Food Safety Information Resource

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Introduction

Bacteria, including those that can cause foodborne illnesses, are found naturally all around us. Safe food handling, cooking, serving and storage practices are necessary to prevent bacteria from multiplying and causing foodborne illness. Foodborne illnesses can result from foods prepared at home or away from home. According to the Centers for Disease Control and Prevention (CDC), the majority of foodborne illnesses could be prevented by improving food handling practices, including proper cooking and storage of food and appropriate personal hygiene practices of food handlers.

It is important for consumers to understand the steps they can take to minimize their risk of contracting a foodborne illness, particularly in the home. These materials can be used to educate consumers on safe food handling, preparation and storage. Following are safety tips for consumers, answers to commonly asked questions about foodborne illnesses and descriptions of some common foodborne pathogens and their sources. The group of foodborne illnesses covered in this resource is not exhaustive, and the information available on foodborne illnesses will continue to change as technological advances allow identification of new or previously unrecognized pathogens.

Although foodborne pathogens do pose the threat of illness, the risk of illness is relatively small when food is prepared and handled using appropriate food safety techniques. It is important, however, to be particularly conscientious about safe food handling practices when preparing food for young children, the elderly and those with compromised immune systems, as they have a greater risk for developing serious consequences from foodborne pathogens.

America has one of the world's safest food supplies. The efforts of the food industry and the U.S. government combined with consumers' use of safe food handling procedures will help ensure that we can all continue to enjoy a wide variety of healthful, safe foods in our diets.

Campylobacter jejuni

(kam-pi´-lō-bak-ter) (jē-jo͞o´-nĭ)

Overview

***Campylobacter jejuni,* though less well known than some other causes of foodborne illness, is estimated to be the most common cause of bacterial diarrhea disease in the U.S., according to the Federal Centers for Disease Control and Prevention. The illness caused by *Campylobacter jejuni* is called campylobacteriosis, and this illness is estimated to affect over four million persons, or 1% of the population, every year.**

Sources

Poultry, shellfish, livestock and even pets carry the *Campylobacter jejuni* organism. Vehicles of campylobacteriosis have included undercooked poultry and meats, raw (unpasteurized) milk and untreated water.

Symptoms/Complications

Symptoms of campylobacteriosis include muscle pain, headache and fever followed by diarrhea, abdominal pain and nausea that begin one to 10 days (usually between two and five days) following ingestion of *Campylobacter jejuni*. Convulsions may occur in some young children in association with high fever. Campylobacter infections also have been known to result in chronic health problems for people with arthritis and Guillian-Barré syndrome. The illness most closely mimics those caused by *Shigella* or *Salmonella*.

Control Measures

The Partnership for Food Safety Education recommends following these four simple steps to Fight BAC!® (bacteria):

Clean

Always wash hands in hot, soapy water for 20 seconds before preparing or eating food, and after using the bathroom, changing diapers and handling pets. Wash cutting boards, counter tops, knives and utensils in hot, soapy water after they come in contact with raw meat, poultry and seafood, and before preparing other foods.

Separate

Bacteria can spread from one food to another through cross-contamination. To decrease the risk of cross-contamination, keep raw meat, poultry and seafood—and their juices—away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

Cooking foods to proper temperatures will kill the harmful bacteria that cause foodborne illness. Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least 145°F, non-ground pork to 160°F, poultry parts to 170°F and whole birds to 180°F. Using an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color. Safely cooked poultry can vary in color from white to pink to tan. Check the temperature in several locations. As soon as all parts reach at least 170°F, all the poultry meat—including any that remains pink—is safe to eat. Reheat leftovers to 165°F.

Chill

Cold foods should be kept at or below 40°F. Refrigerate or freeze prepared food and leftovers within two hours. Never defrost food on the kitchen counter. Use the refrigerator, cold running water or the microwave. Marinate foods only in the refrigerator. With poultry and other stuffed meats, remove the stuffing and refrigerate it in a separate container. Carefully follow "keep refrigerated," "sell by" and "use by" dates.

Other Measures

Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations. Never drink unpasteurized milk or other dairy products or untreated water, and never eat raw or undercooked foods of animal origin.

Resources

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Ling Patty, Office of Nutrition Services, Arizona Department of Health Services

Clostridium botulinum

(kläs-trid´-e-um) (bot´yū-lin-um)

Overview

Botulism, which is caused by *Clostridium botulinum* toxin, is one of the rarest types of foodborne illnesses, but it's also one that should be taken seriously. Under the right conditions, *Clostridium botulinum* bacteria can produce a toxin that can affect the nervous system. Eating foods that contain this toxin causes the illness botulism. One of the most severe foodborne illnesses, botulism can be fatal if untreated.

Sources

Clostridium botulinum is widespread in the environment, occurring in soil, water and animals. As a result, various foods may naturally contain these bacteria, which form resistant cells (called "spores") that can survive many cooking processes. Even though *Clostridium botulinum* is widespread, foods **only** become dangerous when *Clostridium botulinum* grows and produces its toxin in the food. These bacteria are anaerobic, meaning they only grow where there is little or no oxygen. They are also sensitive to acid and cold, and usually cannot grow and produce toxin in acidic foods or in the refrigerator.

Infants younger than 12 months have an increased risk of developing botulism. Because their digestive systems are not well developed at this age, *Clostridium* spores found in certain foods can grow in an infant's digestive system and produce the toxin in the body with serious, often life-threatening effects. Raw honey is the most frequent cause of infant botulism, and infants younger than 12 months should not be fed honey.

Foods that have been associated with outbreaks of botulism include improperly canned foods (both homemade and commercially canned), flavored oils containing garlic and herbs, smoked and salted fish, and potatoes that have been baked in aluminum foil and then kept (still wrapped in foil) at room temperature for several hours. All of these are low-acid foods that are usually stored at room temperature in the absence of oxygen. Another environment where *Clostridium botulinum* can grow is on the surface of fresh vegetables wrapped tightly in plastic (which keeps out oxygen). This is why supermarket vegetables are loosely wrapped with plastic packaging that has holes in it to allow the oxygen to pass through.

Symptoms/Complications

Early symptoms of botulism include double and blurred vision, slurred speech, difficulty in swallowing, dry mouth, drooping eyelids and muscle weakness. Symptoms can begin any time within six hours to 10 days, but usually within 18 to 36 hours after eating the contaminated food, and if untreated can lead to paralysis of the arms, legs, trunk and respiratory muscles. If respiratory failure occurs, intensive medical care will be needed. Respiratory failure can be fatal, and anyone who experiences these symptoms should seek medical help immediately.

Control Measures

Botulism can be prevented by practicing safe food handling techniques and looking for warning signs in food packaging. Visible indicators such as bulging or dented cans, clear liquids that have turned milky and cracked jars can indicate that *Clostridium botulinum* could be present.

These foods should be disposed of immediately and never tasted or eaten! To prevent botulism when home canning, follow recommended USDA home canning methods, and pay special attention to adding the correct amount of acid required and processing times and temperatures. High temperatures destroy *Clostridium botulinum* toxin, so make sure to heat home canned meats and vegetables to boiling (at least 15 minutes) before serving. To prevent the growth of *Clostridium botulinum* in other foods, refrigerate oils infused with herbs, keep wrapped baked potatoes above 140°F until served, and avoid storing fresh fruits and vegetables in an airtight container at room temperature. Since *Clostridium* spores can withstand ordinary cooking, cooked foods also should be refrigerated and not left at room temperature unless they will be eaten soon.

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Ling Patty, Office of Nutrition Services, Arizona Department of Health Services

Clostridium perfringens

(kläs-trid´-ē-um) (per-frin´-jenz)

Overview

Clostridium perfringens **bacteria are everywhere around us—in the intestines of humans and animals, in soil, dust, insects and sewage. These bacteria are anaerobic—they only grow where there is little or no oxygen. They differ from *Clostridium botulinum* in how they cause disease. While *Clostridium botulinum* grows and produces its toxin in food, *Clostridium perfringens*—when ingested in large numbers and if growth conditions are appropriate—grows and produces its toxin in the intestine. This toxin causes the illness *Clostridium perfringens* enteritis.**

Sources

Clostridium perfringens outbreaks frequently occur when large quantities of food are prepared several hours before serving and then served at room temperature or from an improperly heated steam table. *Clostridium perfringens* is sometimes referred to as the "cafeteria germ," and has been found in cafeterias at hospitals, nursing homes and prisons. Steam tables should never be used to reheat leftovers, as they are designed only to hold temperatures.

Foods not cooled properly before storage also contribute to outbreaks of *Clostridium perfringens* enteritis. Meat, poultry, cooked dried beans ("refried" beans) and gravies are the foods most commonly associated with *Clostridium perfringens* enteritis. The organism lives in soil, so cross-contamination from unwashed vegetables also is possible.

Symptoms/Complications

Symptoms are usually relatively mild and include diarrhea and gas pains that begin between six and 24 hours after ingestion of contaminated food and last approximately 24 hours. The illness is most serious for the very young and the elderly.

Control Measures

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Separate

Bacteria can spread from one food to another through cross-contamination. To decrease the risk of cross-contamination, keep raw meat, poultry and seafood—and their juices—away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

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Chill

Cold foods should be kept at or below 40°F. Large leftover portions of cooked foods such as roasts, turkey, stuffing, soups, stews and casseroles should be divided up for storage (use shallow pans; food should be no more than two inches deep) and cooled in the refrigerator.

Other Measures

When replenishing buffet food, it is important to replace the entire dish with a new batch of food that is hot (140°F or above) or cold (40°F or below), rather than adding new food to food that has been sitting out for a period of time. This will eliminate the transfer and harboring of *Clostridium perfringens* bacteria that may already be present. Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations.

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Cryptosporidium parvum

(krip′-tō-spō-rid′-ē-um) (pär′-vŭm)

Overview

***Cryptosporidium parvum* is a parasite found in the intestinal tracts of warm-blooded animals. Cryptosporidiosis, the illness caused by *Cryptosporidium parvum,* was first linked with human disease in 1976. While it has long been a common cause of diarrhea in travelers to developing nations, it is now recognized as a common cause of community illness and day care center illness outbreaks in the U.S. The illness mimics that caused by *Giardia,* a parasitic organism that has been linked to waterborne and foodborne illness outbreaks.**

Sources

Cryptosporidium parvum resides in the intestines of warm-blooded animals and is excreted in feces. Foods of animal origin, vegetables and improperly treated water are potential carriers of the parasite. Waterborne outbreaks of *Cryptosporidium* are more frequent than foodborne, and if a waterborne outbreak occurs, it's important to also be aware of the source of ice. If ice was made with contaminated water, *Cryptosporidium* is still present in the ice. The organism is resistant to chlorine, so it is controlled in water through proper water filtration methods. However, large urban outbreaks from municipal water supplies have occurred.

Symptoms/Complications

The parasite invades intestinal cells and causes profuse, watery diarrhea, abdominal cramps and fever. At-risk populations include the immuno-compromised (people whose immune systems have been compromised due to illness such as HIV or cancer), children, healthcare personnel, family members and day care staff. Healthy individuals typically clear the parasite, with subsidence of symptoms, within one to two weeks. In contrast, the infection may be unremitting in immuno-compromised individuals, progressing into a debilitating and wasting disease.

Control Measures

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Separate

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Cooking foods to proper temperatures will kill the harmful bacteria that cause foodborne illness. Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least

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Chill

Cold foods should be kept at or below 40°F. Refrigerate or freeze prepared food and leftovers within two hours. Never defrost food on the kitchen counter. Use the refrigerator, cold running water or the microwave. Marinate foods only in the refrigerator. With poultry and other stuffed meats, remove the stuffing and refrigerate it in a separate container. Carefully follow "keep refrigerated," "sell by" and "use by" dates.

Other Measures

During waterborne outbreaks, boil drinking water for one minute before consumption or purchase bottled water. In-line water filters that remove one-micron or greater-sized particles should effectively prevent contamination. However, not all are approved for such uses, and specific manufacturers' guidelines should be followed. Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations.

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E. coli / E. coli O157:H7

(esh-ar-ik´-eeya) (cō´-lī)

Overview

***Escherichia coli* or *E. coli* are a group of bacteria normally found in the intestines of warm-blooded animals, including some food animals and humans, and in water contaminated by animal or human feces. When they cause illness due to contaminated food or water, *E. coli* are normally associated with intestinal complaints or diarrhea. There are more than 180 types of *E. coli,* and many of these types are normally present in the human bowel.**

***E. coli 0157:H7* is a virulent strain of *E. coli* that can cause serious and potentially fatal diseases. A number of new technologies have been developed to prevent *E. coli* contamination of animal carcasses. In addition to the Hazard Analysis Critical Control Point (HACCP) programs being used in beef processing plants, a new intervention technology called steam vacuuming uses very hot steam or water to remove *E. coli 0157:H7* and other bacteria from beef carcasses. Today, more than 90% of beef carcasses from fed cattle are treated with steam vacuuming.**

Sources

E. coli 0157:H7 can be transmitted through foods inadvertently contaminated with animal fecal matter during processing or because of improper food handling. Improper handling may include contamination by infected food handlers who have not effectively washed their hands before touching the food or utensils that come into contact with the food. *E. coli 0157:H7* has been identified in undercooked or raw ground beef products, unpasteurized milk, water, juice and produce. Plant foods may become contaminated from fertilization with raw manure, irrigation with contaminated water or contamination by human contact. Outbreaks have been attributed to contaminated municipal and recreational water, and unpasteurized juices and ciders. Person to person transmission can occur as well. Outbreaks that occur at day care centers can be extensive and prolonged.

Symptoms/Complications

General symptoms of *E. coli 0157:H7* infection include severe abdominal cramps and watery diarrhea. *E. coli 0157:H7* has some potentially serious complications. Hemorrhagic colitis can occur in persons infected with *E. coli 0157:H7*, producing symptoms that include severe abdominal cramps, bloody diarrhea, vomiting and nausea. Fever may be present or absent. Symptoms of illness caused by *E. coli 0157:H7* may begin one to nine days following infection and may last two to nine days, though complications will prolong illness. A possible complication of hemorrhagic colitis is hemolytic uremic syndrome (HUS), characterized by severe anemia and renal (kidney) failure. HUS develops in approximately 2 to 7 percent of the cases where *E. coli 0157:H7* is confirmed. HUS is a leading cause of acute kidney failure in children and also poses serious risk of kidney failure for the elderly. Adults may develop HUS or thrombocytopenic purpura (TCP), an illness similar to HUS but with involvement of the central nervous system that can include strokes and seizures.

Control Measures

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Cook

While *E. coli 0157:H7* is a contaminant capable of causing severe disease, it can be effectively controlled by thorough cooking. Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least 145°F, non-ground pork to 160°F, poultry parts to 170°F and whole birds to 180°F. Using an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color. Safely cooked poultry can vary in color from white to pink to tan. Check the temperature in several locations. As soon as all parts reach at least 170°F, all the poultry meat—including any that remains pink—is safe to eat. Reheat leftovers to 165°F.

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Listeria monocytogenes

(lis-tēr´-eeya) (monō-sī´-tō-jĕnēs)

Overview

***Listeria monocytogenes* is a foodborne bacterium that enters the intestines of warm-blooded animals including some food animals, and humans, following the ingestion of contaminated food. Listeriosis, the illness caused by *Listeria monocytogenes,* is a significant public health problem in the U.S., primarily affecting pregnant women, newborns and those with weakened immune systems.**

Sources

Listeria monocytogenes bacteria are commonly found in the intestines of humans and animals, in unpasteurized milk and dairy products, soil, leafy vegetables and in food processing environments. The bacteria have been isolated in a variety of foods including raw and cooked poultry and meat, some processed deli-meats (e.g., frankfurters), seafood, salads and sandwiches. Frequent food vehicles include unpasteurized milk and dairy products (especially soft cheeses including feta, brie and blue-veined cheese like roquefort), meat patés and processed deli meats such as bologna. These bacteria can grow slowly at refrigerated temperatures.

Symptoms/Complications

Symptoms of listeriosis differ in adults and newborns. In adults, symptoms include the sudden onset of fever, chills, headache, backache and occasional abdominal pain and diarrhea. Newborns can contract listeriosis from an infected mother during pregnancy or birth. Newborn symptoms include respiratory distress, refusal to drink and vomiting. Listeriosis is potentially fatal because it is capable of producing complications including bacteremia (blood poisoning), meningitis and meningo-encephalitis, which affects tissues around the brain or spine. Listeriosis can also cause spontaneous abortions and stillbirths. Symptoms may begin anywhere from three to 70 days following infection.

Control Measures

The Partnership for Food Safety Education recommends following these four simple steps to Fight BAC!® (bacteria):

Clean

Always wash hands in hot, soapy water for 20 seconds before preparing or eating food, and after using the bathroom, changing diapers and handling pets. Wash cutting boards, counter tops, knives and utensils in hot, soapy water after they come in contact with raw meat, poultry and seafood, and before preparing other foods. Be sure to wash away all soil from vegetables by scrubbing them under clean, drinkable water.

Separate

Bacteria can spread from one food to another through cross-contamination. To decrease the risk of cross-contamination, keep raw meat, poultry and seafood—and their juices—away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

Cooking foods to proper temperatures will kill the harmful bacteria that cause foodborne illness. Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least

145°F, non-ground pork to 160°F, poultry parts to 170°F and whole birds to 180°F. Using an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color. Safely cooked poultry can vary in color from white to pink to tan. Check the temperature in several locations. As soon as all parts reach at least 170°F, all the poultry meat—including any that remains pink—is safe to eat. Reheat leftovers to 165°F.

Chill

Cold foods should be kept at or below 40°F. Refrigerate or freeze prepared food and leftovers within two hours. Never defrost food on the kitchen counter. Use the refrigerator, cold running water or the microwave. Marinate foods only in the refrigerator. With poultry and other stuffed meats, remove the stuffing and refrigerate it in a separate container. Since *Listeria monocytogenes* grow slowly at refrigerator temperatures, carefully follow "keep refrigerated," "sell by" and "use by" dates on processed foods.

Other Measures

Avoid unpasteurized milk and dairy products. Individuals with compromised immune systems and pregnant women should consult a physician regarding special food and food safety recommendations.

Resources

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Salmonella

(sal-muh-nel´-uh)

Overview

***Salmonella* bacteria, the most commonly reported cause of foodborne illness, cycle continuously through the environment via the intestinal tracts of animals and humans. There are more than 1,600 different types of *Salmonella* bacteria. The illness caused by *Salmonella* bacteria is called salmonellosis.**

Sources

Salmonella bacteria are most commonly found in raw or undercooked foods such as poultry, eggs, unpasteurized milk or other dairy products, and meats. Fruits, vegetables, yeast and chocolate have also been implicated in *Salmonella* outbreaks. Pets, usually reptiles, can also carry *Salmonella,* which may cause illness in people handling them. As with many other agents of foodborne illness, *Salmonella* also can be present in foods because of cross-contamination. Cross-contamination occurs when a raw (contaminated) food touches a cooked food or surface used to prepare or serve cooked foods. For example, cross-contamination could occur if serving tongs are used to put raw foods on a barbecue grill and are again used to remove foods when finished cooking—without washing between uses.

Symptoms/Complications

Salmonellosis has symptoms including headache, abdominal pain, diarrhea, fever, nausea and vomiting, which generally begin eight to 72 hours after eating contaminated food. The bacteria can spread from the intestine to the bloodstream, bones, joints and nervous system. The symptoms can last anywhere from one to eight days. However, not all infected individuals develop illness.

Control Measures

The Partnership for Food Safety Education recommends following these four simple steps to Fight BAC!® (bacteria):

Clean

Always wash hands in hot, soapy water for 20 seconds before preparing or eating food, and after using the bathroom, changing diapers and handling pets. Wash cutting boards, counter tops, knives and utensils in hot, soapy water after they come in contact with raw meat, poultry and seafood, and before preparing other foods. Be sure to wash away all soil from vegetables by scrubbing them under clean, drinkable water.

Separate

To decrease the risk of cross-contamination, keep raw meat, poultry and seafood—and their juices—away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

Cooking foods to proper temperatures will kill the harmful bacteria that cause foodborne illness. Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least

145°F, non-ground pork to 160°F, poultry parts to 170°F and whole birds to 180°F. Using an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color. Safely cooked poultry can vary in color from white to pink to tan. Check the temperature in several locations. As soon as all parts reach at least 170°F, all the poultry meat—including any that remains pink—is safe to eat. Reheat leftovers to 165°F.

Chill

Cold foods should be kept at or below 40°F. Refrigerate or freeze prepared food and leftovers within two hours. Never defrost food on the kitchen counter. Use the refrigerator, cold running water or the microwave. Marinate foods only in the refrigerator. With poultry and other stuffed meats, remove the stuffing and refrigerate it in a separate container. Carefully follow "keep refrigerated," "sell by" and "use by" dates.

Other Measures

Never consume unpasteurized, raw or undercooked foods of animal origin. Eggs should be purchased from refrigerated cases, kept in their original carton in the refrigerator until used and cooked thoroughly. Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations.

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Shigella

(shi-gel´-uh)

Overview

***Shigella* bacteria are generally found where unsanitary conditions prevail, and can be transmitted through improper food handling. Shigellosis, the illness caused by consuming *Shigella* bacteria, can result from ingesting contaminated foods containing a few hundred *Shigella* bacteria cells.**

Sources

Shigella bacteria are carried in the fecal matter of infected humans. This pathogen is most often transmitted through food or water contaminated by a *Shigella*-infected food handler or directly from person to person, especially among children. Because *Shigella* bacteria are effectively eliminated by cooking, the foods that usually cause infection are cold foods such as salads (e.g., tuna, chicken, potato) that may contain ingredients contaminated by the unwashed hands of an infected food handler. Foods of plant origin fertilized with raw manure, irrigated with contaminated water or contaminated by humans also may carry the bacteria, as well as shellfish coming from contaminated water.

Symptoms/Complications

Shigellosis may be characterized by a range of symptoms including severe diarrhea (sometimes bloody), abdominal pain, nausea, headaches, chills and dehydration. Some infected individuals may have no symptoms yet be transient carriers of bacteria. Symptoms typically begin one to seven days after ingestion of contaminated food. Infections are most common in children ages one to four.

Control Measures

The Partnership for Food Safety Education recommends following these four simple steps to Fight BAC!® (bacteria):

Clean

Always wash hands in hot, soapy water for 20 seconds before preparing or eating food, and after using the bathroom, changing diapers and handling pets. Caregivers for children in diapers must wash hands with hot, soapy water after every diaper check and change, and teach children to wash hands after going to the bathroom. Wash cutting boards, counter tops, knives and utensils in hot, soapy water after they come in contact with raw meat, poultry and seafood, and before preparing other foods. Be sure to wash away all soil from vegetables by scrubbing them under clean, drinkable water. Because outbreaks of illness caused by *Shigella* bacteria are most commonly caused by poor hygiene of food handlers, good hygiene and sanitary food preparation are critical in the prevention of shigellosis.

Separate

Bacteria can spread from one food to another through cross-contamination. To decrease the risk of cross-contamination, keep raw meat, poultry and seafood (especially raw shellfish) and their juices away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

Cooking foods to proper temperatures will kill the harmful bacteria that cause foodborne illness. Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least 145°F, non-ground pork to 160°F, poultry parts to 170°F and whole birds to 180°F. Using an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color. Safely cooked poultry can vary in color from white to pink to tan. Check the temperature in several locations. As soon as all parts reach at least 170°F, all the poultry meat—including any that remains pink—is safe to eat. Reheat leftovers to 165°F.

Chill

Cold foods should be kept at or below 40°F. Refrigerate or freeze prepared food and leftovers within two hours. Never defrost food on the kitchen counter. Use the refrigerator, cold running water or the microwave. Marinate foods only in the refrigerator. Carefully follow "keep refrigerated," "sell by" and "use by" dates.

Other Measures

Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations.

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Staphylococcus aureus

(staf´i-lō-kok´-es) (au´-rē-ŭs)

Overview

Staphylococcus aureus **bacteria are found in water, dust and the air, but food handlers are the main source of food contamination. At least 30% of healthy people have *Staphylococcus aureus* bacteria living in their nasal passages and on their hair and skin. Without good hygiene, these bacteria can easily end up in the foods we eat. Given the right environment, *Staphylococcus aureus* can multiply rapidly at room temperature, producing a toxin that is responsible for the condition known as staphylococcal food poisoning.**

Sources

Staphylococcus aureus bacteria can be found in processed meat products, such as ham and sausage, poultry, eggs, milk and dairy products. Foods that require a lot of handling and preparation work and reheating, such as egg, tuna, chicken, potato and macaroni salads, also are susceptible to *Staphylococcus aureus* contamination. Although food handlers are the main source of staphylococcal food poisoning, equipment and surfaces are also common contamination sites.

Symptoms/Complications

Severe nausea and vomiting, occasionally accompanied by abdominal cramps and diarrhea, can occur one to six hours after eating food contaminated with *Staphylococcus aureus* bacteria. In more severe cases, muscle cramping and blood pressure and pulse rate changes may occur.

Control Measures

The Partnership for Food Safety Education recommends following these four simple steps to Fight BAC!® (bacteria):

Clean

Always wash hands in hot, soapy water for 20 seconds before preparing or eating food, and after using the bathroom, changing diapers and handling pets. Wash cutting boards, counter tops, knives and utensils in hot, soapy water after they come in contact with raw meat, poultry and seafood, and before preparing other foods. Be sure to wash away all soil from vegetables by scrubbing them under clean, drinkable water. Since staphylococcal food poisoning has been linked to poor hygiene of people who handle food, it's very important to keep food preparation areas clean and to always practice good personal hygiene.

Separate

Bacteria can spread from one food to another through cross-contamination. To decrease the risk of cross-contamination, keep raw meat, poultry and seafood—and their juices—away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

Although cooking will easily destroy *Staphylococcus aureus* bacteria, the toxins that are produced in the food and cause illness are relatively heat stable. Therefore, the way to control *Staphylococcus* is to minimize food handling, keep food out of the danger zone (40°F to 140°F) and practice good personal hygiene.

Chill

Staphylococcus aureus grows at room temperatures, so keep foods out of the danger zone. Cold foods should be kept at or below 40°F. Prepared salads, such as egg and chicken, should also be purchased from refrigerated cases or else refrigerated promptly after preparation at home. Refrigerate or freeze prepared food and leftovers within two hours. Carefully follow "keep refrigerated," "sell by" and "use by" dates.

Other Measures

Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations.

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Yersinia enterocolitica

(yer-sin´-eeya) (en´-ter-ō-kō-lĭt´-ĭ-kuh)

Overview

***Yersinia enterocolitica* is a bacteria occasionally associated with intestinal disorders. Yersiniosis, the disease caused by *Yersinia enterocolitica,* is not a commonly reported foodborne disease in the U.S. It has been associated with septicemia, reactive arthritis, tender skin nodules, swollen lymph glands and other illnesses that occur outside the intestines.**

Sources

Yersinia enterocolitica bacteria are found in the fecal matter of livestock and domesticated and wild animals, particularly hogs. Consequently, *Yersinia enterocolitica* can be found in meats, poultry, unpasteurized milk and dairy products, seafood from sewage-contaminated waters and produce fertilized with raw manure. *Yersinia enterocolitica* strains that cause human illness are largely associated with pork and pork products. Foods also can be contaminated by food handlers who have not effectively washed their hands before handling food or utensils used to prepare food. *Yersinia enterocolitica* bacteria can grow slowly at refrigerator temperatures.

Symptoms/Complications

Symptoms of yersiniosis include abdominal pain (sometimes mimicking appendicitis), fever, diarrhea and/or bloody diarrhea and sometimes vomiting. Symptoms typically occur within one to seven days after ingestion and often last for more than a week. Young children are at greatest risk of becoming ill from yersiniosis. Though complications from yersiniosis are rare, the elderly and those with compromised immune systems who have yersiniosis may be at greater risk of reactive arthritic or anemic conditions, heart problems and, in rare cases, meningitis.

Control Measures

The Partnership for Food Safety Education recommends following these four simple steps to Fight BAC!® (bacteria):

Clean

Always wash hands in hot, soapy water for 20 seconds before preparing or eating food, and after using the bathroom, changing diapers and handling pets. Wash cutting boards, counter tops, knives and utensils in hot, soapy water after they come in contact with raw meat, poultry and seafood, and before preparing other foods. Be sure to wash away all soil from vegetables by scrubbing them under clean, drinkable water.

Separate

Bacteria can spread from one food to another through cross-contamination. To decrease the risk of cross-contamination, keep raw meat (especially pork), poultry and seafood—and their juices—away from ready-to-eat foods, such as fruits and vegetables. If possible, use one cutting board for raw meat products and another for salads and other ready-to-eat foods. Never place cooked food on a plate that previously held raw meat, poultry or seafood.

Cook

Important measures for the prevention of yersiniosis are thorough cooking and heating, and careful attention to kitchen hygiene, especially when preparing foods made with animal intestines (e.g., chitterlings). Cook ground meats (beef, pork, veal, lamb) to an internal temperature of at

least 160°F, ground poultry to 165°F, non-ground meat cuts such as roasts (beef, veal, lamb) to an internal temperature of at least 145°F, non-ground pork to 160°F, poultry parts to 170°F and whole birds to 180°F. Using an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color. Safely cooked poultry can vary in color from white to pink to tan. Check the temperature in several locations. As soon as all parts reach at least 170°F, all the poultry meat—including any that remains pink—is safe to eat. Reheat leftovers to 165°F.

Chill

Cold foods should be kept at or below 40°F. Refrigerate or freeze prepared food and leftovers within two hours. Never defrost food on the kitchen counter. Use the refrigerator, cold running water or the microwave. Marinate foods only in the refrigerator. With poultry and other stuffed meats, remove the stuffing and refrigerate it in a separate container. Carefully follow "keep refrigerated," "sell by" and "use by" dates.

Other Measures

Yersinia can grow at room temperatures, so keep foods out of the danger zone (40°F–140°F). Never drink unpasteurized milk or other dairy products. Individuals with compromised immune systems should consult a physician regarding special food and food safety recommendations.

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Intervention Processes

Overview

There are several technologies available today that are designed to remove or kill harmful bacteria during meat processing. Subjecting bacteria and microorganisms to high temperatures such as with steam or hot water reduces the potential for a meat product to carry foodborne pathogens.

Meat plants often use multiple interventions to decrease the amount of bacteria on carcasses. However, it's important to remember that these technologies are not "magic bullets"—no combination of methods can be expected to completely eliminate potentially harmful bacteria from food. Therefore it's critical for consumers to continue following safe food handling and cooking practices.

The USDA's Food Safety and Inspection Service has approved all of the following processes for use on beef carcasses:

High-Temperature Vacuuming

High-temperature vacuuming uses very hot steam or water and a hand-held vacuum to kill and remove bacteria and microorganisms. Skinned animal carcasses are sprayed with hot steam or water to kill bacteria. A hand-held vacuum then is used at specific locations or natural "hiding places" on the carcass to remove visible dirt or debris. High-temperature vacuuming results in lower bacterial counts than are possible with a trimming knife, and more than 80 percent of beef-fed cattle are slaughtered in plants using this technology.

Hot Water Pasteurization

Hot water pasteurization involves showering carcasses with 180°F water at the final point in the harvesting process. The hot water kills most microorganisms.

Steam Pasteurization

Often referred to as the "gold standard" for beef safety, steam pasteurization destroys bacteria on carcasses by exposing them to steam. During the process, carcasses pass through a steam cabinet and receive a short blast of steam—approximately 350°F. The steam effectively pasteurizes the exterior of the carcass, and more than 60 percent of beef produced is steam pasteurized.

Organic Acid Rinse

An organic acid rinse (such as acetic or lactic acid) is one of the final steps in meat processing. Surface dirt and microorganisms are removed as the carcass is rinsed or sprayed with a water and acid solution. An organic acid rinse also has a lasting antibacterial effect, and is especially effective when used following hot water or steam pasteurization.

Irradiation

What is Food Irradiation?

Food irradiation is an intervention process that exposes food to ionizing energy that destroys foodborne pathogens—bacteria that cause disease. The ionizing energy removes electrons from atoms and creates free radicals that disrupt the DNA of bacteria, molds and insects. Irradiation of meat and poultry is a safe and effective way to combat potentially harmful bacteria, such as *E. coli 0157:H7* and *Salmonella*. The technology has existed for more than 60 years and is approved as a food additive by the Food & Drug Administration.

Irradiation is often referred to as "cold pasteurization" because it works without heat. This process allows a food to be irradiated in its original packaging, remaining protected against recontamination until the package is opened for use.

Uses and Implications

Aside from killing bacteria, irradiation also has the potential to delay spoilage and extend the shelf life of certain foods. The Food & Drug Administration has approved irradiation for fruits, vegetables, wheat flour, spices, poultry and red meat. Irradiation is currently being used for some of these foods, and the USDA recently proposed a set of rules allowing the use of irradiation on USDA-regulated raw meat products.

Irradiation is not a magic bullet and is not meant to be a substitute for safe food handling practices. It's important to remember that irradiated food can be recontaminated with harmful microorganisms after packaging is opened, hence practicing safe food handling techniques is critical once the food is exposed again and ready to be prepared.

Is Irradiation Safe?

Irradiation does not pose a health risk to individuals. Some consumers have expressed a concern that irradiated foods can become radioactive, but this does not happen. Similar to microwave cooking, foods that are going to be irradiated quickly receive a low dose of radiation. The radiation waves go through the food and kill most microorganisms.

Irradiation does not significantly change a food chemically or physically. There are some chemical changes in irradiated foods, but these changes are similar to those detected in cooked foods.

Irradiated foods can be prepared just like non-irradiated foods. You will know if a food has been treated with irradiation because it will bear the international "radura" symbol (shown below) and the written statement "treated by irradiation" or "treated with radiation."

Many highly respected organizations, including the Food & Drug Administration, the U.S. Department of Agriculture, the Centers for Disease Control and Prevention, the World Health Organization, the American Medical Association and The American Dietetic Association recognize the value of irradiation. All of these organizations agree that irradiation is one way to ensure the safety of foods.

Safe Food Handling Tips

At the Grocery Store

- Pay attention to "sell by" and "use by" dates on perishable products. If the "sell by" date has expired, **do not** buy the product. The "use by" date applies to use at home after purchase. It's important to note that these dates refer to the quality of the food (taste, texture, smell, appearance) and are not a guarantee of an uncontaminated product.
- Be sure that packaging/storage is as it is intended: refrigerated foods should be kept cold; frozen foods should be frozen solid; there should be no holes or tears in the packaging.
- Choose canned goods that are free of dents, cracks, rust or bulging lids.
- When possible, put raw poultry, meat or fish in separate plastic bags before setting in your cart with other unprotected foods. Do not place them directly on top of unprotected foods. Occasionally, packaging on these products may leak, and raw juices may drip onto and contaminate other foods.
- Select perishable food products, including meat, last before checking out, and place them in the coolest spot in your car for the trip home. If food will be held in the car for longer than 30 minutes, store it in a cooler immediately after purchase to keep it cold.

Home Storage

- Immediately put perishable foods into the refrigerator or freezer upon returning home from the grocery store.
- Put uncooked meat, fish and poultry products in separate plastic bags and set on a plate on the bottom shelf of the refrigerator so raw juices do not drip onto other foods.
- Use beef steaks, roasts and deli meats and poultry within three to four days. Ground meat, ground poultry and fish should be used within one to two days. Keep in mind that ground meats are more perishable than roasts or steaks. During grinding, any bacteria that are on the surface are mixed throughout the meat, resulting in a shorter shelf life.
- Using a refrigerator thermometer, check the refrigerator's temperature often to ensure that it is cooling at 35°F to 40°F, and that the freezer is at or below 0°F.
- Space items in the refrigerator and freezer so that cold air can circulate freely around them.
- Keep the interior of the refrigerator/freezer clean. Pack perishables in coolers when cleaning or defrosting your refrigerator/freezer.

Freezing and Defrosting

- To preserve food quality, traditional plastic wraps are not suitable for long-term freezing. For longer storage, prevent "freezer burn" by rewrapping meat in moisture-proof, air-tight material such as freezing paper, food-safe plastic freezer bags or heavy-duty aluminum foil. Wrap raw meat, fish and poultry carefully to protect other foods from juices that may leak.
- To thaw meat, fish and poultry safely, take it out of the freezer and place it on a tray (to catch any juices) on the bottom shelf of the refrigerator the day before needed; let it thaw overnight. A one-inch steak will defrost in 12 to 14 hours. Allow four to seven hours per pound to defrost a large roast and three to five hours per pound for a small roast. A one-inch-thick package of ground beef will defrost in 24 hours. For quick thawing, use the microwave oven according to the manufacturer's directions and then cook defrosted food **immediately**.
- Never defrost meat, poultry or fish on the kitchen counter or in warm water. Use the refrigerator, cold running water or the microwave. Bacteria multiply rapidly at temperatures between 40°F and 140°F.

Food Preparation

- Keep everything that touches food clean—hands, utensils, bowls, counter tops. Wash hands with hot, soapy water for 20 seconds prior to preparing any food, and after handling raw meat, poultry and fish. Use separate platters, cutting boards, trays and utensils for cooked and uncooked meat, poultry and fish.
- Keep juices from raw meat, poultry and fish from coming into contact with other foods, cooked or raw. Always wash contact surfaces and utensils with hot, soapy water immediately after preparing these products.

Safe Food Handling Tips

- When using a cutting board, it is best to use separate boards for each food type. Never use the same cutting board for raw meat or poultry that is used for cooked and ready-to-eat foods. Wash food preparation surfaces thoroughly with hot, soapy water and then sanitize the surface after each use. To sanitize cutting surfaces, wash with a solution of two to three teaspoons of household bleach in one quart of hot water. Rinse with clean, hot water and let air dry. Some cutting boards can also be cleaned in the dishwasher.

- **Never** eat raw seafood, meat, poultry or eggs (or foods containing raw eggs such as homemade salad dressing/mayonnaise, ice cream or cookie dough). Never drink unpasteurized milk or eat other unpasteurized dairy products.

- Never sneeze or cough directly on food; cover mouth and nose with a tissue when sneezing or coughing and wash hands immediately.

- Thoroughly wash all produce with clean, drinkable water.

- When marinating meat, seafood or poultry, use a covered, non-metallic container or food-safe plastic bag, and place it in the refrigerator on the bottom shelf. Ingredients in marinades such as wine, vinegar and lemon juice are acidic and will cause a chemical reaction with some metals. When this happens, the metal may leach into the food being marinated and may create a toxic condition.

- Avoid mixing dark-colored sauces (such as teriyaki, worcestershire or soy sauces) in with ground meat or poultry, as they make it more difficult to judge doneness. Instead, brush sauces on the cooked surface of the patty about midway through the cooking cycle. Be careful not to recontaminate fully cooked meat or poultry by adding sauce with a brush that was used on raw or undercooked foods.

- Always marinate uncooked meat, poultry or fish in the refrigerator, never at room temperature. If a marinade is to be used for basting or as a sauce on cooked products, reserve a portion of it before adding the meat or fish to ensure there is no cross-contamination.

Cooking

- Cook ground meats thoroughly, to an internal temperature of at least 160°F. Ground poultry should be cooked to at least 165°F. Never eat raw or undercooked ground meat or poultry.

- The use of an instant-read thermometer is the best way to determine doneness in ground meats and poultry. If an instant-read thermometer is not available, cook ground beef until the center is no longer pink and the juices show no pink color.

- To assure the desired degree of doneness, use a meat thermometer when cooking roasts, steaks and poultry, placing the thermometer in the thickest portion of the meat, not touching bone or fat.

- Cook roasts 5°F to 10°F below the following recommended internal temperatures for doneness of meats: medium rare (145°F), medium (160°F) and well done (170°F). Roast temperatures rise approximately 5°F to 10°F during standing time (allow 10 to 15 minutes). Poultry parts should be cooked to a minimum of 170°F, whole birds to 180°F and pork to 160°F.

- Avoid very low oven temperature roasting methods (below 325°F) and long or overnight cooking of meats, which may encourage bacterial growth before cooking is complete. Do not use brown paper bags for roasting—they may not be sanitary and can be a fire hazard.

- Cook stuffing for turkey or chicken separately from the poultry instead of in the cavity of the bird.

- Don't interrupt cooking by partially cooking food and then finishing later. Partially cooked food may not reach a temperature sufficient to destroy bacteria and may even encourage bacterial growth.

- When basting or applying a sauce during grilling or broiling, brush the sauce on cooked surfaces only. Be careful not to recontaminate fully cooked meat or poultry by adding sauce with a brush previously used on raw or undercooked foods.

Safe Food Handling Tips

Serving

- Do not leave cooked meat or other perishable foods out at room temperature for longer than two hours.
- When serving from a buffet, keep cold foods on ice at a temperature at or below 40°F, and keep hot foods at an internal temperature of at least 140°F. When replenishing the buffet, do not mix fresh food with food that has already been out for serving.
- Always marinate uncooked meat, poultry or fish in the refrigerator, never at room temperature. If a marinade is to be used for basting or as a sauce on cooked products, reserve a portion of it before adding the meat or fish to ensure there is no cross-contamination. If a marinade that has been in contact with raw meat, poultry or fish is to be served as a sauce, bring it to a full rolling boil and boil covered for at least one minute before serving. Never save and reuse a marinade.
- Use separate plates, platters or trays for holding raw and cooked meat, fish and poultry. Utensils and knives should be washed with hot, soapy water in between contact with raw and cooked foods.

Leftovers

- Freeze or refrigerate leftovers immediately. For more rapid cooling, use small, shallow containers (less than two inches deep) to freeze or refrigerate leftovers. Cut large portions into smaller portions to speed cooling time. Leftover meat, fish and poultry should be wrapped securely before refrigeration and eaten within three to four days.
- When reheating leftover foods in a microwave oven, heat to at least 165°F. Food should be hot to the touch and steaming before it's served. Covering foods with a glass lid, microwave-safe plastic or waxed paper will hold in moisture and provide safe, even heating. Due to the possibility of uneven heating, microwaving baby food and infant formula is not recommended because hot spots in the food could burn the baby's mouth. If microwaved, make sure to stir food, shake bottles and taste-test them yourself for lukewarm temperatures.
- Sauces and gravies should be reheated to a rolling boil for at least one minute before serving.
- Never taste leftover food that looks or smells strange. When in doubt, throw it out.

Away-From-Home Situations

Day Care

- Check to be sure that day care center employees practice appropriate sanitation and food handling. Parents and other care providers should teach children to wash hands with hot, soapy water after going to the bathroom and before touching or eating food. It is critical for child care providers and parents to remember to wash hands with hot, soapy water after every diaper change or check.

Leisure/Picnic

- Pack chilled foods (at or below 40°F) in a cooler with ice or ice packs. This is particularly important if you do not plan to eat for several hours. When finished serving cold foods, promptly return them to the cooler. If you are taking meat, poultry or fish to grill while picnicking, pack these items carefully in the bottom of the cooler to avoid leakage onto other foods. If washing facilities are not available, take along moistened towelettes to wash up with after handling the uncooked meat, poultry or fish, or use a bottle filled with clean water and soap to wash hands and surfaces.

Restaurants/Fast-Food Restaurants

- Make sure meat, fish and poultry are cooked thoroughly (see "Cooking" section).
- Be sure that burgers are served hot and cooked until the center is no longer pink and the juices show no pink color.
- At buffets and salad bars, check for a clean, sanitary appearance of serving containers, counter tops and utensils.

Work

- Carry lunch in an insulated container with a freezer-pack or include a frozen juice box or small plastic bottle of frozen water. Keep lunch out of direct sunlight.

Questions and Answers

Questions and Answers About Foodborne Illnesses and Safe Food Handling Tips

Q1: Why do people get sick from the foods they eat?

A1: Raw food products can be contaminated with microorganisms that can make people ill. Especially at risk are the very young, the elderly and those whose immune systems have been weakened due to illnesses such as HIV or cancer. Although most of these hazards can be controlled by safe food handling and cooking procedures, the occurrence of foodborne illnesses tells us that risk reduction, at every step from farm to table, is very important.

Q2: What is the government doing to improve the safety of our food supply?

A2: Though we have one of the safest food supplies in the world, there will always be risks of contamination, and efforts are under way to reduce those risks even further. In 1997, the President's Food Safety Initiative was created to promote food safety education, improve food safety inspections, develop effective interventions and improve responses to foodborne outbreaks. One part of the initiative is the implementation of HACCP or Hazard Analysis Critical Control Point. HACCP is a prevention-oriented inspection system that can significantly reduce the amount of bacteria in food and water, including meat and poultry products. An intervention process that is effective in reducing foodborne pathogens is irradiation. During irradiation, food is exposed to waves of energy that destroy harmful bacteria. Irradiation is a safe process, and it has been approved by the FDA for use on fruits, vegetables, spices, pork, poultry and red meat.

Q3: I work on a ranch with a variety of livestock and other animals. Can I get a foodborne illness from a live animal?

A3: Yes, many of the bacteria that cause foodborne illnesses are carried by animals (some of them are also carried by humans). It's imperative to always wash hands with hot, soapy water for 20 seconds after you have contact with animals (even your pets) and before you handle food at any time.

Q4: My child is in day care five days each week. How can I help protect him from foodborne illnesses when I'm not there?

A4: Make sure that the people who run the day care center practice appropriate personal hygiene sanitation and food handling techniques. You and the care providers should teach children to wash hands with hot, soapy water before and after going to the bathroom. It's critical for child care providers and parents to remember to wash hands thoroughly after every diaper check and change. Ingestion of foods or beverages is not required to spread diseases.

Questions and Answers

Q5: I send brown-bag lunches with my kids to school every day. Is there a risk of a foodborne illness from leaving their lunches unrefrigerated in their lockers for four hours before lunchtime?

A5: There is a risk any time perishable food is left at room temperature for more than two hours. To reduce the risk, freeze something to be included with the lunch such as a juice box or a small plastic container of water, which will help keep the food cool until lunchtime. A small refreezable ice pack, like those used in coolers, is also useful.

Q6: When my family goes on a picnic, I pack a cold picnic lunch, but we usually don't eat for several hours. Are there precautions I should take to prevent foodborne illness?

A6: Pack food in a cooler with ice or ice packs. Only pack foods that have been chilled to a temperature at or below 40°F — do not use the cooler to chill room temperature foods. When finished serving cold foods, promptly return them to the cooler. If you plan to cook meat, poultry or fish on a grill while picnicking, pack these foods carefully to prevent leakage, and take along moistened towelettes to wash up with after handling the raw foods. A spray bottle filled with clean water and soap is another alternative—this works well for hands as well as surfaces.

Q7: When preparing food at home, should I use a plastic or wood cutting board?

A7: Choose plastic cutting boards and use separate boards for raw and cooked foods. Make sure to clean and sanitize after each use. To sanitize cutting boards, wash with hot, soapy water, and then wash again with a solution of two to three teaspoons of household bleach in one quart of warm water. Rinse with plain, hot water.

Q8: I'm serving a buffet dinner that will be out for several hours at an upcoming party in my home. What precautions should I take to make sure my guests are safe from foodborne illnesses?

A8: Keep the hot foods hot and the cold foods cold. Use chafing dishes or other heated servers that keep already hot foods at a temperature of at least 140°F. Do not leave foods out for longer than two hours. Make sure to stir the food frequently if the heating source does not cover the entire bottom of the dish. Cold foods should be set on ice and kept below 40°F. Never mix fresh food with foods that have already been out for serving.

Q9: My mother used to leave meat out on the counter to defrost during the day—does this increase the risk of foodborne illnesses?

A9: Absolutely. Most foodborne pathogens grow well at room temperature. Never allow foods to defrost at room temperature or in warm water. Instead, to thaw a food safely, place it on a tray (to catch any juices) and transfer it to the refrigerator the day before needed; let it thaw overnight. An alternative method for thawing is in a microwave oven. However, if thawing is done in a microwave oven, the thawed food must be cooked **immediately** afterward.

Q10: Is my slow cooker safe to prepare food in? It seems like it cooks at very low temperatures.

A10: Yes, you can safely prepare foods in a slow cooker. Use small pieces of thawed meat and choose a recipe that contains a liquid. For best results, fill the slow cooker at least half full, but never more than three-fourths full. Bring foods to a boil and then simmer with the lid on at 160°F for longer cooking. Make sure to use a thermometer to check the internal temperature—it should be at least 160°F. Keep in mind that cooking times are guidelines and that each slow cooker varies. Follow recipes to determine whether to cook on low or high setting. Try not to remove the lid during cooking as this will result in heat loss. Lift the lid only when it's time to check for doneness or if stirring is recommended. Do not reheat foods in the slow cooker.

Q11: My kids love to eat raw cookie dough when I bake cookies. Is this safe?

A11: If your cookie dough contains raw eggs there is a risk involved. Other high-risk foods are traditional Caesar salad (the dressing is made with raw

Questions and Answers

eggs) or anything made with homemade mayonnaise or soft poached eggs. If you make homemade mayonnaise, ice cream or other recipes requiring eggs that will not be cooked, use pasteurized eggs. Commercially prepared dressings and mayonnaise, commercially prepared cookie dough and "cookie dough" ice cream all use pasteurized eggs.

Q12: I love steak tartare and carpaccio. Isn't it okay to eat them just once in a while?

A12: Do not eat raw or undercooked eggs, meats or seafood. Avoiding these foods will reduce risk of foodborne illness. Steak tartare poses a significant risk because it contains raw ground beef and raw eggs. Carpaccio, thin-sliced raw beef, also presents a risk.

Q13: My neighbor will leave still-warm leftovers on the counter for hours rather than "warming up her refrigerator." She says this is okay because she covers them with plastic wrap. Is it?

A13: Leftovers should **never** be left at room temperature for more than two hours. They should be refrigerated within two hours. Though the plastic wrap may prevent contact with other food and bacteria, it will not prevent growth of bacteria already in or on the food.

Q14: Can I still eat rare beef?

A14: Cooked steaks, roasts and other cuts of beef offer a much lower risk of carrying foodborne pathogens, since the bacteria exist on the outside and are destroyed in the cooking process. Ground beef is risky to eat rare because surface bacteria are transferred to the interior of the meat during grinding, giving them a much greater surface area on which to grow. Cook steaks, roasts and other cuts of beef to an internal temperature of at least 145°F, and cook ground beef to an internal temperature of at least 160°F.

Q15: What causes mold? If a food has mold on it, is it unsafe to eat?

A15: Mold is another type of microorganism that grows during spoilage. Foods with mold on them should be thrown out. Although most molds affect the quality of the food, some can produce harmful toxins.

Q16: If a food has an unusual smell and I suspect there's something wrong with it, what should I do?

A16: When in doubt, throw it out! The food is likely spoiled, and it's not worth the risk of becoming ill. On the other hand, just because a food does not smell does not mean that it's safe to eat. Be safe and dispose of any suspected food.

Q17: Isn't it the government's responsibility to make sure there are no bacteria on my food?

A17: Bacteria are everywhere—on every surface that isn't sterile—in our homes, in our bodies, in animals' bodies. Even if the government were able to eliminate bacteria on products as you buy them at the store, the foods may come in contact with bacteria during handling or serving in your own home. Safe handling, cooking and serving practices are paramount in preventing foodborne illness.

Q18: What should I do if I suspect I have a foodborne illness?

A18: First, if possible, preserve the suspect food, marking it with a warning label to make sure no one else eats it. Second, call or see a medical professional. If the suspect food was served at a large gathering (in a restaurant or employee cafeteria) or is a commercial product or was prepared by a grocery store, contact your local health department to report the incident. If vomiting or diarrhea are symptoms, drink lots of fluids to prevent dehydration. Physicians and laboratories have a responsibility to contact the health department for diagnoses of some foodborne illnesses. However, most foodborne illness is not diagnosed—symptoms are treated to alleviate discomfort. Keep in mind that not all nausea, vomiting and diarrhea are due to food or water contamination, but if food is the suspected source of illness, be sure to advise a physician.

Resources

For further information, contact:

The American Dietetic Association
Consumer Nutrition Hotline
(800) 366-1655
(recorded messages, fact sheets and referrals to dietitians)
http://www.eatright.org

Centers for Disease Control and Prevention
Foodborne Illness Line
24-hour recorded information
(888) 232-3228
http://www.cdc.gov

FDA Center for Food Safety and Applied Nutrition
Food Safety Line
24-hour recorded information
(800) 332-4010
http://vm.cfsan.fda.gov

National Cattlemen's Beef Association
http://www.beef.org

National Food Safety Database
http://www.foodsafety.org

National Restaurant Association
http://www.restaurant.org

National Restaurant Association Educational Foundation
http://www.edfound.org

Partnership for Food Safety Education
Fight BAC!®
http://www.fightbac.org

USDA Meat and Poultry Hotline
Mon – Fri, 10am – 4pm ET
(800) 535-4555
http://www.fsis.usda.gov
http://www.foodsafety.gov

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