Bacteria and Food-borne Illness

Food-borne illness happens from eating food dirty (*contaminated*) with germs and their toxins (*bacteria*), parasites, or viruses. The illnesses range from upset stomach to more serious symptoms. These include:diarrhea, fever, vomiting, abdominal cramps, and dehydration. Many food-borne infections are undiagnosed and unreported, but people can die from these illnesses.

CAUSES

- Harmful germs (*bacteria*) are the most common causes of food-borne illnesses. Some bacteria may be present on foods when you purchase them. Raw foods are not sterile.
  - Raw meat and poultry may become contaminated when butchered.
  - Seafood may become contaminated during harvest or through processing.
  - One in 20,000 eggs may be contaminated with Salmonella inside the egg shell.
  - Produce grown in the soil such as lettuce, tomatoes, sprouts, and melons can become contaminated with Salmonella, Shigella, or Escherichia coli (E. coli). Contamination can occur during growing, harvesting, processing, storing, shipping or final preparation.
- Contamination may also occur during food preparation in the restaurant or in a person's kitchen.
- When food is cooked and left out for more than 2 hours at room temperature, bacteria can multiply quickly. Most bacteria grow undetected. They do not produce an odd odor or change the color or texture of the food. Freezing food slows or stops bacteria's growth. But it does not destroy the bacteria. The microbes can become reactivated when the food is thawed. Refrigeration may slow the growth of some bacteria. But thorough cooking is needed to destroy the bacteria.

COMMON SOURCES OF FOOD-BORNE ILLNESS

- Raw and undercooked meat and poultry.
  - Symptoms: Abdominal pain, diarrhea, nausea, and vomiting
  - Bacteria: Campylobacter jejuni, E. coli, L. monocytogenes, Salmonella
- Raw (unpasteurized) milk and dairy products, such as soft cheeses.
  - Symptoms: Nausea and vomiting, fever, abdominal cramps, and diarrhea
  - Bacteria: L. monocytogenes, Salmonella, Shigella, Staphylococcus aureus, C. jejuni
- Raw or undercooked eggs. Raw eggs may not be recognized in some foods such as homemade hollandaise sauce, caesar and other salad dressings, tiramisu, homemade ice cream, homemade mayonnaise, cookie dough, and frostings.
  - Symptoms: Nausea and vomiting, fever, abdominal cramps, and diarrhea
  - Bacteria: Salmonella enteriditis
- Raw or undercooked shellfish.
  - Symptoms: Chills, fever, and collapse
  - Bacteria: Vibrio vulnificus, Vibrio parahaemolyticus
- Improperly canned goods, and smoked or salted fish.
  - Symptoms: Double vision, inability to swallow, difficulty speaking, and inability to breathe **(seek medical help right away!)**
  - Bacteria: C. botulinum
- Fresh or minimally processed produce.
  - Symptoms: Diarrhea, nausea, and vomiting
  - Bacteria: E. coli, L. monocytogenes, Salmonella, Shigella, Yersinia enterocolitica, viruses, and parasites.

SYMPTOMS

In most cases of food-borne illness, symptoms resemble intestinal flu. They may last a few hours or even several days. Symptoms can range from mild to serious and include:

- Abdominal cramps.
- Nausea.
- Vomiting.
- Diarrhea.
- Fever.
- Dehydration.

Some people are at greater risk for bacterial infections because of their age or immune status. At greatest risk are:

- Young children.
- Pregnant women and their fetuses.
- The elderly.
- People with lowered immunity.

COMPLICATIONS

- Some micro-organisms, such as Listeria monocytogenes and Clostridium botulinum, cause far more serious illness than vomiting or diarrhea. They can cause spontaneous abortion or death.
- In some people, especially children, HUS (*hemolytic uremic syndrome*) can result from infection by a particular strain of bacteria, E. coli. It can lead to kidney failure and death. HUS is a rare disorder that affects primarily young children between the ages of 1 and 10 years. It is the leading cause of acute renal failure in previously healthy children. The child may become infected after eating a contaminated food, such as:
  - Meat (especially undercooked ground beef).
  - Unpasteurized apple cider or apple juice.
  - Raw sprouts.

The most common symptoms of infection are vomiting, abdominal pain, and diarrhea, which may be bloody. In 5 to 10 percent of cases, HUS develops about 2 to 6 days after the onset of illness. This disease may last from 1 to 15 days. It is fatal in 3 to 5 percent of cases. Symptoms of HUS include fever, lethargy, irritability, and pallor. In about half the cases, the disease progresses until the kidneys are unable to remove waste products from the blood and excrete them into the urine (*acute renal failure*). A decrease in circulating red blood cells and blood platelets and reduced blood flow to organs may lead to multiple organ failure. Seizures, heart failure, inflammation of the pancreas, and diabetes can also result. But most children recover completely.

DIAGNOSIS

Your caregiver may be able to diagnose food-borne illness from a list of what you have recently eaten and results from laboratory tests. Diagnostic tests for food-borne illness may include examination of the feces. A sample of the suspected food, if available, can also be tested for bacteria and their toxins as well as for viruses and parasites.

TREATMENT

- Most cases of food-borne illness are mild. They can be treated by taking in more fluids, either by mouth or intravenously, to replace lost fluids and electrolytes. In cases with gastrointestinal or neurologic symptoms, people should seek medical attention.
- In the most severe situations, such as HUS, the patient may need hospitalization in order to receive supportive nutritional and medical therapy.
  - Maintaining adequate fluid and electrolyte balance and controlling blood pressure are important. Doctors will try to lessen the impact of reduced kidney function. Early dialysis is crucial until the kidneys can function normally again. Blood transfusions may be needed.

PREVENTION

- Most cases of food-borne illness can be prevented through proper cooking or processing of food. This kills bacteria. Also, because bacteria multiply quickly between 40° F (4.5° C) and 140° F (60° C), food must be kept out of this "danger zone."
- To prevent harmful bacteria from growing in food, always:
  - Refrigerate foods promptly. If you let prepared food stand at room temperature for more than 2 hours, it may not be safe to eat. Set your refrigerator at 40° F (4.5° C) or lower and your freezer at 0° F (-18° C).

- Cook food to the appropriate temperature (145° F) (63° C) for roasts, steaks, and chops of beef, veal, and lamb; 160° F for pork, ground veal, and ground beef; 165° F (71° C) for ground poultry; and 180° F (82° C) for whole poultry). Use a thermometer to be sure! Foods are properly cooked only when they are heated long enough and at a high enough temperature to kill the harmful bacteria that cause illness.
- Prevent cross-contamination. Bacteria can spread from one food product to another throughout the kitchen. It can get onto cutting boards, knives, sponges, and countertops. Keep raw meat, poultry, seafood, and their juices away from other foods that are ready to eat.
- Handle food properly. Always wash your hands before touching food and after using the bathroom, changing diapers or handling pets, as well as after handling raw meat, poultry, fish, shellfish, or eggs.
- Clean surfaces well before preparing food on them. Better still, sanitize them with diluted bleach - 1 teaspoon of bleach to 1 quart of hot water.
- Wash sponges and dish towels weekly in hot water in the washing machine.
- Keep cold food cold and hot food hot.
- Maintain hot cooked food at 140° F (60° C) or higher.
- Reheat cooked food to at least 165° F (74° C).
- Refrigerate or freeze perishables, prepared food, and leftovers within 2 hours.
- Never defrost food on the kitchen counter. Use the refrigerator, cold running water, or the microwave oven.
- Never let food marinate at room temperature. Refrigerate it.
- Divide large amounts of leftovers into small, shallow containers for quick cooling in the refrigerator.
- Remove the stuffing from poultry and other meats immediately. Refrigerate it in a separate container.
- Do not pack the refrigerator. Cool air must circulate to keep food safe.

FOOD IRRADIATION

Food irradiation is the treatment of food with high energy such as gamma rays, electron beams, or x-rays as a means of cold pasteurization. This destroys living bacteria to control food-borne disease. Food irradiation is currently approved for wheat, potatoes, spices, seasonings, pork, poultry, red meats, whole fresh fruits, and dry or dehydrated products. Although irradiation destroys many bacteria, it does not sterilize food. Even if you are using food that has been irradiated by the manufacturer, you must continue to take precautions against food-borne illness. Proper refrigeration and handling will safeguard against any surviving organisms.

LINKS TO OTHER DISORDERS

Scientists suspect that food-borne pathogens are linked to chronic disorders. They can even cause permanent tissue or organ destruction. Research suggests that when some people are infected by food-borne pathogens, the activation of their immune system can trigger an inappropriate autoimmune response. means the immune system attacks the body's own cells. In some people, an autoimmune response leads to a chronic health condition.

Chronic disorders that may be triggered by food-borne pathogens are:

- Arthritis.
- Inflammatory bowel disease.
- Kidney failure.
- Guillain-barré syndrome.
- Autoimmune disorders.

SEEK IMMEDIATE MEDICAL CARE IF:

You need to seek medical care right away if you have any of the following symptoms, with or without gastrointestinal symptoms:

- You or your child older than 3 months has an oral or rectal temperature above 102° F (38.9° C).
- **Your baby is 3 months old or younger with a rectal temperature of 100.4º F (38º C) or higher.**
- Blood in the stools.
- Diarrhea that lasts more than 3 days.
- Prolonged vomiting. This can lead to dehydration.
- Signs of shock, such as:

- Weak or rapid pulse.
- Shallow breathing.
- Cold, clammy, pale skin.
- Shaking or chills.
- Chest pain.

- Signs of severe dehydration, such as:
  - Dry mouth.
  - Sticky saliva.
  - Decreased urine output.
  - Dizziness.
  - Fatigue.
  - Sunken eyes.
  - Low blood pressure.
  - Increased heart rate and breathing.
- Confusion or difficulty reasoning.

FOR MORE INFORMATION, CONTACT

- American Dietetic Association. www.eatright.org
- U.S. Department of Agriculture. www.usda.gov
- U.S. Department of Health and Human Services. www.os.dhhs.gov
- U.S. Environmental Protection Agency (EPA). www.epa.gov
- U.S. Food and Drug Administration FDA. www.fda.gov
- Centers for Disease Control and Prevention. www.cdc.gov
- Gateway to Government Food Safety Information. www.foodsafety.gov
- Partnership for Food Safety Education. www.fightbac.org

Information courtesy of the NIH and the National Digestive Diseases Information Clearinghouse

Document Released: 12/18/2006 Document Re-Released: 12/06/2010
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