



# Foodborne Illness-Causing Organisms in the U.S. WHAT YOU NEED TO KNOW

While the American food supply is among the safest in the world, the Federal government estimates that there are about 48 million cases of foodborne illness annually—the equivalent of sickening 1 in 6 Americans each year. And each year these illnesses result in an estimated 128,000 hospitalizations and 3,000 deaths.

The chart below includes foodborne disease-causing organisms that frequently cause illness in the United States. As the chart shows, the threats are numerous and varied, with symptoms ranging from relatively mild discomfort to very serious, life-threatening illness. While the very young, the elderly, and persons with weakened immune systems are at greatest risk of serious consequences from most foodborne illnesses, some of the organisms shown below pose grave threats to all persons.

ORGANISM	COMMON NAME OF ILLNESS	ONSET TIME AFTER INGESTING	SIGNS & SYMPTOMS	DURATION	FOOD SOURCES
<i>Bacillus cereus</i>	<i>B. cereus</i> food poisoning	10-16 hrs	Abdominal cramps, watery diarrhea, nausea	24-48 hours	Meats, stews, gravies, vanilla sauce
<i>Campylobacter jejuni</i>	Campylobacteriosis	2-5 days	Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody	2-10 days	Raw and undercooked poultry, unpasteurized milk, contaminated water
<i>Clostridium botulinum</i>	Botulism	12-72 hours	Vomiting, diarrhea, blurred vision, double vision, difficulty in swallowing, muscle weakness. Can result in respiratory failure and death	Variable	Improperly canned foods, especially home-canned vegetables, fermented fish, baked potatoes in aluminum foil
<i>Clostridium perfringens</i>	Perfringens food poisoning	8-16 hours	Intense abdominal cramps, watery diarrhea	Usually 24 hours	Meats, poultry, gravy, dried or precooked foods, time and/or temperature-abused foods
<i>Cryptosporidium</i>	Intestinal cryptosporidiosis	2-10 days	Diarrhea (usually watery), stomach cramps, upset stomach, slight fever	May be remitting and relapsing over weeks to months	Uncooked food or food contaminated by an ill food handler after cooking, contaminated drinking water
<i>Cyclospora cayatanensis</i>	Cyclosporiasis	1-14 days, usually at least 1 week	Diarrhea (usually watery), loss of appetite, substantial loss of weight, stomach cramps, nausea, vomiting, fatigue	May be remitting and relapsing over weeks to months	Various types of fresh produce (imported berries, lettuce, basil)
<i>E. coli (Escherichia coli) producing toxin</i>	<i>E. coli</i> infection (common cause of "travelers' diarrhea")	1-3 days	Watery diarrhea, abdominal cramps, some vomiting	3-7 or more days	Water or food contaminated with human feces
<i>E. coli O157:H7</i>	Hemorrhagic colitis or <i>E. coli</i> O157:H7 infection	1-8 days	Severe (often bloody) diarrhea, abdominal pain and vomiting. Usually, little or no fever is present. More common in children 4 years or younger. Can lead to kidney failure	5-10 days	Undercooked beef (especially hamburger), unpasteurized milk and juice, raw fruits and vegetables (e.g. sprouts), and contaminated water
Hepatitis A	Hepatitis	28 days average (15-50 days)	Diarrhea, dark urine, jaundice, and flu-like symptoms, i.e., fever, headache, nausea, and abdominal pain	Variable, 2 weeks-3 months	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler; shellfish from contaminated waters
<i>Listeria monocytogenes</i>	Listeriosis	9-48 hrs for gastro-intestinal symptoms, 2-6 weeks for invasive disease	Fever, muscle aches, and nausea or diarrhea. Pregnant women may have mild flu-like illness, and infection can lead to premature delivery or stillbirth. The elderly or immunocompromised patients may develop bacteremia or meningitis	Variable	Unpasteurized milk, soft cheeses made with unpasteurized milk, ready-to-eat deli meats
Noroviruses	Variously called viral gastroenteritis, winter diarrhea, acute non-bacterial gastroenteritis, food poisoning, and food infection	12-48 hrs	Nausea, vomiting, abdominal cramping, diarrhea, fever, headache. Diarrhea is more prevalent in adults, vomiting more common in children	12-60 hrs	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler; shellfish from contaminated waters
<i>Salmonella</i>	Salmonellosis	6-48 hours	Diarrhea, fever, abdominal cramps, vomiting	4-7 days	Eggs, poultry, meat, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables
<i>Shigella</i>	Shigellosis or Bacillary dysentery	4-7 days	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus	24-48 hrs	Raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with an infected food handler
<i>Staphylococcus aureus</i>	Staphylococcal food poisoning	1-6 hours	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present	24-48 hours	Unrefrigerated or improperly refrigerated meats, potato and egg salads, cream pastries
<i>Vibrio parahaemolyticus</i>	<i>V. parahaemolyticus</i> infection	4-96 hours	Watery (occasionally bloody) diarrhea, abdominal cramps, nausea, vomiting, fever	2-5 days	Undercooked or raw seafood, such as shellfish
<i>Vibrio vulnificus</i>	<i>V. vulnificus</i> infection	1-7 days	Vomiting, diarrhea, abdominal pain, bloodborne infection. Fever, bleeding within the skin, ulcers requiring surgical removal. Can be fatal to persons with liver disease or weakened immune systems	2-8 days	Undercooked or raw seafood, such as shellfish (especially oysters)

# Listeria

*Listeria* is the name of a bacteria found in soil and water and some animals, including poultry and cattle. It can be present in raw milk and foods made from raw milk. It can also live in food processing plants and contaminate a variety of processed meats.

*Listeria* is unlike many other germs because it can grow even in the cold temperature of the refrigerator. *Listeria* is killed by cooking and pasteurization.



Sources	<ul style="list-style-type: none"> <li>• Ready-to-eat deli meats and hot dogs</li> <li>• Refrigerated pâtés or meat spreads</li> <li>• Unpasteurized (raw) milk and dairy products</li> <li>• Soft cheese made with unpasteurized milk, such as queso fresco, Feta, Brie, Camembert</li> <li>• Refrigerated smoked seafood</li> <li>• Raw sprouts</li> </ul>
Incubation Period	3-70 days
Symptoms	Fever, stiff neck, confusion, weakness, vomiting, sometimes preceded by diarrhea
Duration of Illness	Days to weeks
Who's at Risk?	<ul style="list-style-type: none"> <li>• Older adults</li> <li>• Pregnant women</li> <li>• People with weakened immune systems</li> <li>• Organ transplant patients who are receiving drugs to prevent the body from rejecting the organ</li> <li>• People with certain diseases, such as:             <ul style="list-style-type: none"> <li>◦ HIV/AIDS or other autoimmune diseases</li> <li>◦ Cancer</li> <li>◦ End-stage renal disease</li> <li>◦ Liver disease</li> <li>◦ Alcoholism</li> <li>◦ Diabetes</li> </ul> </li> </ul>
What Do I Do?	If you are very ill with fever or stiff neck, consult your doctor immediately. Antibiotics given promptly can cure the infection and, in pregnant women, can prevent infection of the fetus.
How Do I Prevent It?	<ul style="list-style-type: none"> <li>• Do not drink raw (unpasteurized) milk, and do not eat foods that have unpasteurized milk in them.</li> <li>• Wash hands, knives, countertops, and cutting boards after handling and preparing uncooked foods.</li> <li>• Rinse raw produce thoroughly under running tap water before eating.</li> <li>• Keep uncooked meats, poultry, and seafood separate from vegetables, fruits, cooked foods, and ready-to-eat foods.</li> <li>• Thoroughly cook raw food from animal sources, such as meat, poultry, or seafood to a safe internal temperature.</li> <li>• Wash hands, knives, countertops, and cutting boards after handling and preparing uncooked foods.</li> <li>• Consume perishable and ready-to-eat foods as soon as possible.</li> <li>• Persons in higher risk groups should heat hot dogs, cold cuts, and deli meats before eating them.</li> </ul>

## At Risk Populations

Listeriosis, an infection caused by *Listeria*, can pose major risks for certain populations. Namely, pregnant women, older adults, and individuals with weakened immune systems are at greater risk.

# Clostridium perfringens

*Clostridium perfringens* (*C. perfringens*) is one of the most common causes of food poisoning in the United States. According to some estimates, this type of bacteria causes nearly a million illnesses each year.



Cooking kills the growing *C. perfringens* cells that cause food poisoning, but not necessarily the spores that can grow into new cells. If cooked food is not promptly served or refrigerated, the spores can grow and produce new cells. These bacteria thrive between 40-140°F (the "Danger Zone"). This means that they grow quickly at room temperature, but they cannot grow at refrigerator or freezer temperatures.

*C. perfringens* infections often occur when foods are prepared in large quantities and are then kept warm for a long time before serving. That's why outbreaks of these infections are usually linked to institutions (such as hospitals, school cafeterias, prisons, and nursing homes) or events with catered food.

<b>Sources</b>	<ul style="list-style-type: none"><li>• Beef</li><li>• Poultry</li><li>• Gravies</li></ul>
<b>Incubation Period</b>	6-24 hours
<b>Symptoms</b>	Diarrhea and abdominal cramps (not fever or vomiting)
<b>Duration of Illness</b>	24 hours or less In severe cases, symptoms may last for 1-2 weeks.
<b>Who's at Risk?</b>	<ul style="list-style-type: none"><li>• Older adults</li><li>• Infants and young children</li></ul>
<b>What Do I Do?</b>	Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration, call your doctor.
<b>How Do I Prevent It?</b>	<ul style="list-style-type: none"><li>• Thoroughly cook foods, particularly meat, poultry, and gravies, to a safe internal temperature.</li><li>• Use a food thermometer</li><li>• Keep food hot after cooking (at 140° F or above)</li><li>• Microwave reheated food thoroughly (to 165°F or above)</li><li>• Refrigerate perishable foods within two hours (at 40°F or below)</li><li>• Divide leftovers into shallow containers and refrigerate immediately. Do not let them cool on the counter.</li></ul>

# E. coli

*E. coli* is the name of a type of bacteria that lives in your intestines and in the intestines of animals. Although most types of *E. coli* are harmless, some types can make you sick.



The worst type of *E. coli*, known as *E. coli* O157:H7, causes bloody diarrhea and can sometimes cause kidney failure and even death. *E. coli* O157:H7 makes a toxin called Shiga toxin and is known as a Shiga toxin-producing *E. coli* (STEC). There are many other types of STEC, and some can make you just as sick as *E. coli* O157:H7.

One severe complication associated with *E. coli* infection is hemolytic uremic syndrome (HUS). The infection produces toxic substances that destroy red blood cells, causing kidney injury. HUS can require intensive care, kidney dialysis, and transfusions.

Sources	<ul style="list-style-type: none"> <li>Contaminated food, especially undercooked ground beef, unpasteurized (raw) milk and juice, soft cheeses made from raw milk, and raw fruits and vegetables (such as sprouts)</li> <li>Contaminated water, including drinking untreated water and swimming in contaminated water</li> <li>Animals and their environment: particularly cows, sheep, and goats. If you don't wash your hands carefully after touching an animal or its environment, you could get an <i>E. coli</i> infection</li> <li>Feces of infected people</li> </ul>
Incubation Period	1-10 days
Symptoms	<p>Severe diarrhea that is often bloody, severe abdominal pain, and vomiting. Usually, little or no fever is present.</p> <p>Symptoms of HUS include decreased urine production, dark or tea-colored urine, and facial pallor.</p>
Duration of Illness	<p>5-10 days. Most people will be better in 6-8 days.</p> <p>If HUS develops, it usually occurs after about 1 week.</p>
What Do I Do?	Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration or if your symptoms are severe (including blood in your stools or severe abdominal pain), call your doctor. Antibiotics should not be used to treat this infection.
How Can I Prevent It?	<ul style="list-style-type: none"> <li>Avoid eating high-risk foods, especially undercooked ground beef, unpasteurized milk or juice, soft cheeses made from unpasteurized milk, or alfalfa sprouts.</li> <li>Use a food thermometer to make sure that ground beef has reached a safe internal temperature of 160° F.</li> <li>Wash hands before preparing food, after diapering infants, and after contact with cows, sheep, or goats, their food or treats, or their living environment.</li> </ul>

# Staphylococcus

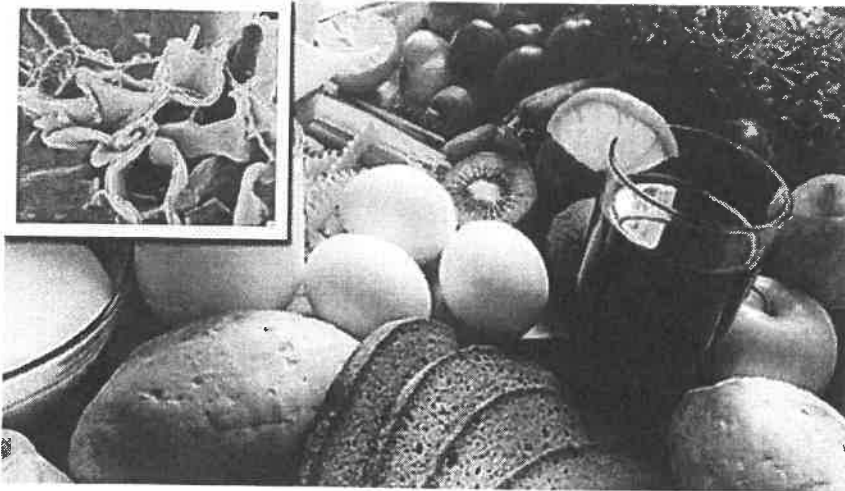
*Staphylococcus aureus* (or *Staph aureus*) is a type of bacteria commonly found on the skin and hair as well as in the noses and throats of people and animals. These bacteria are present in up to 25 percent of healthy people and are even more common among those with skin, eye, nose, or throat infections.



*Staphylococcus* can cause food poisoning when a food handler contaminates food and then the food is not properly refrigerated. Other sources of food contamination include the equipment and surfaces on which food is prepared. These bacteria multiply quickly at room temperature to produce a toxin that causes illness. *Staphylococcus* is killed by cooking and pasteurization.

<b>Sources</b>	<p>Foods that are made with hand contact and require no additional cooking, such as:</p> <ul style="list-style-type: none"> <li>• Salads, such as ham, egg, tuna, chicken, potato, and macaroni</li> <li>• Bakery products, such as cream-filled pastries, cream pies, and chocolate éclairs</li> <li>• Sandwiches</li> </ul> <p>Other sources include milk and dairy products, as well as meat, poultry, eggs, and related products.</p>
<b>Incubation Period</b>	1-6 hours
<b>Symptoms</b>	Nausea, vomiting, diarrhea, loss of appetite, severe abdominal cramps, mild fever
<b>Duration of illness</b>	24-48 hours
<b>What Do I Do?</b>	Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration, call your doctor.
<b>How Can I Prevent Illness?</b>	<ul style="list-style-type: none"> <li>• Wash hands and under fingernails vigorously with soap and water before handling and preparing food.</li> <li>• Do not prepare food if you have a nose or eye infection.</li> <li>• Do not prepare or serve food for others if you have wounds or skin infections on your hands or wrists.</li> <li>• Keep kitchens and food-serving areas clean and sanitized.</li> <li>• If food is prepared more than two hours before serving, keep hot foods hot (over 140° F) and cold foods cold (40° F or under).</li> <li>• Store cooked food in a wide, shallow container and refrigerate as soon as possible.</li> </ul>

# Salmonella

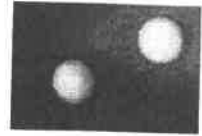


*Salmonella*, the name of a group of bacteria, is one of the most common causes of food poisoning in the United States. Usually, symptoms last 4-7 days and most people get better without treatment. But, *Salmonella* can cause more serious illness in older adults, infants, and persons with chronic diseases. *Salmonella* is killed by cooking and pasteurization.

Sources	<ul style="list-style-type: none"> <li>• <b>Food:</b> Contaminated eggs, poultry, meat, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables (alfalfa sprouts, melons), spices, and nuts</li> <li>• <b>Animals and their environment:</b> Particularly reptiles (snakes, turtles, lizards), amphibians (frogs), birds (baby chicks) and pet food and treats.</li> </ul>
Incubation Period	12-72 hours
Symptoms	Diarrhea, fever, abdominal cramps, vomiting
Duration of Illness	4-7 days
What Do I Do?	<p>Drink plenty of fluids and get rest. If you cannot drink enough fluids to prevent dehydration or if your symptoms are severe, call your doctor. Antibiotics may be necessary if the infection spreads from the intestines to the blood stream.</p>
How Can I Prevent It?	<ul style="list-style-type: none"> <li>• Avoid eating high-risk foods, including raw or lightly cooked eggs, undercooked ground beef or poultry, and unpasteurized milk</li> <li>• Keep food properly refrigerated before cooking.</li> <li>• Clean hands with soap and warm water before handling food. Clean surfaces before preparing food on them.</li> <li>• Separate cooked foods from ready-to-eat foods. Do not use utensils on cooked foods that were previously used on raw foods and do not place cooked foods on plates where raw foods once were unless it has been cleaned thoroughly.</li> <li>• Cook foods to a safe internal temperature. Use a meat thermometer to make sure foods are cooked to a safe temperature.</li> <li>• Chill foods promptly after serving and when transporting from one place to another.</li> <li>• Wash your hand after contact with animals, their food or treats, or their living environment.</li> </ul>

# Botulism

Botulism is a rare but serious illness caused by a bacterium which occurs in soil. It produces a toxin that affects your nerves. Foodborne botulism comes from eating foods contaminated with the toxin.



<b>Sources</b>	<ul style="list-style-type: none"><li>• <b>Infants:</b> Honey, home-canned vegetables and fruits, corn syrup</li><li>• <b>Children and adults:</b> Home-canned foods with a low acid content, improperly canned commercial foods, home-canned or fermented fish, herb-infused oils, baked potatoes in aluminum foil, cheese sauce, bottled garlic, foods held warm for extended periods of time</li></ul>
<b>Incubation Period</b>	<ul style="list-style-type: none"><li>• <b>Infants:</b> 3-30 days</li><li>• <b>Children and adults:</b> 12-72 hours</li></ul>
<b>Symptoms</b>	<ul style="list-style-type: none"><li>• <b>Infants:</b> Lethargy, weakness, poor feeding, constipation, poor head control, poor gag and sucking reflex</li><li>• <b>Children and adults:</b> Double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth and muscle weakness</li></ul>
<b>Duration of Illness</b>	Variable
<b>What Do I Do?</b>	Botulism is a medical emergency. If you have symptoms of botulism, contact your doctor immediately.
<b>How Do I Prevent It?</b>	<ul style="list-style-type: none"><li>• Be very careful when canning foods at home</li><li>• Do not let babies eat honey</li><li>• Get prompt medical care for infected wounds</li></ul>



## Foodborne Illness Chart

Pathogen	Signs and Symptoms	Incubation Period	Food Involved
<i>Anisakis simplex</i> (infection)	abdominal pain; vomiting; coughing	12 hours to several days	salt-water fish
<i>Bacillus cereus</i> (toxico-infection)	nausea; abdominal pain; diarrhea; vomiting	up to 24 hours	cereal products; rice; custards and sauces; meatloaf
<i>Campylobacter jejuni</i> (infection)	Diarrhea (sometimes bloody); severe abdominal pain; fever; anorexia; headache; vomiting	2 to 5 days	Raw milk; poultry; beef liver; raw clams; contaminated water
<i>Clostridium botulinum</i> (intoxication)	vertigo; double vision; difficult swallowing, speaking and breathing; weak muscles; respiratory paralysis. <b>Frequently fatal.</b>	18 to 36 hours	home-canned low-acid food; garlic and oil mixtures; vacuum-packed fish; fermented fish eggs; fish; marine mammals
<i>Clostridium perfringens</i> (toxico-infection)	abdominal pain; diarrhea	8 to 22 hours	cooked meat; poultry; gravy; sauces; soups
<i>Cryptosporidium</i> (infection)	severe diarrhea; low-grade fever and severe intestinal distress	1 to 12 days	any food product that comes into contact with a contaminated person or contaminated water
<i>Escherichia coli</i> O157:h7 ( <i>E.coli</i> ) (toxico-infection)	severe abdominal pain; diarrhea (sometimes bloody); nausea; vomiting; fever; chills; headache; muscular pain; bloody urine	24 to 72 hours	soft unpasteurized cheese; contaminated water; any undercooked animal-source foods, especially hamburger
<i>Giardiasis lamblia</i> (infection)	abdominal pain; diarrhea; fever; cramps	1 week	water; raw vegetables and fruits
<i>Hepatitis A</i> (infection)	fever; anorexia; nausea, abdominal pain; jaundice	15 to 50 days	shellfish; contaminated water; any food contaminated by the feces, urine or blood of infected humans and other primates
<i>Listeria monocytogenes</i> (infection)	nausea; vomiting; stomach cramps; diarrhea; headache; constipation; fever	1 to 70 days	Unpasteurized milk; soft cheeses; undercooked poultry; prepared meats; unwashed raw vegetables
<i>Norovirus</i> (infection)	nausea; vomiting; diarrhea; abdominal pain	24 to 72 hours	Contaminated water, food, or food contact surfaces



Pathogen	Signs and Symptoms	Incubation Period	Food Involved
<i>Salmonella</i> (infection)	abdominal pain; diarrhea; chills; fever; nausea; vomiting	usually 12 to 36 hours, but could be 6 to 72 hours	Poultry; meat and meat products; eggs and egg products; other food contaminated by the feces of infected humans and other animals
<i>Shigella</i> (infection)	abdominal pain; diarrhea (sometimes bloody); chills; fever; dehydration	12 to 50 hours	Moist prepared foods, especially salads such as potato, tuna and macaroni salads; raw fruits and vegetables; unpasteurized milk and dairy products; poultry
<i>Staphylococcus</i> (intoxication)	nausea; vomiting; abdominal pain; diarrhea	2 to 4 hours	ham; meat; poultry; cream-filled pastry; food mixtures; leftover foods
<i>Trichinella</i> (infection)	abdominal pain; vomiting; nausea; fever; swelling around the eyes; muscular pain; chills; laboured breathing	1 to 2 days for gastrointestinal symptoms; other symptoms occur within 2 to 4 weeks	pork; bear meat; walrus flesh
<i>Yersinia</i> (infection)	watery diarrhea; vomiting; abdominal pain; fever; headache; sore throat; may mimic appendicitis	24 to 48 hours	Meats (especially pork, beef and lamb); tofu; oysters; fish; ice cream; powdered milk; unpasteurized milk; raw vegetables; soy products

### Other Types of Foodborne Illness

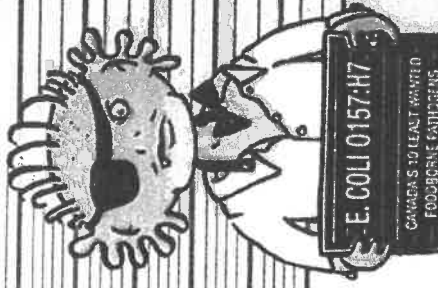
Cause of Illness	Signs and Symptoms	Incubation Period	Food Involved
Allergies	flush; tingling skin; hives; difficulty breathing; anaphylactic shock. <b>Sometimes fatal.</b>	varies—can be instantaneous	various—common allergens include nuts, wheat, soya, MSG, milk, eggs, fish/shellfish, sulphates
Food intolerances and sensitivities	nausea; vomiting; diarrhea; bloating; fatigue; weakness; headaches	varies—can be instantaneous	various
Paralytic/neurologic shellfish poisoning (also known as 'Red Tide Poisoning')	Tingling; burning; numbness around lips and finger tips; giddiness; incoherent speech; difficulty standing; respiratory paralysis	30 minutes to 2 hours	mussels, clams and other bivalve molluscs

# CANADA'S 10 LEAST WANTED FOODBORNE PATHOGENS

## E. COLI 0157:H7

PATHOGEN:

BACTERIA



### SYMPTOMS

Severe stomach cramps  
 Diarrhea (often bloody)  
 Vomiting  
 Nausea  
 Headache  
 Little or no fever

### START OF SYMPTOMS / HOW LONG THEY LAST

Symptoms usually  
 • start within 3 to 4 days but can occur up to 10 days later  
 • last from 5 to 10 days

### HOW YOU CAN GET SICK

By eating or drinking  
 • food or beverages contaminated with *E. coli* 0157:H7  
 • unpasteurized (raw) milk and (raw) milk products  
 • untreated water  
 Through contact with:  
 • cattle or other farm animals  
 • the feces of infected people  
 Through cross-contamination between raw meat and other food when you are preparing food  
 A person or animal can carry the bacteria without showing symptoms of illness, and can spread it to foods, surfaces or other people.

### POTENTIAL HEALTH IMPACTS

Up to 15 percent of children infected, and a much smaller proportion of adults, develop Hemolytic Uremic Syndrome (HUS). This is a type of kidney failure and blood disorder.  
 Most people with HUS recover within a few weeks, but some suffer permanent kidney and other organ damage and complications, or may die.

### FOOD COMMONLY ASSOCIATED

Beef, raw and undercooked, ground and whole cuts  
 Unpasteurized apple juice or cider  
 Unpasteurized (raw) milk and (raw) milk products, such as raw milk cheese  
 Untreated drinking water  
 Contaminated raw fruit and vegetables that are not cooked (including alfalfa and bean sprouts)

### HOW TO PROTECT YOURSELF

Cook food to a safe internal temperature.  
 Use a digital food thermometer to check the internal temperature of your food. Refer to the chart on page 5.  
 Eat and drink only pasteurized apple juice, cider, milk and milk products.  
 Wash your hands thoroughly before preparing or eating food.  
 Wash your hands after contact with animals or their environments (at farms, petting zoos, and fairs).  
 Drink water from a safe supply (treated or boiled water).  
 Keep raw food away from other food while shopping, and while storing, preparing, and serving foods.

# CANADA'S 10 LEAST WANTED FOODBORNE PATHOGENS

## SALMONELLA

PATHOGEN:

BACTERIA



### SYMPTOMS

Fever  
Chills  
Headache (with a sudden onset)  
Stomach cramps  
Diarrhea  
Nausea  
Vomiting (sometimes)

### START OF SYMPTOMS / HOW LONG THEY LAST

Symptoms usually  
• start within 6 to 72 hours after eating or drinking food containing the bacteria  
• last 4 to 7 days  
Sometimes symptoms last up to 8 weeks.

### HOW YOU CAN GET SICK

By eating or drinking food or beverages contaminated with *Salmonella*  
Through cross-contamination between raw meat and other food when you are preparing food  
From hands that were not washed properly after using the washroom and before handling food  
From hands that were not washed properly after petting infected animals (such as cats, reptiles, turtles and birds) whose bodies could be covered in feces that are carrying an infection  
From hands that were not washed properly after handling, animal feces, pets, pet turtles, pet rodents, pet food, pet toys and pet treats

### POTENTIAL HEALTH IMPACTS

Most people recover without treatment. However, in some people, symptoms can be severe and can cause dehydration, which may lead to hospitalization.  
In the case of severe illness, complications such as abscesses (a sore that is infected and filled with pus) and pneumonia can occur. Complications can sometimes cause death unless treated with the appropriate antibiotics. The young, adults 60 years and older and those with weakened immune systems are more likely to have severe illness.  
Some people may get  
• Reiter's syndrome (a condition that develops in response to an infection in another part of the body. It can last for months or years and may lead to chronic arthritis).  
• colitis (inflammation of the colon).

### FOOD COMMONLY ASSOCIATED

Raw or undercooked meat, poultry, eggs and milk  
Unpasteurized dairy products, such as raw milk and raw cheese, and cream-filled desserts and toppings  
Raw fruit and vegetables (especially sprouts and cantaloupes) and their juices  
Homemade products such as salad dressings, hollandaise sauce, mayonnaise, ice cream, cookie dough, tiramisu, and frostings

### HOW TO PROTECT YOURSELF

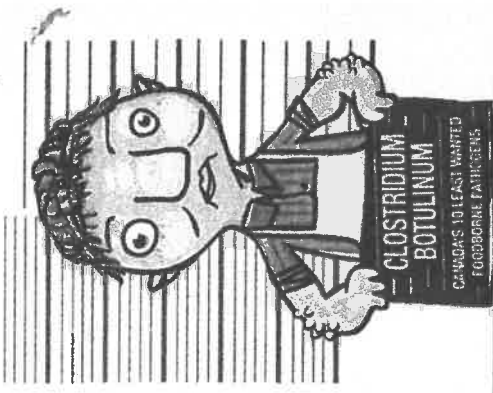
Cook food, including meat, poultry and eggs, to a safe internal temperature.  
Use a digital food thermometer to check the internal temperature of your food. Refer to the chart on page 5.  
Consume only pasteurized juice, cider, milk and milk products.  
Wash fresh fruit and vegetables thoroughly.  
Keep cooked food separate from raw food during storage and preparation.  
Wash your hands thoroughly after contact with animal feces, pets, pet turtles, pet rodents, pet food, pet toys and pet treats.

# CANADA'S 10 LEAST WANTED FOODBORNE PATHOGENS



PATHOGEN:

## CLOSTRIDIUM BOTULINUM

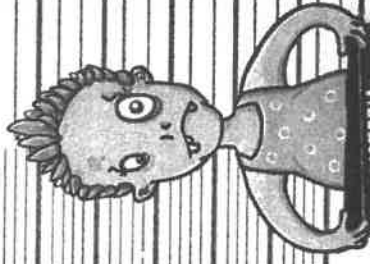


SYMPTOMS	START OF SYMPTOMS / HOW LONG THEY LAST	HOW YOU CAN GET SICK	POTENTIAL HEALTH IMPACTS	FOOD COMMONLY ASSOCIATED	HOW TO PROTECT YOURSELF
<p>Nausea</p> <p>Diarrhea</p> <p>Fatigue</p> <p>Weakness and dizziness</p> <p>Blurred vision</p> <p>Dry mouth</p> <p>Difficulty speaking and swallowing</p> <p>Descending paralysis of the arms, legs, trunk, and breathing muscles (starts in arms and moves down)</p>	<p>Symptoms usually</p> <ul style="list-style-type: none"> <li>• start within 12 to 36 hours after eating or drinking food containing the bacteria</li> <li>• last from 2 hours to 14 days</li> </ul>	<p><i>Clostridium botulinum</i> is a bacteria that can form toxins.</p> <p>By eating or drinking food or beverages contaminated with <i>Clostridium botulinum</i> toxin</p> <p>Through home-canned food that is</p> <ul style="list-style-type: none"> <li>• processed improperly</li> <li>• low-acid</li> </ul>	<p>Illness is rare in Canada, but it can be severe.</p> <p>Most people can recover if diagnosed and treated promptly.</p> <p>Treatment includes early doses of antitoxin and intensive respiratory care.</p> <p>Recovery can take several weeks to months. In some cases, it can take years and you may never fully recover.</p> <p>Severe botulism can lead to</p> <ul style="list-style-type: none"> <li>• a need for intensive medical and nursing care</li> <li>• paralysis and respiratory failure, which can require a person to have ventilator assistance to breathe</li> </ul> <p>If not diagnosed and treated, death from respiratory failure can happen within 3 to 10 days.</p>	<p>Home-canned low-acid food that has been processed improperly, such as asparagus, beets, corn, garlic, green beans, mushrooms, peppers, chicken and chicken livers, ham, liver pâté, sausage</p> <p>Smoked, salted and fermented fish</p> <p>Fermented marine mammal meat, for example whale, walrus, seal</p> <p>Baked potatoes stored in aluminium foil</p> <p>Honey: Although honey may naturally contain <i>Clostridium botulinum</i>, the bacteria can't grow or produce toxins in the honey, but it could grow and produce toxins in a baby's body, and this can cause infant botulism</p> <p>Low-acid juice, such as carrot juice</p> <p>Improperly-cured meat products</p>	<p>Follow instructions and up-to-date canning recipes and use up-to-date equipment when canning low-acid food at home.</p> <p>Don't use aluminium foil to wrap potatoes or other vegetables for baking unless the vegetables will be cooked and eaten right away or unwrapped and refrigerated right away once they're cooked.</p> <p>Don't feed honey (even pasteurised honey) to children under one year old.</p> <p>Keep all low-acid juices, such as carrot juice and other products labelled "keep refrigerated," refrigerated.</p> <p>Never eat food from dented, bulging or leaking home or commercially-canned food.</p>

# CANADA'S 10 LEAST WANTED FOODBORNE PATHOGENS

## LISTERIA MONOCYTOGENES

PATHOGEN:



LISTERIA  
MONOCYTOGENES

CANADA'S 10 LEAST WANTED  
FOODBORNE PATHOGENS

### SYMPTOMS

Persistent fever  
Muscle aches  
Constipation  
Nausea (sometimes)  
Vomiting (sometimes)  
If infection spreads to the nervous system:  
Headache  
Stiff neck  
Confusion  
Loss of balance

### START OF SYMPTOMS / HOW LONG THEY LAST

Symptoms usually start within 3 to 70 days after exposure to the bacteria.  
How long the illness lasts can vary depending on the severity of illness.

### HOW YOU CAN GET SICK

By eating or drinking food or beverages contaminated with *Listeria monocytogenes*  
Through cross-contamination during food preparation in the kitchen or in the processing plant

### POTENTIAL HEALTH IMPACTS

The disease mainly affects adults 60 years and older, pregnant women, newborns, and people with weakened immune systems.  
Pregnant women infected with this bacteria can experience a mild, flu-like illness however infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or infection of the newborn baby.  
Infection with *Listeria* may be followed by meningitis encephalitis (an infection of the brain or its surrounding tissues) and/or septicemia (bloodstream infection), either of which can cause death.

### FOOD COMMONLY ASSOCIATED

Delicatessen (cold cuts or "ready-to-eat" meat)  
Hot dogs  
Raw cheeses from unpasteurized milk, including soft and semi-soft cheese, such as Brie, Camembert and blue-veined cheese  
Raw food, such as uncooked or undercooked meats  
Refrigerated pâtés and meat spreads  
Refrigerated smoked seafood

### HOW TO PROTECT YOURSELF

Use a digital food thermometer to check the internal temperature of your food. Refer to the chart on page 5.  
Wash your hands after handling meat products.  
Adults 60 years and older, pregnant women, and people with weakened immune systems should avoid food commonly associated with *Listeria*, including hot dogs, deli meats and unpasteurized dairy products. If you still choose to eat this food, follow these safe food handling practices:  
Cook high-risk food, including unpasteurized dairy products, deli meat, hot dogs, meat and poultry, to a safe internal temperature. Refer to the chart on page 5.  
Avoid spreading fluid from hot dog and deli meat packages onto other food, cutting boards, utensils, dishes and food preparation surfaces.  
Eat only pasteurized cheese, including hard cheese, such as Colby, Cheddar, Swiss and Parmesan Cheese.