

DPHHS HAN HEALTH ADVISORY



Cover Sheet

DATE: April 12, 2018

SUBJECT: Multi-state outbreak of *E. coli* O157:H7, including Montana

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Information Sheet

Date: April 12, 2018

Subject: Multi-state outbreak of *E. coli* O157:H7 (STEC O157), including Montana.

Background: There has been an increase in reports of STEC O157 cases in Montana, with onset dates between 3/28 and 4/7. These cases are linked to a multi-state outbreak of STEC O157 sickening at least 29 individuals in 11 states.

This total includes three confirmed STEC O157 cases (2 in Missoula, 1 in Ravalli) with patterns matching the national outbreak strain. An additional five PCR positive cases are pending culture confirmation with the state laboratory (3 in Flathead, 1 in Lincoln, and 1 in Gallatin). Further analysis will be needed to determine if they part of the outbreak. Please see the information below for recommendations.

Information for Clinicians

Clinicians are encouraged to consider *E. coli* infection in clinically compatible patients and order appropriate laboratory testing. Laboratories are reminded to submit specimens, as required by state rules, for surveillance purposes to the Montana Public Health Laboratory. Advanced testing will be conducted at no expense to the provider/patient that will enable us to compare the isolate to others at the state and national level.

Local public health officials will interview cases or proxies to assess exposures and the potential for additional transmission using a standardized data collection tool. Prompt reporting to local public health officials is essential.

Reporting: Reporting of suspected and confirmed cases of STEC (O157 and others) is required by state reporting rules. Prompt reporting by clinicians is essential to break the disease transmission cycle and identify potential sources.

Local Health Authorities

- Please interview the patient using the general STEC investigation tool and outbreak specific tools distributed through a separate email. We request that the tools be used on any locally confirmed cases and returned via confidential fax to the CD/Epi program for analysis.
- Review the information in this HAN with key surveillance partners, particularly laboratories, who may be processing enteric samples.

Resources

- Investigation Notice: Multistate Outbreak of *E. coli* O157:H7 Infections <https://www.cdc.gov/ecoli/2018/o157h7-04-18/index.html>
- Resources for Clinicians and Laboratories. <https://www.cdc.gov/ecoli/clinicians.html>

Questions and Answers

Escherichia coli (*E. coli*) bacteria normally live in the intestines of people and animals. Most *E. coli* are harmless and actually are an important part of a healthy human intestinal tract. However, some *E. coli* are pathogenic, meaning they can cause illness, either diarrhea or illness outside of the intestinal tract. The types of *E. coli* that can cause diarrhea can be transmitted through contaminated water or food, or through contact with animals or persons.

E. coli consists of a diverse group of bacteria. Pathogenic *E. coli* strains are categorized into pathotypes. Six pathotypes are associated with diarrhea and collectively are referred to as diarrheagenic *E. coli*.

- Shiga toxin-producing *E. coli* (STEC)—STEC may also be referred to as Verocytotoxin-producing *E. coli* (VTEC) or enterohemorrhagic *E. coli* (EHEC). This pathotype is the one most commonly heard about in the news in association with foodborne outbreaks.
- Enterotoxigenic *E. coli* (ETEC)
- Enteropathogenic *E. coli* (EPEC)
- Enteroaggregative *E. coli* (EAEC)
- Enteroinvasive *E. coli* (EIEC)
- Diffusely adherent *E. coli* (DAEC)

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

What are *Escherichia coli*? —

Escherichia coli (abbreviated as *E. coli*) are a large and diverse group of bacteria. Although most strains of *E. coli* are harmless, others can make you sick. Some kinds of *E. coli* can cause diarrhea, while others cause urinary tract infections, respiratory illness and pneumonia, and other illnesses. Still other kinds of *E. coli* are used as markers for water contamination—so you might hear about *E. coli* being found in drinking water, which are not themselves harmful, but indicate the water is contaminated. It does get a bit confusing—even to microbiologists.

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

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 these bacteria called verocytotoxic *E. coli* (VTEC) or enterohemorrhagic *E. coli* (EHEC); these all refer generally to the same group of bacteria. The strain of Shiga toxin-producing *E. coli* O104:H4 that caused a large outbreak in Europe in 2011 was frequently

referred to as EHEC. 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. Other *E. coli* serogroups in the STEC group, including *E. coli* O145, are sometimes called “non-O157 STECs.” Currently, there are limited public health surveillance data on the occurrence of non-O157 STECs, including STEC O145; many STEC O145 infections may go undiagnosed or unreported.

Compared with STEC O157 infections, identification of non-O157 STEC infections is more complex. First, clinical laboratories must test stool samples for the presence of Shiga toxins. Then, the positive samples must be sent to public health laboratories to look for non-O157 STEC. Clinical laboratories typically cannot identify non-O157 STEC. Other non-O157 STEC serogroups that often cause illness in people in the United States include O26, O111, and O103. Some types of STEC frequently cause severe disease, including bloody diarrhea and hemolytic uremic syndrome (HUS), which is a type of kidney failure.

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

Most of what we know about STEC comes from studies of *E. coli* O157 infection, which was first identified as a pathogen in 1982. Less is known about the non-O157 STEC, partly because older laboratory practices did not identify non-O157 infections. As a whole, the non-O157 serogroups are less likely to cause severe illness than *E. coli* O157, though sometimes they can. For example, *E. coli* O26 produces the same type of toxins that *E. coli* O157 produces, and causes a similar illness, though it is typically less likely to lead to kidney problems (called hemolytic uremic syndrome, or HUS).

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 is hemolytic uremic syndrome (HUS), a complication 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.

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.

Where did my infection come from?

Because there are so many possible sources, for most people we can only guess. If your infection happens to be part of the about 20% of cases that are part of a recognized outbreak, the health department might identify the source.

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 and when should I contact my healthcare provider?

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.

Contact your healthcare provider if you have diarrhea that lasts for more than 3 days, or it is accompanied by high fever, blood in the stool, or so much vomiting that you cannot keep liquids down and you pass very little urine.

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.

Should an infected person be excluded from school or work?

School and work exclusion policies differ by local jurisdiction. Check with your local or state health department to learn more about the laws where you live. In any case, good hand-washing after changing diapers, after using the toilet, and before preparing food is essential to prevent the spread of these and many other infections.

How can STEC infections 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, 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. To learn more about how to protect yourself from *E. coli*, see CDC's feature, *E. coli Infection*.