FAQ on E. coli

Escherichia coli O157:H7 is a leading cause of foodborne illness. Based on a 1999 estimate, 73,000 cases of infection and 61 deaths occur in the United States each year. In the ten CDC Foodborne Diseases Active Surveillance Network (FoodNet) sites (which represent 15% of the US population), there was a 29% decline in *E. coli* O157:H7 infection since 1996-98 (see FoodNet Reports).

Infection with E. coli often leads to bloody diarrhea, and occasionally to kidney failure. People can become infected with *E.coli* O157:H7 in a variety of ways. Though most illness has been associated with eating undercooked, contaminated ground beef, people have also become ill from eating contaminated bean sprouts or fresh leafy vegetables such as lettuce and spinach. Person-to-person contact in families and child care centers is also a known mode of transmission. In addition, infection can occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.

Consumers can prevent *E. coli* O157:H7 infection by thoroughly cooking ground beef, avoiding unpasteurized milk, and by washing hands carefully before preparing or eating food. Fruits and vegetables should be washed well, but washing may not remove all contamination. Public service announcements on television, radio, or in the newspapers will advise you which foods to avoid in the event of an outbreak.

Because the organism lives in the intestines of healthy cattle, preventive measures on cattle farms, during meat processing, and during the growth, harvest and processing of produce are being investigated.

What is *Escherichia coli* O157:H7?

E. coli O157:H7 is one of hundreds of strains of the bacterium *Escherichia coli*. Although most strains are harmless, this strain produces a powerful toxin that can cause severe illness. *E. coli* O157:H7 has been found in the intestines of healthy cattle, deer, goats, and sheep.

E. coli O157:H7 was first recognized as a cause of illness in 1982 during an outbreak of severe bloody diarrhea; the outbreak was traced to contaminated hamburgers. Since then, more infections in the United States have been caused by eating undercooked ground beef than by any other food.

The combination of letters and numbers in the name of the bacterium refers to the specific markers found on its surface and distinguishes it from other types of *E. coli.*

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How is *E. coli* O157:H7 spread?

The organism can be found on most cattle farms, and it is commonly found in petting zoos and can live in the intestines of healthy cattle, deer, goats, and sheep. Meat can become contaminated during slaughter, and organisms can be accidentally mixed into meat when it is ground. Bacteria present on the cow's udders or on equipment may get into raw milk. In a petting zoo, *E.coli* O157:H7 can contaminate the ground, railings, feed bins, and fur of the animals.

Eating meat, especially ground beef, that has not been cooked sufficiently to kill *E. coli* O157:H7 can cause infection. Contaminated meat looks and smells normal. The number of organisms required to cause disease is very small.

Among other known sources of infection are consumption of sprouts, lettuce, spinach, salami, unpasteurized milk and juice, and by swimming in or drinking sewage-contaminated water.

Bacteria in loose stool of infected persons can be passed from one person to another if hygiene or 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 and adults rarely carry the organism without symptoms.

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What illness does *E. coli* O157:H7 cause?

People generally become ill from *E. coli* O157:H7 two to eight days (average of 3-4) after being exposed to the bacteria. *Escherichia coli* O157:H7 infection often causes severe bloody diarrhea and abdominal cramps. Sometimes the infection causes non-bloody diarrhea or no symptoms. Usually little or no fever is present, and the illness resolves in 5 to 10 days.

In some persons, particularly children under 5 years of age and the elderly, the infection can also cause a complication called hemolytic uremic syndrome (HUS), in which the red blood cells are destroyed and the kidneys fail. About 8% of persons whose diarrheal illness is severe enough that they seek medical care develop this complication. 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.

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How is *E. coli* O157:H7 infection diagnosed?

Infection with *E. coli* O157:H7 is diagnosed by detecting the bacterium in the stool. About one-third of laboratories that culture stool still do not test for *E. coli* O157:H7, so it is important to request that the stool specimen be tested on sorbitol-MacConkey (SMAC) agar for this organism. All persons who suddenly have diarrhea with blood should get their stool tested for *E. coli* O157:H7.

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How is the illness treated?

Most people recover without antibiotics or other specific treatment within 5 to 10 days. Antibiotics should not be used to treat this infection. There is no evidence that antibiotics improve the course of disease, and it is thought that treatment with some antibiotics could lead to kidney complications. Antidiarrheal agents, such as loperamide (Imodium®), should also be avoided.

In some people, *E. coli* O157:H7 infection can cause a complication called hemolytic uremic syndrome (HUS), a life-threatening condition that is usually treated in an intensive care unit. Blood transfusions and kidney dialysis are often required. With intensive care, the death rate for hemolytic uremic syndrome is 3%-5%.

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What are the long-term consequences of infection?

Persons who only have diarrhea usually recover completely.

A small proportion of persons with hemolytic uremic syndrome (HUS) have immediate complications with lifelong implications, such as blindness, paralysis, persistent kidney failure, and the effects of having part of their bowel removed. Many persons with hemolytic uremic syndrome have mild abnormalities in kidney function many years later.

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What can be done to prevent the infection?

Cattle are the principal source of *E. coli* O157 infection; they carry *E. coli* O157 in their intestines. Changes in the preparation of animals for slaughter and in slaughter and processing methods could decrease the contamination of carcasses with *E. coli* O157 and the subsequent contamination of meat. Testing ground beef for *E. coli* O157 and withholding it from the market until the test is negative, as many meat producers began doing in 2002, is probably partly responsible for the subsequent decrease in illnesses.

Cattle manure is an important source of *E. coli* O157. Manure can contaminate the environment, including streams that flow through produce fields and are used for irrigation, pesticide application, or washing. Collaborative efforts are needed to decrease environmental contamination and improve the safety of produce.