



Diarrhea

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Diarrhea can be a persistent problem in any crowded setting, especially with diapered children, communal bathrooms, and shared eating facilities. Shelters are particularly prone to outbreaks of diarrhea because food management may involve many different people with varying degrees of training in safe food handling. Shelters commonly receive donations of prepared food without any information about the management of the food prior to its arrival. Helpful strategies for handling such food donations are discussed in Part VI on Food Management.

Fortunately, many steps to prevent and control the incidence of diarrhea can be taken if the staff understands how the illnesses are spread and all those in the shelter follow a few simple guidelines.

Causes

Dozens of infectious agents can cause diarrhea, including:

- viruses (Norwalk, Norwalk-like, and rotavirus);
- bacteria (Campylobacter, Salmonella, Shigella, Staphylococcus, Yersinia and *E.coli*);
- parasites (Giardia, Cryptosporidium).

Furthermore, any child or adult recovering from infectious diarrhea may have damaged the lining of the intestine to such a degree that chronic diarrhea results. At this point, the infection is no longer the primary concern, and focus should shift to the malabsorption of dietary carbohydrates that can lead to malnutrition.

Symptoms

Infectious agents in all three categories can cause diarrhea of varying degrees of severity and duration. Symptoms often overlap from one type of diarrhea to another. Diarrhea caused by viruses tends to be more self-limiting than that resulting from either bacteria or parasites. Parasites are apt to produce subacute or chronic diarrhea, while bacterial diarrhea is often an acute illness. Needless to say, exceptions to these generalizations are common.

Gastrointestinal infection may produce a range of symptoms from mild to life threatening. Mild symptoms include an increase in the frequency of stools, a softening or liquefying of the texture of stools, abdominal cramping, gas, nausea, vomiting, weakness, and fever. Severe diarrhea produces watery, voluminous, or explosive stools, which can lead to dehydration. Stools may contain blood or mucous depending on the specific cause of diarrhea.

Giardia.
A photomicrograph of a positive indirect immunofluorescence test checking for the presence of *Giardia lamblia*. This protozoan organism causes the disease *Giardiasis*, a diarrheal disorder of the small intestine. Photo courtesy of the CDC

Campylobacter	
Symptoms:	Diarrhea, fever, abdominal pain, sometimes blood in stool, nausea and vomiting
Onset:	1 to 7 days after exposure, but can be longer
Infectious period:	2 to 3 weeks without treatment; 2 to 3 days with therapy
Source:	Contact with feces of infected persons, exposure to feces of infected household pets or wild animals, including birds; improperly cooked or stored foods of animal origin
Treatment:	Erythromycin (shortens course of illness), ciprofloxacin (not in children) Treat 5 to 7 days
Infected person:	Special precautions for all those who are symptomatic No food handling until the symptoms have resolved and 2 stool cultures taken 48 hours apart are negative
Close contacts:	Not infectious after 2 to 3 days Treating close contacts may limit spread of disease

Complications

Young children and infants are at the greatest risk of rapid deterioration because of the dehydration brought on by acute diarrhea. Caregivers should closely monitor any young child with diarrhea to guard against dehydration.

The signs of severe dehydration are:

- decrease in the production of tears;
- no urine output for 8 hours;
- depressed fontanel (in infants);
- dry mouth, tongue, and skin.

Anyone with these signs, particularly an infant or child, needs medical attention immediately.

Young children, the elderly, and those chronically ill also risk systematic infection from certain infectious diarrheas such as Salmonella and *E. coli*.

Prevalence

Although scant information is known about the prevalence of diarrheal illness in shelters, experience suggests that it is widespread. One study of shelters for battered women and their children found that 9 of the 73 facilities reviewed had outbreaks of diarrhea involving more than 10 people.

Transmission

Infectious diarrhea spreads directly or indirectly from person to person. If staff and guests do not wash their hands carefully after using the toilet or changing a diaper, an infected person can easily contaminate food, surfaces, or objects with stool that then contacts the hands or mouths of others. The amount of stool needed to cause disease varies with the different organisms.

Diarrheal germs commonly spread when people are preparing and serving food and when children, particularly those in diapers, play together.

Areas within shelters conducive to the spread of organisms include:

- communal bathrooms;
- kitchens;
- changing tables.

Some persons with bacterial or parasitic infections may remain asymptomatic. However, these “carriers” can still transmit the disease to others.

Food Management

The primary focus of this chapter is the spread of diarrhea from an infected person to other people.

Cryptosporidium	
Symptoms:	Frequent, watery diarrhea Can be prolonged (up to 20 episodes per day) and lead to weight loss and malnutrition Can become chronic and/or disseminate in persons with poor immune systems
Onset:	2 to 14 days
Infectious period:	Unknown
Source:	Animals, humans (easily spread in day care centers), and water
Treatment:	Usually supportive in otherwise healthy persons In immuno-compromised persons, IV hyperglobulin therapy
Infected person:	No food handling until all symptoms are gone
Close contacts:	Evaluate stool of all who are symptomatic Avoid food handling until asymptomatic

Giardia	
Symptoms:	Often none May have intermittent bouts of diarrhea, chronic diarrhea with malabsorption, and/or anemia Children may show failure to thrive
Onset:	1 to 4 weeks
Infectious period:	Variable; until all cysts are gone
Source:	Infected humans, animals, contaminated water Commonly spread in day care May also be spread through oral-anal sexual practices
Treatment:	Quinacrine (Atabrine™) is 85 to 95% effective but bitter and difficult to give to children. Can cause GI upset and occasionally jaundice. Metronidazole (Flagyl™) is 90% effective but not approved for use in Giardiasis in the USA. Possibly carcinogenic. Little data available on safety in children. Causes a metallic taste as well as nausea, dizziness, and headache. Use with alcohol can cause a disulfiram-like (Antabuse™) reaction. Furazolidone (Furoxone™) is 80% effective. Liquid suspension is available. Generally the treatment of choice for young children. Can cause GI distress, headache, and dizziness. Can likewise cause a disulfiram-like reaction when taken with alcohol. Paramomycin (Humatin™) is 50 to 70% effective. Has been used for pregnant women because the drug is not measurably absorbed from the intestines. All of the above drugs may have to be repeated in 2 weeks in the event of therapy failure
Infected person:	Special precautions for all those who are symptomatic All family members should be evaluated with stool smears for ova and parasites regardless of symptoms
Close contacts:	In a family shelter, an initial smear for ova and parasites should be done on persons who are symptomatic. If the problem persists, smears for ova and parasites should be done on all persons living or working in the shelter. Infected persons should not handle food until symptoms have resolved and 2 stool cultures taken 48 hours apart are negative. Kitchen workers, regardless of symptoms, with contact to an infected person, should avoid food handling until 2 stool cultures taken 48 hours apart and after the last possible exposure are negative.

Salmonella	
Symptoms:	Diarrhea, cramping, fever, headache, nausea, sometimes vomiting May be complicated by bacteremia and/or focal infection, or a multisystem disorder called enteric fever Asymptomatic in some, constipation in some, especially with enteric fever
Onset:	6 to 72 hours; 3 to 60 days with enteric fever; usually 7 to 14 days
Infectious period:	Until the organisms are no longer excreted; can be weeks or even years in chronic carriers Antibiotic therapy can prolong carriage
Source:	Humans, household and farm animals, improperly prepared or stored foods, contaminated water and food
Treatment:	Usually none for uncomplicated cases of gastroenteritis Children less than 3 months old, people at risk for invasive disease (such as immunocompromised), and persons with <i>Salmonella typhi</i> should be treated with ampicillin or trimethoprim-sulfamethoxazole (Bactrim™, Septra™) (if the organism shows sensitivity in cultures) Ciprofloxacin should be used for strains resistant to ampicillin and trimethoprim-sulfamethoxazole (Bactrim™, Septra™), although this antibiotic should be avoided in children
Infected person:	Special precautions for all who are symptomatic No food handling until symptoms have resolved and 2 stool cultures taken 48 hours apart are negative
Close contacts:	No food handling by symptomatic close contacts until symptoms have resolved and 2 cultures taken 48 hours apart are negative In addition, kitchen workers (regardless of symptoms) with contact to an infected person should avoid food handling until 2 cultures taken 48 hours apart and after the last possible exposure are negative Can return if asymptomatic

Shigella	
Symptoms:	Mild to severe diarrhea, the latter being associated with sudden onset of fever, headache and possibly vomiting Stools may contain blood or mucous
Onset:	1 to 7 days, usually 2 to 4 days
Infectious period:	Until no longer passed in the stool, usually no longer than 4 weeks Antibiotics can shorten this period to less than 1 week
Source:	Humans are the only known source Crowding, particularly in setting with few handwashing facilities, can promote spread Eating contaminated food or water or mouthing infected objects can also spread Few organisms are needed to cause infection
Treatment:	Antibiotics are recommended in most cases. Treat for 5 days. Generally trimethoprim-sulfamethoxazole (Bactrim™, Septra™), ampicillin, or ciprofloxacin (Cipro™) (not in children) are effective However, it is important to check the sensitivity pattern of the organism. Resistant strains use ceftriaxone (Rocephin™), or cefotaxime (Claforan™).
Infected person:	Special precautions for all those who are symptomatic No food handling until symptoms have resolved and 2 stool cultures taken 48 hours apart are negative

Staphylococcus	
Symptoms:	Abrupt onset of severe cramps, vomiting and diarrhea Fever is not usually associated with this infection
Onset:	Very short, 30 minutes to 6 hours
Infectious period:	Unable to be transmitted by the sick person Can be spread to food by staphylococcal carriers until organisms have cleared from site of colonization
Source:	Usually by food handlers with staphylococci colonized in sites including normal skin, lesions (often on the face or hands), nose and throat
Treatment:	Supportive; no antibiotics needed
Infected person:	No control measures necessary Review of foods eaten within 8 hours of onset should occur. If eaten in shelter, evaluate food handlers for lesions, poor hygiene.
Close contacts:	No restrictions

Many foods, particularly dairy and meat products, are inherently prone to bacterial growth and can cause diarrheal outbreaks. If food is properly bought, stored, prepared, and served, the risk of illness is minimal. Please see Part VI on Food Management.

Diagnosis

Different causes of diarrhea are indistinguishable by observation alone. To determine the specific cause of illness, a stool culture or smear is necessary. Diarrhea happens very frequently in

crowded settings, and the decision to culture the stool is based on several factors. In adult shelters, symptoms of diarrhea that have lasted three days or more, or are severe enough to risk dehydration, warrant a stool culture to rule out common bacteria such as *Campylobacter* or *Salmonella*.

Family shelters are comparable to day care settings, which often experience *Shigella* and *Giardia* infections. In family shelters, health providers should collect stool specimens for both bacteria and parasites in symptomatic people. Once a child or an adult has been diagnosed with a bacterial or parasitic

Yersinia	
Symptoms:	Fever, headache, watery diarrhea (blood, mucous, WBCs commonly in stool), abdominal pain Can cause a syndrome resembling acute appendicitis in children Arthritis, osteomyelitis, septicemia, abscesses of the liver and spleen, and skin rashes have been reported in certain types (<i>Y. enterocolitica</i>).
Onset:	4 to 6 days typically; range 1 to 14 days
Infectious period:	For as long as the organism is excreted (up to 6 weeks)
Source:	Household and wild animals, contaminated water and food
Treatment:	Trimethoprim-sulfamethoxazole (Bactrim™, Septra™), chloramphenicol (Chloromycetin™), aminoglycosides, tetracycline (not in children less than 8 years old)
Infected person:	Special precautions for all those who are symptomatic No food handling until symptoms have resolved and 2 stool cultures taken 48 hours apart are negative
Close contacts:	No food handling by symptomatic close contacts until 2 stool cultures taken 48 hours apart are negative and symptoms have resolved Kitchen workers (regardless of symptoms) with close contact to an infected person should avoid food handling until 2 stool cultures taken 48 hours apart and after the last possible exposure are negative

illness, all other symptomatic people in the shelter who share toilet facilities or have a common food source should have specimens sent for analysis.

Treatment

Specific treatment of diarrhea will vary depending on culture results. People with bacterial or parasitic diarrhea always need medical supervision. Some general observations about supportive care follow.

Infants and children

An infant with diarrhea can dehydrate rapidly and the condition may become life threatening. Any child under 12 months of age with more than three episodes of diarrhea or unusually loose stools per day, especially if accompanied by vomiting and/or fever, or who seems very weak or sick, requires a prompt medical evaluation. Any child with no urine output for 8 hours also requires a medical evaluation.

Most cases of diarrhea are mild. In these cases the child should continue a regular diet with an emphasis on starchy foods that are better absorbed. Fluids should also be encouraged, except for fruit juices and soft drinks that can make the diarrhea worse. Commercial oral solutions (e.g., Pedialyte™, Enfalyte™) are preferable to traditional clear liquids. Lactose intolerance can commonly follow a diarrheal illness and last from 2 to 6 weeks. Soy-

based, lactose-free formula may be recommended as a substitute for infants who develop this problem.

Prevention and Control

In Massachusetts, as in many other states, the law requires that outbreaks of diarrhea or episodes of infectious diarrhea be reported to the local health department.

Specific prevention and control measures will depend upon the population in the shelter and the physical arrangements of the building. In the unusual situation where resources and circumstances permit, screening of all shelter residents for stool pathogens prior to entry may be helpful. Shelter residents with poor immune systems may be at special risk during outbreaks and should see a health provider.

Summary

Diarrhea can be a common problem in crowded places such as shelters. The presence of diapered children, the use of shared bathrooms and kitchens, and inappropriate food management heighten the likelihood of diarrheal outbreaks in shelters. While an episode of diarrhea is usually short-lived, it can be very serious, particularly in young children and people with other chronic illness.

Diarrhea is spread when a person gets infected feces on the hands and then touches other hands, food, or mouthed objects. Some people can carry

germs that cause diarrhea but have no symptoms themselves.

Careful hand washing with soap and warm water after using the bathroom or diapering a child is the best way to prevent the spread of diarrhea. Questions regarding episodes of diarrhea should be brought to a health provider. The local board of health and appropriate health agencies are also sources of information regarding the control of diarrhea.

Contact a health provider whenever:

- an adult has had diarrhea lasting three or more days;
- a child has diarrhea accompanied by vomiting or fever;
- a person with diarrhea appears dehydrated;
- more than two people from a family shelter have diarrhea simultaneously;
- the same organism has been identified in two different cases of diarrhea within two weeks in the same shelter. ■■

References

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