Cholera

- Acute intestinal infection by the bacterium *Vibrio cholerae*.
- Natural reservoir unknown, but suspected to be an aquatic environment.
- Short incubation period:
  - Less than 1 day – 5 days

Epidemic Cholera

- Epidemic cholera usually associated with poor sanitation systems and improperly stored food and water.
  - Recent epidemics have occurred in Latin America, Africa and Asia.
- Manmade and natural disasters as well as refugee camp conditions can precipitate an outbreak.
- Cholera in the U.S. virtually eliminated by modern sewage and water treatment systems.
  - Most cases found in U.S. are associated with foreign travel.

Transmission

- Spread by contaminated water and food:
  - Large, sudden outbreaks usually a result of a contaminated water supply.
- Disease is spread person-to-person via indirect route: feces to food to person, feces to water to person.
- Affects mostly young children in areas where cholera is endemic.
  - Breastfeeding infants rarely contract cholera.
- Cholera is sometimes regarded as a seasonal disease, coinciding with the rainy season.

Symptom Severity

- Most infected persons do not become ill, but the bacterium is present, and transmissible, in their feces for 7-14 days.
- 90% of symptomatic episodes are mild or moderate.
- 10% develop severe cholera (cholera gravis) with moderate to severe dehydration.

Signs & Symptoms of Cholera

- Painless, watery diarrhea with the appearance of rice water (water with flecks of rice in it).
- Vomiting in most patients.
- Abdominal cramps.
- Without treatment, death results from severe dehydration.
**Signs & Symptoms of Cholera**

The severe dehydration resulting from cholera produces the “Washer Woman’s Hand” seen in this picture. Photo courtesy of CDC.

**Severe Cholera Symptoms**

- Loss of fluid leads to:
  - Dehydration.
  - Anuria.
  - Acidosis.
  - Shock within 4-12 hours of first liquid stool.
- Death follows in 18 hours to several days.
- **Untreated**, severe symptomatic cholera may result in high case fatality rates (50-60%).
  - Communities with good cholera control programs may have case fatality rates as low as 1%.

**Treatment**

- Treatment objective is to replace fluid and electrolytes lost through diarrhea.
  - WHO Oral Rehydration Salts.
  - Intravenous fluids.
- Tetracycline and other antibiotics may shorten the duration of illness.
  - Caution should be used when prescribing tetracycline for children until all permanent teeth have come in, as it will discolor teeth.

**Prevention**

- Adequate supply of safe drinking water:
  - Bottled water.
  - Boiled water.
  - Water treated with chlorine or iodine.
- Hygienic disposal of human waste.
  - Wash hands after using the bathroom.
- Vaccines unavailable in the United States.
  - Oral vaccines available in other countries – recommended for travelers with known risk factors such as hypochlorhydria (inadequate gastric acidity), or cardiac disease, and for the elderly or individuals of blood group O.

**Prevention**

- Public health measures to institute hygienic practices help reduce incidence of infection.
- Preventive measures that DON’T work:
  - Routine treatment of a community with antibiotics (chemoprophylaxis).
  - Restricting travel or trade from areas where cholera is endemic.
Sources
2. Communicable disease surveillance and response. WHO. Available at: http://www.wpro.who.int/EN/Healthtopics/052c5584-44de-4e34-8e92- 3449e34e06fd.pdf

Pacific EMPRINTS
The Pacific Emergency Management, Preparedness and Response Information Network and Training Services is funded by the U.S. Department of Health and Human Services Assistant Secretary for Preparedness and Response Grant No. T01HP6427-0100.
Slide 1: “Infectious Diseases: Cholera”
Welcome to the “Infectious Diseases: Cholera” tutorial designed by the Pacific Emergency Management, Preparedness and Response Information Network and Training Services at the University of Hawaii at Manoa.

Slide 2: “Cholera”
Cholera is an acute intestinal infection by the bacterium *Vibrio cholerae*. Its natural reservoir is unknown, but is suspected to be an aquatic environment, such as brackish rivers and coastal waters, as improperly cooked seafood is often implicated in cholera outbreaks. Cholera has a relatively short incubation period ranging from a few hours to five days.

Slide 3: “Epidemic Cholera”
Cholera has spread worldwide since the early 19th century in a series of pandemics. The seventh pandemic, caused by *V. cholerae* serogroup O1 biotype *El Tor*, started in 1961 and continues today. It is usually associated with poor sanitation systems and improperly stored food and water. Recent epidemics have occurred in Latin America, Africa and Asia. Manmade and natural disasters, as well as the conditions often found in refugee camps, can precipitate cholera outbreaks. Cholera in the United States, however, has been virtually eliminated by modern sewage and water treatment systems, the most effective prevention tools for cholera. The few cases that are found in the U.S. are usually associated with recent foreign travel.

Slide 4: “Transmission”
Cholera is typically spread by contaminated water and food, and large, sudden outbreaks are usually found to be a result of a contaminated water supply. The disease is spread person-to-person via the indirect route of feces to food to person or feces to water to person. Cholera tends to hit young children the hardest in areas where cholera is endemic. However, breastfeeding infants rarely contract cholera, which is assumed to be due to cholera antibodies contained in the mother's milk. In some cholera-endemic countries, cholera is considered a seasonal disease, usually coinciding with the rainy season.

Slide 5: “Symptom Severity”
Symptoms for cholera vary from mild to severe. In most cases, an infected person will not even be aware that they have contracted cholera, but their body will produce antibodies. These persons are considered to be asymptomatically infected. In these cases, the person is not ill, but the *Vibrio cholerae* bacterium is nonetheless present, and transmissible, in their feces for 7 to 14 days. 90% of...
symptomatic cholera episodes can therefore be characterized as mild or moderate. Only 10% of people who contract cholera develop the severe symptoms of “typical cholera” with moderate to severe dehydration.

Slide 6: “Signs & Symptoms of Cholera”
The hallmark sign of “typical” cholera is painless, watery diarrhea with the appearance of rice water, or water with flecks of rice in it. These specks are flakes of mucus and epithelial cells. Vomiting is also present in most patients, along with abdominal cramps. Without treatment, severe cases of cholera will result in death from severe dehydration.

Slide 7: “Signs & Symptoms of Cholera”
The severe dehydration resulting from severe cases of cholera results in reduced skin turgor, producing the “Washer Woman’s Hand” seen in this picture of an adult cholera victim.

Slide 8: “Severe Cholera Symptoms”
For those with a severe cholera manifestation, the loss of fluid from diarrhea may result in dehydration, anuria, acidosis, and shock within 4 to 12 hours of the first liquid stool. If untreated, death is likely to follow in 18 hours to several days. Untreated, symptomatic cholera may result in case fatality rates as high as 50 to 60 percent. However, in communities with good cholera control programs, case fatality rates may be as low as 1 percent.

Slide 9: “Treatment”
The treatment objective for cholera is to replace fluid and electrolytes lost through diarrhea. This can usually be accomplished via World Health Organization Oral Rehydration Salts, which are pre-packaged mixtures of sugar and salt meant to be mixed with water and drunk in large doses. However, more severe cases of dehydration may require intravenous fluid replacement. Tetracycline and other antibiotics may also shorten the duration of the illness. Caution should be used when prescribing tetracycline for children until all their permanent teeth have come in, as tetracycline is known to discolor teeth. Other antibiotics that may be used in place of tetracycline are erythromycin, trimethoprim-sulfamethoxazole, furazolidone, or ciprofloxacin, which should be used for adults only. For children, furazolidone is recommended; trimethoprim-sulfamethoxazole is second choice.

Slide 10: “Prevention”
The main element in prevention of cholera is ensuring access to clean food and water, as well as adequate sanitation facilities. Although modern sewage systems, water treatment facilities and food preparation standards have virtually eradicated cholera in the U.S., in communities where these factors are not present, cholera can be prevented by taking steps to provide a clean environment. Proper food hygiene involves washing hands before contact with food or drinking water. Food should be cooked thoroughly and ideally eaten while

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it is still hot, as the longer it is left to cool, the likelier it is to become contaminated again. It is important to ensure that cooked food does not come into contact with raw food, water, ice, contaminated surfaces, or flies if at all possible. Raw fruits and vegetables should be avoided unless they are first peeled, and for this reason it may be best to avoid salads in locations where cholera is endemic. Improperly cooked seafood has often been linked to contracting cholera, especially as cholera is suspected to live in the aquatic environment.

Slide 11: “Prevention”
Other prevention efforts should be aimed at ensuring an adequate supply of safe drinking water. Although cholera is not considered a problem in the U.S. due to modern water treatment facilities, in areas where cholera is endemic, it is important to only drink bottled water, boiled water, or water treated with chlorine or iodine. One should also keep in mind that ice should not be used unless it has also been made with these types of water. The hygienic disposal of human waste is a final element in preventing cholera. On a behavioral level, washing hands after defecating helps to cut down on the spread of cholera. In the United States, there is currently no vaccine available, although there are several oral vaccines on the market in other countries. While there are varying opinions on the use of these vaccines, the Control of Communicable Disease Manual notes that “the new oral vaccines can be recommended for individuals from industrialized counties traveling to areas of endemic or epidemic cholera. In countries where the new oral vaccines are already licensed, immunization is particularly recommended for travelers with known risk factors such as hypochlorhydria [or inadequate gastric acidity] or cardiac disease, and for the elderly or individuals of blood group O.” However, use of these vaccines in other countries should not supplant efforts to institute more effective sanitation efforts on a community level.

Slide 12: “Prevention”
Public health measures to institute hygienic practices and sanitation on a personal level have been found to be helpful in reducing the incidence of cholera infection in the Pacific and other places. Preventative measures that DO NOT work are routine treatment of a community with antibiotics, or chemoprophylaxis, and restricting travel or trade from areas where cholera is endemic. Neither of these measures have been found to reduce the incidence of cholera in communities.

Slide 13: “Sources”
The displayed sources were consulted in the development of this tutorial.

Slide 14: “Pacific EMPRINTS”
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Sources:


2. Communicable disease surveillance and response. WHO. Available at: [http://www.wpro.who.int/NR/rdonlyres/572C5084-4ADB-4634-8E85-EE8993DA3E3D/0/05_CSR.pdf](http://www.wpro.who.int/NR/rdonlyres/572C5084-4ADB-4634-8E85-EE8993DA3E3D/0/05_CSR.pdf)


