adpc
Asian Disaster Preparedness Center
Safer Communities and Sustainable Development through Disaster Reduction

Public Health in Emergencies (PHE)

FACT SHEET

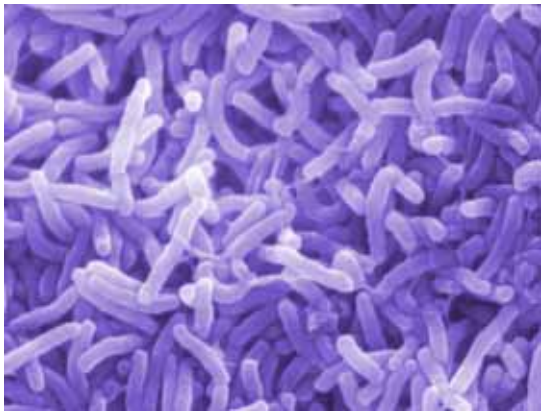
Illness from Food & Water

What is foodborne disease?

Foodborne disease is caused by consuming contaminated foods or beverages. Many different disease-causing microbes, or pathogens, can contaminate foods, so there are many different foodborne infections. In addition, poisonous chemicals, or other harmful substances can cause foodborne diseases if they are present in food.

More than 250 different foodborne diseases have been described. Most of these diseases are infections, caused by a variety of bacteria, viruses, and parasites that can be foodborne. Other diseases are poisonings, caused by harmful toxins or chemicals that have contaminated the food, for example, poisonous mushrooms. These different diseases have many different symptoms, so there is no one "syndrome" that is foodborne illness. However, the microbe or toxin enters the body through the gastrointestinal tract, and often causes the first symptoms there, so nausea, vomiting, abdominal cramps and diarrhea are common symptoms in many foodborne diseases. Many microbes can spread in more than one way, so we cannot always know that a disease is foodborne. The distinction matters, because public health authorities need to know how a particular disease is spreading to take the appropriate steps to stop it.

CHOLERA



Cholera is an acute intestinal infection caused by the bacterium Vibrio cholerae. It has a short incubation period, from less than one day to five days, and produces an enterotoxin that causes a copious, painless, watery diarrhea that can quickly lead to severe dehydration and death if treatment is not promptly given. Vomiting also occurs in most patients.

Most persons infected with V. cholerae do not become ill, although the bacterium is present in their faeces for 7-14 days. When illness does occur, more than 90% of episodes are of mild or moderate severity and are difficult to distinguish clinically from other types of acute diarrhea. Less than 10% of ill persons develop typical cholera with signs of moderate or severe dehydration.

SOURCES: World Health Organization (WHO), Water Sanitation & Health (WSH), Geneva, Switzerland, www.who.int
Center for Disease Control & Prevention, Emergency Preparedness & Response, Atlanta, USA, www.cdc.gov

Transmission

Cholera is spread by contaminated water and food. Sudden large outbreaks are usually caused by a contaminated water supply. Only rarely is cholera transmitted by direct person-to-person contact. In highly endemic areas, it is mainly a disease of young children, although breastfeeding infants are rarely affected.

Vibrio cholerae is often found in the aquatic environment and is part of the normal flora of brackish water and estuaries. It is often associated with algal blooms (plankton), which are influenced by the temperature of the water. Human beings are also one of the reservoirs of the pathogenic form of Vibrio cholerae.

Treatment

When cholera occurs in an unprepared community, case-fatality rates may be as high as 50% -- usually because there are no facilities for treatment, or because treatment is given too late. In contrast, a well-organized response in a country with a well established diarrhoeal disease control programme can limit the case-fatality rate to less than 1%.

Most cases of diarrhea caused by V. cholerae can be treated adequately by giving a solution of oral rehydration salts (the WHO/UNICEF standard sachet). During an epidemic, 80-90% of diarrhea patients can be treated by oral rehydration alone, but patients who become severely dehydrated must be given intravenous fluids.

In severe cases, an effective antibiotic can reduce the volume and duration of diarrhea and the period of vibrio excretion. Tetracycline is the usual antibiotic of choice, but resistance to it is increasing. Other antibiotics that are effective when V. cholerae are sensitive to them include cotrimoxazole, erythromycin, doxycycline, chloramphenicol and furazolidone.

DIARRHEA

Diarrhea occurs worldwide and causes 4% of all deaths and 5% of health loss to disability. It is most commonly caused by gastrointestinal infections which kill around 2.2 million people globally each year, mostly children in developing countries. The use of water in hygiene is an important preventive measure but contaminated water is also an important cause of diarrhea. Cholera and dysentery cause severe, sometimes life threatening forms of diarrhea.

Diarrhea is the passage of loose or liquid stools more frequently than is normal for the individual. It is primarily a symptom of gastrointestinal infection. Depending on the type of infection, the diarrhea may be watery (for example in cholera) or passed with blood (in dysentery for example).

Diarrhea due to infection may last a few days, or several weeks, as in persistent diarrhea. Severe diarrhea may be life threatening due to fluid loss in watery diarrhea, particularly in infants and young children, the malnourished and people with impaired immunity.

SOURCES: World Health Organization (WHO), Water Sanitation & Health (WSH), Geneva, Switzerland, www.who.int
Center for Disease Control & Prevention, Emergency Preparedness & Response, Atlanta, USA, www.cdc.gov

The impact of repeated or persistent diarrhea on nutrition and the effect of malnutrition on susceptibility to infectious diarrhea can be linked in a vicious cycle amongst children, especially in developing countries.

Diarrhea is also associated with other infections such as malaria and measles. Chemical irritation of the gut or non-infectious bowel disease can also result in diarrhea.

Causes

Diarrhea is a symptom of infection caused by a host of bacterial, viral and parasitic organisms most of which can be spread by contaminated water. It is more common when there is a shortage of clean water for drinking, cooking and cleaning and basic hygiene is important in prevention.

Water contaminated with human faeces for example from municipal sewage, septic tanks and latrines is of special concern. Animal faeces also contain microorganisms that can cause diarrhea.

Diarrhea can also spread from person to person, aggravated by poor personal hygiene. Food is another major cause of diarrhea when it is prepared or stored in unhygienic conditions. Water can contaminate food during irrigation, and fish and seafood from polluted water may also contribute to the disease.

Diarrhea may be caused by a temporary problem, like an infection, or a chronic problem, like an intestinal disease. A few of the more common causes of diarrhea are

- ***Bacterial infections***. Several types of bacteria, consumed through contaminated food or water, can cause diarrhea. Common culprits include Campylobacter, Salmonella, Shigella, and Escherichia coli.
- ***Viral infections***. Many viruses cause diarrhea, including rotavirus, Norwalk virus, cytomegalovirus, herpes simplex virus, and viral hepatitis.
- ***Food intolerances***. Some people are unable to digest a component of food, such as lactose, the sugar found in milk.
- ***Parasites***. Parasites can enter the body through food or water and settle in the digestive system. Parasites that cause diarrhea include Giardia lamblia, Entamoeba histolytica, and Cryptosporidium.
- ***Reaction to medicines***, such as antibiotics, blood pressure medications, and antacids containing magnesium.
- ***Intestinal diseases***, like inflammatory bowel disease or celiac disease.
- ***Functional bowel disorders***, such as irritable bowel syndrome, in which the intestines do not work normally.

In many cases, the cause of diarrhea cannot be found. As long as diarrhea goes away on its own, an extensive search for the cause is not usually necessary.

People who visit foreign countries are at risk for traveler's diarrhea, which is caused by eating food or drinking water contaminated with bacteria, viruses, or, sometimes, parasites. Traveler's diarrhea is a particular problem for people visiting developing countries

SOURCES: World Health Organization (WHO), Water Sanitation & Health (WSH), Geneva, Switzerland, www.who.int
Center for Disease Control & Prevention, Emergency Preparedness & Response, Atlanta, USA, www.cdc.gov

Interventions

In most cases, replacing lost fluid to prevent dehydration is the only treatment necessary. Medicines that stop diarrhea may be helpful in some cases, but they are not recommended for people whose diarrhea is from a bacterial infection or parasite--stopping the diarrhea traps the organism in the intestines, prolonging the problem. Instead, doctors usually prescribe antibiotics. Viral causes are either treated with medication or left to run their course, depending on the severity and type of the virus.

There are a wide variety of anti-diarrheal medications on the market, though most doctors suggest staying away from over-the-counter medicines unless diarrhea persists for more than 3 days. If diarrhea is persistent or life altering, medications can be used to alleviate symptoms temporarily (e.g. bismuth, kaopectate, loperamide, calcium polycarbophil)

Key measures to reduce the number of cases of diarrhea include:

- Access to safe drinking water.
- Improved sanitation.
- Good personal and food hygiene.
- Health education about how infections spread.

Key measures to treat diarrhea include:

- Giving more fluids than usual, including oral rehydration salts solution, to prevent dehydration.
- Continue feeding.
- Consulting a health worker if there are signs of dehydration or other problems.

HEPATITIS

Hepatitis, a broad term for inflammation of the liver, has a number of infectious and non-infectious causes. Two of the viruses that cause hepatitis (hepatitis A and E) can be transmitted through water and food; hygiene is therefore important in their control.

Among the infectious causes, hepatitis A and hepatitis E are associated with inadequate water supplies and poor sanitation and hygiene, leading to infection and inflammation of the liver. The illness starts with an abrupt onset of fever, body weakness, loss of appetite, nausea and abdominal discomfort, followed by jaundice within a few days. The disease may range from mild (lasting 1-2 weeks) to severe disabling disease (lasting several months). In areas highly endemic for hepatitis A, most infections occur during early childhood. The majority of cases may not show any symptoms; fatal cases due to fulminant acute hepatitis are rare. Nearly all patients recover completely with no long-term effects.

The cause

Hepatitis A and E viruses, while unrelated to one another, are both transmitted via the faecal-oral route, most often through contaminated water and from person to person. Hepatitis A could also be transmitted via food contaminated by infected food-handlers, uncooked foods, or foods handled after cooking. Hepatitis A has also caused outbreaks transmitted through injecting or non-injecting drug use.

Interventions

As there are no specific antiviral drugs against hepatitis A and E, prevention of these viral diseases remains the most important weapon for their control, such as:

- Providing education on good sanitation and personal hygiene, especially hand-washing
- Adequate and clean water supplies and proper waste disposal
- Vaccination against hepatitis A for persons at risk, e.g. travelers visiting areas where the disease is common.

LEPTOSPIROSIS

Leptospirosis is a bacterial disease that affects both humans and animals. The early stages of the disease may include high fever, severe headache, muscle pain, chills, redness in the eyes, abdominal pain, jaundice, hemorrhages in skin and mucous membranes (including pulmonary bleeding), vomiting, diarrhea and a rash.

The cause

Pathogenic Leptospira spp. cause leptospirosis. Human infection occurs through direct contact with the urine of infected animals or by contact with a urine-contaminated environment, such as surface water, soil and plants. The causative organisms have been found in a variety of both wild and domestic animals, including rodents, insectivores, dogs, cattle, pigs and horses. Leptospires can gain entry through cuts and abrasions in the skin and through mucous membranes of the eyes, nose and mouth. Human-to-human transmission occurs only rarely.

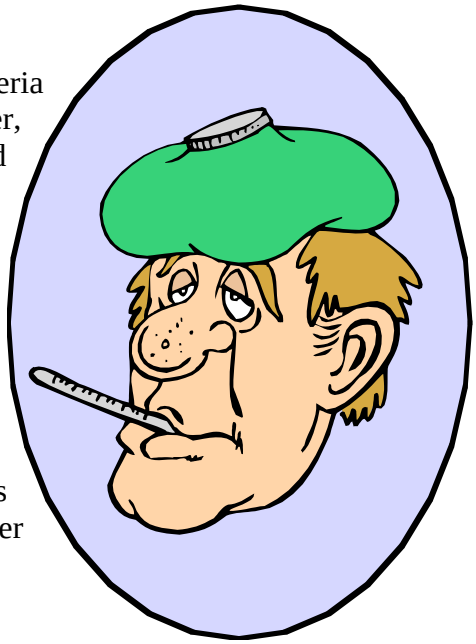
Interventions

The disease is often difficult to diagnose clinically; laboratory support is indispensable. Treatment with appropriate antibiotics should be initiated as early as possible. Untreated cases can progress to a more severe and potentially fatal stage. Preventive measures must be based on a knowledge of the groups at particular risk of infection and the relevant local epidemiological factors. For intervention one may:

- aim at control at the level of the infection source (e.g. rodent control, animal vaccination);
- interrupt the transmission route (e.g. wearing protective clothing, refrain from contact with infected animals and from swimming in contaminated water,
- provide clean drinking-water); or
- prevent infection or disease in the human host (e.g. vaccination, antibiotic prophylaxis, information to doctors, veterinarians, risk groups and the general population).

SOURCES: World Health Organization (WHO), Water Sanitation & Health (WSH), Geneva, Switzerland, www.who.int
Center for Disease Control & Prevention, Emergency Preparedness & Response, Atlanta, USA, www.cdc.gov

TYPHOID FEVER



Typhoid and paratyphoid fevers are infections caused by bacteria which are transmitted from faeces to ingestion. Clean water, hygiene and good sanitation prevent the spread of typhoid and paratyphoid. Contaminated water is one of the pathways of transmission of the disease.

Typhoid fever is a bacterial infection of the intestinal tract and bloodstream. Symptoms can be mild or severe and include sustained fever as high as 39°-40° C, malaise, anorexia, headache, constipation or diarrhea, rose-colored spots on the chest area and enlarged spleen and liver. Most people show symptoms 1-3 weeks after exposure. Paratyphoid fever has similar symptoms to typhoid fever but is generally a milder disease.

The cause

Typhoid and paratyphoid fevers are caused by the bacteria Salmonella typhi and Salmonella paratyphi respectively. Typhoid and paratyphoid germs are passed in the faeces and urine of infected people. People become infected after eating food or drinking beverages that have been handled by a person who is infected or by drinking water that has been contaminated by sewage containing the bacteria. Once the bacteria enter the person's body they multiply and spread from the intestines, into the bloodstream.

Even after recovery from typhoid or paratyphoid, a small number of individuals (called carriers) continue to carry the bacteria. These people can be a source of infection for others. The transmission of typhoid and paratyphoid in less-industrialized countries may be due to contaminated food or water. In some countries, shellfish taken from sewage-contaminated beds is an important route of infection. Where water quality is high, and chlorinated water piped into the house is widely available, transmission is more likely to occur via food contaminated by carriers handling food.

Interventions

Public health interventions to prevent typhoid and paratyphoid include:

- health education about personal hygiene, especially regarding hand-washing after toilet use and before food preparation; provision of a safe water supply;
- proper sanitation systems;
- excluding disease carriers from food handling.

Control measures to combat typhoid include health education and antibiotic treatment. A vaccine is available, although it is not routinely recommended except for those who will have prolonged exposure to potentially contaminated food and water in high-risk areas. The vaccine does not provide full protection from infection.

SOURCES: World Health Organization (WHO), Water Sanitation & Health (WSH), Geneva, Switzerland, www.who.int
Center for Disease Control & Prevention, Emergency Preparedness & Response, Atlanta, USA, www.cdc.gov