

# Salmonella

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## Common Food-borne Illnesses and Symptoms

The most common food-borne illnesses are caused by the bacteria *Campylobacter*, *Salmonella*, and *E. coli* O157:H7, and by a group of viruses called calicivirus, also known as the Norwalk and Norwalk-like viruses. Symptoms vary depending on the type of bacteria and severity of the illness. Common symptoms include nausea, vomiting, abdominal cramps and diarrhea. See your doctor or healthcare provider when diarrheal illness is accompanied by a high fever (temperature over 101.5°F, measured orally), blood in the stools, prolonged vomiting that prevents keeping liquids down, signs of dehydration, including a decrease in urination, a dry mouth and throat, and feeling dizzy when standing up or if diarrheal illness lasts more than 3 days

## Reducing Your Risk

You can reduce your risk of becoming infected with food-borne illness. Do not eat raw or undercooked meat, including hamburgers, poultry, and seafood, and do not drink raw milk or eat products made from raw milk. Rinse fresh fruits and vegetables under running water and always follow the rules of food safety.

## Rules of Food Safety

### Safe Internal Temperatures

Hamburgers — 160°F

Roasts, steaks, chops — 160°F

Ground poultry — 165°F

Poultry parts — 170°F

Pork — 160°F

Hot dogs/leftovers — 165°F

- **CLEAN**  
Clean your hands with soap and warm water before handling food. Clean surfaces before preparing food on them.
- **SEPARATE**  
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.
- **COOK**  
Cook foods to a safe internal temperature (see chart). Use a meat thermometer to make sure foods are cooked to a safe temperature. Color is not an indicator of doneness.
- **CHILL**  
Chill foods promptly after serving and when transporting from one place to another. Keep your refrigerator at 40°F or below. Keep hot foods hot and cold foods cold.

## **What is salmonellosis?**

Salmonellosis is an infection with bacteria called *Salmonella*. Most persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most persons recover without treatment. However, in some persons, the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the *Salmonella* infection may spread from the intestines to the blood stream, and then to other body sites and can cause death unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness.

## **How can Salmonella infections be diagnosed?**

Many different kinds of illnesses can cause diarrhea, fever, or abdominal cramps. Determining that *Salmonella* is the cause of the illness depends on laboratory tests that identify *Salmonella* in the stool of an infected person. Once *Salmonella* has been identified, further testing can determine its specific type.

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## **How can Salmonella infections be treated?**

*Salmonella* infections usually resolve in 5-7 days and often do not require treatment other than oral fluids. Persons with severe diarrhea may require rehydration with intravenous fluids. Antibiotics, such as ampicillin, trimethoprim-sulfamethoxazole, or ciprofloxacin, are not usually necessary unless the infection spreads from the intestines. Some *Salmonella* bacteria have become resistant to antibiotics, largely as a result of the use of antibiotics to promote the growth of food animals.

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## **Are there long term consequences to a Salmonella infection?**

Persons with diarrhea usually recover completely, although it may be several months before their bowel habits are entirely normal. A small number of persons with *Salmonella* develop pain in their joints, irritation of the eyes, and painful urination. This is called Reiter's syndrome. It can last for months or years, and can lead to chronic arthritis which is difficult to treat. Antibiotic treatment does not make a difference in whether or not the person develops arthritis.

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## **How do people catch Salmonella?**

*Salmonella* live in the intestinal tracts of humans and other animals, including birds. *Salmonella* are usually transmitted to humans by eating foods contaminated with animal feces. Contaminated foods usually look and smell normal. Contaminated foods are often of animal origin, such as beef, poultry, milk, or eggs, but any food, including vegetables, may become contaminated. Thorough cooking kills *Salmonella*. Food may also become contaminated by the hands of an infected food handler who did not wash hands with soap after using the bathroom.

*Salmonella* may also be found in the feces of some pets, especially those with diarrhea, and people can become infected if they do not wash their hands after contact with pets or pet feces. Reptiles, such as turtles, lizards, and snakes, are particularly likely to harbor *Salmonella*. Many chicks and young birds carry *Salmonella* in their feces. People should always wash their hands immediately after handling a reptile or bird, even if the animal is healthy. Adults should also assure that children wash their hands after handling a reptile or bird, or after touching its environment.

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## **What can a person do to prevent this illness?**

There is no vaccine to prevent salmonellosis. Because foods of animal origin may be contaminated with *Salmonella*, people should not eat raw or undercooked eggs, poultry, or meat. Raw eggs may be unrecognized in some foods, such as homemade Hollandaise sauce, Caesar and other homemade salad dressings, tiramisu, homemade ice cream, homemade mayonnaise, cookie dough, and frostings. Poultry and meat, including hamburgers, should be well-cooked, not pink in the middle. Persons also should not consume raw or unpasteurized milk or other dairy products. Produce should be thoroughly washed.

Cross-contamination of foods should be avoided. Uncooked meats should be kept separate from produce, cooked foods, and ready-to-eat foods. Hands, cutting boards, counters, knives, and other utensils should be washed thoroughly after touching uncooked foods. Hand should be washed before handling food, and between handling different food items.

People who have salmonellosis should not prepare food or pour water for others until their diarrhea has resolved. Many health departments require that restaurant workers with *Salmonella* infection have a stool test showing that they are no longer carrying the *Salmonella* bacterium before they return to work.

People should wash their hands after contact with animal feces. Because reptiles are particularly likely to have *Salmonella*, and it can contaminate their skin, everyone should immediately wash their hands after handling reptiles. Reptiles (including turtles) are not appropriate pets for small children and should not be in the same house as an infant. *Salmonella* carried in the intestines of chicks and ducklings contaminates their environment and the entire surface of the animal. Children can be exposed to the bacteria by simply holding, cuddling, or kissing the birds. Children should not handle baby chicks or other young birds. Everyone should immediately wash their hands after touching birds, including baby chicks and ducklings, or their environment.

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### **How common is salmonellosis?**

Every year, approximately 40,000 cases of salmonellosis are reported in the United States. Because many milder cases are not diagnosed or reported, the actual number of infections may be thirty or more times greater. Salmonellosis is more common in the summer than winter.

Children are the most likely to get salmonellosis. The rate of diagnosed infections in children less than five years old is about five times higher than the rate in all other persons. Young children, the elderly, and the immunocompromised are the most likely to have severe infections. It is estimated that approximately 400 persons die each year with acute salmonellosis.

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### **What else can be done to prevent salmonellosis?**

It is important for the public health department to know about cases of salmonellosis. It is important for clinical laboratories to send isolates of *Salmonella* to the City, County, or State Public Health Laboratories so the specific type can be determined and compared with other *Salmonella* in the community. If many cases occur at the same time, it may mean that a restaurant, food or water supply has a problem that needs correction by the public health department.

Some prevention steps occur every day without you thinking about it. Pasteurization of milk and treatment of municipal water supplies are highly effective prevention measures that have been in place for decades. In the 1970s, small pet turtles were a common source of salmonellosis in the United States, so in 1975, the sale of small turtles was banned in this country. However, in 2008, they were still being sold, and cases of *Salmonella* associated with pet turtles have been reported. Improvements in farm animal hygiene, in slaughter plant practices, and in vegetable and fruit harvesting and packing operations may help prevent salmonellosis caused by contaminated foods. Better education of food industry workers in basic food safety and restaurant inspection procedures may prevent cross-contamination and other food handling errors that can lead to outbreaks. Wider use of pasteurized egg in restaurants, hospitals, and nursing homes is an important prevention measure. In the future, irradiation or other treatments may greatly reduce contamination of raw meat.