

Shiga toxin producing *E. coli* (including *E. coli* O157:H7) Fact Sheet



Maine Center for Disease
Control and Prevention
An Office of the
Department of Health and Human Services

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What are shiga toxin producing *Escherichia coli* (STEC) and *E. coli* O157:H7?

E. coli are bacteria that normally live in the intestines of people and animals. There are hundreds of different strains of *E. coli* and most strains do not make people sick. Some strains of *E. coli* - including *E. coli* O157:H7 - produce a powerful toxin (chemical) called "shiga toxin" that can make people sick.

What are the symptoms of STEC infections (including *E. coli* O157:H7)?

The most common symptoms include severe diarrhea and stomach cramps. Sometimes the diarrhea is bloody. Some people may vomit or have a fever, but this is less common. Some people don't look or feel sick at all. Symptoms usually begin 1-8 days after swallowing the bacteria (average of 3-4 days).

In some people, particularly children under 5 years of age, women and the elderly, the infection can cause a complication called hemolytic uremic syndrome (HUS). In someone with HUS, red blood cells are destroyed and the kidneys fail. About 8% of persons whose diarrheal illness is severe enough that they seek medical care develop this complication. In the United States, HUS is the principal cause of acute kidney failure in children. Most cases of HUS are caused by *E. coli* O157:H7.

How is STEC spread (including *E. coli* O157:H7)?

The bacteria must be swallowed to cause infection. This can happen if you eat or drink something that contains the bacteria and is not properly cooked or pasteurized. Undercooked ground beef is the most common source of infection in the United States. Contaminated meat looks and smells normal. Other sources of infection in the past have included sprouts, lettuce, salami, spinach, unpasteurized (raw) milk and juice, and swimming in or drinking sewage-contaminated water.

E. coli can also spread from person to person if someone who is infected does not wash their hands well with soap and water before preparing food for others. Person to person spread is more likely in child care centers where children are not toilet trained. Family members and playmates of these children are at high risk of becoming infected. Young children usually shed the bacteria in their stools for a week or two after their illness resolves. Older children and adults rarely carry the bacteria without becoming ill.

Where does STEC come from?

STEC can live in the intestines of healthy cattle, deer, goats, and sheep. It can be found on cattle farms and in petting zoos. STEC can get into meat when animals are slaughtered and can accidentally get mixed into meat when it is ground. Bacteria present on the cow's udders or on equipment may get into raw milk. In a petting zoo, STEC can contaminate the ground, railings, feed bins, and fur of the animals. STEC is also found in the stools of people infected with the bacteria.

How do you know for sure if you have an *E. coli* infection?

The laboratory will test a sample of your stool to see if shiga toxin is present. It is not a routine test so your healthcare provider may need to ask the lab to test for it. Anyone who suddenly has diarrhea with blood should get their stool tested for STEC.

How is the illness treated?

Most people with diarrhea recover without antibiotics or other specific treatment within 5 to 10 days. Antibiotics may not be indicated for treating this infection as there is some evidence they are associated with HUS in young children. Do not try to stop the diarrhea by taking antidiarrheal medications like Imodium®. Drink plenty of liquids to replace the fluids being lost. People who develop HUS need to be treated in the hospital where they may receive blood transfusions and kidney dialysis. With intensive care, the death rate for HUS is 3-5%.

What are the long-term consequences of infection?

People who only have diarrhea usually recover completely. A small number of people who develop HUS have long term complications such as blindness, paralysis, persistent kidney failure, and the effects of having part of their bowel removed. Many people with HUS have mild kidney problems many years later.

What can be done to prevent the infection?

Cattle are the principal source of *E. coli* O157 infection; they carry *E. coli* O157 in their intestines. Changes in the preparation of animals for slaughter and in slaughter and processing methods could decrease the contamination of carcasses with *E. coli* O157 and the subsequent contamination of meat. Testing ground beef for *E. coli* O157 and withholding it from the market until the test is negative, as many meat producers began doing in 2002, is probably partly responsible for the subsequent decrease in illnesses.

Cattle manure is an important source of *E. coli* O157. Manure can contaminate the environment, including streams that flow through produce fields and are used for irrigation, pesticide application, or washing. Collaborative efforts are needed to decrease environmental contamination and improve the safety of produce.

How can STEC infections be prevented?

- Cook all ground beef (hamburger) until it is well done. Ground beef can turn brown before bacteria are killed so use a meat thermometer to make sure the meat is well done. Beef should be cooked to at least 160° F. If no thermometer is available, do not eat ground beef patties that are still pink in the middle.
- Keep raw meat separate from ready-to-eat foods like salads and vegetables you want to eat raw. Wash hands, counters, and utensils with hot soapy water after they touch raw meat. Never put cooked hamburgers or ground beef on the same plate that held raw patties. Wash meat thermometer in between tests of patties that require further cooking.
- Drink only pasteurized milk, juice, or cider.
- Wash fruits and vegetables under running water, especially those that will not be cooked. Be aware that bacteria are sticky, so even washing may not remove all bacteria. Remove the outer leaves of leafy vegetables. Children under 5 years of age, people with weak immune

systems, and the elderly should avoid eating alfalfa sprouts until their safety can be assured.

- Avoid swallowing lake or pool water while swimming.
- Wash hands carefully with soap and water after using the toilet, changing diapers, touching animals, and before preparing food.
- People with diarrhea should not swim in public swimming pools, lakes, or share baths with others. They should also avoid preparing food for others.

Are there any restrictions for people with shiga toxin producing *E. coli* infection?

Yes. The Maine CDC will determine which restrictions apply in a specific situation. An infected food handler, child care worker or health care worker may be required to stay out of work until they have two consecutive negative stool cultures taken at least 24 hours apart. Contact Maine CDC at 1-800-821-5821 for specific information.

Shiga toxin producing *E. coli* in Maine

Typically, between 15 and 50 cases of shiga toxin producing *E. coli* are reported in Maine each year. The Maine CDC immediately investigates all reported cases of shiga toxin producing *E. coli* infections to identify sources of public health concern and to prevent further spread of the disease. If cases occur in a day-care center, the Maine CDC may need to work with parents and staff to improve hand washing among the staff, children, and their families. If many cases occur at the same time, it may mean that a restaurant, food or water supply has a problem that needs to be fixed.

For specific information on the number of shiga toxin producing *E. coli* cases reported in Maine, please visit the Maine CDC website: <http://www.maine.gov/dhhs/boh/newpubs.htm> and refer to the Infectious Epidemiology Program Documents.

Where can I get more information?

For more information contact your healthcare provider or local health center. You can also contact the Maine Center for Disease Control and Prevention by calling 1-800-821-5821. The federal Centers for Disease Control and Prevention website - <http://www.cdc.gov> - is another excellent source of health information.