Shiga toxin-producing *E. coli* (STEC)

What are Shiga toxin-producing *E. coli* (STEC)?

E. coli are bacteria that normally live in the intestines of humans and animals. Although most strains of these bacteria are harmless, several are known to produce toxins that can cause illness. Some kinds of *E. coli* cause disease by making a toxin called Shiga toxin. The bacteria that make these toxins are called "Shiga toxin-producing" *E. coli*, or STEC for short. One of these is the *E. coli* strain called 0157:H7 which can cause severe diarrhea and kidney damage. *E coli* O157:H7 is quite hardy and can survive for extended periods in water and soil, under frozen and refrigerated temperatures, and in dry conditions. The organism is destroyed by thorough cooking or pasteurization.

How does one get infected with Shiga toxin-producing *E. coli* or STEC?

Anyone of any age can become infected, but children and the elderly are more likely to develop serious complications. Infections start when you swallow STEC—in other words, when you get tiny (usually invisible) amounts of human or animal feces in your mouth. Unfortunately, this happens more often than we would like to think about.

Exposures that result in illness include consumption of contaminated food, consumption of unpasteurized (raw) milk, consumption of water that has not been disinfected, contact with cattle, or contact with the feces of infected people. Some foods are considered to carry such a high risk of infection with E. coli O157 or another germ that health officials recommend that people avoid them completely. These foods include unpasteurized (raw) milk, unpasteurized apple cider, and soft cheeses made from raw milk.

Sometimes the contact or contamination with STEC is pretty obvious (working with cows at a dairy or changing diapers, for example), but sometimes it is not (like eating an undercooked hamburger or a contaminated piece of lettuce. Exposure to animal feces in the environment, such as recreational fields or parks contaminated with elk/deer or other animal feces are also a possible source of contamination. In addition, people have become infected by swallowing lake water while swimming, touching the environment in petting zoos and other animal exhibits and then not washing hands carefully, and by eating food prepared by people who did not wash their hands well after using the toilet. Almost everyone has some risk of infection.

What are the symptoms of STEC infection?

People infected by Shiga toxin-producing *E. coli* (STEC) can develop a range of symptoms. Some infected people may have mild diarrhea or no symptoms at all. Most identified cases develop severe diarrhea and abdominal cramps. Blood is often seen in the stool. Usually little or no fever is present. In some people, particularly children under five years of age, the infection can cause a complication called hemolytic uremic syndrome (HUS). Around 5–10% of those who are diagnosed with STEC infection develop a potentially life-threatening complication known as hemolytic uremic syndrome (HUS). This is a serious disease in which red blood cells are destroyed and the kidneys fail.

Anyone experiencing any of the above symptoms should seek medical attention immediately. It is important to contact a physician prior to administering any diarrheal medications as they may be problematic.

How is STEC infection diagnosed?

STEC infection can only be diagnosed by a special stool culture. Public health authorities have advised doctors and laboratories to consider performing a special stool culture test for E. coli 0157:H7 particularly in people with bloody diarrhea.

How soon after exposure do symptoms appear?

The time between ingesting the STEC bacteria and feeling sick is called the "incubation period." The incubation period is usually 3-4 days after the exposure, but may be as short as 1 day or as long as 10 days. The symptoms often begin slowly with mild belly pain or non-bloody diarrhea that worsens over several days. HUS, if it occurs, develops an average 7 days after the first symptoms, when the diarrhea is improving.

Recently, elk were found to carry these bacteria in the mountain community of Evergreen in Jefferson County? Is this common?
Infection in elk is probably not common, but further studies of elk in this and other areas of the state would be required to determine how frequently elk (or deer) might carry the bacteria. Wildlife do not typically become ill when harboring *E. coli* (STEC). It is possible that they may just transiently harbor the organism.

How did the elk become infected?
At this time, the source of infection for the elk has not been identified. It may have come from contact with other infected animals, from contaminated water or grazing in areas where untreated water was used to irrigate, for example. At this time, we can not be certain.

How can Shiga toxin-producing *E. coli* (STEC) infection be prevented?

- **WASH YOUR HANDS** thoroughly after using the bathroom or changing diapers and before preparing or eating food.
- **WASH YOUR HANDS** after contact with animals or their environments (at farms, petting zoos, fairs, parks, even your own backyard)
- **COOK meats thoroughly**. Ground beef and meat that has been needle-tenderized should be cooked to a temperature of at least 160°F/70˚C. It's best to use a thermometer, as color is not a very reliable indicator of "doneness."
- **AVOID** raw milk, unpasteurized dairy products, and unpasteurized juices (like fresh apple cider).
- **AVOID** swallowing water when swimming or playing in lakes, ponds, streams, swimming pools, and backyard "kiddie" pools.
- **PREVENT** cross contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat.

What additional steps can residents of communities heavily populated by deer and elk to prevent infection from any animals who may harbor *E. coli*?

- Wash hands thoroughly (preferably with soap and water) after outdoor or recreational time and prior to touching and consuming food. Hand wipes can be helpful, but are not as effective when hands are badly soiled. It is important to remove most of the "grime" before using disinfecting wipes.
- If possible avoid consuming food during the event. Alternately, consider items that are wrapped and do not require direct contact with potentially contaminated hands and fingers.
- In outdoor and sports settings, parents and organizers should thoroughly cleanse items that may come in contact with their child's mouth (water bottles, food, and mouth guards) before use and takes steps to be certain that their child's hands are clean before handling or using.
- Parents and team staff should ensure that children remove excessive surface grime from hands-- preferably with a soap and water scrub, followed by alcohol or other hand disinfectants-- prior to eating both during and after the game.
- Residents of mountain communities heavily populated by deer and elk around their homes should clean/disinfect shoes and boots prior to entering the home and wash hands thoroughly after removal.

For more information on Shiga-toxin producing *E. coli* please contact a member of the Consumer Protection Program or Jefferson County Public Health at 303-271-5700.