

Foodborne Illness

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Foodborne illness affects 6.5 to 81 million Americans each year. The most common foodborne illnesses are caused by a combination of bacteria, naturally present in our environment, and food handling errors made in commercial settings, food service institutions, or at home.

The cost of these illnesses can be considerable. It has been estimated that \$4.8 billion each year is spent on work time loss and medical and legal expenses. To a food service establishment, a foodborne illness outbreak can mean a loss of both money and reputation. One study evaluated 17 foodborne outbreaks and found the cost to the institution to be between \$16,690 to over \$1 million with an average cost of \$108,615 per outbreak.

No food is risk free. However, many of these outbreaks can be prevented by handling food carefully. It's your best defense against a foodborne illness outbreak!

What are some of the major causes of foodborne illness?

Bacteria

The most commonly reported foodborne illnesses are caused by bacteria. Bacteria are found in all food. Most are killed by high temperatures, but some form toxins which may or may not be killed by heat.

Viruses

Viruses grow or reproduce only on living cells. They are often found in untreated water or sewage-contaminated water, and viruses from human feces on unwashed hands can infect others by passing the virus to food. Examples of viruses responsible for foodborne illness outbreaks include the Norwalk virus and Hepatitis A. Normal cooking may lower the risk of illness but may not destroy all viruses.

Parasites

These tiny organisms can cause severe illness. Parasites need nutrients from their host to complete their life cycle. They are always associated with raw or undercooked meat and fish, including pork, bear meat and others. Examples include Trichinella spiralis found in pork and Toxoplasma gondii which causes toxoplasmosis, of particular risk for pregnant women.

Chemical

Chemical foodborne illnesses are among the most deadly. These chemicals and other "natural" toxins formed in food include agents such as scombrototoxin and ciguatera toxin, which are associated with seafood. Some, but not all, of these illnesses can be prevented by food handlers.

Disease/Caused By	Symptoms
Salmonellosis <i>Salmonella</i>	Stomach pain, usually diarrhea and often nausea, chills, fever, or headache. Onset: 6 to 48 hours Duration: 3 to 5 days
Campylobacteriosis <i>Campylobacter jejuni</i>	Fever, headache, and muscle pain, followed by diarrhea (sometimes bloody), abdominal pain, and nausea. Complications can include meningitis, urinary tract infection, and reactive arthritis. Onset: 2 to 10 days Duration: 1 to 10 day
Clostridium Perfringens Enteritis <i>Clostridium perfringens Type A</i> Note: Illness is caused by a toxin which is usually formed in the body, but may sometimes form in food.	Diarrhea and gas pains, rarely vomiting or fever. Onset: 9 to 15 hours Duration: 1 day
Staphylococcus Aureus Intoxication <i>Staphylococcus aureus</i> Note: Illness is caused by a toxin. Toxin is resistant to heat.	Abdominal pain or nausea, followed by vomiting and often diarrhea; occasionally, fever (or subnormal temperature,) chills, headache, weakness, and dizziness. Onset: 30 minutes to 8 hours (usually within 2-4 hours) Duration: 1 to 2 days.
Botulism <i>Clostridium botulinum neurotoxin</i> Note: The neurotoxin is formed when heat-resistant, dormant spores of <i>C. botulinum</i> Type A, B, E, or F survive and germinate during storage, usually at temperatures greater than 38°F.	Initially, dry mouth, double vision, difficulty swallowing. Many victims also suffer from nausea, vomiting, abdominal cramps, diarrhea, sore throat, or dizziness. Later, constipation, weakness, muscle paralysis, and difficulty breathing. Onset: 12 to 48 hours, but may start 8 days later. Duration: 1 to 10 days
Hemorrhagic Colitis <i>Escherichia coli O157:H7</i> Note: Illness is caused by a toxin. May form in individual's intestinal tract or in food. Person-to-person transmission possible.	Severe abdominal cramps, diarrhea (often bloody), vomiting, nausea, occasionally low-grade fever. Possible complication of hemolytic uremic syndrome (HUS) a urinary tract infection that is a leading cause of kidney failure in children. Onset: 3 to 4 days. Duration: up to 10 days.
Listeriosis <i>Listeria monocytogenes</i> Note: Death rate for this illness is higher than botulism. In some foods, this bacteria can grow at refrigerator temperatures.	Sudden onset of flu-like symptoms: fever, chills, headache, backache, and sometimes abdominal pain and diarrhea. At greatest risk are fetuses, newborns, elderly, and those with chronic diseases.
Yersiniosis <i>Yersinia enterocolitica</i> Note: Yersinia bacteria can grow slowly at refrigeration temperatures.	Abdominal pain (in lower right quadrant, mimicking appendicitis), fever, diarrhea (often bloody), sometimes vomiting. Onset: 1 to 7 days Duration: 1 to 2 days

Major Food Vehicles

Beef (particularly roast beef), turkey, pork, chicken, ice cream made with unpasteurized eggs, poultry salads, eggs, milk (raw), Mexican foods, potato salad, baked goods, macaroni and cheese.

Raw milk, poultry, eggs. May be present in raw or undercooked meat, poultry or shellfish. Campylobacter - contaminated water has caused outbreaks affecting thousands.

Improperly prepared roast beef, turkey, Mexican food (including tacos, enchiladas, and beans), other meat dishes, pork, chicken, and cooked ground meat.

Ham, turkey, chicken, pork, roast beef, chicken & turkey salads, potato salad, cream-filled pastry, other meats, other salads, eggs and egg salad, custard, luncheon meats and hot dogs, and Mexican food. Staph bacteria is found on human skin and infected cuts and pimples.

Peppers and pepper sauce, asparagus, beans (green, lima, salad, soy), salmon and fish eggs, tomatoes and tomato juice, beets, improperly fermented fish, pickles/ relish, baked potatoes, and potato salad.

Ground beef and unpasteurized milk

Cabbage, soft cheese, turkey frankfurters.

Chocolate milk, milk, other dairy products, mussels, tofu, oysters and contaminated water.

Control

Thorough cooking destroys Salmonella bacteria. Avoid contaminating other foods with juices from raw meat or poultry from counters, utensils, hands, or serving plates. Avoid unpasteurized milk.

Avoid raw milk and untreated water. Cook meat and poultry thoroughly. Practice good personal hygiene and kitchen sanitation to prevent recontamination of cooked foods.

Keep cooked foods above 140°F during serving. Cook food thoroughly. Cool rapidly and evenly. Thoroughly reheat leftovers to 165°F before serving.

Refrigerate cooked foods promptly in shallow covered containers. Thorough cooking kills the bacteria but the toxin is resistant to heat, refrigeration, freezing, and chemicals such as nitrite. Avoid recontaminating cooked food. Never leave food at room temperature for extended periods.

Outbreaks rarely associated with commercial products. Home canners should follow USDA recommendations. Refrigerate cooked foods in covered, shallow containers within 2 hours. Keep hot foods hot above 140°F during serving. Reheat refrigerated foods thoroughly before serving or eating.

Thorough cooking and reheating. Refrigerate foods at 40 degrees F. or below.

Avoid raw milk and cheese made from unpasteurized milk. Observe "keep refrigerated", "sell-by", and "use-by" dates. Thoroughly reheat frozen or refrigerated processed meats and poultry products.

Thorough cooking and reheating. Practice good personal hygiene. Handle foods carefully.

Why are health professionals so concerned about foodborne illnesses?

The symptoms of foodborne illness mimic the “flu.” Symptoms can include stomach pain, diarrhea, nausea, vomiting, chills, fever, headache and muscle pain. All symptoms may not be present in all cases.

For some people, the health effects can be more severe. Diarrhea can lead to temporary or permanent arthritic conditions or hospitalization for dehydration. Bacteria can invade the blood or membranes of the brain and spinal cord. For some particularly vulnerable people, a foodborne illness can be fatal.

Extra precautions should be taken when feeding those groups of individuals who are at risk - senior citizens, pregnant women, very young children and those with weakened immune systems.

Which foods are most often the vehicles for foodborne illnesses?

Foods most likely to be implicated are those high in protein, meat, poultry, fish, eggs and dairy products. These foods are known as potentially hazardous. (See box for more information.)

Keep in mind other foods that haven't been handled correctly are also responsible for foodborne illness outbreaks. Examples are potatoes, onions, pinto beans, tofu and coleslaw.

If most foodborne illness outbreaks are caused by bacteria, how do they grow enough to cause illness?

In order to grow, bacteria need water, food, the right acidity, level of oxygen and temperature. One of the easiest conditions to control is temperature.

Bacteria can grow quickly at temperatures between 60 degrees F. and 125 degrees F. To control their growth, keep foods below 40 degrees F. or above 140 degrees F.

Foodborne Illness

- A disease or illness carried or transmitted to humans by food.
- Foodborne infections occur when “enough” of the live bacterial cells that have reproduced in the food, small intestine, or both are consumed. The severity of the infection depends on the virulence of the bacteria, resistance of the victim, and the number of cells that survive digestion.
- Foodborne intoxications result from a poison or toxin produced by reproductive bacterial cells in food or in the human body. Bacterial toxins have varying resistance to heat; some can even survive boiling. Other toxins can be a natural part of the food, for example, certain types of mushrooms.

Potentially Hazardous Food

- Any food that consists in whole or in part of milk or milk products, eggs, meat, poultry, fish, shellfish, edible crustacea, or other ingredients including synthetic ingredients, in a form capable of supporting rapid and progressive growth of infectious or toxigenic microorganisms. Foods with a pH level of 4.5 or below or a water activity (Aw) value of 0.85 or less aren't considered potentially hazardous. (New Hampshire Rules for the Sanitary Production and Distribution of Food, He-P 2300, February 1987)
- Regulations which define potentially hazardous food may vary by state. Be sure to contact the appropriate state health regulatory agency for legal definitions.

Foodborne Illness Outbreak

- The Centers for Disease Control define an outbreak of foodborne illness as illness that involves two or more persons who eat a common food, with the food confirmed as the source of the illness by a laboratory analysis. The only exception is that a single case of botulism qualifies as an outbreak.

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