

Mexico suffered major outbreaks from 1882 to 1883, Argentina from 1886 to 1888, Uruguay in 1886, and Chile from 1886 to 1888.

In New York the disease was again successfully controlled in 1892, despite the arrival of eight heavily infected ships. Only ten cases occurred and the infection did not spread.

The fifth pandemic did cause cholera outbreaks in Brazil from 1893 to 1895, in Argentina from 1894 to 1895, and in Uruguay in 1895.

In the sixth pandemic, from 1899 to 1923, cholera did not succeed in reaching America. The westernmost point affected was the island of Madeira, in 1910.

In the course of the seventh and current pandemic initiated in 1961, a case of unknown origin was discovered in Texas, in the United States, in 1973.

Eight sporadic cases appeared in Louisiana in 1978, and three asymptomatic infections were detected. Since then, new autochthonous cases have continued to appear, 18 in 1986, six in 1987 and seven in 1988, related to the consumption of raw oysters harvested from the Gulf of Mexico. In 1989 no new autochthonous cases were reported, and in 1990 two cases were reported in the State of Louisiana.

References:

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Pollitzer, R. *Cholera*. Geneva, WHO, 1959.

(Source: Alvaro Llopis, Professor, Department of Sanitary Engineering, and Juan Halbrohr, Professor, Institute of Tropical Medicine, Central University of Venezuela, Caracas.)

Epidemiological Surveillance of Cholera

Epidemiological surveillance for the early detection or follow-up of cholera cases in recently infected areas should take into account the need for information on case occurrence, laboratory confirmation, and risk factors associated with the environment—water, waste, food. Environmental factors are discussed in detail elsewhere in this issue.

Surveillance of diarrhea cases is the basis for early discovery of the fact that cholera has appeared in a non-endemic area. Both the treatment centers and health workers in the community should keep daily records. It is essential that health workers be trained to recognize the signs of a probable cholera outbreak, such as:

- Increase in the daily number of diarrhea patients, especially those with *rice water* stool.
- Liquid diarrhea causing serious dehydration or death in persons over the age of 10, especially in non-endemic areas.

When such changes in the normal diarrhea pattern are noted, health workers should immediately report them to the referral establishment or to the designated local health official, providing the name, address, age, and sex of every patient and the date of onset of the disease. The referral establishment should make arrangements without delay for bacteriological and epidemiological investigation to confirm the etiology of the outbreak. At this point it is possible to adopt appropriate control measures and to submit a report to the Pan American Health Organization, in accordance with

International Health Regulations, so that PAHO in turn can disseminate the information to the Member States of the WHO.

Unfortunately, some countries do not report cases occurring within their borders out of fear that restrictions will be imposed on travelers or on their trade. Authorities who are reluctant to report cases should be made aware that the information they provide helps with negotiations for the elimination of restrictions and promotes international collaboration.

The health authorities in newly infected areas, sometimes pressured by a hostile press and an anxious and demanding public, may take an extreme attitude and introduce measures that are ineffective and even counterproductive for controlling the disease, such as quarantining a family, a community, or an area where cases of the disease have been identified or imposing a cordon sanitaire and restricting the movement of persons or merchandise within or outside the infected areas. Restrictions on the movement of people, merchandise, or food in general that compromise an area's economy are not necessary. Such measures contribute to popular hysteria and perpetuate mistaken concepts about the severity, infectiousness, and spread of the disease. They also tend to discourage the subsequent reporting of cases.

Fear of the disease, and even panic, are not unusual in communities where deaths have occurred due to cholera. If the cases can be treated quickly and effectively, fears and misgivings will dissipate, and families will be more inclined to

report their cases. Modern treatment with intravenous and oral fluids ensures the survival of nearly 99% of all patients, including children and pregnant women. For this reason, one of the best investments in cholera control, and the key to surveillance, is to make it possible for patients with diarrhea to be admitted and receive hospital treatment. It is better to expand and improve existing facilities than to install temporary hospitals which are unlikely to be used once the cholera emergency has passed. Almost any room in a district hospital can be adapted for the treatment of cholera as long as simple facilities are available for disinfection and the sanitary disposal of fecal matter.

Cases can get *lost* if physicians do not have, or do not use, local laboratory facilities in the community. Laboratory diagnosis is not important for the medical treatment of cholera patients, but it is essential for surveillance.

Surveillance implies feedback. Those who are responsible for reporting cases need to know how the information has been used, perhaps through a brief surveillance report. It does not need to be very elaborate: a simple newsletter published weekly, or even daily, during a cholera outbreak will go a long way toward enlisting the support and cooperation of physicians and health workers in the community. Every report should include an analysis or evaluation of the current situation. The inclusion of brief and timely reports on clinical, laboratory, and public health subjects also increases the usefulness of such reports, as well as people's interest in them.

Every opportunity should be taken to educate the public. Maximum use should be made of the press, radio, and television to report on preventive measures and actions that are not appropriate.

For an effective surveillance program, it is essential to quickly trace all suspected cases, especially when several have occurred at the same time or in the same place. The epidemiological evaluation of these outbreaks has proven to be extremely worthwhile, since it provides a solid basis for control, as experience has shown in Hong-Kong, the Philippines, and Jerusalem. These investigations are more successful when they are done within a few days after the first cases appear, although in some situations it is not possible to identify the means of transmission for several weeks.

Surveillance is also facilitated by the systematic culturing of excreta samples collected from sewers.

A system that has proved effective for the surveillance of cholera and other enteric diseases is structured around four components, one having to do with coordination and the other three related to reporting:

- The coordinating pivot is the surveillance nucleus. It may be at the local or the central level, and it is usually found in the Ministry of Health or the country's autonomous health authority.

This center receives information, analyzes it, prepares operational plans, initiates and coordinates research, and prepares periodic (weekly) reports for distribution to medical personnel and other interested parties. Control operations are planned and coordinated with other departments in the Ministry of Health and other ministries.

- From each treatment facility—hospital, rehydration or treatment center, health center or sub-center, or mobile unit—daily reports are sent to the surveillance nucleus indicating the number of cases of diarrheal disease admitted or treated during each 24-hour period (or less) as long as the epidemic goes on. Cases are reported by age (under or over 10) and place of residence. Mobile teams consisting of physicians, nurses, and health inspectors have been very useful in some of the countries, especially in remote areas where they provide treatment, conduct research, institute control measures, record and collect information, and participate in health education.
- The data collection system should include, in addition to the reports transmitted by health personnel, any other sources that may be outside the regular reporting channels, such as medical and paramedical practitioners, pharmacists, gravediggers, teachers, clergy, municipal officials, and private individuals. In several countries of Latin America the causes of death are registered by municipal personnel. The information from these sources is extremely valuable, especially in epidemic situations. Deaths due to or associated with diarrhea, especially in adults, should be thoroughly investigated in areas under threat of cholera. The information collected from these systems should be transmitted by the most rapid means possible to the central surveillance offices in order to coordinate the transportation of sick patients to the nearest treatment sites or else dispatch a mobile unit.
- Laboratory services are very important for surveillance. All the treatment sites located in areas at risk should have the capability of culturing diarrhea cases suspected of being cholera. Health services that do not have laboratory facilities nearby can send samples (properly packaged and transported) to reference laboratories. Positive cultures should be reported daily to the central surveillance offices.

Chemoprophylaxis

The mass treatment of a community with antibiotics, known as mass chemoprophylaxis, has never been successful in limiting the spread of cholera.

In theory, this is an attractive strategy for controlling cholera, but experience over the last 20 years has not given encouraging results. There are several reasons for this:

- In the time it takes to distribute and administer the drug and wait for the chemoprophylaxis to take effect, the infection has spread.
- The effect of the antibiotic lasts for only a few days.
- In order to avoid reinfection, the entire population of an area under surveillance must be treated at the same time and then kept isolated.
- People who are presumably infected but have no symptoms are often reluctant to take the treatment.

Mass chemoprophylaxis not only has failed to prevent the spread of cholera but has also diverted attention and taken up resources that could be used for more effective measures. In addition, in several of the countries it has contributed to the development of antibiotic resistance, thus depriving critically ill patients of a valuable form of treatment.

The *selective treatment* of family members who have shared food and lodging with a cholera patient can be useful. As a matter of fact, secondary cases are not very common in communities affected by El Tor cholera. In societies where intimate social relations and the exchange of food among families are common, it is difficult to determine who is a close contact. Most people who are infected with *V. cholerae* 01 El Tor have only mild cases of the disease, and as a result they and their close contacts escape detection and treatment.

When treatment is being given for preventive reasons, it is necessary to recommend the drug and corresponding dosage. Doxycycline is the drug of choice, since only one dose is needed.

Vaccination

The vaccines currently available do not help to control cholera for the following reasons:

- They are not sufficiently effective;
- It is often shown that they do not have the required potency;
- The immunity that they confer lasts for only 3 to 6 months;
- Vaccination does not reduce the rate of asymptomatic infection.

Even more important, vaccination produces a false sense of security not only for those who are vaccinated but also for health authorities, and more effective measures may fail to be applied. Moreover, vaccination campaigns divert resources, care, and personnel from more effective activities.

Vaccination campaigns for controlling cholera not only waste resources but can also introduce health hazards that are much more serious. When inoculation practices are not very safe, as is frequently the case in mass vaccination campaigns, they have been followed by cases of serum hepatitis, and in recent years the risk of HIV infection has become a serious threat to health.

In view of these limitations, the Twentieth-sixth World Health Assembly abolished the requirement under the International Health Regulations for a certificate of vaccination against cholera.

(Source: Health Situation and Trend Assessment Program, PAHO.)

Clinical Diagnosis and Treatment of Cholera Cases

Cholera is an acute bacterial enteric disease with sudden onset, profuse painless watery stools, occasional vomiting, rapid dehydration, acidosis and circulatory collapse.

Many cases of cholera are mild and cannot be distinguished clinically from other types of diarrhea; they can only be recognized from positive fecal cultures. These cases are epidemiologically important because the bacillus continues to circulate in the community.

Serious cholera usually has an abrupt onset, with voluminous stool, but it can also begin slowly, with mild diarrhea during the first 24-36 hours. Vomiting can be copious; it occurs in most patients and can be present before or after the onset of diarrhea. The peak fecal loss usually takes place during the first 24 hours. The stool have a *rice water* ap-

pearance, and the volume exceeds 1 liter per hour in adults and 8 to 10 ml/kg/hour in small children.

After the first 24 hours the rate of elimination declines. Diarrhea can end spontaneously in 1 to 6 days, and many patients improve without antibiotics if the electrolytes and water lost are adequately replaced. The total volume of feces during the course of the disease may be as much as 50% or more of bodyweight.

The metabolic disorders associated with cholera are caused by the rapid loss of water and electrolytes. This has clinical importance because of hypovolemia due to the loss of isotonic fluids, acidosis due to rapid loss of bicarbonate, and depletion of potassium.

Biochemical studies done before the initiation of treatment have revealed a high specific density of