

What is Shiga toxin-producing *Escherichia coli* (STEC)?

Shiga toxin-producing *E. coli* (including *E. coli* O157:H7) are strains of the bacteria *Escherichia coli* (*E. coli*). Although most *E. coli* strains are harmless and live in the intestines of healthy humans and animals, these strains produce a potent toxin and can cause severe illness. A serious complication of STEC infection is hemolytic uremic syndrome (HUS), which can result in kidney failure and death.

Who is at risk for STEC infections?

People of all ages are at risk. Very young children and the elderly are at greatest risk for developing HUS.

What are the symptoms of STEC infections?

STEC infections often cause bloody diarrhea and severe abdominal cramps, but sometimes the infections cause non-bloody diarrhea or no symptoms at all. Usually little or no fever is present, and most people recover in five to 10 days.

About 5 to 10 percent of STEC infections lead to HUS. Clues that a person is developing HUS may include decreased frequency of urination, extreme fatigue, and loss of pink color in cheeks and inside the lower eyelids. In the United States, HUS is the principal cause of acute kidney failure in children, and most cases of HUS are caused by *E. coli* O157:H7.

How soon do symptoms appear?

Symptoms usually appear three to four days after exposure, but the incubation period can range from one to eight days.

How are STEC infections spread?

E. coli is found in the intestines of healthy cattle and other ruminant animals. Meat can become contaminated during slaughter, and bacteria can be mixed into beef when it is ground. Raw and undercooked meat, especially ground beef, can cause infection. Raw milk can be contaminated by bacteria on a cow's udders or on milking equipment. Swimming in or drinking contaminated water can also cause infection.

E. coli can be spread from person-to-person if hygiene or hand washing habits are inadequate, since the bacteria are shed in the stool of infected people. This is particularly likely among toddlers who are not toilet trained. Family members and playmates of young children are at high risk of becoming infected.

When and for how long is a person able to spread the disease?

An infected person is able to spread the disease as long as the bacteria remain in his/her stool. Young children typically shed the organism longer than adults.

How is a person diagnosed?

STEC infections are diagnosed when the bacteria or Shiga toxins are detected in a stool sample.

What is the treatment?

Non-specific supportive treatment, including fluid and electrolyte replacement, is recommended. Antibiotics and

antidiarrheal agents, such as loperamide (Imodium[®]), may increase the risk of serious complications and are not recommended. HUS is a life-threatening condition that usually requires treatment in an intensive care unit. Blood transfusions and kidney dialysis are often required. With intensive care, the death rate for HUS is about 3 to 5 percent.

Does past infection make a person immune?

No.

Should children or others be excluded from child care, school, work, or other activities if they have an STEC infection?

Children in child care should be excluded until diarrhea ceases and two successive negative stool cultures are obtained. A child or an adult should be excluded from school or work if diarrhea cannot be contained.

Food handlers should be excluded from handling food until diarrhea ceases and two successive negative stool cultures are obtained or the worker has been asymptomatic for seven days. Health care workers and child care providers should be excluded from caring for patients or children until diarrhea ceases and two successive negative stool cultures are obtained. Health care workers should refer to their facility policy for specific guidelines on when to return to work.

What can be done to prevent the spread of *E. coli*?

- Cook beef thoroughly, especially ground beef. Make sure that the cooked meat is gray or brown throughout (not pink), any juices run clear, and the inside is hot (165°F).
- If you are served an undercooked hamburger in a restaurant, send it back for further cooking.
- Wash your hands thoroughly after using the bathroom or changing diapers and before preparing or eating food.
- Avoid raw milk, apple juice and cider. Only pasteurized products should be consumed.
- Make sure that infected people, especially children, wash their hands carefully and frequently with soap to reduce the risk of spreading the infection.
- Drink water that has been treated with adequate levels of chlorine or other effective disinfectants.
- Wash fruits and vegetables, particularly if eaten raw.
- People with proven or suspected STEC infections should avoid recreational water venues (e.g., swimming pools, water slides, splash parks) for at least two weeks after diarrhea resolves.
- Wash your hands after contact with animals or their environments (e.g., farms, petting zoos, fairs).

Additional Information:

Additional information is available at www.ndhealth.gov/disease or by calling the North Dakota Department of Health at 800.472.2180.

This disease is a reportable condition. As mandated by North Dakota law, any incidence of this disease shall be reported to the North Dakota Department of Health.

Resources:

1. *Red Book: 2015 Report of the Committee on Infectious Diseases*. 30th ed. [Children in Out-Of-Home Care]. Kimberlin, DW; Brady, MT; Jackson, MA; Long, SS. American Academy of Pediatrics. 2015: 132-151.
2. *Red Book: 2015 Report of the Committee on Infectious Diseases*. 30th ed. [Escherichia coli Diarrhea]. Kimberlin, DW; Brady, MT; Jackson, MA; Long, SS. American Academy of Pediatrics. 2015: 343-347.
3. Heymann, D. L. (2015). *Control of Communicable Diseases Manual, 20th Edition*. E. coli Diarrheal Diseases. American Public Health Association. 2015: 158-172.
4. Centers for Disease Control and Prevention. (2016). E. coli. www.cdc.gov/ecoli/index.html.
5. North Dakota Administrative Code. (2016). 33-33-04-28.9-11. www.legis.nd.gov/information/acdata/pdf/33-33-04.pdf.