slide E.5: *El Tor is less deadly***

Fortunately, the El Tor strain is less deadly than Classical cholera. Among those who get cholera today, fewer die compared to past strains.

**Slide E.6: *Many cases go unnoticed***

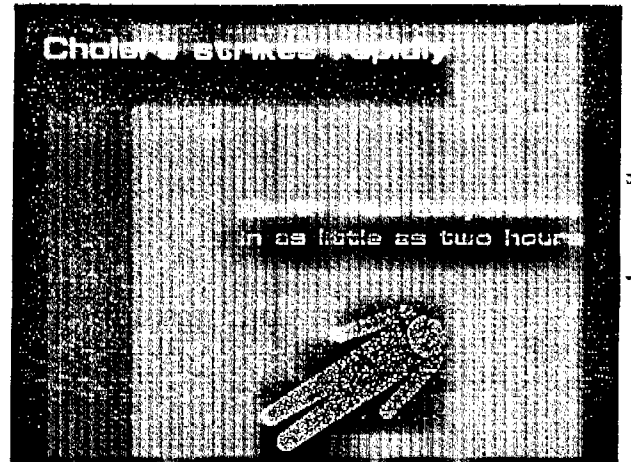
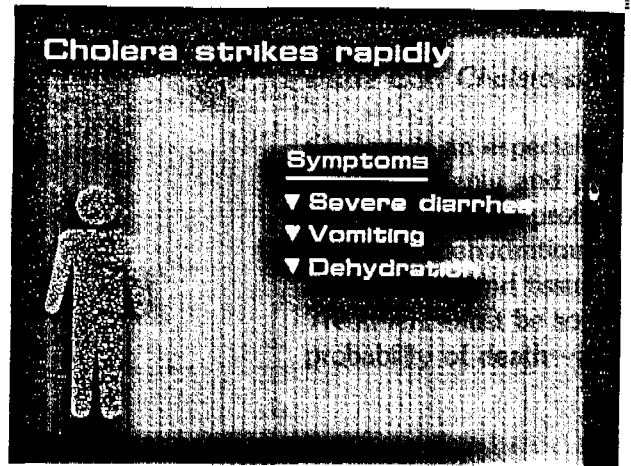
Many cases go unnoticed, presenting few or no symptoms. There are likely 100 symptomless cases for every clinical case of cholera. These symptomless people spread the disease unknowingly.

[Additional Information: Symptomless cases can shed cholera vibrios back into the environment in their stools for up to eight days where they continue to spread rapidly along the fecal-oral route. Because these cases don't appear to be infected, no attempt is made by these people to take special precautions. Cholera can be spread easily from person to person and country to country by asymptomatic people without them knowing it.]



**Slide E.7: Cholera strikes rapidly**

Cholera is an especially frightening disease because it strikes suddenly and progresses rapidly. Clinical cholera produces profuse watery stools, vomiting, and rapid dehydration, acidosis (decreased alkalinity of the blood and tissues), and circulatory collapse. Treatment must be sought or there is a high probability of death—about 30-40%.



**Slide E.8: Treatment is effective**

Treatment for cholera involves replacement of lost fluids and electrolytes, normally through oral rehydration therapy. Cases that have progressed to severe dehydration, shock, and/or unconsciousness require intravenous rehydration. Antibiotic therapy is not essential, but it may shorten the duration of diarrhea.

Twenty to 30% of those untreated die of cholera; rehydration alone reduces fatality rates to 1% or less.

[Additional Information: In Latin America, the death toll has been kept low because of a strong public health response and effective case management. In Africa, where the majority of cases go untreated, the death toll is much higher, up to 30% in some areas with an average of 6-10%.]

**Slide E.9: Treatment is relatively inexpensive, but cholera is costly**

This slide shows what the cholera epidemic cost Peru in 1991, according to a study prepared by WASH. We see that the cost of treating cholera victims was only a bit more than 10% of the total cost. Other costs include losses in trade and tourism and productivity. The analysis also placed a present monetary value on the productivity losses due to illness or death. The total cost, \$255.5 million, is probably on the low side because conservative data were used in the analysis.

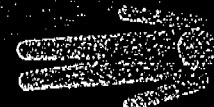
[Additional Information: The World Bank's World Development Report for 1992, states that "in just the first ten weeks of the cholera epidemic in Peru losses from reduced agricultural exports and tourism were estimated at \$1 billion—more than three times the amount that the country had invested in water supply and sanitation during the 1980s."]

Whichever figure is chosen, it is money that Peru could ill afford to lose, and the costs hit more than the Ministry of Health.

**Treatment is effective**


Treatment

- ▲ Replacement of lost fluids
- ▲ Antibiotic therapy





**Treatment is effective**

Deaths among untreated cases 20-30%




**Treatment is effective**

Deaths among rehydrated cases 1%





**Treatment is relatively inexpensive, but cholera is costly**

PERU 1991

\$255.5 million Total economic impact

201.5	- Productivity losses due to illness and death
26.9	- Domestic production losses
27.1	- Hospitalizations + ambulatory care



**Slide E.10:** *These resources could go a long way in helping to prevent cholera in the first place.*

The \$255.5 million could have gone a long way in helping to prevent cholera (as well as other water-related diseases) in the first place. According to figures compiled by the World Bank and UNDP, \$250 million can provide:

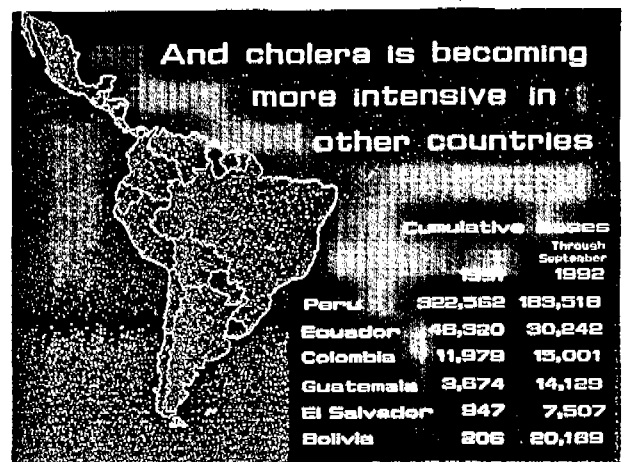
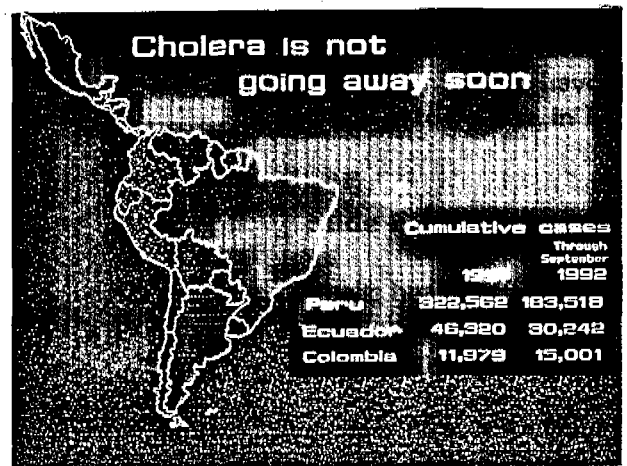
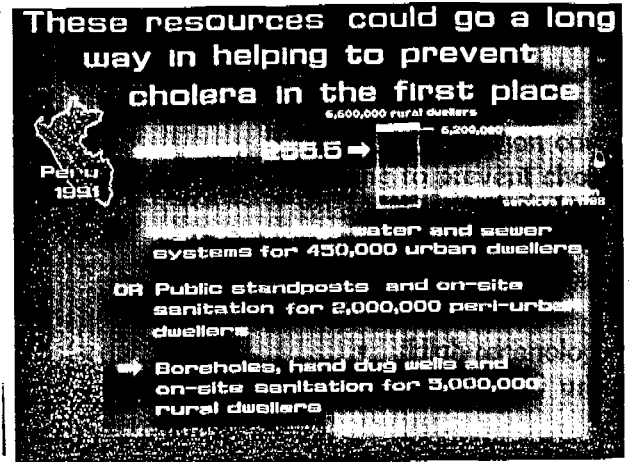
- (High-technology) water and sewer systems for 450,000 urban dwellers, or
- (Intermediate-technology) public standposts and on-site sanitation for 2 million peri-urban dwellers, or
- (Low-technology) boreholes and hand dug wells, rainwater harvesting, etc. and on-site sanitation for 5 million rural dwellers.

Note: Figures are in 1990 US dollars based on worldwide average costs.

There are 6.6 million rural dwellers in Peru. 1.2 million had water and sanitation services in 1988. \$250 million would provide water for 5 million more. This means that 6.6 million, or nearly all of the rural population, could have had water for the amount lost due to cholera in Peru in 1991.

**Slide E.11:** *Cholera is not going away soon*

Public health officials predict that cholera will spread throughout Latin America and the Caribbean and remain endemic there as it has in Africa and Asia. It's a serious health problem that is not going to go away in the foreseeable future. Many countries that had a large number of cases in 1991 are continuing to show high levels of cholera. In other Latin American countries, cholera has become more intensive in 1992. As of October 1992, only three South American countries, Paraguay, Uruguay, and Guyana reported no cases.



**Slide E.12: Prevention is the permanent solution to cholera**

Public health officials agree that cholera will remain endemic in Latin America, and in Africa and Asia as well, until the underlying conditions that make people vulnerable to the disease are changed. This means safe water, adequate means of excreta disposal, and hygiene behaviors that promote health.

**Prevention is  
the permanent solution**

- Safe water supply
- Adequate sanitation services
- Healthy hygiene practices

# Cholera

- Why there is a problem
- Assessing the options
- Transmission and Prevention**
- Epidemiology
- Review

## Transmission and Prevention

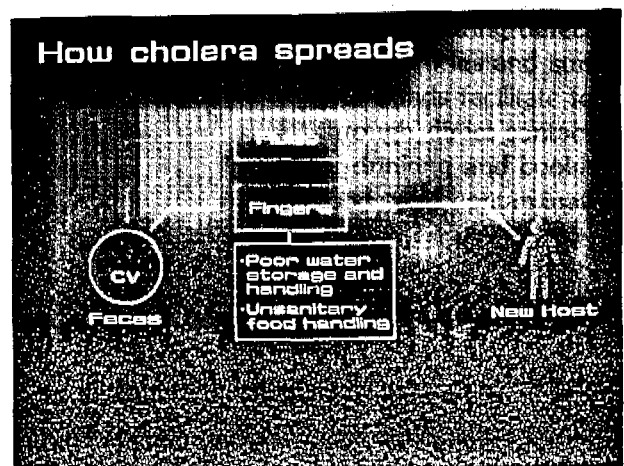
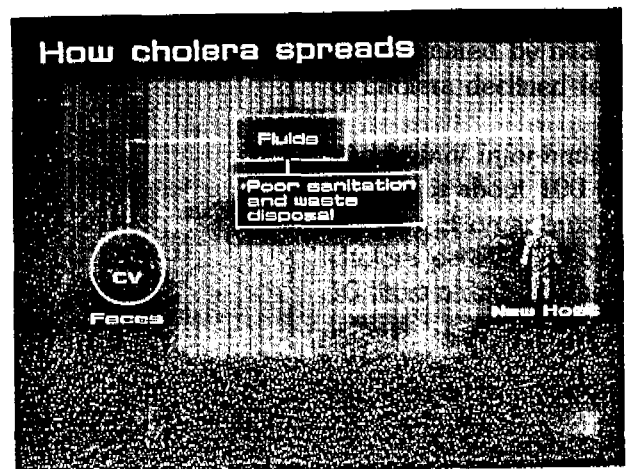
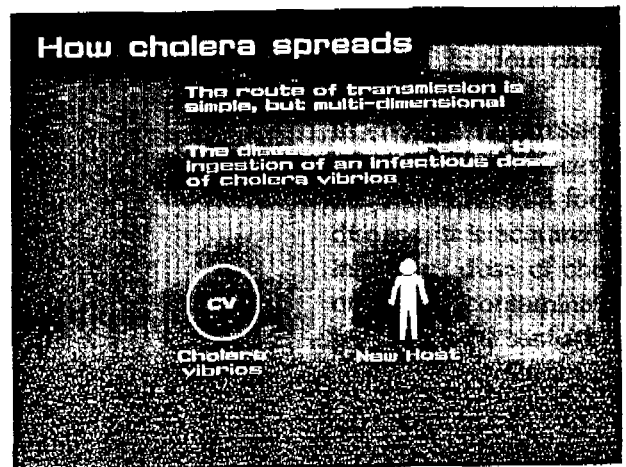
### Slide T.1: How cholera spreads

In cholera transmission it is useful to think of the 5 F's. The first is "feces," which contaminate fluids, fingers, fields and food. Cholera is a fecal-oral disease. It is acquired by the ingestion of an infectious dose of cholera vibrios, usually from water or "fluids" contaminated with feces of an infected person. Poor sanitation and waste disposal practices cause this contamination. The role fecally contaminated water plays in cholera transmission was established in 1854 by John Snow, a leading physician, who removed the handle from the Broad Street pump, whose water he suspected was contaminated by nearby privy faults. The incidence of cholera declined following handle removal.

[Additional Information: The infective dose of cholera is about 100 million organisms. That's the number of organisms in 1 cubic centimeter of a cholera patient's stool. (A patient may purge up to 10 liters a day—thousands of infective doses.)]

### Slide T.2: How cholera spreads

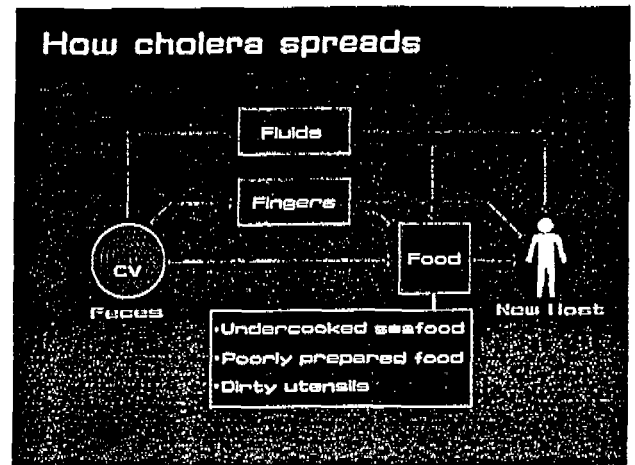
Cholera can be spread by contaminated fingers, the third F word. Fingers or hands are commonly contaminated during defecation or by touching contaminated articles and surfaces. Contaminated fingers and hands facilitate fecal-oral transmission of disease through direct contact with the mouth, contamination of drinking and cooking water, contamination of food, and contamination of cooking utensils and vessels for drinking water and water storage.



### Slide T.3: How cholera spreads

Cholera is considered a classic water-borne disease, but transmission through food—another of the F's—prepared from contaminated water, or raw or undercooked seafood caught in contaminated waters, can also transmit the disease. Food from street vendors can be especially dangerous.

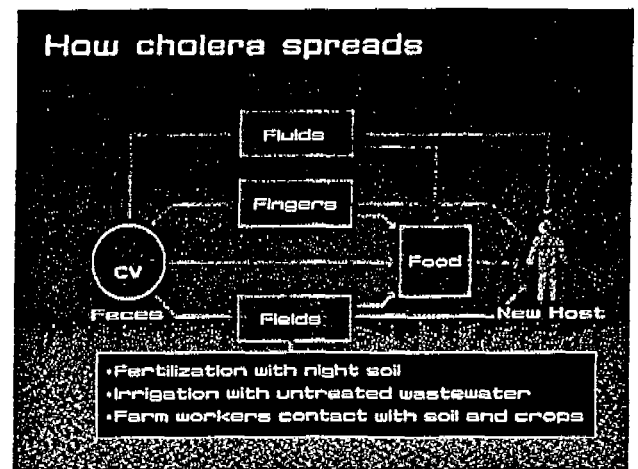
[Additional Information: Cholera multiplies in water and food. If someone reaches into a water tank because it doesn't leave a spigot and they have just 1 or 2 cholera organisms on their fingers, in a couple of days a glass of water from the tank can give people who drink it their infective dose.]



### Slide T.4: How cholera spreads

Fields is one of the F words because fruits and vegetables grown at or near ground level and fertilized with nightsoil, irrigated with untreated wastewater or "freshened" with contaminated water can be a source of infection. Farmworkers who work in such fields are also at risk.

[Additional Information: While some people think flies are important, they are not a factor in transmission of cholera, but their presence indicates unsanitary conditions.]



**Slide T.5: Disrupting cholera transmission**

Just as there are many routes through which fecal-oral transmission of disease may occur, there are many points at which behaviors may intervene to interrupt disease transmission. These opportunities constitute three barriers to disease transmission: one primary barrier and two secondary barriers.

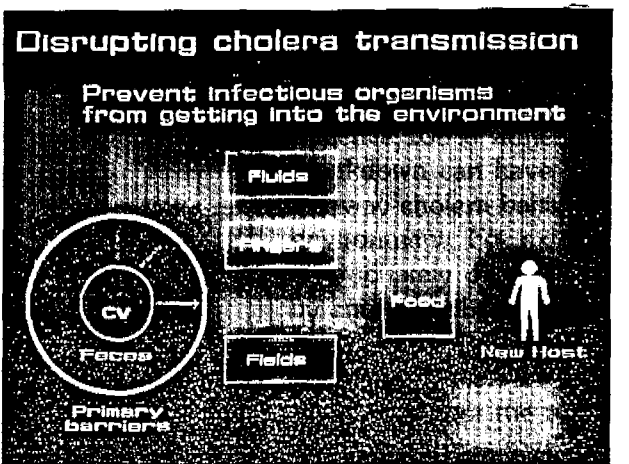
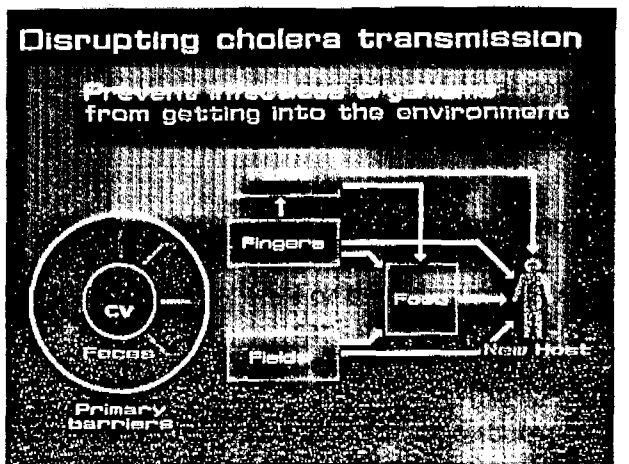
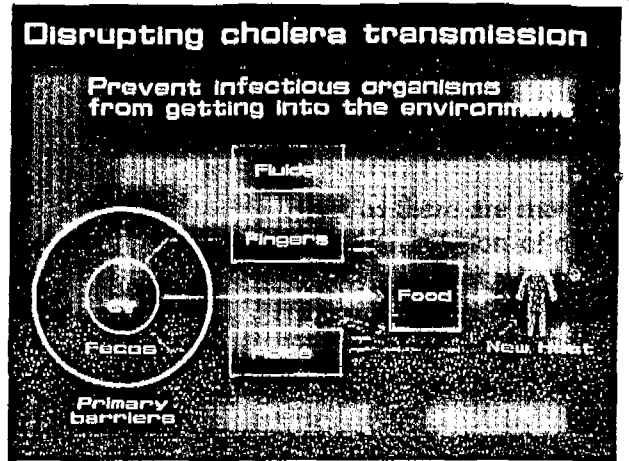
The primary barrier to disease transmission is preventing the infectious organisms from getting into the environment in the first place. As shown on the screen, effective isolation of feces eliminates the possibility of fecal contamination of fluids, fingers and hands, surfaces, food, and fields.

**Slide T.6: Disrupting cholera transmission**

For the primary barrier to be effective, both adequate sanitation systems and health-promoting hygiene behavior are necessary. Adequate sanitation consists of the proper use of a well-maintained latrine or an adequate waterborne sewage system. Good hygiene behavior includes the safe disposal of cleansing materials and diapers and washing hands after defecating or changing a diaper.

[Additional Information: For the primary barrier to be effective 100% adherence is required. Even a minor breakdown can have wide ramifications because of the way cholera bacteria multiply and persist in the environment. For example, latrines must be appropriately designed, well maintained, and used by entire families to provide an effective barrier.

Where well-operating piped water and sanitation systems are not the rule, it is not realistic to expect these preventive methods to be carried out 100% of the time.]



- Disrupting cholera transmission**
- Prevent infectious organisms from getting into the environment
- Adequate sanitation systems:**
    - ☑ Well-maintained latrines
    - ☑ Adequate waterborne sewage system
  - Practices:**
    - ☑ Proper use of disposal system
    - ☑ Safe disposal of contaminated materials
    - ☑ Hand washing after fecal disposal



**Slide T.7: Disrupting cholera transmission**

If there is no primary barrier to keep the infectious organisms out of the environment, or when, as is typically the case, the primary barrier works imperfectly, secondary barriers must be relied on to prevent the transmission of disease. Avoiding infectious organisms is one of these secondary barriers.

**Slide T.8: Disrupting cholera transmission**

People should avoid unsafe water or food, particularly food from vendors. They should avoid putting their fingers or other objects into their mouths. They should realize that the organisms will be present in the environment and take precautions against getting their household items contaminated.

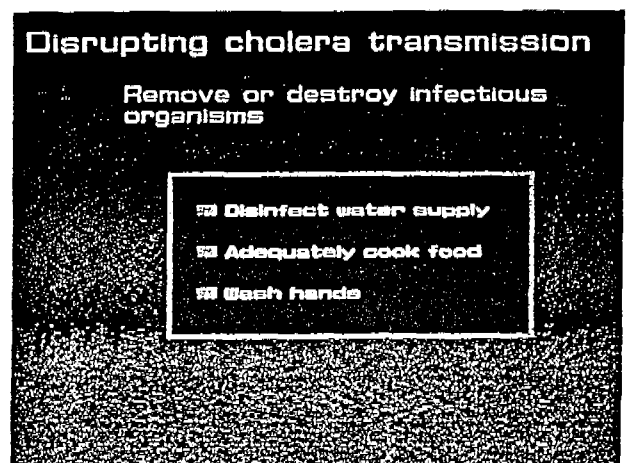
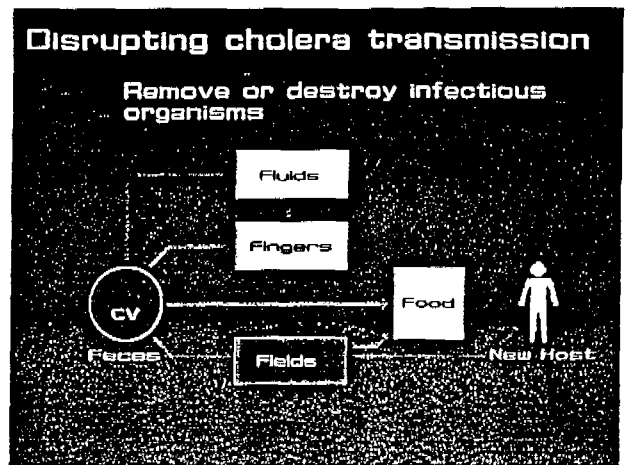
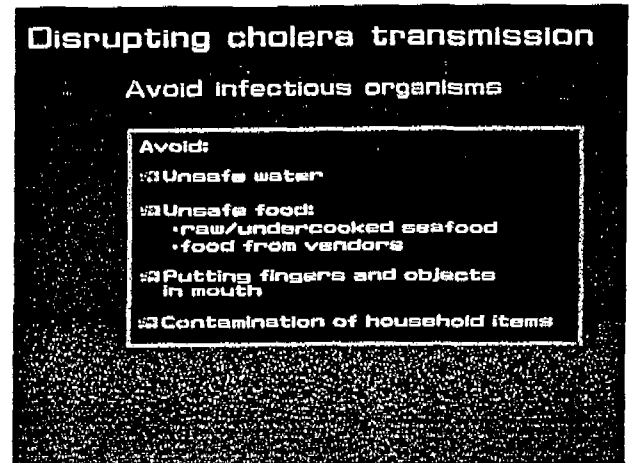
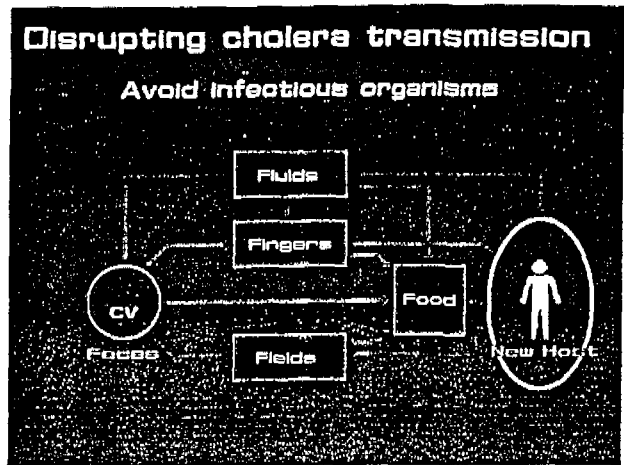
[Additional Information: In an area, neighborhood, or community where cholera is prevalent, it's useful to think that the bacteria are everywhere. People who touch water or food should remember that the cholera bacteria might be on their hands. People who do not have the wherewithal to wash their hands and to keep their food preparation areas clean can't avoid cholera. Unfortunately, many people in developing countries are in just that predicament.]

**Slide T.9: Disrupting cholera transmission**

If avoidance is impossible, steps should be made to remove or destroy the offending bacteria.

**Slide T.10: Disrupting cholera transmission**

If the water supply is suspect, it may be disinfected through boiling or chlorination. Food should be cooked adequately. Handwashing is of prime importance.



**Slide T.11: Example: Policy to chlorinate water**

To show how complicated it can be to disrupt cholera transmissions, the next few slides concentrate on one example: a government recommendation for household chlorination.

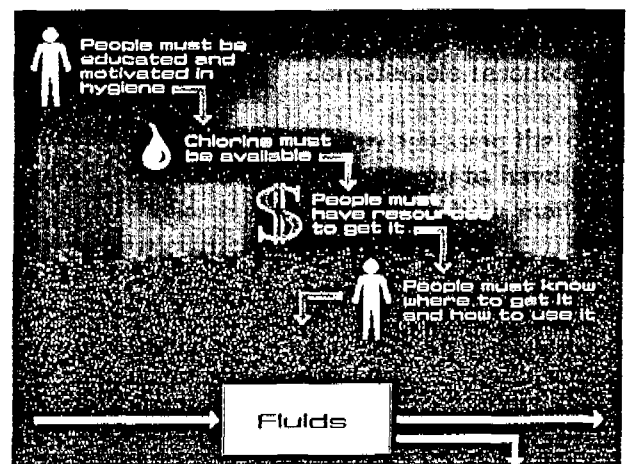
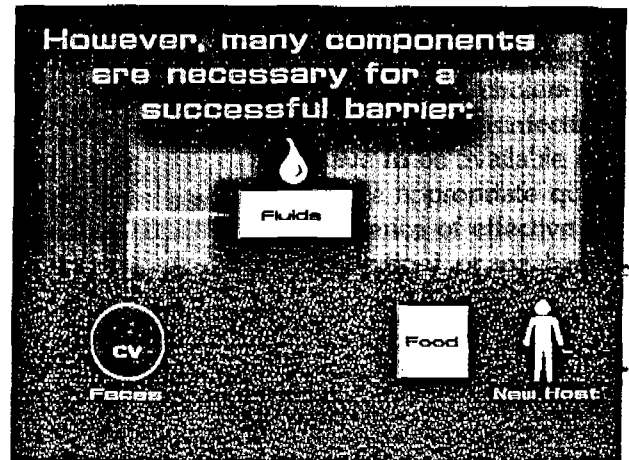
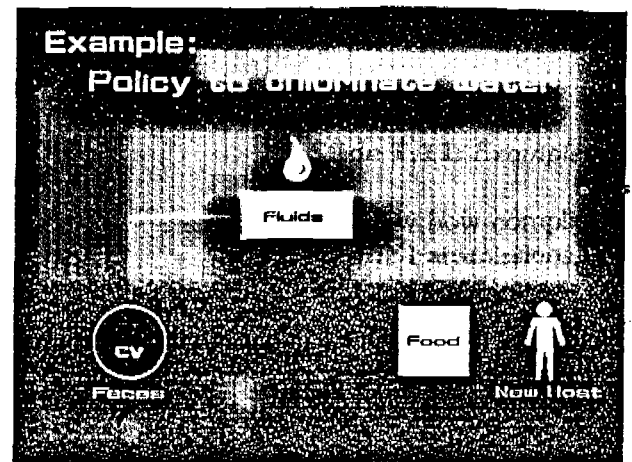
Often many types of interventions must work together for a strong barrier to be constructed.

In our example the government would have to support several inter-related interventions. First, people would have to be well enough educated in hygiene and cholera transmission to understand the necessity of disinfecting their water. Chlorine would have to be available for purchase or for distribution in the appropriate quantities. This implies the existence of effective marketing and distribution institutions or mechanisms and a populace that has been informed about where to obtain and how to use the chlorine and, perhaps, possessing enough money to go out and buy it. In areas with low literacy, communicating messages widely about how to chlorinate water in the home—not to mention other aspects of cholera prevention—presupposes a fairly sophisticated understanding of media promotional campaigns and the existence of considerable resources.

When assessing the options for cholera prevention, it is necessary to have a broad view of the problem and realize how many disciplines are involved.

**Slide T.12: Cholera is not the only disease spread by fecal-oral transmission**

All that has been said here about cholera transmission and prevention applies to other diseases spread through the fecal-oral route. Such diseases are responsible for millions of deaths per year, especially of children under five, as shown in this table. Cholera prevention and control interventions will reduce the death toll from other fecal-oral diseases as well.

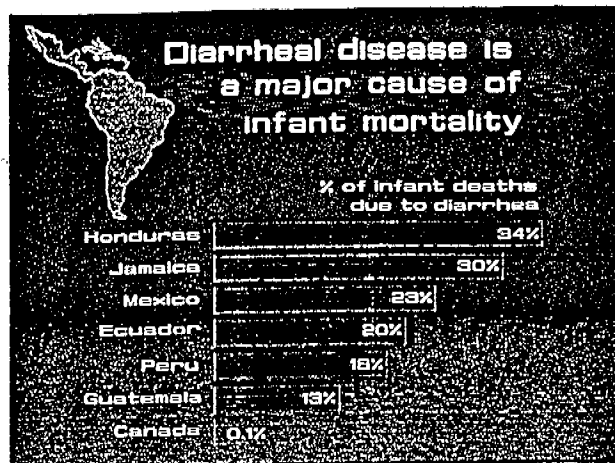


**Cholera is not the only disease spread by fecal-oral transmission**

Deaths in the developing world due to:	
	1988
Bacterial and viral diarrhea	4,300,000
Typhoid	800,000
Amoebic dysentery	70,000
Giardia	10,000

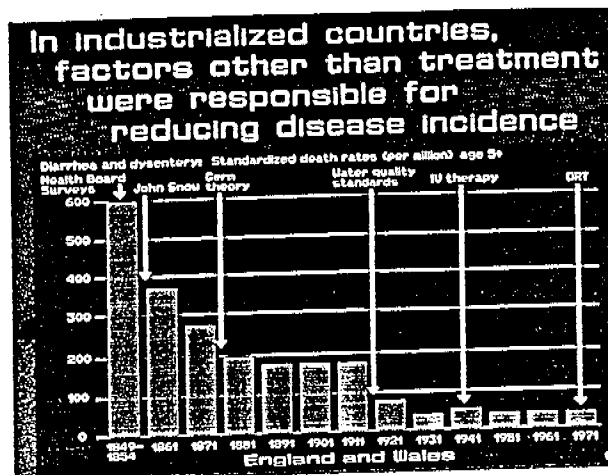
**Slide T.13:** *Diarrheal disease is a major cause of infant mortality*

In many Latin American and Caribbean countries, diarrheal disease is among the top five causes of death in infants under one year of age. In Canada and other developing countries such diseases do not contribute in a major way to infant mortality.



**Slide T.14:** *In industrialized countries, mortality rates declined when water and sanitation was improved.*

In the industrialized West, most diseases had been reduced by the time vaccines or treatment therapies, such as IV therapy and ORS, were introduced. This slide demonstrates the stock reduction in mortality in Great Britain following policy changes. In 1848, England created Health Board Surveys to carry out laboratory surveys of water sources whenever disease outbreaks occurred. These surveys provided a growing wealth of data about disease and water. In 1854, John Snow demonstrated the relationship between disease transmission and water when he removed the handle of the Broad Street pump. In 1876, Robert Koch firmly established the Germ Theory of Disease. John Snow, the Germ Theory, and Health Board Surveys data provided a foundation for public health interest groups to argue for standards under which all water sources would be monitored at all times, rather than only when disease outbreaks occurred. England established water quality standards in 1913.



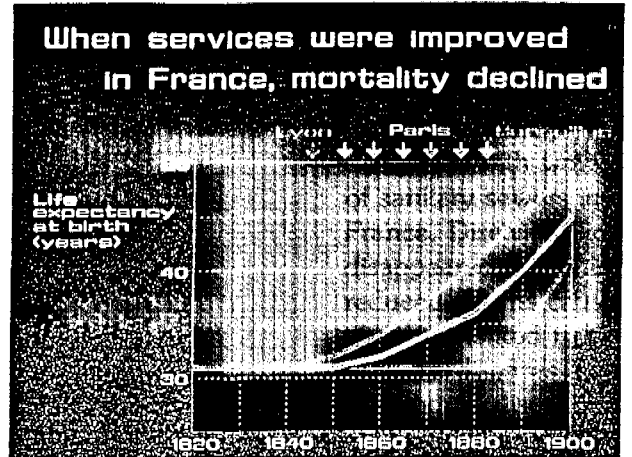
**Slide T.15:** *When services were improved in industrialized countries, the impact on health was revolutionary*

This slide portrays the dramatic decrease in mortality that came with water treatment and the construction of sanitary sewers in the three largest urban areas in France. Diseases like cholera and typhoid disappeared. Cleaning up the water systems not only reduced deaths caused by waterborne disease but also contributed to the reduction in deaths due to airborne diseases because the reduction in waterborne diseases improved the nutritional status of the population, especially of infants and young children (Preston and Van de Walle, 1978).

[Additional Information: Another example concerns typhoid in the United States. At the turn of the century the average death rate from typhoid was as high as 36 per 100,000. In 1900, 25,000 people died of the disease. By 1910, the rate had gone down to 20 per 100,000, and by 1935, following dramatic improvements in water treatment processes and drinking water quality, it had dropped to 3 per 100,000. By 1950, water quality standards had been established throughout the United States. In 1960, fewer than 20 people died of typhoid in the whole United States, and, researchers concluded that the health of the general public improved to a level far beyond that associated with typhoid and other waterborne diseases.]

**T.16:** *Improved water and sanitation services lead to better health in developing countries.*

Water and sanitation can have a positive effect in reducing diarrheal diseases in developing countries.



# Cholera

- Assessing the options
- Transmission and prevention
- Epidemiology
- Review

## Why there is a cholera problem

### Slide W.1: Why there is a problem

In this section we will examine some of the conditions that account for cholera's sudden appearance in Latin America. These conditions exemplify problems prevalent in many developing countries, although Latin American countries are generally better off when it comes to water and sanitation.

- Lack of safe water supply
- Inadequate sanitation services
- Poor hygiene practices

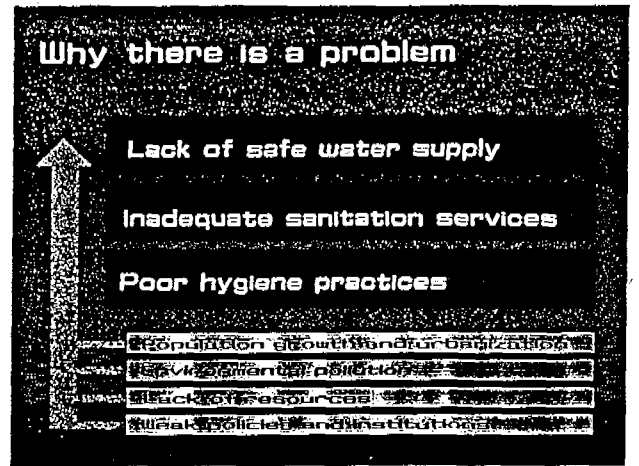
These are exacerbated by rapid population growth and urbanization; growing environmental pollution; lack of resources; and, weak policies and institutions.

We will look at each of these in more detail.

### Slide W.2: Many people still lack safe water and sanitation services

Despite the advances and improvements of the Water and Sanitation Decade (1981-1990), many people in Latin America and the Caribbean still do not have access to safe water and adequate services for excreta disposal.

According to figures provided by the United Nations, 104 million people in LAC do not have a safe water supply, and 159 million have no sanitation services.

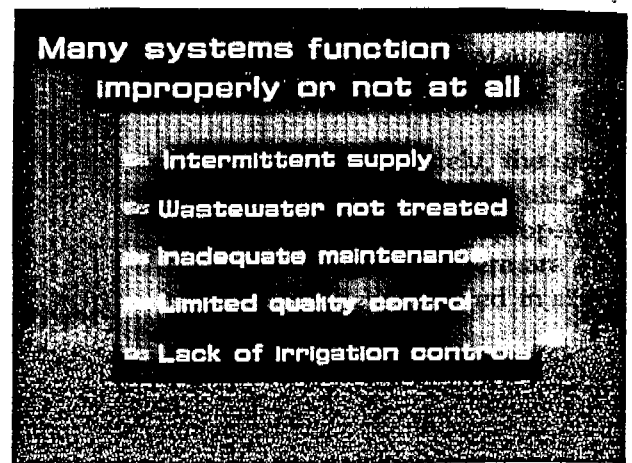


**Slide W.3: Many systems function improperly or not at all**

Unfortunately, the statistics on the previous slide paint too rosy a picture. Many services are functioning improperly or do not meet minimum standards. Here are some of the problems that might be encountered in situations where services *do* exist.

- Intermittent supplies may jeopardize system integrity.
- Wastewater may be collected but it is usually dumped without being treated. In fact, in Latin America and the Caribbean wastewater collected in sewerage systems is not treated in over 90% of the cases.
- Water quality control programs might not be efficiently implemented. Recent WHO studies indicated that 75% or more of water supply systems surveyed did not disinfect the water at all or had operational problems that interfered with effective and continuous disinfection.
- Wastewater might be used for irrigation purposes without any control.

[Additional Information: According to PAHO, ensuring the supply of adequate quality water, both for those who already have services and for those who will receive new service, poses one of the greatest challenges that most of the countries in Latin America and the Caribbean will have to face in upcoming years.]



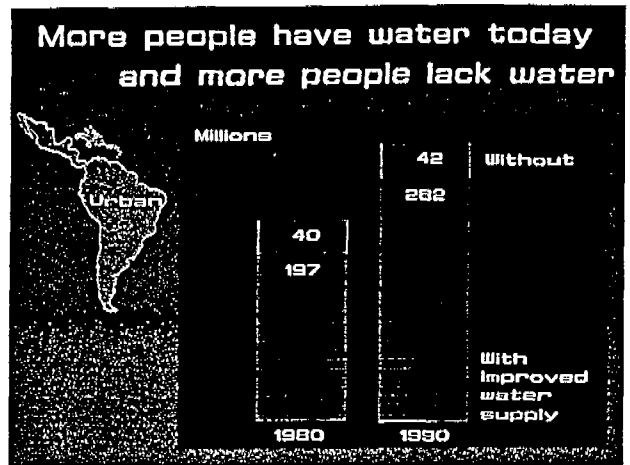
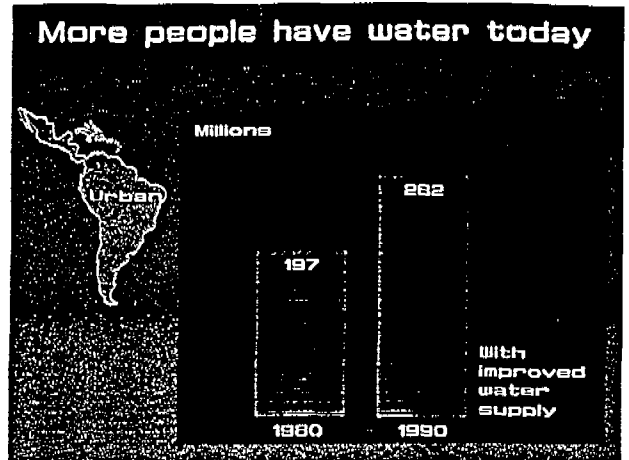
**Slide W.4: More people have water today and more people lack water**

Despite significant accomplishments, the unserved population continues to grow.

Between 1980 and 1990, there was a 43% improvement in water coverage for the urban population of LAC. However, the number of unserved people in urban areas actually grew by 5%.

The situation in rural water coverage and in sanitation is not as bad; in these areas, advances have been made in decreasing the absolute number of people unserved. However, many still remain without access to water and sanitation services.

[Additional Information: Worldwide, those receiving water increased from 1.1 billion to 1.8 billion (66%) over the course of the Decade. The number unserved decreased slightly: from 1.1 billion to 1 billion. Worldwide in sanitation, those receiving service increased from 635 million to a little over a billion, while those still without sanitation increased from 1.6 to 1.8 billion—a 12% increase.]



**Slide W.5: There are more people**

Population growth is the main reason the number of unserved people continues to increase. As this graph shows, during the 1980s, the population of LAC grew by 85 million people. By the year 2000, it is expected to be about 550 million, nearly double what it was in 1970.

This translates to a current annual growth rate of about 2%. Although there has been a decline in the rate of population growth over the past two decades, this still means that the LAC population is growing by about 9 million people every year.

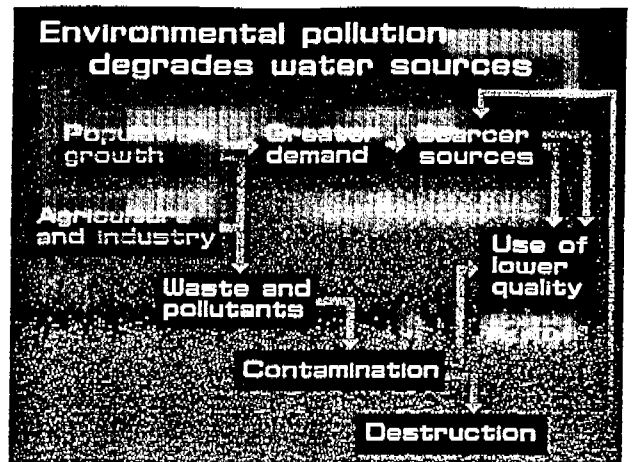
The urban population is growing at the even faster rate of 3.6%. This slide shows what proportion of the population is urban for each of the time intervals. It is obvious that most of the growth is in urban areas—most like peri-urban squatter settlements. By the year 2000, 77% of the LAC population will be urban.

The ill effects of poor environmental sanitation are greatest in high-density urban environments. In the next decade, the greatest demand for water and sanitation will be in marginal urban areas where mostly poor people reside.

**Slide W.6: Environmental pollution degrades water sources**

Population growth and growing agricultural and industrial activity place tremendous pressures on water sources and lead to pollution and depletion.

This results in the need for more aggressive treatment of water supplies, or selection of distant water sources. Both greatly increase the costs of providing safe water.



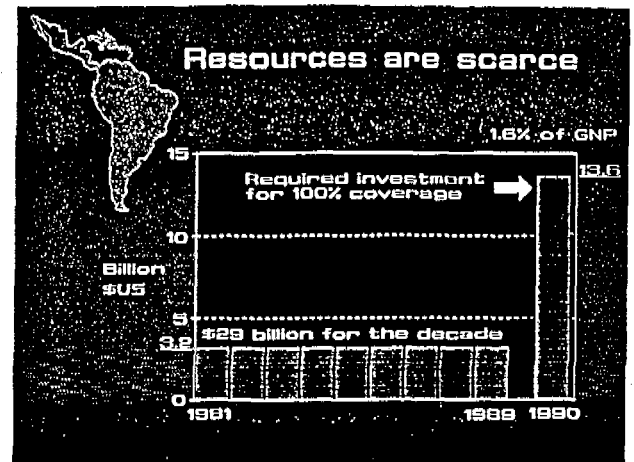


**Slide W.7: Resources are scarce**

Resources just aren't there to improve health through the provision of water and sanitation.

As this graph shows, from 1981 to 1989, \$29 billion was spent on water and sanitation in LAC—20% from external support agencies. This is about \$3.2 billion annually. This was more than usual because countries were putting forth a greater effort for the Water Decade.

In 1989 it was estimated that investment required to achieve 100% coverage in 1990 would be in the neighborhood of \$13.6 billion. This is about 1.6% of the 1989 estimated GNP for the region. It must be pointed out, however, that this amount would not cover the operation and maintenance costs of these new systems.



**Slide W.8: Incremental costs are rising**

Because easy to develop sources have already been developed or have been degraded by environmental pollution or are being depleted through overuse, costs of providing water supplies are rising rapidly.

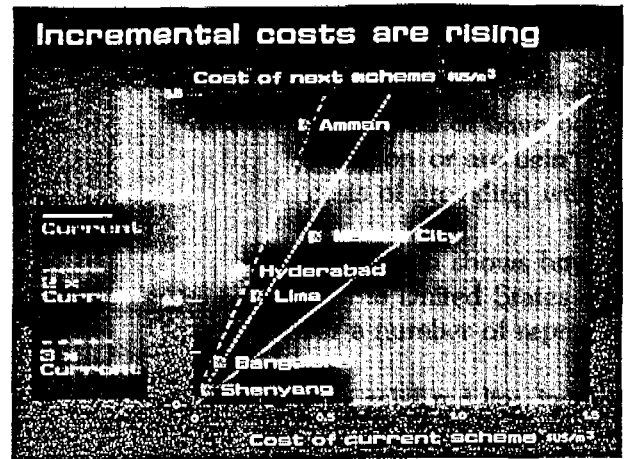
This graph shows how much the “next scheme” will cost in United States dollars per cubic meter of water for a number of representative cities.

The solid red line indicates that the cost of the water supply system will be the same as the current supply per cubic meter of water produced.

The broken orange line indicates that the future scheme will be twice as expensive as the current, and the purple line indicates that the next scheme will be three times as expensive as the current one.

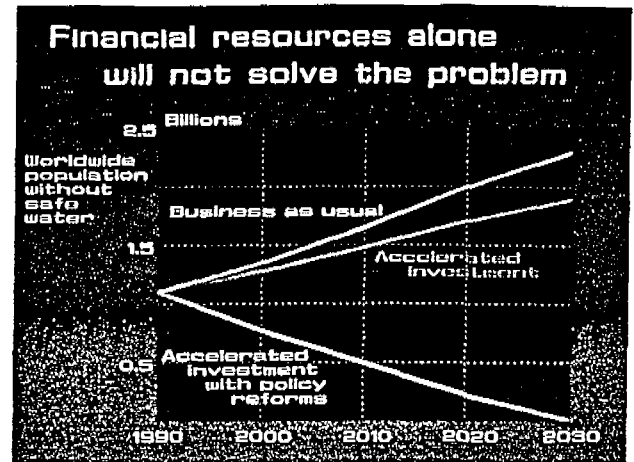
A few cities are placed on this graph to demonstrate the rising cost of water supply. For example, in Lima, during 1981, the average increment cost of a project to meet short to medium-term needs, using the Rimac River and groundwater, was 25¢ per cubic meter. However, now the aquifer has been severely depleted and groundwater sources cannot be used to satisfy needs beyond the early 1990s. In order to meet long-term needs, a transfer of water from the Atlantic watershed has been planned at an estimated cost of 53¢ per cubic meter—over twice as much as the present system.

Mexico City, Bangalore, and Shenyang will also pay twice as much for the next schemes, while Amman and Hyderabad will pay three times as much.



**Slide W.9:** *Financial resources alone will not solve the problem*

Increased financial investments are needed but they alone will not solve the problem of water supply. As the purple line on the graph shows, if the current investment level is maintained (1.7% of total developing country investment), the problem will simply worsen as the purple line on the graph shows. Significantly more people would be without water. Even if investment were to grow by 50%, the numbers of unserved would rise, though not as sharply. Only if policy reforms are undertaken can one see improvement in the future. A similar graph could be prepared for sanitation.



**Slide W.10:** *An enabling environment is essential to improving access*

Policy reforms include use of a range of technologies, involvement of the private sector, better cost recovery, more efficient institutions, integrated planning and the like, as this list indicates. Many countries lack a policy environment that encourages healthy growth of the sector. For example, the private sector can make a clear contribution in water and sanitation but may hold back because the lack of a policy framework makes participation too risky.

Similarly, the lack of strong sector institutions is a great problem for the sector. In many countries, the first step in trying to extend water and sanitation coverage is not to launch a large well-drilling prospect or to build a wastewater treatment plant. Instead, the first step is to make sector institutions more effective and efficient. The characteristics of strong institutions in the water sector are listed on the screen.

### An enabling environment is essential to improving access

**Policies**

- ☑ Legislation to enable water markets
- ☑ Contract laws to encourage private sector, consumer, and NGO participation
- ☑ Environmental and economic regulation
- ☑ Financial mandates to encourage conservation
- ☑ Quality standards

### An enabling environment is essential to improving access

**Institutions**

- ☑ Organizational autonomy
- ☑ Leadership
- ☑ Effective management
- ☑ Technical capabilities
- ☑ Commercial orientation
- ☑ Consumer orientation
- ☑ Interagency collaboration

# Cholera

- Why there is a problem
- Transmission and prevention
- Epidemiology
- Review

## Assessing the options

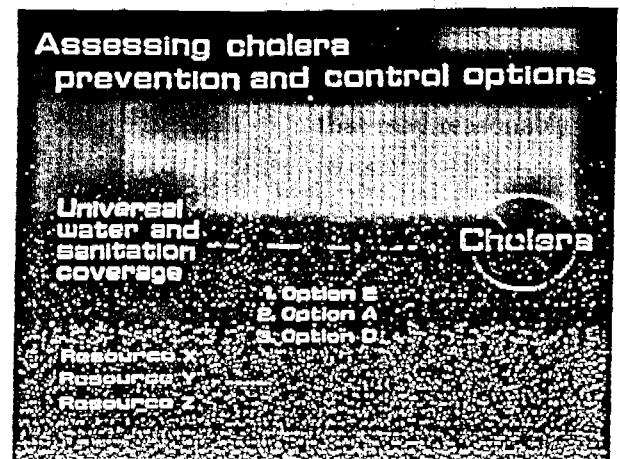
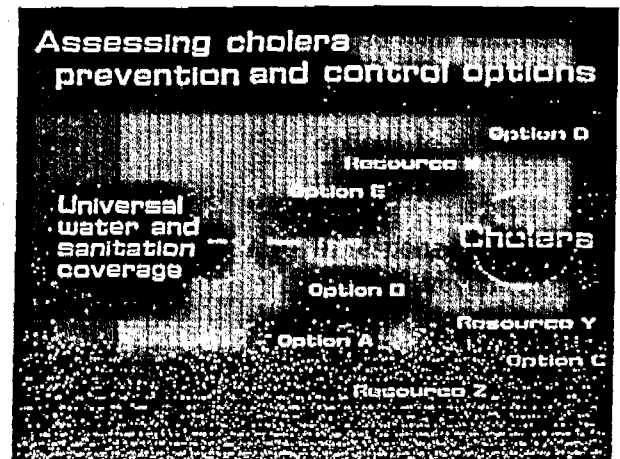
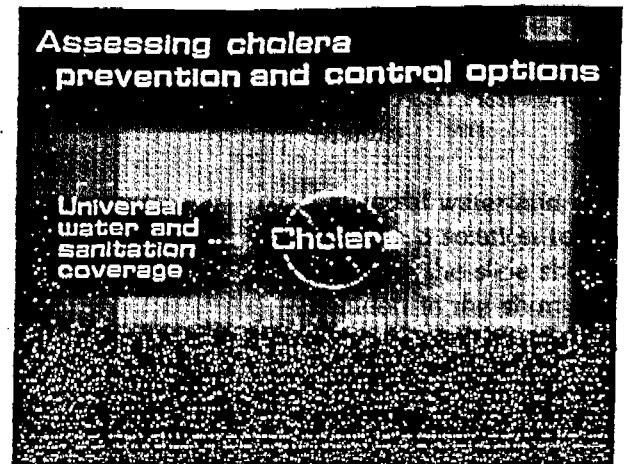
**Slide A.1: Assessing cholera prevention and control options**

Universal water and sanitation coverage would provide a solution to the cholera problem, as the arrow in the slide shows, but it is not a realistic solution in the short or medium term, as indicated by the ever-lengthening arrow in the slide. Instead, governments must use wisely the resources available to control cholera—and other diarrheal diseases into the bargain—and to lay the groundwork for future overall improvements in water and sanitation.

Faced with slim resources and the threat of a disease that can be very costly, governments need to know how to choose among the possible prevention options to select those with the highest potential payoff.

In response to the need, A.I.D. has developed a cholera prevention planning process to assist countries to assess their cholera risks and to act to prevent cholera outbreaks and future spread of the disease.

It is designed to explain how countries can assess their realistic options for prevention. It does not offer a prescription—but it offers a planning process that can enable countries to raise an effective defense against cholera with the resources that are at hand or that may reasonably be obtained.



### Slide A.2: The framework

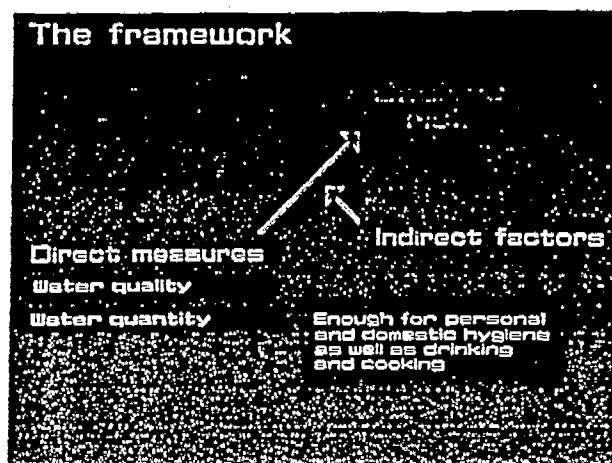
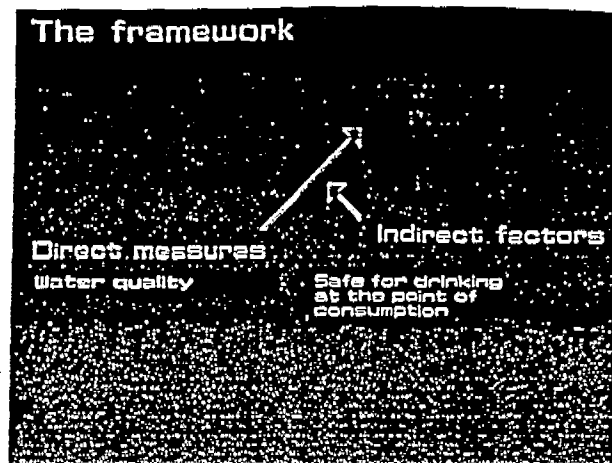
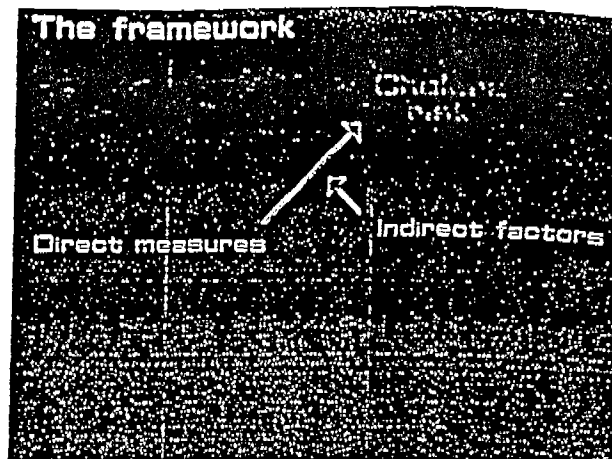
The process is based on a framework for thinking about cholera that considers (1) the standard measures that may be undertaken to directly influence cholera risk, and (2) factors indirectly influencing cholera risk. We look first at the direct measures.

#### ■ Water quality.

Cholera can be directly attacked, if safe water is provided for drinking. The bacteriological quality of drinking water must be guaranteed at the point of consumption. The words "at the point of consumption" are extremely important. It's not good enough to pipe safe water to the home. The water must still be safe when a person is drinking it out of a glass. Also, the piped water must flow 24 hours a day every day.

#### ■ Water quantity.

Another direct measure is to provide an adequate amount of water. A sufficient quantity of water for personal and domestic hygiene as well as for drinking and cooking must be guaranteed. An inadequate supply of water means that people's hygiene will suffer. Uses for water will be prioritized, and uses such as handwashing will probably not be perceived as important as drinking and cooking. If the water supply is inadequate, people must learn to use water from chlorinated sources for drinking and scavenged water for other needs. They must also understand the importance of using even scarce water for hygienic purposes.



■ Excreta disposal.

As we have seen, contaminated water is the single most important route of cholera transmission. Since contamination from fecal matter is due to poor sanitation, water and sanitation are inseparably linked.

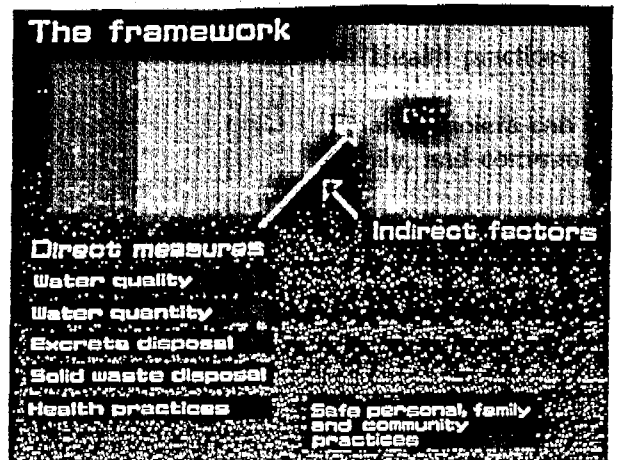
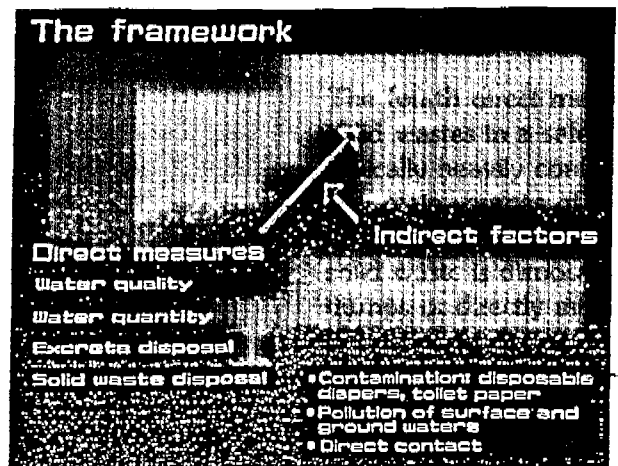
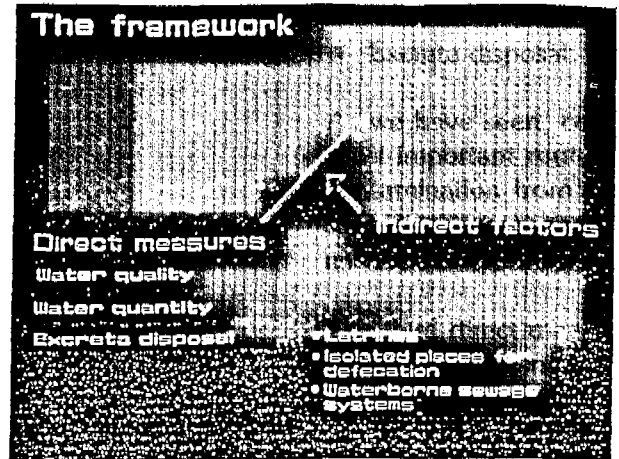
The third direct measure is to dispose of excreta safely. In some instances this means latrines of various kinds, or it may simply mean identifying and reserving isolated places for defecation. In other instances it means construction of waterborne sewage systems.

■ Solid waste disposal.

The fourth direct measure is to collect and dispose of solid wastes in a safe manner. Solid wastes are typically heavily contaminated with fecal matter. The two main sources of fecal contamination are disposable diapers and soiled toilet paper. When solid waste is disposed of with no controls, in open dumps or directly into bodies of water, it can contribute to the pollution of surface waters and groundwater and may present a direct threat to individuals who come in contact with it, such as children playing on dump heaps or scavengers looking for recyclable items. Of special concern are the disposal sites and practices at hospitals and other places where cholera victims are treated.

■ Health practices.

Finally, cholera can be directly impacted if personal, family, and community health practices are safe.



■ Indirect factors.

These five measures have a direct, mitigating impact on the spread of waterborne diseases. In addition, "indirect" or "influencing" measures also play a role. A number of key indirect measures have been identified: community participation, institutional development, financial planning, and laws and regulations. Although they do not directly influence cholera control. The success or failure of cholera programs may depend on these indirect measures.

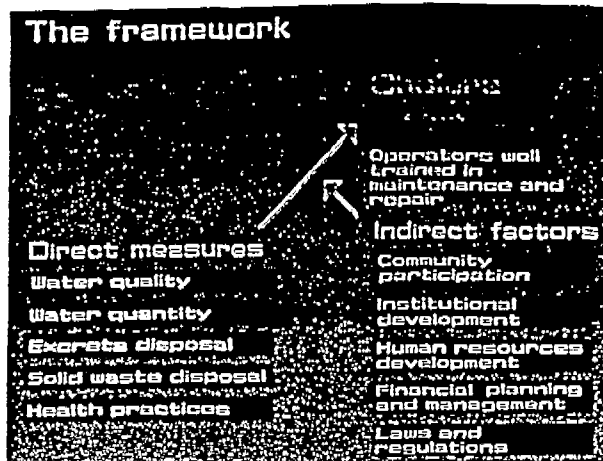
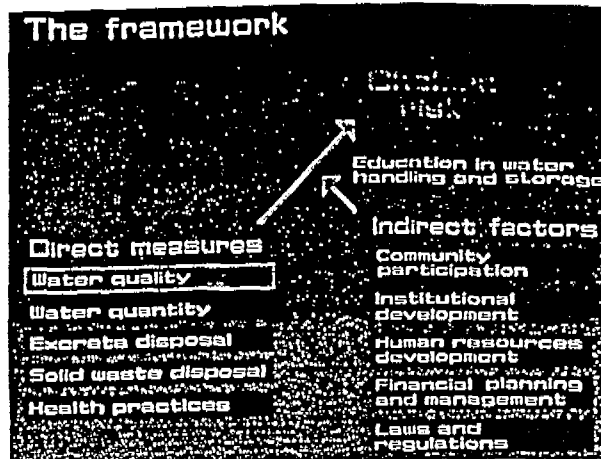
Indirect factors are cross cutting; they operate through direct measures. Let's take guaranteeing the quality of drinking water as an example. This involves not just soundly engineered water systems; other measures also come into play.

■ Community participation.

Assuring that water is safe when it is drunk, not just when it comes out of the tap, implies educating community groups in the proper handling and storage of water in the home.

■ Human resources development.

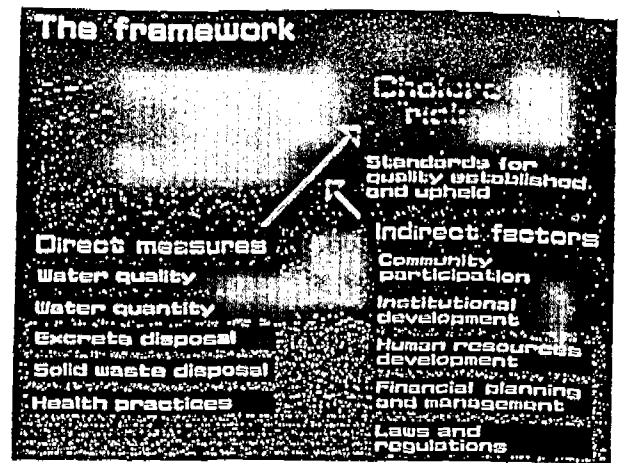
In the case of community water supplies, the village pump operators must be well trained in pump maintenance and repair. When pumps break down, water users may be forced to return to unimproved, sometimes contaminated, sources.



- Laws and regulations.

Country standards for drinking water quality should be established and upheld.

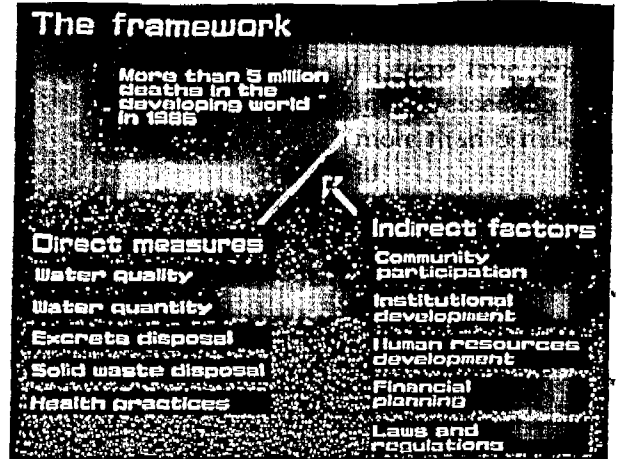
Understanding this framework for thinking about cholera helps planners and policymakers to keep their field of vision wide enough so that they can fully understand all factors that make their countries vulnerable to cholera.



The focus of this planning process is on cholera but at the same time other waterborne diseases are also being addressed. In 1986, such diseases accounted for more than 5 million deaths in the developing world.

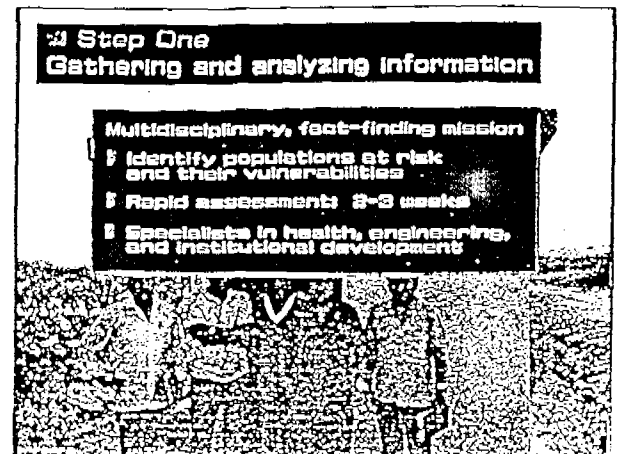
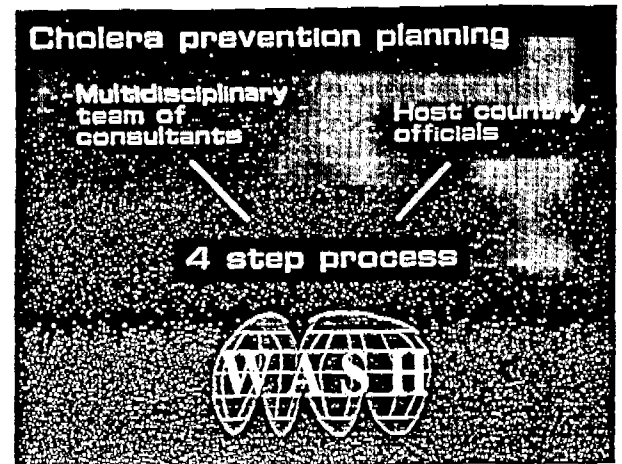
**Slide A.3: Cholera prevention planning**

The cholera prevention planning process comprises four basic steps generally carried out by a multidisciplinary team of consultants with the full collaboration of host country officials. It has been developed and used successfully by A.I.D.'s Water and Sanitation for Health (WASH) Project. A.I.D., through WASH, can provide consultant assistance to countries that wish to go through this planning process.



**Slide A.4: Step One: Gathering and analyzing information**

The first step is a rapid, multidisciplinary fact-finding mission whose goal is to point out what populations are most at risk of contracting cholera and why they are vulnerable. Normally, it is completed in two to three weeks. Two or three specialists, ideally one from the health sciences, one from the engineering sciences, and a third, an institutional specialist, carry out the assessment.





## Slide A.5: Step One

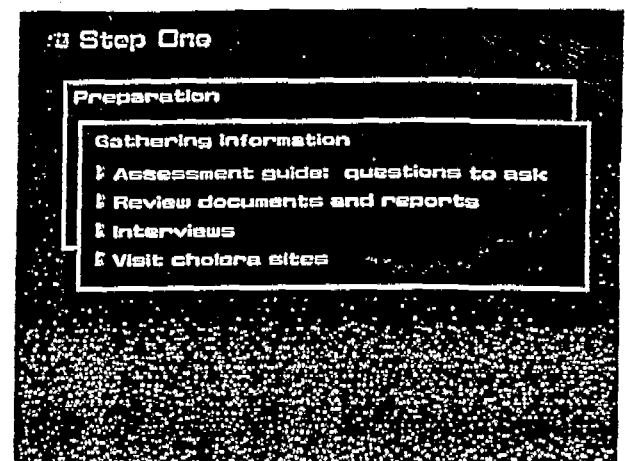
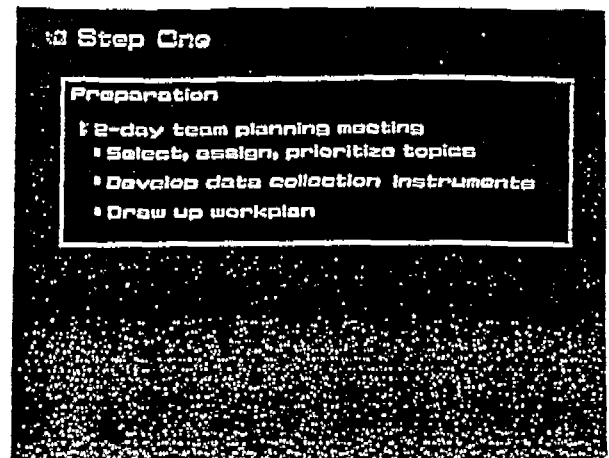
### ■ Preparation.

The team must be well prepared. Preparation includes a two-day planning meeting on how the assessment will be conducted. Assessment topics are assigned to team members according to their interests and background and a team leader is selected. Through discussion, the team members decide what topics should be given priority on the basis of time available and country-specific considerations. Team members also make up survey instruments or questionnaires if needed. Finally, the team draws up a detailed work plan.

### ■ Gathering information.

Before and during the field visit, the team intensively gathers information. This activity is guided by the assessment guide prepared by the WASH Project. It provides questions to ask to collect the necessary data. Assessment questions cover both the conditions that have a direct impact on cholera transmission and those with only an indirect one.

The assessment guide is more than a list of questions. It also tells where to go to find answers and how the information is used to develop recommendations. Information gathering in-country consists of perusing documents and reports; interviewing representatives of pertinent government ministries, organizations, and agencies, as well as community leaders, extension agents, and heads of households; and visiting cholera sites. All assessments should include at least one visit to a cholera-afflicted community. More than one site may be necessary to cover all concerns. In countries where cholera outbreaks have not yet occurred, site visits are also essential in order to take a look at existing conditions and risk behaviors. The choice of sites should correspond to the presumed risks of cholera. Photographs or videos of conditions at the site may be useful.



■ Analyzing information.

After the information-gathering is complete, the team members analyze and synthesize the information in order to make sense out of what they have found. The leader of the team facilitates this process.

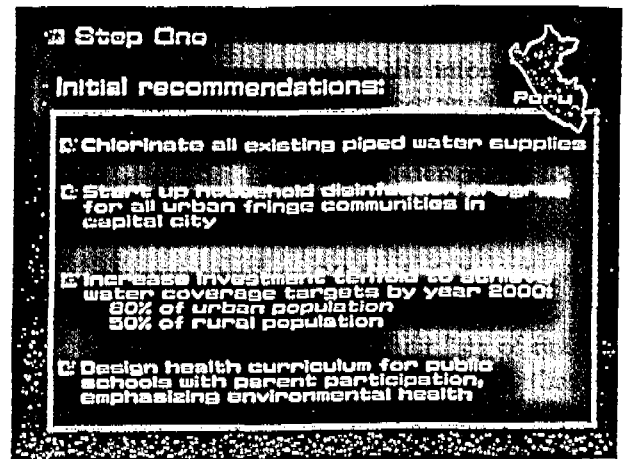
**Slide A.6: Initial recommendations**

With their lists of findings in hand, individual team numbers get together to integrate their analysis to produce, through discussion, an initial set of recommendations. Here are four such recommendations from the Peru assessment.

Note that the actions are both long- and short-term: some relate specifically to the present cholera emergency; others look to the future.

The list may be quite long and perhaps beyond the reach of the country in question. However, at this stage, it is important to state all valid recommendations so that the "universe" of actions needed to overcome the cholera threat is clear. Later the list will be honed down in light of what can reasonably be done.

The recommendations are then discussed and analyzed further in terms of the resources required and the resources available to carry them out.



**Slide A.7: Step Two: Prioritizing recommended actions**

At this point in the process, as it is implemented by WASH, government officials from the country in which the assessment is taking place are asked to join in the deliberations.

The assessment team presents its list of recommended actions to the government counterparts along with an explanation of how it was compiled. After discussing this list, government personnel may wish to propose additional actions.

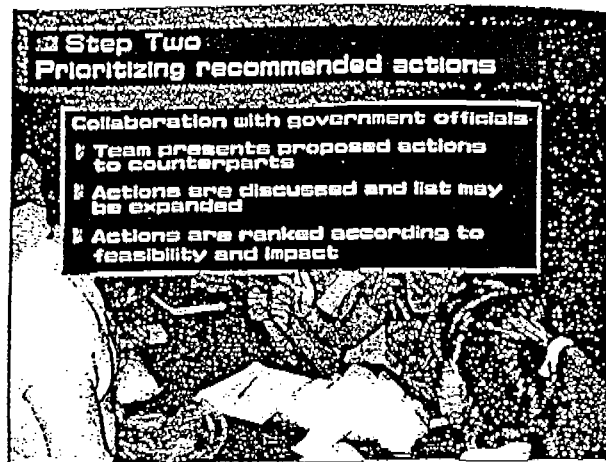
Involving government counterparts in this exercise will enhance the likelihood of the recommendations being in tune with government policy and being carried out. An additional advantage is that the team can use the opportunity to promote an understanding that cholera is a symptom of a developmental problem, not just a problem in and of itself.

By explaining the framework for thinking about cholera, which includes factors such as community participation, institutional capacity and the like, the team will be promoting strategies for permanently reducing vulnerability to outbreaks of preventable disease and for strengthening the social and economic fabric of the country.

**Slide A.8: Prioritizing recommended actions**

After all proposed actions have been listed, they are ranked according to their impact and feasibility. Continuing with the examples from Peru. The impact rating is based on the effect of the proposed action on the spread of cholera. If a proposed action is a true preventative barrier to a cholera epidemic and if it is targeting the people most at risk, it should be given a high impact rating.

The feasibility rating is based mainly on what financial, technical, and human resources are required to undertake the action and what resources are available.



**Step Two** Peru

**Prioritizing proposed actions**

Action	Impact rating	Feasibility rating
Chlorinate piped water supplies	High	Medium
Start up household disinfection program	High	High
Increase investment to achieve targets	Low short term High long term	Low
Design health curriculum for public schools	Medium	Low

Here are the four examples of proposed actions used earlier with their impact and feasibility ratings.

■ **Prioritizing proposed actions—ranking.**

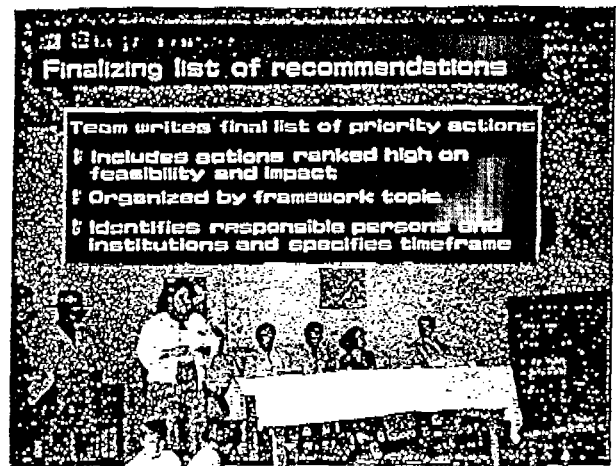
The first two proposed actions would take priority because of their high ratings on both impact and feasibility related to the second two actions. Note that increasing investments in water supply and sanitation is given a high impact rating in the long-term. In a case such as this, when impact is high and feasibility is low, a great attempt should be made to find the resources necessary to make the action feasible.

**Slide A.9: Step Three: Finalizing list of recommendations**

In step three the assessment team writes a final list of recommended priority actions for the government. These are normally a part of the team's report. Those actions with high rankings in feasibility and impact make up this list. They are organized according to the topics in the framework and stated as simply and clearly as possible. Also, to be most useful, a recommendation includes the persons or organizations responsible for carrying the action out, specific quantities or numbers as appropriate, and the time frame.

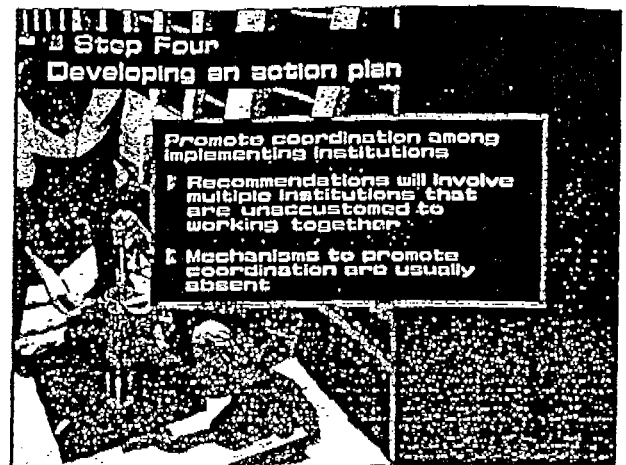
**Slide A.10: Finalizing list of recommendations**

We return again to the sample proposed actions to show how they might be given as final recommendations.



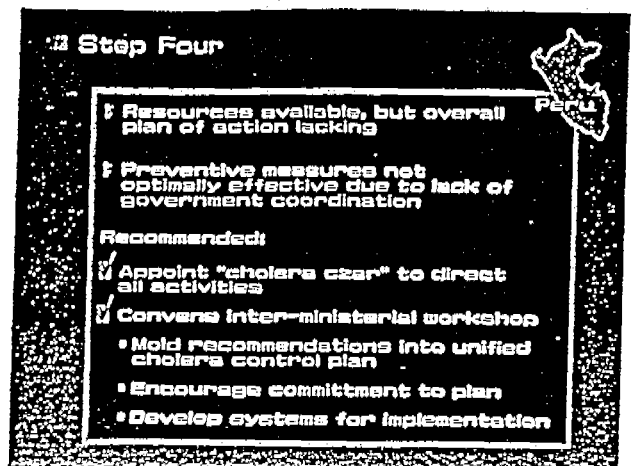
**Slide A.11: Step Four: Developing an action plan**

The process can end at step three if the government is in a position to implement the recommendations without further assistance. Such a situation is rare, however, because the recommendations will probably not all be aimed at one agency or one ministry. Efforts that require coordination among several governmental entities, each guarding their prerogatives and unused to working together, are hard to get going. Normally there are no mechanisms in place for encouraging such coordination. Recognizing the problems inherent in inter-ministerial planning, a government may elect to move on to step four, developing an action plan.



**Slide A.12: Step Four**

For example, in the case of Peru, the WASH assessment team concluded that the country had many of the resources it needed to fight cholera, but lacked an overall plan of action. Preventive measures were not as effective as they should have been because there was little coordination among government agencies involved. The team recommended that a "cholera czar" be appointed by the President of Peru to direct all cholera activities—both preventive and curative—and that a workshop be held to assist an inter-ministerial committee design a unified national cholera control plan.



During such a workshop, representatives from concerned ministries would mold the recommendations into an effective, unified cholera control plan involving interagency cooperation and coordination.

**Slide A.13: Cholera prevention planning**

The four-step process just described can help countries under threat of cholera to be prepared and to make environmental health improvements that keep cholera at bay and ultimately improve their economies and the health of their people.

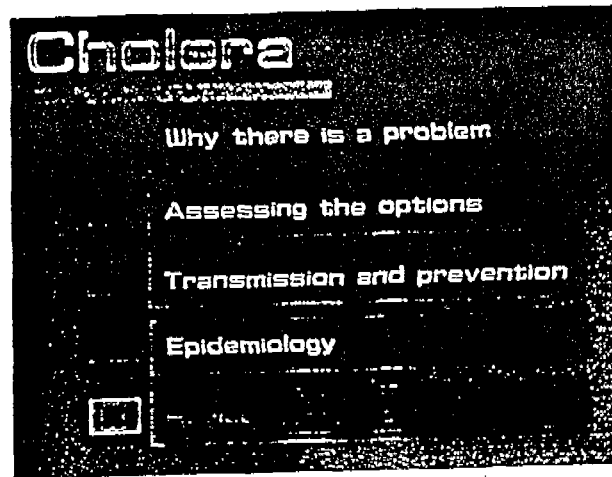
Throughout the process the spotlight is clearly trained on short-term cholera prevention, but the users of this process should not forget that, even before cholera arrived in Latin America, the toll of environmentally-induced disease was high, and that long-term, permanent solutions must be at least a part of every cholera prevention plan.

**Cholera prevention planning**

- 1 Step One  
Gathering and analyzing information
- 2 Step Two  
Prioritizing recommended actions
- 3 Step Three  
Finalizing list of recommendations
- 4 Step Four  
Developing an action plan

Short and long term solutions

Preparation for cholera      Environmental health improvements

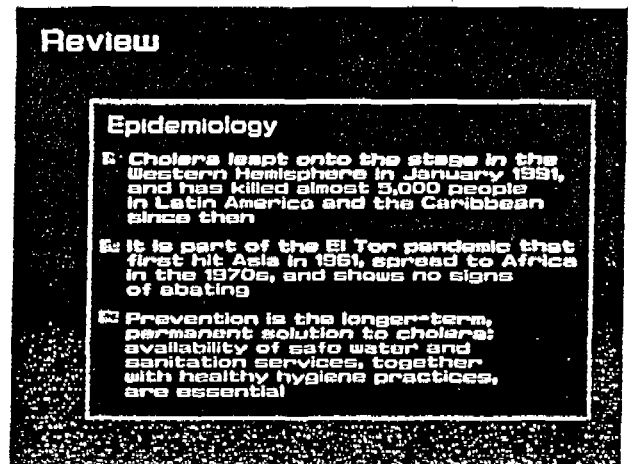


## Review

### Slide R.1: Review

#### Epidemiology

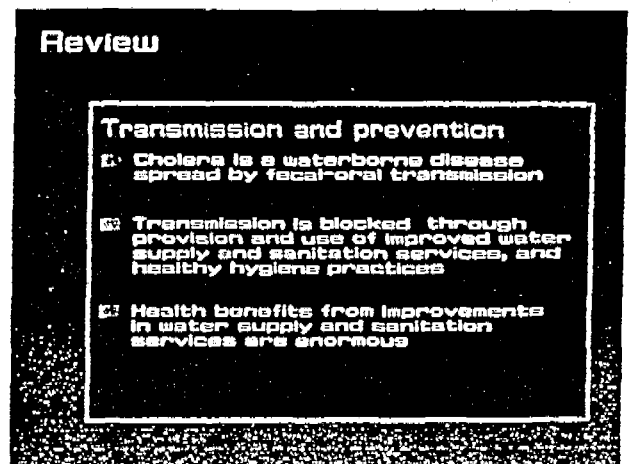
- Cholera leapt onto the stage in the Western Hemisphere in January 1991, and has killed over 6,000 people in LAC since then.
- It is part of the El Tor pandemic that first hit Asia in 1961 and spread to Africa in the 1970s and shows no signs of abating.
- Prevention is the longer-term, permanent solution to cholera. Availability of safe water and sanitation services, together, with healthy hygiene practices, are essential.



### Slide R.2: Review

#### Transmission and prevention

- Cholera is a fecal-oral disease spread by water, food, poor hygiene, and lack of sanitation.
- Transmission is blocked through provision and use of improved water supply and sanitation services, and healthy hygiene practices.



**Slide R.T:** *To request assistance or for more information, contact:*

**Water and Sanitation for Health Project**  
1611 N. Kent Street, Room 1001  
Arlington, Virginia 22209-2111 USA

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