Shiga toxin-producing *Escherichia coli* Fact Sheet

What are Shiga toxin-producing Escherichia coli?



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. You might hear them called verocytotoxic E. coli (VTEC) or enterohemorrhagic E. coli (EHEC); these all refer generally to the same group of bacteria. The most commonly identified STEC in North America is E. coli O157:H7 (often shortened to E. coli O157 or even just "O157"). When you hear news reports about outbreaks of "E. coli" infections, they are usually talking about E. coli O157.In addition to E. coli O157, many other kinds (called serogroups) of STEC cause disease. These other kinds are sometimes called "non-O157 STEC." E. coli serogroups O26, O111, and O103 are the non-O157 serogroups that most often cause illness in people in the United States.

Are there important differences between E. coli O157 and other STEC?

Most of what we know about STEC comes from outbreak investigations and studies of E. coli O157 infection, which was first identified as a pathogen in 1982. The non-O157 STEC are not nearly as well understood, partly because outbreaks due to them are rarely identified. As a whole, the non-O157 serogroup is less likely to cause severe illness than E. coli O157; however, some non-O157 STEC serogroups can cause the most severe manifestations of STEC illness.

Who gets STEC infections?

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) than others, but even healthy older children and young adults can become seriously ill.

What are the symptoms of STEC infections?

The symptoms of STEC infections vary for each person but often include severe stomach cramps, diarrhea (often bloody), and vomiting. If there is fever, it usually is not very high (less than 101˚F/less than 38.5˚C). Most people get better within 5–7 days. Some infections are very mild, but others are severe or even life-threatening.

What are the complications of STEC infections?

Around 5–10% of those who are diagnosed with STEC infection develop a potentially life-threatening complication known as hemolytic uremic syndrome (HUS). Clues that a person is developing HUS include decreased frequency of urination, feeling very tired, and losing pink color in cheeks and inside the lower eyelids. Persons with HUS should be hospitalized because their kidneys may stop working and they may develop other serious problems. Most persons with HUS recover within a few weeks, but some suffer permanent damage or die.

How soon do symptoms appear after exposure?

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.

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Where do STEC come from?

STEC live in the guts of ruminant animals, including cattle, goats, sheep, deer, and elk. The major source for human illnesses is cattle. STEC that cause human illness generally do not make animals sick. Other kinds of animals, including pigs and birds, sometimes pick up STEC from the environment and may spread it.

How are these infections spread?

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 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). People have gotten infected by swallowing lake water while swimming, touching the environment in petting zoos and other animal exhibits, 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.

How common are STEC infections?

An estimated 265,000 STEC infections occur each year in the United States. STEC O157 causes about 36% of these infections, and non-O157 STEC cause the rest. Public health experts rely on estimates rather than actual numbers of infections because not all STEC infections are diagnosed, for several reasons. Many infected people do not seek medical care; many of those who do seek care do not provide a stool specimen for testing, and many labs do not test for non-O157 STEC. However, this situation is changing as more labs have begun using newer, simpler tests that can help detect non-O157 STEC.

How are STEC infections diagnosed?

STEC infections are usually diagnosed through laboratory testing of stool specimens (feces). Identifying the specific strain of STEC is essential for public health purposes, such as finding outbreaks. Many labs can determine if STEC are present, and most can identify E. coli O157. Labs that test for the presence of Shiga toxins in stool can detect non-O157 STEC infections. However, for the O group (serogroup) and other characteristics of non-O157 STEC to be identified, Shiga toxin-positive specimens must be sent to a state public health laboratory.

What is the best treatment for STEC infection?

Non-specific supportive therapy, including hydration, is important. Antibiotics should not be used to treat this infection. There is no evidence that treatment with antibiotics is helpful, and taking antibiotics may increase the risk of HUS. Antidiarrheal agents like Imodium® may also increase that risk.

Reference:

Centers for Disease Control and Prevention. *E. coli*.

http://www.cdc.gov/ecoli/general/index.html