

Escherichia coli O157:H7 Fact Sheet

1. **What is Escherichia coli O157:H7?** Escherichia coli O157:H7 is a bacterium that is an important cause of foodborne illness. An estimated 70,000 cases of infection and 61 deaths occur in the United States each year. Infection often leads to bloody diarrhea, and occasionally to kidney failure. Most illness is foodborne and has been associated with eating undercooked, contaminated ground beef, or vegetables. Person-to-person contact in families and child care centers is also an important mode of transmission. Infection can also occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.
2. **What is different about E. coli O157:H7 from normal E. coli?** - E. coli O157:H7 is just one of the hundreds of strains of the bacterium Escherichia coli. The combination of letters and numbers in the name refers to the specific markers found on bacteria's surface and distinguishes it from other types of E. coli bacteria. Although most strains are harmless and live in the intestines of healthy humans and animals, the O157:H7 strain produces a powerful toxin which can cause severe illness. Other types of toxin-producing E. coli, such as E. coli O111, can cause similar illness and are spread in the same way, but are less commonly identified in the United States. The E. coli bacteria routinely tested for and sometimes found in drinking water suggests that that water is unsafe to drink as it has been contaminated with animal or human waste, however, they generally do not cause disease.
3. **How was E. coli O157:H7 first identified?** - E. coli O157:H7 was first recognized as a cause of illness in 1982 during an outbreak of severe bloody diarrhea; the outbreak was traced to contaminated hamburgers.
4. **How is E. coli O157:H7 spread?** - The bacteria live in the intestines of healthy cattle. Meat becomes contaminated during slaughter, or meat processing. The bacteria, when present, are thoroughly mixed into beef when it is ground. Bacteria present on the cow's udders or on equipment may get into raw milk. Eating meat, especially ground beef that has not been cooked sufficiently to kill E. coli O157:H7 can cause infection. Contaminated meat looks and smells normal. Although the number of organisms required to cause disease is not known, it is suspected to be very small. Among other known sources of infection are consumption of sprouts, lettuce, salami, unpasteurized milk and juice, and swimming in or drinking sewage-contaminated water. Bacteria in stools of infected persons can be passed from one person to another if hand washing habits are inadequate. This is particularly likely among toddlers who are not toilet trained. Family members and playmates of these children are at high risk of becoming infected. Young children typically shed the organism in their feces for a week or two after their illness resolves. Older children or adults rarely carry the organism without symptoms.
5. **What kind of illness does E. coli O157:H7 cause?** - E. coli O157:H7 infection usually causes severe bloody diarrhea and abdominal cramps; sometimes the infection causes non-bloody diarrhea or no symptoms. Vomiting occurs in about half of persons. Fever, usually not of a high temperature, occurs less than one-third of the time. On the second or third day

of illness, stools may become bloody in 30% to 75% of cases. The illness usually resolves in 5 to 10 days. Infants and the elderly are most susceptible. The incubation period is usually 3 - 4 days, although rarely the incubation can be as short as 12 hours or as long as 8 days. Most of the time there are no long-term effects. Asymptomatic infection can occur.

6. **What is Hemolytic Uremic Syndrome (HUS)?** - In some persons, particularly children under five years of age and the elderly, the infection can also cause a complication called hemolytic uremic syndrome (HUS), in which a bacterial toxin damages small blood vessels in the kidney, reduces platelet counts, and destroys red blood cells. Kidney function can be greatly reduced to the degree that dialysis may be necessary. About 2%-7% of infections lead to this complication. There are no currently available treatments that can prevent HUS once a person is infected with the organism. In the United States, hemolytic uremic syndrome is the principal cause of acute kidney failure in children, and most cases of hemolytic uremic syndrome are caused by *E. coli* O157:H7.
7. **How is *E. coli* O157:H7 infection diagnosed?** - Infection with *E. coli* O157:H7 is diagnosed by detecting the bacterium in the stool. Most laboratories that culture stool do not routinely test for *E. coli* O157:H7, so it is important to request that the stool specimen be tested for this organism. All persons who suddenly have diarrhea with blood should get their stool tested for *E. coli* O157:H7.
8. **How is the illness treated?** - Most persons recover without antibiotics or other specific treatment in 5-10 days. There is no evidence that antibiotics improve the course of disease, and it is thought that treatment with some antibiotics may produce the kidney complications. Antidiarrheal agents, such as loperamide (Imodium), should also be avoided. HUS is a life-threatening condition usually treated in an intensive care unit. Blood transfusions and kidney dialysis are often required. With intensive care, the death rate for HUS is 3% to 5%.
9. **What are the long-term consequences of infection?** - Persons who only have diarrhea usually recover completely. About one-third of persons with HUS have abnormal kidney function many years later, and a few require long-term dialysis. Another 8% of persons with HUS have other lifelong complications, such as high blood pressure, seizures, blindness, and, paralysis.
10. **What can be done to prevent the infection?** - *E. coli* O157:H7 will continue to be an important public health concern as long as it contaminates meat and other foods. Preventive measures may reduce the number of cattle that carry it and the contamination of meat during slaughter and grinding. Research into such prevention measures is ongoing.
11. **What can you do to prevent *E. coli* O157:H7 infection?**
 - a. Cook all ground beef and hamburger thoroughly. Because ground beef can turn brown before disease-causing bacteria are killed, use a digital instant-read meat thermometer to ensure thorough cooking. Ground beef should be cooked until a thermometer inserted into several parts of the patty, including the thickest part, reads at least 160° F. Persons

who cook ground beef without using a thermometer can decrease their risk of illness by not eating ground beef patties that are still pink in the middle. If you are served an undercooked hamburger or other beef product in a restaurant, send it back for further cooking. You may want to ask for a new bun and a clean plate, too.

- b. Avoid spreading harmful bacteria in your kitchen. Keep raw meat separate from ready-to-eat foods. Wash hands, counters, and utensils with hot soapy water after they touch raw meat. Never place cooked hamburgers or ground beef on the unwashed plate that held raw patties. Wash meat thermometers in between tests of patties that require further cooking.
- c. Drink only pasteurized milk, juice, or cider. Commercial juice with an extended shelf-life that is sold at room temperature (e.g. juice in cardboard boxes, vacuum sealed juice in glass containers) has been pasteurized, although this is generally not indicated on the label. Juice concentrates are also heated sufficiently to kill pathogens.
- d. Wash fruits and vegetables thoroughly, especially those that will not be cooked. Boil all vegetables for at least 15 seconds to reduce your risk.
- e. Drink municipal water that has been treated with chlorine or other effective disinfectants.
- f. Avoid swallowing lake or pool water while swimming.
- g. Make sure that persons with diarrhea, especially children, wash their hands carefully with soap after bowel movements to reduce the risk of spreading infection, and that persons wash hands after changing soiled diapers.
- h. Children with diarrhea should not attend day care centers, and food handlers should not work while ill with diarrhea.
- i. Anyone with a diarrheal illness should also avoid swimming in public pools or lakes, sharing baths with others, and preparing food for others.

12. For more information about E. coli O157:H7: <http://www.cdc.gov/ecoli/>

This fact sheet provides general information. Please contact your physician and/or veterinarian for specific clinical information related to you or your animal.