



## Diarrhea Caused by Specific Types of *E coli* (*Escherichia coli*)

### What is *Escherichia coli* (*E coli*) diarrhea?

Although many types of *Escherichia coli* (*E coli*) bacteria live normally in the intestinal tract, at least 5 types are known to cause diarrhea. Shiga toxin-producing *E coli* has caused numerous outbreaks in early childhood education (ECE) settings. Infections with Shiga toxin-producing *E coli* may be associated with other severe problems, such as bleeding from irritation of the bowel, kidney damage, and blood cell damage, also known as hemolytic uremic syndrome. Other diarrhea-producing types are enteropathogenic *E coli*, enteroinvasive *E coli*, and enteroaggregative *E coli*. In children and adults who travel to resource-limited countries, enterotoxigenic *E coli* is the most serious and the most likely to be diagnosed. Currently, there are not readily available and reliable diagnostic tests for the others.

### What are the signs or symptoms?

- Loose stools, which may be watery and bloody
- Abdominal pain
- May have fever

### What are the incubation and contagious periods?

- Incubation period: Average 3 to 4 days for Shiga toxin-producing *E coli* but ranges from 10 hours to 8 days for all types.
- Contagious period: For Shiga toxin-producing *E coli*, at least 2 weeks and, in some cases, much longer.

### How is it spread?

- Ingesting the bacteria through food or water contaminated with human or animal (eg, cattle, sheep, deer) feces, undercooked ground beef, unpasteurized milk, or other products contaminated with cattle feces. Contamination has occurred in improperly treated apple cider, raw vegetables, yogurt, and drinking water in recreation areas.
- Fecal-oral route: Contact with feces of children who are infected. This generally involves an infected child contaminating their own fingers and then touching an object that another child touches. The child who touched the contaminated surface then puts their fingers into their own mouth or another person's mouth.

- Exposure to animal feces by direct contact with animals, as in petting zoos, farms, or other contact between animals and people.
- Outbreaks in water parks have been reported.

### How do you control it?

- Use good hand-hygiene technique at all the times listed in Chapter 2, especially after toilet use or handling soiled diapers and before anything to do with food preparation or eating.
- Ensure proper surface disinfection that includes cleaning and rinsing of surfaces that may have become contaminated with stool (feces) with detergent and water and application of a US Environmental Protection Agency-registered disinfectant according to the instructions on the product label.
- Ensure proper washing of raw vegetables (eg, grape and cherry tomatoes).
- Ensure proper cooking and storage of food. Cook all ground beef thoroughly so there is no pink meat. Use only pasteurized milk and juice products.
- Exclude infected staff members who handle food.
- Prevent contamination with human and animal feces.
- Make sure someone has notified local public health authorities that the infected child or adult attends or works at an ECE facility if Shiga toxin-producing *E coli* is identified by a health professional. It is a major public health issue. Local public health authorities should be notified immediately and will be involved. They may close the facility to new enrollees.
- Prevent enrolled children from being transferred for care to other groups or facilities where they may expose other susceptible children.
- Pay close attention to reducing communal exposure to water, such as water tables where the play occurs in a fashion that enhances the risk of transfer of germs from one child to another. Water tables with free-flowing fresh water or separate water bins for each child reduce this risk.
- Exclusion for specific types of symptoms (see the section Exclude from educational setting?).

## What are the roles of the educator and the family?

- A child or staff member with Shiga toxin–producing *E coli* may have bloody diarrhea, which should trigger a medical evaluation.
- There are multiple causes of bloody diarrhea. The following recommendations apply for a child or staff member with diarrhea from any cause (see Diarrhea Quick Reference Sheet):
  - Report the condition to the staff member designated by the ECE program or school for decision-making and action related to care of ill children and staff members. That person, in turn, alerts possibly exposed family and staff members to watch for symptoms and notifies the Child Care Health Consultant.
  - Ensure staff members follow the control measures listed in the section How do you control it?
  - Report outbreaks of diarrhea (more than 2 children or staff members in the group) to the Child Care Health Consultant, who may contact the local health department.
- If you know a child or staff member has Shiga toxin–producing *E coli* in the program
  - Follow the advice of the child’s or staff member’s health professional.
  - Report the infection to the local health department, as the health professional who makes the diagnosis may not report that the infected person is a participant in an ECE program or school, and this could lead to loss of precious time for controlling the spread of the disease.
  - Reeducate staff members to ensure strict and frequent handwashing, diapering, toileting, food handling, and cleaning and disinfection procedures.
  - Follow the direction of the local health department. A potential outbreak with Shiga toxin–producing *E coli* is a public health emergency.

## Exclude from educational setting?

**Yes, if** Shiga toxin–producing *E coli* is identified and for any type of *E coli* diarrhea if

- The local health department determines exclusion is needed to control an outbreak.
- Stool frequency exceeds 2 stools above normal for that child during the time the child is in the program because this may cause too much work for EC educators and make it difficult for them to maintain sanitary conditions.

- There is blood or mucus in stool.
- The ill child or adult has stool that is all black.
- The child has a dry mouth, no tears, or no urine output in 8 hours (suggesting the child’s diarrhea may be causing dehydration).
- The child is unable to participate and staff members determine they cannot care for the child without compromising their ability to care for the health and safety of the other children in the group.

## Readmit to educational setting?

**Yes, when all the following criteria are met:**

- Test results from 2 stool cultures are negative for Shiga toxin–producing *E coli*. These stool tests should be performed more than 48 hours after antibiotics have been discontinued, if they were started. Public health professionals will need to review the situation and approve the child’s readiness to return.
- Once diapered children have their stool contained by the diaper (even if the stools remain loose) and when toilet-trained children do not have toileting accidents.
- Once stool frequency is no more than 2 stools above normal for that child during the time the child is in the program, even if the stools remain loose.
- When the child is able to participate and staff members determine they can care for the child without compromising their ability to care for the health and safety of the other children in the group.

## Comments

- Outbreaks of Shiga toxin–producing *E coli* diarrhea have been associated with the death of young children. Management requires informing parents/guardians carefully about the problem, identifying the source of contamination, and containing the spread of disease with the recommended control measures.
- Antibiotics are not recommended for diarrhea caused by Shiga toxin–producing *E coli*.
- Many ECE programs and schools include visits to petting zoos or visits by animals into the classroom as a routine activity. There is a risk of exposure of young children to animal feces in such activities, which can result in diarrheal illness. Emphasizing good hand hygiene for all children after animal encounters or contact is recommended.

