



Major Foodborne Illnesses Caused by Bacteria

Most Important Prevention Measure		Illness	Controlling time and temperature	Preventing cross-contamination	Practicing personal hygiene	Purchasing from approved, reputable suppliers	
Bacteria Characteristics	Commonly Linked Food						
		<i>Bacillus cereus</i> gastroenteritis					
		Listeriosis					
		Hemorrhagic colitis					
		<i>Clostridium perfringens</i> gastroenteritis					
		Botulism					
		Salmonellosis					
		Shigellosis					
		Staphylococcal gastroenteritis					
		<i>Vibrio vulnificus</i> primary septicemia/gastroenteritis					
Bacteria Characteristics	Commonly Linked Food	Poultry					
		Eggs					
		Meat	•	•	•	•	
		Fish					
		Shellfish					•
		Ready-to-eat food		•			•
		Produce	•		•	•	•
		Rice/grains	•				
		Milk/dairy products	•	•		•	
		Contaminated water					•
	Most Common Symptoms	Diarrhea	•		•	•	•
		Abdominal pain/cramps			•	•	•
		Nausea	•				•
		Vomiting	•			•	•
		Fever				•	•
		Headache					
	Prevention Measures	Handwashing				•	•
		Cooking	•	•	•	•	•
		Holding	•			•	•
		Cooling	•			•	•
		Reheating				•	•
		Approved suppliers			•		•
		Excluding foodhandlers			•		•
	Preventing cross-contamination		•	•	•		

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Most Important Prevention Measure: Controlling time and temperature

Illness *Bacillus cereus gastroenteritis* (ba-SIL-us SEER-ee-us GAS-tro-EN-ter-I-tiss)

Bacteria *Bacillus cereus*



Bacillus cereus is a spore-forming bacteria found in soil. The bacteria can produce two different toxins when allowed to grow to high levels. The toxins cause different illnesses.

Food Commonly Linked with the Bacteria

Diarrhea illness

- Cooked vegetables
- Meat products
- Milk

Vomiting illness

- Cooked rice dishes, including fried rice and rice pudding

Most Common Symptoms

Diarrhea illness

- Watery diarrhea
- No vomiting

Vomiting illness

- Nausea
- Vomiting

Other Prevention Measures

- Cook food to minimum internal temperatures.
 - Hold food at the right temperatures.
 - Cool food correctly.
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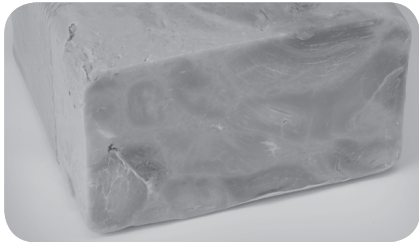
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Most Important Prevention Measure: Controlling time and temperature

Illness **Listeriosis** (*liss-TEER-ee-O-sis*)

Bacteria **Listeria monocytogenes** (*liss-TEER-ee-uh MON-o-SI-TAHJ-uh-nee-z*)



Listeria monocytogenes is found in soil, water, and plants. Unlike other bacteria, it grows in cool, moist environments. The illness is uncommon in healthy people, but high-risk populations are especially vulnerable—particularly pregnant women.

Food Commonly Linked with the Bacteria

- Raw meat
- Unpasteurized dairy products
- Ready-to-eat food, such as deli meat, hot dogs, and soft cheeses

Most Common Symptoms

- Pregnant women
- Miscarriage
- Newborns
- Sepsis
 - Pneumonia
 - Meningitis

Other Prevention Measures

- Throw out any product that has passed its use-by or expiration date.
 - Cook raw meat to minimum internal temperatures.
 - Prevent cross-contamination between raw or undercooked food and ready-to-eat food.
 - Avoid using unpasteurized dairy products.
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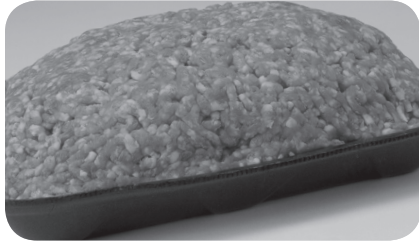
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Most Important Prevention Measure: Controlling time and temperature

Illness Hemorrhagic colitis (*hem-or-RA-jik ko-LI-tiss*)
Bacteria Shiga toxin-producing *Escherichia coli* (*ess-chur-EE-kee-UH KO-LI*), including O157:H7, O26:H11, O111:H8, and O158:NM



Shiga toxin-producing *E. coli* can be found in the intestines of cattle. It can contaminate meat during slaughtering. Eating only a small amount of shiga toxin-producing *E. coli* can make a person sick. Once eaten, it produces toxins in the intestines, which cause the illness. The bacteria are often in a person's feces for weeks after symptoms have ended.

Food Commonly Linked with the Bacteria

- Ground beef (raw and undercooked)
- Contaminated produce

Most Common Symptoms

- Diarrhea (eventually becomes bloody)
- Abdominal cramps
- Kidney failure (in severe cases)

Other Prevention Measures

- Cook food, especially ground beef, to minimum internal temperatures.
 - Purchase produce from approved, reputable suppliers.
 - Prevent cross-contamination between raw meat and ready-to-eat food.
 - Keep employees with diarrhea out of the operation.
 - Keep employees who have been diagnosed with hemorrhagic colitis out of the operation.
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Most Important Prevention Measure: Controlling time and temperature

Illness *Clostridium perfringens gastroenteritis* (klos-TRID-ee-um per-FRIN-jins GAS-tro-EN-ter-I-tiss)

Bacteria *Clostridium perfringens*



Clostridium perfringens is found in soil, where it forms spores that allow it to survive. It is also carried in the intestines of both animals and humans.

Clostridium perfringens does not grow at refrigeration temperatures, but it grows very rapidly in food in the temperature danger zone. Commercially prepared food is not often involved in outbreaks. People who get sick usually do not have nausea, fever, or vomiting.

Food Commonly Linked with the Bacteria

- Meat
- Poultry
- Dishes made with meat and poultry, such as stews and gravies

Most Common Symptoms

- Diarrhea
- Severe abdominal pain

Other Prevention Measures

- Cool and reheat food correctly.
 - Hold food at the right temperatures.
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Most Important Prevention Measure: Controlling time and temperature

Illness **Botulism** (*BOT-chew-liz-um*)

Bacteria ***Clostridium botulinum*** (*klos-TRID-ee-um BOT-chew-LINE-um*)



Clostridium botulinum forms spores that are commonly found in water and soil. These spores can contaminate almost any food. The bacteria do not grow well in refrigerated or highly acidic food or in food with low moisture. However, *Clostridium botulinum* grows without oxygen and can produce a deadly toxin when food is time-temperature abused. Without medical treatment, death is likely.

Food Commonly Linked with the Bacteria

- Incorrectly canned food
- Reduced oxygen packaged (ROP) food
- Temperature-abused vegetables, such as baked potatoes
- Untreated garlic-and-oil mixtures

Most Common Symptoms

Initially

- Nausea and vomiting

Later

- Weakness
- Double vision
- Difficulty in speaking and swallowing

Other Prevention Measures

- Hold, cool, and reheat food correctly.
 - Inspect canned food for damage.
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Most Important Prevention Measure: Preventing cross-contamination

Illness **Salmonellosis** (*SAL-men-uh-LO-sis*)

Bacteria **Salmonella spp.** (*SAL-me-NEL-uh*)



Many farm animals carry *Salmonella* spp. naturally. Eating only a small amount of these bacteria can make a person sick. How severe symptoms are depends on the health of the person and the amount of bacteria eaten. The bacteria are often in a person's feces for weeks after symptoms have ended.

Food Commonly Linked with the Bacteria

- Poultry and eggs
- Dairy products
- Produce

Most Common Symptoms

- Diarrhea
- Abdominal cramps
- Vomiting
- Fever

Other Prevention Measures

- Cook poultry and eggs to minimum internal temperatures.
 - Prevent cross-contamination between poultry and ready-to-eat food.
 - Keep foodhandlers who have been diagnosed with salmonellosis out of the operation.
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Most Important Prevention Measure: Practicing personal hygiene

Illness **Shigellosis** (*SHIG-uh-LO-sis*)

Bacteria ***Shigella* spp.** (*shi-GEL-uh*)



Shigella spp. is found in the feces of humans with shigellosis. Most illnesses occur when people eat contaminated food or water. Flies can also transfer the bacteria from feces to food. Eating only a small amount of these bacteria can make a person sick. High levels of the bacteria are often in a person's feces for weeks after symptoms have ended.

Food Commonly Linked with the Bacteria

- Food that is easily contaminated by hands, such as salads containing TCS food (potato, tuna, shrimp, macaroni, and chicken)
- Food that has made contact with contaminated water, such as produce

Most Common Symptoms

- Bloody diarrhea
- Abdominal pain and cramps
- Fever (occasionally)

Other Prevention Measures

- Keep foodhandlers who have diarrhea out of the operation.
 - Keep foodhandlers who have been diagnosed with shigellosis out of the operation.
 - Wash hands.
 - Control flies inside and outside the operation.
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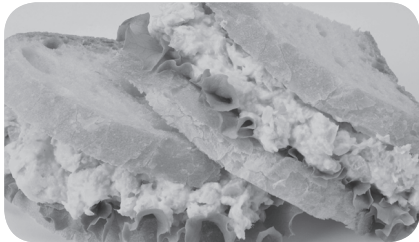




Most Important Prevention Measure: Practicing personal hygiene

Illness **Staphylococcal gastroenteritis** (*STAF-ul-lo-KOK-al GAS-tro-EN-ter-l-tiss*)

Bacteria **Staphylococcus aureus** (*STAF-uh-lo-KOK-us OR-ee-us*)



Staphylococcus aureus can be found in humans—particularly in the hair, nose, throat, and infected wounds. It is often transferred to food when people carrying it touch these areas on their bodies and then handle food without washing their hands. If allowed to grow to large numbers in food, the bacteria can produce toxins that cause the illness when eaten. Because cooking cannot destroy these toxins, preventing bacterial growth is critical.

Food Commonly Linked with the Bacteria

Food that requires handling during preparation, including:

- Salads containing TCS food (egg, tuna, chicken, and macaroni)
- Deli meat

Most Common Symptoms

- Nausea
- Vomiting and retching
- Abdominal cramps

Other Prevention Measures

- Wash hands, particularly after touching the hair, face, or body.
 - Cover wounds on hands and arms.
 - Hold, cool, and reheat food correctly.
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Most Important Prevention Measure: Purchasing from approved, reputable suppliers

Illnesses *Vibrio gastroenteritis* (VIB-ree-o GAS-tro-EN-ter-I-tiss)

Vibrio vulnificus primary septicemia (VIB-ree-o vul-NIF-ih-kus SEP-ti-SEE-mee-uh)

Bacteria *Vibrio vulnificus* and *Vibrio parahaemolyticus* (VIB-ree-o PAIR-uh-HEE-mo-lit-ih-kus)



These bacteria are found in the waters where shellfish are harvested. They can grow very rapidly at temperatures in the middle of the temperature danger zone. People with chronic illnesses (such as diabetes or cirrhosis) who become sick from these bacteria may get primary septicemia, a severe illness that can lead to death.

Food Commonly Linked with the Bacteria

- Oysters from contaminated water

Most Common Symptoms

- Diarrhea
- Abdominal cramps and nausea
- Vomiting
- Low-grade fever and chills

Other Prevention Measures

- Cook oysters to minimum internal temperatures.
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