

- *Feathered Facts* has a new look.

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Feathered Facts

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Foodborne Illness Overview

The Centers for Disease Control and Prevention (CDC) estimates that 48 million people (1 in 6) in the United States will get sick from a foodborne illness each year. From these illnesses, it is also estimated that 128,000 Americans will be hospitalized and 3,000 will die as a direct result of a foodborne illness.



For those cases that can be confirmed, the top 5 pathogens account for 91% of the cases. These top 5 pathogens are: 1) noroviruses, 2) non-typhoidal *Salmonella*, 3) *Clostridium perfringens*, 4) *Campylobacter spp.* and 5) *Staphylococcus aureus*.

Four (4) of the top 5 pathogens can be associated with poultry in some way.

This issue of *Feathered Facts* will focus on some of the causative agents of foodborne illness and what you as a consumer can do to decrease the probability that you will become sick with one of these foodborne pathogens.



Currently, there are 31 types of foodborne agents that are considered to be foodborne pathogens (CDC, 2011). Many of these pathogens are tracked by public health systems in the US. However, these agents only account for around 20% of the estimated number of illnesses in the United States. The other 80% of illnesses cannot be traced due to many things including lack of laboratory confirmation, lack of reporting or unknown agents.

Four Steps to Food Safety

While some foods are more frequently associated with foodborne illness than others, you should always practice the following 4 steps for increased food safety:

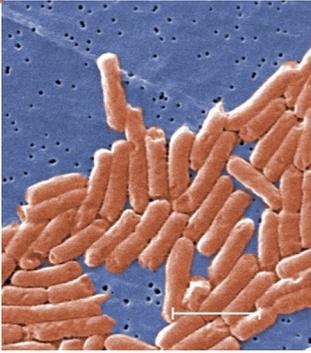
- **CLEAN**—wash your hands and food preparation surfaces often. Wash fruits and vegetables, but not meat.

- **SEPARATE**—Prevent cross-contamination by keeping ready to eat foods away from foods that need to be cooked.

- **COOK**—Cook to the proper temperature. Minimum cooking temperatures can be found [here](#).

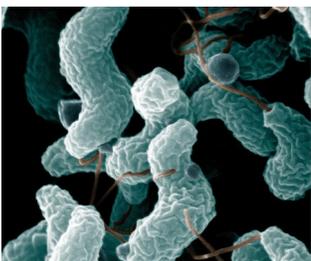
- **CHILL**—Bacteria can reproduce quickly at room temperature. Refrigerate leftovers quickly.





Colorized Scanning Electron Micrograph (SEM) of *Salmonella* spp. Magnification is 10431 x. Photo courtesy of Janet Haney Carr / CDC. Click [here](#) for original picture.

Salmonellosis is more common in the summer than in the winter and there are over 2,500 serotypes known.



Colorized SEM of *Campylobacter jejuni*. Notice the distinctive corkscrew shape. Photo courtesy of De Wood, Pooley, USDA, ARS. Click [here](#) for original picture.

Salmonellosis

Salmonellosis one of the most common types of foodborne illness in the US. These bacteria have been known to cause disease for well over 100 years as they were discovered by D.E. Salmon in 1885.

Symptoms of salmonellosis include diarrhea, fever and abdominal cramps. These symptoms can appear from between 12 and 72 hours after initial infection and will typically last from 4 to 7 days.

Most persons that are infected will recover without treatment, but there are severe cases where hospitalization and death has occurred.

Salmonella bacteria live in the intestinal

tracts of humans and other animals, including poultry. The bacteria are typically transmitted to humans by ingestion of foods that are contaminated with animal feces. Common foods associated with salmonellosis include beef, poultry, milk, eggs and vegetables.

Tips for preventing salmonellosis include: 1) cook meats and eggs thoroughly and do not consume any that are undercooked; 2) wash hands, surfaces and utensils with soap and water after contact with raw meat or poultry; and 3) wash hands after handling animals connected with *Salmonella* (reptiles, birds, poultry). Click [here](#) for more information.

Campylobacteriosis

Campylobacteriosis is an infectious disease that is caused by bacteria from the genus *Campylobacter*. Like salmonellosis, it is one of the most common causes of diarrheal disease in the US, affecting over 1.3 million people each year.

Symptoms of campylobacteriosis include diarrhea, abdominal pain, cramping and fever. These symptoms typically appear within 2 to 5 days after the initial infection and will usually last for one week.

Most persons that become infected will recover without any specific treatment. However, in persons with compromised immune systems, campylobacteriosis can cause serious illness and possibly death. There are different species of *Campylobacter* that cause disease, but the most common isolate in human disease is *Campylobacter jejuni*.

Campylobacter bacteria are a bit different from the serotypes of *Salmonella* that cause diarrheal disease. The bacteria are considered to be fragile as they cannot tolerate drying or normal atmospheric levels of oxygen. They are well adapted to survival in the intestinal tracts of birds and actually

prefer the higher body temperatures of birds compared to humans. *Campylobacter* bacteria have been highly associated with raw poultry products as the birds can carry the organism in their intestinal tract without developing disease. As with salmonellosis, there is a higher incidence of campylobacteriosis during the summer months when compared to winter.

There are some simple food handling practices that can be performed that will reduce or prevent campylobacteriosis:

- Cook all poultry products thoroughly. Minimum internal temperature of all cooked poultry should reach 165°F.
- Wash hands with soap before preparing food and after handling raw foods that are of animal origin.
- Prevent cross-contamination during food preparation and cooking.
- Do not drink unpasteurized milk or untreated surface water.

Additional information on *Campylobacter jejuni* can be found [here](#).

Clostridium perfringens

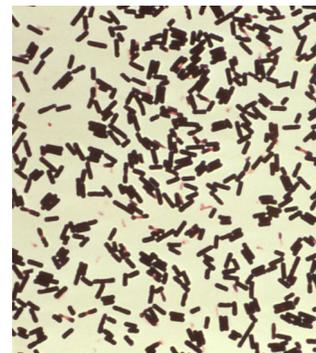
Clostridium perfringens is another bacteria that is one of the leading causes of foodborne illness in the US. It can be isolated from many environmental sources and it is also commonly found on raw meat and poultry. It is estimated that nearly 1 million cases of foodborne illness each year can be attributed to *C. perfringens*.

Symptoms include diarrhea and abdominal cramps that will develop from 6 to 24 hours after initial infection. Most persons will recover without medical treatment, but may require oral rehydration.

This bacteria is different from many others that cause foodborne illness in the way that it operates. Bacteria such as *Salmonella*

and *Campylobacter* will actually invade the cells of the intestinal tract and cause illness (an infection). The disease caused by *C. perfringens* is actually a toxicoinfection. To become ill a person must ingest a large number of the organism. Once the bacteria reach the intestinal tract they will begin their reproductive cycle. During this cycle a toxin is produced that disrupts the cells in the intestine causing the illness.

Foods that are not cooled rapidly or not reheated to a temperature of 140°F before serving are common culprits. These include pre-cooked meats and gravies.



Photomicrograph of *Clostridium perfringens* at 1000x. Photo courtesy of Don Stalons / CDC. Click [here](#) for original picture.

Staphylococcus aureus

Staphylococcus aureus bacteria are found in many places in the environment, including on the skin and in the nasal passages of healthy humans and animals. It is considered important with regard to food safety as the *S. aureus* bacterium has the ability to produce several types of toxins that can cause food poisoning. *S. aureus* is also important because it is a salt-tolerant organism that can survive when others cannot.

The toxins from these bacteria are very fast-acting. Symptoms can develop as fast as 30 minutes after ingestion, but usually take from 1 to 6 hours before development. Symptoms may include nausea, diarrhea,

stomach cramps and vomiting. The toxins are resistant to heat and cannot be destroyed by cooking. Common foods associated with this organism include milk, cheeses, ham, puddings, pastries and poultry.

This type of food poisoning is usually mild and the patient will recover in 1 to 3 days. Treatment includes rest, fluids and stomach settling medications. Sick patients are not contagious as the toxin cannot be passed from one person to another.

Typical prevention measures are the same as with other microorganisms.

Additional information on *S. aureus* food poisoning can be found [here](#).

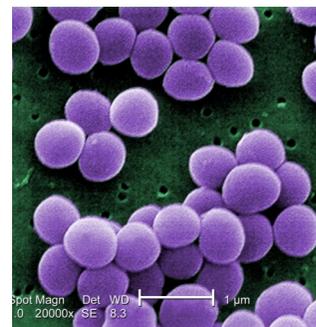
Staphylococcus aureus bacteria are commonly found on the skin and in the noses of healthy people and animals.

Ask the Expert

This month's question relates to food safety: **How should frozen poultry be thawed?**

Frozen poultry, including whole chickens and turkeys, should be thawed in the refrigerator. Refrigerator temperatures are typically below 40°F, which will inhibit the growth of many microorganisms. Thawing poultry on the counter can lead to the outside becoming warm enough for bacterial reproduction before the inside is thawed. Remember that it may take 1 or more days for a whole bird to thaw.

If you have a question for the expert, email it to baker@ifas.ufl.edu.



Colorized SEM of *Staphylococcus aureus*. Magnification is 20,000 x. Photo courtesy of Janet Haney Carr / CDC. Click [here](#) for original picture.

Listeriosis

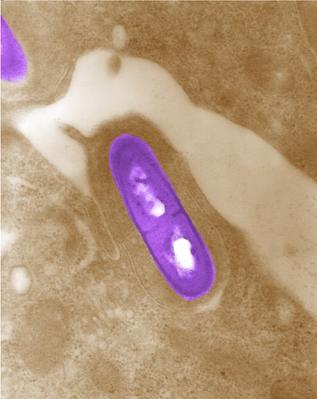
Listeriosis is caused by the *Listeria monocytogenes* bacterium. While this organism is not in the 'Top 5' as far as number of cases each year, it is a pathogen of concern because of its lethality and possible complications for pregnant females. Listeriosis in pregnant women can lead to miscarriage, stillbirth, premature delivery or life-threatening infections in the newborn. Listeriosis has been associated with poultry and other foods such as sprouts, melons, deli meats, hot dogs, raw (unpasteurized) milk, soft cheeses and smoked seafood.

Listeriosis tends to affect persons with incomplete or compromised immune systems including older adults, pregnant women, and newborns. Symptoms include fever, headaches, confusion, loss of balance and muscle

aches that may be preceded by diarrhea or other gastrointestinal issues.

L. monocytogenes is commonly found in soil and water. It is typically transferred to foods by unhygienic practices. The bacterium can be killed by cooking temperatures. However, ready-to-eat foods such as hot dogs and deli meats that are not reheated may become contaminated after processing but before packaging and consumption. Unlike many other microorganisms, *L. monocytogenes* is able to grow and reproduce in refrigeration temperatures.

There are many foods that may be potential harbors for this organism and there are certain precautions that should be taken. A list of specific food precautions recommended by the CDC can be found [here](#).



Electron micrograph of *Listeria* in tissue. Photo courtesy of CDC. Click [here](#) for original picture.

Food Safety Trivia

- True or False:** Rinsing ready-to-eat greens increases the potential for cross-contamination.
- True or False:** Pathogens are unable to survive and grow in cold temperatures.
- True or False:** You should never dry fresh fruits and vegetables after rinsing them.
- True or False:** There are many ways that bacteria on the outside of a melon can get into the part that you eat.

Find the [answers](#) to these questions and more by visiting the Partnership of Food Safety Education at fightbac.org.



Food safety is important for kids as well. The Partnership for Food Safety Education has created many tools to help educate children about food safety. Visit their website by clicking [here](#).

University of Florida | Institute of Food and Agricultural Sciences Baker County Extension Service



1025 W. Macclenny Ave., Macclenny, FL 32063

Phone: (904) 259-3520
Email: baker@ifas.ufl.edu

Website: <http://baker.ifas.ufl.edu>

Hours: M—F 8:30am to 5:00pm (Closed Noon to 1:00pm for Lunch)

