

FACT SHEET

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BACTERIAL FOOD POISONING

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Food poisoning is an ever-present possibility that need not occur. Chemicals, heavy metals, parasites, fungi, viruses and bacteria can cause food-borne illness. Bacteria-related food poisoning is the most common, but fewer than 20 of the many thousands of different bacteria do cause food poisoning. More than 90 percent of the confirmed cases of food poisoning each year are caused by *Staphylococcus aureus*, *Salmonellae*, *Clostridium perfringens*, *Vibrio parahaemolyticus* and *Bacillus cereus*. These bacteria are commonly found on many raw foods. Since a large number of food-poisoning bacteria must be present to cause illness, illness can be prevented by controlling the initial number of bacteria present, preventing the small number from growing and destroying the bacteria by proper cooking.

Poor personal hygiene, improper cleaning of storage and preparation areas and unclean utensils cause contamination of raw and cooked foods. Mishandling of raw and cooked foods allows bacteria to grow. The temperature range in which most bacteria grow is between 40 degrees F (5 degrees C) and 140 degrees F (60 degrees C). Raw and cooked foods should not be kept in this danger zone any longer than absolutely necessary. Undercooking or improper processing of home-canned foods can cause very serious food poisoning.

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Since food-poisoning bacteria are often present on many foods, knowing the characteristics of such bacteria is essential to an effective control program.

Staphylococcus aureus

Man's respiratory passages, skin and superficial wounds are common sources of *S. aureus*. When *S. aureus* is allowed to grow on foods, it can produce a toxin that causes illness. Although cooking destroys the bacteria, the toxin produced is heat stable and may not be destroyed. Staphylococcal food poisoning occurs most often in foods that require hand preparation, such as potato salad, ham salad and sandwich spreads. Sometimes these types of foods are left at room temperature for long periods of time, which allows the bacteria to grow and produce toxin. Good personal hygiene while handling foods will keep *S. aureus* from foods, and refrigeration of raw and cooked foods will prevent the growth of these bacteria if any are present.

Salmonella

The gastrointestinal tracts of animals and man are common sources of *Salmonella*. High protein foods such as meat, poultry, fish and eggs are most commonly affected by *Salmonella*. However, any food that becomes contaminated and is then held at improper temperatures can cause salmonellosis. *Salmonellae* are destroyed at cooking temperatures

above 165 degrees F. The major causes of salmonellosis are contamination of cooked foods and insufficient cooking. Contamination of cooked foods occurs from contact with surfaces or utensils that are not properly washed after use with raw products. If *Salmonella* is present on raw or cooked foods, its growth can be controlled by refrigeration below 40 degrees F.

Clostridium perfringens

Cl. perfringens is found in soil, dust and the gastrointestinal tracts of animals and man. When food containing large numbers of *C. perfringens* is consumed, the bacteria produce a toxin in the intestinal tract that causes illness. *Cl. perfringens* can exist as a heat-resistant spore, so it may survive cooking and grow to large numbers if the cooked food is held between 40 degrees F and 140 degrees F for an extensive time period. Meat and poultry dishes, sauces and gravies are the foods most frequently involved. Hot foods should be served immediately or kept heated over 140 degrees F. When refrigerating large volumes of gravies, meat dishes, etc., divide them into small portions so they will cool rapidly. The food should be reheated prior to serving.

Clostridium botulinum

Botulism accounts for fewer than one of every 400 cases of food poisoning in the U.S., but two factors make it very important. First, it has caused death in approximately 30 percent of the cases; and secondly, it occurs mostly in home-canned foods. In 1975, 18 of the 19 confirmed cases of botulism were caused by home-processed foods, and the other was caused by a commercial product that was mishandled in the home. *Cl. botulinum* can exist as a heat-resistant spore, and can grow and produce a neurotoxin in underprocessed, home-canned foods. An affected food may show signs of spoilage such as a bulging can or an off-odor. But this is not true in all cases, so canned foods should not be tasted before heating. The botulinum toxin is destroyed by boiling the food for 5 to 10 minutes.

Vibrio parahaemolyticus

V. parahaemolyticus is found on seafoods, and requires the salt environment of sea water for growth. *V. parahaemolyticus* is very sensitive to cold and

heat. Proper storage of perishable seafoods below 40 degrees F, and subsequent cooking and holding above 140 degrees F, will destroy all the *V. parahaemolyticus* on seafoods. Food poisoning caused by this bacterium is a result of insufficient cooking and/or contamination of the cooked product by a raw product, followed by improper storage temperature. It is a major problem in Japan where many seafoods are consumed raw.

Bacillus cereus

B. cereus is found in dust, soil and spices. It can survive normal cooking as a heat-resistant spore, and then produce a large number of cells if the storage temperature is incorrect. Starchy foods such as rice, macaroni and potato dishes are most often involved. The spores may be present on raw foods, and their ability to survive high cooking temperatures requires that cooked foods be served hot or cooled rapidly to prevent the growth of this bacteria.

Prevention

The first step in preventing food poisoning is to assume that all foods may cause food-borne illness. Follow these steps to prevent food poisoning:

1. Wash hands, food preparation surfaces and utensils thoroughly before and after handling raw foods to prevent recontamination of cooked foods.
2. Keep refrigerated foods below 40 degrees F.
3. Serve hot foods immediately or keep them heated above 140 degrees F.
4. Divide large volumes of food into small portions for rapid cooling in the refrigerator. Hot, bulky foods in the refrigerator can raise the temperature of foods already cooled.
5. Remember the danger zone is between 40 degrees F and 140 degrees F.
6. Follow approved home-canning procedures. These can be obtained from the Extension Service or from USDA bulletins.
7. Heat canned foods thoroughly before tasting.
8. When in doubt, throw it out.

You are the key to preventing food-borne illness. By observing the simple rules of good food handling, food poisoning can be eliminated.

Bacteria Responsible	Description	Habitat	Types of Foods	Symptoms	Cause	Temperature Sensitivity
<i>Staphylococcus aureus</i>	Produces a heat-stable toxin.	Nose and throat of 30 to 50 percent of healthy population; also skin and superficial wounds.	Meat and sea-food salads, sandwich spreads and high salt foods.	Nausea, vomiting and diarrhea within 4 to 6 hours. No fever.	Poor personal hygiene and subsequent temperature abuse.	No growth below 40 degrees F. Bacteria are destroyed by normal cooking but toxin is heat-stable.
<i>Salmonellae</i>	Produces an intestinal infection.	Intestinal tracts of animals and man.	High protein foods — meat, poultry, fish and eggs.	Diarrhea, nausea, chills, vomiting and fever within 12 to 24 hours.	Contamination of ready-to-eat foods, insufficient cooking and recontamination of cooked foods.	No growth below 40 degrees F. Bacteria are destroyed by normal cooking.
<i>Clostridium perfringens</i>	Produces a spore and prefers low oxygen atmosphere. Live cell must be ingested.	Dust, soil and gastrointestinal tracts of animals and man.	Meat and poultry dishes, sauces and gravies.	Cramps and diarrhea within 12 to 24 hours. No vomiting or fever.	Improper temperature control of hot foods, and recontamination.	No growth below 40 degrees F. Bacteria are killed by normal cooking but a heat-stable spore can survive.
<i>Clostridium botulinum</i>	Produces a spore and requires a low oxygen atmosphere. Produces a heat-sensitive toxin.	Soils, plants, marine sediments and fish.	Home-canned foods.	Blurred vision, respiratory distress and possible DEATH.	Improper methods of home-processing foods.	Type E and Type B can grow at 38 degrees F. Bacteria destroyed by cooking and the toxin is destroyed by boiling for 5 to 10 minutes. Heat-resistant spore can survive.
<i>Vibrio parahaemolyticus</i>	Requires salt for growth.	Fish and shellfish.	Raw and cooked seafood	Diarrhea, cramps, vomiting, headache and fever within 12 to 24 hours.	Recontamination of cooked foods or eating raw seafood.	No growth below 40 degrees F. Bacteria killed by normal cooking.
<i>Bacillus cereus</i>	Produces a spore and grows in normal oxygen atmosphere.	Soil, dust and spices.	Starchy foods.	Mild case of diarrhea and some nausea within 12 to 24 hours.	Improper holding and storage temperatures after cooking.	No growth below 40 degrees F. Bacteria killed by normal cooking, but heat-resistant spore can survive.

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