



E. coli O157:H7

What Health Care Providers Should Know

DRINKING WATER FACT SHEET #4

What Is *E. coli* O157:H7 and Why Is There Concern about Its Presence in Drinking Water?

Escherichia coli is a normal commensal organism for humans and many animals. While there are many harmless *E. coli* strains, *E. coli* O157:H7 can cause food- and waterborne illness. *E. coli* O157:H7 causes approximately 73,000 infections and about 61 deaths per year in the U.S.¹ Recognizing a water-related *E. coli* O157:H7 outbreak requires special attention from health care providers, both because initial symptoms of an *E. coli* O157:H7 infection may resemble many other diarrheal illnesses, and because it is perceived mainly as a food-related disease.

One route of human exposure to *E. coli* is through the consumption of contaminated drinking water. The bacteria are shed in animal and human fecal matter, and drinking water sources may become contaminated during rain or snowmelts that wash *E. coli*-contaminated wastes into surface and ground water. If the source water is not properly treated, drinking water may remain contaminated with *E. coli*.² Additionally, bacteria can contaminate ground water as a result of malfunctioning septic systems, leaking sewer lines, and above-ground pathways that extend below the surface, such as deep cracks in the ground.

E. coli O157:H7 infections can be deadly. Recent water-related outbreaks of *E. coli* O157:H7 in North America include a May 2000 tragedy in Walkerton, Ontario, where at least 6 people died and approximately 2,000 persons became ill from consuming *E. coli* O157:H7-contaminated drinking water. In 1999, at a fair near Albany, New York, approximately 804 cases of *E. coli* O157:H7 infection were linked to consumption of contaminated drinking water. Sixty-five people were hospitalized and two people died.² There were also drinking water *E. coli* O157:H7 outbreaks reported in Wyoming, Illinois, and Washington in 1997 and 1998; all were associated with contaminated ground water systems.³

What are the Health Effects of *E. coli* O157:H7 Infection?

E. coli O157:H7 is a member of the subgroup of shiga toxin-producing *E. coli* known as enterohemorrhagic *E. coli*. Shiga toxins damage the lining of the intestine, often

leading to bloody diarrhea.¹ Symptoms of *E. coli* O157:H7 infection normally occur within two to four days, though they may not appear until eight days after infection, and include abdominal cramps, low-grade fever, as well as watery or bloody diarrhea.¹ Infected persons usually recover without treatment within five to ten days.⁴ However, about 15% of infected children under the age of five develop hemolytic-uremic syndrome (HUS).^{2,5} This potentially fatal condition causes red blood cell hemolysis and renal failure, often requiring dialysis and blood transfusions.² With intensive care, the death rate for HUS is between three and five percent.² For survivors, HUS can have long-term effects. About one-third of persons with HUS will experience abnormal kidney function years later, and others may suffer blindness, paralysis, high blood pressure, or seizures.¹

Adults with *E. coli* O157:H7 infections can also develop HUS, as well as a similar condition, thrombotic thrombocytopenic purpura (TTP). Elderly adults are particularly susceptible to these conditions.^{6,7} TTP is characterized by low platelets, a low red blood cell count (caused by premature breakdown of the cells), and neurological abnormalities. Skin manifestations include purpura, ecchymoses, or a petechial rash.⁸ The neurological symptoms associated with this disease include headaches, confusion, speech changes, and alterations in consciousness, which vary from lethargy to coma. People with severe cases may develop kidney failure.⁸

How is *E. coli* Regulated in Drinking Water?

The U.S. Environmental Protection Agency (EPA) does not specifically regulate *E. coli* O157:H7, nor do water utilities test directly for this pathogen. Rather, EPA requires that public water systems monitor treated drinking water for the presence of total coliform bacteria, which is an indicator of the potential presence of pathogenic organisms, including *E. coli* O157:H7. (Note that EPA does not regulate levels of bacterial contamination in domestic wells. It is the responsibility of the homeowner to have well water tested for microbial as well as chemical contaminants.) To find out about the testing process for your drinking water, contact your local water utility.

EPA's new Ground Water Rule, which is scheduled to be finalized by September 2001,⁹ will provide further protection from viruses and bacteria such as *E. coli* O157:H7 by requiring identification and monitoring of ground water sources that are at risk for contamination and also used for public water systems.

What Can Health Care Providers Do to Reduce the Public Threat from *E. coli* O157:H7?

- Educate your colleagues and community about the potential of waterborne *E. coli* O157:H7, so that if an outbreak does occur, it will be identified quickly. If *E. coli* O157:H7 infection is suspected, patients should be tested. Most standard stool tests do *not* type *E. coli*, so it must be specifically requested.
- If you diagnose a patient with *E. coli* O157:H7, determine the exposure source (consumption of recreational or drinking water, undercooked beef, or other foods) and report confirmed cases to state and local health departments.
- Consider carefully whether or not to prescribe antibiotics to patients you suspect have *E. coli* O157:H7 infection. According to a recent *New England Journal of Medicine* study, antibiotics increase the risk of HUS in *E. coli* O157:H7-infected children and have not been shown to ameliorate symptoms.^{5,10}
- If your patients are customers of public water systems, encourage them to read their Consumer Confidence Reports. The reports from small water systems will provide the *number* of water samples that tested positive for the presence of total coliform bacteria, while the reports from large systems will provide the *percentage* of positive samples. If your patients consume water from a private well, the water should be tested regularly for coliform bacteria. If water is positive for *E. coli*, it should be boiled for at least one minute before drinking.
- Encourage patients who rely on private wells and whose water is at risk for *E. coli* O157:H7 contamination to consider home water treatment units. Maintaining well integrity and sloping the area around private wells (which helps drain surface runoff away from the well) are also useful protective measures.
- Health care providers can be a significant force for prevention of waterborne disease by becoming involved in local efforts to prevent contamination of drinking water sources. See PSR's *From Knowledge to Action: A Safe Drinking Water Advocacy Kit* for strategies on how to become involved in these advocacy efforts.

Sources of Additional Information and Guidance

- Physicians for Social Responsibility: (202) 667- 4260 or www.psr.org.
- U.S. EPA Safe Drinking Water Hotline: (800) 426-4791 or <http://www.epa.gov/safewater/dwinfo.htm>.
- U.S. EPA Office of Ground Water and Drinking Water: (202) 260-5543 or www.epa.gov/ogwdw.
- NSF International: (800) 673-6275 or www.nsf.com.
- Technical assistance at the Farm*A*Syst/Home*A*Syst Program (Supported by USDA and EPA): (608) 262-0024 or www.uwex.edu/farmasyst or www.uwex.edu/homeasyst.

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This document is one in a series of Drinking Water Fact Sheets developed specifically for health care providers by Physicians for Social Responsibility. These fact sheets provide practical and concise information to assist health care providers in recognition and prevention of disease caused by exposure to drinking water contaminants.



Physicians for Social Responsibility

1875 Connecticut Avenue, NW • Suite 1012 • Washington, DC 20009

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