

SHIGA TOXIN-PRODUCING E. COLI (STEC) FACT SHEET



Overview

Escherichia coli (*E. coli*) bacteria are a large and diverse group. Although most strains of *E. coli* are harmless, some *E. coli* cause disease by making a toxin inside an infected person. These bacteria are called "Shiga toxin-producing" *E. coli*, or STEC for short. The most commonly identified STEC in North America is *E. coli* O157:H7. In addition to *E. coli* O157, many other kinds (called serogroups) of STEC cause disease. Some types of STEC are more likely than others to cause severe disease, including bloody diarrhea and hemolytic uremic syndrome (HUS), which is a type of kidney failure.

Signs and Symptoms

STEC infection usually causes severe bloody diarrhea and abdominal cramps, sometimes with vomiting; however, the infection can be less severe and does not always include bloody diarrhea. Infection may even be asymptomatic. Fever, usually not very high, occurs less than one-third of the time. On the second or third day of illness, stools may become bloody in 30 percent to 75 percent of cases. The illness usually resolves in five to 10 days. Infants and the elderly are most susceptible to developing severe disease. The incubation period is usually three to four days, although rarely the incubation can be as short as 12 hours or as long as eight days. Most of the time there are no long-term effects.

Causes and Transmission

Although the number of organisms required to cause disease is not known, it is suspected to be very small. The bacteria live in the intestines of healthy cattle. Meat becomes contaminated during slaughter, or meat processing. The bacteria, when present, may become mixed into beef when it is ground. Bacteria present on a cow's udders or on milking equipment may get into raw milk. Eating meat, especially ground beef that has not been cooked sufficiently to kill STEC can cause infection. Contaminated meat looks and smells normal. In addition to meat, STEC has been increasingly associated with fresh leafy greens and other foods (including sprouts, salami, unpasteurized milk and juice), as well as 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 are less likely to shed the organism once symptoms resolve.

Risk Factors

People of any age can become infected. Very young children and the elderly are more likely to develop severe illness and hemolytic uremic syndrome (HUS), but even healthy older children and young adults can become seriously ill.

Complications

Most people recover completely. If complications such as HUS develop, there may be long-term consequences. About one-third of persons with HUS have abnormal kidney function many years later, and a few require long-term dialysis or kidney transplant. Another 8 percent of persons with HUS have other lifelong complications, such as high blood pressure, seizures, blindness and paralysis. Even with good medical care, the death rate for HUS is 3 to 5 percent.

Tests and Diagnosis

Infection with STEC is diagnosed by detecting the bacterium in the stool. All persons who suddenly have new onset of diarrhea with blood should see a physician and have their stool tested for STEC.

Treatments

Most persons recover without antibiotics or other specific treatment in five to 10 days. Antibiotics are generally not recommended, because treatment with antibiotics may produce complications. Antidiarrheal agents, such as loperamide (Imodium), should also be avoided. HUS is a life-threatening condition usually treated in an intensive care unit.

Prevention

- 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.
- 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.
- 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.
- Wash fruits and vegetables thoroughly, especially those that will not be cooked.
- Boil all vegetables for at least 15 seconds to reduce your risk.
- Drink municipal water that has been treated with chlorine or other effective disinfectants.
- Avoid swallowing lake or pool water while swimming.

- 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.
- Children with diarrhea should not attend day care centers, and food handlers should not work while ill with diarrhea.
- Anyone with a diarrheal illness should also avoid swimming in public pools or lakes, sharing baths with others and preparing food for others.

Disease Patterns

Reports of STEC tend to increase in the summer months. This is probably due to warm weather, eating outdoors and food not being held at appropriately cold temperatures, allowing for bacterial growth.

Additional Information

Centers for Disease Control and Prevention: <http://www.cdc.gov/ecoli/>

This fact sheet provides general information. Please contact your physician for specific clinical information.

Last reviewed/updated: July 12, 2016