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## FOODBORNE ILLNESSES: BACTERIA

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### What is Foodborne Illness?

Foodborne illness often shows itself as flu-like symptoms such as nausea, vomiting, diarrhea, or fever. Often people may not recognize that the illness is caused by bacteria or other pathogens on food.

Thousands of types of bacteria are naturally present in our environment. Not all bacteria cause disease in humans. For example, some bacteria are used beneficially in making cheese and yogurt. Bacteria, viruses, and parasites that cause disease are called “pathogens.” When certain pathogens enter the food supply, they can cause foodborne illness. Only a few types cause millions of cases of foodborne illness each year.

Most cases of foodborne illness can be prevented. Proper cooking or processing of food controls bacteria. They can grow in just about any food but are fond of protein foods, such as meat, poultry, seafood, eggs, and dairy products, as well as high-protein vegetables such as beans and grains.

### How Bacteria Get in Food

Bacteria may be present on products when you purchase them. Raw meat, poultry, seafood, and eggs are not sterile. Neither is produce, such as lettuce, tomatoes, and melons.

Foods, including safely cooked, ready-to-eat foods, can become cross-contaminated with bacteria introduced by raw meat juices or other contaminated products or poor personal hygiene.

### At-Risk Individuals

Age and physical condition place some persons at higher risk for illnesses than others, no matter what type of bacteria are implicated. Infants, pregnant women, the elderly and people with compromised immune systems are at greatest risk, and may become ill after ingesting only a few bacteria; others may remain symptom-free after ingesting thousands.

### How to Prevent Foodborne Illness

**Clean:** Wash hands and surfaces often. Bacteria can spread throughout the kitchen and get on to cutting boards, knives, sponges, and countertops.

- Wash hands in hot soapy water before preparing food and after using the bathroom, changing diapers, and handling pets. For best results, use warm water to moisten your hands. Apply soap and rub hands together for 20 seconds before rinsing thoroughly.
- Wash cutting boards, knives, utensils, and countertops in hot soapy water after preparing each food item and before going on to the next one.
- Use plastic or other non-porous cutting boards. Cutting boards should be run through the dishwasher or washed often in hot soapy water after use.
- Use paper towels to clean up kitchen surfaces or use cloth towels that are washed often in the hot cycle of the washing machine.

**Separate:** Don't cross-contaminate. Cross-contamination is how bacteria spread from one food product to another. This is especially true for raw meat, poultry, and seafood. Keep these foods and their juices away from ready-to-eat foods.

- Separate raw meat, poultry, and seafood from other foods in the grocery cart.

- Store raw meat, poultry, and seafood on the bottom shelf of the refrigerator, so juices don't drip onto other foods.
- If possible, use one cutting board for raw meat products and another for salads and other foods that are ready to be eaten.
- Always wash cutting boards, knives, and other utensils with hot soapy water after they come in contact with raw meat, poultry, and seafood. Then sanitize with a chlorine solution of 1 teaspoon liquid household bleach per quart of water.
- Never place cooked food on a plate, which previously held raw meat, poultry, or seafood.

**Cook:** Cook to proper temperatures. Foods are properly cooked when they are heated for a long enough time and at a high enough temperature to kill the harmful bacteria that cause foodborne illnesses.

- Use a food thermometer, which measures the internal temperature of cooked meat and poultry, to make sure that the meat is cooked all the way through.
- Cook roasts and steaks to at least 145 °F with a 4 minute rest before carving or eating. Cook all poultry to at least 165 °F.
- Cook ground beef, where bacteria can spread during grinding, to at least 160 °F. Eating undercooked, ground beef is linked with a higher risk of illness.
- Cook eggs until the yolk and white are firm, not runny. Don't use recipes in which eggs remain raw or only partially cooked.
- Cook fish until it is opaque and flakes easily with a fork.
- Make sure there are no cold spots in food (where bacteria can survive) when cooking in a microwave oven. For best results, cover food, stir and rotate for even cooking. If there is no turntable, rotate the dish by hand once or twice during cooking.
- Bring sauces and gravy to a boil when reheating. Heat other leftovers thoroughly to 165 °F.

**Chill:** Refrigerate promptly because bacteria multiply rapidly between 40 °F and 140 °F. Set the refrigerator at 34 to 40 °F and the freezer unit at 0 °F and occasionally check these temperatures with an appliance thermometer.

- Refrigerate or freeze perishables, prepared foods, and leftovers within two hours.
- Never defrost (or marinate) food on the kitchen counter. Use the refrigerator, cold running water, or the microwave.
- Divide large amounts of leftovers into small, shallow containers for quick cooling in the refrigerator.
- With poultry and other stuffed meats, remove the stuffing, and refrigerate it in a separate container.
- Don't pack the refrigerator. Cool air must circulate to keep food safe.

## If Foodborne Illness is Suspected

**Preserve the Evidence:** Wrap remaining food securely, mark "DANGER" on the packaging, and refrigerate it. Save all the packaging materials, such as cans or cartons. Write down the food type, the date and time consumed, and when the onset of symptoms occurred. Save any identical unopened products.

**Seek Treatment as Necessary:** Seek medical care immediately if the victim is in an "at-risk" group or if symptoms persist or are severe (such as bloody diarrhea, excessive nausea, vomiting, or high temperature). For more information, call the Poison Control Center at (800) 922-1117.

**Report to Authorities:** Call your county health department if they suspect food was served at a large gathering, from a restaurant or other food service facility, or if it is a commercial product. Call the United States Department of Agriculture Meat and Poultry Hotline (800) 535-4555 if the suspect food is USDA-inspected and you have all the packaging.

## Bacillus cereus

*B. cereus* can cause two types of illnesses, the diarrheal type and the vomiting type.

**Sources:** A wide variety of foods including meats, milk, vegetables, and fish have been associated with the diarrheal-type food poisoning. The vomiting-type outbreaks have generally been associated with rice products; however, other starchy foods such as potato, pasta, and cheese products have also been implicated. Food mixtures such as sauces, puddings, soups, casseroles, pastries, and salads have frequently been incriminated in food poisoning outbreaks.

**Symptoms:** The diarrheal illness results in diarrhea and abdominal cramps occurring within six to 15 hours of eating contaminated food, and may last up to 24 hours. The vomiting-type illness results in nausea and vomiting occurring within three to six hours of eating contaminated food and also lasts about 24 hours.

**Prevention:** Keep hot foods hot (above 140 °F) or refrigerate them rapidly if they will not be served immediately. Keep cold foods cold (40 °F or below).

### ***Campylobacter jejuni***

**Sources:** Contaminated water, raw milk, and raw or undercooked meat, poultry, or shellfish. The most common source of *Campylobacter* infections is from contaminated poultry meat. People become sick when they eat undercooked chicken or when they inadvertently transfer the organisms from the raw meat or raw meat drippings to their mouths. *Campylobacter* infections are also acquired from drinking raw, unpasteurized milk, traveling to foreign countries, drinking untreated water from mountain streams, or contact with infected dogs and cats. These infections cause 845,000 illnesses, 8,400 hospitalizations, and 76 deaths annually in the United States.

**Symptoms:** Fever, headache, and muscle pain followed by diarrhea (sometimes bloody), abdominal pain and nausea that appear two to five days after eating; may last seven to 10 days.

#### **Prevention:**

- Poultry should be thoroughly cooked, and anything that comes in contact with raw poultry — such as hands, knives or cutting boards — should be washed with soap and water before they touch any other foods.
- Avoid cross-contamination of ready-to-eat foods with raw meats and their juices.
- Never drink raw milk.

### **Cholera**

Cholera is an acute intestinal infection that occurs in many of the developing countries of Africa, Asia, and Latin America, where sanitary conditions are less than optimal. Only a few cases of cholera have occurred in the United States since 1973. Even with foreign travel, the risk of infection to the U.S. traveler is very low, especially for those who follow the usual tourist itineraries and stay in standard accommodations.

**Sources:** The organism that causes the illness is *Vibrio cholerae* type O:1. It is spread by ingestion of food or water contaminated directly or indirectly by feces or vomit from infected persons.

**Prevention:** The best protection is to avoid consuming food or water that may be contaminated with feces or vomit from infected persons. The organism can grow well in some foods, such as rice, but it will not survive in very acidic foods, including carbonated beverages, and is killed by heat.

### ***Clostridium perfringens***

**Sources:** Called “the cafeteria germ” because many outbreaks result from food, especially meat dishes, left for long periods in steam tables or at room temperature. Cooking destroys the bacteria, but some toxin-producing spores may survive and grow rapidly in hot foods held too cool.

**Symptoms:** Diarrhea and gas pains may appear eight to 24 hours after eating. Symptoms usually last about one day, but less severe symptoms may persist for one to two weeks.

**Prevention:** Keep hot foods hot (above 140 °F) or refrigerate them rapidly if not served immediately.

### ***Salmonella* (Non-Typhoid) Species (over 1,600 types)**

**Sources:** Raw or undercooked eggs, poultry and meat, raw milk and dairy products, seafood, produce, and peanut butter products.

**Symptoms:** Stomach pain, diarrhea, nausea, chills, fever, and headache usually appear six to 48 hours after eating and may last one to two days. Salmonella causes more than 1 million illnesses, 19,000 hospitalizations, and 378 deaths annually in the United States.

**Prevention of Illness:**

- Avoid cross-contamination of ready-to-eat foods with raw meats or their juices.
- Thoroughly cook meat and poultry.
- Cook eggs thoroughly and never eat runny yolks or raw eggs.
- Always refrigerate processed meat products.
- Wash fruits and vegetables thoroughly.

### ***Listeria monocytogenes***

**Sources:** Soft cheese, raw milk, deli meats, cold cuts, improperly processed ice cream, raw leafy vegetables, meat, and poultry. This organism is unique in that it is able to grow even at refrigerated temperatures. Refrigeration of foods will slow the growth of *Listeria*, but it will not stop it completely.

**Symptoms:** Fever, chills, headache, backache, sometimes abdominal pain and diarrhea; 12 hours to three weeks after contaminated food is consumed. However, the very young, the elderly, pregnant women, and those with AIDS or undergoing cancer treatment may later develop a more serious illness (septicemia, meningitis, or spontaneous abortion in pregnant women). In otherwise healthy individuals, mild symptoms may disappear in a day or two, but medical attention is required for immunosuppressed individuals who develop the above-mentioned complications

**Prevention of Illness:**

- Wash fresh fruits and vegetables thoroughly under running water.
- Keep foods refrigerated to slow the growth of *Listeria* if it is present.
- Immunocompromised individuals should try to avoid eating implicated foods, such as soft-ripened cheeses or lunchmeat products.

### **Shigella Species (over 30 types)**

**Sources:** Found in the human intestinal tract, and thus contamination is person-to-person by the fecal-oral route and fecal contamination of food and water. Most outbreaks result from food, especially salads, prepared and handled by workers using poor personal hygiene.

**Symptoms:** Diarrhea containing blood and mucus, fever, abdominal cramps, chills, and vomiting 12 to 50 hours from ingestion of bacteria symptoms can last a few days to two weeks. Sometimes, no symptoms can be seen.

**Prevention:** Wash fresh fruits and vegetables thoroughly under running water. Always wash hands well when preparing foods.

### ***Staphylococcus aureus***

**Sources:** This bacterium is found on humans (skin, infected cuts, pimples, noses, and throats) and has been associated with a wide range of foods including meat and meat products, poultry and egg products, salads (such as egg, tuna, potato, and macaroni), cream-filled bakery products and pies, sandwich fillings, and milk and dairy products. In general, Staph poisoning often occurs when a food has been handled a great deal (such as the chopping and handling involved in making a salad or sandwich) and is then left at temperatures above refrigeration that allow the bacteria to multiply and produce toxins.

**Symptoms:** Severe nausea, abdominal cramps, vomiting, and diarrhea occur one to six hours after eating. Recovery occurs within two to three days — longer if severe dehydration occurs.

**Prevention:** Always wash hands well when preparing foods. Keep foods refrigerated.

For information on *Clostridium botulinum*, see **HGIC 3680, Botulism**. For information on *E. coli*, see **HGIC 3700, E. coli**.

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